



Implementation Methodology

System Administration Design Operations

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1 Management Summary

1.1 Overview of Current Methodology

Managing complexity, risk, costs as well as skills and resources is the heart of implementing mission-critical support for SAP-centric solutions. To help customers to manage their SAP-centric solutions, SAP provides a comprehensive set of *Standards for Solution Operations*.

Out of this set of standards, the *System Administration* standard describes processes for the administration of SAP-centric solutions. The term *System Administration* encompasses all activities that are required to ensure the successful, long-term operation of a business solution from a technical perspective. The range of activities that can be included in the broadest sense of *System Administration* is therefore very extensive. As usual in this context, the main areas of use (such as *Data Management*, *Change Management* and *Incident Management*) are explained in separate documents.

This document provides an overview of the various, regularly occurring standard *System Administration* tasks and associated tools and focuses on the *Design* phase. It should be regarded in conjunction with the implementation methodology for the *Setup* and *Operations* phase as well as for the *Optimization* phase. Because the *System Administration* runs in a life cycle of the three phases *Design*, *Setup* and *Operation & Optimizations*, the execution of each phase depends on each other. Therefore the last phase can deliver new requirements for starting a new project, e.g. system landscape optimization (SLO) for optimization of total cost of operation (TCO), which requires the running of all three phases.

Furthermore, the most important daily business administration tasks are described in the document. This can also be used for identifying and designing administration processes and tasks, which can be executed by the appropriate tools.

1.2 Run SAP Implementation Methodologies

As IT landscapes grow and solutions become increasingly mission-critical, the cost of successfully operating an IT landscape becomes a key business issue. To optimize operations and to reduce cost SAP has harnessed its experience with thousands of customers and created:

- *SAP Standards for End-to-End Solution Operations* that span customers' mission-critical operations landscapes and aim at reducing the risk of failure and increasing the skill base
- *Run SAP*, a robust operational methodology that underpins these standards and complements SAP's implementation methodology AcceleratedSAP (ASAP)
- *SAP Enterprise Support*, a support offering that enables *SAP Standards for End-to-End Solution Operations* at lower total cost and across mission-critical support systems

2 Design Operations

2.1 Goal of the Design Operations Phase

The overall process goals are described in section 2.5.1.

This phase is for designing the operations processes. Based on the results of scoping you should analyze the existing processes, the current toolset and also the possible interdependencies between new processes.

Produce a blueprint for the processes and the usage of the tools. Adjust the *SAP Standards for End-to-End Solution Operations* to the needs of the organization. Determine the tools to be used in the future.

You should plan the testing of new operational processes at this early stage of your project.

2.2 Requirements and General Conditions for the Design Operations Phase

The overall process requirements and conditions are described in section 2.5.3 and 2.5.4.

You should not start the *Design Operations* phase without having created the following deliverables during the *Assessment & Scoping* phase:

- Collection of business and technical requirements
- Scope that is confirmed with all stakeholders
- Analysis of possible influences of the operational infrastructure
- Project plan with work packages, time schedule, resource plan
- Evaluation whether organizational changes are needed

2.3 Essential Resources for the Design Operations Phase

The overall process organization and roles are described in section 2.5.5.

Before you start the *Design Operations* phase, make sure you have all resources with the required skills in place. You should have at least one representative of each stakeholder area. You will need in-depth knowledge of existing relevant processes and toolset as well as skills in process modeling and conception.

2.4 Key Deliverables of the Design Operations Phase

The overall process output is described in section 2.5.8.

After successful completion of the *Design Operations* phase you should have confirmed concepts for all E2E solution operations processes. These should comprise detailed process descriptions including process steps as well as the technical design.

2.5 Process Description

2.5.1 Process goal

Reliable and adaptable *System Administration* forms the basis for supporting business processes. The increasing demands for implementing business processes through an IT solution landscape are reflected in the demands placed on *System Administration*. You can meet these demands in form of additional, scaling solution landscapes using a dedicated proactive procedure, and with the support of role-based tools designed to complete the tasks and the provision of *Best Practices*. Hereby *System Administration* must be developed in parallel in terms of its tools, tasks, roles, and processes, which ultimately means change.

