Evolving Your APM Capabilities with APM Best Practices

OCTOBER 2010

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Executive Summary

Challenge

Effective use of APM technology requires repeatable skills, processes and organization. Every corporation proceeds at its own pace but where can you get a roadmap that lets you accommodate that pace and still lead you to a fully capable APM discipline? CA has identified a number of best practices to establish these skills and processes, and also to help you rally and evolve your APM discipline – Planning, Implementation and Techniques to be used by your stakeholders to enhance testing, triage and analysis. All of these activities are organized as an APM service catalog which sets the schedule for what you will do with APM, how you will staff and maintain skills, and when those capabilities will become available.

You need to use APM. We know what you need to be successful with APM.

Opportunity

Your measure of business success starts with the customer experience. You need deep visibility into what affects the transactions that drives your business. Realistically, you also need to empower your testing organization to use that visibility to detect potential problems while they can still be addressed and without impacting the production experience. Your route to improving software quality is simply not limited to responding to alerts more quickly but by eliminating many of those conditions before you get to production.

CA can assist with assessments, audits, pilots, deployments of any size and we can even mentor your staff to deliver these activities independently.

Benefits

- Improve the customer experience
- Enhance pre-production testing
- Efficient triage of operational incidents
- Realize proactive management of performance problems
- Build a solid foundation for service-level management

SECTION 1

Getting control of APM

No matter where you are in your service management execution, APM is part of that story. How well is it working for you? Do you know what you need to be successful? Do you have some goals in mind that need an actionable plan? Do you know how to grow the use of APM across your enterprise? Do you know how to evaluate if your teams are making progress?

This is a frequent discussion we participate in. CA has, for many years now, been helping our clients understand what sustainable use of APM looks like – and how to get your staff and stakeholders to be effective in using APM to manage the application lifecycle. To develop this plan we take you through a variety of assessment exercises, depending on the scope of your proposed APM initiative.

To these assessment findings you add your specific objectives – what do you want APM to do for you? We then help you identify the appropriate organization model with which to focus your efforts. Every client is different, in terms of their short and long-term objectives, as well as their staffing models. CA has a variety of options for training, mentoring, expert assistance and outsourcing to meet your requirements. We can even build your in-house expert team for APM.

Assess your current skills and capabilities

Your current monitoring practice has some level of skills and processes that will be harnessed for APM. Through the assessment process; a combination of interviews and review of process artifacts; we will identify your strengths, weaknesses and opportunities for growth. The skills assessment evaluates a number of dimensions that we know a successful APM practice will exhibit, as summarized in Figure 1.

FIGURE 1 – ASSESSMENT DIMENSIONS

Detailed Finding Dimension	Evolutionary Plateau
Alerting	Lifecycle availability, platform metrics, life cycle performance
Technology	Availability, metrics (platform, log, custom, configuration), synthetics, real transactions, instrumentation
Reporting	Availability (daily, hourly), synthetics (hourly, 15 min), real transactions (15 min, 5 min), instrumentation (5 min, 1 min)
Testing	Compliance, functional, automated regression, SVP (Batch, Use case), dedicated testing environment, acceptance criteria (optional, mandatory)
Support/Training	Best effort, runbook, wiki, shared repository, document standards, knowledge base, training repository, self-training and certification
Change Control	Compliance, requirements tracking, synthetics (operations validation, environment health check), performance validation (QA, operations),

These are organized as an evolution of process capabilities, which later become milestones as the APM initiative unfolds. Tracking and managing your progress is just as important as identifying gaps in your existing practice.

The assessment findings and recommendations will summarize your current state and give you a detailed plan to meet your objectives.

Summarize what your want from APM

You have an idea of what you want to do with APM and probably some unique circumstances to address. We have already addressed a large number of unique scenarios. Some recurring APM initiative themes include the following:

MOVE FROM AVAILABILITY TO PERFORMANCE MONITORING

When your helpdesk is a better indicator of user experience than your monitoring tools – it's time for APM! We will help you to understand what APM brings to your existing monitoring capabilities

MORE EFFECTIVE TRIAGE OF OPERATIONAL INCIDENTS

APM tools are easy to use but triage processes take more effort and guidance. We mentor three increasing levels of triage, depending on the breath of lifecycle monitoring and overall integration of metric sources.

