ADM110

Installing and Updating SAP S/4HANA and SAP Business Suite Systems

PARTICIPANT HANDBOOK
INSTRUCTOR-LED TRAINING

Course Version: 25
Course Duration: 4 Days
Material Number: 50166772

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Typographic Conventions

American English is the standard used in this handbook.

The following typographic conventions are also used.

This information is displayed in the instructor's presentation	
Demonstration	
Procedure	
Warning or Caution	
Hint	
Related or Additional Information	
Facilitated Discussion	
User interface control	*Example text*
Window title	*Example text*

Contents

Course Overview

TARGET AUDIENCE

This course is intended for the following audiences:

- Technology Consultant

UNIT 1 Describing SAP System Architecture

UNIT OBJECTIVES

- Describe the SAP system architecture as needed for this course
- List the technical processes of an AS ABAP-based SAP system
- List the technical processes of an AS Java-based SAP system
- List the SAP Systems that will be installed and updated in this course

Unit 1
Lesson 1

Describing SAP Systems

LESSON OVERVIEW
This lesson provides an overview of the applications in SAP Business Suite and the systems that comprise the applications.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Describe the SAP system architecture as needed for this course

SAP Business Suite, SAP Applications, SAP S/4HANA and SAP Systems

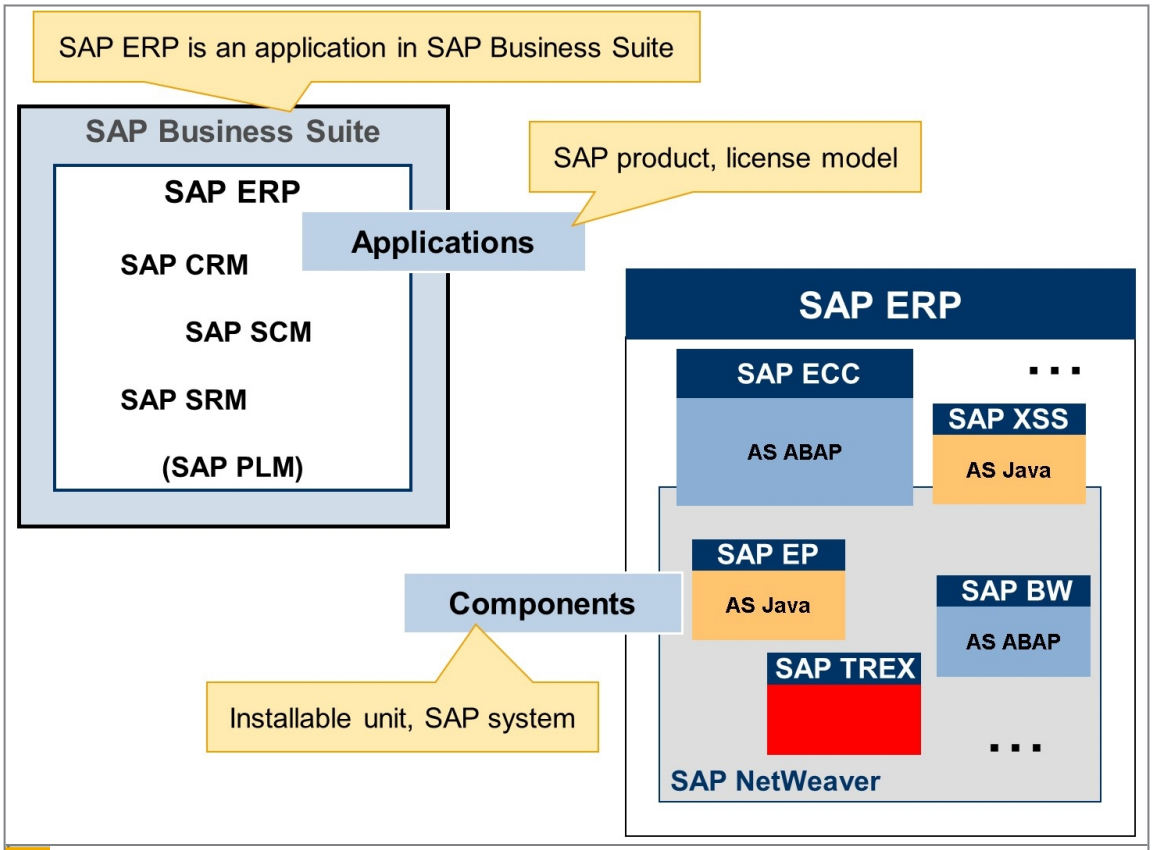

Figure 1: SAP Business Suite

SAP Business Suite consists of several SAP applications, including the following applications:

- SAP Enterprise Resource Planning (SAP ERP)
- SAP Customer Relationship Management (SAP CRM)

- SAP Supply Chain Management (SAP SCM)
- SAP Supplier Relationship Management (SAP SRM)
- SAP Product Lifecycle Management (SAP PLM)

The SAP applications consist of several installable units called SAP systems or components.

SAP ERP is the largest SAP application, and SAP ERP Central Component (SAP ECC) is the largest SAP system, so we will look at this component in detail.

> Note:
> For more information, see SAP Library for Installation Master Guide and SAP ERP on SAP Help Portal at https://help.sap.com

Besides several others, SAP ERP comprises the following components:

- SAP ERP Central Component (SAP ECC)
- SAP Employee and Manager Self Services (SAP XSS)
- SAP Business Warehouse (SAP BW)
- SAP Enterprise Portal (SAP EP)
- SAP TREX
- SAP Process Integration (SAP PI) – not displayed on the slide

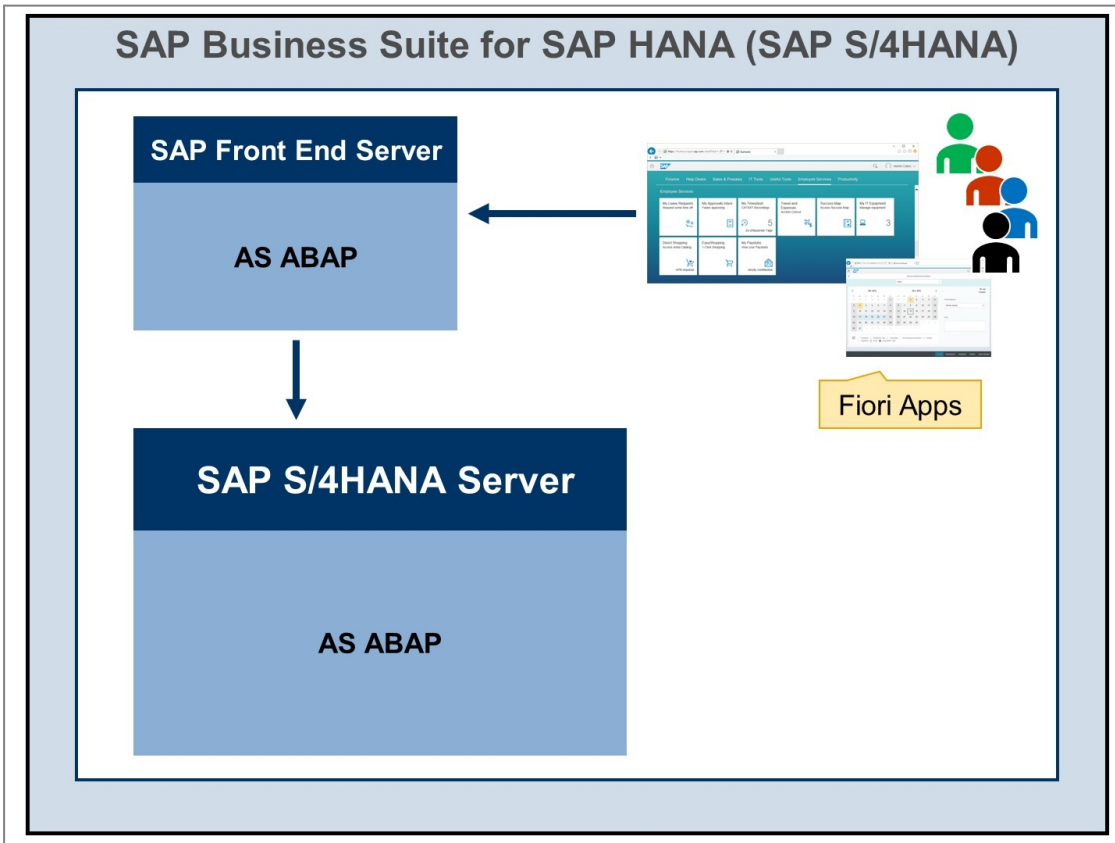

Figure 2: SAP Suite for SAP HANA (SAP S/4HANA)

In parallel to SAP Business Suite exists SAP Business Suite for SAP HANA (SAP S/4HANA). The SAP systems inside SAP Business Suite run with any database – SAP MaxDB, SAP ASE, SAP HANA, Oracle, MS SQL Server, DB2 and others. SAP S/4HANA consists of the SAP S/4HANA Server – which runs with the SAP HANA database, only. Also a SAP Front End Server is required – which runs with the SAP MaxDB, SAP ASE, and SAP HANA database. The Front End Server is used to run the Fiori Apps for the end users. Users like system administrators or developers still log on directly to the SAP S/4HANA Server, using e.g. SAP GUI or SAP Business Client. The Front End Server is more or less an AS ABAP-only system – with no business software components.

Note:
The SAP S/4HANA Server is often just called SAP S/4HANA – which is actually the name of the entire suite.

Releases

Remark	'Basis' Function AS = Application Server	Year of GA	Usage for SAP ECC and SAP S/4HANA Server	Remark	SAP_BASIS
Used by SAP S/4HANA 2025	ABAP Platform 2025	2025	SAP S/4HANA Server 2025	AS ABAP only	759
Used by SAP S/4HANA 2023	ABAP Platform 2023	2023	SAP S/4HANA Server 2023	AS ABAP only	758
Used by SAP S/4HANA 2022	ABAP Platform 2022	2022	SAP S/4HANA Server 2022	AS ABAP only	757
Used by SAP S/4HANA 2021	ABAP Platform 2021	2021	SAP S/4HANA Server 2021	AS ABAP only	756
Used by SAP S/4HANA 2020	ABAP Platform 2020	2020	SAP S/4HANA Server 2020	AS ABAP only	755
Used by SAP S/4HANA 1909	ABAP Platform 1909	2019	SAP S/4HANA Server 1909	AS ABAP only	754
Used by SAP S/4HANA 1809	ABAP Platform 1809	2018	SAP S/4HANA Server 1809	AS ABAP only	753
Used by SAP S/4HANA 1709	AS ABAP 7.52	2017	SAP S/4HANA Server 1709	AS ABAP only	752
Used by SAP S/4HANA 1610	AS ABAP 7.51	2016	SAP S/4HANA Server 1610	AS ABAP only	751
Part of SAP NetWeaver 7.5	SAP NetWeaver AS 7.50	2016	SAP ECC 6.08, SAP S/4HANA Server 1511	Part of SAP ERP 6.0 EHP 8	750
Part of SAP NetWeaver 7.4	SAP NetWeaver AS 7.40	2013	SAP ECC 6.07	Part of SAP ERP 6.0 EHP 7	740
Part of SAP NetWeaver 7.3 EHP 1	SAP NetWeaver AS 7.31	2012			731
Part of SAP NetWeaver 7.3	SAP NetWeaver AS 7.30	2011			730
Used by e.g. SAP NetWeaver CE	SAP NetWeaver AS 7.20	2010		No entire SAP NetWeaver	720
Used by e.g. SAP NetWeaver PI, CE	SAP NetWeaver AS 7.11	2009		No entire SAP NetWeaver	711
Used by e.g. SAP NetWeaver PI, CE	SAP NetWeaver AS 7.10	2007		No entire SAP NetWeaver	710
Part of SAP NetWeaver 7.0 EHP 3	SAP NetWeaver AS 7.03	2012	SAP ECC 6.06	Part of SAP ERP 6.0 EHP 6	731
Part of SAP NetWeaver 7.0 EHP 2	SAP NetWeaver AS 7.02	2010	SAP ECC 6.05	Part of SAP ERP 6.0 EHP 5	702
Part of SAP NetWeaver 7.0 EHP 1	SAP NetWeaver AS 7.01	2009	SAP ECC 6.04	Part of SAP ERP 6.0 EHP 4	701
Part of SAP NetWeaver 7.0	SAP NetWeaver AS 7.00	2006	SAP ECC 6.00, 6.01, 6.02, 6.03	Part of SAP ERP 6.0 EHP 0, 1, 2, 3	700

Figure 3: SAP Releases

The current release of SAP Business Suite since end of January 2016 is SAP Business Suite 7i2016. The previous SAP Business Suite release was SAP Business Suite 7i2013.

The major solutions within the SAP Business Suite 7i2016 have the following releases:

- SAP ERP 6.08: enhancement package 8 for SAP ERP 6.0
- SAP CRM 7.04: enhancement package 4 for SAP CRM 7.0
- SAP SCM 7.04: enhancement package 4 for SAP SCM 7.0
- SAP SRM 7.04: enhancement package 4 for SAP SRM 7.0

Software Components

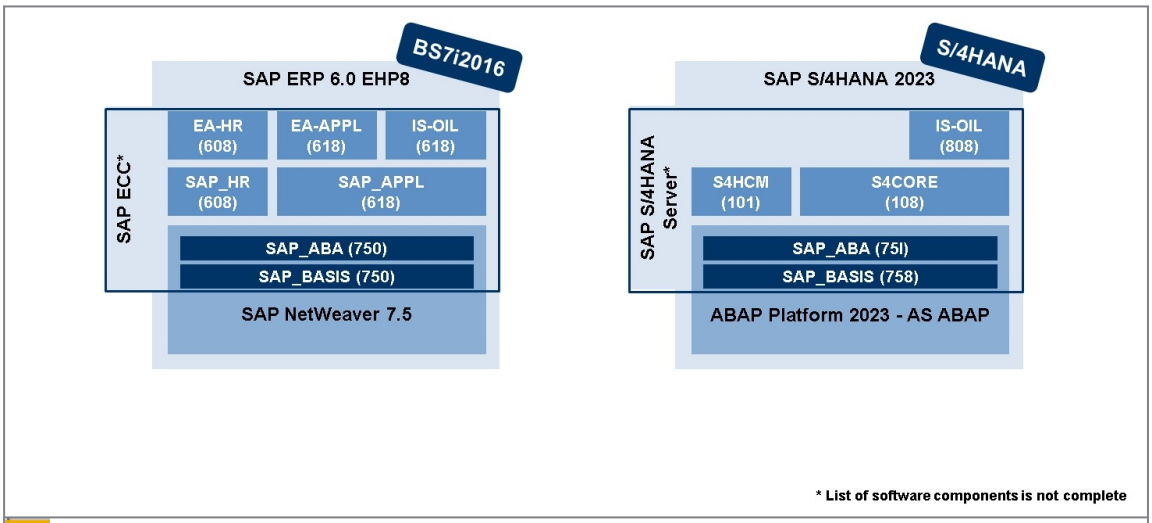

Figure 4: Example: Software Components of SAP ECC and SAP S/4HANA Server

The kernel is not a software component, rather, it is the runtime environment to run the software components. The kernel depends on the database and operating system in use; the kernel is available for several operating systems and databases.

Note:
For more information about software components, see SAP Library for Product Availability Matrix at https://apps.support.sap.com/sap/support/pam.

The software components SAP_BASIS and SAP_ABA contain the basic functions, such as user administration, performance tools, Transport Management System (TMS), development tools, and so on.

The basic software components together with the kernel are also called SAP NetWeaver AS. In case of an ABAP-based system (such as SAP ECC), the name of these software components and the kernel is abbreviated with Application Server (AS) ABAP. In Java-based system (such as SAP Enterprise Portal), the name is abbreviated with AS Java.

The software components on top of AS ABAP (or AS Java) are application-specific software components.

SAP Systems Based on AS ABAP

The SAP systems based on AS ABAP include the following systems:

- SAP S/4HANA Server
- SAP Front End Server
- SAP ECC
- SAP BW
- SAP CRM Server
- SAP SCM Server

- SAP SRM Server
- SAP Solution Manager ABAP

SAP Systems Based on AS Java

The SAP systems based on AS Java include the following systems:

- SAP XSS
- SAP Enterprise Portal
- SAP Solution Manager Java

SAP Systems based on AS ABAP and AS Java (Dual-stack Systems)

SAP systems that are based simultaneously on AS ABAP and AS Java are called dual-stack systems. Since SAP NetWeaver 7.5 no dual stack systems exist any longer. With SAP NetWeaver 7.4 there was only SAP PI installable as a dual stack system. The old Solution Manager 7.1 was a dual stack system, also.

LESSON SUMMARY

You should now be able to:

- Describe the SAP system architecture as needed for this course

Unit 1
Lesson 2

Describing the Processes of an AS ABAP- and AS Java-based SAP System

LESSON OVERVIEW
This lesson describes the structure and the processes of an SAP system. In this lesson, you will also learn about SAP systems and Unicode.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- List the technical processes of an AS ABAP-based SAP system
- List the technical processes of an AS Java-based SAP system

AS ABAP-Based SAP Systems

An SAP system consists of several components such as a database and one or more SAP application servers (old term: SAP instance). Starting with AS ABAP 7.40, each newly installed AS ABAP-based SAP system consists of an ABAP Central Services (ASCS) instance and a Primary Application Server (PAS) instance (old term: central instance), besides the database. The PAS is the first instance offering work processes. All further, optional instances offering work processes of the same SAP system will be called Additional Application Server (AAS) instance (old term: dialog instance). Therefore, each AS ABAP-based SAP system offers exactly one PAS instance (besides the ASCS instance) and might offer none, one or several AAS instances.

It is possible to install two or more instances of one SAP system and also instances of different, additional SAP systems on the same host. When installing several instances (of the same or different SAP systems) on the same host, make sure that the chosen hardware is able to handle the anticipated load. In case you install several PAS instances (and the corresponding databases) on a shared host, be sure to consider topics such as upgrades and restore scenarios. For example, one SAP system may need to be recreated from backup while another SAP system is being used without interference.

When possible, use unique SAP system IDs (SIDs) within a company. In case you install several SAP systems using the same SID within your company special care and measures need to be taken.

An instance of an SAP system is an administrative technical unit in which components of an SAP system providing one or more services are combined. The services within one instance are started or stopped together.

Types of SAP Systems

- AS ABAP-based SAP systems, for example, SAP S/4HANA Server or SAP ECC
- AS Java-based SAP systems, for example, SAP EP

AS ABAP-Based SAP System

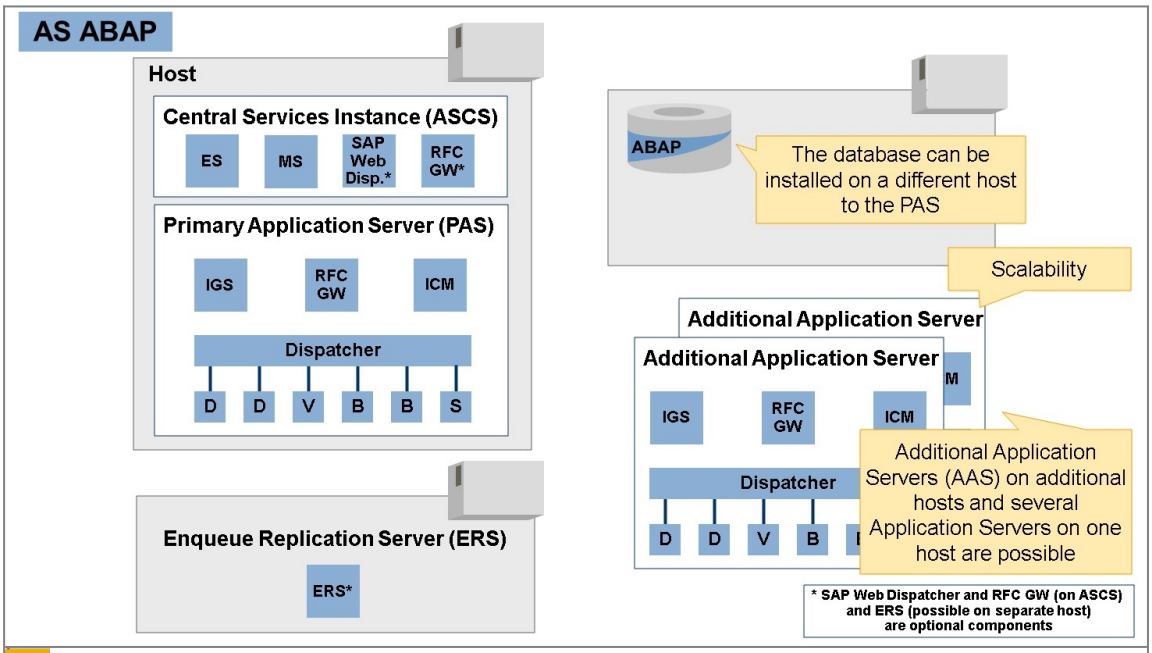

Figure 5: AS ABAP-Based SAP System

The process SAPSTARTSRV starts the ABAP dispatcher of an AS ABAP-based SAP instance (short: “ABAP instance”). The ABAP dispatcher is the central process of an ABAP instance. This process starts other processes that belong to the instance, such as the Gateway (GW), Internet Communication Manager (ICM), and the configured number of work processes. The instance-specific Internet Graphics Server is being started by SAPSTARTSRV, as well.

You configure an ABAP instance by using the instance profile. The processes of an ABAP instance share certain main memory areas and use a common directory structure in the file system. An ABAP instance consists of a dispatcher, a gateway process, one or none Internet Communication Manager (ICM) process and several work processes.

If you install an ABAP instance of AS ABAP 7.40 or higher, you will not find a Start Profile anymore. SAPSTARTSRV only uses the Instance Profile for starting an configuring an ABAP instance, from 7.40 on. New AS ABAP-based SAP systems will use at least the PAS instance and the ABAP Central Services instance. The Enqueue Replication Server Instance (ERS) is optional.

The ABAP Central Services instance can optionally offer an integrated SAP Web Dispatcher, this installation option has been introduced end of 2016.

Features of an SAP Instance

- An instance requires a minimum of two dialog work processes. Otherwise, it is not possible to start the instance.
- Several instances can be installed on the same host. Each instance on a given host must have a unique instance number. The instance number is a two digit number that is chosen during installation. It defines a range of standard communication ports for processes of the instance. The standard port of the dispatcher is 32$$, where $$ denotes the instance number. For example, if the instance number 00 is chosen at installation, the dispatcher port number is 3200.

In this training, we will install all instances of an individual SAP system on the same hardware, so we will handle several different instance numbers.

- If several instances are installed on a shared host, these instances use their own, separate, main memory areas, and each instance has its own directory structure in the file system.

> Hint:
> Do not use the instance numbers 98 and 99, because they are reserved for the SAProuter.

> Note:
> An (SAP) instance is also called an (SAP) application server.

ABAP Central Services (ASCS) Instance

In releases before AS ABAP 7.40 it was possible to use an ASCS instance, already. Starting with SAP NetWeaver 7.0, for high availability scenarios on Windows (HA) the installation of an ASCS instance was required.

The ASCS instance enables you to run the ABAP MS and the ABAP enqueue service (not implemented as a work process in this case) independent from a specific AS ABAP instance. Since the end of 2016, you can also install SAP Web Dispatcher as part of the ASCS instance.

In a High Availability (HA) scenario on Windows, the ASCS instance and the database are contained within the same HA cluster (maybe also including the optional Enqueue Replication Server instance). Outside this cluster, you may have multiple ABAP instances of equal priority.

AS Java-Based SAP Systems

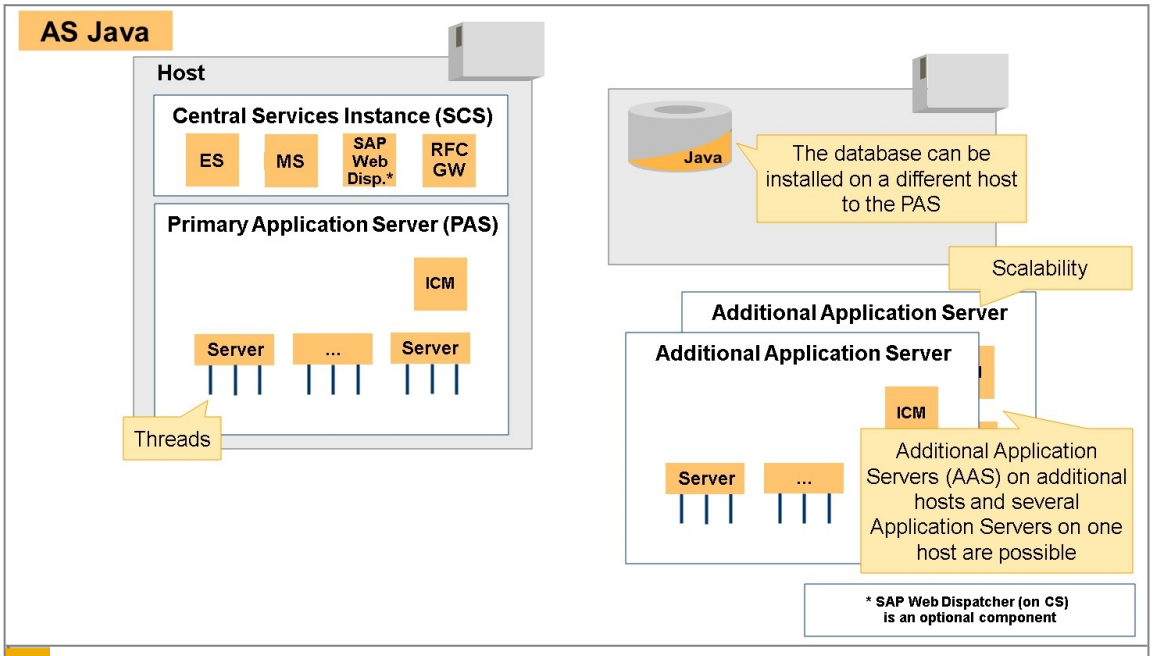

Figure 6: AS Java-Based SAP System

The Internet Communication Manager (ICM) is the central process of an AS Java instance. This process distributes the incoming requests to the available Java server processes. In

addition to the ICM, a Java instance consists of one or more server processes. Several instances can be installed on the same host. An AS Java-based SAP system can have several instances. Some of the instances are as follows:

Java-based SAP System Instances

- Primary Application Server

  The PAS is the instance of an AS Java-based SAP system that has been installed first. There are no further differences to Additional Application Server (AAS) instances except that the Central Services Instance (SCS) shares the same host with the PAS.

- Java CS instance (SCS)

  The SCS instance offers the Java MS, the Java ES, and a Gateway process. In the standard installation, the PAS and the SCS instance are located on the same host.

You can install an AAS on the same host together with the PAS or on other separate hosts.

The SCS instance does not belong to the PAS instance and is started and stopped separately.

Note:
The Java server processes are not equivalent to the ABAP work processes. The Java server processes distribute the incoming work to underlying threads; therefore, the Java server processes use internal threads to process requests.

Unicode

Language and Unicode Considerations

The following are a few of the language and Unicode considerations for an SAP system:

- SAP systems support up to 40 different languages.
- Using certain languages simultaneously requires Unicode.
- Unicode has higher hardware requirements than non-Unicode.
- Non-Unicode SAP systems can be converted to Unicode as of AS ABAP 6.20.
- All newly installed SAP systems are Unicode-based as of AS ABAP 7.00.
- Existing SAP systems may remain non-Unicode up to AS ABAP 7.40.
- SAP system copy of non-Unicode systems is still supported.
- Starting with AS ABAP 7.50 Unicode is mandatory for all SAP systems.
- AS Java-based SAP systems are always Unicode.
- SAP recommends Unicode in any case.

LESSON SUMMARY
You should now be able to:

- List the technical processes of an AS ABAP-based SAP system
- List the technical processes of an AS Java-based SAP system

Unit 1
Lesson 3

Listing the SAP Systems you will install and update in this course

LESSON OVERVIEW
This lesson briefly describes the SAP systems that you will install and update during this course.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- List the SAP Systems that will be installed and updated in this course

SAP HANA Database, SID HAX

The SAP HANA database HAX will serve as the database management system for the SAP S/4HANA Server system S4X, which will be installed later.

HAX will be based on **SUSE Linux Enterprise Server (SLES)** operating system.

What you will do in this training (HAX)

Install and update an SAP HANA 2.0 database using the following details:

- Based on SAP HANA 2.0
- SID **HAX**
- Instance number 10

SAP S/4HANA Server System, SID S4X

The SAP system S4X will be installed.

S4X will be based on **SUSE Linux Enterprise Server (SLES)** operating system and on the database **SAP HANA**, SID **HAX**.

What you will do in this training (S4X)

- Install an SAP S/4HANA 2023 Server system with the following details:
  - SID **S4X**
  - Based on AS ABAP 7.58
  - ABAP Central Services (ASCS): instance number 10
  - Primary Application Server (PAS): instance number 11
  - Additional Application Server (AAS): instance number 12
  - Enqueue Replication Server (ERS): instance number 19

- Update the SAP S/4HANA Server system.
  - Use Software Update Manager (SUM) 2.0 to update **S4X**.
  - Use scenario strategy **Standard**.

SAP Solution Manager ABAP 7.2, SID SMA

SAP Solution Manager 7.2 requires the installation of two separate SAP systems, one based on AS ABAP, one based on AS Java.

The AS ABAP-based SAP system, as part of the SAP Solution Manager 7.2, will use the SID **SMA**.

SMA will be based on **Microsoft Windows** operating system and on the database **SAP MaxDB**.

What you will do in this training (SMA)

- Install an SAP Solution Manager ABAP 7.2 SR2 using the following details:
  - SID **SMA**
  - Based on AS ABAP 7.40
  - ABAP Central Services (ASCS): instance number 80
  - Primary Application Server (PAS): instance number 81
  - Additional Application Server (AAS): instance number 82
- Update the SAP Solution Manager ABAP system.
  - Use Software Update Manager 1.0 (SUM) to update **SMA**.
  - Use scenario strategy **Single System**.

SAP Solution Manager Java 7.2, SID SMJ

SAP Solution Manager 7.2 requires the installation of two separate SAP systems, one based on AS ABAP, one based on AS Java.

The AS Java-based SAP system, as part of the SAP Solution Manager 7.2, will use the SID **SMJ**.

SMJ will be based on **Microsoft Windows** operating system and on the database **SAP MaxDB**.

What you will do in this training (SMJ)

- Install an SAP Solution Manager Java 7.2 using the following details:
  - SID **SMJ**
  - Based on AS Java 7.5
  - Java Central Services (SCS): instance number 90
  - Primary Application Server (PAS): instance number 91
- Update the SAP Solution Manager Java system.
  - Use Software Update Manager 1.0 (SUM) to update **SMJ**.
  - There is no scenario strategy available.

You might wonder why we cover so many installation and patch variants. The answer is that each installation type (AS ABAP, AS Java) differs from the other. In addition, in this course, we use the “Custom” installation mode because it is more complex (“Typical” asks fewer input questions). For updating AS ABAP-based SAP systems in this training, you will work with SUM with two different scenarios, which are **Standard** and **Single System**, in both cases you will use the **Expert Mode** option. The update of AS Java-based systems using SUM does not use those categories and works completely differently.

Also we would like to point out similarities and differences in installation procedures for different operating systems (Windows, Linux) and databases (SAP HANA DB and SAP MaxDB).

The installation tool (SWPM/SAPinst) and the update tool (SUM/SAPup) will be used in different versions/releases, as required by the specific installation procedures.

The different procedures allow for studying different error situations that you might encounter during your work. Covering so many different tasks and situations prepare you as best as possible for tasks like installation preparation, installing SAP systems and patching SAP systems.

It is worth highlighting that you will earn **first-hand installation experience with regard to SAP HANA DB and SAP S/4HANA Server**.

LESSON SUMMARY
You should now be able to:

- List the SAP Systems that will be installed and updated in this course

Learning Assessment

1. Which of these SAP systems is not an AS ABAP based SAP system?

   Choose the correct answer.

   - ☐ **A** SAP EP
   - ☐ **B** SAP ECC
   - ☐ **C** SAP S/4HANA Server
   - ☐ **D** SAP BW

2. Which software components (among others) can be found in every AS ABAP-based SAP system?

   Choose the correct answers.

   - ☐ **A** SAP_BASIS
   - ☐ **B** SAP_APPL
   - ☐ **C** S4CORE
   - ☐ **D** SAP_ABA

3. Which process distributes the incoming requests to the available server processes in an AS Java-based SAP system?

   Choose the correct answer.

   - ☐ **A** Java Gateway Server
   - ☐ **B** Internet Communication Server (ICM)
   - ☐ **C** Java Central Services (CS)

4. Which process is always part of the central services instance of an AS Java-based SAP system with release 750?

   Choose the correct answers.

   - ☐ A Message Server
   - ☐ B Enqueue Service
   - ☐ C SAP Web Dispatcher
   - ☐ D RFC Gateway

5. Which release of AS ABAP does SAP Solution Manager ABAP 7.2 use?

   Choose the correct answer.

   - ☐ A 7.40
   - ☐ B 7.20
   - ☐ C 7.50
   - ☐ D 7.58

Learning Assessment - Answers

1. Which of these SAP systems is not an AS ABAP based SAP system?

   Choose the correct answer.

   - [X] A SAP EP
   - [ ] B SAP ECC
   - [ ] C SAP S/4HANA Server
   - [ ] D SAP BW

   You are correct! SAP EP is not an AS ABAP based SAP system. Read more on this in the lesson Describing SAP Systems of the course ADM110.

2. Which software components (among others) can be found in every AS ABAP-based SAP system?

   Choose the correct answers.

   - [X] A SAP_BASIS
   - [ ] B SAP_APPL
   - [ ] C S4CORE
   - [X] D SAP_ABA

   You are correct! The software components SAP_BASIS and SAP_ABA can be found in every AS ABAP-based SAP system. The software component SAP_APPL can be found in SAP ECC systems. The software component S4CORE can be found in SAP S/4HANA Server systems. Read more on this in the lesson Describing SAP Systems of the course ADM110.

3. Which process distributes the incoming requests to the available server processes in an AS Java-based SAP system?

   Choose the correct answer.

   - [ ] A Java Gateway Server
   - [X] B Internet Communication Server (ICM)
   - [ ] C Java Central Services (CS)

   You are correct! The process which distributes the incoming requests to the available server processes in an AS Java-based SAP system is Internet Communication Server (ICM). Read more on this in the lesson Describing the Processes of AS ABAP and AS Java-based SAP system in course ADM110.

4. Which process is always part of the central services instance of an AS Java-based SAP system with release 750?

   Choose the correct answers.

   - [X] A Message Server
   - [X] B Enqueue Service
   - [ ] C SAP Web Dispatcher
   - [X] D RFC Gateway

   You are correct! A Message Server, an Enqueue Service, and an RFC Gateway is always part of the central services instance of an AS Java-based SAP system with release 750.

5. Which release of AS ABAP does SAP Solution Manager ABAP 7.2 use?

   Choose the correct answer.

   - [X] A 7.40
   - [ ] B 7.20
   - [ ] C 7.50
   - [ ] D 7.58

   You are correct! SAP Solution Manager ABAP 7.2 uses AS ABAP 7.40, other releases of AS ABAP are not possible to use for SAP Solution Manager ABAP 7.2. Read more on this in the lesson List the SAP Systems that will be installed and updated in this course of the course ADM110.

UNIT 2 Installing an SAP S/4HANA Server System

Lesson 1

UNIT OBJECTIVES

- Install an SAP S/4HANA Server System

Unit 2
Lesson 1

Installing an SAP S/4HANA Server System

LESSON OVERVIEW
This lesson describes how to install an SAP S/4HANA system.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Install an SAP S/4HANA Server System

Installing and Updating an SAP HANA Database System

Note:
DISCLAIMER: Please take note, that within this training material the required steps to install a SAP HANA database as required by SAP S/4HANA Server are described. However, the necessary details on running/operating/configuring a SAP HANA database are not described. Therefore refer to the following training offerings that confer the required knowledge:

HA200 - SAP HANA Installation & Operations or, alternatively
TADM55 - SAP HANA Installation & Operations in case you are planning to certify as an SAP Technology Consultant.

Installing an SAP HANA Database System

Note:
When installing an SAP S/4HANA Server system, it is necessary to install the required SAP HANA database software before you start the installation steps using the installation tool SWPM / SAPinst.

Make sure that you have all required installation media available before starting the installation process. Please refer to the corresponding installation guides for further information/guidance.

```
wdflbmt0903:~ # cd /hana
wdflbmt0903:/hana # mkdir 51057281
wdflbmt0903:/hana # cd /hana/51057281
wdflbmt0903:/hana/51057281 # unzip /usr/sap/Media/Installation_HAX/51057281.ZIP
```

```
...
extracting: LABEL.EBC
extracting: CDLABEL.EBC
extracting: VERSION.EBC
 inflating: COPY_TM.TXT
 inflating: COPY_TM.HTM
 inflating: MD5FILE.DAT
 inflating: SHAFILE.DAT
wdflbmt0903:/hana/51057281 # cd /hana/51057281/DATA_UNITS/HDB_SERVER_LINUX_X86_64/
wdflbmt0903:/hana/51057281 /DATA_UNITS/HDB_SERVER_LINUX_X86_64 # ./hdblcmgui
```

The installation of an SAP HANA DB is started by executing ***hdblcmgui***
This database needs to be installed before the installation of the SAP system is started

Figure 7: Prepare Media and Start hdblcmgui

The installation of the SAP HANA database is being executed by the tool **hdblcmgui**.

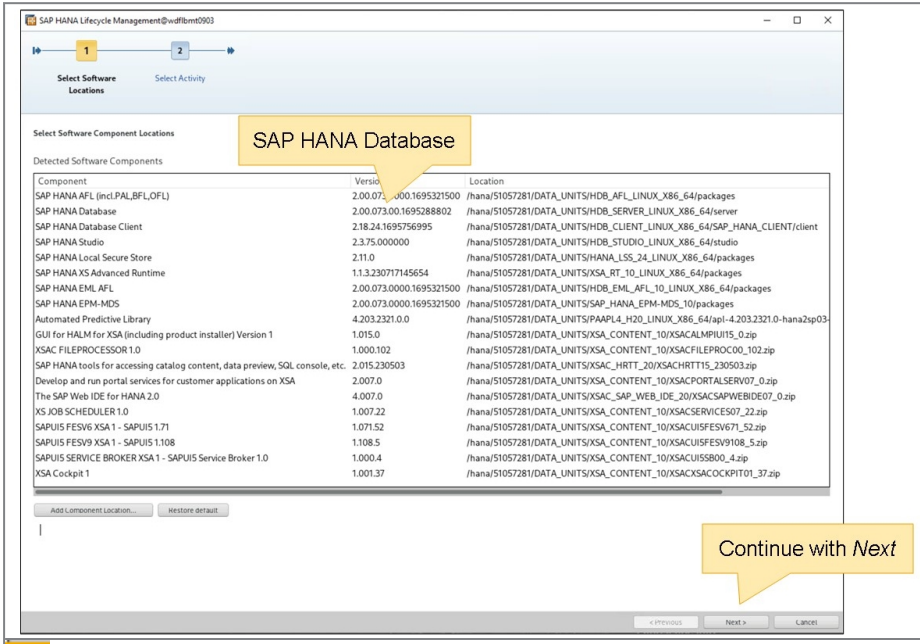

Figure 8: Select Component to be Installed

The slide above shows you the selection that will install the SAP HANA database 2.0.

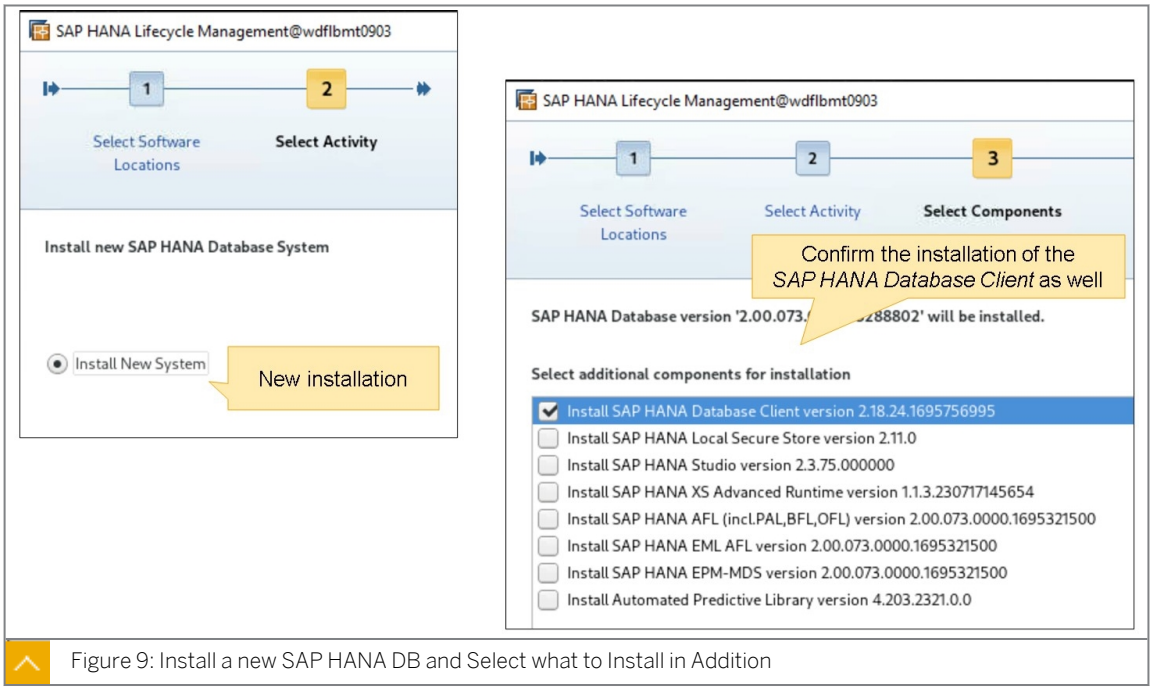

Figure 9: Install a new SAP HANA DB and Select what to Install in Addition

We will install a new SAP HANA database system along with the required SAP HANA database client software.

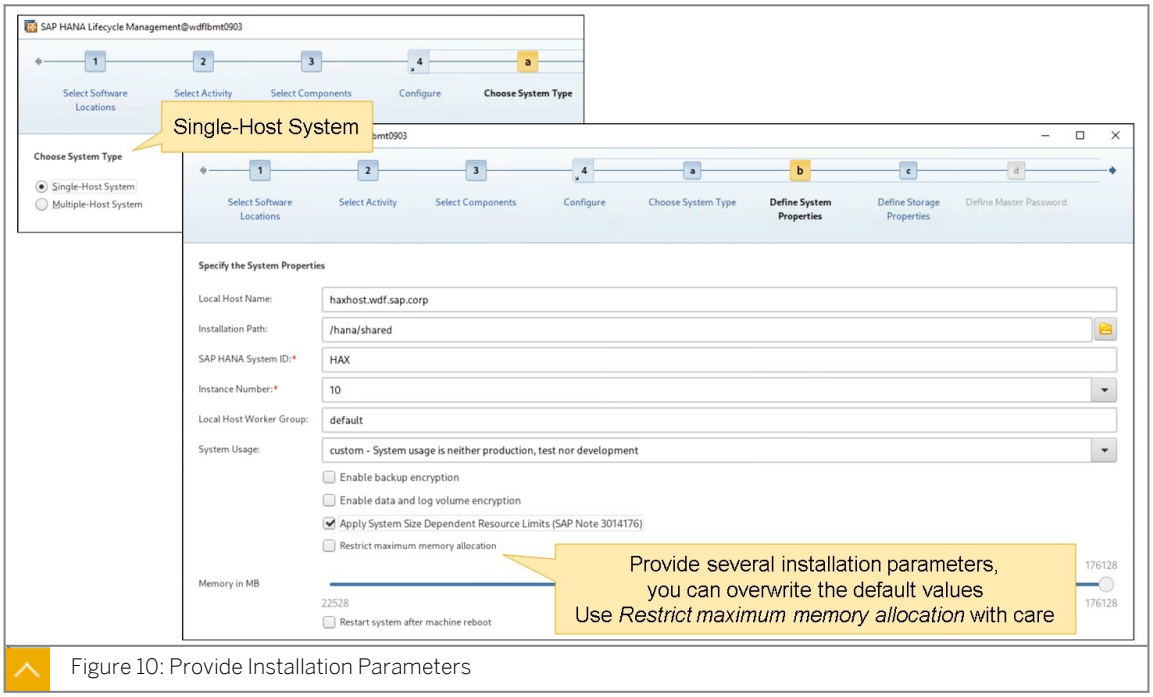

Figure 10: Provide Installation Parameters

Usually, it is sufficient to install a *Single-Host System*.

For larger landscapes it might be useful to select the *Multiple-Host System* option. Before doing so, please confirm (with experts on system sizing) that this is the option you require.

On the lower half of the slide above you find further installation options. Please note that you can provide the *Local Host Name*, a chosen installation path, the *SAP HANA System ID* for the SAP HANA database system and its *Instance Number*.

Select the *System Usage* according to your needs.

You can leave the other values at their default values.

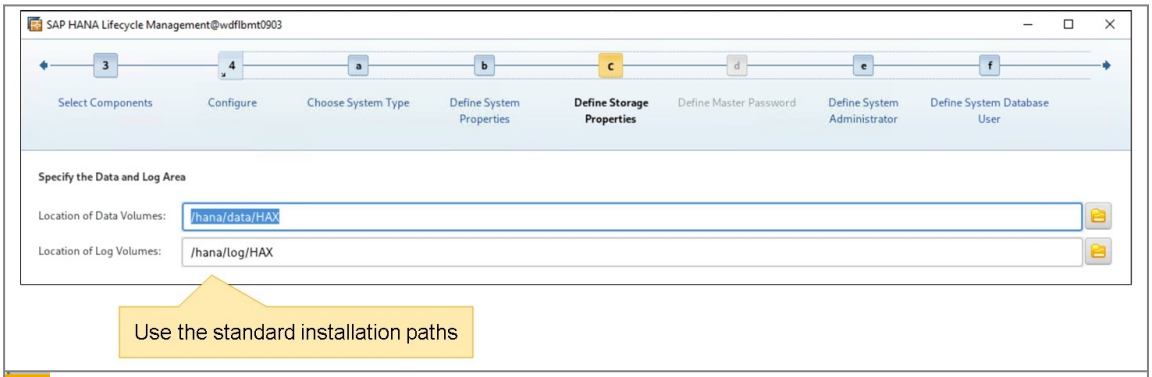

Figure 11: Provide Location for Data and Log Volumes

The slide above shows the specification of the locations for the *Data Volumes* and *Log Volumes*.

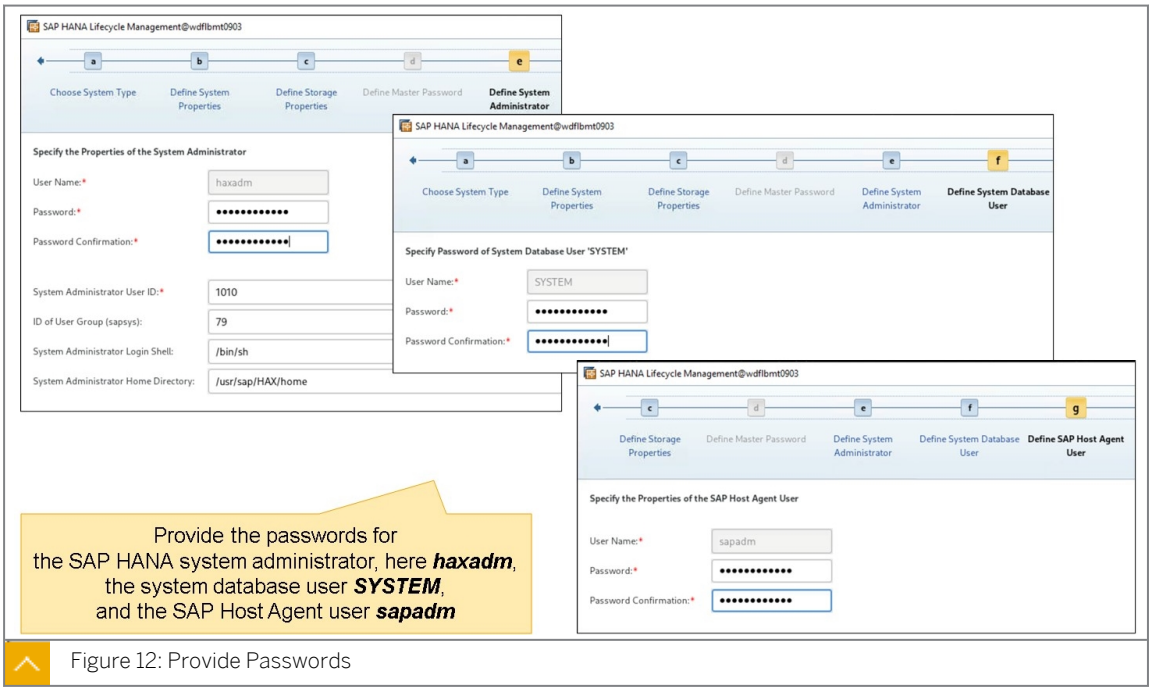

Figure 12: Provide Passwords

The slide above shows the screens that are required to set the passwords for the following users with the SAP HANA database: <sid>adm (<sid> replaced by the chosen SID of the database system) and SYSTEM (a standard user within SAP HANA database).

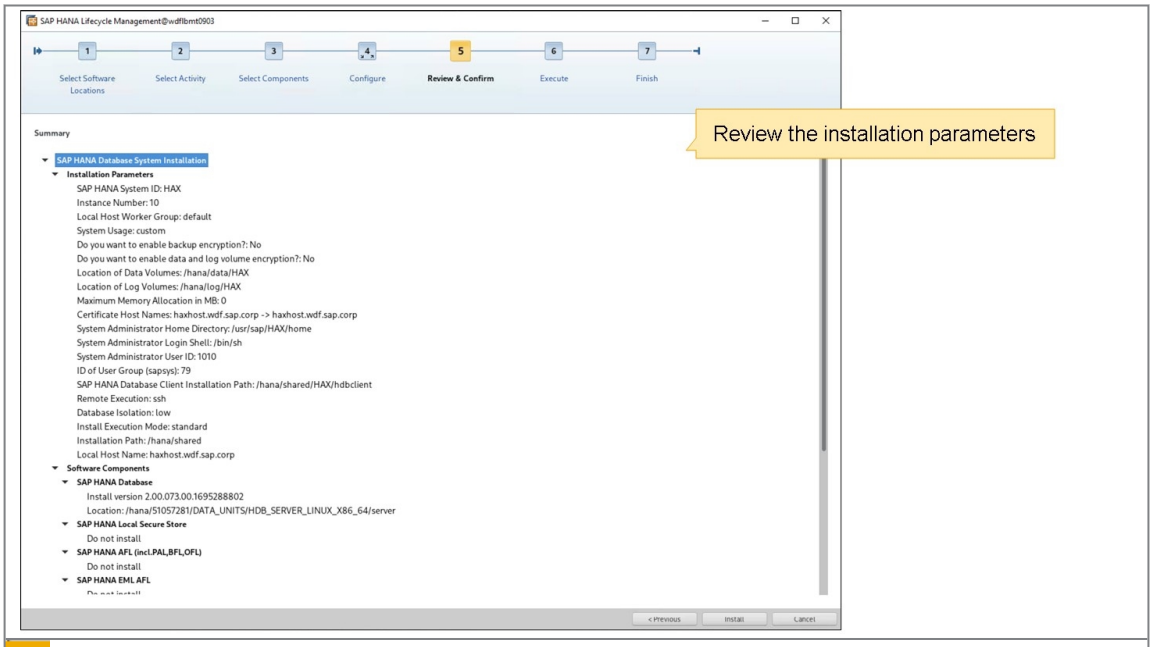

Figure 13: Check the Installation Parameters

Before starting the actual installation of the SAP HANA database, please check the installation parameters you defined.

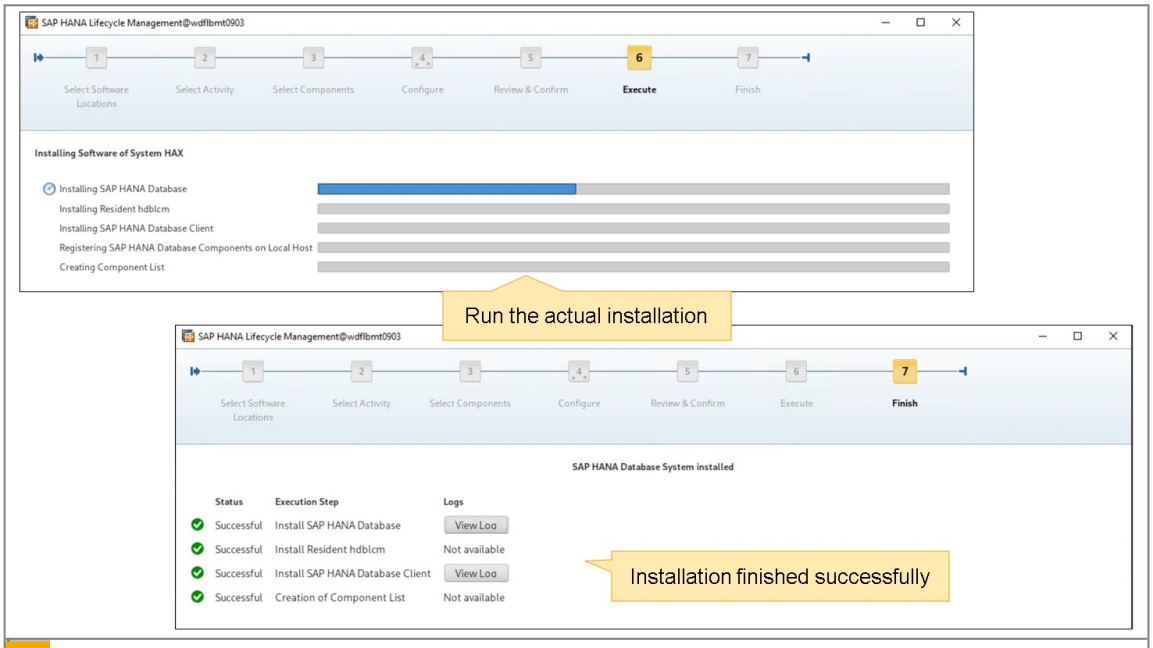

Figure 14: Run the Installation

The actual installation will run rather fast.

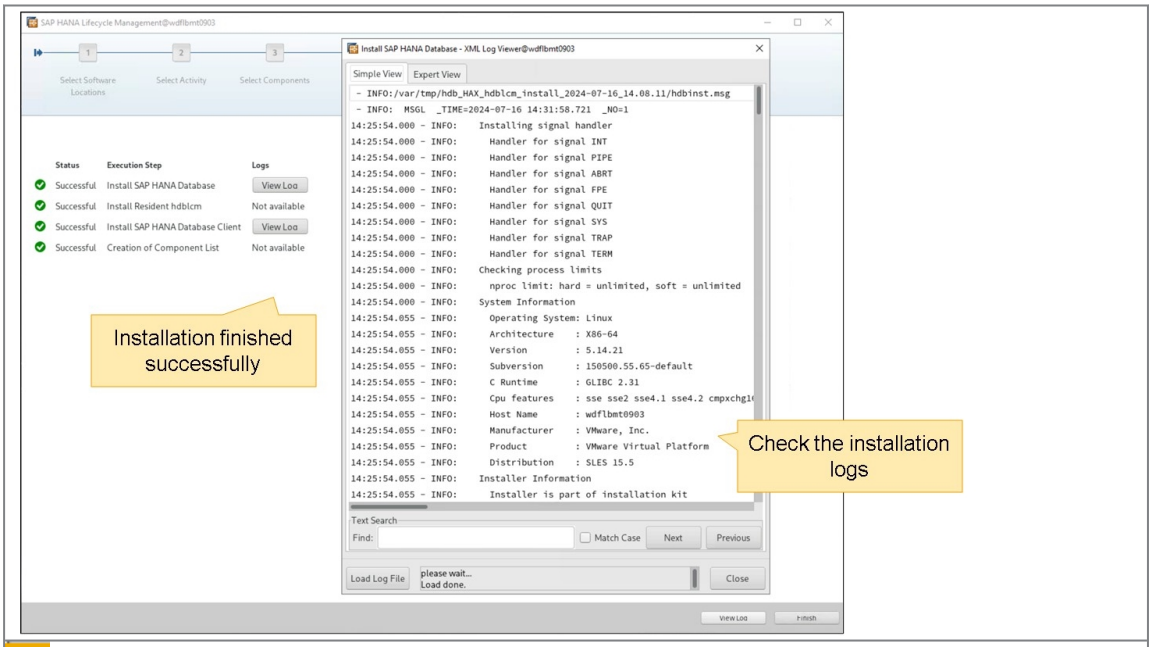

Figure 15: Complete the Installation

After the installation has finished, please check the log for warnings or error messages.

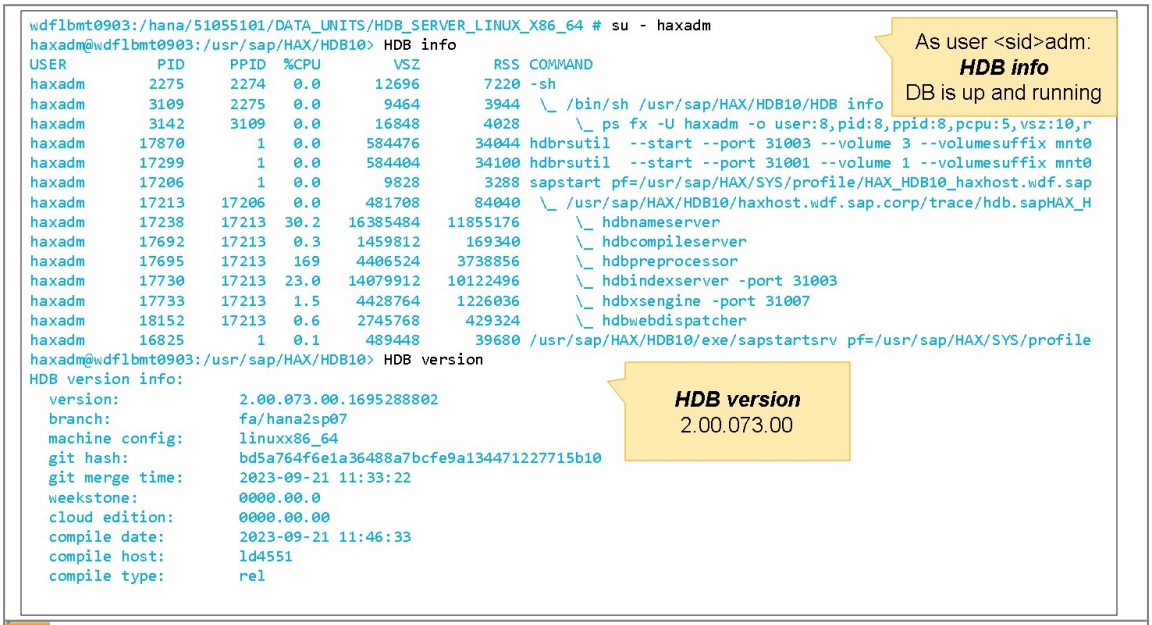

Figure 16: Check the Version of the newly Installed SAP HANA DB

The SAP HANA database system is now installed successfully and can be used for installing an SAP S/4HANA Server system.

The following slides show how to update an SAP HANA database.

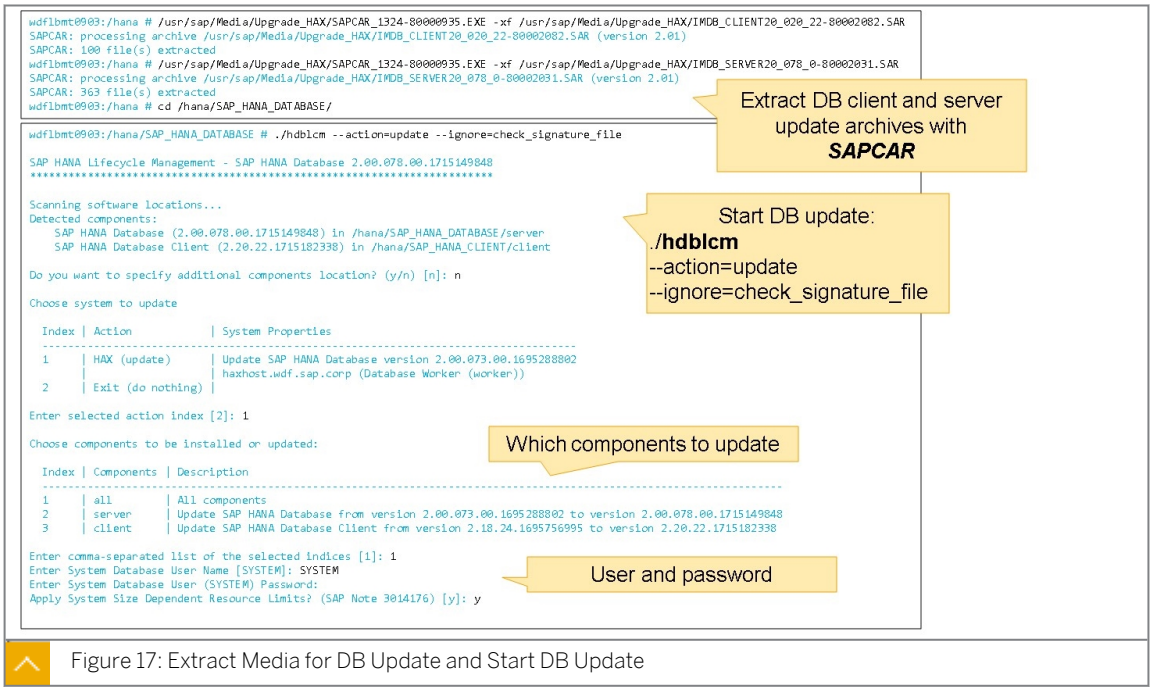

Figure 17: Extract Media for DB Update and Start DB Update

Extract the media for the SAP HANA database update. Start the SAP HANA database update and answer the questions.

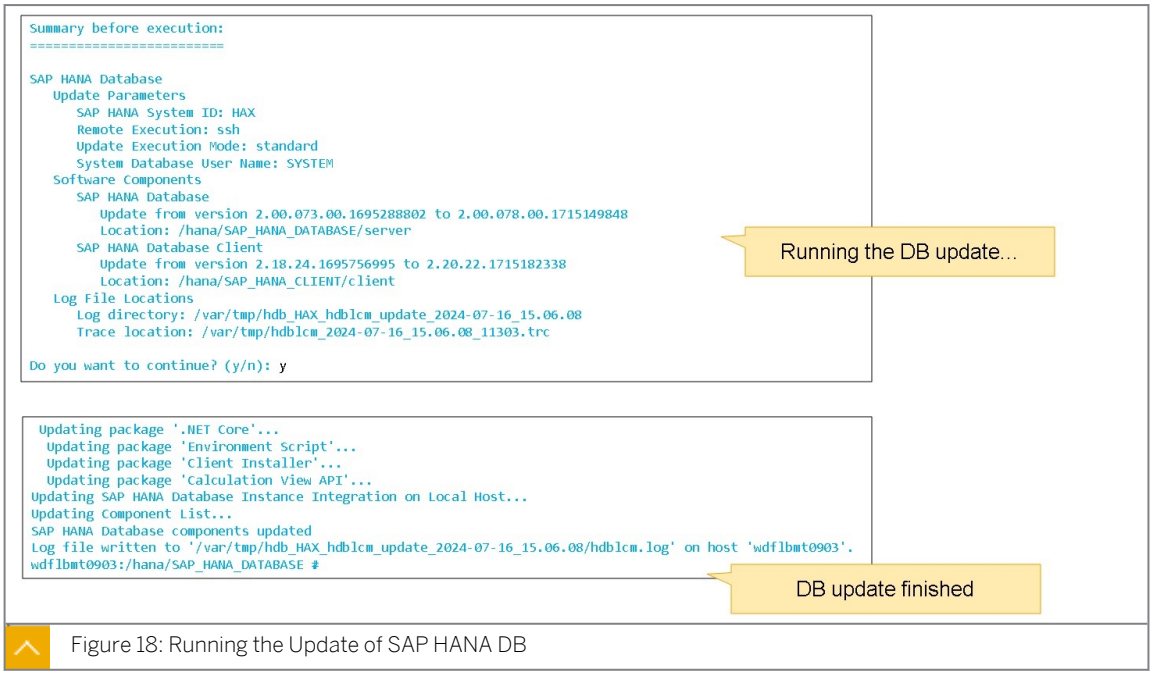

Figure 18: Running the Update of SAP HANA DB

The SAP HANA DB update will run for a few minutes, only.

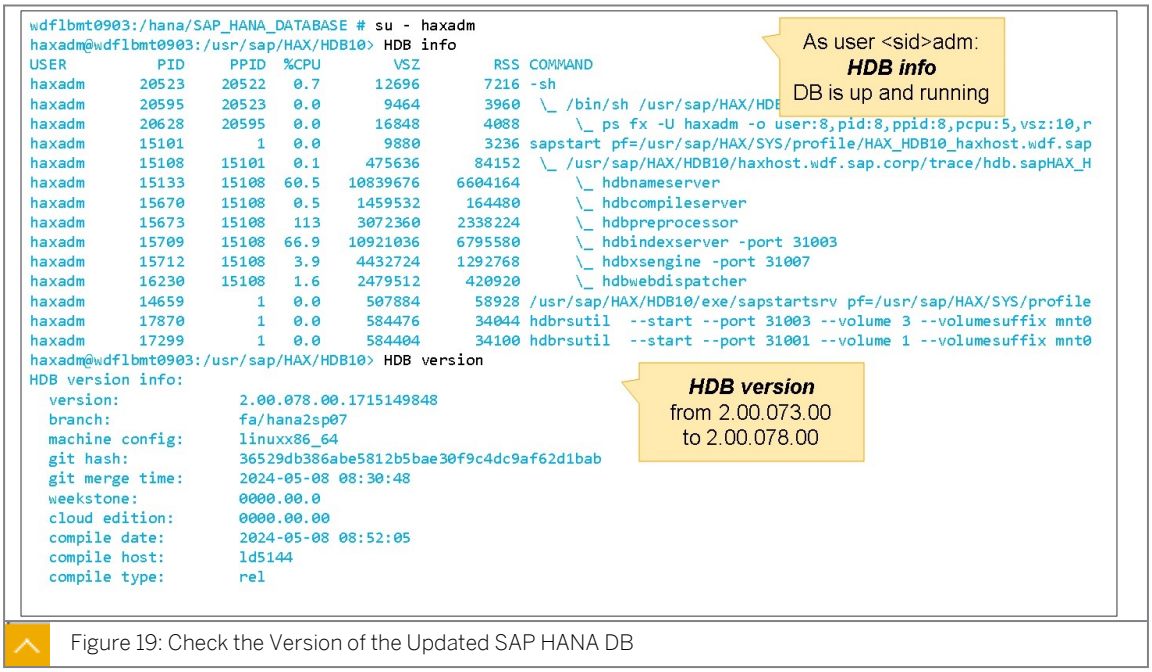

Figure 19: Check the Version of the Updated SAP HANA DB

The SAP HANA database system was updated successfully.

Executing a Prerequisites Check

Note:
This unit describes the required steps for installing an SAP S/4HANA Server 2023 system based on SUSE Linux and SAP HANA DB. The installation procedure might vary slightly depending on the following circumstances:

1. Release of the SAP S/4HANA Server system to be installed
2. Type (and release) of the Linux operating system used
3. Release/patch level/version of the SAP HANA database used
4. Version of the SWPM (Software Provisioning Manager) used

Before starting the actual installation, you can run a prerequisites check. This checks, if there are problems with the installation host, e.g. wrong operating system, not sufficient amount of RAM.

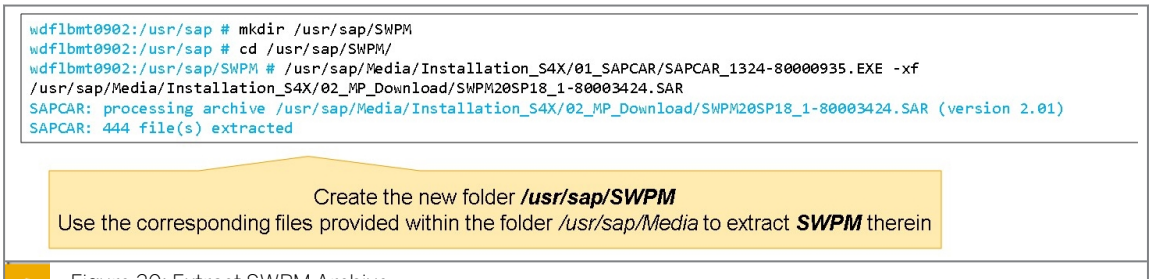

Figure 20: Extract SWPM Archive

When preparing the installation, make sure to use the latest version of the tool *Software Provisioning Manager*. Extract the archive file to create a directory that contains the tool *SAPinst*.

