

ca Opscenter

## Case Study: Learn How Expeditors Uses APM as Both a Technology and Process Transformation Initiative

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OCX13S #CAWorld



# Abstract

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Operations  
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Certified CA APM  
Professional

This session will highlight how Expeditors implemented CA APM as both a technology and process transformation by covering the aspects of planning, deployment, instrumentation and end-user adoption across the enterprise. Special focus will be on the challenges posed by Expeditors' unique architecture and how those challenges were addressed. Expeditors takes great pride in being a solutions-based organization that takes time to understand and address each customer's individual business needs through customized solutions and seamless, integrated information systems. In this session, Expeditors will discuss its CA APM implementation as both a technology and process transformation initiative. The session will cover the aspects of planning, deployment, instrumentation and end-user adoption across the enterprise. Special focus will be on the challenges posed by Expeditors' unique architecture, how those challenges were addressed, and some of the benefits and value gained.

# Agenda

1

INTRODUCTIONS

2

CHALLENGES AND STRATEGY

3

TECHNOLOGY, PEOPLE AND PROCESS

4

KEY LESSONS

5

Q&A

## MISSION STATEMENT

*To set the standard for excellence in global logistics through total commitment to quality in people and customer service, with superior financial results.*

## About Expeditors International of Washington, Inc.

Expeditors is a non-asset based **global logistics company** headquartered in Seattle, Washington. Expeditors satisfies the increasingly sophisticated needs of international trade through **customized solutions** and seamless, integrated information systems. Our services include the consolidation and forwarding of air or ocean freight, customs brokerage, vendor consolidation, cargo insurance, time-definite transportation, order management, warehousing, distribution and customized logistics solutions. Through **organic growth** we give our clients and employees peace of mind knowing that their day to day business won't be disrupted by merger pains.

Founded	Global headquarters	Regional headquarters	Locations	People
1979	Seattle, Washington	London, Shanghai, Sao Paulo, Beirut	250 across six continents	13,900+

# Enterprise Monitoring

Part of IT operations management

## Departmental objective

A simple, consistent, dependable production environment targeting no unplanned downtime that supports our ever-changing global logistics business

Enterprise monitoring is a team of dedicated staff.

- Two developers, two systems analysts, one business analyst, one project manager
- Responsible for assessing needs, managing and improving tools, maintaining data, advocating analysis and promoting education

# Challenges and Strategy

# Challenges

A three-part problem

## Environment

How do you build an Application Performance Management (APM) environment to handle a complex environment?

- 200+ data centers
- 250+ unique, home-grown application code bases
- Numerous proprietary frameworks
- 2,000+ unique possible agents

## Expertise

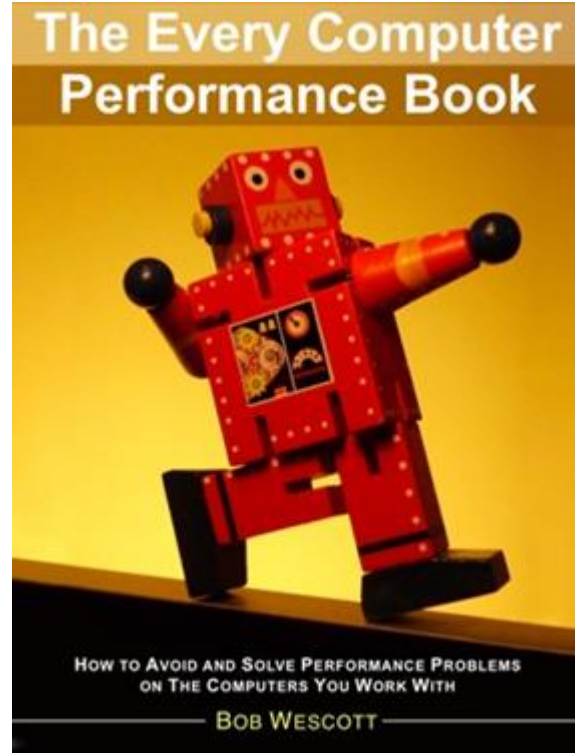
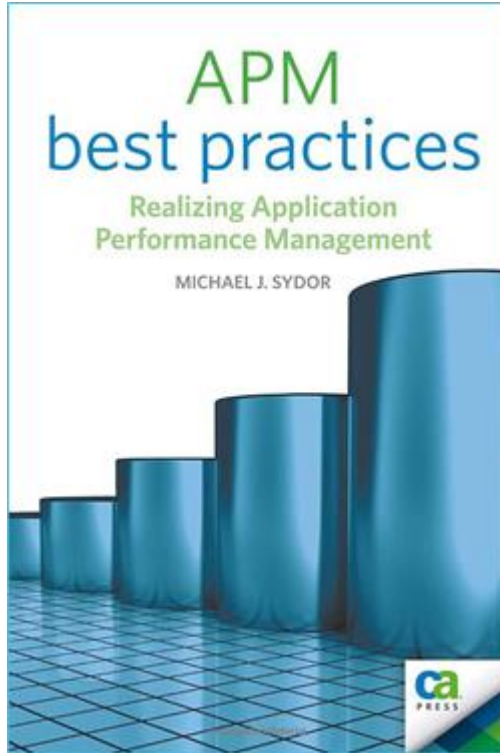
With no existing APM, Business Process Management (BPM) or Service Level Management (SLM) programs, how do you build the knowledge necessary to successfully implement?

## Adoption

With a new, sometimes overwhelmingly large, data set, how do you build trust in the data and encourage its use in decision-making?

# Planning

Get your APM experts on the same page—literally.



