IT service and application management:
Improving operations of complex SAP environments with HP OpenView

How to keep SAP services highly available, performing to expectations, and aligned with business priorities

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Introduction

Today’s global enterprises are increasingly dependent on a connected community of employees, partners, suppliers, and customers. With so much riding on the performance and availability of information technology systems, downtime can quickly translate to lost revenue, missed business opportunities, reduced productivity, and tarnished customer satisfaction. In fact, the impact of downtime is especially costly when it involves business-critical applications, such as SAP.

SAP applications have been widely deployed across a range of industries to streamline and improve business processes. As shown in Figure 1, SAP applications address business needs on an enterprise-wide scale. With increased economic pressure, however, companies must find additional ways to reduce IT costs and achieve a better return on their SAP assets—while ensuring high availability and performance.

In this white paper, we will examine how HP OpenView management can help enterprises maximize the value of their SAP investments across the entire SAP portfolio. For example:

- **SAP R/3 Enterprise/mySAP ERP** – the core product for factory environments. HP OpenView management enables efficient, cost-effective centralized monitoring and operations of R/3 Enterprise/mySAP ERP. This capability is also valuable during upgrade and consolidation projects, helping to total cost of ownership (TCO).

- **mySAP™** – providing all SAP cross-business process applications. HP OpenView management helps enterprises understand the user experience for the full range of mySAP applications and—in combination with SAP Solution Manager—allows users to analyze the impact of problems in the SAP environment on the business process.

- **SAP NetWeaver™** – a web framework for mySAP solutions. HP OpenView management improves management of SAP environments based on NetWeaver by providing insights into the dependencies of various distributed components.

With SAP applications managed by HP OpenView tools, enterprises have a powerful solution to reduce management cost and complexity, while maximizing the performance and availability of mission-critical business processes. It is the key to gaining the full value of SAP capabilities to:
- Manage processes, procurement, production, and sales
- Make commitments to customers based on real-time inventory data from suppliers
- Enable inter-company collaboration to make better products faster and cheaper
- Obtain real-time customer and competitive knowledge
- Cut costs of business transactions within and outside the enterprise
- Help keep global operations running 24 x 7
- Improve the total customer experience and grow customer loyalty
- Streamline and refine business processes

Management issues for CIOs

CIOs are under ever growing pressure to demonstrate the value their IT investments bring to the business. In fact, payback on IT projects is typically expected to be no more than 18 months—and preferably within 12 months.

Because SAP is a business-critical application, payback on SAP investments are carefully scrutinized. Therefore, it is important that CIOs have the means to manage the SAP environment proactively. That is, if a process is interrupted (ordering, production, payables, etc.), the root cause of the problem can be determined immediately, the impact on other areas assessed, and corrective action identified. HP OpenView supports all those tasks: proactive monitoring, automatic correction, and impact analysis of business and IT events. It is, therefore, an invaluable tool for enabling CIOs to meet their business objectives.

Addressing key business demands

Specifically, HP OpenView™ management helps CIOs address the following business demands.

Expanding SAP environments

SAP environments may be expanded to include:

- Integrated supply chain management to grow demand for tailored products and enable immediate delivery
- E-markets to cut purchasing costs and strengthen supplier relationships
- Customer relationship management to centralize customer information and reduce sales costs
- Product lifecycle management to bridge between development and production; a prerequisite to introduce SAP PLM is an already running R/3 environment
- Optimized and extended SAP solutions to take full advantage of new mySAP technology (NetWeaver) or other related technology
- Increased availability and reduced operating costs for mySAP applications

The HP Adaptive Enterprise strategy plays a crucial role in helping CIOs expand their SAP environments—flexibly and cost effectively. This strategy, in which business and IT are perfectly synchronized, enables organizations to respond quickly and seamlessly to accommodate changing business needs. Within this strategy, HP OpenView service management solutions are the key to maintaining control over complex SAP environments. From operating the computing platform (servers), through database and SAP application management, HP OpenView management is scalable across multi-vendor infrastructures, and can be customized to meet the unique requirements of individual organizations.

Upgrading, consolidating, or migrating an SAP environment

Changes to the SAP environment may be made to help organizations to:
stay ahead of obsolescence curves and take advantage of newer, web-enabled mySAP features
reduce the number of dispersed SAP instances and consolidate to uncover cost savings

When planning upgrades, consolidations, and migrations, it is important to keep systems running without disrupting critical business services. HP OpenView solutions can help CIO’s avoid disruptions by providing the right metrics to guide the transition from a current SAP environment into the future.

**IT service and application management**

In the new economy, the solution complexity is on the rise, with business processes extending not only across different systems and components inside the same organization, but also across different organizations. For this reason, integration of business processes, as well as software and system components, becomes more relevant when implementing new solutions.

A recent IDC study\(^1\) of service management ROI of HP OpenView customers shows that the proper implementation of an IT management solution can achieve the following improvements:

- reduced downtime up to 79%, leading to an average savings per 100 users over 3 years of
  - $93,712 for improved user productivity
  - $74,468 for reduction of lost revenue resulting from downtime
- average saving of $55,405 per 100 users over 3 years for increased productivity of IT and other cost reductions
- average total savings over three years of $223,585 per 100 users

Even with sufficient human resources to operate a fully implemented SAP solution, the chance for human error is likely. Consider how many software components and systems are needed to run business processes, and how many critical interfaces are involved in the core business processes. Then, factor in the number of organizations involved in implementing and maintaining business processes. It is easy to imagine that a business-critical event might be missed, or that there may be difficulty differentiating between business-critical events and non-business-critical events.

