CA TECHNOLOGIES GREEN BOOKS

CA Service Desk Manager

Integration Best Practices

Volume 2

- INTEGRATION OPTIONS AND APPROACHES
- CA PROCESS AUTOMATION

ca technologies

TITLE AND PUBLICATION DATE:

CA Service Desk Manager Green Book Volume 2
Publication Date: May 23, 2012

ACKNOWLEDGEMENTS

Principal Authors

Tyson Bell

Amy Chenard

Christy Druzynski

Shawn Walsh

The principal authors and CA Technologies would like to thank the following contributors:

Harish Goteti

Tom Kouhsari

Randal Locke

Anders Magnusson

Malcolm Ryder

Lao-Tan Scotto

CA Technologies Support

Third-Party Acknowledgments

Forward, Inc. Legal Notice

CA TECHNOLOGIES PRODUCT REFERENCES

This document references the following CA Technologies products:

- CA Application Performance Management
- CA Asset Portfolio Management (included with the CA IT Asset Manager solution)
- CA Business Intelligence
- CA Business Service Insight (CA BSI) – formerly known as CA Oblicore Guarantee™
- CA Clarity™ Project and Portfolio Manager (CA Clarity PPM)
- CA Configuration Automation – formerly known as CA Cohesion Application Configuration Manager (CA Cohesion ACM)
- CA Customer Experience Manager (CA SOI)
- CA ecoMeter
- CA Embedded Entitlements Manager (CA EEM)
- CA eHealth® (CA eHealth)
- CA Identity Manager
- CA Introscope
- CA IT Client Manager (CA ITCM)
- CA Management Database (CA MDB)
- CA Network and Systems Management (CA NSM)
- CA Process Automation (formerly CA IT Process Automation Manager, CA IT PAM)
- CA Role and Compliance Manager (CA RCM)
- CA Service Catalog (which includes CA Service Accounting)
- CA Service Desk Manager (CA SDM)
- CA Service Operations Insight (CA SOI) – formerly known as CA Spectrum Service Assurance (CA SSA)
- CA SiteMinder® (CA SiteMinder)
- CA Software Change Manager (CA SCM)

- CA Spectrum® (CA Spectrum IM)
- CA Spectrum Service Assurance (CA SSA)
- CA Workflow

FEEDBACK

Please email us at greenbooks@ca.com to share your feedback on this publication. Please include the title of this publication in the subject of your email response. For technical assistance with a CA Technologies product, please contact CA Support at http://ca.com/support. For assistance with support specific to Japanese operating systems, please contact CA Technologies at http://www.casupport.jp.

Contents

Chapter 1: Introduction

The *CA Service Desk Manager Integration Best Practices Green Book* is comprised of three volumes. Each volume describes ways to improve the process maturity for various ITIL® processes when CA Service Desk Manager (CA SDM) 12.6 is integrated with other CA Technologies solutions. The following ITIL V3 IT Service Management processes are covered in this Green Book:

- Access Management
- Availability Management
- Capacity Management
- Change Management
- Continual Service Improvement
- Demand Management
- Evaluation
- Event Management
- Financial Management
- Incident Management
- Information Security Management
- IT Service Continuity Management
- Knowledge Management
- Problem Management
- Release and Deployment Management
- Request Fulfillment
- Service Asset and Configuration Management
- Service Catalog Management

- Service Level Management
- Service Portfolio Management
- Service Validation and Testing
- Supplier Management
- Transition Planning and Support

Chapter 2 highlights the key objectives and recommended product and solution integrations for each ITIL process. These integrations can help achieve and mature the process goals. Additional products are available that also add value to the ITIL processes. However, Chapter 2 discusses the product-to-process mappings for the product integrations that are described in this Green Book.

The remaining chapters in each volume describe how to integrate additional CA Technologies solutions with CA SDM. The integrations can help extend the capability of CA SDM and enhance the management and coordination of service management business processes. This Green Book uses a layered approach to technical integrations by starting with a point-to-point integration with CA SDM. This Green Book then includes instructions or recommendations for introducing one or more additional product solutions into the existing integration.

The following information is provided for each product integration:

- An overview that describes the benefits of the integration.
- Recommended best practices for the integration.
- Steps to set up, configure, test, and troubleshoot the integration.
- Steps to introduce additional solutions into the environment, if applicable.

The CA SDM integrations that are explained in this Green Book are divided into the following volumes:

- Volume 1

  CA Service Catalog

  CA Clarity™ Project and Portfolio Manager (CA Clarity PPM)

  CA Business Service Insight (CA BSI)

  CA Identity Manager

  CA SiteMinder®

- Volume 2

  CA Integration Platform

  CA Process Automation

- Volume 3

  CA Asset Portfolio Management

  CA IT Client Manager

  CA Patch Manager

  CA Cohesion Application Configuration Manager (CA Configuration Automation)

  CA ecoMeter

  CA NSM

  CA Spectrum IM (includes CA eHealth and CA SOI)

All three volumes include the following chapters:

- Introduction
- ITIL V3 Service Lifecycle Support

Important! Some of the product features and functions listed in this Green Book are not described in CA Technologies product documentation and CA Technical Support does not support them. While the integrations described have been tested in a limited test environment, these integrations are not fully supported. We recommend that you test the integrations carefully in a test environment before going into production.

Who Should Read This Book

This Green Book provides the following types of users with the information necessary to integrate CA SDM with various CA Technologies solutions:

- Support technician
- Software architect

- Software developer
- Software engineer
- System administrator

This Green Book is intended for highly technical users who have an advanced knowledge of CA SDM and require integration capabilities to configure and maintain their CA SDM environment successfully.

Chapter 2: ITIL® V3 Service Lifecycle Support

CA Technologies integrated solutions support and align with the 24 processes and 4 functions in the Service Lifecycle of ITIL V3. This chapter lists the objectives for each process and the technologies that support them.

Service Strategy

Demand Management

Objectives

- Influence user and customer demand of IT services.
- Manage the impact on IT resources.
- Develop and maintain service packages and service level packages that are based on patterns of business activity.

How CA Technologies Solutions Help Meet the Objectives for Demand Management

The following process describes how CA eHealth, CA Clarity PPM, CA Service Catalog, and CA SDM integrate to help improve the Demand Management process:

1. CA eHealth provides a service provider with the metrics that can be used to model service demand. CA eHealth metrics can be tied to CA Service Catalog service offerings to enable reporting back to the customers on how their services are used. The reporting also identifies the costs that are associated with providing the service at the given demand.
2. When CA eHealth and CA Service Catalog are integrated with the CMDB component of CA SDM, the relationship between the services and their supporting infrastructure can be analyzed graphically with the CMDB Visualizer for actual and anticipated demand.
3. As improvements or details of a new service are defined, the Demand Manager documents the details in the service package of the portfolio within CA Clarity PPM.
4. As updates are approved, CA Clarity PPM creates requests for change (RFCs) in CA SDM to update the CA eHealth monitoring profiles and CA Service Catalog with changes to the service and its costs.

5. CA BSI integrates, at a service view, CA eHealth, CA Clarity PPM, CA Service Catalog, and CA SDM to enable a Demand Manager to review existing and anticipated patterns of business activity for the business.

Other CA Technologies Products that Facilitate the Demand Management Process

Demand Management is also facilitated in other CA Technologies solutions.

- CA ecoMeter automates delivering green service and reports on green IT effectiveness. The reports from CA ecoMeter help IT to convey the savings of having well-defined demand back to the business.
- CA SOI provides infrastructure that is based on demand. Specific service level packages are modeled in CA SOI. Modeling in CA SOI helps simplify the deployment of the infrastructure that is based on demand. A Demand Manager can use the metrics that CA SOI gathers to model future service packages.
- CA SDM provides statistics of incident and change requests to understand customer patterns of business activity better.

Financial Management

Objectives

- Quantify the value of IT services and their underlying assets by managing IT budgeting, accounting, and charging.

How CA Technologies Solutions Help Meet the Objectives for Financial Management

The following process describes how CA Asset Portfolio Management, CA Clarity PPM, CA Service Catalog, and CA SDM integrate to help improve the Financial Management process:

1. CA Clarity PPM helps a service provider manage the project and asset costs and evaluate how the services are budgeted and charged to the customer.
2. The integration of CA Clarity PPM with CA Service Catalog helps in managing finances efficiently. The accounting capabilities of CA Service Catalog provide the metrics useful to an IT Financial Manager. The IT Financial manager uses them to model which services are cost-effective, and to identify ways of gaining efficiencies in those services.

3. CA Clarity PPM provides the accounting capabilities of CA Service Catalog with up-to-date costs and services that a customer can request.

4. Each individual asset that is requested through the catalog is tracked through CA SDM as either a request or, if needed, a change order.

5. CA Asset Portfolio Management provides the cost of the assets, contracts, and vendor information. When CA Asset Portfolio Management is integrated with CA Service Catalog, a user sees currently available assets. An asset can be a configuration item (CI), an asset which is associated with a user, or both a CI and a user asset. If an asset is also a CI, the asset is managed under the full Change Process.

6. CA Asset Portfolio Management integrates into the Enterprise Resource Planning (ERP) solution of the service provider, strengthening the IT alignment to business budgeting, accounting, and charging.

7. CA Asset Portfolio Management provides details to CA Clarity PPM to enable up-to-date IT financial management decisions for services.

Service Portfolio Management

Objectives

- Provide a dynamic method for governing investments in service management across the enterprise and managing them for value.
- Define, analyze, approve, and offer services.

How CA Technologies Solutions Help Meet the Objectives for Service Portfolio Management

The following process describes how CA Clarity PPM, CA Service Catalog, and CA SDM integrate to help improve the Service Portfolio Management process:

1. CA Technologies has an industry-leading Project and Portfolio Management solution, CA Clarity PPM. Native integration to other solutions such as CA SDM and CA Service Catalog provide three-direction feeds that provide current, planned, and historical data about how services are used.

2. When CA Clarity PPM receives request volumes from CA Service Catalog, CA Clarity PPM can track the frequency of a service is currently being requested, compared to the long-term usage of the service.

3. Incident and problem ticket volumes from CA SDM, together with relationships in the CA SDM CMDB component, enable analysis of how effectively a service delivers on its commitments.

4. The Portfolio Manager uses CA Clarity PPM to analyze all aspects of providing the service to justify further investment.

5. In CA Clarity PPM, the approval process is modeled in a way which allows the workflow and decision tree to retain, replace, rationalize, refactor, renew, or retire a service can be documented, assessed, and ultimately approved.

6. Most importantly, the integration helps ensure continuous improvement to the service without the need to recompile data that is natively integrated.

7. CA BSI provides the Service Level Management understanding that supports the Service Portfolio. CA BSI also helps ensure that the Service Level Agreements (SLAs), Operational Level Agreements (OLAs), and Underpinning Contracts (UCs) are being managed properly.

Service Strategy

Define the best possible value that a service can create for a customer through analysis of competition, market space, asset use, and business capabilities.

How CA Technologies Solutions Help Meet the Objectives for Service Strategy

The following process describes how CA Clarity PPM and CA SDM integrate to help improve the Service Strategy process:

1. CA Clarity PPM analyzes the key attributes with a number of scenarios such as comparisons over time, costing models, resource use, and others.

2. When CA Clarity PPM is integrated with CA SDM, detailed attributes of the CIs, organizations, resources, service use, and ties to other services are added to the analysis within the CMDB Visualizer.

3. With the solutions integrated, CA Clarity PPM and CA SDM provide the ability to analyze which combinations of investments provide the most benefit to the business.

Service Design

Availability Management

Objectives

- Produce and maintain an availability plan that reflects the current and future needs of the business.
- Provide advice and guidance on all availability-related issues.
- Help ensure that service availability achievements meet or exceed all their agreed targets by managing the performance of services and resource-related availability.
- Assist with the diagnosis and resolution of availability-related incidents and problems.
- Assess the impact of all changes on the availability plan and the performance and capacity of all services and resources.
- Help ensure that proactive measures to improve the availability of services are implemented, if the measures are cost-justifiable.

How CA Technologies Solutions Help Meet the Objectives for Availability Management

The following process describes how CA eHealth, CA SOI, CA NSM, CA Spectrum IM, and CA SDM integrate to help improve the Availability Management process:

1. CA SOI allows for real-time and historical views of the customer experience of the service, such as web page generation and data retrieval.
2. CA Introscope gathers back-end to front-end application performance metrics.
3. CA NSM provides agent level metrics on the operating system, database, and applications.
4. CA Spectrum IM provides the heuristic measurements of the network and system availability.
5. These four solutions provide details that are sent to CA eHealth for the baseline and real-time availability of the IT infrastructure.
6. The modeling of the infrastructure is maintained in the CMDB component of CA SDM. The CIs the infrastructure solutions manage are imported into the CMDB component, which is associated to a Management Database Repository (MDR), and visualized at a service layer.

7. Incident metrics are automatically created from the tools and manually created from customers and are added to the analysis within CA SDM.

8. The availability plans are documented as knowledge documents in the knowledge management function of CA SDM. Knowledge management has a flexible document lifecycle, which helps ensure that updates to the availability plan are properly managed.

Other CA Technologies Products that Facilitate Availability Management

Other CA Technologies solutions also facilitate Availability Management. The solutions are added to the Availability Manager planning tools.

- CA BSI automates, activates, and accelerates the management, monitoring, and reporting of business and technology Service Level Agreements (SLAs) and service delivery agreements for enterprises and service providers.

- CA SOI gives a model-based view of critical application monitoring data. CA SOI pulls all the data from domain management systems, such as CA Application Performance Management, CA Spectrum IM, and CA eHealth, and presents it in a single view to end users. CA SOI provides service impact analysis, service visualization, and integration to service management through CA SDM.

- CA Patch Manager lists computers that are not patched, which enables Availability Management to identify potential threats to availability.

  Note: CA Patch Manager uses the infrastructure and resources of the CA IT Client Manager solution.

Capacity Management

Objectives

- Produce and maintain an up-to-date capacity plan, which reflects the current and future business needs.

- Provide advice and guidance to all business and IT departments on all issues that are related to capacity and performance.

- Help ensure that service performance achievements meet or exceed all of their agreed performance targets.

- Assess the impact of all changes on the capacity plan, and the performance and capacity of all services and resources.

How CA Technologies Solutions Help Meet the Objectives for Capacity Management

Capacity Management relies on metrics from the infrastructure to plan, advise, and react to capacity needs. The metrics are used to analyze historical, current, and future availability through visualization, alerting, and reporting. CA Technologies solutions gather the metrics about a service provider infrastructure and add an integrated management layer to support mature Capacity Management.

1. CA SOI allows for real-time and historical views of the customer experience of the service, such as web page generation and data retrieval.

2. CA Introscope gathers back-end to front-end application performance metrics.

3. CA NSM provides agent-level metrics on the operating system, database, and applications.

4. CA Spectrum IM provides the heuristic measurements of the network and system availability.

5. These four solutions provide details that are fed to CA eHealth for baseline and real-time capacity of the IT infrastructure.

6. Final service modeling of the infrastructure is maintained in the CMDB component of CA SDM. The CIs that the infrastructure solutions manage, are imported into the CA SDM CMDB component. These components are associated to a Management Database Repository (MDR) and visualized at a service layer.

7. Incident metrics are automatically created from the tools or from customers and are added to the analysis within CA SDM.

8. The Capacity Plans are documented as knowledge documents in the knowledge management function of CA SDM. Knowledge management has a flexible document lifecycle to help ensure that updates to the plan are properly managed.

Other CA Technologies Products that Facilitate Capacity Management

Other CA Technologies solutions also facilitate Capacity Management. These solutions are added to the Capacity Manager planning tools.

- CA BSI automates, activates, and accelerates the management, monitoring, and reporting of business and technology SLAs in addition to service delivery agreements for enterprises and service providers.
- CA SOI gives a model-based view of critical application monitoring data. CA SOI pulls all the data from domain management systems, such as CA Application Performance Management, CA Spectrum IM, and CA eHealth, and presents it in a single view to end users. CA SOI provides service impact analysis, service visualization, and integration to service management through CA SDM.
- CA ITCM and CA DCA Manager provide alerts and automated actions on desktops and servers that are running low on disk space. CA IT Client Manager provides a set of cross-platform product capabilities for Windows, Linux, UNIX, and MAC environments. While CA ITCM was previously sold as a standalone product, it is now included as part of the CA Client Automation and also as part of CA DCA Manager solutions. CA Client Automation has focus on managing end-user devices such as desktops, laptops, and end-point devices; while CA DCA Manager has focus on managing servers. This document refers to the functionality of the CA ITCM product capabilities.

Information Security Management

Objectives

- Help ensure availability, confidentiality, and integrity of data, systems, and the environments that contain them.
- Communicate, implement, and enforce the Information Security Policy.

How CA Technologies Solutions Help Meet the Objectives for Information Security Management

1. CA Technologies IT Security Solutions manage the full scope of Information Security Management as it relates to implementing, evaluating, maintaining, and controlling access, identities, and information.
2. The Service Management solutions leverage and integrate with CA Technologies IT Security Solution enabling a service provider to plan and design an Information Security Policy.

3. CA SDM tracks security incidents, assets and locations, SLAs, UCs, and OLAs that are used to plan the security policy.

4. Information Security is published as a knowledge document in the CA SDM knowledge management feature. An enforced review cycle maintains the Information Security.

5. The service management solution supports implementation, evaluation, maintenance, and control through its technology stack. For example, CA EEM, a component within the IT Security Solutions, is a core component of the Service Management solution enabling service providers a central repository of service management application users. This solution is integrated using LDAP and provides access to features and data within the Service Management suite. This integration supports password reset through the CA SDM end-user self-service interface.

6. CA ITCM, CA DCA Manager, and CA Configuration Automation feed the infrastructure resources contained in the CMDB component of CA SDM. CA ITCM and CA DCA Manager identify changes to desktops and servers that can introduce security threats, such as unauthorized USB drives, inappropriate software installs, or changes to browser settings.

7. CA Configuration Automation baseline comparison lists changes to CIs that affect the availability of service. Moreover, CA Patch Manager (which feeds CA ITCM and CA DCA Manager) lists all desktops and servers that are not at the proper patch level. CA SDM integrates with CA Identity Manager to enable pass-through authentication in the most complex security architecture.

IT Service Continuity Management

Objectives

- Maintain a set of IT Service Continuity plans and IT Recovery plans that support the overall organizational business continuity plans.
- Complete regular business impact analysis exercises to help ensure that all continuity plans are maintained in line with changing business impacts and requirements.
- Assess the impact of all changes on the IT Service Continuity plans and IT Recovery plans.
- Negotiate and agree to the necessary supplier contracts for the provision of the recovery capability that supports the continuity plans with Supplier Management.

How CA Technologies Solutions Help Meet the Objectives for IT Service Continuity Management

Helping ensure an effective IT Service Continuity Management (ITSCM) process requires a documented and executed continuity plan. CA Technologies integrated solutions leverage all of the solutions documented in this Green Book to provide inputs to defining the continuity plan. This plan is ultimately published in CA SDM and managed as an ongoing project with the business in CA Clarity PPM.

1. The integration of CA SDM with CA Process Automation can be used to automate recovery plans by notifying key personnel, initiating failover systems, and initiating monitoring of new facilities.
2. Functionally, CA Clarity PPM opens Change Orders in CA SDM to schedule recovery testing, which initiates the CA Process Automation process flow to begin a recovery process.
3. Leveraging the solutions in Capacity and Availability Management, a service provider can identify whether the service levels are being met. The service provider can then feed them back to CA SDM and ultimately back into the ITSCM design improvements.

Service Catalog Management

Objectives

- Provide a single source of consistent information about all the agreed services.
- Help ensure wide availability to users who have access.

How CA Technologies Solutions Help Meet the Objectives for Service Catalog Management

The following process describes how CA SDM, CA Service Catalog, CA Clarity PPM, and CA Asset Portfolio Management integrate to help improve the Service Catalog Management process:

1. CA Service Catalog is a solution that supports all objectives of the Service Catalog Management process in Service Design.
2. CA SDM and CA Service Catalog share a repository of users, locations, organizations, tenants, and CA EEM for security.

3. RFCs that are created in CA SDM can be linked to CA Service Catalog requests. The assets in the CA SDM CMDB are managed in CA Asset Portfolio Management.

4. When fulfilling a request, a link directly into CA Asset Portfolio Management data is used to assign only available assets to the request. This link helps ensure immediate CA SDM CMDB updates on the asset or CI status for the request throughout its progress into a production state.

5. CA Clarity PPM contains the master portfolio and helps ensure that CA Service Catalog is given the proper service offerings and deactivates any inactive ones.

Service Level Management

Objectives

- Define, document, agree on, monitor, measure, report, and review the level of IT services provided.
- Help ensure the specific and measurable targets are developed for all IT services.
- Monitor and improve customer satisfaction with the quality of service delivered.
- Verify that IT and the customers have a clear and unambiguous expectation of the level of service that is delivered.

How CA Technologies Solutions Help Meet the Objectives for Service Level Management

The following process describes how CA Clarity PPM, CA eHealth, CA BSI, and CA SDM integrate to help improve the Service Level Management process:

1. The defined and agreed levels of SLAs are developed in CA Clarity PPM and then documented and tracked in CA BSI.

2. The Service Level Manager publishes the details of the SLAs that are maintained in CA BSI or CA Clarity PPM as a CA SDM knowledge document. This document supports communication to the business about the expected levels of service.

3. CA BSI and CA eHealth enforce, alert, and report on the defined levels of service.

4. When there are agreed changes to the SLA, CA Clarity PPM initiates an RFC in CA SDM against the services. The RFC initiates a workflow in CA Process Automation to deploy the updated service levels to CA eHealth and CA BSI for monitoring.

Supplier Management

Objective

- Ensure the best value of service is obtained from suppliers and contracts.
- Ensure the underpinning contracts are aligned to business needs and SLAs.
- Manage supplier relationships and performance.
- Maintain a supplier and contracts database.

How CA Technologies Solutions Help Meet the Objectives for Supplier Management

The following process describes how CA BSI, CA Clarity PPM, CA eHealth, CA Asset Portfolio Management, CA ITCM, CA DCA Manager, and CA SDM integrate to help improve the Supplier Management process:

1. A service provider uses CA Asset Portfolio Management as the supplier and contracts database (SCD) enabling centralized management of underpinning contracts. The database includes a list of the providers, their products and services, and the value they bring to the business.
2. When integrated with CA ITCM, CA DCA Manager, and CA SDM, CA Asset Portfolio Management is able to identify quantitatively the hardware, software, and system performance of the services that the suppliers provide. CA ITCM and CA DCA Manager provide up-to-date inventory in a service provider environment.
3. The CA ITCM and CA DCA Manager inventory is provided to CA Asset Portfolio Management and linked to the relevant contracts.
4. The CA SDM CMDB component and CA Asset Portfolio Management share the physical asset and CI records that are linked back to the Supplier in CA Asset Portfolio Management. Service contracts in CA BSI enforce service levels against the CIs that are associated to the suppliers through automated escalation and reporting.
5. The CA SDM CMDB component contains the relationships of the services to the CIs and assets that link to CA Asset Portfolio Management. Leveraging the integration of the CMDB component with CA eHealth provides the visibility to the overall health and performance of the services that a supplier provides.
6. CA Asset Portfolio Management and CA SDM ad-hoc reporting enables visibility into the number of incidents that are opened against supplier services. This visibility can be used to help manage supplier relationships and prove their performance.

7. CA Asset Portfolio Management and CA SDM are integrated with CA Clarity PPM, which provides the detailed costs that are associated to the service portfolio. This integration is then used to validate and analyze the value that a supplier provides to the service provider and business.

8. CA BSI consolidates the details from the other technologies to provide insight into how well suppliers are meeting SLAs.

Service Transition

Change Management

Objectives

- Help ensure that standardized methods and procedures are used for efficient and prompt handling of all changes.
- Record all changes to service assets and configuration items in the Configuration Management System and optimize the overall business risk.

How CA Technologies Solutions Help Meet the Objectives for Change Management

The following process describes how CA Configuration Automation, CA SOI, CA ITCM, CA DCA Manager, and CA SDM integrate to help improve the Change Management process:

1. RFCs are recorded, reviewed, assessed, and prioritized in CA SDM.

2. The approval process of the RFC is enforced using CA Process Automation for normal or emergency changes.

3. For standard changes, CA Process Automation automates the end-to-end approval and deployment, through CA ITCM and CA DCA Manager or CA SOI, of the requested change using the inventory in the CMDB component of CA SDM.

4. When CA ITCM and CA DCA Manager are integrated with CA SDM, RFCs of unauthorized changes are automatically logged as incidents or RFCs for further review.

5. The complex relationships of CIs and the recipients of their services are tracked in CA Configuration Automation. CA Configuration Automation baselines help ensures the complex interconnections of the infrastructure that supplies the service remain unchanged.

6. CA Configuration Automation is integrated into CA SDM through inventory importing, which helps ensure that the CA SDM CMDB is up-to-date with the latest relationships between CIs.

Evaluation

Objectives

- Evaluate the impact a new or changed service has on the customer perception of capacity, resource, and performance.
- Enable change management to be more effective in the decision about service changes.

How CA Technologies Solutions Help Meet the Objectives for Evaluation

The following process describes how CA eHealth, CA SOI, and CA SDM integrate to help improve the evaluation process:

1. Integrating CA eHealth and CA SOI with the CA SDM CMDB and change management functions enables a service provider to compare previous and new performance metrics.
2. CA SDM surveys gather feedback from customers on the effectiveness of a new release.
3. CA SOI enables measurements from the customer perspective of the service.
4. Using the CMDB Visualizer, together with real-time statistics from CA SOI and performance trends of CA eHealth, a service provider can determine which portions of a change reduced the resource performance. CA Technologies integrated solutions enable this end-to-end visualization which facilitates effective management decisions.

Knowledge Management

Objectives

- Enable the service provider to be more efficient and improve quality of service, reduce the cost of service, and increase customer satisfaction.
- Help ensure that the service provider staff has a clear and common understanding of the following areas:
  - Value that the services provide to customers.
  - Benefits that are realized from the use of those services.

- Help ensure that at a given time and location, the service provider staff has adequate information about the following areas:
  - Who uses the services
  - Current states of consumption
  - Service delivery constraints
  - Difficulties that the customer faces.

How CA Technologies Solutions Help Meet the Objectives for Knowledge Management

The following process describes how CA SDM helps improve the Knowledge Management process:

1. CA SDM Knowledge Management centralizes the administration and management of knowledge for service providers.
2. Integrations to other systems that can automate steps for the customer, such as CA ITCM and CA DCA Manager scripts or CA SDM Support Automation Automated Tasks scripts, can be called from Action Content in the knowledge document.

Release and Deployment Management

Objectives

- Provide clear and comprehensive release and deployment plans to align with customer and business change project activities.
- Build, install, test, and deploy release packages efficiently and on schedule.
- Minimize unpredicted impact on the production services, operations, and support organization.
- Improve the satisfaction of customers, users, and service management staff with the service transition practices and outputs.

How CA Technologies Solutions Help Meet the Objectives for Release and Deployment Management

The following process describes how CA Service Catalog, CA Clarity PPM, CA SCM, CA ITCM, CA DCA Manager, and CA SDM integrate to help improve the Release and Deployment Management process:

1. The Release and Deployment Management process is the culmination of the work from the strategy, design, and remaining transition processes.
2. The service portfolio in CA Clarity PPM initiates an RFC in CA SDM, where the requested change is classified, reviewed, and approved through a Change Management process.
3. CA Process Automation automates the process and creates the release package in CA SCM. The documents that are related to the release package are centrally controlled in CA SCM through approvals and a check-in and check-out process. Ultimately, the documents are promoted through the test to production. Throughout the process, status updates are provided to the project and the RFC.
4. CA SCM leverages its integration with CA ITCM and CA DCA Manager to initiate the deployment of the release package. This action ensures a consistent deployment, which results in a reduced impact to the service at the production roll-out.
5. When the release package is ready to be part of CA Service Catalog, CA SCM notifies the CA Clarity PPM project and portfolio that the service is ready to be promoted into CA Service Catalog.
6. When the RFC is closed, satisfaction surveys are sent to customers. Any incidents that are related to the release can be tied back to the RFC for future analysis and the change impact.

Service Asset and Configuration Management

Objectives

■ Identify, control, record, report, audit, and verify service assets and configuration items, including their versions, baselines, constituent components, attributes, and relationships.

■ Account for, manage, and protect the integrity of service assets and configuration items throughout the service lifecycle by ensuring that only authorized components are used and only authorized changes are made.

■ Help ensure the integrity of the assets and configurations that are required to control the services and IT infrastructure by establishing and maintaining an accurate and complete Configuration Management System.

How CA Technologies Solutions Help Meet the Objectives for Service Asset and Configuration Management

The following process describes how CA Service Catalog, CA Configuration Automation, CA Asset Portfolio Management, CA ITCM, CA DCA Manager, and CA SDM integrate to help improve the Service Asset and Configuration Management process:

1. CA Technologies solutions support the ability of the service provider to perform Service Asset and Configuration Management, which includes everything from procuring a new asset to providing final support for a service. The process helps ensure control through a centralized CMDB component.

2. An asset is procured and logged in CA Asset Portfolio Management with the associated contracts, licensing, and classifying attributes that enable it to be tracked throughout its life cycle.

3. When a CA Service Catalog request is initiated, the service provider leverages the CA Asset Portfolio Management and CA Service Catalog integration to retrieve a list of available assets to assign to the request. Unique attributes, such as which software to install, are also identified.

4. The CA Service Catalog request creates an RFC in CA SDM.

5. CA SDM and CA Asset Portfolio Management share the repository of assets and CIs. When an RFC is initiated from a CA Service Catalog request, it already has the approved linked assets, along with the desired software configuration.

6. The automation and integrated solutions help ensure that the status of the identified asset is updated and auditable by the service provider. The automation and integration also help ensure the continuity of the Release and Deployment Management process.

7. When an asset (for example, a server being provisioned for a particular service) is put onto the network, CA ITCM and CA DCA Manager discover the device. CA ITCM and CA DCA Manager deploy their agents to begin immediate management of the device and start the deployment of required software.

8. To add to the control of the server, CA Configuration Automation identifies which part of the service the server is providing (for example, a database server in a cluster). CA Configuration Automation identifies the relationship, which is then sent back to the CA SDM CMDB component. Change Manager validates the relationship on the RFC.

9. Baselines of the server are contained in CA ITCM, CA DCA Manager, and CA Configuration Automation, allowing a service provider to identify any unauthorized changes to the device.

10. Any updates of software or configuration are provided to CA Asset Portfolio Management by CA ITCM and CA DCA Manager or through updates of the CA SDM CMDB through CA Configuration Automation.

11. As the server depreciates in its ability to provide value to the service, an RFC is created in CA SDM to retire the device. Leveraging historical data from CA SDM (such as incidents, RFCs, performance statistics, and memory upgrades), the service provider can show a full audit trail for the CI over time.

Service Validation and Testing

Objectives

- Validate that a service is "fit for use" or Warranty.
- Validate that a service is "fit for purpose" or Utility.
- Provide confidence that a new or changed service delivers value to the customer.
- Confirm that the requirements for a service are correctly defined and remedy any errors or variances early in the service lifecycle.

How CA Technologies Solutions Help Meet the Objectives for Service Validation and Testing

The following process describes how CA SCM, CA eHealth, CA SOI, and CA SDM integrate to help improve the Service Validation and Testing process:

1. Integrating CA Clarity PPM, CA SDM, and CA SCM enables a service provider to manage the documentation that is required to ensure a new or changed service is fit for use and fit for that purpose.

2. CA Clarity PPM contains the quantitative attributes of what is required for the portfolio.

3. CA SCM contains the documents that capture the requirements of the service as well as the testing strategy.

4. The CA SDM CMDB Visualizer enables modeling of the test environment for impact analysis.

   Note: The service model is an abstraction that shows logical elements and their relationships. The service definition is the description of an implemented instance of a service that has been modeled. A service map is a selective view of a service showing desired elements and relationships from an explicit perspective. Different perspectives on a given service generate different maps.

5. CA eHealth measures the availability and capacity of the service.

6. CA SOI automates the deployment of the test environment and testing scripts. These integrated solutions share CI information, test plans, test package promotion and state, and the CA Business Intelligence centralized reporting solution.

Transition Planning and Support

Objectives

■ Plan appropriate capacity and resource to package a release and to build, release, test, deploy, and establish a new or changed service into production.

■ Provide support for the service transition teams and people.

■ Help ensure that service transition issues, risks, and deviations are reported to the appropriate stakeholders and decision makers.

■ Coordinate activities across projects, suppliers, and service teams when required.

How CA Technologies Solutions Help Meet the Objectives for Transition Planning and Support

The following process describes how CA Clarity PPM, CA SCM, and CA SDM integrate to help improve the Transition Planning and Support process:

1. CA Technologies integrated solutions enable effective transition planning and facilitate support of new or changed services. For transition planning, resources are scheduled in CA Clarity PPM against a project.

2. In CA SDM, individual work tasks are created as RFCs, incidents, or requests from the CA Clarity PPM project workflow, depending on the work needed.

3. As work for developers and product teams begins, CA SDM initiates packages inside CA SCM. CA SCM helps ensure that activity is properly coordinated, approved, and promoted through a defined lifecycle.

4. In CA SDM, incidents are tracked against the projects providing visibility to management on the success of the transition as well as identifying areas that could require additional support.

Service Operation

Access Management

Objectives

■ Provide the permission for users to access services based on policies and actions defined in security and availability management.

How CA Technologies Solutions Help Meet the Objectives for Access Management

The following process describes how CA SiteMinder, CA Identity Manager, CA Service Catalog, and CA SDM integrate to help improve the Access Management process:

1. From CA Service Catalog, an authorized user can request to change or add security rights as well as initiate approvals that are based on CA Process Automation workflows.

2. After a request is created, CA SDM generates an RFC so that the user profile can be updated in the CA SDM CMDB.

3. CA SDM then initiates a workflow in CA Identity Manager, where security administrators review and implement the security access.

4. CA SiteMinder, integrated with CA Identity Manager, helps ensure that only authorized systems are made available to the user.

Event Management

Objectives

■ Detect events, comprehend, and determine the appropriate control action; communicate operational information as well as warnings and exceptions.

■ Automate routine operations management activities.

- Provide a way of comparing actual performance and behavior against design standards and Service Level Agreements.

How CA Technologies Solutions Help Meet the Objectives for Event Management

The following process describes how CA NSM, CA Spectrum IM, CA eHealth, CA SOI, CA Introscope, and CA SDM integrate to help improve the Event Management process:

1. Event Management begins with determining the level of the service that a service provider intends to monitor.
2. CA SOI monitors the service from the customer perspective. For any breach of service level, CA SOI creates an incident in CA SDM.
3. As a service provider delves deeper into monitoring the application communications to back-end systems, CA Introscope generates incidents in CA SDM.
4. For events that occur inside the applications, CA NSM agent technology generates SNMP traps. These traps are used against a robust correlation engine, which determine whether it is necessary to open an incident.
5. If there is an event in the environment that results in a cascading failure to multiple users or service, CA Spectrum IM automatically creates a single incident in CA SDM instead of multiple individual incidents for each affected resource. This single incident helps the Service Desk to manage more effectively the queue and to stay focused on the user perception of service. Incidents are logged for each user and linked to the parent incident.
6. CA eHealth monitors the Systems-level SLAs. CA eHealth opens incidents that are based on general service degradation or potential service degradation. Application management and IT operations management functions use this set of integrated solutions to manage their responsibilities. Application managers use the metrics from these solutions to design better services for the customer. For IT Operations Managers, these tools offer the low-level metrics with alerting and automation to ensure day-to-day stability.

Incident Management

Objectives

- Restore normal service operation as quickly as possible and minimize the adverse impact on business operations.
- Help ensure that the best possible service quality and availability are maintained.

How CA Technologies Solutions Meet the Objectives for Incident Management

The following process describes how CA SDM, CA eHealth, CA Spectrum IM, CA ITCM, and CA DCA Manager integrate to help improve the Incident Management process.

1. CA SDM provides the front end to incident, problem, request, and change tickets as well as the Knowledge Documents. The CMDB function of CA SDM integrates into all aspects of IT operations to help ensure that CA SDM can gather facts to restore service quickly to the customer.

2. CA eHealth and CA SOI proactively generate Incidents as a result of potential service degradation.

3. Incidents can be analyzed against impact analysis using the CMDB Visualizer to plan availability and capacity better.

4. CA ITCM and CA DCA Manager can generate incidents in CA SDM based on policy violations that result in degradation of client/server ability to provide service.

5. CA Spectrum IM auto-generates incidents when there is a disruption of service.

6. The CA SDM web services application programming interface (API), email API, and native integration with various CA Technologies solutions enable bidirectional communication that is based on activities that are performed on the ticket. This communication helps ensure the most effective route to restoration of service to the end user.

Problem Management

Objectives

- Prevent problems and resulting incidents from happening.

- Eliminate recurring incidents and minimize the impact of incidents that cannot be prevented.

How CA Technologies Solutions Help Meet the Objectives for Problem Management

The following process describes how CA Spectrum IM, CA NSM, CA ITCM, CA DCA Manager, CA Configuration Automation, and CA SDM integrate to help improve the Problem Management process:

1. CA SDM provides a robust Problem Management solution that enables a service provider to manage a problem throughout its lifecycle, from Incident creation and known error recording to initiation of an RFC.

2. By leveraging the native integration of CA Spectrum IM, CA NSM and other Infrastructure Management solutions, Problem Management can become proactive.

3. CA Spectrum IM and CA NSM monitor the infrastructure for the signs of service degradation that automatically opens problem tickets.

4. CA ITCM and CA DCA Manager, when integrated with the CA SDM CMDB, proactively create hardware and software based Incidents. The Problem Manager can leverage the Incidents to perform Root Cause Analysis (RCA) of the problem.

5. CA Configuration Automation integrates with CA SDM to enable a Problem Manager to identify deviations of a CI-based configuration change that could be the root cause of the problem.

Request Fulfillment

Objectives

- Provide a channel for users to request and receive standard services that have a predefined approval and qualification process.

- Provide information to users and customers about available services and procedures for obtaining them.

- Source and deliver the components of requested services.

- Assist with general information, complaints, or comments.

How CA Technologies Solutions Help Meet the Objectives for Request Fulfillment

The following process describes how CA Service Catalog, CA Asset Portfolio Management, and CA SDM integrate to help improve the Request Fulfillment process:

1. CA Service Catalog provides a list, description, and workflow of services to enable request fulfillment.

   CA Service Catalog provides the list of offerings that the user can access, the pricing, and the expected levels of service for the offering.

2. CA Service Catalog natively integrates with CA Asset Portfolio Management. CA Asset Portfolio Management maintains a list and status of available resources that can fulfill the request. When Service Asset Managers fulfill the order, they link the identified resource to the request and they create an RFC in CA SDM for deployment.

3. The CA SDM end-user self-service interface helps ensure that customers have access to the following information:

   - Knowledge documents
   - Hours of service
   - Requests for general information (single-click access)
   - Complaints or comments
   - View into CA Service Catalog offerings

Continual Service Improvement

Seven-Step Improvement Process

CA Technologies integrated solutions collaboratively enable the Seven-Step Improvement Process. Each solution provides metrics, measures, and process enablers that facilitate the following process:

1. Defining what measured: CA Clarity PPM is the central tool to collect these requirements, which are then validated through CA BSI.

2. Defining what you can measure: CA eHealth, CA Wily, and CA NSM help ensure that you can measure all technology attributes to improve your services. CA Clarity PPM, CA BSI, and CA SDM enable you to measure process level metrics.

3. Gathering the data: CA eHealth, CA Wily, and CA NSM enable the collection of the data that your organization identifies for technology and service level metrics. CA Clarity PPM and CA SDM collaboratively provide process metrics.

4. Processing the data: CA Technologies uses CA BSI and CA Business Intelligence reporting to provide a central view of the collected metrics.

5. Analyzing the data: CA Business Intelligence and CA BSI enable robust analysis of the gathered metrics.

6. Presenting and using the data: At this stage of the Seven-Step Improvement Process, you can take your CA Business Intelligence and CA BSI reports to your Service Manager, Continual Service Improvement Manager, and can Process owners, to review the collected data.

7. Implementing corrective actions: Finally, you can update the status of your portfolio in CA Clarity PPM. CA Clarity PPM creates an RFC in CA SDM and the cycle of improvement begins again. You have continuous visibility of business objectives that are tied to critical success factors and the underlying key performance indicators (KPIs) and metrics, all from the integrated suite of solutions CA Technologies provides.

Chapter 3: Integration Options and Approaches

CA SDM Integration Methods

CA SDM is designed to interact with many software solutions, including CA Technologies solutions and third-party products. In addition, CA SDM is typically integrated with products that have been developed in-house by CA Technologies customers.

Most of the methods that are used to integrate CA SDM with other products are described in this chapter and summarized in the following table.

Method type	Purpose	Implementation point
Web Services	Allow workflows and other external products to invoke internal functions of CA SDM.	Java-based calls using standards including XML for data formatting, SOAP for message exchange, and WSDL for describing the services.
TextAPI	Create and update objects in CA SDM using text-based input.	Command lines in text files.
Database	Directly manipulate CA SDM management database content.	Command line utilities.
Email	Use email messages to query, create, or update an incident or change order.	Specially formatted email message.
URL	Use URLs to access CA SDM objects.	URL of the specific object is embedded in html, text file, email, or scripts.
Remote reference	Insert calls to external products into the CA SDM Client interface menus and forms.	CA SDM Client uses a lookup table.
CTI	Launch application screens (screen pops) in coordination with voice and data.	Using web services, in combination with opening a web browser, to launch a prepopulated CA SDM URL.
Spel / Majic	Specify or trigger actions associating defined CA SDM objects with external executables.	Proprietary language for scripting, setting database triggers, and object modeling.

Method type	Purpose	Implementation point
Web Services	Allow workflows and other external products to invoke internal functions of CA SDM.	Java-based calls using standards including XML for data formatting, SOAP for message exchange, and WSDL for describing the services.
Process Automation	Manage user interactions and automate tasks within production environments. Retrieve and validate information from any object within CA SDM, and execute logic for the information.	Executable workflow scripts using web services, Java, command line, or API calls

Some of these techniques are available only to CA Technologies developers, CA Technologies Services, and CA Technologies certified partners, while customers can use others.

This section is not intended to provide instructions on how to use the methods. Instead, it provides examples and explanations that help you decide whether an integration method is suitable for your particular need. To further aid in selecting appropriate methods, consult the text about each method for the following key points of comparison:

- Business Challenges
- CA Technologies Approach
- Best Practice
- Configuring the Solution
- Enabling the Solution
- TouchPoints and Value
- Support Disclaimer
- Authentication / Security
- Technology

Important! Your organization is responsible for testing and maintaining any custom integration. We recommend that you thoroughly test your integration before you implement it.

Web Services Application Programming Interface (API)

A service orientation implies that participants in any transaction are either consumers or providers. A service-oriented architecture (SOA) describes a loosely coupled system that uses service orientation as its basic design principle. Service orientation implies that the services (software functionality or capability) in a SOA are presented on a high level. The consumer of a service does not need to understand the underlying technical implementation of the service. Typically, this means that the service is defined in business terms rather than technical terms. In theory, SOA does not place any requirements on the platform on which a SOA system is built. In practice, SOA is almost exclusively built using the World Wide Web Consortium (W3C) defined web services. Web services are well-suited to a SOA architecture for the following reasons:

- They are standardized.
- They are based on the ubiquitous HTTP protocol.
- They have provisions for describing and publicizing available services.

CA SDM provides web services. When these web services were identified for inclusion, the following goals were present:

- **Expose CA SDM functionality as much as possible**. This goal aims to expose as much of the CA SDM functionality as possible. You can provide low-level services that expose the building blocks from which CA SDM was built. These services constitute a tool kit from which higher-level business services can be built for a SOA. In addition, this tool kit can be used to build specific interfaces, such as those used in some product integrations that constitute new capabilities for a service desk.

- **Develop high-level services that can fit directly into an SOA implementation**. The following services are the examples of high-level services:
  - createRequest
  - attachChangeToRequest

  Working with these high-level services and the lower-level building blocks, CA SDM can be used to provide a loosely coupled service desk service. The service can be accessed anywhere a web service can be used.

Important! Web services are a powerful technology that requires programming skills that CA Technologies Technical Support does not support. Similar to other sections of this guide, this chapter includes information that is not included in the product documentation. The manager at your site is responsible for the testing and maintenance of web services-based project deliverables that are built with web services. The provided samples are not production code. We recommend that while developing your project, you follow sound software engineering practices, such as source control and code reviews. We highly recommend ITIL release management practices for web services projects. Verify and test your web services projects before going into production.

Web Services

A *web service* is a collection of services that have been deployed over the Web. Another application can access these services to perform a task by calling the service through the Internet using standard protocols. The key standards are XML for data formatting, SOAP for message exchange, and WSDL for describing the service.

The following services are the advantages of using a web service, in addition to those advantages previously mentioned:

- They are free of vendor-specific libraries.
- They are the platform and language independent.
- They are readily available for various development platforms.

For more information about web services and the associated standards, see the following web service basics articles:

http://msdn.microsoft.com/en-us/netframework/aa663324.aspx

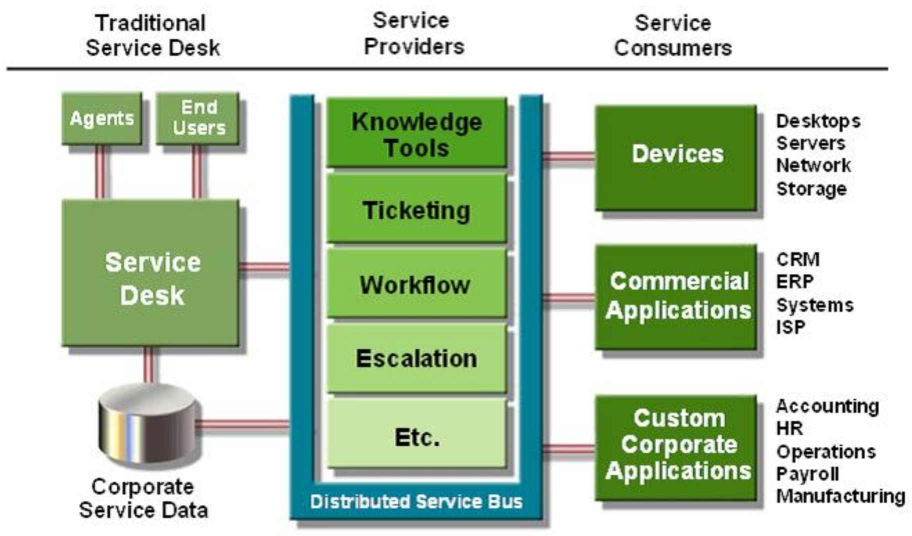
http://en.wikipedia.org/wiki/web_services

Service Aware

Service Aware is a part of the CA Technologies vision for a self-managing enterprise and is part of an on-demand strategy.

CA Technologies develops a *Service Aware* paradigm that attempts to achieve a self-managing infrastructure by having applications and devices report problems directly to the service desk. By completing this task, the application removes the end user from the equation. This task significantly reduces reporting time, improves research and troubleshooting, and avoids communication problems with the end user. Integration methods enable Service Aware infrastructures.

The following diagram shows the virtual architecture of Service Aware. By using web services, the core functions of CA SDM and knowledge base are provided to applications and devices that consume the functions as support.



As previously illustrated, the traditional support model is still available as exceptions to automation. The CA SDM web services are the means to deliver on-demand services in this model.

CA SDM Web Services

The following sections describe the CA SDM web services:

- Functions available in the web services.
- Typical tasks that the web services are used to perform.
- Common pitfalls that implementers and developers must be aware of.

Note: Various other application program interfaces (APIs) and integration alternatives are provided. However, the web services API must always be the first option when integrating other applications with CA SDM. The web services offer much of the functionality that is available through the interface from outside the product. By using the web services, customers can reuse many of the policies and business processes already created.

For more information about the web services, see the *CA SDM Technical Reference Guide*. In addition, a Java language example is provided in the $NX_ROOT\samples\sdk\websvc directory.

Business Challenges

Not every IT organization has the type of resources that are able to develop and maintain custom code. Depending on your requirements, CA Technologies Services or a CA Technologies partner is a good fit to help you address your specific requirements. The best way to minimize the risks that are associated with your custom code is to complete the following tasks:

- Verify that detailed documentation is provided with any delivered custom code.
- Arrange for some form of maintenance contract to be in effect.

CA Technologies Approach

CA SDM web services are provided as a supported mechanism for performing integrations. CA Technologies Support does not directly support any custom created web services code. However, the documented methods that the custom code uses are supported.

Best Practice

CA Technologies best practices caution against the use of any custom code. For a valid business need, the Web Services API is the *only* API that CA Technologies supports. In addition, CA Technologies best practice also suggests implementing a formal software development methodology to help ensure the proper scoping, design, and maintenance of any custom code.

Configuring the Solution

No special CA SDM configuration requirements exist. The web services are configured by running pdm_configure on a CA SDM server.

Enabling the Solution

After configuring CA SDM and implementing the previously mentioned components, no further steps are required to enable custom components to use the web services-based feature.

API TouchPoints and Value

This section provides a description of the generic CA SDM Web Services API, focusing on what can be accomplished with this toolkit for integration purposes.

The two primary areas where the CA SDM Web Services API can be utilized in the integration are following:

- Separate products (both CA Technologies and third-party products).
- New features for CA SDM.

The value of this functionality is recognized when you want to perform a custom implementation. You can implement your solution quickly on a wide variety of platforms using many different programming environments. Alternatively, some CA Technologies Smart-certified partner products leverage the Web Services API to provide the desired integration to CA SDM from a wide variety of third-party products.

This section illustrates how to use the CA SDM Web Services API to integrate a new feature into the CA SDM web interface. In the example, a new feature is added to assist the user in more efficiently managing the incidents and problems that have been attached to a change order.

Support Disclaimer

Important! Web services are a powerful technology that requires programming skills that CA Technologies Technical Support does not support. Similar to other sections in this guide, this chapter contains information that is not contained in the product documentation. Testing and maintenance of projects that are based on web services are the responsibility of the site. This chapter contains samples and not production code. We recommend that while developing your project, you follow established software engineering practices such as source control and code reviews. We highly recommend ITIL release management practices for web services projects. Test your projects carefully before going into production.

Accessing the Web Service

CA SDM provides two distinct web services. One is specific to Release 11 and above, and another is used for backward compatibility for integrations that use the CA SDM 6.0 web service. The Release 6.0 web service does not cover the CA SDM Knowledge Tools function. Users who integrated with the CA SDM Knowledge Tools 6.0 web services must review and update those integrations to work with the current web service.

A list of all the methods available through both of these web services is available on a CA SDM web server from the following URL:

http://localhost:8080/axis/servlet/AxisServlet

You can find the r12.5 /12.6-specific WSDL using the following URL, where 8080 is the default port:

http://localhost:8080/axis/services/USD_R11_WebService?wsdl

The WSDL is a key component for integrating through the web service. The WSDL tells the other application where the web service is located and all the associated methods of that service.

Authentication

To communicate with the web service (unless you are using certificate-based authentication), a user must first log in to the web service with a valid CA SDM user ID and password. User security and access are the same as it is in the CA SDM interface, which mechanisms such as access types and data partitions define. Once users log in to the web service, they can only perform tasks and retrieve data based on their access. This access restriction also applies to CA SDM Knowledge Tools, which use permission groups to segment the knowledge base. Users cannot, therefore, retrieve knowledge documents to which they do not have access.

When accessing the web service, an analyst user type or a user performing analyst functions use a concurrent user license. When building integrations, consider this information to keep a check on the number of licenses.

For information about certificate-based authentication, see Using Public Key Infrastructure Authentication and Interacting with the Web Interface (see page 64).

Working with the Object Layer

The web service communicates with the object layer in CA SDM. By interacting with this layer, updates that are made through the web service trigger the appropriate business processes, escalations, and service levels within CA SDM. Additionally, using the object layer allows developers to work at a layer above the database and not concern themselves with those low-level connections. Every object within CA SDM has a unique ID. At the object layer, this ID is referred to as a handle or persistent id (PERSID). When accessing and updating objects, the developer is often required to use the handle of an object to identify it in a method call.

Technology

The web services that are provided with CA SDM are built on Java (J2EE) technology and run on Apache Axis and Apache Tomcat. All of the prerequisites are installed with CA SDM, and the web services can be hosted on any of the supported server platforms for CA SDM. The use of Java, Apache Axis, and Apache Tomcat does not limit the technology that is used to communicate with the web service.

For information about the advantages of using a web service, see Web Services (see page 44).

Web Services Methods

Much of the same functionality that is available using the CA SDM interface is accessible through the web service. For example, there are functions to create and update contacts, assets, and tickets. Through the web services you can transfer or escalate tickets, notify users, and update the CA SDM tasks. Using the same API, CA SDM Knowledge Tools functions can be accessed including the ability to create, search, retrieve, and rate documents.

The following information includes several of the most commonly used functions:

login/logout

These functions control the session with the web service. The userid that is used to log in determines the security and access throughout the rest of that session.

doSelect/doQuery

Both methods allow querying of specific objects to retrieve data. For example, a query retrieves the ref_num IDs (ref_num) of all open tickets for a given user.

createRequest

The most common integration with CA SDM is to open a request or incident. This method creates a request, incident, or problem that is based on the parameters that are passed to it.

getHandleForUserid

Typically, the web service requires the handle (or unique ID) of an object that passes to a method call. This method retrieves the handle of a user, which gives their unique userid.

createTicket

Like the createRequest function, this method creates a ticket for a request, incident, or problem. However, the type of ticket that is created depends on the web service policy that a CA SDM administrator creates. This method is designed to simplify the most common integration with CA SDM by hiding some of the CA SDM-specific knowledge and complexity that is associated with other method calls.

createAttachment

When reporting an incident with another application, it is often helpful to attach a log (or other file) to the incident to improve troubleshooting.

Keyword search

This method performs a search for knowledge documents similar to how a user provides a search string using the web interface.

getDocument

This method retrieves the attributes of a knowledge document given its ID.

createDocument

This method creates a knowledge document.

The Keyword search, getDocument, and createDocument methods are knowledge base functions that use the functionality that is provided with either CA SDM Knowledge Tools or keyword search. Keyword search is the embedded search and retrieval tool that comes with CA SDM. Customers who do not have CA SDM Knowledge Tools can still use the web service but they only have access to the basic embedded knowledge methods. When a Keyword Search-only customer attempts to access a CA SDM Knowledge Tools-specific method, such as FAQ or getDecisionTrees, the user sees the following error: *Soap Exception: Keyword Search does not support this feature*.

For more information about the available web service methods, see the chapter *Web Services Methods* in the *CA SDM Technical Reference Guide*.

Web Services Typical Tasks

This section discusses the most common tasks that are performed using the web service. The section also provides examples and tips on how to perform these tasks.

Creating an Incident

The most common task that is performed through the web service is creating a request, incident, or problem. You can use the createRequest method to create all of these ticket types. Other ticket types, such as change orders and issues, use their own methods (createChangeOrder and createIssue, respectively). Similar to the web interface, the createRequest method creates an incident and sets all of the associated attributes and properties of that ticket.

Example: Create an Incident

This example discusses the steps to create an incident. After you complete this example, the affected end user is set as *employee123*, the priority as *2,* and the incident area or category as *applications*.

Before you review this example, review the *CA SDM Technical Reference Guide*. This guide describes the web service and its methods.

1. Log in.

   The first step is to log in to the web service using the login method with a user ID that has access to the following functions:

   ■ Create an incident.

   ■ Retrieve the key attribute data.

   In this example, set the priority, category, and group fields. To verify that a user has the correct level of access, test the example in the web interface and validate the access type of the user. On the successful web service login, an integer session ID (SID) is returned, which has a value greater than zero. A call to log in therefore fails when the returned SID is less than or equal to zero. The SID is used in almost all other method calls to help ensure that a valid user is accessing the methods.

2. Retrieve the handle for the affected end user.

   Set the affected end user or customer attribute in the incident. Therefore, retrieve the handle (PERSID) of that user. As previously mentioned, the affected userid of the end user is employee123. Pass that string value and the SID to the *getHandleForUserid* method. This method returns the handle for that user as a string that is used later.

3. Retrieve the handle for the applications incident area.

   Retrieve the handle for the incident area to which you want to assign this incident: Applications. The doSelect method queries CA SDM for information that you are looking for. In this situation, you want to query all incident area objects to find the handle for one that has a name (sym) *Applications*. By reviewing *Chapter 2 of the CA SDM Technical Reference Guide*, you can locate the call request (cr) object which holds requests, incidents, and problems. The incident area or category attribute of the cr object is the pcat object (problem category). To retrieve the handle for the *Applications* incident area, the doSelect method call must go against the pcat object and must have a where the clause sym — Applications. The doSelect method returns an XML node that contains the results of the query. XML parsing is necessary to retrieve the handle for the incident area.

The following pseudocode example shows how this method call looks:

```
//define the attribute array to pass the return values.
String attributes[] = new String[0]

//doSelect method definition

// doSelect(SID, objectType, whereClause, maxRows, attributes[])
xmlReturn = USDWebService.doSelect(SID, "pcat", "sym = 'Applications'",
1, attributes)
```

4. Retrieve the handles for priority and ticket type.

   To retrieve these handles, you do not have to call the web service. Instead, you can use the documentation, which covers commonly used objects (Chapter 2 of the *CA SDM Technical Reference Guide*). As previously mentioned, the cr object holds requests, incidents, and problems. By default, the createRequest function creates a request and explicitly tells it to create an incident. The type attribute in the request object has a value of R for the request, I for the incident and P for the problem. However, the web service requires that you pass this value as a handle. This type attribute is a commonly used object and is provided in the documentation as crt:182.

5. Create the incident.

   Now that you have the handles for all the incident attributes, you can create the incident. To call the createRequest function, the method requires the following parameters:

   - SID.
   - Any of the required attributes for the request object passed in the attrVals[] array.
   - Any required property that is based on the incident area (category) in the propertyValues[] array.

   The last three parameters in the method call retrieve attributes from the ticket once it is created. The attributes[] array is used to specify specific attributes to retrieve. newRequestHandle and newRequestNumber retrieve the handle and ref_num of the new ticket as string values.

The following pseudocode example shows how this method call looks:

```
// assign the name value pairs to the attrVals array of strings. The customerHandle and
categoryHandle hold the handles of values returned from the previous function calls in
this example.
String attrVals[] = ("customer", customerHandle, "category",
categoryHandle, "priority", "pri503", "type", "crt:182")

//create empty array of strings variables for properties and return attributes as we are
not passing data. The method still requires passing array of string objects in the function
call.
String propertyValues[] = new String [0]
String attributes[] = new String[0]

//create new string variables to hold return values.
String newRequestHandle = ""
String newRequestNumber = ""

//createRequest function definition

//createRequest(SID, creatorHandle, attrVals[], template, propertyValues[],
attributes[], newRequestHandle, newRequestNumber)

//actual function call, the creator handle is left blank which tells the method to default
to the logged in the user of the web service. The template parameter is left blank as we
are not setting that value.
xmlReturn = USDWebService.createRequest(SID, "", attrVals, "",
propertyValues, newRequestHandle, newRequestNumber)
```

6. Log out.

   The logout method ends the session for the SID that was created during the login. The SID can no longer be used.

   This example is complete and a new priority 2 incident is created in CA SDM for employee123. The incident is assigned to the applications category.

Updating an Incident

Several different methods are provided to update attributes and perform actions such as transferring or escalating a ticket. These methods perform actions or events in CA SDM that can trigger the support process already defined in the tool.

Example: Update an Incident

This example discusses the three most often used action methods:

- transfer
- changeStatus
- createActivityLog

This example discusses the steps to update the incident created in Creating an Incident (see page 51). After you complete this example, the incident is transferred to *analyst123.* A log comment activity is added and the status is changed to *Work In Progress*.

Follow these steps:

1. Log in.

   As noted in Creating an Incident (see page 51), a valid call to log in is necessary to acquire the SID to use in the other methods.

2. Retrieve the handles for the assignee and creator.

   To transfer the ticket, you first acquire the handle for the analyst as a new assignee. The userid of the assignee is analyst123 so you pass this string value with the SID to the *getHandleForUserid* method. This method returns the handle for the assignee as a string that you use later. In addition, you need the handle for the user (the creator) that performs the transfer activity. To demonstrate that the transfer was completed through the web service, you use the userid webserviceuser. Another call to the *getHandleForUserid* function is required to retrieve the handle for this second user.

3. Transfer the incident.

   With the assignee, creator, and incident handles, you now have all of the information you must update during the transfer. The transfer method allows the update of the assignee, group, and organization attributes. One or more of these attributes can be updated at a time. Several Boolean parameters exist to tell the method what to update. Because you want to set only the assignee, pass a Boolean True value in the setAssignee parameter and False for setGroup and setOrganization.

   The following pseudocode example shows how this method call looks:

   ```
   //transfer method definition

   //transfer(SID, creator, objectHandle, description, setAssignee, newAssigneeHandle,
   setGroup, newGroupHandle, setOrganization, newOrganizationHandle)
   xmlReturn = USDWebService .transfer(SID, creatorHandle,
   newRequestHandle, "transfer details", True, assigneeHandle, False, "",
   False, "")
   ```

4. Log a comment.

   In this step, a comment is logged on the previously created incident. The createActivityLog method can create various activities. To tell the method and the type of activity to create, you pass the LogType. For a comment, the LogType is LOG. This LogType and others are documented with the method description in the *CA SDM Technical Reference Guide*. The method call also has parameters for TimeSpent and Internal. The TimeSpent parameter takes an integer value for the amount of time that is spent on this individual activity. In this example, you pass 0, which is the default. This value shows that it was part of an automated process that is performed through the web service. The internal parameter, when set to True, allows a comment to be visible to analyst users only.

   The following pseudocode example shows how this method call looks:

   ```
   //createActivityLog method definition

   //createActivityLog(SID, creator, objectHandle, description, LogType, TimeSpent,
   Internal)
   xmlReturn = USDWebService .createActivityLog(SID, creatorHandle,
   newRequestHandle, "log comment details", "LOG", 0, False)
   ```

5. Retrieve the handle for the new status.

   To update the status, you retrieve the handle of the new status using the doSelect method. The new status name or sym is Work In Progress. To locate the request status object: crs, see Chapter 2 in the *CA SDM Technical Reference Guide*.

   The following pseudocode example shows how this method call looks:

   ```
   //empty array of strings
   String attributes[] = new String[0]
   xmlReturn = USDWebService .doSelect(SID, "crs", "sym = 'Work In
   Progress'", 1, attributes[])
   ```

6. Update the status.

   The final step in this example is to change the status of the incident. By completing the previous steps, you have handles for the creator, incident, and status. You have all of the necessary information to call the changeStatus method.

   The following pseudo code example shows how this method call looks:

   ```
   //changeStatus method definition
   //changeStatus(SID, creator, objectHandle, description, setStatus, newStatusHandle)
   xmlReturn = USDWebService .changeStatus(SID, creatorHandle,
   newTicketHandle, True, StatusHandle)
   ```

7. Log out.

   Log out of the web service using the logout method and invalidate the SID.

   This example is complete and the incident has a new assignee, priority, and comment. The advantage of using the web service in this situation is that all of the notifications and escalations occur. A service event occurs when an incident is unassigned for an hour. That event does not trigger because of the actions that are taken through the web service.

Performing a Knowledge Search

The most common task that is performed using the knowledge-related functions is a search of the knowledge base. The search method takes a search string as input to query the knowledge base. The search method takes various input parameters, allowing a user to define the type of search to be performed, and how the results are returned.

The following pseudocode example shows how a call to the search method is formatted and the key parameters are explained.

```
String searchString = "printer toner error"
integer resultSize = 10
string propertyList = "id, Title, Summary"
integer searchType = 2 //keyword search = 2
integer matchType = 0 //'Or' search = 0
integer searchFields = 1 + 2 + 4 //title, summary and problem
integer maxDocIDs = 20
xmlReturn = USDWebService.search(SID, "printer toner error", resultSize,
propertyList, "", True, False, searchType, matchType, searchFields, "", "",
maxdocIDs)
```

String searchString = "printer toner error"

The goal of this example is to return knowledge documents that are relevant to the search string *printer toner error*. The search method call takes several key parameters that define the way search is performed and constrain the returned results.

The first parameter in the function call is the SID which designates proper access to the web service followed. The SID follows the search string, which in this example is *printer toner error*.

integer resultSize = 10

In this example, the resultSize variable sets the limit of knowledge documents with their appropriate attributes to return to 10. This parameter differs from the maxDocIDs variable which sets the maximum number of knowledge document IDs to return based on the search. The search method call returns the first 20 relevant document IDs, and, for the top 10 results, returns all of the attributes listed in the propertyList. The extra ten document IDs can be useful later to retrieve the additional results.

string propertyList = "id, Title, Summary"

The propertyList variable specifies the knowledge document attributes to return for the top ten documents. In this example, id, Title, and Summary are retrieved. For a list of all the knowledge document (kd) object attributes, see Chapter 2 in the *CA SDM Technical Reference Guide*.

The next two parameters in the function call set how the results are sorted. The default search orders results by their relevance. To help ensure that the results are in ascending order, pass the next value as *True*. Therefore, the output of the search shows the top ten documents that are ordered from most relevant to least relevant.

The next parameter that is passed is a Boolean False value. This value tells the search method not to retrieve related categories for the returned documents. This value is helpful if the results must use or display the other categories in which the documents reside.

searchType, matchType, and searchFields all designate how the search is performed against the knowledge base.

integer searchType = 2 //keyword search = 2

searchType designates the type of search as either natural language or keyword.

integer matchType = 0 //'Or' search = 0

matchType is used to specify if the search must be an "Or," "And," or "Exact Match" search.

integer searchFields = 1 + 2 + 4 //title, summary, and problem

searchFields is an integer value that tells the method which fields to search. In this example the title, summary, and problem fields are used to find the keywords "printer toner error."

integer maxDocIDs = 20

xmlReturn = USDWebService.search(SID, "printer toner error", resultSize, propertyList, "", True, False, searchType, matchType, searchFields, "", "", maxdocIDs)

The last two string parameters are left empty in this example to take the defaults. The first empty string can be used to limit the search to one or more knowledge categories. The default is to search all knowledge categories. The last empty string can be used to add an additional *where* clause on the search.

Additional Methods to Create Tickets

The Creating an Incident (see page 51) example showed how you can use the web service to create an incident. If there are many attributes to set during the call, creating an incident can become a tedious task. The createQuickTicket (see page 60) and createTicket (see page 60) methods make this task much easier for simple tickets and defined integrations.

createQuickTicket

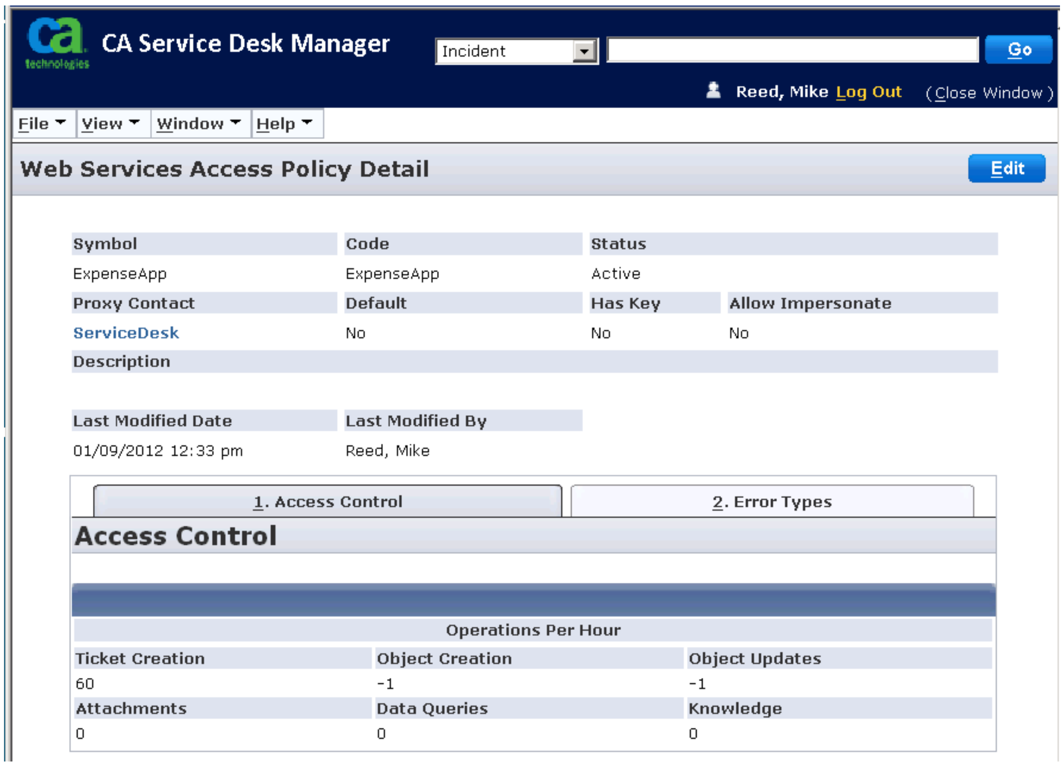
The createQuickTicket method is best used when you must create a simple ticket with only a brief description. The ticket type is selected based on the preferred ticket setting for the user with their access type. The method call only requires a SID, customer handle, and description. These requirements make this method straightforward and easy to use, but lack the detail that the more advanced methods provide.

createQuickTicket is best used for simple or test integrations that must only report a ticket to CA SDM. This method is not recommended for large-scale integrations because it creates tickets with little detail for analysts to use in troubleshooting.

createTicket

Like the createQuickTicket method, the createTicket method simplifies the process of creating a ticket. However, createTicket uses the web service policy settings within CA SDM administration. These policies allow a CA SDM administrator to define the ticket type, frequency, and problem type that integration can create. As a result, the integration is simplified and it can also help prevent ticket floods, if a problem repeatedly occurs with an integrated application.

The following example shows a Sample Web Services Access Policy:



Web Services Access Policy Detail

Symbol	Code	Status	
ExpenseApp	ExpenseApp	Active	
Proxy Contact	**Default**	**Has Key**	**Allow Impersonate**
ServiceDesk	No	No	No
Description			
Last Modified Date	**Last Modified By**		
01/09/2012 12:33 pm	Reed, Mike		

1. Access Control | 2. Error Types

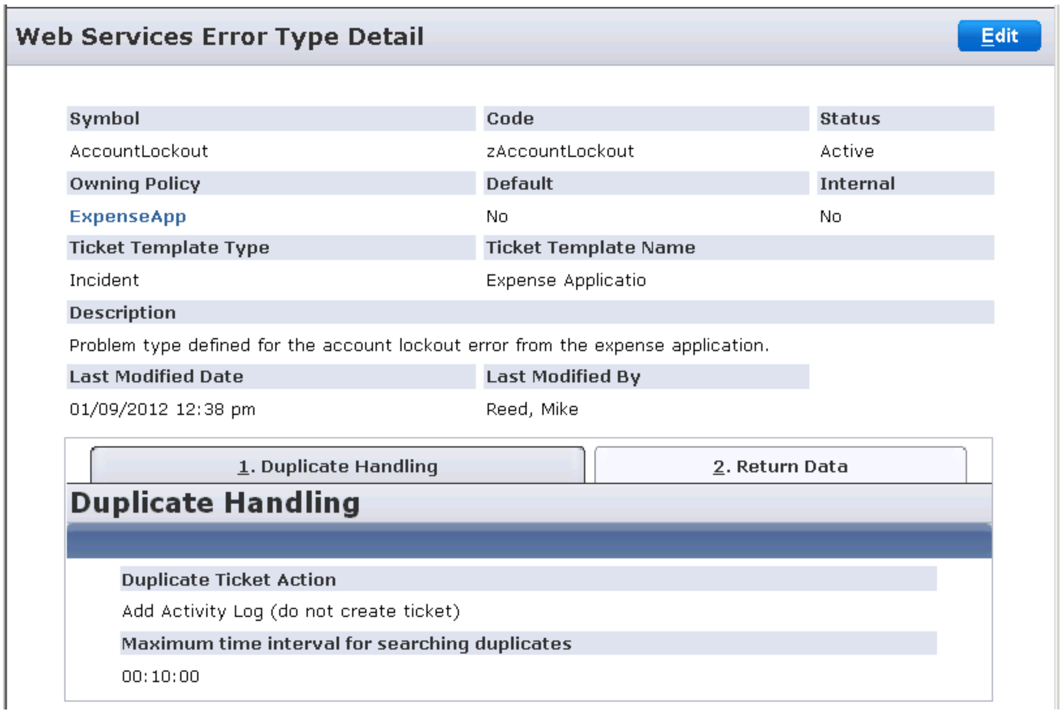
Access Control

Operations Per Hour

Ticket Creation	Object Creation	Object Updates
60	-1	-1
Attachments	**Data Queries**	**Knowledge**
0	0	0

A web services policy controls the access that the user (or integrated application) has when communicating with CA SDM through the web services. As illustrated in the previous example, the policy defines any limitations on accessing or updating data with the web service. The Access Control tab specifies the number of operations that can occur within an hour. For example, a user under this policy can create a maximum of 60 tickets an hour, without a limit on creating objects. The user cannot create attachments, query data, or cannot search the knowledge base.