IMPROVING SOFTWARE QUALITY

CA provides a variety of approaches from simply auditing your release candidates, assisting in performance tuning, establishing performance testing and strategies for collaboration among your stakeholders.

ENHANCE PRE-PRODUCTION READINESS AND DEPLOYMENT

When you have a lot of team operating independently it is hard to establish consistent practices. This can sometimes result in ineffective monitoring configurations getting to production. CA can help you bring these deployment activities back under control and improve the production monitoring experience.

DEFINE AND MANAGE SERVICE-LEVEL AGREEMENTS

Among trading partners, more and more relationships are defined with highly detailed service-level agreements. The quality of these agreements is directly related to you APM capabilities. If you can't measure it, then you don't have effective control over the relationship. CA can help you evolve your SLAs, cover any monitoring gaps, and mentor your teams in using APM KPIs to define your SLAs.

ENHANCE THE VALUE OF YOUR EXISTING MONITORING TOOL INVESTMENT

You already have a significant investment in APM technology but you are not getting the full value. We can help document why this occurs and how to improve it.

REALIZE PROACTIVE MANAGEMENT OF APPLICATION PERFORMANCE

You want proactive management of performance problems. We know how to extend proactive management from hours to weeks to months before the problem occurs and create opportunities to avoid some problems altogether.

DASHBOARDS SUPPORTING A SINGLE VIEW OF APPLICATION PERFORMANCE

The real-time nature of APM, as well as the ease in accessing performance information, makes it a real tool for collaboration. The first point of collaboration is to get all of the available information into a single dashboard. CA can help you achieve this integration, from a single application, to the entire enterprise.

Organizational Models for APM

While we may espouse a full lifecycle approach to successful APM, every organization has their own ambitions and proceeds at their own pace. This means that we can get you to a fully capable APM disciple no matter your starting point or goal. And that every skill and process you implement will fit into the overall scheme – when you're ready. There are four major types of APM organization:

AD-HOC

- Initial
    - Deploy monitoring, show value
    - Production-only use of APM
    - QA-only use of APM
    - Enterprise-scale deployment planning and management
- Growing
    - Use metrics storage resources effectively
    - Get processes established for installation, testing, review and triage
    - Establish acceptance criteria and app audit capability

- – Division of labor and specialization
- **Mature**
  - – Deep visibility and integration
  - – Mature processes
  - – Catalog of services and specialties

Small initiatives (1-5 applications) will generally follow an *ad-hoc* model with minimal training and scope, appropriate for clients who are new to APM. As their experience grows, they will evolve their skills and processes, as well as the scope of their APM deployments. This can result in a very capable APM discipline but not often the most efficient use of staff resources.

SERVICE BUREAU

- **Take charge of the on-boarding process**
  - – Pre-production review
  - – Audit and initial production monitoring configuration
  - – QA Acceptance testing
- **Build towards service-level management**

As the number of separate APM projects grows, or if the pace of adoption is slow, the client may be interested to operate as a service bureau for APM. This eliminates much of the staff redundancy or gaps (among multiple initiatives) and supports a concentration and growth of expertise. Service bureaus can assume many forms but generally operate to provide expert assistance to a much larger community of application owners. They leverage the expertise of the service bureau and avoid their own staffing and training considerations. Multiple service bureaus are possible and generally aligned with specific business units.

COE

- **Establish education and self-service**
- **Leverage existing staff and technologies**
- **Establish and share triage specialists across the enterprise**

When duplication of effort arises from multiple service bureaus, a further refinement can be had by moving to a Center of Excellence model. This operates the same as the service bureau but includes a broader responsibility for the application lifecycle and strong emphasis on a single standard for processes and techniques. A COE will often assume internal training responsibilities to insure an adequate supply of APM practitioners as well as stakeholder training on how to use performance information.