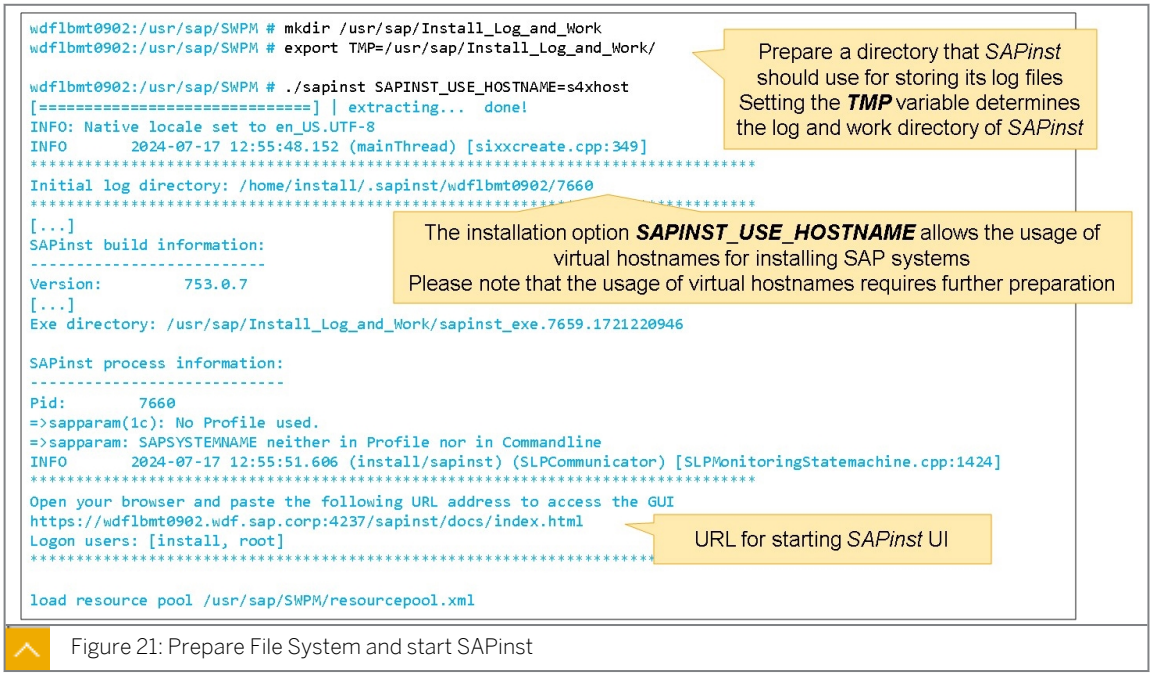

Figure 21: Prepare File System and start SAPinst

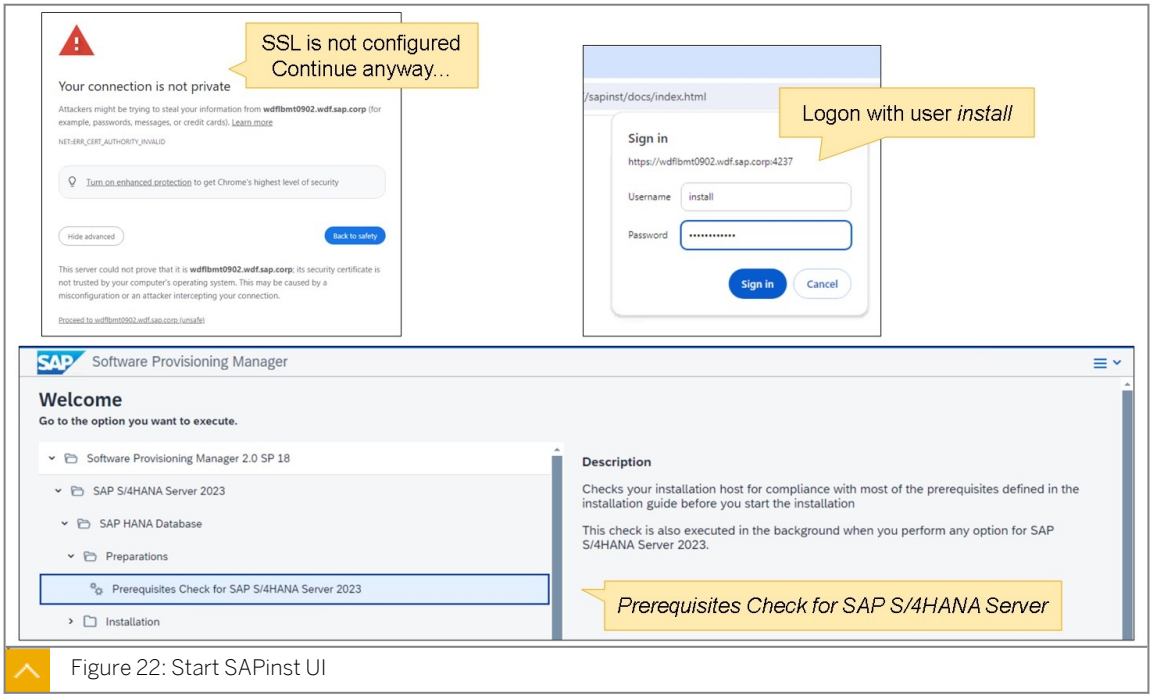

Figure 22: Start SAPinst UI

Within Software Provisioning Manager (started by calling the executable SAPinst), navigate to the *Prerequisites Check* if you would like to prepare for the actual system installation in advance.

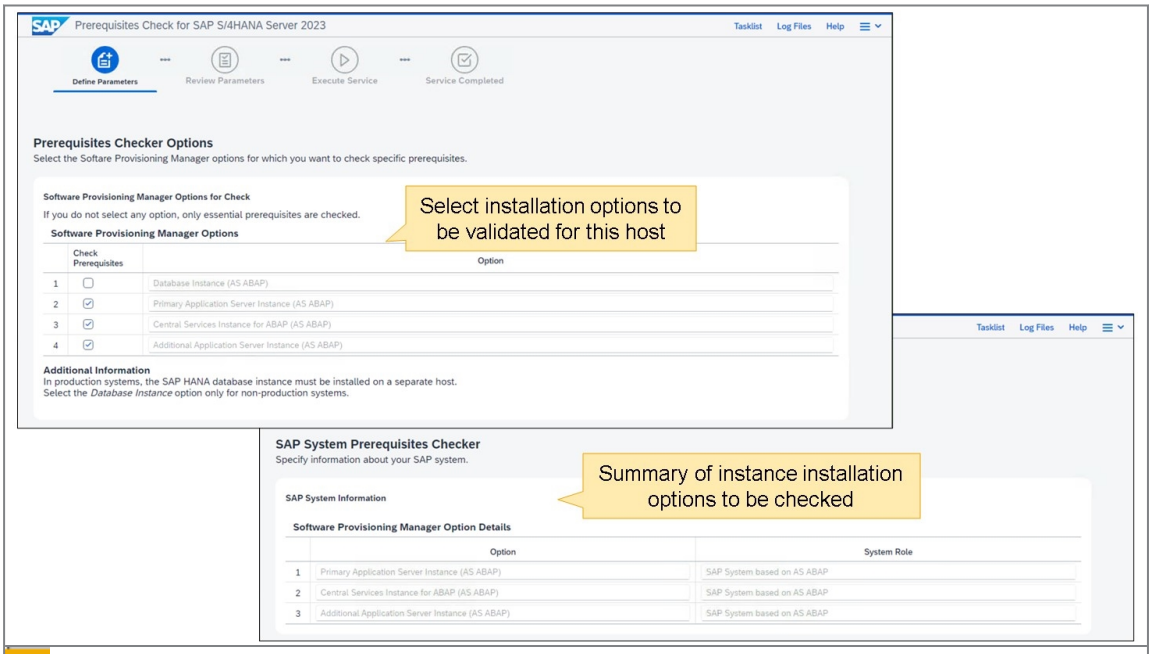

Figure 23: Decide for which Components to Check

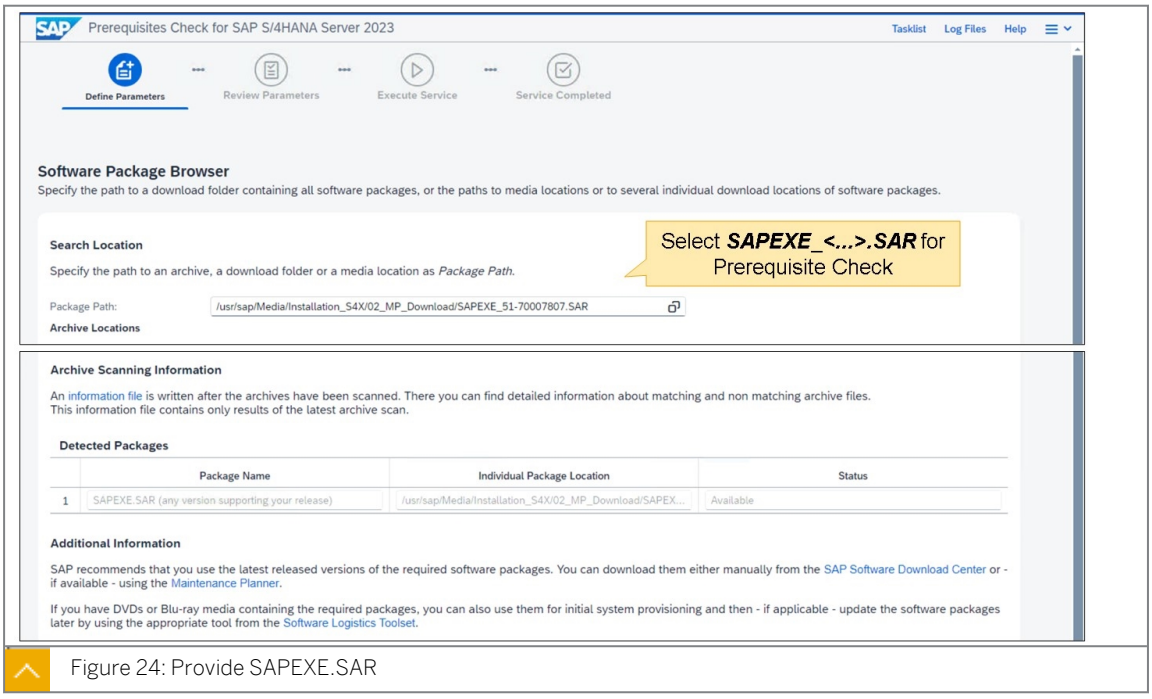

Figure 24: Provide SAPEXE.SAR

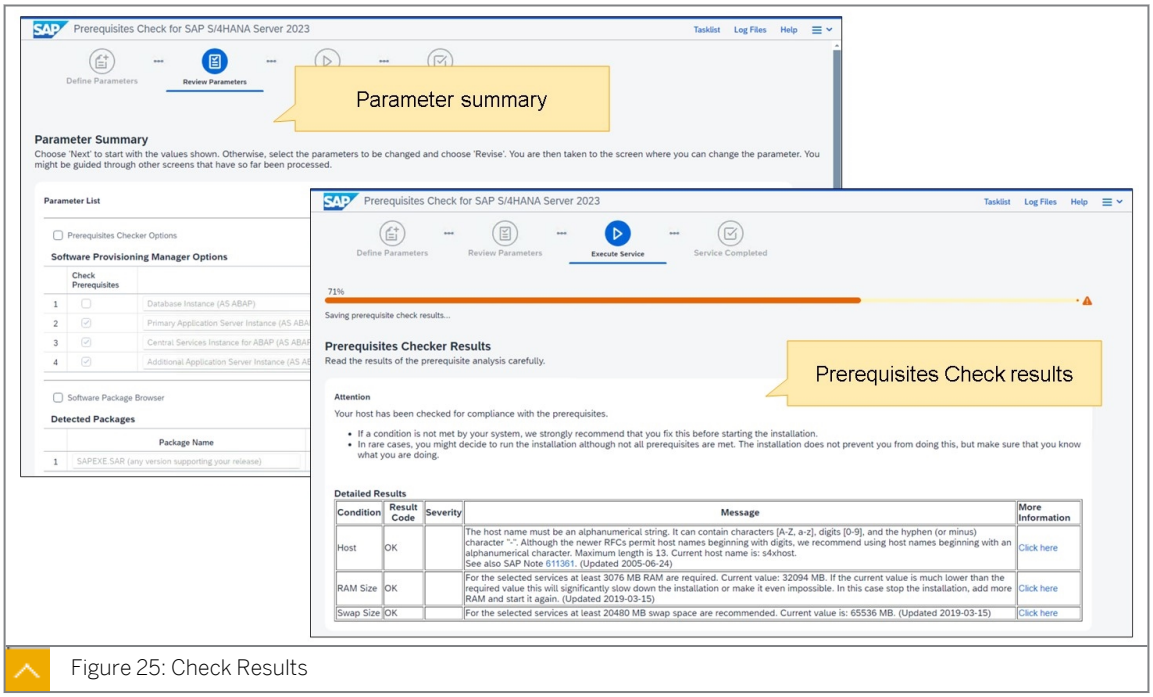

Figure 25: Check Results

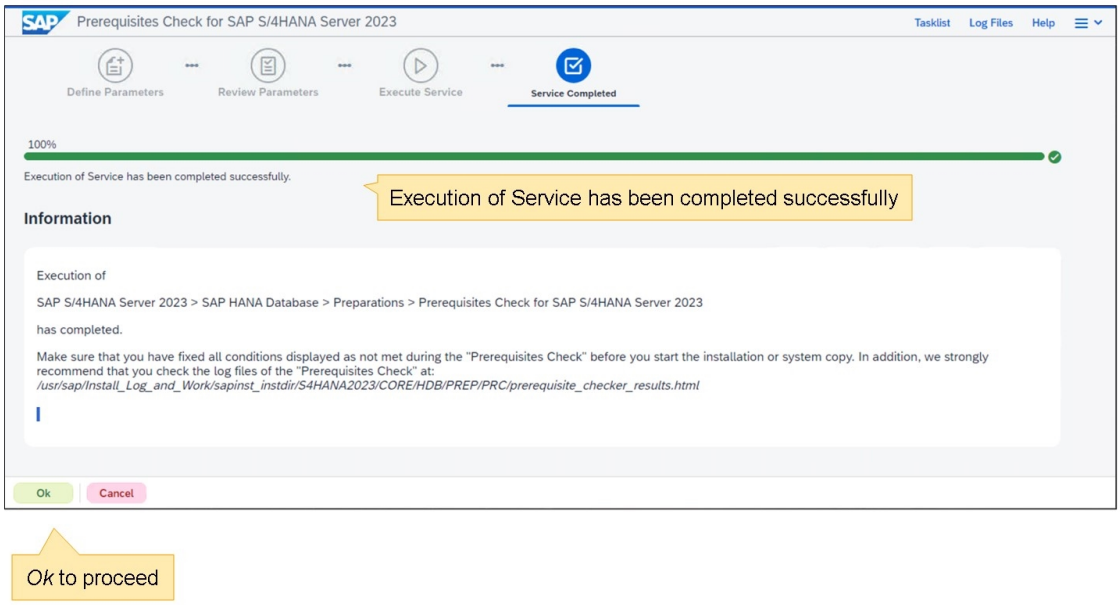

Figure 26: Execution Completed

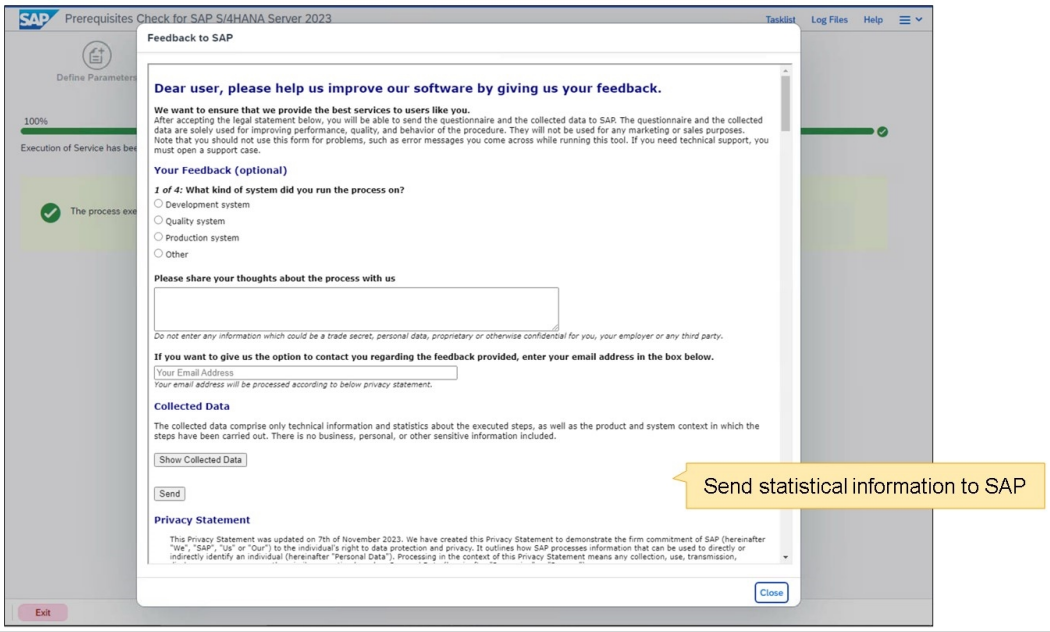

Figure 27: Send Statistical Information to SAP

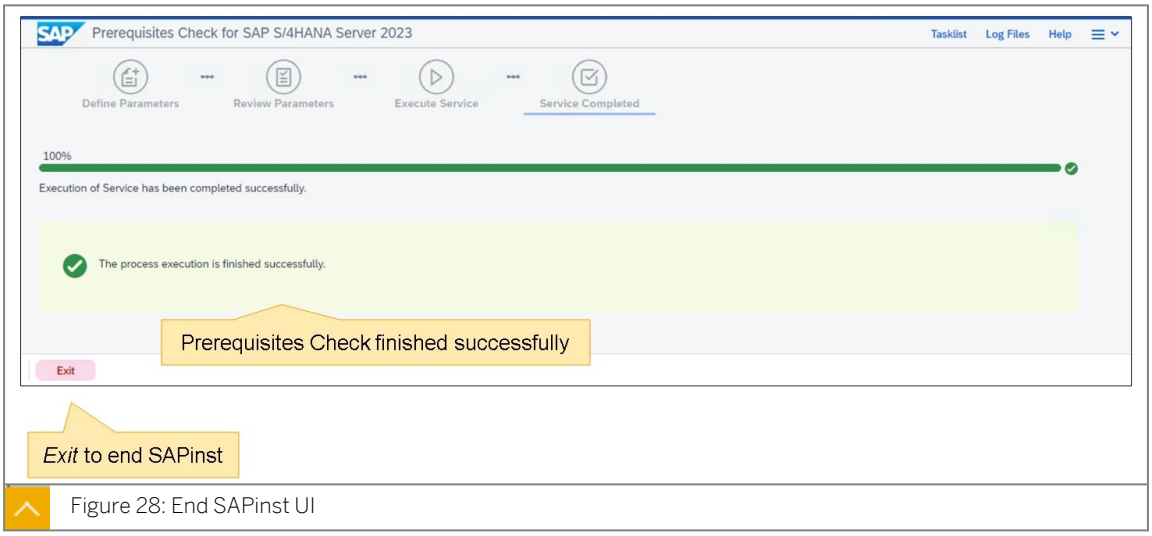

Figure 28: End SAPinst UI

After the prerequisites check is successfully completed, the actual installation can be started.

Installing an SAP S/4HANA Server System

Note:
This unit describes the required steps for installing an SAP S/4HANA Server 2023 system based on SUSE Linux and SAP HANA DB. The installation procedure might vary slightly depending on the following circumstances:

1. Release of the SAP S/4HANA Server system to be installed
2. Type (and release) of the Linux operating system used
3. Release/patch level/version of the SAP HANA database used
4. Version of the SWPM (Software Provisioning Manager) used

Installing an SAP S/4HANA Server System

For the installation of an SAP S/4HANA Server system, complete the necessary planning and preparation steps, install the SAP HANA database, start SAPinst from the Software Provisioning Manager then install the SAP S/4HANA Server system.

> Caution:
> When installing an SAP S/4HANA Server system, you need to consider that the required SAP HANA database needs to be installed before starting SAPinst. Some database systems are installed via SAPinst (e.g. SAP MaxDB, SAP ASE) whereas an SAP HANA database or an Oracle database need to be installed before starting SAPinst.

Here is a summary of the steps necessary to install an SAP S/4HANA Server system. Details, including most installation screens, follow.

1. Install the required SAP HANA database system.
2. Start Software Provisioning Manager (SWPM) and select the installation you want to execute.
3. Set the installation mode to *Custom*.
4. Specify various installation settings and system parameters, such as:
   - SAP System ID
   - Master password
   - Connection details for the SAP HANA database
   - Path to the installation media
   - Database-specific parameters
   - Instance numbers
5. Review the installation parameters and revise where required.
6. Start the dialog-free part of the installation process.
7. Review the logs of the installation process.
8. Stop your SAP system and set some parameters for your SAP system.
9. Start your SAP system.

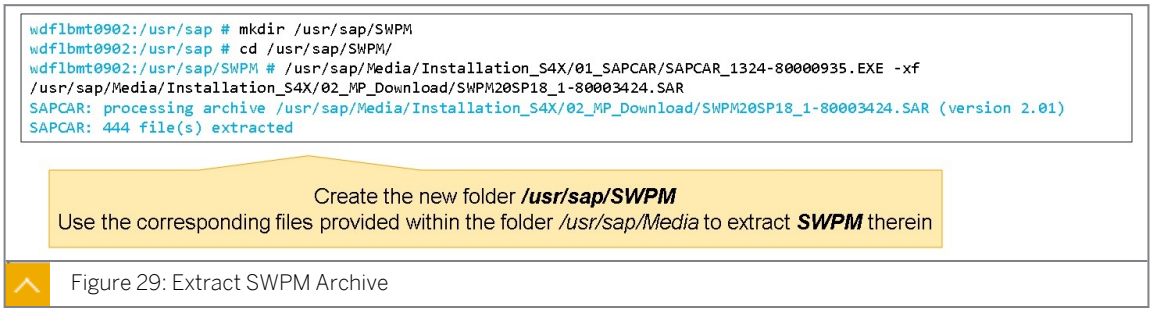

Figure 29: Extract SWPM Archive

When preparing the installation, make sure to use the latest version of the tool *Software Provisioning Manager*. Extract the archive file to create a directory that contains the tool *SAPinst*.

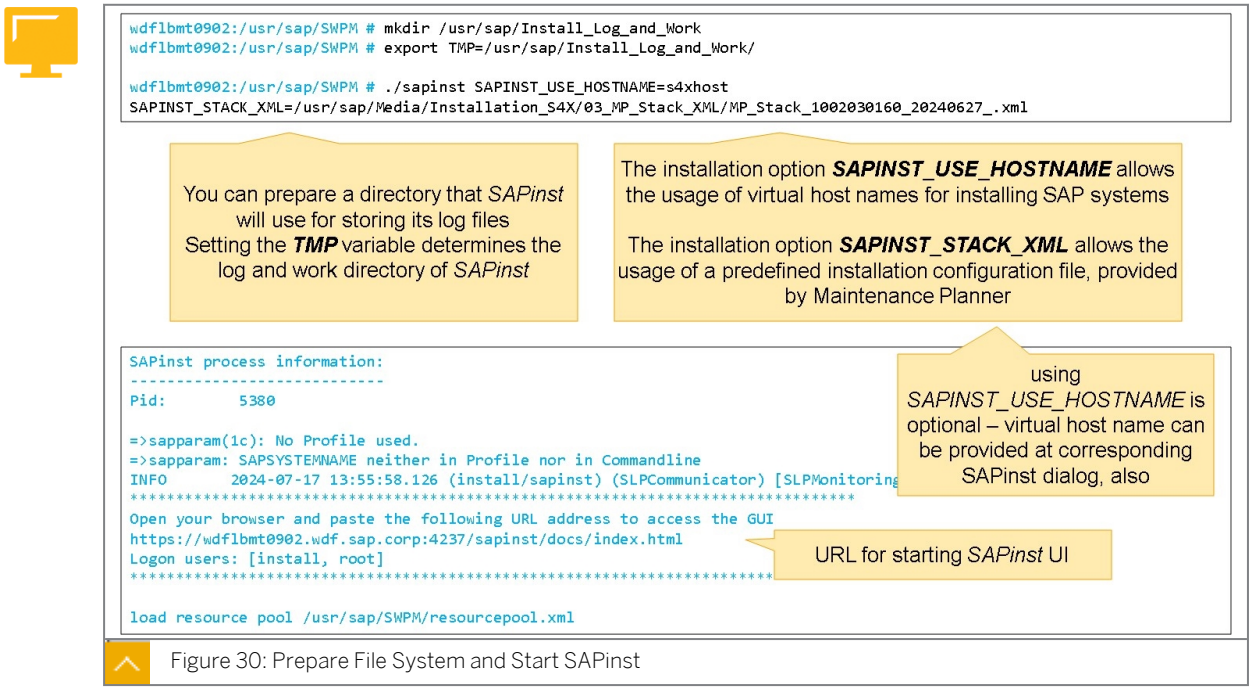

Figure 30: Prepare File System and Start SAPinst

SAPinst offers some command line options for being started.

SAPINST_STACK_XML

This option allows the usage of a so-called *Stack XML* file generated by the *Maintenance Planner*. If used, this option narrows down the installation options offered by SWPM and SAPinst to those defined within Maintenance Planner.

SAPINST_USE_HOSTNAME

When using this option you can install your SAP system using virtual hostnames.

Note:
Instead of using the SAPinst parameter *SAPINST_USE_HOSTNAME* you can also enter the virtual hostname in the corresponding SAPinst dialogs.

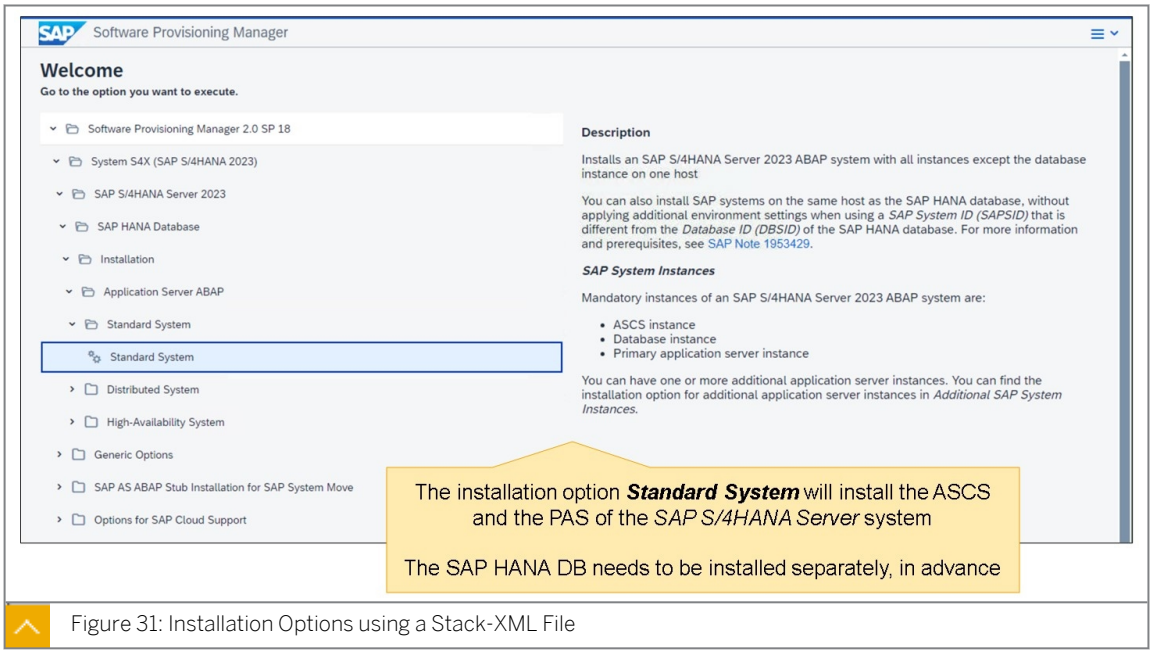

Figure 31: Installation Options using a Stack-XML File

Within *Software Provisioning Manager* (started by calling the executable *SAPinst*), drill down to the installation that you would like to conduct. The slide above highlights the selection (*Standard System*) that will install all AS ABAP-based elements of an SAP S/4HANA Server system on top of an already existing SAP HANA database.

Other installation options offer the distribution of components (Database, PAS, ASCS) onto different hosts or provide options for installing an SAP system within a high-availability environment.

After choosing *Next*, you will enter the dialog phase of the installation process, in which you will provide/set many parameters required by the installation process.

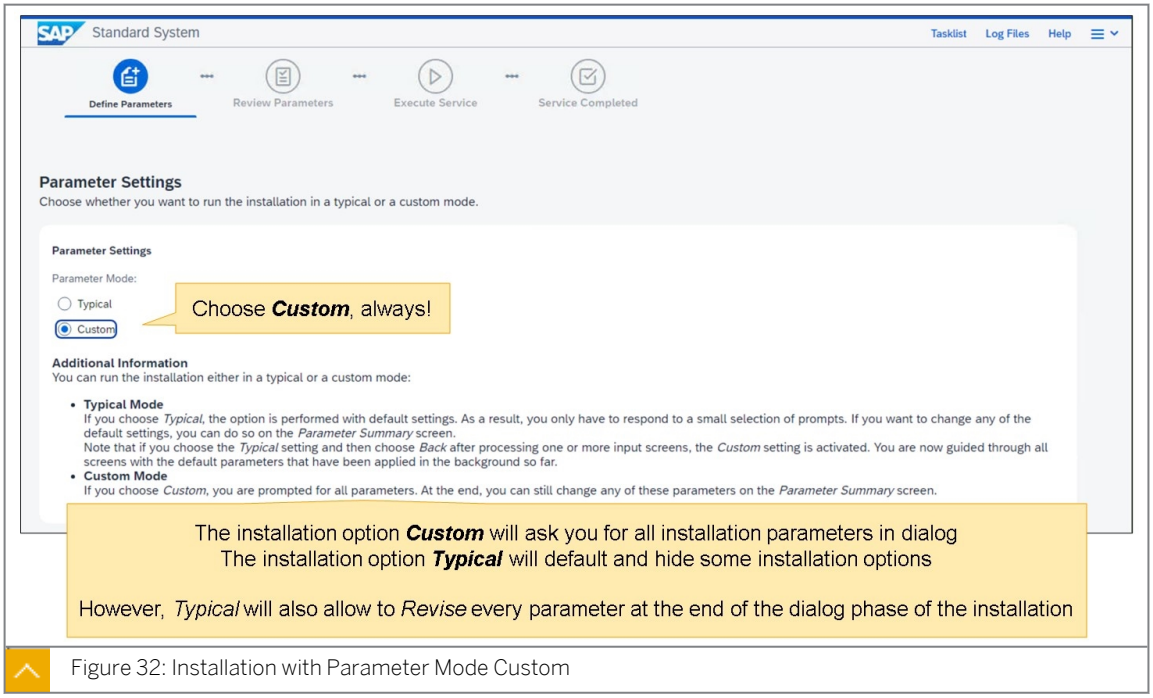

Figure 32: Installation with Parameter Mode Custom

The slide above shows the selection of the *Parameter Mode Custom*. It allows for setting each parameter explicitly; you are guided through each step. Always select this option.

The parameter mode *Typical* presents a reduced set of steps. The final parameter check allows for the revision of each parameter – even those side-stepped by choosing typical parameter mode. Do not select this option.

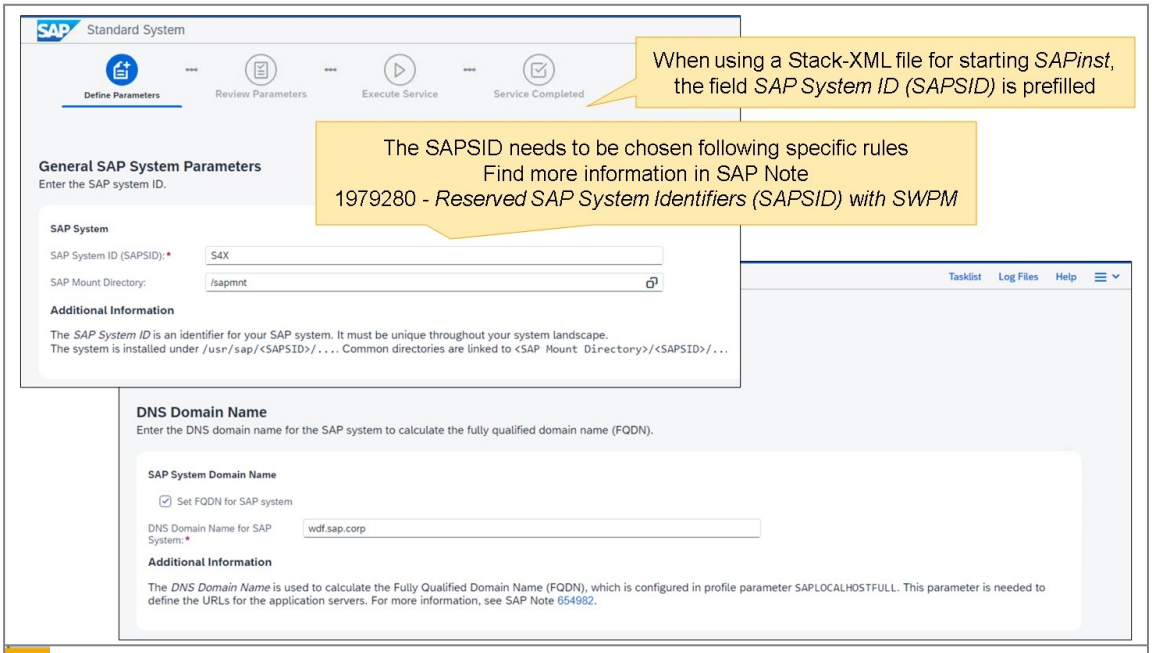

Figure 33: Set SAP System ID, Mount Directory, and DNS Domain Name

You are prompted for the SAP System ID (SAPSID) that your system should use. Note that some SIDs cannot be used; for example, the SID *SAP* is always forbidden. The SAP System ID needs to be chosen following specific rules. Find more information in *SAP Note* 1979280 - Reserved SAP System Identifiers (SAPSID) with Software Provisioning Manager.

Also above, you find another screen asking for the DNS Domain Name for your SAP system. Set the flag for *Full Qualified Domain Name* (*FQDN*) and provide the domain name to which your SAP system belongs. If you do not provide values here, different functions of your SAP system might not be usable or may require additional work.

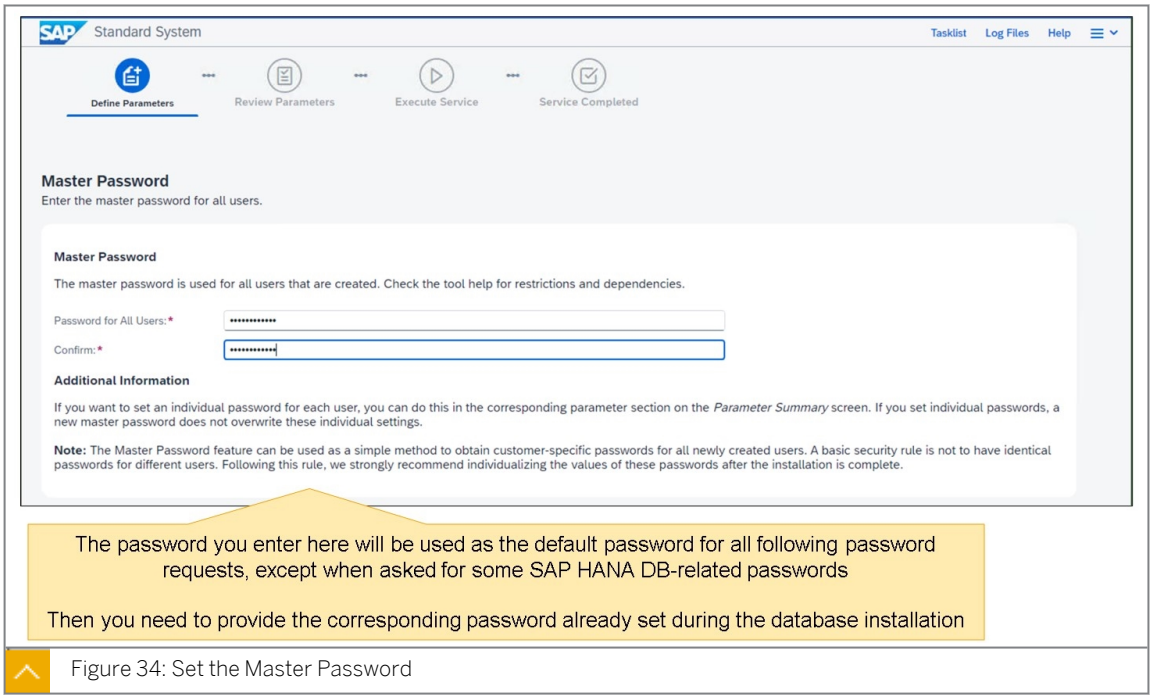

Figure 34: Set the Master Password

The previous slide is of essential significance.

Here you provide the so-called Master Password for this installation.

The master password is used for standard users in the SAP system and for users on the operating system and database level, in case the database is installed by SAPinst — which is not the case with SAP HANA.

After the installation, you should set individual passwords for the different users.

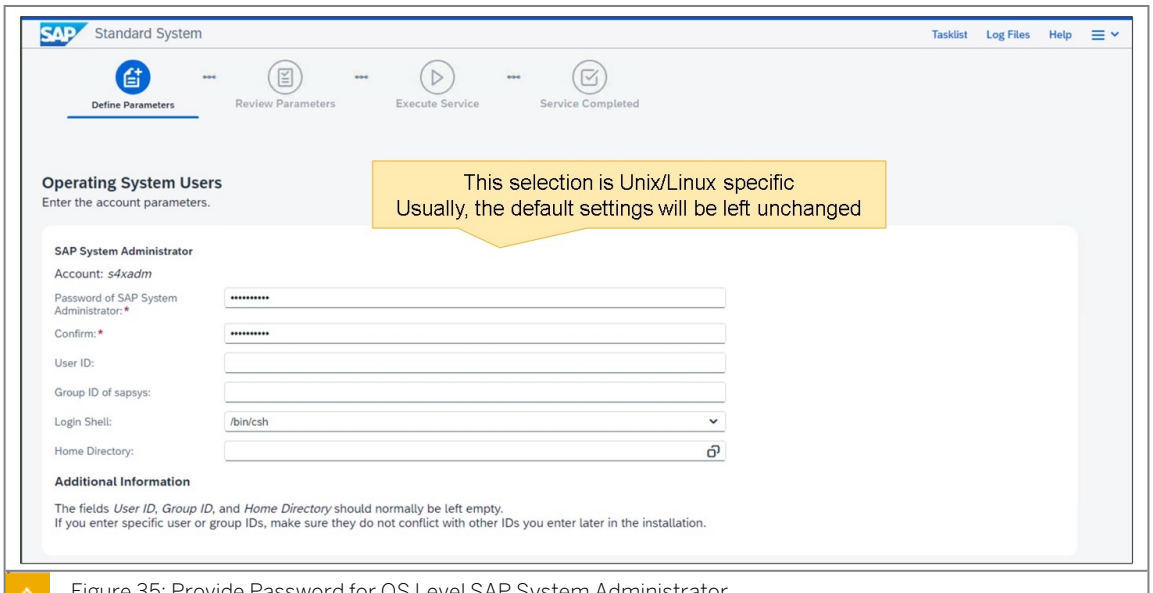

Figure 35: Provide Password for OS Level SAP System Administrator

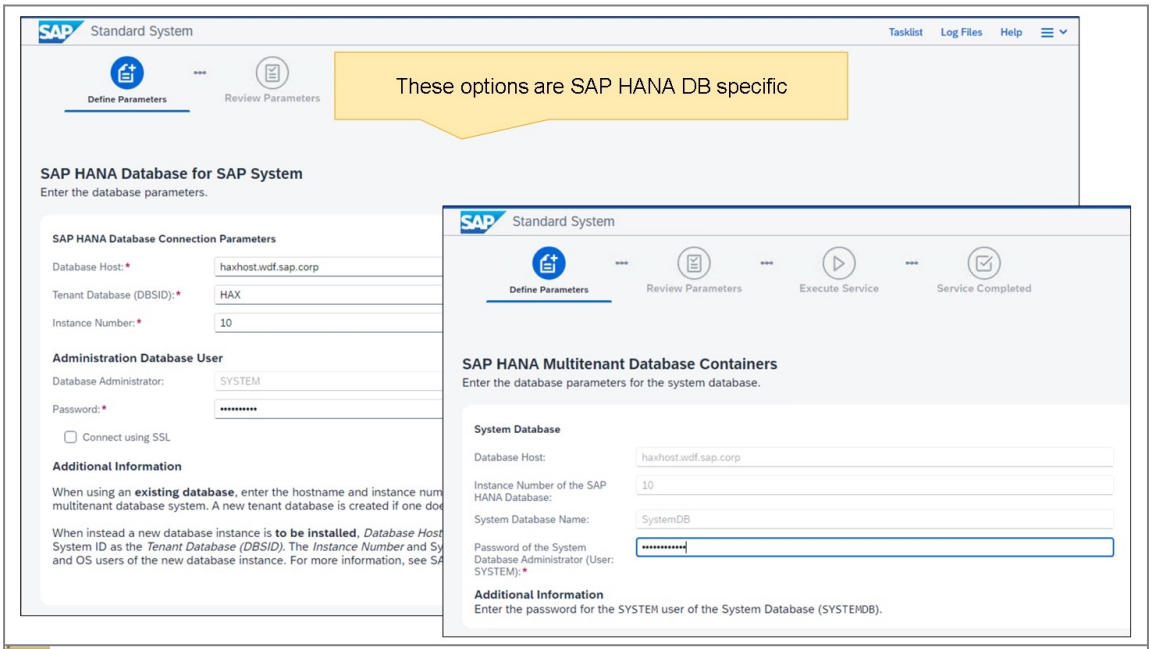

Figure 36: Enter SAP HANA Database Tenant Parameters

The slide above shows a screen asking for information on how to connect to the SAP HANA database this system should be installed upon. You are required to enter the password for the SAP HANA Database Administrator, you already set this password during the installation of the SAP HANA database. The System Administrator from the example above has the name *haxadm* (not shown on slide).

The connection parameters will be checked immediately.

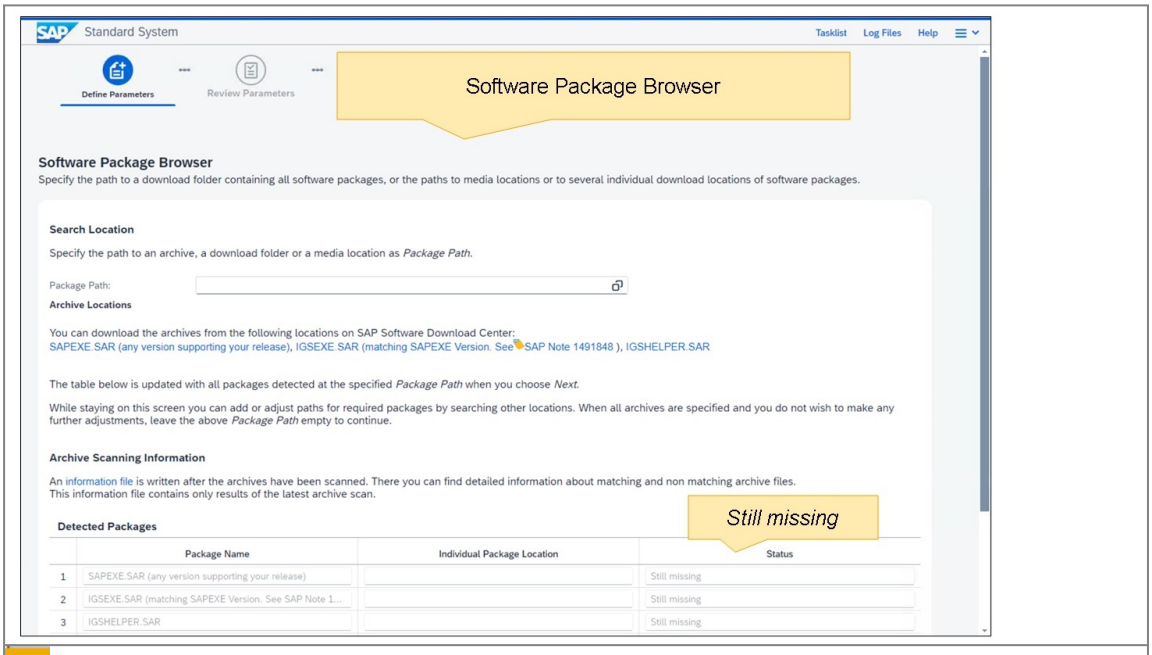

Figure 37: Provide Path to Installation Media

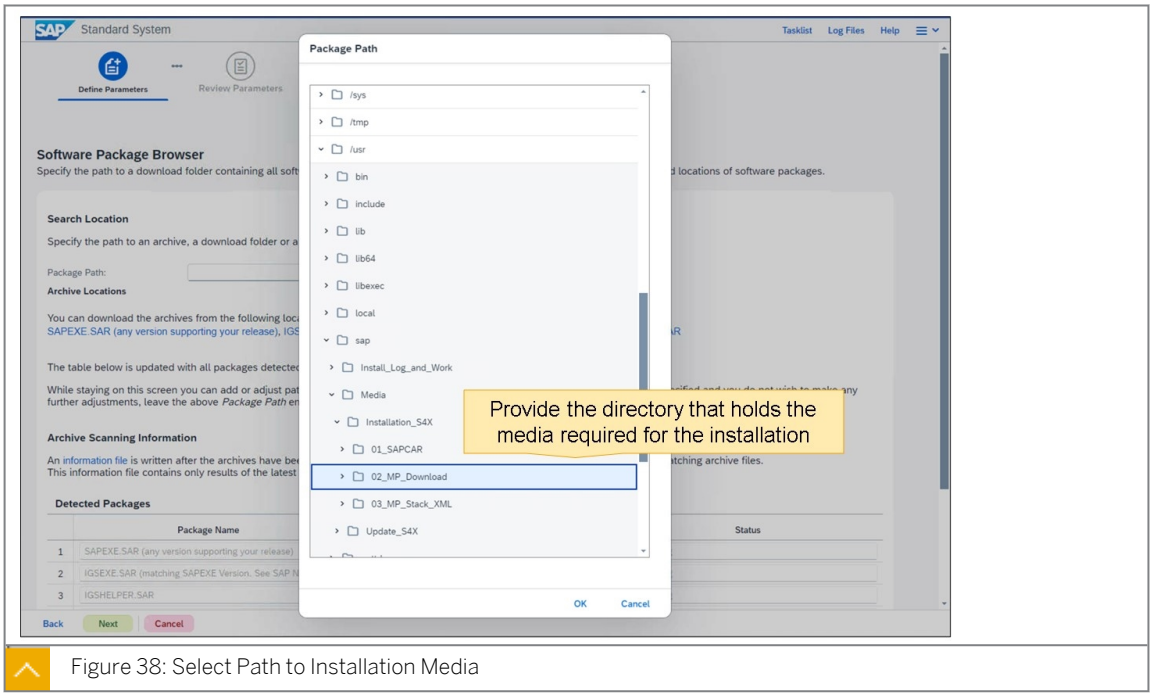

Figure 38: Select Path to Installation Media

The slide above asks you to enter the path to the installation media that should be used throughout the installation process. SAPinst should be able to identify several different installation media stored in the same location. At least the kernel installation is required to be found at that location. Also, you can provide archives (as listed) for kernel components in the same location — they will be used for replacing older kernel components provided by the kernel installation medium.

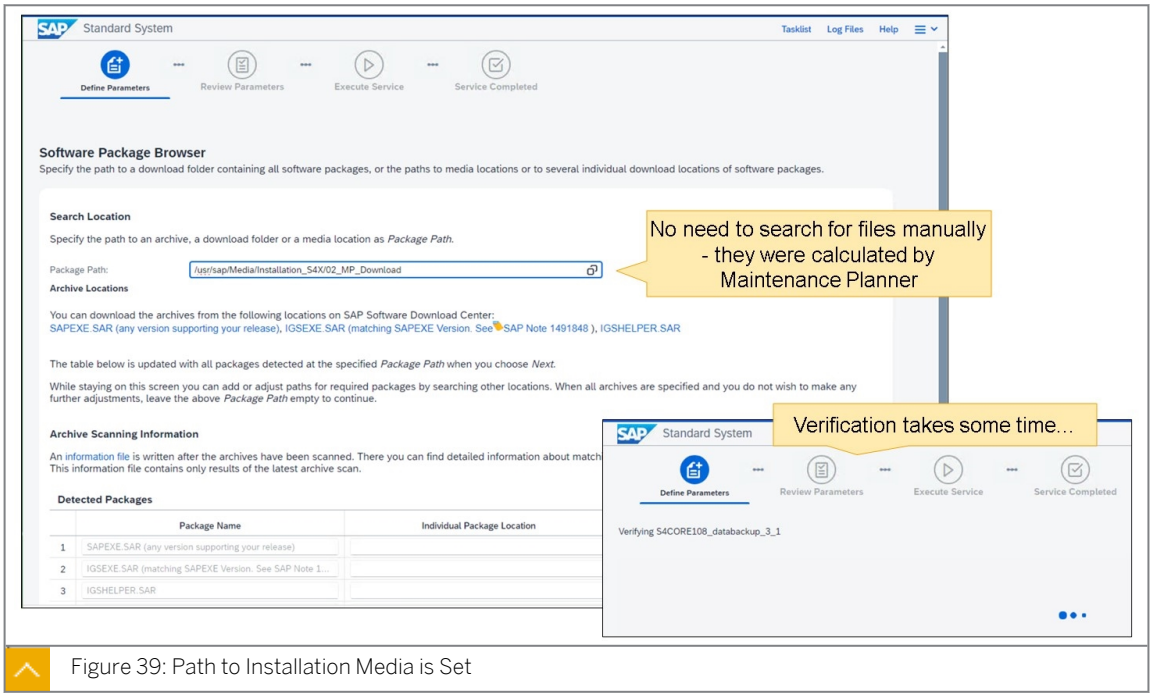

Figure 39: Path to Installation Media is Set

In the slide above, the download directory is provided. After choosing *Next*, this directory will be checked (for required software) and the field *Package Path* will be shown as empty again.

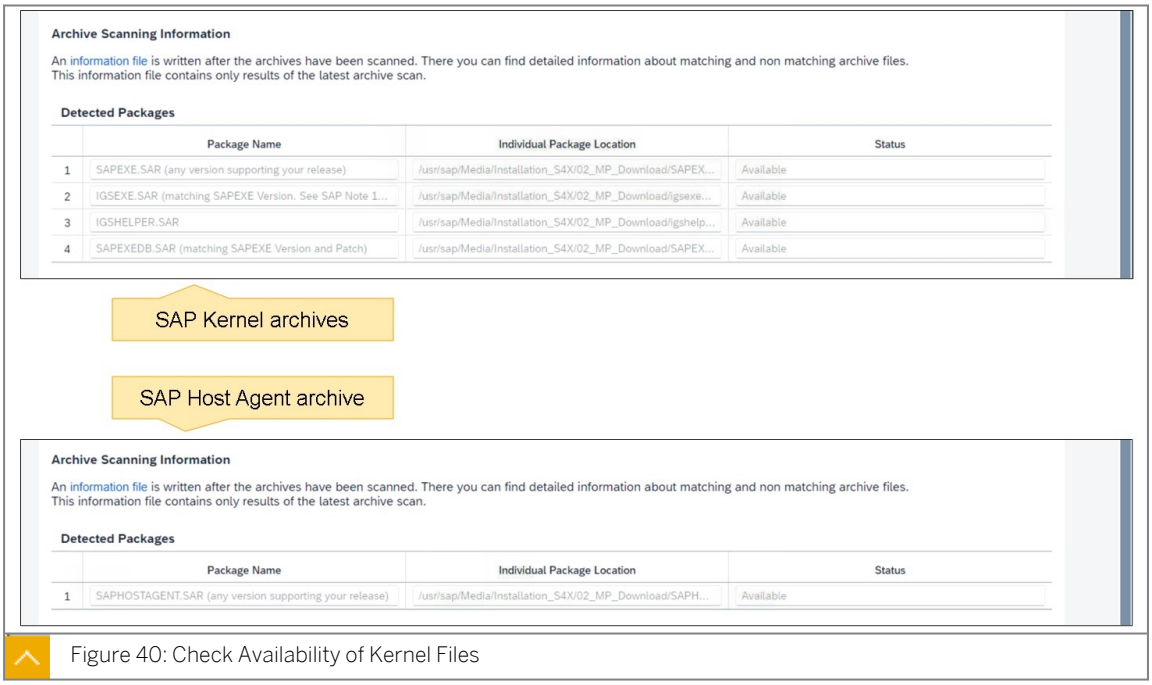

Figure 40: Check Availability of Kernel Files

Please note that this slide (above) won't show the so called *Package Path* anymore, after it has been validated. You can recognize that you provided the correct location by checking the status shown for the kernel components that can (and will) be updated. In case this status is shown as *Available*: everything is fine.

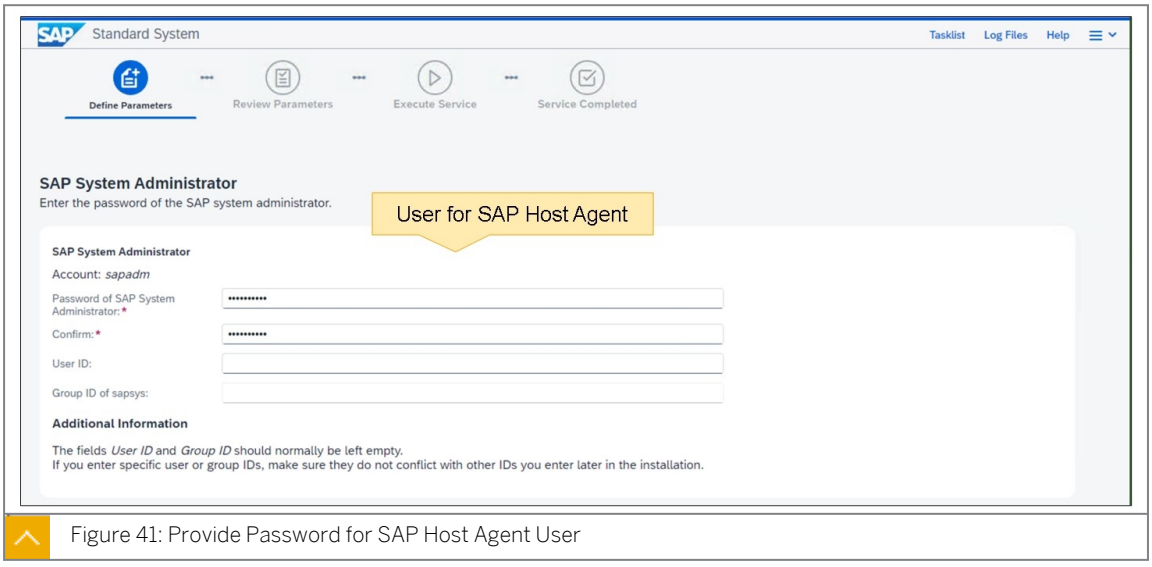

Figure 41: Provide Password for SAP Host Agent User

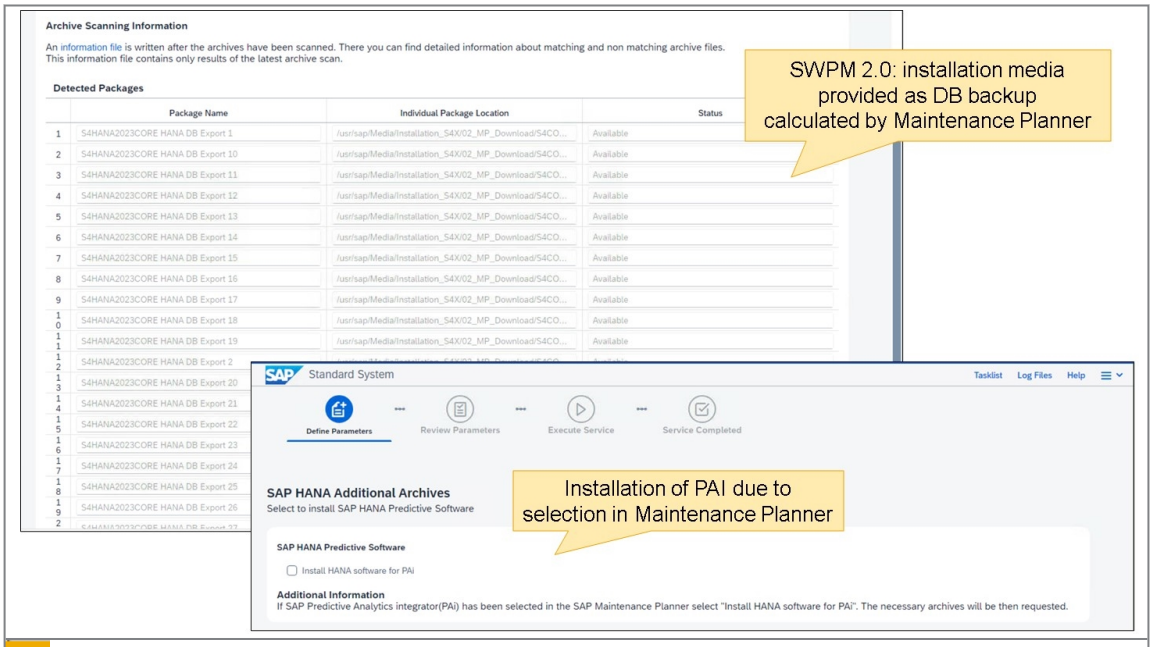

Figure 42: Provide Path to Backup Media and Decide for Installation of PAi

While SWPM 1.0 loads the database of an AS ABAP based SAP system via loading export media, SWPM 2.0 loads the database of an AS ABAP based SAP system via restoring a backup. Both, export media and backup are provided by SAP.

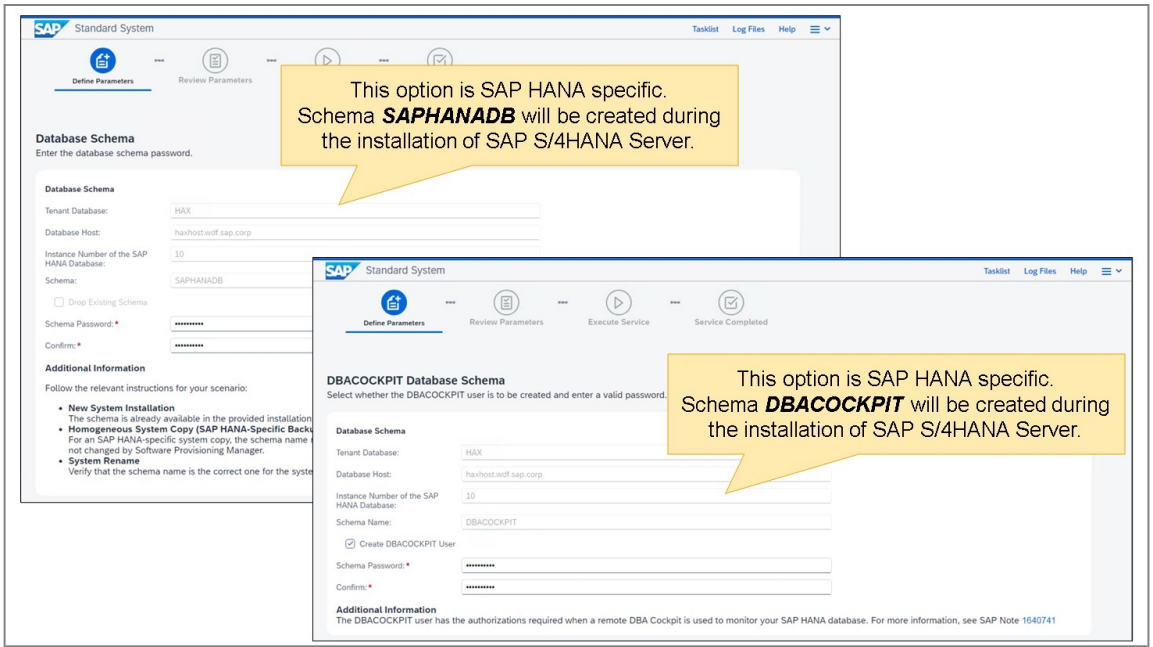

Figure 43: Provide Password for DB Schema User and DB User DBACOCKPIT

The database schema *SAPHANADB* will be created during the installation. To create this schema, the password of the corresponding user is set.

The database schema *DBACOCKPIT* will be created during the installation. To create this schema, the password of the corresponding user is set.

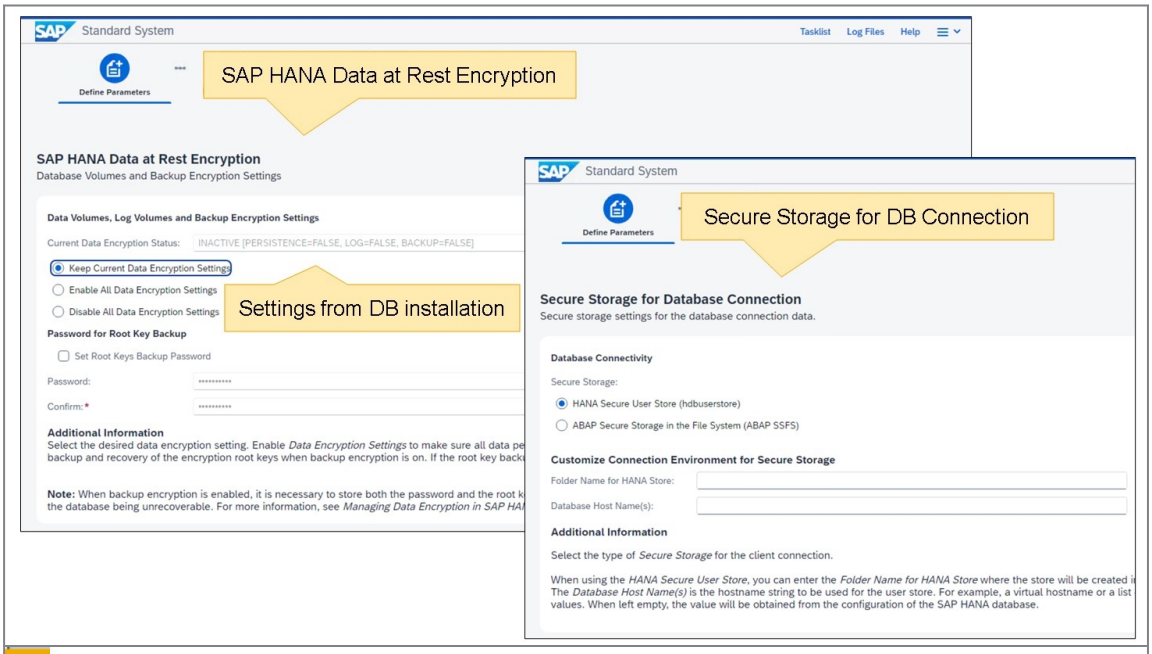

Figure 44: Decide for SAP HANA Data Encryption and Secure Storage

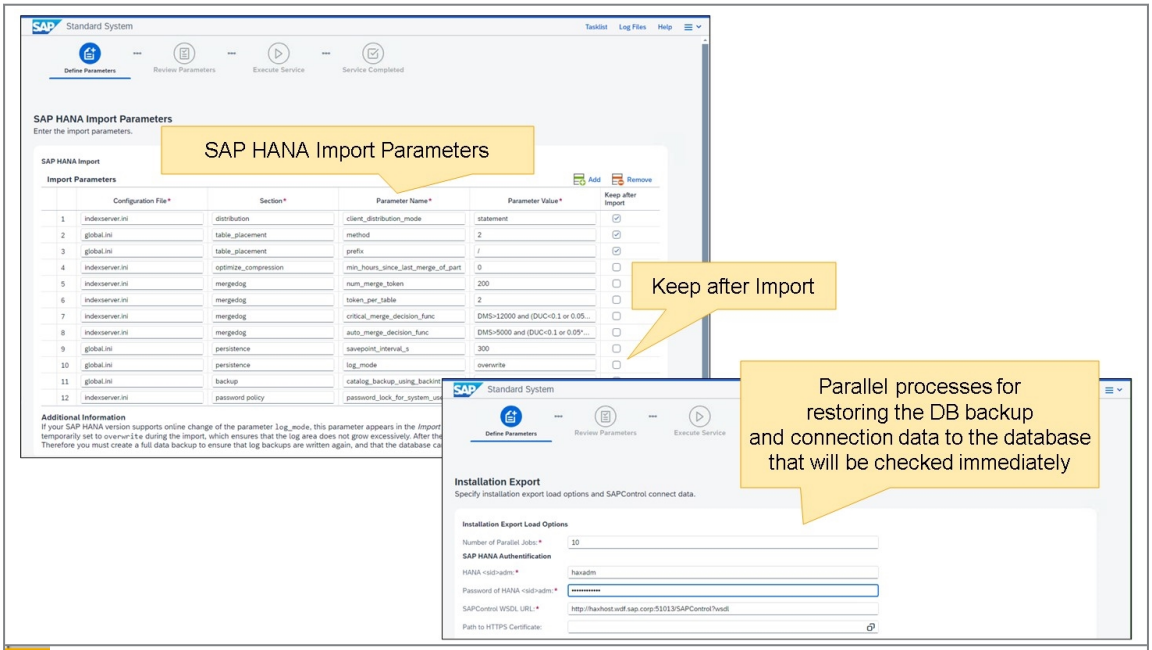

Figure 45: Provide SAP HANA Import Parameters

Leave these import parameters on default, unless you are an expert on SAP HANA DB or a SAP Note recommends to change a value.

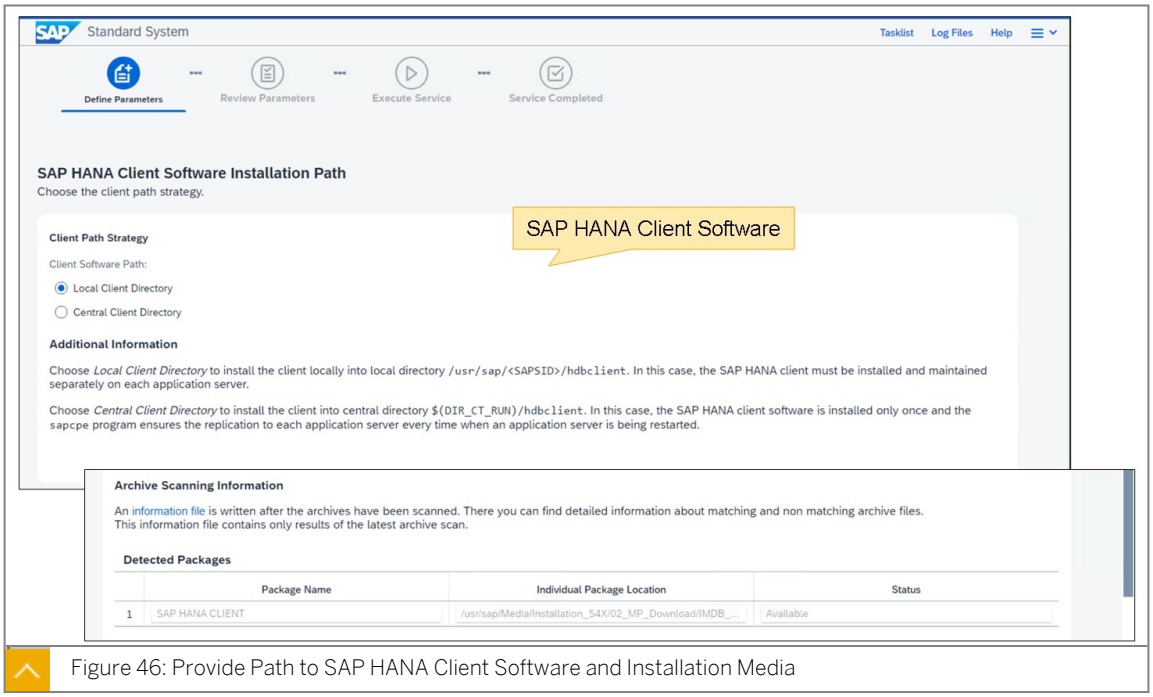

Figure 46: Provide Path to SAP HANA Client Software and Installation Media

Your AS ABAP (which your SAP S/4HANA Server system is using) needs the *SAP HANA Client Software* for being able to connect to the SAP HANA database of this SAP system. Therefore, this client software will be installed by SAPinst. You can define, if a local client software directory should be used. To install the client software, you need to extract the database client software package, as shown above.

Provide the path to the DB client software to SAPinst.

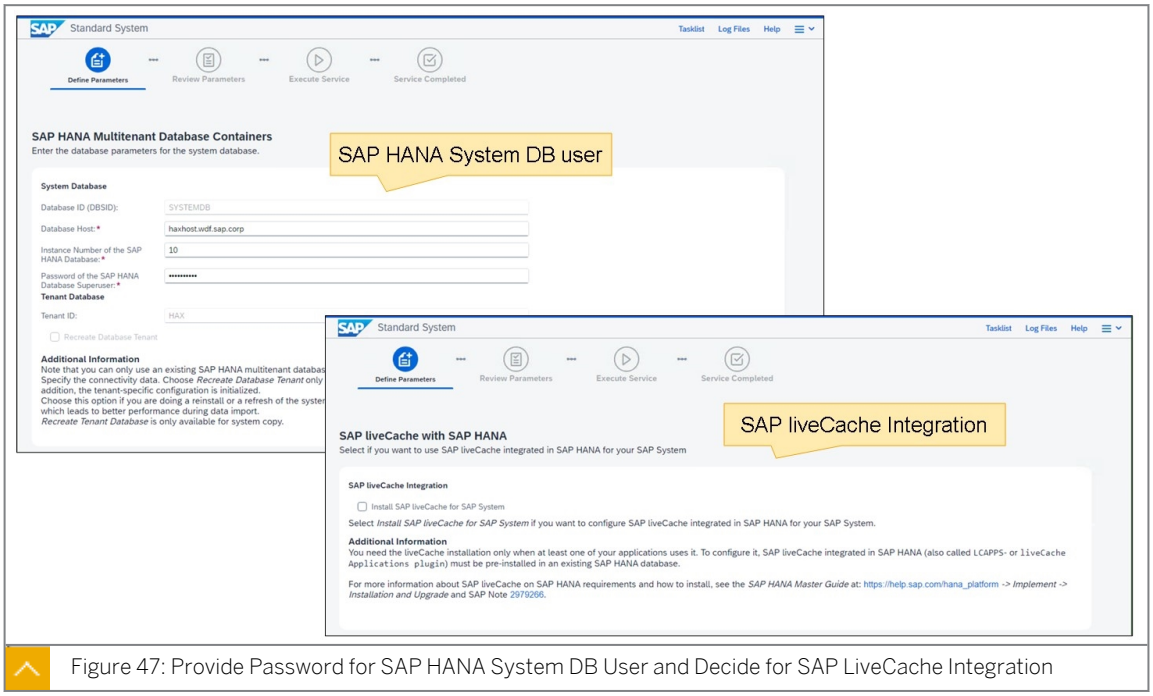

Figure 47: Provide Password for SAP HANA System DB User and Decide for SAP LiveCache Integration

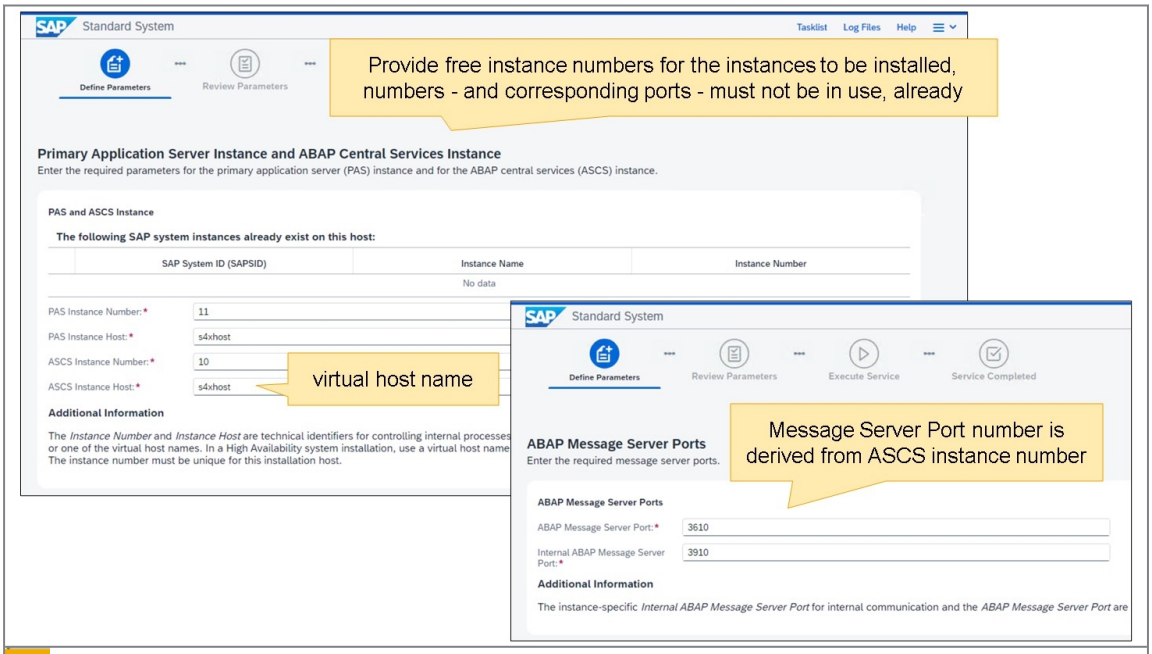

Figure 48: Provide Instance Numbers for PAS and ASCS

The slide above shows the selection screen for setting the instance numbers for the Primary Application Server (PAS) instance and the ABAP Central Services (ASCS) instance of your SAP system. The two-digit instance number needs to be chosen from the numbers between 00 and 97 and they must be unique on an individual host.

