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# Deploying SAP in Oracle and Linux Environments Using the Hitachi Adaptable Modular Storage 2000 Family

Installation and Configuration Guide

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September 2009



## Summary

SAP's Enterprise Resource Planning (ERP) software integrates business process and information technology and people associated with the business that implement these systems. The mission-critical nature of SAP deployments requires an IT infrastructure that delivers high performance and is highly available. The infrastructure must be easy to deploy, manage and scale. Good planning prior to deploying SAP software is key to preventing performance issues, whether you're deploying business process management software for the first time or replacing a storage system that doesn't meet your needs.

This white paper introduces the architectural concepts that underpin SAP and explains how to use a Hitachi Adaptable Modular Storage 2000 family based-solution to create an ideal storage environment for SAP deployments using Oracle and Linux. It also provides deployment guidelines for a successful implementation of SAP in Oracle and Linux environments using the Hitachi Adaptable Modular Storage 2000 family, and describes the hardware and software required to build the solution.

This white paper is written for businesses of all sizes that are deploying SAP on the Hitachi Adaptable Modular Storage 2000 family. It is targeted at anyone at those businesses who is charged with deploying SAP. At small companies, that might be a single individual who handles all data center functions, including applications, storage and network administration. At larger companies, these responsibilities are likely divided.

**For best results use Acrobat Reader 8.0.**



## Contributors

The information included in this document represents the expertise, feedback and suggestions of a number of skilled practitioners. The authors recognize and sincerely thank the following contributors and reviewers of this document:

- Heidi Biggar
- Malcolm Brickwood
- Ron-An Lee
- Lisa Pampuch

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# Deploying SAP in Oracle and Linux Environments Using the Hitachi Adaptable Modular Storage 2000 Family

## Installation and Configuration Guide

SAP is the leader in the field of business process management solutions. Organizations rely on SAP's software to automate mission-critical operations. Very often SAP applications must be available 24 hours a day, seven days a week, meaning a loss of application availability can have a devastating effect on businesses. That is just as true for a small business as it is for a global enterprise.

SAP's Enterprise Resource Planning (ERP) software integrates business processes and information technologies. Generally, SAP ERP implementations are enterprise-wide and integrate a variety of SAP business modules.

The mission-critical nature of SAP deployments requires an IT infrastructure that delivers high performance and is highly available. The infrastructure must be easy to deploy, manage and scale. The storage area network (SAN) typically is responsible for two out of every three customer calls related to SAP database performance issues. It is crucial that the SAN, which houses database files, not only is capable of handling current loads, but is also capable of scaling to meet future transaction loads.

Good planning prior to deploying SAP software is key to preventing performance issues, whether you're deploying business process management software for the first time or replacing a storage system that doesn't meet your needs.

All SAP solutions include an embedded database that runs on the selected operating system. The most widely implemented SAP database is Oracle running on a Linux or Unix operating system.

This white paper introduces the architectural concepts that underpin SAP and explains how to use a Hitachi Adaptable Modular Storage 2000 family based-solution to create an ideal storage environment for SAP deployments using Oracle and Linux.

This white paper also provides deployment guidelines for a successful implementation of SAP in Oracle and Linux environments using the Hitachi Adaptable Modular Storage 2000 family. It describes the hardware and software required to build the solution and provides links to supporting documentation needed to build, test and validate the solution. Although this document does not provide step-by-step detailed instructions for each and every task required to deploy the solution, it does provide a consolidated resource where administrators can easily locate related materials needed to construct a functional solution.

This white paper is written for businesses of all sizes that are deploying SAP on the Hitachi Adaptable Modular Storage 2000 family. It is targeted at anyone at those businesses who is charged with deploying SAP. At small companies, that might be a single individual who handles all data center functions, including applications, storage and network administration. At larger companies, these responsibilities are likely divided.

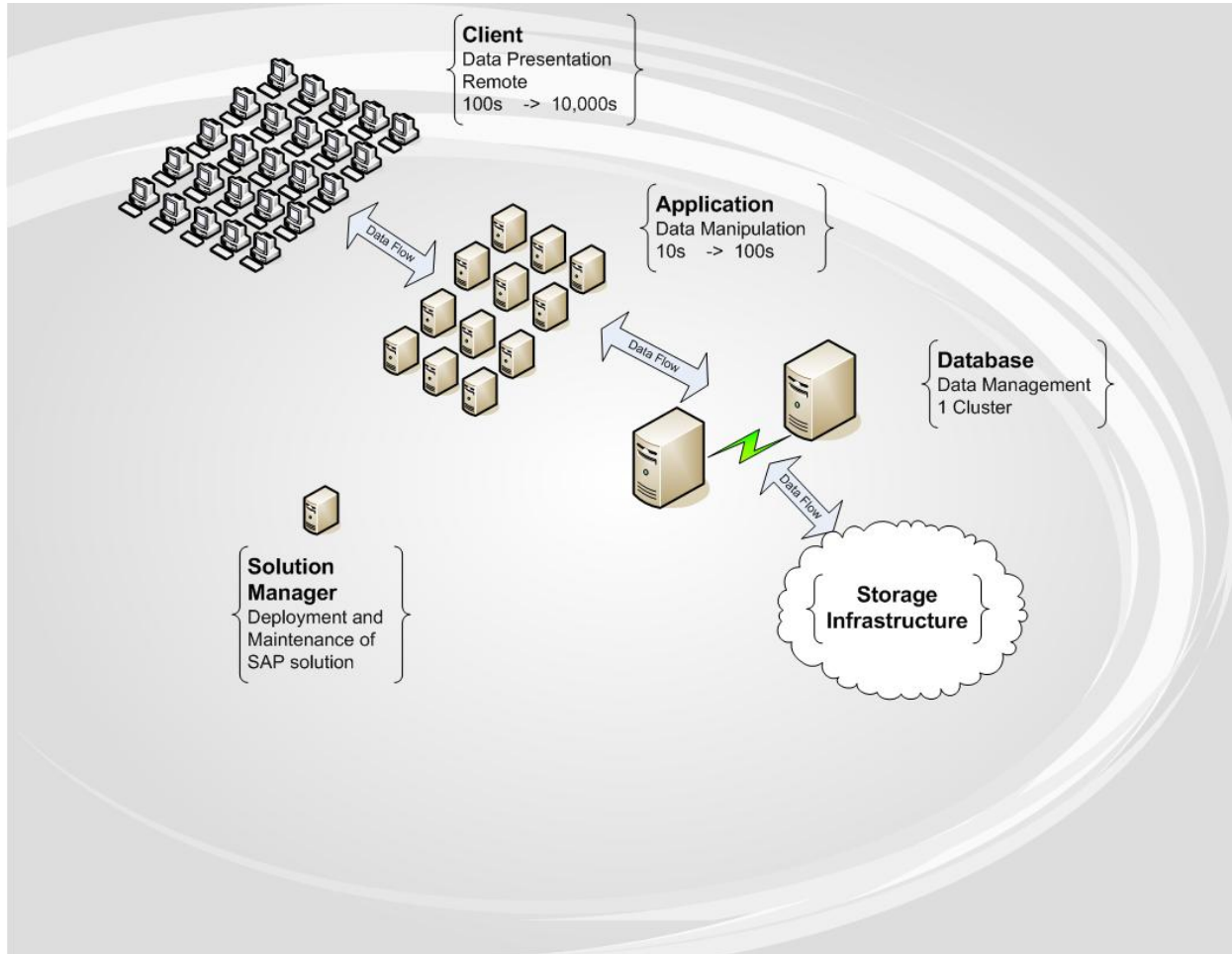
Storage administrators might not realize how important it is to have a high-level understanding of SAP architecture to ensure that storage systems meet service level agreements. This paper provides that understanding for storage administrators who are just beginning SAP deployments as well as those who might be attempting to remedy problems in existing deployments.