To address these limitations, IT personnel must understand the business requirements relative to IT and have, at any given time, complete control of the SAP environment, as well as the solutions integrated with the SAP environment, to meet those requirements. Therefore, an IT service management software solution is essential.

Critical questions to consider include:

- How much guesswork and effort must be eliminated from mySAP and SAP R/3 management tasks?
- Is an adequate IT service management solution already in place to lower TCO?
- How can business processes be linked to IT operational processes; that is, having IT operational processes defined and executed in the context of business priorities?
- Can services be improved and provisioning automated in a heterogeneous environment?

With the right IT service management environment, enterprises can manage their entire SAP environment to proactively support individual organizations with the information they need to optimize their business processes. Important capabilities include:

- **Monitoring of critical business processes end-to-end** – providing the ability to identify the components required by each critical business process, and perform appropriate instrumentation and monitoring. For example, in a procurement scenario not only must SAP software components such as EBP and R/3 must be monitored, but also the network and supplier integration. In addition,

\(^1\) Paul Mason: “Turning IT Overhead into Business Value by Improving Infrastructure Management”, IDC Whitepaper, 2002
once this information is collected, it must be presented to end-users, business teams, operating and IT personnel in a form specific to their business needs.

- **Monitoring and performance tuning of business processes** - ensuring that critical performance metrics are under control regarding violations and capacity growths. This activity can be highly automated to help adjust system load dynamically. For example, if there are certain periods of the month when more performance is needed (e.g., HR monthly salary calculations, web sales promotions, production preparation, etc.), historic demand measurements can easily be used to plan for capacity improvements so critical business process performance is assured.

- **Definition and monitoring of service level agreements** - enabling service levels to be specified and monitored according to business requirements. This may span a wide range of components, including the SAP Enterprise Portal, the mySAP components and transactions being used, the integration with non-SAP components, and the underlying infrastructure. By identifying the components that are important to run a given business process, different service levels can be assigned to different user groups. For example, a customer placing a web order will require tighter service levels, placing greater dependence on the resources and components required for this business process. Without meeting this customer’s service expectations, the order could quickly be lost.

In addition, other considerations for maintaining a healthy SAP environment include:

- Software change management on all levels, including the SAP transport management system (TMS), SAP hot packages, SAP upgrade verification, and quality test assistance
- Network, bandwidth, availability, database, storage
- Interoperability with non-SAP applications through integration with Microsoft Windows Server System solutions or IBM WebSphere environments
- Batch processing (SAP and non-SAP)

Considering the management requirements described above, it would not be surprising to expect an enterprise-wide mySAP and SAP R/3 infrastructure to require additional staff. There is a solution, however, that automates management of SAP environments, and eliminates the need for additional staff. The solution is IT service and application management—part of HP OpenView management.

### Using IT service and application management solutions for SAP

There are a number of scenarios to consider that point to IT service and application management as the appropriate solution to support the requirements of an SAP environment, including:

- Multiple SAP R/3 systems and mySAP environments, with a system environment that is growing. In this scenario, it is no longer possible to manage the SAP environment without an appropriate concept, tools, and services.
- Stringent customer and end-user SLA requirements. In this scenario, it is essential to define the provided service, and verify it against the defined SLA.
- The system and application environment is being expanded with additional SAP components and HP OpenView products are already in place.
- Web services or mobility solutions are being added to a current SAP environment to empower the mobile workforces with mobile access to the business applications

### Comprehensive IT service and application management from HP

HP offers comprehensive IT service and application management solutions for SAP environments, building on HP OpenView management with marketleading products from SAP, along with consulting, integration, and support services. The total solution is customized to meet the specific requirements of individual enterprises.
In cooperation with SAP, HP leverages innovative concepts that bring a new level of productivity to business processes. At the core is a wide range of HP OpenView products and services for SAP environments, including:

- HP OpenView Operations
- HP OpenView Performance
- HP OpenView Smart Plug-in for SAP
- HP OpenView Internet Services
- HP OpenView Service Desk

Additional solution components include:

- integrated backup/recovery (HP OpenView Data Protector)
- network management (HP OpenView Network Node Manager)
- identity management (HP OpenView Select Access)
- output management (HP OpenView Select Management)

HP is firmly committed to providing best-in-class IT service and application management solutions to SAP customers. HP customers around the world, as well as organizations within HP, rely on HP OpenView solutions to successfully manage large mySAP and SAP R/3 environments.

HP OpenView management, SAP Solution Manager, and SAP Computer Center Management System (CCMS) complement each other very well in these solutions. For example, while SAP Solution Manager is optimized to manage the SAP application lifecycle from a business perspective (e.g., customization, deployment, support), HP OpenView products are optimized to integrate the SAP environment into the overall enterprise IT service management solution. Working together, information coming from SAP CCMS can be routed to HP OpenView Operations where it is aggregated with other information collected by HP OpenView Operations. HP OpenView Operations will also be able to route information to SAP Solution Manager, enabling IT infrastructure information to be seen within the SAP application or business process context.

**Management as the foundation for an adaptive enterprise**

By building on a flexible infrastructure with dynamic management capabilities, IT service and application management solutions from HP and SAP lay the foundation for creating a truly adaptive enterprise. As shown in Figure 2, HP and SAP provide complementary capabilities that enable IT resources to be dynamically linked to business needs. The result is a business environment that can respond proactively as customer demands or market conditions change.
Automated, intelligent management of SAP business solutions

HP follows a comprehensive and service-driven approach to management, providing the ability to monitor and control resource health, track utilization, and report on the business impact of infrastructure operations.