The instance number defines several port numbers used for communication by your SAP system. For example, an ABAP dispatcher process communicates via port 32##, where ## signifies the instance number. Therefore, in case any software on your SAP host uses ports in the range of 3200 to 3297 (for example), this need to be taken into consideration. SAPinst can only list ports used by SAP instances - so further restrictions need to be consider by you.

The default values of the ABAP message server port and the internal ABAP message server port are determined by your previous entry for the Central Instance. The port number for the ABAP message server is 36## and the port number for the internal ABAP message server is 39##, where ## is the value that you specified for the ASCS instance. You can choose different port numbers (even outside the 36## and 39## range) if those port numbers are not already in use.

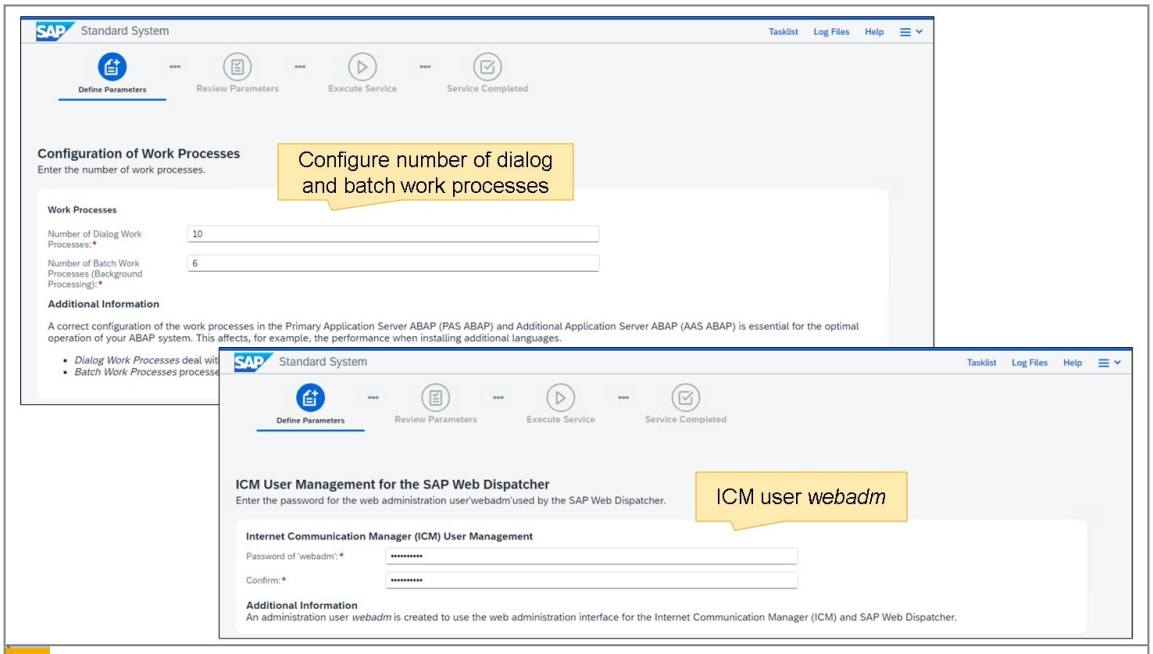

Figure 49: Configure Number of Dialog and Background Work Processes and Provide Password for User webadm

When an installed component offers an Internet Communication Manager (ICM) process then you are prompted to enter a password for the user *webadm*. This user can access administration functions offered by ICM via web interface.

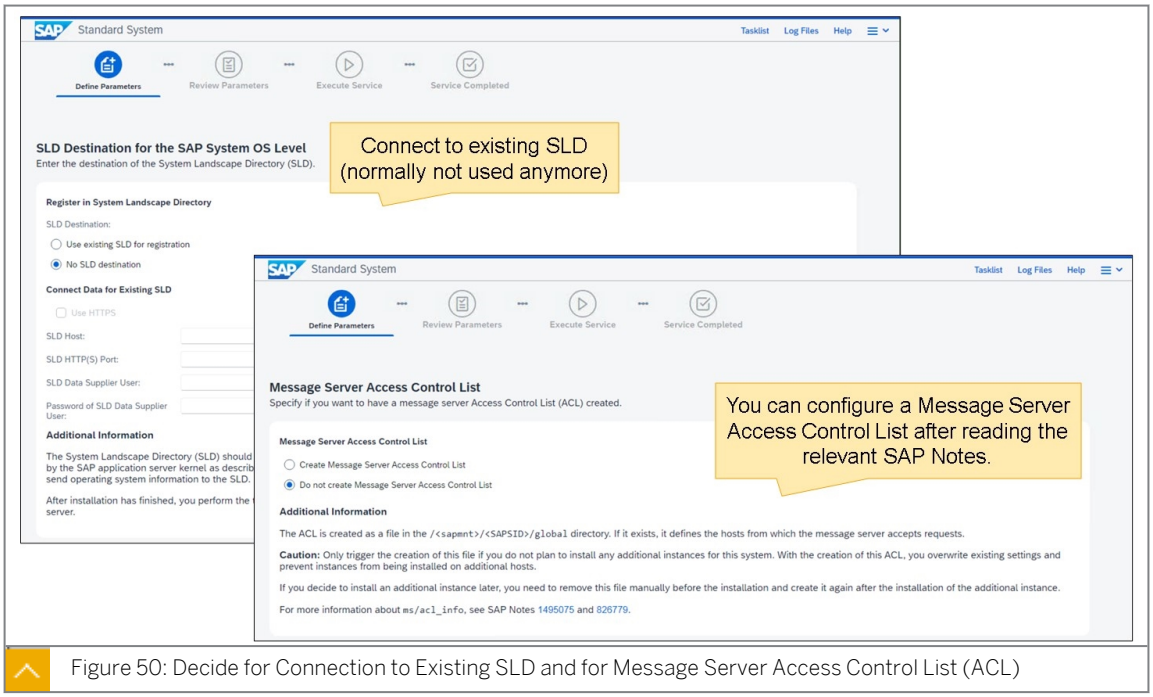

Figure 50: Decide for Connection to Existing SLD and for Message Server Access Control List (ACL)

When installing a new SAP system, you are offered to connect it to an already existing System Landscape Directory (SLD) or to set up this connection at a later time - in which case you choose *No SLD destination* on the slide shown above.

To increase the security of your SAP system, you can create a *Message Server Access Control List* (ACL) that can be used to limit access to the Message Server. In this training, we do not create such an ACL because we would be required to delete it before installing an Additional Application Server. For more information, please read the SAP Notes mentioned by SAPinst.

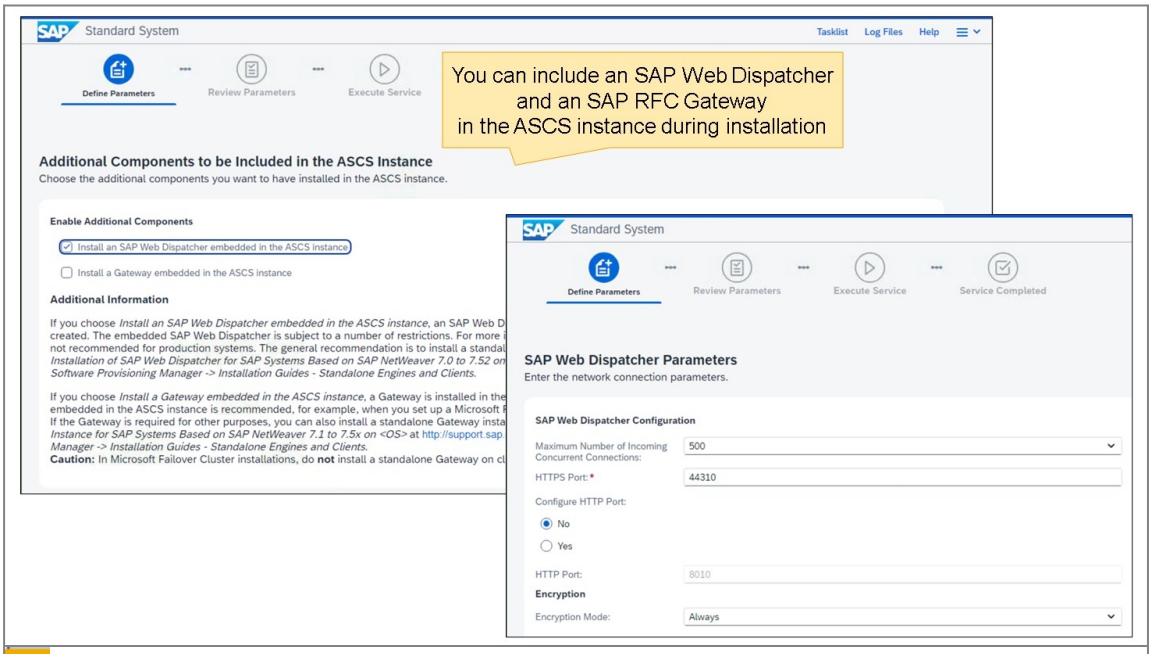

Figure 51: Decide on Additional Components to be Installed integrated in the ASCS

Depending on the version of SAPinst used (contained within the SWPM package) you can choose to install an integrated SAP Web Dispatcher and/or SAP RFC Gateway, that would be part of the ASCS instance.

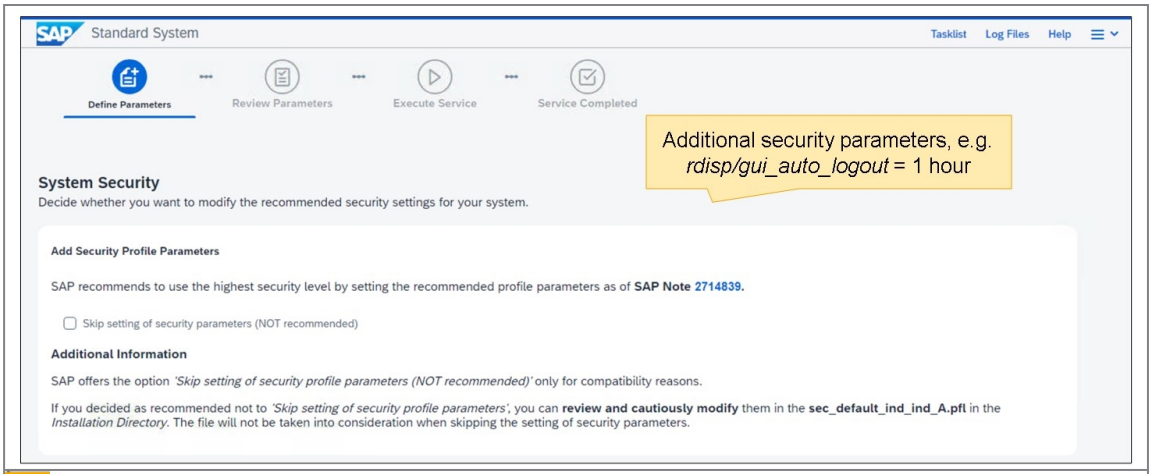

Figure 52: Set Security Profile Parameters

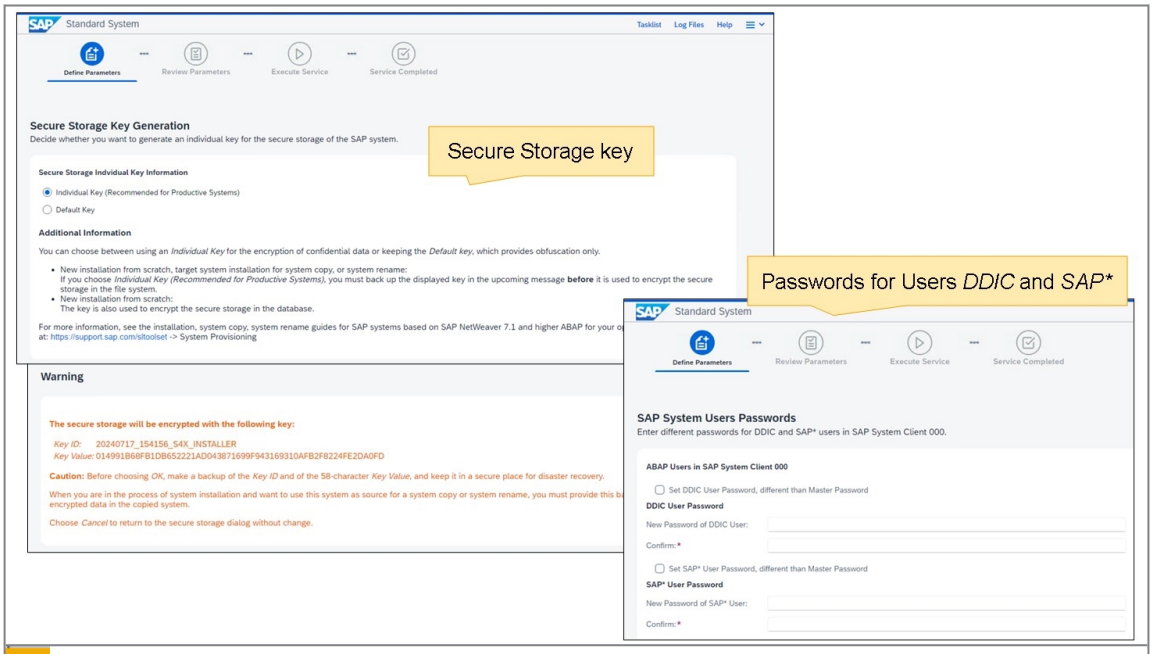

Figure 53: Decide for Secure Storage Key and Alternative Passwords for SAP Users DDIC and SAP* in Client 000

You can enhance the security of your SAP system by generating an individual key for the secure store of SAP system. In case you choose to do so, you need to create a safe copy of the generated key.

Save the information shown in the message box you can see in the slide above. Store this information in a secure place.

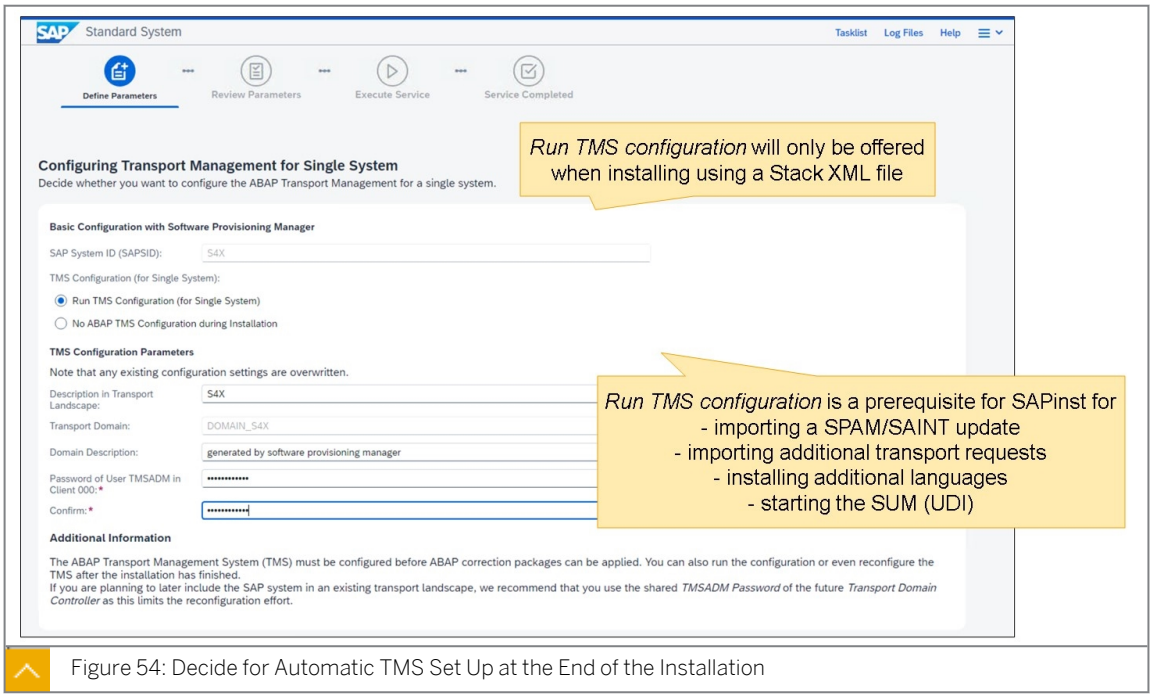

Figure 54: Decide for Automatic TMS Set Up at the End of the Installation

When choosing an automatic TMS set up, SAPinst can import an SPAM/SAINT update and additional languages. German and English will always be part of the installation itself. To be able to choose the automatic TMS set up, SAPinst has to be started with a stack xml file!

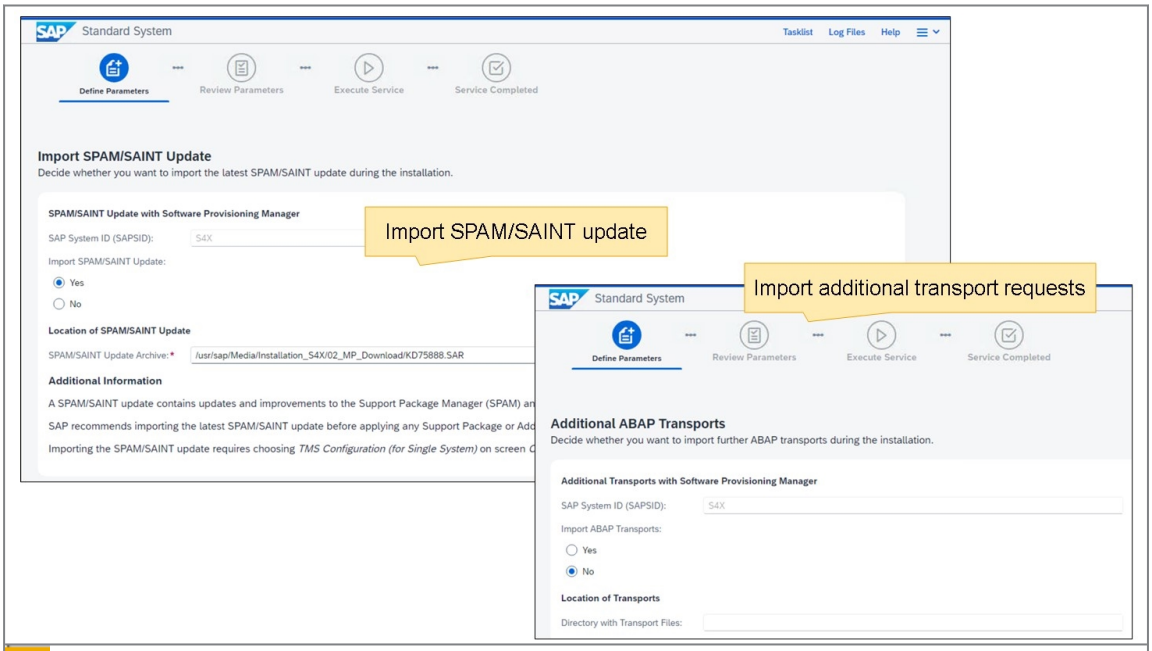

Figure 55: Decide for Import of SPAM/SAINT Update and Additional Transport Requests

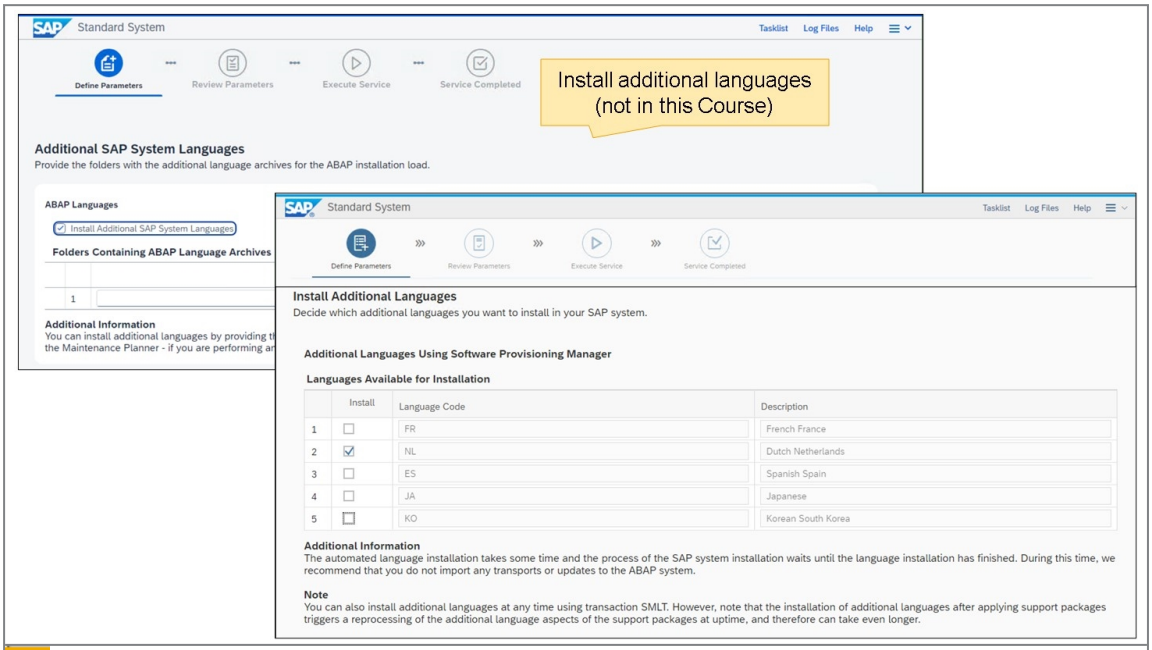

Figure 56: Decide for of Import of Additional Languages

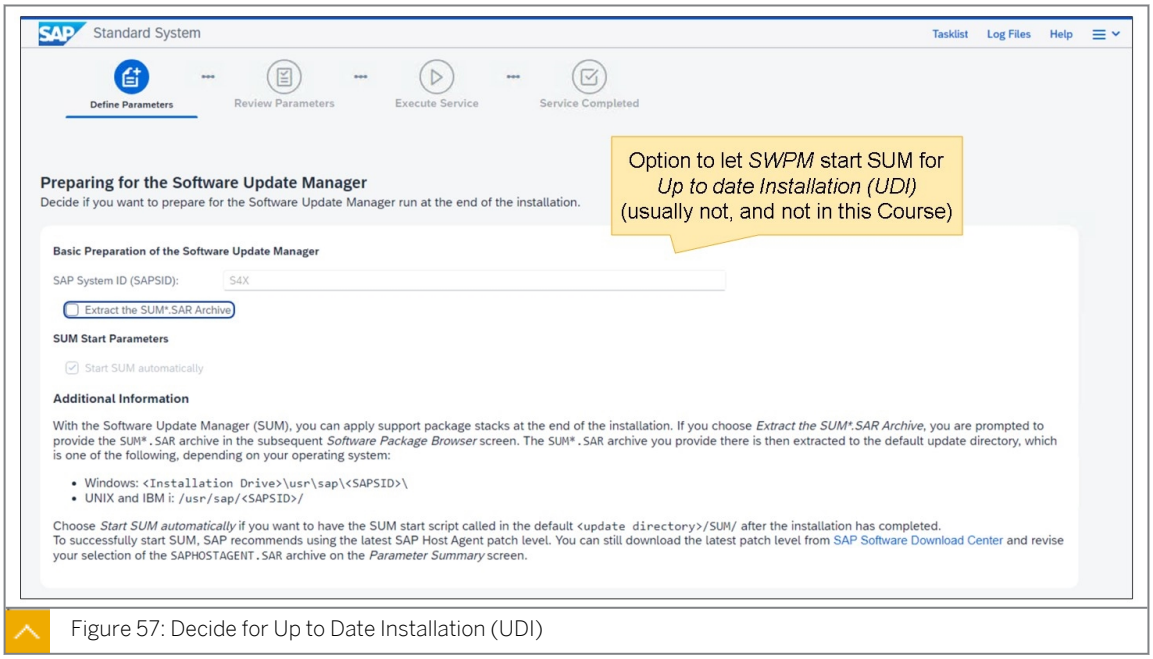

Figure 57: Decide for Up to Date Installation (UDI)

In this course we will unpack and start the SUM manually. So we do not choose the UDI procedure.

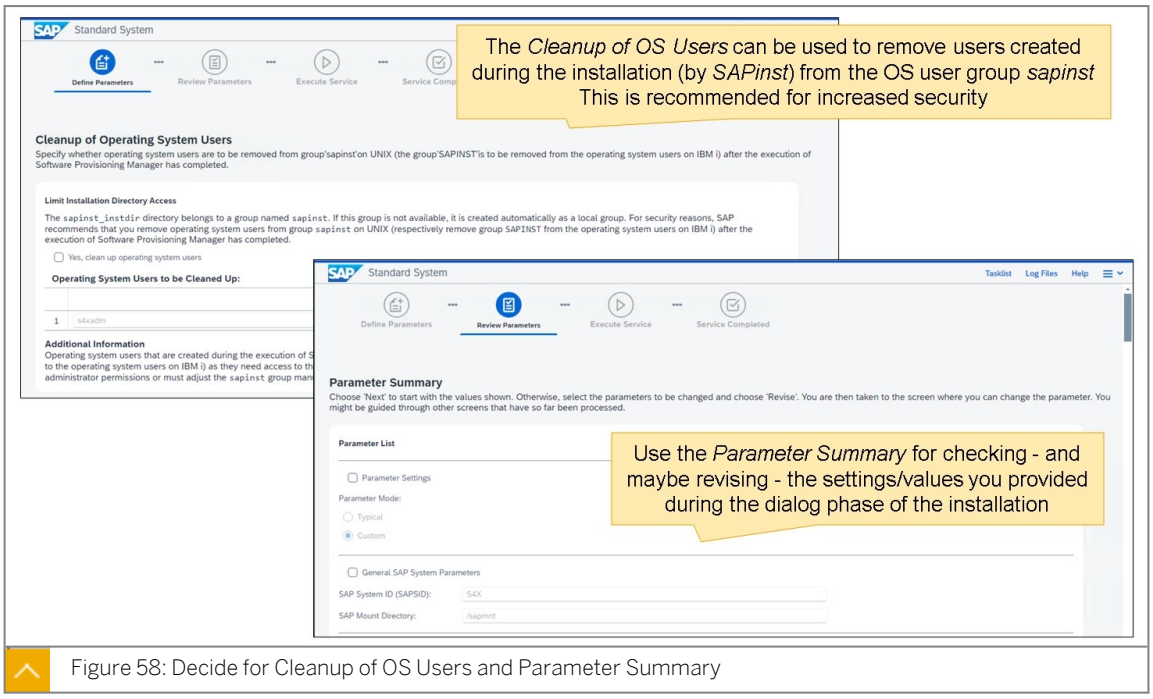

Figure 58: Decide for Cleanup of OS Users and Parameter Summary

You can select to cleanup operating system users after installation, for more information, please see the slide above.

In the *Parameter Summary*, you can select individual parameters and choose to revise them. If you don't select at least one parameter, the button *Revise* will remain grayed out.

When you choose the *Next* button in the screen above, the dialog-free part of the installation process will start. This means, SAPinst will work on the installation until it finishes successfully or encounters a situation that requires your intervention, for example an error situation.

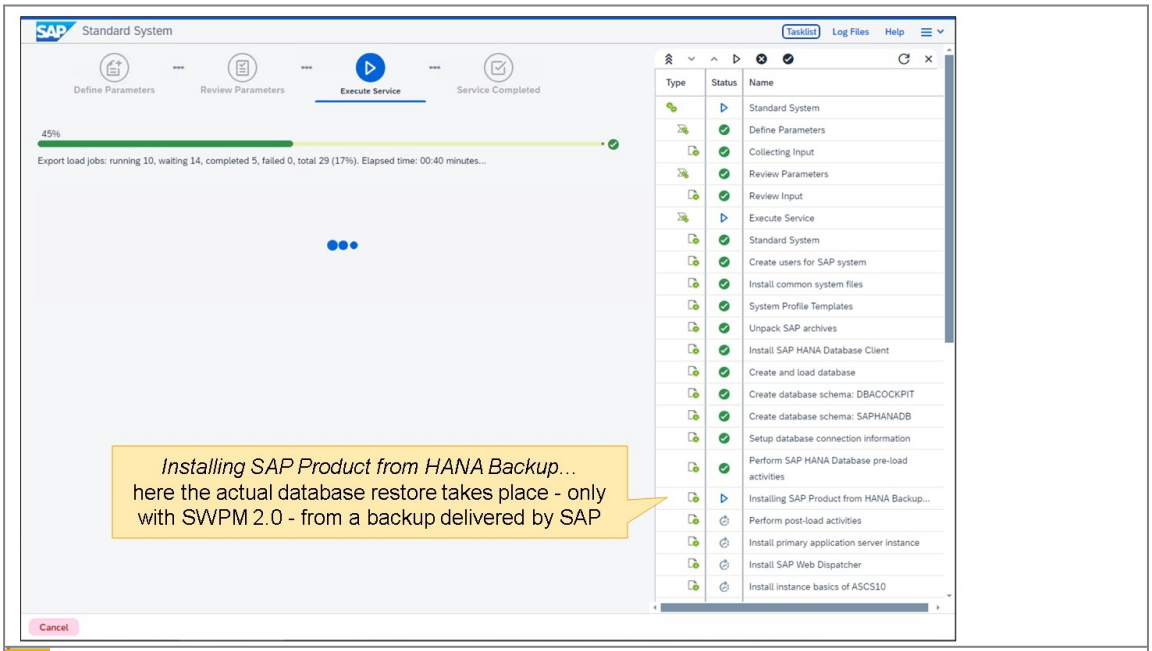

Figure 59: Installation is Running...

Note:
On the slide above you find a long running step during the installation: the phase *Installing SAP Product from HANA Backup...*.

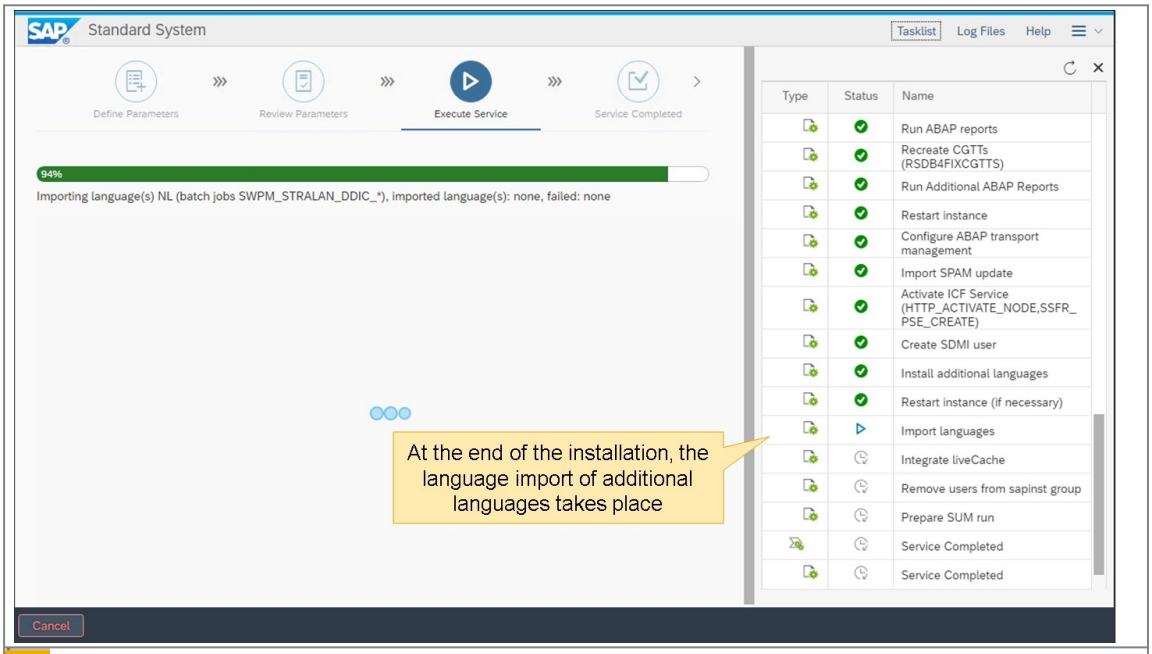

Figure 60: Language Import is Running...

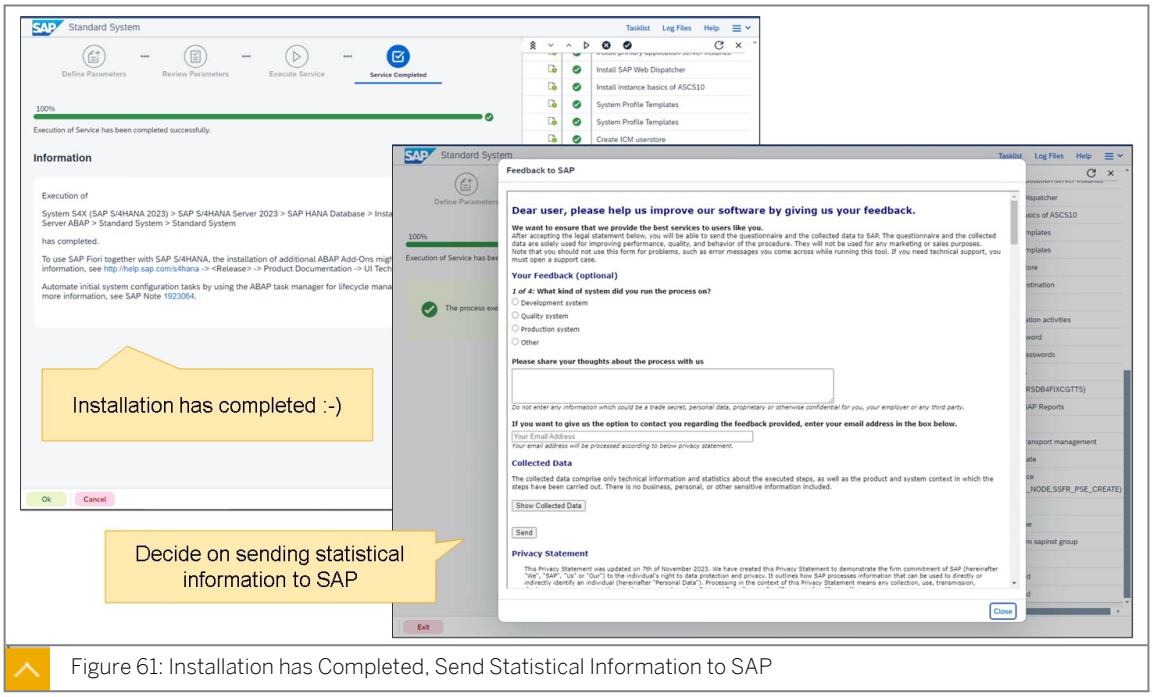

Figure 61: Installation has Completed, Send Statistical Information to SAP

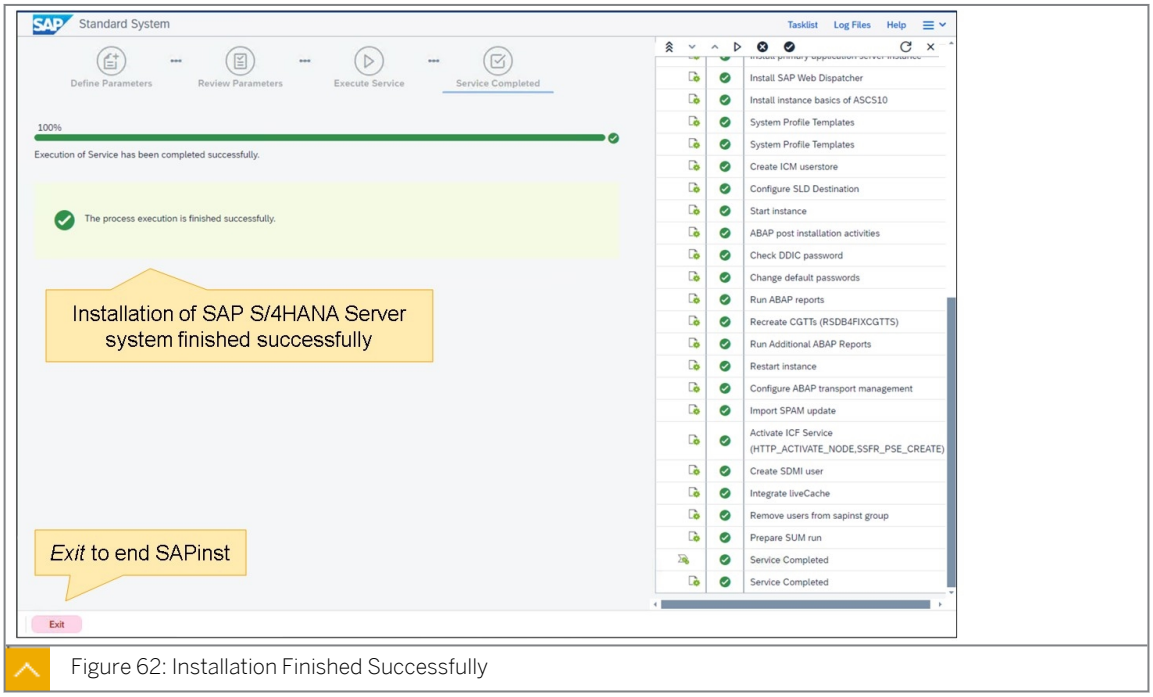

Figure 62: Installation Finished Successfully

Congratulations: The installation of your SAP S/4HANA Server system finished successfully!

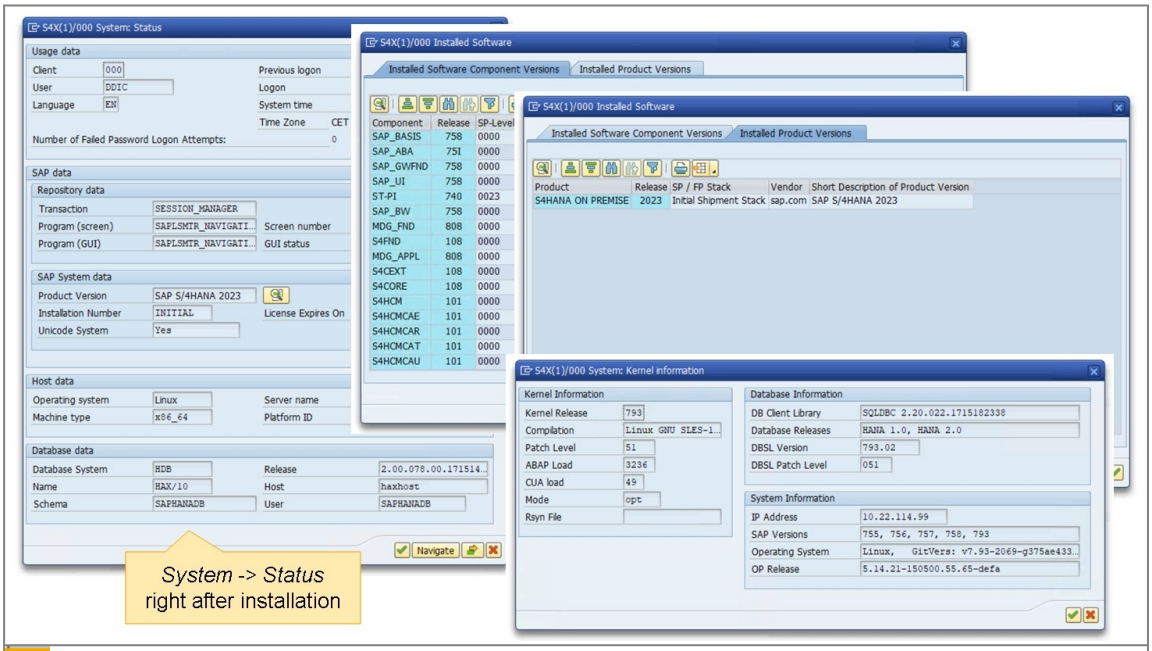

Figure 63: Check the Result

As you can see from the slide above, this newly installed SAP S/4HANA Server 2023 system contains SAP_BASIS 758 with Support Package 00 and S4CORE 108 with Support Package 00). S4CORE replaces the software component SAP_APPL that is part of SAP ECC systems.

On the slide above you also find information on the operating system used (Linux) and the database type and release (SAP HANA DB version 2.0).

LESSON SUMMARY

You should now be able to:

- Install an SAP S/4HANA Server System

Learning Assessment

1. You choose 42 as the instance number for the application server. What will the ABAP dispatcher port be?

   Choose the correct answer.

   - ☐ **A** 3242
   - ☐ **B** 4200
   - ☐ **C** 42

2. When you install an SAP S/4HANA Server system, how do you install the SAP HANA DB?

   Choose the correct answer.

   - ☐ **A** Use a database tool to install the SAP HANA DB before starting SAPinst
   - ☐ **B** Use SAPinst to install the SAP HANA DB before any other SAP system instances
   - ☐ **C** Use SAPinst to install the SAP HANA DB and other SAP system instances in a single run
   - ☐ **D** Use Software Provisioning Manager to install the SAP HANA DB before any other SAP system instances

3. Identify the name of an database schema that will be created during the installation of an SAP S/4HANA Server 2023 system when using SAPinst?

   Choose the correct answer.

   - ☐ **A** SAPSR3
   - ☐ **B** SAPHANADB
   - ☐ **C** SAPSR3758
   - ☐ **D** SAPS4

4. When you use the parameter mode Typical for an installation procedure, this setting will determine some parameter values that can't be changed during the following installation process.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

5. You are installing an SAP S/4HANA Server 2023 system. During this installation you can use any kernel released for this SAP system release.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

Learning Assessment - Answers

1. You choose 42 as the instance number for the application server. What will the ABAP dispatcher port be?

   Choose the correct answer.

   [X] A 3242

   [ ] B 4200

   [ ] C 42

   You are correct! The port for an ABAP dispatcher will be 3242. Read more on this in the lesson Installing an SAP S/4HANA Server system of the course ADM110.

2. When you install an SAP S/4HANA Server system, how do you install the SAP HANA DB?

   Choose the correct answer.

   [X] A Use a database tool to install the SAP HANA DB before starting SAPinst

   [ ] B Use SAPinst to install the SAP HANA DB before any other SAP system instances

   [ ] C Use SAPinst to install the SAP HANA DB and other SAP system instances in a single run

   [ ] D Use Software Provisioning Manager to install the SAP HANA DB before any other SAP system instances

   You are correct! The SAP HANA DB needs to be installed using some database tool before starting SAPinst. Read more on this in the lesson Installing an SAP S/4HANA Server system of the course ADM110.

3. Identify the name of an database schema that will be created during the installation of an SAP S/4HANA Server 2023 system when using SAPinst?

   Choose the correct answer.

   - [ ] A SAPSR3
   - [x] B SAPHANADB
   - [ ] C SAPSR3758
   - [ ] D SAPS4

   You are correct! The database schema SAPHANADB will be created during the installation of SAP S/4HANA Server 2023 system using SAPinst. Read more on this in the lesson Installing an SAP S/4HANA Server system of the course ADM110.

4. When you use the parameter mode Typical for an installation procedure, this setting will determine some parameter values that can't be changed during the following installation process.

   Determine whether this statement is true or false.

   - [ ] True
   - [x] False

   You are correct! The parameter mode Typical allows you to revise every installation parameter before the non-dialog part of the installation will start. Read more on this in the lesson Installing an SAP S/4HANA Server system of the course ADM110.

5. You are installing an SAP S/4HANA Server 2023 system. During this installation you can use any kernel released for this SAP system release.

   Determine whether this statement is true or false.

   - [ ] True
   - [x] False

   You are correct! When installing an SAP S/4HANA Server 2023 system you should always use the kernel, calculated by Maintenance Planner. Read more on this in the lesson Installing an SAP S/4HANA Server System of the course ADM110.

UNIT 3 Installing an SAP Solution Manager ABAP System

Lesson 1

UNIT OBJECTIVES

- Install an SAP Solution Manager ABAP System

Unit 3
Lesson 1

Installing an SAP Solution Manager ABAP System

LESSON OVERVIEW
This lesson explains the installation process of an SAP Solution Manager 7.2 AS ABAP.

Business Example

You need to install the SAP Solution Manager 7.2 AS ABAP system. For this reason, you require the following knowledge:

- An understanding of how to install SAP Solution Manager 7.2 AS ABAP

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Install an SAP Solution Manager ABAP System

Installing SAP Solution Manager ABAP

Installing SAP Solution Manager AS ABAP

SAP Solution Manager 7.2 needs two separate SAP systems to work as designed. One of those SAP systems is AS ABAP-based, the other on is AS Java-based. Both systems need to cooperate closely to offer all functions delivered with SAP Solution Manager 7.2. Therefore, during the installation of the SAP Solution Manager ABAP we will encounter elements that refer to SAP Solution Manager Java, and vice versa.

The SAP Solution Manager ABAP system needs to be installed first. For both SAP systems we will use the database SAP MaxDB, which will be installed by SAPinst.

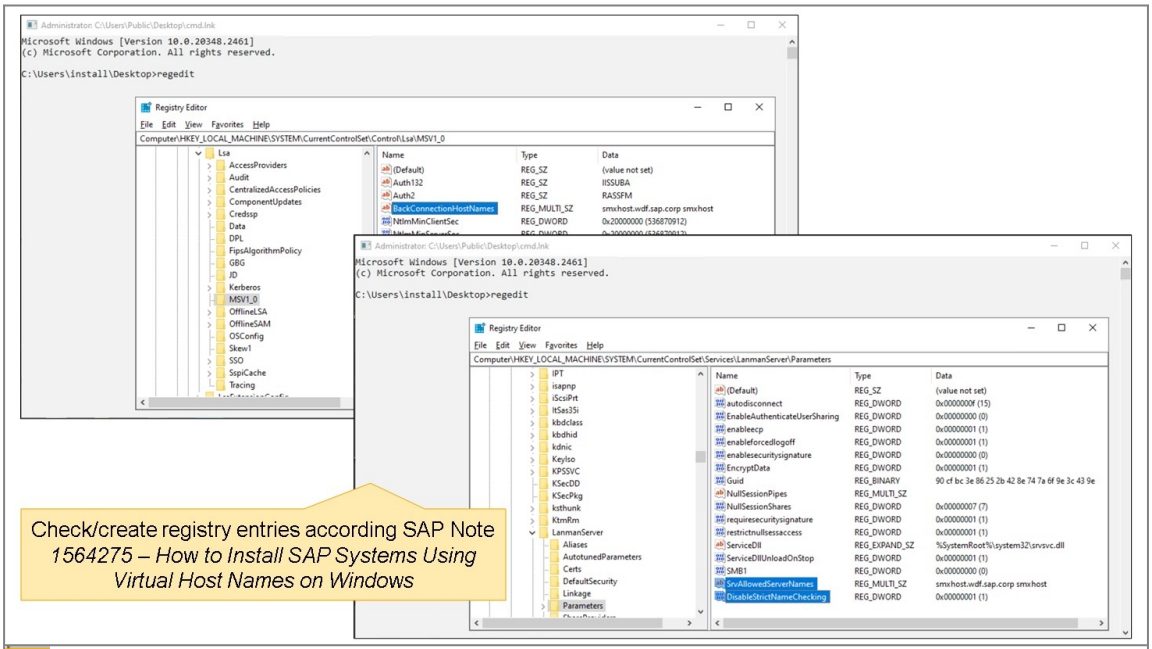

Figure 64: Prepare for Virtual Host Names

For this installation, we make use of the option SAPinst offers to install the SAP system using a virtual host name. On Windows, the usage of virtual host names requires certain preparation steps.

We need to take special care when using virtual host names in our training environment. Aside from other preparation steps (not further detailed here) we need to add a registry key to *Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Lsa\MSV1_0*, named *BackConnectionHostNames* set to the values, in our case: *smxhost.wdf.sap.corp* and *smxhost*. In addition to other steps, this allows us to connect to our training server using the names listed.

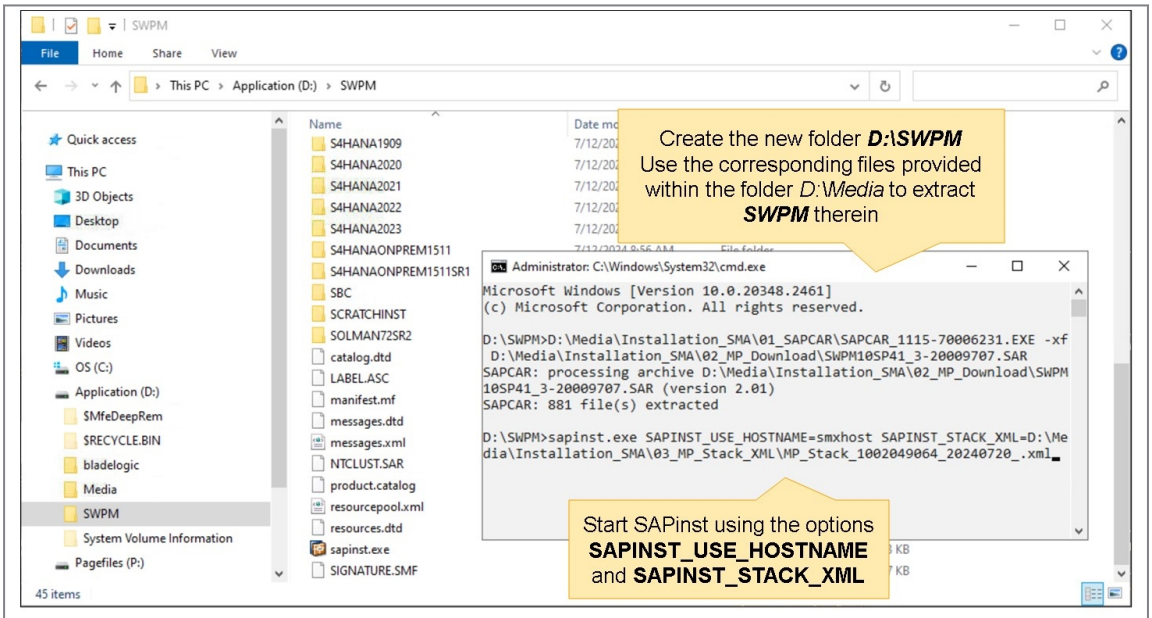

Figure 65: Start SAPinst Using Virtual Host Name

Note:
Please read SAP Note 1564275: **How to Install SAP Systems Using Virtual Host Names on Windows** for further information on the required steps for using virtual host names on Windows.

When preparing the installation, make sure to use the latest version of the tool **Software Provisioning Manager**. Extract the archive file to create a directory that contains the tool **SAPinst**.

SAPinst offers some command line options for being started. We will use the option **SAPINST_USE_HOSTNAME** for installing this SAP system. When using this option you can install your SAP system using **virtual hostnames**.

Note:
Please note, that you will encounter different versions of the tools used in this course. SWPM 1.0 is the tool to install SAP Solution Manager 7.2.

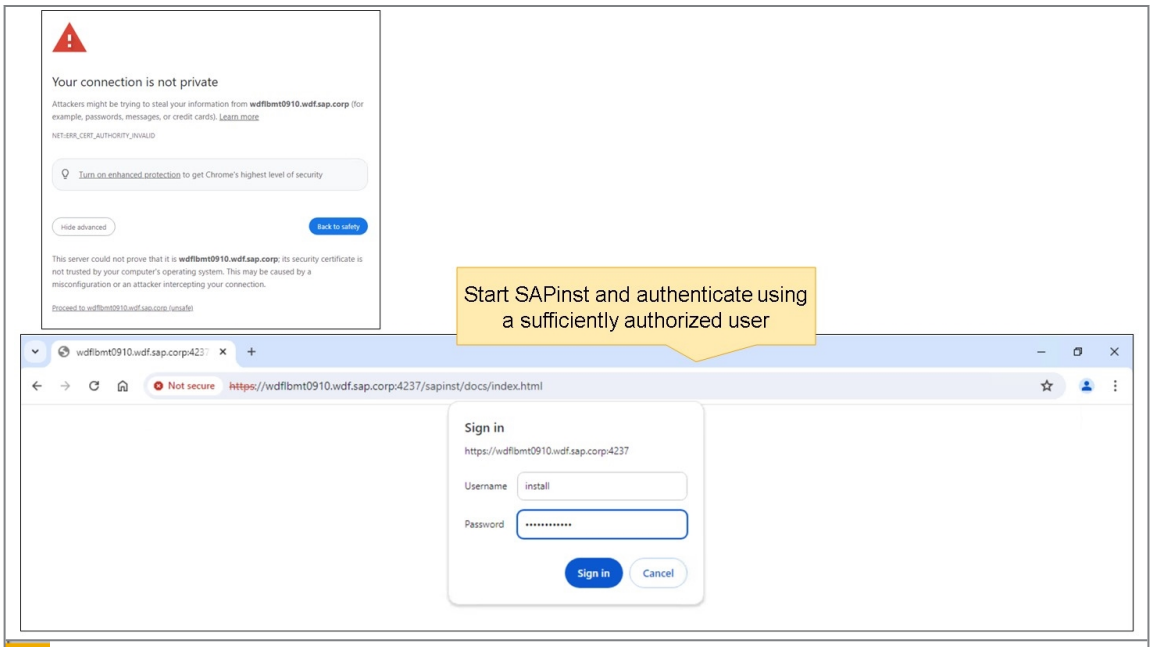

Figure 66: Log on to the UI of SAPinst

As we did not configure SSL communication for SAPinst, the browser will warn about an insecure connection. You need to authenticate with a sufficiently authorized user.

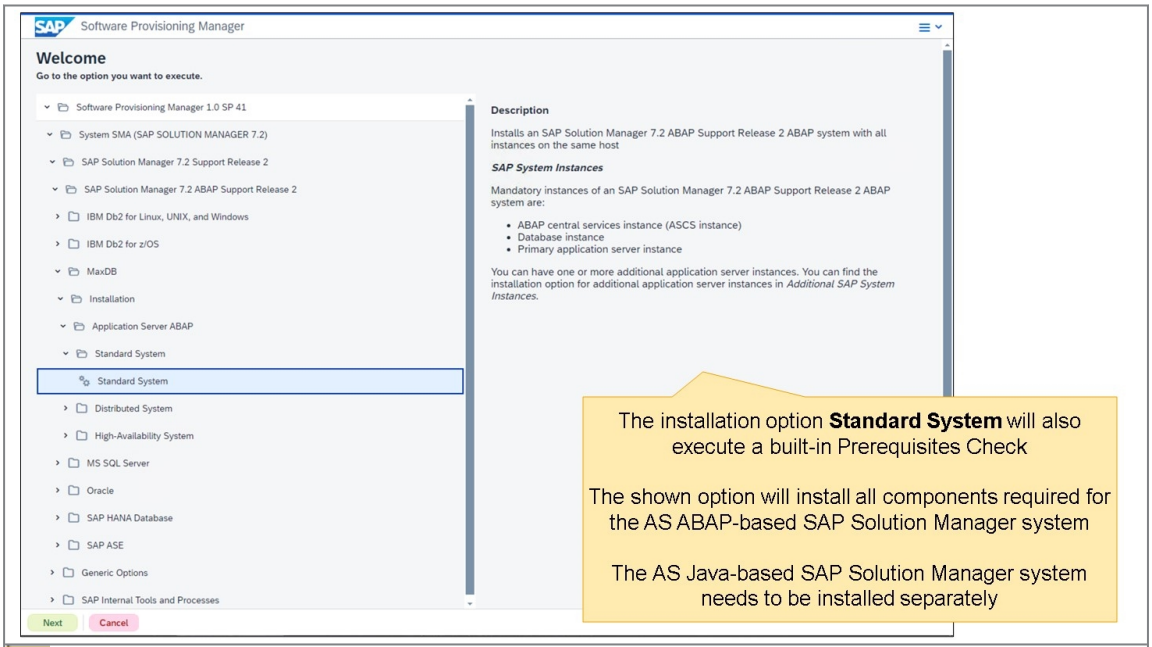

Figure 67: Select the Installation Option

The figure above shows the installation options offered by SWPM 1.0. These options depend on the version of SWPM.

Within SWPM (started by calling the executable *SAPinst*), drill down to the installation that you would like to perform.

The figure above highlights the selection (Standard System) that will install all AS ABAP-based elements of an SAP Solution Manager 7.2 Support Release 2 using the database SAP MaxDB.

Other installation options offer the distribution of components (Database, PAS, ASCS) onto different hosts or provide options for installing an SAP system within a high-availability environment.

After choosing *Next*, you will enter the dialog phase of the installation process, in which you will provide/set many parameters required by the installation process.

Within SAPinst, navigate to the *Prerequisites Check* if you would like to prepare for the actual system installation in advance.

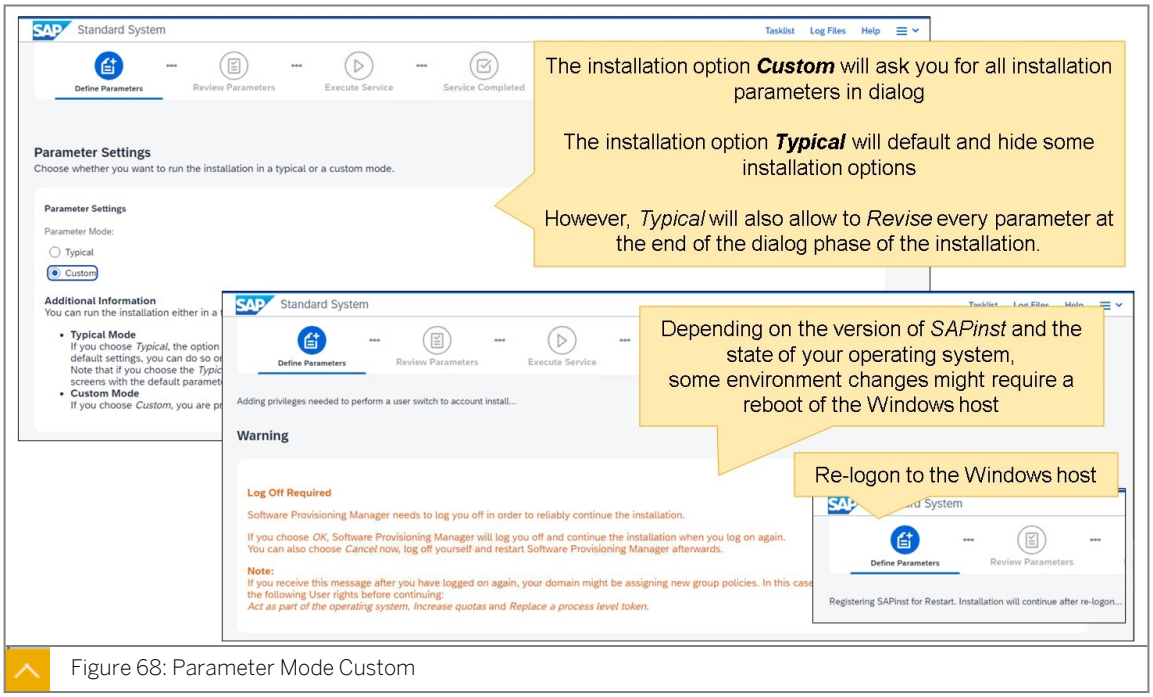

Figure 68: Parameter Mode Custom

The figure above shows the selection of the *parameter mode Custom*. It allows for setting each parameter explicitly; you are guided through each step. Always select *Custom*.

The parameter mode *Typical* presents a reduced set of steps. The final parameter check allows for the revision of each parameter.

In case SAPinst requires the update of certain DLLs a reboot of the server is necessary. Please note, that right after the reboot and logging on to the server, SAPinst will automatically restart and offer to proceed where you left off.

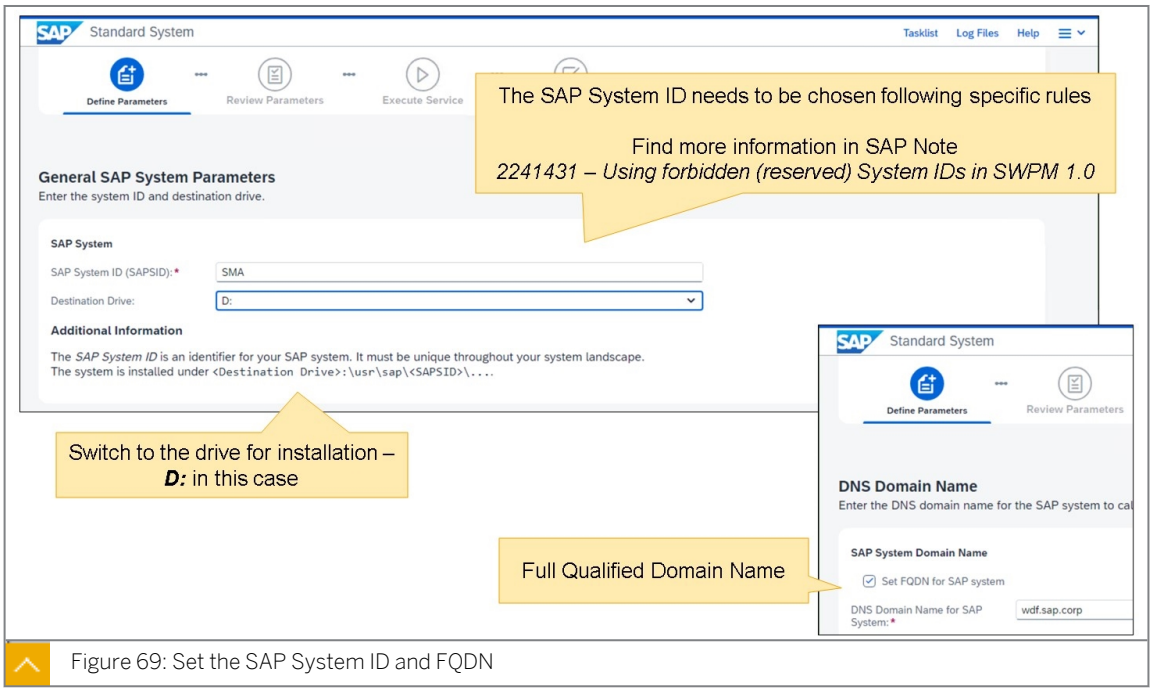

Figure 69: Set the SAP System ID and FQDN

You are prompted for the SAP system ID (SAPSID) that your system should use. Note that some SIDs cannot be used; for example, the SID **`SAP`** is forbidden. The SAP System ID needs

to be chosen following specific rules. Find more information in SAP Note 1979280: *Reserved SAP System Identifiers (SAPSID) with Software Provisioning Manager 1.0*.

Also above, you find another screen asking for the DNS Domain Name for your SAP system. Set the flag for *Full Qualified Domain Name* (FQDN) and provide the domain name to which your SAP system belongs. If you do not provide values here, different functions of your SAP system might not be usable or may require additional work.

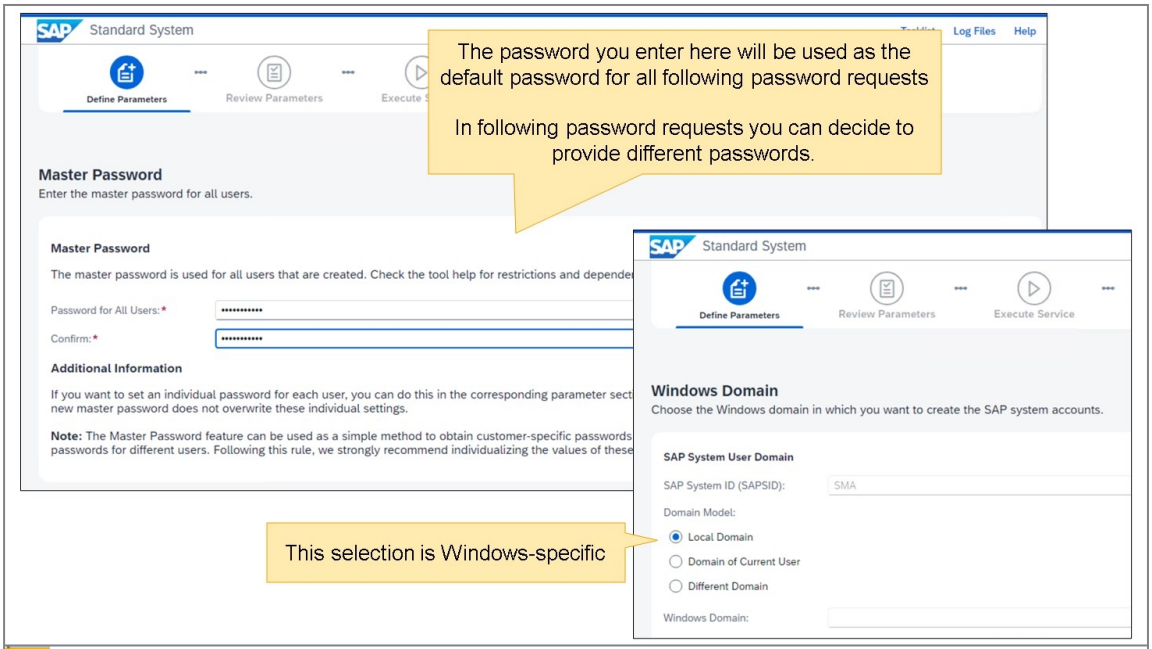

Figure 70: Set the Master Password and Decide on Domain Installation (Windows)

The previous figure is of essential significance. Here you provide the so-called Master Password for this installation. The master password is used for standard users in the SAP system and for users on the operating system and database level, in case the database is installed by SAPinst — which is true for SAP MaxDB (e.g.). SAP recommends that after installation, you set individual passwords for the different users.

On operating system Windows you can decide on the next screen (also shown above) on the Domain Model for this installation. Usually, SAP systems are installed with admin users created on Domain level. In this training environment we select a so-called Local Domain installation.

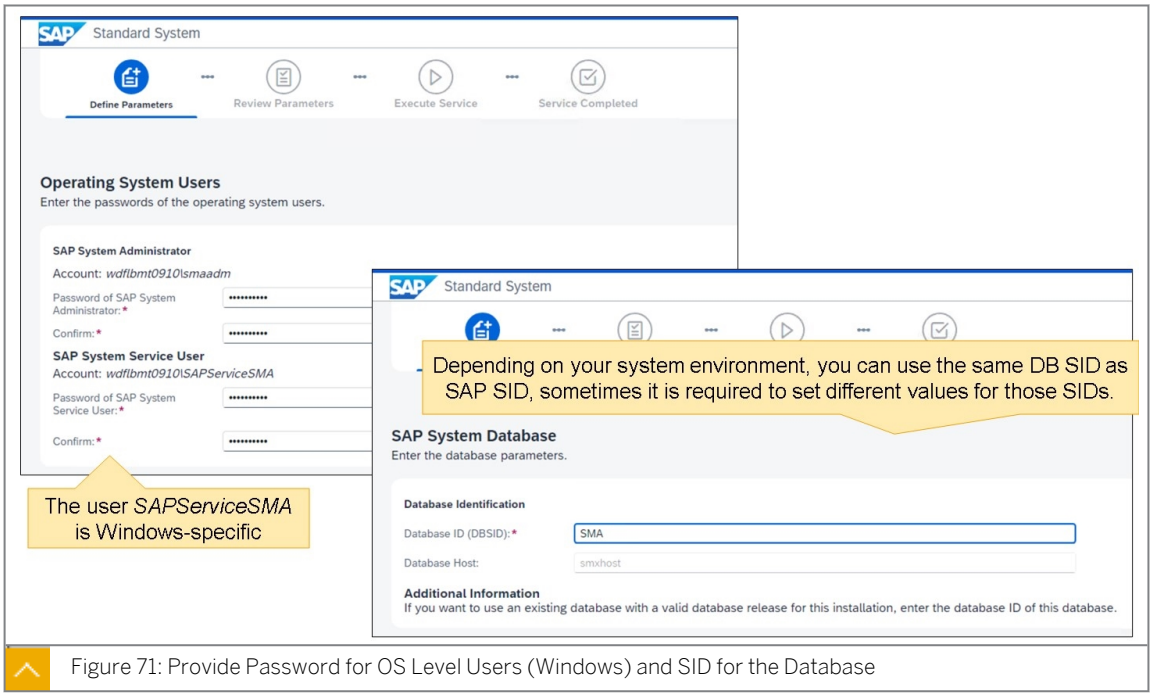

Figure 71: Provide Password for OS Level Users (Windows) and SID for the Database

The figure above shows the setting of the passwords for two users created during installation on Windows OS: <*SID*>*adm* and *SAP Service*<*SID*>. The default for this password is the master password you chose previously. You can specify a different password for these users.

On the lower screen shot in the figure above you find the setting of the SID for the database (DBSID).

