When application performance is better, business works better.

Six application performance management steps to optimize efficiency and satisfaction
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Poor application performance can cost more than you think.

Enterprise Management Associates reports that in large organizations, the impact can exceed $1 million per hour and in virtually every organization, IT management lists availability as a primary objective. Yet despite the financial and business risks, many organizations possess alarmingly little insight into application performance.

Given the critical role applications play in managing customer transactions and supporting essential business processes, companies everywhere are growing increasingly interested in application performance management. Application performance management helps you detect, prioritize, isolate, diagnose, repair, and prevent problems before users and the business are impacted—thereby improving the customer experience and IT staff efficiency. To be effective, application performance management should go beyond the monitoring of simple customer-facing Web applications. It needs to support composite applications, service oriented architecture (SOA), and enterprise resource planning (ERP) applications as well.

A pragmatic approach to application performance management is to implement in phases. HP offers a detailed roadmap that helps you articulate your objectives and see where you’re headed. This evolutionary process is designed to yield tangible returns for each phase—returns that can be parlayed to fund subsequent phases as your organization sees fit. This roadmap can be implemented in-house or using HP Software as a Service. Your organization can access HP Software as a Service over the Web, based on an affordable subscription model. This can help you drive down costs while still providing the performance and availability you require.

This paper details an approach that application owners and operations managers can use to achieve a successful application performance management deployment. The ultimate goal is to help you take clear steps toward robust application performance management capabilities so that you can serve your internal and external customers more effectively.

What makes application performance management difficult?

For effective application performance management in complex, multi-vendor IT landscapes, users require extensive coordination across often isolated IT domains. This is because few applications live in a vacuum. More often than not, they live in SOA-based environments where multiple applications work together to create a business service. Virtualization adoption and investments in cloud computing have only complicated matters further. This reality leads to a distinct set of challenges facing both IT and the lines of business that IT serves.

Inconsistent quality of service

When a customer calls to complain about application performance, IT has already failed to do its job. The goal should be 100 percent uptime for all applications—but the reality is often quite far from this ideal. It doesn't help that once problems are detected, the issue often gets passed around from group to group—especially when no root cause is immediately evident. For protracted problems, the resolution effort can often degenerate into acrimonious blame games and tedious, resource-draining IT war room sessions.

Organizations need better early warning systems with root-cause isolation tools so they can spot and address problems before they impact the business.

Pressures from the business

In complex, siloed IT environments, monitoring tools are typically focused on the performance of specific technology components, yielding metrics such as network throughput rates and server uptime. For the business, such data is meaningless. Instead of technology performance metrics, line-of-business managers want business performance metrics—such as transaction completion rates and the financial/productivity impact of service downtime. But without end-to-end infrastructure visibility and insight into how actual users are experiencing the business service, most IT organizations find themselves at a loss. In the end, this adversely impacts customer satisfaction and quality of experience.

**Heightened risk**
When IT is unable to efficiently link an infrastructure issue to a specific business service, it’s nearly impossible to assess the business impact of the event and prioritize activities. What organizations need is a way to optimize the end-to-end application performance lifecycle. This starts with forging stronger connections between pre-production and post-production teams so that quality and performance tests—as well as individual development experience—can be leveraged to address problems after implementation. Powerful diagnostics can then be added—not only to reduce triage time but to weed out the more incipient problems that tend to degrade business services performance over the long term.

**Increasing IT costs**
On average, companies have 11 different platforms, technologies, and vendors across heterogeneous hypervisors, storage, network, and clients. In such complex environments, organizations cannot afford to continue to address application problems following ad hoc, siloed, manual processes. To help alleviate the financial burden of application management, IT needs to find ways to drive down costs and improve efficiencies. This requires clear, straight-forward application performance management processes, supplemented by automation so that IT staff can manage by exception. Supporting such processes with cloud-based tools as part of a software as a service (SaaS) agreement can also help by enabling IT to avoid the up-front cost of a single implementation, spreading the cost out over multiple years.