This white paper assumes either familiarity with SAN technologies and tools and Hitachi storage management software, including Hitachi Storage Navigator Modular 2 and Hitachi Dynamic Link Manager. It does not assume detailed knowledge of SAP's products or architecture.

## Solution Overview

SAP's ability to scale almost without limit is based on the company's use of a three-tier approach to solution deployment that involves a client tier, an application tier and a database tier, as shown in Figure 1. This conceptual framework is the same for all SAP implementations, whether large or small.

Figure 1. SAP Three-Tier Architecture



In very small or test environments, all three tiers might be implemented on a single server. In production environments, the client tier is deployed into a user environment and can run on a variety of device types ranging from hand-held scanners that collect and transmit data to SAP or desktop PCs used by information professionals. In all cases, these devices are located physically close to the end user. This tier can scale virtually without limit.

The application and database tiers are centralized in the data center and are the focus of the majority of IT attention. By design, the application tier can scale as the needs of an organization grow. The expansion is accomplished by simply adding servers. SAP software balances the processing load across the application servers, which delivers high performance and protects against service interruption in the case of hardware failure.

In production environments, database servers are clustered to eliminate a single point of failure. While any performance issues that are related to the application servers are easily remedied by additional

servers, that is not the case with the database tier. Performance issues in the database tier can be difficult to remedy. Hitachi Data Systems effectively introduces a fourth tier to SAP implementations that is highly effective in addressing the data availability requirements of SAP deployments. In addition, proper focus on the architecture of the storage tier minimizes SAN-related performance issues that can develop as the SAP solution evolves and expands.

For demonstration purposes, this paper details the steps required to deploy the Solution Manager server as well as a single server that contains an instance from application and database tiers. The focus of the paper is the architecture of the storage infrastructure, the conceptual fourth tier of this solution, because any storage configuration and performance issues that arise originate in this area. You only use the Solution Manager server when you're deploying the SAP environment or making changes to it, so it is not mission critical.

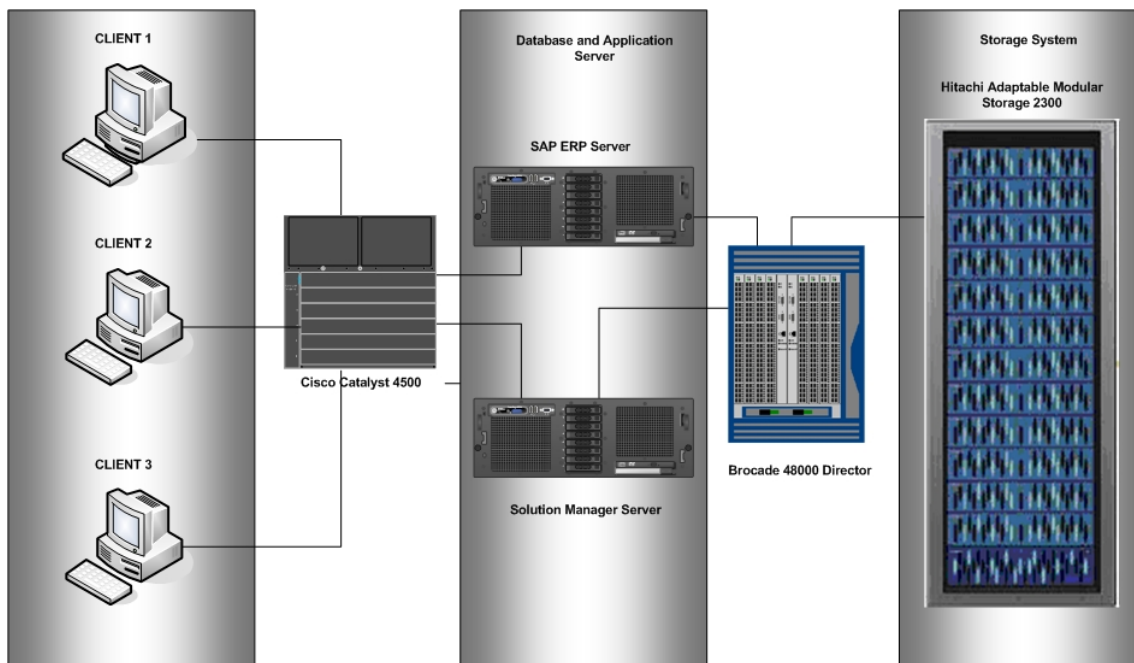
The solution described in this deployment guide includes the following components:

- Hardware:
  - Servers for deployment or SAP Solution Manager, SAP ERP and SAP GUI software
  - Storage system that stores application data
- Software:
  - **SAP business process software** — SAP Solution Manager, SAP ERP, SAP GUI and Oracle database that is provided by SAP
  - **Hitachi storage management software** — Hitachi Storage Navigator Modular 2 and Hitachi Dynamic Link Manager Advanced

## Tested Deployment

This white paper describes a solution that includes an SAP client that accesses the SAP application infrastructure, which in turn stores data in and accesses data from a Hitachi Adaptable Modular Storage 2000 family storage system, as illustrated by Figure 2.

Figure 2. Solution Architecture



In the tested deployment, the client tier consists of Windows-based servers with SAP GUI installed. The clients connect to the SAP system in the SAP application tier via a Cisco Catalyst 4500 switch. The SAP Solution Manager was installed on a management server. The SAP application tier and database tier are installed on a single server. The SAP application is connected to a Hitachi Adaptable Modular 2300 storage system via a Brocade 48000 director.

## Hardware Requirements

The following sections describe the hardware used to deploy the solution described in this white paper.

### Hitachi Adaptable Modular Storage 2000 Family

The Hitachi Adaptable Modular Storage 2000 family provides a reliable, flexible, scalable and cost effective modular storage system for the solution described in this white paper. The 2000 family is ideal for demanding application requirements and delivers enterprise class performance, availability, capacity and functionality at a midrange price.