SELF-SERVICE PORTAL

- **Assessing the monitoring need**
- **Access real-time and historical reporting**
  - – QA and Production Baselines
  - – Performance incidents and resolutions
- **Value-added services**
  - – On-boarding an Application
    - > Selecting a solution
    - > Implementing the solution
    - > Operating the solution
  - – Application Audit
  - – Performance Optimization
  - – Monitoring Optimization
  - – SLA Definition and Management

Self-service is an important goal for truly accessible technology. Both the service bureau and COE build a number of process and training artifacts that form the foundation of the self-*service portal*. The initial goal is for a document repository. To this you can add

workflows for approvals and requesting assistance, automating the governance of what technology is employed, as well as mediating access to APM staff.

Of course, you need not limit yourself to APM process artifacts. Testing baselines, operational incidents, test plans – all of these documents and reports may likewise be integrated via the self-service portal. This allows uniform access control policies and total flexibility in how APM staff are assigned and scheduled to assist in any variety of incidents or requests.

Growing and Mastering APM

To grow your practice we plan for short and incremental deployments, including operation and mastery of APM skills appropriate at each iteration. This is called the *phased deployment* model. This allows you to gain some operational experience quickly, which can then be fed-forward, refining the plan for the successive deployment increment. Each deployment iteration revisits the same core skills, reinforcing and extending your capabilities.

As your enterprise grows with APM, you may undertake additional deployments to further extend your visibility and skills, or any other combination of activities. The best practices are defined to be incremental, so you can pick and choose activities to align with your immediate goals.

HOW WE BUILD AN APM PRACTICE

- Identify the Gaps in Your Organization
    - Skills, Process and Competencies
    - Reuse existing Visibility (Tools and Infrastructure)
    - Define an Tactical Evolution from Availability to Performance Monitoring
- Basic Triage
- Leverage QA during Functional and Stress Testing
- Enhance the Deployment Mechanism
- Realize Collaborative Monitoring across the Application Lifecycle

Repeat twice, each time increasing the skills and process definition/enrichment/reuse. This part of the process is surprisingly simple. The challenge is to organize the mentoring that helps design and implement your skills, processes and competencies – which is something we have been doing for some years now.

ROLES AND RESPONSIBILITIES

The primary roles for APM are for APM administration (tools and metric storage), Project Manager and Specialist, summarized in Figure 2. Two secondary roles are for the Application Specialist and Monitoring Architect, which will be explained shortly. The APM Administrator role is an extension of traditional sysadmin capabilities and does not require extensive training. We can achieve this because the *phased deployment model* prepares a number of *cookbooks* to make the deployment and configuration of APM very predictable. APM Administrators work at the direction of any of the remaining roles. The APM Specialist role requires a more significant investment in training and mentoring but will be much fewer in number. Two to five APM Specialists can easily support hundreds of applications, leveraging dozens of sysadmins (APM Administrators) as needed for deployment and configuration activities.

The APM Project Manager is more to support the absence of APM Specialists. Not all clients are interested in maintaining dedicated staff for APM and will use consulting, or staff augmentation, to achieve their objectives, as needed. The APM PM role thus becomes the primary interface between the client and the temporary APM resources, and has the responsibility for continuity among the different projects. This continuity is essential for long-term success of APM because it preserve the experiences and nuances of your environment. This sets the foundation for efficient use of consultant time and allows for tracking progress towards greater APM goals.