CA APM for Java r9.0

Introduction 200

Student Guide

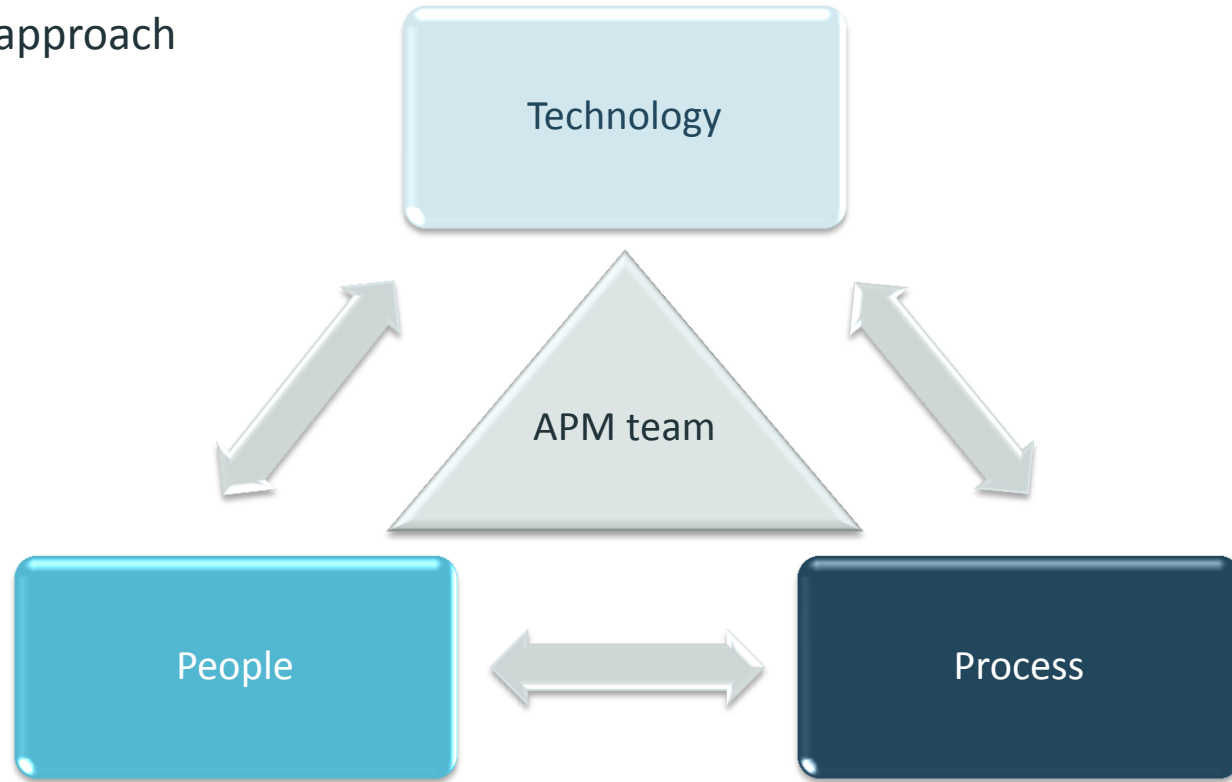
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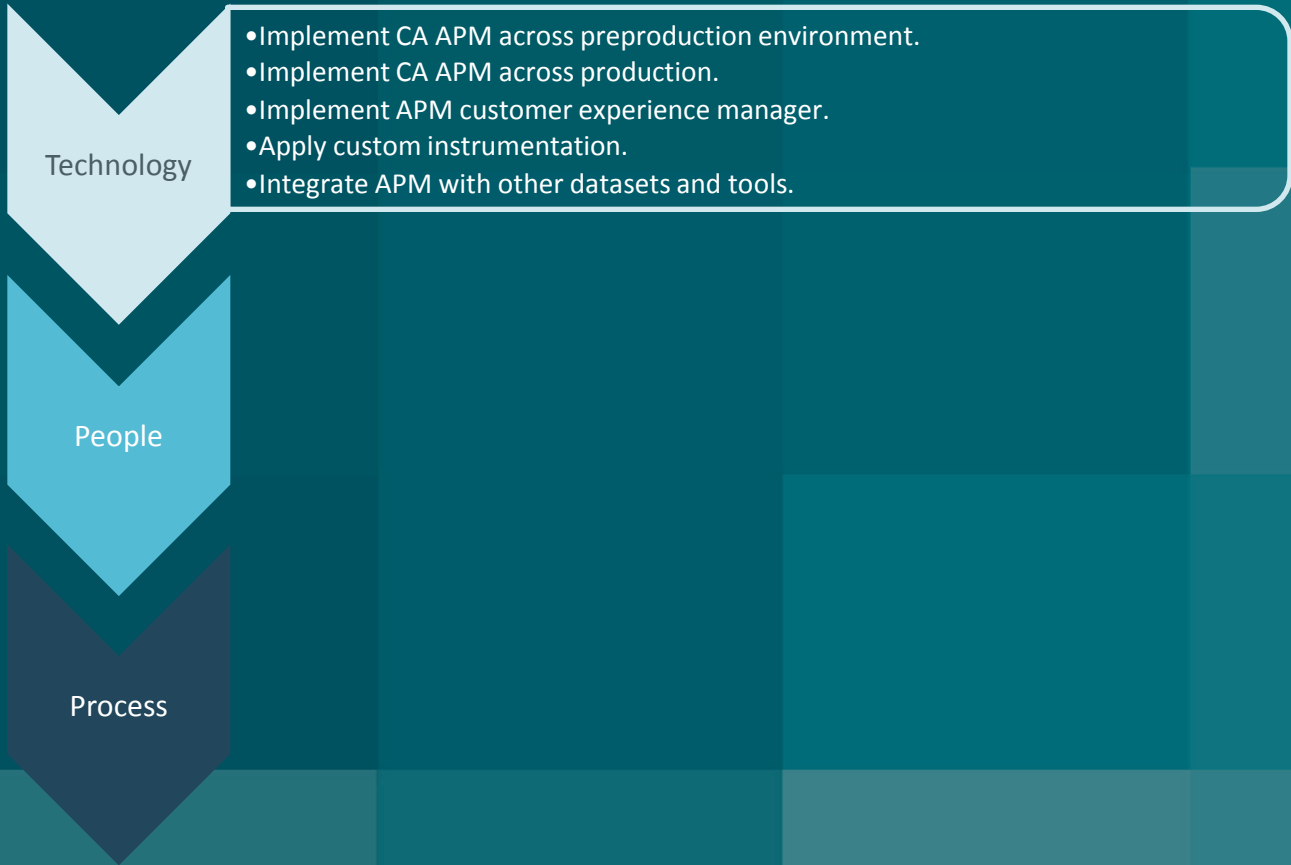