The Hitachi Adaptable Modular Storage 2000 family is the only midrange storage product with symmetric active-active controllers that provide integrated, automated hardware-based front-to-back-end I/O load balancing. Both controllers in a 2000 family storage system are able to dynamically and automatically assign the access paths from the back of the controller to the LU. All LUs are accessible regardless of the physical port or the server from which the access is requested. Utilization rates of each controller are monitored so that a more even distribution of workload between the two controllers can be maintained.

No other midrange storage product that scales beyond 100TB has a serial attached SCSI (SAS) drive interface. The point-to-point back-end design virtually eliminates I/O transfer delays and contention associated with Fibre Channel arbitration and provides significantly higher bandwidth and I/O concurrency. It also isolates any component failures that might occur on back-end I/O paths.

The Hitachi Adaptable Modular Storage 2300 is the 2000 family storage system used in the testing of this solution. Although Hitachi Data Systems’ testing used the 2300, any member of the 2000 family can be used to deploy this solution.

### Servers

Table 1 lists the servers used to deploy this SAP solution. Servers must meet specification requirements for the SAP Solution Manager and SAP ERP roles they are hosting.

**Table 1. Servers Used in Tested Deployment**

<i>Number of Servers</i>	<i>Server Make and Model</i>	<i>Role</i>	<i>Memory, Processor and Host Bus Adapters (HBAs)</i>
1	Dell PowerEdge R905	SAP Solution Manager server	64GB memory, 4 dual-core AMD processors. Two Emulex LPe11002 HBA with 4Gb/s transfer rate
1	Dell PowerEdge R905	SAP ERP server	64GB memory, 4 dual-core AMD processors. Two Emulex LPe11002 HBA with 4Gb/s transfer rate
2	Dell PowerEdge 750	SAP clients	2GB memory, 2 Intel Xeon processors
1	Dell PowerEdge 750	Management server – Hitachi Storage Navigator Modular 2 software	2GB memory, 2 Intel Xeon processors

For more information about server requirements for SAP ERP, SAP Solution Manager and SAP clients, see the following SAP Notes, which are available to licensed customers from SAP's [Web site](#):

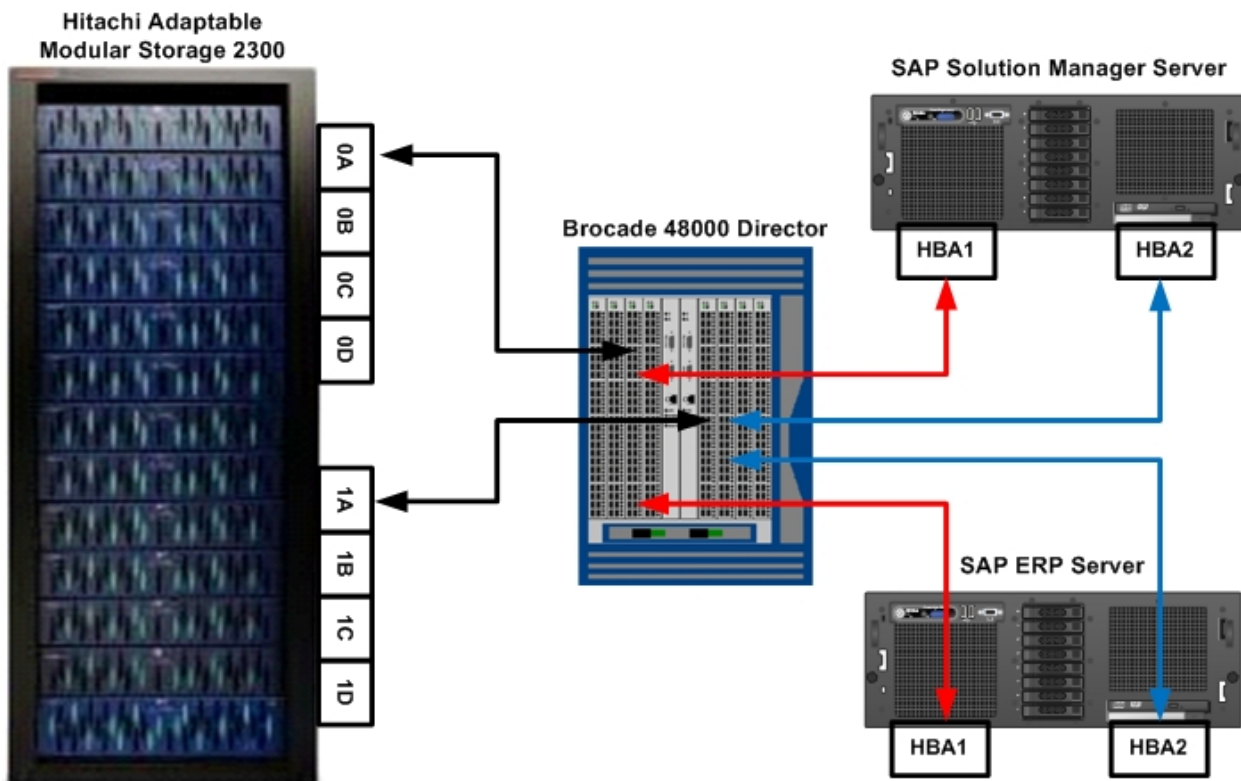
- SAP Note 1094599, *Installation NW7-SR3/Business Suite 2005 SR3 Unix/Oracle*
- SAP Note 26147, *SAP GUI Resources: Hardware and Software*
- SAP Note 901070, *Resource Requirements for SAPECC6*

## Storage Area Network Components

Attach the SAP ERP server and SAP Solution Manager server to redundant HBAs via a SAN consisting of a Fibre Channel switch or a director. Every Hitachi Adaptable Modular Storage 2000 family storage system has at least four Fibre Channel ports. The 2300, which was used in testing for this solution, has eight Fibre Channel ports, four ports on each controller. In the tested deployment, the SAP ERP and SAP Solution Manager servers were connected via two HBAs each to a Brocade 48000 Director. The Brocade 48000 director, in turn, was connected to two different ports of the 2300.

Figure 3 illustrates the redundant paths that are managed by Hitachi Dynamic Link Manager Advanced software in the deployment tested for this solution.

**Figure 3. Connections to the Hitachi Adaptable Modular Storage 2300**



## Software Requirements

The following sections describe the software applications required to deploy this solution.

### SAP Software

SAP provides business software and enterprise applications that enable companies to execute their business and IT strategies more effectively by integrating structured and unstructured information, business processes and people involved. SAP offers a large portfolio of products and solutions to integrate cross enterprise processing using technologies such as Electronic Data Interchange (EDI),

Collaborative Cross Applications. SAP is based on a Netweaver Technology platform that allows an enterprise to choose from a wide variety of operating systems and database management systems. An SAP system can be flexibly deployed either in a single-stack (using ABAP) or dual-stack (using ABAP and Java) environment. Moreover, due to its three-tier architecture, SAP systems can scale vertically and horizontally.