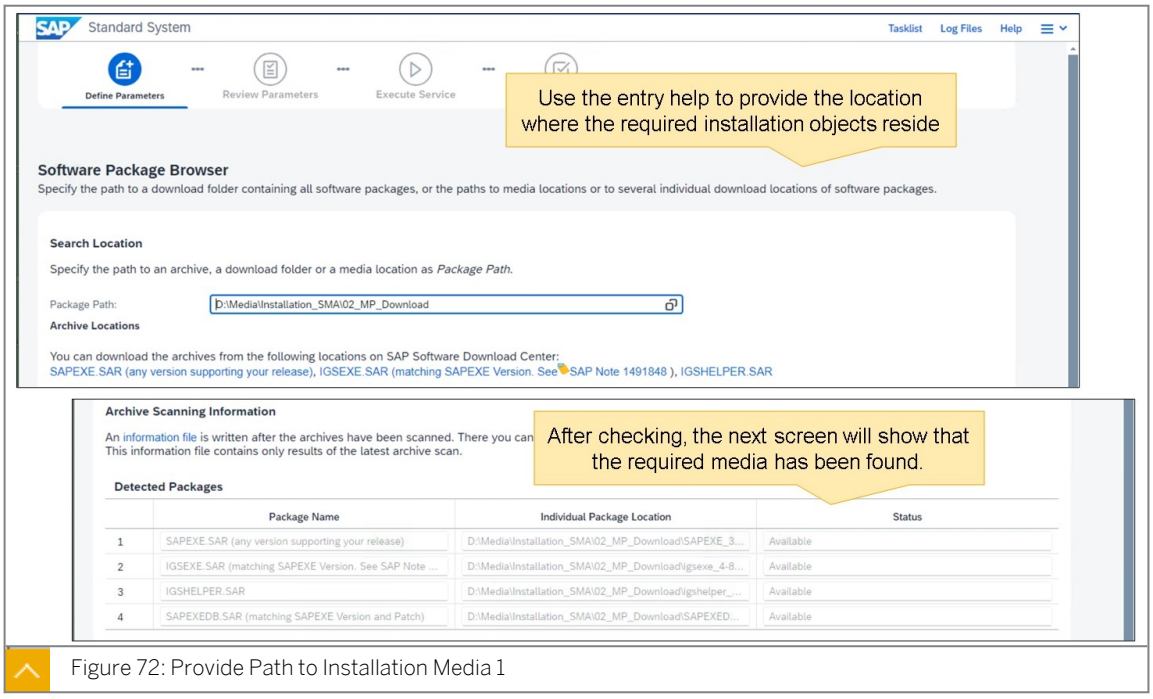

Figure 72: Provide Path to Installation Media 1

The screen above asks you to enter the path to the installation media that should be used throughout the installation process. Theoretically, SAPinst should be able to identify several different installation media stored in the same location. At least the kernel installation is required to be found at that location. Also, you are required to provide archives (as listed) for kernel components in the same location.

The media directory shown in the figure above contains several installation media required during the installation as well as kernel packages.

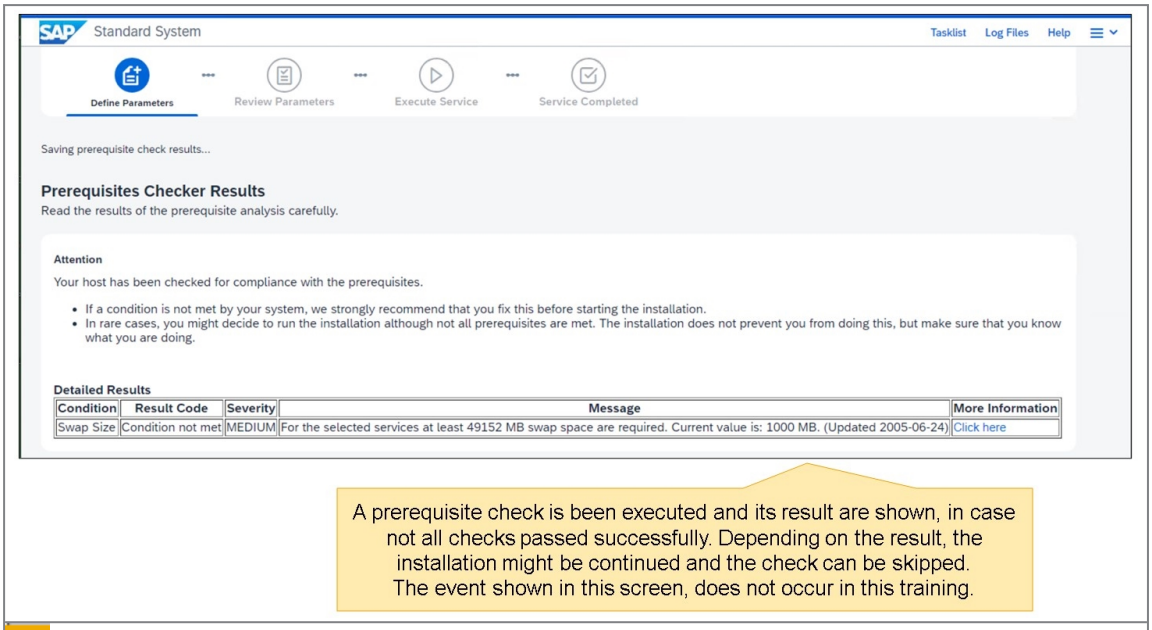

Figure 73: Review Results of Prerequisite Check

A Prerequisite Check is always executed, its results shown. Sometimes you can skip/ignore the results of the Prerequisite Check.

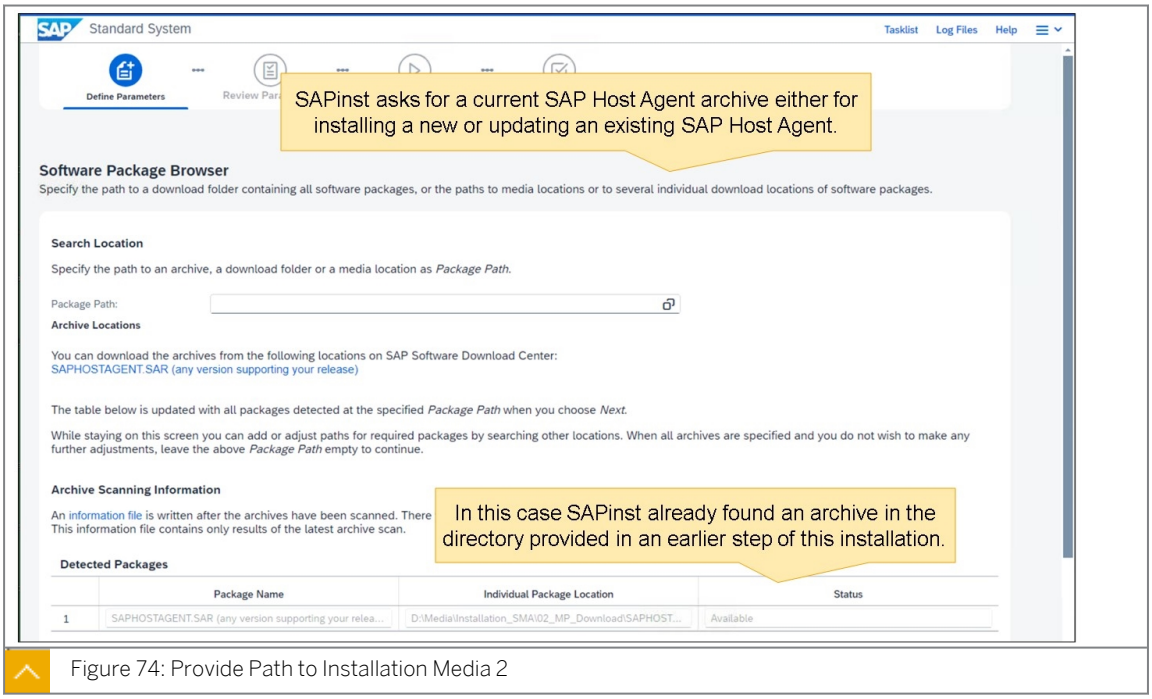

Figure 74: Provide Path to Installation Media 2

Provide the installation archive for SAP Host Agent, unless the archive had already been found as shown above.

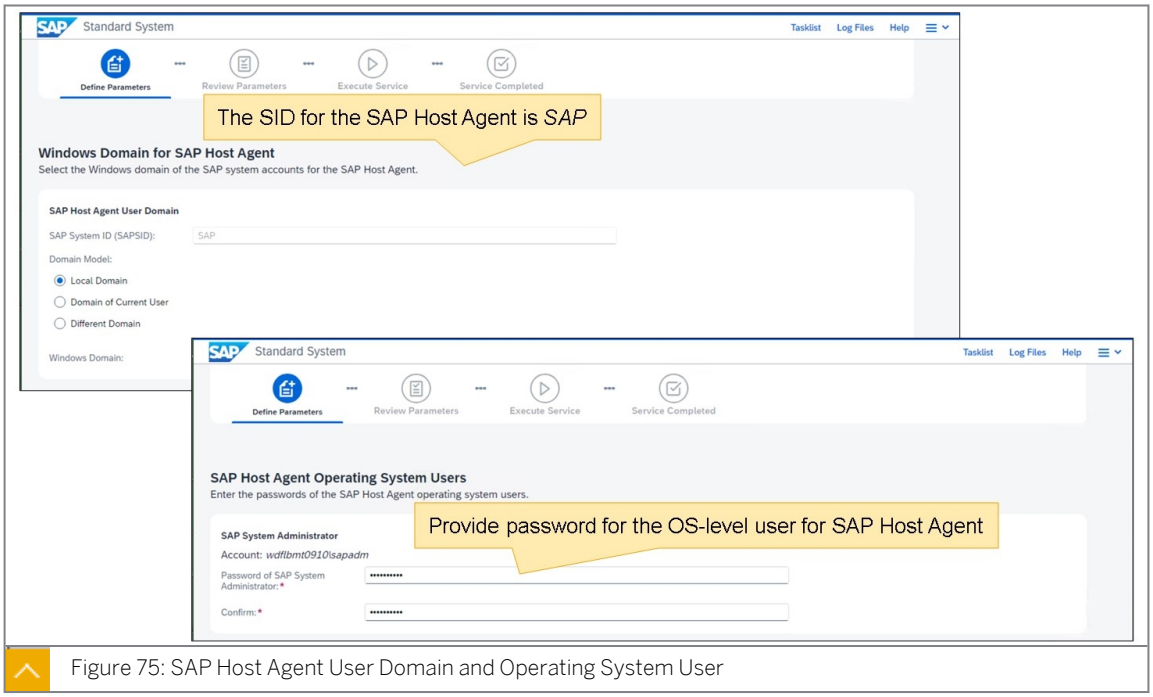

Figure 75: SAP Host Agent User Domain and Operating System User

SAP Host Agent will receive an own SAPSID, default *SAP*. SAP Host Agent also requires an OS-level user, here *sapadm*.

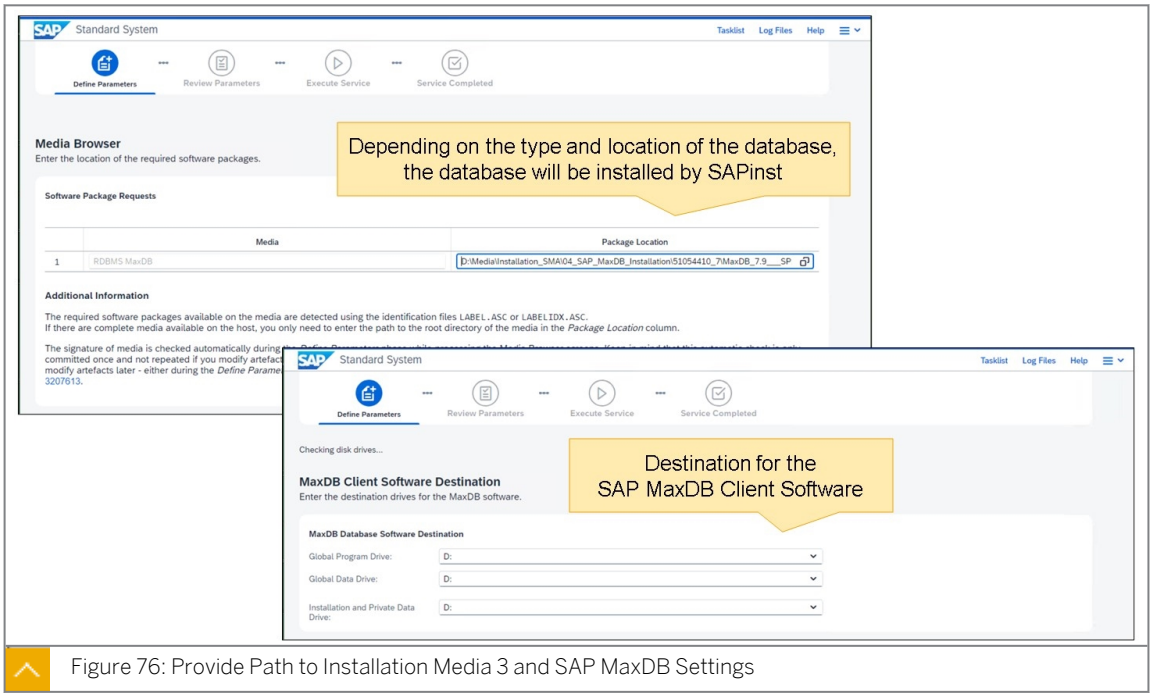

Figure 76: Provide Path to Installation Media 3 and SAP MaxDB Settings

Also provide the path to the installation media used for the database installation during SAPinst, in this case SAP MaxDB and set the destination drive for the SAP MaxDB Client Software.

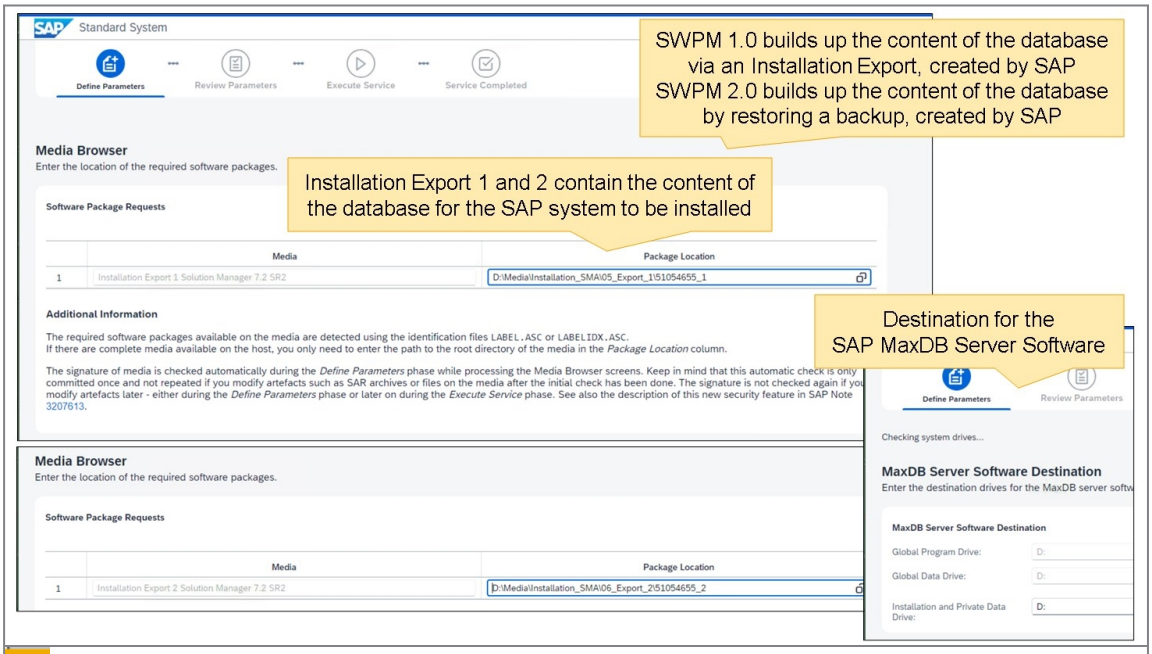

Figure 77: Provide Path to Installation Media 4, Installation Export 1 and 2

Provide the path to the Installation Export 1 and 2 packages and set the destination drive for the SAP MaxDB Server Software.

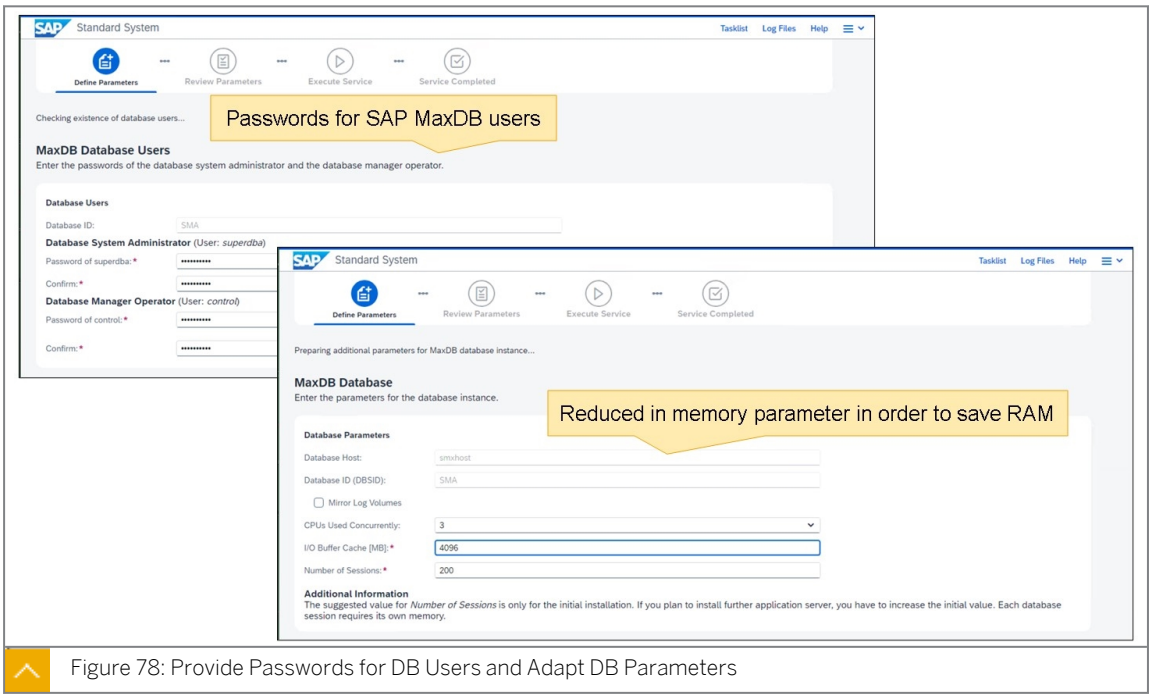

Figure 78: Provide Passwords for DB Users and Adapt DB Parameters

Confirm or change the (master) password for important database users.

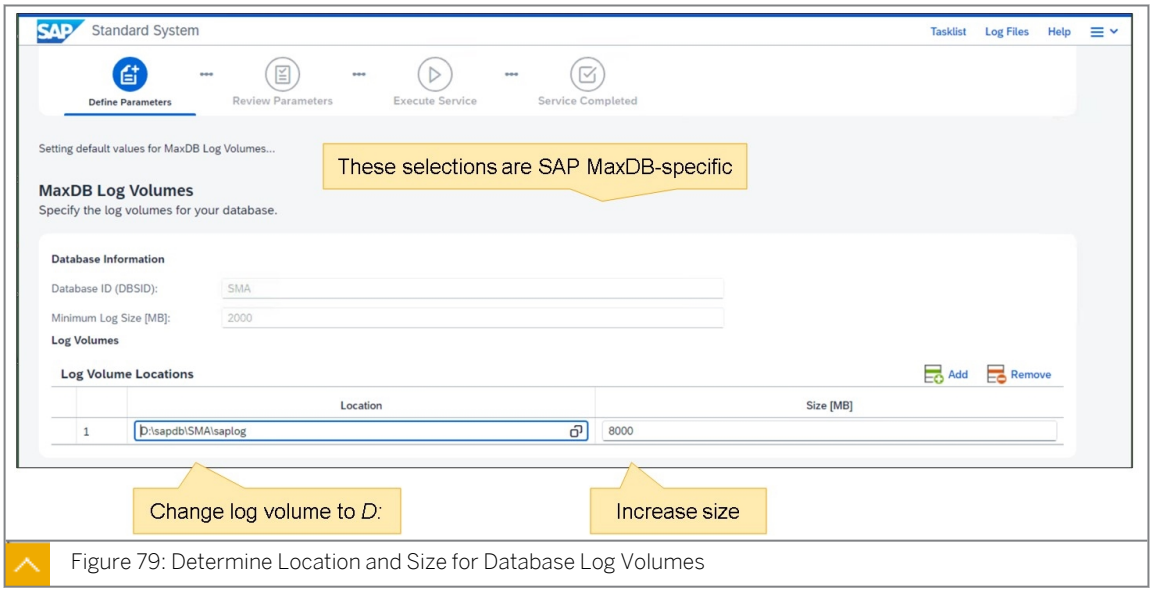

Figure 79: Determine Location and Size for Database Log Volumes

Please adapt the location and size of the log volumes to your needs.

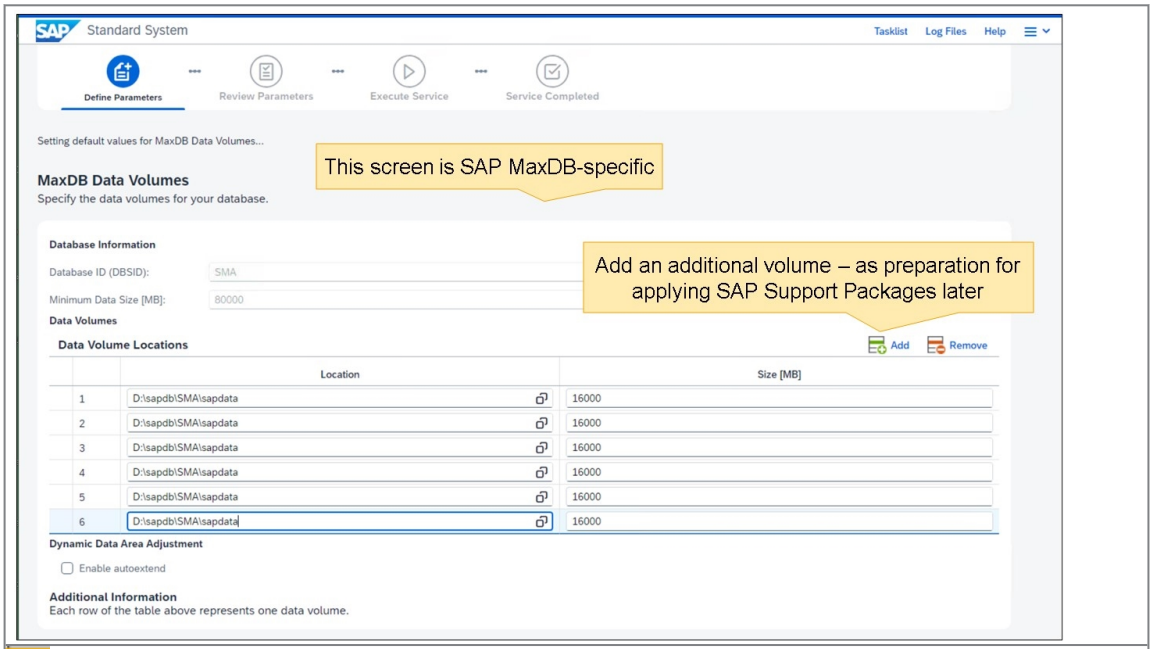

Figure 80: Determine Location and Size for Database Data Volumes

Please adapt the location and size of the data volumes to your needs.

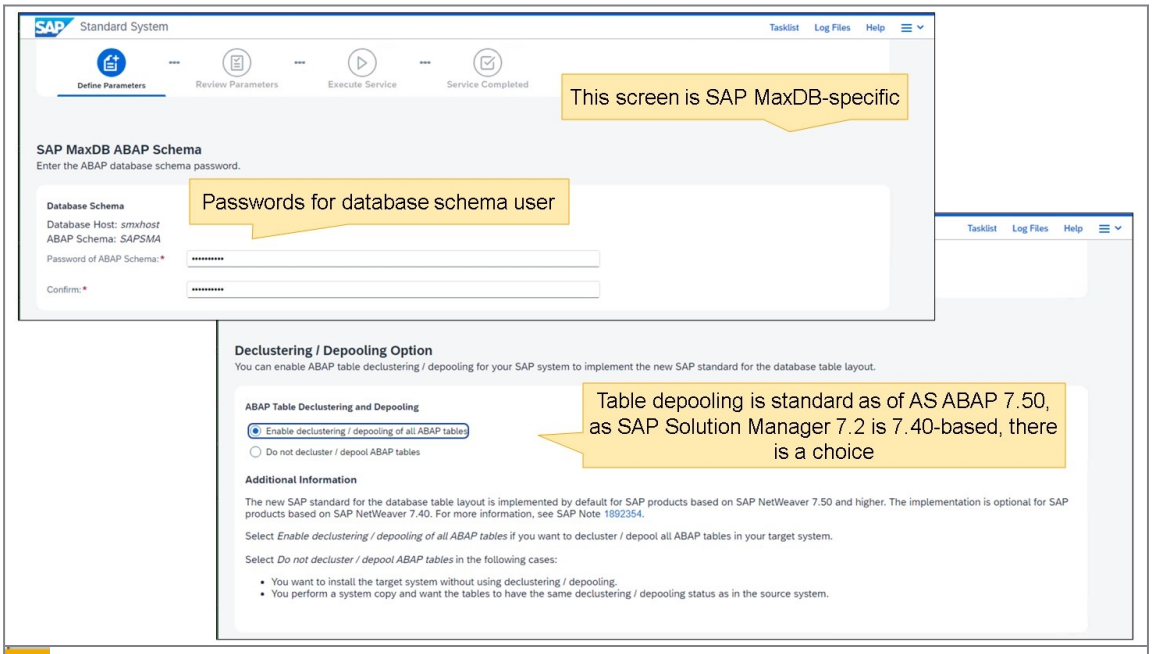

Figure 81: Set the Password for the ABAP Schema and Decide on Table Declustering/Depooling

The password for the database schema of your SAP MaxDB is set to the master password by default. You can change this password now or later. In this course we recommend to use the master password.

The option to *Enable the declustering / depooling of all ABAP tables* will be the default for the SAP database table layout for SAP Products based on AS ABAP 7.50 and higher. For SAP systems based on earlier AS ABAP releases, you might be offered the choice seen above. When installing a new SAP system, SAP recommends to use this option.

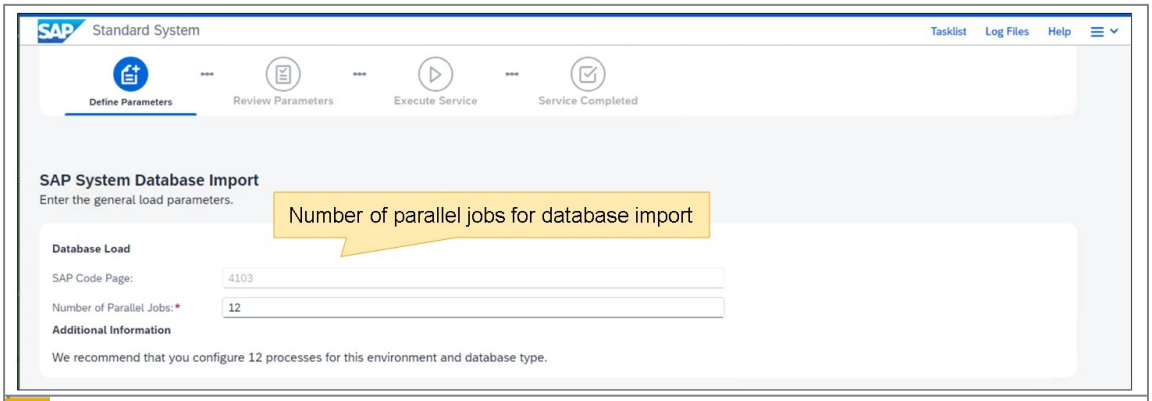

Figure 82: Set the Number of Parallel Import Jobs

The database load process can use several CPU resources in parallel, which will decrease the installation run time. Note that the parallel processing will be using CPU resources and the database system itself will be also using CPU resources (defined earlier). Therefore, we recommend that you match the number of parallel jobs to the CPU capacity you assigned to the database system. Overall do not use more CPU capacity than your server or environment offers. Additionally, many import jobs running in parallel might require the database system to create MANY lock entries. On high-performance hardware, if the number of parallel import jobs has been set too high, the default number of possible locks (as defined by SAP delivery) might become a bottleneck

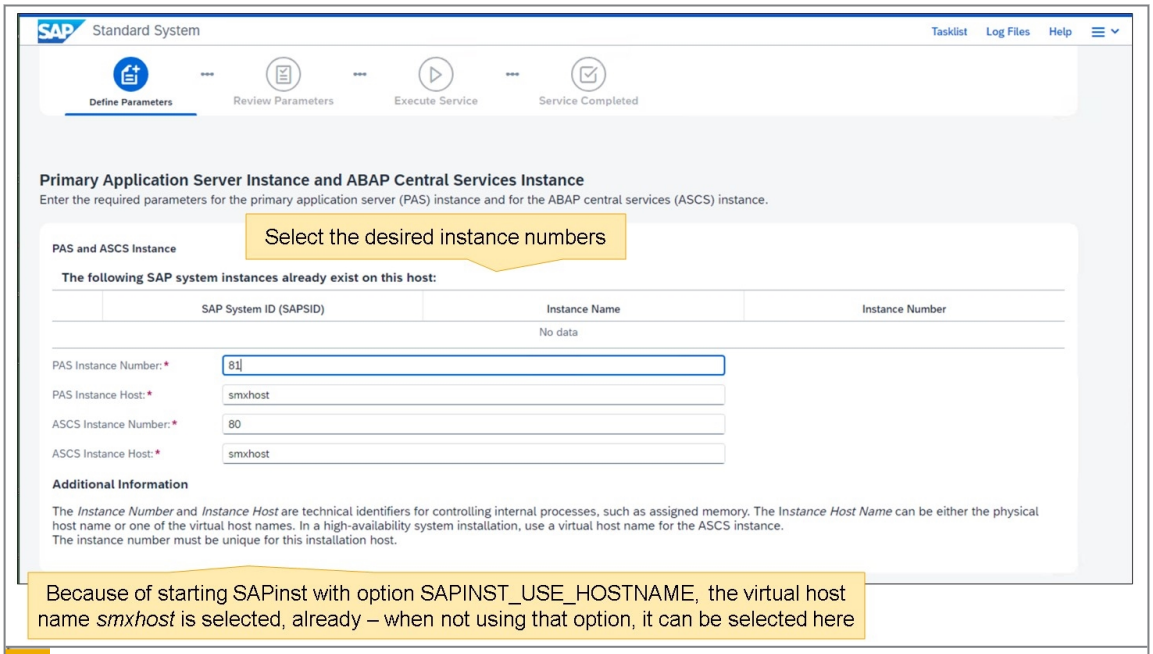

Figure 83: Provide Instance Numbers for PAS and ASCS

The figure above shows the selection screen for setting the instance numbers for the Primary Application Server (PAS) and the ABAP Central Services (ASCS) of the SAP system. The two-digit instance number needs to be chosen from the numbers between 00 and 97 and they must be unique on an individual host.

The instance number defines several port numbers used for communication by your SAP system. For example, an ABAP dispatcher process communicates via port 32## where ## signifies the instance number. Therefore, in case any software on your SAP host uses ports in the range of 3200 to 3299 (for example), this need to be taken into consideration. SAPinst can only list ports used by SAP instances — so further restrictions need to be consider by you.

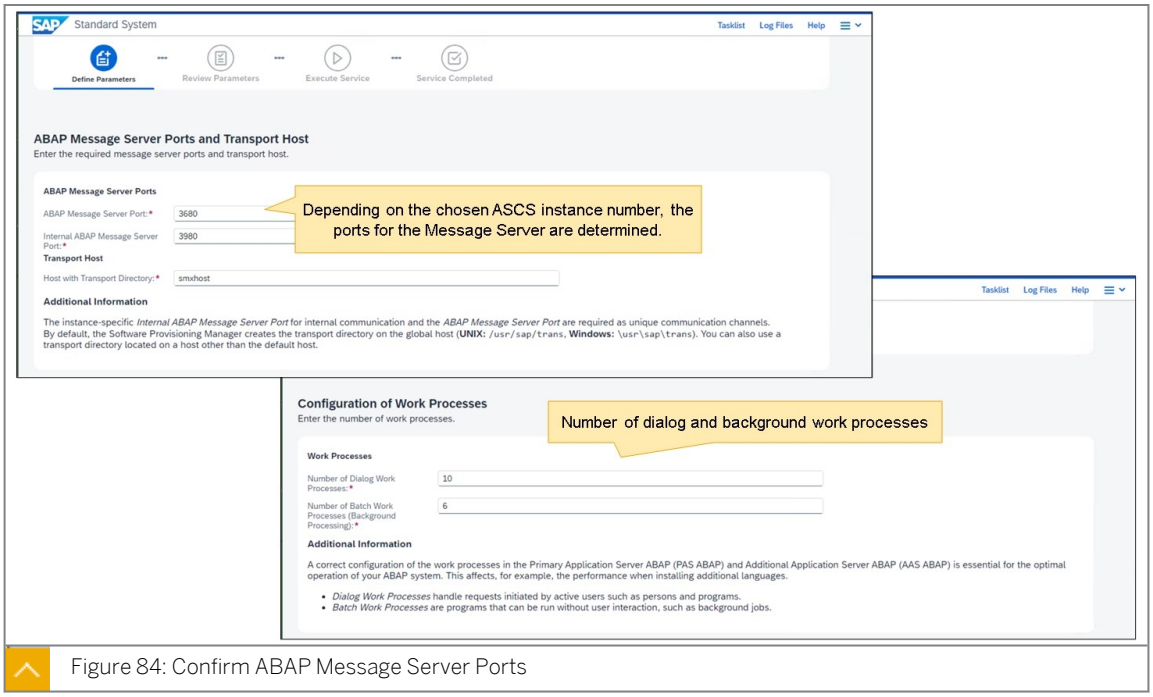

Figure 84: Confirm ABAP Message Server Ports

The default values of the ABAP message server port and the internal ABAP message server port are determined by your previous entry for the Central Instance. The port number for the ABAP message server is 36## and the port number for the internal ABAP message server is 39##, where ## is the value that you specified for the ASCS. You can choose different port numbers (even outside the 36## and 39## range) if those port numbers are not already in use.

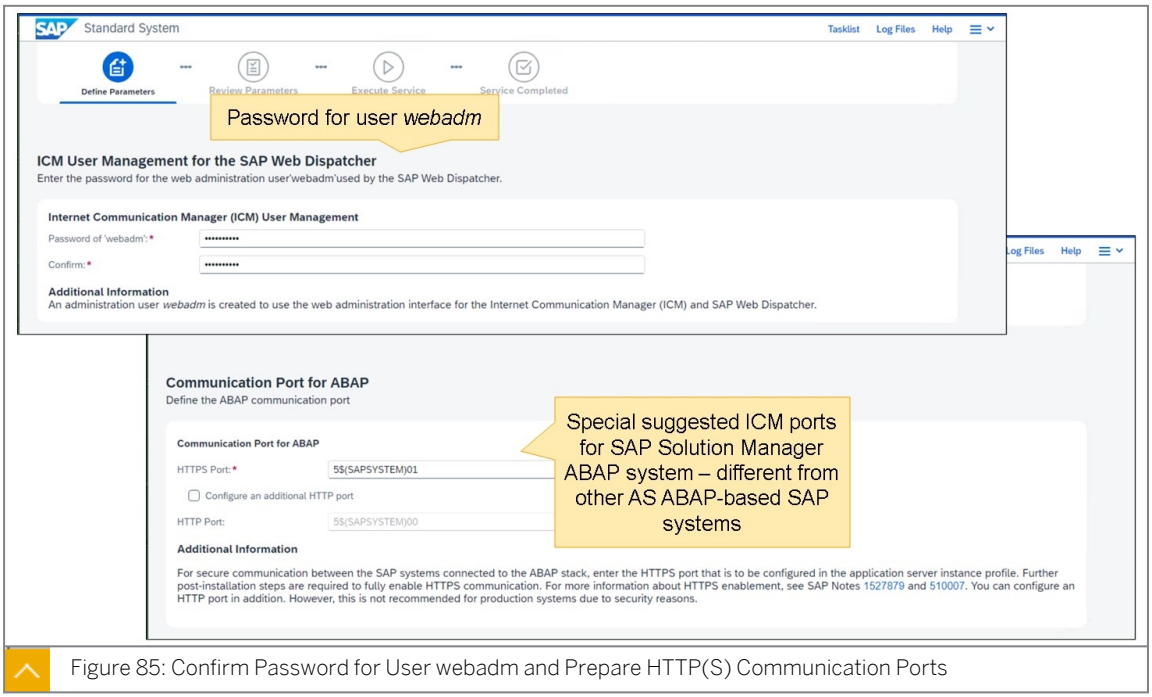

Figure 85: Confirm Password for User webadm and Prepare HTTP(S) Communication Ports

When an installed component offers an Internet Communication Manager (ICM) process then you are prompted to enter a password for the user webadm. This user can access administration functions offered by ICM via Web interface.

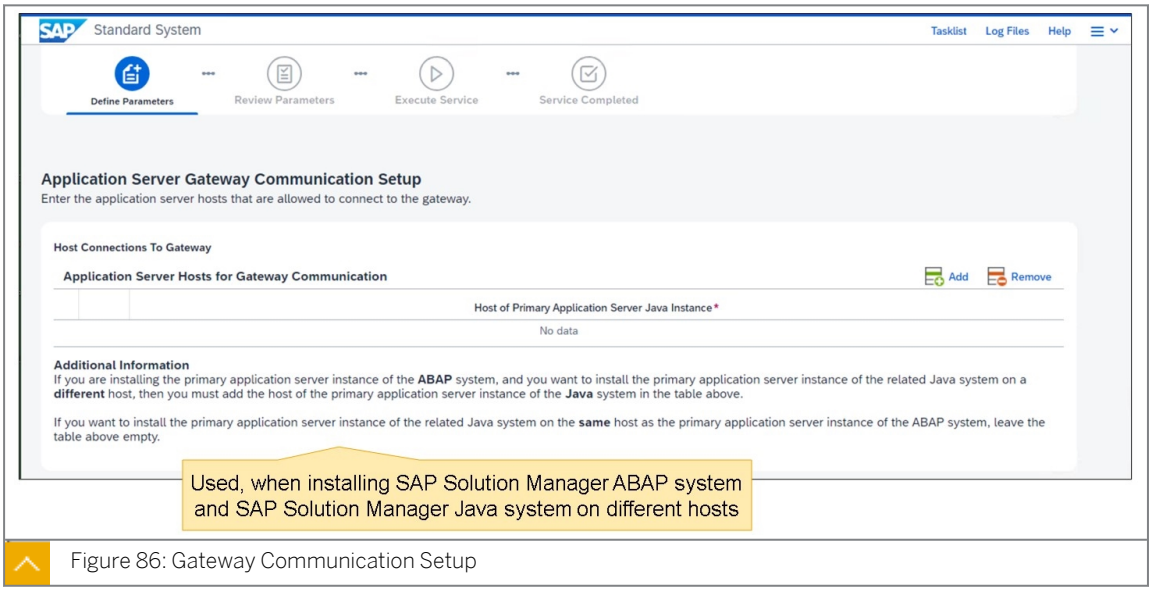

Figure 86: Gateway Communication Setup

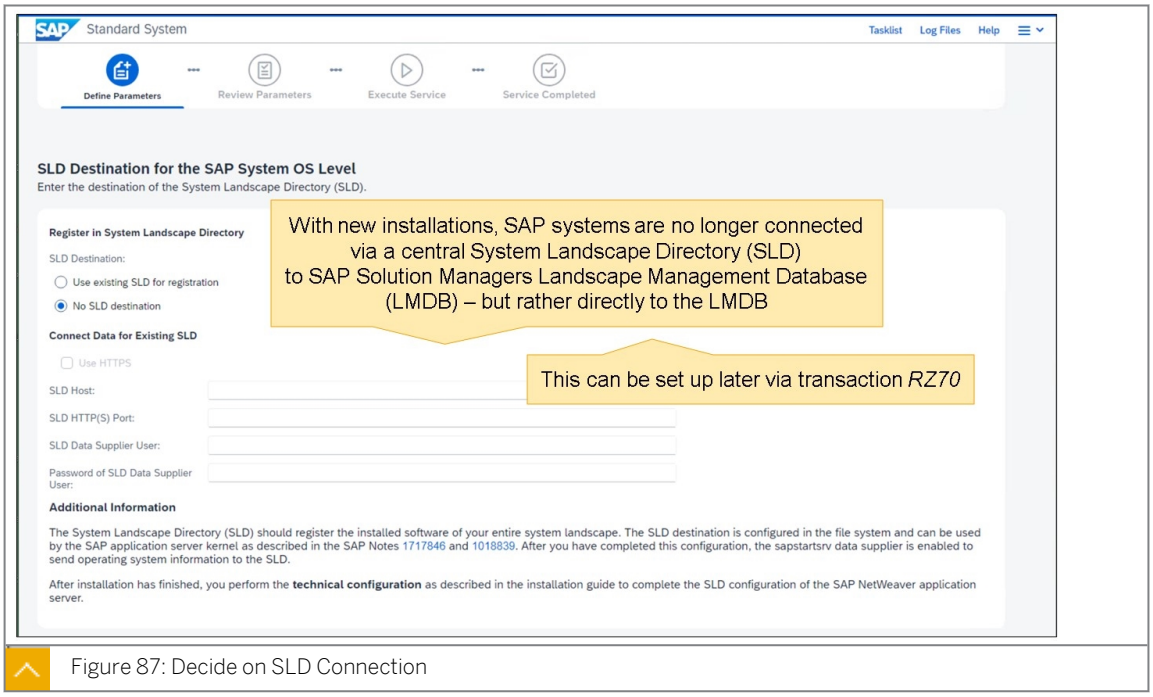

Figure 87: Decide on SLD Connection

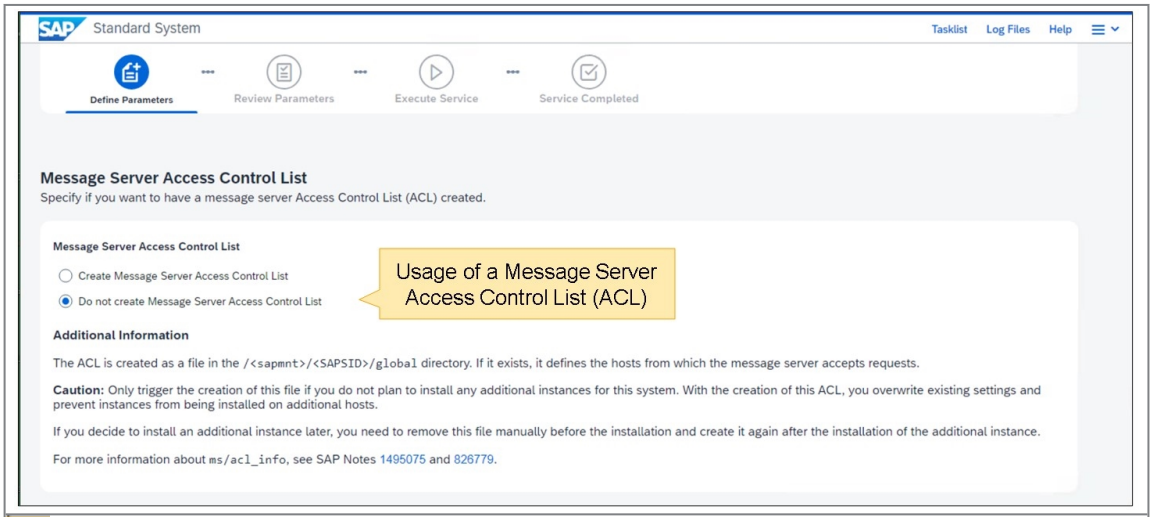

Figure 88: Decide on Usage of Message Server Access Control List (ACL)

To increase the security of your SAP system, you can create a Message Server Access Control List (ACL) that can be used to limit access to the Message Server. In this training, we do not create such an ACL because we would be required to delete it before installing an Additional Application Server. For more information, please read the SAP Notes mentioned on the screen shot above.

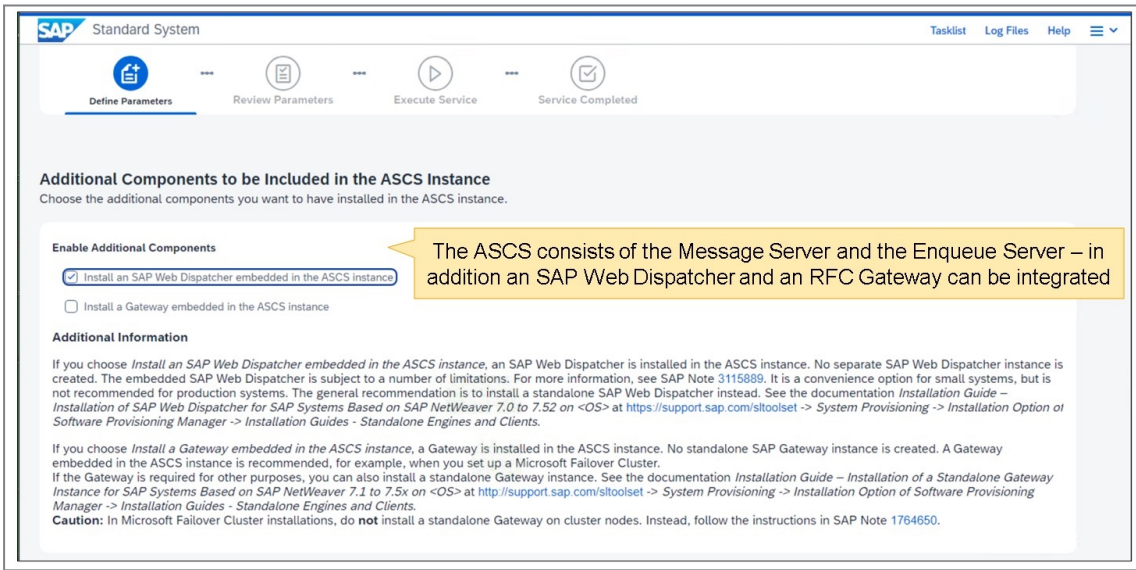

Figure 89: Enable Additional Components in the ASCS

You can select additional components to be installed as part of the ASCS instance.

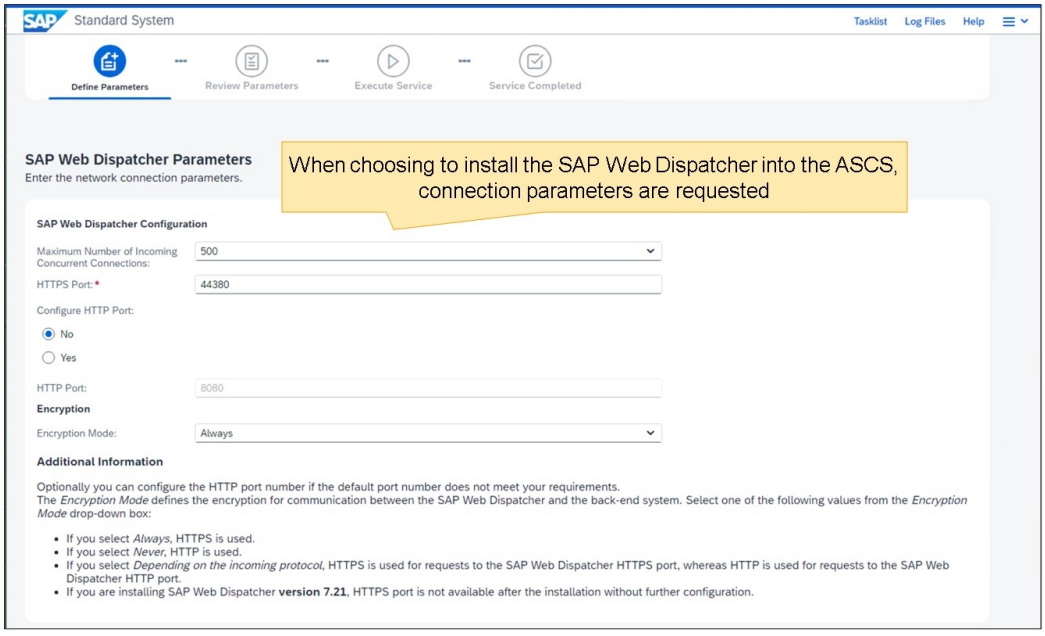

Figure 90: Set Parameters for SAP Web Dispatcher

When you choose to install additional components into the ASCS, those might require additional parametrization, as shown for SAP Web Dispatcher above.

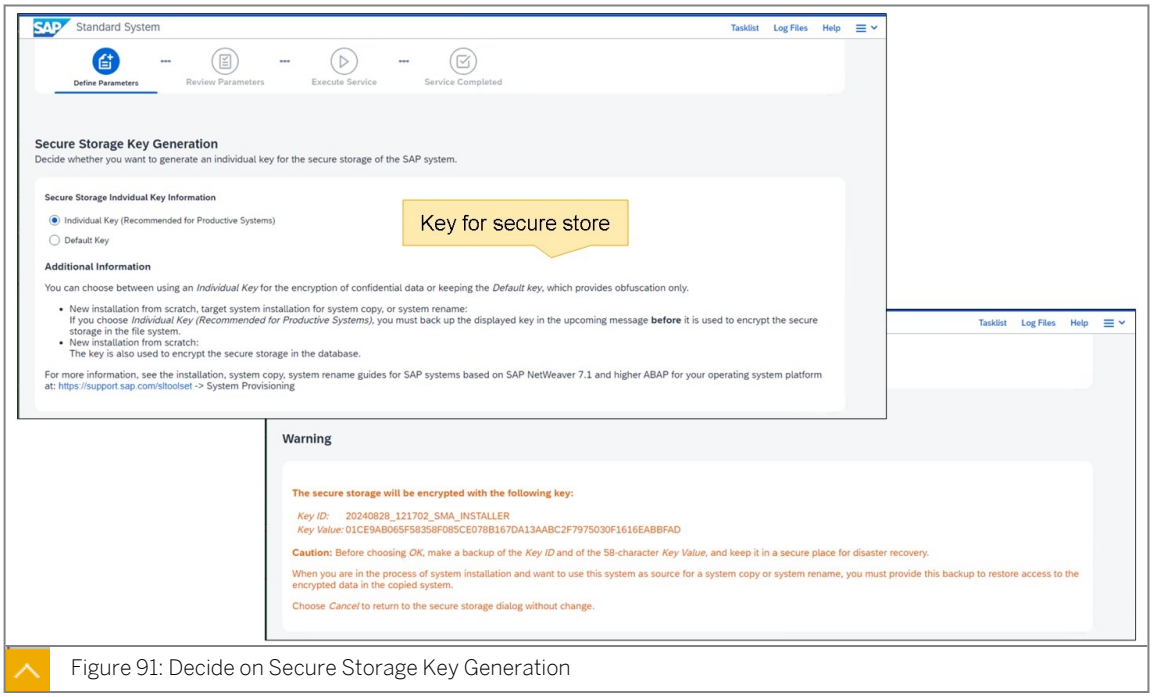

Figure 91: Decide on Secure Storage Key Generation

You can enhance the security of your SAP system by generating an individual key for the secure store of SAP system.

Save the information shown in the Message Box you can see in the figure above. Store this information in a secure place.

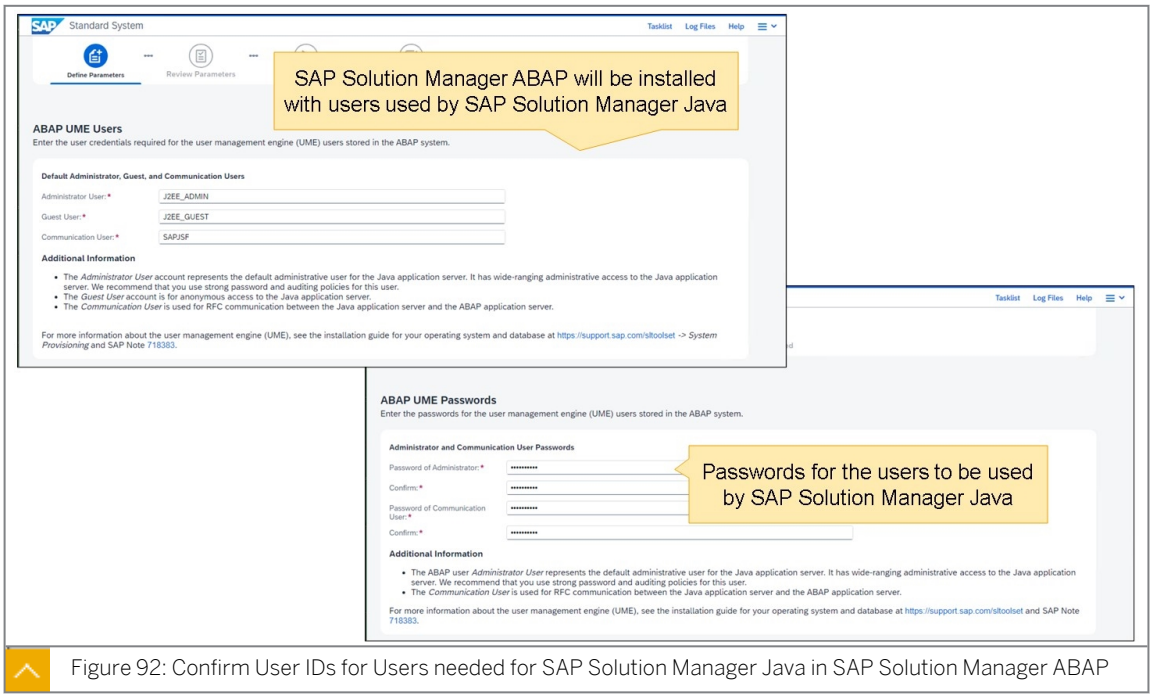

Figure 92: Confirm User IDs for Users needed for SAP Solution Manager Java in SAP Solution Manager ABAP

On the screen above you can confirm the default user IDs for users that are stored within the SAP Solution Manager ABAP system and are used by the SAP Solution Manager Java system. Usually, you should refrain from changing these user default names.

Please note, that when installing the SAP Solution Manager Java system you should replace the (THEN) proposed user IDs by those used during the installation of the SAP Solution Manager ABAP system:

J2EE_ADM_<SID> needs to be replaced by **`J2EE_ADMIN`** and

J2EE_GST_<SID> needs to be replaced by **`J2EE_GUEST`**.

SAPJSF needs to stay unchanged.

You are also prompted for the password of the administrator user and the communication user. The default values for the passwords are the master password.

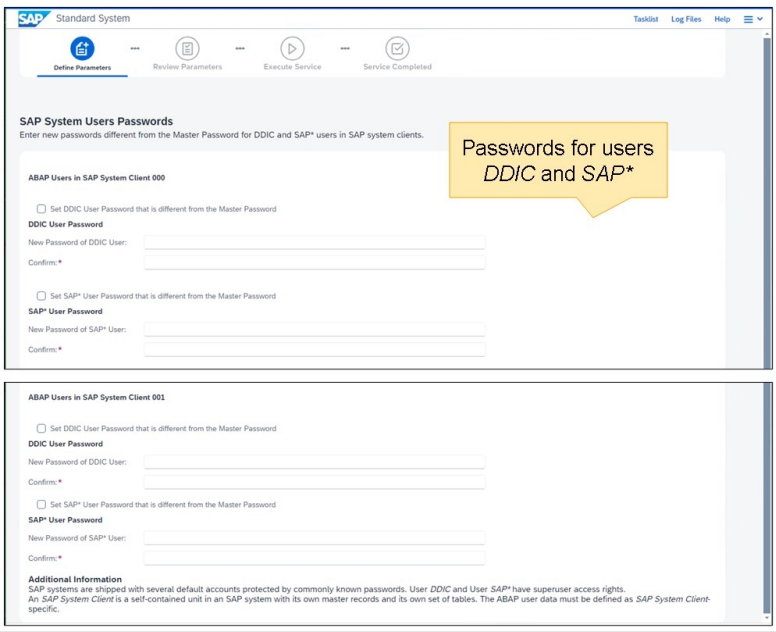

Figure 93: Individual Passwords for SAP System Users DDIC and SAP*

You can set individual passwords for SAP system users DDIC and SAP* – different from the master password.

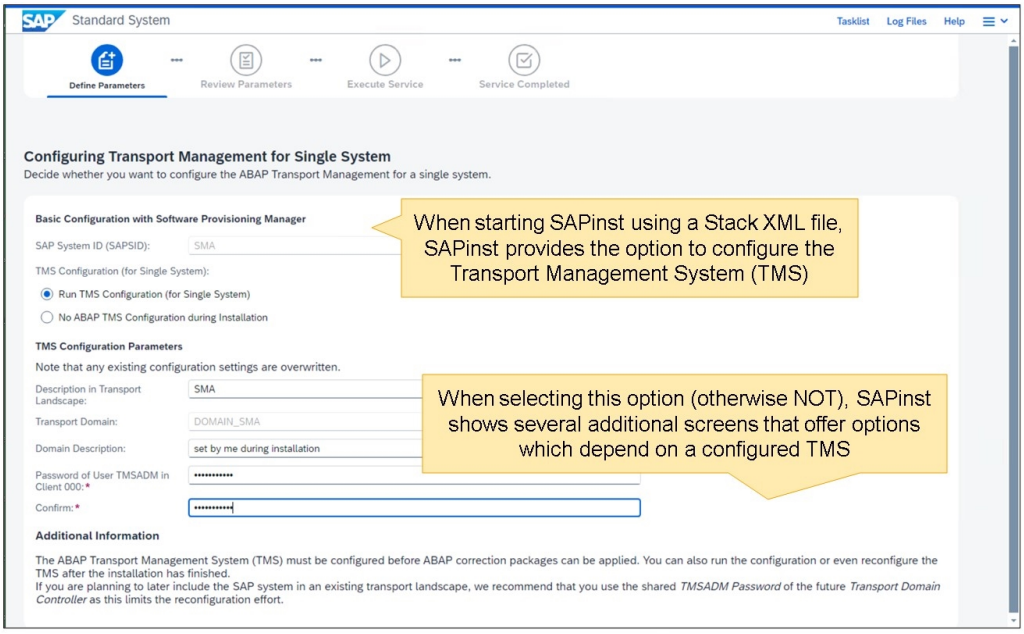

Figure 94: Decide on TMS Configuration

When you start SAPinst with providing an Stack-XML file, you will encounter this additional option: to configure the Transport Management system of the system to be installed. In case you select this option, the TMS will be configured very simple and further installation options become available, as shown in the next slides.

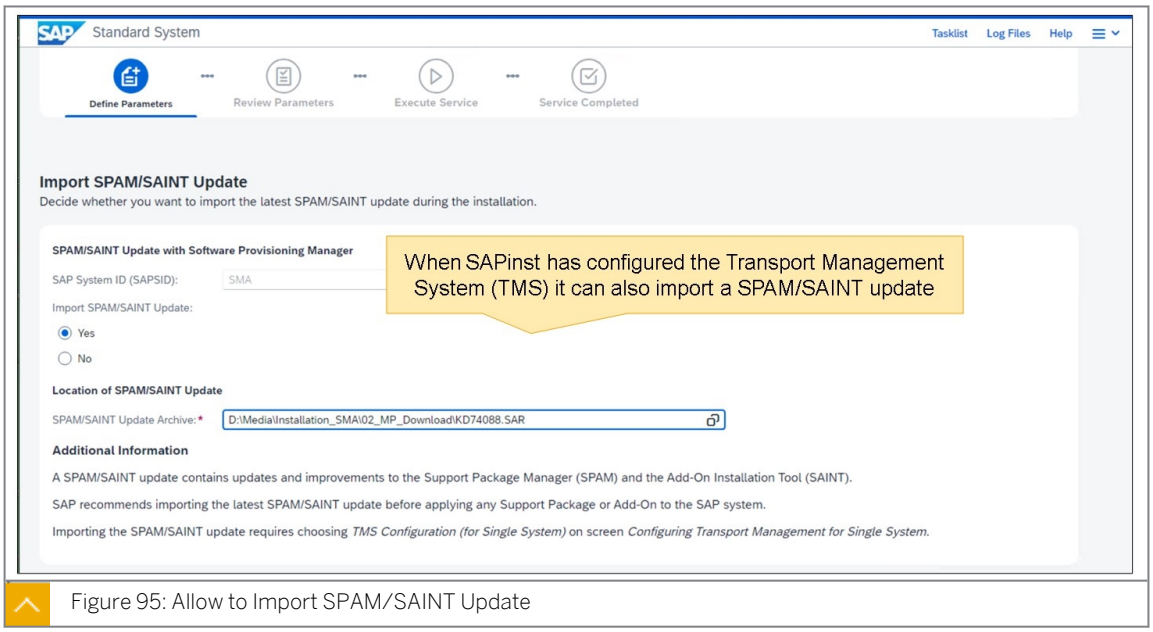

Figure 95: Allow to Import SPAM/SAINT Update

In case you let SAPinst configure the TMS, SAPinst can import a SPAM/SAINT update at the end of the installation.

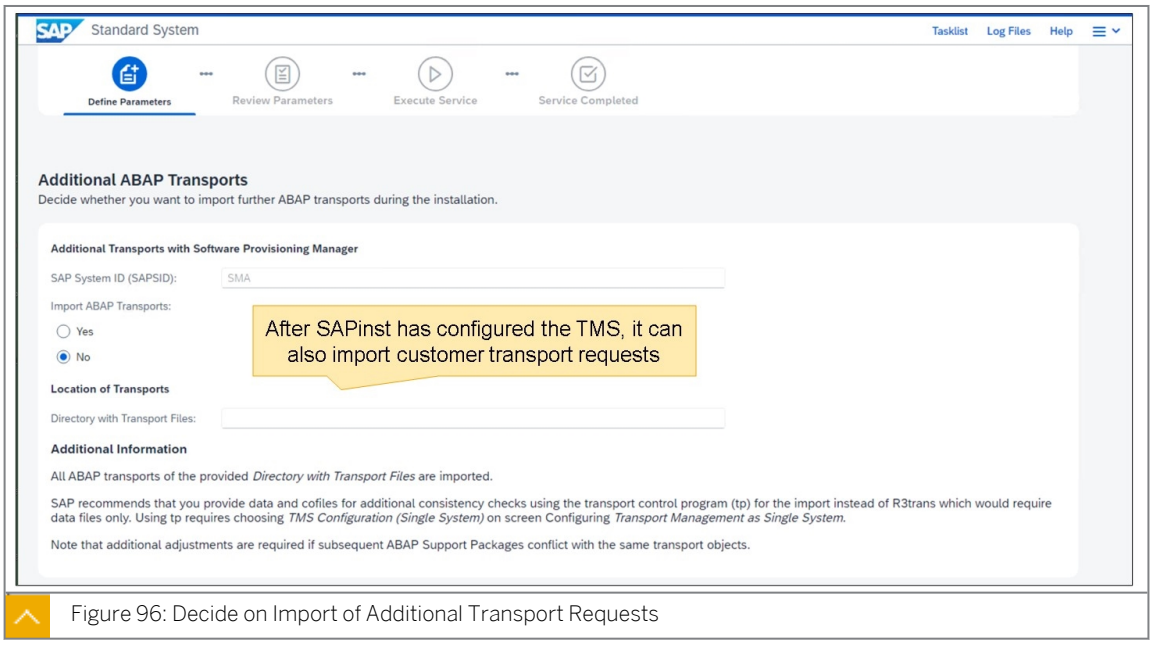

Figure 96: Decide on Import of Additional Transport Requests

In case you let SAPinst configure the TMS, you can also provide a directory with transport files (data and cofiles) – those transport requests will be imported at the end of the installation.

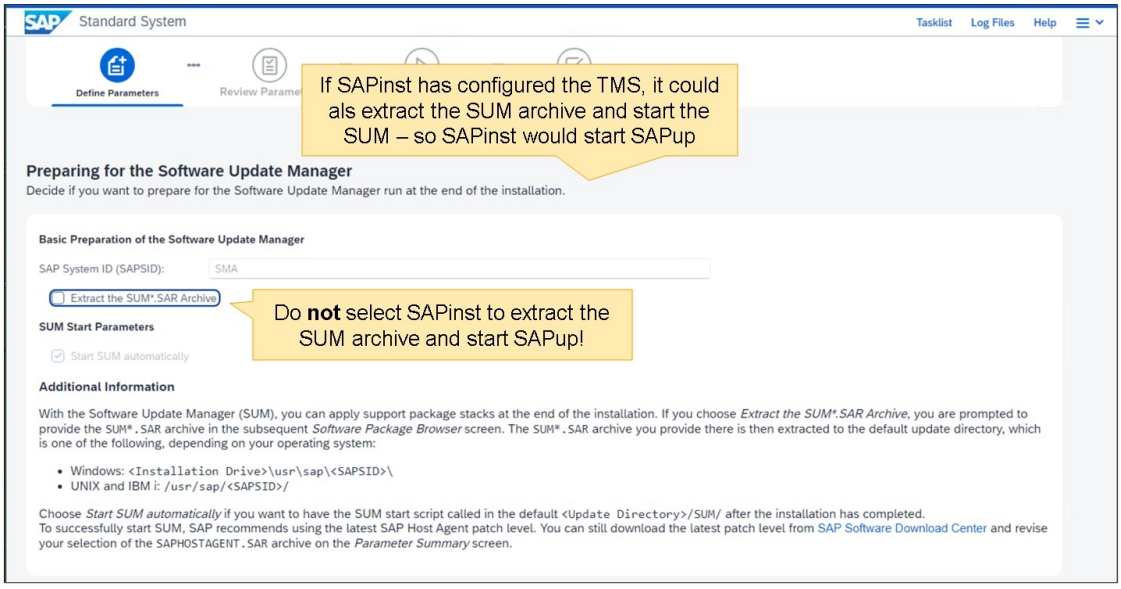

Figure 97: Decide on Preparation for SUM

SAPinst can also start the SUM (after extracting an archive that you need to provide), for this option to be shown, the configuration of TMS is mandatory as well.

Note:
Please note that it is highly recommended to execute some post installation activities right after installation, BEFORE starting (and using) SUM. For example, the SUM Master Guide can ask you to apply certain SAP Notes, Kernel Patches or Database Patches BEFORE you use SUM to update the SAP system.

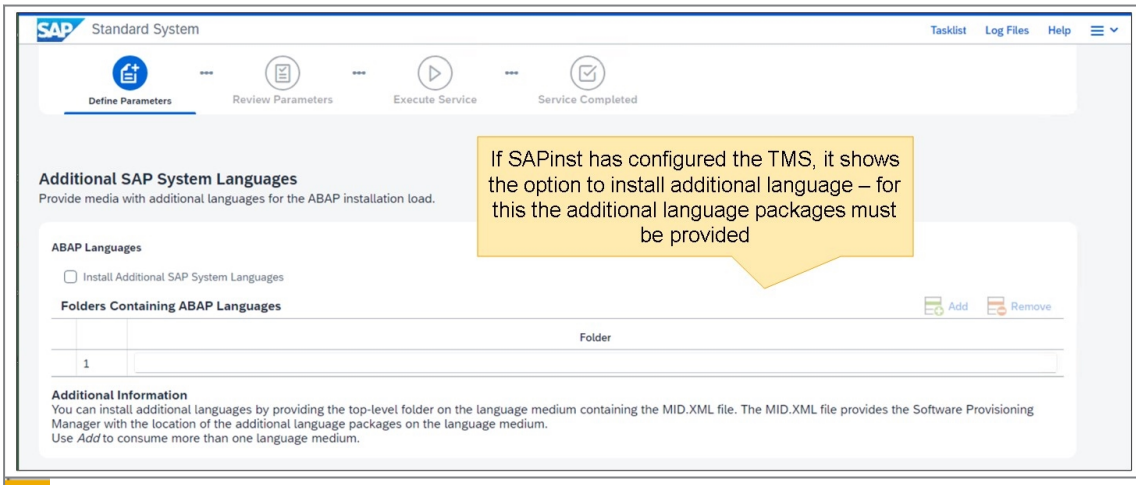

Figure 98: Decide on Import of Additional Languages

SAPinst can import additional SAP system languages at the end of the installation. For this you have to provide the corresponding language packages.

The following screen show the *Parameter Summary*. You can select individual parameters and choose to revise them. If you don't select at least one parameter, the button *Revise* will remain grayed out.

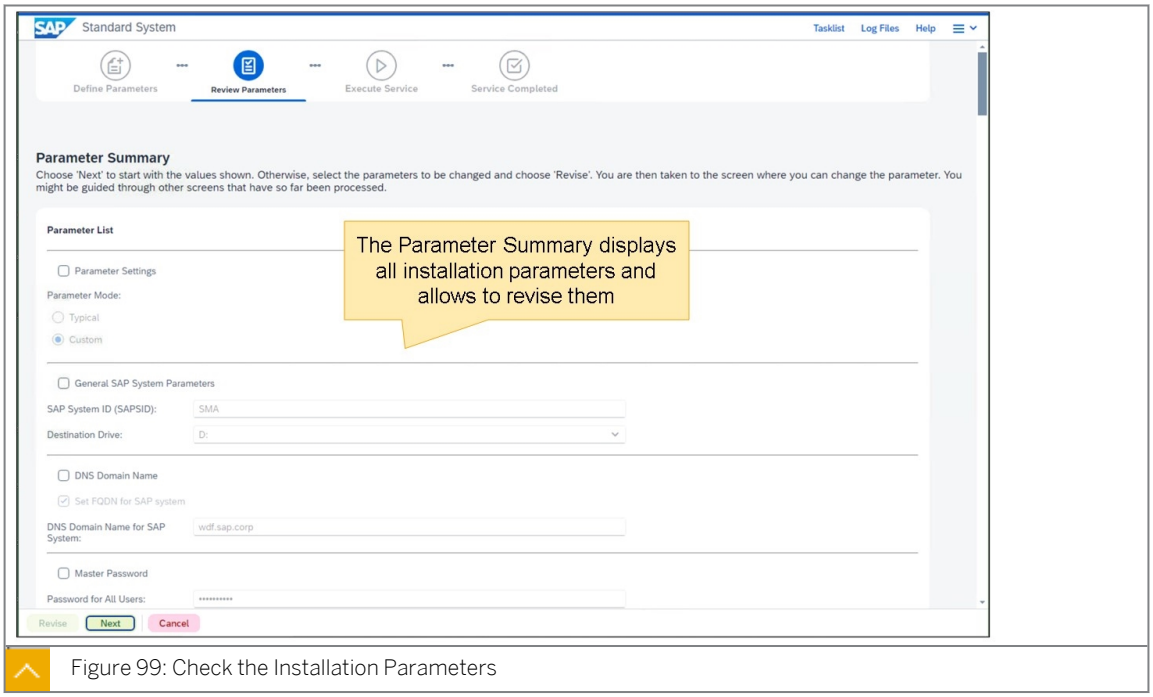

Figure 99: Check the Installation Parameters

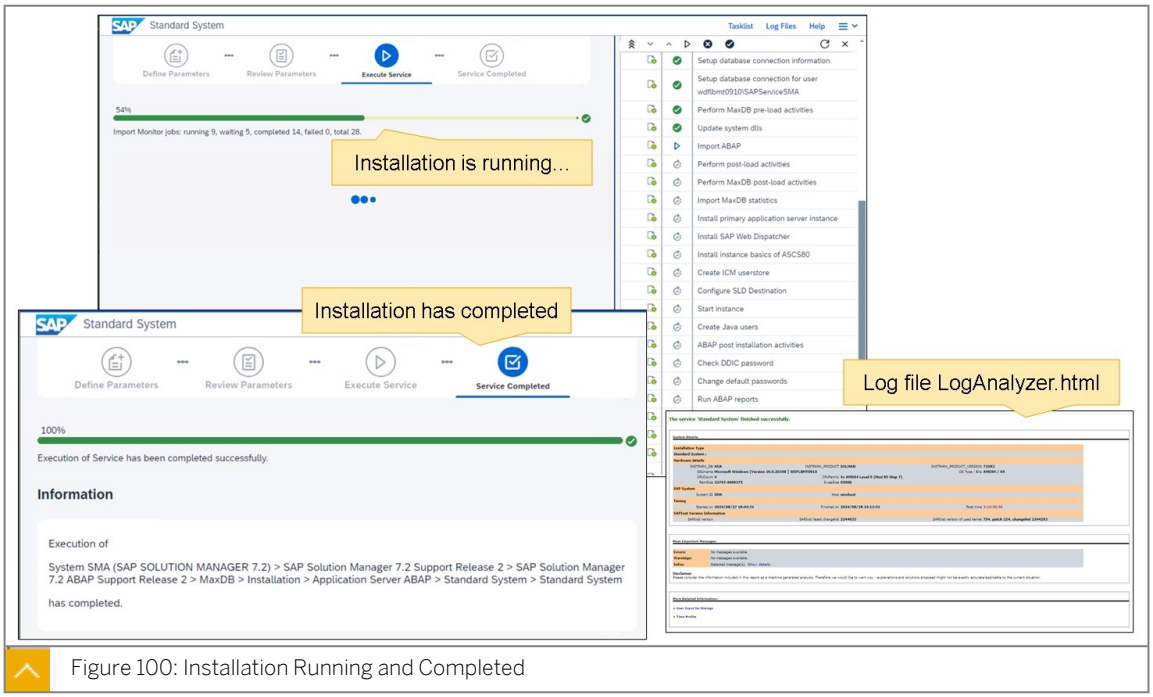

Figure 100: Installation Running and Completed

The installation phase *Import ABAP* takes a significant amount of time.