FIGURE 2 – APM ROLES AND ACTIVITIES

APM Role	Activity
APM Administrator	Agent installs, transaction recording, metrics storage administration
APM Project manager	Coordinate tactical service engagements, assessment activities, deployment planning, upgrades, vendor management
Application Specialist	Design of application –specific dashboards and reporting, alert integration strategy, guidance for triage activities, establish acceptance criteria, supervision of efforts to extend agent visibility
Monitoring Architect	Monitoring tool identification and implementation, monitoring solution planning and sizing, definition of QA testing procedures and reporting with APM, definition of acceptable QA performance characteristics, definition of key metrics, dashboards and reporting, strategy to enhance visibility, alert integration strategy
APM Specialist	Advance installation and configuration of APM, triage activities, advance integration and customization

The Application Specialist and Monitoring Architect are both traditional roles that are augmented with a deeper understanding of APM capabilities. The Application Specialist, usually representing the line of business, is responsible for the entire application lifecycle. They are the repository for all of the issues and goals for an application. This role needs to understand the APM activities and when to invoke the APM administrator or APM Specialist.

The Monitoring Architect is more focused on the longer-term objectives of the monitoring initiative. This will include the APM assessment and planning activities and extends to the capacity planning and management of the APM infrastructure. This is also the opportunity to establish different internal standards for process definition and tools selection. Depending on aptitude, the Monitoring Architect may also participate in triage and firefight activities, in support of the APM Specialist or APM Project Manager, depending on the staffing model in force.

EVALUATING COMPETENCY

An important part of the best practice approach is to achieve a *competency* before APM candidates can advance to the next level of mentoring. You have to demonstrate that you can employ the technology, in a peer reviewed situation, for the following five APM scenarios:

- Rapid Deployment

    - Deployment and configuration of APM components, following a cookbook. An agent takes 10-30 minutes. A server component 30-60 minutes.

- Solution Sizing

    - Assessing the impact of a proposed APM deployment in terms of application characteristics, consumption of metric storage capacity and performance, solution architecture impacts and avoiding unsuitable agent and monitoring configurations.

- Application Audit

    - This is a comprehensive evaluation of an application under simulated load to prepare and validate the monitoring configuration, including dashboards and alerts, as suitable for production deployment. You will identify all of the major availability, performance and capacity (APC) characteristics that make the target application unique. This is also an opportunity to find out if the application is stable and scalable.

- Triage

- – There are multiple levels of triage depending on the breath of the lifecycle you have under monitoring. The focus here is on consistency of problem approach, managing expectations and communication of observations.
- Gap and Enterprise Visibility Assessments
  - – The focus here is first for the application survey in support of the Solution Sizing. Followed by the Enterprise Visibility, which is more complicated and used to rationalize tool investment and scope of follow-on APM initiatives.

During mentoring sessions, competencies are demonstrated three times per practitioner, when practical. It's not enough to simply attend the lectures. You have to complete a real activity. When a phased deployment is being followed, the APM practitioners will easily have the three opportunities. In the absence of a live deployment, a variety of artifacts are employed. Completing the work in your own environment is always preferred.

To measure is to know

The first section presented the general themes that comprise the APM best practices, leading to the five competencies that help to ensure consistency delivery of the skills and processes of APM. This established the APM lifecycle. In this section we continue to extend that *management by measurement* concept to the activities that will comprise your service catalog and the major scenarios you will address. This establishes how you will use APM to manage the application lifecycle.

Measuring Customer Experience

The first opportunity is during the assessment phase, as an optional activity. You deploy real-transaction monitoring to document performance and stability of key business transactions. Much less subjective than interview and survey techniques, real-transaction monitoring provides direct measurements supporting an estimate of the business cost of degraded performance. It helps you confirm where investment is needed and establish application priority, for the APM deployment schedule.

Once deployment of transaction monitoring technology is achieved for production, the collaborative work begins. APM visibility into each and every monitored transaction provides more reporting detail but also lets you explore the relationships among different transaction types. When full instrumentation is achieved, you are able to link specific transactions to the supporting infrastructure, eventually mapping those relationships. Part of this new reporting supports service level management. The other part is to support more efficient triage of performance incidents.

Enhancing pre-production testing

Much of pre-production testing can quickly be enhanced by the addition of APM visibility. The testing schedule is not impacted and you have immediate potential to catch problems before they reach production. The challenge is to establish an acceptance process, as well as an escalation process – to get defects fixed or accepted. We can help you define initial and evolving acceptance criteria. When APM is monitoring production, additional details can be fed back to QA to improve test plan coverage.