# Strategy

A three-tier approach





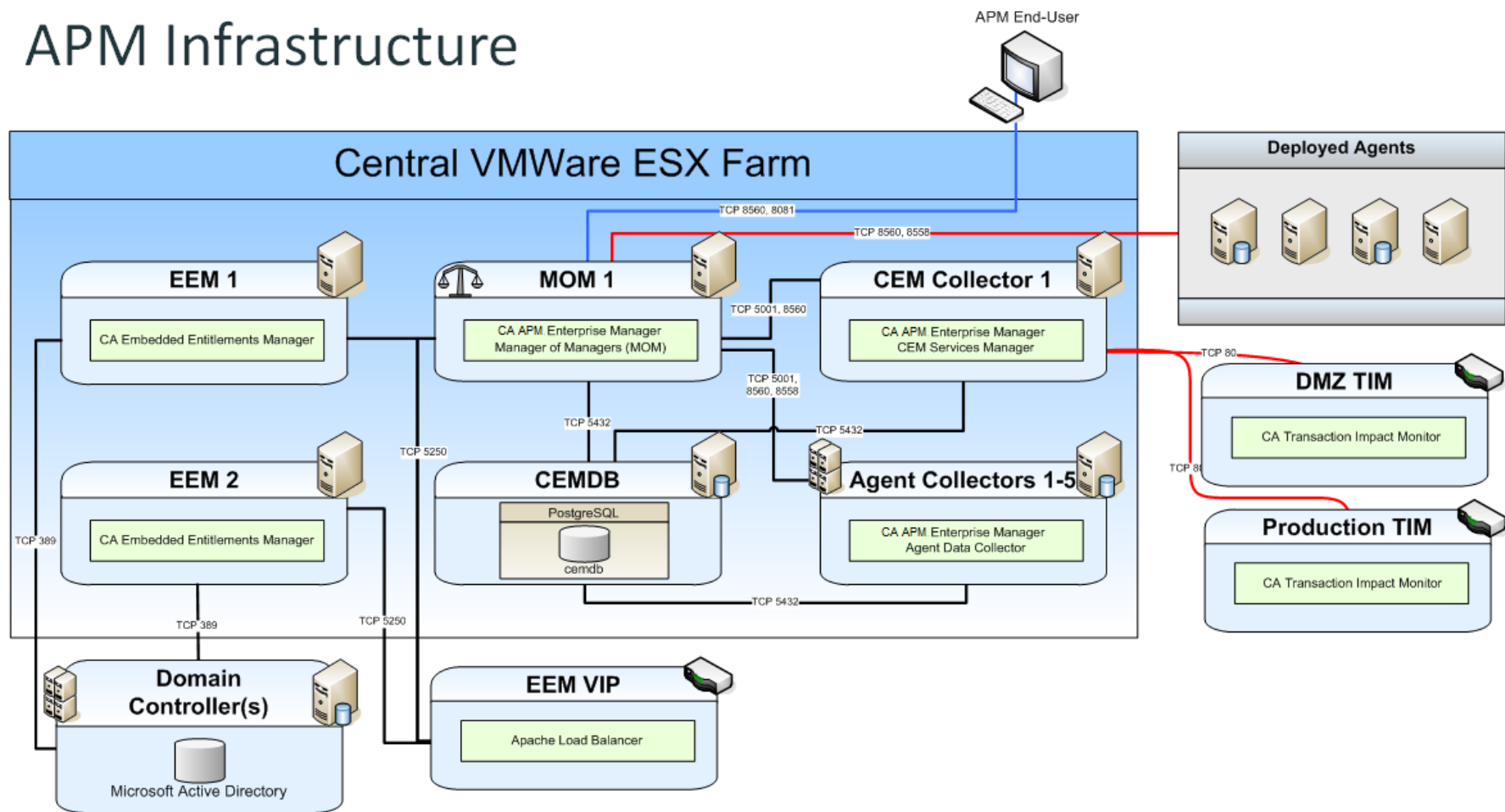
Technology

- Implement CA APM across preproduction environment.
- Implement CA APM across production.
- Implement APM customer experience manager.
- Apply custom instrumentation.
- Integrate APM with other datasets and tools.

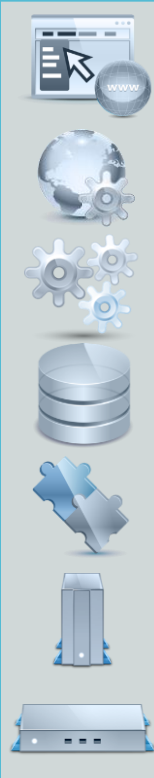
People

Process

# APM Infrastructure

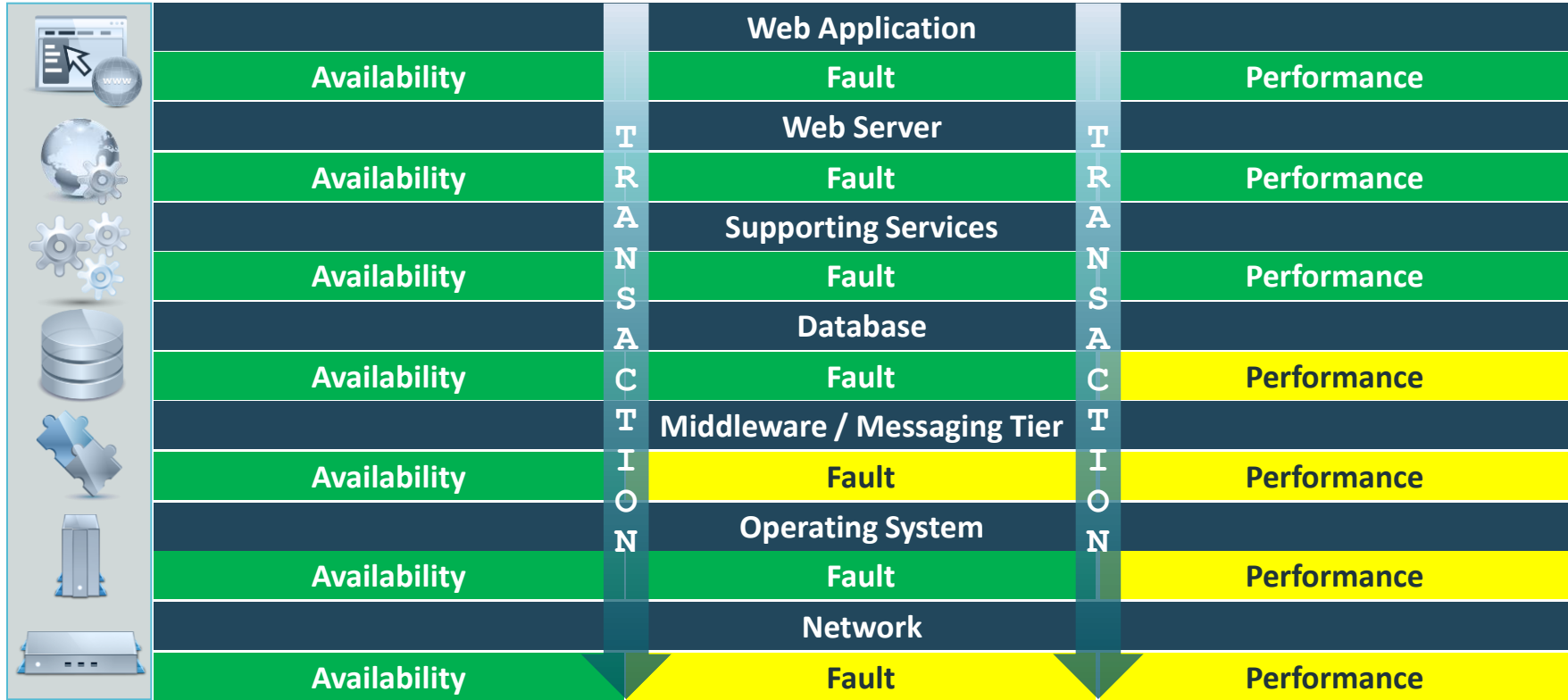
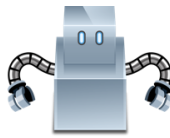