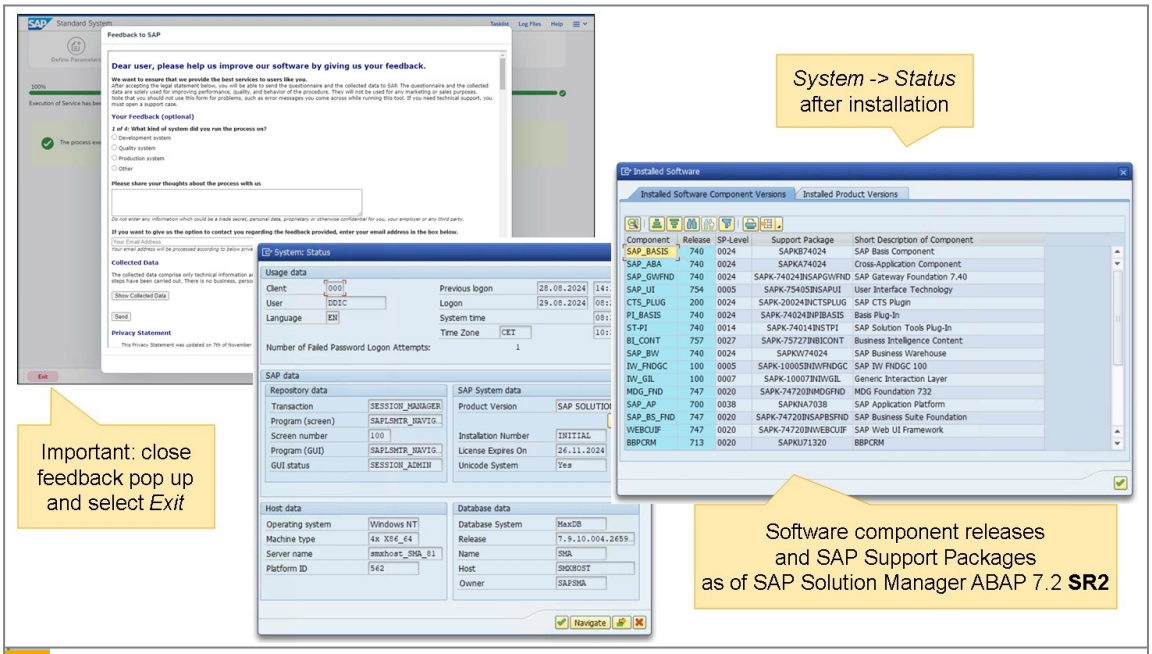

Figure 101: Installation Finished Successfully

Congratulations: The installation of your SAP Solution Manager ABAP system finished successfully!

LESSON SUMMARY

You should now be able to:

- Install an SAP Solution Manager ABAP System

Learning Assessment

1. SAP recommends that you use unique SAP system IDs (SID) throughout your SAP system landscape.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

2. In which phase can you revise the parameters value during the SAP Solution Manager system installation?

   Choose the correct answer.

   - ☐ **A** Parameter Summary
   - ☐ **B** Execution
   - ☐ **C** Initial phase
   - ☐ **D** Define parameters

3. For which kernel components will you potentially be asked to provide current archives during installation?

   Choose the correct answers.

   - ☐ **A** SAPEXE.SAR
   - ☐ **B** SAPEXEDB.SAR
   - ☐ **C** SAPHOSTAGENT.SAR
   - ☐ **D** SAPCAR.EXE
   - ☐ **E** icmadmin.SAR
   - ☐ **F** dw.SAR

4. When installing an SAP system, you can start SAPinst to install Primary Application Server, ABAP Central Services Instance and one or several Additional Application Servers in one go.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

5. During the installation of an SAP Solution Manager ABAP system, you are required to set the user IDs for some user management engine (UME) users stored in the ABAP system. Identify the accounts, for which you need to provide user IDs.

   Choose the correct answers.

   ☐ A Administrator User

   ☐ B Guest User

   ☐ C Database User

   ☐ D SAP System Landscape Directory (SLD) user

Learning Assessment - Answers

1. SAP recommends that you use unique SAP system IDs (SID) throughout your SAP system landscape.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! SAP recommends that you use unique SAP system IDs (SID) throughout your SAP system landscape. Read more about this in the lesson Installing an SAP Solution Manager ABAP system of the course ADM110.

2. In which phase can you revise the parameters value during the SAP Solution Manager system installation?

   Choose the correct answer.

   [X] A Parameter Summary

   [ ] B Execution

   [ ] C Initial phase

   [ ] D Define parameters

   You are correct! You can revise the parameters value during the SAP Solution Manager system installation during the Parameter Summary phase. Read more on this in the lesson Installing an SAP Solution Manager ABAP system of the course ADM110.

3. For which kernel components will you potentially be asked to provide current archives during installation?

   Choose the correct answers.

   - [X] A SAPEXE.SAR
   - [X] B SAPEXEDB.SAR
   - [X] C SAPHOSTAGENT.SAR
   - [ ] D SAPCAR.EXE
   - [ ] E icmadmin.SAR
   - [ ] F dw.SAR

   You are correct! SAPinst will ask you for the location of SAPEXE.SAR, SAPEXEDB.SAR, SAPHOSTAGENT.SAR and two more IGS-related archives. A current SAPCAR version needs to be downloaded separately, if required, whereas icmadmin.SAR is contained in dw.SAR, which is an archive that provides some specific kernel components but that cannot be used during installation. Read more on this in the lesson Installing an SAP Solution Manager ABAP system of the course ADM110.

4. When installing an SAP system, you can start SAPinst to install Primary Application Server, ABAP Central Services Instance and one or several Additional Application Servers in one go.

   Determine whether this statement is true or false.

   - [ ] True
   - [X] False

   You are correct! The installation of an Addition Application Server requires a separate execution of SAPinst. Read more on this in the lesson Installing an SAP Solution Manager ABAP system of the course ADM110.

5. During the installation of an SAP Solution Manager ABAP system, you are required to set the user IDs for some user management engine (UME) users stored in the ABAP system. Identify the accounts, for which you need to provide user IDs.

   Choose the correct answers.

   [X] **A** Administrator User

   [X] **B** Guest User

   [ ] **C** Database User

   [ ] **D** SAP System Landscape Directory (SLD) user

   You are correct! During the installation of an SAP Solution Manager ABAP system, you are required to set the user IDs for the accounts Administrator User, Guest User and Communication User. It is not required to provide a database user or an SLD user for the UME during the installation. Read more on this in the lesson Installing an SAP Solution Manager ABAP system of the course ADM110.

UNIT 4 Performing Post-Installation Activities

UNIT OBJECTIVES

- Identify Initial Post-Installation Steps
- Prepare the training system for an Software Update
- Configure SAP License, Operation Modes, SAProuter
- Describe Installation Check, Additional Languages, Business Functions
- Complete final installation checks
- Describe the installation of additional languages
- Describe activation of business functions
- Describe automated setup of AS ABAP
- Describe the configuration of an AS Java-based SAP System

Unit 4
Lesson 1

Identifying Initial Post-Installation Steps

LESSON OVERVIEW
This lesson provides a short overview of the steps we recommend that you perform immediately following an SAP system installation.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Identify Initial Post-Installation Steps

Overview of Post-Installation Steps

After you install an SAP system, you must complete a number of post-installation tasks before your SAP system is ready for use. The order in which you complete the tasks depends on the specifics of your SAP system installation.

Post-Installation Steps

1. Create an initial backup of the newly installed SAP system.
2. Create a few named users for further configuration activities.

   Later, you will implement a detailed user/authorization concept; you will not need these named users any longer.
3. Apply a valid license to your SAP system.
4. Configure the remote connection to the SAP Support Portal and to SAP Support.
5. Execute some basic configuration steps:
   - Importing the SAP system profiles and adapting them where necessary
   - Configuring operation modes
   - Setting up the Transport Management System (TMS)
   - Scheduling standard jobs
   - Creating printer definitions
   - Configuring logon groups
6. Import additional languages
7. Create a production client (in the case that you do not want to use the default client 001 – if exists)
8. Ensure user security and create a basic authorization concept.

9. Schedule regular backups.

Note:
Some of the steps listed above do not have a required or recommended sequence; for example configuring logon groups and creating printer definitions. However, some steps have strong dependencies: you should import additional languages before applying SAP Support Packages, this will save you work later on.

Full Installation Backup

Back up your SAP system immediately after installation. The back up operation saves the structure of the SAP system and all configuration files.

Directories and Files to Back Up

- All database-specific directories
- Registry (Windows operating system)
- All SAP-specific directories:
  - Drive:\usr\sap (Windows operating system)
  - /usr/sap/ (Linux/UNIX operating system)
  - transport directory
  - home directory of user <sid>adm
  - \%WINDIR% (Windows operating system)
  - root file system (Linux/UNIX operating system)

Note:
Check the system administration guide for details and for operating system-specific backup procedures.

LESSON SUMMARY

You should now be able to:

- Identify Initial Post-Installation Steps

Unit 4
Lesson 2

Preparing the Training System for an Software Update

LESSON OVERVIEW

The lesson describes how to install an SAP license and how to establish a remote connection to the SAP Support

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Prepare the training system for an Software Update

Named User Creation

After an SAP installation, only a few standard dialog users exist in the SAP system, for example, SAP* and DDIC. Although these users have many authorizations (authorization profile SAP_ALL), they are not allowed to perform certain tasks. For example, they are not allowed to perform customizing or development-related tasks. Therefore, you must create a normal dialog user account before you can perform some of the post-installation steps.

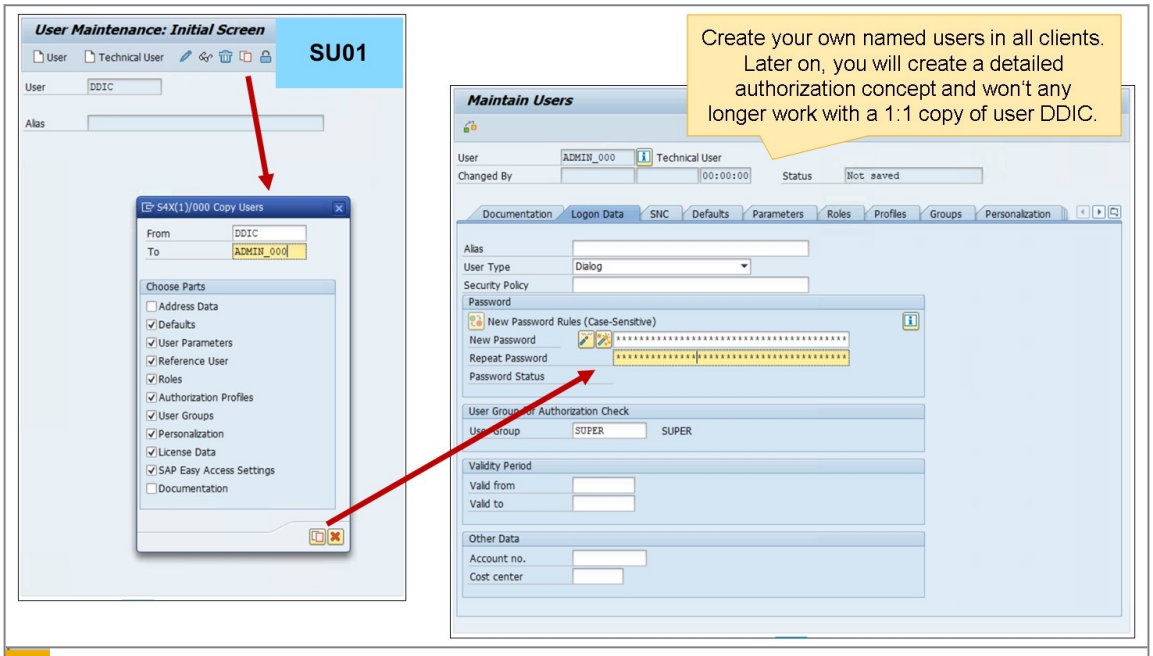

Figure 102: Create Named User in All Clients

In transaction `SU01`, copy SAP* or DDIC to a regular dialog user. This step is necessary to perform some of the subsequent post-installation steps.

Hint:
When creating the first dialog user, maybe SU01 informs that no default company address exists. In this case create and maintain the default company address.

Import of Profiles

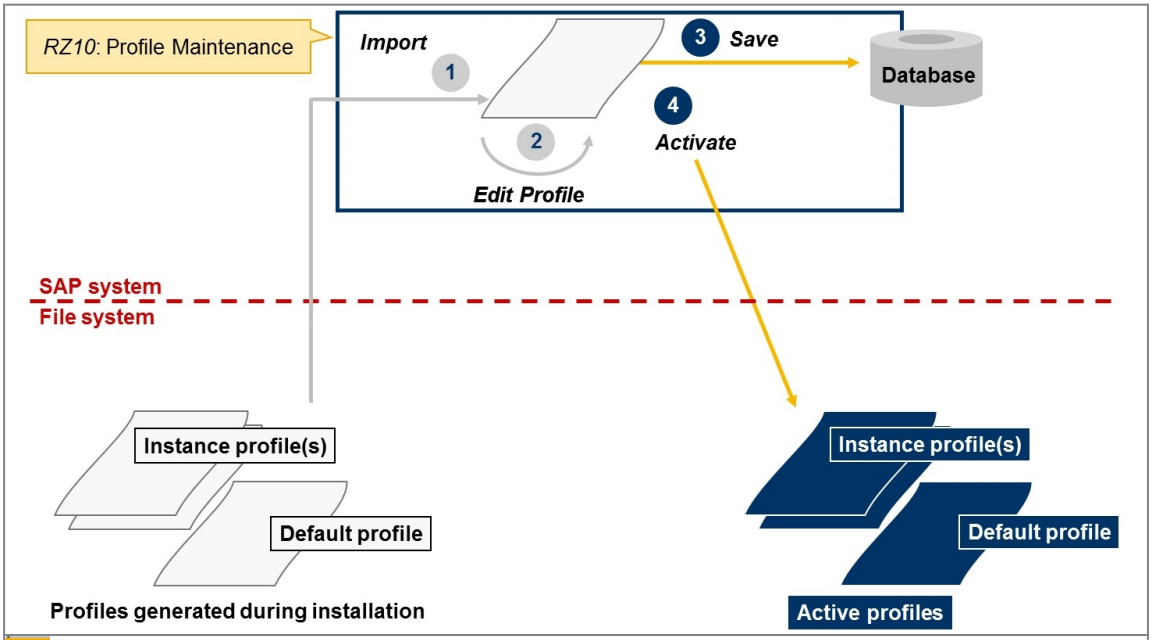

Figure 103: Import and Maintenance of Profiles

The technical configuration of an SAP system is controlled by profile parameters. There are around 2,000 profile parameters.

Most of them have a default and are compiled in the SAP kernel. They are not set explicitly by the SAP system administrator. About 100 profile parameters are explicitly set in profiles.

The default profile contains the profile parameters that configure all application servers of an SAP system. In addition, each application server has its own instance profile to individually configure the corresponding application server. Each application server has its own start profile to configure what must be started while starting that application server. For example, check if the database is started already. Up to AS ABAP 7.03 the start profile was a separate file. Starting with AS ABAP 7.10 the parameters from the start profile are now part of the instance profile – the profiles were merged together.

After the installation, the profile parameters are only present at file system level in the profiles generated by SAPinst. To use the profile administration inside the SAP system (transaction RZ10), the profiles must be imported into the database of the SAP system.

Transaction RZ10 performs a consistency check during this import. Changes to profile parameters can then be performed inside the SAP system. The profile parameters are then stored in the database and are written back to file system level. The changes only take effect when they are read by the SAP system at SAP system start. The affected application servers of the SAP system have to be restarted after changing profile parameters.

Perform the administration and maintenance of profiles in transaction RZ10. In the first step, you import the profiles into the database by choosing *Utilities → Import profiles → Of active*

servers. You can change and add individual profile parameters after selecting the profile to edit. For example, SAPinst installs a SAP system with a very small number of work processes.

SAP recommends that you adapt SAP profiles using the transaction `RZ10`. It is possible to change SAP parameters in the corresponding files on file system level. For example, SAP parameters can be changed when the SAP system cannot be started because of a wrong configuration.

> Note:
> Best practice: Often customers have created a template text file, holding profile parameters concerning password rules to meet security standards and other parameters. After the installation of an application server an initial configuration at file system level is done using this template file. Afterwards the profile parameters are imported using transaction `RZ10` – and from now on are maintained via `RZ10`.

Standard Job Scheduling

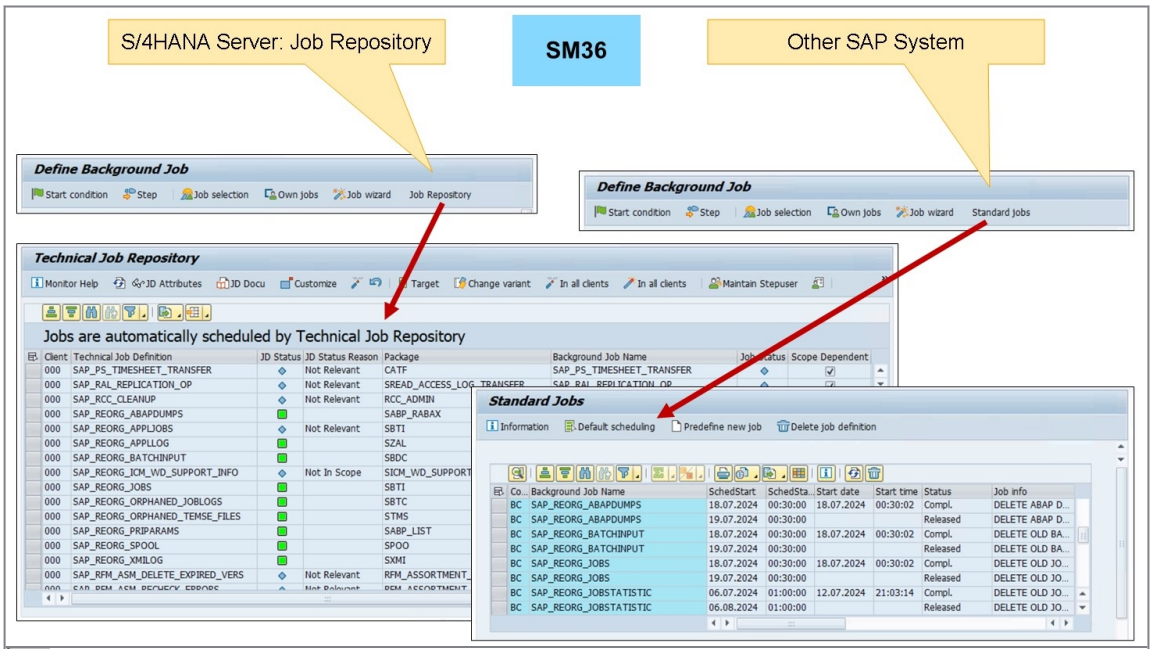

Figure 104: Schedule Standard Jobs

Several different kinds of statistical and technical data is accumulated in the SAP system, such as performance data, job logs, ABAP short dumps, spool data, and so on. This data must be reorganized regularly; therefore, standard reorganization jobs are offered in the SAP system. These standard jobs should run regularly in an SAP system. The job definition or transaction `SM36` provides a list of important standard jobs that you should schedule.

Complete the following steps to schedule jobs:

1. In transaction `SM36`, select the *Standard Jobs* screen.
2. Choose the *Component BC* in the *SAP Component* field.
3. Choose *Default scheduling* to schedule all the standard jobs with a single click.

The SAP system schedules all standard jobs along with their specified variants and intervals. You can also schedule the different jobs individually.

Note:
In a newly installed SAP S/4HANA Server system, the standard Job scheduling might require some help by you. In case the Job Scheduling does not work as designed, consider **SAP Note** 2311392 — SAP S/4HANA: Job Repository Jobs (Standard Jobs) released with huge delay and not executing.

Note:
Please note, that depending on the release of SAP S/4HANA Server you have installed, the button **`Job Repository`** as shown above might require the following manual settings: the profile parameter **rdisp/job_repo_activate_time** has a value greater 0 AND in table **BTCOPTIONS** the parameter **JOB_REPO_ACTIVATE** with value **PERIODIC_RUN** has been set to **ON**.

Post-Installation Activities for Transport Organizer

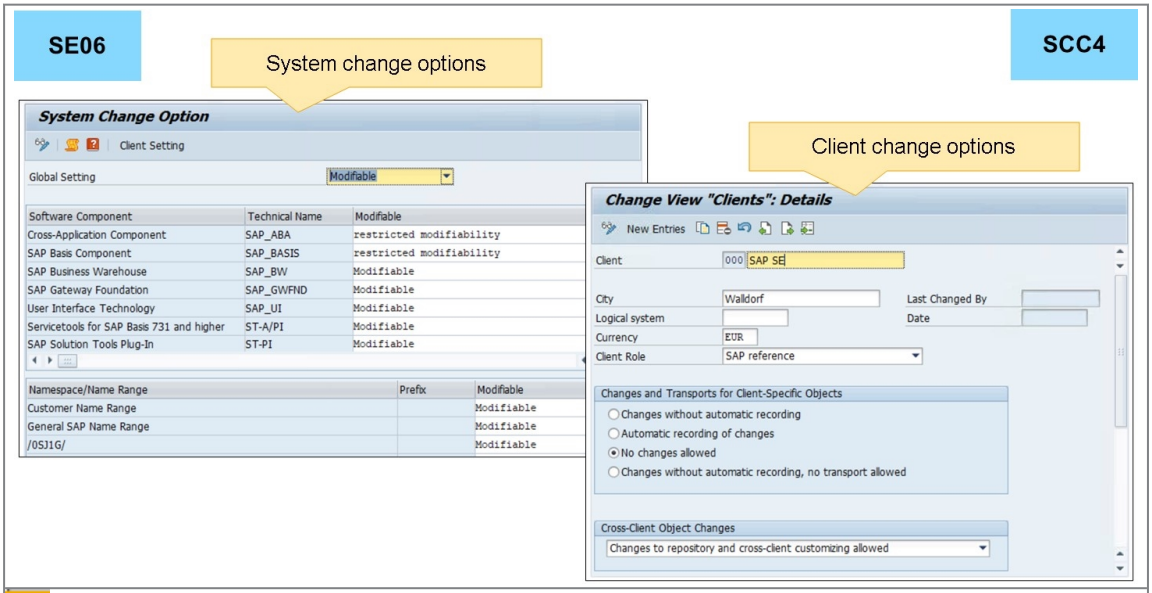

Figure 105: System and Client Change Options

If you have installed the SAP system from installation media, the Change and Transport System (CTS) is initialized by SAPinst. For this reason, you do not need to initialize the CTS after the installation. Basic settings for the CTS are generated during this initialization of the TMS.

If you have installed your SAP system as a copy of an existing SAP system, you must initialize the CTS after installation.

If you set up an SAP system that originated from a database copy by selecting the *Standard Installation* radio button, problems may arise when you transport objects or upgrade the SAP system.

Select the *Database Copy or Database Migration* radio button if the SAP system was created based on a copy. SAPinst provides utilities to copy and migrate databases of SAP systems.

Once for the entire SAP system, you have to set the system change options. These options control the changeability of repository objects.

You have to maintain the client change options once per the client. Besides others, they control the changeability of repository objects and customizing from within the specific client.

Transport Management System (TMS) Configuration

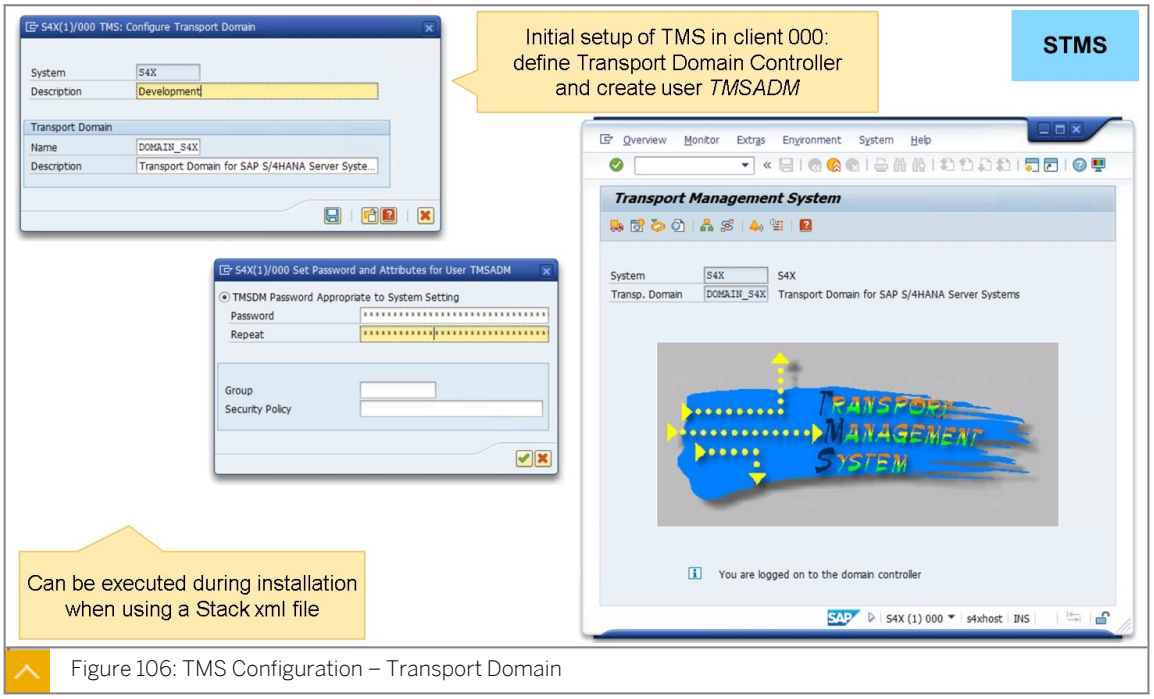

Figure 106: TMS Configuration – Transport Domain

You should already set up the TMS after the first SAP system of a transport landscape is installed. TMS describes the role of the SAP systems within a transport landscape, for example, development system, quality assurance system, and production system.

Hint:
It is not necessary that all SAP systems that should be part of the transport landscape exist from the beginning. The SAP systems that will be installed later can be represented as virtual systems until they exist physically.

After defining the role of SAP systems, the transport sequence is defined by creating transport routes. Optionally, you should also define the quality assurance (QA) procedure to prevent untested objects and customize settings to be imported into the production system.

Hint:
The basic configuration of TMS must be done in transaction `STMS` in client 000. This is especially because a user *TMSADM* is created in client 000. All subsequent configuration steps can be performed in any client.

TMS Configuration – Transport Routes

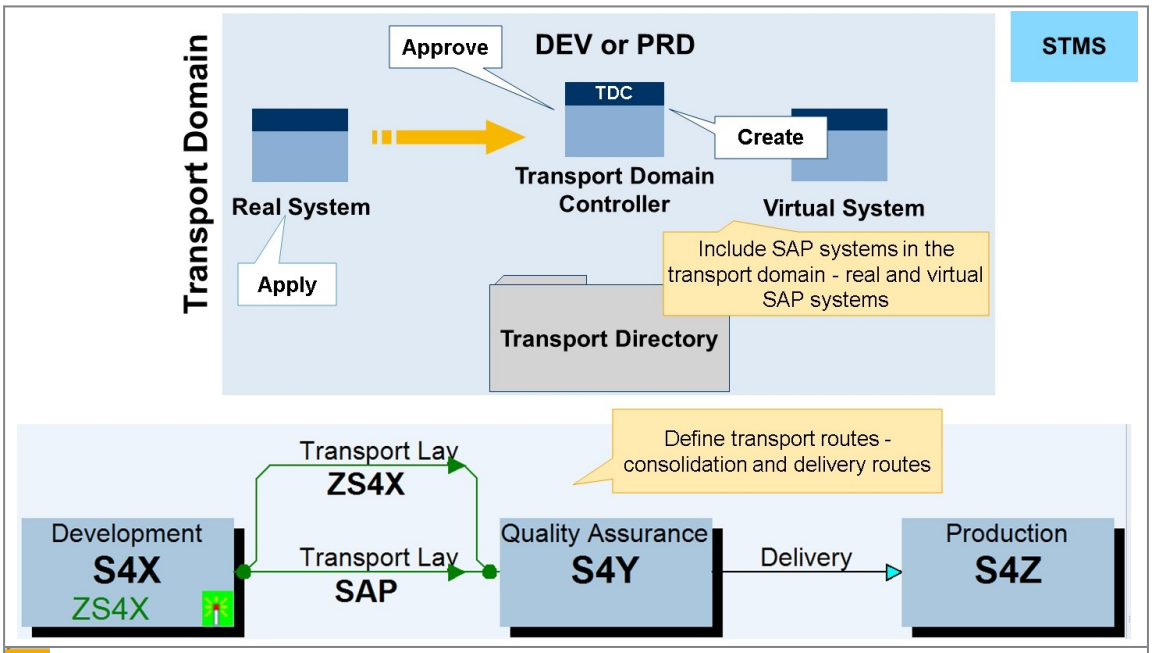

Figure 107: TMS Configuration – Transport Routes

The initialization of TMS is done when you call the transaction `STMS` for the first time. TMS initialization includes the setup of the transport domain controller (TDC).

To create virtual SAP systems or to approve SAP systems choose *Overview* → *Systems* in transaction `STMS`.

To create standard transport routes between SAP systems, choose *Overview* → *Transport Routes* → *Configuration* → *Standard Configuration*. Select *Single System* or *Development and Production System* or *Three Systems in Group*.

For more complex SAP system landscapes there is a graphical editor available.

LESSON SUMMARY

You should now be able to:

- Prepare the training system for an Software Update

Unit 4
Lesson 3

Configuring SAP License, Operation Modes, SAProuter

LESSON OVERVIEW
This lesson describes post-installation activities, including preparing the Transport Management System, importing system profiles, and setting up operation modes.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Configure SAP License, Operation Modes, SAProuter

SAP License for AS ABAP-based SAP system

You must have an SAP license to work with an SAP system. After installing a primary application server, a temporary license is active for only three months. During this period, you must install a permanent license. If the temporary license expires, only the user SAP* can log on to the SAP system.

You can install several licenses. If you change the installation number, all dependent information, such as SAP Software Change Registration (SAP SSCR) keys, is lost.

Conditions Requiring the Installation of a New License

You must install a new license after executing one of the following activities:

- Installed a new SAP system
- Changed the SAP system ID
- Changed the message server host
- Changed the hardware key by changing an existing hardware configuration
- Migrated to a different database

Note this list is not exhaustive.

For more information on how to apply SAP license key, see

- SAP Note 870871 - License key installation
- SAP Note 729013 - TOP customer questions

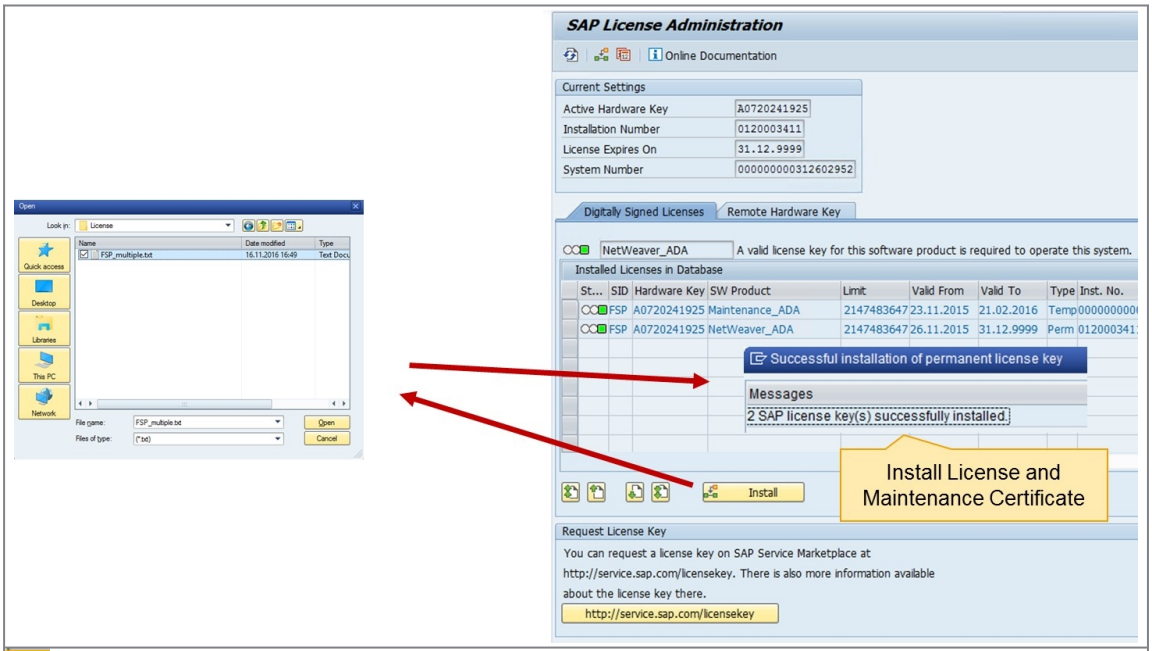

Figure 108: Installing a New SAP License in an AS ABAP-Based SAP System

Call transaction SLICENSE. The hardware key of the local host is shown on the screen. Use this hardware key to request a license from SAP.

In the AS ABAP-based SAP system, you can use the transaction SLICENSE to determine the hardware key on all SAP system hosts.

You can install a new SAP license on your SAP system using transaction SLICENSE. Select the *Install* button and upload the license file you received from SAP by mail. Immediately after the license is installed, the license key becomes active.

There are two types of keys that can be installed with transaction SLICENSE. They are delivered together in one license file.

- the license key itself – used to prove, that there is a valid license contract for this SAP system – needed for customizing and development in this SAP system
- the maintenance certificate – used to prove, that there is a valid maintenance contract for this SAP system – needed for patching and upgrading this SAP system

Note:
The maintenance certificate is valid for three months only. To avoid installing a new maintenance certificate every three months in all SAP systems, there is a function in SAP Solution Manager to automize this procedure. This causes a batch job running in SAP Solution Manager, that automatically checks and – if necessary – updates the maintenance certificate.

SAP License for AS Java-based SAP system

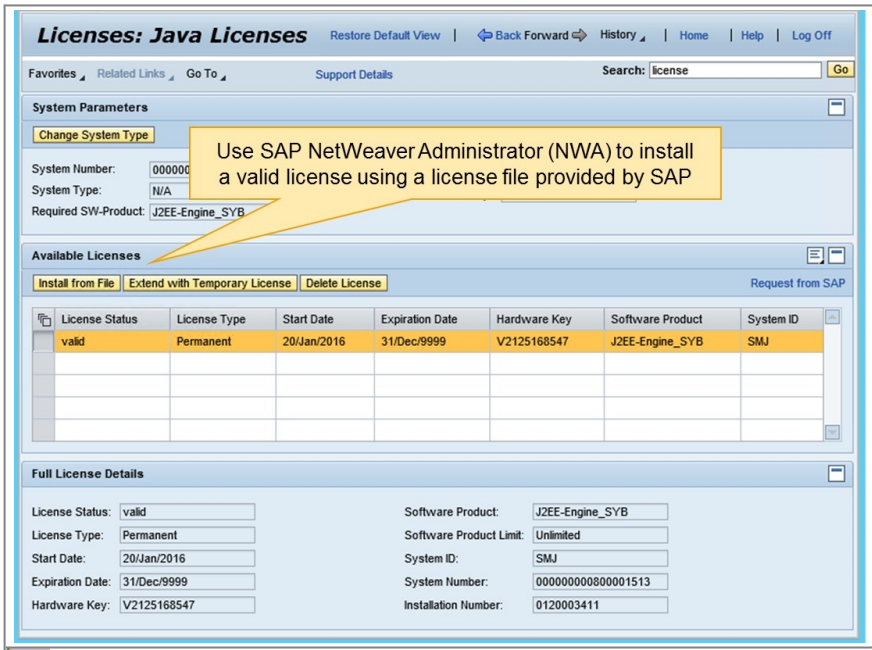

Figure 109: Installing a New SAP License in an AS Java-Based SAP System

For AS Java- based SAP systems you can use the SAP NetWeaver Administrator (NWA) to install a new license. In older releases of AS Java (older than AS Java 7.10), the Visual Administrator was used for this task.

Start the NWA and search for **`license`**. This directs you to the *License: Java Licenses* screen. Here you can install a new license, using the *Install from File* button.

Operation Modes Setup

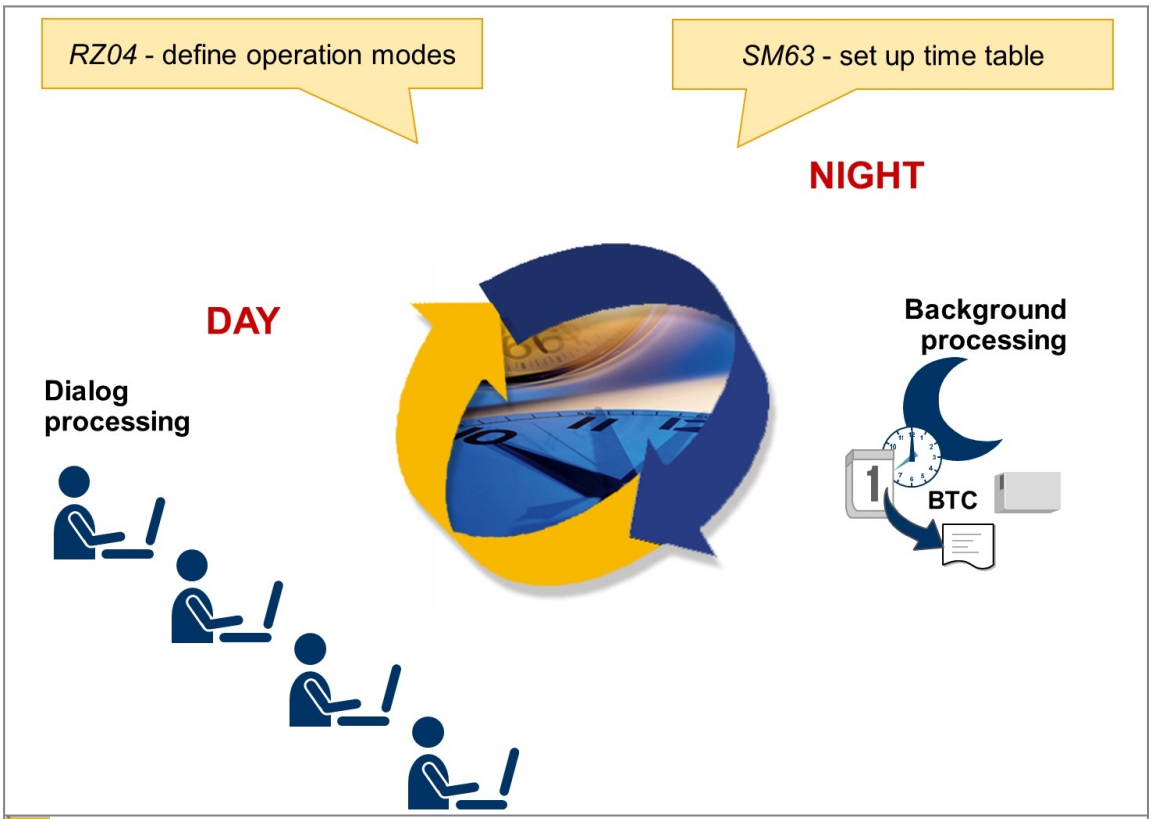

Figure 110: Set Up Operation Modes

You can control the amount of the different work process types during a day using a time table and operation modes.

Overview of Operations Mode Setup

- The operation modes are created as empty containers in transaction `RZ04`.

> Hint:
> The prerequisite is that the profiles are loaded into the database with transaction `RZ10`.

- All started application servers of the SAP system are recorded and the work processes defined in the instance profiles are assigned to the operation modes as default values.
- Set the desired number of different work processes per application server and per operation mode.
- In the timetable (transaction `SM63`), you specify the periods for which operation modes are valid and when the switch between operation modes should occur.

Setup of Logon Groups

Note:
Set up logon groups with transaction SMLG.

Load distribution allows you to dynamically distribute the SAP users across the application servers of an SAP system. Logon load balancing increases efficiency with respect to performance and the use of SAP system resources for variously defined workgroups. The efficiency is increased by distributing users across available application servers based on requirements for workgroup service and utilization.

Installation of Printers

Note:
Install printers with transaction SPAD.

The platform-independent SAP spool system is responsible for the output of forms and documents. All devices, servers, and so on that are involved in printing are defined and managed in spool administration using transaction SPAD. For more information refer to “SAP Printing Guide” in online documentation.

SAProuter: Basic Information

The SAProuter is an SAP program that acts as an intermediate station or proxy in a network connection between SAP systems or between SAP systems and external networks. SAProuter controls access to your network by using an application level gateway, therefore, it is a useful enhancement to an existing firewall system or port filter.

SAProuter Functions

- Controls and logs connections to your SAP system, for example, from an SAP service center
- Sets up indirect connection when programs involved in the connection cannot communicate with each other due to the network configuration

  

  Note:
  The address conflicts if nonregistered Internet Protocol (IP) addresses are used, or if restrictions arising from firewall systems are encountered.

- Improves network security by means of:
  - A password, which helps to protect your connection and data from unauthorized external access
  - Access from particular SAProuters only
  - Access of only encrypted connections from a known partner by using the Secure Network Communication (SNC) layer
- Increases performance and stability by reducing the SAP system workload in a LAN when communicating with a WAN

SAP offers its customers access from their SAP system to SAP Support Portal. This is used for downloading SAP Notes via transaction `SNOTE`, for example. Therefore, you must set up a remote network connection to SAP.

Note:
For more information about remote connections to SAP, see SAP Library for remote connections on SAP Help Portal at http://help.sap.com and SAP Note 35010 - Service connections: Composite note/overview.

Remote Connection to SAP Support

The SAProuter uses a permission table that contains the host names and port numbers of the predecessor and successor points on the route (from the point of view of SAProuter), as well as the password required to set up the connection. You can also use the SAProuter permission table to specify which connections are allowed and which connections are prohibited by the SAProuter.

You must create a separate route permission table for each SAProuter on your network.

Standard entries in a route permission table appear as *P/S/D <source-host> <dest-host> <dest-port> <password>*. The entries **<source-host>** and **<dest-host>** can be SAProuters.

P(ermit) causes SAProuter to set up the connection. P(ermit) entries can contain a password. SAProuter checks whether this password corresponds to that sent by the client.

S(ecure) only allows connections with the SAP protocol. Connections with other protocols, such as Transmission Control Protocol (TCP) are not allowed. For D(eny) prevents the connection from being established.

Note:
For more information about SAProuter see SAP Note 30289 - SAProuter documentation.

Configuring Remote Connection to SAP

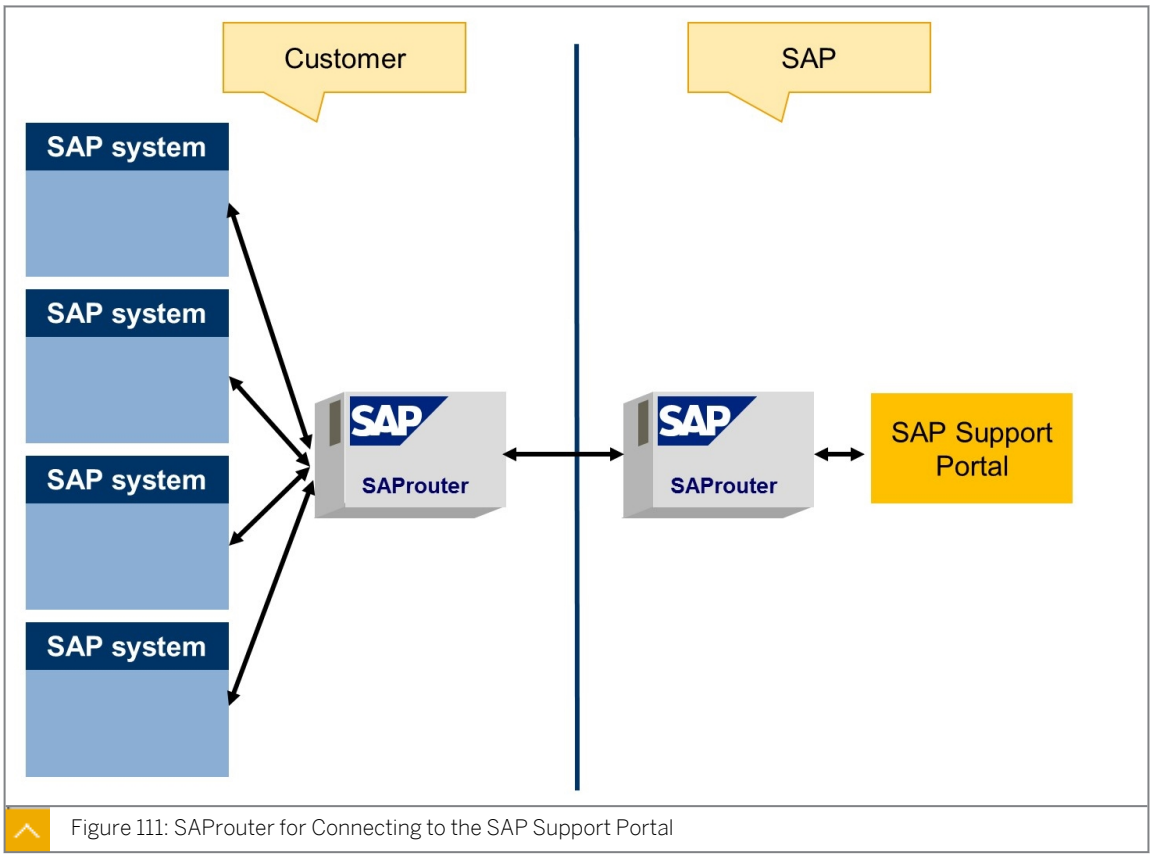

Figure 111: SAProuter for Connecting to the SAP Support Portal

SAProuter increases network security and simplifies network configuration.

SAProuter allows you to make indirect network connections. SAProuter software is included in the standard SAP kernel. An additional installation is not required.

SAP Support Portal is the SAP-based service system, which provides the technical link between SAP customers and SAP. SAProuter controls connections from SAP to your SAP system. SAProuter is started as a demon under UNIX and as a service under Windows.

Note:
Running an SAProuter is a must for every customer! Otherwise, for example, full SAP support is not possible!

SAP Notes Regarding SAProuter Configuration:

- SAP Note 14716 – Questions on ISDN, remote connection to SAP
- SAP Note 30289 – SAProuter documentation
- SAP Note 46902 – Security aspects with remote access

SAP Note 30289 provides the method to perform the following tasks:

- Install SAProuter
- Configure routing table

- Start SAProuter

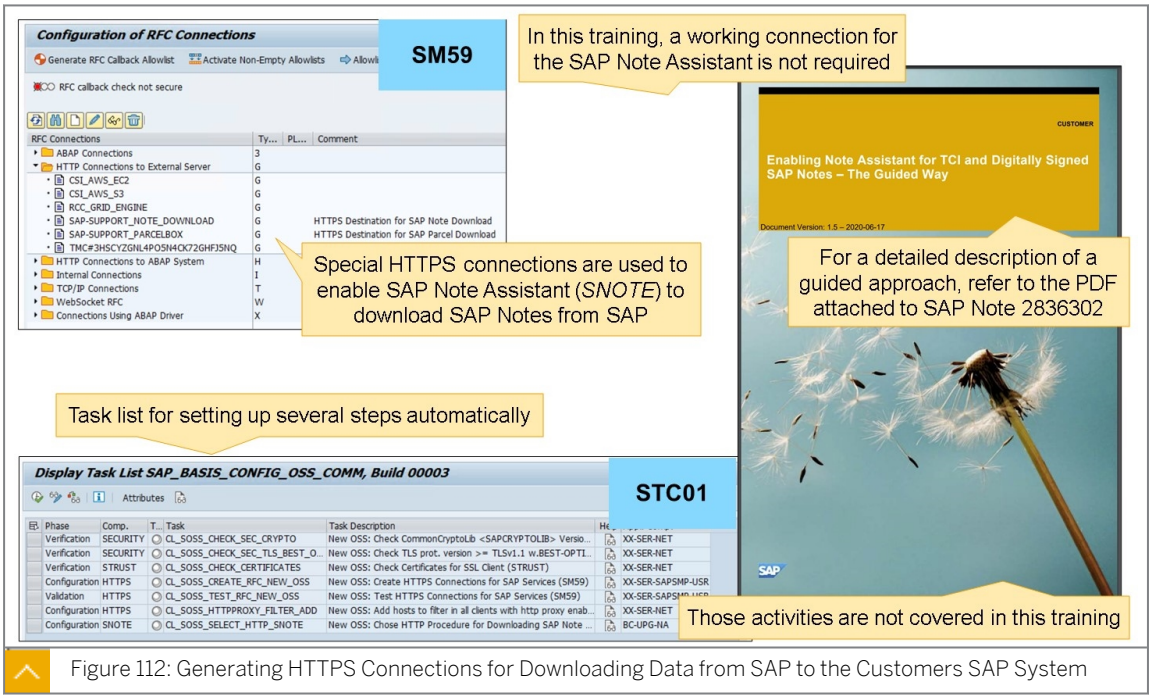

Figure 112: Generating HTTPS Connections for Downloading Data from SAP to the Customers SAP System

For transferring data from SAP to your SAP system, special HTTPS connections are needed. These are used for:

- Transferring of EarlyWatch Alert data
- Exchanging of data using the SAP Notes Assistant

For a detailed description of each step in of guided approach, refer to SAP Note 2836302 – Automated guided steps for enabling Note Assistant for TCI and Digitally Signed SAP Notes

To configure the HTTPS connections refer to:

- SAP Note 2738426 – Automated Configuration of new Support Backbone Communication
- SAP Note 2793641 – Automated Configuration of new Support Backbone Communication - Update 01
- SAP Note 2827658 – Automated Configuration of new Support Backbone Communication - Update 02

> Note:
> Before January 2020, instead of the HTTPS connections an RFC connection was used. This was generated via transaction `OSS1`. It was called *SAPOSS*. This does not work any longer since mid of January 2020.

LESSON SUMMARY

You should now be able to:

- Configure SAP License, Operation Modes, SAProuter

Unit 4
Lesson 4

Describing Installation Check, Additional Languages, Business Functions

LESSON OVERVIEW

This lesson describes how to complete further setup activities of your SAP system. These activities include scheduling jobs, installing additional languages, and activating business functions.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe Installation Check, Additional Languages, Business Functions
- Complete final installation checks
- Describe the installation of additional languages
- Describe activation of business functions

Installation Checks

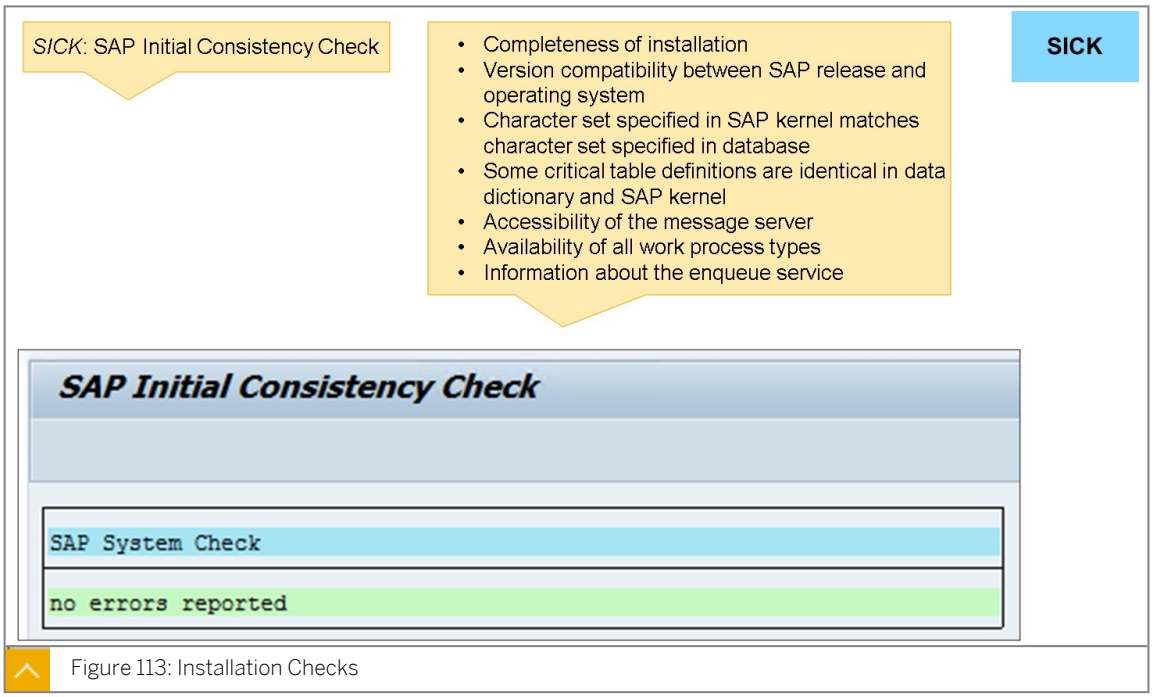

Figure 113: Installation Checks

The installation check using transaction `SICK` validates the consistency of the newly installed SAP system.

SAP System Consistency Check

The consistency check determines inconsistencies in your SAP system. This function is also called automatically when you start an application server of your SAP system.

The table structures that are checked include the tables SYST, T100, TSTC, TDCT, TFDIR, and others.

Installation of Additional Languages

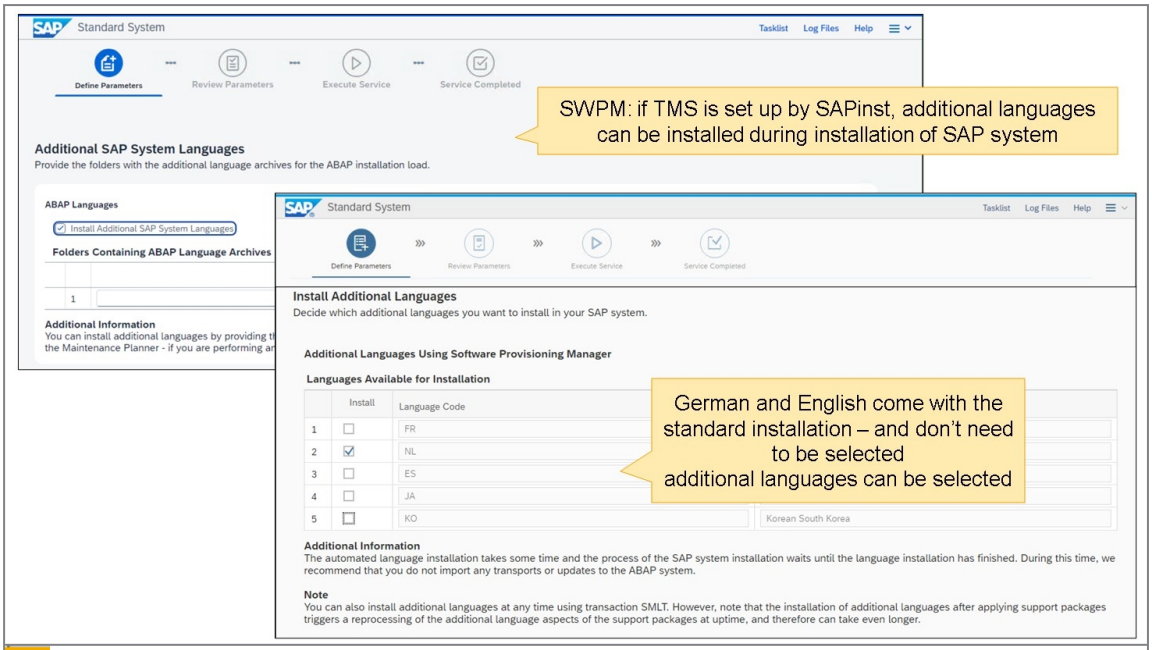

Figure 114: Installing Additional Languages During SAP system Installation

SAP systems supports up to 40 different languages. The language with which a user works is specified through entry on the logon screen, by a SAP Logon setting, by a profile parameter, or by a default setting in the user master record. This language must first be imported into the SAP system before users can log on with the desired language. Only German (DE) and English (EN) are initially installed after a new installation of an SAP system.

During installation it is possible to let SAPinst set up the Transport Management System (TMS). If you use this option, you can choose to let SAPinst install additional languages. Therefor you must provide the corresponding language media.

> Note:
> Without SAPinst setting up the TMS, SAPinst can not install additional languages. This is because the language installation relies on a configured TMS.

After the installation, if required, you can use transaction `SMLT` to import additional languages.

If you select a language (other than German, English), you should note that the selected language is not fully translated. The texts that are not translated in the selected language must be provided using a supplemental language. This supplemental language must be a completely translated language. This can also be recursively configured so that you use a number of supplemental languages, each of which supplements texts that are not translated in the previously configured languages.

Economic, political, and cultural criteria determine the extent to which individual languages need to be imported into the SAP system and the extent to which these languages are completely translated. User acceptance is an important aspect in these considerations.

Installing Additional Languages after the Installation

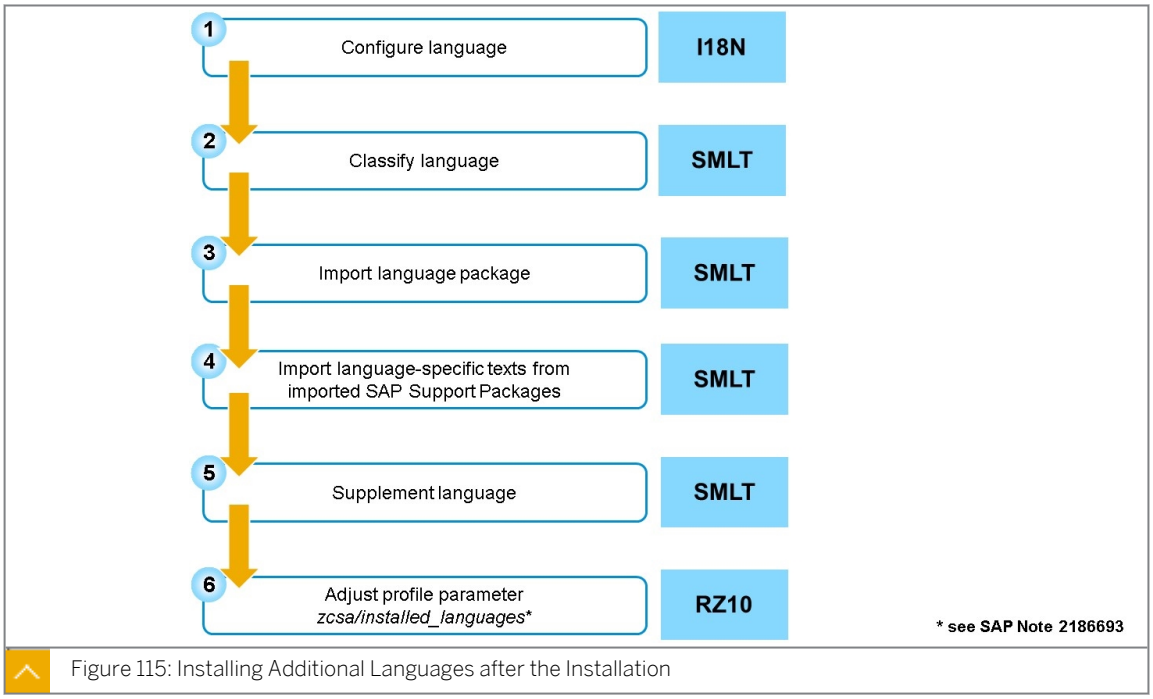

Figure 115: Installing Additional Languages after the Installation

The figure above shows an overview of the steps that are required for a language import.

Before you can classify a new language in transaction `SMLT`, you have to configure the required languages using program *RSCPINST*. For more information on program RSCPINST see SAP Note 42305 - RSCPINST (I18N configuration tool)

You can also use transaction `I18N` (area: *I18N Menu → I18N Customizing → I18N System Configuration*). Choose *Add Language* to select the country code for each language required and then select the *Activate* button.

To import additional languages call transaction `SMLT`. Here you can also find tools for language transports at *Goto → Other Tools*.

Language Management with SMLT

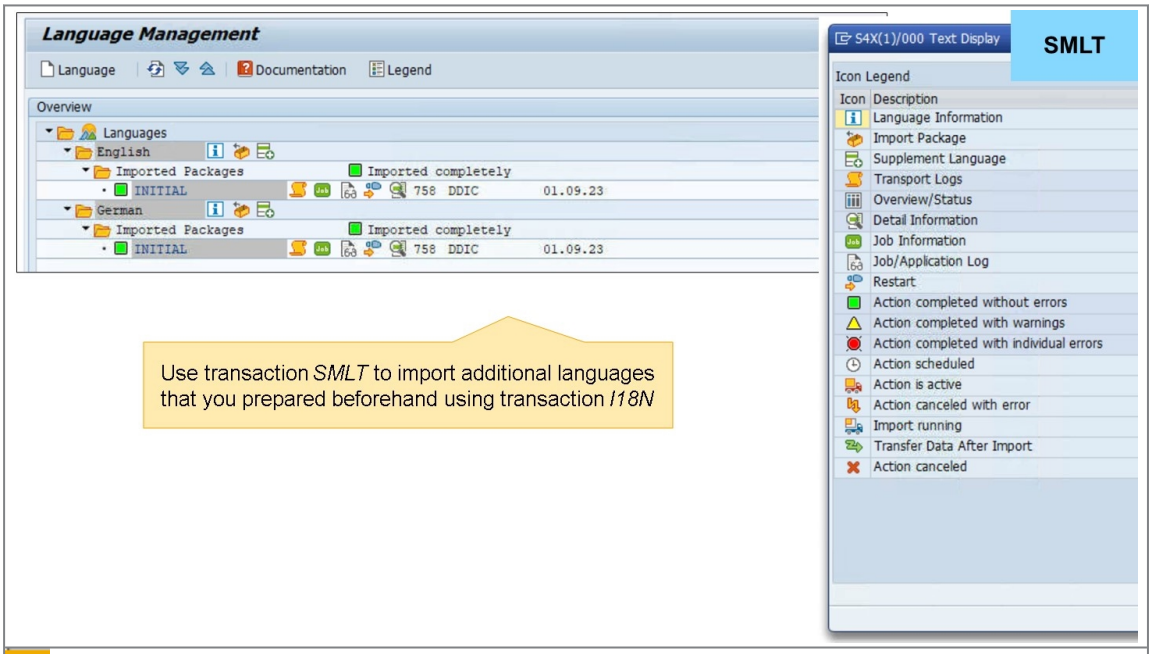

Figure 116: Language Management with SMLT

SAP delivers SAP Support Packages to correct errors that occur in SAP transactions. SAP Support Packages can contain language-dependent data, such as message texts, ABAP text pool entries, or screen texts. After importing an SAP Support Package with transaction `SPAM` or using the tool *SUM*, the translated texts for these objects have the newest status for all languages that exist in the SAP system. Problems can occur if an additional language is to be imported from the language media into an SAP system in which SAP Support Packages have already been imported. Since the language media is created before the first SAP Support Package is shipped and the objects in the SAP Support Packages are only provided with translations for the languages that have already been imported, importing a language subsequently overwrites the objects contained in the SAP Support Packages. Texts can be incorrect or completely missing.

For more information on languages and SAP Support Packages, see SAP Note 352941 - Consultation: Languages and Support Packages.

You must classify each language in transaction `SMLT` to make it known to the SAP system. Only then is it possible to import a language package or supplement the language.

Supplementation of Language

The following steps show the method to import a language package or supplement the language:

1. In transaction `SMLT`, choose *Language* → *Classify*.
2. In the dialog box that appears, choose the language to be imported and the associated supplementation language.
3. Note that you must adapt profile parameter *zcsa/installed_languages* in the DEFAULT profile, accordingly.

You can display the current settings for a language any time by choosing the Information button on the initial screen of transaction `SMLT`. If no supplementation language was specified

when classifying a language, then the language can be specified any time. You can use transaction SMLT to import an additional language package. English (EN) and German (DE) are always completely available in newly installed SAP systems. You therefore do not need to import these into SAP systems. After importing the languages, you must also import the language data contained in SAP Support Packages. To do so, select the affected language in transaction SMLT and choose *Language → Special Actions → Import Support Packages*.

To fill translation gaps that exist in a language, you should start the language supplementation after the language import. The supplementation actions are client-dependent. The language supplementation is performed in the client that you are logged on. If you use multiple clients, you must perform the language supplementation explicitly in each productive client. You can access the texts stored in cross-client database tables simultaneously from all clients. The default setting is set in such a way that cross-client tables are supplemented if you are logged on to client 000.

The following rules apply for defining supplementation logic:

Languages can have different degrees of translation:

- 1 – DE/customizing and documentation complete
- 2 – DE/customizing complete; documentation in parts
- 3 – DE/customizing complete; no documentation
- 4 – DE/customizing application-dependent; no documentation
- 0 – Not classified; not a standard SAP language
- 9 – Technical language code

This results in restrictions:

- You cannot supplement languages with a degree of translation of 1. See SAP Note 111750 - Supplementing German with English (Customizing).
- You should define a supplementation language for every language in the SAP system (except languages with a degree of translation of 1).
- You can only supplement texts from a language with a degree of translation of 1 or from a language that has already been supplemented with a degree of translation of 1.
- You need to take the following SAP Notes into account:
  - SAP Note 830722 - Current note for language transports in Release 7.0
  - SAP Note 73606 - Supported Languages and Code Pages
  - SAP Note 15023 - Initializing table TCPDB (RSCP0004) (EBCDIC)
  - SAP Note 18601 - Frequently asked questions about language transport
  - SAP Note 43853 - Consulting: Language-dependent + client-specific C-tables
  - SAP Note 195442 - Language import and Support Packages
  - SAP Note 352941 - Consultation: Languages and Support Packages
  - SAP Note 703795 - Transaction UMB_CUST: Menu bar displays only ?????

> Note:
> See course *ADM103 - System Administration II for SAP S/4HANA and SAP Business Suite* for details.

Activation of Business Functions

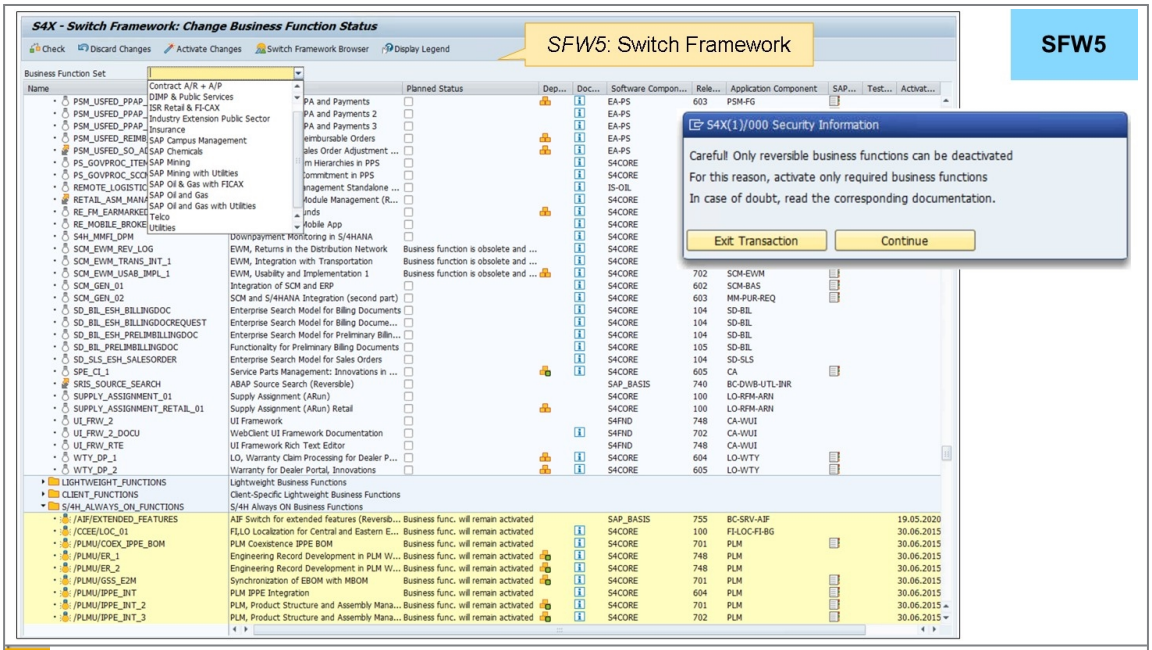

Figure 117: Activation of Business Functions

Business functions can be *ENTERPRISE_EXTENSIONS*, *ENTERPRISE_BUSINESS_FUNCTIONS*, or Industry Solutions, for example *UTILITIES*. In SAP S/4HANA server systems there is also a category *S/4H_ALWAYS_ON_FUNCTIONS*. Client-independent activation switches allow you to activate these functions.

You activate a business functions by selecting it and using the Activate button in transaction `SFW5`, the *Switch Framework*. Transaction `SFW5` provides additional information about the business functions. After activating business functions, a batch job is started that switches all objects belonging to the selected business function.

> Hint:
> Business functions are activated manually only in the development system. They are transported to the subsequent SAP systems where they are imported. The import in the subsequent SAP systems automatically starts the batch job for activating the individual object switches.