2.5.2 Process steps

There are different types of processes concerning the execution method (manual, automatically or tool driven), usage (business process, support process) and their permission rights.

Define here, how and where to document a process and how to handle process changes. Decide further on, if the documentation and the change management of processes will be done in *SAP Solution Manager*.

2.5.3 Process requirements

The resulting productive operation of *SAP Solution Manager* makes demands of all areas of system operation. *SAP Solution Manager* must be available at all times and provide high-performance functions for alerting, analyzing and correcting critical and unforeseen errors, for example.

2.5.4 General conditions

For *SAP Solution Manager*, like for all other SAP solutions, there is a software maintenance concept which contains the corresponding support packages or error corrections. For customers, this means that *Change- and Release Management* processes have to be enhanced in *SAP Solution Manager*. Therefore, *SAP Solution Manager* must be operated on the basis of a dual system landscape so that the necessary changes can be quality-assured and transferred to the productive environment.

If *SAP Solution Manager* is not operable, system administrators would be deprived of their most important tool for implementing business solutions. An appropriate technical, and highly available solution is therefore indispensable.

SAP Solution Manager is a productive system. It supports *IT Service Management* processes such as *Incident-, Problem-, and Change Management*. It is therefore the focus of central *System Administration* and monitoring tasks.

System administrators can use the *Downtime Manager* within *SAP Solution Manager* for planning a downtime for selected systems or instances. Hereby the process participants (roles) and the process steps from creating up to approving the downtime can be defined.

2.5.5 Organization (roles)

The IT processes run across the organization hierarchy. This works only if tasks and responsibilities are described clearly, and so it is useful to develop a role concept. In smaller IT organizations or for cost reasons, you can combine roles.

Alongside the roles described in the *SAP Standards for Solution Operations*, the following roles are also significant in the area of technical operations:

Strategist

- Modifies, implements, and integrates specific support tools
- Plans and coordinates the exchange of technical components

Component expert

- Has technical, detailed knowledge of individual components
- Maintains individual, specific components such as RDBMS, TREX, and customer-specific developments

Generalist

- Acts as an intermediary between solution and technology
- Integrates monitoring and administration of a solution as a whole
- Localizes the root cause in the solution landscape
- Can make qualitative statements about the solution landscape
- Has knowledge of the relationships between technical components, their steps, and their effects on key business processes

Technical system administrator

The technical system administrator manages the SAP systems belonging to the system landscape. He or she is therefore a generalist for the SAP solutions implemented in the system. These are usually systems with distinct features that are used to model the data flow of a business process (ECC, BI, PI, and so on).

The technical system administrator is responsible for:

- Planning the system landscape
- Starting and stopping the systems
- Configuring and monitoring the processes involved
- Setting up and maintaining the system
- Monitoring the system
- Planning, executing, and verifying the data backup
- Monitoring performance and tuning

The technical system administrator requires appropriate tools to complete these tasks. These are provided centrally in the *Work Center of SAP Solution Manager* (for example, monitoring background jobs), installed as standalone software (such as *Visual Administrator* or *Config Tool*), or integrated locally in individual systems (such as local *SAP NetWeaver Administrator*).

A typical component expert is the database expert since databases are involved in almost every solution.

Database administrator (DBA)

Data in a complex system landscape is saved in relational database management systems (RDBMS). One or more RDBMSs are managed by the database administrator. The database administrator is therefore defined as a role and not a person. Consequently, the following tasks can be carried out by various persons:

- Designing and modifying the database layout
- Starting and stopping the RDBMS
- Managing the file structure on which the RDBMS is based (data files, log files, and so on)
- Managing the storage space for the RDBMS on the storage subsystem
- Planning, executing, and verifying the data backup
- Performance monitoring and tuning
- Maintaining the RDBMS (generating statistics, implementing patches, and so on)

Various tools are available for the database administrator to complete these tasks. Alongside the standard tools provided by the RDBMS, SAP provides the DBACOCKPIT as a central administration tool for the RDBMS of different providers.