### *SAP ERP*

SAP ERP combines scalable and effective software for enterprise resource planning (ERP) with a flexible, open technology platform that can leverage and integrate SAP and non-SAP systems. This industry leading solution provides end-to-end software functionality for enterprise management and support by controlling and processing business related company processes. The tested deployment described in this white paper uses ERP version 6.0 Special Release 3 (SR3).

### *SAP Solution Manager*

SAP Solution Manager is a service and support platform that provides the integrated content, tools and methodologies to implement, support and monitor operations of SAP implementations. Solution Manager is installed on a separate system. The tested deployment described in this white paper used SAP Solution Manager version 7.0.

### *SAP GUI 7.1*

SAP GUI is the client software that allows SAP users to access various functionality in SAP applications and SAP Solution Manager. The tested deployment described in this white paper used SAP GUI version 7.1 on various clients.

### *Oracle Database 10.2.0.4*

SAP systems can be used with a variety of databases available from different vendors. The execution of business transactions in SAP systems are processing units grouped to provide specific functions; these processing units execute changes to the database that are consistent. Oracle is the industry leader in providing state-of-the-art high performance database management system. The tested deployment described in this white paper uses the Oracle database version 10.2.0.4 that is available from SAP.

## Hitachi Software

Hitachi software helps you maintain high levels of information availability and optimize application performance while improving IT staff productivity through the automation of management and maintenance tasks.

### *Hitachi Storage Navigator Modular 2*

Hitachi Storage Navigator Modular 2 is part of the Hitachi Basic Operating System software package. It monitors and manages Hitachi modular storage systems, including the Hitachi Adaptable Modular Storage 2000 family, through either a GUI or a command-line interface (CLI). Use Storage Navigator to create RAID groups and LUs and to assign those LUs to SAP Solution Manager and SAP ERP servers.

### *Hitachi Dynamic Link Manager Advanced Software*

Hitachi Dynamic Link Manager Advanced software bundles Hitachi Dynamic Link Manager I/O multipathing software and Hitachi Global Link Manager software. Hitachi Dynamic Link Manager software, which is installed on the SAP ERP and SAP Solution Manager servers, includes capabilities such as path failover and failback and automatic load balancing to provide higher data availability and accessibility.

Hitachi Dynamic Link Manager software includes the following load-balancing algorithms that are especially suited for Hitachi storage systems:

- Round robin
- Extended round robin
- Least I/Os
- Extended least I/Os
- Least blocks
- Extended least blocks

The choice of load-balancing algorithm depends on the specific environment and access patterns of the application. In most cases, the round robin algorithm provides the best overall performance. In some environments, such as an environment shared with other applications, one of the other algorithms might give the best overall performance.

The 2000 family supports active-active multipath connectivity. To obtain maximum availability, design and implement your host-storage connections so that at least two unique paths exist from the host to the storage system. Hitachi Data Systems recommends the use of dual SAN fabrics, multiple HBAs and host-based multipathing software when deploying SAP systems.

Because the SAP Solution Manager and SAP ERP servers have HBAs each, two I/O paths exist from host to the storage system. This means that each LU is identified twice by the operating system. Hitachi Dynamic Link Manager software manages the dual naming issue and provides high availability in case of I/O path failure. Install Hitachi Dynamic Link Manager Advanced software on both the SAP Solution Manager server and the SAP ERP server.

## Deploying the Solution

A successful deployment of SAP software involves the following high-level steps:

1. Establish your requirements for the deployment.
2. Configure servers and operating environment.
3. Complete pre-installation tasks.
4. Configure storage and file systems.
5. Install and configure SAP Solution Manager software.
6. Install and configure SAP ERP software.
7. Install and configure SAP GUI software.
8. Verify the SAP system.

Your checklist might vary based on your environment. More details about each of these steps are included in the following sections.

The specific activities and detailed processes for each of the high-level tasks are located in documentation provided by Hitachi Data Systems and SAP. This documentation set is required to assist with deploying the solution. For more information, see the following resources:

- Hitachi Storage Navigator Modular 2 Users Guide
- Hitachi Dynamic Link Manager Users Guide for Linux
- [SAP Notes](#) and related guides

## SAP Deployment Considerations

To deploy a basic SAP system that is also highly available and provides high performance, use high-powered servers and storage systems that provide availability, scalability and performance. As shown in Figure 3, accepted best practice is to deploy SAP Solution Manager and SAP ERP software on separate servers. Figure 3 shows multiple I/O paths providing high-availability and high I/O performance from the hosts to storage via a Fibre Channel director.

## Server and Operating Environment Configuration

When deploying SAP Solution Manager and SAP ERP software for this solution, Hitachi Data Systems used two high-powered Dell PowerEdge R905 servers with four Quad Core CPUs and 64GB memory. Each server had two Emulex LPe 11002 HBAs (4Gb/s transfer rate) and two 1GB network interface cards.

Two SAP client servers and one management server for Hitachi Storage Navigator Modular 2 were deployed using Dell PowerEdge 750 servers with 2 CPUs and 2GB memory.

Hitachi Data Systems installed Red Hat Enterprise Linux version 5.2 (x86 64 bit) on the SAP Solution Manager and SAP ERP servers. Microsoft Windows 2008 was installed on SAP clients and the Hitachi Storage Navigator Modular 2 server.

For more information about operating system requirements for SAP systems, see the following SAP Notes, which are available to licensed customers from SAP's [Web site](#):

- SAP Note 171356, *SAP Software on Linux: Essential*
- SAP Note 1048303, *Red Hat Enterprise Linux 5.x: Installation and Upgrade*
- SAP Note 1172419, *Linux: Supported Java Versions on the x86\_64 Platform*

## Pre-installation Tasks

You must complete several pre-installation tasks before installing either SAP Solution Manager or SAP ERP software or configuring your storage. For more information about pre-installation tasks, see the following SAP Notes, which are available to licensed customers from SAP's [Web site](#):

- SAP Note 855498, *Installation Pre-requisite Checker, SAP Guides*
- SAP Note 1145779, *SAP Solution Manager 7 Installation*
- SAP Note 1052298, *SAP Netweaver 7.0(2004s) SR3 Installation on UNIX/Oracle*
- SAP Note 828268, *Oracle Database 10g: New Functions*
- SAP Note 871735, *Current Patch Set for Oracle 10.2.0*
- SAP Note 830576, *Parameter Recommendations for Oracle 10g*
- SAP Note 1289199, *Information about Oracle Parameters*

## Storage Configuration

Proper planning helps ensure a robust solution. Proper planning requires that you identify your storage needs and carefully choose a RAID configuration. After these planning decisions are made, you can begin configuring your storage system.

### *Identify Storage Needs*

The critical nature and performance requirements of SAP implementations demand that IT administrators carefully select SAN infrastructure elements. It's important to remember that not all elements of an SAP storage infrastructure demand the same level of performance. Also note that a mature implementation has a wide variety of requirements, ranging from high performance for data related to the production instance to cost-effective near-line storage for archiving. The performance and availability requirements of the production landscape are measured separately from any other part of the environment. The most

demanding areas of concern are the online redo logs and offline redo logs. The data file that contains data from the Oracle Instance for ERP is the next most significant element.