# Before APM



Web Application		
Availability	Fault	Performance
Web Server		
Availability	Fault	Performance
Supporting Services		
Availability	Fault	Performance
Database		
Availability	Fault	Performance
Middleware/Messaging Tier		
Availability	Fault	Performance
Operating System		
Availability	Fault	Performance
Network		
Availability	Fault	Performance

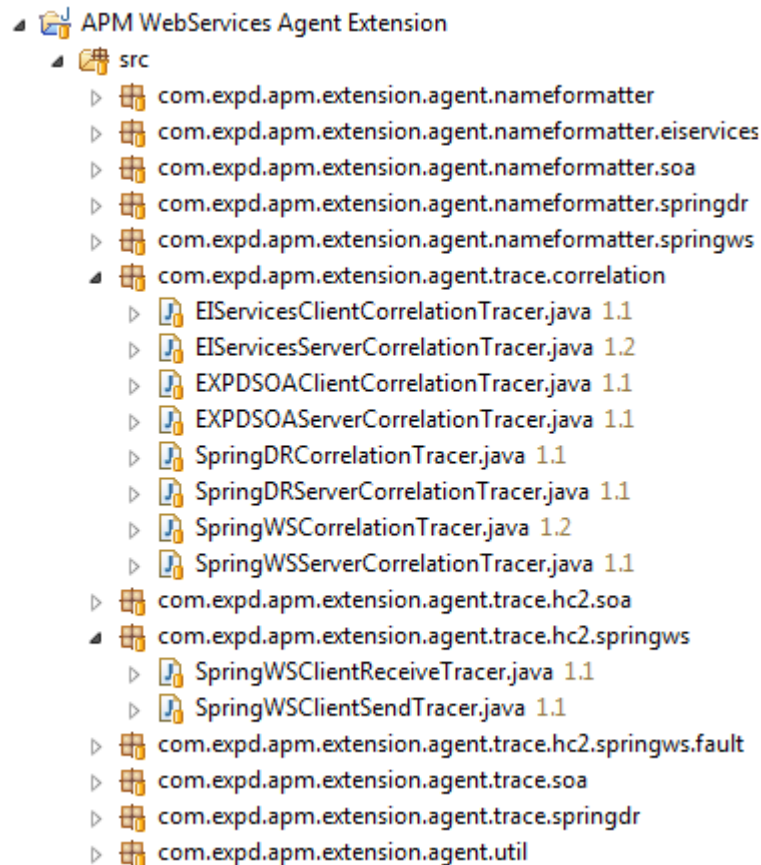
# After APM



# Custom Support

Shining a light in dark places

- CA APM community library
- Worked with pre-sales team
- Created 14 custom agent extensions
  - 41 new tracers
  - 23 new nameformatters
  - Five new services



# GeoIP APM-CEM Plugin

Grouping users by geography, not subnet

- Custom APM-CEM plugin
- Groups users by using GeoLocation
- Multiple grouping options
  - Country
  - State
  - Time-zone
  - And more

Currently available on the CA APM Community!

User Groups

CA CEM user groups can be created automatically, or you can create them manually.