The pre-production review is used to confirm a useful monitoring configuration as well as apply minimum criteria for application characteristics based on stability. When load generation becomes effective, the acceptance criteria, becomes more varied and basic elements of capacity and performance are managed. When stress testing becomes available, a compete audit and capacity forecast become available. The collaboration point is through the different baselines for configuration, application (transaction characteristics) and performance that are a unique signature for each type of application. These same baselines will be used later, during production incidents, to establish 'normal' and accelerate triage of the problem.

Realizing Proactive Management

To be proactive you need to catch performance problems before they become performance incidents. As you expose more of the application lifecycle to APM visibility this moves through three distinct stages. The first is having detailed historical information so that when an incident occurs, you can go back 1-2 hours and see what components contributed to the incident. Eventually, you can set a threshold on the critical component so that next time you can get an alert 20-60 minutes before things get really bad. This is a **Good** result but you can do better.

If instead you characterized the application, prior to production, you would know what the key components were as well the appropriate thresholds. These baselines not only eliminate the trial-by-incident of the previous approach but by defining 'normal' it makes it much easier to identify 'abnormal' during an incident. You triage experience is **Better**. And yet, you can still achieve more.

APM technology applies first to your most modern applications. But what about the other applications and resources that are not directly amenable to APM? There are integration strategies to bring all kinds of useful information together to assist triage. You need to allow for an additional process, just beyond triage and leading to root-cause analysis (RCA) to achieve the **Best** triage capability. You prioritize your integration efforts by attempting RCA and noting when the 'trail goes cold' – and then using integration techniques to get more visibility at that point. This keeps you focused on the critical applications and helps you prioritize strictly based on key incidents.

These three levels of triage are summarized in the Triage Capabilities dimension of your APM service catalog, in Figure 4.

	Good	Better	Best
Assessments	Interviews	Transaction Analysis	Application Audit (On-Boarding)
Deployments	QA + prod	QA + DEV + Prod	Match Monitoring Need: -High Value Apps -Service Level Management
Visibility	Availability	*Application Context:* Performance Capacity	*Transaction Context:* User Experience KPIs
Triage Capabilities	Individual Metrics	Baselines (leading to App Audit)	Trending and Forecasting

Each of these dimensions has a Good-Better-Best evolution. Your evolution proceeds at your pace of adoption. The greater your capabilities, the more effective your triage becomes, which ultimately enhances your ability to management proactively.

Establishing your catalog of APM services

The capabilities goals, summarized in Figure 3 are one way to look at your evolution. But what are you going to do, day-to-day and week-to-week, to achieve these goals? Here the APM best practice takes on the characteristics of a college course catalog. Some courses are core while others are more appropriate for some specialty. These courses are the actual services that comprise your APM service catalog, as summarized in Figure 4.

What your service catalog looks like as you APM organization evolves.

Service Catalog		
Initial	**Growing**	**Mature**
Monitoring needs survey	App audit	Capacity management
APM deployment	Dashboard design and implementation	Performance tuning
On-boarding	Reporting design and implementation	Service-level management
Triage	Alert integration	Gap and visibility assessments

Here we begin to describe what specifically you will do for your stakeholders. Whatever your stakeholders want, we will help you define a schedule and curriculum to get you there.

AUTOMATING YOUR PROCESS AND APPROVAL FLOWS

The final stage of your evolution to an APM-centric organization is to bring each of the artifacts, cookbooks, process templates – and even your baselines and incident reports – into a self-service portal. You automate the processes by exploiting conventional workflow technology, document repositories, access control and approval flows to establish a portal. Your stakeholders interact with the portal in advance of working with an APM resource. This ensures that everything is ready so that the APM task is completed efficiently, which further enhances the scalability

- Provides a workflow interface for APM tasks
  - Single point of scheduling and status information
  - Reinforces corporate process and guidelines
- Provides ready access to documentation, whitepapers, self-training and certification in context, for the task at hand.
- Staffing can be more flexible and dynamic
  - Supports out-sourced model for expertise
  - Supports use of pooled resources to meet workloads
- Enforces access control policy for access to test and performance data
- Supports broad collaboration and visibility into application and service quality

The types of services presented by the APM portal are the same as for the APM service bureau. Only the degree of governance and automation differs.