The advanced architecture of the Hitachi Adaptable Modular Storage 2000 family helps alleviate port and front-end processor utilization from the factors that contribute to high I/O response times.

When deploying an SAP system, primary areas of concern are disk type, disk size and RAID configuration. Given the potential negative effect of a performance issue, Hitachi Data Systems recommends erring on the side of too much rather too little performance.

A common practice is to take advantage of the ability of high end SANs to divide disk resources among multiple host to attain the highest utilization possible. Hitachi Data Systems does not recommend this in the case of SAP, because when the ERP systems share RAID groups with other applications, poor performance can result.

Not all elements of the SAP storage infrastructure demand the same level of performance. The most demanding areas are transaction log and tempdb files. Hitachi Data Systems recommends placing production databases on individual RAID-1+0 groups, and always on the fastest disk. Although a 2D+2D configuration provides high performance, based on performance numbers a 4D+4D can yield a larger number of IOPs and maintains meeting best practice response times. These files remain relatively small for all implementations.

The production data file grows as the SAP project matures and expands. The conservative approach is to use fast disks and RAID-1+0. For smaller database configurations with a low number of transactions and concurrent users, you can reduce costs by using RAID-5. The goal is to incorporate a configuration that provides the most I/O within the best practices approved time for reads writes.

The other areas of an SAP implementation are not generally high focuses for performance. A variety of disk types and RAID configurations are available that can help lower our TCO and meet the I/O and availability requirements of SAP. These are out of scope of this white paper.

### *Choose RAID Configuration*

Hitachi Data Systems recommends using RAID-1+0 for this solution because it provides both high availability and performance. In addition, SAP Solution Manager and SAP ERP software need various file systems with varied requirements to be created.

Table 2 provides storage configuration details for SAP Solution Manager software. This table assumes RAID-1+0, RAID type 2D+2D and 146GB 15K SAS disks.

**Table 2. Storage Configuration Details for SAP Solution Manager Software**

<b>RAID Group</b>	<b>LUN</b>	<b>Size (GB)</b>	<b>File System Mount Point</b>	<b>Usage</b>
06	101	20	/sapmnt	Central repository for SAP Solution Manager
06	102	60	/usr/SAP/<SID>	File system to stores SAP binaries
06	103	80	/usr/SAP/trans	Central location for moving data to another system when required
05	104	20	/oracle and /oracle/client	File system for ORACLE_BASE and Oracle client
05	105	40	/oracl estage and /oracl e/<SID>	File system for Oracle binaries for installation of Oracle and home directory for Oracle user respectively
05	106	60	/sapreorg and /oracl e/<SID>/<REL>	File system to temporarily store data for online data reorganization and location for ORACLE_HOME respectively

<b>RAID Group</b>	<b>LUN</b>	<b>Size (GB)</b>	<b>File System Mount Point</b>	<b>Usage</b>
05	107	15	/oracl e/<SI D>/ori gl ogA and /oracl e/<SI D>/mi rrl ogB	File system for online redo logs and duplex logs of the database
05	108	15	/oracl e/<SI D>/ori gl ogB and /oracl e/<SI D>/mi rrl ogA	File system for online redo logs and duplex logs of the database
05	109	80	/oracl e/<SI D>/saparch	File system for archived redo logs
04	110	50	/oracl e/<SI D>/sapdata1	File system for SAP data
04	111	50	/oracl e/<SI D>/sapdata2	File system for SAP data
04	112	50	/oracl e/<SI D>/sapdata3	File system for SAP data
04	113	50	/oracl e/<SI D>/sapdata4	File system for SAP data

Table 3 provides storage configuration details for SAP ERP software. This table assumes RAID-1+0, RAID type 2D+2D and 146GB 15K SAS disks

**Table 3. Storage Configuration Details for SAP ERP Software**

<b>RAID Group</b>	<b>LUN</b>	<b>Size (GB)</b>	<b>File System Mount Point</b>	<b>Usage</b>
07	201	20	/sapmnt	Central repository for SAP ERP
07	202	60	/usr/SAP/<SI D>	File system to store SAP binaries
07	203	80	/usr/SAP/trans	Central location for moving data to another system when required
08	204	20	/oracl e and /oracl e/cl ient	File system for ORACLE_BASE and Oracle client
08	205	40	/oracl estage and /oracl e/<SI D>	File system for Oracle binaries for installation of Oracle and home directory for Oracle user respectively
08	206	60	/sapreorg and /oracl e/<SI D>/<REL>	File system to temporarily store data for online data reorganization and location for ORACLE_HOME respectively
08	207	15	/oracl e/<SI D>/ori gl ogA and /oracl e/<SI D>/mi rrl ogB	File system for online redo logs and duplex logs of the database
08	208	15	/oracl e/<SI D>/ori gl ogB and /oracl e/<SI D>/mi rrl ogA	File system for online redo logs and duplex logs of the database
08	209	80	/oracl e/<SI D>/saparch	File system for archived redo logs
09	210	50	/oracl e/<SI D>/sapdata1	File system for SAP data
09	211	0	/oracl e/<SI D>/sapdata2	File system for SAP data
09	212	50	/oracl e/<SI D>/sapdata3	File system for SAP data
09	213	50	/oracl e/<SI D>/sapdata4	File system for SAP data

## Configure Storage

Follow these steps to configure your Hitachi Adaptable Modular Storage 2000 family storage system.

1. Use Hitachi Storage Navigator Modular 2 software to create RAID groups and LUs.

For more information, see the user's guide that accompanies the software.

2. Use Hitachi Storage Navigator Modular 2 software to create host groups and assign LUs to them.

Creating host groups allows storage systems to be managed more easily. World Wide Names of the HBAs residing on a physical server can be assigned to a host group and then LUs can be associated with each host group. This means that a group of LUs can be isolated to be used by only the assigned physical servers.

3. Follow these steps to install Hitachi Dynamic Link Manager Advanced software and configure your storage system:
  - a. Issue the following command on the server on which you want to install Hitachi Dynamic Link Manager Advanced software:

```
. /installhdlm
```

When the installation is complete, Hitachi Dynamic Link Manager Advanced displays a message indicating that the software was successfully installed.

Hitachi Dynamic Link Manager Advanced software names your disk device using the following format:

```
sddl m<disk-device>
```

<disk-device> is a combination of letters from a to z identifying your disk device.

- b. On each server, create a partition on each disk device using the `fdisk` utility.
- c. On each server, create a file system for each disk device.

Follow this syntax to create a file system:

```
mke2fs -b 4096 /dev/sddl m<disk-device>
```

- d. Mount each file system.