HP OpenView products, along with consulting, integration, and support services from HP, enable end-to-end, multi-vendor management of every aspect of enterprise operations across HP-UX, Microsoft Windows, Sun Solaris, and Linux operating environments. With most enterprises running SAP solutions with other business application software, it is particularly valuable that HP OpenView management can help integrate all applications under one umbrella. A library of additional HP OpenView Smart Plug-ins are available to assemble solutions that fit a variety of environments, including links to leading applications such as Oracle, WebMethods, Microsoft Exchange, Sun ONE, and IBM WebSphere.

For Intel-based environments, HP Systems Insight Manager delivers modular, centralized platform management capabilities across all HP ProLiant servers, including hardware fault management, server deployment and server configuration. In addition, when combined with HP OpenView, HP Systems Insight Manager provides complete control over the Windows infrastructure.

Dynamic SAP resource optimization

Provisioning of SAP application environments and asset pools is becoming increasingly important to meeting the flexibility requirements of a business-services oriented infrastructures. Especially with the introduction of SAP NetWeaver, the demand for a flexible IT environment will increase. HP OpenView, working with SAP CCMS/Solution Manager, appropriate hardware, and virtualization software, is the ideal solution.

Continuous, secure SAP operations

HP OpenView software, combined with intelligent fault resilience capabilities at the operating system level and value-added management tools such as HP Systems Insight Manager and HP Storage Resource Manager, offer a powerful solution to ensure continuous, secure SAP operations. These complementary technologies identify faults and performance issues before they become problems, and monitor the overall health of the enterprise infrastructure to prevent failures that could have serious business impact.

The HP management software is further complemented by SAP CCMS and SAP Solution Manager, which together provide a service-level view of the entire SAP environment, along with controls for reliable management of critical resources to address business, operation, and IT management needs in combination.

Understanding the issues of managing an SAP environment

Overview

When monitoring an SAP environment using an end-to-end management approach, it is necessary to take a comprehensive view of the business. For example, working from the business blueprint, it is necessary to then define the business critical process and map all process steps to the IT functional blocks that are involved in the specific process. These functional blocks represent the elements that must be monitored by specific tools and services to provide event information and generate performance data. From this information, an overall picture of the process is developed, called the “service model.”
The calculation and presentation of the overall status of business processes and their underlying components can be implemented with products such as HP OpenView Operations and HP OpenView Service Desk. Other products, such as HP OpenView Smart Plug-ins, support the definition of the service model by providing a discovery function that automatically generates a section of the service model. In this section of the paper, we will describe the many capabilities of the HP OpenView products that can be used to manage a mySAP environment as part of an end-to-end management strategy.

Monitoring results are presented in a form that is specific to each business stakeholder, such as business team managers (e.g. supply chain manager), IT managers, SAP basis administrators, SAP operators, or SAP end users. Some stakeholders may want to see fault information in the context of the business processes. For those stakeholders, the HP OpenView solution will route all relevant information into SAP Solution Manager business process monitoring maps. Other stakeholders may want to see fault information in a consolidated view across different applications, and they can use the HP OpenView Operations console to gain that view.

The tight integration between SAP products and HP OpenView products also facilitates the analysis and resolution of problems. For any SAP-related problems recognized in the HP OpenView Operations console, it is possible to launch the SAP CCMS console for further analysis. The context of the SAP problem (SAP instance ID, transaction type, etc.) is preserved in this context launch, so that the SAP CCMS console present the appropriate screen.

All this provides users with a consistent end-to-end view presented in a flexible way to serve a wide range of business needs. In the SAP Solution Manager tool, it is common that only high level IT information is routed since the users of this tool are primarily interested in determining if a business process execution is interrupted, and if so, whether the interruption is due to a technology-related failure. If the problem is caused by a technology failure, these users will rely on the IT department to resolve the situation.

In cases situations where a malfunction is related to a functional problem, IT personnel address the problem using their business and functional expertise without reporting the issue.

**Enabling end-to-end management of SAP applications**

Figure 3 provides an overview of an end-to-end management approach for SAP applications. In this diagram, the functionality and expectation for each layer, as well as the interfaces between layers, must be defined. The result will form a business view of the environment, which will be specific to individual user roles within the business. These user roles characterize different administrative, operational, or end-user tasks.
When developing an end-to-end management strategy, it is important to follow these steps:

- Identify business-critical processes, leveraging information from SAP Business Blueprint or SAP Solution Manager.
  - Define the reporting level and what must be presented to whom (SAP administrator, business team manager, database administrator, network administrator, SAP functional administrator, etc.).
- Define the interface to the application, describing the influence of the business process in relation to the underlying and associated applications.
  - Define the SAP-related landscape that requires monitoring, which should incorporate all technology components and resources responsible for a given service.
- Detail the instrumentation of the SAP applications and related infrastructure to be monitored.
- List network components and communication interfaces.

**Definition of service model for end-to-end management**

The definition of a service model for end-to-end management starts with identifying and describing a business-critical process. This business process may go far beyond the functionality of an ERP system to include steps taken prior to a process entering the SAP R/3 environment, as well as the post-SAP process. The business-critical process may be initiated in a variety of ways, including pressing a button, the actions of another process, an internal or external event, or via the Internet or a corporate intranet. The business process ends with a resulting output, such as an invoice, a sales order, a printed spool job, or a report. Monitoring this type of business process requires verifying the successful completion of the process, or if problems occur, informing the appropriate people with the relevant event information.