The following example shows a sample web services problem type that defines how duplicate tickets are handled:



Web Services Error Type Detail

Symbol	**Code**	**Status**
AccountLockout	zAccountLockout	Active
Owning Policy	**Default**	**Internal**
ExpenseApp	No	No
Ticket Template Type	**Ticket Template Name**	
Incident	Expense Applicatio	

Description

Problem type defined for the account lockout error from the expense application.

Last Modified Date	**Last Modified By**
01/09/2012 12:38 pm	Reed, Mike

Duplicate Handling

Duplicate Ticket Action

Add Activity Log (do not create ticket)

Maximum time interval for searching duplicates

00:10:00

A problem type links to a policy and defines the ticket type and template that is created when this problem occurs. In addition, the problem type can define what to do when a duplicate ticket is encountered. In this example, a new ticket is not created but an activity log is added to the previously created ticket.

The following example explains the steps to access the sample web services policy and use it to report an account lockout error with the expense application.

1. Log in to the web service.

   This login process is slightly different from the previous examples. When using policies, the user must define the policy that they are using at login using the loginService method. In addition to the username and password, the method requires the code of the policy that can be used.

   ```
   SID = USDWebService.loginService(username, password, "ExpenseApp")
   ```

2. Create the ticket.

   To report the ticket, only one other method call is required. The createTicket method only requires the SID and problem type. This method utilizes the web services policy and problem types defined in CA SDM, which simplifies this process. This method can accept additional information such as a description, asset, and end user. However, these fields are not required.

   ```
   //define the string variables for the new ticket number and handle the String.
   newTickethandle, newTicketNumber

   //CreateTicket method definition

   //CreateTicket(SID, description, problem_type, Userid, Asset, DuplicationID,
   NewTicketHandle, NewTicketNumber)

   //create the new ticket using the problem type AccountLockout
   xmlReturn = USDWebService.createTicket(SID, "new ticket description",
   "AccountLockout", "", "", "", newTicketHandle, newTicketNumber)
   ```

This example is now complete and demonstrates the reduced amount of work that is necessary when using web services access policies. Policies are highly recommended when a user having little or no experience with CA SDM creates the integration. The policy hides the CA SDM complexity and allows the user to focus on reporting the problem and letting the CA SDM administrator define how that integration is interpreted.

For more information about web services policies and the createTicket method, see the:

- *Simplified Web Services Access* section in Chapter 7 of the *CA SDM Technical Reference Guide*
- Online Help in the CA SDM web interface

Using Public Key Infrastructure Authentication and Interacting with the Web Interface

This section explains how to use the web services advanced features for secure authentication and interacting with the web interface. The web services Public Key Infrastructure (PKI) features provide an additional layer of security when authenticating to CA SDM. For additional information about PKI authentication and the loginServiceManaged method, see the *CA SDM Technical Reference Guide*.

PKI Authentication Sample Overview

The following information includes detailed steps and sample code that leverages the web services ability to generate certificates and use the generated certificates to access the web services. Certificates are typically used in environments that require a higher level of security, such as having external users or vendors accessing the web services.

In the following example, you complete the login process using the CA SDM certificate and then make several common web services calls. The more interesting of the two is the getBopsid() web services method call, which allows you to obtain a token that is linked to a specific user. This token can be used to log in to the CA SDM web interface as the linked user without being prompted for a password. As a result, you have a seamless integration between different applications. The generated BOPSID token expires after approximately 10 seconds, so it must be used promptly.

Prerequisites

Before you begin, verify the following prerequisites:

- Verify that you use the AXIS Tool that is known as WSDL2Java to generate the required stub classes.

  If you have not previously created the stub classes, continue to the next section Generating Stub Classes with AXIS Tool WSDL2Java. This section provides a sample script and the steps to generate the stub classes. If you have already completed this step, continue to the section Creating and Using a PKI Certificate (see page 66).

- Verify that you have the short form of the CA SDM directory and the path of the Java compiler.

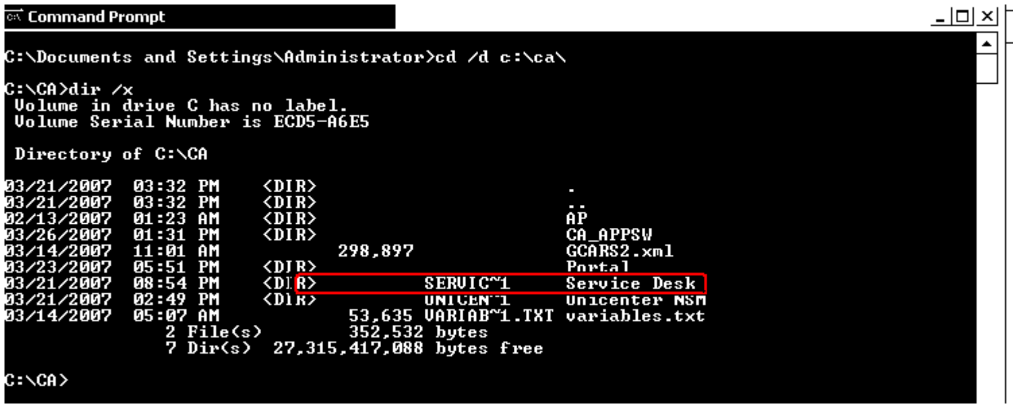
Generating Stub Classes with AXIS Tool WSDL2Java

Complete the following steps to generate sub classes with the AXIS Tool WSDL2Java.

1. Open a Command Prompt window and change the directory to the C:\program files\CA directory.

2. Run the dir /x command to see the short form of the CA SDM directory.

   In the following example, the short name is SERVIC~1. Note the CA SDM directory; this information is needed later:



```
Command Prompt

C:\Documents and Settings\Administrator>cd /d c:\ca\

C:\CA>dir /x
 Volume in drive C has no label.
 Volume Serial Number is ECD5-A6E5

 Directory of C:\CA

03/21/2007  03:32 PM    <DIR>                          .
03/21/2007  03:32 PM    <DIR>                          ..
02/13/2007  01:23 AM    <DIR>                          AP
03/26/2007  01:31 PM    <DIR>                          CA_APPSW
03/14/2007  11:01 AM           298,897                 GCARS2.xml
03/23/2007  05:51 PM    <DIR>                          Portal
03/21/2007  08:54 PM    <DIR>          SERVIC~1      Service Desk
03/21/2007  02:49 PM    <DIR>          UNICEN~1      Unicenter NSM
03/14/2007  05:07 AM            53,635 VARIAB~1.TXT variables.txt
               2 File(s)        352,532 bytes
               7 Dir(s)  27,315,417,088 bytes free

C:\CA>
```

3. Search for javac.exe on the local drives of all of the servers. If you locate a drive, note its path. You reference the path later in the bat file. If you do not find the executable, follow these steps:

   a. Navigate to the Oracle Java SE Downloads page at http://java.sun.com/javase/downloads/index.jsp.

   b. Locate and download Java J2SE SDK.

   c. Install the SDK after the download is complete.

   d. Restart the computer.

   Note: CA SDM Release 12.x, when installed on Windows Server, installs with a java compiler.

The following sections include the batch files with the code required to generate stub classes. In addition to these samples, working samples that are delivered with the product for Java and Perl are available. You can find these samples in the following location: $NX_ROOT\samples\sdk\websvc\. For more information about the samples, open TableOfContents.doc in this folder location.

Create a .bat File (Windows Servers)

In this step, create a .bat file named build_wsdl.bat and place it in the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis\ directory.

Note: You can copy the example code that is provided in the Appendix.

Create a Script File (Linux and UNIX Servers)

In this step, create a script file named build_wsdl.sh and place it in the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis\ directory.

Note: You can copy the example code that is provided in the Appendix.

After you create the batch file, run it from the command line. Verify that you are running the file from the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis\ directory. After you run the batch file, the stub classes are in place and compiled.

After you complete all of the previous steps, run the following commands to recycle Apache Tomcat:

```
pdm_tomcat_nxd -c STOP
pdm_tomcat_nxd -c START
```

Note: Instead of running the previous commands, you can recycle CA SDM.

Creating and Using a PKI Certificate

1. Verify that CA SDM is up and running.

2. Open a Command Prompt window and run the following command:

   ```
   pdm_pki -p DEFAULT
   ```

   This command creates the DEFAULT.p12 file in the current directory. This policy has the password equal to the web services policy name that exists in CA SDM (in this case DEFAULT).

   This command adds the public key of the certificate to the field pub_key field (public_key attribute) in the sapolicy table/object.

3. Open the CA SDM web interface and navigate to Administration, Web Services Policy, and Policies.

4. In the DEFAULT web services policy, complete the following steps:

    a. Insert the Proxy Contact (in this case ServiceDesk).

    b. Confirm that the DEFAULT policy record field shows Has Key = YES.

5. Copy DEFAULT.p12 file to the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis directory.

6. Create an htm file named pkilogin in the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis directory and copy the following code into the new file, pkilogin.htm.

    Note: You can copy the example code for pkilogin.htm that is provided in the Appendix.

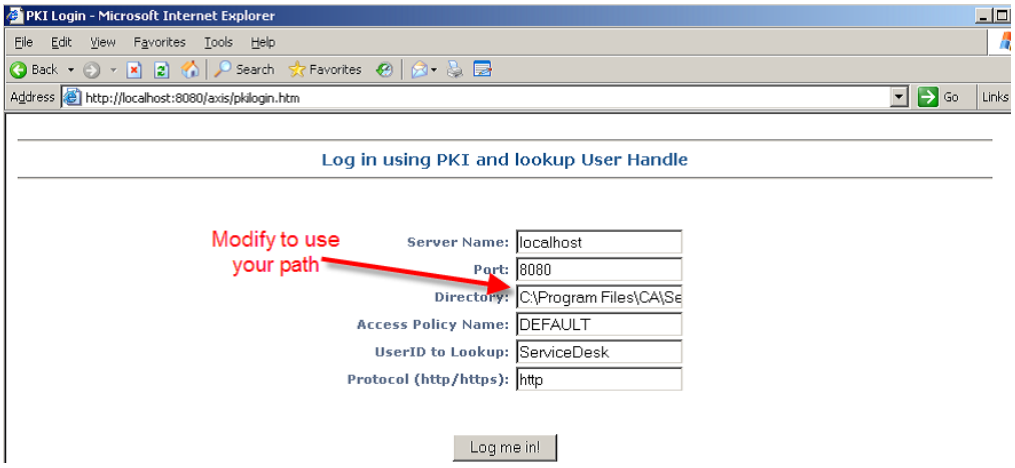
7. Create a JSP file named pkilogin in the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis directory and copy the following code into the new file, pkilogin.jsp.

    Note: You can copy the example code for pkilogin.jsp that is provided in the Appendix.

8. Open the HTML form page at (http://localhost:8080/axis/pkilogin.htm), where localhost is the name of the CA SDM server, and 8080 is the default tomcat port. Complete the fields and click *Log me in!*

   The JSP page launches to run the login process to the web service using the DEFAULT access policy and ServiceDesk userid. The values can be changed if necessary to test against other policies and users.

   Note: The Directory field is the location where the certificate file that was previously created can be found. Use the short path name in the *Directory* field.


PKI Login - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://localhost:8080/axis/pkilogin.htm
Go Links
Modify to use your path
Log me in!

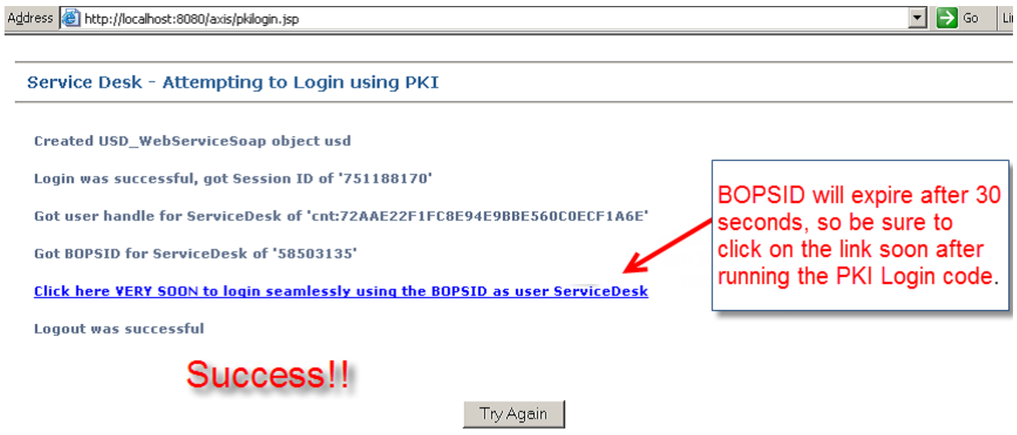
Log in using PKI and lookup User Handle

Server Name:	localhost
Port:	8080
Directory:	C:\Program Files\CA\Se
Access Policy Name:	DEFAULT
UserID to Lookup:	ServiceDesk
Protocol (http/https):	http

   After you click the *Log me in!* button, a result page opens to show the details of the PKI authentication and other web services calls. The URL that is embedded in the results page is a hyperlink to the CA SDM web interface. This hyperlink provides a seamless login (no login/password required) using the BOPSID functionality that is called after the login process completed. The getBopsid method provides for opening the web interface without a login and is often used in integrations. Click the URL for the login process to complete successfully as the BOPSID has a limited life token of 30 seconds that is linked to a specific user. The format of a URL using a BOPSID is:

   http://*servername:port*/CAisd/pdmweb.exe?BOPSID=*BOPSID value*

This URL navigates to the main page of CA SDM. Other URLs can be used to navigate directly to other pages like the profile browser.



Service Desk - Attempting to Login using PKI

Created USD_WebServiceSoap object usd

Login was successful, got Session ID of '751188170'

Got user handle for ServiceDesk of 'cnt:72AAE22F1FC8E94E9BBE560C0ECF1A6E'

Got BOPSID for ServiceDesk of '58503135'

Click here VERY SOON to login seamlessly using the BOPSID as user ServiceDesk

Logout was successful

BOPSID will expire after 30 seconds, so be sure to click on the link soon after running the PKI Login code.

You can extend a BOPSID by adding a variable named @NX_BOPSID_TIMEOUT to the $NX_ROOT\NX.env file. The default value is 30, which represents 30 seconds.

Common Mistakes

This section covers several of the common mistakes that users encounter when using the web services.

Using Handles

The most common error that users encounter is passing a sym value to a function rather than a persistent_id or handle.

For example, when a customer calls the createRequest function they pass a list of attributes that can include the priority of the request or incident. The value that is passed with priority must be a handle for that priority such as pri:502, instead of the actual priority value of 3. This mistake often appears in the SOAP error message *Bad Handle*.

For a list of out-of-the-box handles, read the Perform Common Tasks section in Chapter 3 of the *CA SDM Technical Reference Guide*.

Defining and Using Arrays Of Strings

Many of the methods in the web service require an array of strings. An array of strings is a data type that passes data to the CA SDM web service that can hold zero or more string values.

Note: When passing data to functions that require an array of strings, the function accepts an empty array of strings but the function does not accept a single empty string. For example, passing "" to a function that requires an array of strings results in a data type error.

The following examples are provided to illustrate how to define an empty array of strings to pass to a method:

C#

```
String[] emptyArray = new string[0];
```

Visual Basic .NET

```
Dim emptyArray As String() = {}
```

Java

```
String emptyArray[] = new String[0];
```

The following example shows how an array of strings showing name value pairs is formatted in XML:

```
<ArrayOfString>
<String>assignee</String>
<String>cnt:38293</String>
String>description</String>
String>My new description</String>
String>priority</String>
<String>pri:38903</String>
</ArrayOfString>
```

Troubleshooting Failed Web Services Method Call

Using TCPMon

TCPMon is one of many ways to intercept web services traffic between the web services client and the server. This product can provide useful data to CA Technologies Support when there is a problem with a web services call or integration.

TCPMon is an open source utility for monitoring the data flowing on a TCP connection. TCPMon is placed in between a client and a server. The client requests are first sent to TCPMon, which then forwards the request to the server. TCPMon also displays the request and the response in its own graphical user interface. You can download TCPMon from https://TCPMon.dev.java.net/.

TCPMon can reside on *any* computer on the same network as the CA SDM web services.

Note: This product is useful when you cannot recycle CA SDM Tomcat to enable advanced AXIS logging.

Configure TCPMon

You configure TCPMon to specify the details of the CA SDM server that you must monitor.

Configure the following fields in the Create a New TCP Monitor Connection window in TCPmon:

Local Port

Specifies the port where TCPmon runs. Use netstat to verify that the port is not already in use.

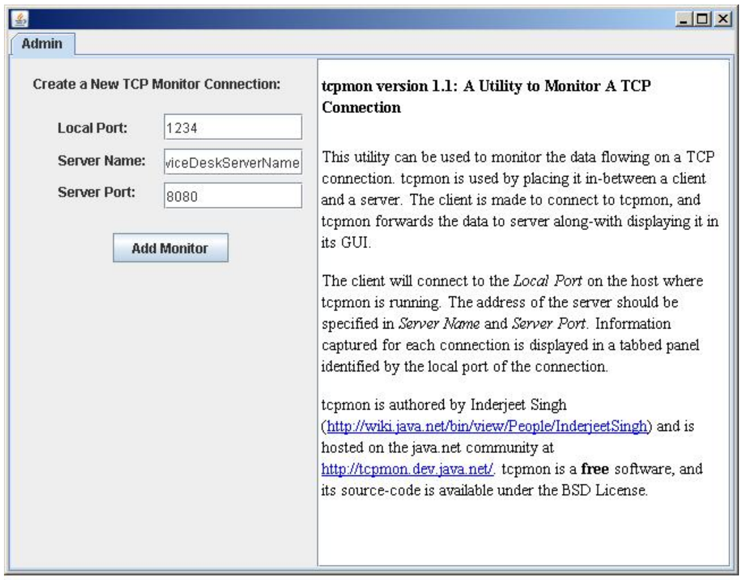
Server Port

Specifies CA SDM Tomcat port.

Server Name

Specifies the host name or IP address of the CA SDM server.

The following example shows a sample configuration on TCPMon:



Create a New TCP Monitor Connection:

Local Port: 1234

Server Name: viceDeskServerName

Server Port: 8080

tcpmon version 1.1: A Utility to Monitor A TCP Connection

This utility can be used to monitor the data flowing on a TCP connection. tcpmon is used by placing it in-between a client and a server. The client is made to connect to tcpmon, and tcpmon forwards the data to server along-with displaying it in its GUI.

The client will connect to the *Local Port* on the host where tcpmon is running. The address of the server should be specified in *Server Name* and *Server Port*. Information captured for each connection is displayed in a tabbed panel identified by the local port of the connection.

tcpmon is authored by Inderjeet Singh (http://wiki.java.net/bin/view/People/InderjeetSingh) and is hosted on the java.net community at http://tcpmon.dev.java.net/. tcpmon is a **free** software, and its source-code is available under the BSD License.

Reconfigure the Web Services Client

You reconfigure the web services client to redirect requests to the port where TCPmon is running as shown in the following example.

http://*tcpmonhost*:*tcpmonport*/axis/services/USD_R11_WebService

tcpmonhost

Specifies the host name of the computer where TCPmon is running.

tcpmonport

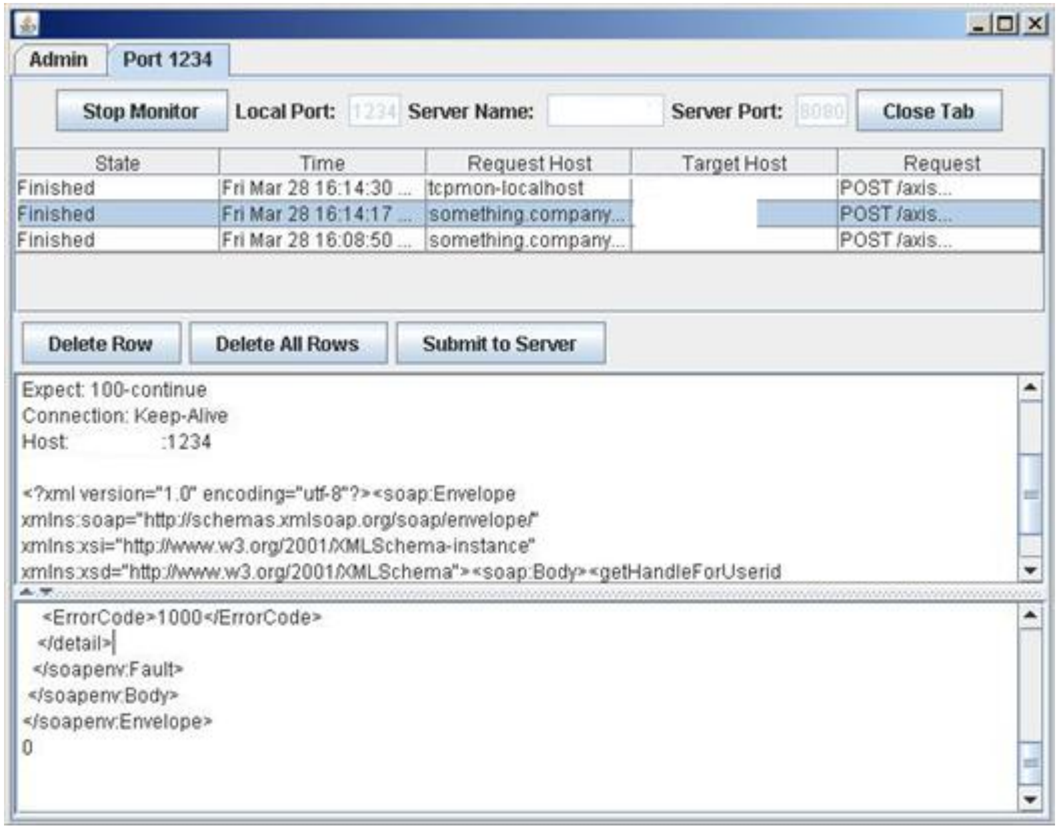
Specifies the port number where TCPmon is running. This port corresponds to the Local Port specified in the TCPmon configuration.

You can now launch the client application and monitor the output in TCPmon.

The following example helps illustrate TCPMon capturing an error.

- The bottom pane shows the Web Services Exception.
- The top pane shows the requests that are sent to the CA SDM server.
- The middle pane shows the response from CA SDM.

This example captured a working call. Notice the handle (persid) returned in the bottom pane.



State	Time	Request Host	Target Host	Request
Finished	Fri Mar 28 16:14:30 ...	tcpmon-localhost		POST /axis...
Finished	Fri Mar 28 16:14:17 ...	something.company...		POST /axis...
Finished	Fri Mar 28 16:08:50 ...	something.company...		POST /axis...

```
Expect: 100-continue
Connection: Keep-Alive
Host:            :1234

<?xml version="1.0" encoding="utf-8"?><soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><getHandleForUserid
```

```
   <ErrorCode>1000</ErrorCode>
  </detail>
 </soapenv:Fault>
 </soapenv:Body>
</soapenv:Envelope>
0
```

This information is helpful to troubleshoot issues with web services. You can view the requests that are sent to CA SDM and the response to the web services client. This information helps you identify which method is not working as expected.

Troubleshooting Problems When Tomcat Hangs or Crashes

A web services client can expose a problem in CA SDM when Tomcat hangs or crashes. The following sections describe the information that CA Technologies Support requires to help debug and troubleshoot the problem. Before you open an issue with CA Technologies Support, perform the steps in these sections.

Disable Existing pdf_logstate Logging

The current stdlog is cluttered with verbose logging unrelated to your issue or was left enabled from other past activities. Execute the following command to disable all existing pdm_logstat logging:

```
Pdm_logstat –vL > logstat.outputstepA
```

This command produces the logstat.outputstepA file. CA Technologies Support reviews the logstat.outputstepA file and provides you with commands to disable existing logging unrelated to this Tomcat issue.

Enable Tomcat Debug Logging

Edit the %$NX_ROOT%\bopcfg\www\CATALINA_BASE\webapps\CAisd\WEB-INF\log4j.properties file and change the following line to configure Tomcat debug logging:

```
log4j.rootCategory=info, jsrvrlog TO log4j.rootCategory=debug, jsrvrlog
```

This command enables debug logging for Tomcat.

Create axis.log and jsrvrbop.log Files

Follow these steps:

1. Create the file: %NX_ROOT%\bopcfg\www\CATALINA_BASE\webapps\axis\WEB-INF\classes\log4j.properties.

   Note: You can copy the example code that is provided in the Appendix.

2. Recycle Tomcat using the following commands:

   ```
   pdm_tomcat_nxd -c stop
   pdm_tomcat_nxd -c start
   ```

   After you recycle Tomcat, verify that the axis.log and jsrvrbop.log files have been created in the $NX_ROOT\log directory. If you do not find these files in this location, contact CA Technologies Support.

Enable Tracing on the CA SDM Server

Enable tracing on the CA SDM server to monitor Tomcat workflow within CA SDM.

Follow these steps:

1. Increase the stdlog file size from the default of 3 MB to 10 MB using the following command:

   ```
   pdm_logfile -b 10000000
   ```

   ```
   //This can increase STDLOG.x file size to 10meg each.
   ```

2. Enable verbose logging for these components by running these commands:

   ```
   pdm_logstat -n sda 300
   pdm_logstat -f api.spl 300
   ```

   The output is written to the STDLOG.x files under $NX_ROOT\log directory.

3. Enable BP message tracing on these processes:

   ```
   pdm_trace spelsrvr SIZE 10000
   pdm_trace spelsrvr ON
   pdm_trace domsrvr SIZE 10000
   pdm_trace domsrvr ON
   ```

   Pdm_trace is useful for finding the sequence of events leading up to a particular log message or a process crash.

   You can configure your system to handle Tomcat traffic on a domsrvr\spelsrv process other than the default one. Options Manager lets you configure a specific domsrvr to handle web services calls. For information about setting up an exclusive domsrvr/splsrvr or domsrvr/webengine named pair, see the *CA SDM Administration Guide*.

   The option installs an NX variable named NX_WEBSERVICES_DOMSRVR in the file $NX.env. If you do not set this variable, the default domsrvr\spelsrvr process on the primary is used. The previously mentioned tracing commands can be used. If set, verify your configuration and enable message tracing on the following processes, provided they have been configured to use the none default domsrvr\spelsrvr:

   ```
   pdm_trace slump_name_of_spelsrvr SIZE 10000
   pdm_trace slump_name_of_spelsrvr ON
   pdm_trace slump_name_of_domsrvr SIZE 10000
   pdm_trace slump_name_of_domsrvr ON
   ```

   slump_name_of_domsrvr is the value specified in the $NX_WEBSERVICES_DOMSRVR variable.

4. Run the following command to find the associated spelsrvr slump name pair:

   ```
   slstat
   ```

   Pdm_trace commands write output to a trace log file in the $NX_ROOT\log directory when disabled.

Enable Interval Logging on the CA SDM Primary Server

Enable interval logging on your primary CA SDM installation. The following instructions are applicable for Windows. For information about how to perform a similar logging for Linux or UNIX, contact CA Technologies Support. The key for UNIX logging is to have process output added, which is equivalent to pslist output on Windows (outputting CPU and Memory utilization).

Follow these steps:

1. Download Microsoft PSTools from the following URL: http://www.microsoft.com/technet/sysinternals/utilities/pslist.mspx.

   A ZIP file is downloaded.

2. Create a folder named perfout on the C Drive and unzip the downloaded file to the C:\perfout folder.

3. Use the example perf.bat code provided in the Appendix to create a text file and save it as a .bat file, for example, perf.bat.

4. Schedule the batch file to run every 3 minutes using Windows Task Scheduler.

   The output is filtered to the C:\perfout.

Create a Dump of javaw

From the $NX_ROOT/bin directory, run the following commands:

```
//if you have r11.2 installed
pdm_ident sda60.dll > sda60_ident.txt

//if you have r12 installed
pdm_ident sda65.dll > sda65_ident.txt
```

This output is necessary for CA Technologies Development to review a dump of javaw, if retrieved. Pdm_tomcat_nxd.exe is not the process we need pdm_ident against to be able to read javaw dump files. Our Tomcat is javaw process not pdm_tomcat_nxd.exe. pdm_tomcat_nxd.exe is a process that starts and stops the Tomcat javaw process.

Disable Tracing

When you see the next outage, disable tracing by executing the following command:

```
pdm_logstat -n sda
pdm_logstat -f api.spl
```

Run pdm_trace slump_name on, where slump_name is the slump name of the process being traced. For Example if the default domsrvr is used, run:

```
pdm_trace spelsrvr OFF
pdm_trace domsrvr OFF
```

Turn off the Axis logging initiated previously.

Take a Dump of the Process

You can either use the UserDump utility or the Microsoft Process Dumper utility to take a dump of the process. However, the Microsoft Process Dumper utility dumps a process being monitored whenever it throws an exception or crashes (terminates from the Task Manager Process list). The Process Dumper utility does not help to determine javaw crashing. For instance, when javaw throws exceptions, the Process Dumper utility does not necessarily crash or hang as most javaw exceptions are not fatal. However, Process Dumper dumps javaw for every exception. Tomcat (javaw) is stalled or hung while Task Manager is running. Hence, when the problem occurs and you see javaw running in Task Manager, follow these steps to take the dump of the process:

Follow these steps:

1. To dump a running process that is not responsive or hanging, use the Microsoft utility named USERDUMP.exe. Download userdump.exe from the following URL:

   http://www.microsoft.com/downloads/details.aspx?FamilyID=E089CA41-6A87-40C8-BF69-28AC08570B7E&amp;displaylang=en&displaylang=en

2. Install userdump.exe and run the following command:

   ```
   userdump javaw
   ```

   This command gets the dump without killing the process. The Javaw process crashed or terminated and a new javaw PID starts but no dump file was produced. Verify that the underlying operating system is configured to produce a Windows crash dump (drwatson32.exe –h) or a UNIX core file (ulimit –a). If Javaw continues to crash and no dump is produced, use the Microsoft Process Dumper.

Execute USD_WS_R12_JWS.exe to Test Tomcat Responsiveness

Execute USD_WS_R12_JWS.exe to test Tomcat responsiveness to a web service application.

Follow these steps:

1. Open the executable, click Setting, URL and specify the server name and port number.
2. Click Build URL and then click Save.
3. Click Setting, Set User.
4. Enter the Username and Password for a CA SDM Contact.
5. Click Quick Login and verify whether the session is created.

   If this application responds during the problem, it indicates that Tomcat is not hanging. The problem is with the application and not necessarily with the CA SDM Web Services.

Send the Dump and Traces to CA Technologies Support

Send the following information to CA Technologies Support when you open the issue:

- Entire ServiceDesk log directory, $NX_ROOT\log.
- Javaw dump file specifies who generated the dump.
  - The Process Dumper automatically generated the dump.
  - The dump was manually created by executing the userdump.exe.
  - The operating system (using drwatson) produces it automatically.
- If this dump is from a crash, follow the Windows Dump Checklist template as much as you can for Javaw.exe or the Core Dump Checklist template for UNIX.
- pdm_ident output files.
- Logstat.outputstepA (the pdm_logstat –vL output file).
- Any hs_err_pidXXX.log files.
- Date\time stamp of when the Tomcat problem is reported or seen.
- C:\perfout directory.
- The result of running USD_WS_R12_JWS.exe: success or failure.

Web Services API Best Practices

- If you have integrated CA SDM with CA Process Automation and the integration is used heavily, consider using a secondary CA SDM server for either the web services application or for the integration.
- Add a webengine/domsrvr pair for each secondary server used.
- Consider placing the Repository Daemon on the secondary server and use the document repository on that secondary server.
- After every set of web services calls, the web services client must perform a logoff().
- Each web services client who is using loginService() or loginServiceManaged() methods must use a different CA SDM web services policy. These methods are preferred over the login() method.
- Each web services client must use a different login in CA SDM. Using the ServiceDesk user login is not a good practice.
- Avoid using wildcards such as an asterisk (*) in search methods, like doquery or getlist. This practice helps avoid the extra overhead on the domsrvr. We strongly recommended that you do not use searches with surrounding wildcards, for example: *string*. Expressions having asterisk result in large table scans, which can negatively impact the performance of the database and CA SDM.
- Avoid requesting large data sets with the web service method calls like doSelect().

  For example:

maxRows	Integer	Indicates the maximum number of rows to return. Specify -1 to return all rows.

  Using -1 is not a good practice as it retrieves all of the rows. Test all web service calls before moving into production environment to see whether there is an impact on performance.

- Consult with CA Technologies Support before upgrading Tomcat. The compatibility issues arise or special steps needed.
- Fully test all web services clients in your own labs before moving into a production environment. A web service client can easily impact the performance CA SDM.

- The Service Desk Web Director does not work for Web Services.
- Increase the Tomcat Memory (JVM size) to as much as 1 GB.

  For more information about common errors on Java heap size, see the tech doc: TEC418959 on http://support.ca.com.
- Increase the Max Threads for Tomcat to 150 or 200. The Max Threads default is 75.

  Locate the server.xml file from $NX_ROOT/bopcfg/www/CATALINA_BASE/conf. Find the appropriate "connector" section and change maxproc from 75 to 150 or 200. For example:

  ```
  <Connector acceptCount="100"
  className="org.apache.coyote.tomcat4.CoyoteConnector"
  connectionTimeout="20000" debug="0" disableUploadTimeout="true"
  enableLookups="true" maxProcessors="150" minProcessors="5" port="8080"
  redirectPort="8443" useURIValidationHack="false"/>
  ```

  After you save the file, recycle the CA SDM Daemon Server.
- For a new implementation, use the latest cumulative patch level for CA SDM.
- If you are using CMDB GRLOADER in a busy CA SDM environment, run GRLOADER on a dedicated secondary server.
- Consult CA Workflow Best Practices in the following URL while using CA Workflow, as CA Workflow also uses the CA SDM Web Services API:

  Best Practices
  https://support.ca.com/irj/portal/anonymous/phpdocs?filePath=0/7956/7956_tecdoc.html#bestpractices
- If you are using a secondary Tomcat instance for web services calls, the domsrvr\spelsrvr that handles the calls uses the default domsrvr\spelsrvr processes on the CA SDM primary server. As a result, any logging for web services issues requires bop_logging or pdm_trace on the primary server.
- Options Manager lets you configure a particular domsrvr for Web Services calls. Determine the domsrvr in use for appropriate logging while debugging a web services issue. The option installs a $NX variable named $NX_WEBSERVICES_DOMSRVR. If this variable is not set, the default domsrvr\spelsrvr process on the primary server is used.
- Using a dedicated domsrvr for web services is a best practice for heavy loads.

bop_cmd Command

The bop_cmd command is an object-oriented command-line interface that executes defined methods for CA SDM objects. This command has great flexibility, but requires detailed knowledge of CA SDM.

How bop_cmd Works

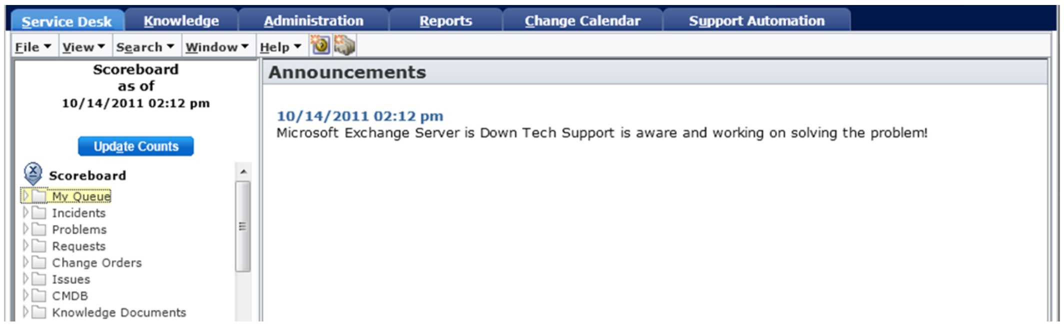
bop_cmd is a command line utility that can execute fragment files. Fragment files are on demand applications written in spel code, which is a CA Technologies proprietary language. CA Technologies spel closely resembles straight C code, with many built-in functions and features that designed around the CA SDM architecture. The bop_cmd command executes the fragment file which can invoke a set of parameters in the same command line.

The following example illustrates how to execute the fragment file named *cnote.frg* to add an announcement in CA SDM.

From the command prompt on a CA SDM computer, enter the following command:

```
C:\Program Files\CA\Service Desk\bopcfg\interp>bop_cmd -f cnote_add.frg
"cnote_add (Microsoft Exchange Server is Down Tech Support is aware and
working on solving the problem!)"
```

You can see the announcement that was added about an outage with the Microsoft Exchange server in the following example:



Announcements

10/14/2011 02:12 pm
Microsoft Exchange Server is Down Tech Support is aware and working on solving the problem!

Business Challenge Example

Michael Reed, the service desk manager at Forward, Inc., is having some difficulties managing accurate information for the incidents and requests that have been assigned to the technicians that travel on site. The technicians are not able to update the tickets in a timely manner from the customer location because they cannot access CA SDM. Recently, Forward, Inc. has been successful by providing its staff with handheld devices that are able to send Telealert messages to update data in other applications. Knowing, Michael Reed has requested that those individuals responsible for implementing CA SDM integrate the message center application with CA SDM. Through the integration, service desk technicians can create or update incidents and requests while working at a customer site.

CA Technologies Approach

CA Technologies Services have been engaged at Forward, Inc. Working together with a developer at the client, they create two fragment files that provide a solution to the request that Michael raises.

bop_cmd Command Best Practices

Reference these best practices when working with the bop_cmd command:

- Become familiar with the CA SDM architecture and the way the objects and attributes are defined and work.
- Identify the objects and attributes to update during the fragment file execution.
- Identify the attributes that are required to save the appropriate information in the object.
- During the testing phase, review the CA SDM stdlogs for possible messages which can provide notifications about inconsistencies.

Configuring the Solution

Preparing to Generate a New Incident or Request

To prepare for configuring the solution and generate a new incident or request, first read the information about the gencr method (gencr.frg) in Appendix A of the *CA SDM Implementation Guide*.

Note: The file named gencr.frg, explained in Appendix A, can be found in the following default install directory: C:\Program Files\CA\Service Desk\samples\call_mgt.

Configuring the Solution from CA SDM

To configure the solution from CA SDM, copy the gencr.frg file into the following directory:

```
$NX_ROOT\bopcfg\interp
```

Configuring the Solution from the Alert Message Product

To configure the solution from the Alert Message product, configure the third-party product so that it can to pass the required parameters. In addition, verify that the parameters are in the following format:

```
bop_cmd -u user-id -f gencr.frg "gencr("""description""", """asset""",
"""""", """2""", """Work In Progress""", """Applications""",
"""assignee""", """group """, """charge back""",   """impact""",
"""urgency""", """severity""", """type""")"
"""""", """2""", """Work In Progress""", """Applications""","""assignee""",
"""group """, """charge back""", """impact""", """urgency""",
"""severity""", """type""")"
```

Testing the Solution

Open a Command Prompt window on the computer where bop_cmd is available to test the solution. Execute the following command on the command prompt:

```
bop_cmd -u ServiceDesk -f gencr.frg "gencr("""My first Incident from the
command line:-)""", """BSODEMOS1""","""""","""2-High""", """Open""",
""Applications""","""ServiceDesk""", """""", """back""", """3-Single
Group""", """3-Quickly""","""""", """Incident""")"
```

Important! BSODEMOS1 is an asset example. Use a valid asset/CI from your environment.

Note: The code is only provided as an example. Copy the code correctly. Copying text and especially the special characters out of pdf documents can be error prone.

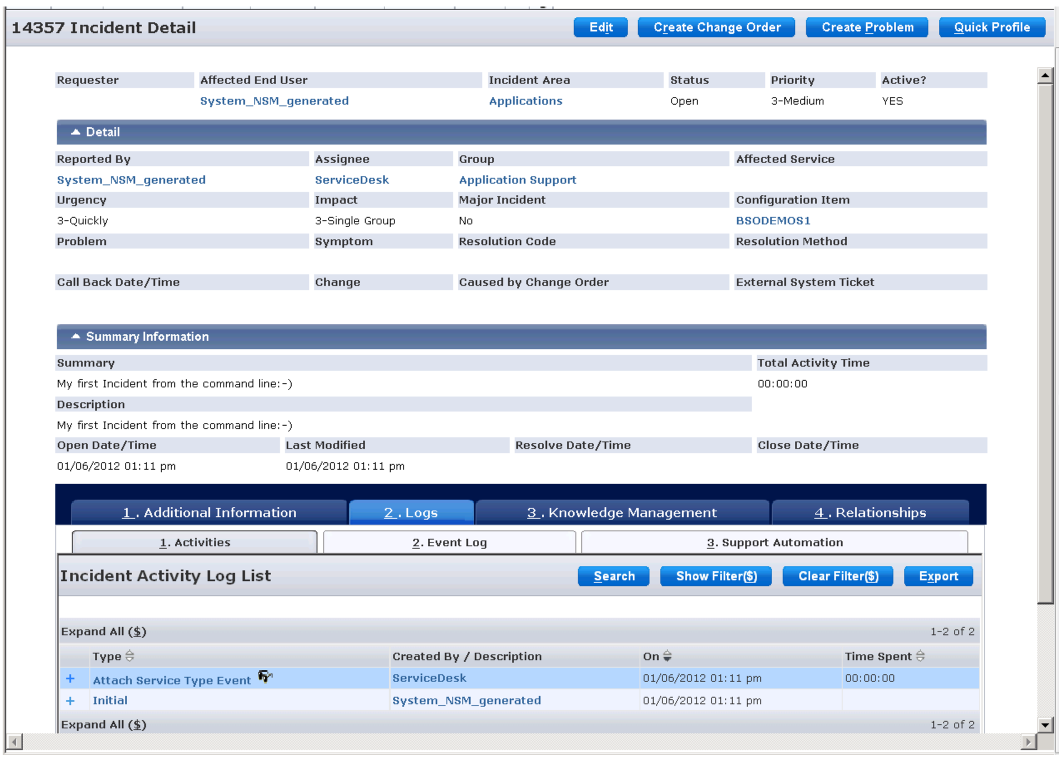
The following table describes the input for this command:

Input	Description
Description	My first Incident from the command line.
Asset	BSODEMOSI
Request Template Name	Blank
Priority	2-High
Status	Work in Progress
Request Area	Applications
Assignee	ServiceDesk
Group	Blank

Input	Description
Charge Back	Back
Impact	3-Single Group
Urgency	3-Quickly
Severity	Blank
Type	Incident

This command returns Request number, messages.

As illustrated in the following example, incident number 14357 was created in CA SDM:



14357 Incident Detail

Requester	Affected End User	Incident Area	Status	Priority	Active?
	System_NSM_generated	Applications	Open	3-Medium	YES

Reported By	Assignee	Group	Affected Service
System_NSM_generated	ServiceDesk	Application Support	
Urgency	**Impact**	**Major Incident**	**Configuration Item**
3-Quickly	3-Single Group	No	BSODEMOS1
Problem	**Symptom**	**Resolution Code**	**Resolution Method**
Call Back Date/Time	**Change**	**Caused by Change Order**	**External System Ticket**

Summary: My first Incident from the command line:-)

Total Activity Time: 00:00:00

Description: My first Incident from the command line:-)

Open Date/Time	Last Modified	Resolve Date/Time	Close Date/Time
01/06/2012 01:11 pm	01/06/2012 01:11 pm		

Incident Activity Log List

Expand All ($) 1-2 of 2

	Type	Created By / Description	On	Time Spent
+	Attach Service Type Event	ServiceDesk	01/06/2012 01:11 pm	00:00:00
+	Initial	System_NSM_generated	01/06/2012 01:11 pm	

Expand All ($) 1-2 of 2

Updating a Request

Preparing to Update the Request Status and Add an Activity Log Comment

To prepare for configuring the solution, which updates the request status and adds an activity log comment, first read the information about the ZUpdateCr method in Appendix A.

Configuring the Solution from CA SDM

To configure the solution from CA SDM, copy the ZUpdateCr.frg into the following directory:

```
$NX_ROOT\bopcfg\interp
```

Configuring the Solution from the Alert Message Product

To configure the solution from the Alert Message product, configure the third-party product so that it can to pass the required parameters. Then, execute the following command:

```
bop_cmd -f ZUpdateCr.frg "ZUpdateCr('56', 'belldo01', 'Researching',
'Telalert Message')"
```

You can use the fragment to update the status of a request and add an activity log by executing the command line using the bop_cmd command. The following information provides an example:

Ref_Num

56

Assignee

belld01 (User who sent the message)

Status

Researching

Activity Log detail

Telalert Message

Testing the Solution

Complete the following steps to test the solution:

1. Request number 56 is created and assigned to the analyst Donald Bell. Donald is on-site and updates the status of the request by sending a text message to the Telealert through the telephone.

2. Telealert creates an executable file with the following command:

   ```
   bop_cmd -f ZUpdateCr.frg "ZUpdateCr('56', 'donaldbell', 'Researching', 'Telalert Message')"
   ```

3. The status of the request is updated from Work In Progress to Researching after the command received. Activities tab adds an activity log. The activity log contains the name of the user who sent the message, and the status change.

Troubleshooting

Having issues with fragment files that bop_cmd executes, review the stdlogs for more information. In addition, you can use bop_logging and pdm_trace commands to debug your fragment files, as described in the following section.

Bop_logging and pdm_trace

In the CA SDM architecture, most communication between processes, and within processes, is performed by exchanging BPMessages. When having issues with making your fragment files work using bop_cmd command, it is useful to trace the message flow. The following two methods allow you to trace the message flow:

bop_logging

Writes each BPMessage send or receive by the process being logged in to a file. You can configure this method for following use:

- A single file that grows indefinitely.
- A set of files used in round robin fashion. Each file is permitted to grow to a specified size before logging switches to the next file.

Important! bop_logging involves considerable overhead and noticeably slows a process. Use bop_logging in a production environment when it is necessary.

pdm_trace

Stores each message send or receive by the process being logged in to internal memory. Only a specified maximum numbers of messages are kept.

Messages in memory are written to a file on a request, or when certain events occur, such as a process crash or a specified stdlog message.

CA SDM Integrations 235

Important! Pdm_trace has a low overhead and is suitable for a production environment. Pdm_trace is ideal to determine the message flow before an unusual event.

Note: The message capacity of the memory buffer limits pdm_trace.

Both forms of logging are activated with a common line command. To determine the options available for each command, invoke it with the –h argument:

```
bop_logging –h
pdm_trace –h
```

The output from bop_logging or pdm_trace is similar. Each message that is captured is reported in the following format:

```
07/12 09:22:02.781 (+0.000) Received Msg [User usd; Session 1995107485]

From: 138.42.43.231.web:local.

To: 138.42.43.231.domsrvr.TOP [Top_Ob]

BPMessage

{

method = call_attr

arg 0 = (string) chg

arg 1 = (string) get_new_dob

arg 2 = nil

arg 3 = nil

arg 4 = gPCAAA(2references) [Group_CO]

reply object = 138.42.43.231.web:local.GHAAAA (not refcounted)

reply method = get_new_dob:0

}
```

The following information is displayed for each message:

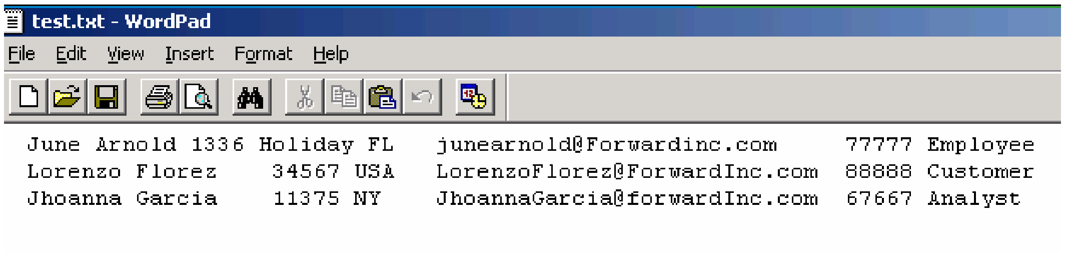
- The date and time of the message.
- The number of milliseconds since the previous message (parenthesized).
- The type of action that resulted in this message, Sending, Received, or Imported.
- The userid and session of the user that is associated with the message.
- The sending (From) process. This process is a two-part address, consisting of the IP address of the slump server, a dot, and the name for the process that is supplied at the slump login.
- The receiving (To) object. This process is a three-part address. The first two parts are in the same format as the *From* address. The third part is the object name. If the process performing the logging defines the object, its name follows the C++ or Java class name in square brackets.
- The message invokes the name of the method.
- The type and value of any arguments to the message.
- The name of the object expecting a reply to the message, and the name of the reply method.

Note: You can export the required information to a text file. After you export, you can use a C++ or a Perl script to put the parameters into a bop_cmd command line format and execute it. The following section describes an example of a Turbo C program that can complete these tasks for you.

Automated Updates of CA SDM Using Sutility

Appendix A provides an example of a C program, *sutility* that reads a text input file. The text input file contains the information to fill the parameters that are required for a fragment file named mk_creq.frg. Then, an output file is generated and is ready to be executed to create or update information into CA SDM.

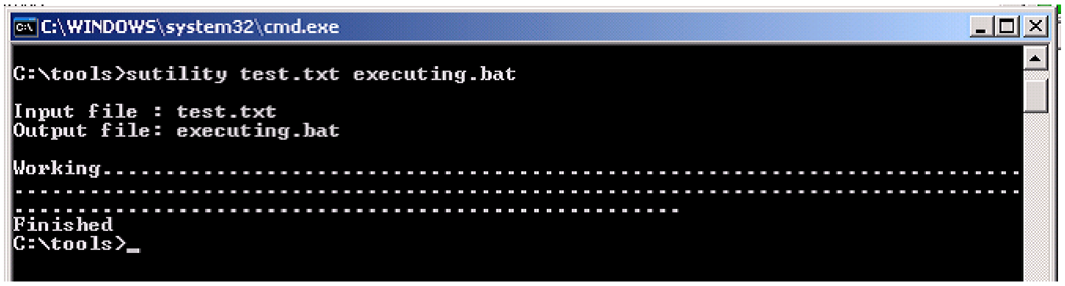
sutility takes information from a text file (test.txt in the following example) having the following entries and formats the text into a bop_cmd command syntax:



```
June Arnold 1336 Holiday FL   junearnold@Forwardinc.com     77777 Employee
Lorenzo Florez    34567 USA   LorenzoFlorez@ForwardInc.com  88888 Customer
Jhoanna Garcia    11375 NY    JhoannaGarcia@forwardInc.com  67667 Analyst
```

After creating the test.txt file as a tab separated file with the expected values, execute the sutility from the command line, using the following syntax:

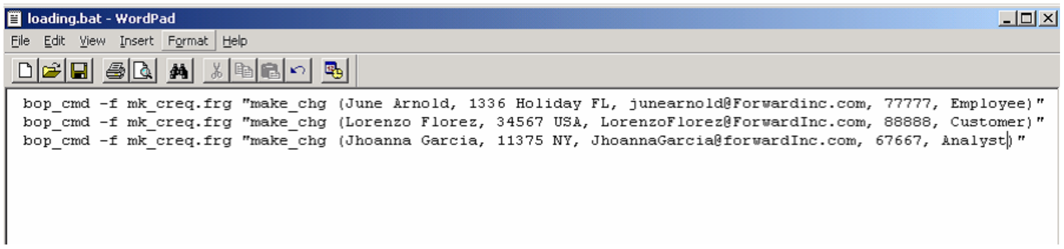
```
C:\>sutility test.txt executing.bat
```



```
C:\tools>sutility test.txt executing.bat

Input file : test.txt
Output file: executing.bat

Working.................................................................................
................................................................................................
...........................................................
Finished
C:\tools>_
```

The output file named executing.bat can execute to create or update information in CA SDM. You can configure AT or scheduling commands to run the output file.

The following sample window illustrates the contents of executing.bat.



```
bop_cmd -f mk_creq.frg "make_chg (June Arnold, 1336 Holiday FL, junearnold@Forwardinc.com, 77777, Employee)"
bop_cmd -f mk_creq.frg "make_chg (Lorenzo Florez, 34567 USA, LorenzoFlorez@ForwardInc.com, 88888, Customer)"
bop_cmd -f mk_creq.frg "make_chg (Jhoanna Garcia, 11375 NY, JhoannaGarcia@forwardInc.com, 67667, Analyst)"
```

bop_cmd Summary

CA SDM has a command line utility which can be invoked with a file name and a set of attributes. The type of file that works in context with the bop_cmd command is named a fragment file. The file contains spel code that is interpreted. CA Technologies spel code is a proprietary interpreted language closely resembling C, and is used for specifying business logic.

The command line must have the following syntax:

```
bop_cmd –f file.frg "function ("""parameter1""", """parameter2""",
"""parameter3""")"
```

External products can put the parameter information into a text file. From the text file, a Perl script or C++ program can extract the parameters, put them into the required bop_cmd format, and execute the command.

Text API Method

The Text API is a simple common interface that allows you to create and update objects in the CA SDM database. Using text-based input, you can create and update objects such as issues, requests, contacts, and assets. Using the Text API, you can set most fields that are accessible from the Java client and the web interface.

Accessing the Text API

You can access the Text API using the following interfaces:

- Command line
- Email
- CA NSM

The following example illustrates how to use the Text API from the command line. Later, the email and NSM interfaces are explained.

Note: You can use Web Services as an alternative to the Text API for cross application integration. For more information, see the Web Services integration methods that are described earlier in this section, or the *CA SDM Technical Reference Guide*.

How the Text API Works from the Command Line

From the command line, you use the pdm_text_cmd command to activate the Text API command-line interface. You specify certain information, such as the table to process and the operation to perform, using parameters in the pdm_text_cmd command. The input to the Text API is passed to the pdm_text_cmd command in the form of an input file or directly from STDIN.

Note: For more information about the pdm_text_cmd entry, see the reference commands in the *CA SDM Administrator Guide*. You can also type pdm_text_cmd –h from the command prompt.

Business Challenge

Michael Reed is the service desk manager for Forward, Incorporation. Michael must configure CA SDM to create a change order from information in an in-house developed Human Resource product when a new employee is hired. Assign the Change Order to the Windows Administrators who create all required Windows accounts for the new employee.

CA Technologies Approach

CA Technologies Services advise Michael to use the pdm_text_cmd command to create the change order from the Human Resource product.

Best Practices

Review the following best practices when using the pdm_text_cmd command:

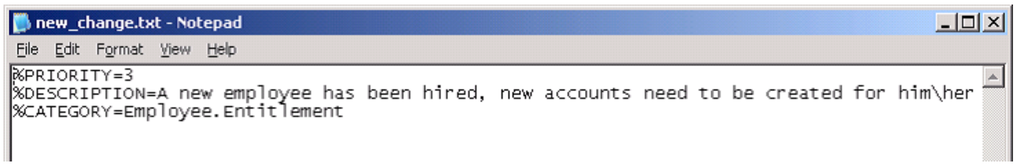
- Validate that change order creation in CA SDM supports the existing process in your organization.
- Clearly define when the change order must be created and updated.
- Discuss the implementation with the CA SDM Administrator.
- Test in a development environment first.
- Verify that all parameters sent from the change order creation source exist in CA SDM.

Configuring the Solution

Create a Change Order from the Command Prompt Window

Use the following steps to create a text file with the information that you want to populate into the change order.

1. Using Notepad, create a text file named new_change.txt with the information illustrated in the following sample window:

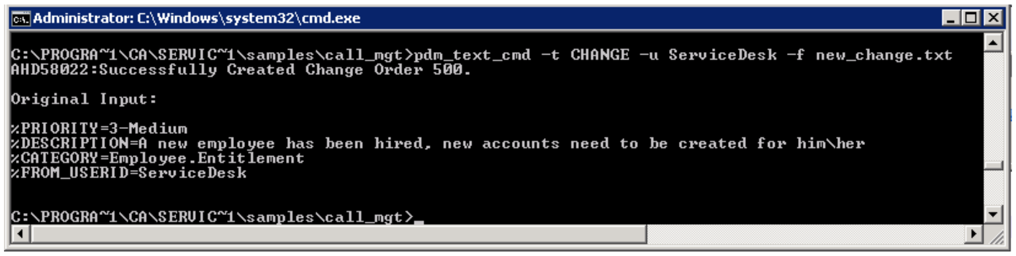


```
%PRIORITY=3
%DESCRIPTION=A new employee has been hired, new accounts need to be created for him\her
%CATEGORY=Employee.Entitlement
```

2. From the Command Prompt window, execute following command:

   pdm_text_cmd –t CHANGE –u ServiceDesk –f new_change.txt

   The following sample Command Prompt window illustrates the command:



```
C:\PROGRA~1\CA\SERVIC~1\samples\call_mgt>pdm_text_cmd -t CHANGE -u ServiceDesk -f new_change.txt
AHD58022:Successfully Created Change Order 500.

Original Input:

%PRIORITY=3-Medium
%DESCRIPTION=A new employee has been hired, new accounts need to be created for him\her
%CATEGORY=Employee.Entitlement
%FROM_USERID=ServiceDesk

C:\PROGRA~1\CA\SERVIC~1\samples\call_mgt>_
```

   pdm_text_cmd is interacting with text_api.cfg. As a result, a new change order is created in CA SDM.

Text API Summary

The Text API is a simple command interface that allows you to create and update objects in CA SDM. Using text-based input, you can create and update issues, requests, change orders, contacts, and assets. Using the Text API, you can set any fields that are accessible from the Java client and the web interface.

Troubleshooting

Having issues with the Text API, verify the entries in the stdlog. The stdlog provides more information about what is wrong in your definitions.

Database-level Data Integration

All CA SDM data is stored in a normalized relational database. Subject to certain restrictions and caveats, other products can read and update this database. The restrictions include the following points:

- CA SDM keeps its own locks at the product level. Using the locks and dynamic screen updates, the user is guaranteed that the data they see is the data that is updated, without database lock contention. If updates occur outside CA SDM, that guarantee is not valid and impact performance of the product.
- CA SDM is designed to never deadlock and hold locks for short durations. Deadlocked rows are managed by waiting, and eventually generating errors and abandoning the operation. However, on high-volume production systems, deadlocking of critical tables can catastrophically affect performance. Table locks held for any length of time almost always have negative consequences. Therefore, carefully design any external system that works directly with CA SDM tables to avoid prolonged locking, table locks, and deadlocks.

Given these restrictions, data level integration can work well. The first concern, data serialization, is more theoretical than actual. In practice, occasional random updates occur outside the software. For example, when a service representative closes an incident after a technician has been dispatched, but before the technician has arrived on site. This transaction is effectively an unserialized update that has nothing to do with the software. As long as integration does not increase the number of unserialized updates, the site is typically satisfied.

The Common Registration API (CORA) and the MDB are examples of database-level integration. All Unicenter Release 11 and later products use the common MDB schema to store and manage their data. As the interface through which these assets are registered and as the only source for updating these tables, CORA helps ensure that asset data flows consistently. As a result, the data and referential integrity of the master asset data model in the MDB is supported.

CA Technologies Services can provide resources for assistance with database-level integration engagements.

pdm_load

pdm_load is a database-independent utility that is supplied with CA SDM for adding, deleting, and updating rows in the CA SDM database. pdm_load is a convenient utility for performing batch loads and updates to CA SDM. pdm_load generates numeric IDs and incident and change order numbers, and interacts correctly with CA SDM application locking. Typically, pdm_load is a simple and relatively safe way to perform batch loads into CA SDM.

Note: For more information about pdm_load, see the reference commands in the *CA SDM Administrator Guide*.

pdm_extract

pdm_extract is a database-independent utility that is supplied with CA SDM for extracting data from CA SDM. The default output is in a proprietary format suitable for loading data back into CA SDM with the pdm_load utility. Utility options are available to export data in comma-separated value (CSV) format, which can be imported into Microsoft Office products such as Excel and Project.

pdm_extract accepts table names to dump the entire contents of tables, and it accepts standard basic SQL statements for joins and projections.

Note: For more information about pdm_extract, see the reference commands in the *CA SDM Administrator Guide*.

pdm_deref

pdm_deref is a database-independent utility that simplifies loading normalized data. pdm_deref converts strings to their numeric key values as part of a pdm_load, making it possible to load foreign keys in a single step.

Note: For more information about pdm_deref, see the reference commands in the *CA SDM Administrator Guide*.

Business Challenge

The service desk team at Forward, Inc. receives a request from the security department to inactivate all customers that have not used the service desk in the last six months. The lack of use indicates that the customer is no longer using the services or support contract.

CA Technologies Approach

CA Technologies Services have recommended using pdm_extract, pdm_deref, and pdm_load commands to enable Forward, Inc. to identify and inactivate the appropriate customer contact records.

Configuring the Solution

Complete the following steps to configure the solution:

1. Use pdm_extract to find all inactive customers who have been inactive for more than six months. Customers are defined as contacts where the contact type equals customer.

   This example searches for contacts in which the last_mod_date of the record in the contact table is greater than a certain time period. Use the following command:

   ```
   pdm_extract -f "Select userid, id, last_update_date FROM ca_contact WHERE
   inactive=0 AND contact_type=2305 AND last_update_date < 1325376000" >
   excustomers.dat
   ```

   Note: In this command, the value 1166918400 is the UNIX format for the date that is searched. In this example, the last_update_date value of 1325376000 converts to the date and time of January 01, 2012 00:00:00. View the companion ZIP file posted with this Green Book for a sample Excel file (UNIX Date Format.xls). The file contains a macro allowing date information to be formatted into a UNIX format. pdm_extract works with the format illustrated in the sample Excel file.

2. Based on the customers identified in the previous step, use *pdm_deref* to search in the Call_Req table. The search identifies those customers who have never opened a call or they do not have call activity recorded in the last six months. The condition is met if the number of calls equals zero, where:

   - The ref_num attribute="" (NULL) in the Call_Req table.
   - The customer = id (from the output file ex-customers).
   - The last_mod_date is less than six months ago.

3. Execute the following command:

   ```
   pdm_deref -s correl1.spc < ex-customers.dat > inactive.dat
   ```

   In this command, correl1.spc contains the following code:

   ```
   Deref
   {
   input = id, last_update_date
   output = id, ref_num
   rule = "SELECT customer, id, ref_num, last_mod_dt FROM Call_Req WHERE
   customer = ?"
   AND last_mod_dt < ?"
   }
   ```

   From the Command Prompt window, use the following command to copy the inactive.dat file to inactive2.dat as a backup activity:

   ```
   copy inactive.dat inactive2.dat
   ```

4. Use the following steps to set the identified customers to *inactive* status:

   a. Edit the inactive.dat file, which looks similar to the following code:

   ```
   TABLE ca_contact
   userid id ref_num
   {"acarson", "177CABDF70BF164BADFCBE155ECE671F", ""}
   {"requester", "EB4D86B942D7F948AC3963FEC35D8602", ""}
   ```

   b. Delete the attribute named *ref_num*, and add the attribute named *inactive* with a value of 1. The inactive.dat file looks similar to the following code:

   ```
   TABLE ca_contact
   userid id inactive
   {"acarson", "177CABDF70BF164BADFCBE155ECE671F", "1"}
   {"requester", "EB4D86B942D7F948AC3963FEC35D8602, "1"}
   ```

   c. Execute pdm_load –f inactive.dat.

   The customers are now inactive in CA SDM.

Summary

CA SDM offers pdm_extract, pdm_load, and pdm_deref utilities to manipulate data.

- pdm_extract extracts data from specified CA SDM database tables, or the entire CA SDM database, and creates output as ASCII-formatted text.
- pdm_load updates a CA SDM database using an input file you specify, up to a maximum of 112 attributes.
- pdm_deref processes ASCII-formatted input to exchange data found in one database table for data found in another database table. You can use pdm_deref to create files compatible with pdm_userload and pdm_load from a non-CA SDM database or spreadsheet. You can also use pdm_deref to create reports or output files for the non-CA SDM database or spreadsheet.

Note: For more information these commands, see the reference commands in the *CA SDM Administrator Guide*.

Email Interface Method

The email interface can be used to create, requests, problems, issues, and update incidents and change orders. This method is often an easy way to implement low volume integrations that do not require high speed.

Process Flow for Maileater

Upon startup of the CA SDM service, the pdm_maileater_nxd process reads the usp_mailbox and usp_mailbox_rules tables. If no mailboxes are configured, the daemon watches the tables for changes.

On the defined interval (default 30 seconds), each mailbox is read and each email is processed individually. First the email address is checked for any policy violations and handled accordingly.

If there are no policy violations, each mailbox is compared to each mail box rule defined for that mailbox. If a matching rule is found, then the defined action for that rule is performed. If a reply section is defined for that rule, then a reply is returned to the user. If the system finds a matching rule, then no other rules are tested and the system processes the next email.

The daemon sets a callback for the mailbox to process at next interval after the system processes all the emails for an inbox. If an interval has been reached and another mailbox is being processed, then the mailbox is queued to be processed after the current mailbox processing is finished. In other words, only one mailbox is processed at any one time, and the intervals are approximate times.

A mailbox rule contains a filter string that is used as a regular expression to search in the email. If the string is found, then the system processes the defined action. For reply emails, a special Update Object action is used. The filter string identifies the artifact that assists in mapping back to the ticket. The artifact is translated to TextAPI notation and then sent to TextAPI for processing.

Once complete, an optional response is sent back to the sender.

High-level steps to configure integrations using the email interface include:

1. Configure your CA SDM server to send emails by installing the necessary options that are listed under the Email node in Options Manager. Options Manager is available in the Administration tab when you logged in to CA SDM as an Administrator.

2. Define the incoming emails to CA SDM. Set the time of integration when they are sent from the application. For example, the specific email address that the email is initiated from, or specific error text in the email summary, or body that you can use to define a filter for the email rule to use.

3. Create a contact in CA SDM for the integration to use and supply a valid email address for that contact. The valid email address is the email from which the email initiates.

4. Create a Mailbox.

5. Create one or more Mailbox Rules to recognize specific keywords or elements of the incoming email messages. Perform any actions, replies, or both, that must occur for incoming messages, which contain those keywords or elements. Associate the mailbox rules with the created Mailbox.

Enabling the Solution

Complete the following steps to enable the solution:

1. After configuring and installing the CA SDM options managers for email, recycle CA SDM services.

2. Create a Mailbox, using the following chart as a guideline:

Label	Example	Description
Name	App_Errors	Descriptive name of mailbox connection.
Check Interval	20	Number of seconds to check mailbox. The default is 30 seconds.
Active	Active	Active Flag. Mailbox is not processed if inactive.
Email Type	POP3	Type of email (NONE, IMAP, or POP3).
Hostname	MAILSERVER	Host name or IP of the mailserver.
Port Override	110	Port to override the default for Email Type. The default is 110 for POP3 and 143 for IMAP.
Userid	ServiceDesk	Userid to log on to mailserver.
Password	password	Password for the userid.
Security Level	Clear Text	Security Level for connection (0=Clear Text, 1=APOP (POP3 Only), 2=NTLM and 3=MD5).
Allow Anonymous	Yes	Allow Anonymous users to create tickets.
Attachment Repository	Service Desk	Repository for attachments that must be local to pdm_maileater_nxd. If an email repository is configured, the attachments are kept.
Attach Entire Email	No	Attach entire email to the ticket, which overrides the default of splitting out attachments.
Force Attachment Split out	No	Forces attachment split out if attach Entire Email is set.

Label	Example	Description
Name	App_Errors	Descriptive name of mailbox connection.
Save Unknown Emails	Yes	Save emails that are not able to be processed into NX_ROOT/site/unknown_mails.
Use Reply-To: Address	Yes	Use the Reply-To: address if available to reply to requestor. Default is to use From: address.
Description	Open incidents when applications send email errors to the ServiceDesk account.	Description of the mailbox.
Email Address/Hour(Policy Tab)	-1	Maximum number of emails per email address per hour. Values are -1 (no limit – default), 0 - No emails allows, >= 1 – Max number allowed.
Log Violation **(Policy Tab)**	Do not log	Whether to log to stdlog the violation. Values are *Do not log*, *First Violation Only* (default) and *All violations*.
Inclusion List **(Policy Tab)**	*	A space (or new line) delimited list of email addresses or domains that are allowed to process emails. If set, only emails matching the list are allowed.
Exclusion List **(Policy Tab)**		A space (or new line) delimited list of email addresses or domains that are not allowed to process emails.

3. Create a Mailbox Rule using the following chart for guidelines, and link it to the Mailbox created previously.

Label	Field	Description
Sequence	101	Sequence number of the rule. Rules are processed in this order.
Mailbox	App_Errors	Mailbox that this rule belongs to.
Active	Active	Active Flag. Rule is not processed if inactive. Rules can be deleted, the active flags allows for disabling rules temporarily.
Description	Rule to capture emails with keyword.	Description of the rule.
Filter	Subject contains	Type of filter. Options are Subject contains, Body contains, From Address contains.

Label	Field	Description
Sequence	101	Sequence number of the rule. Rules are processed in this order.
Filter String	.*Error.*	Regular expression string to match against. A special placeholder *{{object_id}}* can be used to identify the object identifier. Using the **.*** combination denotes a wildcard.
Ignore Case	Selected	Whether to ignore case in pattern matching.
Action	Create/Update Object	Action to take if filter matches. See Rule Types section.
Action Object	Incident	Ticket object for action.
Write to Stdlog	Selected	Whether to write email text to stdlog when filter matches.
Log Entry Prefix	Error_Emails	Optional prefix to write to log. Allows for matching rules to logs.
Add Subject Line	Append	Add a Subject line to message body before the processing. The options are: append, prepend, or null.
TextAPI Defaults	INCIDENT.CATEGORY=Application.Error	Additional defaults for the TextAPI if the filter matches. In this case, the category of the incident is set to Application Error.
TextAPI Ignore Incoming		Additional Ignore Details for the TextAPI if the filter matches.
Reply	Email	Notification method to send back response. If not set, no response is returned.
Reply Subject	Incident has been created.	Subject line to use for reply.
Reply Success Text	Incident @{ref_num} was successfully created!	If the Action processing is successful, the message response to send back in text format.
Reply Success HTML	Incident @{ref_num} was successfully created!	If the Action processing is successful, the message response to send back in html format.
Reply Failure Text	Error creating incident.	If the Action processing is unsuccessful, the message response to send back in text format.
Reply Failure HTML	Error creating incident.	If the Action processing is unsuccessful, the message response to send back in html format.

- When editing Mailbox Rules that the associated Mailbox is first set to Inactive. Otherwise, the Mailbox continues to be checked for new messages while the changes are being made. Any messages, which are on the mail server and retrieved between when the first change is made and the last change is made, are processed according to the existing rules at the time of message retrieval.
- Changing the Mailbox or Mailbox Rules reset the mail polling cycle for the affected Mailbox, if it is Active, triggering an immediate mail check.
- The default behavior for an incoming e-mail is to update the Ticket Description, rather than to Log a Comment. To change this behavior, set the value UPDATE_DESC_IS_LOG=yes in file $NX_ROOT/site/text_api.cfg. To override it on a per-message basis, begin the message with %LOG.

Rule Types

The following table describes the processing of the rule types. Logging is always available even if no other processing is requested. Replies are processed after the Reply configuration.