2.5.6 KPI definition

To assess the quality of the process, clearly-defined parameters and measurable objectives are required. The performance parameters should be collated and evaluated in regular reports. The historical data that is created in this way can be used to identify trends and then derive the necessary measures.

Considering the general process execution, these measured values can include:

- Duration of process execution (duration between occurring problem and alerting or notification time, reaction time for starting process execution, duration of overall process execution)
- Quality and result of process execution (workaround or interims solution, final problem solution)
- Number of involved process participants (higher number than at normal process execution e.g. in case of process owner delegation or forward)

Especially for monitoring the system landscape, the following KPIs can be concluded, whereby all KPIs for monitoring are listed in the *Design Operations* document for *System Monitoring*:

- Availability of the applications, system components and business processes
- Reaction time of the incident starting execution concerning SLA
- Duration for problem solution of incidents concerning SLA
- Performance and response time for selected business processes or transactions

To determine if the current administration platform and the sizing of the system landscape is sufficient, the following KPIs can be used:

- Percentage of storage usage
- Percentage of server utilization
- Number of monitoring alerts in relation to incidents
- Availability and performance of the administration components (*SAP Solution Manager*, backup tool)

2.5.7 Tools to support the process

Due to the distributed architecture in SOA and the numerous technical components that interact with each other, *System Administration* tools are just as numerous even if the tasks are comparable.

SAP Solution Manager combines general tasks and enables a central administration within *SAP Solution Manager*. Besides these typical *System Administration* tasks, there may also be other, component-specific activities that remain the responsibility of component experts. Therefore, tasks can be classified in general *System Administration* tasks and additional, local (and occasionally manufacturer-specific) tasks that are required in exceptional cases. This document deals solely with the general tasks that are usually executed centrally.

2.5.7.1 Work Centers

In *SAP Solution Manager*, tasks required for a specific operating process and for accessing information are combined into work areas or *Work Centers* to support standard, role-based *System Administration*. You can assign the required *Work Centers* according to your specific role characteristics in *System Administration*, allowing employees with these roles to access them using role-specific navigation (see Figure 1).

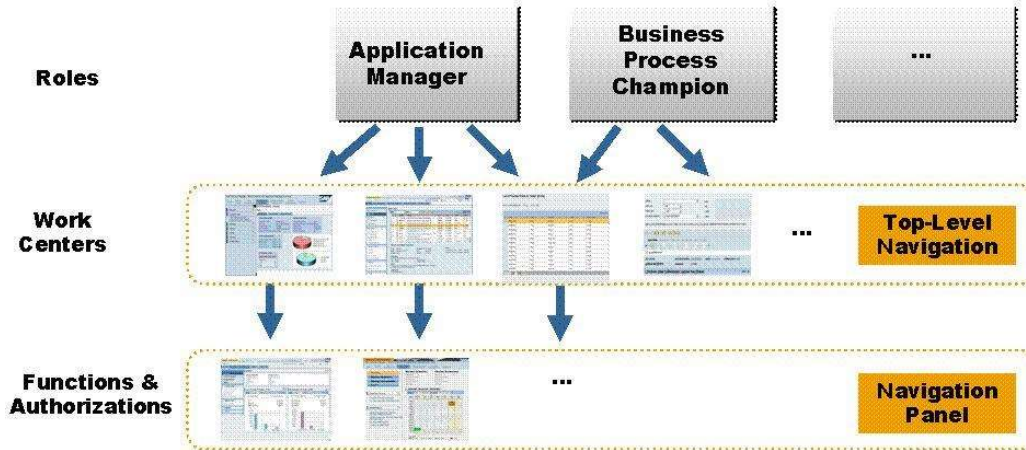


Figure 1: Work Centers and roles

Activities in the *System Administration* area are supported by the *System Administration Work Center*, which is shown in Figure 2. Standard important tasks and work areas are combined and provided on the left of the screen under the *Common Tasks* heading. You can branch to the online help, documentation, or *SAP Notes* from the *System Administration Work Center* by choosing **Related Links**.