**Stakeholders of SAP end-to-end management**

As presented thus far, end-to-end management is one aspect of bridging the gap between business and IT. It is a transformation from infrastructure-centric IT management to business-process focused IT management through analyzing the impact of IT events on the business process, and of business events on the IT infrastructure.

With an understanding of this approach, it is important to recognize the key people who receive the end-to-end management information. There are several groups of people who are interested in different aspects of this information:

- Business manager
- SAP basis administrator
- IT personnel
- SAP operator
- SAP application end user
- Suppliers and partners

Information from end-to-end SAP management solutions consists of graphics, numbers, or text, and of both online and offline data. This data will be gathered into intelligent correlated reports (based on the key business processes of the organization) on a real time, daily, weekly or monthly basis. Specific reports are targeted to specific stakeholders.

It is worthwhile to note, that both business and IT stakeholders should be provided with at least some high-level information relevant to their respective domains. For example, a business stakeholder should be able to identify whether an interruption in the business process is caused by a problem in
the IT infrastructure. Details of the IT event, however, would only be provided to the IT organization, which would perform the necessary root cause analysis. The final result is that an integrated business and IT management solution from HP and SAP will enable more effective cooperation between business and IT organizations.

Figure 4: Integrated IT service and application management solution from HP and SAP

Managing an SAP environment with HP OpenView

Now that we have examined the challenges in managing today's business critical processes, and identified the SAP business solutions that need to be managed, we will take a look at how HP OpenView management can help enterprises address these issues. The management approach breaks down into three key steps, with each step building on the previous one:

1. Managing the IT infrastructure
   The first step in IT manageability is gaining proactive control. HP OpenView software is highly pre-configured to provide out-of-the-box functionality, and is well integrated with the SAP CCMS via the HP OpenView Smart Plug-in for SAP. In addition, HP OpenView is able to manage the complete SAP technology infrastructure, as well as other technologies that have been integrated with SAP, such as WebMethods, Microsoft Exchange, archiving solutions, or mobility solutions.

2. Managing the services
   The next step is to prioritize the discrete business services that depend on the SAP infrastructure. These key services cross all boundaries that affect the organization, building on the elements of the infrastructure.

3. Managing the business value of IT
   The final step is to build credibility for IT—bringing visibility to stakeholders of the value that IT provides to them, including the customer experience.
SAP technology landscape

To better understand a services-oriented approach to managing SAP environments, it is helpful to examine the basic SAP technology landscape.

Figure 5 presents a typical SAP infrastructure for running enterprise applications.

In this diagram, the various SAP components are identified, including mySAP ERP (R/3), SCM, and Enterprise Buyer Professional (EBP), as well as the non-SAP systems that are integrated with SAP components. Each system in this landscape has different infrastructure component requirements and may share common resources such as storage and CPU. Typically, there is extensive communication between different components on both the intranet and Internet level. Therefore, a user of this environment— whether an employee, customer, partner, or supplier— could be connected to the application modules or services by passing through different firewalls and other security components.

To ensure control of all critical components required to deliver a service or to run a business process, it is important to have the right instrumentation of different components, using technology specifically designed for these purposes. HP OpenView tools provide IT with extensive control to manage complex SAP environments.

**SAP procurement example**

A typical business process for purchasing indirect materials includes:

- Ordering materials using a shopping cart
- Competitive bidding
- Creating and confirming goods receipts
- Creating and approving invoices

The system landscape for such a procurement scenario is represented in Figure 6.
Figure 6: SAP system Landscape for a procurement scenario

This landscape includes SAP applications, such as R/3 and EBP, as well as catalog systems, web components, and middleware, such as SAP WebMethods today or SAP Exchange Infrastructure in the future.

Process flow
The process flow for this scenario follows six key steps:

1. Creating a shopping cart
   In this step, there are several ways employees can find and order materials using a shopping cart, including:
   - Ordering from a catalog (hosted internally or at a supplier)
   - Ordering using a description
   - Ordering using a product number (creating a purchase order)

2. Approving or rejecting a shopping cart
   This is a critical step in the workflow. If interrupted, no orders are possible. If one or more supervisors must approve a shopping cart (e.g., a certain value threshold is exceeded), the system automatically submits it to the inbox of the person responsible via a web-based workflow.

3. Displaying a purchase order in the SAP R/3 back-end system
   In some cases, a purchase order is created in the SAP R/3 back-end system.

   → EBP to R/3 back-end communication
   Because this activity takes place in the background, it is critical that the intercommunication between EBP and R/3 function properly; otherwise, the process will be interrupted.

4. Creating and confirming goods receipts or performance of service
   After the goods are delivered or the service is performed, the vendor creates a goods receipt and employees can confirm it. If a business partner enters the confirmation, the system starts a workflow and places the confirmation in the employee’s inbox for approval.

   → external to EBP communication

5. Creating an invoice
Vendors create the invoice in EBP, which starts a workflow and places the invoice in the employee’s inbox for approval.

→ external to EBP communication

6. Approving an invoice or service entry sheet
An employee checks the invoice created by the business partner and releases it. If it contains errors, employees can also reject it. The system then notifies the vendor or service provider via e-mail.

→ EBP to external communication

Communication between EBP and back-end systems
Many of the tasks performed in EBP result in activity in the SAP R/3 back-end system. Other tasks may require interfaces to a supplier’s back-end system. Figure 7 illustrates when and how this interaction takes place.