Process	Description
Ignore Email	Do not process the email and do not reply. This process is useful for System level messages such as Out of Office or Mail Delivery errors.
Ignore Email and Reply	Do not process the email, but send a response back to the sender.
Update Object	Using the filter string, determine the Object Identifier (see Text API Processing), then send the update request to TextAPI. If the Object Identifier cannot be found, then a new ticket is created if appropriate. This process handles email replies where the Object Identifier is embedded somewhere in the email.
Create/Update Object	This process is the classical behavior of the Maileater where the email can or cannot contain TextAPI keywords.

Text API Processing

To update a ticket, the Object Identifier is pulled from the body or subject of the email. A special placeholder *{{object_id}}* within the filter string is used to identify the object identifier. The identifier and value are dependent upon the object that is defined for processing.

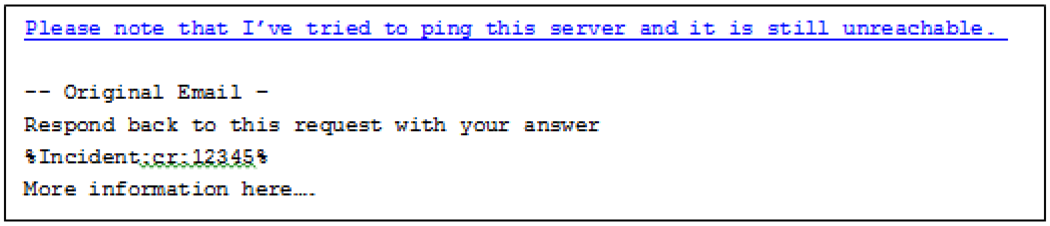
Object	TextAPI Keyword	Identifier
Incident	%INCIDENT_ID	Ref_num
Problem	%PROBLEM_ID	Ref_num

Object	TextAPI Keyword	Identifier
Incident	%INCIDENT_ID	Ref_num
Request	%REQUEST_ID	Ref_num
Change	%CHANGE_ID	Chg_ref_num
Issue	%ISSUE_ID	Ref_num

The Maileater daemon searches the email body or subject section for the defined filter string. When found, the value that is denoted by the placeholder along with the Object TextAPI keyword is appended to the end of the message before sending to the TextAPI.

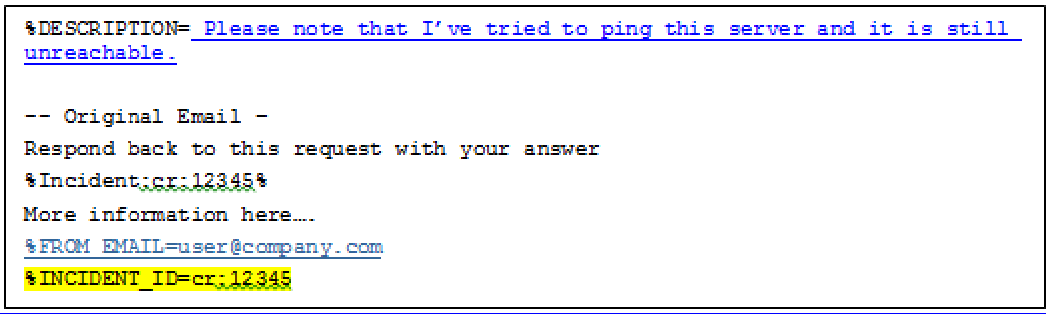
Example

If the filter string was set to *%Incident:{{object_id}}%* and the email body of:



```
Please note that I've tried to ping this server and it is still unreachable.

-- Original Email -
Respond back to this request with your answer
%Incident:cr:12345%
More information here….
```

The response to the TextAPI would be:



```
%DESCRIPTION= Please note that I've tried to ping this server and it is still
unreachable.

-- Original Email -
Respond back to this request with your answer
%Incident:cr:12345%
More information here….
%FROM_EMAIL=user@company.com
%INCIDENT_ID=cr:12345
```

Normal processing of the TextAPI would then attempt to update the Incident where the incident ref_num was equal to *cr:12345*.

Testing the Solution

To test the solution, initiate an email from the application you are integrating CA SDM. The email is sent to the ServiceDesk email account. The subject of the email has text that matches the filter defined in the mailbox rule.

Example

Summary for Error xyz.

The body of the email specifies the content.

Summary

The Mailbox functionality that is provided with CA SDM allows users and applications to create and update tickets using email. The ticket can be an incident, request, problem, issue, or change order. The mailbox connection logic is stored in the Mailbox, and the Mailbox rules contain the filters for any action or replies that happen when the filter matches. CA SDM contacts create or update a ticket by sending an email message to the CA SDM ServiceDesk email account, when the email contains and matches a defined Mailbox Rule filter.

Outgoing Notifications Method

CA SDM notifications are emails, but the notification subsystem is an integration (getting integrated to other products) product. An exit code that is executed when a service desk object transitions from one state to another sends these notifications. Typically, the transitions are related to incident, problem, request, or change order status changes, but they can be configured to fire on many possible object state changes and timers.

When a notification fires, the exit code has access to the state of the system. Out-of-the box notifications insert state information (such as the incident number, description, and assignee) into predefined text. Out-of-the box notifications email the information to an address that is also derived from the system state (such as the email address of the person who opened the request). This mechanism provides many opportunities for outbound integration in which an activity on CA SDM causes an action on an integrated system.

Business Challenge

Anita Hirsch, VP of IT Services, has created a 24 x 7 service desk team that is based on the number of Forward, Inc. branches and the number of services that the IT department offers. This means that the CA Support Online staff must be available at any time to resolve a critical issue, escalation, or transference to avoid service level agreement (SLA) violations.

VP needs the service desk product to notify all pertinent support staff members when critical issues occur at any time to:

- Control and implement this well-organized service support work process.
- Meet the goal of delivering excellent customer service.

Mistakes, or missing escalations, or transfers are not allowed, as an SLA violation can cost thousands of dollars to the organization.

CA Technologies Approach

CA Technologies has identified the kinds of communication methods that Forward, Inc. uses, which include a telephone, an email, a pager, a Blackberry, a network management event consoles, and text messages. In addition, CA Technologies Services has analyzed and designed a notification process that is based on service types, critical events, times, people responsible for the events, and notification methods. Once this information has been identified and categorized, CA Technologies recommends that CA SDM outgoing notifications are implemented to allow the system to notify service desk staff. The process uses the outbound notification methods that they choose. This notification allows Forward, Inc. to implement the work processes that are required for 24 x 7 support and to meet the established SLAs for service desk performance.

Best Practices

Review the following best practices when configuring the solution:

1. Based on the work process that is established, the customer must define the "who, what, when, and how" for outgoing notification actions.
2. Determine the way that you want to deliver the notification. For example, sent to a Blackberry, emailed to a specified address, or printed on a particular printer.
3. Determine the contents of the notification message.
4. Specify what information from the message template to include in the notification.
5. Set up a script to transmit the notification.
6. Place the script in an executable file in the path of the CA SDM server.

Configuring the Solution

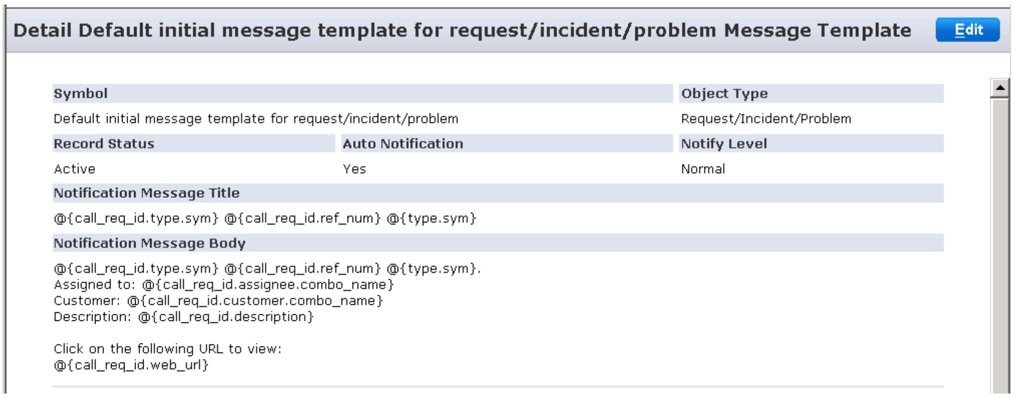
Configure Outbound Notification Using a TeleAlert Message Management System from the CA SDM Side.

1. First notification method.

2. The notification message sent using the Telealert message management system has the following information:

   - End user name
   - Assigned to name
   - Incident number
   - Summary of the incident description

3. The activity notification that is selected to notify is Initial, and the message template to use for the notification is illustrated in the following sample window:



Detail Default initial message template for request/incident/problem Message Template

Symbol		Object Type
Default initial message template for request/incident/problem		Request/Incident/Problem
Record Status	**Auto Notification**	**Notify Level**
Active	Yes	Normal

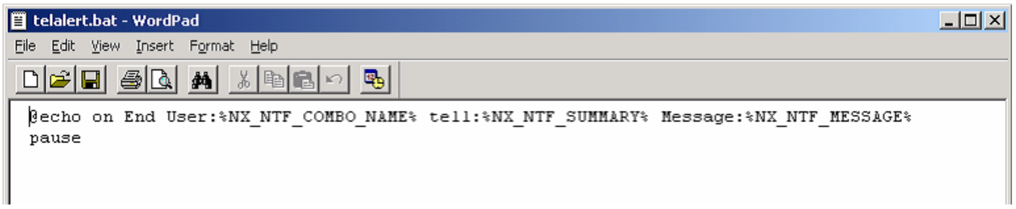
Notification Message Title

@{call_req_id.type.sym} @{call_req_id.ref_num} @{type.sym}

Notification Message Body

```
@{call_req_id.type.sym} @{call_req_id.ref_num} @{type.sym}.
Assigned to: @{call_req_id.assignee.combo_name}
Customer: @{call_req_id.customer.combo_name}
Description: @{call_req_id.description}

Click on the following URL to view:
@{call_req_id.web_url}
```

4. The script is a .bat file which contains the definitions illustrated in the following sample window:



telalert.bat - WordPad

```
@echo on End User:%NX_NTF_COMBO_NAME% tell:%NX_NTF_SUMMARY% Message:%NX_NTF_MESSAGE%
pause
```

To implement the notification

1. Copy the telealert.bat file into the path of the CA SDM server, into the directory $NX_ROOT\site\mods\bin.

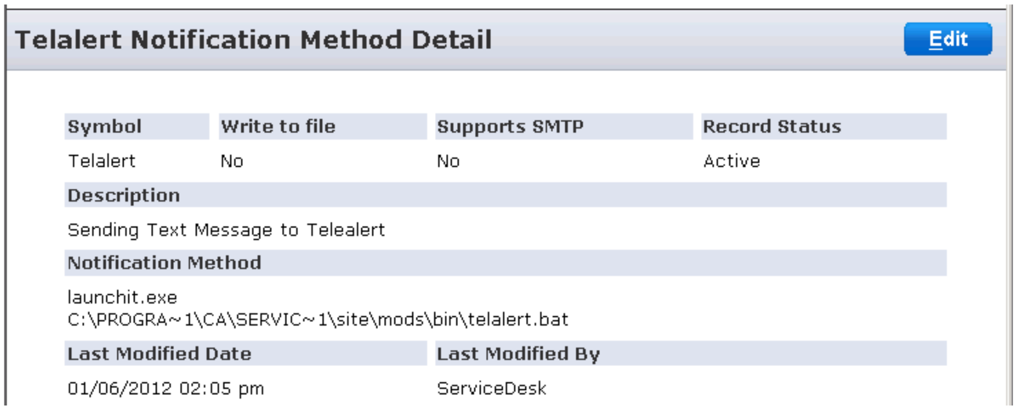
2. From the Administration Interface, select Notification Methods from Notifications.

The Notification Method List appears.

3. Click the Create New button.

   The Create New Notification Method window appears.

4. Click Save.



Telalert Notification Method Detail

Edit

Symbol	Write to file	Supports SMTP	Record Status
Telalert	No	No	Active

Description

Sending Text Message to Telealert

Notification Method

```
launchit.exe
C:\PROGRA~1\CA\SERVIC~1\site\mods\bin\telalert.bat
```

Last Modified Date	Last Modified By
01/06/2012 02:05 pm	ServiceDesk

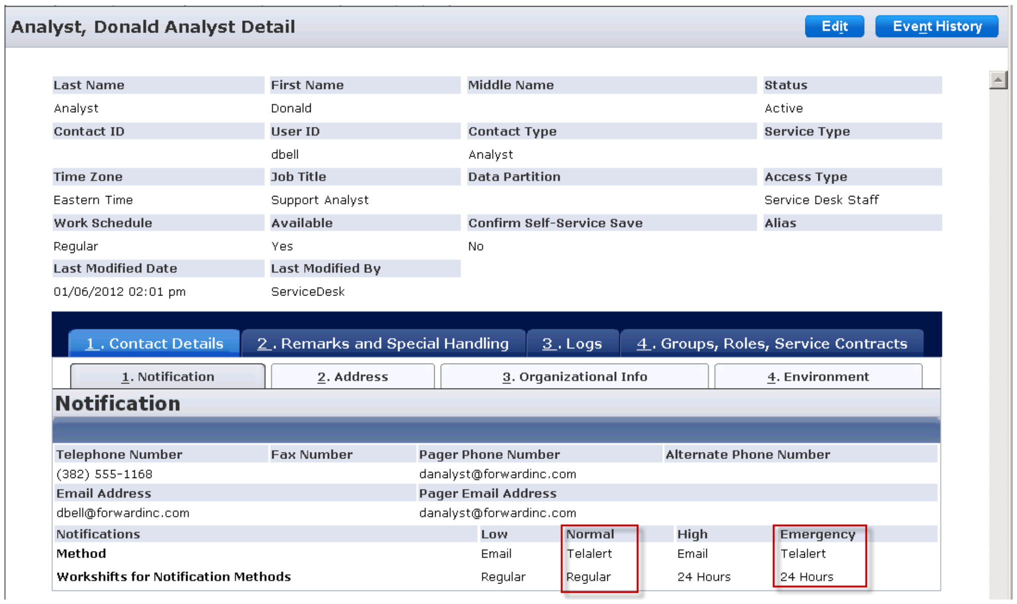
   Note: You do not have to specify the full path in the Notification Method field. For a Windows server, consider using the launchit.exe utility to invoke your script or program. For more information about the launchit utility, see the book CA SDM online help. In addition, since the notification method runs from the CA SDM server, you must put the notification method script in a directory that can be accessed from the path on the server, or can specify the full path to the script. On UNIX, depending on the shell you are running, you may be able to check this by executing the *pathname_to_script* command.

   If there is a problem with the notification methods, examine the logs in the $NX_ROOT/log directory (UNIX) or $NX_ROOT\log (Windows).

   Use the same procedure to interact with an external product. Once the information is created, it can be caught and sent to another product.

5. Complete the configuration so that all the analysts who require notification using the Telealert message management system can be assigned to the Telealert notification method.

   In this example, Donald (analyst) is configured to be notified using Telealert during non business hours and in an emergency. The definition appears as follows, illustrated in the following sample window:



Last Name	First Name	Middle Name	Status
Analyst	Donald		Active
Contact ID	User ID	Contact Type	Service Type
	dbell	Analyst	
Time Zone	Job Title	Data Partition	Access Type
Eastern Time	Support Analyst		Service Desk Staff
Work Schedule	Available	Confirm Self-Service Save	Alias
Regular	Yes	No	
Last Modified Date	Last Modified By		
01/06/2012 02:01 pm	ServiceDesk		

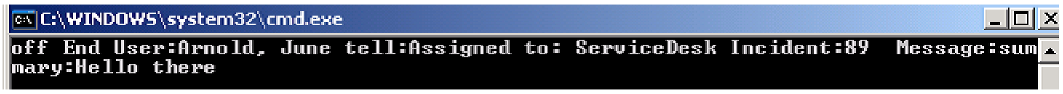
Notification

Telephone Number	Fax Number	Pager Phone Number	Alternate Phone Number
(382) 555-1168		danalyst@forwardinc.com	
Email Address		Pager Email Address	
dbell@forwardinc.com		danalyst@forwardinc.com	

Notifications	Low	Normal	High	Emergency
Method	Email	Telalert	Email	Telalert
Workshifts for Notification Methods	Regular	Regular	24 Hours	24 Hours

Configuring Outbound Notification Using a Telealert Message

This step could be different for the different tele-messaging product. The messaging product must be able to send the information that CA SDM and CA SDM notification method generates. The information is stored in the .bat file specified in the notification method field. In our example, the output can look similar to the following output, where the Telealert can be picked up information from the variables End User, Tell, and Message:



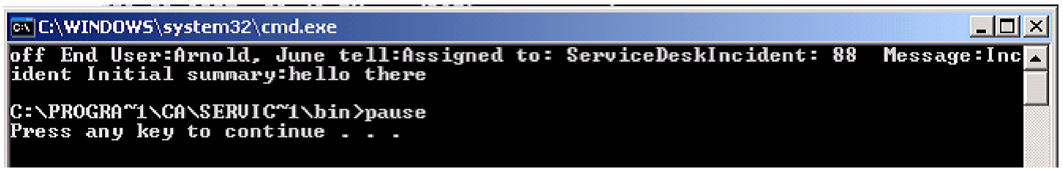
```
off End User:Arnold, June tell:Assigned to: ServiceDesk Incident:89  Message:sum
mary:Hello there
```

Testing the Notification – for Action "Initial"

Complete the following steps to test the notification, for action "Initial":

1. Create an incident.

2. Receive the notification in the Telealert message management system when the incident has been saved. If it has not yet been configured, you receive a Command Prompt window with the following message:



```
off End User:Arnold, June tell:Assigned to: ServiceDeskIncident: 88  Message:Inc
ident Initial summary:hello there

C:\PROGRA~1\CA\SERVIC~1\bin>pause
Press any key to continue . . .
```

How the Method Works

Notifications (applicable to incidents, problems, issues, change orders, and requests) are processed when the ticket is saved. If the notification method is not Notification (for example, Email or FAXserve), the notification processor executes the notification method for each contact in the list. This method is typically an executable or shell script, which is launched in a new process.

Details about the notification are stored in environment variables for easy access by the executable and script. For each notification requested, the notification processor sets the $NX_NTF_MESSAGE and $NX_NTF_SUMMARY environment variables using the Notification Message Title and Notification Message Body information that is provided on the Message Template notebook page of the Activity Notifications Detail window. If the recipient is a valid contact, additional environment variables are created using information in their Contact Detail record. When you select the *Write To Fil*e option for the notification, a text file is created with additional information. (The notification method can use to obtain more detailed information).

A list of contacts to receive the notification is built from the information that is provided on the Objects, Contacts, Types, and Survey notebook pages of the Activity Notifications Detail window. For those having a notification method matching the Notify Level and the log_all_notify Options Manager option that is installed, a notification is generated first to the notification log.

Note: For more information, see the *CA SDM Administrator Guide*.

How to Overcome Environment Problems

Most notification methods invoke an executable or shell script to read the environment variables and send the message. This method works on the UNIX servers, but facing difficulties in reading the environment variables on a Windows server. As a workaround, you can use a Perl script on Windows.

CA SDM includes a ready-to-use installation of the Perl interpreter named *pdm_perl*. Any Perl script that is invoked with pdm_perl as a notification method can reliably obtain the environment variables. The Perl script can read and format the environment variable values and can continue with the rest of the notification, such as invoking a pager or sending an email.

For Windows-based servers, consider using the *launchit* utility. One of the functions of the utility is to invoke your scripts or programs in a shell environment similar to the command prompt with the proper environment variables set.

Example

When you write a Perl script named read_env.pl to read several of the environment variables, then you can invoke it for a notification by entering the following code in the Notification Method field on the Notification Method Detail window:

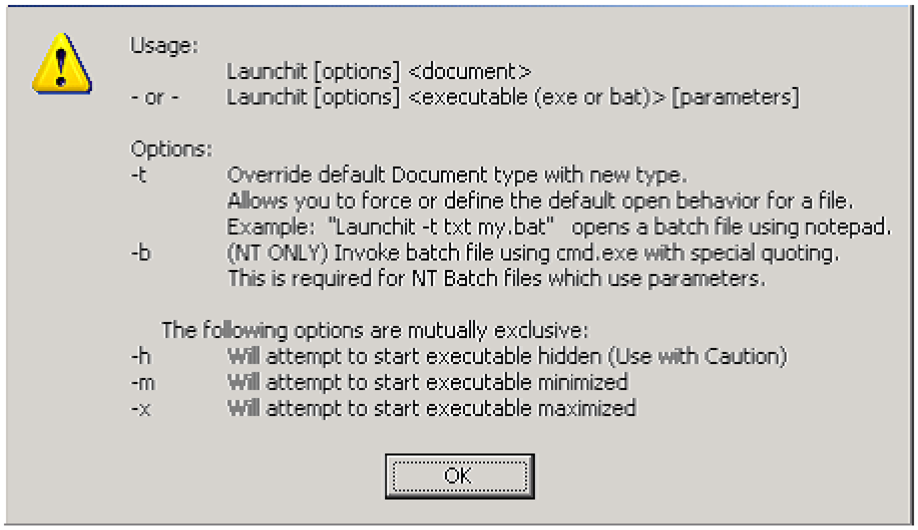
```
pdm_perl script_path/read_env.pl
```

This notification method can start the Perl interpreter and can execute the instructions in read_env.pl script.

Launchit Utility

One of the functions of the *launchit* utility is to invoke your scripts or programs in a shell environment, similar to the command prompt with the proper environment variables set.

Note: For information about the launchit.exe parameters, execute the command from the command prompt. The following window provides the valuable information about the utility.



```
Usage:
            Launchit [options] <document>
- or -      Launchit [options] <executable (exe or bat)> [parameters]

Options:
-t          Override default Document type with new type.
            Allows you to force or define the default open behavior for a file.
            Example:  "Launchit -t txt my.bat"   opens a batch file using notepad.
-b          (NT ONLY) Invoke batch file using cmd.exe with special quoting.
            This is required for NT Batch files which use parameters.

    The following options are mutually exclusive:
-h          Will attempt to start executable hidden (Use with Caution)
-m          Will attempt to start executable minimized
-x          Will attempt to start executable maximized
```

Notification Method Variables

Two sets of variables are created and made available to the notification method.

Basic Environment Variables

The first set of variables is created for every notification that is sent, independent of whether you select the *Write To File* option for the notification. They are written to the environment as you can access the environment variables by the notification method in the standard way. If you choose the *Write To File* option for the notification method, these variables are also written to the notification file in the notification section.

The following environment variables provide you with the basic information about the notification. They are always defined, even if the corresponding value is empty:**vironmentblescri.**

Environment Variable	Description
NX_NTF_MESSAGE	The completed message template text, including full expansion of all variables.
NX_NTF_COMBO_NAME	The completed message template header, including full expansion of all variables.

Environment Variable	Description
NX_NTF_MESSAGE	The completed message template text, including full expansion of all variables.
NX_NTF_URGENCY	The notification urgency (1 is low, 4 is emergency).

The following environment variables are created only if the recipient is a valid CA SDM contact, in which case they are set using values from the recipient Contact Detail record as shown in the following table:

Variable	Contact Detail Record Fields
NX_NTF_BEEPER_PHONE	Pager Number
NX_NTF_COMBO_NAME	Last Name, First Name, Middle Name
NX_NTF_CONTACT	Contact ID
NX_NTF_EMAIL_ADDRESS	Email or Pager Email Address (depending on the notification type).
NX_NTF_FAX_PHONE	Fax Number
NX_NTF_PUBLIC_PHONE	Phone Number
NX_NTF_USERID	System Login
NX_NTF_VOICE_PHONE	Alternate Phone Number

Summary

Outbound notification methods describe how notification messages are delivered to users. Notification methods are scripts that are invoked based on activity notifications. The scripts use information that is supplied as variables to notify personnel or other systems of something that has occurred. For example, you can write a script that sends voice mail to the analyst assigned to a request to indicate that the request has just been escalated.

Notification methods can be assigned for each contact record. The system looks up the notification method to use for specific contacts.

Note: For information about contact records, see the information about setting up users in the *CA SDM Administrator Guide*.

The standard notification methods for CA SDM are as follows:

Email

Sends messages by electronic mail directly to the recipient through Simple Mail Transport Protocol (SMTP) mail. Messages are also sent to the notification log of the recipient.

Fax

Sends messages to the recipient using FAXserve. Install the FAXserve. FAXserve is a separate product and is not part of CA SDM.

Pager email

*S*ends email to an address that a paging system provider manages. The email text can typically display on an alphanumeric pager.

You can also create your own notification methods. For example, you can send notification to a particular printer for periodic collection, or to a pager. To create a notification method, create a shell script that includes notification variables, and then enter the new notification method into CA SDM.

Note: For information about customizing notification methods, see the *CA SDM Technical Reference Guide*.

Remote Reference Method

The Remote Reference integration method is a table-driven system for inserting calls to external products into the CA SDM Java Client interface menus and forms. This functionality does not work properly in the CA SDM web interface due to the security restrictions that the browser imposes while attempting to launch products.

CA SDM administrators can also leverage Remote References in Execute Remote Reference types of macros. These items can then be further leveraged by Classic Workflow tasks as well as Service Type events in managing the CA SDM policy.

CTI Integration Method

CTI integration is possible through a number of mechanisms. This integration is typically implemented by using web services, in combination with opening a web browser, to launch a prepopulated CA SDM URL. This process allows the display of the profile browser and incident in context. Either existing tickets or new tickets are displayed, prepopulated with information gathered using telephonic means such as Voice Response Units (VRUs).

Note: For more information about CTI integration, contact CA Technology Services.

Integration Value

Computer Telephony Integration (CTI) is a technology that allows interactions on customer contact channels (voice, email, web, fax, and so forth) and computer systems to integrate or coordinate. In this scenario, it is primarily used to launch application screens (*screen pops*) in coordination with voice and data. Interactive Voice Response Units (VRUs) capture information from a customer. This information is then used not only to forward the call to an agent desk, but also to display information in context of the responses.

The advantage is that all relevant customer information is available to an agent by the time the agent is ready to answer the call. CTI is also used for call routing. Information such as an account number, request type, and area the VRU captures. This information is used to route a call to an appropriate agent or a group of agents. Overall, CTI contributes to enhancing the customer experience.

How the Integration Works

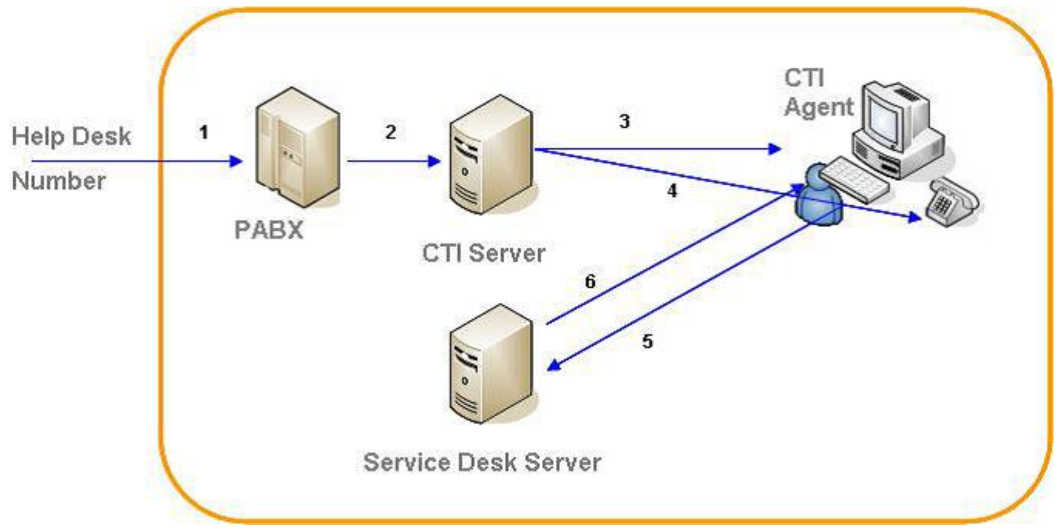
The CA SDM CTI integration is based on CTI Software Server and desktop client software. The name for the CTI server software can change from one telecom equipment provider to another.

Example

CCE Server and the *Avaya* desktop client are named CCE Agent software and provides Avaya CTI Server functionality.

The PABX (or PBX) is linked with the CTI server which can receive data from the PABX. Equally, the CTI Server can command and control the PABX. The following diagram illustrates how the CTI integration works.

The following information applies to the previous diagram:



Follow these steps:

1. The Customer calls the *Service Desk* Number. The customer is presented with various options to respond.
2. The PABX passes the captured responses and the call to the CTI Server.
3. The CTI Server finds the first available support analyst. The captured customer information is sent to the CTI agent software of the identified support analyst.
4. At the same time, the call is routed to the support analyst phone.
5. The CTI Agent Software uses the captured information to interact with a solution such as CA SDM.

6. The CTI Agent interacts with CA SDM and results in a *screen pop* on the support analyst desktop. This interaction is in the context of the information that the CTI agent passes. The support analyst now proceeds with the call and has the application information relevant to that call.

The CTI agent software is responsible for passing information and initiation of the screen pop from CA SDM. All the efforts surrounding the integration of CA SDM and the CTI product is focused around the CTI Agent software. Typically, no effort is required on the CA SDM.

Identification and Acquisition of CTI software

Existing telephone infrastructure and a contract with a telephone service provider does not mean that you have a CTI Server and the requisite CTI Agent Software. Start discussions with your telephone vendor to acquire the software. The discussion includes the considerable expenses in software and hardware.

IVRU Prompts

Put thought and effort in to developing IVRU prompts and call routing. Prompts are limited, but enough to satisfy business requirement for call routing. Consult CTI to integrate the vendor in the process.

Identification and Authentication

CTI Agent software can launch an application on behalf of a support analyst. To prepare for the integration, answer the following questions:

- How does the CTI Agent authenticate to the application?
- How does it get the authentication information?
- How often does it authenticate an application?

CA Technologies Approach

The CA SDM web interface makes life easier to launch contextual information. The *CA SDM Technical Reference Guide* describes in detail how to access CA SDM information by launching a web interface URL. Here are few examples:

Launching a New Incident Screen

In this sample URL, BOPSID is a token that identifies a CA SDM user.

http://<host_name>:<port_number>/CAisd/pdmweb.exe?OP=CREATE_NEW+FACTORY=in+BOPSID=12314432874

See the following section for an explanation on how to generate a BOPSID.

Launching a New Incident Screen and Prepopulate the Fields

In this sample URL, the Customer field for the new incident record is to be preset to a contact record with the *employee number* = 12345.

http://<host_name>:<port_number>/CAisd/pdmweb.exe?OP=CREATE_NEW+FACTORY=in+BOPSID=213123434+PRESET_REL=customer:cnt.id:contact_num:12345

Launching and Displaying the Contact Record for the Calling Customer

This URL can list the Service Desk contact record for the employee with employee number 12345.

http://<host_name>:<port_number>/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=cnt+QBE.EQ.contact_num=12345+BOPSID=34235543534535

Note: For more information about arguments used in Service Desk web interface URLs, see the *CA SDM Technical Reference Guide*. In addition, all URLs in the previous examples require a BOPSID to be passed as an argument.

Getting a BOPSID

Complete the following steps to get a BOPSID:

Follow these steps:

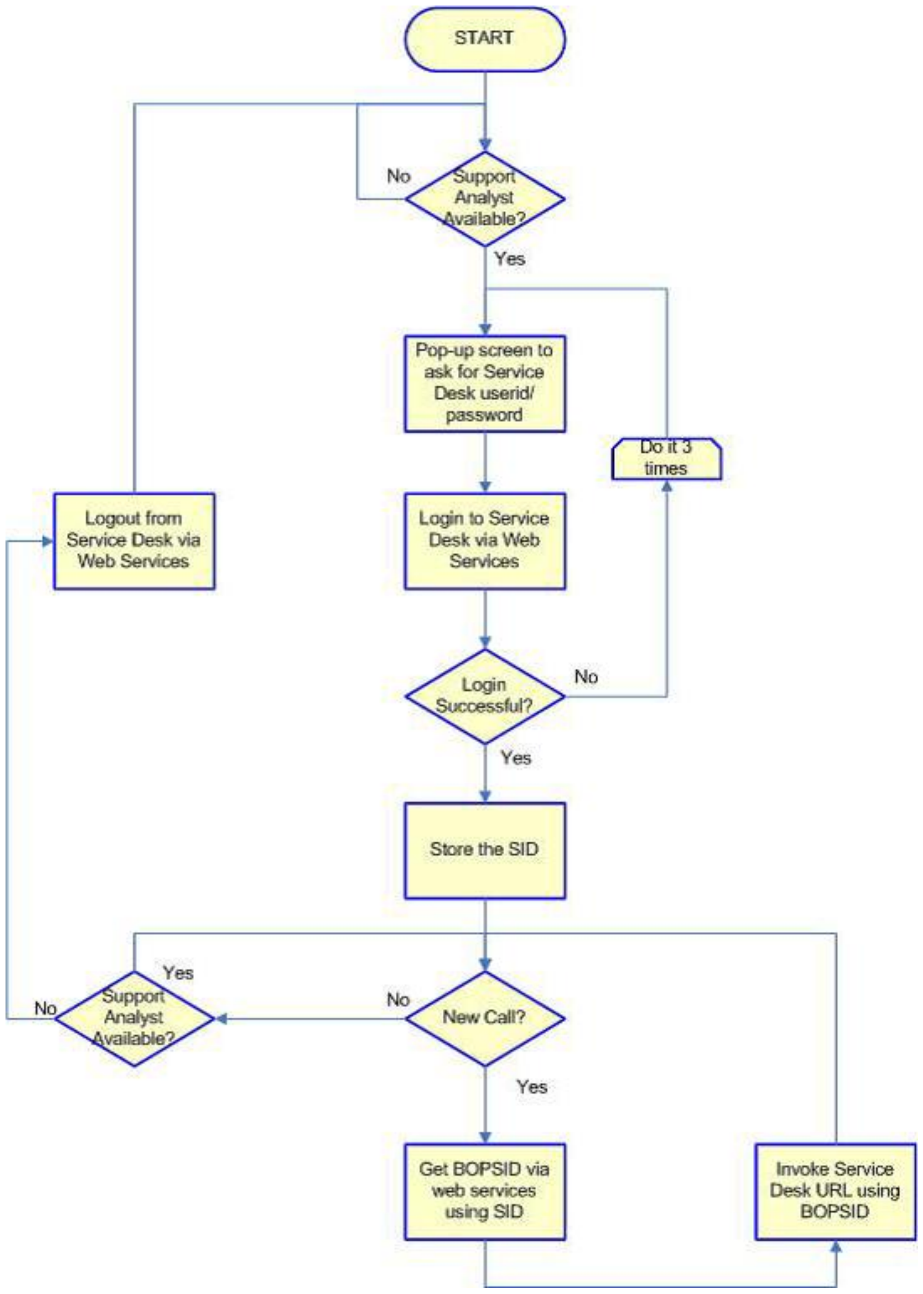
1. Log in to CA SDM using Service Desk web services. The login operation returns a Session Identifier (SID).

2. Use the SID from the previous step to get the BOPSID. Invoke the *getBopsid* web services method. The BOPSID retrieves every time a URL is launched.

   Note: For more information, see the *CA SDM Technical Reference Guide*.

Best Practice

The Support Analysts must indicate to the CTI Agent software that they are available to take phone calls. This step is typically the first step. Then, the CTI agent can route incoming calls to the Support Analyst. The CTI agent software adapts to incorporate the CA Service Desk login and logout in the process of the support person indicating their availability. The following diagram illustrates the sequence of events that must happen in the CTI agent software:


START
Support Analyst Available?
No
Yes
Pop-up screen to ask for Service Desk userid/ password
Do it 3 times
Logout from Service Desk via Web Services
Login to Service Desk via Web Services
Login Successful?
No
Yes
Store the SID
Yes
Support Analyst Available?
No
No
New Call?
Yes
Get BOPSID via web services using SID
Invoke Service Desk URL using BOPSID

Configuring the Solution

CA SDM does not require special configuration. CA SDM web services have been configured when you run pdm_configure.

Currently, there is no way to launch the *profile browser* with the contact details completed.

The Profile browser provides a nice aggregated view of client information and serves as a launch pad to other CA SDM activities. A minor adaptation to the list_cnt.htmpl file allows searching of a contact and displaying details for the contact in a profile browser.

The following htmpl code highlights the changes that are made to the list_cnt.htmpl.

Note: The code in **bold** is the adaptation that is required to the list_cnt.htmpl.

```
<PDM_MACRO NAME=lsStart>
<PDM_MACRO NAME=lsCol hdr=Name attr=combo_name link=yes>
<pdm_macro name=lsWrite both=yes text="if (groupOnly) {">
<PDM_MACRO NAME=lsCol hdr=Number attr=contact_num>
<pdm_macro name=lsWrite both=yes text="}">
<pdm_macro name=lsWrite both=yes text="else {">
<pdm_macro name=lsWrite both=no text="PDM_IF \"@args.KEEP.cti\" == \"1\" &&
\"@list.id\" != \"\" ">
<pdm_macro name=lsWrite both=no text="profile_browser
(\"@list.persistent_id\")
;">
<pdm_macro name=lsWrite both=no text="/PDM_IF">
<PDM_MACRO NAME=lsCol hdr="Contact Type" attr=type.sym>
<PDM_MACRO NAME=lsCol hdr="Access Type" attr=access_type>
<PDM_MACRO NAME=lsCol hdr="Contact ID" attr=contact_num>
<PDM_MACRO NAME=lsCol hdr="System Login" attr=userid>
<pdm_macro name=lsWrite both=yes text="}">
<PDM_MACRO NAME=lsCol hdr="Phone Number" attr=phone_number>
<PDM_MACRO NAME=lsCol hdr=Status attr=delete_flag>
<PDM_MACRO NAME=lsEnd>
```

Contact details and the profile browser with the contact details can now be launched using the following URL:

http://<host_name>:<port_number>/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=cnt+QBE.EQ.contact_num=12346+KEEP.cti=1+BOPSID=324322323423

In this URL, KEEP.cti=1 drives the launching of the profile browser for the searched contact.

Note: This method works only when there is a unique contact record for the search criteria entered. In addition, the adaptation has been tested for CA SDM.

Enabling the Solution

The adaptation to the CTI Agent software is required to do the following steps to enable the solution:

Follow these steps:

1. Prompt the support analyst for the CA SDM userid and password.
2. Use CA SDM web services to log in to CA SDM.
3. Use CA SDM web services to get the BOPSID.
4. Launch the appropriate CA SDM URL with BOPSID.

Testing the Solution

CA SDM URLs can be tested without BOPSID using the following URL:

http://<host_name>:<port_number>/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=cnt+QBE.EQ.contact_num=12346

This URL displays the CA SDM login page. You must see the contact that is listed once you log in to CA SDM.

Troubleshooting

Use the CA SDM log files to verify any errors that are related to the web services call.

Integration Summary

The CA SDM and CTI integration directly impacts customer perception and improves the process of call management. Therefore, it is important and critical to understand the call handling process being planned. CA Technologies Services can provide guidance and information to the CTI vendor to carry out the adaptations that are required to the CTI agent.

The CTI integration discussed in this section must serve 95 percent of the client requirements. More complicated implementations such as transfer of calls and popping of incident details with the transfer have been implemented at customer locations, but are beyond the scope of this section. Your local CA Technologies Services resources are available to assist with these complex scenarios.

URL Integration Method

You can use URLs to access CA SDM objects. For example, a URL can be embedded in an email to allow the email recipient to access the incident.

Note: For more information about the URL integration, see CTI Method, earlier in this section. For complete details about URL integration, see the *CA SDM Administrator Guide*.

External Authentication Method

Using a secondary server, CA SDM can be integrated with an authentication system running on a different system, or even on a different hardware platform.

Example

Work with the boplogin process, explained in the User Authentication section in the *CA SDM Implementation Guide*.

Majic Triggers

Triggers can be defined in the CA SDM object definition language (Majic) to execute when the value of an object attribute change. The trigger can execute code that is external to CA SDM.

Important! CA Technologies Services set up this kind of trigger that requires detailed knowledge of the CA SDM architecture, specifically the domsrvr.

The Domsrvr

The Domain Object Server (domsrvr) is where the business objects "live". The server is the business object repository. The objects in the domsrvr are defined and implemented in two types of files. The majic files (*.maj and *.mod) define the schema of the objects (that is, the class definitions). The spel files (*.spl) define the procedural behavior using interpreted C code.

Type	Product Files (bopcfg/majic)	Customer Files (site/mods/majic)
Majic *.maj of the product.	Initial OBJECT specification	Initial Customer specifications of local tables.
Majic modifications *.mod	Product temporary fixes to delivered *.maj files in bopcfg/majic.	Customer modifications to either product OBJECT or Customer OBJECT specifications.

Type	Product Files (bopcfg/majic)	Customer Files (site/mods/majic)
Spel *.spl	Either of the following steps: ▪ Compiled product spel libraries. ▪ QOxxx.spl replacements for one or more spell methods in product spel libraries.	Either of the following steps: ▪ Customer ASCII Spel methods. ▪ Optional customer replacements for one or more spell methods in product Spel libraries.

What is Majic?

Majic is a CA Technologies proprietary language use to define the files that the domsrvr reads, as follows:

Objects

An object is a rough equivalent to a database table. However, a single object can be mapped to multiple tables. For example, the CA SDM cnt (contact) object maps to MDB tables ca_contact and usp_contact. No mapping is required to an external table.

Factories

A factory is a manager for a class of objects. All objects have at least one factory, and have more than one, with the additional factories encompassing a cross section of object instances. For example, the CA SDM cst (customer) factory contains those contacts who are customers.

Attributes

Attributes are a rough equivalent to database columns. Most object attributes are mapped to database columns. The local attributes hold entirely within the domsrvr. Attributes can be scalar values, references to other objects (SRELs), or references to domsets (query results).

Triggers

Majic triggers are a rough equivalent to a database trigger, but are considerably more flexible. Triggers can be defined for either objects or attributes. The domsrvr invokes the triggers automatically at key times, such as when an attribute or object is instantiated or changed. They can be written in C++, Java, or Spel.

Methods

Methods are functions that can be invoked in the context of an object or factory.

What is Spel?

Spel is a procedural language closely resembling C, with some additional statements for handling the Business Object Process (BOP) messaging architecture. The spel_srvr server interprets the Spel language. The Spel interpreter executes Spel source code, whereas the primary purpose of the spel_srvr is to execute methods that are associated with business objects defined to the domsrvr. This source includes object, trigger and factory methods.

Summary

By using Majic and Spel definitions, CA SDM can trigger actions to add or modify CA SDM object behavior to fit into business process definitions that involve interactions with other CA or third-party products.

Important! Consult the CA SDM specialists from CA Technologies Services when implementing this type of integration.

Chapter 4: CA Process Automation

CA Process Automation Integration

CA SDM 12.6 offers integration with the following workflow components:

- Classic CA Service Desk Workflow, which is the embedded legacy Change Order workflow system. This system offers a basic approach to defining and automating linear, streamlined processes.
- CA Workflow (introduced in Unicenter Service Desk r11), which is a generic, high performance scalable workflow management system, that allows for the definition, management, and execution of complex workflows.
- CA Process Automation introduced in CA SDM r12.5. The integration provides the most current compatibility with external systems and industry standards.

You can have all three workflow methods running in the same single instance of CA SDM. However, only one tool can be used as an initial launch point per process.

This chapter focuses on the CA SDM integration with CA Process Automation.

What is CA Process Automation

CA Process Automation enables you to improve your operational efficiencies by automating commonly executed tasks that would ordinarily be performed manually. CA Process Automation frees up the resources that were previously assigned to perform those tasks. The automation reduces the potential for inconsistencies that can occur with manual execution.

Coupled with the ability to automate tasks, CA Process Automation manages user interactions, such as approvals and notifications for compliance and accuracy within production environments. These functionalities make CA Process Automation an ideal candidate for workflow management throughout the IT organization.

Integration Details

Integration Points and Functionality from CA SDM

The following integration points from CA SDM allow you to do the following steps:

- Associate a CA Process Automation process definition to a Request, Incident, Problem Area, Change Order Category, or Issue Category in CA SDM.

  Important! Attach a CA Process Automation process definition to all Ticket *Types* within CA SDM. The use of term *Ticket* within this chapter is synonymous with either a Request/Incident/Problem/Change Order or Issue for simplicity.

- Associate and execute a CA Process Automation process definition to an Execute *CA IT PAM Action* Macro Type. This approach permits CA Process Automation processes to be launched for any update to a ticket, contact record, CI, or asset record.

- Integrate CA SDM with other CA Technologies, or third-party products using web services, Java, a command line, or the API calls.

Integration Points from CA Process Automation to CA SDM

The following integration points from CA Process Automation allow you to do the following steps:

- Retrieve and validate information from any object within CA SDM, execute logic for the information, and continue the defined process flow using the new information.

- Exchange and share information between CA SDM and other CA or third-party product.

Integration Value

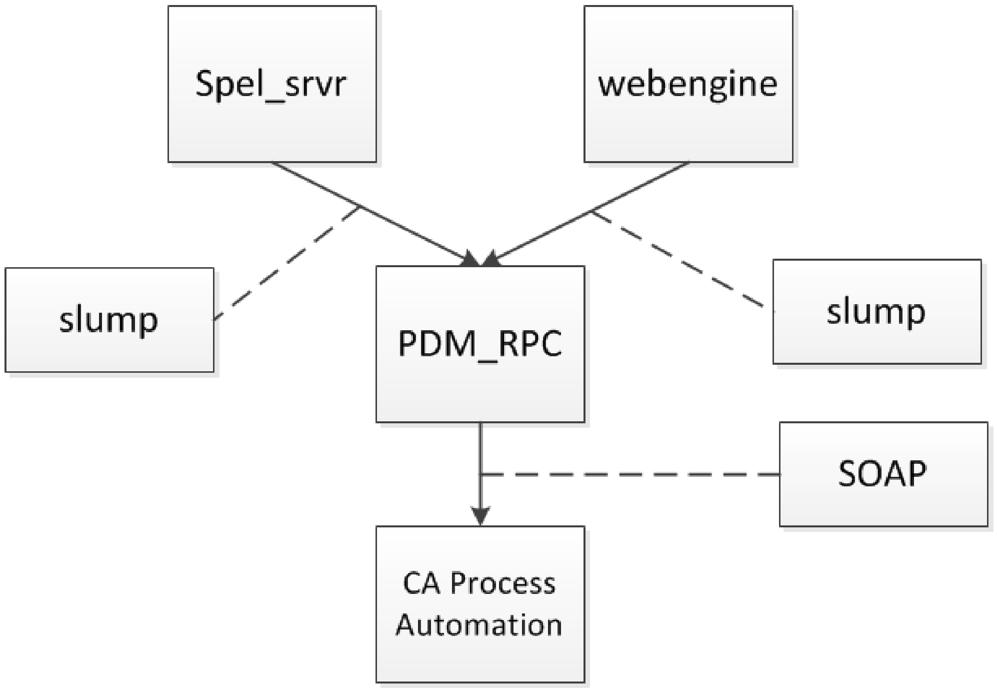
Leveraging the integration between CA SDM and CA Process Automation enables your organization to manage processes related CA SDM tickets.

How the Integration Works

From CA SDM to CA Process Automation

All the communication from CA SDM to CA Process Automation is through CA Process Automation web services. The pdm_rpc (a Java application), a CA SDM server-side daemon performs the web service calls.

The following diagram explains the basic communication flow:



To launch a CA Process Automation Process, CA SDM invokes a CA Process Automation Web Service: *executeStartRequest*. To display task information on the Workflow Tasks Tab within a ticket, CA SDM invokes the CA Process Automation Web Service: *getProcessLogs*.

From CA Process Automation to CA SDM

All the communication from CA Process Automation to CA SDM is done through invoking CA SDM Web Service calls, either through the CA Process Automation operators available with the CA Service Desk Connector, or SOAP operators, or your own custom operators. These methods and terms are explained later in this chapter.

Getting Started with Top Ten CA Process Automation Basic Terminology

Following terms are a list of the top ten CA Process Automation Basic Terminologies that are used throughout this chapter. If there are any terms that are referenced and not defined, you can find more information in the *CA Process Automation Online Documentation* available on support.ca.com.

Domain

The Domain is always the root container in the hierarchy, representing the CA Process Automation Domain, which is the top-level configuration boundary for CA Process Automation running in the enterprise network. All other CA Process Automation objects are contained and configured in the Domain. Environments, Orchestrators, and Agents are the child elements in a Domain. The Domain container provides default security and module settings for these child elements.

Orchestrator

The Orchestrator is the CA Process Automation Engine. An Orchestrator maps to and configures the CA Process Automation Orchestrator application running on a host computer. The Orchestrator managing the Domain is referred to as the Domain Orchestrator.

Agent

An Agent maps and configures a *CA Process Automation Agent* application running on a host computer.

Environment

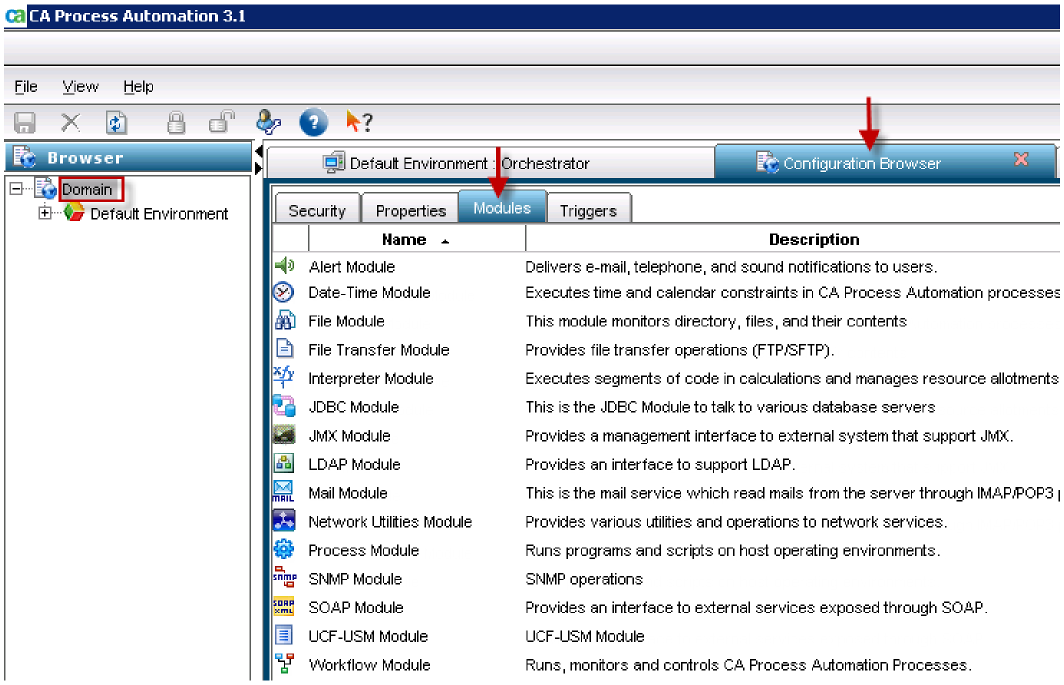
An Environment provides a configuration and operations boundary for the Touchpoint in the Domain.

Touchpoint

A Touchpoint is an Orchestrator or Agent in the Domain. CA Process Automation Touchpoints expose modules that an Orchestrator or Agent runs. Modules schedule, execute, and monitor operations and Processes within a CA Process Automation Environment. Agent Touchpoints perform tasks on their host computers while Orchestrators manage tasks across Touchpoints in an environment.

Modules/Connectors

Modules/Connectors integrate CA and third-party products into workflow processes. The 16 modules shown in the screenshot are available with CA Process Automation 3.1 by default.

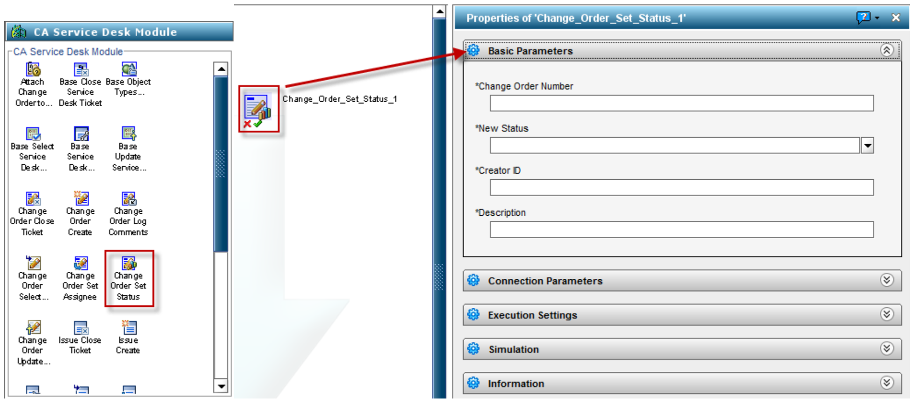


Name	Description
Alert Module	Delivers e-mail, telephone, and sound notifications to users.
Date-Time Module	Executes time and calendar constraints in CA Process Automation processes
File Module	This module monitors directory, files, and their contents
File Transfer Module	Provides file transfer operations (FTP/SFTP).
Interpreter Module	Executes segments of code in calculations and manages resource allotments
JDBC Module	This is the JDBC Module to talk to various database servers
JMX Module	Provides a management interface to external system that support JMX.
LDAP Module	Provides an interface to support LDAP.
Mail Module	This is the mail service which read mails from the server through IMAP/POP3
Network Utilities Module	Provides various utilities and operations to network services.
Process Module	Runs programs and scripts on host operating environments.
SNMP Module	SNMP operations
SOAP Module	Provides an interface to external services exposed through SOAP.
UCF-USM Module	UCF-USM Module
Workflow Module	Runs, monitors and controls CA Process Automation Processes.

Additional connectors (including the CA Service Desk Connector) can be downloaded from the CA Process Automation *Best Practices* page on support.ca.com. You can find the link later in this chapter, in section Additional Best Practices Tips and Tricks Available Online. (see page 248)

Operators

Operators are preconfigured parameters for repeated use in your process definitions. The *Change Order Set Status* is an example of an Operator within the CA Service Desk Module/Connector available for the download on *CA Process Automation Best Practices* page on support.ca.com, which updates the status of a Change Order:



*Change Order Number

*New Status

*Creator ID

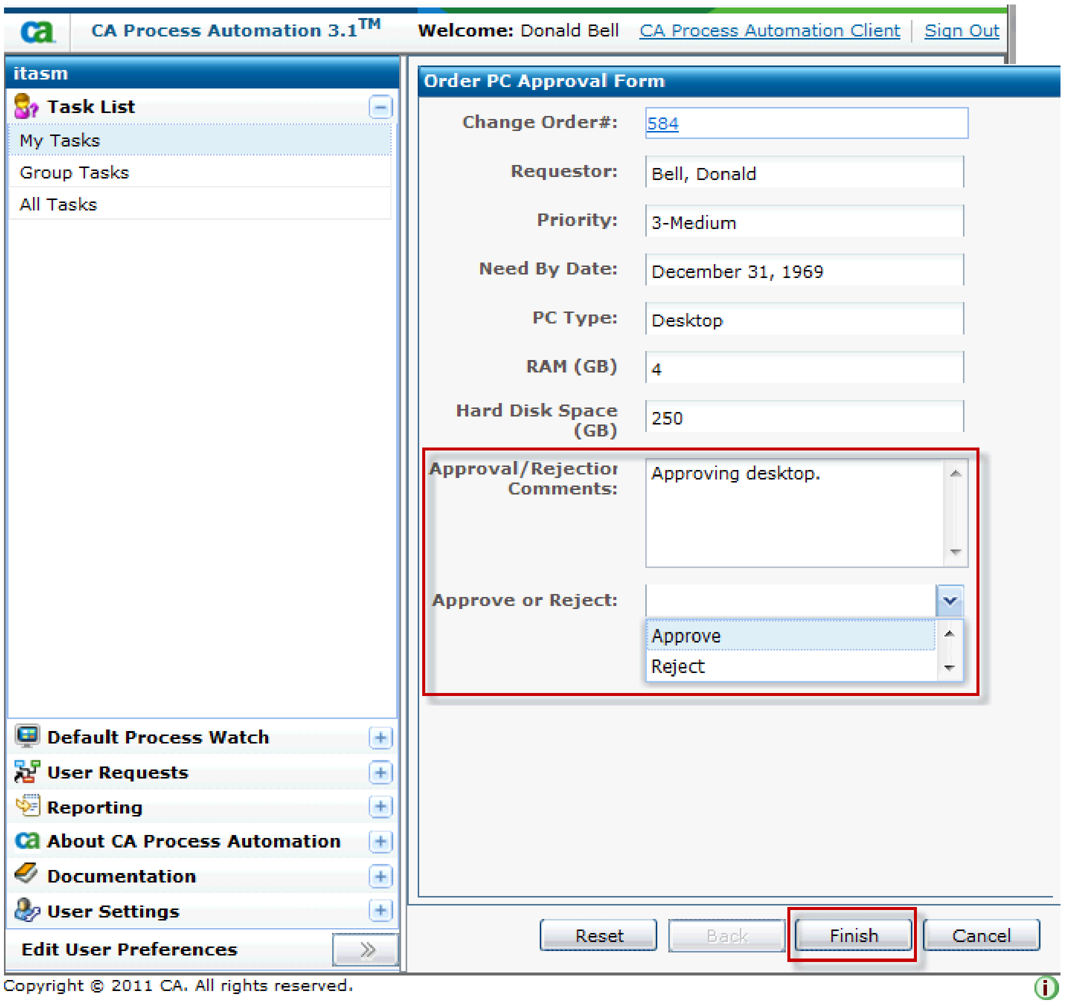
*Description

Datasets

Datasets store information that can be shared among instances of the same process or between different processes. The information defined in a dataset can be modified manually or by users or Administrators or automatically during execution of a process. For more information on the types of datasets that are used, see the section later in this Chapter *Using Dataset Objects to Define Variables* (see page 181).

Interaction Request Forms (IRF)

IRF provides field and other UI elements with which users can enter information that is required to execute an Operator or continue a process. As an example, an IRF is the interface that an approval form uses and that must display to an approver of a Change Order within CA SDM. For additional information, see the section later in this chapter *Requesting User Interaction (see page 197).*

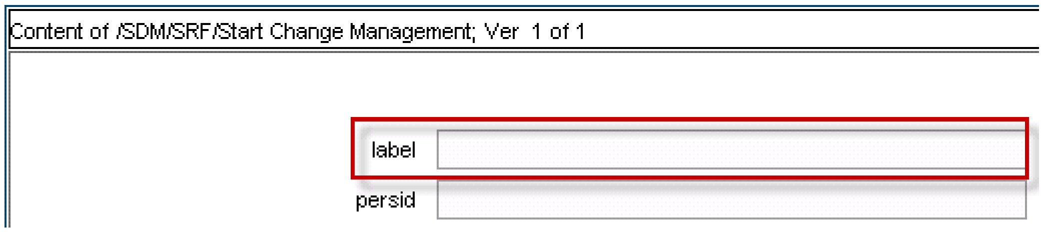


Order PC Approval Form

Change Order#:	584
Requestor:	Bell, Donald
Priority:	3-Medium
Need By Date:	December 31, 1969
PC Type:	Desktop
RAM (GB)	4
Hard Disk Space (GB)	250
Approval/Rejectior Comments:	Approving desktop.
Approve or Reject:	Approve / Reject

Start Request Forms (SRF)

SRF is a shortcut to allow an operator to invoke processes manually using the CA Process Automation Management Console. SRF objects define custom dialogs that prompt operators for the values of parameters that the associated object requires. CA SDM also uses this dialog to launch CA Process Automation Process Definitions by attaching a definition to a Request/Incident/Problem Area, or Change Order/Issue Category. If CA SDM, the two values that are required to be passed from CA SDM to a CA Process Automation process in order for it to be instantiated are *label* and *persid*. This process is discussed later in this chapter, Link a CA Process Automation Process Definition to CA SDM (see page 201).


Content of /SDM/SRF/Start Change Management; Ver 1 of 1

Configuring the Integration

The following section describes the steps to integrate CA SDM and CA Process Automation.

Prerequisites for the Integration

This chapter assumes all of these products that are listed have been installed and are baseline that is tested successfully. The minimum system requirements for the integration example documented in this chapter are as follows:

For more information on CA SDM and CA Process Automation general architecture and recommendations, see the C*A Process Automation Best Practices Page* available online on support.ca.com. The direct link can be found later in this chapter, in section Additional Best Practices Tips and Tricks Available Online *(see page 248).*

CA EEM 8.4 SP4

CA EEM is required when multi-tenancy is implemented. CA EEM is also required when you are planning to implement pass through authentication from CA SDM to CA Process Automation.

If CA EEM is not a part of your architecture, you need an alternate LDAP repository for CA Process Automation to leverage.

We integrate CA EEM with CA SDM later in this chapter, in section Configure Pass-Through Authentication.

CA SDM 12.6

Configure the email functionality and test the email notifications successfully. Integrate CA EEM with CA SDM later in this chapter, in section Configure Pass-Through Authentication.

CA Process Automation 3.1 CP1 (Minimum)

Install the CA Service Desk Connector if you would like to leverage the connector in your process definitions. In previous versions of CA Process Automation the installation of the CA SDM Connector was completed through the checkbox during the installation of CA Process Automation. You can leave this connector intact when upgrading from the prior versions with the connector installed, no additional installation steps are necessary. However, if you are performing a fresh connector install into a CA Process Automation instance with version r3.0 CP01 or later, use the new connector installers (r1.5 or above). The prior versions of the installer fail against newer versions of CA Process Automation. The CA Service Desk Connector (along with additional connectors) can be downloaded from the CA Process Automation Best Practices Page on support.ca.com.

The installation of the CA Service Desk Connector is discussed in detail in the section Install the CA Service Desk Connector. For our example, CA EEM is integrated with CA Process Automation. The installation is done while installing CA Process Automation by selecting CA EEM type as the *Security Server* type.

For more information on CA SDM and CA Process Automation general architecture and recommendations, see the Product Home Pages on support.ca.com, or alternatively the CA Process Automation Best Practices Page available online on support.ca.com. The direct link can be found later in this chapter, in section Additional Best Practices Tips and Tricks Available Online (see page 248).

User Authentication and Authorization

As stand-alone products, both CA Process Automation and CA SDM have individual requirements for authentication and authorization. To support a unified Service Oriented Architecture (SOA) strategy, and to enable pass through authentication, you can configure both products to use CA EEM for authentication.

Pass-Through Authentication Benefits

Following scenario provides information on what pass-through authentication leveraging CA EEM provides. For more information on how to configure, see the section Configuring Pass-Through Authentication:

- If a user is logged in to CA SDM, and from within the Workflow Tasks Tab of a given ticket with a running process instance, clicks on a hyperlink that launches into CA Process Automation Task List. This user is not prompted for a username and password.

The following list is not provided with pass through authentication leveraging CA EEM. The following two scenarios, although achievable, require the use of an EEM token which is not inherently available by default, or alternatively, requires integration with CA SiteMinder.

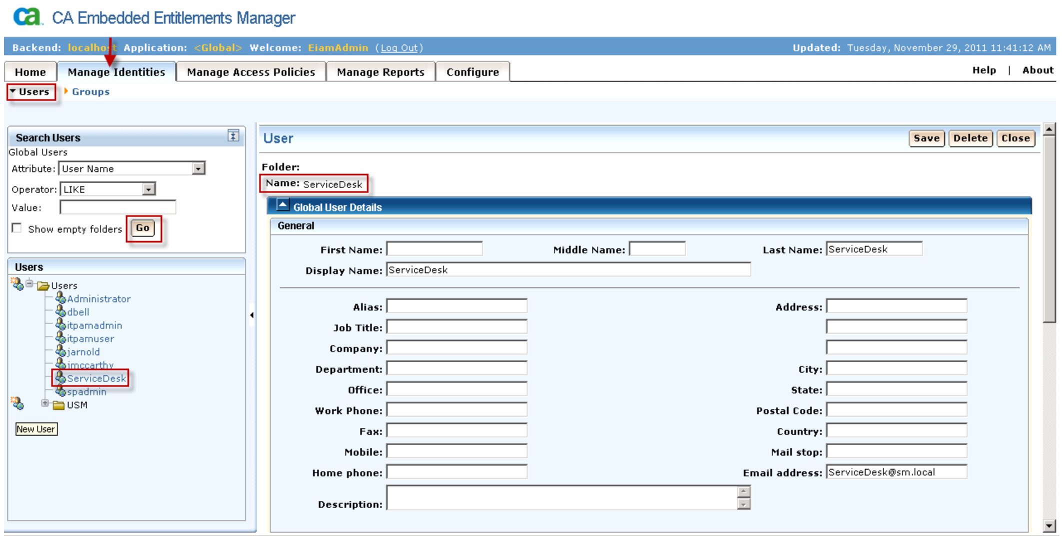
- A user receives an email notification with a hyperlink to a CA Process Automation task, and clicks on the hyperlink. The user is prompted for a username and password to log in to CA Process Automation.
- A user is logged in to CA Process Automation, and clicks on a hyperlink to a CA SDM Ticket. The user is prompted for a username and password to log in to CA SDM.

  For more information on integration with CA SiteMinder, see *Volume I of the CA Service Desk Manager Integrations Green Book.*

Configure Pass-Through Authentication

Pass-through authentication is enabled providing that the following prerequisites have been met:

- CA SDM and CA Process Automation are configured to use the same CA EEM installation.
- CA SDM is configured to use CA EEM for Authentication.
  - Two Options Manager Options in CA SDM controls CA EEM Authentication, under Administration, Options Manager, Security. Once set, a recycle of the CA SDM service is required for changes to take effect:
    - Eiam_hostname
    - Use_eiam_authentication
- When CA EEM uses the internal data store as its repository, the users must have either global permissions or must belong to the same folder. Otherwise, if CA EEM references an external user store like an external directory or CA SiteMinder, the users must be of the same store to access pass through authentication.
- Users who leverage this pass through authentication must:
  - Have contact records defined in the CA SDM contact table, either created manually or automatically through LDAP. For more information on how to configure CA SDM to access an LDAP directory, please see the CA SDM12.6 *Administration Guide*, Chapter 5, *Configuring User Accounts*, section on *LDAP Directory Data*.
  - Have contact records defined in CA EEM, using either the internal data store or LDAP.
    - The *Name* field at the top of a CA EEM user record is the userid that must match the *userid* in the CA SDM contact table.



Backend: localhost Application: <Global> Welcome: EiamAdmin (Log Out)

Updated: Tuesday, November 29, 2011 11:41:12 AM

Global Users

Attribute: User Name

Operator: LIKE

Value:

☐ Show empty folders

Users
- Users
  - Administrator
  - dbell
  - itpamadmin
  - itpamuser
  - jarnold
  - jmccarthy
  - ServiceDesk
  - spadmin
- USM

User

Folder:

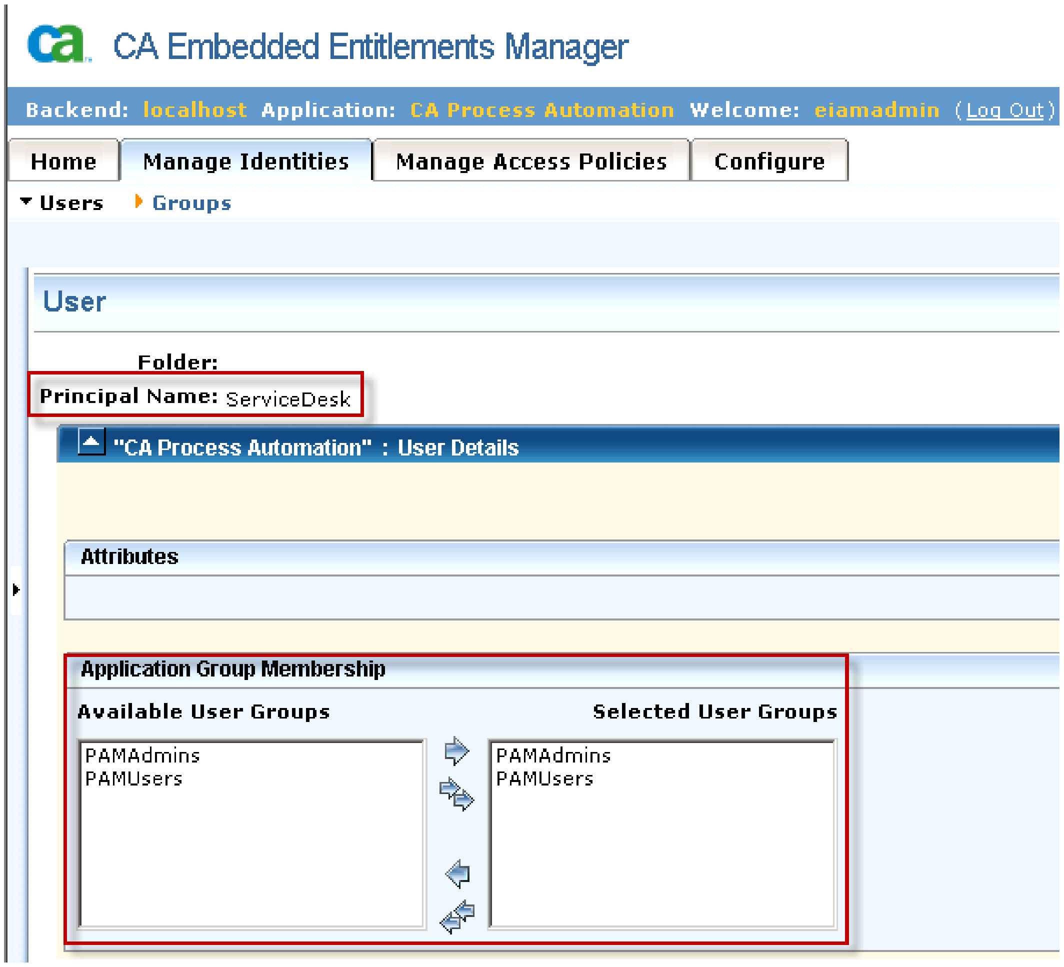
Name: ServiceDesk

First Name:		Middle Name:	
Last Name:	ServiceDesk		
Display Name:	ServiceDesk		
Alias:		Address:	
Job Title:			
Company:			
Department:		City:	
Office:		State:	
Work Phone:		Postal Code:	
Fax:		Country:	
Mobile:		Mail stop:	
Home phone:		Email address:	ServiceDesk@sm.local
Description:			

- Have the following policies that are defined within CA EEM:

When you install CA Process Automation 3.1 with CA EEM as the authentication server, the installer creates several policies and four essential entities by default:

- Two application users: pamadmin, pamuser
- Two application groups: PAMAdmins, PAMUsers


CA Embedded Entitlements Manager
Backend: localhost Application: CA Process Automation Welcome: eiamadmin (Log Out)
Home
Manage Identities
Manage Access Policies
Configure
Users
Groups
User
"CA Process Automation" : User Details
Attributes
Application Group Membership
Available User Groups
Selected User Groups

Folder:
Principal Name: ServiceDesk

Available User Groups	Selected User Groups
PAMAdmins	PAMAdmins
PAMUsers	PAMUsers

Important! CA Process Automation version 3.0 and prior creates application users as itpamadmin and itpamuser, and application groups as ITPAMAdmins and ITPAMUsers. If you are running 3.0 and prior versions, or alternatively, have upgraded to 3.1 from 3.0 or higher you see these users.

CA SDM users who use CA Process Automation can be divided into PAMAdmins and PAMUsers group as follows:

- CA SDM analysts must be members of the PAMUsers group when their duties entail the following tasks:

- Approve, reject, or otherwise responding to CA Process Automation Interaction Request Forms.
- List CA Process Automation process instances that are assigned to the user.
- Viewing the graphical display of a running process instance by clicking the *View Process* button in the Workflow Tasks Tab of a Ticket.

- CA SDM analysts must be members of the PAMAdmins group when their duties entail the following tasks:
  - Create and check in CA Process Automation process definitions or Interaction or Start Request Forms.
  - Terminate process instances directly within CA Process Automation. Terminating process instances are an administrative exception to expected integration procedures.
  - Delegate CA Process Automation process instance tasks.
  - Being defined as the Administrative user in CA SDM Options Manager for the CA Process Automation Workflow option.

    Note: Being defined in the PAMAdmins group does not automatically grant permissions for that option of PAMUsers.