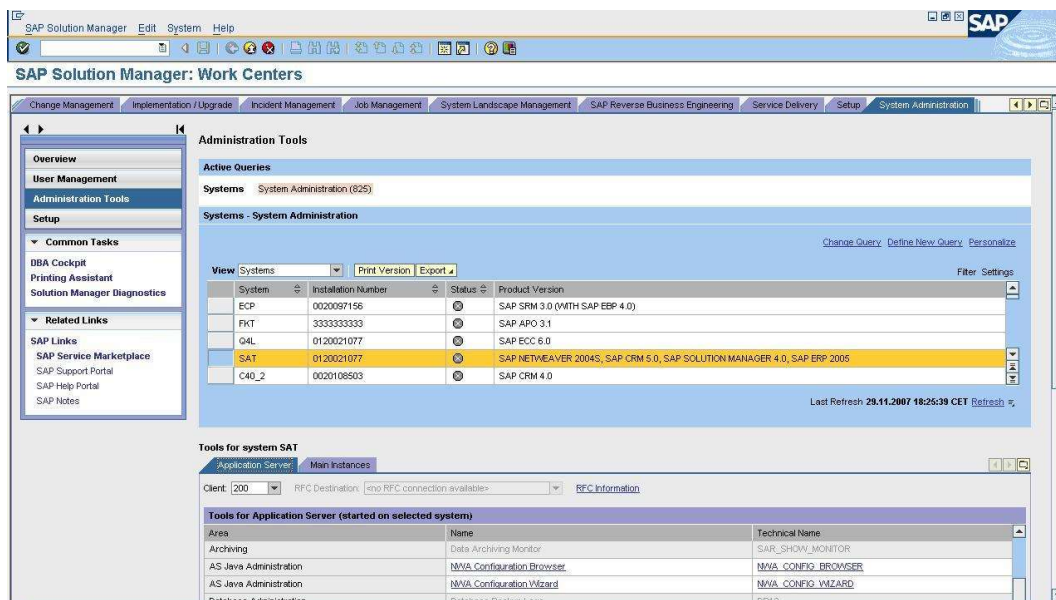


Figure 2: Overview of Work Centers currently available

Besides calling individual activities for specific tasks, you can also branch to other tools for special areas of administration that have been made transparent for the users. These can be transactions that run centrally in *SAP Solution Manager* (such as DBACOCKPIT) as well as transactions that are called in the monitored system (such as local *SAP NetWeaver Administrator*). For a list of standard administration tools, see the next section. Additional tools for experts make the system status clear to customers. This allows a proactive, manual health check, for example.

2.5.7.2 Important administration tools

DBACOCKPIT

A system landscape generally comprises several, independent, and even different databases in which the application and administration data of individual systems is permanently stored.

SAP provides DBACOCKPIT to manage and monitor these databases, to support administrators in their regular tasks, and to analyze performance issues and errors. DBACOCKPIT replaces a range of previously standalone tools (SAP transactions) and therefore provides a central point of access for database administration. DBACOCKPIT contains information from the following, individual transactions:

- DB02 – Storage management for tables and indexes
- DB12 – Security logs
- DB13 – Scheduling calendar for database administration activities
- DB13C – Central database scheduling calendar
- DB14 – DBA operations logs
- ST04 – Database performance

The information displayed may vary depending on the RDBMS used. However, you can use DBACOCKPIT to manage all RDBMSs supported by SAP. This applies to both, the local database of the SAP NetWeaver system in which DBACOCKPIT was started and remote databases. Consequently, you don't have to set up remote databases that have to be monitored manually, but you can configure them centrally in the system landscape directory (SLD).

DBACOCKPIT therefore provides a central administration tool for database administration that you can use not only for everyday tasks such as checking database health or whether database changes have been saved successfully, but also for specific analyses if errors occur (for example, analyzing lock situations) or performance issues arise (for example, evaluating execution plans).