Follow this syntax to mount a file system:

```
mount /dev/sddl m<disk-device> /sapmnt/SMT
```

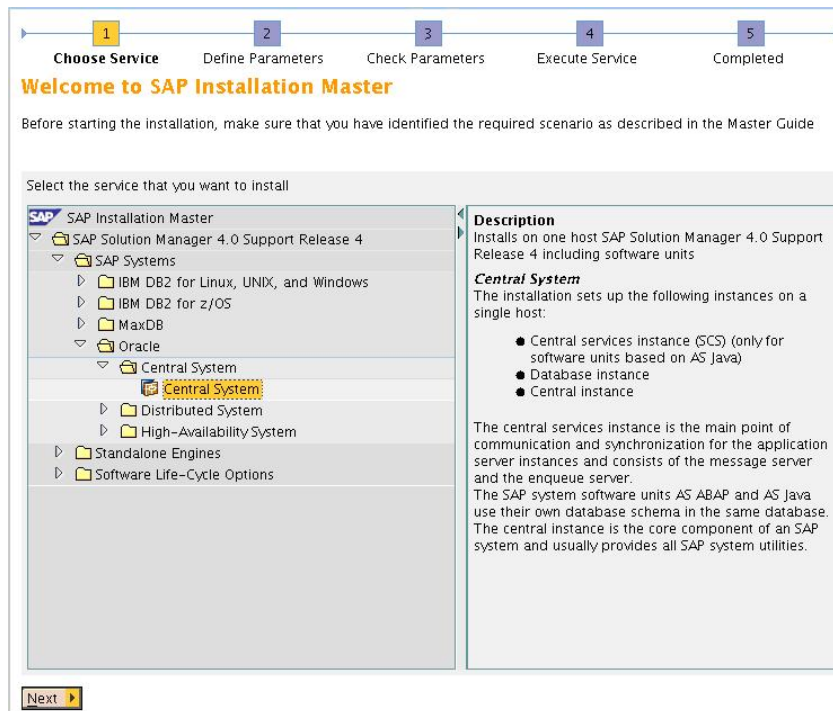
Table 2 and Table 3 show the the file systems and mount points needed for this solution.

# SAP Solution Manager Installation and Configuration

Install SAP Solution Manager on a dedicated server. Follow these steps to install SAP Solution Manager:

1. Copy the SAP Solution Manager software from the installation media to a staging directory on the Solution Manager server.
2. Issue the `/sapi nst` command from a subdirectory in the staging area.

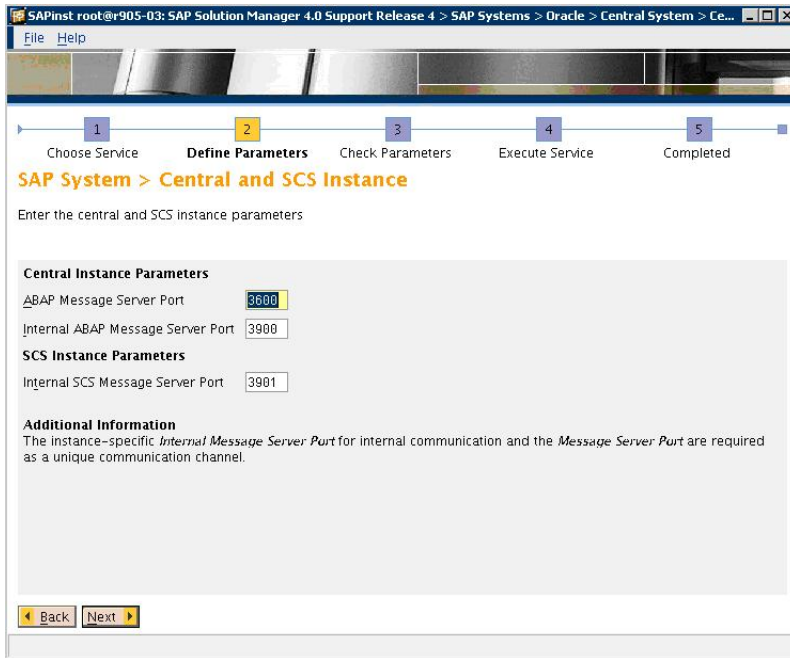
SAP Installation Master launches.



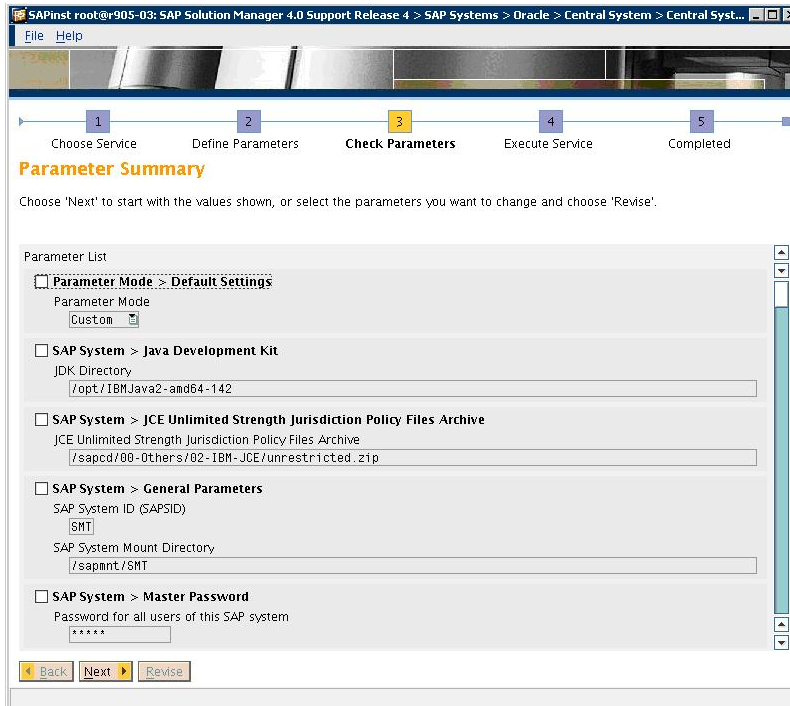
3. Choose the **Central System** service by navigating the service tree as follows:

**SAP System Manager 4.0 Support Release 4 > SAP Systems > Oracle > Central System**

4. Identify and provide the parameters as prompted by SAP Installation Master.



SAP Installation Master verifies all parameters that you provide and begins to execute the installation. If any parameters cannot be validated, you can change the values you supplied.