- CA SDM users do not require privilege assignment or access to CA Process Automation when their duties entail the following tasks:
  - Create Tickets that launch CA Process Automation instances.
  - Review the Workflow tab, which shows CA Process Automation process instance status and task information.
  - Change the status of a ticket, which causes the termination of a CA Process Automation process such as, cancel a Change Order.
  - Select a CA Process Automation process definition on a CA SDM Request Area or Change/Issue Category.

Configure the Integration from CA Process Automation

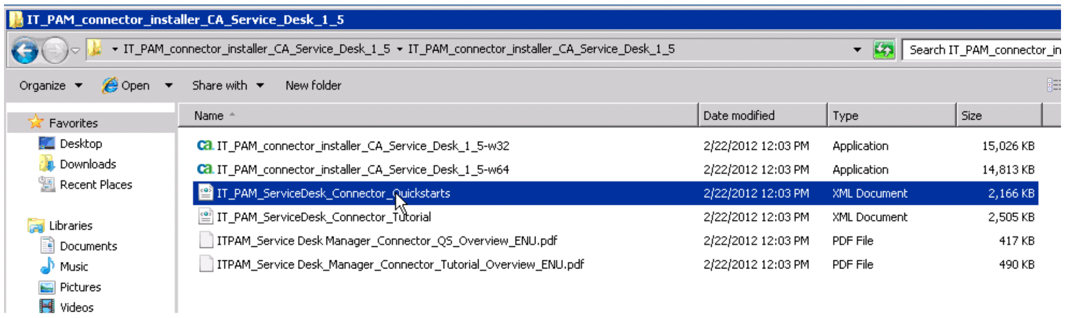
Once the prerequisites have been met as outlined above, the next step is to define how the two products communicate with each other. If you are leveraging the Service Desk Connector in your process definitions, then set the following CA SDM Connector/Module properties through the CA Process Automation Configuration Browser. Detailed steps on how to configure the connector properties are described in the next sections within this Chapter.

Install the CA Service Desk Connector for CA Process Automation

In previous versions of CA Process Automation the installation of the CA SDM Connector was completed through the checkbox during the installation of CA Process Automation. Leave the checkbox intact if upgrading from prior versions with the connector installed, no additional installation steps are necessary. Follow these steps to leverage the new connector installers (r1.5 or above), when you perform a fresh connector that is installed into a CA Process Automation instance with version r3.0 CP01 or later.

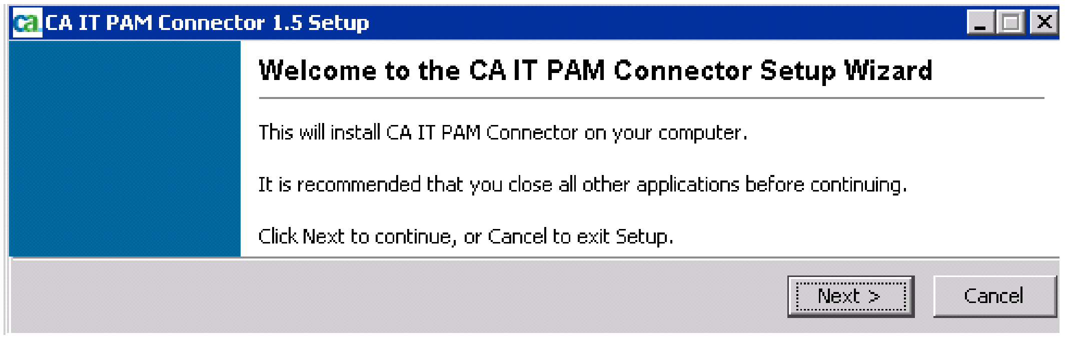
Note: The prior versions of the installer fail against newer versions of CA Process Automation.

1. Download and unzip the CA SDM connector from the CA Process Automation Best Practices Page on support.ca.com.
2. Stop the CA Process Automation Orchestrator Service.
3. Navigate to the directory where the connector was previously downloaded.
4. Execute the IT_PAM_connector_installer_CA_Service_Desk_1_5-w64.exe (if you are running on a 64-bit platform, otherwise install the 32-bit version):


IT_PAM_connector_installer_CA_Service_Desk_1_5
IT_PAM_connector_installer_CA_Service_Desk_1_5 ▸ IT_PAM_connector_installer_CA_Service_Desk_1_5
Search IT_PAM_connector_in
Organize
Open
Share with
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos

Name	Date modified	Type	Size
IT_PAM_connector_installer_CA_Service_Desk_1_5-w32	2/22/2012 12:03 PM	Application	15,026 KB
IT_PAM_connector_installer_CA_Service_Desk_1_5-w64	2/22/2012 12:03 PM	Application	14,813 KB
IT_PAM_ServiceDesk_Connector_Quickstarts	2/22/2012 12:03 PM	XML Document	2,166 KB
IT_PAM_ServiceDesk_Connector_Tutorial	2/22/2012 12:03 PM	XML Document	2,505 KB
ITPAM_Service Desk Manager_Connector_QS_Overview_ENU.pdf	2/22/2012 12:03 PM	PDF File	417 KB
ITPAM_Service Desk_Manager_Connector_Tutorial_Overview_ENU.pdf	2/22/2012 12:03 PM	PDF File	490 KB

5. Click Next.



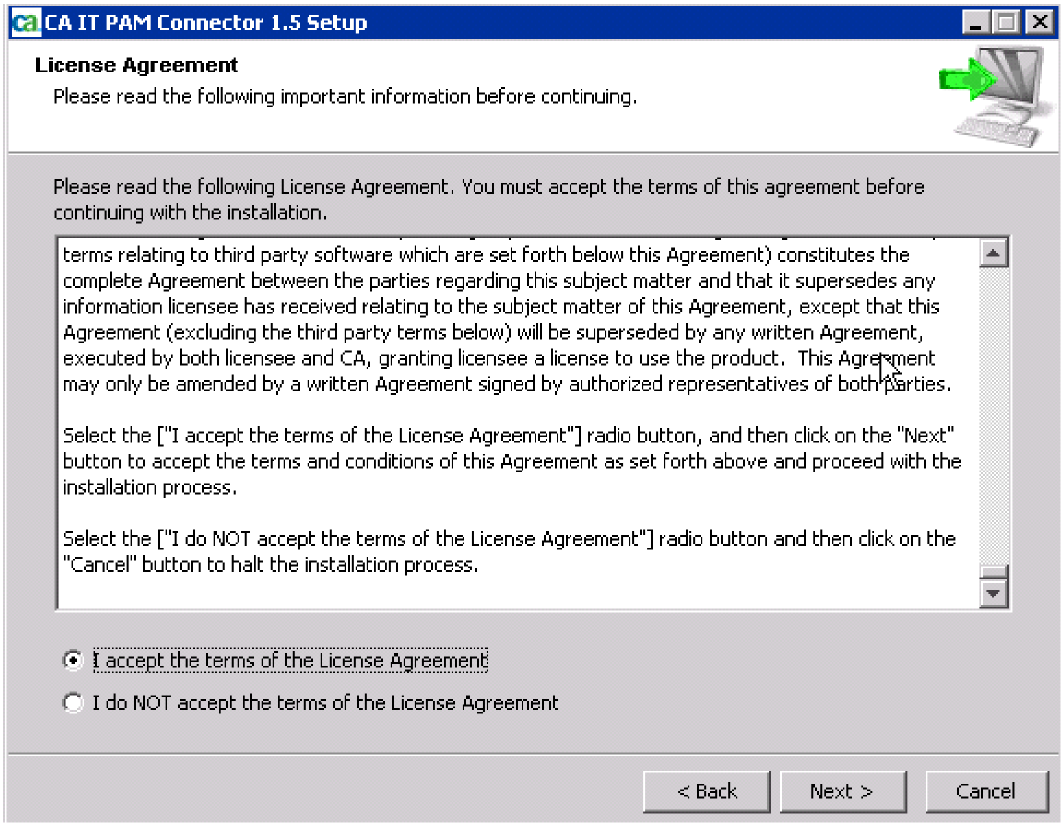
Welcome to the CA IT PAM Connector Setup Wizard

This will install CA IT PAM Connector on your computer.

It is recommended that you close all other applications before continuing.

Click Next to continue, or Cancel to exit Setup.

6. Accept the license agreement and click Next.


CA IT PAM Connector 1.5 Setup

License Agreement

Please read the following important information before continuing.

Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.

terms relating to third party software which are set forth below this Agreement) constitutes the complete Agreement between the parties regarding this subject matter and that it supersedes any information licensee has received relating to the subject matter of this Agreement, except that this Agreement (excluding the third party terms below) will be superseded by any written Agreement, executed by both licensee and CA, granting licensee a license to use the product. This Agreement may only be amended by a written Agreement signed by authorized representatives of both parties.

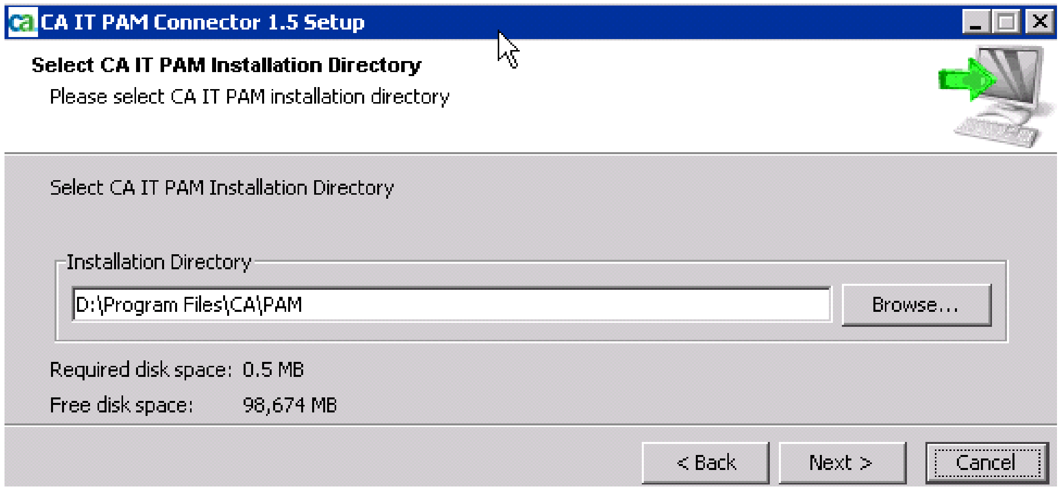
Select the ["I accept the terms of the License Agreement"] radio button, and then click on the "Next" button to accept the terms and conditions of this Agreement as set forth above and proceed with the installation process.

Select the ["I do NOT accept the terms of the License Agreement"] radio button and then click on the "Cancel" button to halt the installation process.

[● I accept the terms of the License Agreement]

○ I do NOT accept the terms of the License Agreement

7. In our test environment, CA Process Automation was installed on the D Drive. Enter the path after changing to the D drive and click Next.


CA IT PAM Connector 1.5 Setup

Select CA IT PAM Installation Directory

Please select CA IT PAM installation directory

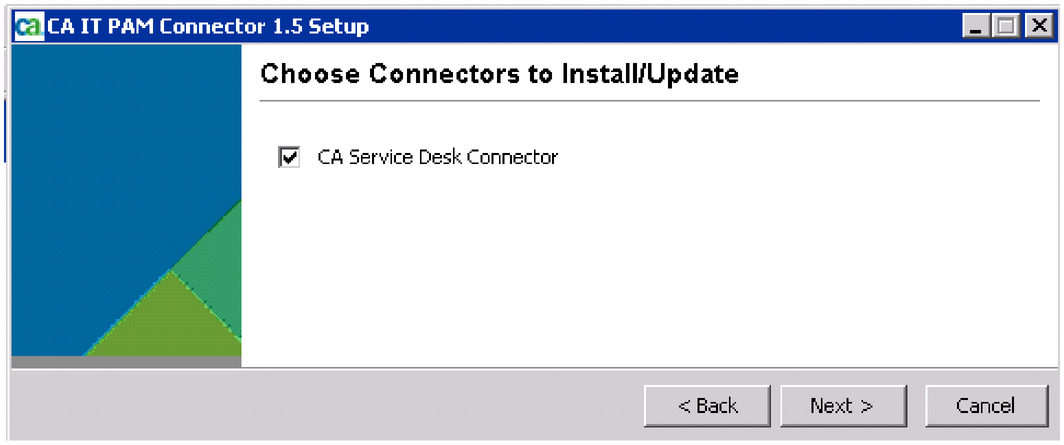
Select CA IT PAM Installation Directory

Installation Directory: D:\Program Files\CA\PAM

Required disk space: 0.5 MB

Free disk space: 98,674 MB

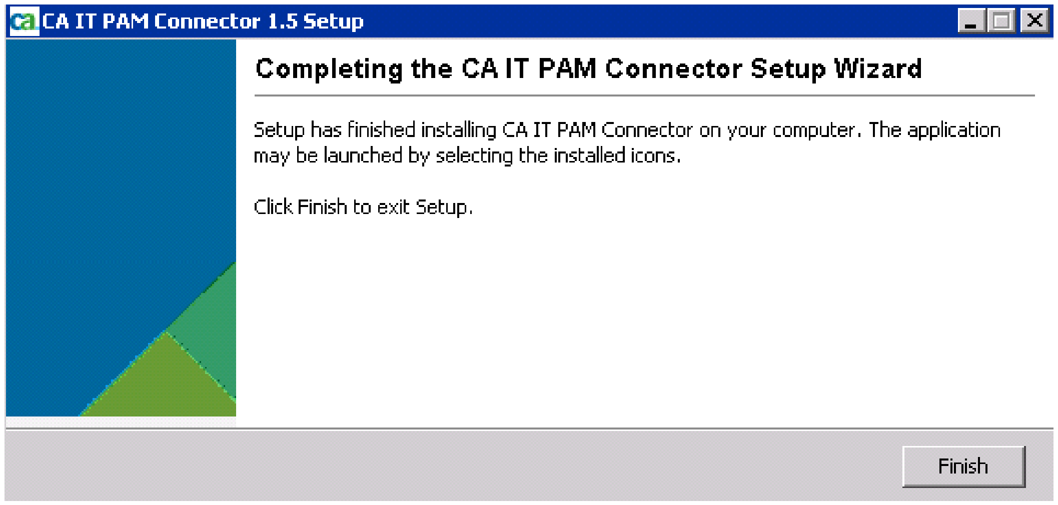
8. Select the CA Service Desk Connector checkbox, and Click Next.



Choose Connectors to Install/Update

☑ CA Service Desk Connector

9. Click Finish.



Completing the CA IT PAM Connector Setup Wizard

Setup has finished installing CA IT PAM Connector on your computer. The application may be launched by selecting the installed icons.

Click Finish to exit Setup.

10. Start the CA Process Automation Orchestrator service to verify that the connector has installed.

Verify the Installed Connector

1. Open CA Process Automation Management Console locally from the CA Process Automation Server using one of the following methods:

   ■ Click Start, Programs, CA, CA Process Automation Domain, Start CA Process Automation Management Console.

   ■ Alternatively, you can access the following URL remotely:

   http://<CAITPAMSERVER>:<CAITPAMPORT>/itpam

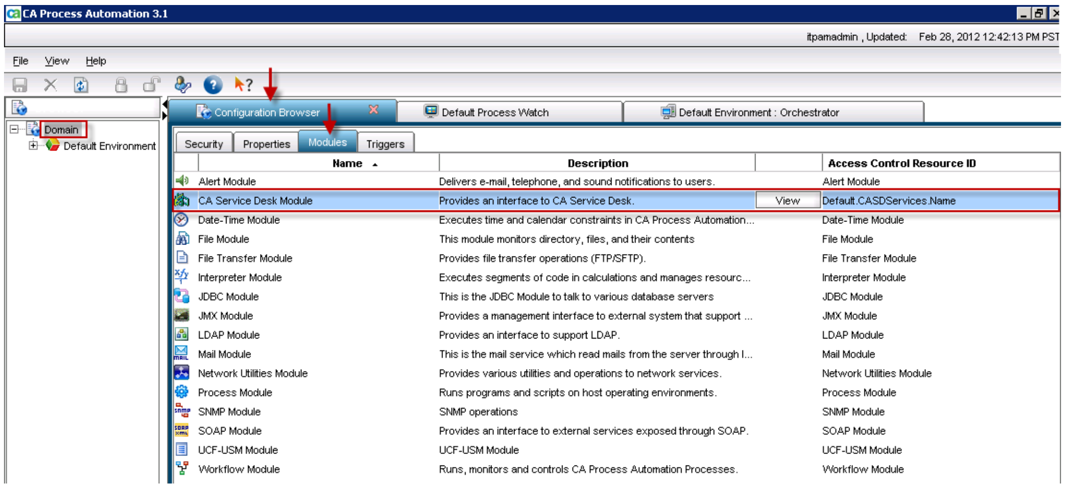
2. If prompted, log in with a user ID that has administrative privileges (for example, pamadmin on a new install of CA Process Automation 3.1). For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would be itpamadmin.

3. Open the CA Process Automation Java Client by clicking the *CA Process Automation Client* link in the upper right corner of the web page.

4. Click on the *Configuration Browser* tab, or alternatively go to File, Configuration Browser.

5. Select the *Modules* tab.

6. Validate that the *CA Service Desk Module* (which is the connector) is loaded in CA Process Automation:



Name	Description		Access Control Resource ID
Alert Module	Delivers e-mail, telephone, and sound notifications to users.		Alert Module
CA Service Desk Module	Provides an interface to CA Service Desk.	View	Default.CASDServices.Name
Date-Time Module	Executes time and calendar constraints in CA Process Automation...		Date-Time Module
File Module	This module monitors directory, files, and their contents		File Module
File Transfer Module	Provides file transfer operations (FTP/SFTP).		File Transfer Module
Interpreter Module	Executes segments of code in calculations and manages resourc...		Interpreter Module
JDBC Module	This is the JDBC Module to talk to various database servers		JDBC Module
JMX Module	Provides a management interface to external system that support ...		JMX Module
LDAP Module	Provides an interface to support LDAP.		LDAP Module
Mail Module	This is the mail service which read mails from the server through l...		Mail Module
Network Utilities Module	Provides various utilities and operations to network services.		Network Utilities Module
Process Module	Runs programs and scripts on host operating environments.		Process Module
SNMP Module	SNMP operations		SNMP Module
SOAP Module	Provides an interface to external services exposed through SOAP.		SOAP Module
UCF-USM Module	UCF-USM Module		UCF-USM Module
Workflow Module	Runs, monitors and controls CA Process Automation Processes.		Workflow Module

Modify CA SDM Module/Connector Properties in CA Process Automation

The steps in this section assume that you are leveraging the Service Desk Connector. When you are not using the connector, your integration settings vary and are dependent upon your configuration. If you need more information on the CA SDM Connector, please see the *CA Process Automation Best Practices Page* on support.ca.com and download the *CA Service Desk Connector Tutorial*. The operators that are provided with the CA Service Desk Connector are also discussed later in this chapter, in section CA Service Desk Connector Operators.

Follow these steps:

1. Open CA Process Automation Management Console locally from the CA Process Automation Server using one of the following methods:

   - Click Start, Programs, CA, CA Process Automation Domain, Start CA Process Automation Management Console.

   - Alternatively, you can access the following URL remotely:

     ```
     http://<CAITPAMSERVER>:<CAITPAMPORT>/itpam
     ```

2. On prompt, log in as pamadmin on a new install of CA Process Automation 3.1. For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would be itpamadmin.

3. Open the CA Process Automation Java Client by clicking the *CA Process Automation Client* link in the upper right corner of the web page.

4. Select File and Open Configuration Browser, or select the Configuration Browser tab in the right pane.

   The Configuration Browser opens.

5. In the left hand pane, expand Domain, Default Environment.

6. Right-click on either the Domain, or Environment for which you want to configure the Connector, and select Lock.

   The selected domain or environment is enabled for editing.

7. Click the Modules tab in the right hand pane of the same node.

8. Double-click the CA Service Desk module.

   Deselect the *Inherit Settings* checkbox, when the changes are different from the domain settings and you configure the settings for a specific *Environment*. If the Environment settings are the same as the domain settings, select the Inherit Settings checkbox.

By default, these communication properties are defined for the complete Domain and the individual Environments and Orchestrators within that Domain inherit these properties.

Note: If the properties are inherited, Orchestrators inherit values from the Environment. Environments inherit the properties of the Domain. The *Inherit* setting does not appear when modifying properties at the Domain level.

9. Update the configuration properties as needed for the CA Service Desk Module as follows:

Note: The default values for *Default Web Service URL*, *Default User ID*, and *Default Password* that is specified at the CA Service Desk connector module level. Override the values entered in the Service Desk Connection Parameters page for each individual operator.

Maximum result length (bytes)

Defines the maximum result length (in bytes) of the XML value that is received and stored in CA Process Automation datasets. If this length is exceeded, the result is truncated.

Default: 1048576 bytes

Default WebService URL

Defines the default value for the Service Desk Web Service.

Note: This value is NOT the CA SDM Web Services WSDL!

By default, the path is *http://localhost:8080/axis/services/USD_R11_WebService*. Update this value to reflect the correct host name and port number to access the CA SDM web services.

Default User ID

Provides a default user name that can be used to connect to CA SDM web services.

Default Password

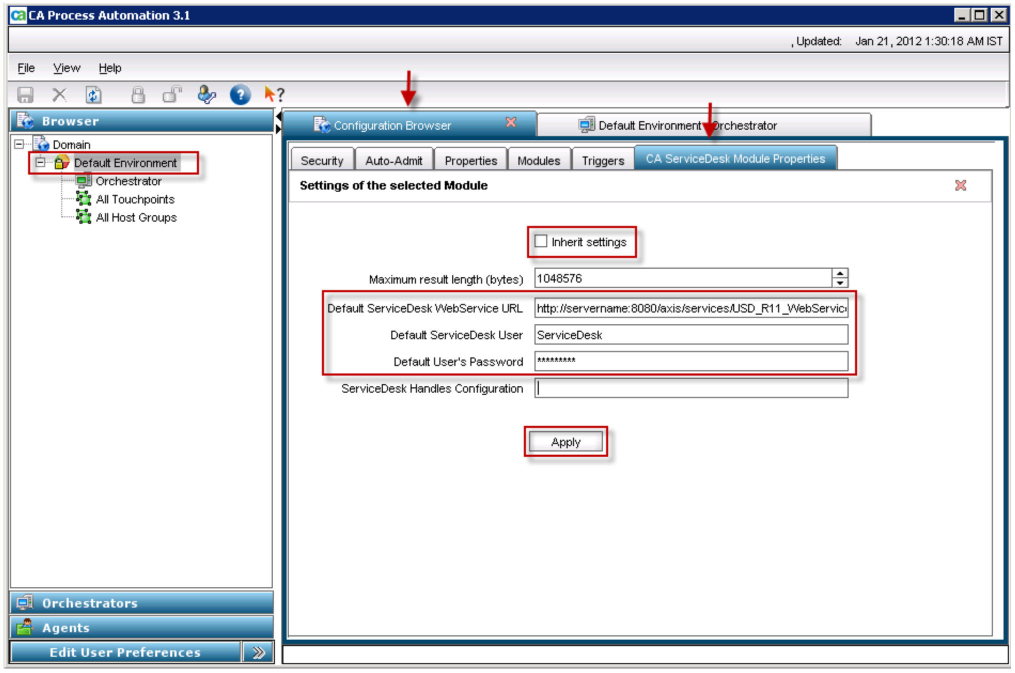
Provides the password of the default user that is used to connect to CA SDM web services.

Handles Configuration

Identifies the XML file that provides configuration information for managing the CA SDM handles. This file contains rules on what additional service calls with user supplied data to obtain application, or based on the session it handles the ticket information. The default Handles the Configuration file is used for no value, *HandleConfiguration.xml*, which is invoked through the connector file casdservice.jar.

Note: If needed, with the assistance of CA Services, you can modify this file to customize the default mapping between CA Process Automation and CA SDM web service call parameters.

The modified CA Service Desk Module Properties page can look like the following screenshot:



Inherit settings: ☐

Maximum result length (bytes): 1048576

Default ServiceDesk WebService URL: http://servername:8080/axis/services/USD_R11_WebServic

Default ServiceDesk User: ServiceDesk

Default User's Password: *********

ServiceDesk Handles Configuration:

10. Click Apply to save the changes.

11. Right-click the selected node in the left hand pane and select Unlock. The module properties are now read-only.

Configure the Integration from CA SDM

From the CA SDM perspective, connectivity with CA Process Automation is enabled by configuring the CA Process Automation Workflow options within Options Manager.

Perform these steps regardless of whether you are using the CA Service Desk Connector in your process definitions or your own custom operators.

To configure Workflow options for CA Process Automation:

1. Log in to CA SDM locally from the CA SDM Server as an Administrator using one of the following methods:

   - Click Start, Programs, CA, Service Desk Manager, Service Desk Web Client.

   - Alternatively, you can access the following URL remotely:

     http://<CASDMSERVER>:<CASDMPORT>/CAisd/pdmweb.exe

2. On the Administration tab, select Options Manager, then click the CA IT PAM Workflow Node *Workflow* node.

   The Option List appears.

3. Right-click the name of each of the following options and select Edit from the short-cut menu. After you configured an option, click Install and then Save.

   Configure the following options:

   caextwf_eem_hostname

   Specifies the name of the CA EEM server. The server name must match the host name that is returned by running the **hostname** command in the command prompt on your CA EEM Server. For example:

   http://<CAEEMSERVER>

   This option identifies the authentication host. You install caextwf_eem_hostname only if you configured CA Process Automation to use CA EEM as the authentication server. CA SDM uses this value to transform a user name and password into a CA EEM token, so that a username and password are not passed in plain text over HTTP.

   Note: If the CA Process Automation installation is using CA EEM for authentication, then place a value in the caextwf_eem_hostname option and install caextwf_eem_hostname. Entering a false value or installing caextwf_eem_hostname when it is not necessary causes the integration to fail.

caextwf_endpoint

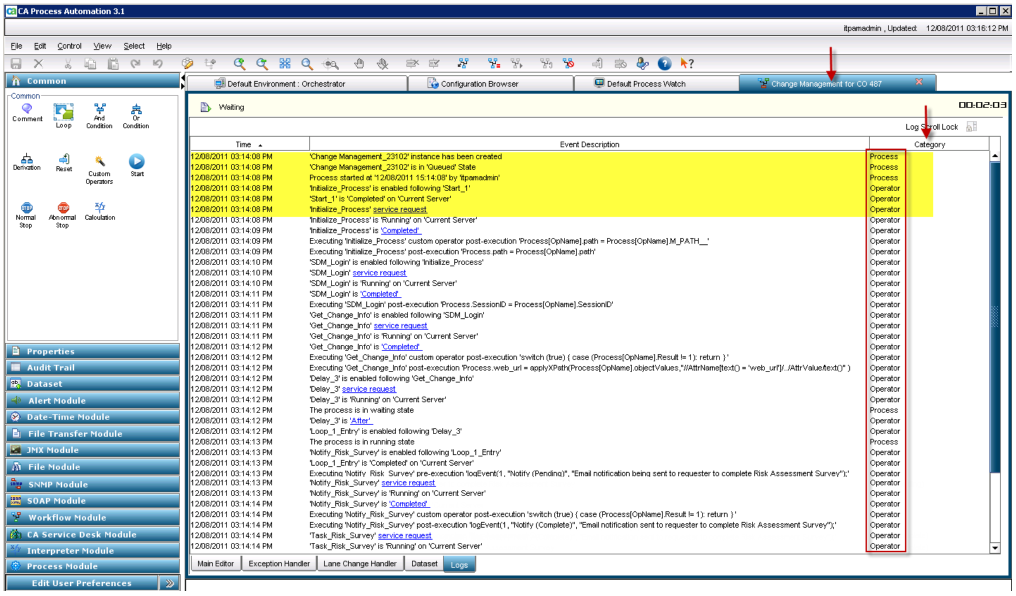
Specifies the URL that points to the CA Process Automation web services by including the CA Process Automation host name, port, and the mandatory /itpam/soap path. For example:

http://<CAITPAMSERVER>:<CAITPAMPORT>/itpam/soap

This option identifies the endpoint. Installing the caextwf_eem_hostname option is required for the integration between CA Process Automation and CA SDM to operate properly.

caextwf_log_categories

By default, the messages that are displayed on the Workflow Tasks tab within a CA SDM ticket have a 1:1 relationship with the messages that are displayed in the CA Process Automation Process Instance logs. The entries in the CA Process Automation Process Instance Logs are categorized into Process or Operator messages, as shown in the following screenshot.

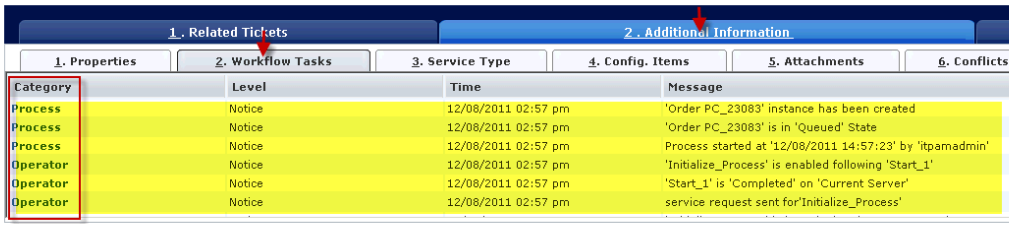


Time	Event Description	Category
12/08/2011 03:14:08 PM	'Change Management_23102' instance has been created	Process
12/08/2011 03:14:08 PM	'Change Management_23102' is in 'Queued' State	Process
12/08/2011 03:14:08 PM	Process started at '12/08/2011 15:14:08' by 'itpamadmin'	Process
12/08/2011 03:14:08 PM	'Initialize_Process' is enabled following 'Start_1'	Operator
12/08/2011 03:14:08 PM	'Start_1' is 'Completed' on 'Current Server'	Operator
12/08/2011 03:14:08 PM	'Initialize_Process' service request	Operator
12/08/2011 03:14:08 PM	'Initialize_Process' is 'Running' on 'Current Server'	Operator
12/08/2011 03:14:09 PM	'Initialize_Process' is 'Completed'	Operator
12/08/2011 03:14:09 PM	Executing 'Initialize_Process' custom operator post-execution 'Process[OpName].path = Process[OpName].M_PATH__'	Operator
12/08/2011 03:14:09 PM	Executing 'Initialize_Process' post-execution 'Process.path = Process[OpName].path'	Operator
12/08/2011 03:14:10 PM	'SDM_Login' is enabled following 'Initialize_Process'	Operator
12/08/2011 03:14:10 PM	'SDM_Login' service request	Operator
12/08/2011 03:14:10 PM	'SDM_Login' is 'Running' on 'Current Server'	Operator
12/08/2011 03:14:11 PM	'SDM_Login' is 'Completed'	Operator
12/08/2011 03:14:11 PM	Executing 'SDM_Login' post-execution 'Process.SessionID = Process[OpName].SessionID'	Operator
12/08/2011 03:14:11 PM	'Get_Change_Info' is enabled following 'SDM_Login'	Operator
12/08/2011 03:14:11 PM	'Get_Change_Info' service request	Operator
12/08/2011 03:14:11 PM	'Get_Change_Info' is 'Running' on 'Current Server'	Operator
12/08/2011 03:14:12 PM	'Get_Change_Info' is 'Completed'	Operator
12/08/2011 03:14:12 PM	Executing 'Get_Change_Info' custom operator post-execution 'switch (true) { case (Process[OpName].Result != 1): return } '	Operator
12/08/2011 03:14:12 PM	Executing 'Get_Change_Info' post-execution 'Process.web_url = applyXPath(Process[OpName].objectValues,"//AttrName[text() = 'web_url']/../AttrValue/text()")	Operator
12/08/2011 03:14:12 PM	'Delay_3' is enabled following 'Get_Change_Info'	Operator
12/08/2011 03:14:12 PM	'Delay_3' service request	Operator
12/08/2011 03:14:12 PM	'Delay_3' is 'Running' on 'Current Server'	Operator
12/08/2011 03:14:12 PM	The process is in waiting state	Process
12/08/2011 03:14:12 PM	'Delay_3' is 'After'	Operator
12/08/2011 03:14:12 PM	'Loop_1_Entry' is enabled following 'Delay_3'	Operator
12/08/2011 03:14:13 PM	The process is in running state	Process
12/08/2011 03:14:13 PM	'Notify_Risk_Survey' is enabled following 'Loop_1_Entry'	Operator
12/08/2011 03:14:13 PM	'Loop_1_Entry' is 'Completed' on 'Current Server'	Operator
12/08/2011 03:14:13 PM	Executing 'Notify_Risk_Survey' pre-execution 'logEvent(1, "Notify (Pending)", "Email notification being sent to requester to complete Risk Assessment Survey");'	Operator
12/08/2011 03:14:13 PM	'Notify_Risk_Survey' service request	Operator
12/08/2011 03:14:13 PM	'Notify_Risk_Survey' is 'Running' on 'Current Server'	Operator
12/08/2011 03:14:14 PM	'Notify_Risk_Survey' is 'Completed'	Operator
12/08/2011 03:14:14 PM	Executing 'Notify_Risk_Survey' custom operator post-execution 'switch (true) { case (Process[OpName].Result != 1): return } '	Operator
12/08/2011 03:14:14 PM	Executing 'Notify_Risk_Survey' post-execution 'logEvent(1, "Notify (Complete)", "Email notification sent to requester to complete Risk Assessment Survey");'	Operator
12/08/2011 03:14:14 PM	'Task_Risk_Survey' service request	Operator
12/08/2011 03:14:14 PM	'Task_Risk_Survey' is 'Running' on 'Current Server'	Operator

The default value of the caextwf_log_categories option is set to the following value:

Process, Operator

This results in the following messages displayed in the Workflow Tasks tab in CA SDM:



Category	Level	Time	Message
Process	Notice	12/08/2011 02:57 pm	'Order PC_23083' instance has been created
Process	Notice	12/08/2011 02:57 pm	'Order PC_23083' is in 'Queued' State
Process	Notice	12/08/2011 02:57 pm	Process started at '12/08/2011 14:57:23' by 'itpamadmin'
Operator	Notice	12/08/2011 02:57 pm	'Initialize_Process' is enabled following 'Start_1'
Operator	Notice	12/08/2011 02:57 pm	'Start_1' is 'Completed' on 'Current Server'
Operator	Notice	12/08/2011 02:57 pm	service request sent for'Initialize_Process'

When you install the caextwf_log_categories option, all CA Process Automation Process instance log messages from the Process and Operator categories appear on the Workflow Tasks tab within a CA SDM Ticket. You can also add in your own custom categories. Leveraging this capability, you can tailor the types of messages that are displayed and can make them more user-friendly and relative to your business.

When you do not install caextwf_log_categories, only the CA Process Automation process instance log messages from the Process category appear on the Workflow Tasks tab.

Note: For more information about the CA Process Automation predefined log message categories, and defining custom message categories, see the section later in this chapter, Create Business-Like Entries in the CA SDM Workflow Tasks tab (see page 211). Additionally, see the CA Process Automation 3.1 Reference Guide, Section *CA Process Automation System Functions*.

caextwf_processdisplay_url

Specifies how to launch a graphical snapshot of a CA Process Automation Process instance from the Workflow Tasks tab in a ticket by supplying the host name and the mandatory /itpam/JNLPRequestProcessor?processType=startUI&roid path. For example:

```
http://<CAITPAMSERVER>:<CAITPAMPORT>/itpam/JNLPRequestProcessor?processType=start
UI&roid=
```

On the Workflow Tasks tab of a ticket, the user selects the View Process button to see the graphical snapshot.

Installing the caextwf_processdisplay_url option is required for the integration between CA Process Automation and CA SDM to operate appropriately.

caextwf_worklist_url

Specifies the process instance path by supplying the host name and the mandatory /itpam?webPage=mytaskfilter&view=tasklist path. For example:

```
http://<CAITPAMSERVER>:<CAITPAMPORT>/itpam?webPage=mytaskfilter&view=tasklist
```

This option enables CA SDM users to see a list of CA Process Automation Process instances that require attention, through the CA Process Automation Task list. The list appears in CA Process Automation when the CA SDM user selects a link that is associated with any pending task in the Workflow Tasks tab of a ticket.

Installing the caextwf_worklist_url option is required for the integration between CA Process Automation and CA SDM to operate properly.

caextwf_ws_user

Specifies the CA Process Automation administrative user name that is associated with the CA Process Automation user name. CA SDM uses the user name and password to access the CA Process Automation web service functions to perform integration activities. These activities are selecting Start Request Forms, process definition information, process instance information, or launching process instances. Typically this user would be pamadmin on a new install of CA Process Automation 3.1. For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would typically be an itpamadmin.

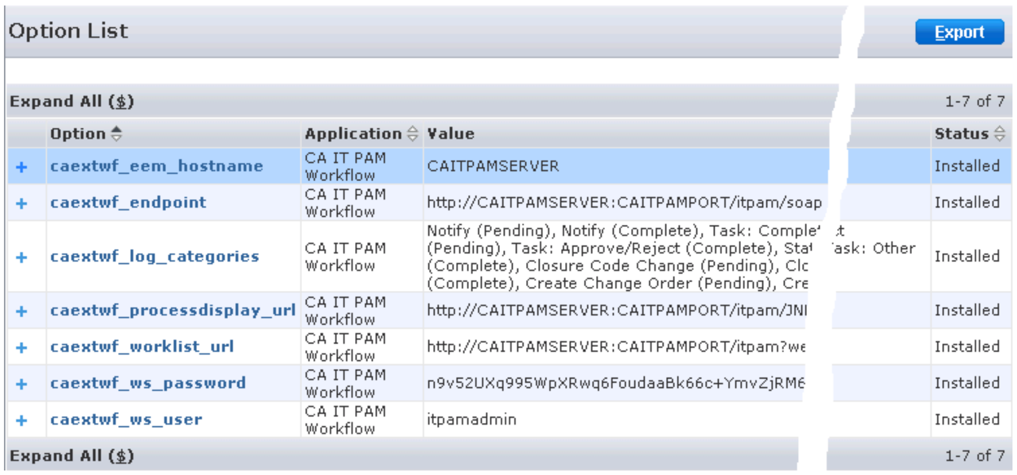
Installing the caextwf_ws_user option is required for the integration between CA Process Automation and CA SDM to work. The user must have appropriate access to CA Process Automation. However, it is not necessary that the CA Process Automation user name to exist as a CA SDM contact record.

caextwf_ws_password

Specifies the encrypted administrative password that is associated with the CA Process Automation user name from the caextwf_ws_user option. CA SDM uses the user name and password to access the CA Process Automation web service functions to perform integration activities. These activities are selecting start request forms, process definition information, process instance information, or launching process instances.

Installing the caextwf_ws_password option is required for the integration between CA Process Automation and CA SDM to operate. The user name and password that you specify requires the appropriate access to CA Process Automation. However, it is not necessary that the CA Process Automation user name is defined as a CA SDM contact record.

4. Once complete, your CA IT PAM Workflow Options Manager Options look like the following list:



Option List

Export

Expand All ($) 1-7 of 7

	Option	Application	Value	Status
+	caextwf_eem_hostname	CA IT PAM Workflow	CAITPAMSERVER	Installed
+	caextwf_endpoint	CA IT PAM Workflow	http://CAITPAMSERVER:CAITPAMPORT/itpam/soap	Installed
+	caextwf_log_categories	CA IT PAM Workflow	Notify (Pending), Notify (Complete), Task: Comple' :t (Pending), Task: Approve/Reject (Complete), Sta' 'ask: Other (Complete), Closure Code Change (Pending), Clc (Complete), Create Change Order (Pending), Cre	Installed
+	caextwf_processdisplay_url	CA IT PAM Workflow	http://CAITPAMSERVER:CAITPAMPORT/itpam/JNI	Installed
+	caextwf_worklist_url	CA IT PAM Workflow	http://CAITPAMSERVER:CAITPAMPORT/itpam?we	Installed
+	caextwf_ws_password	CA IT PAM Workflow	n9v52UXq995WpXRwq6FoudaaBk66c+YmvZjRM6	Installed
+	caextwf_ws_user	CA IT PAM Workflow	itpamadmin	Installed

Expand All ($) 1-7 of 7

5. Restart the CA SDM services.

The CA SDM and CA Process Automation can communicate even though there are no existing Process Definitions or Instances. As we walk through a sample flow later in this chapter, under the section Integration Example (see page 213) we test the integration.

Before you Begin

Careful planning is the key to good process design. To design the appropriate process flows for your business requirements, you can do the following steps:

- First, design and lay out your process design requirements from a business perspective.

- Using a Visio diagram or similar tool, clearly identify and document the process that you want to automate at the business level. For example, if you are creating a process to implement change management for a business critical hardware, consider having answers to the following questions:
  - What approvals are granted?
  - Who has to give the approvals?
  - Who is notified?
  - What other CIs impact by this change?
- Map these business requirements to technical level design for creation and implementation within CA Process Automation.

Be sure to start small and test individual pieces as you go along in creating your broader process definition.

Process Design

Create the Process Definition

After you have identified the process that you want to automate from a business perspective, you can create the process definition.

Processes are defined through the CA Process Automation Process Designer, which lets you graphically implement the process object model, allowing you to create management packages with a wide range of functionality.

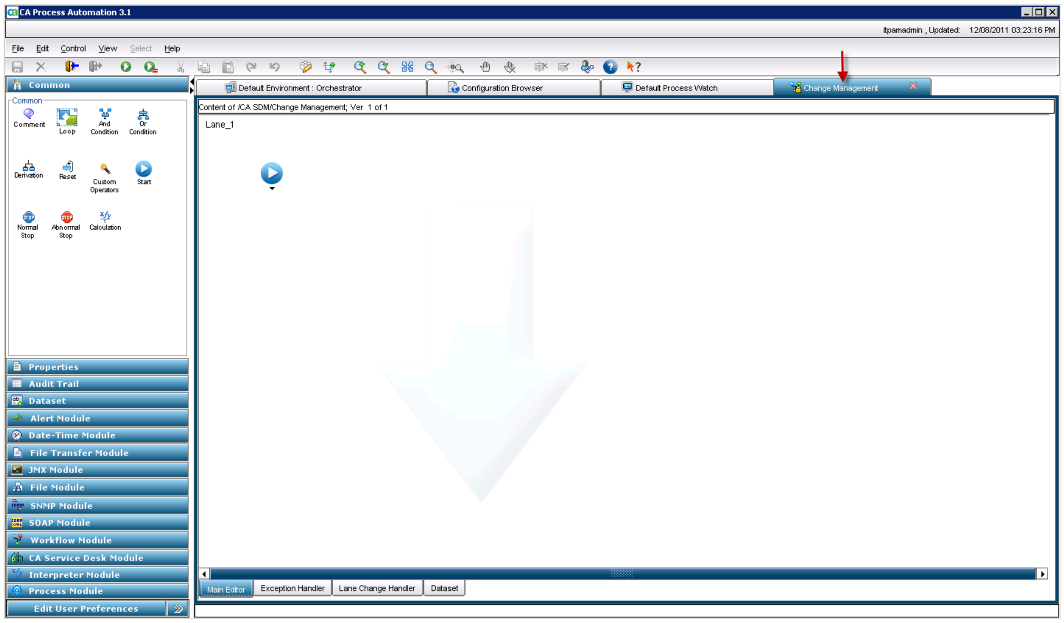
To create a Process Definition:

1. Open CA Process Automation Management Console.
2. If prompted, log in with a user ID that has administrative privileges (for example, pamadmin on a new install of CA Process Automation 3.1). For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would typically be an itpamadmin.
3. Open the CA Process Automation Java Client by clicking the *CA Process Automation Client* link in the upper right corner of the web page.
4. Select File, and Open Library Browser.

   The Library Browser opens.
5. Right click on the directory under which you would like to create the Process Definition.
6. Navigate to New Object, Process.

   The Process appears on the right pane.

Here you can see the example of Process Designer.



The Process Designer window contains the following components:

- The Designer pane, upon which you configure the Process; with tabs for editing the Process, configuring exception handling, lanes, and variables in the Process Dataset.
- A menu bar containing the menus File, Edit, Control, View, Select, and Help.
- The Main toolbar have buttons for:
  - Object commands, such as saving, deleting, checking in, and checking out.
  - Edit commands for the cut, copy, paste, redo, and undo.
  - Zoom-in and zoom-out commands.
  - Commands for starting a Process.
  - Commands for debugging a Process.
  - Process properties command.
  - Toolbar buttons for adding lanes, setting and removing breakpoints, enabling and disabling icons and help buttons.
  - The State bar shows the path and version of the process.
- Palettes pane, which contains the Common palette as well as module-specific palettes also contains the operators that those modules support, such as CA Service Desk.
- Properties pane

The Common palette includes some simple Operators that are most likely used in each Process you can create. These Operators define the start and end of a process as well as logical conditions, loops, and comments. The set of palettes containing Operators that perform basic tasks such as transferring files, making SOAP calls, setting, or getting SNMP variables, running child Processes, sending email alerts, and other such tasks.

You can right-click the Operator you often use in its original palette to add to the Common palette. Then select *Add to Common Palette* from the context menu. You can then access the Operator from both the Common palette as well as the original palette. Similarly, you can remove Operators that you have added to the Common palette by right-clicking the Operator in the Common palette and selecting *Remove from Common Palette*.

Follow these steps:

To create a process definition in the *CA Process Automation client:*

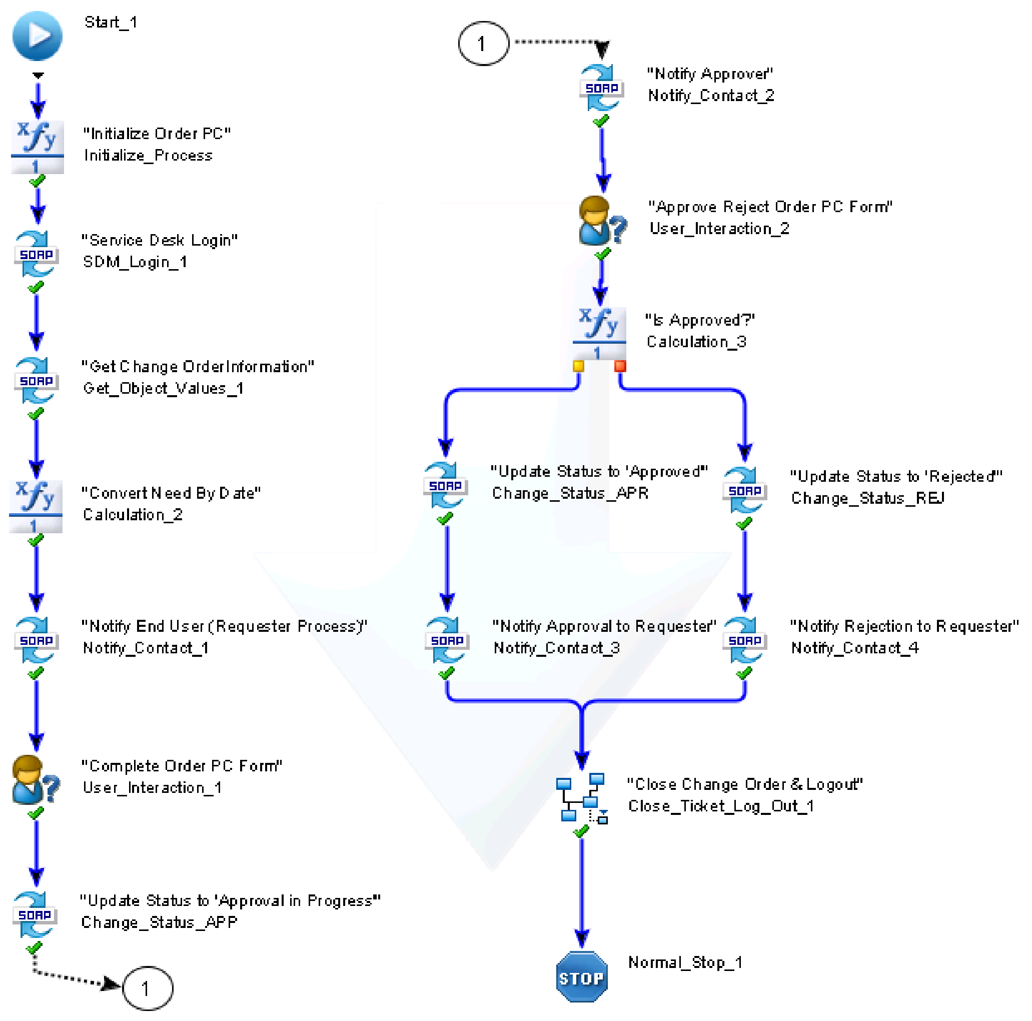
1. Drag the required operators from the appropriate palette to the design sheet.
2. Connect the operators with the links.
3. Check in the process.

   Note: Check-in is an important process. Else, any new running process instances do not reflect the new updates.

Technical Process Design

After creating a placeholder for a process definition, you can map the different parts of that process flow to specify what steps follow from the beginning of the process to its conclusion.

For example, consider the following sample process flow for CA SDM, which automates a process to request a new PC:



This example process flow consists of the following steps:

- A Start point. This sample process definition can be instantiated from within a CA SDM Change Order.
- A sequence of action operators, which includes an approval process necessary to approve the provisioning of a PC for an end user.
- Closure of the Change Order once the approval or rejection decision is made.
- A normal stop point.

Process Design Tips

Following process are some tips for designing an automated CA SDM process.

When designing your process, start small and test individual operators as you build out your broader definition.

High-Level Process Design

You can design the high-level process considering the following points:

- Each Process is comprised of a series of tasks, or steps, which occur in an expected order and have a defined outcome.
- The Operator determines the *type* of task that is performed such as, retrieving information, creating a request, updating a status in CA Process Automation. Each Process contains one or more chains of Operators that are executed sequentially or in parallel.
- The best practice is to leverage existing Operators, or create your own custom operators where possible, as opposed to creating and invoking sub processes to group together more complex tasks.
- You can also determine where an Operator can be run. If you do not select a Touchpoint for an Operator, the action that is defined within that Operator can be performed on the Orchestrator.
- The best practice for process design is to define at least one Touchpoint. Note which operators must run on the orchestrator and which can run on either the Agent, or Touchpoint, or Orchestrator.
- Although there are many methods that CA Process Automation can leverage for communication, the primary way that is used for communication with CA SDM integration is through CA SDM Web Services.

CA Service Desk Connector Operators

To select the appropriate Operator, consider the type of interactions that CA Process Automation can have to execute against CA SDM. This interaction includes identifying the following operators:

■ *Type of objects* that the CA Process Automation process has to interact with.

  For example, Requests, Incidents, Problems, Change Orders, or Issues.

■ *Type of actions* that CA Process Automation can have to execute against CA SDM.

  For example, Open, Close, Log Comment, or Update Status.

In addition to defaults CA Process Automation Operators, sample Operators are provided through the CA Service Desk Connector that is mentioned earlier in this chapter. Leveraging these operators automatically performs a web service login/logout for every CA SDM web service method that is invoked. The web services SID (Session ID) is required for all web services communication with CA SDM. Log in to CA SDM to obtain the SID. The only way to release SID is to either allow the timeout to exceed, or to simply logout.

The use of the operators in the connector benefits the process design but negatively impact a production environment from a performance perspective. Your implementation is highly utilized due to the overhead of the multitude of web service calls. Do not use the operators that the Service Desk Connector provides and create your own custom operators as well as leverage the CA Process Automation SOAP Operator to invoke CA SDM Web Service Calls. For more information on when to use the Service Desk Connector vs. use the CA Process Automation SOAP Operator, see section Pros and Cons of Leveraging CA Service Desk Operators.

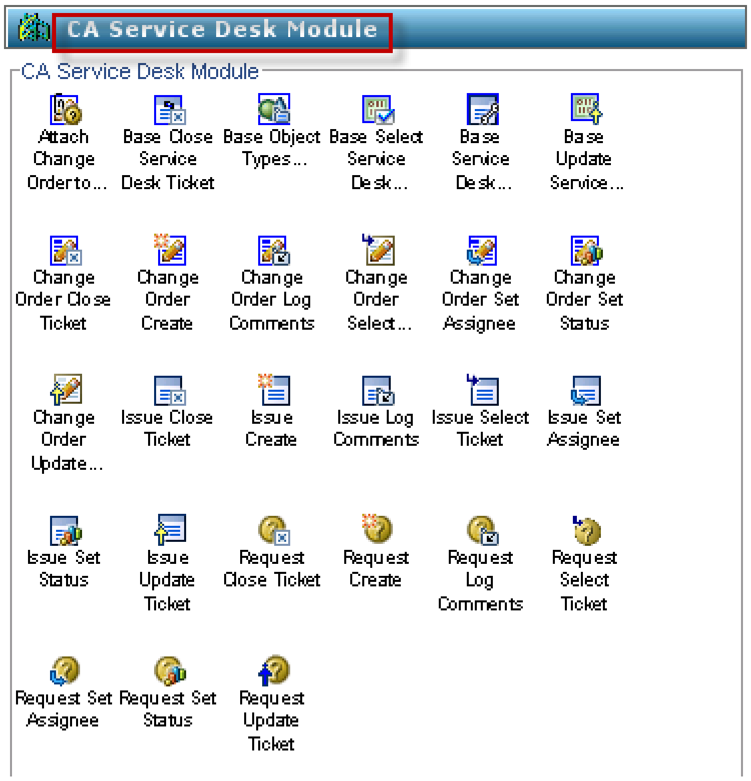
The Service Desk Connector enables you to use CA Process Automation to automate CA SDM tasks. The tasks are opening an Incident in response to a specific event, modifying the status of an existing Incident, and attaching a Change Order when required. A designated starting event or by association with a particular category of object (for example, Request, Incident, Problem Area, or Change Order, Issue Category) triggers these automated processes:

■ Base (generic) Operators

■ Change Order Operators

■ Issue Operators

■ Request Operator (Filtered by Type; Requests, Incidents and Problems are held in the cr (Call_Req) object. Its type attribute distinguishes the record as an Incident, Problem, or Request)


CA Service Desk Module
CA Service Desk Module
Attach Change Order to...
Base Close Service Desk Ticket
Base Object Types...
Base Select Service Desk...
Base Service Desk...
Base Update Service...
Change Order Close Ticket
Change Order Create
Change Order Log Comments
Change Order Select...
Change Order Set Assignee
Change Order Set Status
Change Order Update...
Issue Close Ticket
Issue Create
Issue Log Comments
Issue Select Ticket
Issue Set Assignee
Issue Set Status
Issue Update Ticket
Request Close Ticket
Request Create
Request Log Comments
Request Select Ticket
Request Set Assignee
Request Set Status
Request Update Ticket

Base (Generic) Service Desk Operators

Following list is a summary of the out of box CA SDM Base Operators provided with the Service Desk Connector. These generic operators provide the following functions:

Base Close Service Desk Ticket

Closes a ticket by supplying a ticket handle. If closing comments stating the reason for closing for closure, these tickets can appear on the activity log of the ticket.

Base Object Type Information

Retrieves the list of all attribute names for a given object type (Change Order, Issue, Request, Contact, Asset, Workflow, Property, or Property Template) along with the type information for each attribute. An example of when this operator would be used is to retrieve a list of all available properties for Change Order Categories.

Base Select Service Desk Elements

Retrieves selected user-supplied fields that match the specific data criterion (where clause). See the CA SDM 12.6 Technical Reference Guide for more details on object and attribute names.

Base Service Desk Interface

This interface is an advance operator that is based on the SOAP client operator, which exposes all operations of the CA Service Desk web service. You can use this operator to call any CA SDM web service method. The one difference is that this operator automatically does a login/logout with CA SDM. For example, when this operator would be used is to call *doQuery* to look up contacts in CA SDM, *getRelatedListValues*, to look for entries in the activity log of a Request, or *notifyContacts*, to send a manual notification out through CA SDM Web Services.

Base Update Service Desk Element

Updates user-specified fields from a specified object handle. An example of when this operator would be used is to update the Priority of a Request.

To simplify the integration effort and the flows, select the Operator that is specific to the object and operation you are trying to automate. Use the Base operators to complement the specific operators or when a specific Operator cannot be used for target operation.

Change Order Operators

In CA SDM, Change Orders are tickets that manage changes to the supported business infrastructure. The following Operators are specific to Change Orders:

Attach Change Order to Request

Attaches a new or existing Change Order to a specific Request. When the Change Order Number string is left blank, a new Change Order is created based on values initialized from the Request. To override these values, or set additional values, use the Updates Fields List and Corresponding Values List parameters. If a Change Order Number is specified, these fields can be ignored.

Note: A Change Order cannot be attached, when it is attached to another Request.

Change Order Close Ticket

Closes the specified Change Order. If Closing Comments are provided stating the reason for closure, they can appear in the Service Desk activity log.

Change Order Create

Creates a CA SDM Change Order.

Change Order Log Comments

Attaches log comments to a Change Order.

Change Order Select Ticket

Retrieves selected information for the specified Change Order. If the Select Fields List parameter is left blank, all value-based attributes are returned. Upon successful execution, the values of the requested attribute found in the SoapResponseBody field. See the *CA SDM 12.6 Technical Reference Guide* for the list of attributes.

Change Order Set Assignee

Sets Assignee ID for this Change Order.

Change Order Set Status

Sets the status for the Change Order and generates the activity log.

Change Order Update Ticket

Updates one or more attributes for the specified Change Order.

Issue Operators

In CA SDM, Issues are the basic units of support when operating an external service desk. Issues are tickets that are designed to handle customer questions or problems and are oriented toward supporting products and services that the customer buys. The following Operators are specific to Issues:

Issue Close Ticket

Closes a specific Issue. If closing comments stating the reasons for closure are provided, they can appear in the CA SDM activity log for that issue.

Issue Create

Creates a Service Desk Issue – including contact, requester, and priority information.

Issue Log Comments

Attaches log comments to an issue.

Issue Select Ticket

Retrieves information about selected attributes for a specific issue. If the list of selected fields is left blank, all value-based attributes are returned. Upon successful execution, the values of the requested attribute would be found in the *SoapResponseBody* field. See the *CA SDM 12.6 Technical Reference Guide* for the list of attributes.

Issue Set Assignee

Sets the Assignee ID for the specific Issue.

Issue Set Status

Sets the status for the specified issue.

Issue Update Ticket

Updates one or more fields on the Issue.

Request Operators

In CA SDM, Requests handle the questions of internal employees, and are oriented toward supporting an infrastructure that the support organization owns and administers. Incidents handle any type of disruption in service, with a goal of restoring service as quickly as possible. Problems handle those tickets which require further investigation.

Filtered by the *Type* parameter, Request Operators also apply to Incidents and Problems as well so in terms of the descriptions below they can be used interchangeably. They include the following operators:

Request Close Ticket

Closes the specified Request. If closing comments are provided stating the reasons for closure, they can appear in the Service Desk activity log.

Request Create

Creates a Service Desk Request, Incident, or Problem. Priority, Severity, Impact, Urgency as well as Requester and Contact ID can be specified.

Request Log Comments

Attaches log comments to a specific Request. Comments can also be flagged as *Internal Use Only*.

Request Select Ticket

Retrieves select information about a specific Request. If the Select Fields List is left blank, all value-based attributes are returned. Upon successful execution, the values of the requested attribute can be found in the *SoapResponseBody* field. See the *CA SDM 12.6 Technical Reference Guide* for the list of attributes.

Request Set Assignee

Sets the Assignee ID for a specific Request.

Request Set Status

Sets the status for the Request\Incident\Problem.

Request Update Ticket

Updates one or more attributes for the specified Request.

Sample Process Definitions Leveraging the Service Desk Connector

For more information and sample process definitions that leverage the operators in the CA Service Desk Connector, see the CA *Process Automation Best Practices Page* on support.ca.com. Once there, navigate to CA *Process Automation Connectors*. With the download of the connectors you get links to a Tutorial, Quick Start Documentation, and Sample Process Definitions.

The table shows the sample process definitions that are available with Quick Start Content, and which process definitions leverage which operators. Cross-reference is useful if you need assistance on leveraging the operators in your own customer process definitions:

Quick Start Directory	Quick Start Process	Operators
Base Operation		
AttachChangeOrder	New request with Change Order	Attach_Change_Order_to_Request Request_Create
CloseTickets	Close Ticket	Base_Select_Service_Desk_Elements Base_Close_Service_Desk_Tickets
ObjectInfo	Object Info	Base_Object_Types_Information
QuickTicketBase	Quick Ticket	Base_Service_Desk_Interface
Update	LowerPriority RaisePriority	Request_Select_Ticket Base_Service_Desk_Elements Change_Order_Select_Ticket Issue_Select_Ticket Base_Update_Service_Desk_Elements
CreateType		
CreateType	CreateType	Request_Create Change_Order_Create Issue_Create
LifeCycle		
ChangeOrder	ChangeOrderLifeCycle	Change_Order_Create Change_Order_Log_Comments Change_Order_Set_Assignee Change_Order_Set_Status Change_Order_Update_Ticket Change_Order_Close_Ticket

Quick Start Directory	Quick Start Process	Operators
Base Operation		
Issue	IssueLifecycle	Issue_Create Issue_Log_Comments Issue_Set_Assignee Issue_Set_Status Issue_Update_Ticket Issue_Close_Ticket
Request	RequestLifeCycle	Request_Create Request_Log_Comments Request_Set_Assignee Request_Set_Status Request_Update_Ticket Request_Close_Ticket
MaintenanceWindow	MaintenanceEnd MaintenanceRequest MaintenanceStart	Request_Create Request_Set_Assignee Request_Update_Ticket Change_Order_Create Change_Order_Set_Status Request_Set_Status Request_Close_Ticket
QueryingTicket		
ChangeOrder	Change Order Query	Change_Order_Select_Ticket Change_Order_Set_Status Change_Order_Log_Comments
Issue	Issue Query	Issue_Select_Ticket Issue_Set_Status Issue_Log_Comments
Request	Request Query	Request_Select_Ticket Request_Set_Status Request_Log_Comments

Pros and Cons of Leveraging CA Service Desk Operators

The benefit of using these CA Service Desk Operators provided with the Service Desk Connector, is that they offer a more simplified approach to process design for CA Process Automation processes. Each of these operators leverages CA SDM Web Services to communicate with CA SDM, and perform a minimum of three web service calls:

- The first call invokes the login method to log in to the web services and obtains a Session ID (SID)
- The second call leverages the above SID and invokes the necessary subsequent CA SDM web service call to perform a function, such as updateStatus.
- The third call invokes the logout, which logs out of the web services and releases the SID.

Consider a different approach to process design by invoking individual soap operators, and leveraging exception handling to reuse SIDs, when you run a complex process that is used extensively with heavy load in your production environment. Avoid logging in and logging out of web services each time a task or a function is performed. This approach is helpful when multiple web service calls are invoked one after another, such as updateStatus, followed by an immediate notifyContact and logComment methods.

In this case, the operations take place relatively quickly and it is unlikely that the web services SID timeouts between each call. Therefore, the SID can be reused, eliminating the need for multiple logins/logouts. This operation is not applicable in the case where a user is prompted for interaction. In this case, the SID times out awaiting the users response. For more information, click the section Exception Handling (see page 194) and Integration Example (see page 213).

Note: An Options Manager Option under Administration, Options Manager, Web Service, *webservice_session_timeout* controls the Web Services Session timeout value.

Custom Operators

As noted above, you can create your own Custom Operators to use in lieu or in conjunction with the operators that the CA Service Desk Connector provides. For further information on creating custom operators see the *CA Process Automation User Guide, Chapter 9, Custom Operators* available on support.ca.com.

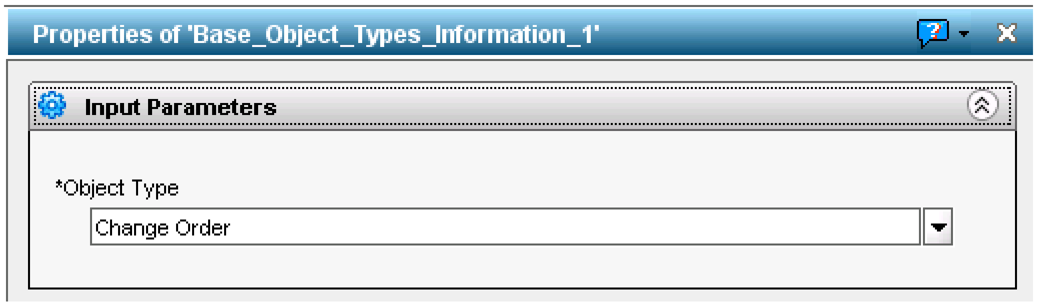
Note: The use case that is described later in this chapter leverages custom operators and does not leverage the operators in the CA Service Desk Connector.

Designating Operator Input Parameters

Operators specify the *type of operation* is to occur. For example, update a status, close a request, update an activity log. The *types of targeted objects are* a Change Order, Incident, or Request. Input parameters further specify *how* it can be performed and *which specific objects* are targeted. For example, which status can be set, Incident would be affected, or what text can be added to the activity log for a particular Request.

All the parameters that are required for process execution are specified through the Operator Property Palettes, which are automatically displayed when you select the properties for the Operator within in the Process (by double-clicking the operator). Some examples are as follows:

Input Parameters: Used on operators those either update existing objects, or create new ones, for example:

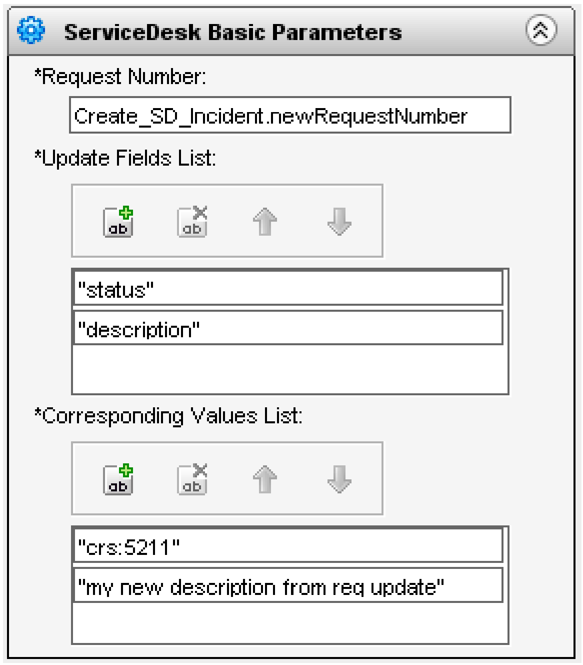

Properties of 'Base_Object_Types_Information_1'

Input Parameters

*Object Type

Change Order

Basic Parameter: This parameter is used on operators which either updates existing objects, or create new objects, for example:


ServiceDesk Basic Parameters

*Request Number:

Create_SD_Incident.newRequestNumber

*Update Fields List:

"status"

"description"

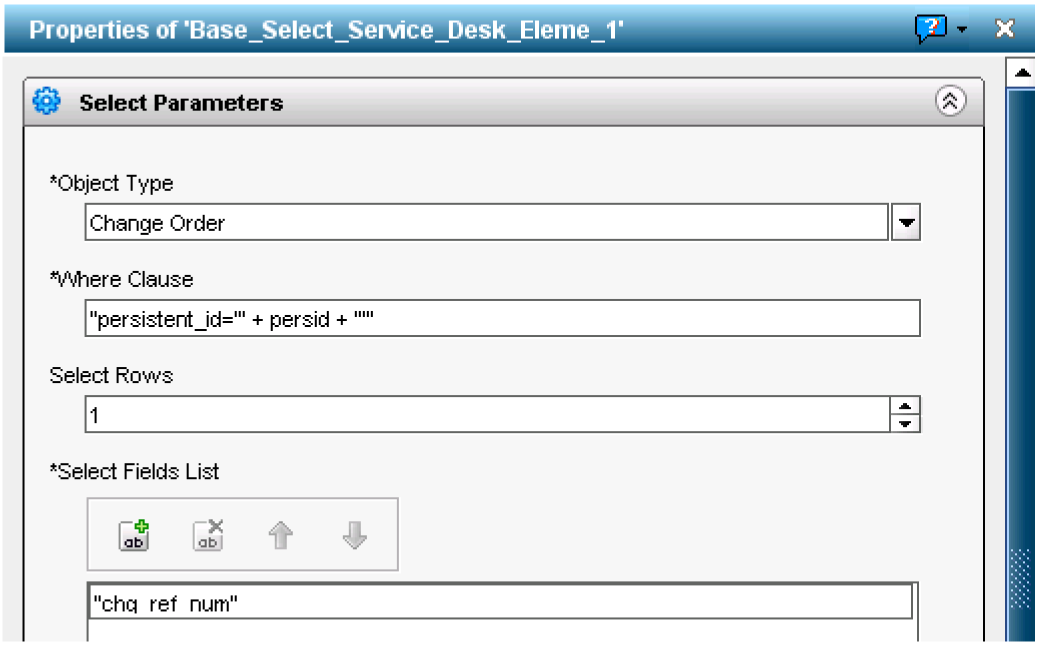
*Corresponding Values List:

"crs:5211"

"my new description from req update"

Select Parameters

Used on all operators that query existing objects.


Properties of 'Base_Select_Service_Desk_Eleme_1'

Select Parameters

*Object Type
Change Order

*Where Clause
"persistent_id='" + persid + "'"

Select Rows
1

*Select Fields List
"chg_ref_num"

Depending on the specific Operator and Parameter, input values are literal strings or expressions. Input parameters override any global settings that are defined for these parameters.

Common Input parameters

Typically one of the following attributes is used to represent the specific CA SDM object instance being queried: persistent_id/persid/handle, chg_ref_num/ref_num.

The following table provides the detail on these attributes. The table also provides the comparison between automatically (when the instance is instantiated through CA SDM Category or macro) and manually (when the instance is instantiated through CA Process Automation) obtained parameters.

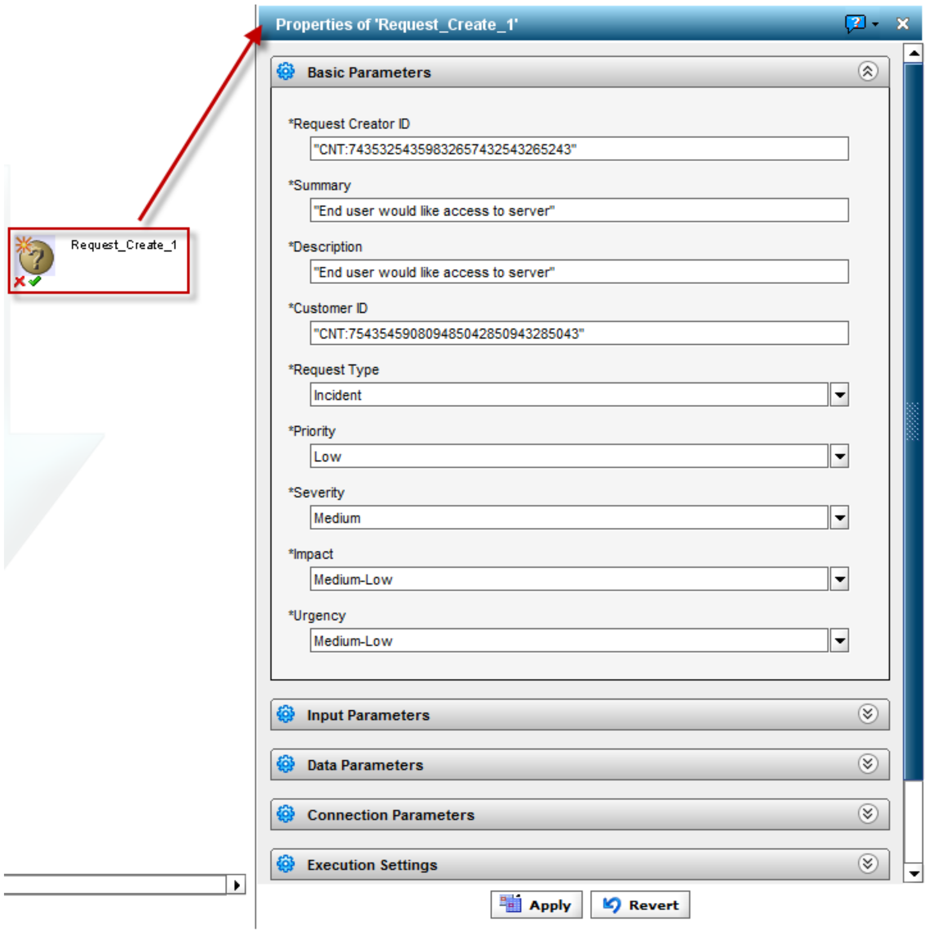
CA SDM Parameter	What is it?	How it is obtained when a process is invoked automatically through SDM Category/Area/Macro ?	How it is obtained when a process is manually invoked in CA Process Automation?
Persistent_id or Persid	CA SDM Web Services uniquely identifies an object by its handle, which is a string value of the form	Automatically passed as an input parameter when the integration is invoked, through	The value is not passed automatically in this case because the integration is not kicking off the

CA SDM Parameter	What is it?	How it is obtained when a process is invoked automatically through SDM Category/Area/Macro ?	How it is obtained when a process is manually invoked in CA Process Automation?
or Handle	objectType:ID, where objectType is the object type (factory) name, and ID is a unique value. Each object, regardless of its type, stores this value in an object attribute named *persistent_id*. IE: chg:400002.	*executeStartRequest* CA Process Automation web service call.	process definition. To obtain the persid of any given object, you can either run a query directly in SQL, or alternatively, you can run the following from the command line on the CA SDM Primary or Secondary Server if you know the ticket number: Pdm_extract –f *select persid from Change_Request where chg_ref_num = 1234* Output is: TABLE Change_Request persid { chg:400291}
Chg_ref_num , ref_num	Change Order Number, and Request/Incident/Problem Number, IE 1234.	The value is not passed automatically. To obtain the number of an existing ticket, you first run *Base_Service Desk_Elements* operator from the Service Desk Connector, passing in the persid (which is automatically obtained as a part of the integration so the input would be a variable), and then as output from this node, select to return the *chg_ref_num*, to then pass over to the next operator through dataset that requires it as an input parameter.	The value is not passed automatically in this case because the integration is not kicking off the process definition. If you are manually starting a CA Process Automation Process Definition and pass in the Change Order Number, you can simply look it up in CA SDM and pass it over to the SRF when you instantiate the process instance.