2.5.7.3 SAP Print Assistant for Landscape (PAL)

PAL is a tool based on ABAP WebDynpro and is used for central printer configuration.

The administrator can use PAL to:

- Configure printers centrally
- Distribute printer definitions to other systems
- Bundle printers and systems into groups and assign them to each other. This allows large printers in system landscapes to be maintained efficiently.

PAL is especially suited for front-end printing and printing using a print server. In the future, you will also be able to request the printer status centrally.

2.5.7.4 SAP NetWeaver Administrator

SAP NetWeaver Administrator can be used both, in a local scenario for local System Administration and in a central scenario.

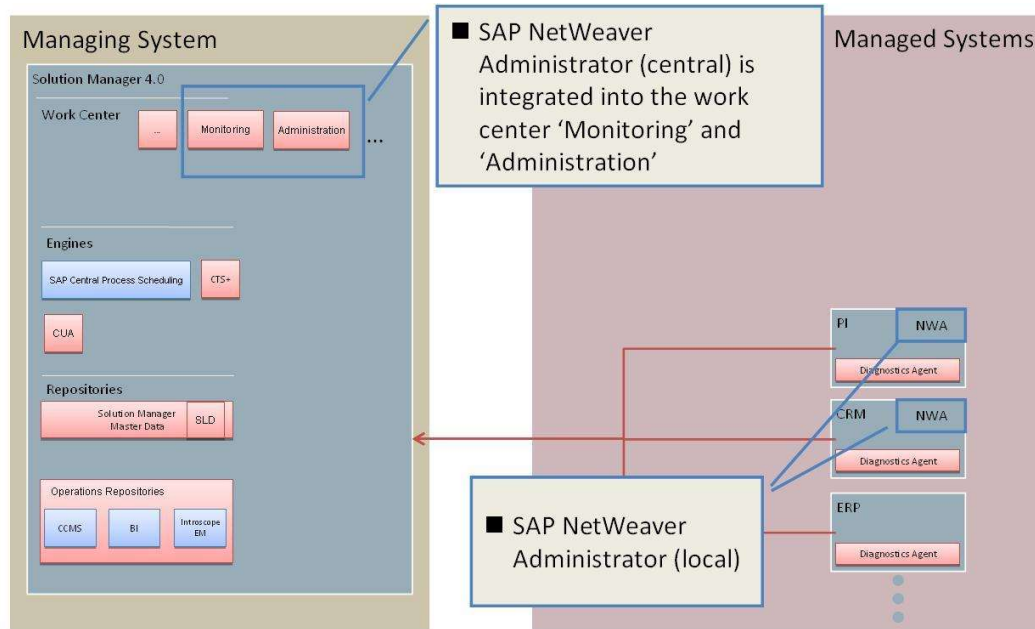


Figure 3: Architecture of SAP NetWeaver Administrator

- Local SAP NetWeaver Administrator is part of the SAP NetWeaver installation. As of SAP NetWeaver 7.1, it replaces SAP Visual Administrator as the administration tool for AS Java. Local SAP NetWeaver Administrator can contain additional, component-specific functions (NWA for SAP Composition Environment, NWA for SAP Process Integration, and so on).
- Central SAP NetWeaver Administrator is enhanced with administrative functions and integrated into SAP Solution Manager. This is implemented on a role basis and with the help of new Work Centers.

2.5.7.5 SAP Management Console (SAP MC)

In a worst-case scenario, and especially if it is not possible to log onto an SAP instance, administrators require a tool that allows them to execute basic tasks such as starting and stopping instances or analyzing log files without having to log into the system. This is known as *bootstrap¹ management*.

Whereas administrators of SAP landscapes in Windows environments have been using a convenient tool for starting, stopping, and analyzing SAP systems for a long time (the SAP snap-in for *Microsoft Management Console*, or MMC), administrators in UNIX environments had to master a range of tools and scripts, such as `startsap` script, `stopsap` script, or `dpmon`.