Generally, you cannot deactivate an activated switch because after activation data is maintained in a different way than it would be if the switch was inactive. This depends on the component and the actions performed in the SAP system after activation. SAP recommends activating and testing the switches in a sandbox system before activating them in the development system, because you generally cannot deactivate the switches.

LESSON SUMMARY

You should now be able to:

- Describe Installation Check, Additional Languages, Business Functions
- Complete final installation checks
- Describe the installation of additional languages
- Describe activation of business functions

Unit 4
Lesson 5

Using Automated Setup of an AS ABAP-based SAP System

LESSON OVERVIEW

This lesson discusses the initial steps to set up SAP NetWeaver 7.4 as AS ABAP. These steps can be configured and run automatically, which results in less manual work to prepare an SAP system for further use.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Describe automated setup of AS ABAP

Using Automated Setup of AS ABAP

SAP offers some functions for automated configuration of SAP systems, based on task lists. Task lists contain one or more individual steps that execute some automatic SAP system configuration. SAP delivers around 500 setup steps. You can create your own task lists, containing selected setup steps. You can access these functions by using the ABAP task manager for lifecycle management automation (short: ABAP task manager) , via transaction `STC01`. The ABAP task manager guides you through extensive configuration processes by means of predefined task lists. You can customize these task lists according to your needs.

Note:
Those functions are available since SAP NetWeaver AS ABAP 7.30 and have been downported to lower releases as well.

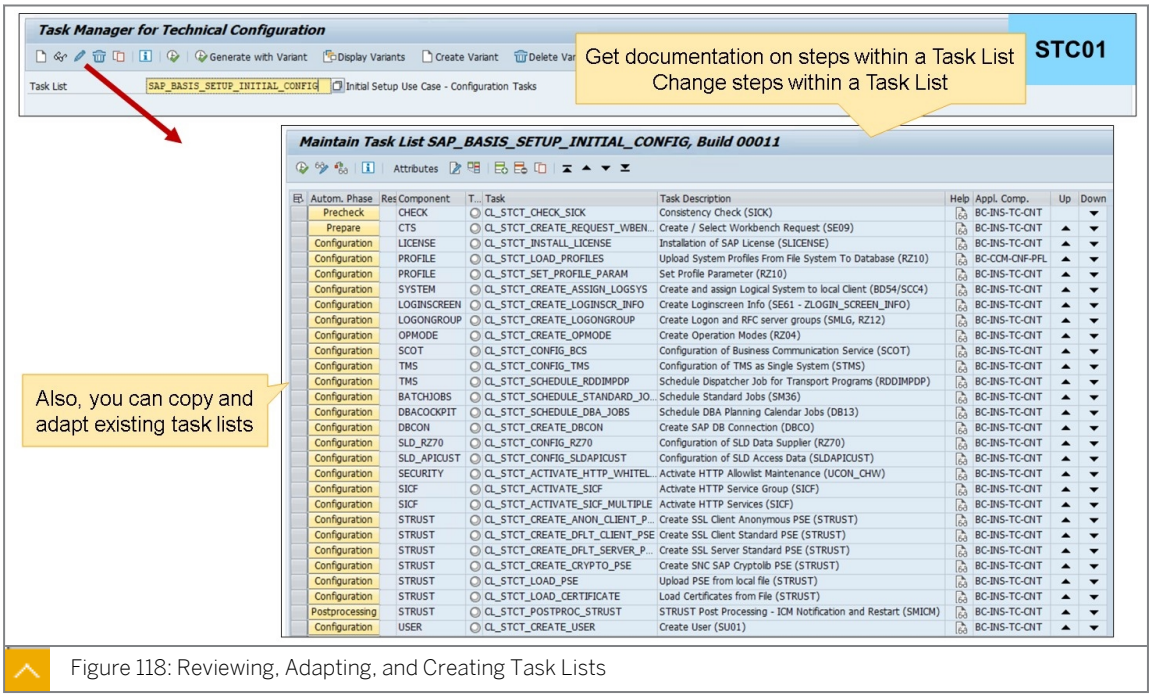

Figure 118: Reviewing, Adapting, and Creating Task Lists

You can modify the task selection and parameter settings according to your needs and you can create your own task lists.

To see which tasks are included in a task list, choose the *Display Task List* function.

To add, remove or change tasks in an existing task list, choose the *Edit* function.

You can remove task lists which are no longer needed by deleting the respective task lists.

To duplicate existing task lists, choose *Copy Task List*.

To execute a certain extensive scenario automatically, choose *Generate Task List Run*.

You can also save a set of selections and values of an existing task list by creating a task list variant. A task list variant is a customized task list. To configure a certain extensive scenario automatically, run a task list variant.

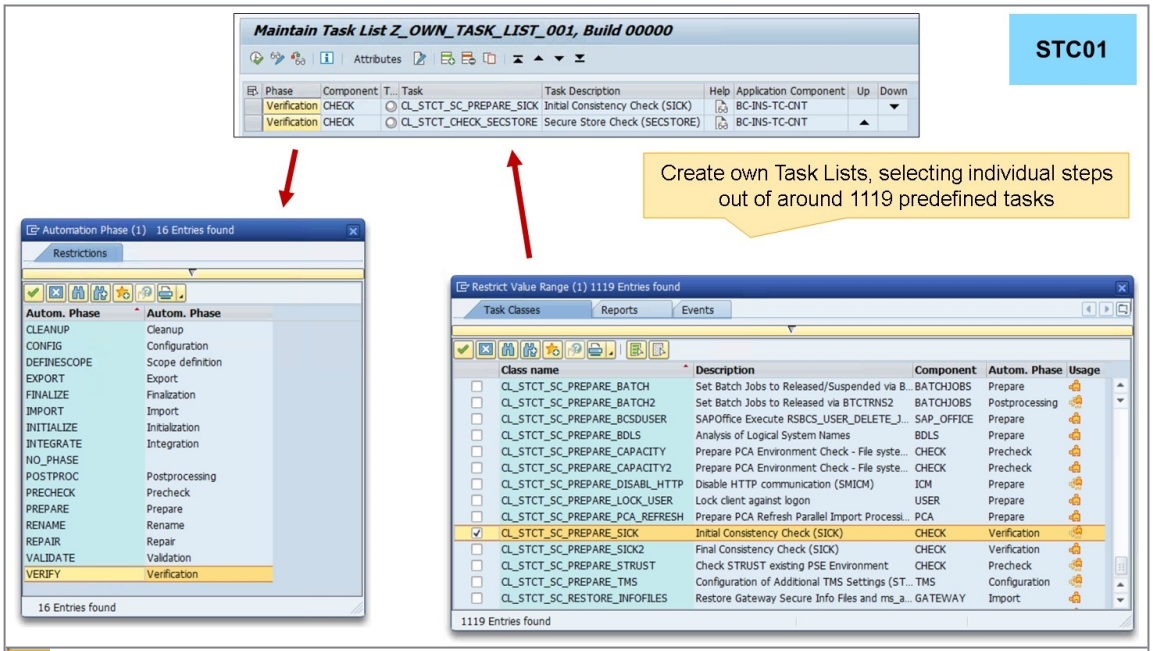

Figure 119: Creating Own Task Lists

To create your own task list:

1. Enter a name for the new task list.
2. Choose *Create New Task List*.
3. Enter a description, if available a related documentation object and its class, and confirm your entries.
4. Modify the task selection and the parameter settings according to your needs.
5. Save the new task list.

> Hint:
> To monitor the execution of task lists, use transaction `STC02`, Task List Run Monitor.

For more information, check the following links:

SAP Note 1923064 - Initial Setup: System Configuration using ABAP Task Manager.

Call transaction `STC01` in your SAP system and choose the Online Help button directly in the tool. FAQ - ABAP Technical Configuration: http://scn.sap.com/docs/DOC-55774

LESSON SUMMARY

You should now be able to:

- Describe automated setup of AS ABAP

Unit 4
Lesson 6

Configuring an AS Java-based SAP System

LESSON OVERVIEW
This lesson describes the features and use of the SAP NetWeaver Administrator (SAP NWA) for the configuration of an AS Java-based SAP system.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Describe the configuration of an AS Java-based SAP System

Configuration Wizard

When you have installed an AS Java-based SAP system, the configuration wizard establishes some technical settings. These settings are required for the technical processing of an SAP system or a technical scenario, for example, connectivity, service users, and usage-type initialization.

The technical settings should be made with the configuration wizard immediately after installing an AS Java-based SAP system. The configuration wizard is a part of the SAP NetWeaver Administrator (NWA). The SAP NetWeaver installation guide contains detailed information about the configuration tasks to choose while running the configuration wizard.

The configuration wizard makes the technical settings (technical configuration) using scenario-based templates, for example, for the AS Java-based SAP Process Integration (SAP PI) system, pure AS Java system, and so on. Automated configuration tasks allow you to centrally enter the same data only once, for example, connectivity, service users, and so on. The configuration wizard automatically distributes this data to the AS Java-based SAP system.

You cannot use the configuration wizard after an SAP system upgrade or after the installation of an additional usage type.

Caution:
You can directly run the configuration wizard only once, after you have installed and patched the AS Java-based SAP system.

Configuration Wizard Initialization

Before you run the configuration wizard, apply the latest kernel patch and SAP Support Packages to your SAP system.

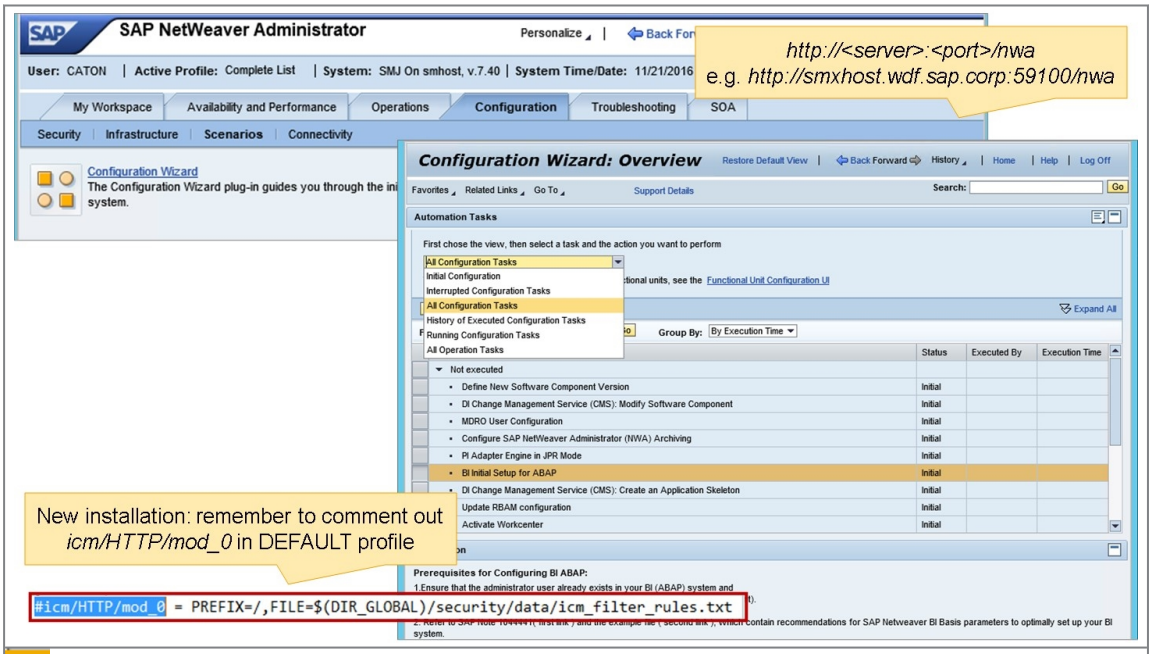

Figure 120: Configuration Wizard

Steps to Set Up the Configuration Wizard

1. Call *http://<server>:<port>/nwa* in a browser and log on with a Java administrator user.
2. Go to *Configuration*, then *Scenarios*. Start the *Configuration Wizard*.
3. Choose a task from the list and choose the *Start* button.
4. On the next screen, enter the required data and choose the *Next* button.
5. Follow the screens in the configuration wizard. The configuration wizard makes the necessary settings and reports any configuration errors.

Note:
For more information about the configuration wizard and its limitations, see SAP Note 923359 - Collective Note: Configuration Wizard - Template Installer.

Verification of the AS Java Configuration

Steps to Verify the AS Java-based System Configuration

1. Create a second administrator user.
2. Check and configure the necessary communication ports.
3. Check the additional configuration settings for the following parameters:
   - Parameters depending on the size of the AS Java-based SAP system
   - Parameters depending on the expected workload
4. Configure security settings.

To prevent locking the administrator (in case you change the administrator password and forget to update the entry secure storage), create a second administrator user after installing an AS Java based SAP system.

When you install an AS Java application server or create an additional server process, the AS Java assigns default values to the communication ports. If some of these communication ports are being used by another program, manually assign a different value to the corresponding port.

If necessary, change the assigned join port of a server process on which the server process listens for connections (for example, when the port assigned to the cluster element is already in use by another program).

Additional Configuration

The additional cluster configuration that you perform is divided into the following types of configurations:

- Required configuration

  The required configuration includes the configuration of some additional parameters depending on the size of the AS Java-based SAP system, the expected workload, and so on.

  Although these settings are referred to as required configuration, it is recommended that you maintain the following settings only after careful consideration and testing:

  - Connections manipulation

    Connections manipulation configures the maximum number of user connections that the dispatcher can handle simultaneously and a time out for establishing these connections.

  - Service load time out

    Service load time out configures the maximum time for which the services on a cluster node should start.

- Optional configuration

  The optional configuration is performed only if there are some problems within the AS Java-based SAP system operation. Otherwise, it is recommended that you do not reconfigure the default settings.

  The default settings are as follows:

  - Thread system configuration

    The thread system configuration optimizes the reallocation of SAP system resources. It is recommended to closely monitor and reconfigure the AS Java-based SAP thread system.

  - Startup and shutdown configuration

    Startup and shutdown configures the manner in which the cluster elements are started up and shut down.

  - Cluster communication configuration

    Cluster communication configures the Message Server, session, and lazy communication.

  - Services stop and event time out configuration

    Service stop and event time out specifies the waiting time of the Service Manager for each service.

The following components of the required and optional configurations facilitate the cluster configuration settings:

- Connections Manipulator Manager

  The Connections Manipulator Manager represents the management of client connections in the cluster in AS Java-based SAP systems. The Connections Manipulator Manager has an indirect connection with all the services running on the dispatcher that receive or send data outside the cluster using a socket. You can configure the maximum number of user connections that a dispatcher is able to process at a certain moment, configure a time out for these connections, and configure the connections checks.

- Service Manager

  The Service Manager changes the maximum time for which all services on a cluster node have to be started. If there are services that have not started after the time out elapses, the Service Manager assumes that all services are started and the SAP system continues with the other startup processes. The timed-out services continue their startup process in the background. A notification for each timed-out service is logged in the log files.

- Thread system

  The AS Java thread system is responsible for handling SAP system and client threads. It comprises two managers – Thread Manager and Application Thread Manager.

  All the threads in which AS Java-based SAP system operations are executed, such as core, services, and so on, use system threads supplied by the Thread Manager. The Application Thread Manager supplies the threads in which the code of the client application is executed.

- Cluster Manager

  The Cluster Manager configures the cluster in a way so that it works in full parallelism or it sets the cluster's startup or shutdown in a serial manner. For configuration purposes, use the properties provided by the AS Java Cluster Manager. By default, the cluster elements startup and shutdown in full parallelism mode, that is, simultaneously without waiting for each other.

  Cluster Manager also configures the following communication:

  - Message Server communication

    The Message Server communication is established through the Message Server that is used as a dispatcher when sending messages. The advantage of this communication is that it provides a fail-over function that avoids the loss of information. The Cluster Manager provides the properties needed to configure the default settings of the Message Server communication.

  - Session communication

    The session communication is used to exchange information between the dispatcher and a server in one cluster group. The Cluster Manager provides properties to modify the default settings of the session communication.

  - Lazy communication

    The lazy communication mechanism is used automatically by the Cluster Manager to quickly exchange large amounts of information between two server processes without using the Message Server as an intermediary. The lazy communication is enabled only

for a predefined list of services by default. You can enable a mechanism by which lazy communication is activated when a previously defined amount of objects is transferred between two parties for a defined time interval.

Hint:
It is recommended not to modify the default Message Server communication, the default session communication, and the default lazy communication settings unless it is officially advised to do so by SAP support.

- Stop time out

  The stop time out service in the Service Manager is responsible for the maximum time that the Service Manager waits for each service to stop when the cluster node is shutting down. If this time out has elapsed and the service has not managed to stop, the Service Manager continues with the cluster node shutdown. A notification for each timed-out service is logged in the log files.

- Event time out

  The event time out in the Service Manager specifies the time that the Service Manager waits for the event to be processed before undertaking another action. If you want to stop a service, a beforeServiceStopped event is executed first. Then, the Service Manager waits for all components to process the event. That is, the components are notified that the service will be stopped and they should undertake the appropriate actions, such as unregistration and so on. The service is stopped after the specified time out.

  The default value of the event time out is 20 sec. If after 20 sec, there are still components that have not processed the event, the system does not wait for them and the services are stopped. It is recommended to modify this value only if you have problems in stopping the service, else do not reconfigure the default time out.

Security Configuration

While configuring security, you may need to configure some additional aspects of the server's security environment. Providing security for the applications that run on the AS Java-based SAP system is an important aspect in the overall architecture of the AS Java-based SAP system. You need to be able to identify the users that access the server and protect access to individual resources. Confidentiality is also important when dealing with sensitive information.

Observe the following settings to increase security for your AS Java-based SAP system:

- Security Provider Service

  The Security Provider Service is the primary service required for maintaining security environment of the server.

  You can use this service for the following:

  - Choose cryptographic providers.
  - Select the data source.
  - Maintain users and groups.
  - Assign security roles.

  - Restrict access to resources.
  - Set up your login modules to use.
  - Maintain protection domains.
  - Monitor user sessions.

- User Storage Service

  The Security Provider Service uses the User Storage Service to determine and access the chosen data source, either the Database Management System (DBMS) user store or the User Management Engine (UME). No administration tasks are directly associated with this service; however, you can change the properties that apply.

- Key Storage Service

  The Key Storage Service is used to maintain the server's personal security information where cryptography is supported, for example, when using the Secure Socket Layer (SSL) protocol. You can create server's key pairs, generate the corresponding certificate signing requests, and maintain the list of trusted Certification Authorities (CAs) associated with the key pair.

- SSL Provider Service

  The SSL Provider Service is used to select the key pair that the server is to use for SSL. If you are using client certificates for user authentication, you also maintain the list of CAs who you trust as issuers of client certificates.

- Certificate Revocation Check Service

  Certificate Revocation Lists (CRLs) are used with the AS Java-based system to make sure that a given certificate has not been revoked by the issuing CA.

- Security Assertion Markup Language (SAML) Authentication Service

  The SAML Authentication Service handles the user authentication for applications that use the SAML. It requests and processes the SAML user assertions from the corresponding SAML source site.

- Secure Storage Service

  The Secure Storage Service maintains the secure storage area of the AS Java-based system. The secure storage area is a storage area on the server that applications or services can use to store security-critical information, such as passwords. Data stored in this area is encrypted and can only be accessed and decrypted by the corresponding application.

- Destination Service

  Applications or services establish connections to other services. When using such connections, you need to specify the address of the remote service and confirm the user authentication information to use for the connection. Many applications use the Destination Service for this purpose.

LESSON SUMMARY

You should now be able to:

- Describe the configuration of an AS Java-based SAP System

Learning Assessment

1. When the database is running in a mode where it does not write any change logs, data can be restored to:

   Choose the correct answer.

   - ☐ **A** the last full backup
   - ☐ **B** a specific date and time (point in time recovery)

2. After installing an SAP system (not an SAP S/4HANA Server system) you should schedule standard background jobs.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

3. You configure the Transport Management System (TMS) in a freshly installed SAP system running on AS ABAP 7.4 and above. What will be done (by the system) during the initial setup of TMS?

   Choose the correct answers.

   - ☐ **A** The user SUPPORT will be created
   - ☐ **B** The user TMSADM will be created
   - ☐ **C** A password is required
   - ☐ **D** The transport directory will be created
   - ☐ **E** The system description needs to be provided

4. In which client is the initial set up of TMS done?

   Choose the correct answer.

   - ☐ **A** In client 000
   - ☐ **B** In the production client
   - ☐ **C** In any client

5. The standard background jobs are configured in the same way, whether you configure the jobs for an SAP S/4HANA Server or for a non-SAP S/4HANA Server system that is based on AS ABAP.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

6. For which scenarios can you use the SAProuter?

   Choose the correct answers.

   - ☐ A Enabling SAP support to log on to your SAP system
   - ☐ B Restricting from which PCs users can log on to which SAP systems
   - ☐ C Setting up an auto logout for unused user sessions
   - ☐ D Enabling single sign on to multiple SAP systems

7. After installation of the PAS, no user can log on to the SAP system until a permanent license is installed.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

8. What are use cases of SAProuter?

   Choose the correct answers.

   - ☐ A Increase network security
   - ☐ B Simplify network configuration
   - ☐ C Enable remote support connections
   - ☐ D Determine the language version of the online help displays
   - ☐ E Offering customers access to the SAP Help Portal

9. What are the steps needed to install additional languages?

   Choose the correct answers.

   - ☐ **A** Classifying the language
   - ☐ **B** Scheduling of language import
   - ☐ **C** Scheduling of language supplementation
   - ☐ **D** Supplementing of periodic language for newly generated texts

10. When you use the SAP Initial Consistency Check, which checks will be executed?

    Choose the correct answers.

    - ☐ **A** Security of passwords of users SAP* and DDIC
    - ☐ **B** Version Compatibility between SAP release and operating system
    - ☐ **C** Accessibility of the message server
    - ☐ **D** Write access regarding the transport directory
    - ☐ **E** Information about the enqueue service

11. When defining a task list within the Task Manager for Technical Configuration, you can select between several hundred predefined steps to include into your own task list.

    Determine whether this statement is true or false.

    - ☐ True
    - ☐ False

12. Identify characteristics of the SAP NetWeaver Administrator tool.

    Choose the correct answers.

    - ☐ **A** Is used as a standalone tool outside the SAP system
    - ☐ **B** Requires logon with the user J2EE_ADMIN
    - ☐ **C** Allows access to the Configuration Wizard
    - ☐ **D** Is being accessed via a web browser interface

Learning Assessment - Answers

1. When the database is running in a mode where it does not write any change logs, data can be restored to:

   Choose the correct answer.

   [X] A the last full backup

   [ ] B a specific date and time (point in time recovery)

   You are correct! When the database is running in a mode where it does not write any change logs, data can be restored to the last full backup. Read more on this in the lesson Identifying Initial Post Installation Steps of the course ADM110.

2. After installing an SAP system (not an SAP S/4HANA Server system) you should schedule standard background jobs.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! The scheduling of standard background jobs is a recommended post-installation activity. Read more on this in the lesson Identifying Initial Post-Installation Steps of the course ADM110.

3. You configure the Transport Management System (TMS) in a freshly installed SAP system running on AS ABAP 7.4 and above. What will be done (by the system) during the initial setup of TMS?

   Choose the correct answers.

   - [ ] A The user SUPPORT will be created
   - [X] B The user TMSADM will be created
   - [X] C A password is required
   - [ ] D The transport directory will be created
   - [X] E The system description needs to be provided

   You are correct! The user TMSADM will be created and you are required to decide on the password for this user and you will define the description for the system. There is no user SUPPORT created and the transport directory will be created/provided during the installation. Read more on this in the lesson Preparing the Training System for an Software Update of the course ADM110.

4. In which client is the initial set up of TMS done?

   Choose the correct answer.

   - [X] A In client 000
   - [ ] B In the production client
   - [ ] C In any client

   You are correct! The initial set up of TMS is done in client 000 . Read more on this in lesson Preparing the Training System for an Software Update of the course ADM110.

5. The standard background jobs are configured in the same way, whether you configure the jobs for an SAP S/4HANA Server or for a non-SAP S/4HANA Server system that is based on AS ABAP.

   Determine whether this statement is true or false.

   - [ ] True
   - [X] False

   You are correct! The scheduling of standard background jobs is done differently for an SAP S/4HANA Server system than for other AS ABAP-based SAP systems. Read more on this in the lesson Preparing the Training System for an Software Update of the course ADM110.

6. For which scenarios can you use the SAProuter?

   Choose the correct answers.

   - [X] A Enabling SAP support to log on to your SAP system
   - [X] B Restricting from which PCs users can log on to which SAP systems
   - [ ] C Setting up an auto logout for unused user sessions
   - [ ] D Enabling single sign on to multiple SAP systems

   You are correct! The SAProuter can be used for enabling SAP support to log on to your SAP system and for restricting from which PCs users can log on to which SAP systems. Read more on this in the lesson Configuring SAP License, Operation Modes, SAProuter of the course ADM110.

7. After installation of the PAS, no user can log on to the SAP system until a permanent license is installed.

   Determine whether this statement is true or false.

   - [ ] True
   - [X] False

   You are correct! After installation of the PAS, a temporary license is active for four weeks. During this time, users can log on to the SAP system. Read more on this in the lesson Configuring SAP License, Operation Modes, SAProuter of the course ADM110.

8. What are use cases of SAProuter?

   Choose the correct answers.

   - [X] A Increase network security
   - [X] B Simplify network configuration
   - [X] C Enable remote support connections
   - [ ] D Determine the language version of the online help displays
   - [ ] E Offering customers access to the SAP Help Portal

   You are correct! SAProuter increases network security and simplifies network configuration. SAProuter is required for remote support connections. Read more on this in the lesson Configuring SAP License, Operation Modes, SAProuter of the course ADM110.

9. What are the steps needed to install additional languages?

   Choose the correct answers.

   - [X] A Classifying the language
   - [X] B Scheduling of language import
   - [X] C Scheduling of language supplementation
   - [ ] D Supplementing of periodic language for newly generated texts

   You are correct! We need to classify the language, schedule language transport or import, and schedule language supplementation to install additional languages. Read more on this in lesson Describing Installation Check, Additional Languages, Business Functions of the Course ADM110.

10. When you use the SAP Initial Consistency Check, which checks will be executed?

    Choose the correct answers.

    - [ ] A Security of passwords of users SAP* and DDIC
    - [X] B Version Compatibility between SAP release and operating system
    - [X] C Accessibility of the message server
    - [ ] D Write access regarding the transport directory
    - [X] E Information about the enqueue service

    You are correct! The SAP Initial Consistency Check will check the version Compatibility between SAP release and operating system, the accessibility of the message server and will collect information about the enqueue service among other checks. It doesn't check the security of passwords for SAP* and DDIC, and it also doesn't check write access regarding the transport directory. Read more on this in the lesson Describing Installation Check, Additional Languages, Business Functions of the course ADM110.

11. When defining a task list within the Task Manager for Technical Configuration, you can select between several hundred predefined steps to include into your own task list.

    Determine whether this statement is true or false.

    - [X] True
    - [ ] False

    You are correct! The Task Manager for Technical Configuration offers several hundred predefined steps that you can include into your own task list definition. Read more on this in the lesson Using Automated Setup of an AS ABAP-based SAP System of the course ADM110.

12. Identify characteristics of the SAP NetWeaver Administrator tool.

Choose the correct answers.

- [ ] A Is used as a standalone tool outside the SAP system
- [ ] B Requires logon with the user J2EE_ADMIN
- [x] C Allows access to the Configuration Wizard
- [x] D Is being accessed via a web browser interface

You are correct! SAP NetWeaver Administrator needs to be accessed via a web browser and allows access to the Configuration Wizard. You use any sufficiently authorized user to log on to the SAP NetWeaver Administrator and it is fully embedded into AS Java - meaning when the AS Java is stopped, SAP NetWeaver Administrator can't be used. Read more on this in the lesson Configuring an AS Java-based SAP System of the course ADM110.

UNIT 5 Updating an SAP S/4HANA Server System using SUM, Strategy Standard

UNIT OBJECTIVES

- Explain different options to patch an AS ABAP-based SAP system
- Update an SAP S/4HANA Server System using SUM, Strategy Standard

Unit 5
Lesson 1

Patching SAP Systems

LESSON OVERVIEW

This lesson explains how to apply patches to an SAP system. Patches include SAP Notes, kernel patches, and SAP Support Packages for Application Server (AS) ABAP and AS Java-based SAP systems.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Explain different options to patch an AS ABAP-based SAP system

SAP Note

You can apply an SAP Note to patch individual development objects (or small collections thereof) within AS ABAP based SAP systems. You use transaction `SNOTE` for the application of SAP Notes. Transaction `SNOTE` requires an HTTPS connection to SAP before you can download SAP Notes directly from the SAP Support Portal into your SAP System.

Kernel Patch

By applying a kernel patch, you update the runtime environment of your SAP system on operating system level. You can retrieve kernel patches from the SAP Support Portal for your release and platform. You should back up the kernel directory before applying a kernel patch, so that an easy rollback is possible. The rolling kernel switch imports a new SAP kernel while the SAP system is running. This means operation of the SAP system as a whole is not interrupted - only single applications servers are stopped one by one - and so downtime is reduced significantly. The rolling kernel switch has some system minimum requirements.

SAP Support Package

SAP Support Packages provide a collection of many corrections, combined for a specific software component; for example, SAP_BASIS. SAP Support Packages can also deliver corrections that cannot be applied via `SNOTE`. As such, SAP Support Packages are more than just many SAP Note corrections combined. Before applying SAP Support Packages, you should apply a SPAM/SAINT updates. This is not only necessary when using transaction `SPAM` for applying SAP Support Packages – but also when using the *Software Update Manager (SUM)*.

SAP Support Package Stack (SAP SPS)

SAP Support Package Stacks are tested target combinations of SAP Support Packages. The recommended way to apply SAP Support Package Stacks is by using the Support Package Manager (transaction `SPAM`) or the Software Update Manager (*SUM*). You should use the Maintenance Planner, to calculate the necessary SAP Support Packages and to create the corresponding stack XML file, used by `SPAM` and *SUM*.

Software Update Manager (SUM)

The Software Update Manager (SUM) offers many functions for updating SAP systems. For example, you can use SUM to import an SAP Support Package Stack in your SAP system. SUM is the central tool for system maintenance.

> Note:
> For some activities, it is required to use SUM because `SPAM/SAINT` is not an option. For details, see SAP Note 1803986 - Rules to use SUM or SPAM/SAINT to apply SPs for ABAP stacks.

SUM is provided via the SAP Support Portal and is frequently updated. SAP recommends that you always download and use the newest version of SUM when you patch an SAP system.

Because SUM evolves and the options offered by SUM are subject to change, this training uses a fixed setup.

This setup has been tested and proven to ensure that you will be able to install and patch the SAP systems using the tools provided in the training environment. Be aware that this does not mean that unexpected situations will not arise during this training.

To help you get familiar with the processes, by design, some events during the installation and patching will require your attention. It is likely that you will encounter different, unexpected situations on your own, when working with SUM at your company. So part of the exercise is to prepare you for the unexpected... because that is what will happen in real life.

For more information about SUM, see support.sap.com/sltoolset.

Options to patch/update the software of an AS ABAP based SAP system

- SAP Notes to patch individual development objects, or small collections thereof, within an AS ABAP based SAP system
- Kernel patches to update the runtime environment of the SAP system on operating system level
- SAP Support Packages to apply a collection of many corrections, combined for a specific software component
- SAP Support Package Stack / SAP Feature Package Stack is an SAP-tested target combination of SAP Support Packages
- Software Update Manager offers many functions for updating SAP systems, e.g. importing SAP Support Packages to your SAP system.

LESSON SUMMARY

You should now be able to:

- Explain different options to patch an AS ABAP-based SAP system

Unit 5
Lesson 2

Updating an SAP S/4HANA Server System using SUM, Strategy Standard

LESSON OVERVIEW
This lesson describes the required activities to update an AS ABAP-based SAP system using Software Update Manager (SUM) in Standard/Advanced mode.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Update an SAP S/4HANA Server System using SUM, Strategy Standard

Update an SAP S/4HANA Server System using SUM, Strategy Standard - Prerequisites

Possible Steps before actually starting SUM

Software Update Manager (SUM) executes many different phases, grouped within so-called Roadmap Steps.

General steps to update an AS ABAP-based SAP System with SUM

1. Start SUM.
2. Provide the configuration information in each of the SUM screens, such as:
   - Location of stack XML file
   - Passwords for important users
   - Decisions on modification transport requests, customer transport requests, add-ons, and so on.
   - Whether to update `SPAM/SAINT`
3. Perform modification adjustments
4. Complete the update

You can decrease the runtime/manual efforts of SUM by manually executing some steps in advance.

You should complete the following tasks before you start SUM.

Activities you should complete before executing SUM

1. Download the latest version of SUM from https://support.sap.com/sltoolset

2. Read the corresponding SAP Notes for SUM, delivered there.
3. Check for modifications that might require attention during the update process.
4. Check disk space and free space in the database.
5. Apply the latest SPAM/SAINT update to your SAP system.
6. Apply the latest SAP Host Agent patch.
7. Update SAP Notes using `SNOTE`.
8. Consider updating your database software before starting SUM, especially if you haven't updated the database software for a longer time.

Correcting the Installed Products Information

The newly installed SAP S/4HANA Server system needs a correction of the information about the installed product versions.

This can be done by applying a so-called *CISI* file to the SAP system, using SUM. This is shown in the following slides.

> Note:
> You can get a CISI file as part of a maintenance planning, executed within Maintenance Planner.

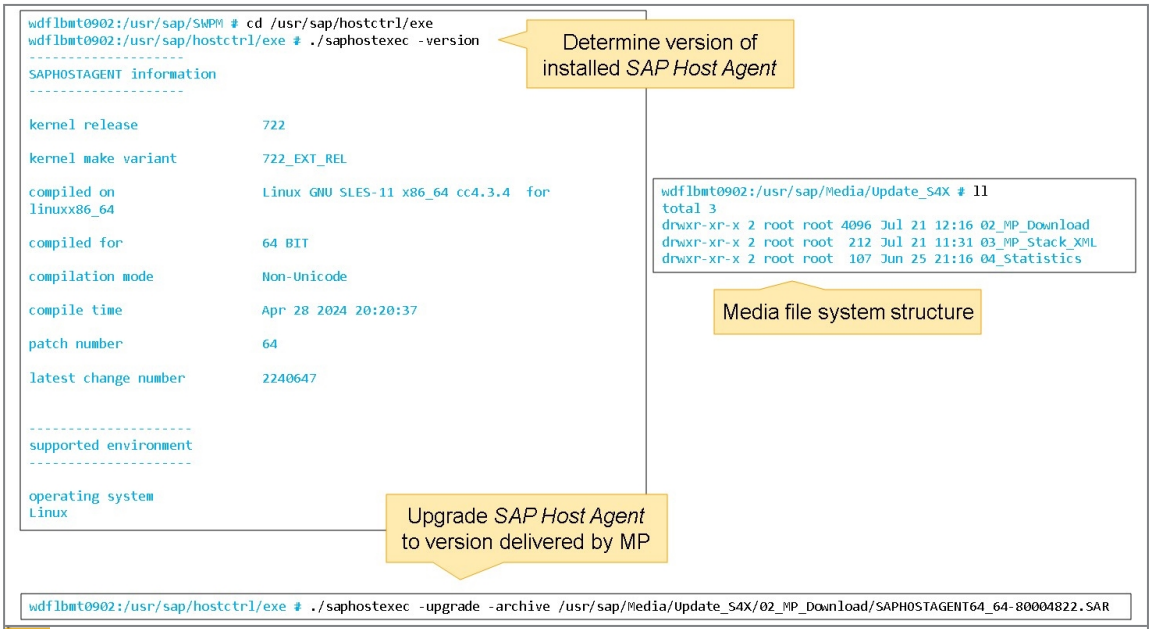

Figure 121: Check and Update SAP Host Agent

Check the version of the SAP Host Agent. Perform an update, if it is not up-to-date, already.

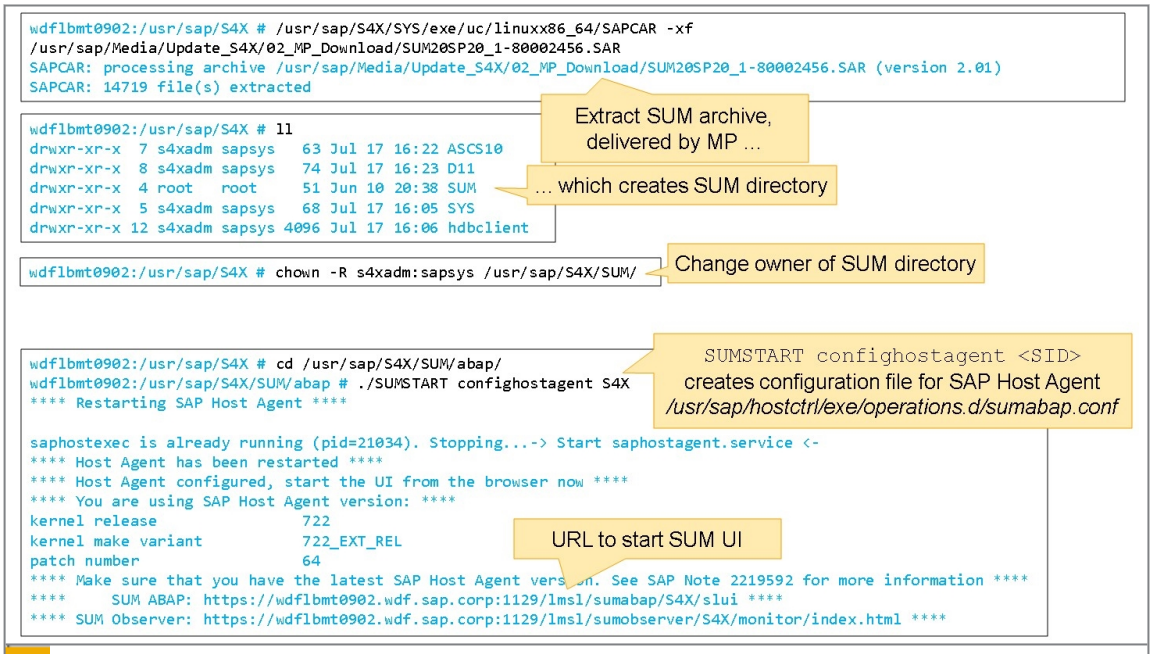

Figure 122: Extract SUM Archive and Configure SAP Host Agent

Prepare for using SUM like shown in the screen above: by executing the command **`./SUMSTART confighostagent S4X`** in the directory *.../SUM/abap*.

> Note:
> For preparing the SAP Host Agent you need a privileged user, as shown above.

The following figure shows how to connect to SUM, where you are prompted for the <sid>adm user/password.

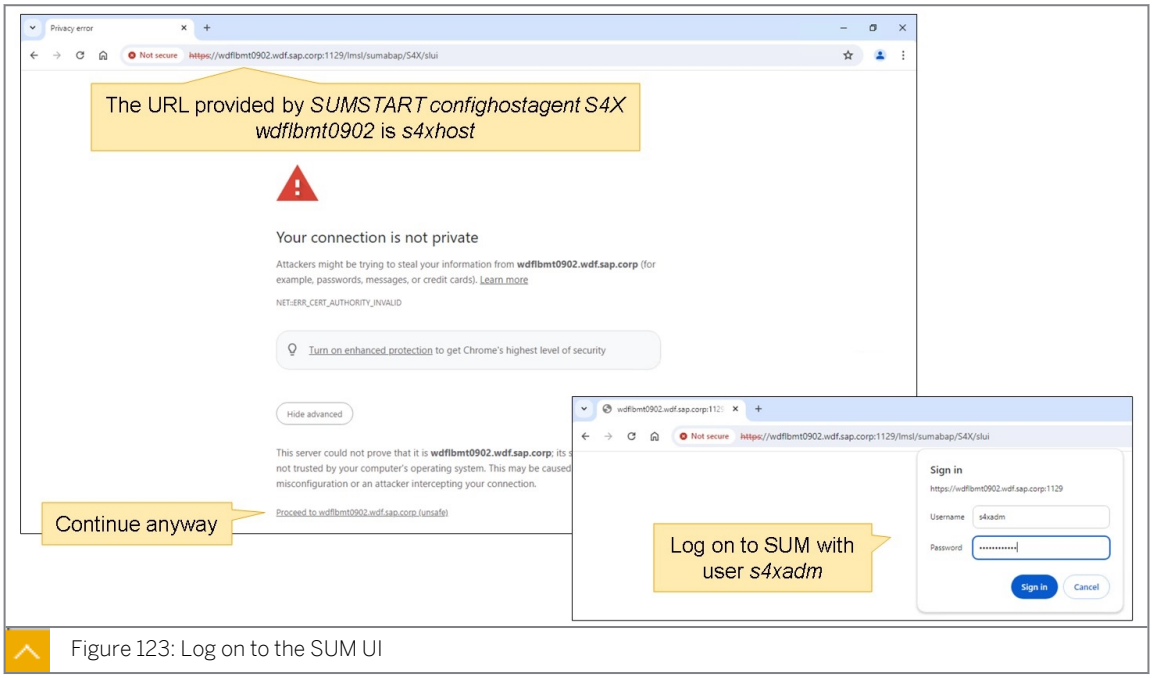

Figure 123: Log on to the SUM UI

From a front end that is able to connect to the server where you have started SUM, open a browser and call the following URL:

`https://<host>:1129/lmsl/sumabap/<SID>/slui`

You need to log on with the user <sid>adm.

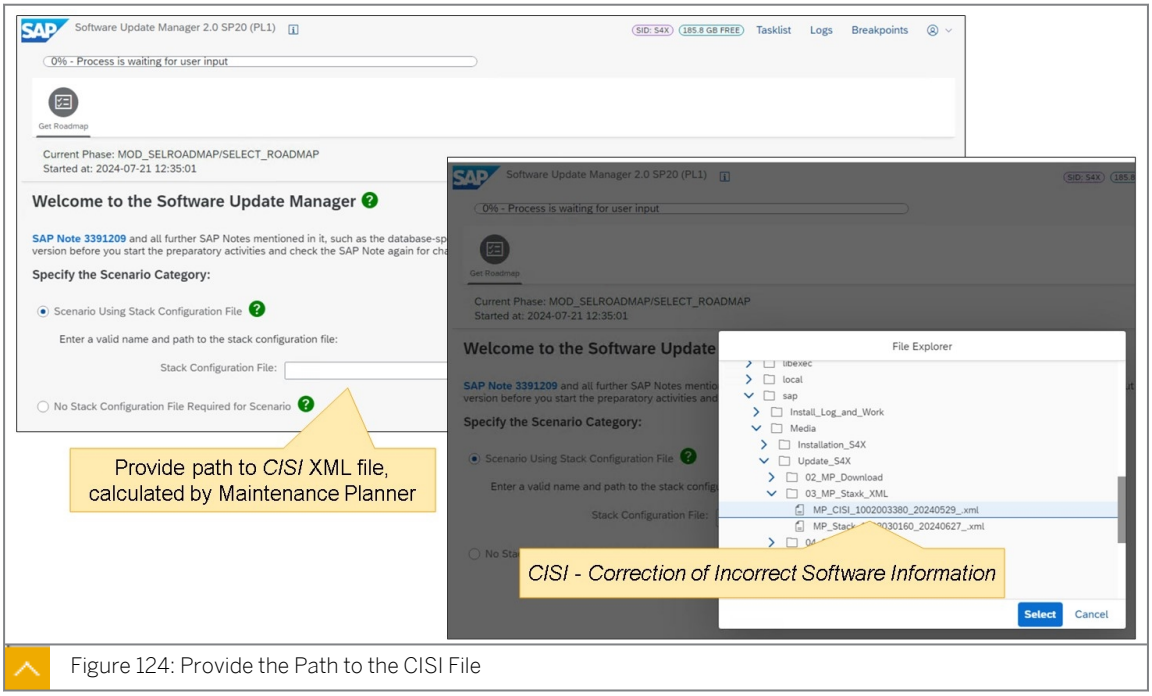

Figure 124: Provide the Path to the CISI File

In order to correct the product information, a CISI run is necessary. This CISI file can be calculated by Maintenance Planner (MP).

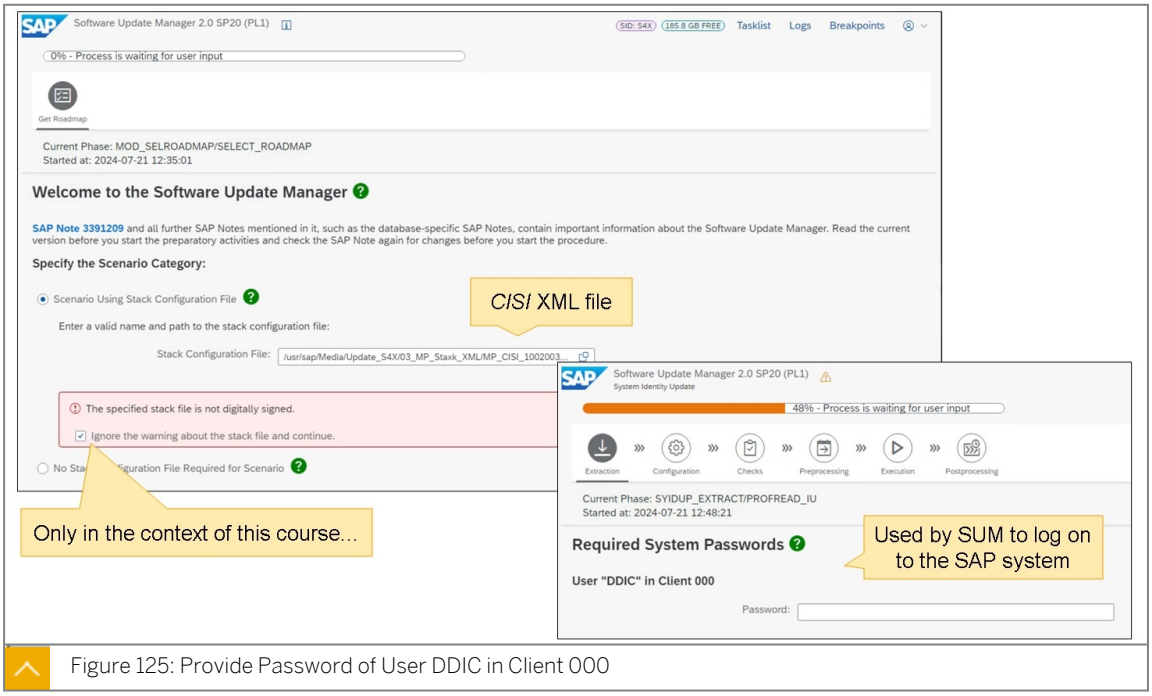

Figure 125: Provide Password of User DDIC in Client 000

For this course the CISI XML file had to be manipulated. Because the CISI/Stack XML file is digitally signed since 2021, this causes a warning from SUM.

Provide the password of the user DDIC in client 000.

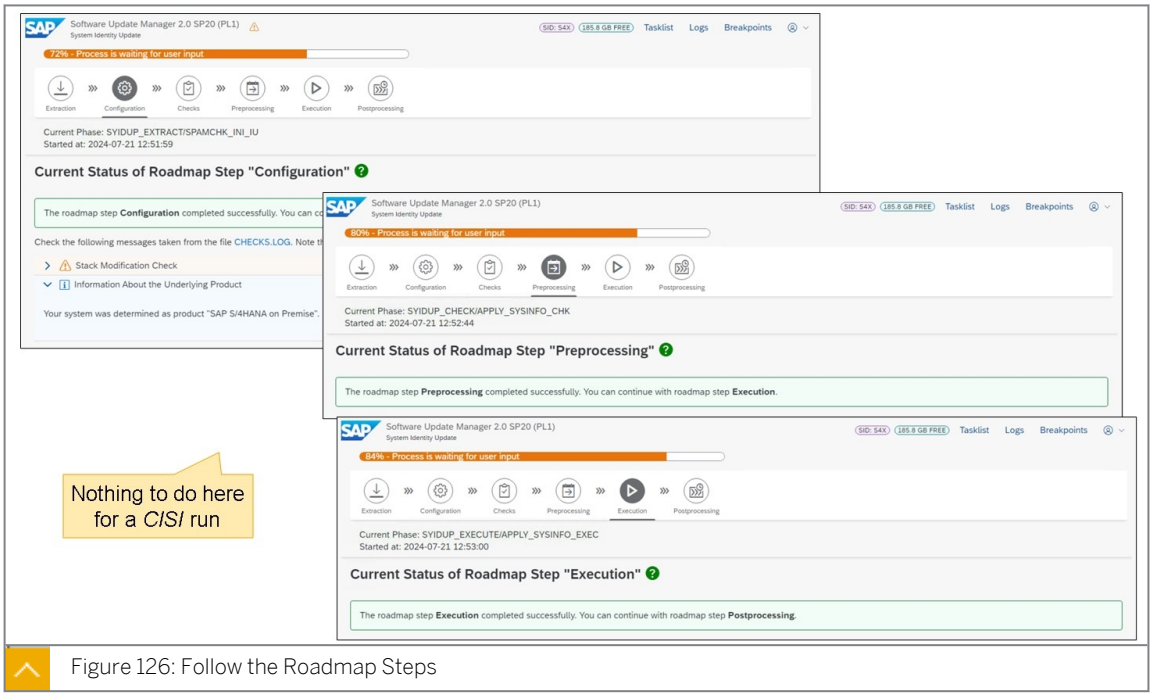

Figure 126: Follow the Roadmap Steps

The further Roadmap steps should run without further input besides choosing *Next*. Nothing is executed here during a CISI run.

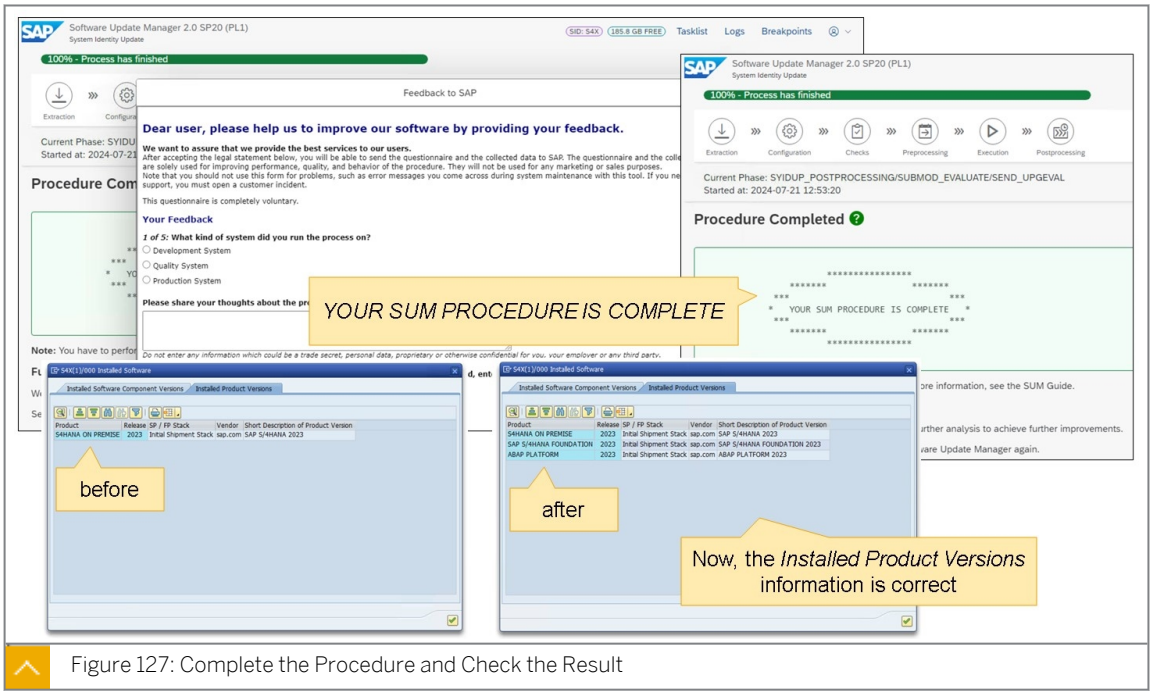

Figure 127: Complete the Procedure and Check the Result

The CISI run is finished. Check the corrected product information.

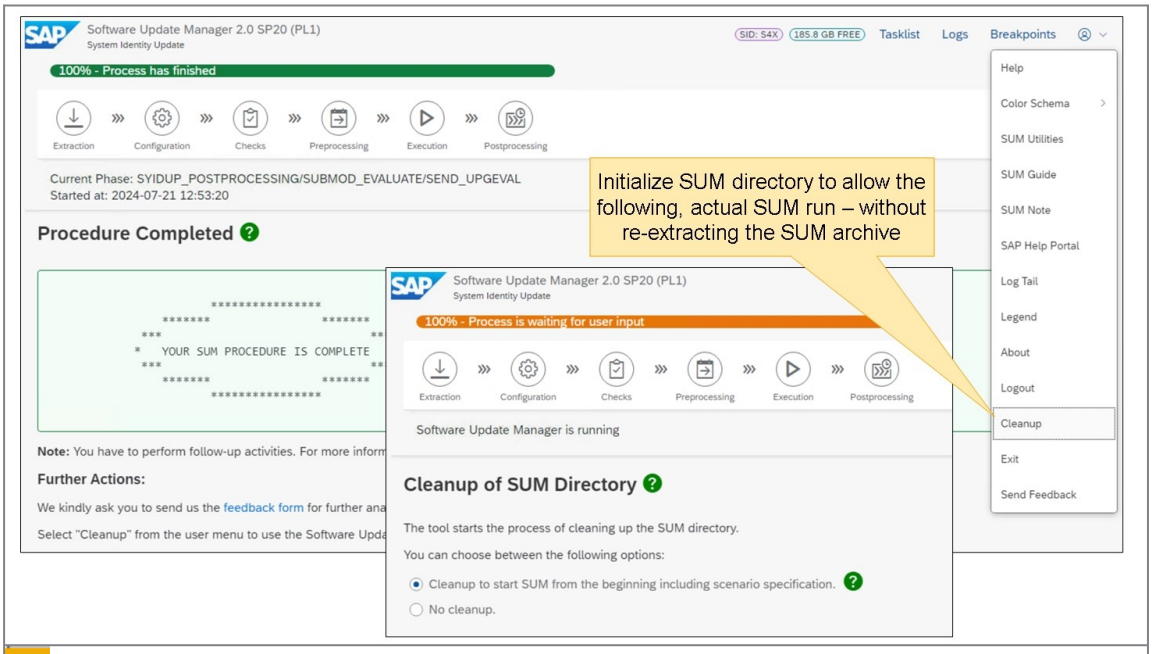

Figure 128: Clean up the SUM Directory for the next SUM Run

Clean up the SUM directory in order to start the actual SUM update run afterwards.

Update an SAP S/4HANA Server System using SUM, Strategy Standard

The start of the SUM in this lesson assumes, that the SUM CISI run was performed successfully. Otherwise SUM will run into problems. Also, additional steps would have to be performed to start SUM – which were part of the SUM CISI run, already.

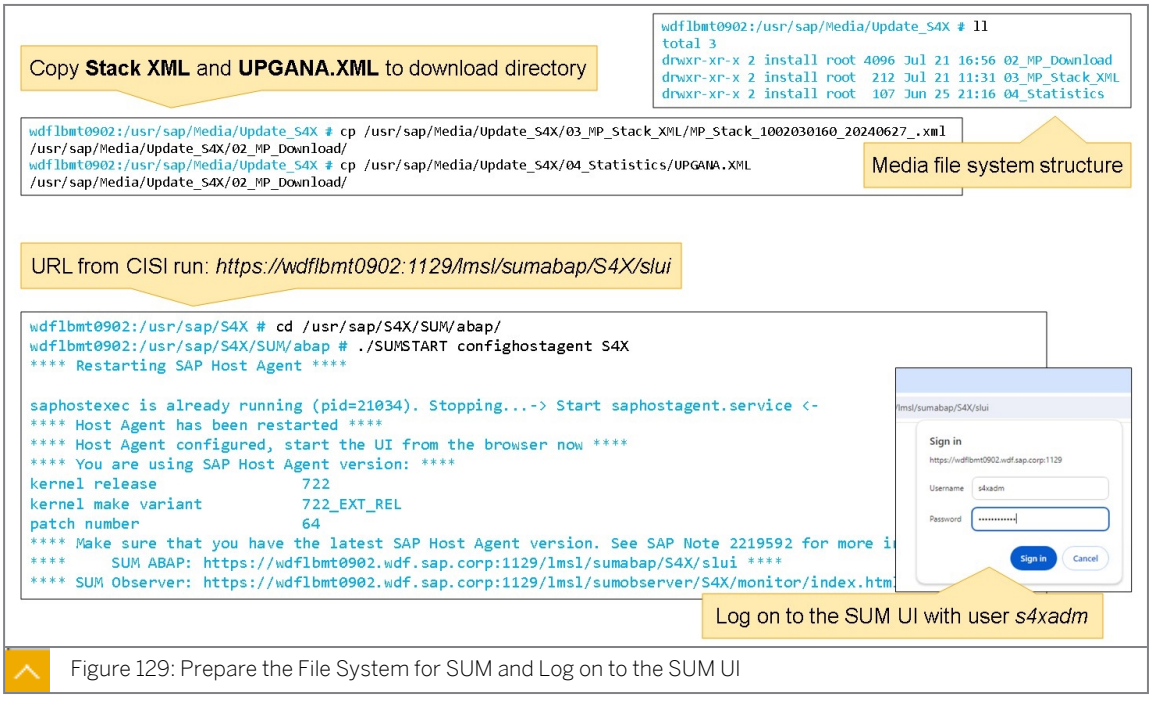

Figure 129: Prepare the File System for SUM and Log on to the SUM UI

From a front end that is able to connect to the server where you have started SUM, open a browser and call the following URL:

`https://<host>:1129/lmsl/sumabap/<SID>/slui` .

You need to log on with the user <sid>adm.

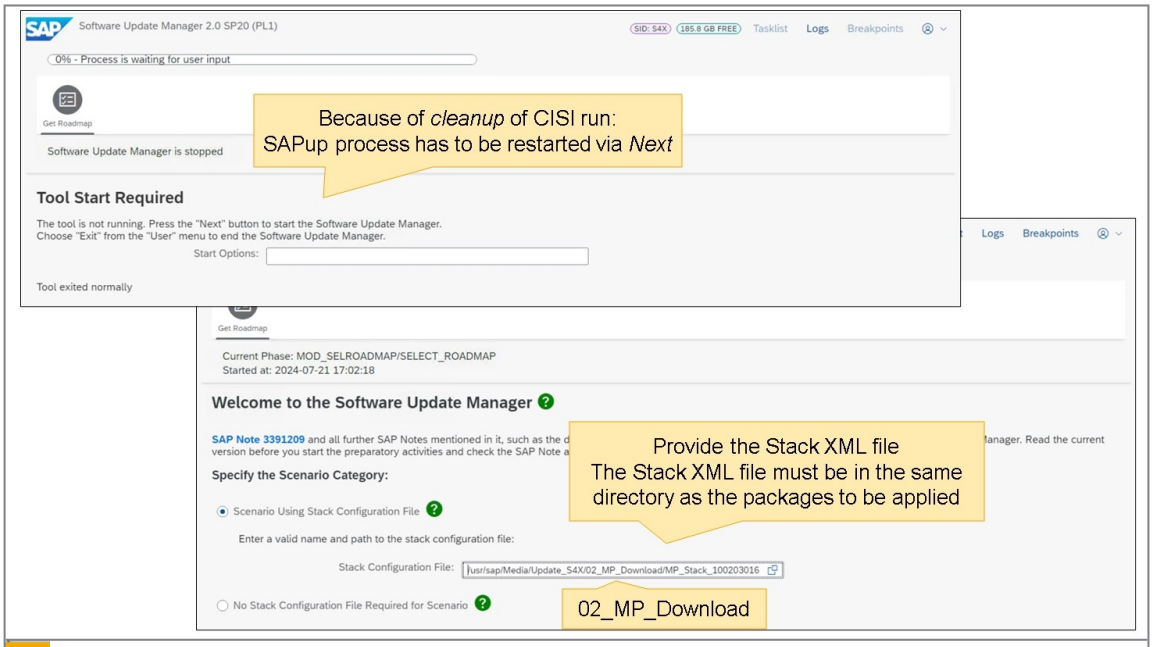

Figure 130: Provide Stack XML File

Provide the stack XML file, calculated by Maintenance Planner (MP).

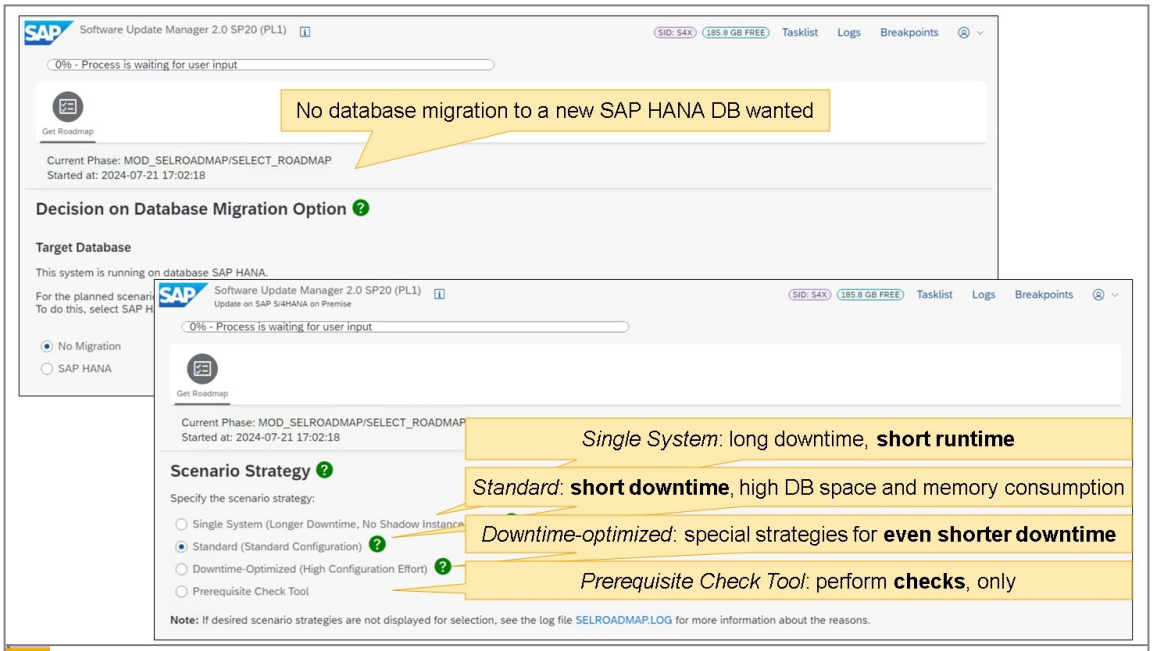

Figure 131: Decide on DMO and Select the Scenario Strategy

Do not choose to migration to another SAP HANA DB.

Choose *Single System* for a short runtime and low DB space and main memory usage.

Choose *Standard* for a shorter downtime.

For a more shorter downtime than with *Standard*, you can choose *Downtime-optimized*, which will use even more DB space, performance, and time.

Since SUM 2.0 SP 06, *Advanced* is not available any more. *Advanced* was the same as *Standard*, anyway.

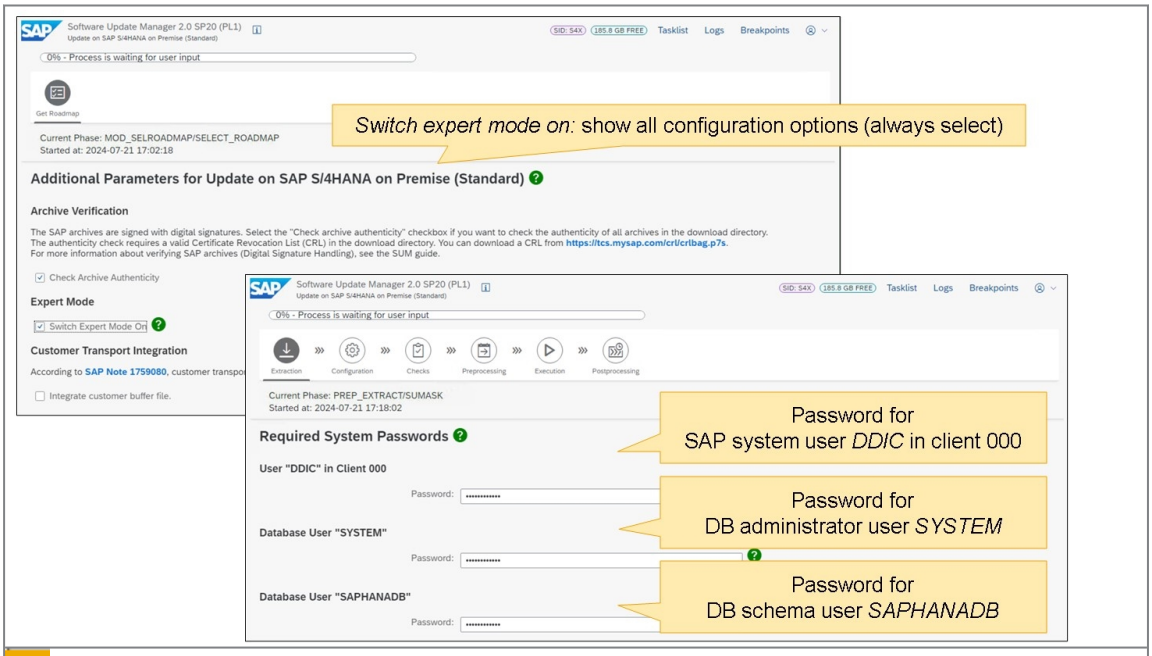

Figure 132: Choose the Expert Mode and Provide Passwords

Enabling the *Expert Mode* provides the option of specifying additional configuration settings. Always choose the expert mode.

Provide the password for *DDIC* in client 000, Tenant DB user *SYSTEM*, and DB schema user *SAPHANADB*. If the SPAM version in the SAP system is not up-to-date, and a SPAM/SAINT update file is in the download directory, SUM updates it. You can do this manually in advance, also.

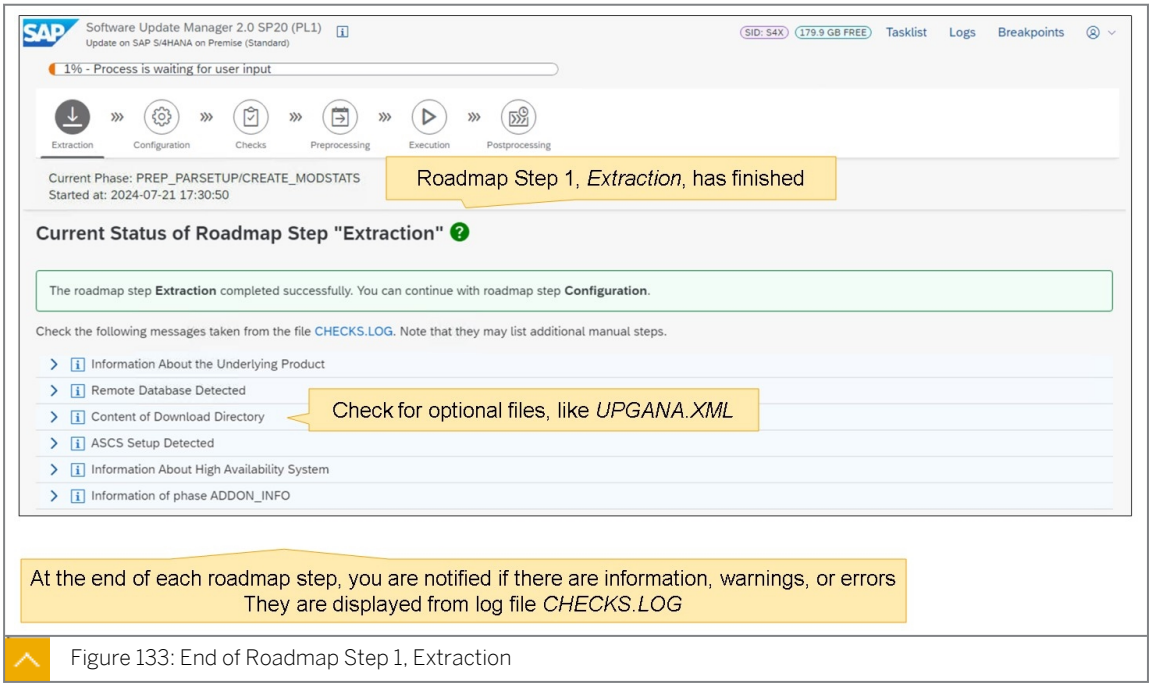

Figure 133: End of Roadmap Step 1, Extraction

At the end of the Roadmap Step 1, Extraction, information is displayed about several findings of SUM.

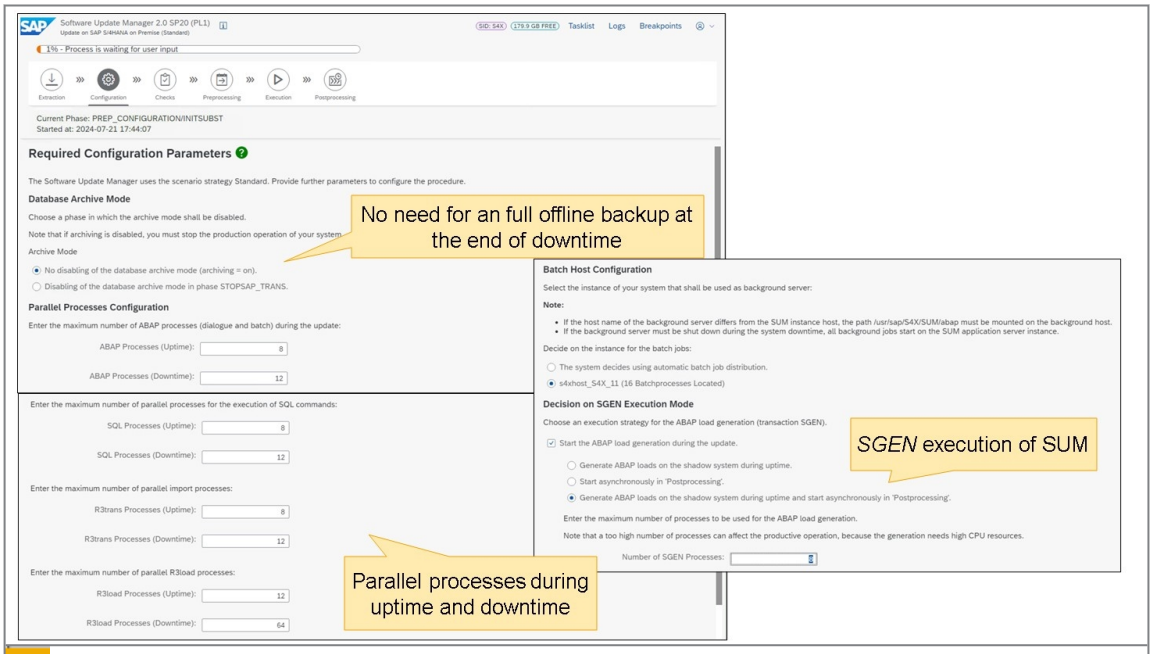

Figure 134: Select Archive Mode, Number of Parallel Processes, and SGEN Execution

The option *No disabling of the database archive mode* does not switch the archiving mode currently used by the database system of your SAP system. If your database runs with archiving on, point-in-time recovery will be possible but this setting might increase the overall runtime of the update process.