Information on mapping additional Input Parameters in CA Process Automation with CA Service Desk attributes is provided in the section Mapping Additional Process Input/Select/Base Parameters to Service Desk Attributes.

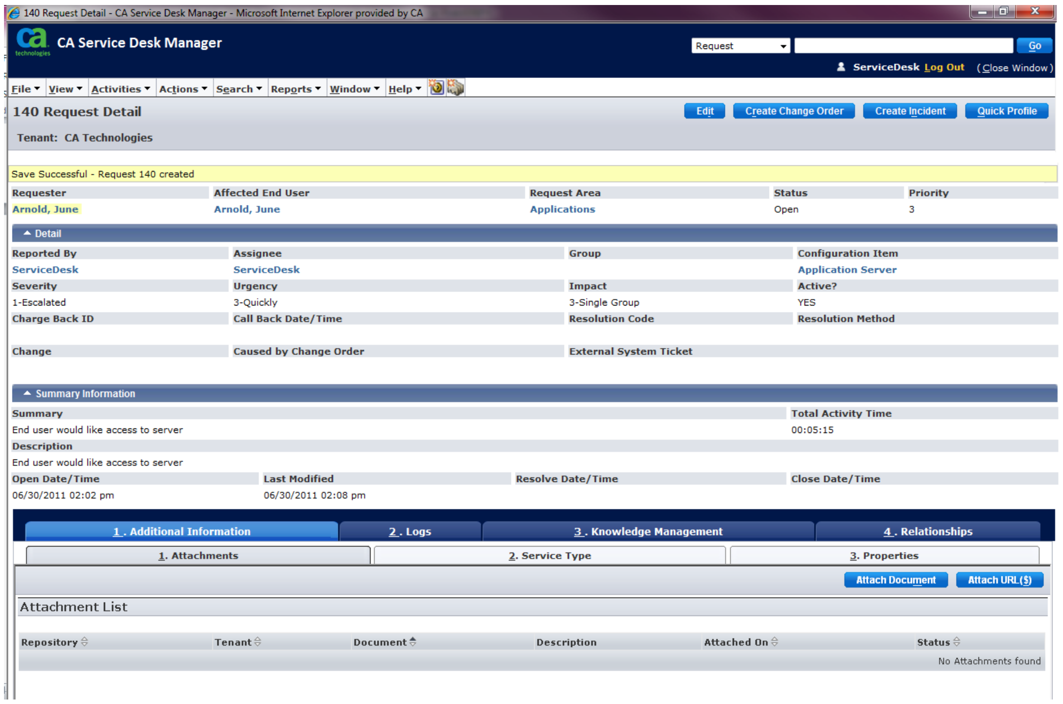
Mapping Additional Process Input/Select/Base Parameters to Service Desk Attributes

Each Operator includes input parameters that provide the specifics of the action being performed. For example, when a Request is created using the CA Service Desk Connector, the input parameters define the Requester ID as well as Impact and Severity of that Request.



*Request Creator ID	"CNT:74353254359832657432543265243"
*Summary	"End user would like access to server"
*Description	"End user would like access to server"
*Customer ID	"CNT:754354590809485042850943285043"
*Request Type	Incident
*Priority	Low
*Severity	Medium
*Impact	Medium-Low
*Urgency	Medium-Low

In specifying these input parameters, both for the operators in the default Service Desk Connector as well as your own custom operators, it is important to understand how they relate to CA Service Desk underlying fields, and which values are supported for those fields. For example, consider the following Request:



140 Request Detail

Tenant: CA Technologies

Save Successful - Request 140 created

Requester	Affected End User	Request Area	Status	Priority
Arnold, June	Arnold, June	Applications	Open	3

Reported By	Assignee	Group	Configuration Item
ServiceDesk	ServiceDesk		Application Server
Severity	**Urgency**	**Impact**	**Active?**
1-Escalated	3-Quickly	3-Single Group	YES
Charge Back ID	**Call Back Date/Time**	**Resolution Code**	**Resolution Method**
Change	**Caused by Change Order**	**External System Ticket**	

Summary	Total Activity Time
End user would like access to server	00:05:15

Description

End user would like access to server

Open Date/Time	Last Modified	Resolve Date/Time	Close Date/Time
06/30/2011 02:02 pm	06/30/2011 02:08 pm		

Attachment List

Repository	Tenant	Document	Description	Attached On	Status
					No Attachments found

Each field on the Request Detail screen, including any custom fields that have been added to the defaults, map to an attribute name in the object layer of the CA SDM schema. The attribute name, in turn, maps to a specific database column name at the database layer in the MDB schema.

The CA SDM objects and attributes are defined in MAJIC code. The MAJIC code relates objects to schema as follows:

- MAJIC object, schema table, DBMS table
- MAJIC attribute, schema column, DBMS column

Note: These definitions are documented and cross referenced in the *CA SDM 12.6 Technical Reference Guide*, Chapter 1, 2, and 3. You would find this guide useful as you build your process definitions in CA Process Automation.

Chapter 1, *Data Element Dictionary* contains the definitions for the tables in the CA SDM database. The tables are found in the schema [.sch] files. See the ddict.sch file in the $NX_ROOT/site directory (UNIX) or installation-directory\site directory (Windows) for the most current list of all database tables for your specific installation.

Chapter 2, *Objects and Attributes* lists the objects and attributes that define CA SDM.

Chapter 3, *Table and Object Cross-Reference* provides several tables that allow you to reference the table names, DBMS names, and object names.

When building your process definitions in CA Process Automation, *Object* and *Attribute* names that CA SDM Web Services manipulates data at the object layer are considered. Data Partitions and Security are enforced, whereas they would not go directly against the database layer (running a database query directly in SQL). The attribute name at the object layer is typically – but not always - identical to the name of the corresponding column in the database layer. Therefore, it is important to find the correct naming convention to use when invoking a CA Process Automation process which manipulates data within CA SDM.

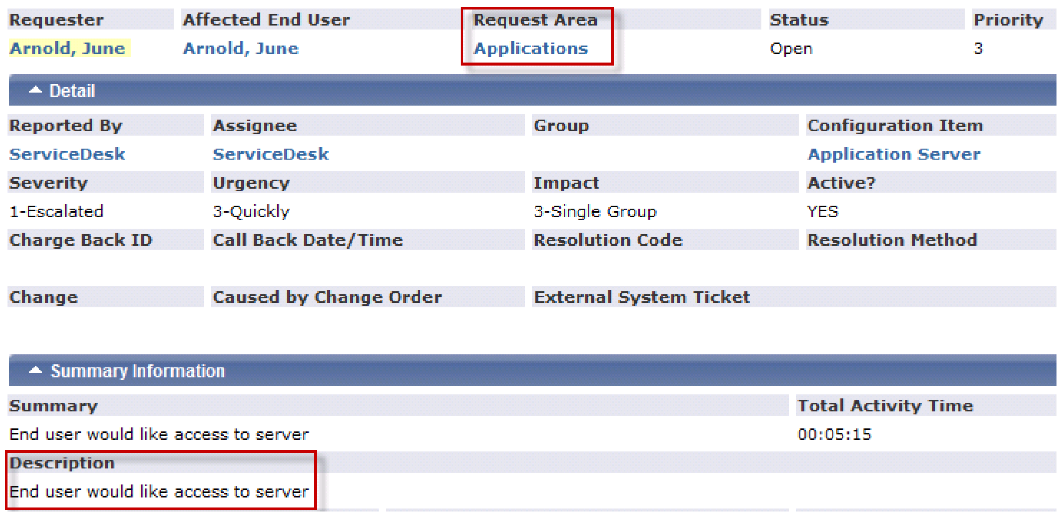
In addition to identifying the appropriate attribute names, know what type of data that is valid for those fields. If the attribute references another table (SREL), the attribute knows what Ids (handles) are currently valid for that attribute.

The following example walks through the process of mapping fields for a Request:

Step 1: Identify the Service Desk Fields to be Modified or Manipulated

Example

We have chosen to manipulate the *Description* and *Request Area* fields on a Request, pass these attributes as an input parameter to a CA Process Automation Operator.



Requester	Affected End User	Request Area	Status	Priority
Arnold, June	Arnold, June	Applications	Open	3

Detail

Reported By	Assignee	Group	Configuration Item
ServiceDesk	ServiceDesk		Application Server
Severity	**Urgency**	**Impact**	**Active?**
1-Escalated	3-Quickly	3-Single Group	YES
Charge Back ID	**Call Back Date/Time**	**Resolution Code**	**Resolution Method**
Change	**Caused by Change Order**	**External System Ticket**	

Summary Information

Summary	Total Activity Time
End user would like access to server	00:05:15

Description
End user would like access to server

Step 2: Map the Displayed Fields to Attributes

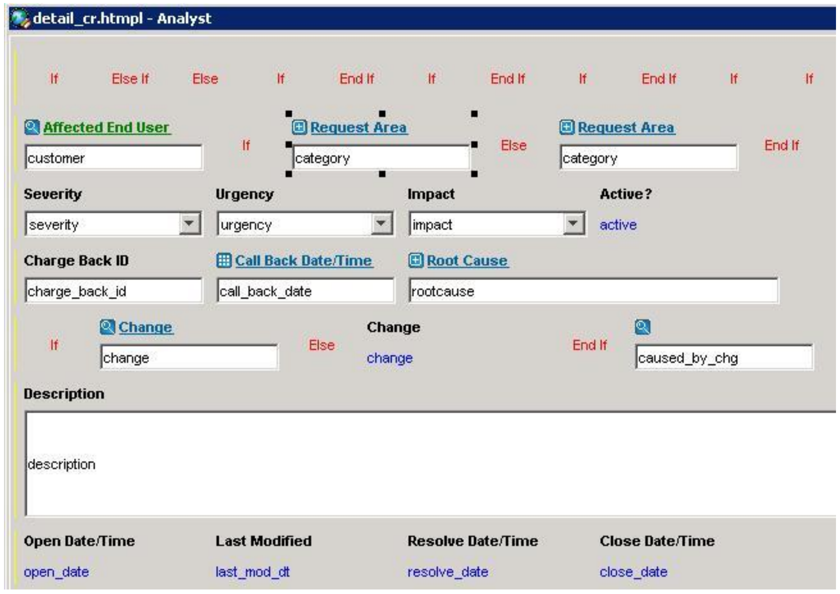
Map the displayed fields from the previous step to the corresponding attribute names in the CA SDM Object Layer that the web services (and thus CA Process Automation) use to manipulate data within CA SDM. If you know the attribute name, you can proceed directly to Step 3 and verify the specifics about the attribute. If you do not know the attribute name, consult the *CA SDM 12.6 Technical Reference Guide.* Information can be found in Chapters 1, *Data Element Dictionary;* Chapter 2, *Objects and Attributes,* or Chapter 3, *Table and Object Cross-Reference.*

You can locate it using one of the following options:

- **Use Web Screen Painter:**

  a. Open the detail_<objectname>.htmpl form (or the form that is associated with the ticket type you are looking for), detail_cr.htmpl, for example.

  The Web Screen Painter opens file as shown in the following screenshot:


detail_cr.htmpl - Analyst

If Else If Else If End If If End If If End If If If

Affected End User: customer	If Request Area: category	Else Request Area: category	End If
Severity: severity	Urgency: urgency	Impact: impact	Active?: active
Charge Back ID: charge_back_id	Call Back Date/Time: call_back_date	Root Cause: rootcause	
If Change: change	Else Change: change	End If caused_by_chg	
Description: description			
Open Date/Time: open_date	Last Modified: last_mod_dt	Resolve Date/Time: resolve_date	Close Date/Time: close_date

  The main forms for other Service Desk ticket types are:

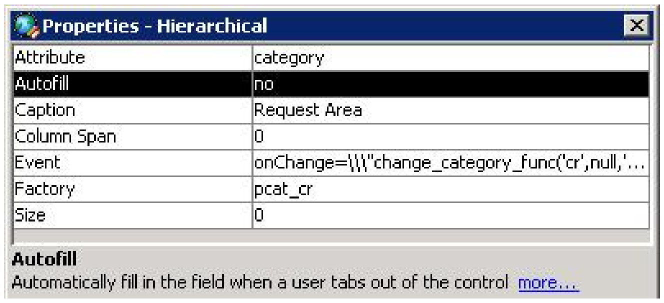
  - detail_cr.htmpl (for Requests)detail_in.htmpl (for Incidents)
  - detail_pr.htmpl (for Problems)
  - detail_chg.htmpl (for Change Orders)
  - detail_iss.htmpl (for Issues)

b. Locate the field and make a note of the attribute name that appears in the corresponding text box. For example, the attribute name for Description is *description* and the attribute name for Request Area is a *category*.

Note: The attribute names are case-sensitive.

c. Double-click the field.f the attribute name is partially hidden.

A Properties dialog similar to the following screenshot opens, which displays the complete attribute name:


Properties - Hierarchical

Attribute	category
Autofill	no
Caption	Request Area
Column Span	0
Event	onChange=\\\"change_category_func('cr',null,'...
Factory	pcat_cr
Size	0

Autofill
Automatically fill in the field when a user tabs out of the control more...

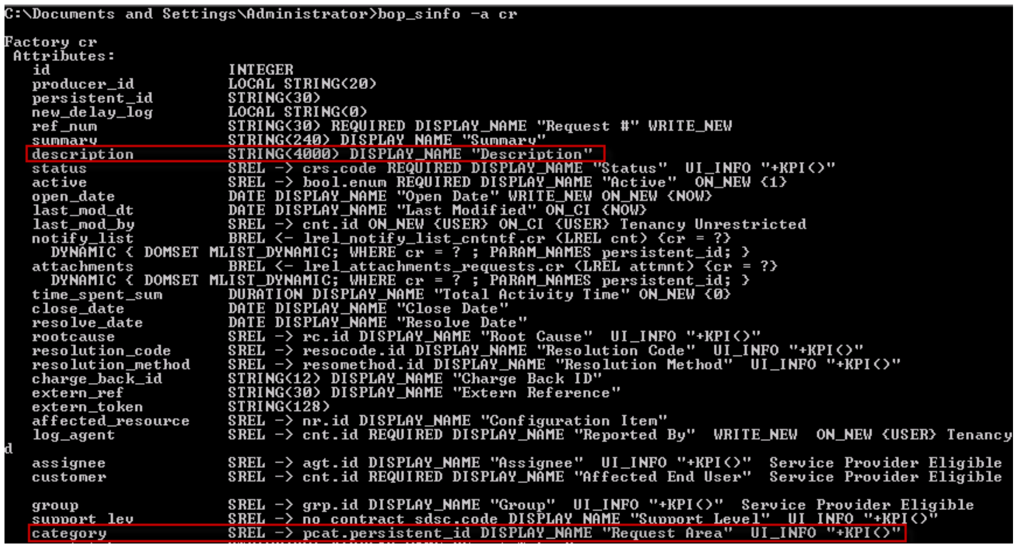
- **Use bop_sinfo:**

Alternatively, you locate the attribute name by running a utility that is called *bop_sinfo –a <object name>* from a command prompt on the CA SDM Primary or Secondary Server. The bop_sinfo utility returns all the attribute names and attribute details for a given object.

a. Run the following command from the CA SDM Primary or Secondary Server:

```
bop_sinfo –a object name
```

The utility returns all attribute names and attribute details for a given object. The object name for a Request is *cr*. The example output as a result of running *bop_sinfo –a cr* is displayed here:

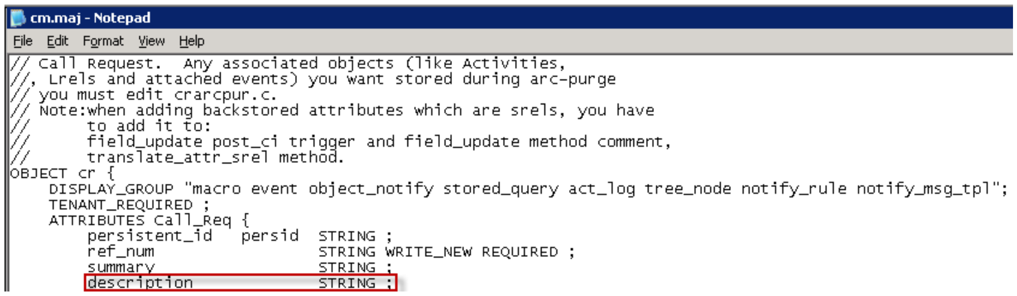


```
C:\Documents and Settings\Administrator>bop_sinfo -a cr

Factory cr
 Attributes:
   id                   INTEGER
   producer_id          LOCAL STRING(20)
   persistent_id        STRING(30)
   new_delay_log        LOCAL STRING(0)
   ref_num              STRING(30) REQUIRED DISPLAY_NAME "Request #" WRITE_NEW
   summary              STRING(240) DISPLAY_NAME "Summary"
   description          STRING(4000) DISPLAY_NAME "Description"
   status               SREL -> crs.code REQUIRED DISPLAY_NAME "Status"  UI_INFO "+KPI()"
   active               SREL -> bool.enum REQUIRED DISPLAY_NAME "Active"  ON_NEW (1)
   open_date            DATE DISPLAY_NAME "Open Date" WRITE_NEW ON_NEW (NOW)
   last_mod_dt          DATE DISPLAY_NAME "Last Modified" ON_CI (NOW)
   last_mod_by          SREL -> cnt.id ON_NEW (USER) ON_CI (USER) Tenancy Unrestricted
   notify_list          BREL <- lrel_notify_list_cntntf.cr (LREL cnt) {cr = ?}
     DYNAMIC { DOMSET MLIST_DYNAMIC; WHERE cr = ? ; PARAM_NAMES persistent_id; }
   attachments          BREL <- lrel_attachments_requests.cr (LREL attmnt) {cr = ?}
     DYNAMIC { DOMSET MLIST_DYNAMIC; WHERE cr = ? ; PARAM_NAMES persistent_id; }
   time_spent_sum       DURATION DISPLAY_NAME "Total Activity Time" ON_NEW (0)
   close_date           DATE DISPLAY_NAME "Close Date"
   resolve_date         DATE DISPLAY_NAME "Resolve Date"
   rootcause            SREL -> rc.id DISPLAY_NAME "Root Cause"  UI_INFO "+KPI()"
   resolution_code      SREL -> resocode.id DISPLAY_NAME "Resolution Code"  UI_INFO "+KPI()"
   resolution_method    SREL -> resomethod.id DISPLAY_NAME "Resolution Method"  UI_INFO "+KPI()"
   charge_back_id       STRING(12) DISPLAY_NAME "Charge Back ID"
   extern_ref           STRING(30) DISPLAY_NAME "Extern Reference"
   extern_token         STRING(128)
   affected_resource    SREL -> nr.id DISPLAY_NAME "Configuration Item"
   log_agent            SREL -> cnt.id REQUIRED DISPLAY_NAME "Reported By"  WRITE_NEW  ON_NEW (USER) Tenancy
d
   assignee             SREL -> agt.id DISPLAY_NAME "Assignee"  UI_INFO "+KPI()"  Service Provider Eligible
   customer             SREL -> cnt.id REQUIRED DISPLAY_NAME "Affected End User"  Service Provider Eligible

   group                SREL -> grp.id DISPLAY_NAME "Group"  UI_INFO "+KPI()"  Service Provider Eligible
   support_lev          SREL -> no_contract_sdsc.code DISPLAY_NAME "Support Level"  UI_INFO "+KPI()"
   category             SREL -> pcat.persistent_id DISPLAY_NAME "Request Area"  UI_INFO "+KPI()"
```

By the screenshot, we can see that the *description* field in the UI corresponds to the *description* attribute. The *Request Area* field in the UI corresponds to the *category* attribute.

- **Use Majic Files:**

  a. Open up the majic file definition in $NX_ROOT/bopcfg/majic for the Request Object, which is cm.maj.



```
// Call Request.  Any associated objects (like Activities,
//, Lrels and attached events) you want stored during arc-purge
// you must edit crarcpur.c.
// Note:when adding backstored attributes which are srels, you have
//      to add it to:
//      field_update post_ci trigger and field_update method comment,
//      translate_attr_srel method.
OBJECT cr {
    DISPLAY_GROUP "macro event object_notify stored_query act_log tree_node notify_rule notify_msg_tpl";
    TENANT_REQUIRED ;
    ATTRIBUTES Call_Req {
        persistent_id   persid  STRING ;
        ref_num                 STRING WRITE_NEW REQUIRED ;
        summary                 STRING ;
        description             STRING ;
```

The attribute names are displayed.

Step 3: Determine Data Types of Attributes

The data types of these attributes can be seen in the output from any of the options described in Step 2 (Web Screen Painter, bop_sinfo output, Majic files). You can also refer to the following chapters of *CA SDM 12.6 Technical Reference Guide*:

- Chapter 1, *Data Element Dictionary*
- Chapter 2, *Objects and Attributes*
- Chapter 3, *Table and Object Cross-Reference*

The following table shows the details for the description and category attributes in a Request, as taken from the *Technical Reference Guide*.

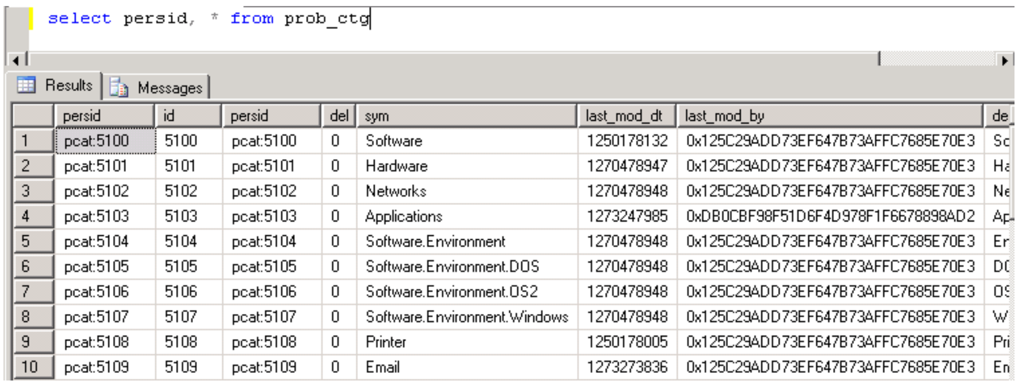
Attribute	Database Column	Data Type	SREL (Relationship table)
description	Description	STRING	
category	Category	SREL	prob_ctg persid

Note: The Database Column can be obtained by running bop_sinfo –d <object name>.

We have all the information for the *description* field. We know the attribute name, its value as STRING and that it does not have an associated relationship table (SREL which stands for *Single RELation*). However, the Request Area (category) field has an SREL associated with the attributes so investigate it further.

Step 4: Locate Valid Values in the SREL Table

When an attribute has an SREL associated with it, then its value has to match one of the valid values specified in the corresponding SREL table. In our example of the category field on a Request, this attribute denotes the field *persid* in the table prob_ctg. To list these values, use a SQL query tool to perform the query *SELECT persid, * FROM prob_ctg* against the MDB (using the SQL Table Name), or alternatively you can use Service Desk utilities such as pdm_extract (using the Object Name). The following screenshot shows the result of the query when executed using the Microsoft SQL Server Management Studio query tool:



```
select persid, * from prob_ctg
```

	persid	id	persid	del	sym	last_mod_dt	last_mod_by	de
1	pcat:5100	5100	pcat:5100	0	Software	1250178132	0x125C29ADD73EF647B73AFFC7685E70E3	Sc
2	pcat:5101	5101	pcat:5101	0	Hardware	1270478947	0x125C29ADD73EF647B73AFFC7685E70E3	Ha
3	pcat:5102	5102	pcat:5102	0	Networks	1270478948	0x125C29ADD73EF647B73AFFC7685E70E3	Ne
4	pcat:5103	5103	pcat:5103	0	Applications	1273247985	0xDB0CBF98F51D6F4D978F1F6678898AD2	Ap
5	pcat:5104	5104	pcat:5104	0	Software.Environment	1270478948	0x125C29ADD73EF647B73AFFC7685E70E3	Er
6	pcat:5105	5105	pcat:5105	0	Software.Environment.DOS	1270478948	0x125C29ADD73EF647B73AFFC7685E70E3	DC
7	pcat:5106	5106	pcat:5106	0	Software.Environment.OS2	1270478948	0x125C29ADD73EF647B73AFFC7685E70E3	OS
8	pcat:5107	5107	pcat:5107	0	Software.Environment.Windows	1270478948	0x125C29ADD73EF647B73AFFC7685E70E3	W
9	pcat:5108	5108	pcat:5108	0	Printer	1250178005	0x125C29ADD73EF647B73AFFC7685E70E3	Pri
10	pcat:5109	5109	pcat:5109	0	Email	1273273836	0x125C29ADD73EF647B73AFFC7685E70E3	En

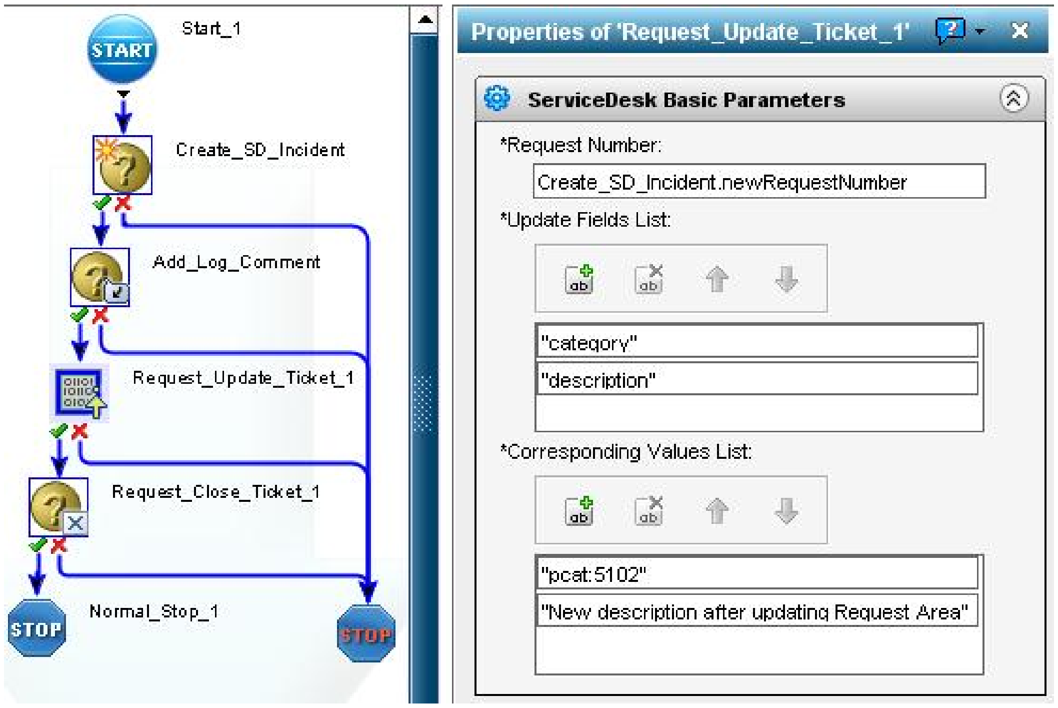
The *persid* column includes the valid for the handles of the categories (Request Area) while the *sym* column includes its corresponding *display name* shown on the UI.

Step 5: Use the Information Collected in the CA Process Automation Operator

The following information has now been identified for the *Description and Request Area* fields:

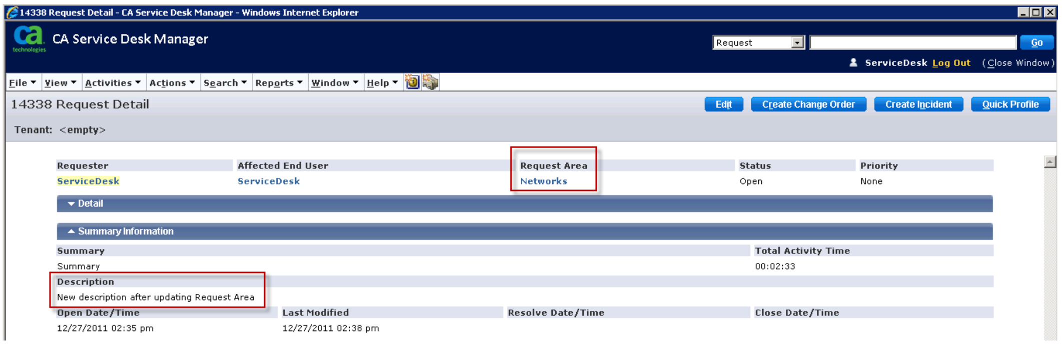
UI Name	Attribute/field name	Valid Values	Values referencing to…
Description	description	Any String	
Request Area	category	pcat:5100 pcat:5101 pcat:5102 pcat:5103 pcat:5104 pcat:5105 pcat:5106 pcat:5107 pcat:5108 pcat:5109	Software Hardware Networks Applications Software.Environment Software.Environment.DOS Software.Environment.OS2 Software.Environment.Windows Printer Email

We can now use this information to update a Request leveraging an operator from the Service Desk Connector in a CA Process Automation Process definition as follows:



*Request Number:
Create_SD_Incident.newRequestNumber
*Update Fields List:
"category"
"description"
*Corresponding Values List:
"pcat:5102"
"New description after updating Request Area"

When executed, this process sets the Request Area to a value of *Networks* and the Description field to *New description after updating Request Area*.



14338 Request Detail

Tenant: <empty>

Requester	Affected End User	Request Area	Status	Priority
ServiceDesk	ServiceDesk	Networks	Open	None

Summary
Summary

Total Activity Time
00:02:33

Description
New description after updating Request Area

Open Date/Time	Last Modified	Resolve Date/Time	Close Date/Time
12/27/2011 02:35 pm	12/27/2011 02:38 pm		

In the example above, we hardcoded this change to our operator properties, however, we could also change these values dynamically using Datasets.

Using Dataset Objects to Define Variables

In CA Process Automation, a Dataset object stores information that can be shared among instances of the same process or even between processes. Modify the information defined in a Dataset manually (by users or administrators), or automatically during the execution of a Process. Within a Dataset, define pages that are used to organize the various parameters or fields that the Dataset contains.

Understand the differences in scope of different Dataset objects with in CA Process Automation.

Data that is frequently shared among multiple processes and operators is typically stored in a **Named Dataset**. A Named Dataset is accessible to all processes in the Library in which it is contained. A typical example is usernames, passwords, database, and server names for certain applications. Storing these names in a named dataset greatly simplifies the process when any of these parameters must be updated. An update can include anything from a simple change of password to a situation where you have moved an application server to a new renamed server.

Process Datasets, on the other hand, define variables within the context of a process and are included in every instance of a process object. Within the context of a particular process, this set is also called the *local Dataset*. Process Datasets are accessible (and modifiable) from all operators within the Process and can be initialized from the parent process or from external applications. Their final value is readable from the parent process.

Operators that return information that is more complex than a binary response typically use the **operator dataset**.

The best practice is to store information locally as much as possible without causing unnecessary duplication of data. To make some parts of this information accessible to the other processes, decide who can see this information and what data are made available. A Named Dataset is available for the complete environment, while a Process Dataset is only available in the process itself and its parent process.

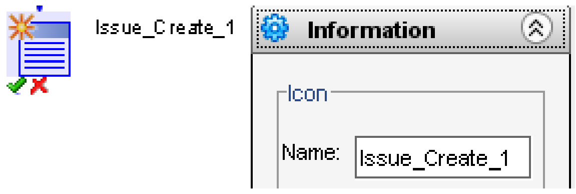
When storing usernames, passwords, server names, or other parameters in a shared dataset, be sure to use different variables for different logical functions. For example:

- If Application A and Application B are both hosted on Server X, their Application Server Name does not store in the same dataset variable. This application avoids any potential problems in the event the applications are deployed to separate servers in the future.
- If Application A and Application B both use root to connect to a specific function, store this username in application-specific variables. This variable gives you better flexibility in the event you (or your security team) can have separate user IDs for the individual applications.

Tracking Service Desk Ticket Numbers Using Datasets

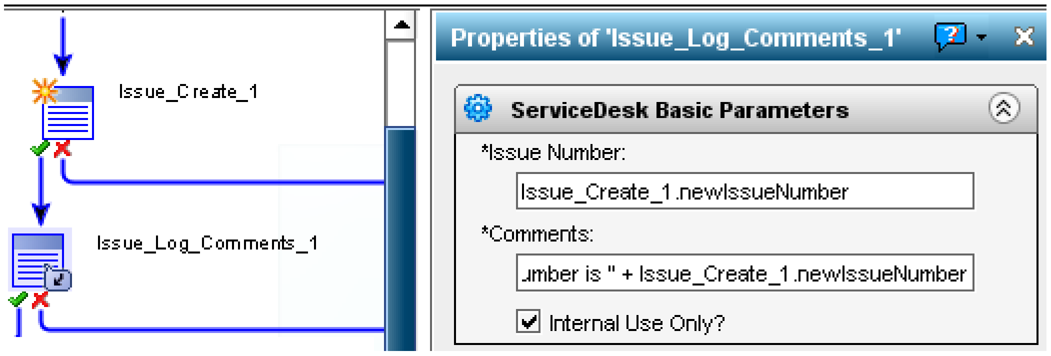
When an Operator is used to open a CA SDM ticket, their numbers are stored in dataset variables. These numbers are critical to process the tickets with updates, updating status, setting assignee, close, and logging comments.

Following diagram is an example of the Issue_Create Operator, which is used to open an issue:



Name: Issue_Create_1

In this example, the Operator is called Issue_Create_1. The dataset variable that keeps the Issue number after this operator is executed is called newIssueNumber. To use this number in other Operators, such as Issue_Log_Comments, concatenate the operator name that opened the issue with the variable name. For example, Issue_Create_1.newIssueNumber as shown in the following screenshot:

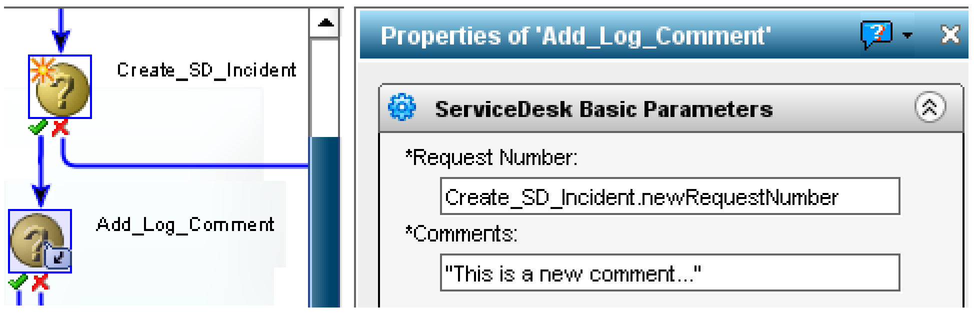

Issue_Create_1
Issue_Log_Comments_1
Properties of 'Issue_Log_Comments_1'
ServiceDesk Basic Parameters

*Issue Number: Issue_Create_1.newIssueNumber

*Comments: umber is " + Issue_Create_1.newIssueNumber

☑ Internal Use Only?

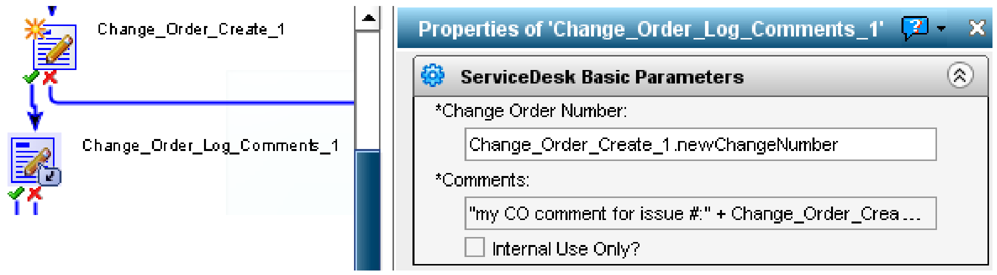
A similar method can be used to track the internal Request Numbers as shown in the following screenshot:



*Request Number: Create_SD_Incident.newRequestNumber

*Comments: "This is a new comment..."

In this case, the variable name is newRequestNumber. A Change Order variable is newChangeNumber as shown in the following screenshot:


Change_Order_Create_1
Change_Order_Log_Comments_1
Properties of 'Change_Order_Log_Comments_1'
ServiceDesk Basic Parameters

*Change Order Number:
Change_Order_Create_1.newChangeNumber
*Comments:
"my CO comment for issue #:" + Change_Order_Crea...
Internal Use Only?

Parsing XML data from CA SDM SOAP Operator Results

When using SOAP operators make a web service call to pull information from a CA SDM object, it is necessary to parse the resulting XML and save the data needed into dataset variables. CA Process Automation can leverage these variables. The CA SDM Web Services methods use a standard XML structure beginning with the following root element:

<UDSObject>

The format of the XML representation is described in the following table:

XML Element	Type	Description
<UDSObject>	N/A	Identifies the root node.
<Handle>	String	Identifies the object handle.
<Attributes>	Sequence	Identifies the attribute values. This attribute holds zero or more elements for the objects attribute values.
<attrName0 DataType = "typeEnum">	String	Identifies the AttrName0, which is an object attribute name as defined in the Service Desk majic (.maj) or mod (.mod) file. This name uses dot-notation depending on the web method used. The element value is the attribute value. An empty element indicates a null/empty value for this object attribute. The DataType attribute is an integer indicating the attribute data type in the Service Desk environment. The value is one of the data type enumerations described in the Data Types section in this document.

For example, a web service call to getObjectValues() can return information that is illustrated as follow:

```
<?xml version="1.0" encoding="UTF-8"?>
<UDSObject>
<Handle>chg:400006</Handle>
<Attributes>
<Attribute DataType="2002">
<AttrName>web_url</AttrName>
<AttrValue>http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIP
LIST=1+QBE.EQ.id=400006</AttrValue>
</Attribute>
<Attribute DataType="2004">
<AttrName>need_by</AttrName>
<AttrValue/>
</Attribute>
<Attribute DataType="2002">
<AttrName>chg_ref_num</AttrName>
<AttrValue>57</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>priority.sym</AttrName>
<AttrValue>3-Medium</AttrValue>
</Attribute>
<Attribute DataType="2005">
<AttrName>affected_contact</AttrName>
<AttrValue>6531EE30E432E34FA71C0BD014622A41</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>affected_contact.userid</AttrName>
<AttrValue>jarnold</AttrValue>
</Attribute>
<Attribute DataType="2002">
</Attributes>
</UDSObject>
```

Some methods, such as doSelect(), return a sequence of <UDSObject> elements that is contained inside a <UDSObjectList> element. The <Lists> section holds zero or more <List> nodes. A <List> node holds zero or more <UDSObject> nodes. <List> elements are returned only when a specific request for list values is made, an example is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<UDSObjectList>
<UDSObject>
<Handle>cr:4249712</Handle>
<Attributes>
<Attribute DataType="2005">
<AttrName>status</AttrName>
<AttrValue>OP</AttrValue>
</Attribute>
</Attributes>
</UDSObject>
</UDSObjectList>
```

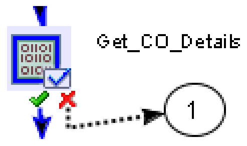
For the generic data retrieval methods, such as getObject(), a list is requested by naming it in the return value array. The list that is requested must be a BREL/QREL/LREL defined for the object. The list is requested in the parameter array of the form *listname.attribute*, where listname is the name of a QREL/BREL/LREL (for example, for the Request object, actlog.description, actlog.time_spent). Requests for multiple values from the same list source are consolidated into a single <List> return (such as, the previous example return only one <List> element for the actlog list). The contents are <UDSObjects> with two attributes, time_spent and description.

If a request is made just for a list with no attribute name, such as actlog, then the entire <UDSObject> is returned in the <List> section.

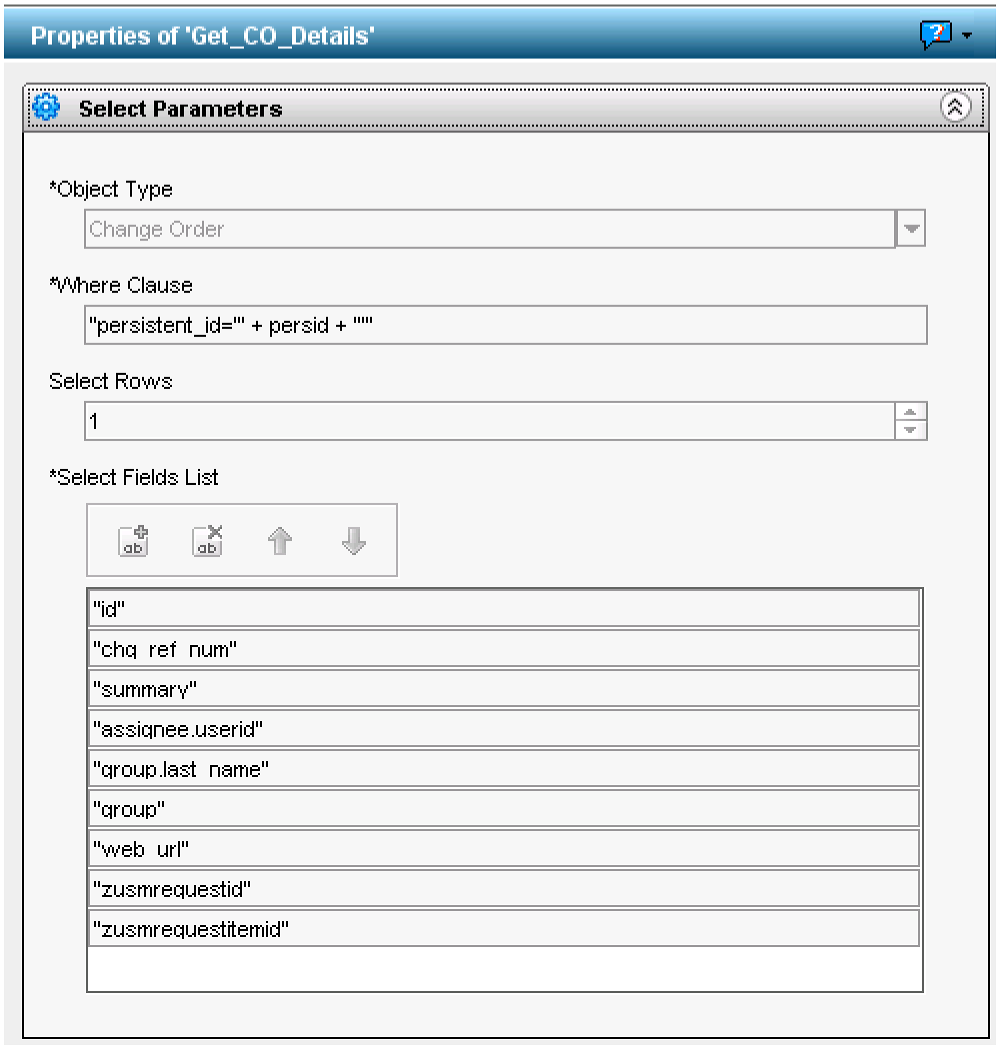
The following two examples show the methods to extract and parse XML data that is resulting from a CA SDM Web Service Call, and save to CA Process Automation Dataset variables.

Example 1: Using JavaScript

The following example leverages the Base_Select_Service_Desk_Elements Operator from the out of box CA Service Desk Connector in a node *Get_CO_Details* to invoke the CA SDM Web Service Call, *doSelect*, and it retrieves attribute information from the calling Change Order. This example is taken from the *HWSW_FilledFromInventory* sample process definition supplied the default with CA Service Catalog 12.6, this process definition is a key piece of the integration with CA SDM and CA Service Catalog:



In the high-level operator, *Get_CO_Details*, we pass the attributes that we would like to retrieve from the Change Order to the Base_Select_Service_Desk_Elements operator. See properties from *Get_CO_Details*:



*Object Type

Change Order

*Where Clause

"persistent_id='" + persid + "'"

Select Rows

1

*Select Fields List

"id"
"chg_ref_num"
"summary"
"assignee.userid"
"group.last_name"
"group"
"web_url"
"zusmrequestid"
"zusmrequestitemid"

The result of this call is, saved into a Dataset variable, as 'SoapResponseBody', is:

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<soapenv:Body>
<doSelectResponse>
<doSelectReturn>&lt;?xml version="1.0" encoding="UTF-8"?&gt;
&lt;UDSObjectList&gt;
&lt;UDSObject&gt;
&lt;Handle&gt;chg:400076&lt;/Handle&gt;
&lt;Attributes&gt;
&lt;Attribute DataType="2001"&gt;
&lt;AttrName&gt;id&lt;/AttrName&gt;
&lt;AttrValue&gt;400076&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2002"&gt;
&lt;AttrName&gt;chg_ref_num&lt;/AttrName&gt;
```

```
&lt;AttrValue&gt;86&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2002"&gt;
&lt;AttrName&gt;summary&lt;/AttrName&gt;
&lt;AttrValue&gt;Procure Server &lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2002"&gt;
&lt;AttrName&gt;assignee.userid&lt;/AttrName&gt;
&lt;AttrValue&gt;spadmin&lt;/AttrValue&gt;
&lt;/Attribute&gt;  &lt;Attribute DataType="2002"&gt;
&lt;AttrName&gt;group.last_name&lt;/AttrName&gt;
&lt;AttrValue&gt;IT Services&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2005"&gt;
&lt;AttrName&gt;group&lt;/AttrName&gt;
&lt;AttrValue&gt;E46D064281F27B4FA9898F34A4F0FCB6&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2002"&gt;
&lt;AttrName&gt;web_url&lt;/AttrName&gt;
&lt;AttrValue&gt;http://CASDMSERVER:9080/CAisd/pdmweb.exe?OP=SEARCH+FACTO
RY=chg+SKIPLIST=1+QBE.EQ.id=400076&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2001"&gt;
&lt;AttrName&gt;zusmrequestid&lt;/AttrName&gt;
&lt;AttrValue&gt;10038&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;Attribute DataType="2001"&gt;
&lt;AttrName&gt;zusmrequestitemid&lt;/AttrName&gt;
&lt;AttrValue&gt;10372&lt;/AttrValue&gt;
&lt;/Attribute&gt;
&lt;/Attributes&gt;
&lt;/UDSObject&gt;
&lt;/UDSObjectList&gt;
</doSelectReturn>
</doSelectResponse>
</soapenv:Body>
</soapenv:Envelope>
```

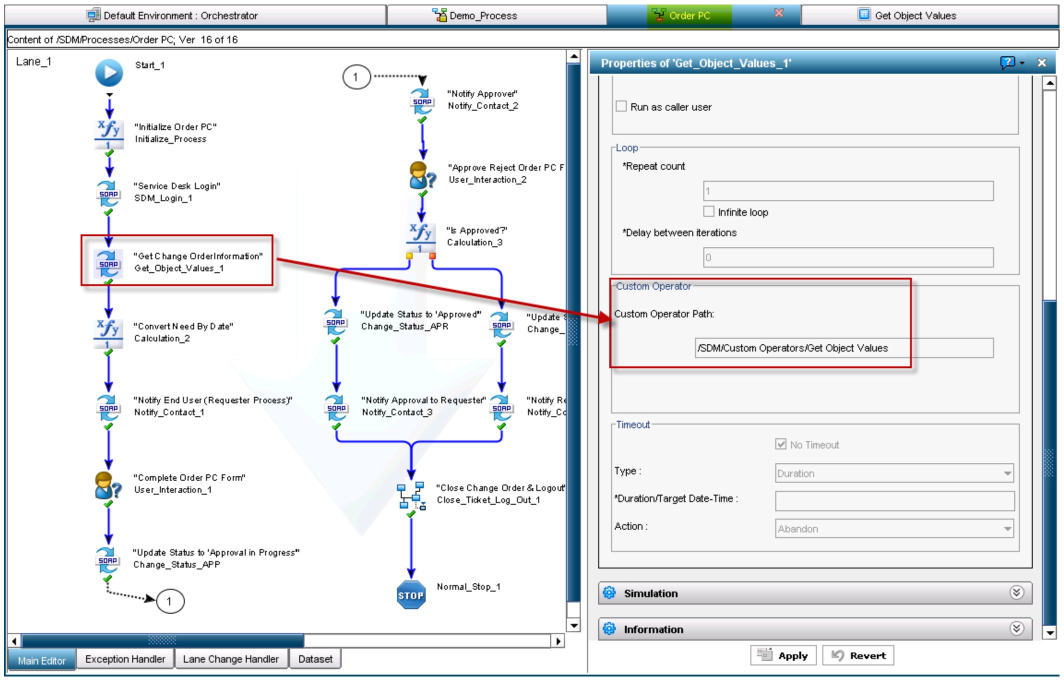
In order to parse the resulting data, we will need to apply JavaScript as a part of the Post Execution Code for the *Get_CO_Details* node as follows, to be executed after the web service call has completed successfully and the data is retrieved. Once this code is executed, the XML is parsed and saved into dataset variables:

```
if ((Process[OpName].ResponseCode).indexOf('Failed',0) != -1) {
       Process.Subject = GblMSGVals.SUBJECT_MSG20;
       Process.Message = "Process: " + Process.Prefix_UserInstName__ + " "
+ GblMSGVals.SUBJECT_MSG4 +" " + OpName + " " + Process[OpName].Reason;
}

var i;
var j;
var k;
var str;

Process.noRequestorRow = 0;
if ( typeof(Process[OpName].SelectDataResponse) == 'undefined' )
{
       Process.noRequestorRow = 1;
       return;
}
if ( typeof(Process[OpName].SelectDataResponse.UDSObject) == 'undefined' )
{
       Process.noRequestorRow = 1;
       return;
}
if ( Process[OpName].SelectDataResponse.UDSObject.length < 1 )
{
       Process.noRequestorRow = 1;
       return;
}
Process.MemberCount = Process[OpName].SelectDataResponse.UDSObject.length;
if ( typeof(Process[OpName].Rows) =='undefined' ){
       Process[OpName].Rows = newValueMap();
}

for ( j = 0; j < Process[OpName].SelectDataResponse.UDSObject.length; j++ )
{
       str = "row" + j;
       Process[OpName].Rows[str] = newValueMap();
       var myAttributes = new Array();
       myAttributes =
Local[IconName].SelectDataResponse.UDSObject[j].Attributes[0].Attribute;
              Process.CO_ID          = myAttributes[0].AttrValue[0].text_;
              Process.CO_Number      = myAttributes[1].AttrValue[0].text_;
              Process.CO_Summary     = myAttributes[2].AttrValue[0].text_;
              Process.CO_Analyst_UserID =
myAttributes[3].AttrValue[0].text_;
              Process.CO_Group_Name     =
myAttributes[4].AttrValue[0].text_;
              Process.CO_Group_UUID     =
myAttributes[5].AttrValue[0].text_;
              Process.CO_URL      = myAttributes[6].AttrValue[0].text_;
              Process.CO_SLCM_ID  = myAttributes[7].AttrValue[0].text_;
              Process.zusmrequestitemid=
myAttributes[8].AttrValue[0].text_;
}
Process.UserInstName="SDM Fulfillment CO: " + Process.CO_Number;
```

Example 2: Using XPATH

The follwoing example leverages a custom SOAP Operator *Get Object Values* to invoke the CA SDM Web Service Call, *getObjectValues.* This custom SOAP Operator is called from a high-level operator *Get Change Order* Information and it retrieves attribute information from the calling Change Order.

This example is taken from the *Order PC* sample process definition and is included in the CA Process Automation Sample Process Definitions for CA SDM posted to the *CA Process Automation Best Practices* Page on support.ca.com:



Properties of 'Get_Object_Values_1'

☐ Run as caller user

Loop

*Repeat count: 1

☐ Infinite loop

*Delay between iterations: 0

Custom Operator

Custom Operator Path: /SDM/Custom Operators/Get Object Values

Timeout

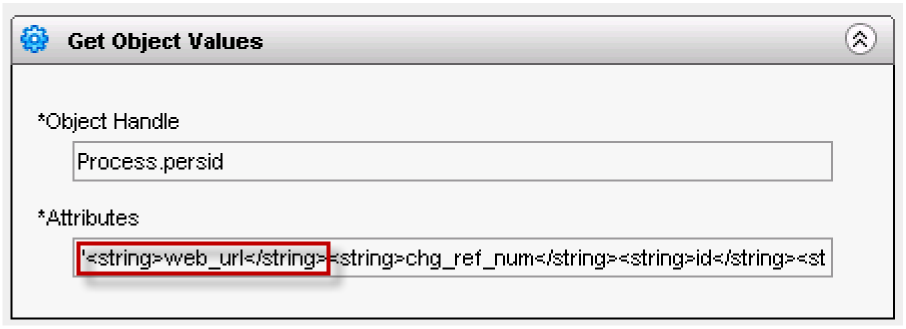
☑ No Timeout

Type : Duration

*Duration/Target Date-Time :

Action : Abandon

In the high-level operator, *Get Change Order Information*, we pass the *attributes* that we would like to retrieve from the Change Order to our custom operator. See the properties from *Get Change Order Information*:



Get Object Values

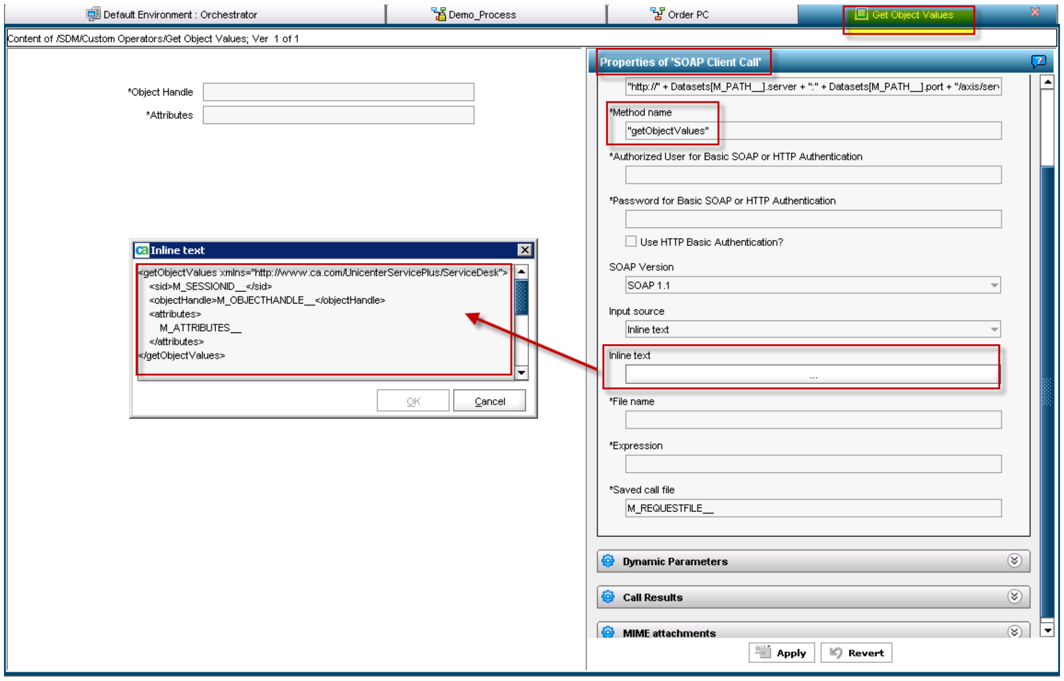
*Object Handle

Process.persid

*Attributes

'<string>web_url</string><string>chg_ref_num</string><string>id</string><st

See properties from our custom operator *Get Object Values:*



Content of /SDM/Custom Operators/Get Object Values; Ver 1 of 1

*Object Handle

*Attributes

Inline text

```
<getObjectValues xmlns="http://www.ca.com/UnicenterServicePlus/ServiceDesk">
   <sid>M_SESSIONID__</sid>
   <objectHandle>M_OBJECTHANDLE__</objectHandle>
   <attributes>
      M_ATTRIBUTES__
   </attributes>
</getObjectValues>
```

Properties of 'SOAP Client Call'

"http://" + Datasets[M_PATH__].server + ":" + Datasets[M_PATH__].port + "/axis/serv

*Method name: "getObjectValues"

*Authorized User for Basic SOAP or HTTP Authentication

*Password for Basic SOAP or HTTP Authentication

☐ Use HTTP Basic Authentication?

SOAP Version: SOAP 1.1

Input source: Inline text

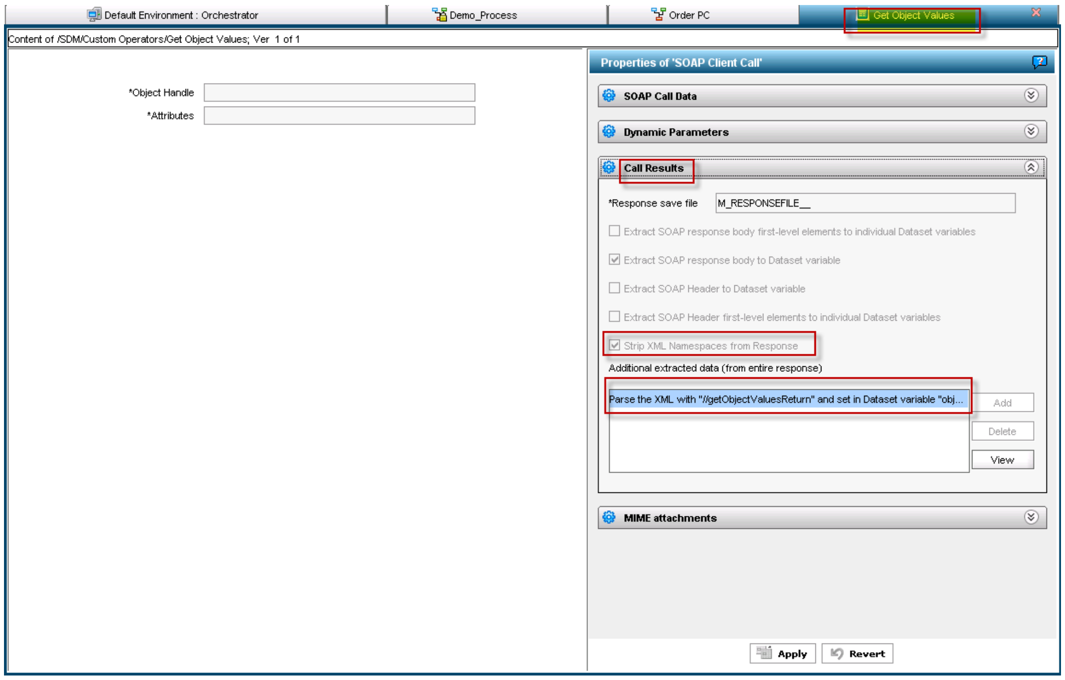
Inline text: ...

*File name

*Expression

*Saved call file: M_REQUESTFILE__

The result is, saved as SoapResponseBody, and is similar to the format noted in the first example. However, the difference is that in this custom operator *Get Object Values.* We have stripped the XML namespaces from the response. We save the result to a variable called *object* Values in our custom operator properties under Call Results as shown.



Content of /SDM/Custom Operators/Get Object Values; Ver 1 of 1

*Object Handle

*Attributes

Properties of 'SOAP Client Call'

Call Results

*Response save file: M_RESPONSEFILE__

☐ Extract SOAP response body first-level elements to individual Dataset variables

☑ Extract SOAP response body to Dataset variable

☐ Extract SOAP Header to Dataset variable

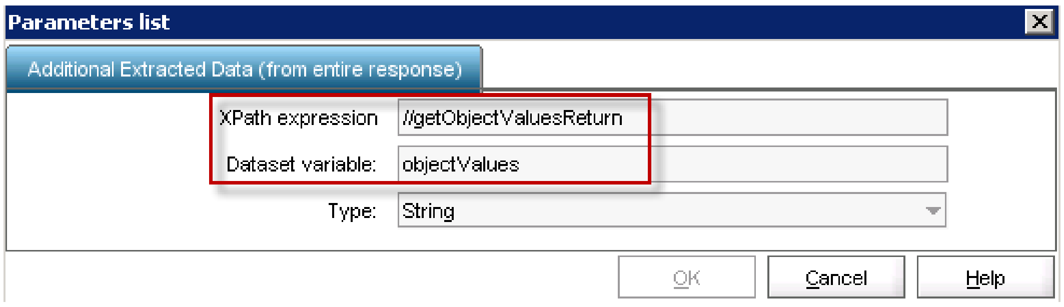
☐ Extract SOAP Header first-level elements to individual Dataset variables

☑ Strip XML Namespaces from Response

Additional extracted data (from entire response)

Parse the XML with "//getObjectValuesReturn" and set in Dataset variable "obj...