SECTION 3

Managing the software performance lifecycle

WHAT DRIVES OR IMPEDES YOUR BUSINESS SERVICES

The motivation to move to APM can be a rational decision – or something more painful. Every enterprise today depends on software systems to bring their products and services to the marketplace. Everyone has the same access to hardware and software systems but the application software remains largely proprietary. How you process orders, manage your catalog, generate billing and update inventory is largely unique. But do you maintain software to do your own payroll, administer 401k plans, or schedule shipping? More and more software functions are moving to the cloud where we all will get a similar level of service. So the parts that remain in your enterprise really account for the uniqueness of your business model. How efficiently you administer that business model may become the dominant measure of your success. Are your software systems assets – or risks? Or do you simply don't know?

Understand your business transactions and interactions

When your helpdesk, with increasing call volume, is your primary feedback on the user experience - you need to move to APM. You can use assessments, both interview and real-transactions, to confirm and quantify the nature of the problems. To get the performance problems resolved you will need to define a program to extend your visibility and start taking control of the application lifecycle that allowed the problems to get to the production environment in the first place. Production monitoring will help you to document where investment is needed, and to show you when you are making progress.

CA can help you make these assessments and define a strategy that aligns with your long-term goals.

Getting real value out of your testing cycles

Not all production problems are directly related to software quality but a combination of gaps, in test plans and change control processes, will often account for 30-60% of those incidents. You need APM visibility to understand these gaps so that you can define appropriate processes to remediate. You need to leverage your existing test cycles to uncover performance problems and start implementing acceptance criteria to encourage remediation prior to reaching production.

CA will help you performance audit key applications, establish a more effective QA practice or mentor your monitoring team into an APM service bureau.

Realizing proactive management

With APM visibility across the application lifecycle you have the performance information to get control of the operational experience. The earlier you can identify and remediate a problem, the better your operational experience will be, and so the user experience that defines the success of your business.

CA will help you define this evolution to proactive management and show you how to track its progress.

Building towards service management

APM is the foundation for service management. You need reliable and consistent performance measurements to realize effective management of your software infrastructure. CA has a number of complementary technologies to complete your service management capabilities.

SECTION 4

Conclusions

APM is the foundation for reliable and efficient service management. You can't expect to manage what you can't measure and APM best practices guide you to establishing, growing and mastering robust measurements across the application lifecycle. The earlier in that lifecycle that you can start applying the deep visibility of APM technology, the more quickly you can move from a purely reactive management model to truly proactive management of software and operational quality.

APM best practices are your roadmap to realizing an APM discipline; addressing all aspects of planning, staffing, deployment, testing, triage and even how your may organize your APM resources . You don't have to re-invent the wheel or figure it out on your own. CA can help you leverage the promise of APM into reality for you and your stakeholders.

Anyone can sell you APM. Only CA is going to show you want to do with it.

SECTION 5

References

For complete details on the topics covered in this whitepaper, please see:

APM Best Practices : Realizing Application Performance Management – Michael J. Sydor . Published December 2010 under CA Press Program, produced by Apress and distributed by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013   **ISBN-13:** 978-1430231417

SECTION 6

About the Author

Michael J. Sydor is a software solution architect who has invested 20 years in the mastery of high performance computing technology. He has significant experience identifying and documenting technology best practices and has designed programs to mentor and realize client performance management teams. With a broad combination of software and systems architecture experience, as well as critical situation and traditional performance analysis, Michael is well positioned to influence and guide major initiatives within client IT organizations, for both distributed and mainframe architectures, and across Telco, Cable, Financial Trading, Media, Banking, Insurance, and Utilities industries.