**Added complexity with virtualization**
The value of virtualization is undisputed; it helps organizations maximize resource utilization, scale up quickly, speed application deployment, and increase administrative productivity. But virtualization also adds complexity—and a lot of it. The days of IT staffers monitoring performance in front of domain-specific consoles are numbered. The concepts of servers, storage, and networks are becoming much more fluid. This calls for a new application management approach that connects business services and the end-user experience to the underlying infrastructure—whether that infrastructure is physical or virtual.

**The HP approach to application performance management**
Effective application performance management doesn’t happen overnight. It requires the steady introduction of processes and capabilities so that IT can adjust over time. This is why HP Software and Solutions offers a clear approach to application performance management. Using this approach, you can introduce new capabilities over time in an incremental fashion—reaping clear benefits each step of the way as you advance along the application performance management maturity path.

**Step 1: Detect**—by monitoring the end-user experience.
If IT wants to be the first to know about application performance problems, it needs an early warning system that can detect problems before they impact the business. This is best enabled by managing the end-user experience rather than the performance of technology components. End-user management tools fall into two categories: synthetic monitoring and real-user monitoring.

Synthetic monitors are recorded procedures that continuously execute defined transactions from various access points inside and outside the network. These monitors report back to IT in the form of early warning alerts, allowing IT to react before end users feel the impact.
Real-user monitors allow IT to capture the actual real-time user experience by monitoring all users from all locations at all times. An unobtrusive probe listens to incoming network traffic and feeds the data it collects into an analysis engine. This engine then generates usable information on a variety of user-experience metrics, such as transaction round trip time, application availability, errors experienced, and more. Real-user monitors can also replay sessions to better diagnose problems and improve customer satisfaction.

Using both approaches, IT can stay ahead of the game. With the ability to detect problems as they arise, IT can act quickly before the business or its customers feel the impact.

**Step 2: Prioritize—by determining business impact.**

To serve the business best, IT must know which problems have the potential to adversely impact business operations the most—and then focus on those issues first. This capability starts with a comprehensive dependency map, allowing IT to clearly document and store the configuration items that make up the IT infrastructure. The result is a data structure that allows IT to quickly understand the interdependencies between technical components and the business services they support. Equally important, IT can also simulate proposed fixes to trace the potential ramifications of changes made.

Business-relevant views of the map are also important so that the right information is delivered to the right people. These can be delivered through role-defined dashboards that track KPIs specific to each business service. To measure the business impact of these KPIs, you need service-level management capabilities that allow you to compare actual application performance to business goals and issue alerts when performance is in danger of falling below agreed-upon service levels. This can help IT save money by avoiding financial penalties articulated in the service level agreement (SLA).

**Mobile collaboration and application performance management**

Information about application performance and the end-user experience needs to be delivered to stakeholders in a way that is both relevant and actionable. Today, these stakeholders—both technical and non-technical—want to access and consume this information in a variety of ways, including through mobile devices. This is why HP software supports mobile access to its application management solution—as well as the ability to manage applications that run on mobile devices. This helps you react quicker and more effectively to critical application issues and ensures that your applications perform as needed on mobile platforms. The end result is improved application performance and improved business performance, too.

![Figure 2. HP personalized business service dashboard for application performance management](image)

**Step 3: Isolate—to speed resolution times.**

When virtualization and cloud computing technologies keep the infrastructure in a constant state of flux, isolating problems can be a challenge. This is another reason why it’s important to monitor from the end-user perspective—allowing IT to focus more on the health of the user experience rather than on the performance of technology components that are constantly shifting.

Virtualization and cloud computing also tend to spread transactions out across multiple technologies in unpredictable ways. This challenge requires IT to track transactions in an end-to-end manner, regardless of the technologies used to complete them.

The ultimate goal is to achieve complete monitoring coverage so that you can pinpoint problems faster. This requires IT to combine system health and application health into a unified service health view based on a run-time service model. This serves as the repository for all discovered configuration items—including the relationships among them (topology) and dependencies between applications, transactions, business services, and the underlying IT infrastructure. The run-time service model can receive discovery information from multiple automated discovery sources. This provides a complete and up-to-date picture of the managed environment and enables the sophisticated impact analysis needed to speed isolation times. In the end, IT is able to dramatically reduce mean time to repair (MTTR) and more effectively honor its SLAs.
Step 4: Diagnose——by focusing on applications and business transactions.