![Figure 7: System interaction for the SAP procurement scenario](image)

Managing the IT infrastructure

IT infrastructure refers to the network devices, systems, servers, applications, databases, and storage systems supporting the SAP environment. HP OpenView tools provide the advantage of allowing all policies and customization established for SAP components to be reused for non-SAP applications. For many commercial software applications, HP OpenView has appropriate specialized monitoring components—HP OpenView Smart Plug-ins—to integrate these applications into a comprehensive IT service management environment.

Infrastructure visibility

HP OpenView management pioneered the concept of mapping and discovering network devices (see Figure 8), enabling most of the SAP and non-SAP components inside an enterprise to be auto-discovered, saving time and ensuring accurate views of the system landscape in real time. With these integrated, accurate views, it is easy to gain visibility into the SAP environments to determine:

- Connectivity of various elements with linkages visually displayed
- Status of the elements, with the ability to drill down to find the root cause of any problems
- Network topology, including subnets, servers, storage, and applications

Once discovered, components can be customized to reflect specific business needs (see Figure 9) as follows:

- particular floor or department
- all of a particular device
- services or applications associated with each component
- business relevance of services
Finally, the discovery results are also used to provide quick insight into the status of the SAP infrastructure, including:

- Potential threats – a visual presentation of where problems may be
- Root cause – with the ability to drill down for problem resolution

This visual representation is fully customizable to reflect thresholds and color mappings specific to individual organizations and business processes.

End-user experience monitoring

With HP OpenView Internet Services and the SAP specific probe, as shown in Figure 10, SAP performance and availability requirements can be specified for SAP user transactions that are being executed via the SAPGUI or via the browser-based SAP user interface. HP OpenView Internet Services will regularly check availability and performance of the SAP application, and evaluate the results based on service level definitions for response time and availability. Issues will be reported as alarms and forwarded into HP OpenView Operations, regardless of whether the action is taken by an internal user, customer or supplier, and independent of the SAP user interface being used.

With so many enterprises engaged in organizational change, these tools are invaluable for understanding IT operations and how its impact on mission-critical SAP environments.

Fault management

Another key area of IT infrastructure management is centralized fault management. Fault management (also known as event management) should encompass everything that the operators need to be informed about: a change of configuration, unavailability of the SAP application, bottlenecks for SAP and non-SAP resources. It is important to alarm operators only about those events that have an actual impact on the application, and that trigger a corresponding action. Non-critical or non-actionable events should simply be stored in the event database.

HP OpenView management delivers predefined monitoring policies for SAP that determine what is monitored and what type of event will be created (see Figure 11). This set of pre-defined policies can be created, changed, or extend as needed using HP OpenView tools. HP OpenView event correlation capabilities can also be used to filter unnecessary events or to create a meaningful, actionable event from multiple low-level events.
Fault management goes beyond simply notifying administrators of a problem; it also includes capabilities to resolve problems quickly and to start appropriate automatic or operator-initiated actions. For example, if a disk is 80% full, the operator is notified to address the problem manually; at 90% full, an automatic action is invoked to delete all temporary files. If a virus has infected certain servers in the IT environment, they can be automatically decoupled to protect mission-critical SAP applications.

When monitoring the IT infrastructure for SAP applications, it is important to take the following areas into consideration:

- **Work process monitoring**
  - Exceptional states, operation modes, availability, idle, update requests, errors, locks
- **Jobs, spooling**
  - aborted jobs, short/long runner, failed to start, printer/spooler errors, TemSe consistency
- **Number of users, ALE status, all CCMS events, XMI interface, ABAP dumps, RFC traces, developer traces, log files, change and transport monitoring**
- **Centralized fault management**
  - networks, servers, applications, databases, storage, policies
- **Event monitoring**
  - availability, failures, warnings, thresholds, message strings
- **Fast problem resolution**
  - automatic or one-click operator-initiated actions such as automatic SAP resource reallocation to bypass problems
  - extensive drill-down and problem analysis capabilities covering all components within the SAP environment from IT to mySAP applications

**Alerts and escalations**

Of particular importance is proper definition and prioritization of necessary alerts. Therefore, several decisions steps must be taken:

- **Categorize the severity levels of alerts**
- **Define reaction times for each severity**
- **Define methods to respond to each alert**
- **Define escalation paths for critical situations**
The escalation paths should bring together different parties such as business owner, hosting partner, and support organizations, to ensure the fastest possible communication in critical situations.

Performance management

The objective of performance management is to detect and correct resource bottlenecks before SAP users are affected, and to collect metrics for SAP-related proactive capacity planning. HP OpenView management collects performance and resource data at various levels:

- Network
- Operating system
- SAP and other applications
- SAP user transactions

It is not adequate to know only when a failure has occurred; it is also important to know when performance is degrading or falling short of expectations. As shown in Figure 12, HP OpenView Performance products track end-user performance, collect resource usage, monitor resource usage for bottlenecks, and store the performance and resource usage data for future analysis.

![Figure 12: Visualizing performance and resource data with HP OpenView Performance](image)

The information collected by HP OpenView Performance products can be directly used to influence behavior in the SAP landscape. HP OpenView software, in combination with server configuration tools such as HP Process Resource Manager, can control the behavior of the SAP landscape in real-time. If the HP OpenView Performance Agent detects a system resource bottleneck, the management solution can automatically trigger an action to add CPU, memory, or I/O power to a certain partition that is running a specific SAP-based business service.

For capacity planning, a single spike (e.g., CPU utilization reaches 100%) may not be noteworthy. The duration and number of times the CPU reaches 100% utilization, however, may be of much greater interest. This becomes important data for determining which resources need to be increased long-term to ensure that business processes receive appropriate capacity when they need it. Historic performance data collected with HP OpenView Performance can also answer questions, such as why order processing was slow the previous week.