User Groups | User Search

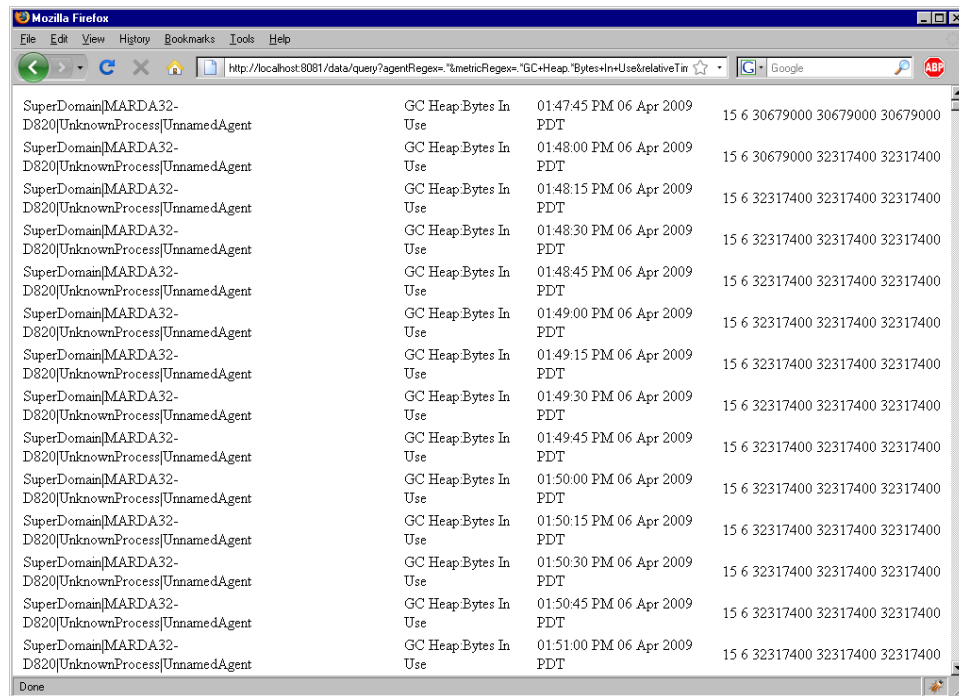
New Delete

<input type="checkbox"/>	Name	Impact Level	Active Users	Inactive Users
<input type="checkbox"/>	Bolivia, America/La_Paz	Medium (Default)	5	0
<input type="checkbox"/>	Botswana, Africa/Gaborone	Medium (Default)	1	0
<input type="checkbox"/>	Brazil, America/Araguaina	Medium (Default)	1	0
<input type="checkbox"/>	Brazil, America/Campo_Grande	Medium (Default)	32	0
<input type="checkbox"/>	Brazil, America/Cuiaba	Medium (Default)	1	0
<input type="checkbox"/>	Brazil, America/Manaus	Medium (Default)	2	0
<input type="checkbox"/>	Brazil, America/Recife	Medium (Default)	7	0
<input type="checkbox"/>	Brazil, America/Sao_Paulo	Medium (Default)	243	3
<input type="checkbox"/>	Brazil, Unknown Time Zone	Medium (Default)	230	1
<input type="checkbox"/>	Bulgaria, Europe/Sofia	Medium (Default)	3	0
<input type="checkbox"/>	Cambodia, Asia/Phnom_Penh	Medium (Default)	58	6
<input type="checkbox"/>	Canada, America/Edmonton	Medium (Default)	96	25
<input type="checkbox"/>	Canada, America/Halifax	Medium (Default)	5	0
<input type="checkbox"/>	Canada, America/Montreal	Medium (Default)	96	6
<input type="checkbox"/>	Canada, America/Rainy_River	Medium (Default)	539	38
<input type="checkbox"/>	Canada, America/Regina	Medium (Default)	1	0
<input type="checkbox"/>	Canada, America/St_Johns	Medium (Default)	39	4
<input type="checkbox"/>	Canada, America/Vancouver	Medium (Default)	220	3
<input type="checkbox"/>	Canada, America/Winnipeg	Medium (Default)	5	0
<input type="checkbox"/>	Canada, Unknown Time Zone	Medium (Default)	111	10
<input type="checkbox"/>	Chile, America/Santiago	Medium (Default)	78	0
<input type="checkbox"/>	Chile, Chile/Continental	Medium (Default)	7	0
<input type="checkbox"/>	China, Asia/Chongqing	Medium (Default)	957	90
<input type="checkbox"/>	China, Asia/Harbin	Medium (Default)	129	8
<input type="checkbox"/>	China, Asia/Shanghai	Medium (Default)	1078	55

177 items found, displaying 26 to 50. [First/Prev] 1, 2.

# EasyIntegrationKit – Enhanced

- A Web service that allows for direct use of APM metrics in external tools:
  - Includes CA APM-CEM statistical data, defect data and incident data
  - String metric extraction
  - New export formats
  - Enhanced UTF-8 to support and content type selection to enabled SAS integration



The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://localhost:8081/data/query?agentRegex='.*metricRegex='GC+Heap+Bytes+In+Use+relativeTir`. The main content area displays a table with 15 rows of APM metrics. Each row contains five columns of data: a hierarchical identifier, a metric name, a timestamp, and three numerical values.

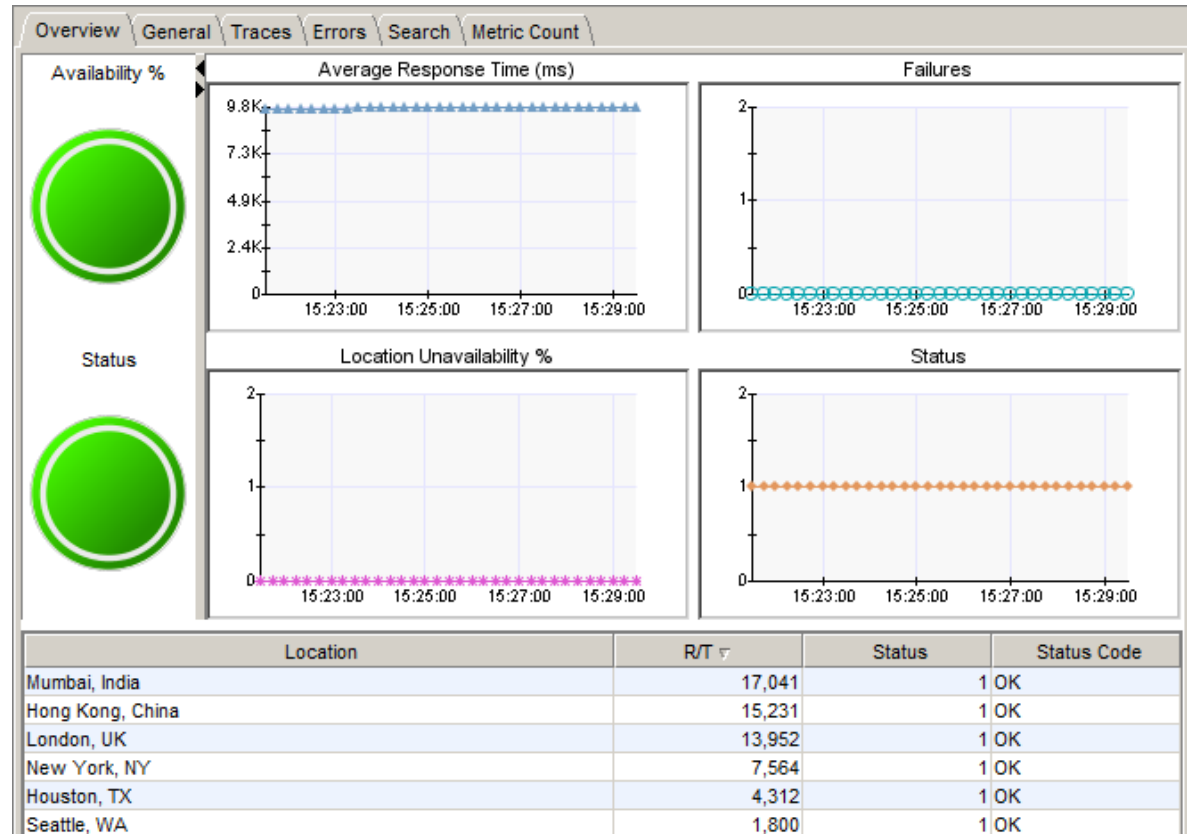
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:47:45 PM 06 Apr 2009 PDT	15	6	30679000	30679000	30679000
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:48:00 PM 06 Apr 2009 PDT	15	6	30679000	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:48:15 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:48:30 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:48:45 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:49:00 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:49:15 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:49:30 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:49:45 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:50:00 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:50:15 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:50:30 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:50:45 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400
SuperDomain[MARDA32-D820]UnknownProcess[UnnamedAgent]	GC Heap:Bytes In Use	01:51:00 PM 06 Apr 2009 PDT	15	6	32317400	32317400	32317400

Soon to be available on the CA APM Community!