5. Provide any input required by SAP Installation Master during the execution phase.

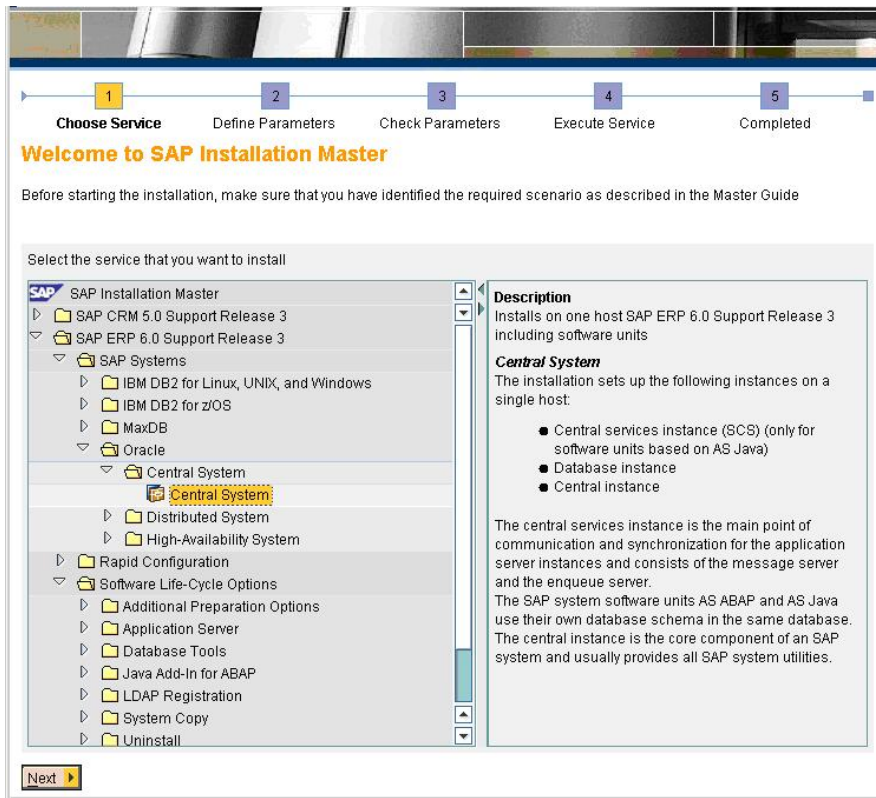
After all the steps are complete, SAP Installation Master displays a message indicating successful installation.

# SAP ERP Installation and Configuration

Install SAP ERP on a dedicated server. Follow these steps to install and configure SAP ERP:

1. Copy the SAP Solution Manager software from the installation media to a staging directory on the Solution Manager server.
2. Issue the `/sapi nst` command from a subdirectory in the staging area.

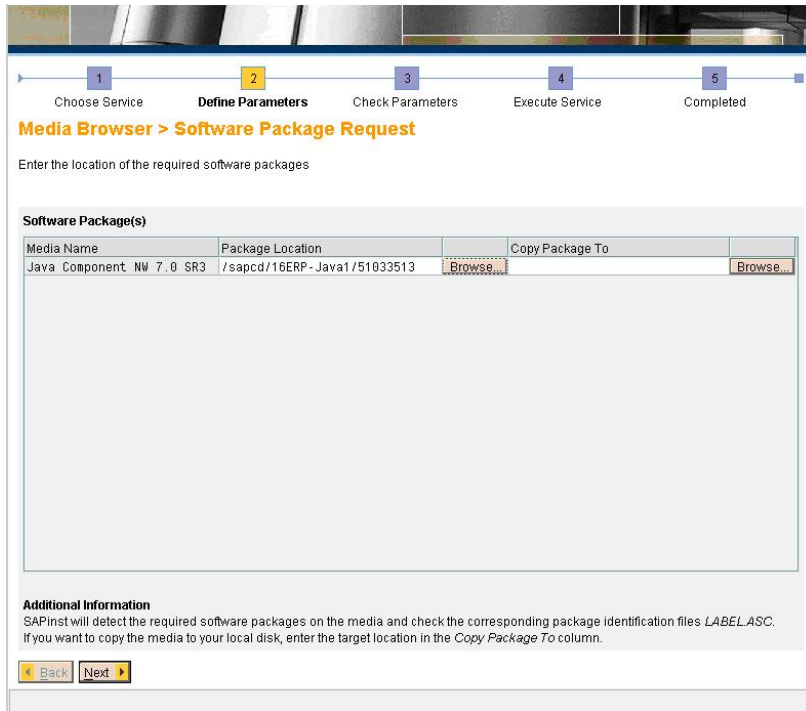
SAP Installation Master launches.



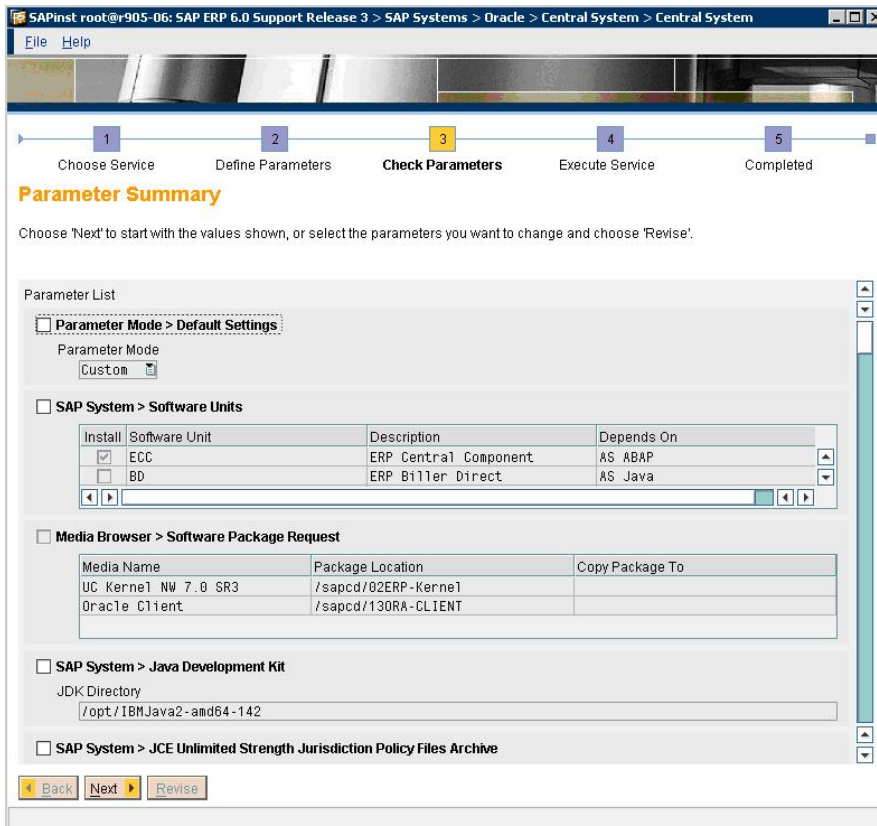
3. Choose the **Central System** service by navigating the service tree as follows:

**SAP ERP 6.0 Support Release 3 > SAP Systems > Oracle > Central System**

- Identify and provide the parameters as prompted by SAP Installation Master.



SAP Installation Master verifies all parameters that you provide and begins to execute the installation. If any parameters cannot be validated, you can change the values you supplied.



5. Provide any input required by SAP Installation Master during the execution phase.

After all the steps are complete, SAP Installation Master displays a message indicating successful installation.