¹ Bootstrap: "Do without the help of others"

Even when the UNIX tools were simple to use and functioned stably, they still had some disadvantages:

- No clear indication of the current system status
- No option to work remotely, for example, starting a remote system
- No central point of access for administration of multiple systems
- Different concepts for UNIX and Windows environments

SAP Management Console (MC) now provides the administrator with one platform-independent tool that can be used to complete nearly all of the basic administration tasks such as starting or stopping the system or analyzing log files, without having to log onto an SAP instance.

The SAP MC interface is based on the interface of MMC. Both tools exist in parallel and will also be supported by SAP in the future.

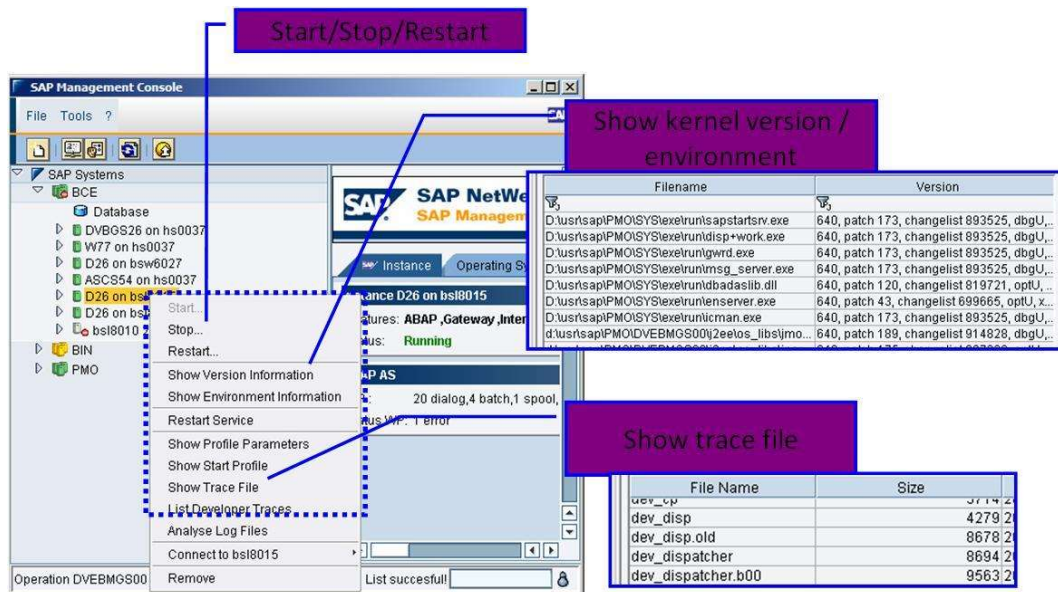


Figure 4: SAP Management Console

To implement SAP MC on UNIX-based systems, a new SAP startup framework has been developed, which comprises the SAPStartSRV and SAPHostControl services. SAPStartSRV, which is implemented on UNIX platforms as a *daemon*, starts for each SAP instance when the system is started and provides instance-specific information. SAPHostControl, which is also implemented as a *daemon*, provides host-specific information and is started once for each host.

SAP MC itself does not have to be installed, but connects to the corresponding services via a Web interface.

It is implemented as a Java applet and can be called in a browser with the following URLs:

- <http://<host>:5<instance number>13>
- <https://<host>:5<instance number>14>

A Java runtime environment (JRE) with a minimum release level of 1.4.2 is required for this. The SAPStartSRV and SAPHostControl services are both implemented when a current *SAP NetWeaver* system is installed. However, it is also possible to use this technology on earlier *SAP NetWeaver* platforms provided that technical framework conditions are met. For more information, see *SAP Service Marketplace* or chapter 3, *Further Information* (Installation Guide: NetWeaver).

2.5.7.6 Visual Administrator

With *Visual Administrator*, SAP provides a graphical user interface for the administration of a J2EE instance. *Visual Administrator* connects directly to a J2EE instance, and so the Java instance must be started.