Click *View,* to see where this view is saved:



XPath expression: //getObjectValuesReturn
Dataset variable: objectValues
Type: String

Once the *Get Change Order Information* node is executed within our Order PC Process definition, the output of *objectValues* looks as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<UDSObject>
<Handle>chg:400276</Handle>
<Attributes>
<Attribute DataType="2002">
<AttrName>web_url</AttrName>
<AttrValue>http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIP
LIST=1+QBE.EQ.id=400276</AttrValue> </Attribute>
<Attribute DataType="2004">
<AttrName>need_by</AttrName>
<AttrValue/> </Attribute>
<Attribute DataType="2002">
<AttrName>chg_ref_num</AttrName>
<AttrValue>457</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>priority.sym</AttrName>
<AttrValue>None</AttrValue>
</Attribute>
<Attribute DataType="2005">
<AttrName>affected_contact</AttrName>
<AttrValue>6531EE30E432E34FA71C0BD014622A41</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>affected_contact.userid</AttrName>
<AttrValue>jarnold</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>affected_contact.combo_name</AttrName>
<AttrValue>Arnold, June </AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>requestor.userid</AttrName>
<AttrValue>jarnold</AttrValue>
</Attribute>
<Attribute DataType="2005">
```

```
<AttrName>assignee</AttrName>
<AttrValue>08A4A894F3B53244830A9D5EDE3ACAED</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>assignee.userid</AttrName>
<AttrValue>jmccarthy</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>category.assignee.userid</AttrName>
<AttrValue>jmccarthy</AttrValue>
</Attribute>
<Attribute DataType="2005">
<AttrName>category.assignee</AttrName>
<AttrValue>08A4A894F3B53244830A9D5EDE3ACAED</AttrValue>
</Attribute>
<Attribute DataType="2002">
<AttrName>category.assignee.combo_name</AttrName>
<AttrValue>McCarthy, John </AttrValue>
</Attribute>
</Attributes>
</UDSObject>
```

We can then apply XPATH as a part of the Post Execution Code for the *Get Change Order Information* node. This code executes after the web service call in our custom operator has completed successfully and the data is retrieved. Once this code is executed, the XML is parsed and saved into dataset variables:

```
Process.web_url =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'web_url']/../AttrValue/text()" )
Process.needByDate =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'need_by']/../AttrValue/text()" )
Process.chgRefNum =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'chg_ref_num']/../AttrValue/text()" )
Process.priority =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'priority.sym']/../AttrValue/text()" )
Process.endUserHandle = "cnt:" +
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'affected_contact']/../AttrValue/text()" )
Process.requestorUserID =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'affected_contact.userid']/../AttrValue/text()" )
Process.requestorName =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'affected_contact.combo_name']/../AttrValue/text()" )
Process.assigneeUserID =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'assignee.userid']/../AttrValue/text()" )
```

```
Process.defaultApproverUserID =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'requestor.userid']/../AttrValue/text()" )
Process.categoryAssigneeUserID =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'category.assignee.userid']/../AttrValue/text()" )
Process.approverHandle = "cnt:" +
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'category.assignee']/../AttrValue/text()" )
Process.approverUserIDList = "<xml><userid>" +
Process.categoryAssigneeUserID + "</userid><userid>" +
Process.assigneeUserID + "</userid><userid>" +
Process.defaultApproverUserID + "</userid></xml>"
if( Process.categoryAssigneeUserID.length > 0)
{
   Process.approverUserID = Process.categoryAssigneeUserID;
}
else if( Process.assigneeUserID.length > 0)
{
   Process.approverUserID = Process.assigneeUserID;
}
else
{
   Process.approverUserID = Process.defaultApproverUserID;
}
Process.approverName =
applyXPath(Process[OpName].objectValues,"//AttrName[text() =
'category.assignee.combo_name']/../AttrValue/text()" )
Process.UserInstName = "Order PC for CO " + Process.chgRefNum
```

Exception Handling

When designing your Process Definition in CA Process Automation, it is important to identify possible outcomes of each step, and to plan for exceptions.

Links determine the order in which actions are processed. Each Operator can have multiple entry and exit links. An entry link invokes the Operator, serving as an execution order for an Operator. Each exit link corresponds to a particular *outcome* of an Operator. All Operators have predefined exit links (such as Aborted, Completed, Failed, or Successful). Operators also allow you to use a Boolean expression to define a custom exit link that is based on the Operator results and the value of variables accessible to Operators in a Process.

Under normal circumstances, the Process can proceed from Operator to Operator, following each link to the expected conclusion. Sometimes, however, the Process flow encounters an unexpected result that can create issues with the execution. As an example, what action do you take when making a web service call to an application that has gone down? Without a contingency plan in place, execution can simply stop until the problem is resolved.

Although you can manage special exceptions right within the main process flow, it is much more efficient to manage the execution errors generically through the CA Process Automation **Exception Handlers**. As with CA SDM connectivity parameters, CA Process Automation has a generic Exception handler setting that leverages all the running process flows, if an error occurs.

Following list shows the three types of exceptions:

- System Error

  Example: Invalid Touchpoint Name, System Communication Problems, Unreachable Agents.

- Unidentified Response

  Example: An operator has no path to take after it has executed.

- Aborted

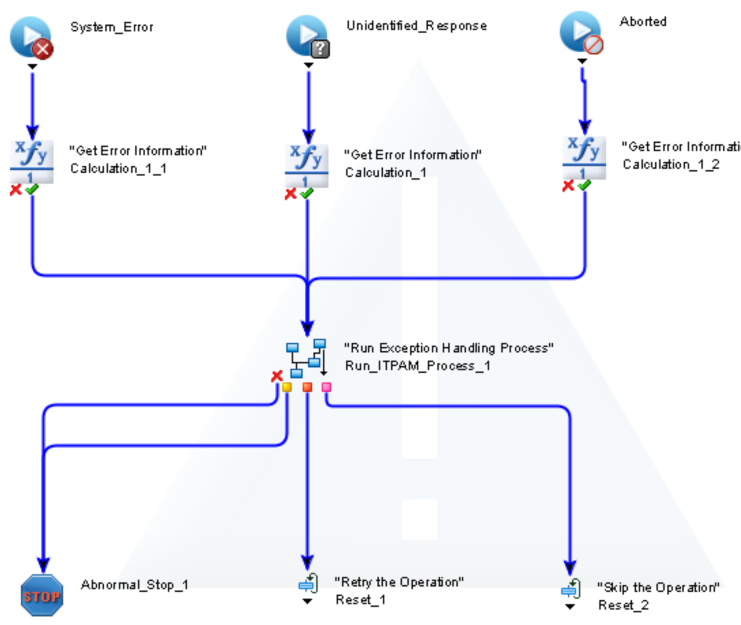
  Example: User or system aborts the operator.

Following list shows the three types of lane changes:

- All to All
- All to One
- One to All

The three exceptions handler types manage to cover all the basic unexpected and expected failure scenarios. If more complex process flows are created in the library using lane changes, the three lane changes handler types are managed.

The following screenshot is an example of a typical CA SDM exception handler:


System_Error
Unidentified_Response
Aborted
"Get Error Information" Calculation_1_1
"Get Error Information" Calculation_1
"Get Error Information" Calculation_1_2
"Run Exception Handling Process" Run_ITPAM_Process_1
STOP
Abnormal_Stop_1
"Retry the Operation" Reset_1
"Skip the Operation" Reset_2

In this example, you can see a few special operators involved:

- Three different Start Operators, each mapping to a different type of exception handler
  - System Errors
  - Unidentified Responses
  - (Process) Aborted
- Get Error Information on each entry point, which saves the error to process level attributes.
- A sub process, *Run Exception Handling,* is called. This sub process determines the action to take dependent upon the error message received.

Following steps are the possible actions for the process as a result of error received:

- System generated email alert to the Process Administrator.
- Obtain a new Session ID (SID) for the failed web service call.
- Skip the action.

- Retry the action.

Important! In the exception handler, we have built in the ability to reuse Session IDs (SID), so that every CA SDM web service call that is invoked does not require a separate login/logout of the CA SDM Web Services to obtain a SID. The SID is built with logic that if there is no valid SID available (due to session timeout), then the process logs back in to the Web Services to obtain a valid SID. This process significantly drops the amount of web service calls that are made within a process definition. The CA Service Desk Connector is not built with this logic; however the example *Change Management* use case is discussed later in this chapter.

Note: The Web Services Session timeout value is controlled by an Options Manager Option under Administration, Options Manager, Web Service, *webservice_session_timeout.*

If you would like to see an example of how the method of exception handling that is described here is used within a process definition, please download the CA Process Automation Sample Process Definitions for CA SDM Sample Process Definitions available on the *CA Process Automation Best Practices* page on support.ca.com.

In this sample, there is a template that you can use to create your own custom process definitions leveraging the exception handling noted in this section, called *Template Process*.

Requesting User Interaction

Interaction Request Forms (IRFs) enable you to create an interface that can be used during the execution of a process to interact with an end user in a structured manner. For example, an Interaction Request Form can be used in the following scenarios:

- Get approval before continuing with a process or path within a process.
- Enable a user to select a course of action.
- Retrieve information that is only available from a person at runtime.
- Request performance of a manual action (for example, physically connecting a server to a switch) and marked as completed before proceeding with a process.

The IRF object defines the pages, parameters, and other characteristics of the form. IRFs are saved as separate objects in the Automation Library. After they have been created and checked in, IRFs can be added to any Process using the User Interaction Operator. For more information on the User Interaction Operator see the CA Process Automation *Reference Guide*. For more information on Interaction Request Forms, refer to the *Interaction Request Forms* chapter in the CA Process Automation *User Guide.*

The list of CA Process Automation IRFs that are waiting for user action can be viewed by selecting an entry in the Workflow Tasks tab, which invokes the CA Process Automation Task List. The Workflow Tasks tab of a ticket contains an audit trail of process instance messages that appear on the CA Process Automation task list.

Create an Interaction Request Form

To create an Interaction Request Form:

1. Log in to the CA Process Automation Management Console as an administrative user (pamadmin on a new install of CA Process Automation 3.1, for example. For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would be itpamadmin).

2. Click on the link *CA Process Automation Client* on the upper right hand side.

3. Open the Library Browser by going to File, Open Library Browser.

4. Right click on the directory under which you would like to create IRF.

5. Navigate to New Object, Interaction Request Form.

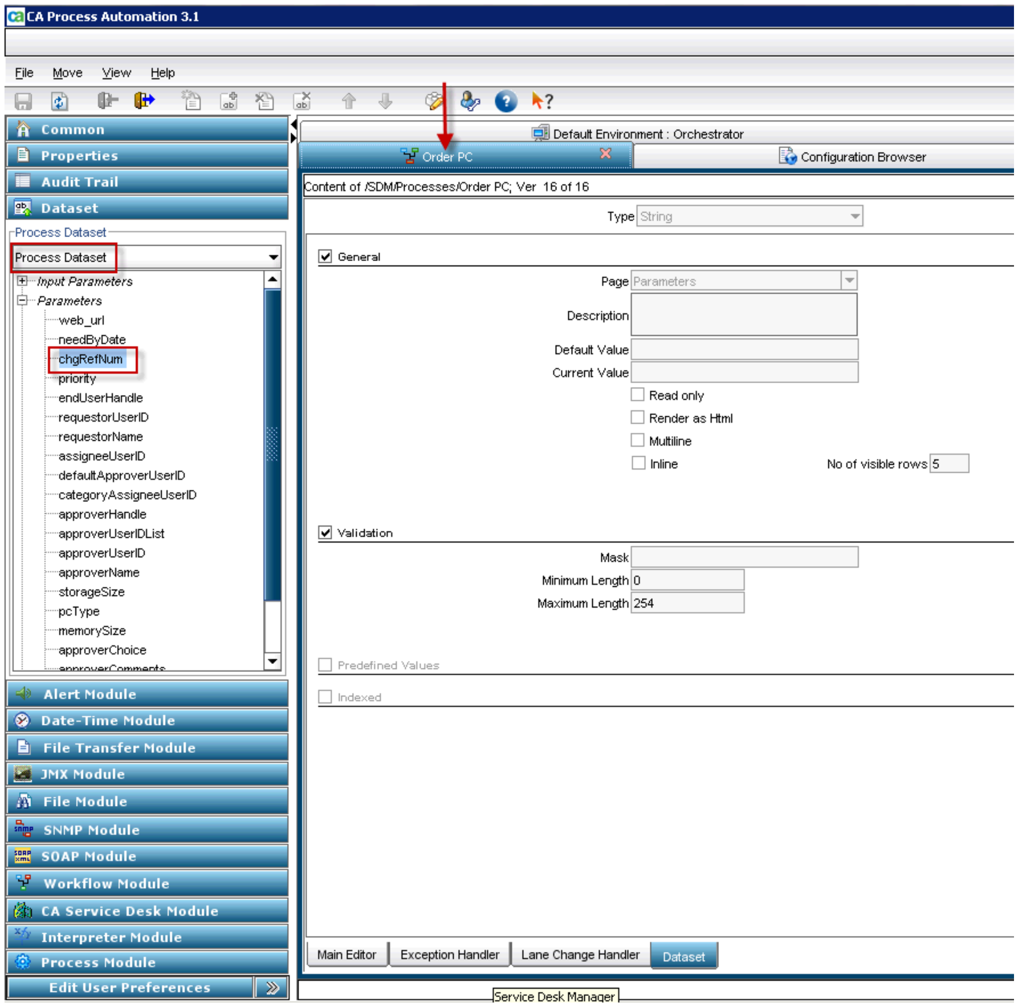
   The IRF appears in the right pane of CA Process Automation library. You would first need to provide a name.

6. Double-click the IRF to open details.

7. Provide a name to the IRF, add *Parameters* for the data that you would like displayed on the form. Define these parameters as Process Dataset parameters in order of data and these fields are available to other steps in the process.

   Take an example of a form which must be completed and approved before an end user is provisioned a PC. The requirement is for the approval form to provide a link back to the Change Order Number that requests the provisioning of the PC. Here is the definition of our form:

If we go to our Order PC Process Definition, we have a Process Dataset Variable that is defined for chgRefNum our Change Order Number. We have obtained the value at run time:



Process Dataset

Process Dataset

- Input Parameters
- Parameters
  - web_url
  - needByDate
  - chgRefNum
  - priority
  - endUserHandle
  - requestorUserID
  - requestorName
  - assigneeUserID
  - defaultApproverUserID
  - categoryAssigneeUserID
  - approverHandle
  - approverUserIDList
  - approverUserID
  - approverName
  - storageSize
  - pcType
  - memorySize
  - approverChoice
  - approverComments

Content of /SDM/Processes/Order PC; Ver 16 of 16

Type: String

[✓] General

Page: Parameters

Description:

Default Value:

Current Value:

[ ] Read only

[ ] Render as Html

[ ] Multiline

[ ] Inline No of visible rows 5

[✓] Validation

Mask:

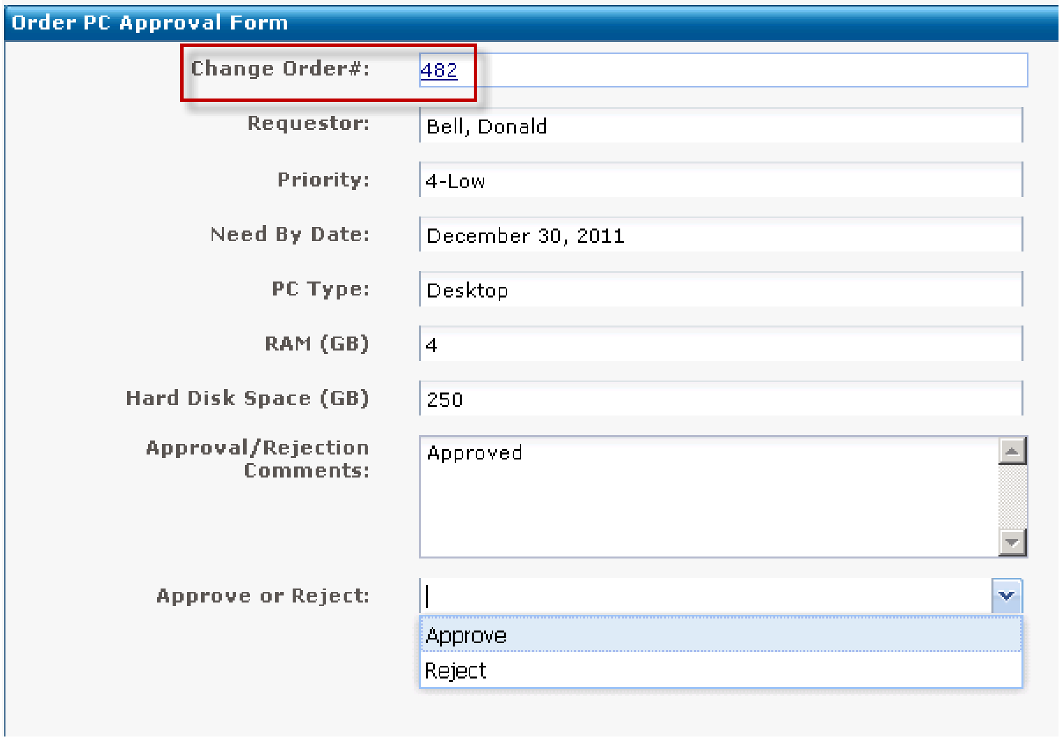
Minimum Length: 0

Maximum Length: 254

[ ] Predefined Values

[ ] Indexed

This results in the following IRF when executed within a task:


Order PC Approval Form

Change Order#:	482
Requestor:	Bell, Donald
Priority:	4-Low
Need By Date:	December 30, 2011
PC Type:	Desktop
RAM (GB)	4
Hard Disk Space (GB)	250
Approval/Rejection Comments:	Approved
Approve or Reject:	

For more information on the User Interaction Operator see the *CA Process Automation Reference Guide*, Chapter 17, *Workflow Module*, section on *User Interaction Operator*. For more details on using Interaction Request Forms see Chapter 11, *Interaction Request Forms* in the *CA Process Automation User Guide*.

The list of CA Process Automation Interaction Request Forms (IRFs) that are pending user action can be viewed by selecting any entry in the CA SDM Ticket Workflow Tasks tab. This selection invokes the CA Process Automation Task list. The running process instance is configured for Create Business-Like Entries in the CA SDM Workflow Tasks tab (see page 211) that is discussed later in this chapter. In *CA Process Automation* you can view IRF by the assignee of the task, if said assignee logs in to their Task List in the *CA Process Automation Client*, or an Administrator logs in to the *CA Process Automation Client* and can navigate to Configuration Browser, Default Process Watch, and User Interactions.

Note: Once a form has been completed and submitted, there is no current default way to go back and review *Completed* tasks, or completed Interaction Request Forms. To track this completed data that you must refer to the Process Dataset Variables.

Link a CA Process Automation Process Definition to CA SDM

In CA Process Automation, processes can be executed manually, and triggers a Start Request Form object, called from other Processes, or triggered using FTP, SOAP calls, SNMP traps, or SMTP (email) messages. When CA Process Automation is integrated with CA SDM, an automated process can be added to a particular CA SDM category (for example, a Request or Issue Category), or an Area (Request, Incident, or Problem Area). The process can also be triggered in response to an event through Macro.

Create a Start Request Forms

As mentioned above the key to the integration with CA SDM and CA Process Automation is the CA Process Automation Start Request Form (SRF). This object ties to Service Desk and instantiates a process definition.

When you create an SRF, you associate it with the Process definition and check in. You include the appropriate keywords in the SRF properties. If the appropriate keyword is missing from the SRF properties, the SRF and its associated Process definition fail to be made available to a CA SDM Ticket Area/Category, or macro.

Follow these steps:

1. Log in to CA Process Automation Management Console as an administrative user. (For Example pamadmin on a new install of CA Process Automation 3.1. For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would typically be an itpamadmin.)

    a. Click on the *CA Process Automation Client* link on the upper right hand side.

    b. Open the CA Process Automation Library Browser.

2. Right-click the directory under which you would like to create an SRF.

3. Navigate to New Object, Start Request Form.

    The Start Request Form appears in the right pane of CA Process Automation library.

4. Provide a name.

5. Right-click on the SRF to open Properties.

    The Library Object Properties page appears.

6. Click the General tab and modify the description of the Start Request Form. Add a description that identifies the proper usage of the Start Request Form and the associated Process Definition to the CA SDM Administrator.

7. Click the Keywords tab.

    The Keywords tab is active.

8. Click the ab+ icon.

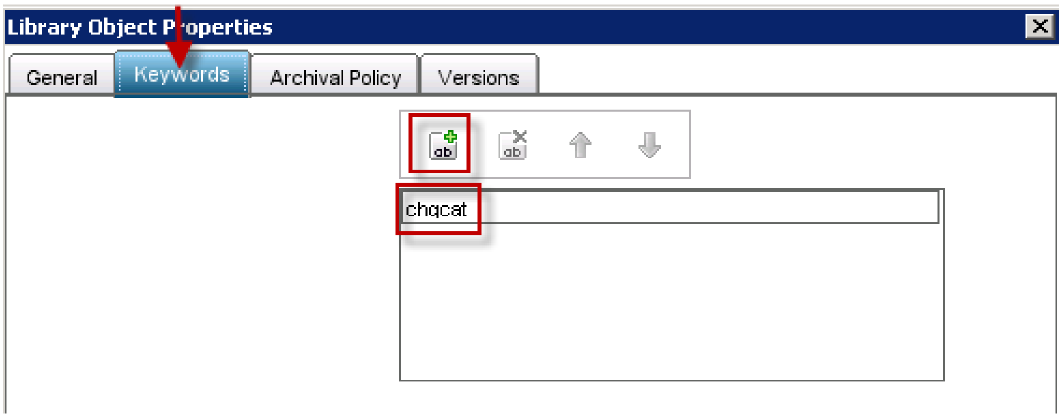
    A row adds to the empty list.

9. Click the row.

10. Enter one of the following values to associate a keyword to the appropriate ticket area or category. For example, to make a Start Request Form available for a CA SDM Change Category, enter the *chgcat* keyword.

Launch Point in CA SDM	Use Keyword
Request/Incident/Problem Area	pcat
Change Category	chgcat
Issue Category	isscat
Execute CA IT PAM Action Macro.	macro

When you complete the steps, it looks like the following screenshot:

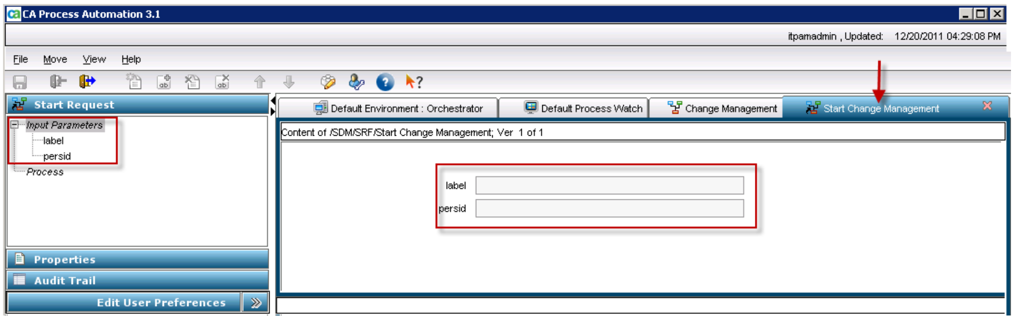


1. Click OK.

   CA Process Automation saves the keywords and description and closes the Library Object Properties dialog.

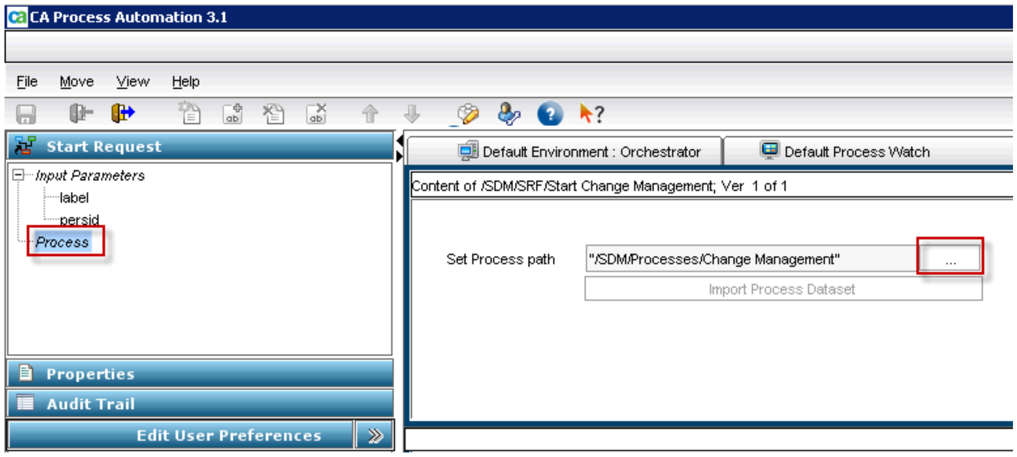
2. Tie a *Process* definition and *Parameters* to the Start Request Form. To do so, double-click the Start Request Form link that was just created.

3. With the *Parameters* value highlighted, rename the parameter to *Input Parameters*. Right click the mouse and click *Add Parameter*. Add two parameters, *label* and *persid,* persid is required and obtained automatically when the integration is leveraged.



Content of /SDM/SRF/Start Change Management; Ver 1 of 1

4. Highlight *Process*. Click ... button on the right hand side of the pane to tie your process definition to the SRF.



Content of /SDM/SRF/Start Change Management; Ver 1 of 1

Set Process path "/SDM/Processes/Change Management"

5. Check in the SRF.

   Note: If you fail to check in the Start Request Form, the form is not available to a CA SDM Ticket Area/Category, or macro.

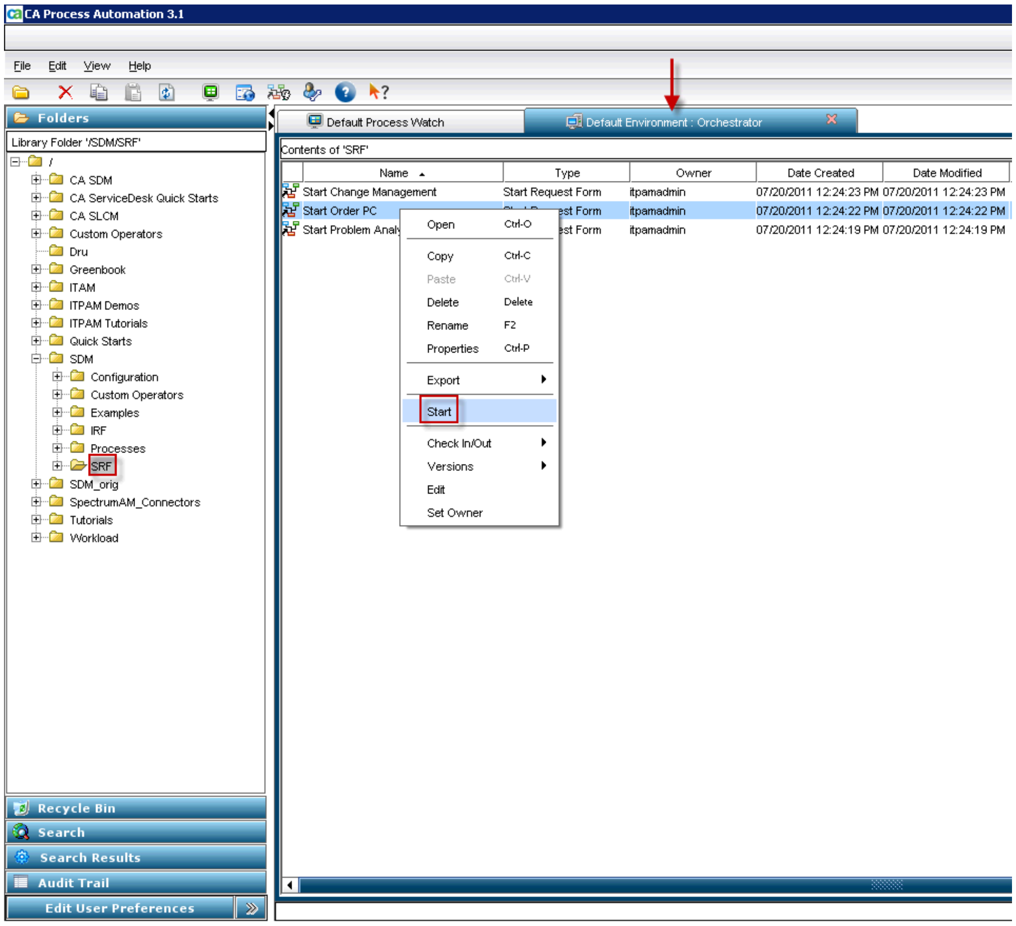
After the Start Request Form has been checked in, it appears on the CA Process Automation SRF List within CA SDM, when you tie a Request/Incident/Problem Area, Change Category, Issue Category, or Macro to a CA Process Automation Process Definition, depending on the keyword used. For more information, you can refer to the *Start Request Forms* chapter in the *CA Process Automation User Guide.*

Launching a Process Definition from CA Process Automation

Before attaching a CA Process Automation Process Definition to a Ticket Area/Category or invoking it from CA SDM, it is a good idea to have a quick test in CA Process Automation first.

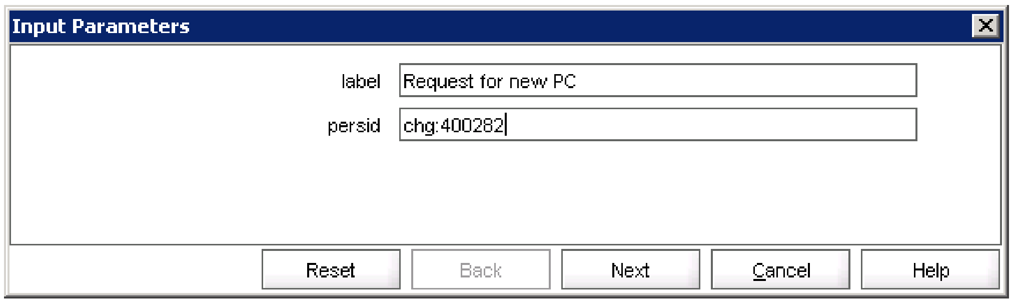
To launch a process definition from CA Process Automation:

1. Log in to the CA Process Automation Management Console as an administrative user (pamadmin on a new install of CA Process Automation 3.1, for example. For previous versions of CA Process Automation or on an upgraded instance of 3.1, this user would typically be an itpamadmin).
2. Click on the link *CA Process Automation Client* on the upper right hand side.
3. Open the Library Browser by going to File, Open Library Browser.
4. Navigate to the Start Request Form (SRF) that ties to the process you would like to launch.
5. Right-click the mouse on the SRF and click *Start*:

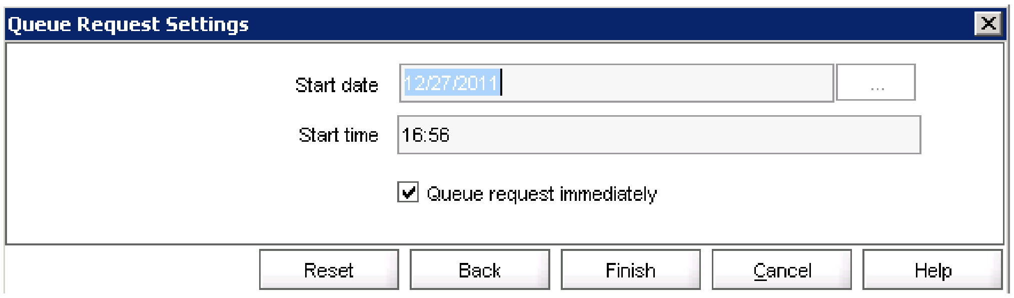


Name	Type	Owner	Date Created	Date Modified
Start Change Management	Start Request Form	itpamadmin	07/20/2011 12:24:23 PM	07/20/2011 12:24:23 PM
Start Order PC	est Form	itpamadmin	07/20/2011 12:24:22 PM	07/20/2011 12:24:22 PM
Start Problem Analy	est Form	itpamadmin	07/20/2011 12:24:19 PM	07/20/2011 12:24:19 PM

6. You are prompted for whatever parameters are defined in your SRF:

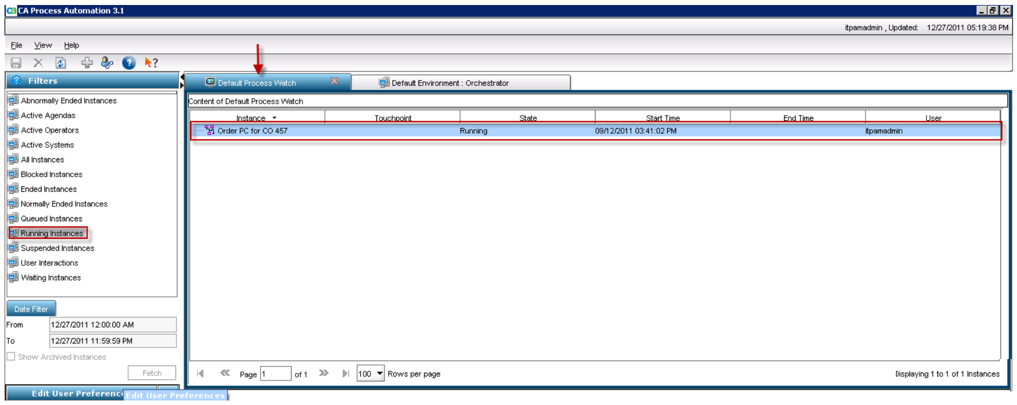


label: Request for new PC
persid: chg:400282



Start date: 12/27/2011
Start time: 16:56
[✓] Queue request immediately

7. Navigate to *Default Process Watch* tab, and click *Running Instances*, you would see your definition running.



itpamadmin , Updated: 12/27/2011 05:19:38 PM

From 12/27/2011 12:00:00 AM
To 12/27/2011 11:59:59 PM
Show Archived Instances

Content of Default Process Watch

Instance	Touchpoint	State	Start Time	End Time	User
Order PC for CO 457		Running	09/12/2011 03:41:02 PM		itpamadmin

Page 1 of 1 100 Rows per page Displaying 1 to 1 of 1 Instances

If this process is successful, you can now try attaching your process definition to a Ticket Area/Category, or Macro.

Attach a CA Process Automation Process Definition to a Ticket Area/Category

If the process definition tests successfully when it is instantiated within CA Process Automation, then you can attach the process definition to a CA SDM Ticket Area/Category to be instantiated from within CA SDM. When you attach a CA Process Automation process definition to a CA SDM Request, Incident, Problem Area, or Change Category, you create a static connection between a CA SDM area or category and a CA Process Automation process definition.

When a CA SDM user creates or edits a ticket and selects a ticket area or category, the associated CA Process Automation process definition launches into a process instance. Pertinent information about the process instance appears on the Workflow Tasks tab on the ticket from which it was invoked.

Follow these steps:

1. Launch the CA SDM UI as an Administrator.
2. On the Administration tab, click Service Desk.
3. Navigate to Request, Incidents, Problems, or Change Orders or Issues, then drill down to Areas or Categories.

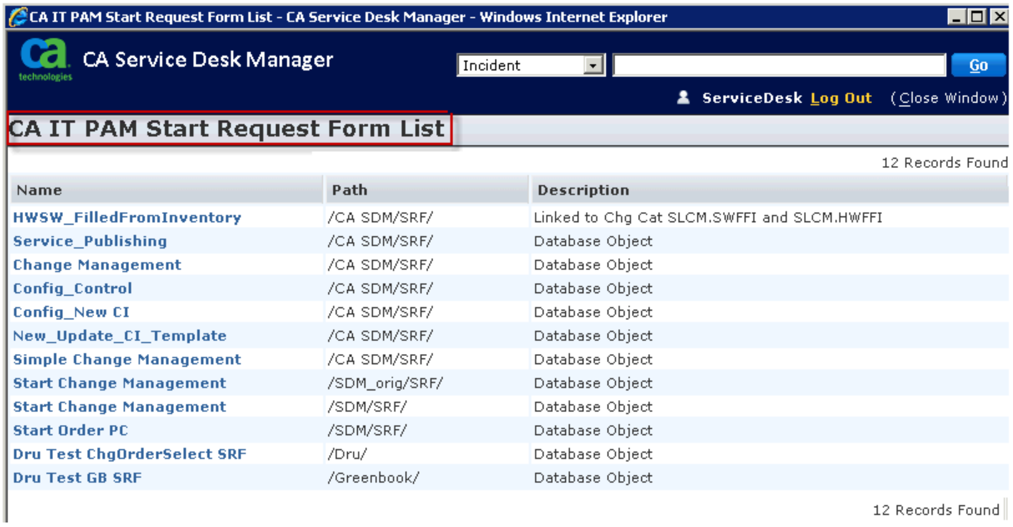
   The Area or Category List appears.
4. Create or edit a ticket area or category.

   The Update page appears.
5. Click the Workflow tab.

   If the CA Process Automation Workflow Options are installed in the CA SDM Options Manager, then the *Use ITPAM* button is available on the Workflow tab.

6. Click *Use ITPAM*.

   The CA Process Automation Start Form Request List appears. Each row in the list is a CA Process Automation Start Request Form as shown in the following screenshot:


CA IT PAM Start Request Form List - CA Service Desk Manager - Windows Internet Explorer
CA Service Desk Manager
Incident
Go
ServiceDesk Log Out (Close Window)

CA IT PAM Start Request Form List

12 Records Found

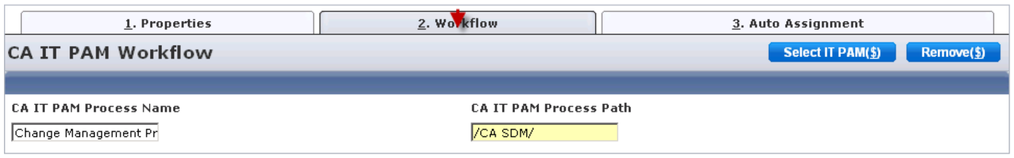
Name	Path	Description
HWSW_FilledFromInventory	/CA SDM/SRF/	Linked to Chg Cat SLCM.SWFFI and SLCM.HWFFI
Service_Publishing	/CA SDM/SRF/	Database Object
Change Management	/CA SDM/SRF/	Database Object
Config_Control	/CA SDM/SRF/	Database Object
Config_New CI	/CA SDM/SRF/	Database Object
New_Update_CI_Template	/CA SDM/SRF/	Database Object
Simple Change Management	/CA SDM/SRF/	Database Object
Start Change Management	/SDM_orig/SRF/	Database Object
Start Change Management	/SDM/SRF/	Database Object
Start Order PC	/SDM/SRF/	Database Object
Dru Test ChgOrderSelect SRF	/Dru/	Database Object
Dru Test GB SRF	/Greenbook/	Database Object

12 Records Found

   The Start Request From for each process definition can appear in this list only if the appropriate keyword has been associated with the Start Request Form.

7. Click the value in the Name column to select the SRF associated with the Process Definition you would like to invoke.

   The CA Process Automation SRF List closes. The Process definition name and Process definition reference path appear on the Workflow tab as shown in the following screenshot:



CA IT PAM Process Name: Change Management Pr

CA IT PAM Process Path: /CA SDM/

8. Click Save.

   The system saves the process settings. The next ticket that a user creates in the specified ticket area or category automatically attaches the workflow and creates a process instance. The ticket Workflow Tasks tab shows a summary of running the process instance information. Additionally, a user can access additional information about the process instance by clicking View Process on the Workflow Tasks tab, which launches CA Process Automation in context of the running process instance.

Using Macros to Trigger a CA Process Automation Process Definition

Macros are small scripts that define either conditions or actions. When Events or Behaviors execute, they can execute one or more Action macros. Before macros are executed, you can use a conditional macro to determine which set of Action macros to execute.

You can configure events that are attached to objects to execute configured actions. Events are procedures that execute after a certain amount of time has elapsed. For example, an event sends a message to a service desk analyst, if a priority one issue is not received within an hour. Other parts of the system use events, for example, Service Types.

You can define events for Requests, Incidents, Problems, Change Orders, Issues, Contacts, Configuration Items, and Global and Specific Tenants.

For each macro, you specify the object type that you want the macro to use. If you create a site defined condition to verify the values of a request, you set the type to Request. When you select macros for Events and Behaviors, CA SDM only displays macros with a type matching the type on the Event or Behavior.

CA SDM includes an *Execute CA IT PAM Action* macro*,* which can trigger the execution of a CA Process Automation Process.

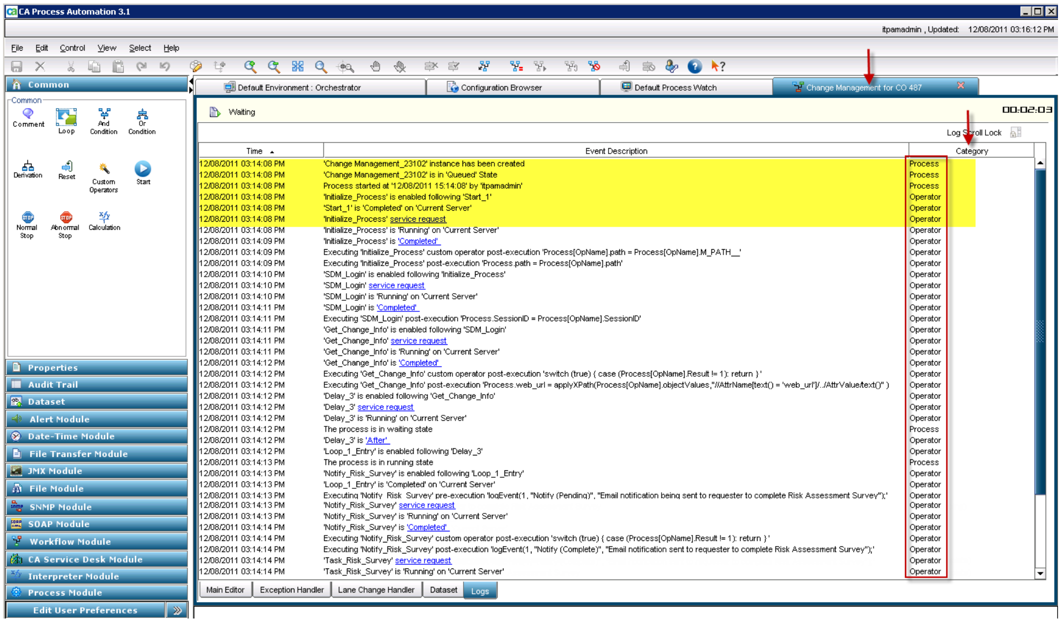
For instructions on leveraging this macro, see Tech Doc TEC537603 *Using a Service Desk Macro to launch an ITPAM process* on Support*.*

Important: If you instantiate a CA Process Automation Process Definition through an *Execute CA ITPAM Action* macro, you do not see any tasks in the Workflow Tasks Tab within the calling CA SDM ticket.

Create Business-Like Entries in the CA SDM Workflow Tasks Tab

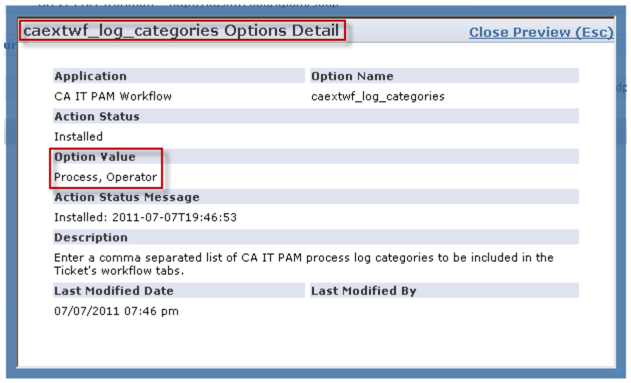
By default, when a CA SDM ticket launches a CA Process Automation Process, the information that is brought over from CA Process Automation in to the CA SDM Workflow Tasks Tab is taken directly from the CA Process Automation process instance logs.

By default, the entries in CA Process Automation process instance logs are categorized as Process or Operator, which are low-level and not user-friendly, as shown in the following screenshot:



```
Time                    Event Description                                                                                                                                 Category
12/08/2011 03:14:08 PM  'Change Management_23102' instance has been created                                                                                               Process
12/08/2011 03:14:08 PM  'Change Management_23102' is in 'Queued' State                                                                                                    Process
12/08/2011 03:14:08 PM  Process started at '12/08/2011 15:14:08' by 'itpamadmin'                                                                                          Process
12/08/2011 03:14:08 PM  'Initialize_Process' is enabled following 'Start_1'                                                                                               Operator
12/08/2011 03:14:08 PM  'Start_1' is 'Completed' on 'Current Server'                                                                                                      Operator
12/08/2011 03:14:08 PM  'Initialize_Process' service request                                                                                                              Operator
12/08/2011 03:14:08 PM  'Initialize_Process' is 'Running' on 'Current Server'                                                                                             Operator
12/08/2011 03:14:09 PM  'Initialize_Process' is 'Completed'                                                                                                               Operator
12/08/2011 03:14:09 PM  Executing 'Initialize_Process' custom operator post-execution 'Process[OpName].path = Process[OpName].M_PATH__'                                    Operator
12/08/2011 03:14:09 PM  Executing 'Initialize_Process' post-execution 'Process.path = Process[OpName].path'                                                               Operator
12/08/2011 03:14:10 PM  'SDM_Login' is enabled following 'Initialize_Process'                                                                                             Operator
12/08/2011 03:14:10 PM  'SDM_Login' service request                                                                                                                       Operator
12/08/2011 03:14:10 PM  'SDM_Login' is 'Running' on 'Current Server'                                                                                                      Operator
12/08/2011 03:14:11 PM  'SDM_Login' is 'Completed'                                                                                                                        Operator
12/08/2011 03:14:11 PM  Executing 'SDM_Login' post-execution 'Process.SessionID = Process[OpName].SessionID'                                                              Operator
12/08/2011 03:14:11 PM  'Get_Change_Info' is enabled following 'SDM_Login'                                                                                                Operator
12/08/2011 03:14:11 PM  'Get_Change_Info' service request                                                                                                                 Operator
12/08/2011 03:14:11 PM  'Get_Change_Info' is 'Running' on 'Current Server'                                                                                                Operator
12/08/2011 03:14:12 PM  'Get_Change_Info' is 'Completed'                                                                                                                  Operator
12/08/2011 03:14:12 PM  Executing 'Get_Change_Info' custom operator post-execution 'switch (true) { case (Process[OpName].Result != 1): return }'                          Operator
12/08/2011 03:14:12 PM  Executing 'Get_Change_Info' post-execution 'Process.web_url = applyXPath(Process[OpName].objectValues,"//AttrName[text() = 'web_url']/../AttrValue/text()" )  Operator
12/08/2011 03:14:12 PM  'Delay_3' is enabled following 'Get_Change_Info'                                                                                                  Operator
12/08/2011 03:14:12 PM  'Delay_3' service request                                                                                                                         Operator
12/08/2011 03:14:12 PM  'Delay_3' is 'Running' on 'Current Server'                                                                                                        Operator
12/08/2011 03:14:12 PM  The process is in waiting state                                                                                                                   Process
12/08/2011 03:14:12 PM  'Delay_3' is 'After'                                                                                                                              Operator
12/08/2011 03:14:12 PM  'Loop_1_Entry' is enabled following 'Delay_3'                                                                                                     Operator
12/08/2011 03:14:13 PM  The process is in running state                                                                                                                   Process
12/08/2011 03:14:13 PM  'Notify_Risk_Survey' is enabled following 'Loop_1_Entry'                                                                                          Operator
12/08/2011 03:14:13 PM  'Loop_1_Entry' is 'Completed' on 'Current Server'                                                                                                 Operator
12/08/2011 03:14:13 PM  Executing 'Notify_Risk_Survey' pre-execution 'logEvent(1, "Notify (Pending)", "Email notification being sent to requester to complete Risk Assessment Survey");'  Operator
12/08/2011 03:14:13 PM  'Notify_Risk_Survey' service request                                                                                                              Operator
12/08/2011 03:14:13 PM  'Notify_Risk_Survey' is 'Running' on 'Current Server'                                                                                             Operator
12/08/2011 03:14:14 PM  'Notify_Risk_Survey' is 'Completed'                                                                                                               Operator
12/08/2011 03:14:14 PM  Executing 'Notify_Risk_Survey' custom operator post-execution 'switch (true) { case (Process[OpName].Result != 1): return }'                       Operator
12/08/2011 03:14:14 PM  Executing 'Notify_Risk_Survey' post-execution 'logEvent(1, "Notify (Complete)", "Email notification sent to requester to complete Risk Assessment Survey");'  Operator
12/08/2011 03:14:14 PM  'Task_Risk_Survey' service request                                                                                                                Operator
12/08/2011 03:14:14 PM  'Task_Risk_Survey' is 'Running' on 'Current Server'                                                                                               Operator
```

As such, by default, CA SDM brings over entries that are categorized as Process or Operator. An option named caextwf_log_categories controls the entry, in the Options Manager in CA SDM as shown in the following screenshot:



caextwf_log_categories Options Detail

Application	Option Name
CA IT PAM Workflow	caextwf_log_categories

Action Status
Installed

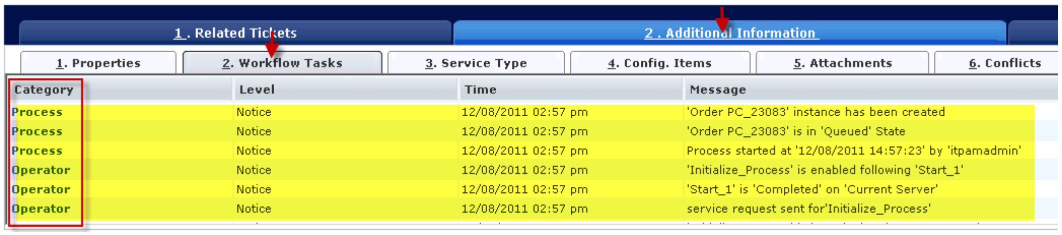
Option Value
Process, Operator

Action Status Message
Installed: 2011-07-07T19:46:53

Description
Enter a comma separated list of CA IT PAM process log categories to be included in the Ticket's workflow tabs.

Last Modified Date	Last Modified By
07/07/2011 07:46 pm	

If you compare the screenshot of CA Process Automation process instance logs (two preceding screenshots), against the following screenshot of the Ticket Workflow Tasks tab in CA SDM, you can see a 1:1 correlation between the entries:



Category	Level	Time	Message
Process	Notice	12/08/2011 02:57 pm	'Order PC_23083' instance has been created
Process	Notice	12/08/2011 02:57 pm	'Order PC_23083' is in 'Queued' State
Process	Notice	12/08/2011 02:57 pm	Process started at '12/08/2011 14:57:23' by 'itpamadmin'
Operator	Notice	12/08/2011 02:57 pm	'Initialize_Process' is enabled following 'Start_1'
Operator	Notice	12/08/2011 02:57 pm	'Start_1' is 'Completed' on 'Current Server'
Operator	Notice	12/08/2011 02:57 pm	service request sent for'Initialize_Process'

If you would like to log business events, such as pending or completed tasks, you can accomplish that by using explicit logging in your CA Process Automation process definitions. This step is done using Pre and Postexecution Code for each CA Process Automation operator, or anywhere you can put JavaScript code for that matter, as follows:

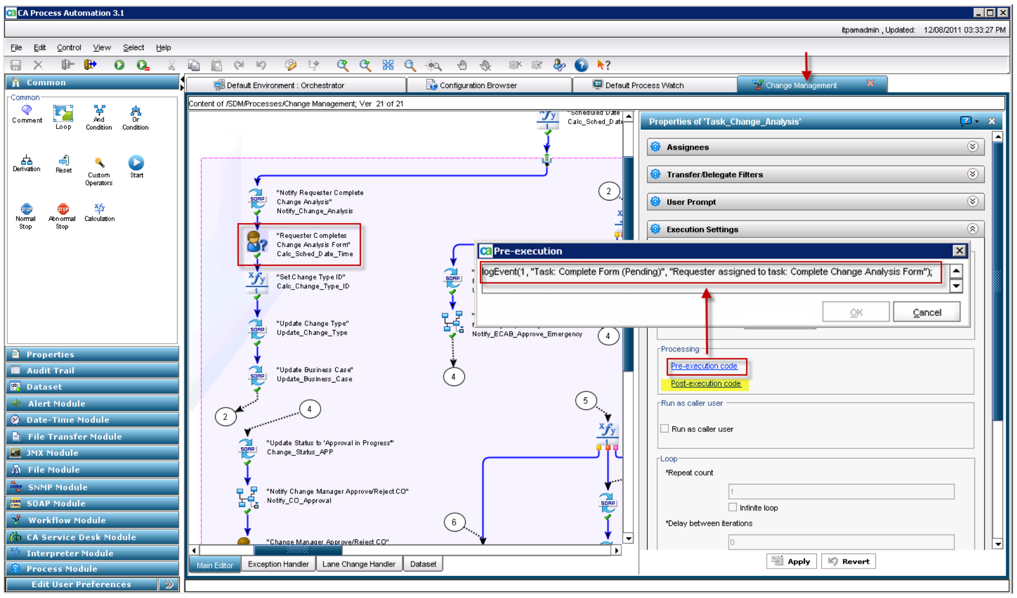
```
logEvent(level,category,message);
An example:
logEvent(1, "Task: Complete Form (Pending)", "Requester assigned to task:
Complete Change Analysis Form");
```

Leveraging this capability, you can tailor your process to log entries for all Pending (using Preexecution Code) and Complete (using Post Execution Code) tasks or functions.

To create business-like entries in the CA SDM workflow Tasks tab, follow the steps.

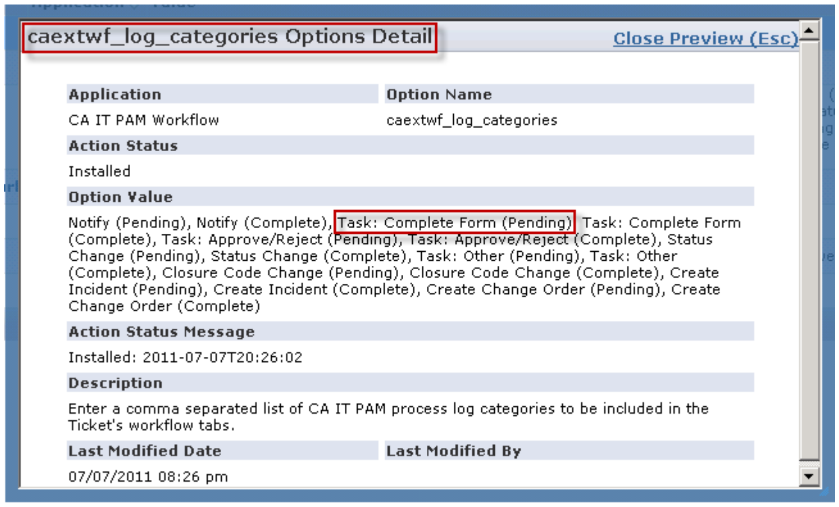
Follow these steps:

1. In the Properties of the CA Process Automation operator, modify Pre and Post Execution Code using *logEvent* as shown in the following screenshot. Pre and Post Execution Code can be found under Execution Settings of operator properties (or alternatively anywhere JavaScript can be instantiated:



```
logEvent(1, "Task: Complete Form (Pending)", "Requester assigned to task: Complete Change Analysis Form");
```

2. Add the category type to the caextwf_log_categories options manager option in CA SDM as shown in the following screenshot:



caextwf_log_categories Options Detail

Close Preview (Esc)

Application	Option Name
CA IT PAM Workflow	caextwf_log_categories

Action Status

Installed

Option Value

Notify (Pending), Notify (Complete), Task: Complete Form (Pending), Task: Complete Form (Complete), Task: Approve/Reject (Pending), Task: Approve/Reject (Complete), Status Change (Pending), Status Change (Complete), Task: Other (Pending), Task: Other (Complete), Closure Code Change (Pending), Closure Code Change (Complete), Create Incident (Pending), Create Incident (Complete), Create Change Order (Pending), Create Change Order (Complete)

Action Status Message

Installed: 2011-07-07T20:26:02

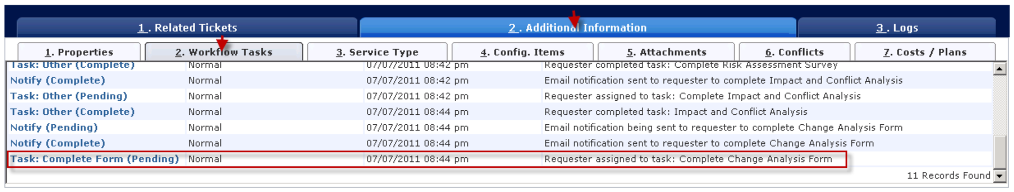
Description

Enter a comma separated list of CA IT PAM process log categories to be included in the Ticket's workflow tabs.

Last Modified Date	Last Modified By
07/07/2011 08:26 pm	

3. Recycle the CA SDM Services for the changes to take effect.

   This result in the following business-like entries in the CA SDM Workflow Tasks tab for process definitions instantiated following this change:



Task: Other (Complete)	Normal	07/07/2011 08:42 pm	Requester completed task: Complete Risk Assessment Survey
Notify (Complete)	Normal	07/07/2011 08:42 pm	Email notification sent to requester to complete Impact and Conflict Analysis
Task: Other (Pending)	Normal	07/07/2011 08:42 pm	Requester assigned to task: Complete Impact and Conflict Analysis
Task: Other (Complete)	Normal	07/07/2011 08:44 pm	Requester completed task: Impact and Conflict Analysis
Notify (Pending)	Normal	07/07/2011 08:44 pm	Email notification being sent to requester to complete Change Analysis Form
Notify (Complete)	Normal	07/07/2011 08:44 pm	Email notification sent to requester to complete Change Analysis Form
Task: Complete Form (Pending)	Normal	07/07/2011 08:44 pm	Requester assigned to task: Complete Change Analysis Form

11 Records Found

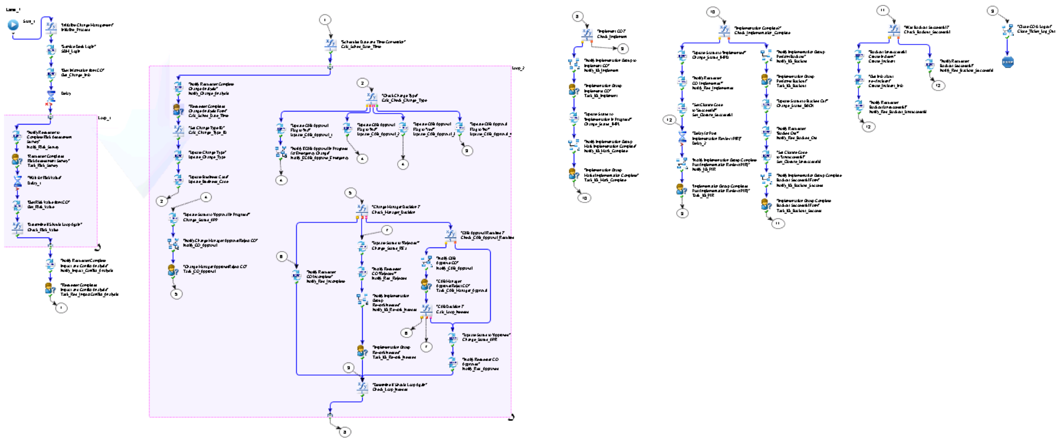
Note: When designing your CA Process Automation Workflows, you can establish a foundation or best practice for the types of categories and the events that are logged, so that entries logged in the CA SDM Workflow Tasks tab remain consistent. You can update the caextwf_log_categories option appropriately. A spreadsheet format was used in designing the sample process definitions. This spreadsheet records the types of tasks to log entries, the assigned category, and the subsequent messages displayed.

Integration Example

The following section takes you through an example process definition which demonstrates the integration available between CA SDM and CA Process Automation.

Design View

The following screenshot is the Change Management Process Definition in the design view in the *CA Process Automation client*. This process definition was originally created in CA Workflow, and was available out of the box in previous and current versions of CA SDM. The Change Management process definition has been manually converted into a Process Definition that CA Process Automation leverages, and is available for download in the CA Process Automation Best Practices Page on support.ca.com.



Setup and Configuration

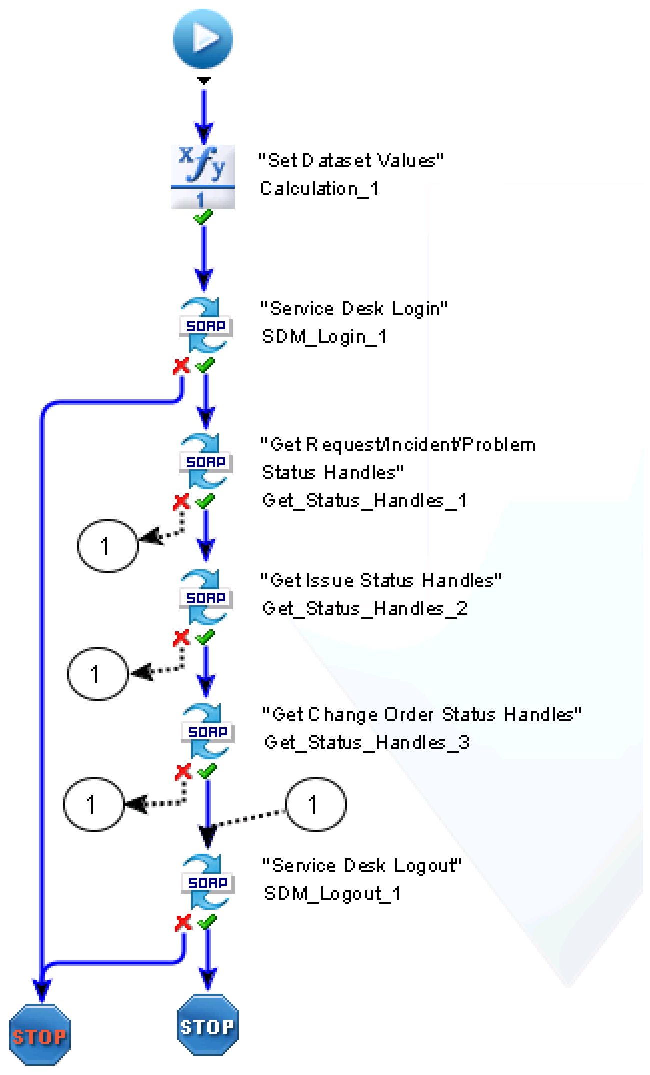
Follow the steps in section Configure the Integration to verify all prerequisites for the integration.

Note: You are not required to install or configure the CA Service Desk Connector for this specific example, nor for any of the examples that are provided as a part of the CA Process Automation Sample Process Definitions for CA SDM. Although configuring the connector is a good idea in creating your own sample flows, it is not required for this use case, as this use case leverages custom operators.

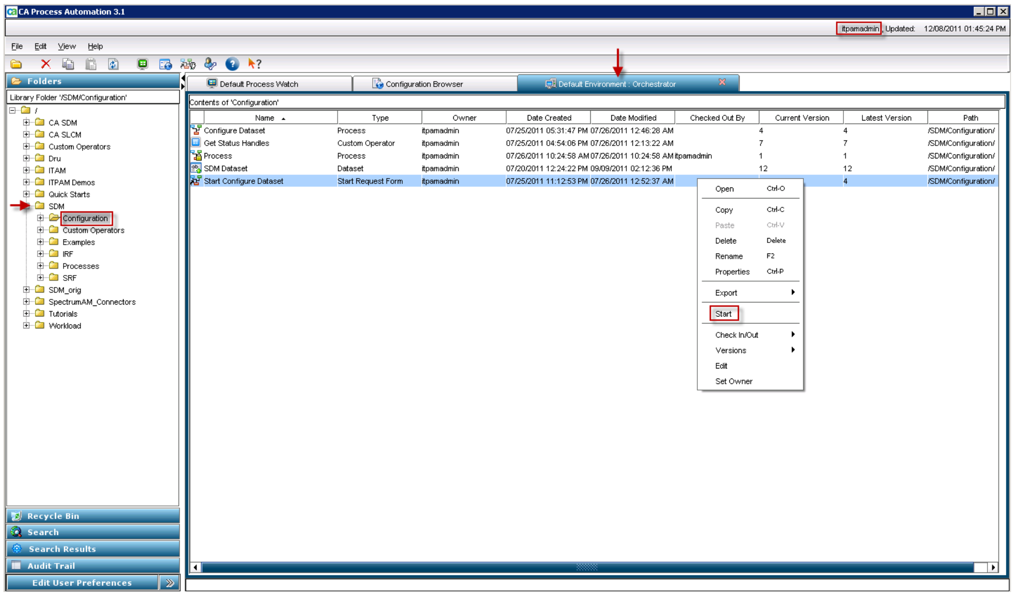
1. Import the Change Management Sample Process Definition from the *CA Process Automation Best Practices* page on support.ca.com. The Change Management Sample Process Definition is provided as a part of the CA Process Automation Sample Process Definitions for CA SDM.

2. Configure the integration from CA Process Automation leveraging sample custom operators, as follows:

    a. In the *CA Process Automation client*, Library Browser, navigate to the SDM folder, then Configuration. Here is where configuration from CA Process Automation for this process definition is configured. There is an SRF, *Start Configure Dataset*, which instantiates a *Configure Dataset* Process that initializes the CA SDM Server, CA Process Automation Server, Exception Handling, and also obtains all handles for tickets:



b. Launch the *Start Request Form* for *Start Configure Dataset*:

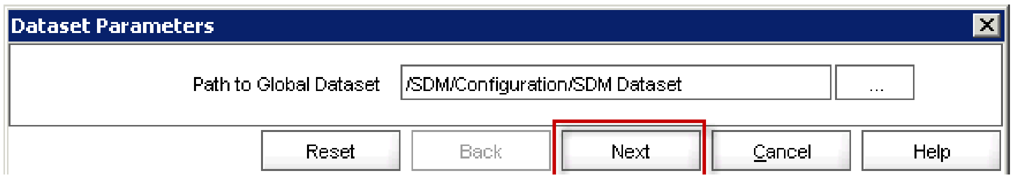


itpamadmin, Updated: 12/08/2011 01:45:24 PM

Contents of 'Configuration'

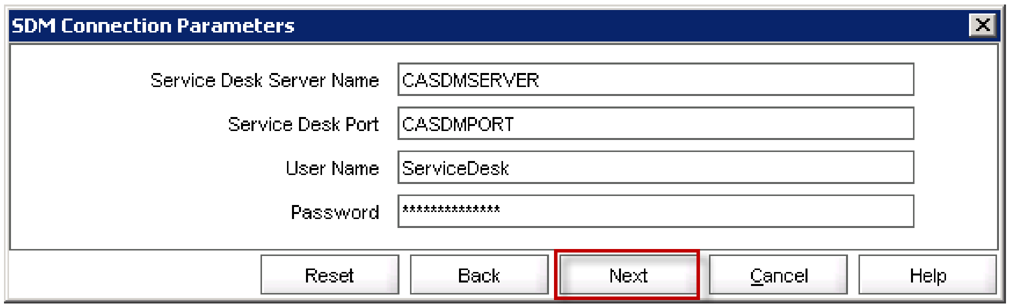
Name	Type	Owner	Date Created	Date Modified	Checked Out By	Current Version	Latest Version	Path
Configure Dataset	Process	itpamadmin	07/25/2011 05:31:47 PM	07/26/2011 12:46:28 AM		4	4	/SDM/Configuration/
Get Status Handles	Custom Operator	itpamadmin	07/25/2011 04:54:06 PM	07/26/2011 12:13:22 AM		7	7	/SDM/Configuration/
Process	Process	itpamadmin	07/26/2011 10:24:58 AM	07/26/2011 10:24:58 AM	itpamadmin	1	1	/SDM/Configuration/
SDM Dataset	Dataset	itpamadmin	07/20/2011 12:24:22 PM	09/09/2011 02:12:36 PM		12	12	/SDM/Configuration/
Start Configure Dataset	Start Request Form	itpamadmin	07/25/2011 11:12:53 PM	07/26/2011 12:52:37 AM			4	/SDM/Configuration/

c. Verify the path to the Global Dataset (where all of the following data is saved for other sample processes to leverage), and click *Next*:



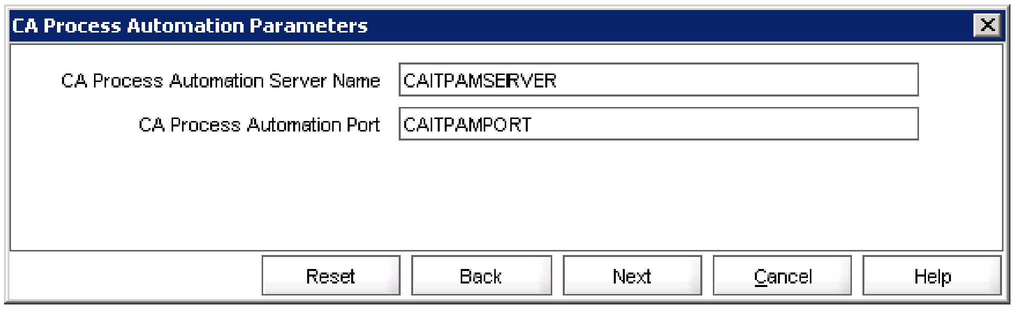
Path to Global Dataset: /SDM/Configuration/SDM Dataset

d. Enter in the values for the CA SDM server, port, Administrative Username and Password:



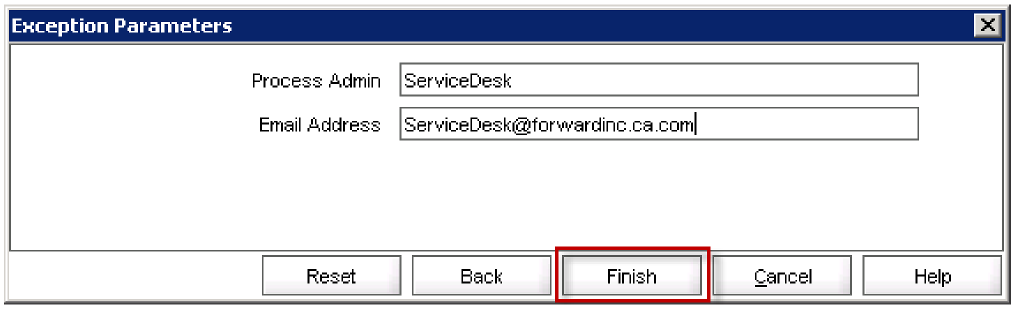
Service Desk Server Name: CASDMSERVER
Service Desk Port: CASDMPORT
User Name: ServiceDesk
Password: ***************

e. Next, enter in the values for the CA Process Automation server, and port:


CA Process Automation Parameters

CA Process Automation Server Name	CAITPAMSERVER
CA Process Automation Port	CAITPAMPORT

f. Enter in the value for CA Process Automation Process Admin and the email address.


Exception Parameters

Process Admin	ServiceDesk
Email Address	ServiceDesk@forwardinc.ca.com

g. Click Finish. Your CA Process Automation integration settings are now complete. All data resulting from this process definition is saved to the CA SDM Dataset.

3. Configure the integration from CA SDM. Follow the steps in the *Configuring the Integration* section in this chapter to configure CA SDM Options Manager Options for *CA IT PAM Workflow*.

4. Follow the steps in the section *Creating Business-Like Entries in the CA SDM Workflow Tasks Tab* to set the caextwf_log_categories option to the following tasks:

   Notify (Pending), Notify (Complete), Task: Complete Form (Pending), Task: Complete Form (Complete), Task: Approve/Reject (Pending), Task: Approve/Reject (Complete), Status Change (Pending), Status Change (Complete), Task: Other (Pending), Task: Other (Complete), Closure Code Change (Pending), Closure Code Change (Complete), Create Incident (Pending), Create Incident (Complete), Create Change Order (Pending), Create Change Order (Complete).

5. Recycle the CA SDM Services for changes to the Options Manager options to take effect.

6. Complete all of the steps in the following chart to configure the data that can be used as a part of this use case. We configure the Change Order Category that can launch our sample process definition.

   Note: The value used in the *Value that is Used for this Demo* column is not hard coded, you can use any type of content for this value. In other words, the name of the analyst does not have to be *Donald Bell;* it can be anyone, as long as they are defined as an Analyst.

CA SDM Object/Option	Value Used for This Demo	Notes	Complete?
Add contact (Analyst)	Donald Bell	Must define in CA EEM, if you are leveraging EEM for authentication. Donald is the Requester of the Change Order and also a member of both the CAB and Implementation Groups.	Yes
Add contact (Analyst)	Kevin Smith	Must define in CA EEM, if you are leveraging EEM for authentication. Kevin is a member of both the CAB and Implementation Groups.	Yes
Add contact (Analyst)	John McCarthy	Must define in CA EEM, if you are leveraging email for authentication. Must have an email address in CA SDM contact record as well as a notification method of email. John is a member and manager of both the CAB and Implementation Groups.	Yes
Add an Implementation Group	Implementation Group	This group implements the Change Order. Must define in CA EEM as an Application Group. When you create this group in CA EEM, the Group Name in CA SDM must match the folder name in CA EEM. This group is not restricted to any specific name.	Yes
Add users to Implementation Group	John McCarthy Donald Bell Kevin Smith	This group must have more than one member.	Yes
Make a user in the Implementation Group a Manager.	John McCarthy	The group must have only one manager.	Yes
Add CAB Group	CAB	The CAB (Change Advisory Board) which can serve as the approval group for the Change Order. Must define in CA EEM as an Application Group. When creating this group in CA EEM, the Group Name in CA SDM must match the folder name in CA EEM. This group is not restricted to any specific name.	Yes

CA SDM Object/Option	Value Used for This Demo	Notes	Complete?
Add contact (Analyst)	Donald Bell	Must define in CA EEM, if you are leveraging EEM for authentication. Donald is the Requester of the Change Order and also a member of both the CAB and Implementation Groups.	Yes
Add users to CAB Group.	John McCarthy Donald Bell Kevin Smith	This group must have more than one member.	Yes
Make a user in CAB Group the Manager.	John McCarthy	The group must have only one manager.	Yes
Create Change Order Category.	Add.IT.Patch	This category needs an Assignee (John McCarthy), a Risk Survey (General), CAB (CAB), Implementation Group (Implementation Group), and also has the Change Management CA Process Automation Process Definition Associated.	Yes
Create at least two new CIs, that have relationships established.	Apache Server 1 Apache Server 2 Apache Server 3	These CIs must have relationships that are established, as well as Change Orders that are opened against them, which are a part of Conflict Analysis.	Yes
Install Category_Defaults Option, recycle CA SDM services for changes to take effect.	Yes	Install the option so that the information from the Add.IT.Patch Change Category is pulled over to the Change Order once it is created.	Yes
Modify Change Order Status	Check Make Change Order Active.	Check *Make Change Order Active*, such that when a Change Order enters the Backed Out status as a part of this workflow, it remains active.	Yes

Change Management Workflow in Action

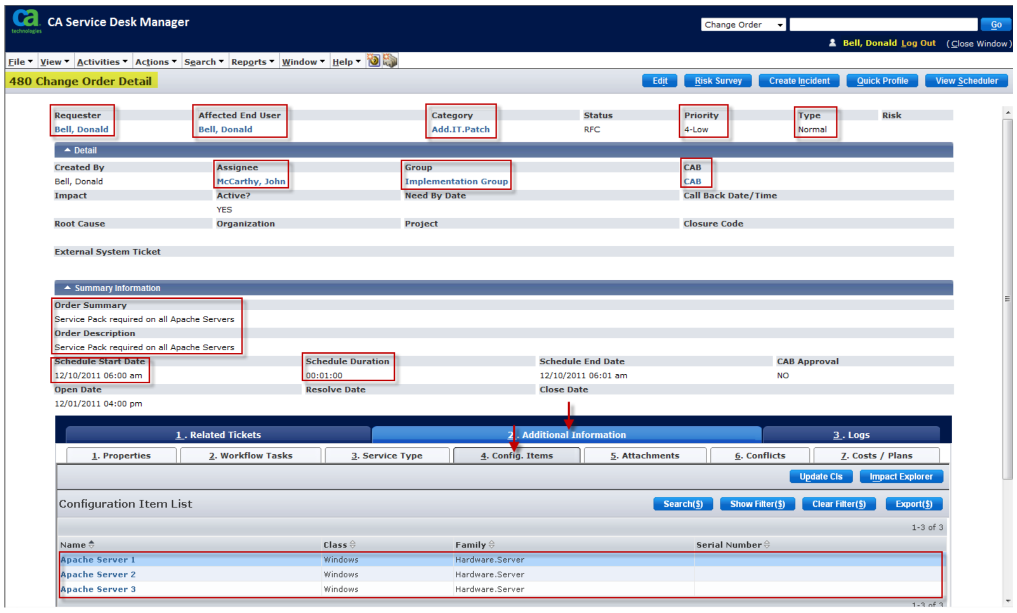
Forward Inc. introduces a Service Pack to all of their Apache Servers. As they follow the ITIL v3 guidelines, there is a standard process that the IT Department must follow. This includes:

- Risk Assessment
- Impact and Conflict Analysis
- Approvals by both Change Manager and Change Advisory Board (CAB)
- Implementation Assessment and Review

To ensure that the proper process is followed, they have standardized this process leveraging the integration between CA SDM and CA Process Automation. Our Analyst, Donald Bell, creates the Change Order, and after a series of approvals by the Change Manager and the CAB, this Request for Change (RFC) is passed to the Implementation Group for implementation and Post Implementation Review (PIR).

Follow these steps:

1. Log in to CA SDM as an analyst, in our case Donald Bell.
2. Create a Change Order.
3. Enter all the fields highlighted in red. Once you select the Category, and tab out of the field, the *Assignee*, *Implementation Group,* and *CAB* are filled in automatically, because we have the category_defaults option that is turned on:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	Active?	Need By Date	Call Back Date/Time
	YES		
Root Cause	Organization	Project	Closure Code
External System Ticket			

Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

Configuration Item List

1-3 of 3

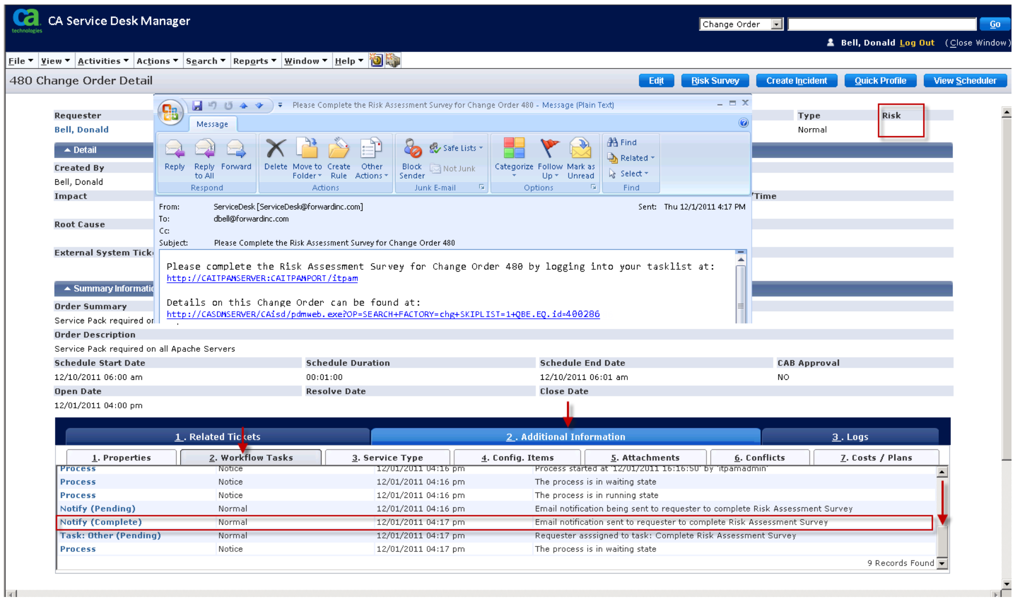
Name	Class	Family	Serial Number
Apache Server 1	Windows	Hardware.Server	
Apache Server 2	Windows	Hardware.Server	
Apache Server 3	Windows	Hardware.Server	

Risk Assessment Survey

Follow these steps:

1. Click the *Additional Information* Tab, and then navigate to the *Workflow Tasks* Tab. Scroll down through the tasks. You would see a notification has gone out to the requester (Donald Bell) to complete the Risk Assessment Survey.

   Note: No Risk value that is assigned to the Change Order.



480 Change Order Detail

Please Complete the Risk Assessment Survey for Change Order 480 - Message (Plain Text)

From: ServiceDesk [ServiceDesk@forwardinc.com]
Sent: Thu 12/1/2011 4:17 PM
To: dbell@forwardinc.com
Cc:
Subject: Please Complete the Risk Assessment Survey for Change Order 480