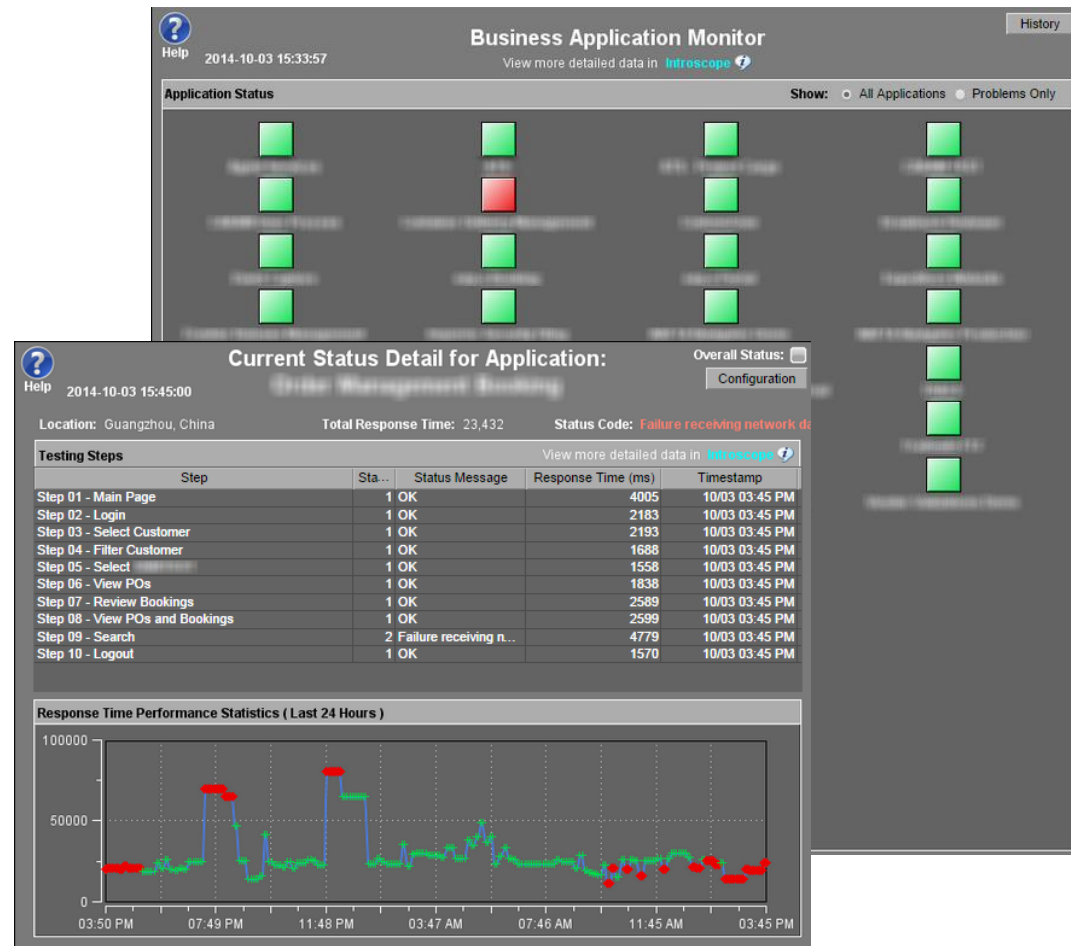
# Synthetic Transactions

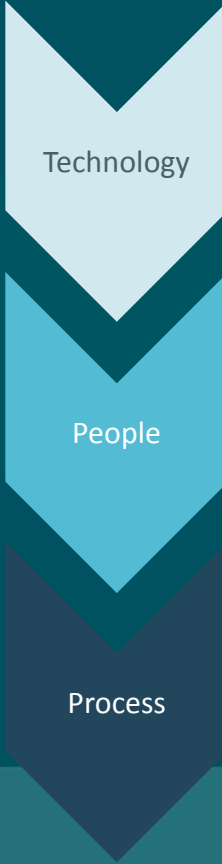
- Third-party service
  - Like CA App Synthetic Monitor (formerly, Cloud Monitor)
- Custom Java EPMagent to query API and report to CA APM



# Synthetic Transactions

- Used EasyIntegrationKit to bring data into other dashboarding solutions
- Provides URL links back to CA APM workstation for more granular and historical data
- Brings more users into CA APM





### Technology

- Implement CA APM across preproduction environment.
- Implement CA APM across production.
- Implement customer experience manager.
- Apply custom instrumentation.
- Integrate APM with other datasets and tools.

### People

- Define appropriate roles and responsibilities with APM.
- Provide targeted, internal training for each role.
- Partner with technical experts to reduce visibility gaps and add additional context.

### Process

# Role Definitions

APM Role	Permissions
APM Analyst	View graphs and metrics.
APM Incident Analyst	Run a transaction trace session for an agent.* Mount and un-mount agents for historical data. Perform thread dumps for detailed diagnostics.*
APM-CEM Role	Permissions
CEM Analyst	View service level agreement information. Analyze graphs and trends.
CEM Incident Analyst	Review, troubleshoot and close incidents. Search for defects by individual username. Run transaction trace from CA CEM for diagnostics.*
CEM Configuration Administrator	Modify service level agreement thresholds. Adjust defect thresholds. Record and edit business transaction definitions.