You can also install *Visual Administrator* on a host where no *SAP Web AS Java* instance is installed. This enables remote administration. You can configure the services and managers of all Java instances in the cluster using *Visual Administrator*. Changes to selected parameters already take effect at runtime. You can use *Visual Administrator* to start and stop services. However, you cannot use it to change the parameters of the Java Virtual Machine (JVM).

The *Visual Administrator* is integrated into the local *SAP NetWeaver Administrator* with *SAP NetWeaver* release 7.1. *SAP NetWeaver Administrator* therefore replaces the *Visual Administrator* as the administration tool for *SAP NetWeaver AS Java*.

2.5.7.7 Config Tool

Config Tool allows you to configure a J2EE instance offline. You do not have to start the J2EE engine while you are working with this tool. The tool connects directly to the database of the J2EE instance, which must be started, and changes the configuration here.

JVM settings of the J2EE engine can be configured only with *Config Tool*. You can use *Config Tool* only locally on the central instance of *SAP Web AS Java*. It allows you to export all of the configuration settings of a J2EE instance as an XML file so that they can be used again later.

2.5.8 Process Output

The result is a central administration with which you can control and set up the landscape components centrally. Together with *System Monitoring*, you can monitor individual technical components centrally and, in an ideal situation, automatically address problem scenarios. This forms the basis for further analysis and allows you to branch to *Root Cause Analysis* or the *Service Desk*, if necessary.

3 Further Information

3.1 Standard System Installation

Link	Description
Product Availability Matrix	The <i>Product Availability Matrix</i> (PAM) bundles technical and release planning information on SAP product versions for quick reference. You will find information on the availability of SAP product versions, maintenance end dates and upgrade paths, as well as technical release information (DB platforms, JSE platforms, operating systems, etc.)
Installation Guide: SAP NetWeaver	The installation guide contains all information needed for the preparation and the execution of the <i>SAP NetWeaver</i> installation and can be accessed under the tab page <i>Installation & upgrade guide</i> .

3.2 Recommended or Standard Processes of System Administration

Link	Description
General Administration tasks	This section contains general administration tasks as an overview, needed for administrating all SAP systems.
Administration of SAP NetWeaver Systems	This section contains the usage type-specific administration tasks for <i>SAP NetWeaver</i> systems.
Administration of Standalone Engines	This section contains the administration tasks for additional installable entities that function "standalone", and which are not really <i>SAP NetWeaver</i> systems (e.g. <i>TREX</i> , <i>SAP Web Dispatcher</i>).
Administration of SAP NetWeaver IT Scenarios	This section contains administration information that is specific to the individual IT scenarios.
Work Center system administration	Here, the usage and functions of the <i>Work Center</i> as central point for access and viewing the monitoring of the systems is described.
Help-Portal: Technical Operations Manual for SAP NetWeaver	The link provides a starting point for administrators in procedures for the optimal operation and use of <i>SAP NetWeaver</i> . It contains specific information for various administration tasks, and lists the tools that you can use to perform them. It also refers to documentation required for these tasks. You can use this guide only in connection with other guides such as the <i>Master Guide</i> , and the <i>SAP Library</i> .

3.3 Standard System Configuration

Link	Description
Solution Manager	With this link, you can access all documentation (release notes, installation & configuration guides) about <i>SAP Solution Manager</i> .
Technology Consultant's Guide	This chapter guides you in configuring an <i>SAP NetWeaver</i> installation so that it works most effectively with your IT scenario.

3.4 System Maintenance

Link	Description
Support Package Stack Information	Here, the latest Support Package Stack Information can be found, necessary to evaluate and plan a support package update.
SAP System Landscape Optimization	If you plan to optimize the TCO of your SAP landscape or want to make a major organizational change, which mostly results in running an IT landscape consolidation or process optimization, the SAP SLO group can deliver a number of services starting from analysis, preparation and execution (conversion and migration services) to a complete successful system consolidation. Information about the SAP SLO service offerings are described here.



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