```
Please complete the Risk Assessment Survey for Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400286
```

Requester			Type	Risk
Bell, Donald			Normal	
Created By				
Bell, Donald				
Impact			Time	
Root Cause				
External System Tick				

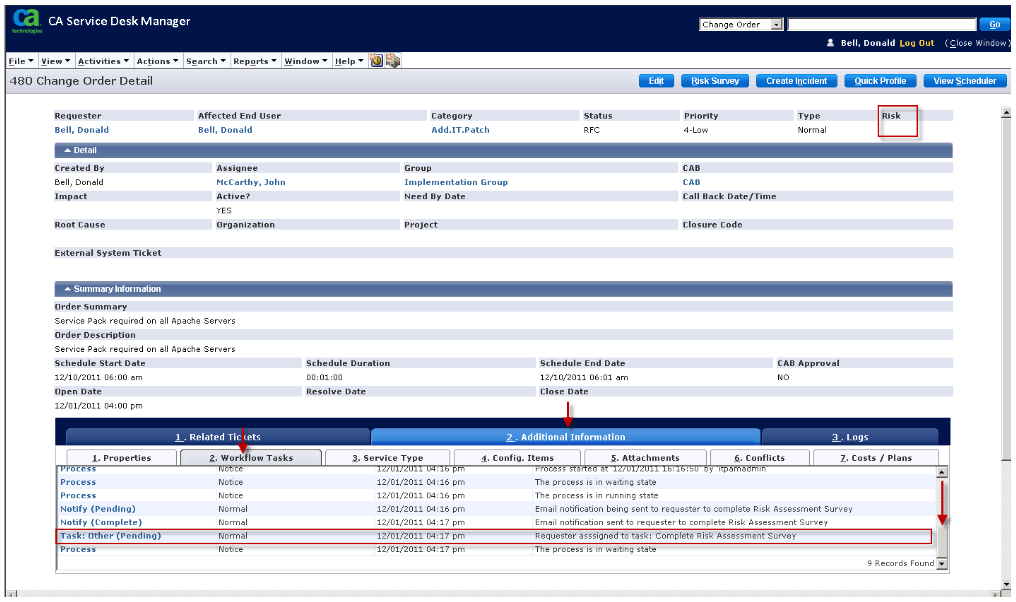
Summary Information

Order Summary			
Service Pack required or			
Order Description			
Service Pack required on all Apache Servers			
Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

Process	Notice	12/01/2011 04:16 pm	Process started at '12/01/2011 16:16:50' by 'itpamadmin'
Process	Notice	12/01/2011 04:16 pm	The process is in waiting state
Process	Notice	12/01/2011 04:16 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 04:16 pm	Email notification being sent to requester to complete Risk Assessment Survey
Notify (Complete)	Normal	12/01/2011 04:17 pm	Email notification sent to requester to complete Risk Assessment Survey
Task: Other (Pending)	Normal	12/01/2011 04:17 pm	Requester asssigned to task: Complete Risk Assessment Survey
Process	Notice	12/01/2011 04:17 pm	The process is in waiting state

9 Records Found

2. Either clicks on the link that is provided through the email, or alternatively, scrolls to the next pending task in the Workflow and click on the hyperlink for Task:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	

Detail

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	Active?	Need By Date	Call Back Date/Time
	YES		
Root Cause	Organization	Project	Closure Code
External System Ticket			

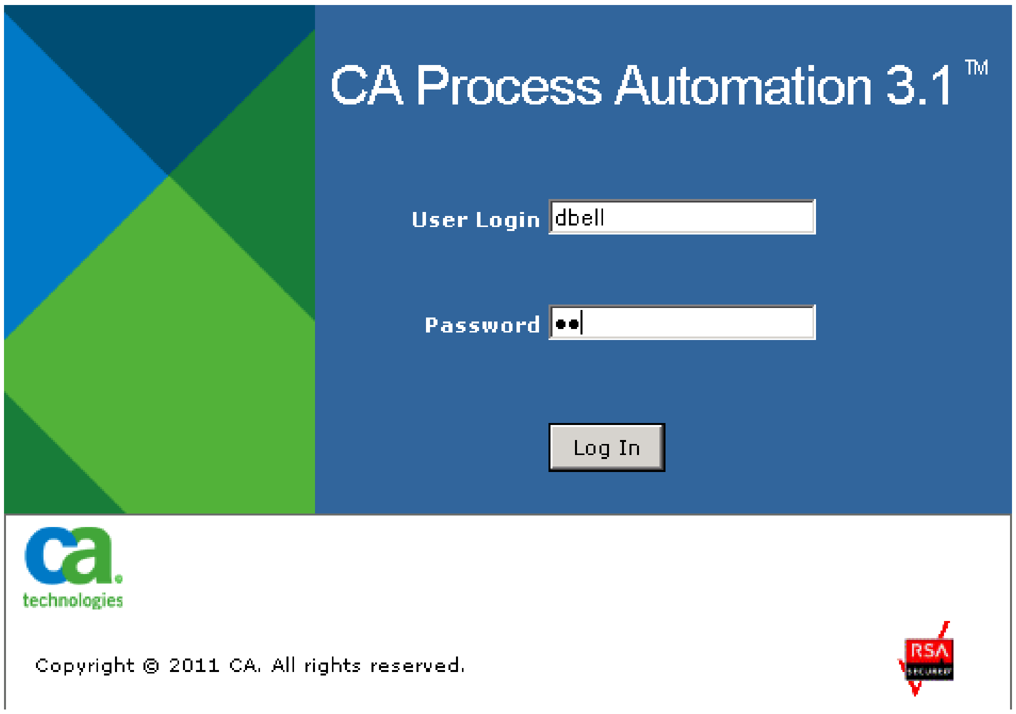
Summary Information

Order Summary			
Service Pack required on all Apache Servers			
Order Description			
Service Pack required on all Apache Servers			
Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

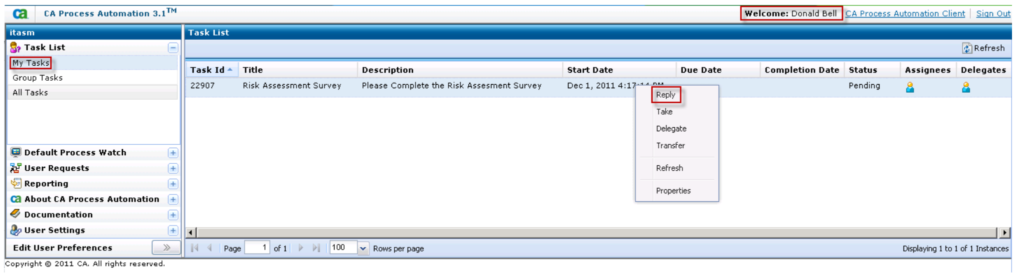
Process	Notice	12/01/2011 04:16 pm	Process started at '12/01/2011 16:16:50' by 'itpamadmin'
Process	Notice	12/01/2011 04:16 pm	The process is in waiting state
Process	Notice	12/01/2011 04:16 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 04:16 pm	Email notification being sent to requester to complete Risk Assessment Survey
Notify (Complete)	Normal	12/01/2011 04:17 pm	Email notification sent to requester to complete Risk Assessment Survey
Task: Other (Pending)	Normal	12/01/2011 04:17 pm	Requester assigned to task: Complete Risk Assessment Survey
Process	Notice	12/01/2011 04:17 pm	The process is in waiting state

9 Records Found

3. Log in to CA Process Automation as Donald Bell. If you have the pass-through authentication setup, you are not prompted for a login here:

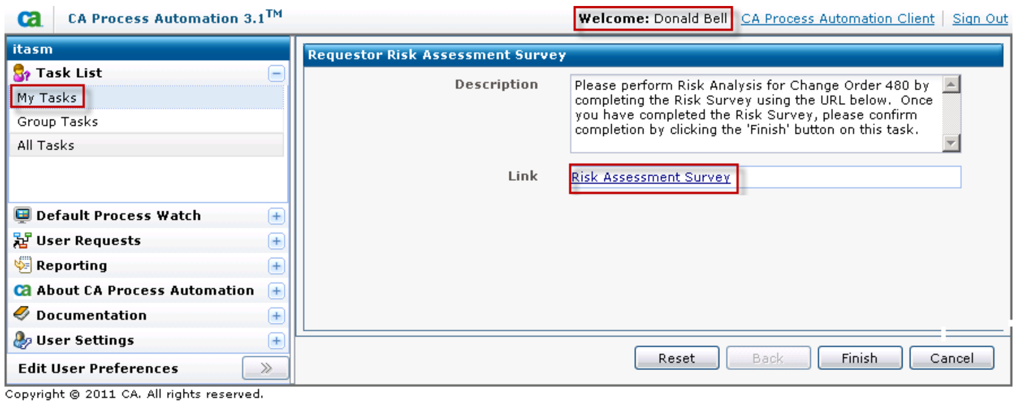

CA Process Automation 3.1 TM
User Login
dbell
Password
Log In
ca technologies
Copyright © 2011 CA. All rights reserved.
RSA SECURED

4. Once logged in as Donald, you must see one pending task to complete the *Risk Assessment Survey*. You would also see an **I** flashing in the lower right hand side of the screen, indicating user interaction is pending. Navigate to Task and right click on the mouse. Select *Reply*:



Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
22907	Risk Assessment Survey	Please Complete the Risk Assesment Survey	Dec 1, 2011 4:17:14 PM			Pending		

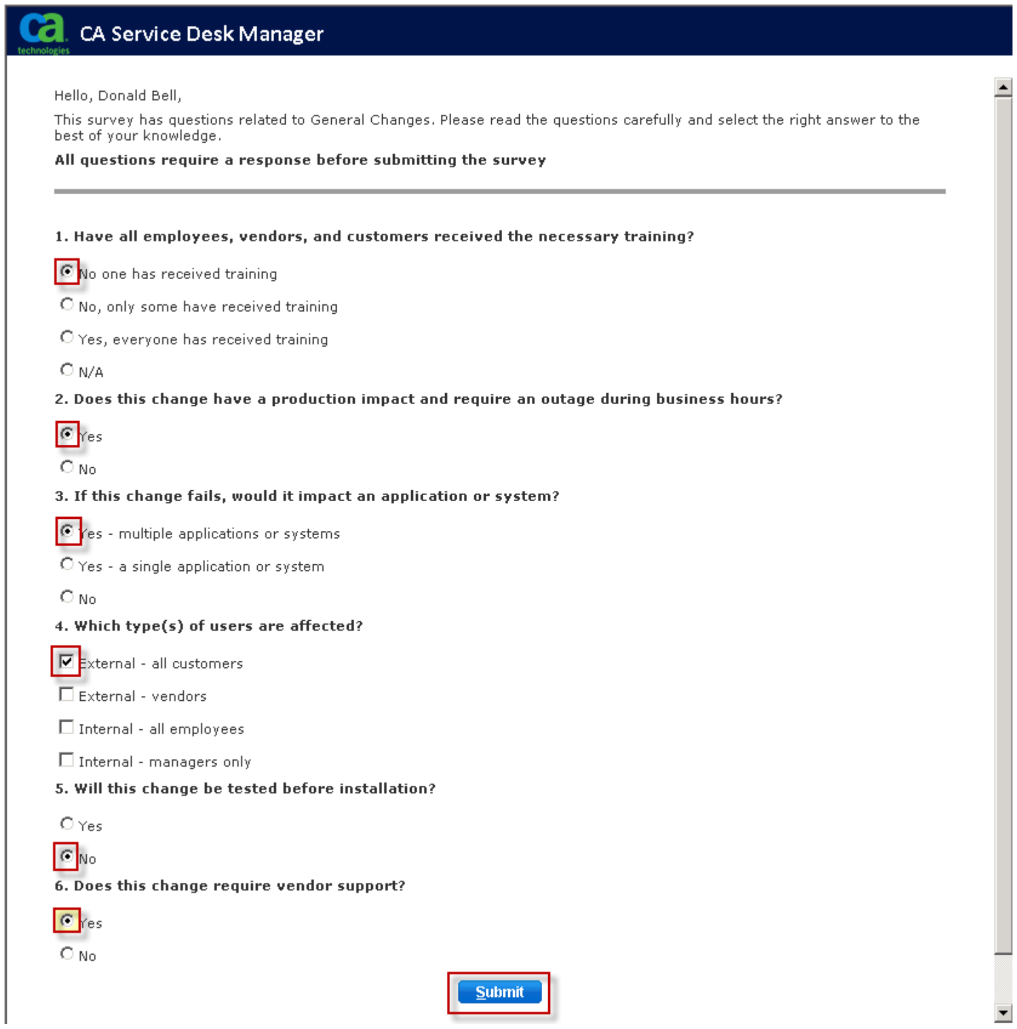
5. Donald is prompted to complete the Risk Assessment Survey. Donald clicks the *Risk Assessment Survey* link:



Description: Please perform Risk Analysis for Change Order 480 by completing the Risk Survey using the URL below. Once you have completed the Risk Survey, please confirm completion by clicking the 'Finish' button on this task.

Link: Risk Assessment Survey

6. The link brings Donald in context to the Risk Assessment Survey. The system prompts for a login here even if you have Pass Through authentication setup. The survey which we have assigned to the Change Category is the default *General* Risk Survey. Complete the Risk Survey, answering questions in such a way that it generates a high risk as shown in the following screenshot:



Hello, Donald Bell,

This survey has questions related to General Changes. Please read the questions carefully and select the right answer to the best of your knowledge.

All questions require a response before submitting the survey

1. Have all employees, vendors, and customers received the necessary training?

[✓ No one has received training]
No, only some have received training
Yes, everyone has received training
N/A

2. Does this change have a production impact and require an outage during business hours?

[✓ Yes]
No

3. If this change fails, would it impact an application or system?

[✓ Yes - multiple applications or systems]
Yes - a single application or system
No

4. Which type(s) of users are affected?

[✓ External - all customers]
External - vendors
Internal - all employees
Internal - managers only

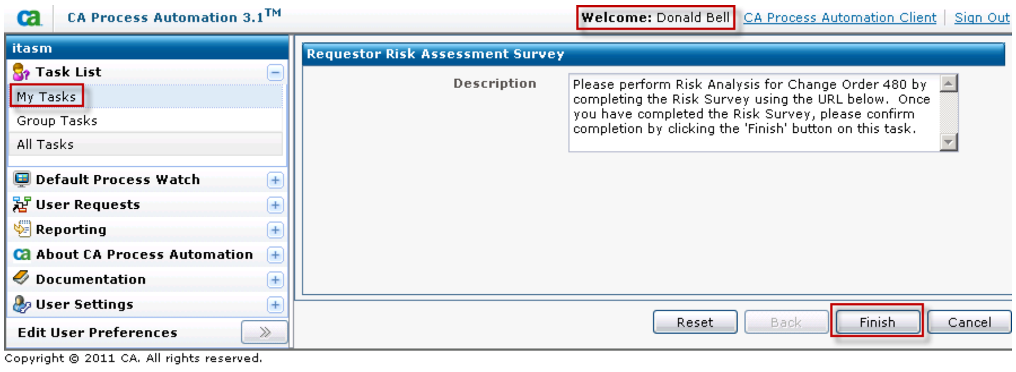
5. Will this change be tested before installation?

Yes
[✓ No]

6. Does this change require vendor support?

[✓ Yes]
No

7. Once the Risk Survey is complete, navigate back into CA Process Automation in context of the task and click *Finish* on the Risk Assessment task. You can remain logged in to CA Process Automation as Donald.

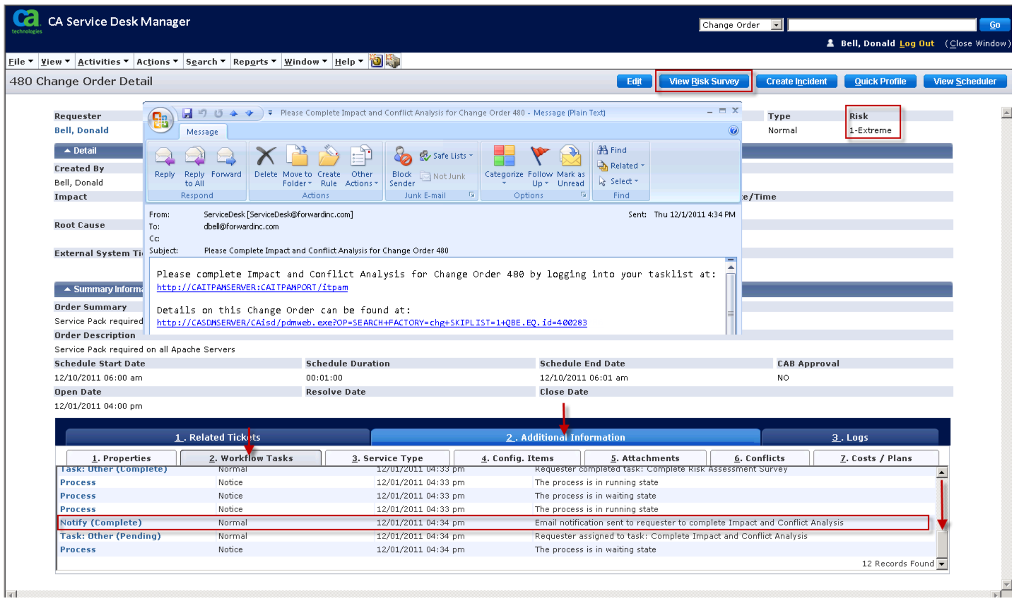


Please perform Risk Analysis for Change Order 480 by completing the Risk Survey using the URL below. Once you have completed the Risk Survey, please confirm completion by clicking the 'Finish' button on this task.

Impact and Conflict Analysis

Follow these steps:

1. Navigate back to the Change Order. Click on the *Additional Information* Tab, and then navigate to the *Workflow Tasks* Tab. Scroll down through the tasks. A notification has gone out to the requester (Donald Bell) to complete Impact and Conflict Analysis.



480 Change Order Detail

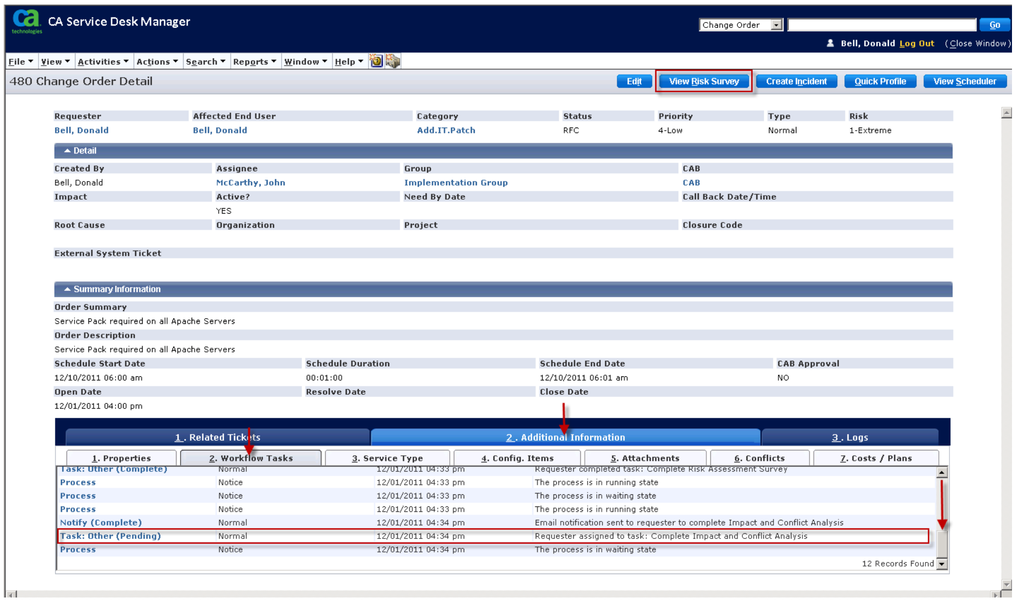
From: ServiceDesk [ServiceDesk@forwardinc.com]
To: dbell@forwardinc.com
Cc:
Subject: Please Complete Impact and Conflict Analysis for Change Order 480
Sent: Thu 12/1/2011 4:34 PM

```
Please complete Impact and Conflict Analysis for Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
```

Task: Other (Complete)	Normal	12/01/2011 04:33 pm	Requester completed task: Complete Risk Assessment Survey
Process	Notice	12/01/2011 04:33 pm	The process is in running state
Process	Notice	12/01/2011 04:33 pm	The process is in waiting state
Process	Notice	12/01/2011 04:33 pm	The process is in running state
Notify (Complete)	Normal	12/01/2011 04:34 pm	Email notification sent to requester to complete Impact and Conflict Analysis
Task: Other (Pending)	Normal	12/01/2011 04:34 pm	Requester assigned to task: Complete Impact and Conflict Analysis
Process	Notice	12/01/2011 04:34 pm	The process is in waiting state

12 Records Found

2. To complete this task Donald can either clicks the link that is provided through email above, or alternatively, scrolls to the next pending task in the Workflow and click the hyperlink for *Task: Other (Pending)*:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB

Order Summary: Service Pack required on all Apache Servers
Order Description: Service Pack required on all Apache Servers

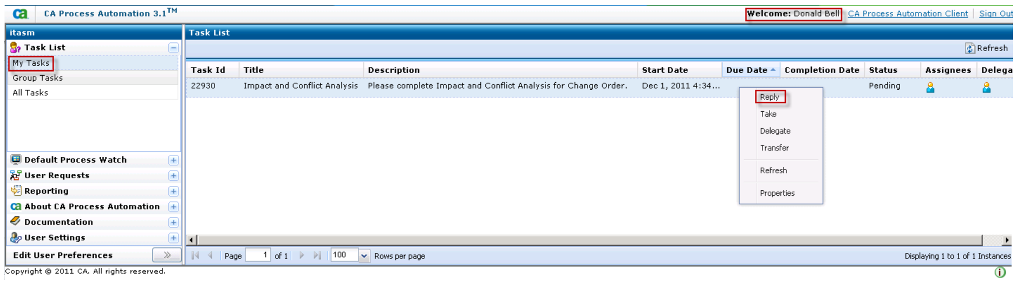
Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO

Open Date: 12/01/2011 04:00 pm

Task: Other (Complete)	Normal	12/01/2011 04:33 pm	Requester completed task: Complete Risk Assessment Survey
Process	Notice	12/01/2011 04:33 pm	The process is in running state
Process	Notice	12/01/2011 04:33 pm	The process is in waiting state
Process	Notice	12/01/2011 04:33 pm	The process is in running state
Notify (Complete)	Normal	12/01/2011 04:34 pm	Email notification sent to requester to complete Impact and Conflict Analysis
Task: Other (Pending)	Normal	12/01/2011 04:34 pm	Requester assigned to task: Complete Impact and Conflict Analysis
Process	Notice	12/01/2011 04:34 pm	The process is in waiting state

12 Records Found

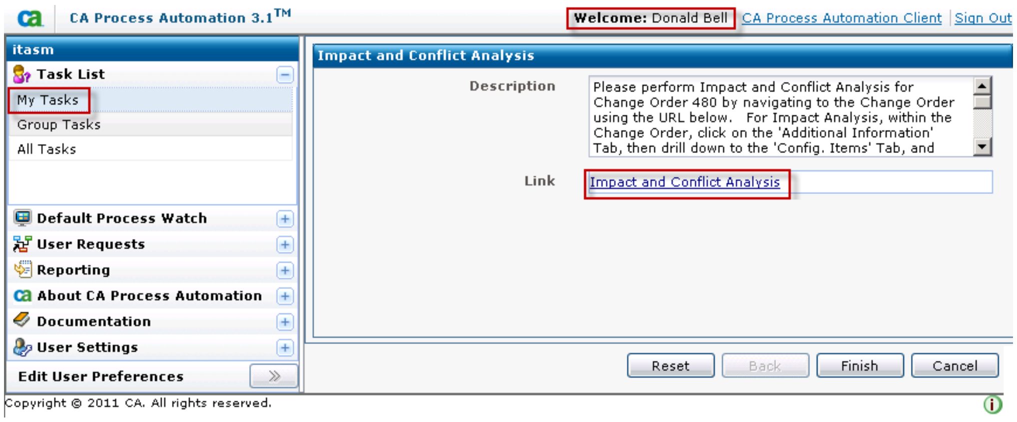
3. Navigate back in to CA Process Automation as Donald. You would see one pending task for Impact and Conflict Analysis. Navigate to the Task and right click on the mouse. Click Reply.



Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delega
22930	Impact and Conflict Analysis	Please complete Impact and Conflict Analysis for Change Order.	Dec 1, 2011 4:34...			Pending		

Copyright © 2011 CA. All rights reserved.

4. Click Impact and Conflict Analysis link. You can view the Change Order where Impact and Conflict Analysis needs to be instantiated manually:



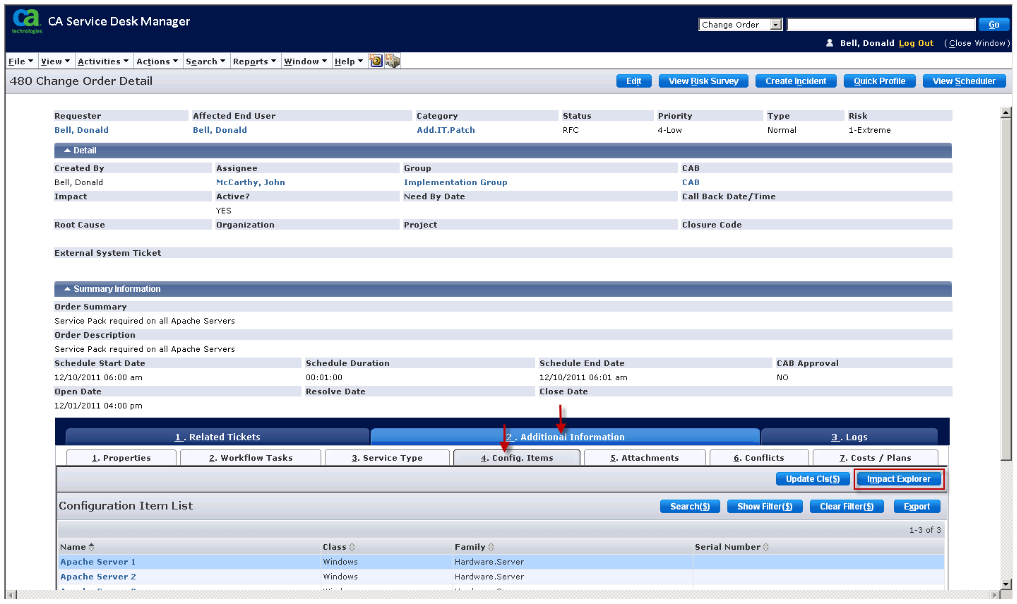
Impact and Conflict Analysis

Description: Please perform Impact and Conflict Analysis for Change Order 480 by navigating to the Change Order using the URL below. For Impact Analysis, within the Change Order, click on the 'Additional Information' Tab, then drill down to the 'Config. Items' Tab, and

Link: Impact and Conflict Analysis

Copyright © 2011 CA. All rights reserved.

5. The first step is to perform Impact Analysis. Impact Analysis shows, which CIs is impacted if the Apache Servers are temporarily brought down for the patch upgrade. Two ways are there to run Impact Analysis. You can either run it through Impact Explorer which is accessible through the Additional Information Tab, then drilling to the Config. Items tab within a Change Order:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	**Active?**	**Need By Date**	**Call Back Date/Time**
	YES		
Root Cause	**Organization**	**Project**	**Closure Code**
External System Ticket			

Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

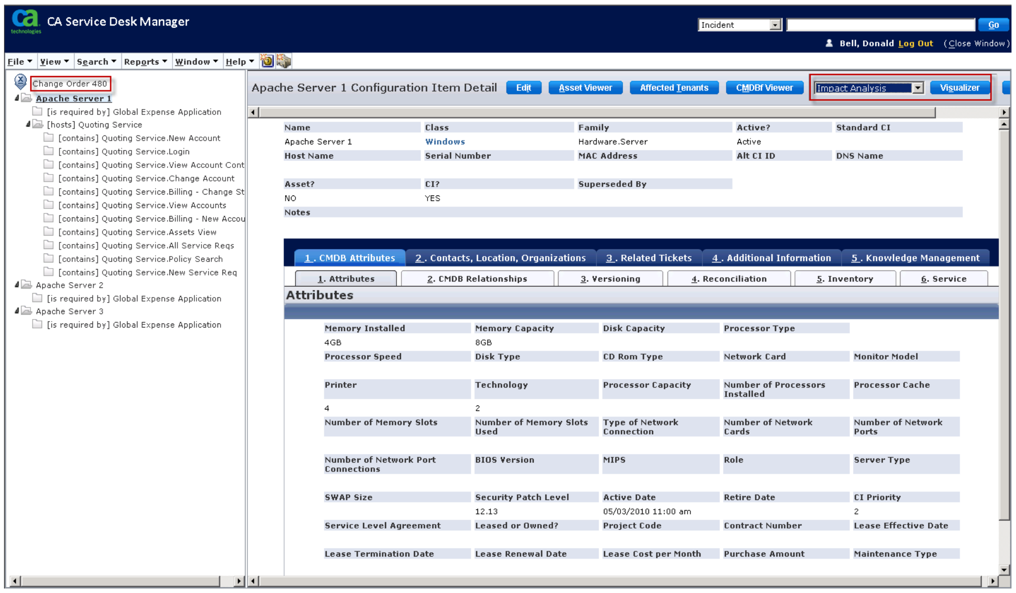
Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO
Open Date	**Resolve Date**	**Close Date**	
12/01/2011 04:00 pm			

Configuration Item List

1-3 of 3

Name	Class	Family	Serial Number
Apache Server 1	Windows	Hardware.Server	
Apache Server 2	Windows	Hardware.Server	

a. And/or alternatively through CA CMDB Visualizer:



Change Order 480
- Apache Server 1
  - [is required by] Global Expense Application
  - [hosts] Quoting Service
    - [contains] Quoting Service.New Account
    - [contains] Quoting Service.Login
    - [contains] Quoting Service.View Account Cont
    - [contains] Quoting Service.Change Account
    - [contains] Quoting Service.Billing - Change St
    - [contains] Quoting Service.View Accounts
    - [contains] Quoting Service.Billing - New Accou
    - [contains] Quoting Service.Assets View
    - [contains] Quoting Service.All Service Reqs
    - [contains] Quoting Service.Policy Search
    - [contains] Quoting Service.New Service Req
- Apache Server 2
  - [is required by] Global Expense Application
- Apache Server 3
  - [is required by] Global Expense Application

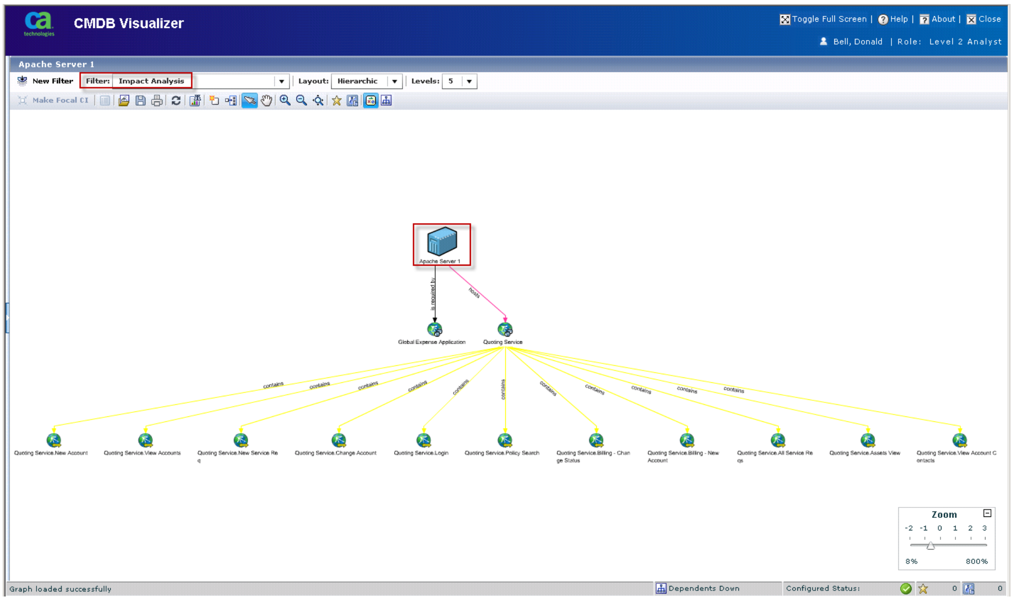
Apache Server 1 Configuration Item Detail

Name	Class	Family	Active?	Standard CI
Apache Server 1	Windows	Hardware.Server	Active	
Host Name	**Serial Number**	**MAC Address**	**Alt CI ID**	**DNS Name**
Asset?	**CI?**	**Superseded By**		
NO	YES			
Notes				

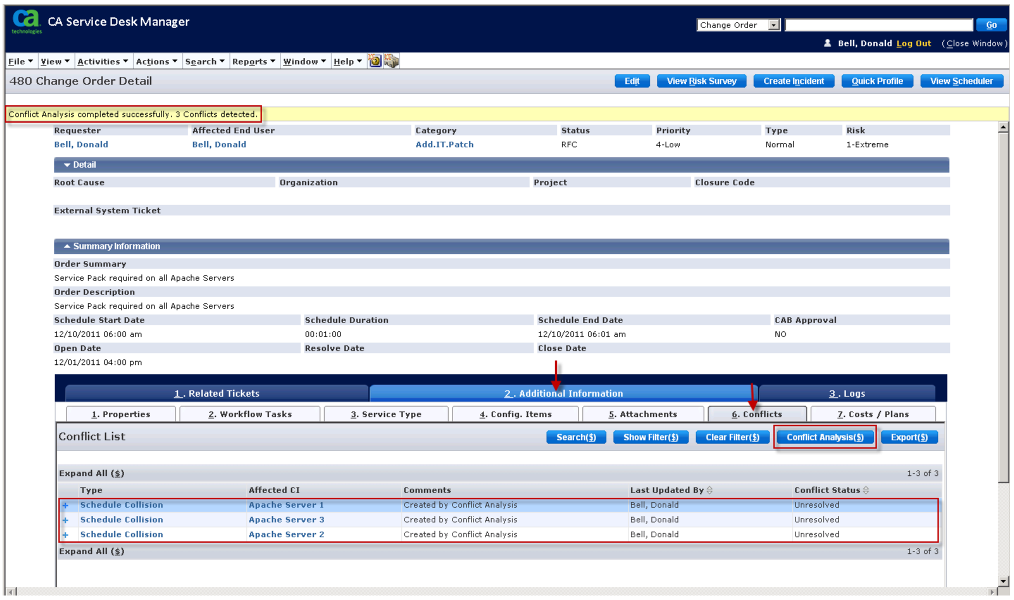
Attributes

Memory Installed	Memory Capacity	Disk Capacity	Processor Type	
4GB	8GB			
Processor Speed	**Disk Type**	**CD Rom Type**	**Network Card**	**Monitor Model**
Printer	**Technology**	**Processor Capacity**	**Number of Processors Installed**	**Processor Cache**
4	2			
Number of Memory Slots	**Number of Memory Slots Used**	**Type of Network Connection**	**Number of Network Cards**	**Number of Network Ports**
Number of Network Port Connections	**BIOS Version**	**MIPS**	**Role**	**Server Type**
SWAP Size	**Security Patch Level**	**Active Date**	**Retire Date**	**CI Priority**
	12.13	05/03/2010 11:00 am		2
Service Level Agreement	**Leased or Owned?**	**Project Code**	**Contract Number**	**Lease Effective Date**
Lease Termination Date	**Lease Renewal Date**	**Lease Cost per Month**	**Purchase Amount**	**Maintenance Type**

b. You can filter the Visualizer for *Impact Analysis*.


CMDB Visualizer
Toggle Full Screen | Help | About | Close
Bell, Donald | Role: Level 2 Analyst
Apache Server 1
New Filter
Filter: Impact Analysis
Layout: Hierarchic
Levels: 5
Make Focal CI
Apache Server 1
is required by
hosts
Global Expense Application
Quoting Service
contains
Quoting Service.New Account
Quoting Service.View Accounts
Quoting Service.New Service Req
Quoting Service.Change Account
Quoting Service.Login
Quoting Service.Policy Search
Quoting Service.Billing - Change Status
Quoting Service.Billing - New Account
Quoting Service.All Service Reqs
Quoting Service.Assets View
Quoting Service.View Account Contacts
Zoom
-2 -1 0 1 2 3
8% 800%
Graph loaded successfully
Dependents Down
Configured Status:

6. Once Impact Analysis is complete, the next step is Conflict Analysis, which is also run within context of a Change Order, beneath the *Additional Information* Tab, then navigate to the *Conflicts* Tab. The Conflict Analysis shows if there are any Change Orders open for the same CI in the same timeframe, thus generating conflict. If there are any conflicts, they must be resolved before proceeding further with the Change Order:



480 Change Order Detail

Conflict Analysis completed successfully. 3 Conflicts detected.

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	1-Extreme

Detail

Root Cause	Organization	Project	Closure Code

External System Ticket

Summary Information

Order Summary

Service Pack required on all Apache Servers

Order Description

Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO
Open Date	**Resolve Date**	**Close Date**	
12/01/2011 04:00 pm			

Conflict List

1-3 of 3

Type	Affected CI	Comments	Last Updated By	Conflict Status
Schedule Collision	Apache Server 1	Created by Conflict Analysis	Bell, Donald	Unresolved
Schedule Collision	Apache Server 3	Created by Conflict Analysis	Bell, Donald	Unresolved
Schedule Collision	Apache Server 2	Created by Conflict Analysis	Bell, Donald	Unresolved

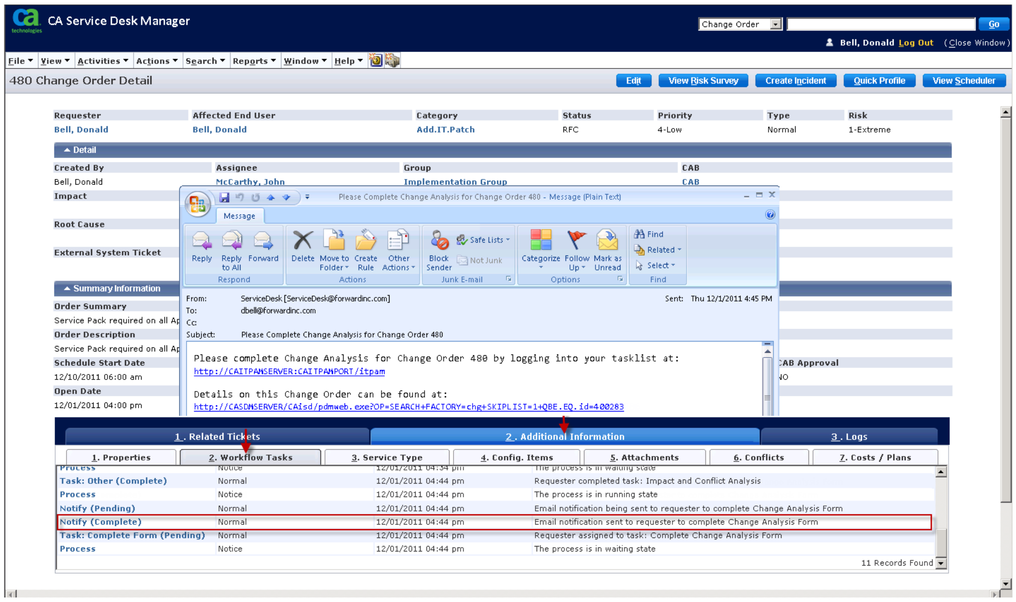
1-3 of 3

7. Go back into CA Process Automation task and hit finish on the Impact and Conflict Analysis Task. You can remain logged in as Donald Bell.

Change Analysis

Follow these steps:

1. Navigate back to the Change Order. Click on the *Additional Information* Tab, and then drill down to the *Workflow Tasks* Tab. Scroll down through the tasks. You can see a notification has gone out to the requester (Donald Bell) to complete Change Analysis.



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	1-Extreme

Detail

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB

Impact

Root Cause

External System Ticket

Summary Information

Order Summary

Service Pack required on all Ap

Order Description

Service Pack required on all Ap

Schedule Start Date

12/10/2011 06:00 am

CAB Approval

NO

Open Date

12/01/2011 04:00 pm

Please Complete Change Analysis for Change Order 480 - Message (Plain Text)

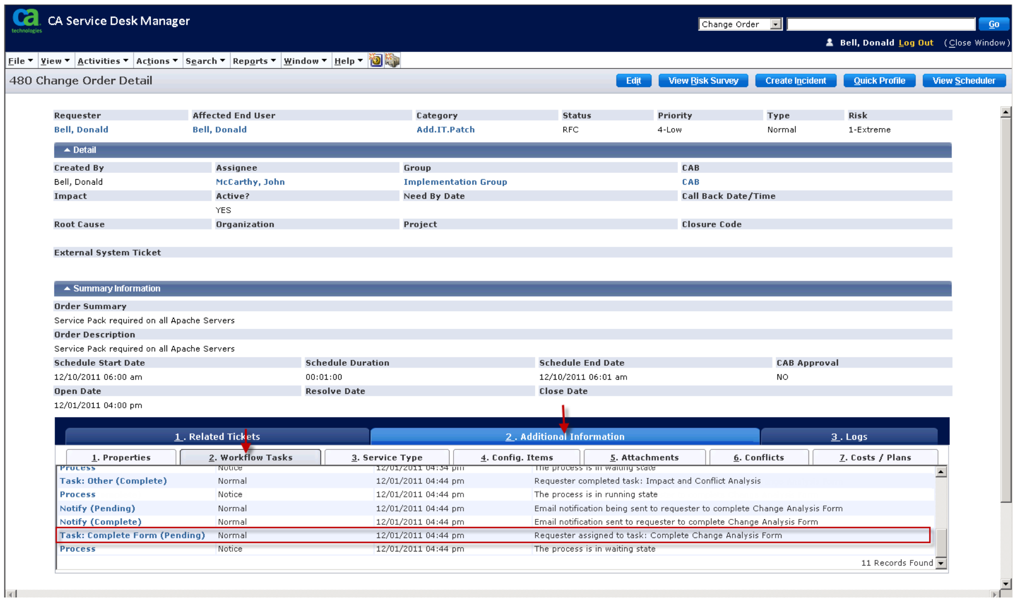
From: ServiceDesk [ServiceDesk@forwardinc.com]
Sent: Thu 12/1/2011 4:45 PM
To: dbell@forwardinc.com
Cc:
Subject: Please Complete Change Analysis for Change Order 480

```
Please complete Change Analysis for Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
```

Process	Notice	12/01/2011 04:34 pm	The process is in waiting state
Task: Other (Complete)	Normal	12/01/2011 04:44 pm	Requester completed task: Impact and Conflict Analysis
Process	Notice	12/01/2011 04:44 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 04:44 pm	Email notification being sent to requester to complete Change Analysis Form
Notify (Complete)	Normal	12/01/2011 04:44 pm	Email notification sent to requester to complete Change Analysis Form
Task: Complete Form (Pending)	Normal	12/01/2011 04:44 pm	Requester assigned to task: Complete Change Analysis Form
Process	Notice	12/01/2011 04:44 pm	The process is in waiting state

11 Records Found

2. To complete this task Donald can either clicks on the link provided through an email, or alternatively, can scroll to the next pending task in the Workflow and click on the hyperlink for *Task: Complete Form (Pending)*:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	RFC	4-Low	Normal	1-Extreme

Detail

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	**Active?**	**Need By Date**	**Call Back Date/Time**
	YES		
Root Cause	**Organization**	**Project**	**Closure Code**

External System Ticket

Summary Information

Order Summary

Service Pack required on all Apache Servers

Order Description

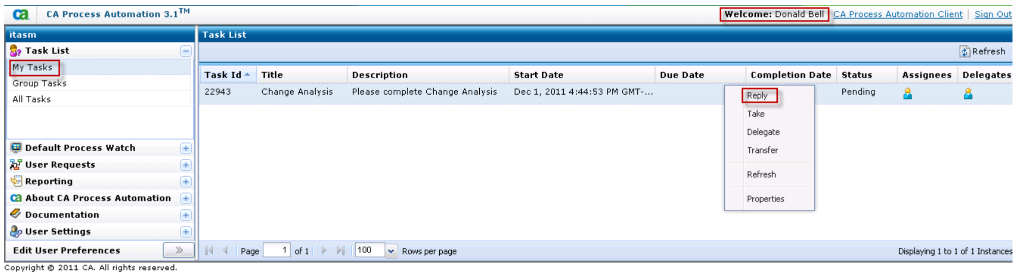
Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	NO
Open Date	**Resolve Date**	**Close Date**	
12/01/2011 04:00 pm			

Process	Notice	12/01/2011 04:34 pm	The process is in waiting state
Task: Other (Complete)	Normal	12/01/2011 04:44 pm	Requester completed task: Impact and Conflict Analysis
Process	Notice	12/01/2011 04:44 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 04:44 pm	Email notification being sent to requester to complete Change Analysis Form
Notify (Complete)	Normal	12/01/2011 04:44 pm	Email notification sent to requester to complete Change Analysis Form
Task: Complete Form (Pending)	Normal	12/01/2011 04:44 pm	Requester assigned to task: Complete Change Analysis Form
Process	Notice	12/01/2011 04:44 pm	The process is in waiting state

11 Records Found

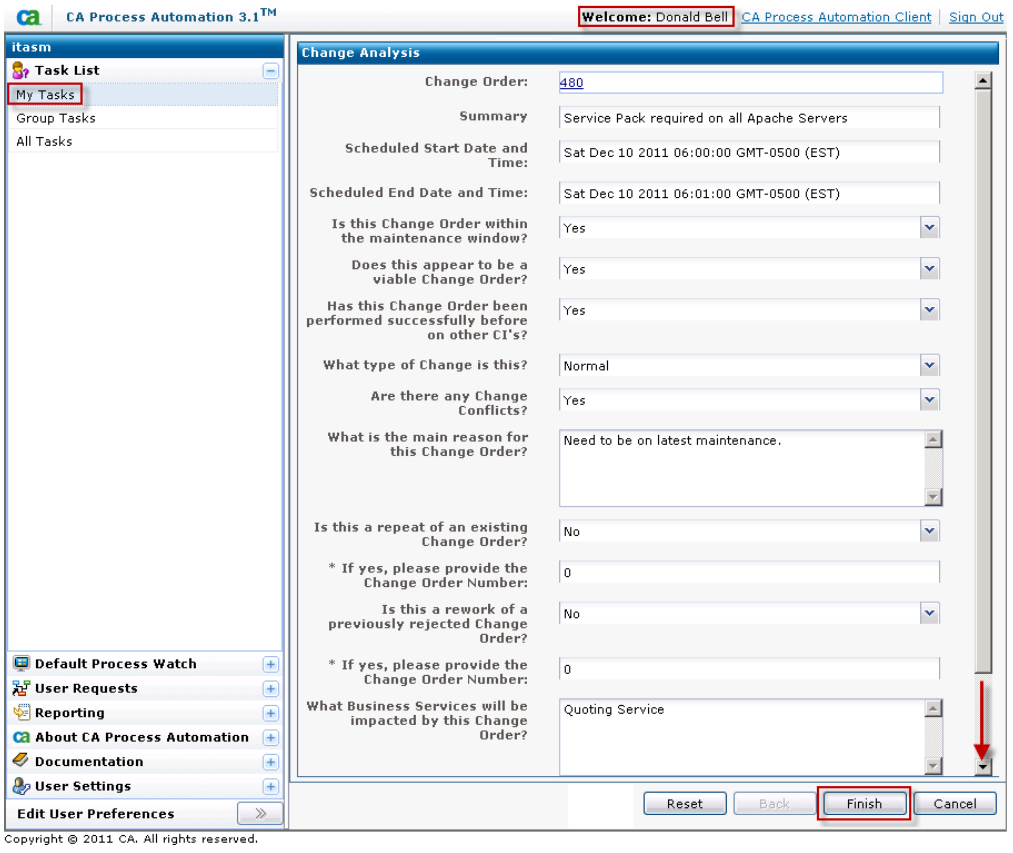
3. Navigate back in to CA Process Automation as Donald Bell. You would see one pending task for Change Analysis. Navigate to the Task and right click on the mouse. Click *Reply*:



Task List

Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
22943	Change Analysis	Please complete Change Analysis	Dec 1, 2011 4:44:53 PM GMT-...			Pending		

a. Complete the information in the Change Analysis form and hit finish, including the last question which did not fit in this screenshot (do not miss this step), and then sign out of CA Process Automation as Donald.


CA Process Automation 3.1™
Welcome: Donald Bell | CA Process Automation Client | Sign Out
itasm
Task List
My Tasks
Group Tasks
All Tasks
Default Process Watch
User Requests
Reporting
About CA Process Automation
Documentation
User Settings
Edit User Preferences
Reset
Back
Finish
Cancel
Copyright © 2011 CA. All rights reserved.

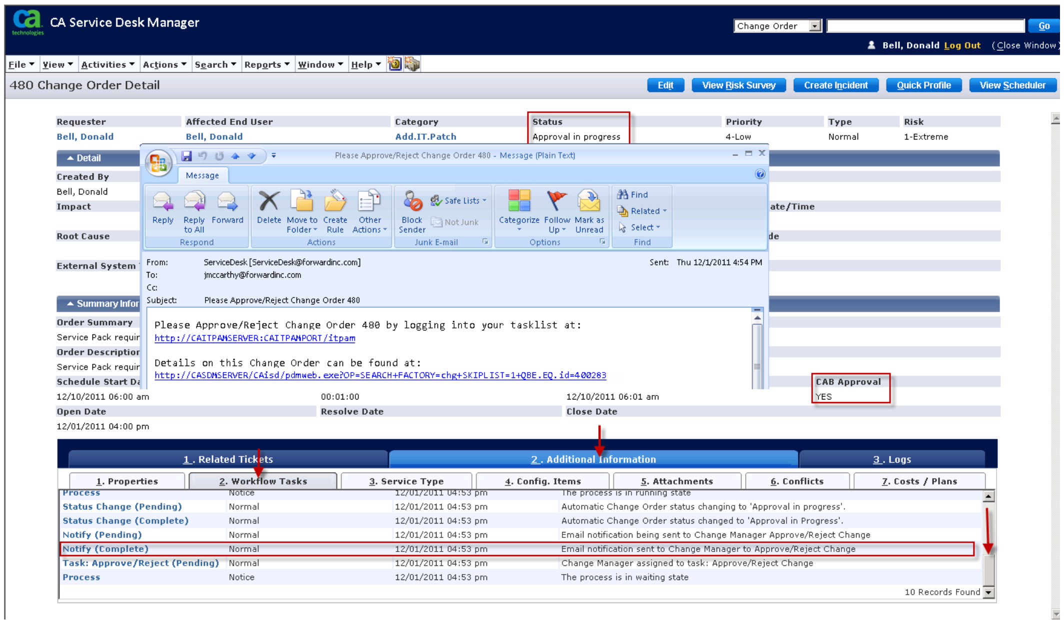
Change Analysis

Change Order:	480
Summary	Service Pack required on all Apache Servers
Scheduled Start Date and Time:	Sat Dec 10 2011 06:00:00 GMT-0500 (EST)
Scheduled End Date and Time:	Sat Dec 10 2011 06:01:00 GMT-0500 (EST)
Is this Change Order within the maintenance window?	Yes
Does this appear to be a viable Change Order?	Yes
Has this Change Order been performed successfully before on other CI's?	Yes
What type of Change is this?	Normal
Are there any Change Conflicts?	Yes
What is the main reason for this Change Order?	Need to be on latest maintenance.
Is this a repeat of an existing Change Order?	No
* If yes, please provide the Change Order Number:	0
Is this a rework of a previously rejected Change Order?	No
* If yes, please provide the Change Order Number:	0
What Business Services will be impacted by this Change Order?	Quoting Service

4. Navigate back to the Change Order. The status of the Change Order goes to *Approval in progress* and the CAB Approval flag is set to *Yes*.

Change Manager Approval

Click the *Additional Information* Tab and then navigate to *Workflow Tasks* Tab. Scroll down through the tasks. You can observe that a notification has gone out to the Change Manager, who is the Manager of the Implementation Group, John McCarthy. John must Approve or Reject the Change Order:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Approval in progress	4-Low	Normal	1-Extreme

Created By
Bell, Donald
Impact
Root Cause
External System
Order Summary
Service Pack requir
Order Descriptior
Service Pack requir
Schedule Start Da

12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	
Open Date	Resolve Date	Close Date	CAB Approval
12/01/2011 04:00 pm			YES

Please Approve/Reject Change Order 480 - Message (Plain Text)

From: ServiceDesk [ServiceDesk@forwardinc.com] Sent: Thu 12/1/2011 4:54 PM
To: jmccarthy@forwardinc.com
Cc:
Subject: Please Approve/Reject Change Order 480

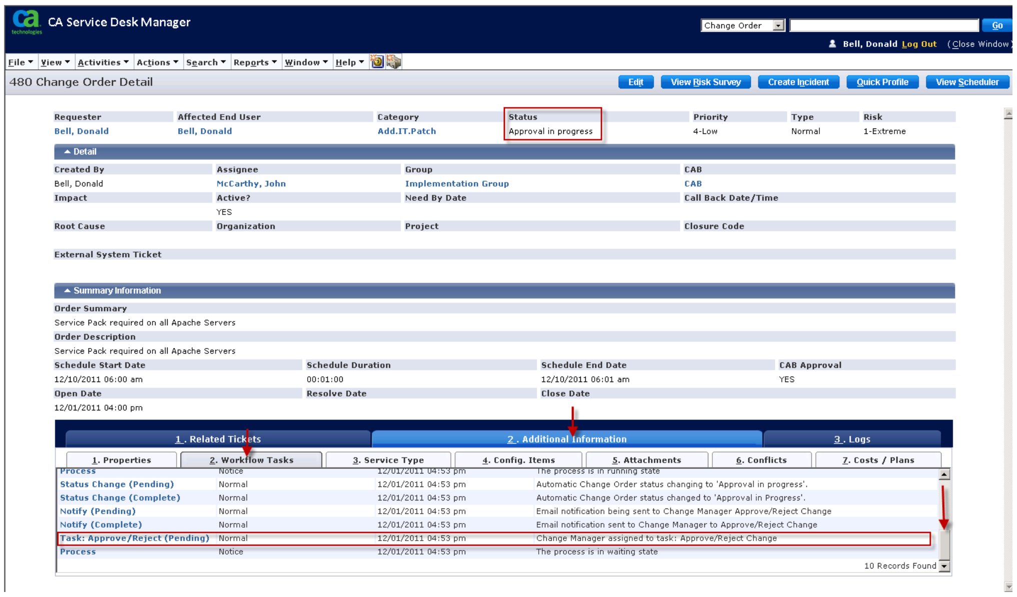
```
Please Approve/Reject Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
```

Process	Notice	12/01/2011 04:53 pm	The process is in running state
Status Change (Pending)	Normal	12/01/2011 04:53 pm	Automatic Change Order status changing to 'Approval in progress'.
Status Change (Complete)	Normal	12/01/2011 04:53 pm	Automatic Change Order status changed to 'Approval in Progress'.
Notify (Pending)	Normal	12/01/2011 04:53 pm	Email notification being sent to Change Manager Approve/Reject Change
Notify (Complete)	Normal	12/01/2011 04:53 pm	Email notification sent to Change Manager to Approve/Reject Change
Task: Approve/Reject (Pending)	Normal	12/01/2011 04:53 pm	Change Manager assigned to task: Approve/Reject Change
Process	Notice	12/01/2011 04:53 pm	The process is in waiting state

10 Records Found

Follow these steps:

1. To complete this task John can either click the link that is provided through the email, or alternatively, can scroll to the next pending task in the Workflow and click on the hyperlink for *Task: Approve/Reject (Pending)*:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Approval in progress	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	Active?	Need By Date	Call Back Date/Time
	YES		
Root Cause	Organization	Project	Closure Code

External System Ticket

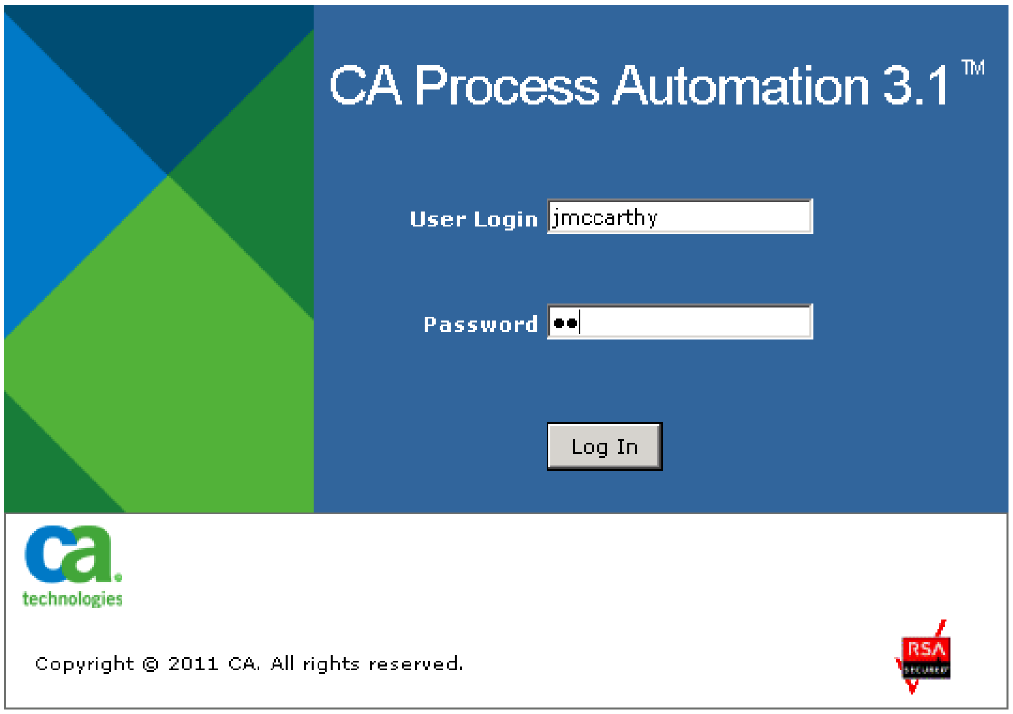
Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

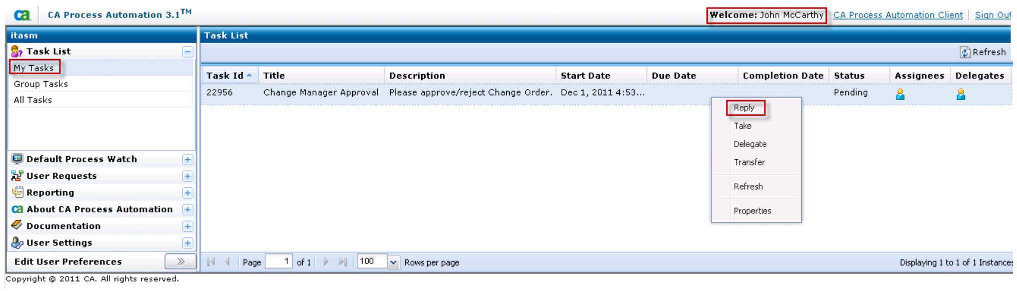
Process	Notice	12/01/2011 04:53 pm	The process is in running state
Status Change (Pending)	Normal	12/01/2011 04:53 pm	Automatic Change Order status changing to 'Approval in progress'.
Status Change (Complete)	Normal	12/01/2011 04:53 pm	Automatic Change Order status changed to 'Approval in Progress'.
Notify (Pending)	Normal	12/01/2011 04:53 pm	Email notification being sent to Change Manager Approve/Reject Change
Notify (Complete)	Normal	12/01/2011 04:53 pm	Email notification sent to Change Manager to Approve/Reject Change
Task: Approve/Reject (Pending)	Normal	12/01/2011 04:53 pm	Change Manager assigned to task: Approve/Reject Change
Process	Notice	12/01/2011 04:53 pm	The process is in waiting state

10 Records Found

2. Log in to CA Process Automation as the Change Manager, John McCarthy:


CA Process Automation 3.1 TM
User Login
jmccarthy
Password
●●
Log In
technologies
Copyright © 2011 CA. All rights reserved.
RSA SECURED

3. As John, you would see one pending task to Approve/Reject the Change Order. Navigate to Task and right click. Click *Reply*:

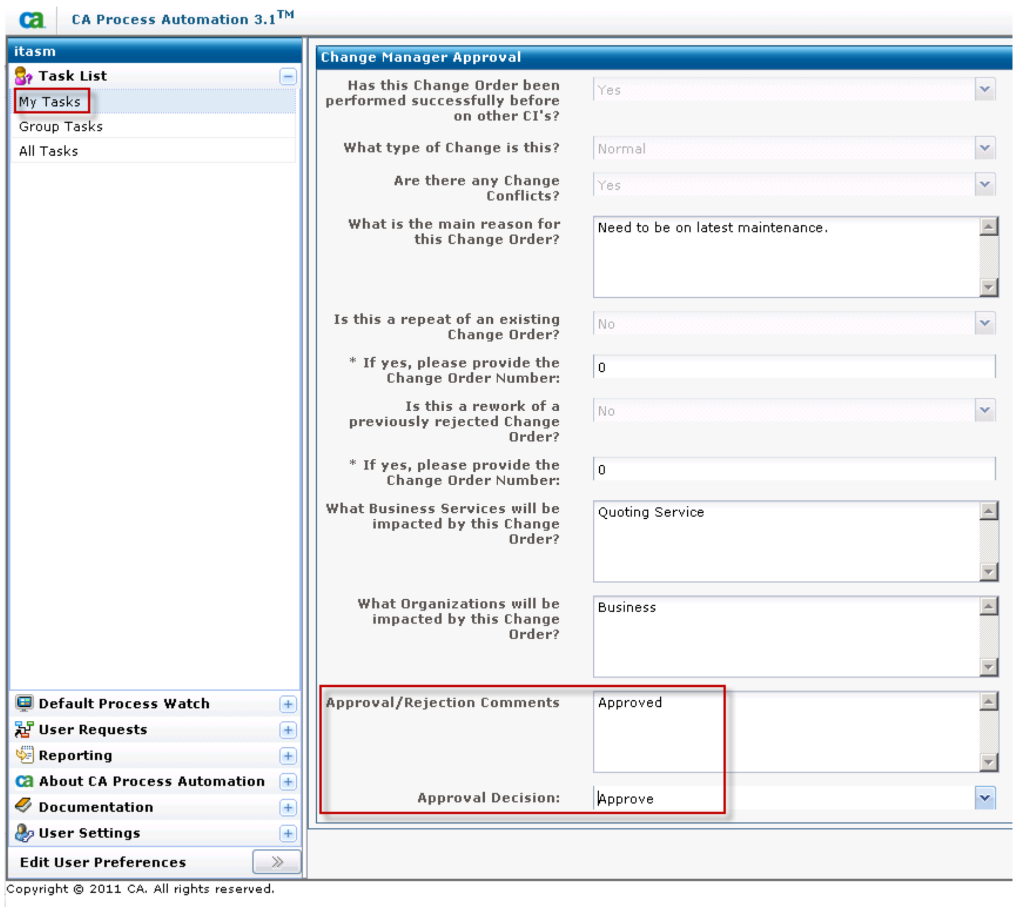


Welcome: John McCarthy

Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
22956	Change Manager Approval	Please approve/reject Change Order.	Dec 1, 2011 4:53...			Pending		

Page 1 of 1 · 100 Rows per page · Displaying 1 to 1 of 1 Instances

4. Complete the Approval/Rejection comments. Dependent upon whether the Change Manager Approves, Rejects, or marks the Change Order Incomplete, the Workflow takes different paths. In our case, we mark it as *Approved*. You can remain logged in to CA Process Automation as John.



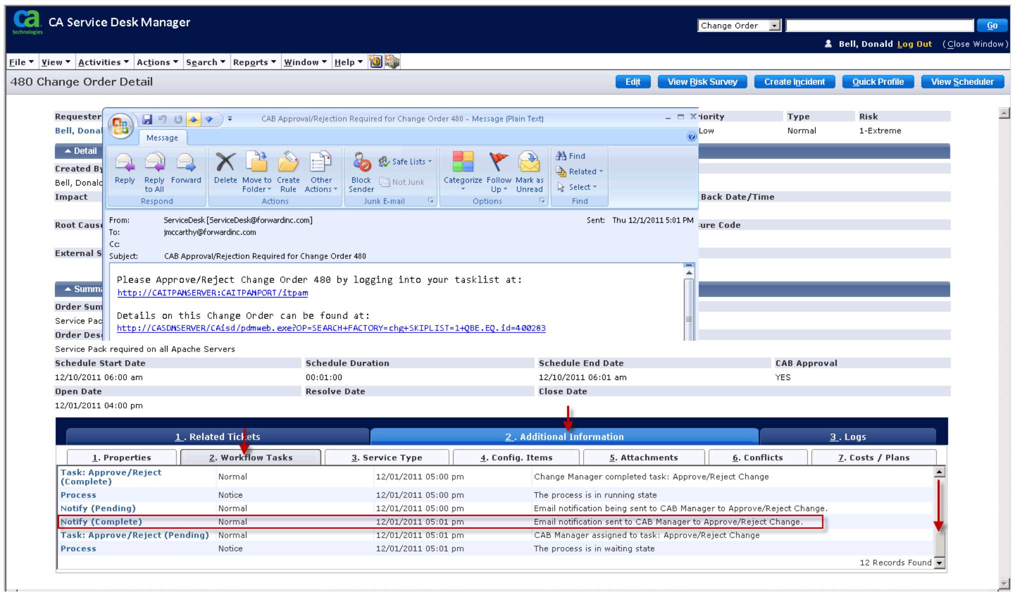
Change Manager Approval

Has this Change Order been performed successfully before on other CI's?	Yes
What type of Change is this?	Normal
Are there any Change Conflicts?	Yes
What is the main reason for this Change Order?	Need to be on latest maintenance.
Is this a repeat of an existing Change Order?	No
* If yes, please provide the Change Order Number:	0
Is this a rework of a previously rejected Change Order?	No
* If yes, please provide the Change Order Number:	0
What Business Services will be impacted by this Change Order?	Quoting Service
What Organizations will be impacted by this Change Order?	Business
Approval/Rejection Comments	Approved
Approval Decision:	Approve

CAB Manager Approval

Follow these steps:

1. Navigate back to the Change Order. Click on the *Additional Information* Tab and then navigate to the *Workflow Tasks* Tab. Scroll down through the tasks. You can see a notification has gone out to the CAB, including the CAB Manager, who incidentally is also John McCarthy. The CAB Manager, John, must Approve or Reject the Change Order on behalf of the CAB:



480 Change Order Detail

CAB Approval/Rejection Required for Change Order 480 - Message (Plain Text)

From: ServiceDesk [ServiceDesk@forwardinc.com]
To: jmccarthy@forwardinc.com
Cc:
Subject: CAB Approval/Rejection Required for Change Order 480
Sent: Thu 12/1/2011 5:01 PM

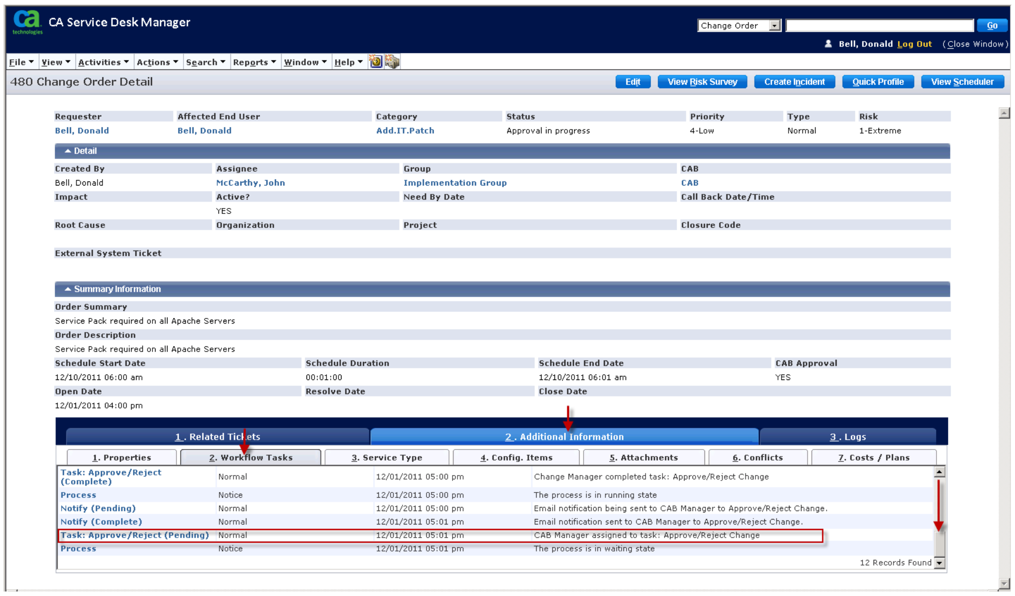
```
Please Approve/Reject Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
```

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

Task: Approve/Reject (Complete)	Normal	12/01/2011 05:00 pm	Change Manager completed task: Approve/Reject Change
Process	Notice	12/01/2011 05:00 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 05:00 pm	Email notification being sent to CAB Manager to Approve/Reject Change.
Notify (Complete)	Normal	12/01/2011 05:01 pm	Email notification sent to CAB Manager to Approve/Reject Change.
Task: Approve/Reject (Pending)	Normal	12/01/2011 05:01 pm	CAB Manager assigned to task: Approve/Reject Change
Process	Notice	12/01/2011 05:01 pm	The process is in waiting state

12 Records Found

2. To complete this task, John can either click the link that is provided through an email. Alternatively, John can scroll to the next pending task in the Workflow and click on the hyperlink for *Task: Approve/Reject (Pending)*:



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Approval in progress	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	Active?	Need By Date	Call Back Date/Time
	YES		
Root Cause	Organization	Project	Closure Code
External System Ticket			

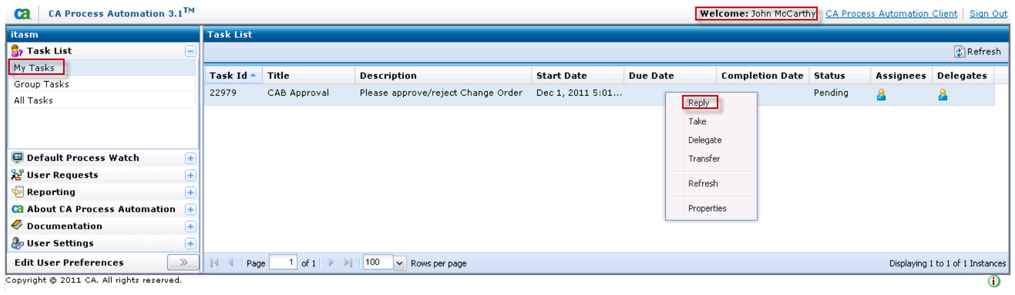
Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

Task: Approve/Reject (Complete)	Normal	12/01/2011 05:00 pm	Change Manager completed task: Approve/Reject Change
Process	Notice	12/01/2011 05:00 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 05:00 pm	Email notification being sent to CAB Manager to Approve/Reject Change.
Notify (Complete)	Normal	12/01/2011 05:01 pm	Email notification sent to CAB Manager to Approve/Reject Change.
Task: Approve/Reject (Pending)	Normal	12/01/2011 05:01 pm	CAB Manager assigned to task: Approve/Reject Change
Process	Notice	12/01/2011 05:01 pm	The process is in waiting state

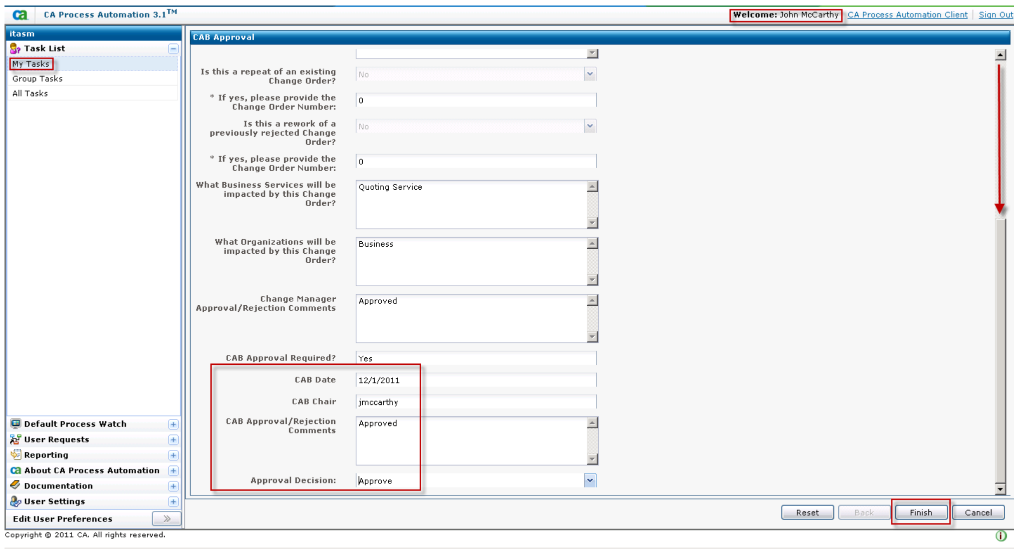
12 Records Found

3. As John, you would see one pending task for CAB Approval. Navigate to the Task and right click on the mouse. Click *Reply*:



Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
22979	CAB Approval	Please approve/reject Change Order	Dec 1, 2011 5:01...			Pending		

4. Complete CAB Date/CAB Chair, and the CAB Approval/Rejection comments. Dependent upon whether the CAB Manager Approves, Rejects, or marks the Change Order Incomplete, the Workflow takes different paths. In our case, we mark it as *Approved*. You can remain logged in to CA Process Automation as John.



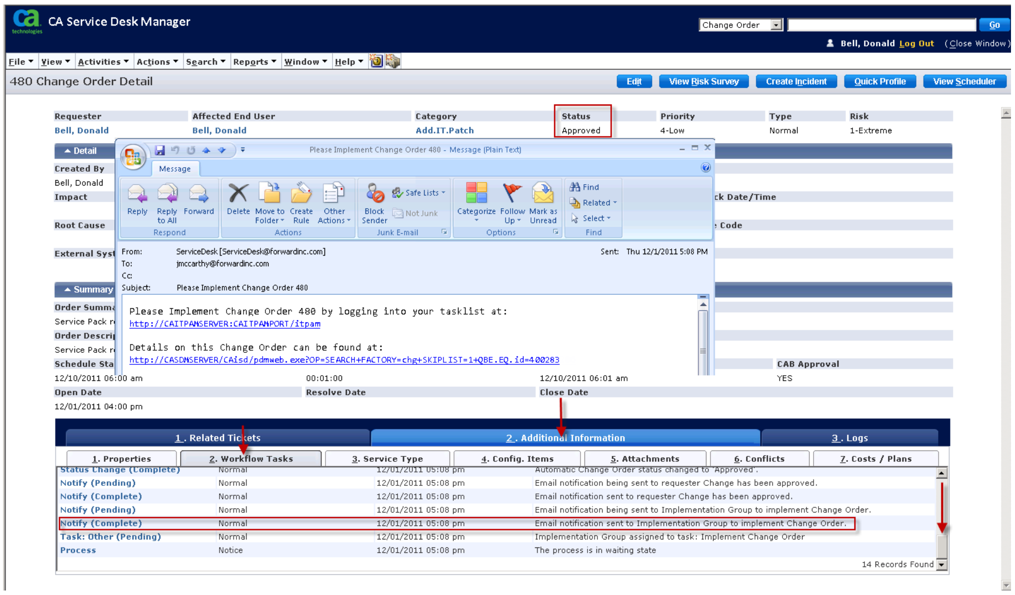
CAB Approval

Is this a repeat of an existing Change Order?	No
* If yes, please provide the Change Order Number:	0
Is this a rework of a previously rejected Change Order?	No
* If yes, please provide the Change Order Number:	0
What Business Services will be impacted by this Change Order?	Quoting Service
What Organizations will be impacted by this Change Order?	Business
Change Manager Approval/Rejection Comments	Approved
CAB Approval Required?	Yes
CAB Date	12/1/2011
CAB Chair	jmccarthy
CAB Approval/Rejection Comments	Approved
Approval Decision:	Approve

Implement the Change Order

Follow these steps:

1. Navigate back to the Change Order. The Status of the Change Order is now *Approved*. Click on the *Additional Information* Tab. Then navigate to the *Workflow Tasks* Tab. Scroll down through the tasks. You can see a notification has gone out to the Implementation Group, of which John McCarthy is a member. The Implementation Group is now responsible for implementing the Change and applying the patches to our Islandia based Apache servers.



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Approved	4-Low	Normal	1-Extreme

Please Implement Change Order 480 - Message (Plain Text)

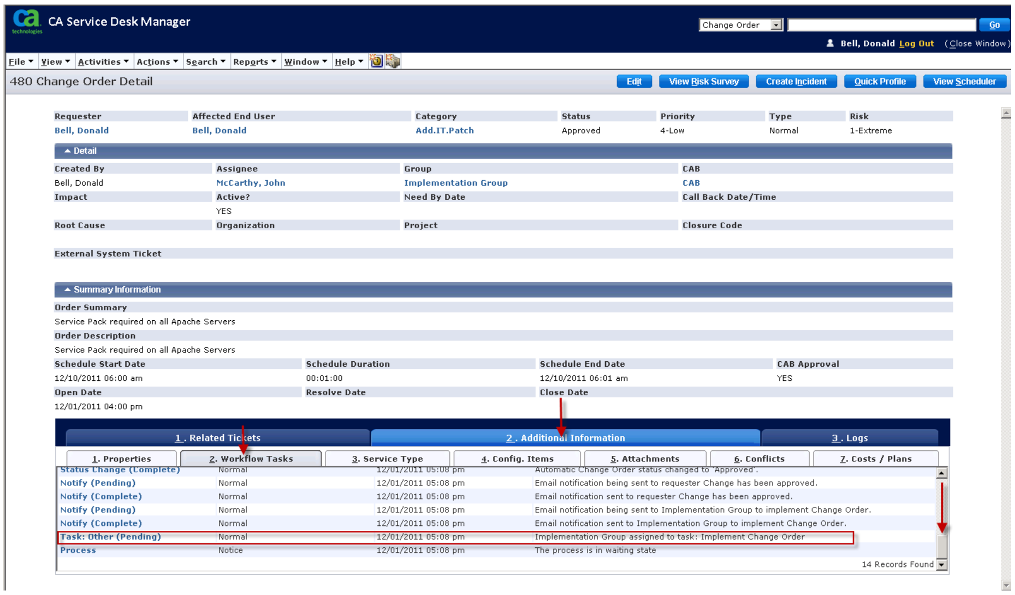
From: ServiceDesk [ServiceDesk@forwardinc.com]
To: jmccarthy@forwardinc.com
Cc:
Subject: Please Implement Change Order 480
Sent: Thu 12/1/2011 5:08 PM