Diagnostics involves monitoring, tracing, and resolving performance issues, problems, and anomalies across the IT environment to pinpoint bottlenecked components. This is important for both applications and transactions. On the applications side, diagnostics tools can give organizations a powerful method to peer into the tiers of an application as they relate to individual infrastructure components, providing both historical context and application-specific details at the time of an issue. This provides traceability into issues and helps shorten MTTR rates.

When it comes to transactions, it is important to distinguish between well-defined, high-value transactions and those that are difficult to track and see because they spread across a multitude of different technologies. High-value transactions, such as overnight bank transfers, need to be monitored closely using business transaction management technology. This gives organizations the granular view they need to monitor and report on every step taken during a transaction, and even roll transactions back in case of serious errors.

For the more technologically dispersed transaction that is common today, organizations are exploring transaction-aware capabilities. This is an approach that dynamically combines the critical end-user experience perspective with near real-time diagnostic data and the ability to automatically discover composite application components in real time. The end result is an actionable, role-based view of the entire lifecycle of all transactions.

Step 5: Repair——with automated remediation.

Once you have determined the root cause of a problem, the final step is to resolve the issue. Automating this process can help minimize the cost of IT operations and significantly improve productivity. It can also ensure consistency to minimize the potential for human error.

When it comes to automating routine IT operational tasks, look for tools that can manage repetitive maintenance and change execution, and incident resolution in a way that integrates with your existing IT environment. An important consideration is the ability to easily design, create, and share flows and operations—otherwise known as runbook automation. Also look for powerful reporting capabilities—which are important when it comes to reviewing and auditing tasks executed on an automated basis.

Figure 3.
HP Run-time Service Model for application performance management

Step 6: Prevent——by collaborating throughout the application lifecycle.

Collaboration across IT groups plays a key role in preventing application problems. Unfortunately, most groups view their roles as a series of independent and discrete tasks. Seldom do they provide feedback to other groups to improve applications and processes.

Today, however, tools exist that can track and capture actual user application behavior, such as click-stream traffic, page performance, application error, and visitor sessions on Web-based applications. The IT operations team can share this information with development and quality assurance (QA) teams to provide better applications that meet real-world requirements.

In the end, the main emphasis should be on managing the entire application lifecycle. Starting in the pre-production stage, quality and development engineers need ways to test a given application against real-world conditions. Once an application goes live, the same quality and development engineers used in pre-production can be leveraged again to solve application problems for real-world problems as they arise. This approach minimizes overhead, significantly improves operational efficiency, and helps to promote a higher quality of service for business end users and customers alike.
Figure 4.
HP performance and availability lifecycle for application performance management

Customer success spotlight: Boeing Communication Systems

Boeing is the world’s leading aerospace company and the largest manufacturer of commercial jetliners and military aircraft combined. Boeing Communication Systems (BCS), a call-center application used to provide customer support to commercial airlines, experienced significant performance and availability issues immediately after going live. Users complained of transaction times lasting several minutes and application availability was low.

To resolve the issue, the company built an application performance management solution around the HP Business Availability Center tool suite. Tools included:

- HP End User Monitoring software, including HP Business Process Monitor and HP Real User Monitor, for end-user monitoring
- HP SiteScope for infrastructure monitoring
- HP Diagnostics for internal monitoring of J2EE and the call-center application

This provided IT with key information needed to react faster and resolve issues before they impact users.

Benefits have included:

- Costs savings of $878,641 per year for IT operations
- Improved application availability—from low numbers to 99.83 percent today
- Lower MTTR rates—reducing incident resolution times by 90 percent (from 10.02 hours in 2005 to 1.03 hours today)
- Reduced incident times—moving from 621.24 hours dedicated to incidents in 2005 to just 44.29 hours in 2009

In February 2007, the Commercial Airlines IT Leadership Team gave the green light to establish the Commercial Aviation Services BAC Monitoring Service as its best-practice tool suite for application management, with HP BAC delivered as a shared service. Today, the solution supports 160 applications.