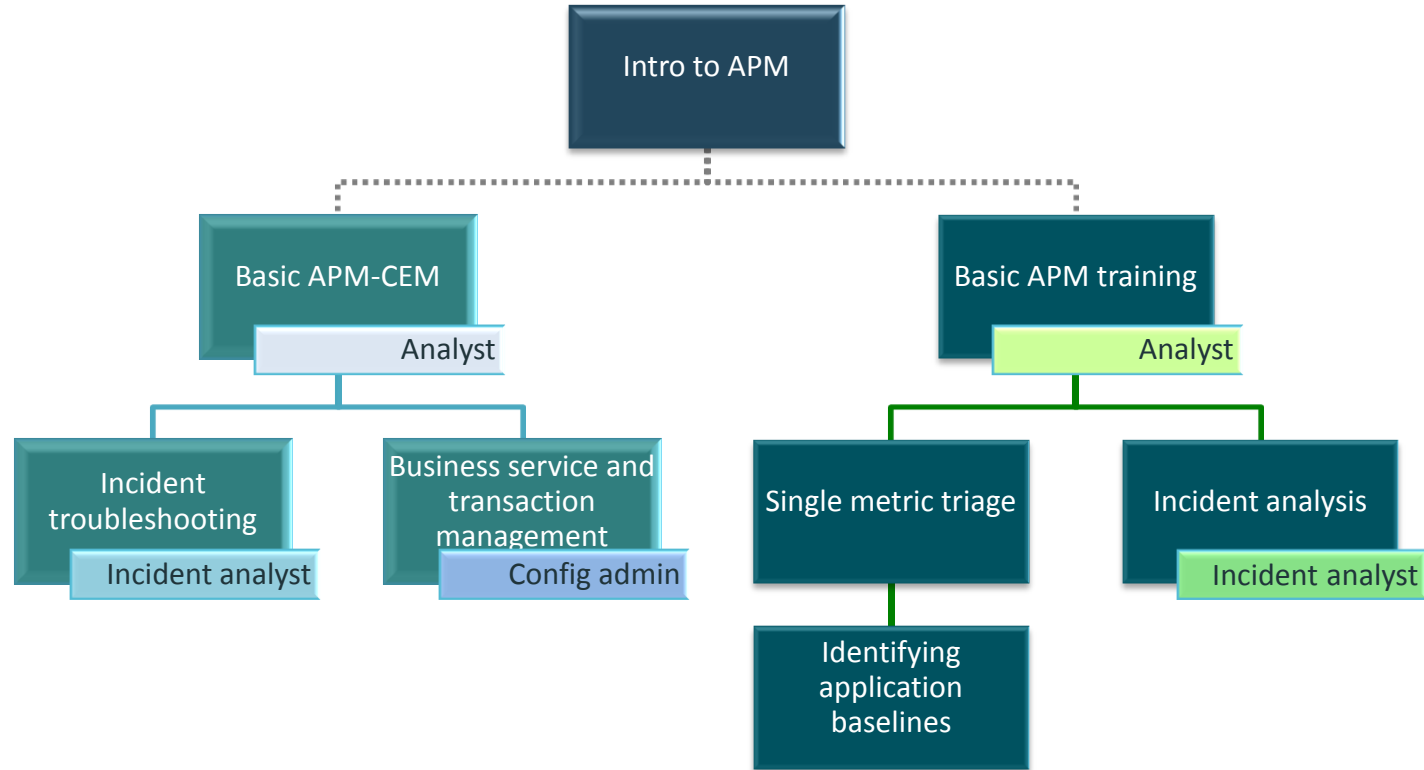
*\*May increase overhead on application. Required training provides information on assessing risk.*

# Suggested Roles by Job Function

Function	Interest in APM	Basic user	Power user
Support	Ability to assess the impact of a performance problem Ability to troubleshoot and more accurately escalate performance issues	CEM Incident Analyst Isc Analyst	CEM Incident Analyst Isc Incident Analyst
Quality assurance	Visualization of dependencies and dependency performance Compare transaction times and component transactions times between tests and across environments	CEM Analyst Isc Analyst	CEM Incident Analyst Isc Incident Analyst (esp. Dev in Test)
Development	Identify possible performance bottlenecks earlier in the lifecycle, diagnose performance problems, prioritize bug fixes.	CEM Analyst Isc Analyst	CEM Analyst Isc Incident Analyst
Business analyst	Measure against performance and scalability requirements. Analyze usage patterns. Assess current thresholds and defect settings.	CEM Analyst	CEM Configuration Administrator Isc Analyst
Project manager	Prioritize bug fixes, prioritize work on improving performance.	CEM Analyst Isc Analyst	CEM Analyst Isc Analyst
Business owner/ manager	View dashboards and reports regarding trends in usage, transaction times and success rates.	CEM Analyst	CEM Analyst Isc Analyst

*\*May increase overhead on application. Required training provides information on assessing risk.*

# Training Roadmap (Simplified)



# Partnerships

Making it matter to those who care

- What questions can we help you answer?
- What are the key business transactions?
- What are the pain points and bottlenecks?
- Which classes and interfaces should be instrumented?

For business transaction “A,” it would be helpful to know:

- The number of orders
- The type of order
- The number of units per order
- The total time to complete the order, based on complexity (one to five units, five to ten units, etc.)
- If the user received an error message (but not an exception)

### Technology

- Implement CA APM across preproduction environment.
- Implement CA APM across production.
- Implement customer experience manager.
- Apply custom instrumentation.
- Integrate APM with other datasets and tools.

### People

- Define appropriate roles and responsibilities with APM.
- Provide targeted, internal training for each role.
- Partner with technical experts to reduce visibility gaps and add additional context.

### Process

- Create APM maintenance discipline.
- Include instrumentation and business transaction mapping into SDLC.
- Increase effectiveness of triage/war-room scenarios.
- Build custom instrumentation during development.
- Performance analysis/proactive approach.