Define the number of parallel processes. Be careful concerning the parallel processes during uptime! They can cause bad performance during productive usage.

Choose, whether SUM should generate the ABAP loads during uptime (SGEN).

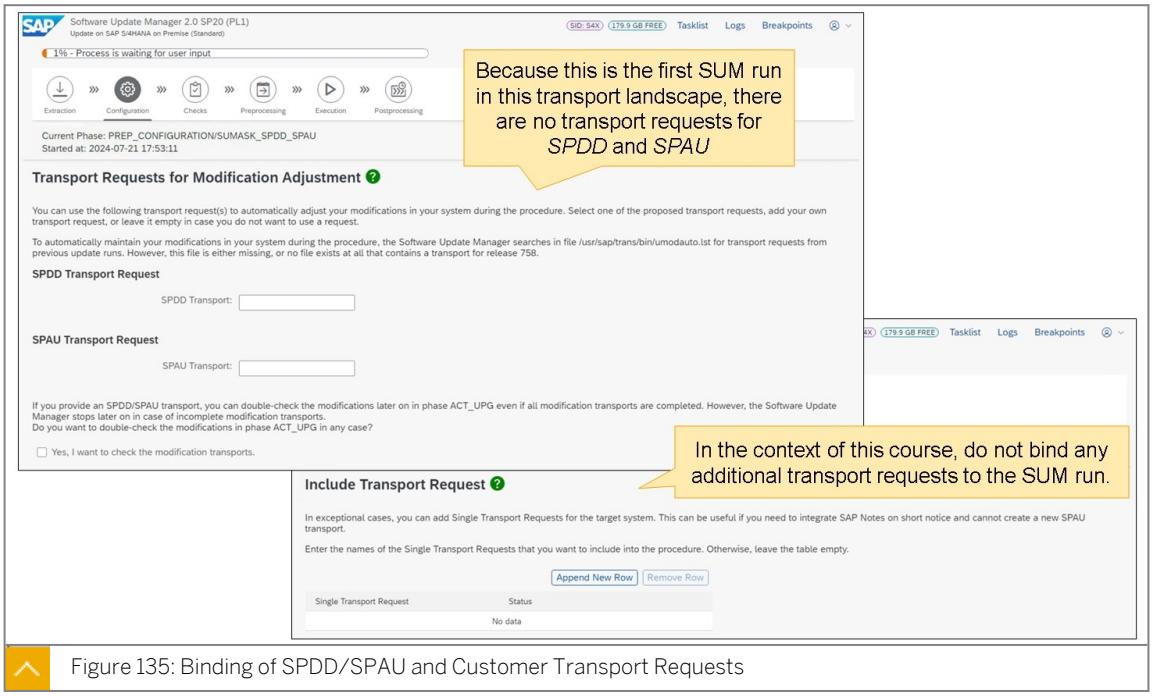

Figure 135: Binding of SPDD/SPAU and Customer Transport Requests

You can bind additional transport requests to the SUM run. They will be applied to the SAP system almost without causing additional downtime. The alternative would be to import these transport requests after the SUM run – which will cause an additional downtime.

In the development system the developers have to perform SPDD and SPAU modification adjustments manually. In the subsequent SAP systems of the transport landscape (for example quality assurance and production system), the resulting transport requests can be used for handling the modification adjustments. If there is a delta between the development system and the subsequent SAP systems, this delta still has to be handled manually.

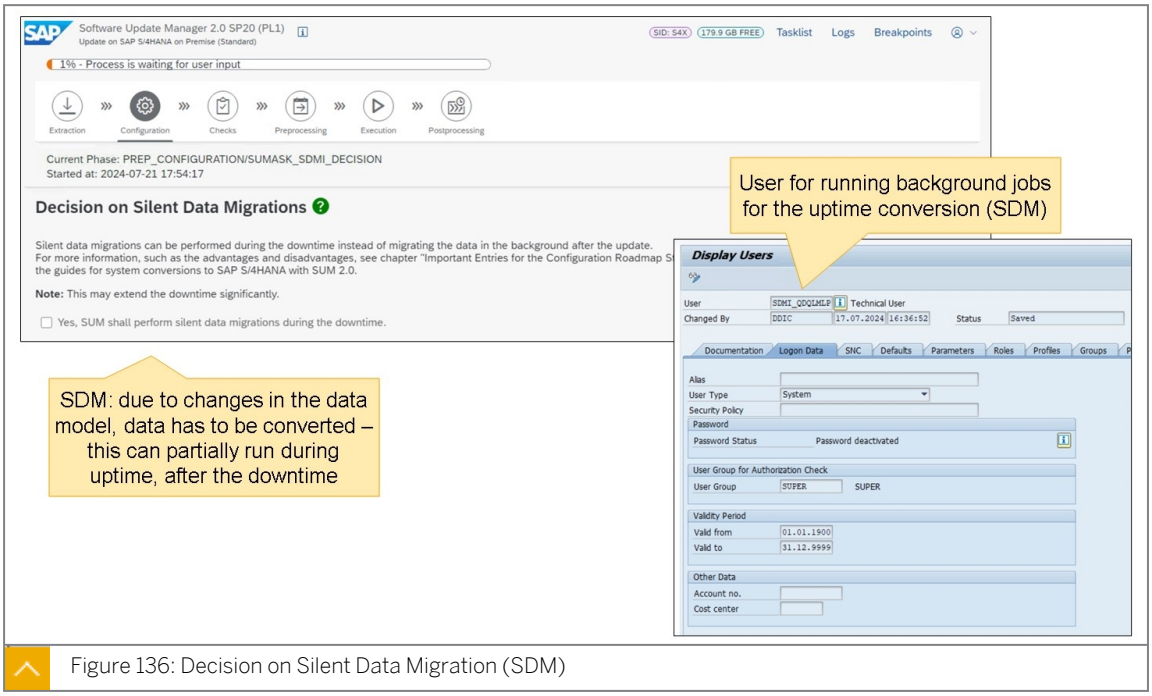

Figure 136: Decision on Silent Data Migration (SDM)

During the SUM procedure table structures are changed and created. This requires the conversion of data to the changed and new table structures. This data conversion is done during downtime. Do reduce downtime, parts of this conversion can be done after the SUM run, during productive operation. This data conversion during productive operation is called Silent Data Migration (SDM).

Note:
Don't get mixed up: Silent Data Migration is no migration, but a conversion of data. (wrong term used)

If downtime is of no big concern, you can decide to run this Silent Data Migration during downtime.

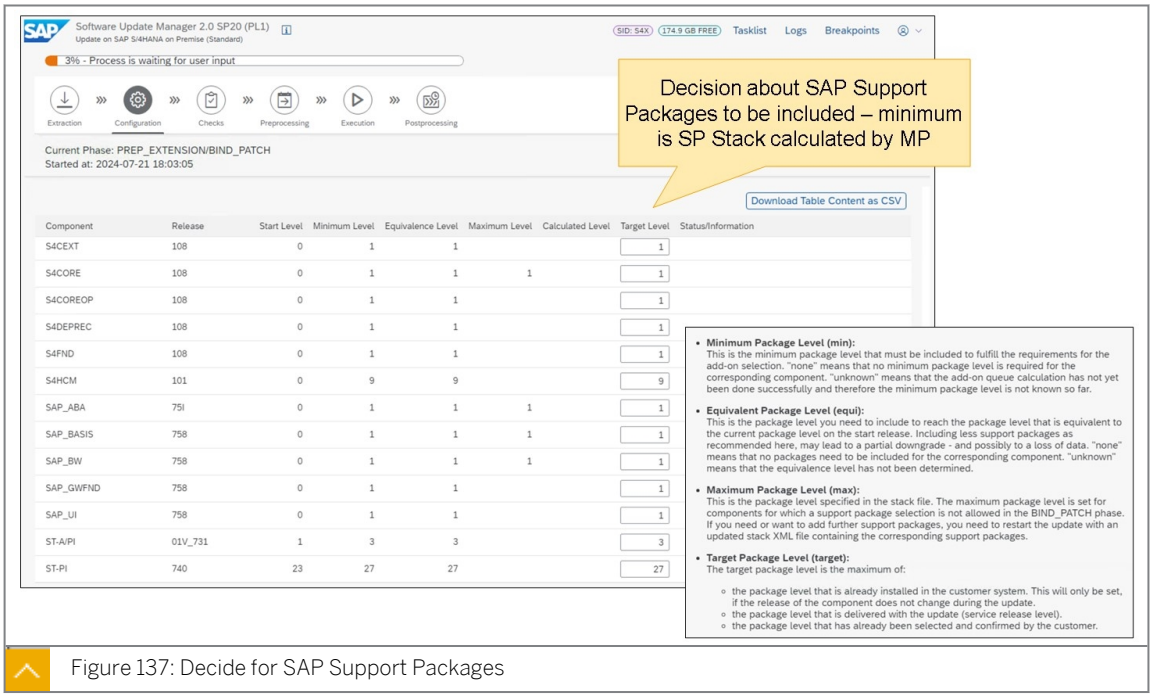

Figure 137: Decide for SAP Support Packages

Decide about the SAP Support Packages, SUM should import. The minimum number of SAP Support Packages to be imported, is the number listed in the Stack XML file. But you can let SUM import additional SAP Support Packages! The number must be in a certain range:

Component is the software component, the SAP Support Packages belong to

Release is the target release of this software component

Start Level is the number of SAP Support Packages for this software component imported before the SUM run

Minimum Level is the number of SAP Support Packages for this software component to be reached at least in order to avoid inconsistencies with SAP Support Packages of other software components

Equivalence Level is the number of SAP Support Packages for this software component to be reached at least in order to avoid a downgrade of this software component (relevant only in case of an upgrade of this software component)

Maximum Level is the number of SAP Support Packages for this software component to be reached at the most in order to avoid inconsistencies with SAP Support Packages of other software components

Calculated Level is the highest consistent number of SAP Support Packages for this software component found in the download directory

Target Level is the number of SAP Support Packages, SUM will import

If there are additional SAP Support Packages in column *Calculated Level*, you can choose *Take over calculated level*. This option is not displayed, if there are none.

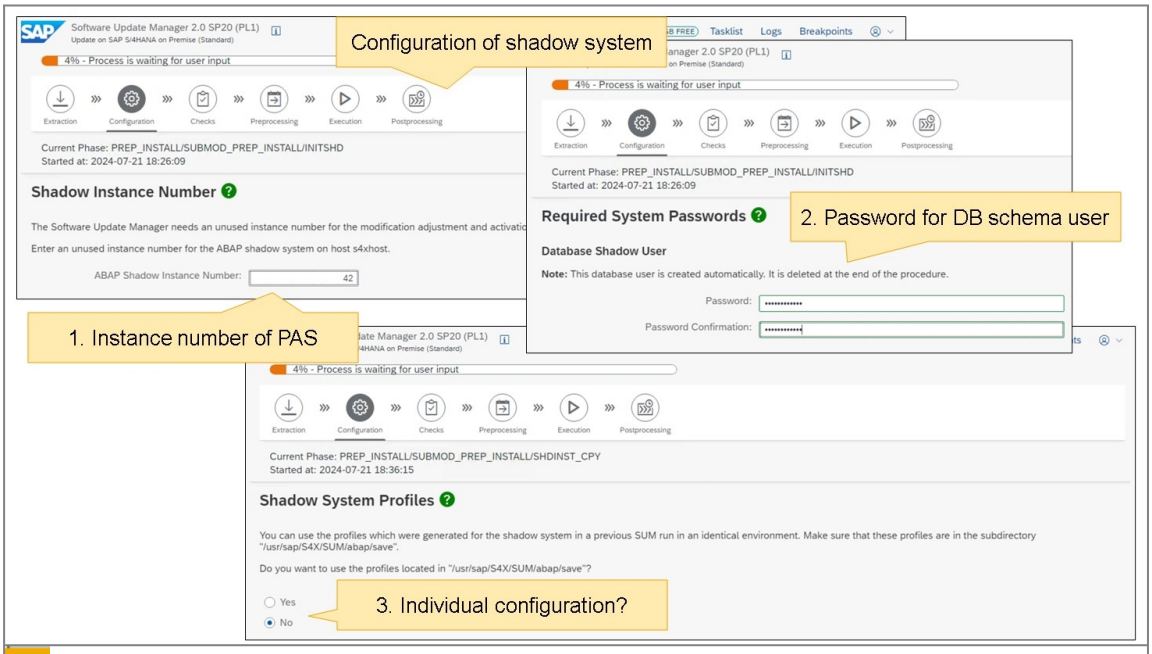

Figure 138: Configure Shadow System

Choose an instance number, a DB schema user password, and the configuration of the shadow system.

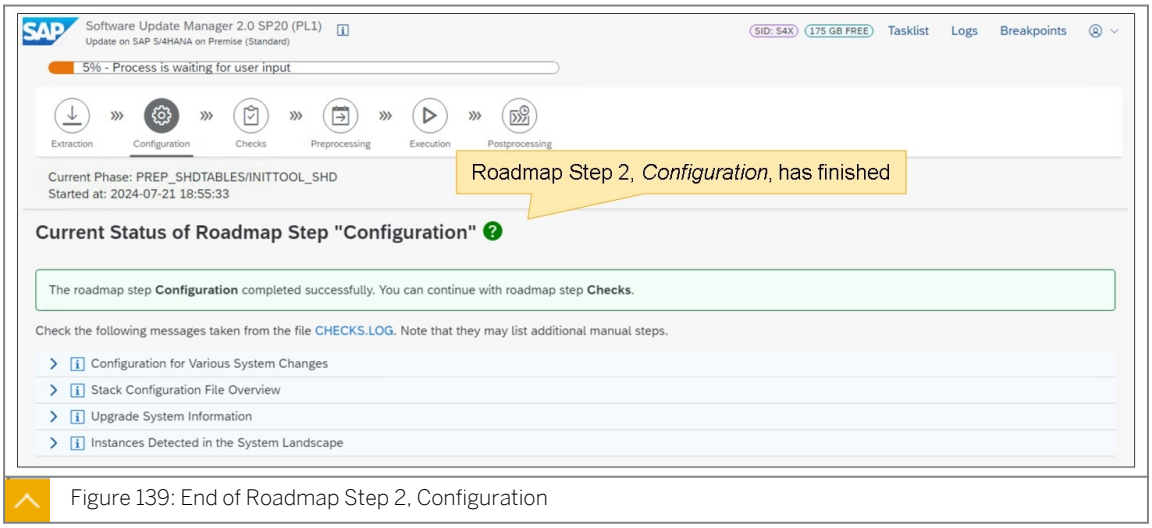

Figure 139: End of Roadmap Step 2, Configuration

Check the results.

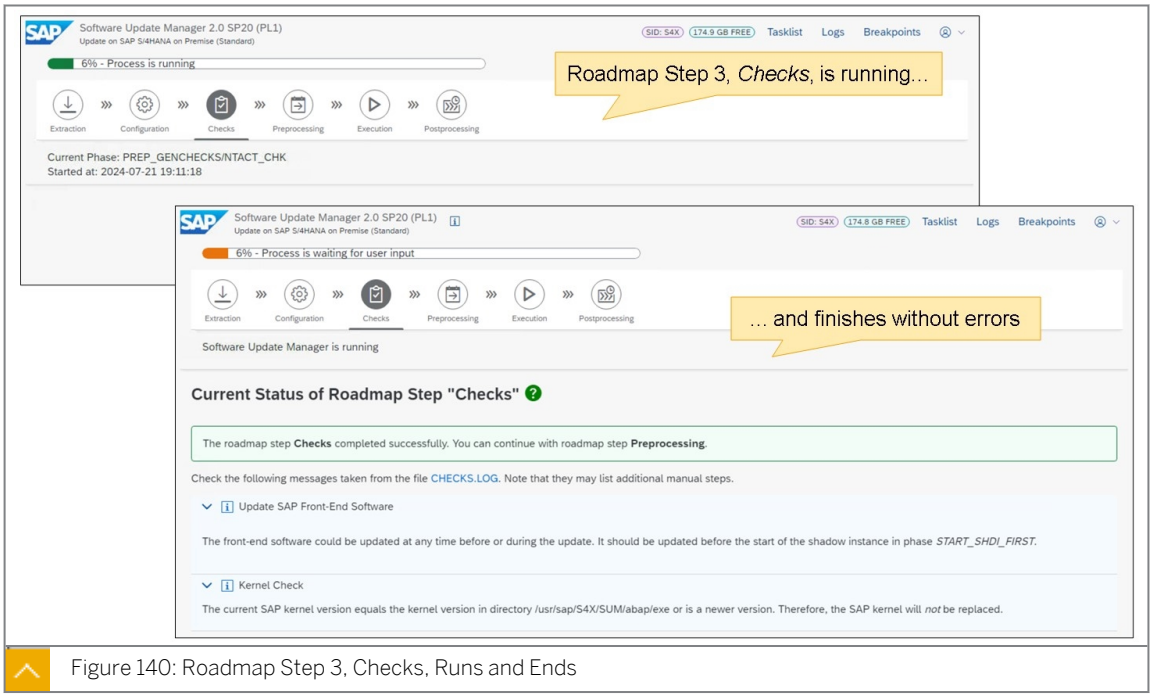

Figure 140: Roadmap Step 3, Checks, Runs and Ends

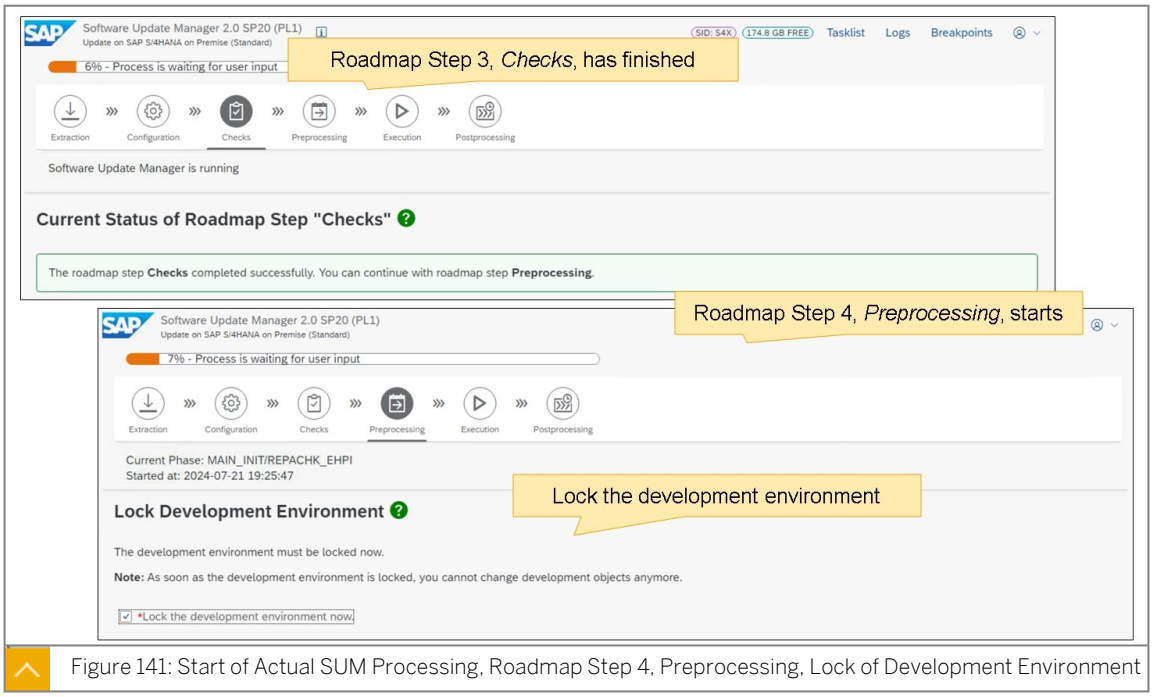

Figure 141: Start of Actual SUM Processing, Roadmap Step 4, Preprocessing, Lock of Development Environment

Lock the development environment. From now on, it is not possible to develop in this SAP systems. You can no longer use transactions like `SE80`, `SE11`, `SNOTE` – and even not `STMS` to import transport requests.

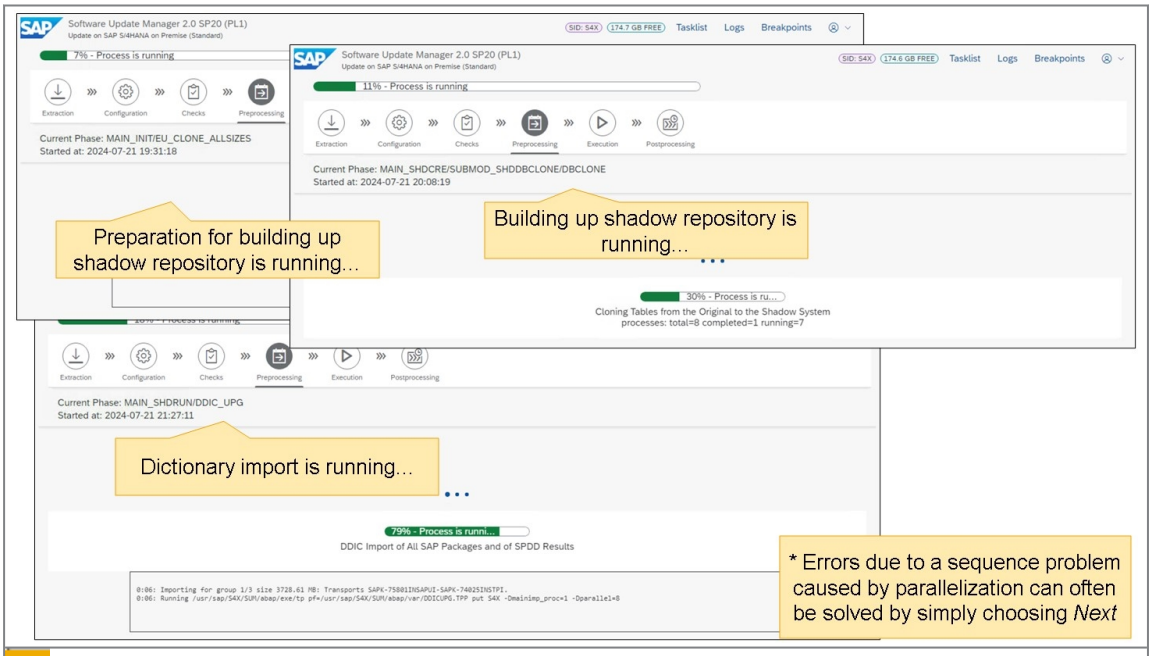

Figure 142: Roadmap Step 4, Preprocessing, is Running (1)

Sometimes errors occur, caused by the parallel processes: If it is only a problem due to a wrong sequence of activities, it can be solved by simply repeating the phase.

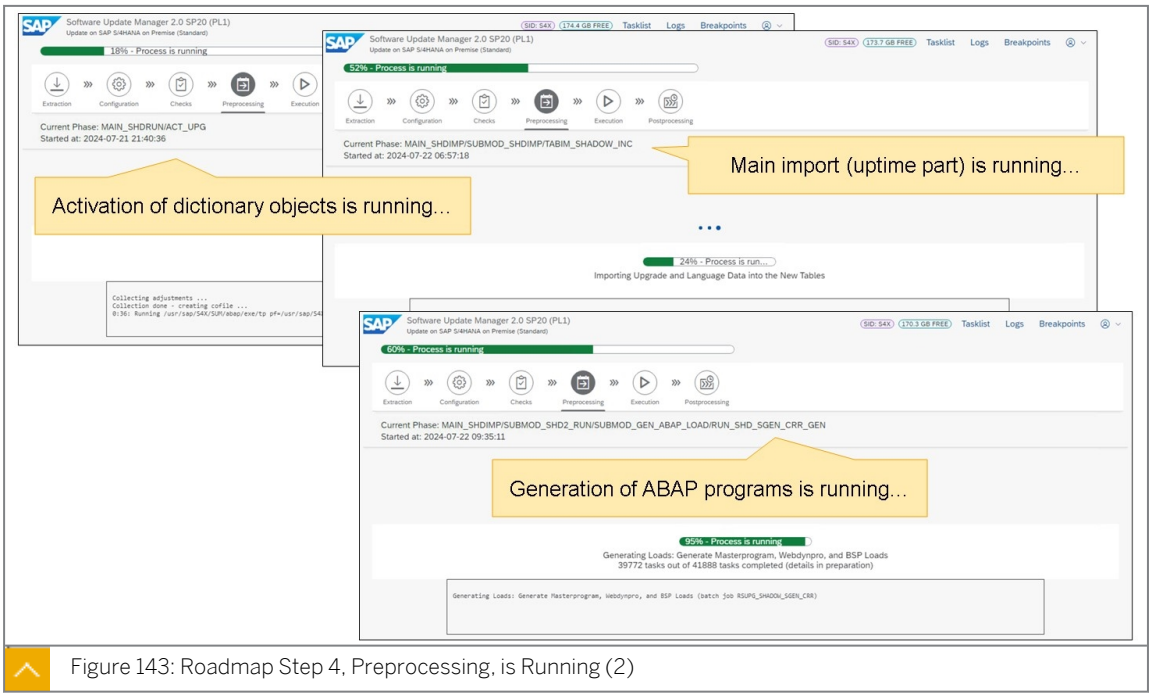

Figure 143: Roadmap Step 4, Preprocessing, is Running (2)

Most of the activities are performed during uptime.

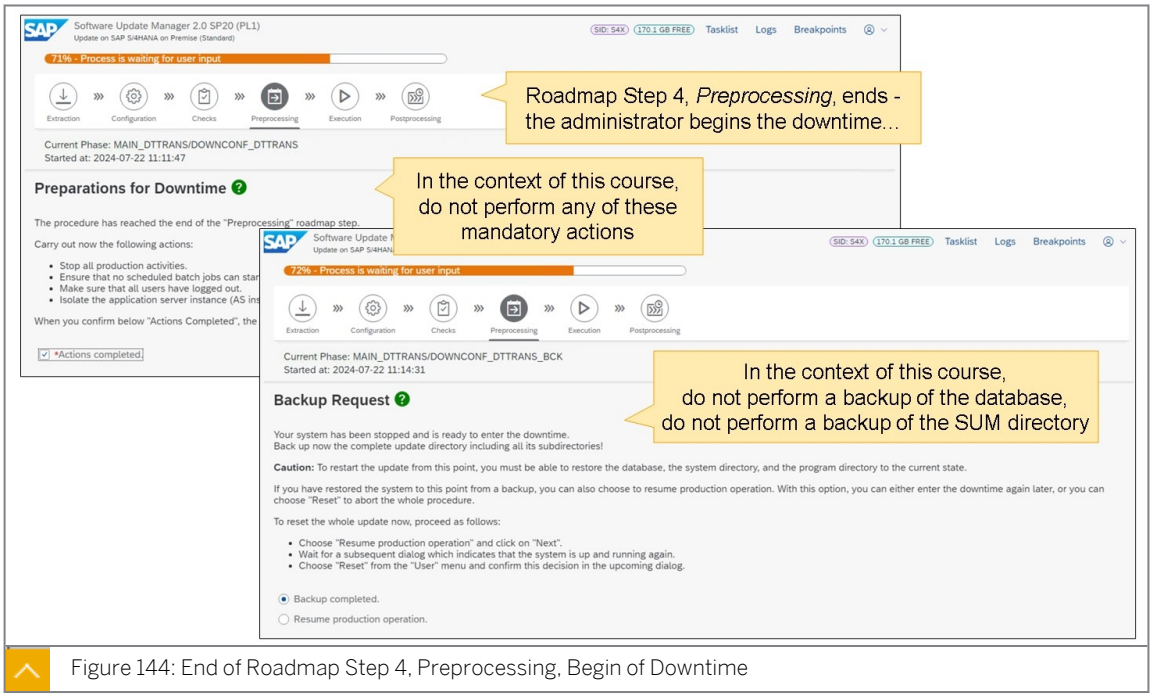

Figure 144: End of Roadmap Step 4, Preprocessing, Begin of Downtime

Before proceeding you should create a backup of the complete update directory (/SUM or \SUM).

Note:
Several activities have to be performed to achieve a downtime window. These steps will not be performed in the context of this course.

Before entering the next Roadmap Step you need to ensure that the SAP system can be recovered to its current state.

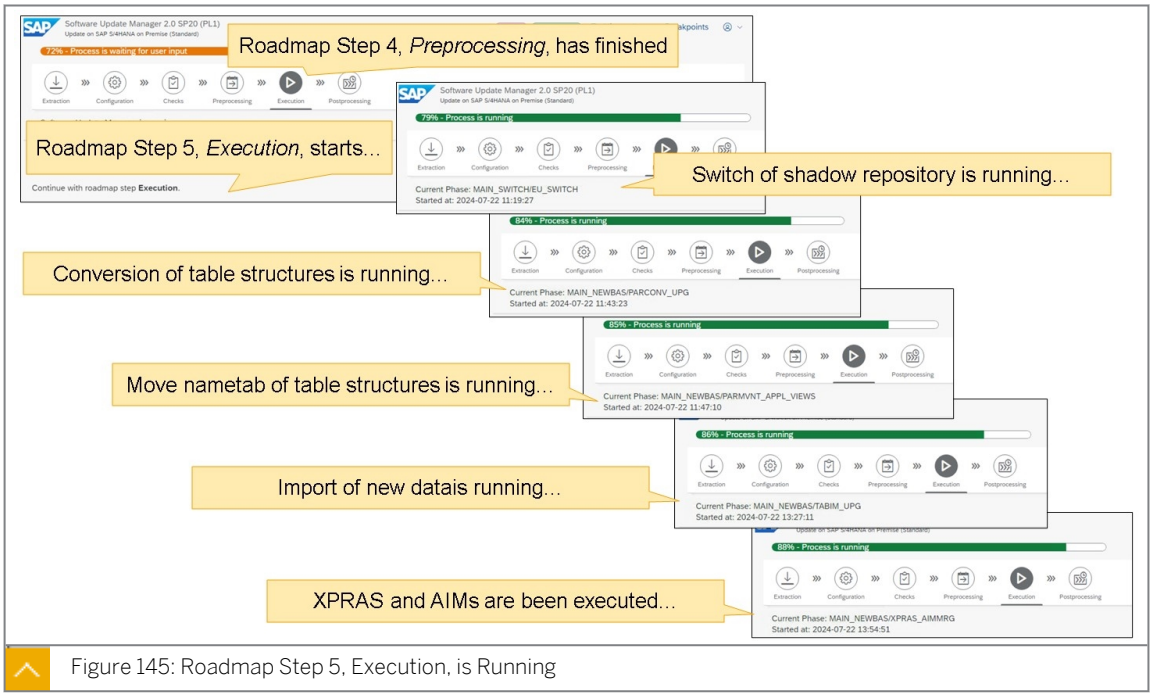

Figure 145: Roadmap Step 5, Execution, is Running

In Roadmap Step 5, Execution, no productive work is possible.

The duration of the execution phase (Roadmap Step 5) depends on the size of the update to be executed and on the strategy chosen for the update (*Single System* versus *Standard*).

> Note:
> In case of error situations, review the corresponding log files and try to solve the problem. Then continue the execution of the update.

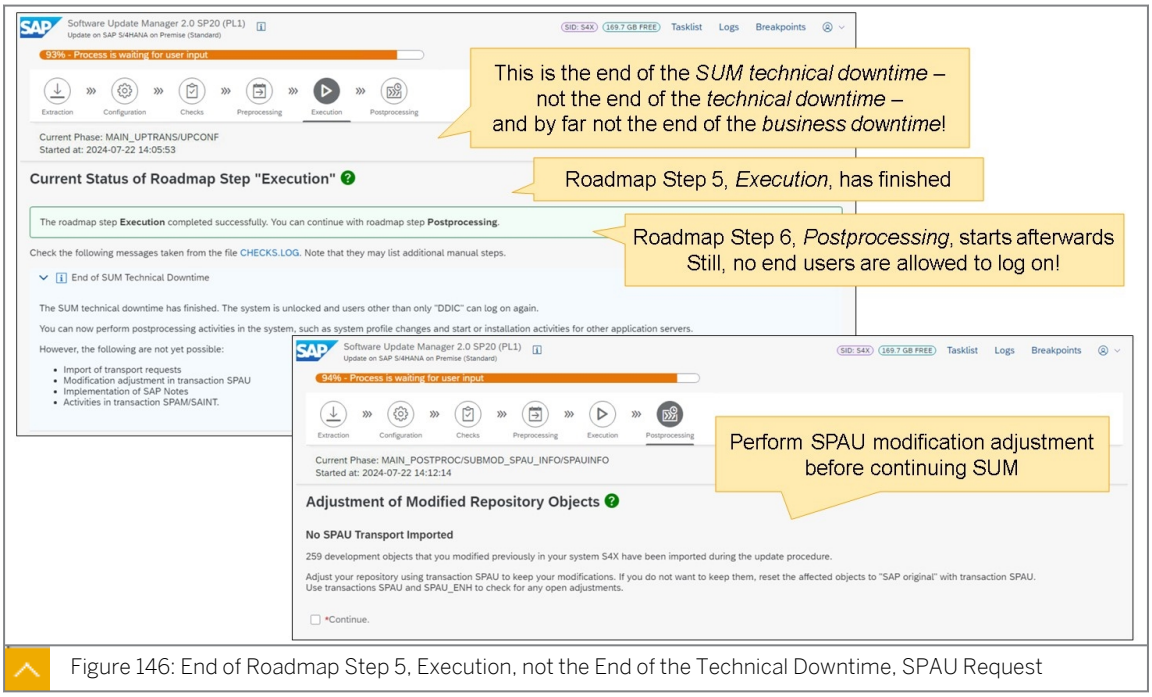

Figure 146: End of Roadmap Step 5, Execution, not the End of the Technical Downtime, SPAU Request

Don't mix up *SUM Technical Downtime* (dialog free part) with *Technical Downtime* (SAP system technically not available) with *Business Downtime* (SAP system not available for end users)!

The *SUM Technical Downtime* is part of the *Technical Downtime*, which is part of the *Business Downtime*.

> Note:
> Please note, that the end of the SUM technical downtime is not sufficient to start productive work again.

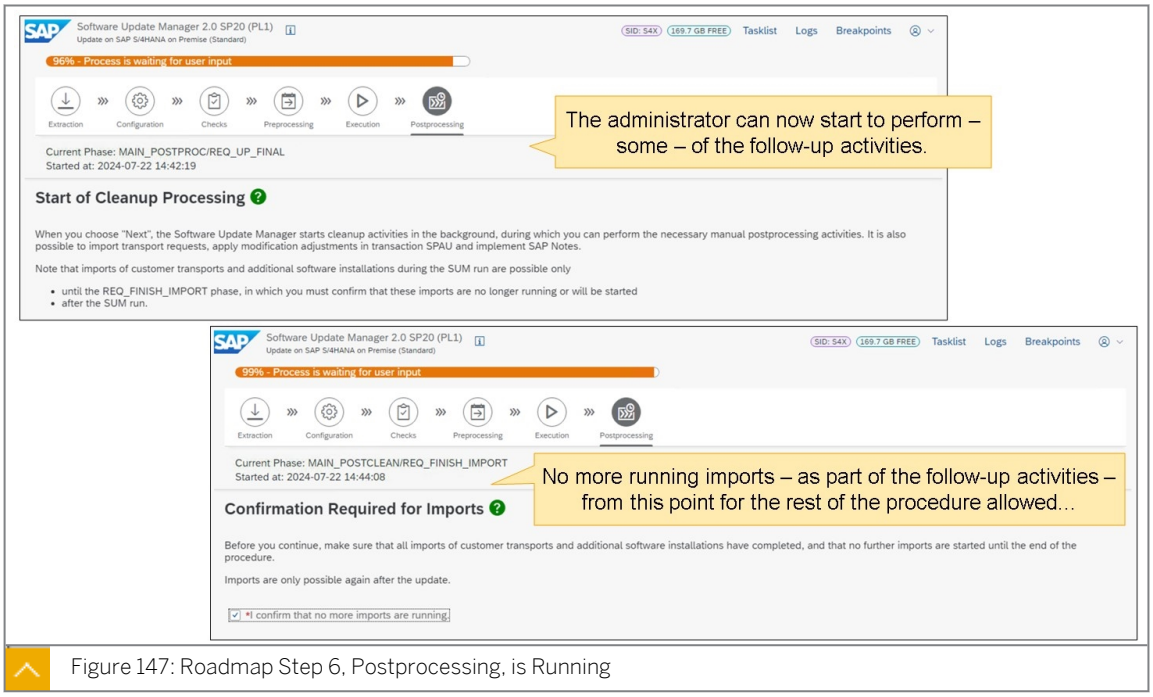

Figure 147: Roadmap Step 6, Postprocessing, is Running

SUM executes some clean-up activities.

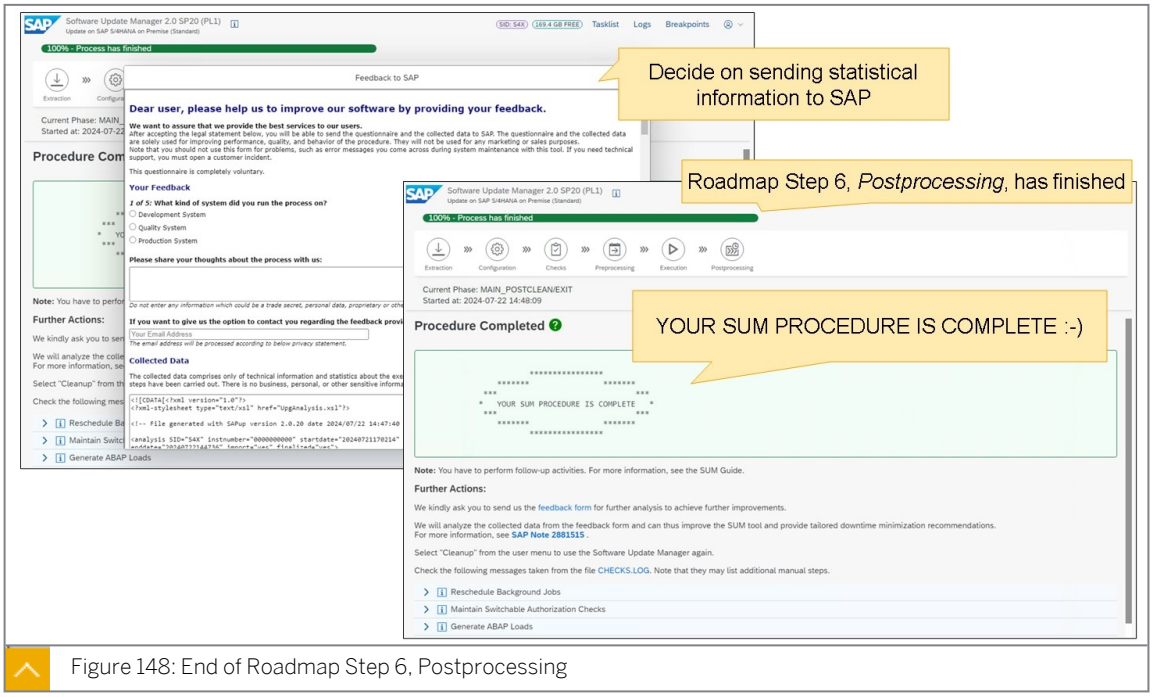

Figure 148: End of Roadmap Step 6, Postprocessing

Note:
At this point, the *Technical Downtime* is still not completed! But in the context of this course we ignore almost all manual technical follow-on activities.

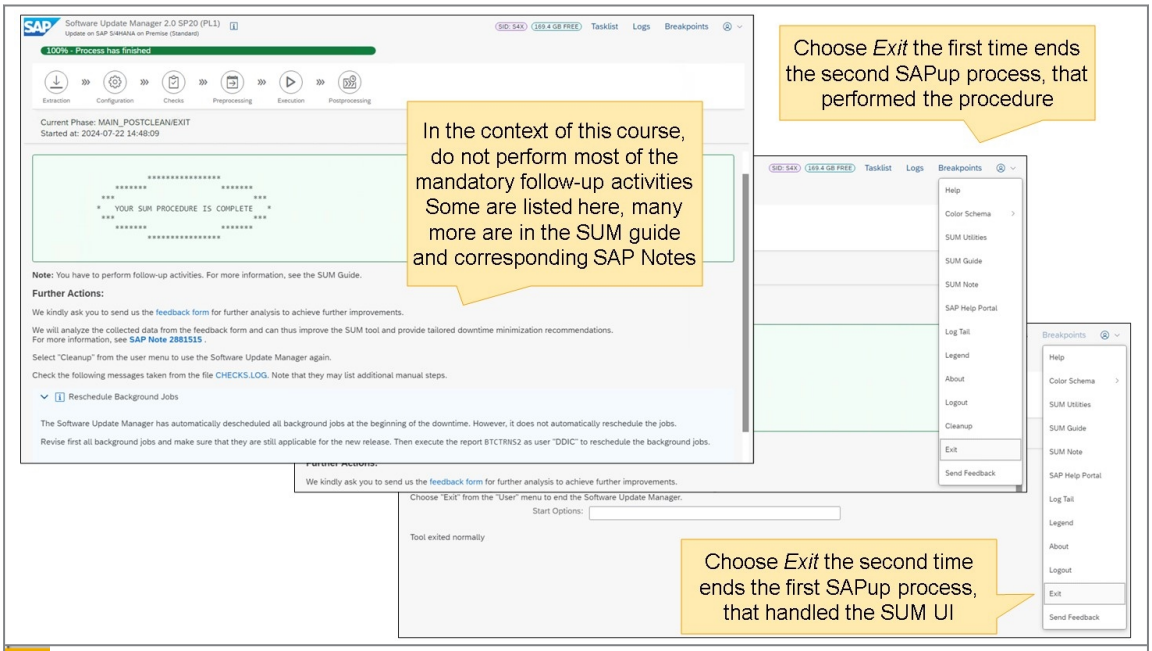

Figure 149: SUM Procedure Completes, End SUM

Congratulations! You finished the update procedure for an SAP S/4HANA Server system!

You can send feedback to SAP to improve your SUM procedure for the next run.

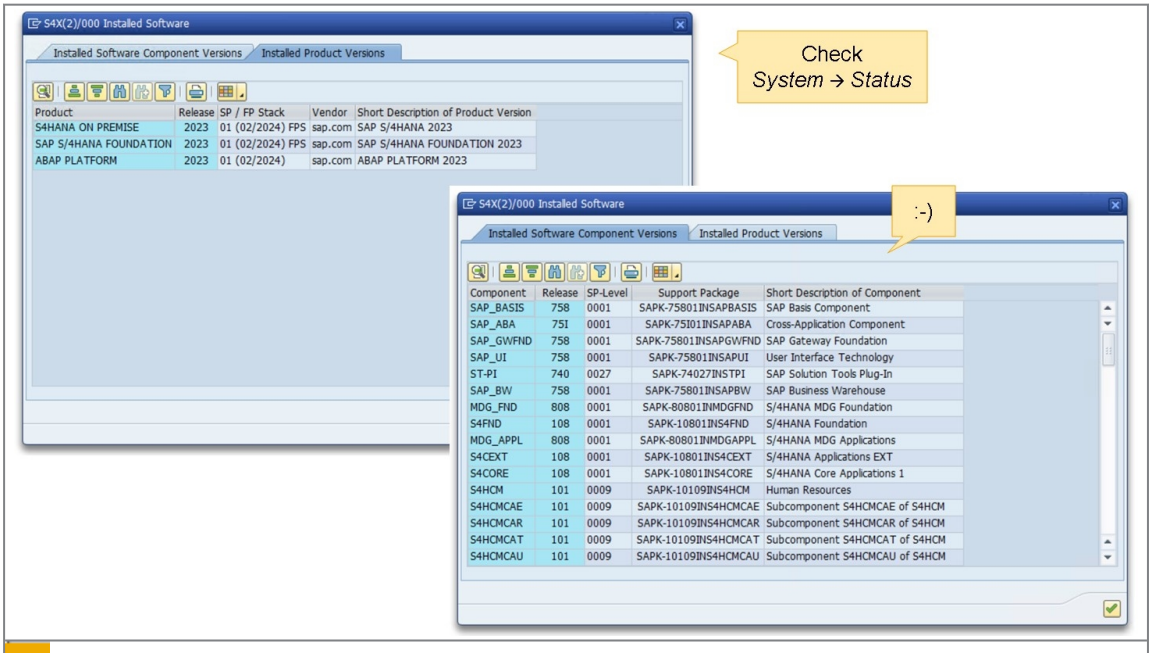

Figure 150: Check the Result

Check the software components and their respective SAP Support Package levels.

You have successfully updated your SAP S/4HANA Server system!

Note:
Please note, that the end of the technical update procedure is not sufficient to start productive work again. Further checks are required before end users can return to productive use. See SUM guide and major SUM notes from https://support.sap.com/sltoolset for details. These steps will not be performed in this course.

LESSON SUMMARY
You should now be able to:

- Update an SAP S/4HANA Server System using SUM, Strategy Standard

Learning Assessment

1. Several components of SAP Systems can be patched using Software Update Manager (SUM). Which components of AS ABAP-based SAP systems can be updated using SUM?

   Choose the correct answers.

   - ☐ A Kernel
   - ☐ B Database
   - ☐ C `SPAM / SAINT`
   - ☐ D SAP_BASIS

2. Which content of an SAP system can be updated with an SAP Support Package?

   Choose the correct answers.

   - ☐ A ABAP programs
   - ☐ B table structures
   - ☐ C data
   - ☐ D kernel

3. What should you do before updating your SAP system using SUM?

   Choose the correct answers.

   - ☐ A Download the latest version of SUM
   - ☐ B Download the latest version of Software Provisioning Manager (SWPM)
   - ☐ C Change the password for user DDIC in client 000
   - ☐ D Read the corresponding SAP Note for your version of SUM

4. When updating an SAP S/4HANA Server system using Software Update Manager (SUM), you will be asked for the passwords for which users?

   Choose the correct answers.

   - ☐ A SAP* in client 000
   - ☐ B DDIC in client 000
   - ☐ C SYSTEM in SAP HANA Tenant database
   - ☐ D TMSADM in client 000

5. When working with Software Update Manager (SUM) you should activate an Expert Mode that allows additional settings.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

6. Identify activities that you should complete before executing an update of your SAP system using Software Update Manager (SUM). Which activities can make updating your SAP system easier, if executed in advance?

   Choose the correct answers.

   - ☐ A Read and follow the corresponding SAP Notes for the version of SUM you will be using
   - ☐ B Check for modifications that might require attention during the update
   - ☐ C Execute SAP Load Generator before starting the update
   - ☐ D Check available disk space and free space in the database

7. Importing SAP Support Packages in an AS ABAP based SAP system using the Software Update Manager (SUM) requires that you provide a so-called stack-XML file at the begin of the update process.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

8. You are using the strategy *Standard* for updating an AS ABAP-based SAP system. This will result in lower required free space in the database than when using the strategy *Single System*.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

Learning Assessment - Answers

1. Several components of SAP Systems can be patched using Software Update Manager (SUM). Which components of AS ABAP-based SAP systems can be updated using SUM?

   Choose the correct answers.

   [X] A Kernel

   [ ] B Database

   [X] C `SPAM / SAINT`

   [X] D SAP_BASIS

   You are correct! Kernel, `SPAM/SAINT` and SAP_BASIS can be updated using SUM. Read more on this in the lesson Patching SAP Systems from the course ADM110.

2. Which content of an SAP system can be updated with an SAP Support Package?

   Choose the correct answers.

   [X] A ABAP programs

   [X] B table structures

   [X] C data

   [ ] D kernel

   You are correct! An SAP Note can update ABAP programs, table structures, and data. Read more on this in the lesson Patching SAP Systems of the course ADM110.

3. What should you do before updating your SAP system using SUM?

   Choose the correct answers.

   [X] A Download the latest version of SUM

   [ ] B Download the latest version of Software Provisioning Manager (SWPM)

   [ ] C Change the password for user DDIC in client 000

   [X] D Read the corresponding SAP Note for your version of SUM

   You are correct! Before updating your SAP system using SUM, download the latest version of SUM and read the corresponding SAP Note for your version of SUM. Read more on this in the lesson Updating an SAP S/4HANA Server System using SUM, Strategy Standard of the course ADM110.

4. When updating an SAP S/4HANA Server system using Software Update Manager (SUM), you will be asked for the passwords for which users?

   Choose the correct answers.

   [ ] A SAP* in client 000

   [X] B DDIC in client 000

   [X] C SYSTEM in SAP HANA Tenant database

   [ ] D TMSADM in client 000

   You are correct! When updating an SAP S/4HANA Server system using SUM, you will be asked for the passwords of DDIC in client 000 and SYSTEM in the SAP HANA Tenant database - but the passwords for the users SAP* in client 000 or TMSADM in the same client are not required. Read more on this in the lesson Updating an SAP S/4HANA Server System using SUM, Strategy Standard of the course ADM110.

5. When working with Software Update Manager (SUM) you should activate an Expert Mode that allows additional settings.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! SUM offers an expert mode that offers additional settings to be used during the update. Read more on this in the lesson Updating an SAP S/4HANA Server System using SUM, Strategy Standard of the course ADM110.

6. Identify activities that you should complete before executing an update of your SAP system using Software Update Manager (SUM). Which activities can make updating your SAP system easier, if executed in advance?

   Choose the correct answers.

   [X] A Read and follow the corresponding SAP Notes for the version of SUM you will be using

   [X] B Check for modifications that might require attention during the update

   [ ] C Execute SAP Load Generator before starting the update

   [X] D Check available disk space and free space in the database

   You are correct! Among other recommended activities, you should check the corresponding SAP Note for prerequisites, you should check your system for modifications and you should check the available disk space and free space in the database. Executing the SAP Load Generator is an activity that you will execute after updating your SAP system. Read more on this in the lesson Updating an SAP S/4HANA Server System using SUM, Strategy Standard of the course ADM110.

7. Importing SAP Support Packages in an AS ABAP based SAP system using the Software Update Manager (SUM) requires that you provide a so-called stack-XML file at the begin of the update process.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! When importing SAP Support Packages in an AS ABAP-based SAP system you are required to provide a so-called stack-XML file. Read more on this in the lesson Updating an SAP S/4HANA Server System using SUM, Strategy Standard of the course ADM110.

8. You are using the strategy *Standard* for updating an AS ABAP-based SAP system. This will result in lower required free space in the database than when using the strategy *Single System*.

   Determine whether this statement is true or false.

   [ ] True

   [X] False

   You are correct! Using the strategy *Standard* for updating an AS ABAP-based SAP system will result in higher required free space in the database than when using the strategy *Single System*. Read more on this in the lesson Updating an SAP S/4HANA Server System using SUM, Strategy Standard of the course ADM110.

UNIT 6 Updating an SAP Solution Manager ABAP System using SUM, Strategy Single System

UNIT OBJECTIVES

- Update an SAP Solution Manager ABAP System using SUM, Strategy Single System
- Start and schedule the SAP load generator (SGEN)

Unit 6
Lesson 1

Updating an SAP Solution Manager ABAP System using SUM, Strategy Single System

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Update an SAP Solution Manager ABAP System using SUM, Strategy Single System

Updating an SAP Solution Manager ABAP System using SUM, Strategy Single System

Before updating an AS ABAP-based SAP system using SUM, you should consider the following steps:

1. Because SUM might ask you for the application of certain SAP Notes, you should make sure that transaction SNOTE itself is as current as possible. For most releases you can ensure this by applying SAP Note 1668882 to your SAP system.
2. Consider updating the database software to the most current patch level - ESPECIALLY, when you installed your SAP system using rather old RDBMS media and did not update the database software since then.
3. Consider updating SPAM/SAINT.
4. Check free space within the database data volumes and on file system level.
5. Read the relevant SUM Master Guide and check the SAP Notes mentioned therein that are relevant for your planned update process.