With HP OpenView Performance, IT managers can define what performance data is collected, how often it is collected, and for how long it is stored. While detailed performance data is stored de-
centralized on the monitored systems, it can be aggregated and transferred automatically to a centralized server for reporting.

When adding major functionality to an SAP environment, or when expanding the SAP System Landscape, it is critical to know current capacity so that sufficient additional capacity can be added to support future load.

Resource usage and service level reporting

Based on data collected by various HP OpenView products (HP OpenView Internet Services, HP OpenView Performance agents, HP OpenView Operations), web-based reports can be created and made available automatically on a daily basis. The HP OpenView Smart Plug-in for SAP delivers more than 100 pre-defined report templates, covering the following areas:

- Availability
- Performance
- Work processes
- Jobs
- Workload
- Service levels

![Figure 13: Web-based reports for SAP environments](image-url)
Reports providing various levels of details are available for different stakeholders. A business team manager, for example, might only be interested in overall availability of the SAP-based services and compliance with service levels. By comparison, an SAP operator would likely need much more detail.

**SAP-specific monitoring policies**

HP OpenView Smart Plug-in for SAP is the key to managing complex mySAP environments. It works in combination with other HP OpenView solutions (HP OpenView Operations, HP OpenView Performance Agents, HP OpenView Reporter) to provide control over the entire SAP systems landscape. It helps keep SAP services highly available, performing to expectations and aligned with business priorities.

Based on HP OpenView Operations, the HP OpenView Smart Plug-in for SAP monitors key operational activities and events to ensure always-on availability spanning 20 message groups:

- CCMS and Syslog (all events, XMI interface, consolidated across systems)
- Work process (states, op mode)
- User (logged in users)
- Spool (TemSe, print, spool errors)
- Update (errors)
- Job (aborts, late starters, long runners)
- Dumps and files (rfc/ dev trace, log files)
- Transport (ex/ import, repair, connect)
- Lock Monitor (open locks)
- Seamless launch of CCMS/ SAP console
- Transport Management System (TMS)
- Monitor (requests, tasks)

In combination with HP OpenView Performance, the HP OpenView Smart Plug-in for SAP monitors critical SAP resources including more than 70 performance metrics:

- Transactions (end-to-end response times)
- Dialog/ Batch/ Spool/ Update (response/ wait time, event rate)
- Update processes (number tasks, errors)
- Spooler (number of jobs, print requests, failures)
- Jobs (number of jobs running, ready, scheduled, released, finished, aborted)
- Buffer (used, roll/ paging area)
- Work process (number of idle/ running for batch, update, spool, dialog, enqueue)
- Database (Oracle/ SQL Server: CPU usage, physical read/ writes, buffers)
- ITS performance (TAT, sessions, time)
- System up/ down time

Based on recommendations from SAP, most tasks on the checklist for SAP administrators must be performed daily. If performed manually, these tasks can require a significant amount of the SAP administrator’s time over the course of days, weeks, and months. The HP OpenView Smart Plug-in for SAP, however, can execute these tasks in the background, analyze the results, and alarm if necessary. The HP OpenView Smart Plug-in for SAP performs the following tasks:

- Check that the R/3 system is up and running
- Check that daily backups executed without errors
• Check that all application server are up and running
• Check the CCMS alert monitor
• Check work processes
• Look for any failed updates
• Check system log
• Review for cancelled jobs
• Check for ‘old’ locks
• Check for users on the system
• Check for spool problems
• Check job log
• Check work processes
• Review and resolve dumps
• Review workload statistics
• Review buffer statistics
• Review error log for problems
• Review for cancelled and critical jobs
• Check database for free space
• Monitor database growth
• Check transport system
• TemSe consistency check
• Review security audit log
• Review system logs for problems
• Review NT system logs for problems
• Check file system for adequate space
• Plot database growth
• Check that the system is set to ‘not modifiable’
• Check locked transactions

Using the HP OpenView Operations console, operators are informed if an error or a problem has occurred, and can take immediate action to resolve the problem. With this automated approach, SAP administrators are freed to focus on maintenance and analysis tasks for the SAP system, providing a higher value to the IT organization.

Managing the services

Businesses are continually enhancing their SAP environment with new services such as SAP mobile services to provide mobile workers with better remote access to back-end business applications. Once implemented, it is important to monitor the behavior of services such as these to ensure their continuous availability.

Implementation of a web-services architecture not only enables interoperability at the technology infrastructure level, but also offers opportunities to introduce new business models and tightly integrated cross-company value chains. A web service is a reusable business component that can be accessed by other systems across the Internet using lightweight, industry-standard, vendor-neutral technologies. Multiple web services can be combined into loosely coupled business processes that may span enterprise boundaries. Figure 14 illustrates how different technologies are connected for specific services.
All the elements that are combined in a given application roll up into a service (e.g., e-mail or account management). IT organizations today must adopt a service delivery approach to IT management, whether providing services to internal customers (e.g., e-mail) or external customers (e.g., web operations).

HP OpenView tools can be used to manage an entire SAP environment from a service and business perspective by mapping infrastructure elements into services. As a result, administrators can manage from a top-down, as well as a bottom-up approach (See Figure 15). For example, with top-down management, operators would view issues at a service level and drill down into the details of the IT infrastructure if necessary. A bottom-up approach starts by analyzing problems in the IT infrastructure that are affecting services. Both approaches are important, depending on the perspective of the individual operator.
HP OpenView technology enables operators to visualize the full range of infrastructure elements from a business/service perspective, providing a clear understanding of activity across the SAP landscape.