# Maintenance

CEM		
Task Performer	Task	Task Description
	Review CEM Collector Logs: 1. Any Errors 2. TIM Daily Aggregation Status	
CEM System Admin		
CEM System Admin	Review System Events in CEM	
CEM System Admin	Back up Configuration and Trace Directory for CEM	Backup Configuration and Trace directory. Make sure nothing is writing to the database while backing up. Best Practice: Shut down MOM, Collector, then backup.
TIM		
Task Performer	Task	Task Description
		1. Check if number of files in /etc/wily/cem/tim/data/out/defects is increasing. 2. This should be blank: C:\Program files\CA APM\Introscope9.1.1.1\cem\tess\badfiles If there are files, check on MOM and on CEM collector If CEM collectors are unable to process defect data, those transaction data will be stored in badfile directory
CEM System Admin	Check TIM Defect Directory	A. Check Transaction Trends. CEM SLA management - Check that there are hourly data B. Couple things to watch out for: 1. Get to TIM, TIM Packet Statistics, Dropped should show 0. If Dropped Packet Statistics shows anything greater than 0, there are too much data being handled. Few options to consider if that happens: a. Upgrade the NIC, Adjust the webserver filters, Adjust Mirror data to limit data, or add new TIM to split the mirror data 2. Captured/Analyzed should be the same but a non-zero number. If this is all zero, TIM has been unplugged
	Open TIM: 1. Check TIM Hourly Stats Processing 2. Check TIM Packet Stats 3. Check Daily Aggregation Status	
CEM System Admin		
CEM System Admin	Mount a new EP agent on TIM, review	
EM		
Task Performer	Task	Task Description
	Check APM Status Console: 1. Everything connected? 2. Are there active clamps? 3. Monitor Errors	Open APM Status Console from ISC workstations. Make sure everything is connected. Are the collectors slowing down? Are there active clamps? Monitor the errors. Try a Investigator search for 'iscamp' from the superdomain
ISC System Admin		
	Open Logs: 1. Scan for Error Message and Warnings	
ISC System Admin		
	Check Outgoing Message Queue: 1. Look for warning on the logs 2. Check from superdomain for Internal Message Queue	Message queue is created for each socket connection to the EM (Collector or MOM) for each agent or each work station. More than 60% of the clustering issues are related to this. 1. Check for warnings in the logs 2. Goto Customs Metric Agent ("Super Domain*"), then open Enterprise Manager. Then goto Internal, Messages, que should equal to 0. This should be added to a dashboard in the future
ISC System Admin		

# Maintenance

```
Expeditors Application Support Menus      Mon Oct  6 09:27:41 PDT 2014
Java Workers count: 6      Tomcat Proc count: 0      HTTPD procs: 0
```

## exp.o Monitoring APM Deployment menu

- 1) Install / Upgrade Agents
- 2) Audit Agent Details
- 3) Update Agent Details
- q) Exit Menu

Please enter an option: █

```
Expeditors Support Menus      Mon Oct  6 09:28:10 PDT 2014
Logon id: expmon      Server: expmon
```

## exp.o Monitoring APM Install / Upgrade Agents Menu

- 1) Sync Server SSH Keys
- 2) Install New Agents
- 3) Upgrade Existing Agent
- 4) Create Symbolic Link
- 5) Upgrade Agent Profile
- 6) Push Base Agent Files
- 7) Remove Agent
- 8) Transfer Agent Profile
- 9) Transfer Agent Files
- 10) Delete Agent Files
- q) Quit to previous Menu

Please enter an option: █

# SDLC

## System Development Lifecycle

- Ensure that development teams account for monitoring.
- Provide a standard for interfacing with monitoring experts.
- Ensure monitoring is implemented uniformly.

### Solution Planning and Design

-  Participate in Solution Design Sessions
-  Submit Strategic Self-Assessment Form
-  Communicate and Validate Proposed Solution
-  Refine Requirements
-  Design Data Model

### Plan and Design User Interface

### Critical Production Planning

-  Facilitate Security Planning
-  Plan Disaster Recovery and High Availability
-  **Plan Monitoring** 
-  Plan Hardware and Network Needs
-  Plan Support Feedback and Communication
-  Plan and Establish Non-Production Environment
-  Plan Training
-  Plan Training Environment
-  Plan Deployment
-  Perform Design Reviews
-  Review Controls and Compliance
-  Initial Solution Plan and Design Complete

### PreProduction

#### Perform PreProduction Testing






-  Perform Bug Management
-  Perform Pre-Release Regression Testing

#### QA Approval

#### Support Transition

-  Communicate Notifications to ISC
-  Participate in QA Handoff to Support
-  Participate in Support Transition Meeting
-  Transition Support Documents
-  Validate Deployment Communication Plan
-  Validate Support Feedback Communication Plan
-  Set Up SoftDist
-  Update Required Deployment Documents
-  Conduct Application Support Requirements Audit
-  Validate OPs Menu Functionality
-  **Validate Monitoring** 

#### Support Handoff Complete

-  Create Support Training Modules
-  Manage User Feedback
-  Execute Training Plan
-  Review Controls and Compliance
-  PreProduction Work Complete

# The Rise of APM

Sweet, sweet data

- Development teams are now using APM data in **daily** scrums and **weekly/monthly** reviews.
  - APM, APM-CEM *and* synthetic transaction data
- **Performance enhancements** are being made based on APM metrics from production.
  - Able to target bottlenecks as never before
- Quality Assurance teams are comparing **performance baselines** of new releases to old.
- APM data is now used to help answer the question: *Can our systems support this new line of business?*

# Performance Analysis

Would dedicating staff to proactively analyze and take action on our performance data provide value?

**Yes!**

- Performance analysts can **get to** the data.
  - Directly through Workstation/WebView and via integration points
- Performance analysts can **get meaning out of** the data.
- Performance analysts can **partner** with teams for needed expertise.
- Recommendations have **measurable impact**.
- But ...

# Key Lessons

# Keys to Success

<b>Plan ahead.</b>	Read <u>everything</u> you can get your hands on. Create a roadmap and understand the needs of your end-users.
<b>Dedicate ownership.</b>	Ensure that the APM environment can be appropriately managed by <u>dedicated</u> resources.
<b>Train.</b>	Empower as many users as possible to understand and <u>own the data</u> .
<b>Integrate.</b>	Bring APM data into existing tools and processes by <u>any means necessary</u> .
<b>Contextualize.</b>	Make the data <u>meaningful</u> to the people who use it.
<b>Budget.</b>	To use performance analysis recommendations proactively, you need to be <u>willing to devote resources</u> toward them.



Q & A



# Recommended Sessions

SESSION #	TITLE	Day	Date	TIME
OCS16S	Enhancing the mobile end-user experience by integrating CA Mobile App Analytics and CA APM	Tuesday	11/11/2014	4:00 PM
OCX14S	Redefine Triage by Learning the Golden Nuggets of APM	Wednesday	11/12/2014	11:00 AM
OCX18S	Designing The Next Generation of Usability	Wednesday	11/12/2014	1:00 PM

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