## SAP GUI Installation and Configuration

SAP GUI software allows users and administrators to access SAP system from client machines. It also lets SAP system administrators manage SAP ERP and SAP Solutions Manager systems. SAP GUI software is installed on SAP clients. For the tested deployment used in this solution, the client machines were Microsoft Windows-based servers.

Follow these steps to install and configure SAP GUI software:

1. Double-click the SetupAI I . exe file to launch the SAP Front End Installer.

The installation wizard screen appears.



2. Follow the wizard's prompts to complete the installation.

When the all the steps are complete, a message indicating successful installation appears.

3. Double-click the SAP Logon icon to launch the SAP GUI interface.



For example, click **New Item** to add systems to Solution Manager, or click **Change Item** to reconfigure an existing system.

## SAP System Verification

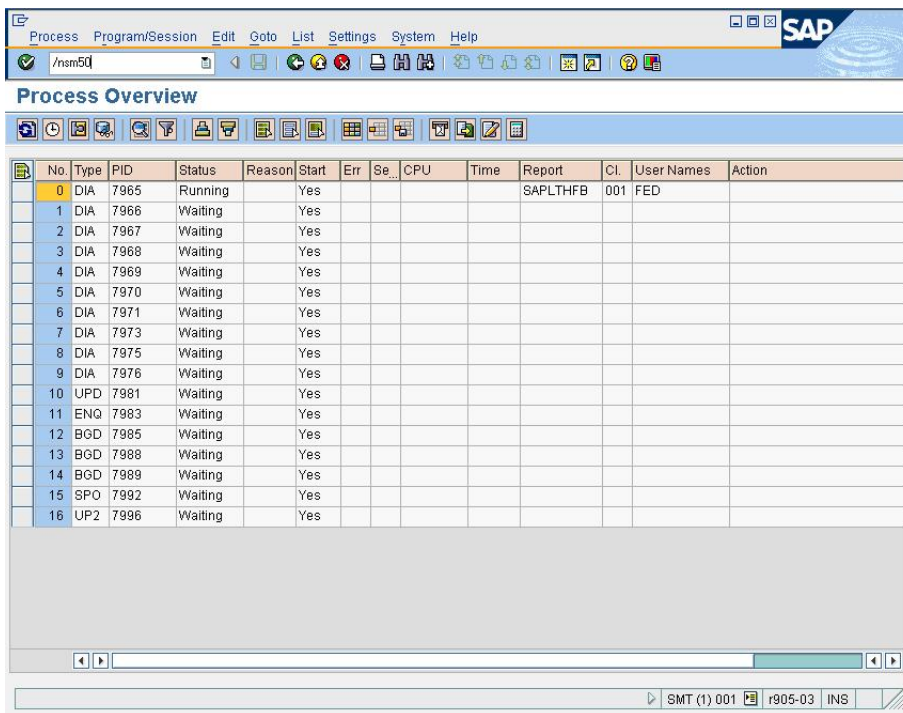
It is important to verify that your newly installed and configured hardware and software are operating properly before making your deployment live. The verification process involves logging in to each server and executing a few transactions. Follow these steps:

1. Log in to SAP Solution Manager software using SAP GUI software.



2. Execute a transaction.

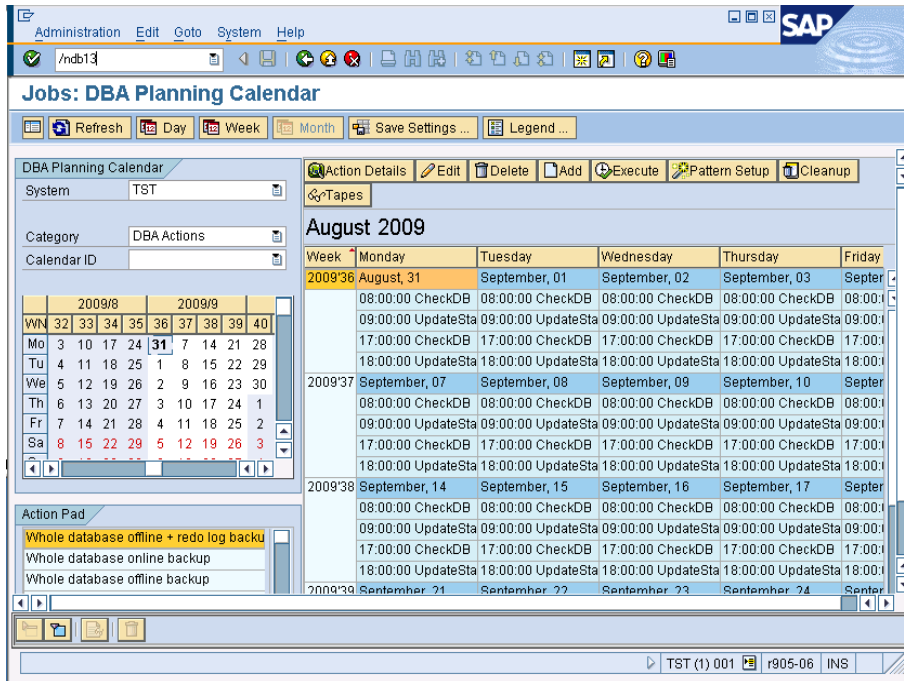
In this example, transaction SM50 is being executed in SAP Solution Manager.



No.	Type	PID	Status	Reason	Start	Err	Se...	CPU	Time	Report	Cl.	User Names	Action
0	DIA	7965	Running		Yes					SAPLTHFB	001	FED	
1	DIA	7966	Waiting		Yes								
2	DIA	7967	Waiting		Yes								
3	DIA	7968	Waiting		Yes								
4	DIA	7969	Waiting		Yes								
5	DIA	7970	Waiting		Yes								
6	DIA	7971	Waiting		Yes								
7	DIA	7973	Waiting		Yes								
8	DIA	7975	Waiting		Yes								
9	DIA	7976	Waiting		Yes								
10	UPD	7981	Waiting		Yes								
11	ENQ	7983	Waiting		Yes								
12	BGD	7985	Waiting		Yes								
13	BGD	7988	Waiting		Yes								
14	BGD	7989	Waiting		Yes								
15	SPO	7992	Waiting		Yes								
16	UP2	7996	Waiting		Yes								

3. Log out of SAP Solution Manager and log in to SAP ERP using SAP GUI.
4. Verify the functionality of SAP ERP software.

In this example, the DB13 transaction is being used by SAP ERP.



## Conclusion

The white paper documents how to deploy, configure, validate and manage SAP systems in Oracle and Linux environments using the Hitachi Adaptable Modular Storage 2000 family. This solution allows companies deploying business applications using SAP to achieve superior performance, higher availability and high scalability, thus achieving higher return on investment and reducing total cost of ownership.

For more information about Hitachi products and solutions, see the Hitachi Data Systems [Web site](#), your sales representative or a channel partner.



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