With HP OpenView Operations and the HP OpenView Smart Plug-in for SAP, operators can instantly see:

- if SAP services are impacted by technology faults in the infrastructure
- the root cause for this impact
  - the “Show root cause” function of HP OpenView Operations maps the problem directly to its source, whether it is an issue related to SAP CRM, SCM, R/3 Transaction or Batch, or an issue related to infrastructure components such as databases, storage, CPU, or network.
- other services that are affected
  - the “Show impacted services” function of HP OpenView Operations displays all services affected by a problem. For example, SAP CRM and SRM systems might share the same disk subsystem; if a problem occurs with the disk, then the operator is informed that both services are affected.
- which problem to address first

Business impact analysis provides insight into what services are affected by problems that may be in the environment. Moreover, with a click of a button, it is possible to determine the root cause of the problem affecting the service.

If there is only one problem in the SAP environment, it is easy to prioritize. In a complex SAP environment, however, it is important to understand those services that are more critical and prioritize them by business impact. Addressing critical issues first also reveals other services that may be affected by the problem. The HP OpenView solution monitors all elements required to deliver a service, including SAP components, as well as other applications (home-grown or from ISVs), infrastructure elements (computer, disk, memory, operating system, network), and external services (e.g., Internet). Only by managing all these elements is it possible to ensure that mission-critical business services are under control.

For example, suppose a non-productive database is used by a small R&D team and an indirect procurement system supports a critical area in central purchasing. Both are affected by a certain network problem. What element requires priority attention? Who is affected? What is the business impact? It is not sufficient to simply know that a network problem exists; it is equally important to know how that problem affects the business at large.

All the information collected by the various HP OpenView products can be communicated to various stakeholders in real time through a web-based portal. The HP OpenView Service Information Portal provides secure, personalized, web-based information related to services and the IT infrastructure.

**ITIL-based processes with HP OpenView Service Desk**

With HP OpenView tools, IT can build service models, as well as the configuration management database (CMDB) that connects people and the SAP infrastructure to the services IT delivers. In addition, IT can implement proven, ITIL-based processes using HP OpenView Service Desk—a product covering all user-interfacing processes based on built-in, yet configurable, process and object definitions (See Figure 16).
Once the services, infrastructure and people cataloged, Service Level Agreements (SLAs) can be established and the quality of services can be monitored relative to those SLAs. HP OpenView Service Desk can be the central data store for service and SLA definitions, and service definitions can also be transferred automatically to HP OpenView Operations for continuous monitoring. Conversely, events within HP OpenView Operations can be forwarded automatically to HP OpenView Service Desk, so that whenever a component of the infrastructure becomes unavailable, administrators have immediate insight into what services and customers are affected. As a result, the right people can be engaged to resolve the issue. HP OpenView Service Desk also offers built-in reporting capabilities that generate reports describing the quality of a service that is delivered.

Through integration between HP OpenView Operations and HP OpenView Service Desk, SAP-specific events can be automatically converted into trouble tickets with HP OpenView Service Desk. Also, the open interfaces of HP OpenView Service Desk allow the exchange of trouble tickets between SAP and HP OpenView Service Desk.

Managing the business value of IT

HP OpenView management correlates the health of IT services to the business processes that have economic impact on the organization. By understanding the business impact of an outage within the infrastructure, IT personnel are equipped with the necessary information to prioritize problem resolution.

When an SAP application is implemented, business processes are typically well documented in business blueprints. In the future, they can be documented within the SAP Solution Manager.

Determining business processes

To effectively manage the value of IT, it is first important to identify business processes. There are many different features within SAP products that support a given business process. Typically these SAP functions are combined with in-house capabilities or functionality of non-SAP systems.

To show the dependency of a given business process on these functions (or the services built on these functions) they can be correlated with business process-oriented maps to proactively manage business impact.
The result is a presentation and control solution that can be used directly by management to prioritize problem resolution, with those problems having the greatest business impact addressed first.

Managing the perception of IT

Managing the perception of IT within the organization is a difficult job at best. There are three ways that HP OpenView can help maximize the perceived value of IT within the rest of the organization. By having the right data and reporting capabilities, the organization is more aware of the return from its IT investments.

1. HP OpenView tools can help demonstrate the value already being delivered in the corporation
2. The IT department can demonstrate that it is an enabler of new business, providing credibility and recognition for its strategic contribution to the business
3. HP OpenView tools can manage not just the technology side of the equation, but the financial side as well

Most important, because HP OpenView tools enable administrators to act proactively and report on the results, it provides a powerful means to demonstrate IT value across the organization.

Summary

As we have seen, HP OpenView solutions for SAP enable the SAP infrastructure to meet critical IT imperatives and adapt to the changing business needs by:

- Linking business and IT
  - Rapid response to business changes
  - Information integration for real-time decision making
  - Business process-oriented management
- Ensuring stability and flexibility
  - Self management for continuous SAP operations
  - Data protection at any time, independent of the database being used
  - Control of resource reallocation
  - Interaction with SAP and other applications
  - Reduction of costs by maximizing utilization of available resources
- Reducing complexity
  - Management of entire infrastructure as a single system
  - Integration with different service desk/help desks
  - Single point of contact in the SAP Customer Competence Center
  - Tight integration with SAP applications
  - Holistic view of business with customizable views
  - Key building block to optimize assets today and tomorrow
- Extending value and reach for the enterprise
  - Information delivered to where the work is done
  - Improved customer service

Because HP OpenView tools are tightly integrated, they enable infrastructure components to be managed individually, and aggregated services to be managed with a broader view. The entire infrastructure is presented through a single window, allowing individual operators to manage according to their individual preferences. Notices and alerts can be sent only to those who are responsible for that particular issue or otherwise have a need for the data. Management data can be divided by operator role and routed by level of management (e.g., critical issues vs. details, help desk, etc.). In addition, events can be consolidated and filtered, preventing a firestorm of messages from all the different tools.
HP OpenView management also provides extensive scalability, making it cost effective to manage a small SAP environment today, with the assurance that all the pieces are in place to manage that environment as it grows.