```
Please Implement Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
```

Status Change (Complete)	Normal	12/01/2011 05:08 pm	Automatic Change Order status changed to 'Approved'.
Notify (Pending)	Normal	12/01/2011 05:08 pm	Email notification being sent to requester Change has been approved.
Notify (Complete)	Normal	12/01/2011 05:08 pm	Email notification sent to requester Change has been approved.
Notify (Pending)	Normal	12/01/2011 05:08 pm	Email notification being sent to Implementation Group to implement Change Order.
Notify (Complete)	Normal	12/01/2011 05:08 pm	Email notification sent to Implementation Group to implement Change Order.
Task: Other (Pending)	Normal	12/01/2011 05:08 pm	Implementation Group assigned to task: Implement Change Order
Process	Notice	12/01/2011 05:08 pm	The process is in waiting state

14 Records Found

2. To complete this task, John can either click the link that is provided through the email, or scroll to the next pending task in the Workflow and click the hyperlink for *Task: Other (Pending)* to complete this task.



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Approved	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	Active?	Need By Date	Call Back Date/Time
	YES		
Root Cause	Organization	Project	Closure Code
External System Ticket			

Summary Information

Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

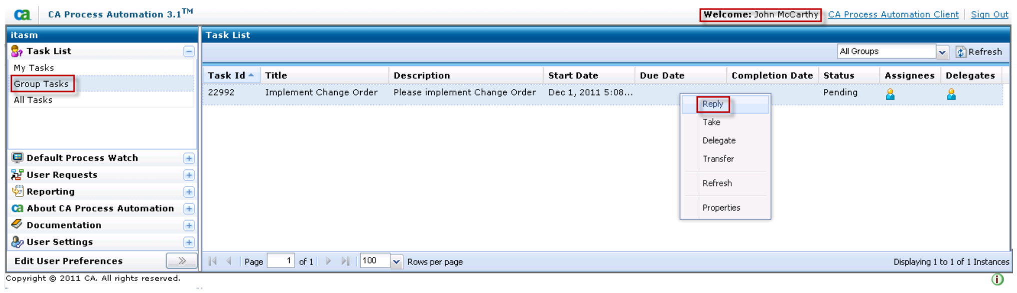
Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm			

Status Change (Complete)	Normal	12/01/2011 05:08 pm	Automatic Change Order status changed to 'Approved'.
Notify (Pending)	Normal	12/01/2011 05:08 pm	Email notification being sent to requester Change has been approved.
Notify (Complete)	Normal	12/01/2011 05:08 pm	Email notification sent to requester Change has been approved.
Notify (Pending)	Normal	12/01/2011 05:08 pm	Email notification being sent to Implementation Group to implement Change Order.
Notify (Complete)	Normal	12/01/2011 05:08 pm	Email notification sent to Implementation Group to implement Change Order.
Task: Other (Pending)	Normal	12/01/2011 05:08 pm	Implementation Group assigned to task: Implement Change Order
Process	Notice	12/01/2011 05:08 pm	The process is in waiting state

14 Records Found

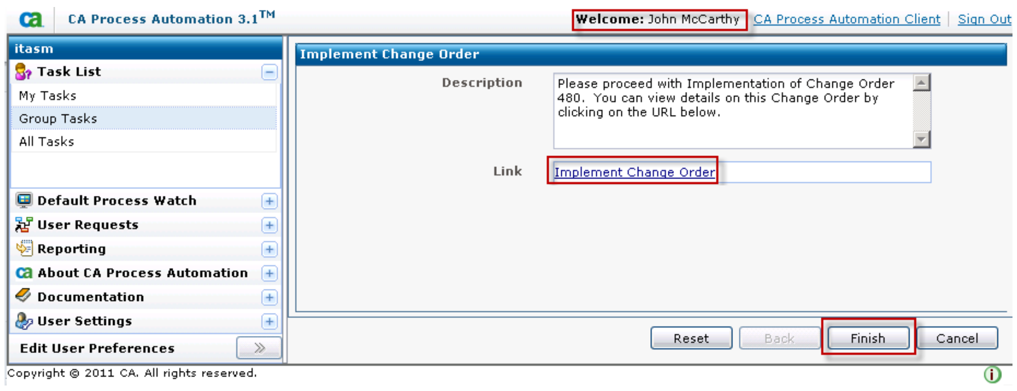
3. As John, click *Group Tasks* on the left hand side of the pane since this task of implementing the Change Order is assigned to the full Implementation Group.

4. Navigate to Implementation task and right click on the mouse. Click Reply.



Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
22992	Implement Change Order	Please implement Change Order	Dec 1, 2011 5:08...			Pending		

5. The link in this task brings you directly into CA SDM in context of the Change Order once you are logged in. Once the Implementation Group begins implementation of the patches, John can click Finish to complete the task. You can remain logged in to CA Process Automation as John.



Description: Please proceed with Implementation of Change Order 480. You can view details on this Change Order by clicking on the URL below.

Link: Implement Change Order

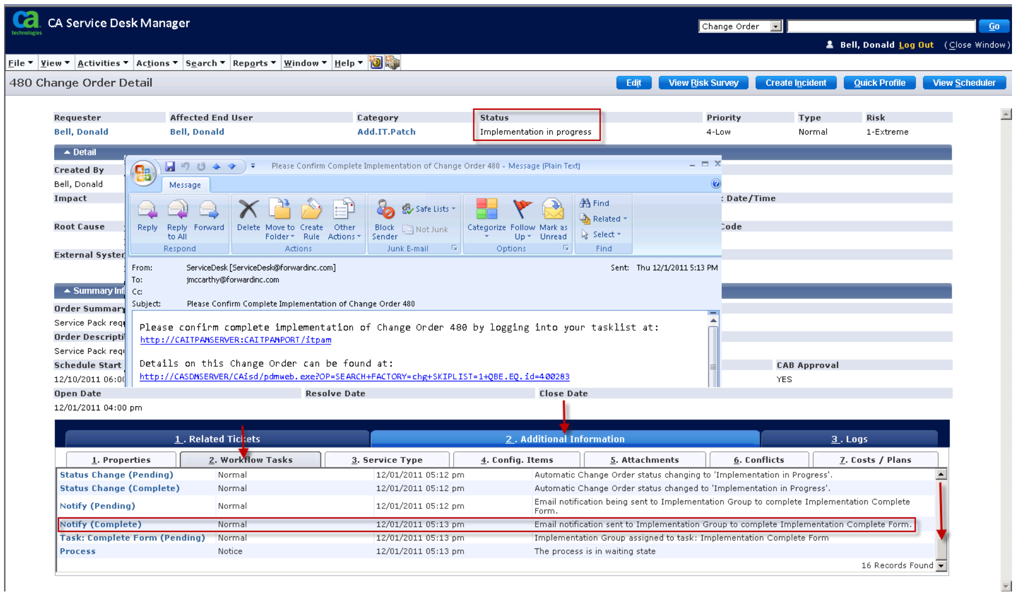
6. Navigate back to the Change Order. The status has changed from *Approved* to *Implementation in Progress*.

Confirm Complete Implementation

Follow these steps:

1. Click the *Additional Information* tab in the Change Order.
2. Navigate to the *Workflow Tasks* tab. Scroll down through the tasks.

   You can see a notification has gone out to all of the members of the Implementation Group, of which John McCarthy is a member. The Implementation Group is now responsible for confirming the successful implementation of the patches.



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Implementation in progress	4-Low	Normal	1-Extreme

Created By: Bell, Donald
Impact
Root Cause
External Syster
Order Summary: Service Pack req
Order Descripti: Service Pack req
Schedule Start: 12/10/2011 06:0
CAB Approval: YES

Open Date	Resolve Date	Close Date
12/01/2011 04:00 pm		

Please Confirm Complete Implementation of Change Order 480 - Message (Plain Text)

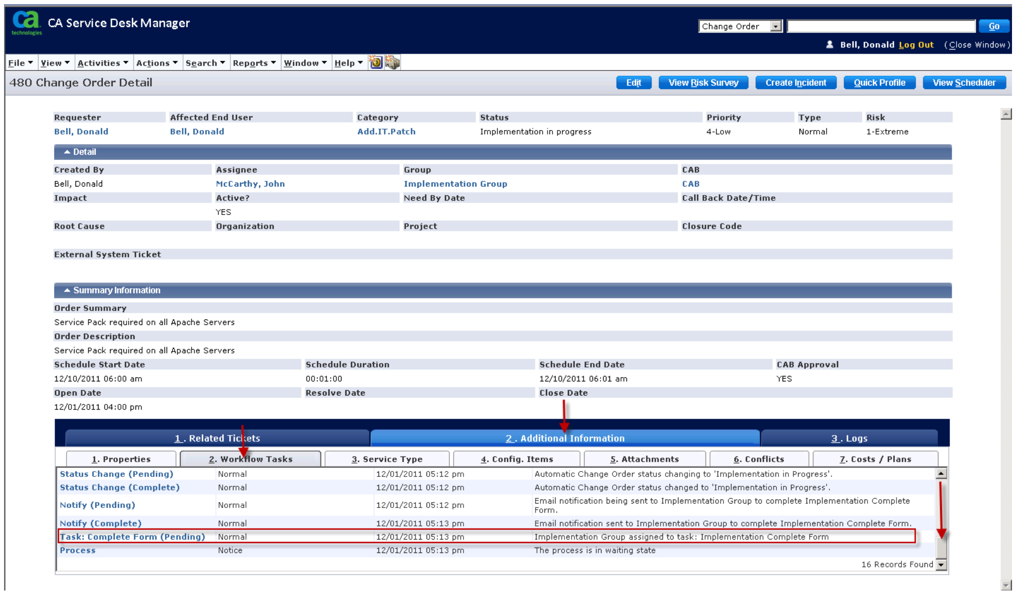
From: ServiceDesk [ServiceDesk@forwardinc.com]
Sent: Thu 12/1/2011 5:13 PM
To: jmccarthy@forwardinc.com
Cc:
Subject: Please Confirm Complete Implementation of Change Order 480

```
Please confirm complete implementation of Change Order 480 by logging into your tasklist at:
http://CAITPAMSERVER:CAITPAMPORT/itpam

Details on this Change Order can be found at:
http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
```

Status Change (Pending)	Normal	12/01/2011 05:12 pm	Automatic Change Order status changing to 'Implementation in Progress'.
Status Change (Complete)	Normal	12/01/2011 05:12 pm	Automatic Change Order status changed to 'Implementation in Progress'.
Notify (Pending)	Normal	12/01/2011 05:12 pm	Email notification being sent to Implementation Group to complete Implementation Complete Form.
Notify (Complete)	Normal	12/01/2011 05:13 pm	Email notification sent to Implementation Group to complete Implementation Complete Form.
Task: Complete Form (Pending)	Normal	12/01/2011 05:13 pm	Implementation Group assigned to task: Implementation Complete Form
Process	Notice	12/01/2011 05:13 pm	The process is in waiting state

16 Records Found

3. Either click the link that is provided through the email, or scroll to the next pending task in the Workflow and click the hyperlink for *Task: Complete Form (Pending)* to complete this task.



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Implementation in progress	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	**Active?**	**Need By Date**	**Call Back Date/Time**
	YES		
Root Cause	**Organization**	**Project**	**Closure Code**

External System Ticket

Order Summary
Service Pack required on all Apache Servers

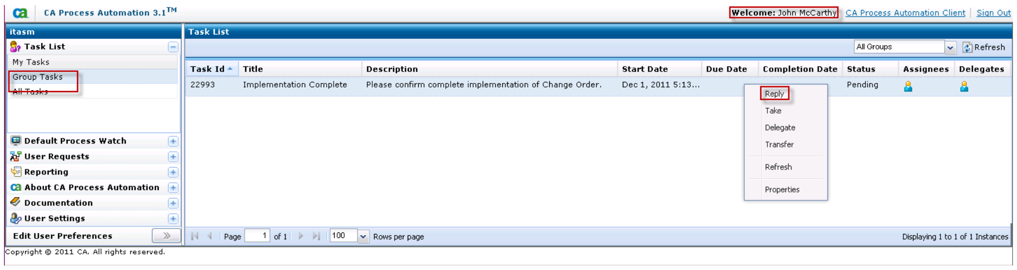
Order Description
Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	**Resolve Date**	**Close Date**	
12/01/2011 04:00 pm			

Status Change (Pending)	Normal	12/01/2011 05:12 pm	Automatic Change Order status changing to 'Implementation in Progress'.
Status Change (Complete)	Normal	12/01/2011 05:12 pm	Automatic Change Order status changed to 'Implementation in Progress'.
Notify (Pending)	Normal	12/01/2011 05:12 pm	Email notification being sent to Implementation Group to complete Implementation Complete Form.
Notify (Complete)	Normal	12/01/2011 05:13 pm	Email notification sent to Implementation Group to complete Implementation Complete Form.
Task: Complete Form (Pending)	Normal	12/01/2011 05:13 pm	Implementation Group assigned to task: Implementation Complete Form
Process	Notice	12/01/2011 05:13 pm	The process is in waiting state

16 Records Found

4. As John, you click *Group Tasks* on the left hand side of the pane since this task of confirming implementation of the Change Order is assigned to the full Implementation Group. Navigate to Implementation Complete task and right click on the mouse. Click Reply.



Task List

Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
22993	Implementation Complete	Please confirm complete implementation of Change Order.	Dec 1, 2011 5:13...			Pending	👤	👤

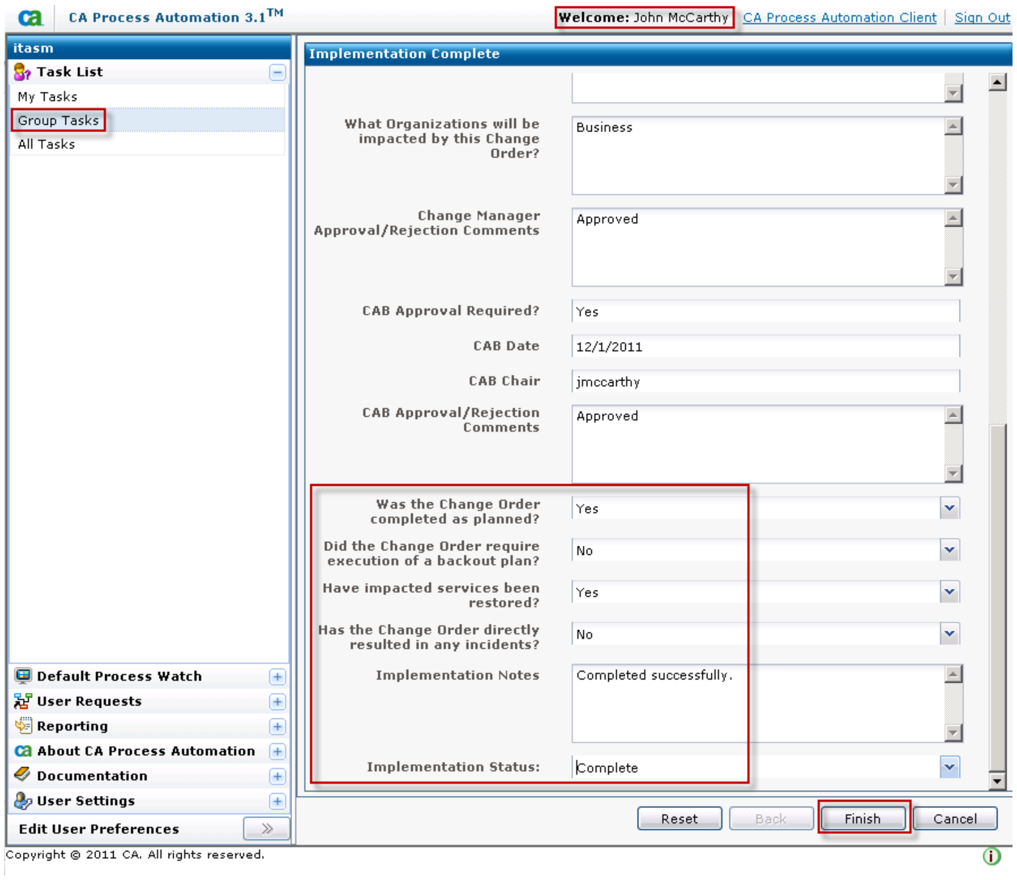
Copyright © 2011 CA. All rights reserved.

5. Complete the applicable implementation notes.

   Depending on whether the Implementation group successfully completed implementation of the patches or not, they either mark the Implementation Status as *Complete* or *Incomplete* and as a result the Workflow takes different paths.

6. Mark the status as *Complete*.

   You can remain logged in to CA Process Automation as John.



Implementation Complete

What Organizations will be impacted by this Change Order?	Business
Change Manager Approval/Rejection Comments	Approved
CAB Approval Required?	Yes
CAB Date	12/1/2011
CAB Chair	jmccarthy
CAB Approval/Rejection Comments	Approved
Was the Change Order completed as planned?	Yes
Did the Change Order require execution of a backout plan?	No
Have impacted services been restored?	Yes
Has the Change Order directly resulted in any incidents?	No
Implementation Notes	Completed successfully.
Implementation Status:	Complete

Copyright © 2011 CA. All rights reserved.

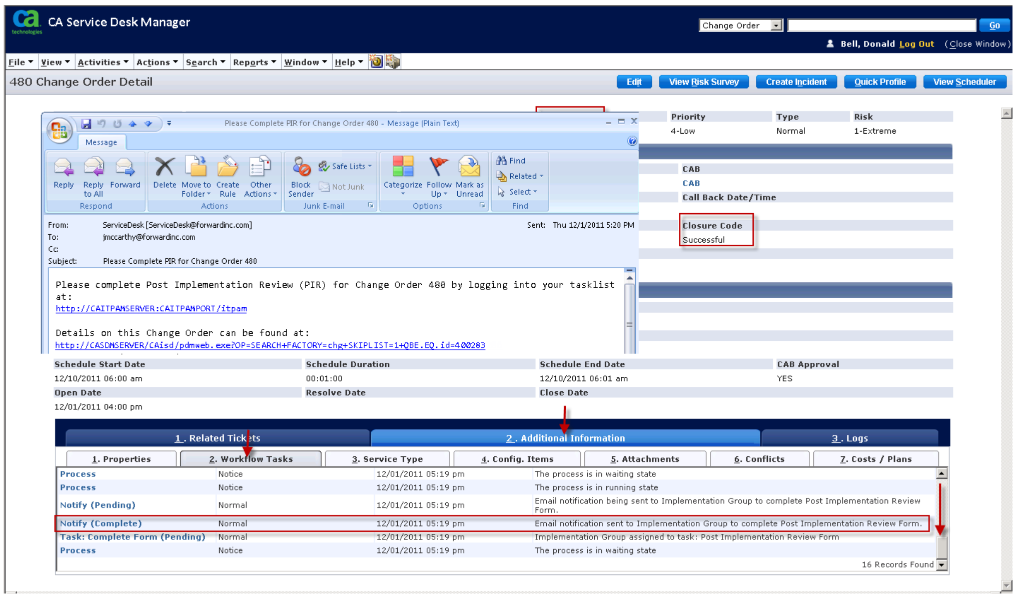
Post Implementation Review

Navigate back to the Change Order. The status has changed from *Implementation in Progress* to *Implemented* and the closure code is now set to *Successful*. Click the *Additional Information* tab.

Follow these steps:

1. Navigate to the *Workflow Tasks* tab. Scroll down through the tasks.

   You can see that a notification has gone out to all of the members of the Implementation Group, of which John McCarthy is a member. The Implementation Group is now responsible for doing a Post Implementation Review (PIR).

   480 Change Order Detail

From:	ServiceDesk [ServiceDesk@forwardinc.com]
To:	jmccarthy@forwardinc.com
Cc:	
Subject:	Please Complete PIR for Change Order 480
Sent:	Thu 12/1/2011 5:20 PM

   ```
   Please complete Post Implementation Review (PIR) for Change Order 480 by logging into your tasklist
   at:
   http://CAITPAMSERVER:CAITPAMPORT/itpam

   Details on this Change Order can be found at:
   http://CASDMSERVER/CAisd/pdmweb.exe?OP=SEARCH+FACTORY=chg+SKIPLIST=1+QBE.EQ.id=400283
   ```

Priority	Type	Risk
4-Low	Normal	1-Extreme

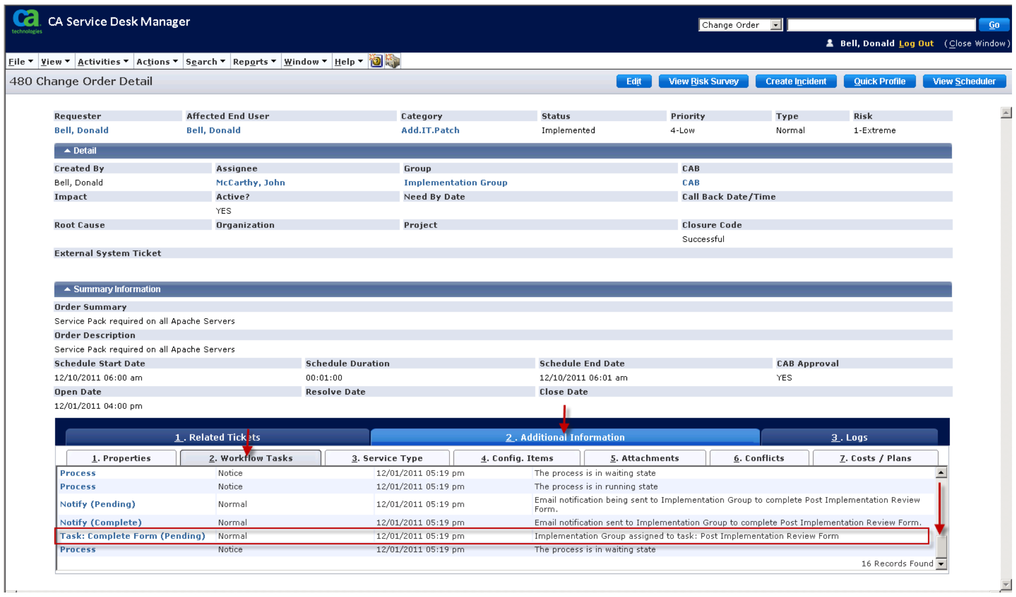
CAB	CAB
Call Back Date/Time	
Closure Code	Successful

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	**Resolve Date**	**Close Date**	
12/01/2011 04:00 pm			

Process	Notice	12/01/2011 05:19 pm	The process is in waiting state
Process	Notice	12/01/2011 05:19 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 05:19 pm	Email notification being sent to Implementation Group to complete Post Implementation Review Form.
Notify (Complete)	Normal	12/01/2011 05:19 pm	Email notification sent to Implementation Group to complete Post Implementation Review Form.
Task: Complete Form (Pending)	Normal	12/01/2011 05:19 pm	Implementation Group assigned to task: Post Implementation Review Form
Process	Notice	12/01/2011 05:19 pm	The process is in waiting state

   16 Records Found

2. Either clicks the link that is provided through the email, or alternatively, scrolls to the next pending task in the Workflow and click on the hyperlink for *Task: Complete Form (Pending)* to complete this task.



480 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Implemented	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	**Active?**	**Need By Date**	**Call Back Date/Time**
	YES		
Root Cause	**Organization**	**Project**	**Closure Code**
			Successful
External System Ticket			

Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

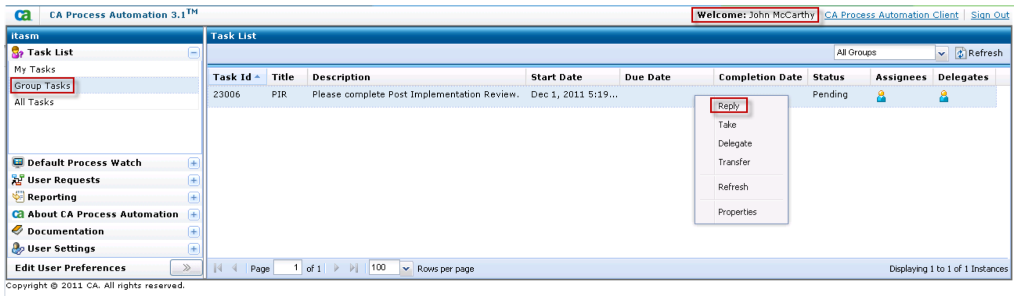
Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/10/2011 06:00 am	00:01:00	12/10/2011 06:01 am	YES
Open Date	**Resolve Date**	**Close Date**	
12/01/2011 04:00 pm			

Process	Notice	12/01/2011 05:19 pm	The process is in waiting state
Process	Notice	12/01/2011 05:19 pm	The process is in running state
Notify (Pending)	Normal	12/01/2011 05:19 pm	Email notification being sent to Implementation Group to complete Post Implementation Review Form.
Notify (Complete)	Normal	12/01/2011 05:19 pm	Email notification sent to Implementation Group to complete Post Implementation Review Form.
Task: Complete Form (Pending)	Normal	12/01/2011 05:19 pm	Implementation Group assigned to task: Post Implementation Review Form
Process	Notice	12/01/2011 05:19 pm	The process is in waiting state

16 Records Found

3. As John, click *Group Tasks* on the left hand side of the pane since this task of Post Implementation Review is assigned to the full Implementation Group.

4. Navigate to Post Implementation Review task and right click on the mouse. Click Reply.

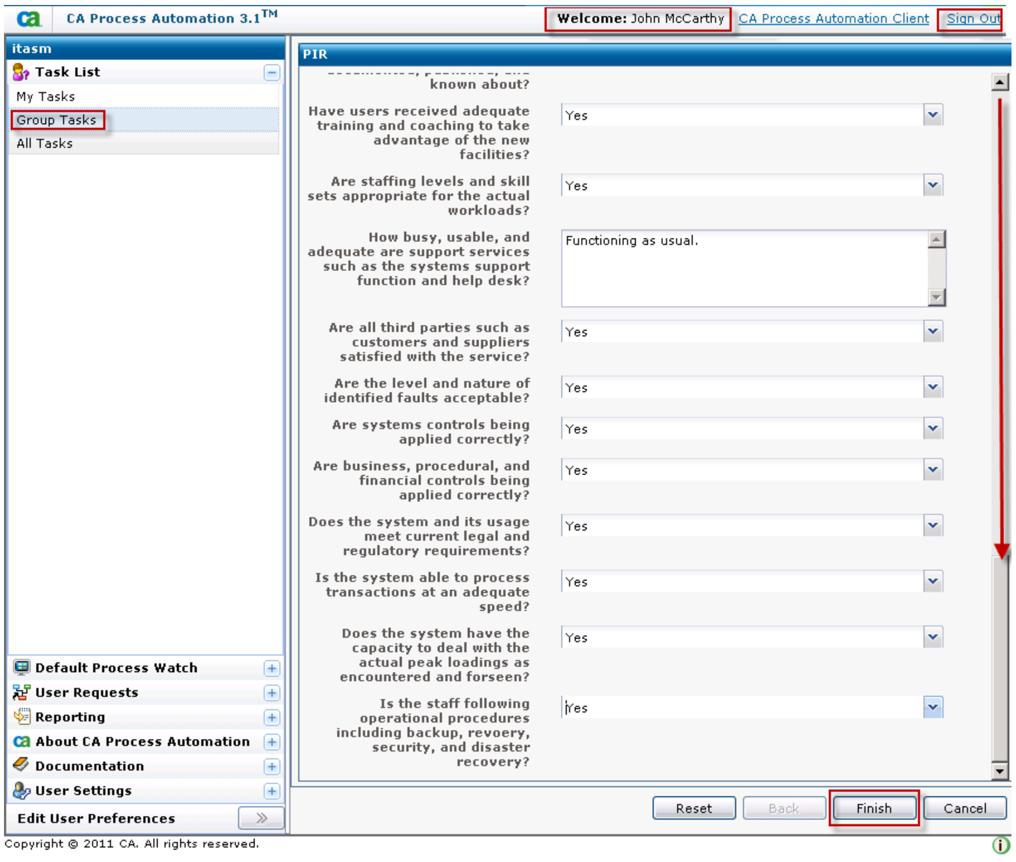


Task List

Task Id	Title	Description	Start Date	Due Date	Completion Date	Status	Assignees	Delegates
23006	PIR	Please complete Post Implementation Review.	Dec 1, 2011 5:19...			Pending	👤	👤

Copyright © 2011 CA. All rights reserved.

5. Complete the PIR Form, and click *Finish*. Log out of CA Process Automation.

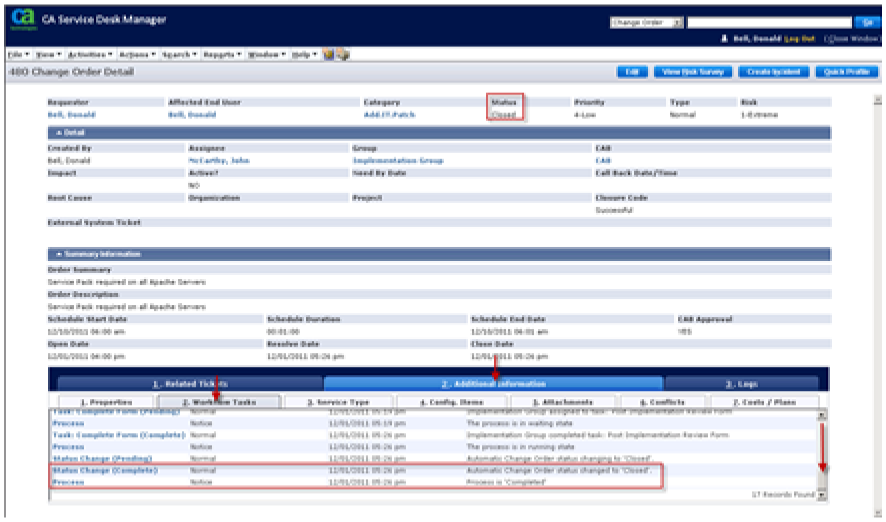


PIR

known about?	
Have users received adequate training and coaching to take advantage of the new facilities?	Yes
Are staffing levels and skill sets appropriate for the actual workloads?	Yes
How busy, usable, and adequate are support services such as the systems support function and help desk?	Functioning as usual.
Are all third parties such as customers and suppliers satisfied with the service?	Yes
Are the level and nature of identified faults acceptable?	Yes
Are systems controls being applied correctly?	Yes
Are business, procedural, and financial controls being applied correctly?	Yes
Does the system and its usage meet current legal and regulatory requirements?	Yes
Is the system able to process transactions at an adequate speed?	Yes
Does the system have the capacity to deal with the actual peak loadings as encountered and forseen?	Yes
Is the staff following operational procedures including backup, revoery, security, and disaster recovery?	Yes

Copyright © 2011 CA. All rights reserved.

6. Navigate back to the Change Order.



400 Change Order Detail

Requester	Affected End User	Category	Status	Priority	Type	Risk
Bell, Donald	Bell, Donald	Add.IT.Patch	Closed	4-Low	Normal	1-Extreme

Created By	Assignee	Group	CAB
Bell, Donald	McCarthy, John	Implementation Group	CAB
Impact	Active?	Need By Date	Call Back Date/Time
	NO		
Root Cause	Organization	Project	Closure Code
			Successful
External System Ticket			

Order Summary
Service Pack required on all Apache Servers
Order Description
Service Pack required on all Apache Servers

Schedule Start Date	Schedule Duration	Schedule End Date	CAB Approval
12/15/2011 06:00 am	00:01:00	12/15/2011 06:01 am	YES
Open Date	Resolve Date	Close Date	
12/01/2011 04:00 pm	12/01/2011 05:26 pm	12/01/2011 05:26 pm	

Task: Complete Form (Pending)	Normal	12/01/2011 05:19 pm	Implementation Group assigned to task: Post Implementation Review Form
Process	Notice	12/01/2011 05:19 pm	The process is in waiting state
Task: Complete Form (Complete)	Normal	12/01/2011 05:26 pm	Implementation Group completed task: Post Implementation Review Form.
Process	Notice	12/01/2011 05:26 pm	The process is in running state
Status Change (Pending)	Normal	12/01/2011 05:26 pm	Automatic Change Order status changing to 'Closed'.
Status Change (Complete)	Normal	12/01/2011 05:26 pm	Automatic Change Order status changed to 'Closed'.
Process	Notice	12/01/2011 05:26 pm	Process is 'Completed'

17 Records Found

The status of the CO is set to *Closed* as all steps in the Workflow are completed and the patch implementations were successful.

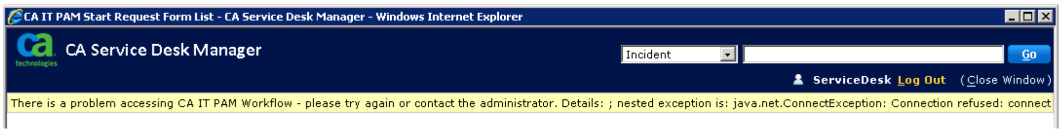
Common Integration Errors

Some common integration errors and typical resolution that is found when integrating CA SDM and CA Process Automation:

CA Process Automation Connection Error in the CA SDM Workflow Tasks Tab

Symptom:

You see a CA Process Automation Connection Error (such as *There is a problem accessing CA IT PAM Workflow – please try again or contact the administrator)* in the *Workflow Tasks* tab from a CA SDM Ticket, or when you try to associate a CA Process Automation SRF with a CA SDM ticket, or macro:


CA IT PAM Start Request Form List - CA Service Desk Manager - Windows Internet Explorer
CA Service Desk Manager
Incident
Go
ServiceDesk Log Out (Close Window)

There is a problem accessing CA IT PAM Workflow - please try again or contact the administrator. Details: ; nested exception is: java.net.ConnectException: Connection refused: connect

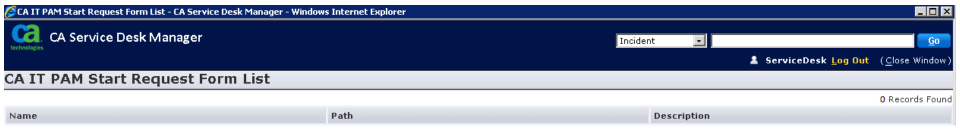
Solution:

To resolve this error, verify that CA Process Automation is up and running. If it is up and running, and you are able to access the CA Process Automation UI, verify that your Options Manager Options for CA Process Automation are correct. And the CA SDM services have been recycled following any changes.

Cannot View CA Process Automation SRF List

Symptom:

You do not see CA Process Automation SRFs when trying to associate an SRF with a CA SDM ticket or macro as shown in the following screenshot:


CA IT PAM Start Request Form List - CA Service Desk Manager - Windows Internet Explorer
CA Service Desk Manager
Incident
Go
ServiceDesk Log Out (Close Window)

CA IT PAM Start Request Form List

0 Records Found

Name	Path	Description

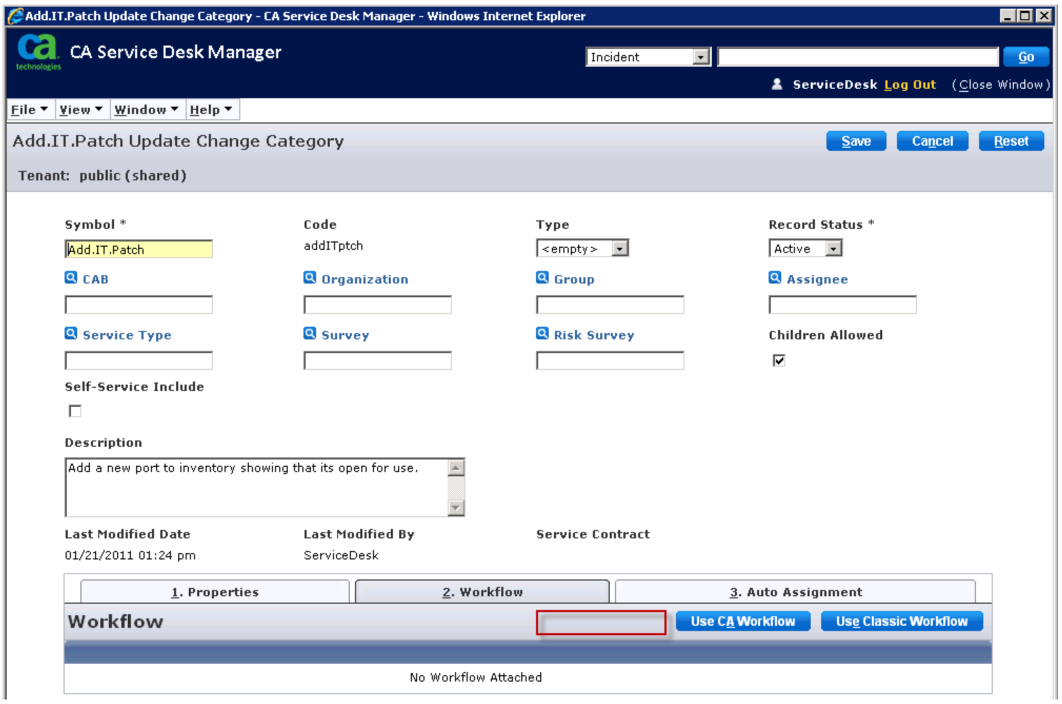
Solution:

This list usually indicates that you have no keyword that is associated with your CA Process Automation Process Definition. For more information on keywords, see section *Linking a CA Process Automation Process Definition with CA SDM.*

No option to Attach a CA Process Automation Workflow from a CA SDM Ticket Area or Category

Symptom:

You do not see the option to attach a CA Process Automation Workflow from within a CA SDM ticket Area or Category as shown in the following screenshot:



Add.IT.Patch Update Change Category

Tenant: public (shared)

Symbol *	Code	Type	Record Status *
Add.IT.Patch	addITptch	<empty>	Active
CAB	Organization	Group	Assignee
Service Type	Survey	Risk Survey	Children Allowed
			✓
Self-Service Include			

Description

Add a new port to inventory showing that its open for use.

Last Modified Date	Last Modified By	Service Contract
01/21/2011 01:24 pm	ServiceDesk	

Workflow

No Workflow Attached

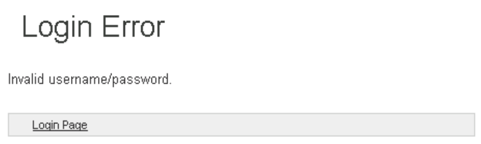
Solution:

This option usually means that you have not installed the Options Manager Options for CA Process Automation Workflow, or have not recycled the CA SDM Services following Options Manager Changes.

Login Errors when Accessing the Task List from CA Process Automation

Symptom:

You click a link to complete a task from the CA SDM Workflow Tasks tab and you see login error as shown in the following screenshot:



Login Error

Invalid username/password.

Solution:

Verify that when you exit the TaskList you properly logout of CA Process Automation.

Additional Best Practices Tips and Tricks Available Online

For additional best practices information including tips and tricks on testing and troubleshooting your CA Process Automation process definitions, see the CA Process Automation Best Practices page in the following URL:

[CA Process Automation Best Practices](#)

Integration Summary

The integration between CA SDM and CA Process Automation enables your organization to manage your Request, Incident, Problem, and Change Management processes.

Appendix A: Additional Information and Tips

Build_wsdl.bat

Create a .bat file named build_wsdl.bat and save it in the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis\ directory. Update the items in bold text as appropriate:

```
@ECHO off
::############################################################################
::# Batch file to Build and run a java test program.
::# Rename to run_java_test.bat and edit the SET statements to match the
::# installation of CA Service Desk.
::# The TEST_APP variable must be set to the name of the .java test program.
::#
::#  Usage: run_java_test.bat
::############################################################################
@REM Update with the PATH to the CA Service Desk $NX_ROOT location.
@SET USD_SHORT_PATH=C:\PROGRA~1\CA\SERVIC~1
@REM Update to the path to the CA Service Desk $NX_ROOT/java/lib location.
@SET USD_JAVA=%USD_SHORT_PATH%\java\lib
@REM Update to the path to the CA Shared Components location.
@SET CASHCOMP=C:\PROGRA~1\CA\SC
@SET
CP=%USD_JAVA%\axis.jar;%USD_JAVA%\axis-ant.jar;%USD_JAVA%\commons-discove
ry.jar;%USD_JAVA%\commons-logging.jar;%USD_JAVA%\jaxrpc.jar;%USD_JAVA%\sa
aj.jar;%USD_JAVA%\log4j-1.2.8.jar;%USD_JAVA%\wsdl4j.jar;%CASHCOMP%\JRE\1.
6.0_23\lib\rt.jar;%CASHCOMP%\tomcat\5.5.25\common\lib\mail.jar;.
@REM Verify the path to java.exe and javac.exe.
@REM You can obtain this by reviewing the NX.env file.
@REM Use the @NX_JRE_INSTALL_DIR variable to derive this information.
@SET JAVA_PATH=C:/Progra~1/CA/SC/JRE/1.6.0_23
@SET JAVA_EXE=%JAVA_PATH%/bin/java.exe
@REM Update this with the PATH to the JDK javac.exe compiler.
@SET JAVAC_EXE=%JAVA_PATH%/bin/javac.exe
: NXENV_TEST
IF EXIST %USD_SHORT_PATH%\NX.env GOTO EXE_TEST1
@ECHO.
@ECHO Could not find NX.env at %USD_SHORT_PATH%.  The USD_SHORT_PATH is
incorrect.
@ECHO Aborting process
@ECHO.
GOTO DONE
: EXE_TEST1
IF EXIST %JAVA_EXE% GOTO EXE_TEST2
@ECHO.
```

```
@ECHO Could not find java.exe at %JAVA_EXE%.
@ECHO Aborting process
@ECHO.
GOTO DONE
: EXE_TEST2
IF EXIST %JAVAC_EXE% GOTO SET_STUBS
@ECHO.
@ECHO Could not find javac.exe at %JAVAC_EXE%
@ECHO Aborting process
@ECHO.
GOTO DONE
::##############################################################################
::# WSDL2Java - creates the CA Service Desk client-side stub files in STUBS_DIR.
::# -w parameter required when using Axis 1.4 that comes with r12.
::# Remove this flag if using Axis 1.1.
::##############################################################################
: SET_STUBS
@SET STUBS_DIR=com\ca\www\UnicenterServicePlus\ServiceDesk
REM Check for USD_WebService.class to see if the stubs have been compiled.
IF EXIST %STUBS_DIR%\USD_WebService.class GOTO COMPILE_APP
REM Check for USD_WebService.java to see if the stubs have been generated.
IF EXIST %STUBS_DIR%\USD_WebService.java  GOTO COMPILE_STUBS
@ECHO.
@ECHO Generating the CA Service Desk Web Services stub files with WSDL2Java
@ECHO.
%JAVA_EXE% -cp %CP% org.apache.axis.wsdl.WSDL2Java -w
http://localhost:8080/axis/services/USD_R11_WebService?wsdl
::##############################################################################
::# Compile the CA Service Desk stub code.
::##############################################################################
: COMPILE_STUBS
@ECHO.
@ECHO Compiling the CA Service Desk Web Services stub files
@ECHO.
%JAVAC_EXE% -classpath %CP% -deprecation %STUBS_DIR%\ArrayOfInt.java
%JAVAC_EXE% -classpath %CP% -deprecation %STUBS_DIR%\ArrayOfString.java
%JAVAC_EXE% -classpath %CP% -deprecation %STUBS_DIR%\ListResult.java
%JAVAC_EXE% -classpath %CP% -deprecation %STUBS_DIR%\USD_WebService.java
%JAVAC_EXE% -classpath %CP% -deprecation
%STUBS_DIR%\USD_WebServiceLocator.java
%JAVAC_EXE% -classpath %CP% -deprecation
%STUBS_DIR%\USD_WebServiceSoap.java
%JAVAC_EXE% -classpath %CP% -deprecation
%STUBS_DIR%\USD_WebServiceSoapSoapBindingStub.java
: DONE
```

ZUpdateCr Method

Important! The following code is not provided with CA Unicenter Service Desk. It is a customization, and therefore is not supported by CA Support. If you want to use this code and have CA support it, you must complete a support agreement using CA Technology Services. Otherwise, you are responsible for the support of this utility and any questions or errors related to its use.

```
////////////////////////////////////////////////////////////////////////////
//////////////////////////////
//
// Method:      ZUpdateCr(...)
//
// Description: This FRAG file updates the status of a Request and add activity
log comment from
//              the command line using the bop_cmd command.
//
// Input:       RequestNo
//               User_id
//              New Status
//               Telealert Message
//
//              All parameters are required.
// Notes : Program validates Ref_Num, User_id and New_Status
// Usage Example:
// bop_cmd -f ZUpdateCr.frg "ZUpdateCr('Ref_Num', 'User_id', 'New_Status',
'Telalert Message')"
//
////////////////////////////////////////////////////////////////////////////
//////////////////////////////
string ZUpdateCr(string RequestNo, string assignee, string status, string
message)
{


         string errmsg;
         string assignee_search_key;
         assignee_search_key="userid";




 // Fetching the CR domset
 // belgl01 Comment : Validating that Request/Incident/Problem number exist
in Service Desk


send_wait(0,top_object(),"call_attr","cr","sync_fetch","RLIST_DYNAMIC",
format("ref_num ='%s'",RequestNo), -1,0);
         if (msg_error()) {
                        errmsg=format("Cant find DOMSET '%s':
'%s'\n",RequestNo, msg[0]);
                         _errmsg(errmsg);
```

```
                }



         object get_cr_domset;
         int domset_size;
         get_cr_domset = msg[0];
         domset_size = msg[1];
         if (domset_size != 1)
          {
                printf("\n");
             printf("The Request doesnt exist \n");
             printf("Enter a valid Request No \n");
             errmsg=format("Found %d records for '%s'\n", domset_size ,
RequestNo);
             _errmsg(errmsg);
          }

  // Get the CR dob
         send_wait(0,get_cr_domset, "dob_by_index", "DEFAULT", 0,0);
         if (msg_error())
         {
                      errmsg=format("Unable to get dob for  '%s':
'%s'\n",RequestNo, msg[0]);
                        _errmsg(errmsg);
          }
          object get_cr_dob;
          get_cr_dob = msg[0];


   // get a group leader so we can change things


        send_wait(0, top_object(), "get_co_group");
        if (msg_error()) {
                errmsg=format("Error in get_co_group: '%s'\n",msg[0]);
                 _errmsg(errmsg);
        }

        object group_leader;
        group_leader = msg[0];


   //Checkout the DOB

        send_wait(0,group_leader,"checkout",get_cr_dob);
         if (msg_error())
         {
                errmsg=format("Unable to checkout: '%s'\n",msg[0]);
                _errmsg(errmsg);
        }
   // Validate the status
                send_wait(0, top_object(), "call_attr", "crs",
"val_by_key", "sym",
                        status, (int) 1, "code");
                if (msg_error()) {
                    printf("Invalid status :'%s'\n",status);
                    printf("Please pass a valid Status");
                        errmsg=format("Can't find status '%s':
'%s'",status, msg[0]);
                        _errmsg(errmsg);
                        return;
                          }
               string status_code;
               status_code=msg[1];
               // printf("status='%s' code='%s'\n", status, status_code);

   //Update the Status
               if(status !='')
               {
               get_cr_dob.status=status_code;
               }



// get the agent who is making the log entry
  // belgl01 adding code to validate and define who is making the comment
submitted by Telalert.


//   Validate the assignee

                send_wait(0, top_object(), "call_attr", "agt",
"val_by_key", assignee_search_key,
                        assignee, (int) 1, "id");
                if (msg_error()) {
                        printf("Invalid assignee :'%s'\n",assignee);
                    printf("Please pass a valid Assignee");
                        errmsg=format("Can't find assignee '%s':
'%s'",assignee, msg[0]);
                        _errmsg(errmsg);
                        return;
                }

                uuid assignee_id;
                assignee_id=msg[1];

                string assignee_combo;
                 assignee_combo=expand(
format("&{'cnt:%s'=cnt.persistent_id->combo_name}", assignee_id));
                printf("assignee='%s' name='%s' id='%s'\n", assignee,
assignee_combo, assignee_id);
```

```
/////////////////////////////////////////////////////////////////////////
////////
       //     GET CR persid SECTION
       //////////////////////////////////////////////////////////////////
///////////////
       string cr_persid;

       if (!is_empty(RequestNo)) {
              send_wait(0, top_object(), "call_attr", "cr", "val_by_key",
"ref_num",
                     RequestNo, (int) 1, "persistent_id");
              if ( msg_error()) {
                     errmsg=format("ERROR: Error with cr lookup on ref_num:
'%s'", msg[0]);
                     _errmsg(errmsg);
                     return -1;
              }
              cr_persid = msg[1];
       }
       printf("\nref_num\t\t->\t'%s'\t\t(CR_PERSID = %s)",ref_num,
cr_persid);

       //////////////////////////////////////////////////////////////////
///////////////
       //     ACTIVITY LOG CREATE SECTION
       //////////////////////////////////////////////////////////////////
///////////////
       // Get new dob
       object new_actlog;
       send_wait(0, top_object(), "call_attr", "alg", "get_new_dob", NULL,
NULL, group_leader);
       if (msg_error()) {
              errmsg=format("ERROR: Error creating Activity Log dob:
'%s'",msg[0]);
              _errmsg(errmsg);
              return -1;
       }
       //printf("Got new dob\n");
       new_actlog = msg[0];

       new_actlog.description = message;
       new_actlog.action_desc = "Activity Log entered by " + assignee + " via
the ZUpdateCr.FRG file";
       new_actlog.call_req_id = cr_persid;
       new_actlog.time_stamp = now();
       new_actlog.analyst = assignee_id;
       new_actlog.type = "LOG";

       new_actlog.time_spent = 30;  // 30 secs
       send_wait(0, group_leader, "checkin");



           if (msg_error())
          {
                errmsg=format("Checkin Failed: '%s\n'",msg[0]);
                 _errmsg(errmsg);
        }
        else
        {
         string log_msg;
        log_msg += format("Status='%s' ",
get_cr_dob.status.sym,assigned_id);
        printf("Successfully Changed Status and Logged Comment from Telalert
for Request# '%s' ",RequestNo);

        return get_cr_dob.ref_num;
         }


  }
```

Build_wsdl.sh

This is example code for the build_wsdl.sh file. Update the items in **bold text** as appropriate and save the build_wsdl.sh file to the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis\ directory.

```
---------------Start of build_wsdl.sh script----------------

#!/bin/sh
############################################################################
##
# Script file to Build and run a sample java program.
# Rename to run_java_test.sh and edit the set statements to match your
# installation of CA Service Desk.
# The TEST_APP variable must be set to the name of the .java test program.
#
#  Usage: ./run_java_test.sh
############################################################################
##
TEST_APP=USDWSUtil
# TEST_APP=JWS
# TEST_APP=doquery_list
# TEST_APP=create_attachment
# TEST_APP=create_attmnt


# Update with the PATH to CA Service Desk $NX_ROOT location.
USD_SHORT_PATH=/opt/CA/ServiceDesk


# Update to the path to the CA Service Desk $NX_ROOT/java/lib location.
USD_JAVA=$USD_SHORT_PATH/java/lib


# Update to the path to the CA Shared Components location.
CASHCOMP=/opt/CA/SC

CP=$USD_JAVA/axis.jar:$USD_JAVA/axis-ant.jar:$USD_JAVA/commons-discovery.
jar:$USD_JAVA/commons-logging.jar:$USD_JAVA/jaxrpc.jar:$USD_JAVA/saaj.jar
:$USD_JAVA/log4j-1.2.8.jar:$USD_JAVA/wsdl4j.jar:$CASHCOMP/JRE/1.6.0_00/li
b/rt.jar:$CASHCOMP/tomcat/5.5.25/common/lib/mail.jar:.
```

```
# Verify the path to the java and javac executables.

# The JRE on some platforms does not include javac.  In these cases, you can
need to obtain the JDK.
JAVA_PATH=/opt/CA/SC/JRE/1.6.0_00
JAVA_EXE=$JAVA_PATH/bin/java
JAVAC_EXE=$JAVA_PATH/bin/javac


# Check to see if the NX.env file is at the USD_SHORT_PATH.
ls "$USD_SHORT_PATH/NX.env" 2> /dev/null | grep "NX.env" > /dev/null
if [ $? != 0 ]
   then
echo
echo "The NX.env file was not found at $USD_SHORT_PATH.  The USD_SHORT_PATH
is incorrect."
echo "aborting process"
echo
exit 1
fi


# Check to see if the java executable is at JAVA_EXE.
ls "$JAVA_EXE" 2> /dev/null | grep "java" > /dev/null
if [ $? != 0 ]
   then
echo
echo "The java executable was not found at $JAVA_EXE"
echo "aborting process"
echo
exit 1
fi



# Check to see if the javac executable is at JAVAC_EXE.
ls "$JAVAC_EXE" 2> /dev/null | grep "javac" > /dev/null
if [ $? != 0 ]
   then
echo
echo "The javac executable was not found at $JAVAC_EXE"
echo "aborting process"
echo
exit 1
fi


##########################################################################
##

# WSDL2Java - creates the CA Service Desk client-side stub files in STUBS_DIR.

# -w parameter required when using Axis 1.4 that comes with r12.
# Remove this flag if using Axis 1.1.

##########################################################################
##
STUBS_DIR=com/ca/www/UnicenterServicePlus/ServiceDesk

ls "$STUBS_DIR/USD_WebService.java" 2> /dev/null | grep
"$STUBS_DIR/USD_WebService.java" > /dev/null
if [ $? != 0 ]
   then
echo
echo "Generating the CA Service Desk Web Services client-side stub files"
echo
$JAVA_EXE -cp $CP org.apache.axis.wsdl.WSDL2Java -w
http://localhost:8080/axis/services/USD_R11_WebService?wsdl
fi



##########################################################################
##

# Compile the CA Service Desk stub code.

##########################################################################
##
ls "$STUBS_DIR/USD_WebService.class" 2> /dev/null | grep
"$STUBS_DIR/USD_WebService.class" > /dev/null
if [ $? != 0 ]
   then
echo
echo "Compiling the CA Service Desk Web Services stub files"
echo
$JAVAC_EXE -classpath $CP -deprecation $STUBS_DIR/ArrayOfInt.java
$JAVAC_EXE -classpath $CP -deprecation $STUBS_DIR/ArrayOfString.java
$JAVAC_EXE -classpath $CP -deprecation $STUBS_DIR/ListResult.java
$JAVAC_EXE -classpath $CP -deprecation $STUBS_DIR/USD_WebService.java
$JAVAC_EXE -classpath $CP -deprecation
$STUBS_DIR/USD_WebServiceLocator.java
$JAVAC_EXE -classpath $CP -deprecation $STUBS_DIR/USD_WebServiceSoap.java
$JAVAC_EXE -classpath $CP -deprecation
$STUBS_DIR/USD_WebServiceSoapSoapBindingStub.java
fi

-----------End of Script---------------
```

After you create the batch file, run it from the command line. Verify that you are running the file from the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis\ directory. After you run the batch file, the stub classes are in place and compiled.

After you complete all of the previous steps, run the following commands to recycle Apache Tomcat:

```
pdm_tomcat_nxd -c STOP
pdm_tomcat_nxd -c START
```

Note: Instead of running the previous commands, you can recycle CA SDM.

Pkilogin.htm

The following code is an example code for the pkilogin.htm file. Copy the following code into a new file, pkilogin.htm, and save it to the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis directory.

```
<html>
<head>
<title>PKI Login</title>
<style type="text/css">
TD{font-family: Verdana;}
.font1{color:#336699;font:bold 14px;}
.font2{color:#6A7A94;text-decoration:none;font:bold 11px;padding: 0px 6px
0px 6px;}
</style>
</head>
<body>
<form name="frmLoginPKI" method="post" action="pkilogin.jsp">
<table width=99% cellpadding=0 cellspacing=0>
<tr><td colspan=2><hr></td></tr>
<tr>
<td CLASS="font1" colspan=2 valign="center" align="center">Log in using PKI
and lookup User Handle</td>
</tr>
<tr><td colspan=2><hr></td></tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr>
<td CLASS="font2" align=right>Server Name:</td>
[assign the value for TD in your book]<input type=text id=server name=server
value="localhost"></td>
</tr>

<tr>
<td CLASS="font2" align=right>Port:</td>
[assign the value for TD in your book]<input type=text id=port name=port
value="8080"></td>
</tr>
<tr>
<td CLASS="font2" align=right>Directory:</td>
[assign the value for TD in your book]<input type=text id=dir name=dir
value="C:\Program Files\CA\Service
Desk\bopcfg\www\CATALINA_BASE\webapps\axis"></td>
</tr>
<tr>
<td CLASS="font2" align=right>Access Policy Name:</td>
[assign the value for TD in your book]<input type=text id=accessPolicy
name=accessPolicy value="DEFAULT"></td>
</tr>
<tr>
```

```
<td CLASS="font2" align=right>UserID to Lookup:</td>
[assign the value for TD in your book]<input type=text id=userId name=userId
value="ServiceDesk"></td>
</tr>
<tr>
<td CLASS="font2" align=right>Protocol (http/https):</td>
[assign the value for TD in your book]<input type=text id=protocol
name=protocol value="http"></td>
</tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr>
<td colspan=2 align=center><input type="submit" value="Log me in!"></td>
</tr>
</table>
</form>
</body>
</html>
```

Pkilogin.jsp

Create a JSP file named pkilogin in the $NX_ROOT\bopcfg\www\CATALINA_BASE\webapps\axis directory and copy the following example code into the new pkilogin.jsp file.

```
<!-- pkilogin.jsp -->
<%@ page
import="com.ca.www.UnicenterServicePlus.ServiceDesk.ArrayOfString" %>
<%@ page
import="com.ca.www.UnicenterServicePlus.ServiceDesk.USD_WebServiceLoc
ator" %>
<%@ page
import="com.ca.www.UnicenterServicePlus.ServiceDesk.USD_WebServiceSoa
p" %>
<%@ page import="java.io.FileInputStream" %>
<%@ page import="java.net.URL" %>
<%@ page import="java.security.KeyStore" %>
<%@ page import="java.security.PrivateKey" %>
<%@ page import="java.security.Signature" %>
<%@ page import="org.apache.axis.encoding.Base64" %>
<html>
<head>
<title>Login...</title>
<style type="text/css">
TD{font-family: Verdana;}
.font1{color:#336699;font:bold 14px;}
.font2{color:#6A7A94;text-decoration:none;font:bold 11px;padding: 0px
6px 0px 6px;}
</style>
</head>
<body>
<table width=99% cellpadding=0 cellspacing=0>
<tr><td colspan=2><hr></td></tr>
<tr>
<td width="10">&nbsp;</td>
<td class="font1" valign="middle" align="left">Service Desk - Attempting
to Login using PKI</td>
</tr>
<tr><td colspan=2><hr></td></tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr>
<td width=10>&nbsp;</td>
<td class=font2>
<p>
<%


// Collect the variables sent from the HTML page.

String server = request.getParameter("server");
String port = request.getParameter("port");
String dir = request.getParameter("dir");
String accessPolicy = request.getParameter("accessPolicy");
String userId = request.getParameter("userId");
String protocol = request.getParameter("protocol");


// Initialize some additional variables.

String endPoint = protocol + "://" + server + ":" + port +
"/axis/services/USD_R11_WebService";

int SID;
String userHandle;
String bopSid;


// Now let's get started.
try
{

// create a new web service instance.
USD_WebServiceLocator ws = new USD_WebServiceLocator();
java.net.URL url = new java.net.URL(endPoint);
USD_WebServiceSoap usd = ws.getUSD_WebServiceSoap(url);
out.print("Created USD_WebServiceSoap object usd<p>");


// Now proceed with PKI togin.

// Getting the appropriate Keystore instance to load the .p12 file.
KeyStore ks = KeyStore.getInstance ( "PKCS12" );


// loading the certificate, the second parameter is null and refers to an optional

// password associated with the certificate, in this case there is not
ks.load( new FileInputStream( dir + "/" + accessPolicy + ".p12" ), null);


// Creating a password to be used when extracting the private key, it's the

// same as the name of the access policy.
char[] privateKeyPassword = accessPolicy.toCharArray();


// Extracting the private key, the first parameter is the alias associated

// with the key which is "servicedesk <accessPolicy>"(all lower case);

// the second parameter is the password to extract the key (this defaults to

// the Access Policy name as well ... when using pdm_pki utility).
PrivateKey key = (PrivateKey) ks.getKey("servicedesk " +
accessPolicy.toLowerCase(), privateKeyPassword);


// Creating an instance of the signature class to create a digital signature

// of the private key...must use the SHA1withRSA algorithm.
Signature s = Signature.getInstance("SHA1withRSA");
// Initializing the signature with the private keys.initSign(key);

// Updating the signature with the access policy.
s.update(accessPolicy.getBytes());


// Creating the digital signature.
byte sig[] = s.sign();


// Converting the signature to BASE64 text format to pass into loginServiceManaged.
String encryption = Base64.encode(sig);


// Logging into Service desk using the access policy as the first parameter

// and the BASE64 text we created earlier, returning a sessionid.
String sessionid = usd.loginServiceManaged(accessPolicy,encryption);
SID=Integer.parseInt(sessionid);
out.print("Login was successful, got Session ID of '" + SID + "'<p>");


// Now lookup the UserId's handle.
userHandle = usd.getHandleForUserid(SID, userId);
out.print("Got user handle for " + userId + " of '" + userHandle + "'<p>");


// Now get a BOPSID.
bopSid = usd.getBopsid(SID, userId);
out.print("Got BOPSID for " + userId + " of '" + bopSid + "'<p>");
out.print("<a
href="+protocol+"://"+server+":"+port+"/CAisd/pdmweb.exe?BOPSID="+bop
Sid+" target=_new>Click here VERY SOON to login seamlessly using the
BOPSID as user "+userId+"</a><p>");


// Now logout.
usd.logout(SID);
out.print("Logout was successful<p>");
}
catch(Exception e)
{
out.print("Error Message: " + e.getMessage() + "<p> Additional Details:
" + e.toString());
}
%>
</td>
</tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr><td colspan=2>&nbsp;</td></tr>
<tr>
<td align="center" colspan=2>
<input onclick="window.location='pkilogin.htm';" type="button"
value="Try Again" tabindex=1>
</td>
</tr>
</table>
```

```
</body>
</html>
```

Log4j.properties

Create the file %NX_ROOT%\bopcfg\www\CATALINA_BASE\webapps\axis\WEB-INF\classes\log4j.properties by copying/pasting the following text example into your file. Replace the path C:/PROGRA~1/CA/SERVIC~1/log/jsrvrbop.log in the text file with the relevant path on your system. In addition, use equivalent short name paths because long name paths with spaces do not work.

```
---------------Start of
log4j.properties----------------------------------------------------
# $Id: log4j.properties.tpl,v 1.5 2005/11/01 23:35:08 kubtr01 Exp $
# Created: 03/12/04
#----------------------------------------------------------------------
# Description:
# Unicenter ServicePlus log4j configuration

# Default output is a set of ten files in $NX_ROOT/log/jsrvr.log.
# Messages of level error and above are also echoed to the console.

log4j.rootCategory=debug, axislog

log4j.appender.axislog=org.apache.log4j.RollingFileAppender
log4j.appender.axislog.File=C:/PROGRA~1/CA/SERVIC~1/log/axis.log
log4j.appender.axislog.MaxBackupIndex=9
log4j.appender.axislog.MaxFileSize=30MB
log4j.appender.axislog.layout=org.apache.log4j.PatternLayout
log4j.appender.axislog.layout.ConversionPattern=%d{MM/dd
HH:mm:ss.SSS}[%t] %-5p %c{1} %L %m %n

log4j.appender.stdout=org.apache.log4j.ConsoleAppender
log4j.appender.stdout.Threshold=error
log4j.appender.stdout.layout=org.apache.log4j.PatternLayout
log4j.appender.stdout.layout.ConversionPattern=[%t] %-5p %c{1} %L %m %n
!log4j.appender.stdout.layout.ConversionPattern=%d{MM/dd hh:mm:ss.SSS}
%t%- 5p %F %L %m %n

# Default bop_logging output from Java applications is a set of three files written to
$NX_ROOT/log/jsrvrbop.log
# Bop_logging is only produced if the loglevel is set to debug.

log4j.logger.bop_logging=info, jsrvrboplog
log4j.appender.jsrvrboplog=org.apache.log4j.RollingFileAppender
log4j.appender.jsrvrboplog.File=C:/PROGRA~1/CA/SERVIC~1/log/jsrvrbop.log
log4j.appender.jsrvrboplog.MaxBackupIndex=30
log4j.appender.jsrvrboplog.MaxFileSize=30MB
log4j.appender.jsrvrboplog.layout=org.apache.log4j.PatternLayout
log4j.appender.jsrvrboplog.layout.ConversionPattern=%m %n

# Default log level for pdm_rpc package.
log4j.logger.com.ca.ServicePlus.pdm_rpc=DEBUG
```

```
log4j.logger.usdjws65=DEBUG
---------------End of log4j.properties----------------
```

Perf.bat

Copy the following example code to a text file and save it as perf.bat.

```
- - - - - - - - - START of perf.bat - - - - - - - - -
REM Performance Monitoring batch file.
REM You MUST download the free PSList.exe file from Microsoft to enable the
PSList functionality.
REM http://www.microsoft.com/technet/sysinternals/utilities/pslist.mspx.
REM Place this to the same folder as the batch file is saved, or to a path
location such as
REM C:\WINDOWS or similar.
REM You MUST configure MS Windows Task Scheduler to run this batch file every
three minutes in
REM in order to get benefit from it. Running it less frequently may not capture
important
REM information at the time of a problem and must only be done after
consultation with
REM CA Technical Support.
REM In general, this batch files is not expected to have an adverse effect
on a fully patched production system. The commands take only a small amount
of time to run.
echo Start time >> c:\perfout\perf.out
echo %DATE% %TIME% >> c:\perfout\perf.out
echo %DATE% %TIME% >> c:\perfout\stat.out
pdm_webstat >> c:\perfout\stat.out
slstat >> c:\perfout\stat.out
pdm_status >> c:\perfout\stat.out
echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\stat.out
echo %DATE% %TIME% >> c:\perfout\listconn.out
pdm_listconn -s -c >> c:\perfout\listconn.out
echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\listconn.out
echo %DATE% %TIME% >> c:\perfout\netstat_an.out
netstat -an >> c:\perfout\netstat_an.out
echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\netstat_an.out
echo %DATE% %TIME% >> c:\perfout\db_report.out
db_report >> c:\perfout\db_report.out

echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\db_report.out
echo %DATE% %TIME% >> c:\perfout\pdm_vdbinfo.out
pdm_vdbinfo >> c:\perfout\pdm_vdbinfo.out
echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\pdm_vdbinfo.out

echo %DATE% %TIME% >> c:\perfout\pslist_mem.out
pslist.exe -m >> c:\perfout\pslist_mem.out
echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\pslist_mem.out
echo %DATE% %TIME% >> c:\perfout\pslist_CPU.out
pslist.exe >> c:\perfout\pslist_CPU.out
echo -=-=-=-=-=-=-=-=-=-=-=-= >> c:\perfout\pslist_CPU.out
echo End time >> c:\perfout\perf.out
echo =+=+=+=+=+=+=+=+=+=+=+=+ >> c:\perfout\perf.out
- - - - - - - - - END - - - - - - - - -
```