HP can guide you on the path to success.

HP supports comprehensive, end-to-end application performance management with software that helps you advance along the maturity path for application performance management. This software makes it possible for you to detect, prioritize, isolate, diagnose, repair, and prevent problems before they impact users, customers, and the business itself.

As discussed, HP Software as a Service can help speed your time to value and significantly lower your up-front costs. With ten years of experience assisting hundreds of customers, HP Software as a Service takes the burden off your internal IT resources and gives you the flexibility to focus on core competencies, while at the same time, promoting the highest levels of availability and performance.

The table below outlines the steps you need to take to advance along the application performance management maturity path, and provides details on the relevant HP products that can help you get started.

HP BAC Anywhere

HP BAC Anywhere is a service delivered by HP Software as a Service exclusively for HP customers running HP Business Availability Center (BAC) software on premises. HP BAC Anywhere supports 24x7 real-time visibility into the cloud-based user’s quality of experience. Through a service-driven dashboard, your IT operations group receives meaningful metrics and alerts that enables it to identify and act on issues faster. This helps to ensure a positive customer and end-user experience.
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<th>Step</th>
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| Step 1: Detect by monitoring end-user experience | HP End User Management software | • Proactively monitor and manage the performance of all business-critical applications, including client/server (TCP/IP), Web services (SOAP/XML), and Web-based (http and https) applications from an end-user perspective.  
• Reduce the business impact of end-user outages and performance issues. |
| Step 2: Prioritize by determining business impact | HP Service Level Management software | • Track service-level availability and performance, both on a real-time basis and for offline planning purposes.  
• Improve the availability of revenue-producing applications, increasing productivity. |
| | HP Discovery and Dependency Mapping software | • Dynamically discover and map IT service dependencies between applications and the underlying infrastructure, to provide visibility and control over business services with minimal effort and cost.  
• Create an accurate service model by automatically populating the HP Universal CMDB.  
• Reduce deployment and maintenance overhead that’s typically associated with customization and updates. |
| Step 3: Isolate to speed triage times | HP Application Performance Management Foundation software | • Use the run-time service model to centrally store and automatically discover configuration items throughout the IT infrastructure, and provide a complete and up-to-date picture of the managed environment.  
• Deploy dashboards that provide a customizable, role-based environment that brings together real-time service health, business impact, incidents, and historical performance data from the underlying products in the HP application performance management solution. |
| Step 4: Diagnose to quickly resolve an issue | HP Diagnostics software | • Collaborate with development organizations by providing data such as CPU time by method, heap dump, thread dump, exceptions, and advanced instrumentation control.  
• Drill down from slow, end-user transactions to the bottleneched component, method, or SQL statement, helping to solve memory exceptions and other common problems. |
| | HP TransactionVision software | • Track each transaction and link business process steps to the IT services on which they run, translating IT service impacts into business and financial impact information.  
• Improve transaction performance and improve capacity planning. |
| Step 5: Repair with automated remediation | HP Operation Orchestration software | • Seamlessly launch runbooks and automation flows to quickly repair known issues.  
• Easily design, create, and share flows and operations with an intuitive visual interface.  
• Manage diverse operating systems, databases, applications, and IT management tools.  
• Use a secure execution environment to run flows in a visually guided mode, schedule mode, or completely automated. |
| Step 6: Prevent problems throughout the application lifecycle | HP Performance and Availability Lifecycle software | • Improve application performance and availability by integrating processes for load testing, diagnostics, and end-user monitoring.  
• Track and capture actual end-user application usage and behavior.  
• Reduce risk due to new application rollouts and applications and infrastructure upgrades. |

**Getting started**

To create your own application performance management roadmap, contact your HP Software & Solutions representative or HP partner. If you would like to learn more about the HP Application Performance Management solution, visit [hp.com/go/apm](http://hp.com/go/apm). For a trial of HP Software as a Service, go to [hp.com/go/saas](http://hp.com/go/saas).

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