Managing the infrastructure is a critical function of any IT organization. HP OpenView can make that function easier, more proactive, and more cost-effective by providing a service-level management approach. The end result is that IT personnel can be more productive and deliver greater value to the business.
Appendix A: HP OpenView products

**Note:** The table below is not a list of all HP OpenView products available; it only lists those HP OpenView products that are frequently used to manage SAP environments.

<table>
<thead>
<tr>
<th>OpenView Product</th>
<th>Description</th>
<th>Monitoring landscape</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP OpenView Network Node Manager</td>
<td>Centralized management for enterprise networks</td>
<td>IP network management based on SNMP for all network components, as well as server and clients.</td>
</tr>
<tr>
<td>HP OpenView Operations</td>
<td>Centralized management infrastructure for system and application management</td>
<td>Operational front-end and infrastructure for monitored environment. Installed on all monitored nodes.</td>
</tr>
<tr>
<td>HP OpenView Performance Manager and Agent</td>
<td>Operation System monitoring agent for performance metrics.</td>
<td>On every node to gather performance metrics.</td>
</tr>
<tr>
<td></td>
<td>Basis for all performance integration of the HP OpenView Smart Plug-ins.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitors and analyzes the performance of systems and applications to compare service level objectives with actual application performance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enables real-time performance monitoring as well as action on alarm.</td>
<td></td>
</tr>
<tr>
<td>HP OpenView GlancePlus</td>
<td>Provides a powerful system-monitoring and diagnostic tool for online performance information, examination of system activities, identification and resolution of performance bottlenecks and fine-tuning.</td>
<td></td>
</tr>
<tr>
<td>HP OpenView Reporter</td>
<td>Centralized reporting tool to generate HTML reports based on performance metrics and events.</td>
<td>One's per landscape to document the behavior of the Systems (offline reporting).</td>
</tr>
<tr>
<td>HP OpenView Service Navigator</td>
<td>Centralized service to implement the service trees for customer.</td>
<td>Complementary with HP OpenView Operations. Basis for all visualizing service views coming with HP OpenView Smart Plug-ins.</td>
</tr>
<tr>
<td>HP OpenView Service Information Portal</td>
<td>Creates a “portal” view of customers’ managed environment.</td>
<td>Any management information for the whole managed environment.</td>
</tr>
</tbody>
</table>
filtered, customized, consolidated views of management information to their customers to proactively demonstrate performance against SLAs. Customer information can be from the network, services, systems, applications, performance, data, storage and other third-party data.

<table>
<thead>
<tr>
<th>HP OpenView Smart Plug-in for SAP</th>
<th>Integration to manage SAP components with HP OpenView products</th>
<th>For every R/3 system and mySAP components, ITS monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP OpenView Smart Plug-in for Databases</td>
<td>Integration to manage databases (SQL server, oracle, Informix, DB2)</td>
<td>For every databases in the landscape of mySAP components plus more</td>
</tr>
<tr>
<td>HP OpenView Smart Plug-in for MS Exchange</td>
<td>Integration to manage Microsoft Exchange</td>
<td>Specially for Mail System integration with mySAP (EBP)</td>
</tr>
<tr>
<td>HP OpenView Smart Plug-in for WebMethods</td>
<td>Full integration of WebMethods including service maps</td>
<td>This is important for SAP users since SAP Business connector is WebMethods technology, and SAP customers often use WebMethods.</td>
</tr>
<tr>
<td>HP OpenView Internet Services</td>
<td>Monitoring the response and availability of SAP through synthetic probes replaying customer transactions (either via HTTP transactions to SAP web UI or through logging into SAP directly via ABAP)</td>
<td>For all implemented SAP applications - R/3 basis system or web servers and the SAP Enterprise Portals in the mySAP environment get the performance and event metrics (ITS, CRM, EBP)</td>
</tr>
<tr>
<td>HP OpenView Smart Plug-in for Storage Devices</td>
<td>Management and Monitoring the Disk Arrays</td>
<td>SAP application heavily rely on storage so it's important to have storage managed properly</td>
</tr>
<tr>
<td>HP OpenView Smart Plug-in for Web Application Servers</td>
<td>Monitoring of Weblogic, WebSphere, .net</td>
<td>For all connections via SAP NetWeaver eaver to the solutions based on Weblogic/ WebSphere/.net</td>
</tr>
<tr>
<td>HP OpenView Service Desk</td>
<td>Offers a suite of fully integrated support processes that measure and monitor IT resources to ensure that contracted services meet predefined service level agreements (SLAs).</td>
<td></td>
</tr>
<tr>
<td>HP OpenView Data Protector</td>
<td>Provides comprehensive data protection and disaster recovery across a broad range of</td>
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</table>
applications and operating systems for heterogeneous data center environments. HP OpenView Data Protector is highly integrated with SAP backup / recover software.

HP OpenView Data Protector is the successor to HP OpenView Omniback II, and integrates storage media management with HP OpenView Storage Media Operations.

For more information

www.openview.com/sap