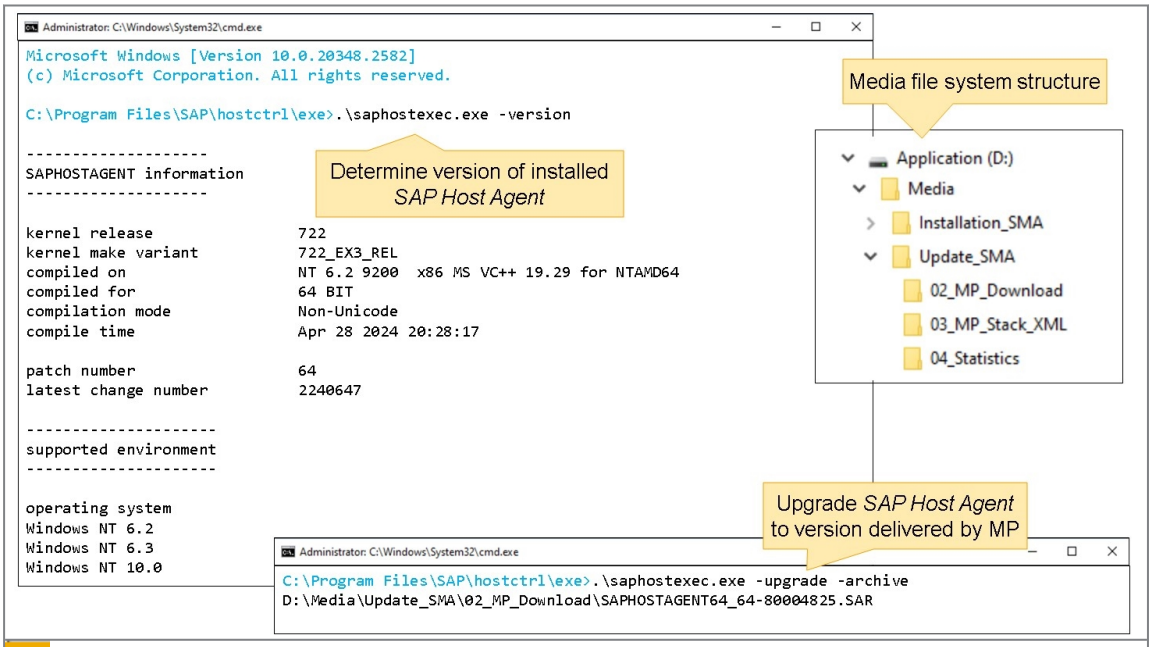

Figure 151: Check and Update SAP Host Agent

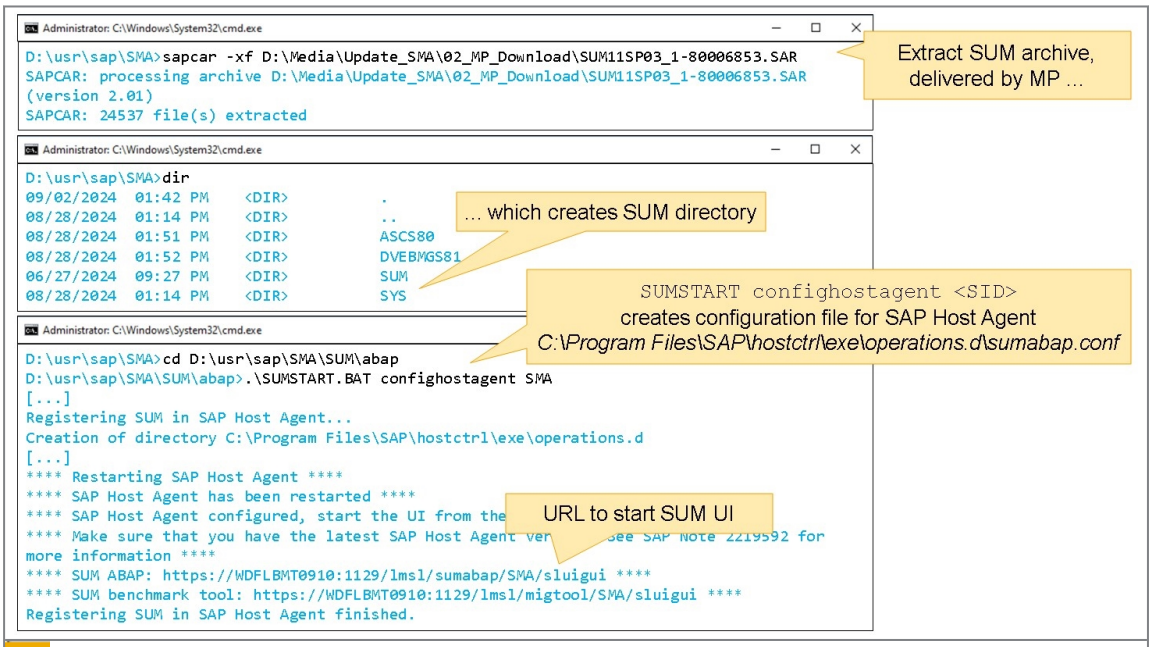

Figure 152: Extract SUM Archive and Configure SAP Host Agent

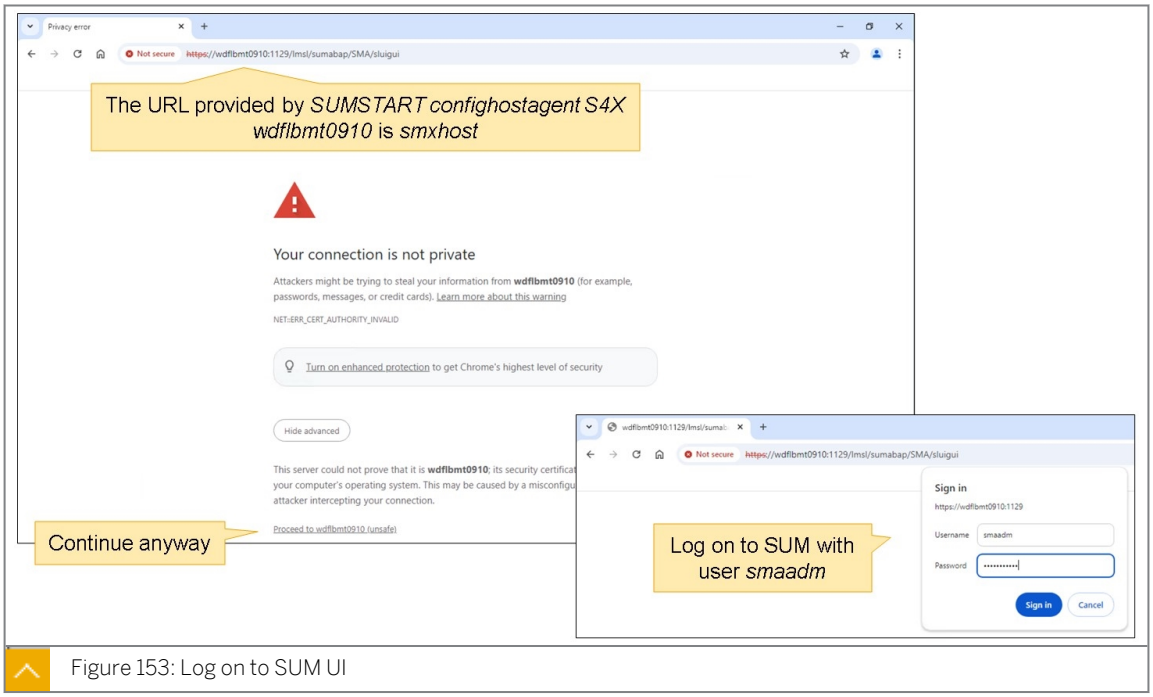

Figure 153: Log on to SUM UI

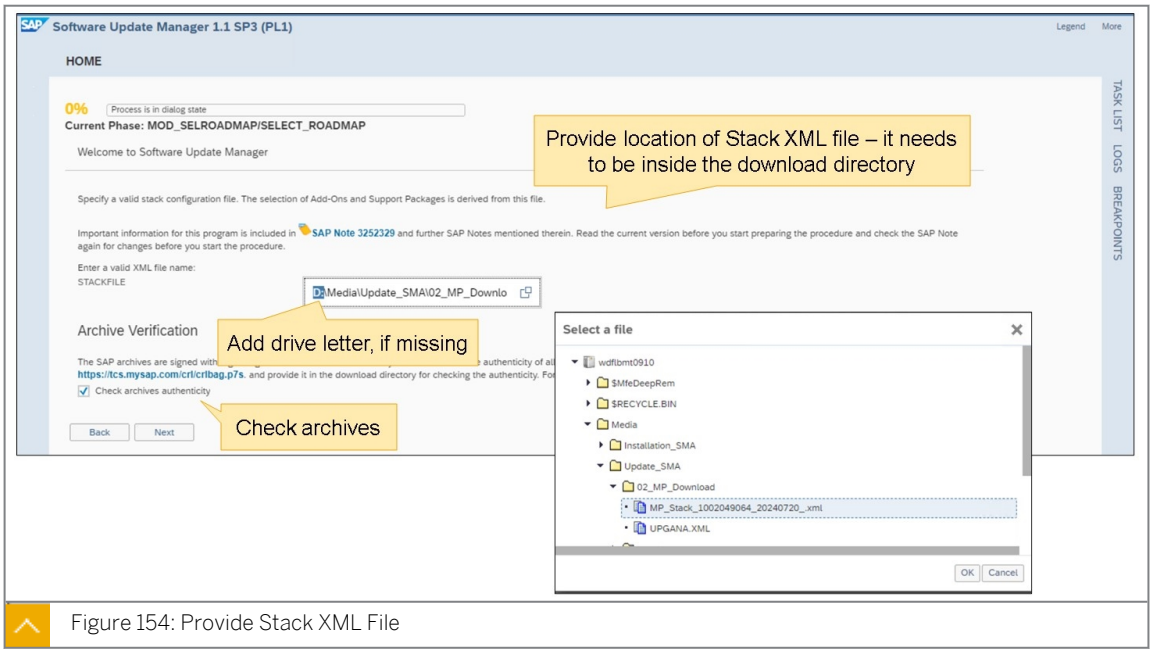

Figure 154: Provide Stack XML File

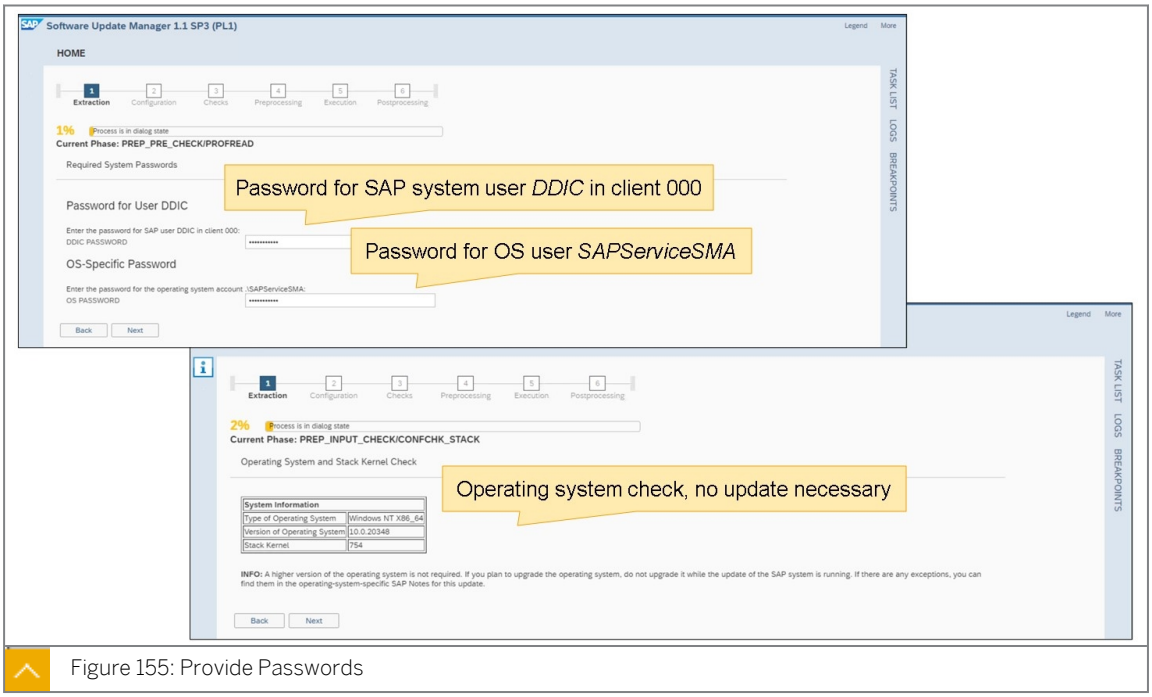

Figure 155: Provide Passwords

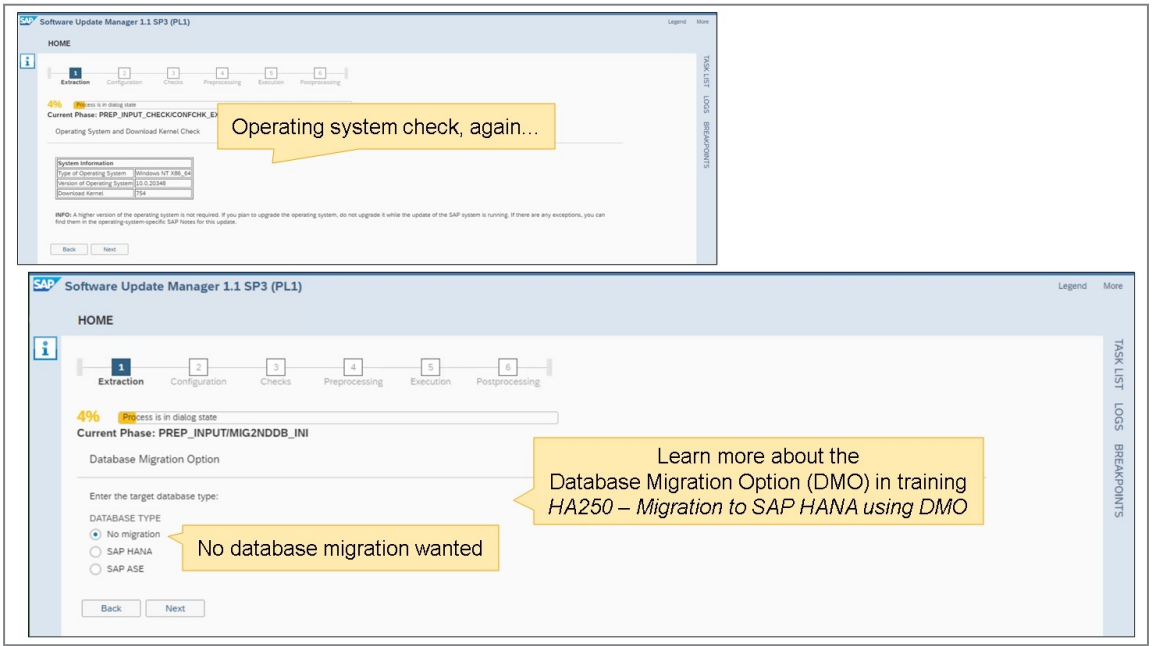

Figure 156: Decide for Database Migration

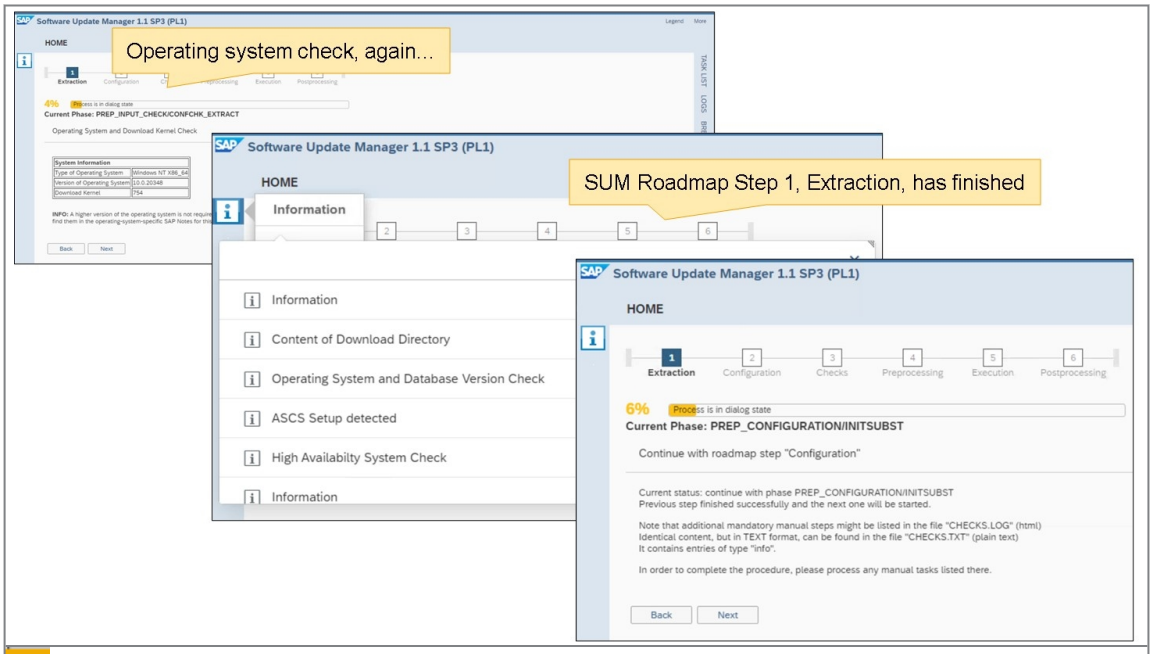

Figure 157: Complete Roadmap Step 1, Extraction

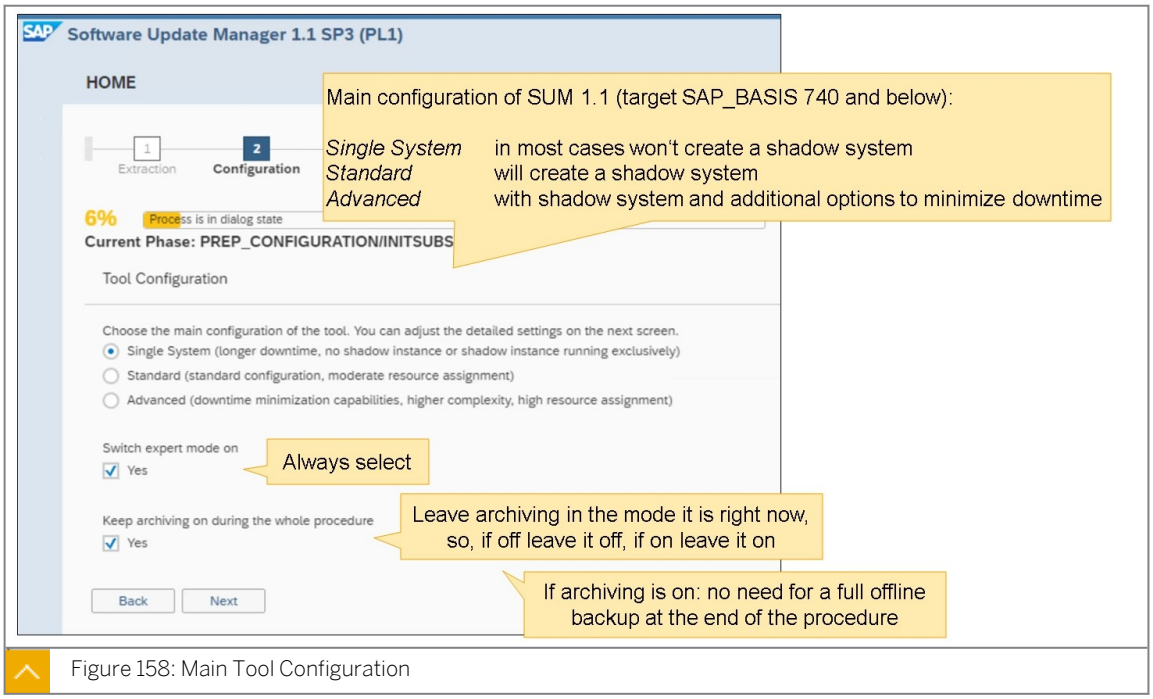

Figure 158: Main Tool Configuration

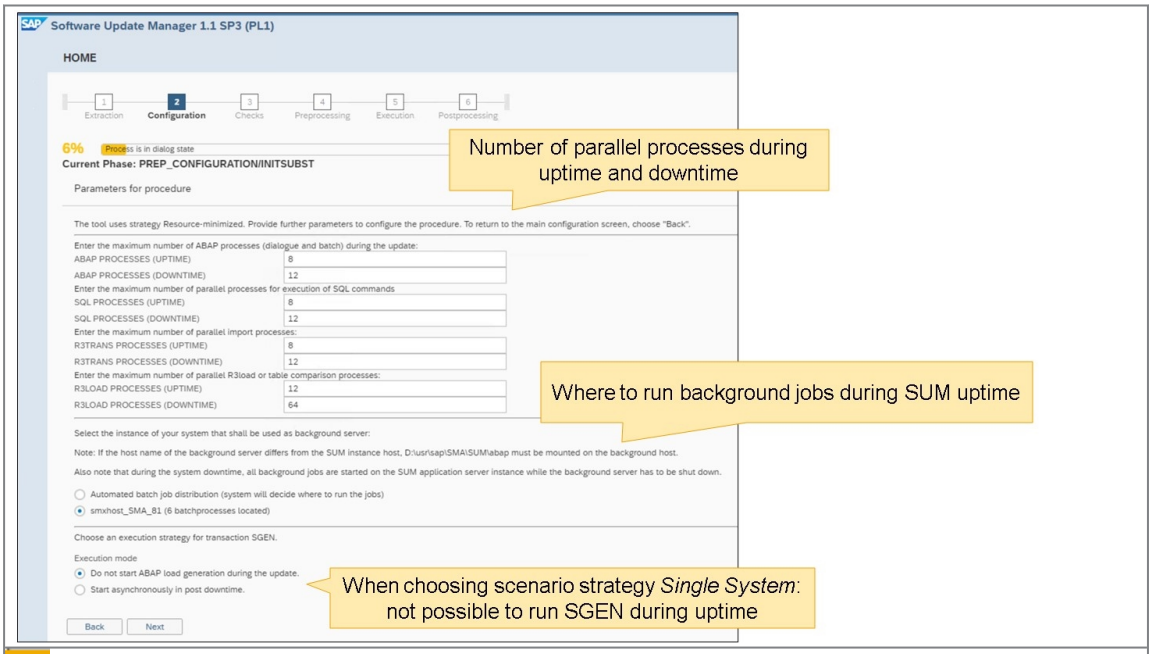

Figure 159: Parallel Processes, where to run Background Jobs, and SGEN Execution

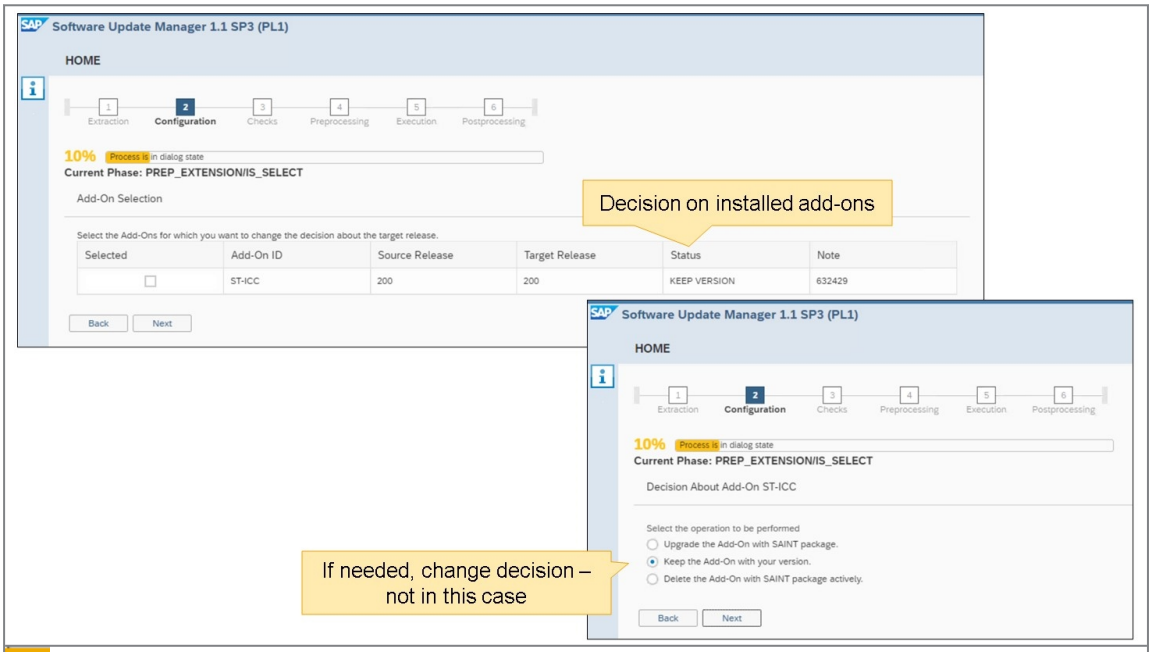

Figure 160: Decision on Add-ons

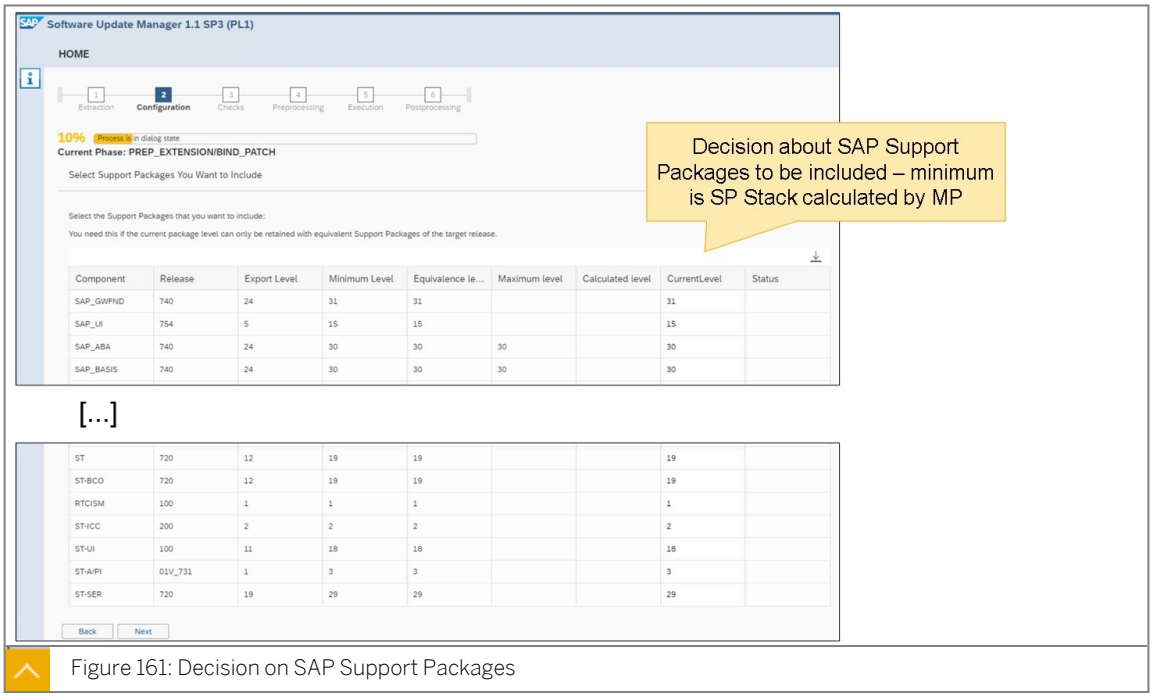

Figure 161: Decision on SAP Support Packages

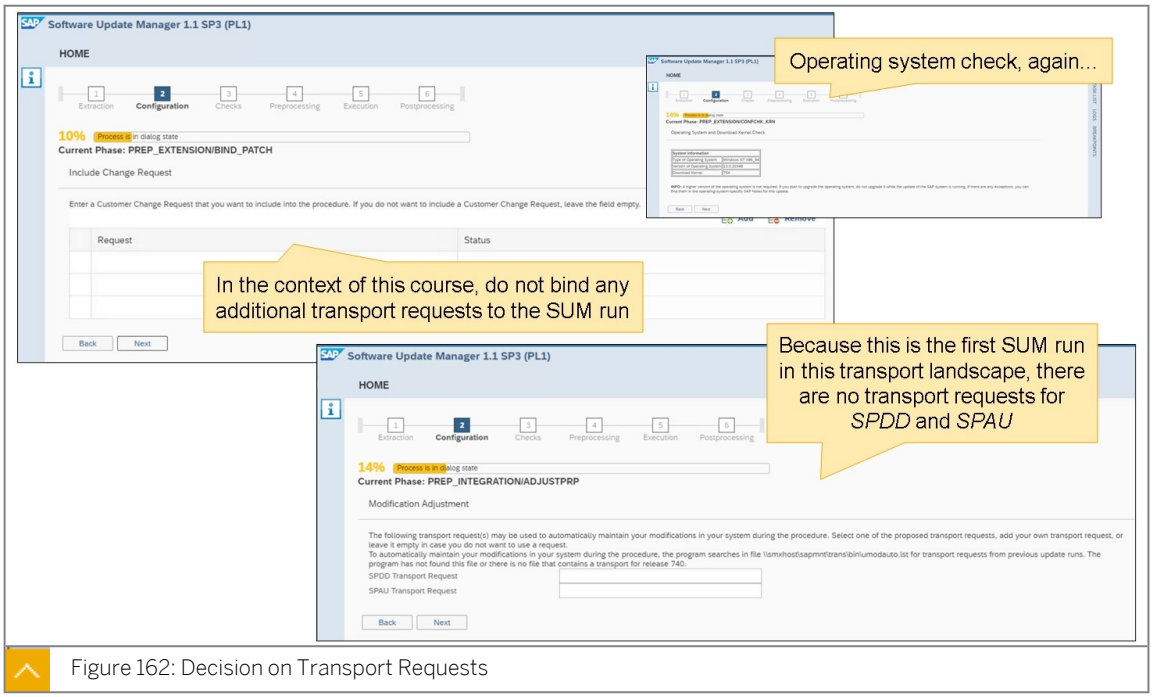

Figure 162: Decision on Transport Requests

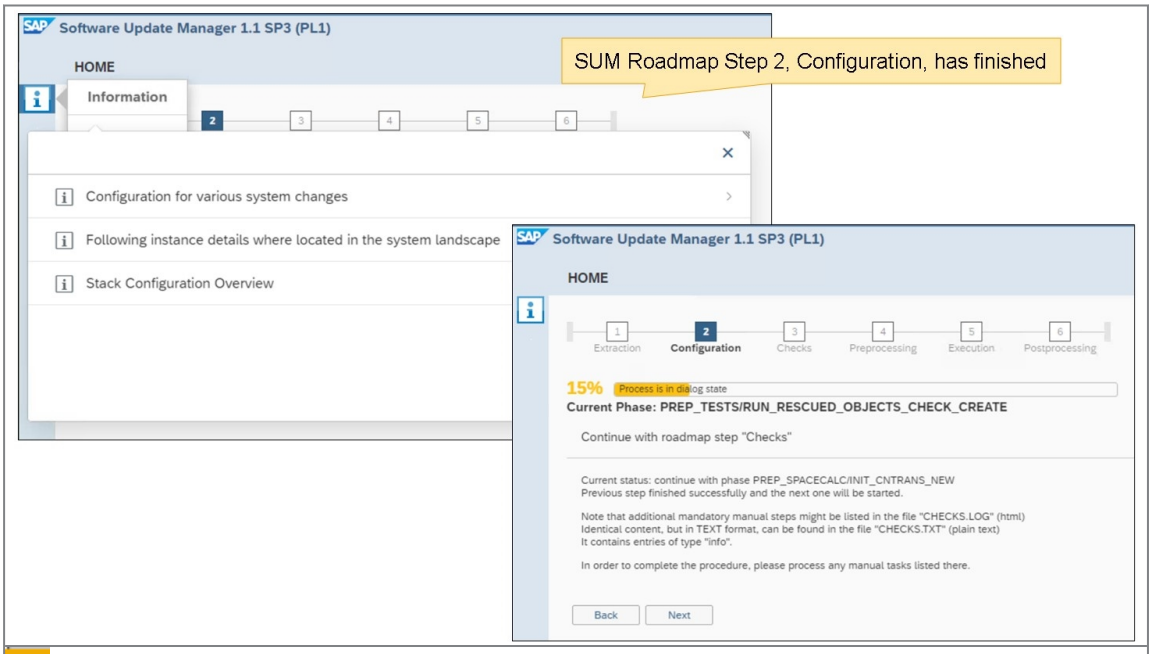

Figure 163: Complete Roadmap Step 2, Configuration

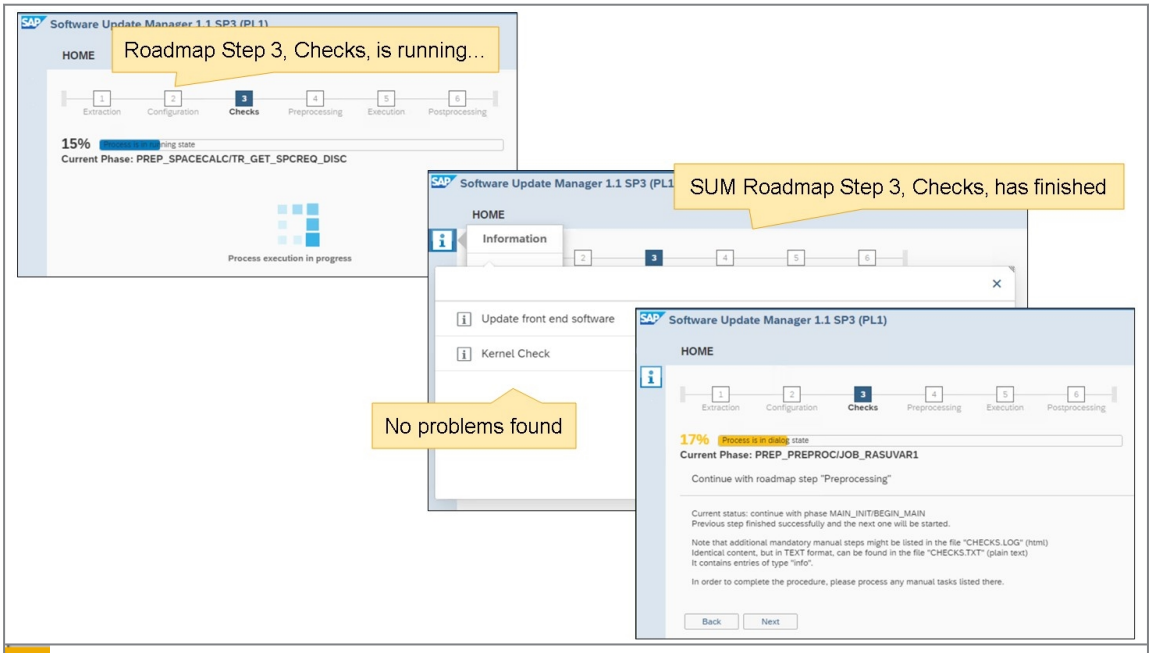

Figure 164: Run and Complete Roadmap Step 3, Checks

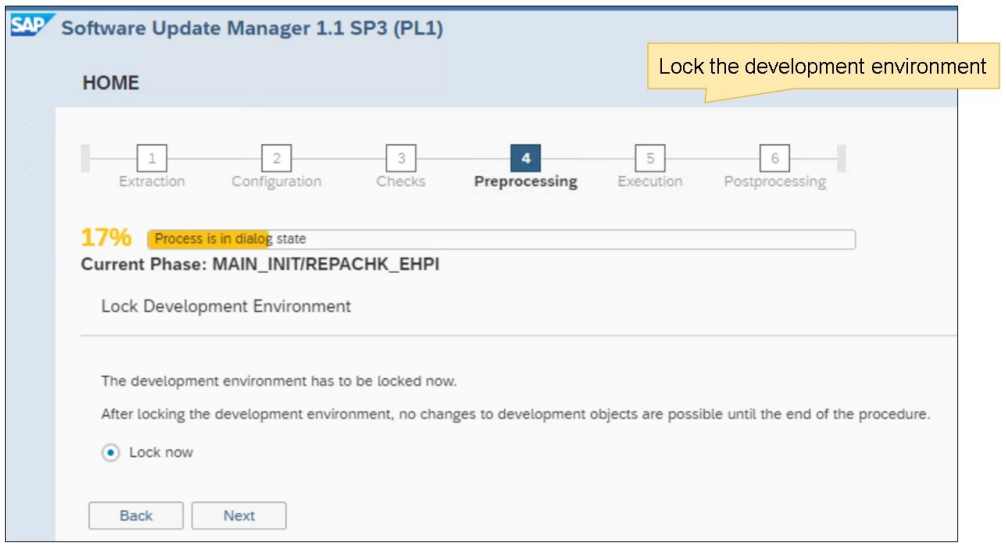

Figure 165: Lock Development Environment

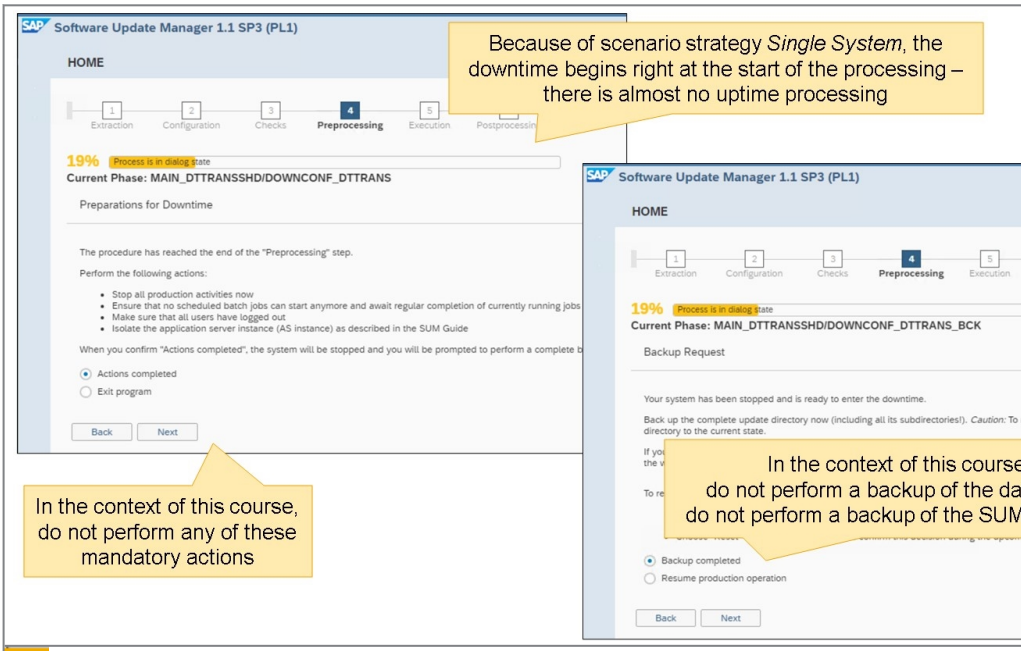

Figure 166: Begin of Downtime

The administrator begins the downtime.

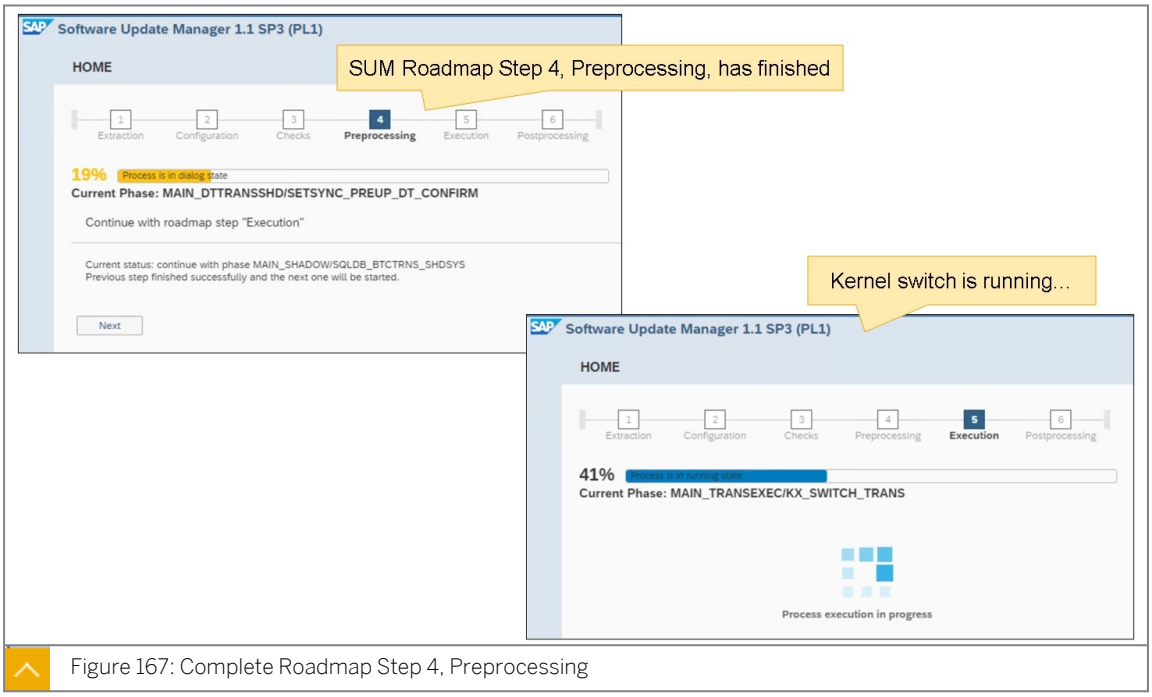

Figure 167: Complete Roadmap Step 4, Preprocessing

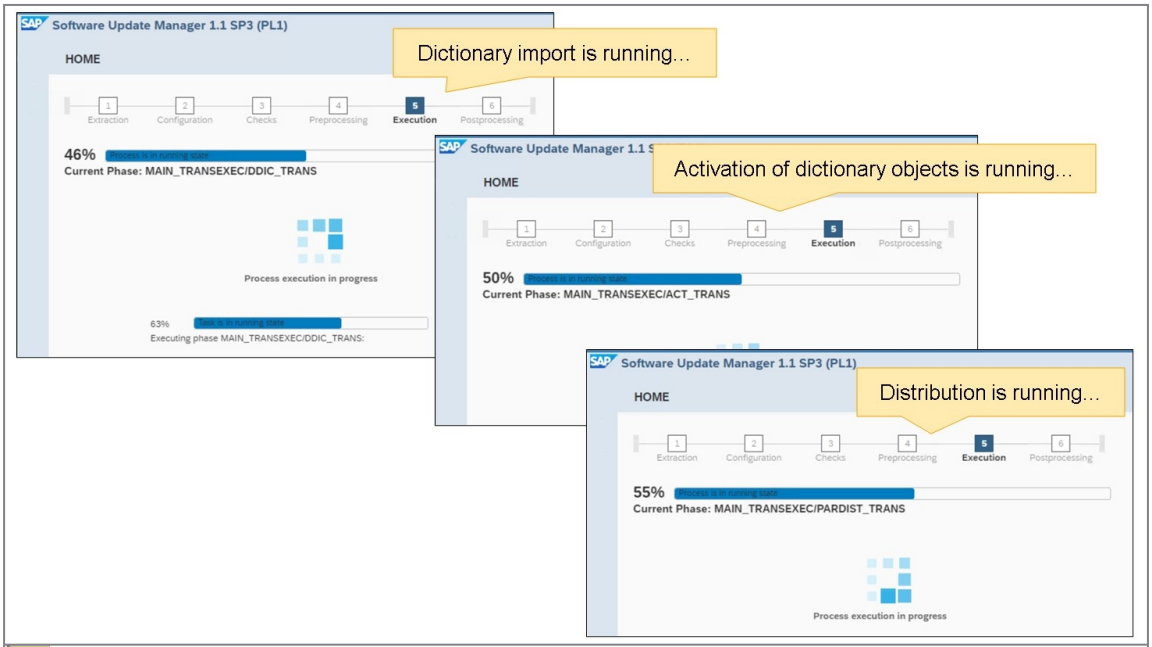

Figure 168: Roadmap Step 5, Execution is Running (1)

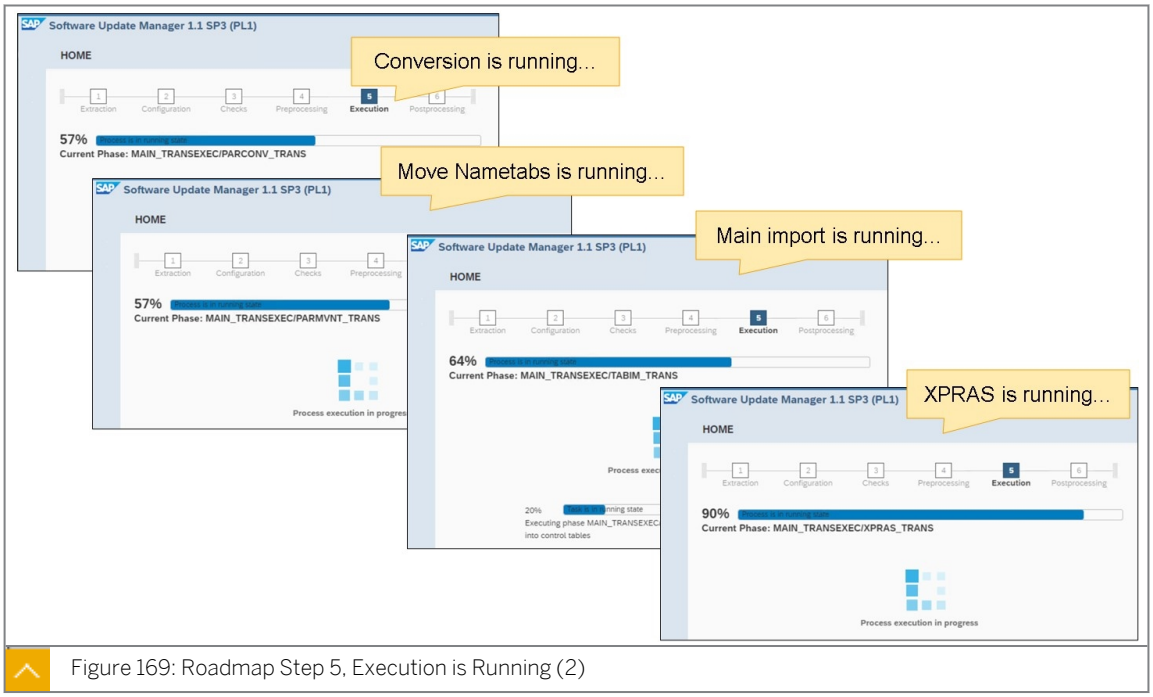

Figure 169: Roadmap Step 5, Execution is Running (2)

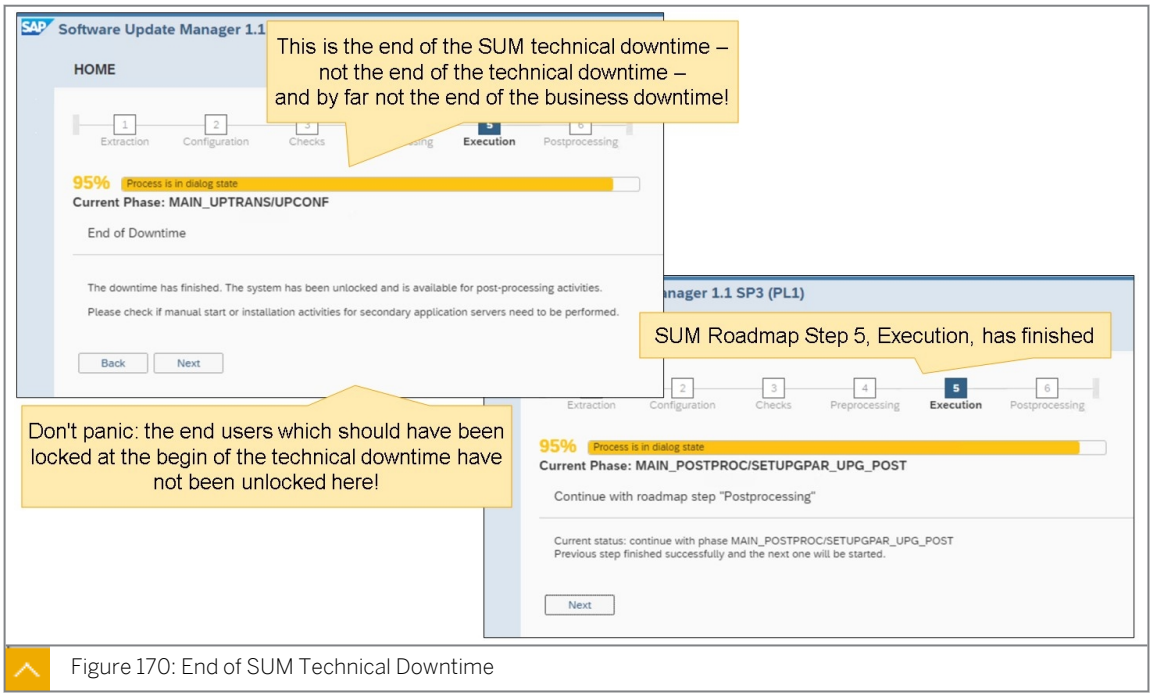

Figure 170: End of SUM Technical Downtime

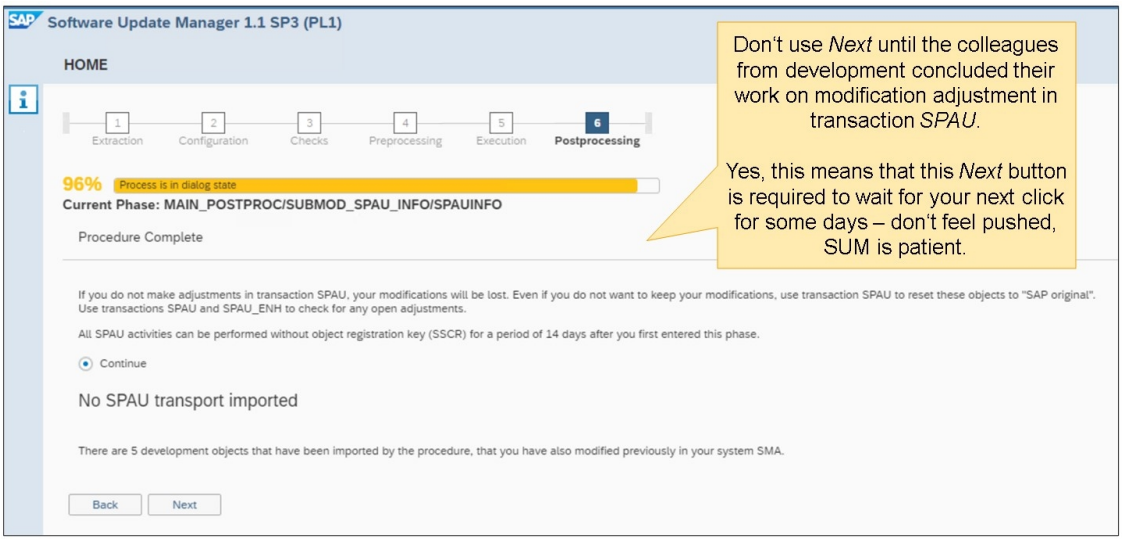

Figure 171: SUM Stop for SPAU

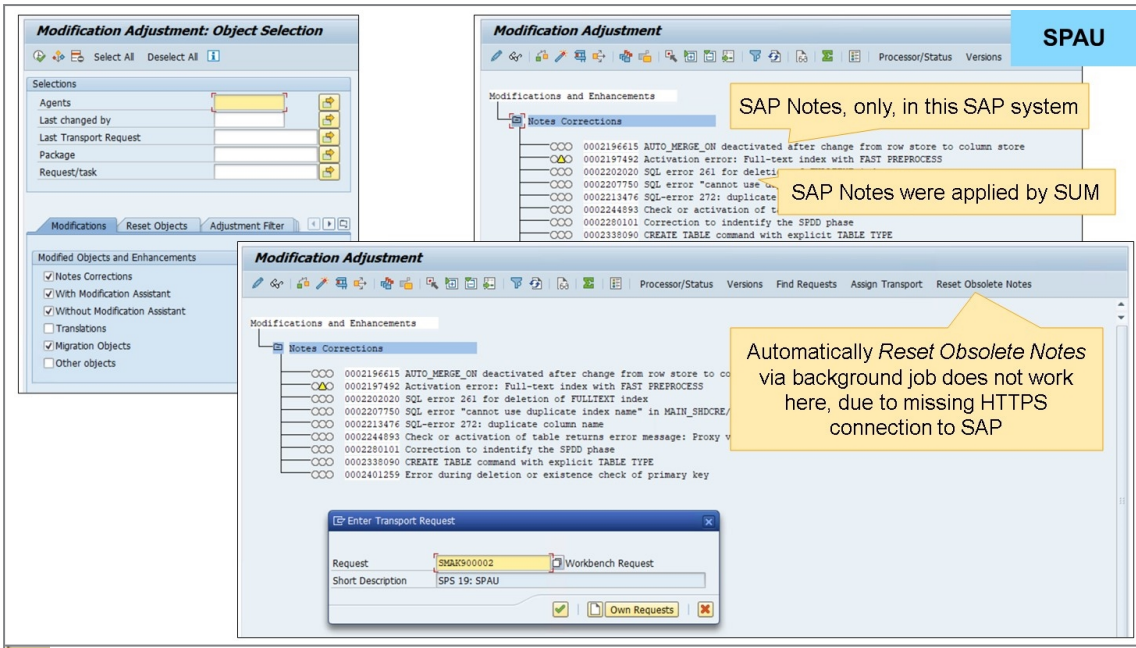

Figure 172: Perform SPAU Modification Adjustment (1)

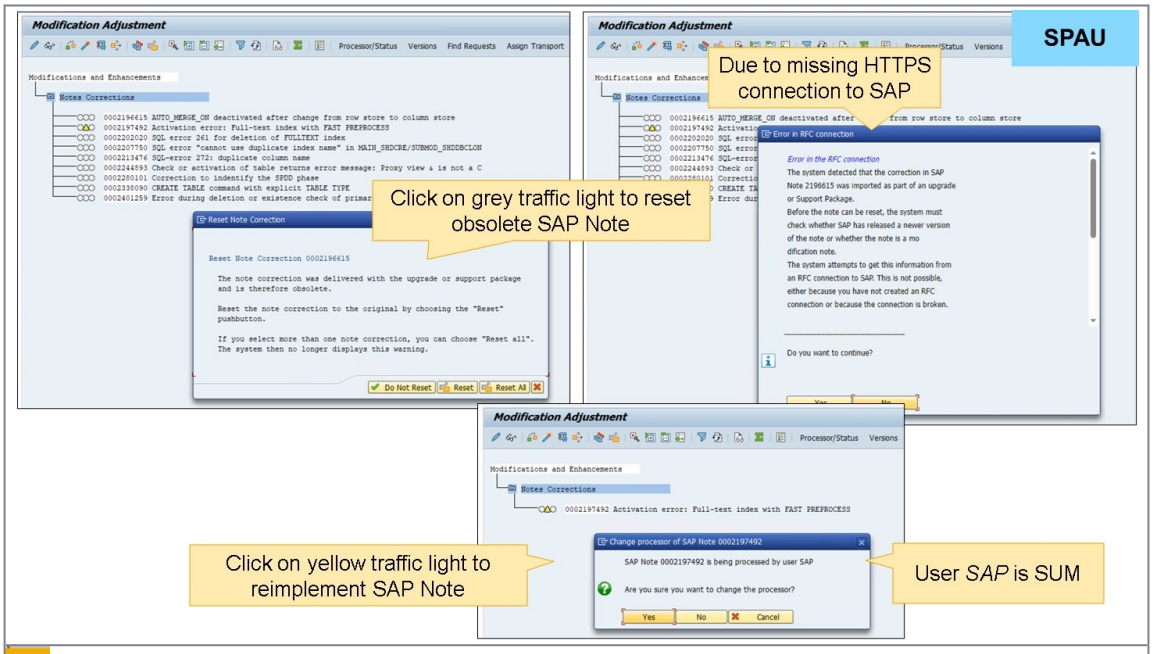

Figure 173: Perform SPAU Modification Adjustment (2)

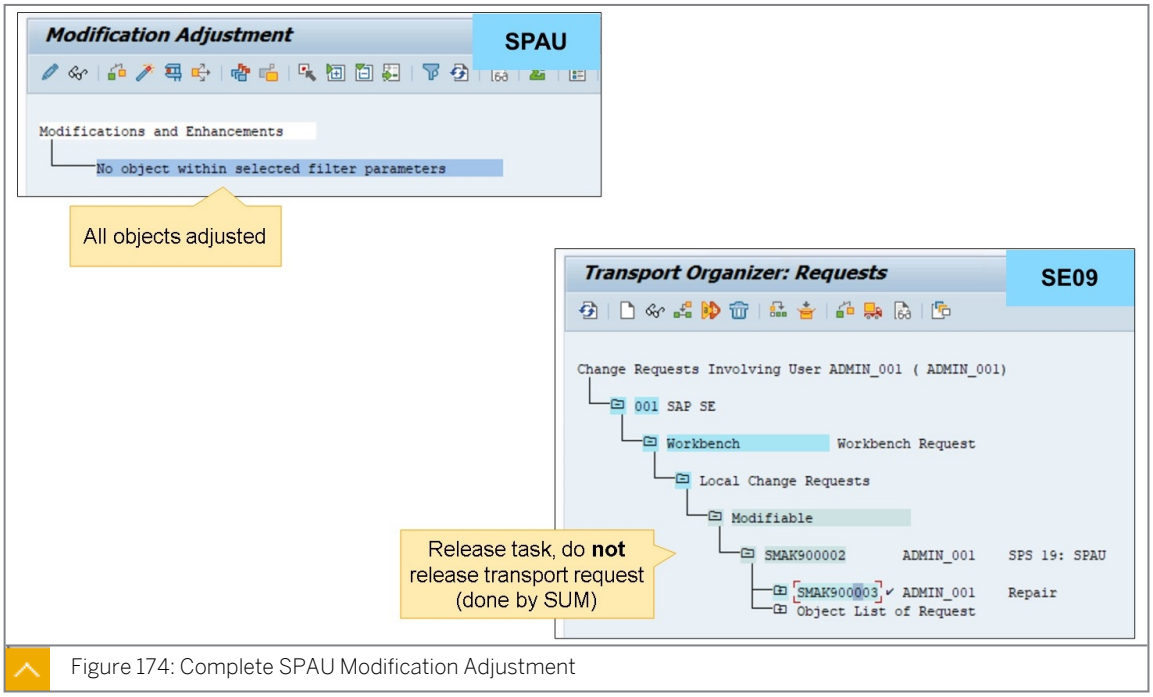

Figure 174: Complete SPAU Modification Adjustment

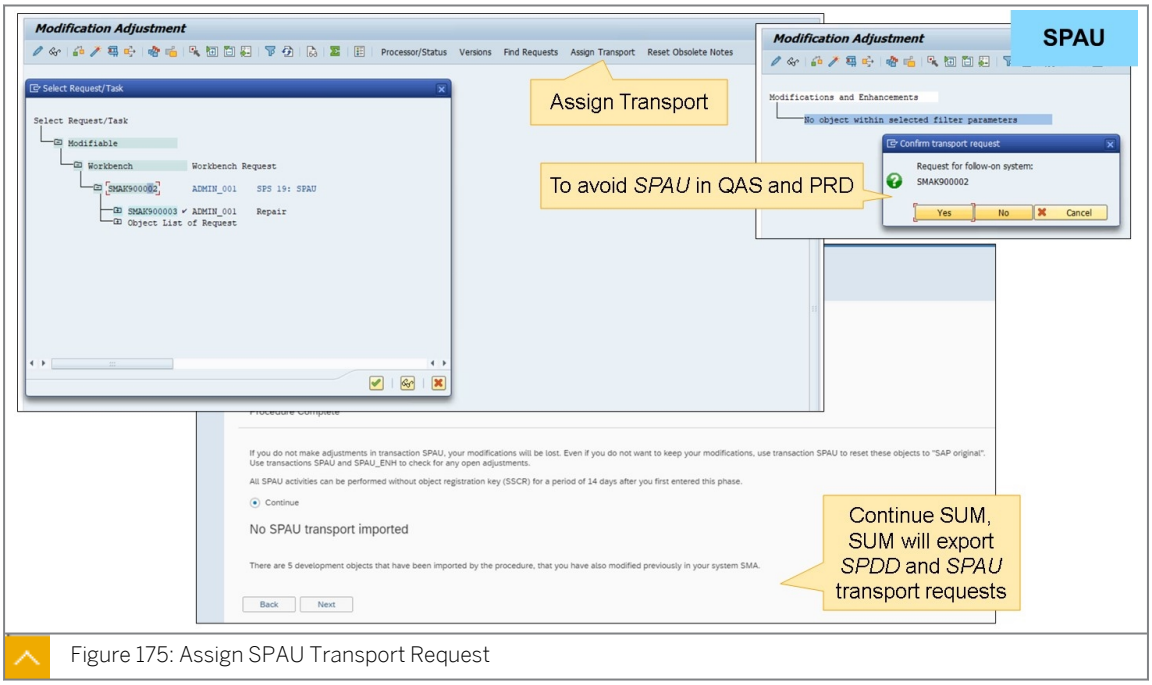

Figure 175: Assign SPAU Transport Request

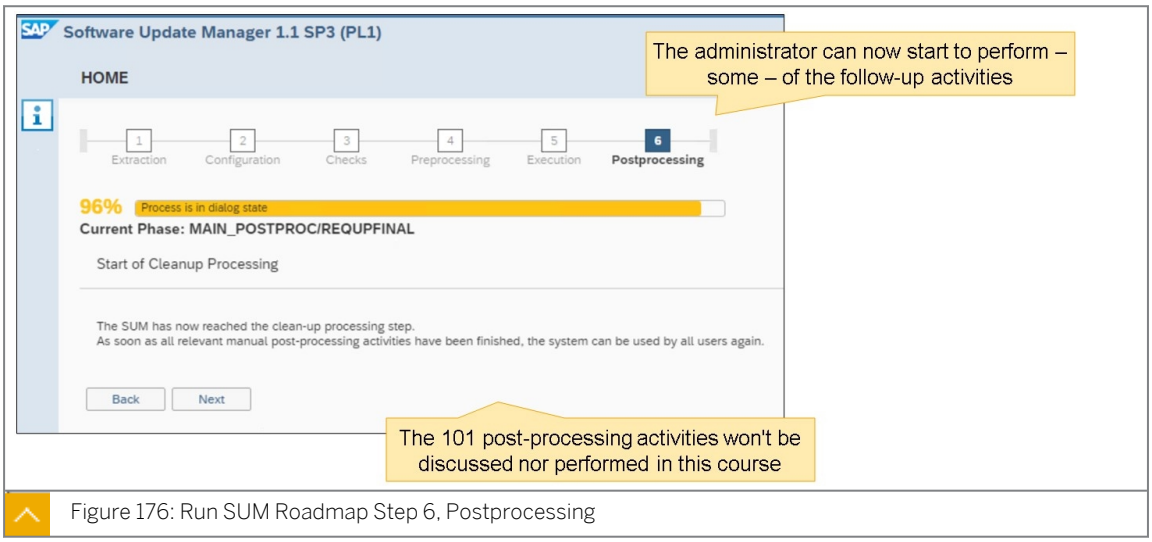

Figure 176: Run SUM Roadmap Step 6, Postprocessing

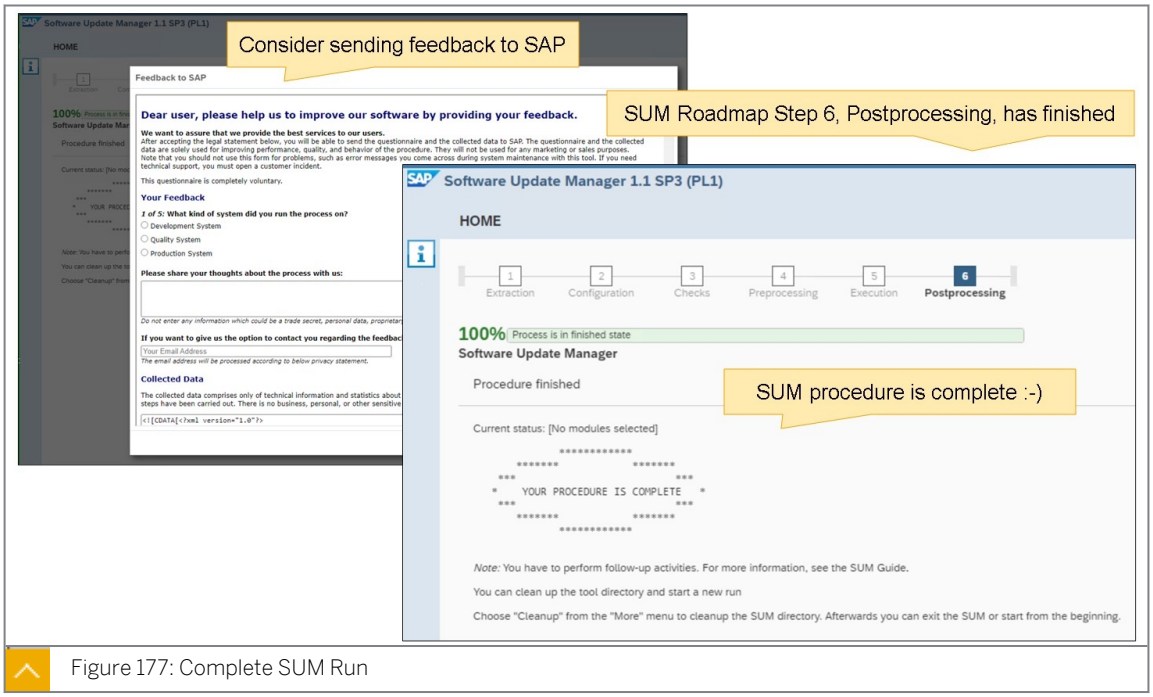

Figure 177: Complete SUM Run

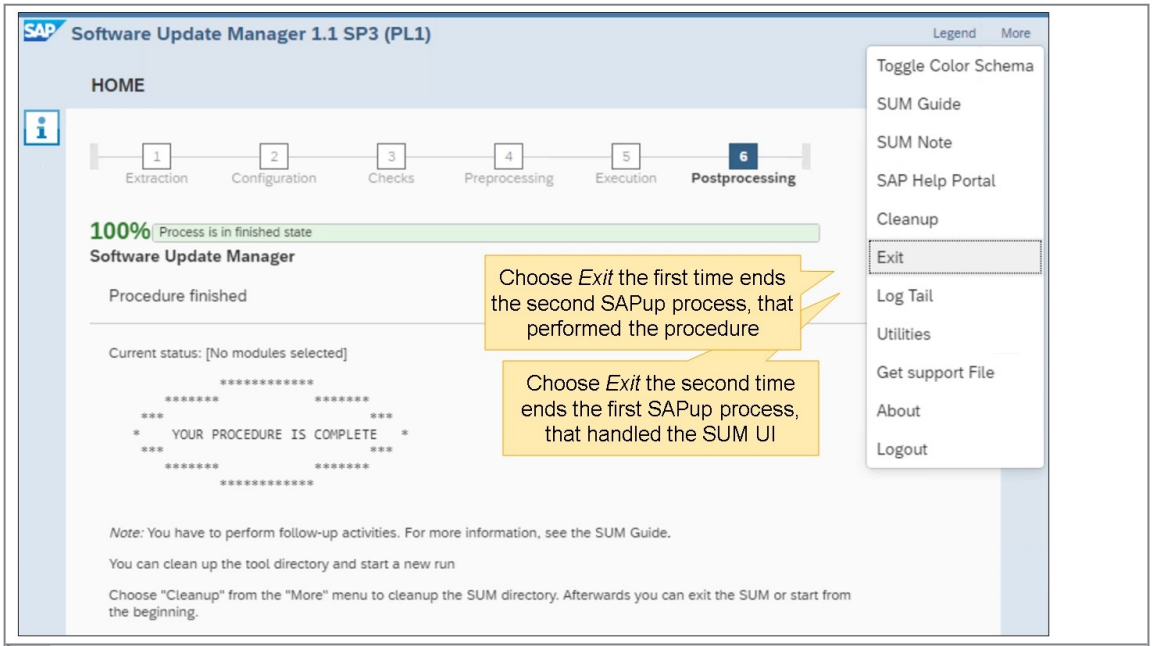

Figure 178: Exit SUM Procedure

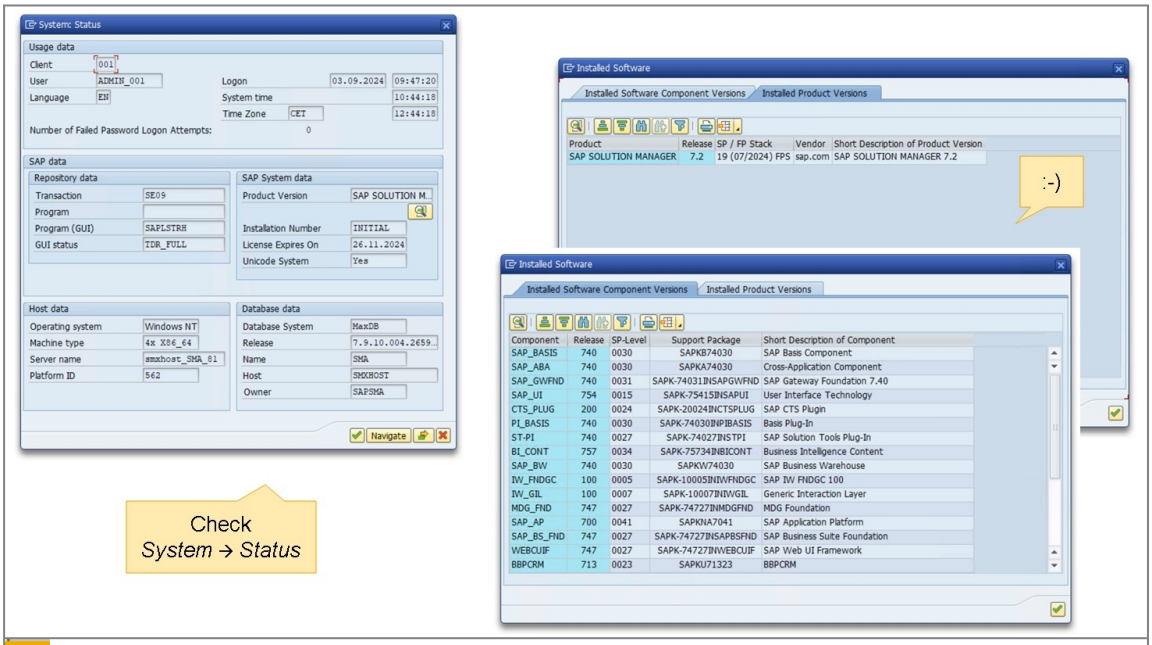

Figure 179: Check Result

Check the software components and their respective SAP Support Package levels.

You have successfully updated your SAP Solution Manager ABAP system!

> Note:
> Please note, that the end of the technical update procedure is not sufficient to start productive work again. Further checks are required before end users can return to productive use. See SUM guide and major SUM notes from https://support.sap.com/sltoolset for details. These steps will not be performed in this course.

LESSON SUMMARY

You should now be able to:

- Update an SAP Solution Manager ABAP System using SUM, Strategy Single System

Generating new Program Loads using SGEN

LESSON OVERVIEW
This lesson explains the usage of SGEN after completing the update of an AS ABAP-based SAP system.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Start and schedule the SAP load generator (SGEN)

SAP Load Generator (SGEN)

After the installation of an SAP system, all ABAP programs and other objects are available as source code. When transactions are called for the first time, corresponding programs are generated and compiled automatically (that is, their loads are generated). This process can take several seconds. When transactions are called a subsequent time, the access is faster because the loads already exist. To avoid delays when a transactions is called for the first time, you can use transaction `SGEN` and start the SAP Load Generator.

The following figure shows three SAP Load Generator screens. The first two screens offer load generation options and the third screen enables you to monitor the progress of load generation. In addition to providing progress information about current generation jobs or jobs that have already run, the screen displays other information such as predictions about the duration of a load generation.

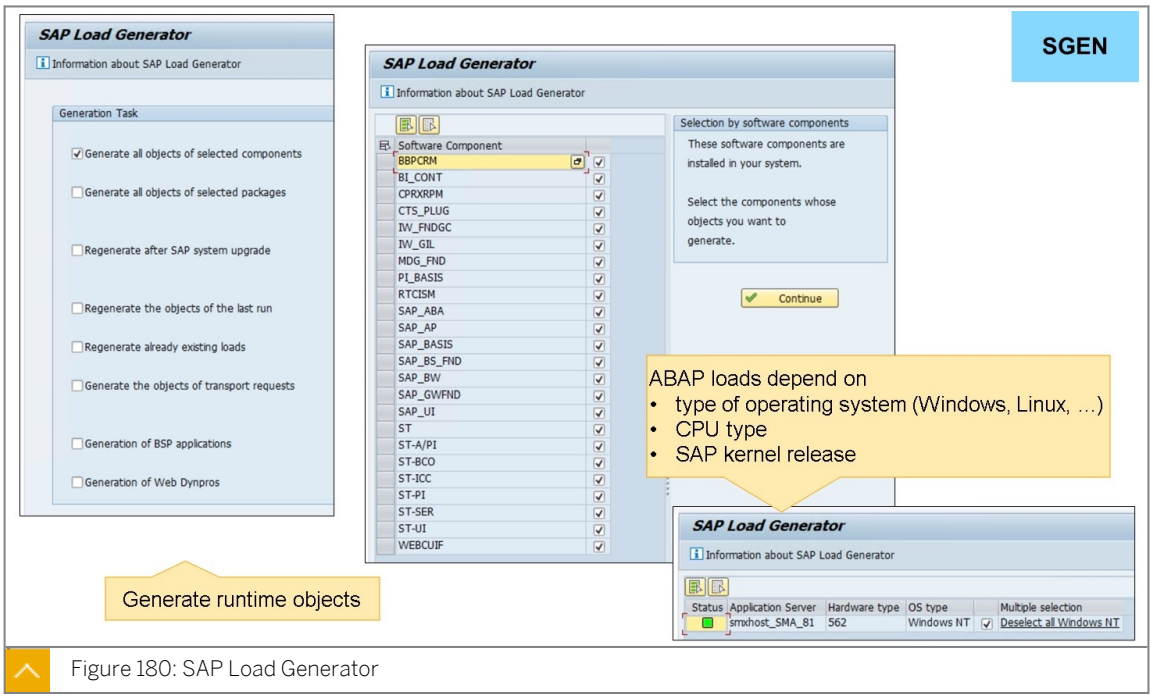

Figure 180: SAP Load Generator

LESSON SUMMARY

You should now be able to:

- Start and schedule the SAP load generator (SGEN)

Learning Assessment

1. Immediately after a new installation, all ABAP programs are available as source code including their load.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

2. You use the SAP Load Generator to generate loads in your SAP system which consists of applications servers running on Linux and another Unix operating system. To generate all selected loads for all application servers, you need to start the load generation more than once.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

Learning Assessment - Answers

1. Immediately after a new installation, all ABAP programs are available as source code including their load.

   Determine whether this statement is true or false.

   ☐ True

   ☒ False

   You are correct! Immediately after a new installation, all ABAP programs are available as source code only. You can use transaction `SGEN` to generate the ABAP loads of a number of programs, function groups, and classes after installation. Read more on this in the lesson Generating new Program Loads using SGEN of the course ADM110.

2. You use the SAP Load Generator to generate loads in your SAP system which consists of applications servers running on Linux and another Unix operating system. To generate all selected loads for all application servers, you need to start the load generation more than once.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   You are correct! Loads are platform-specific, therefore you need to start the Load Generator as often as your system uses different OS-platforms. Read more on this in the lesson Generating new Program Loads using SGEN of the course ADM110.

UNIT 7 Installing an SAP Solution Manager Java System

Lesson 1

UNIT OBJECTIVES

- Install an SAP Solution Manager Java System

Unit 7
Lesson 1

Installing an SAP Solution Manager Java System

LESSON OVERVIEW

This lesson explains how updating an AS ABAP Plus Java-based SAP system, like SAP Solution Manager, differs in several aspects from updating a pure AS ABAP-based SAP system or a pure AS Java-based SAP system. The update procedure is described in some detail.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Install an SAP Solution Manager Java System

Installing an SAP Solution Manager Java System

Installing SAP Solution Manager Java

SAP Solution Manager 7.2 needs two separate SAP systems to work as designed. One of those SAP systems is AS ABAP-based, the other on is AS Java-based. Both systems need to cooperate closely to offer all functions delivered with SAP Solution Manager 7.2. Therefore, during the installation of the SAP Solution Manager ABAP we will encounter elements that refer to SAP Solution Manager Java, and vice versa.

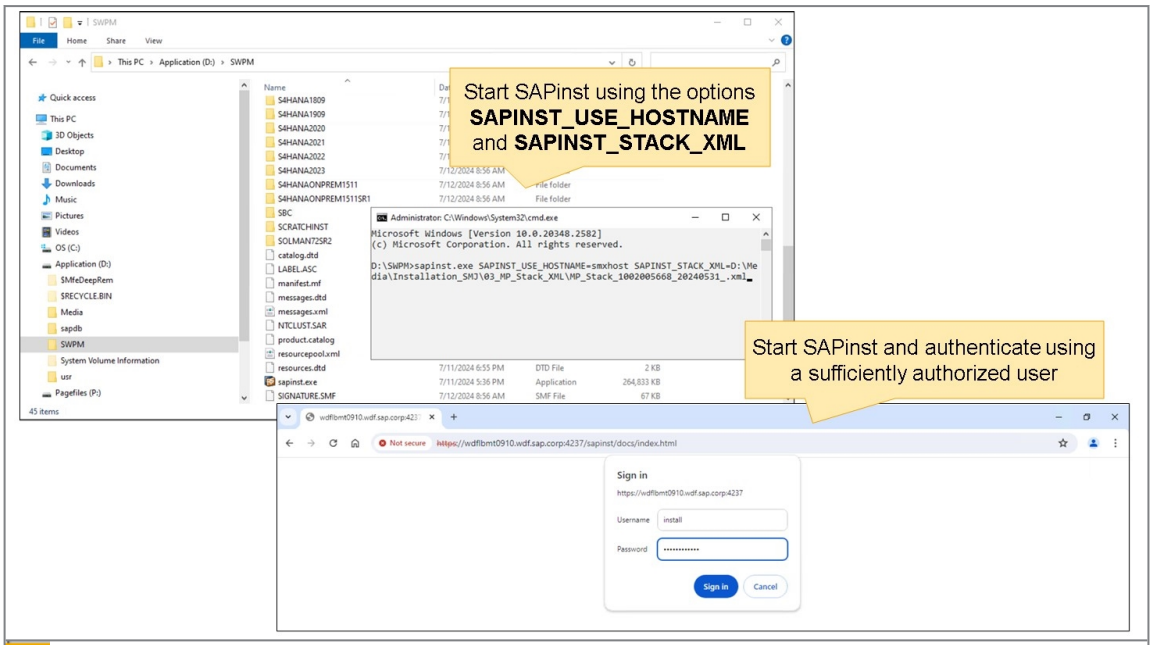

Figure 181: Start SAPinst

For this installation, we make use of the option SAPinst offers to install the SAP system using a virtual host name. On Windows, the usage of virtual host names requires certain preparation steps. Aside from other preparation steps (not further detailed here) we need to add a registry key to *Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Lsa\MSV1_0*, named *BackConnectionHostNames* set to the values, in our case: *smxhost.wdf.sap.corp* and *smxhost*. This allows us to connect to our training server using the names listed.

Note:
Please read SAP Note 1564275: **How to Install SAP Systems Using Virtual Host Names on Windows** for further information on the required steps for using virtual host names on Windows.

Note:
Please note, that you will encounter different versions of the tools used in this course. SWPM 1.0 is the tool to install SAP Solution Manager 7.2.

As we did not configure SSL communication for SAPinst, the browser will warn about an insecure connection. You need to authenticate with a sufficiently authorized user.

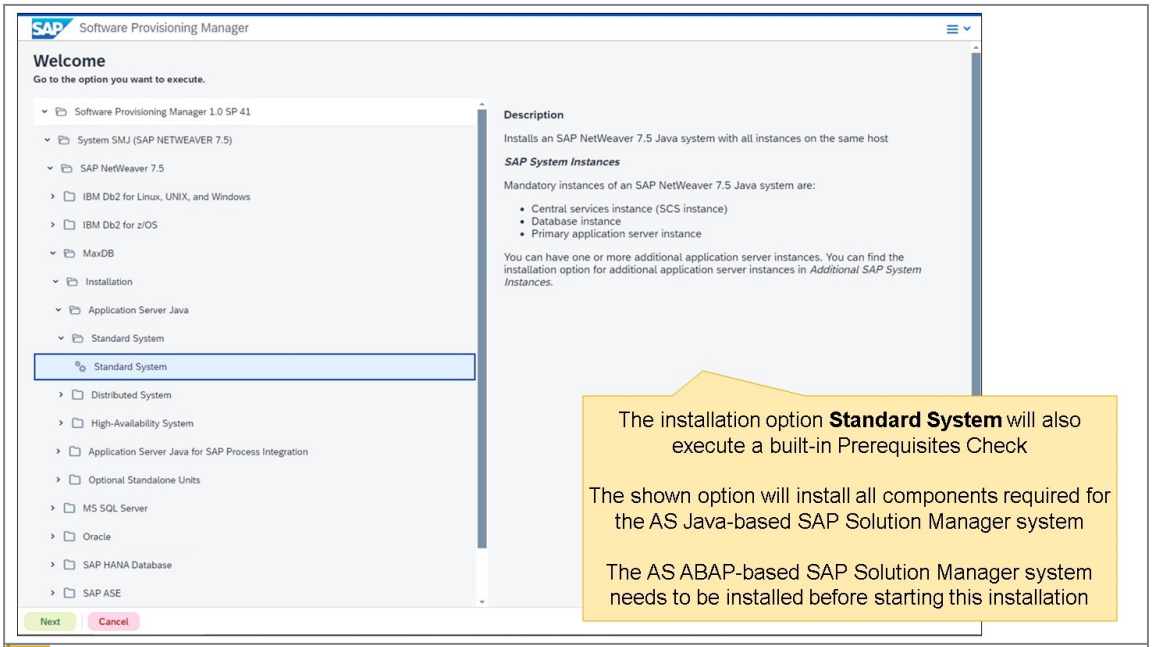

Figure 182: Select the Installation Option

The figure above shows the installation options offered by Software Provisioning Manager (SWPM). These options depend on the version of SWPM.

Within Software Provisioning Manager (started by calling the executable SAPinst), drill down to the installation that you would like to conduct.

The figure above highlights the selection (Standard System) that will install all AS Java-based elements of an SAP Solution Manager 7.2 Java Support Release 2 using the database SAP MaxDB.

Other installation options offer the distribution of components (Database, PAS, SCS) onto different hosts or provide options for installing an SAP system within a high-availability environment.

After choosing *Next*, you will enter the dialog phase of the installation process, in which you will provide/set many parameters required by the installation process.

Within Software Provisioning Manager (started by calling the executable SAPinst), navigate to the Prerequisites Check if you would like to prepare for the actual system installation in advance.

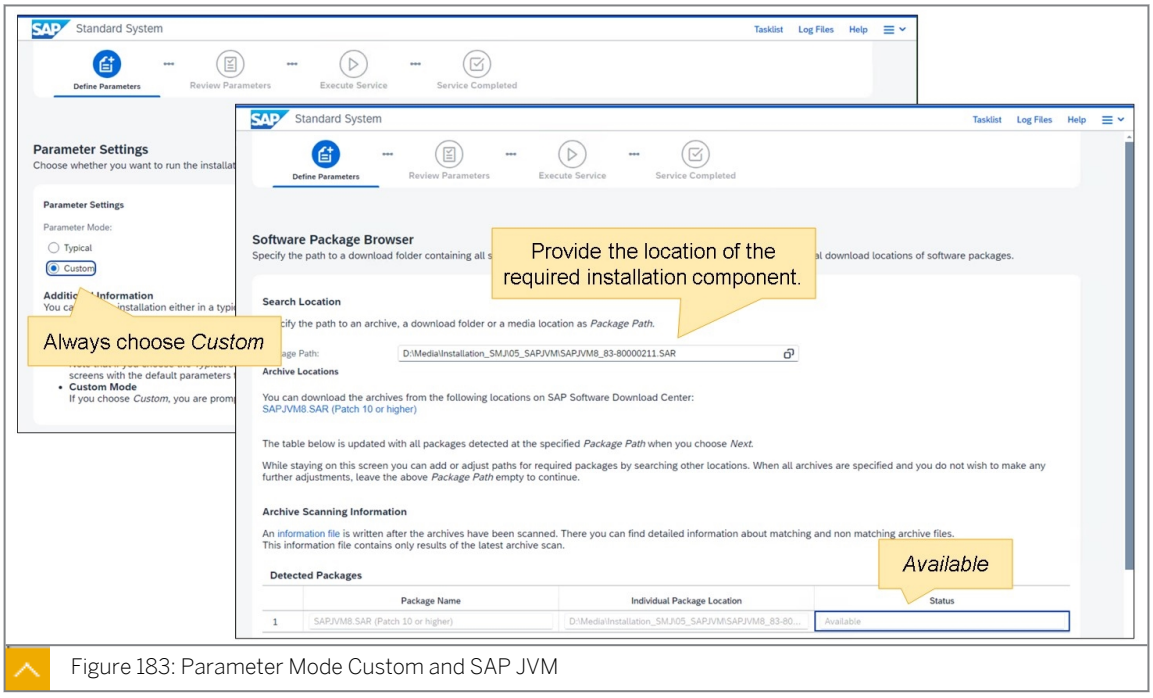

Figure 183: Parameter Mode Custom and SAP JVM

The figure above shows the selection of the parameter mode **Custom**. It allows for setting each parameter explicitly; you are guided through each step. We select this setting for this course.

The parameter mode **Typical** presents a reduced set of steps. The final parameter check allows for the revision of each parameter – even those side-stepped by choosing typical parameter mode. In most circumstances, typical parameter mode is sufficient.

You can see that the first installation archive that is asked for is SAP Java Virtual Machine (**SAP JVM**).

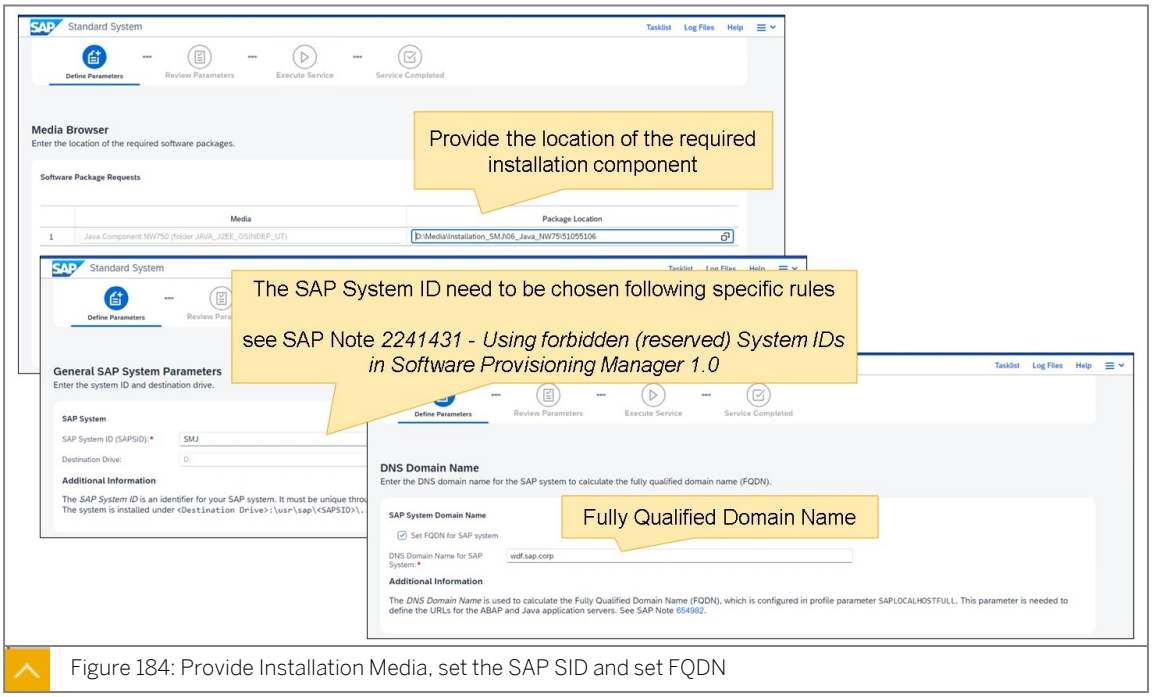

Figure 184: Provide Installation Media, set the SAP SID and set FQDN

SAPinst will ask for several installation media during the dialog-phase of the installation procedure.

You are prompted for the SAP System ID (SAPSID) that your system should use. Note that some SIDs cannot be used; for example, the SID **SAP** is always forbidden.

The SAP System ID needs to be chosen following specific rules. Find more information in SAP Note 1979280: *Reserved SAP System Identifiers (SAPSID) with Software Provisioning Manager 1.0*.

Also above, you find another screen asking for the DNS Domain Name for your SAP system. Set the flag for Full Qualified Domain Name (FQDN) and provide the domain name to which your SAP system belongs. If you do not provide values here, different functions of your SAP system might not be usable or may require additional work.

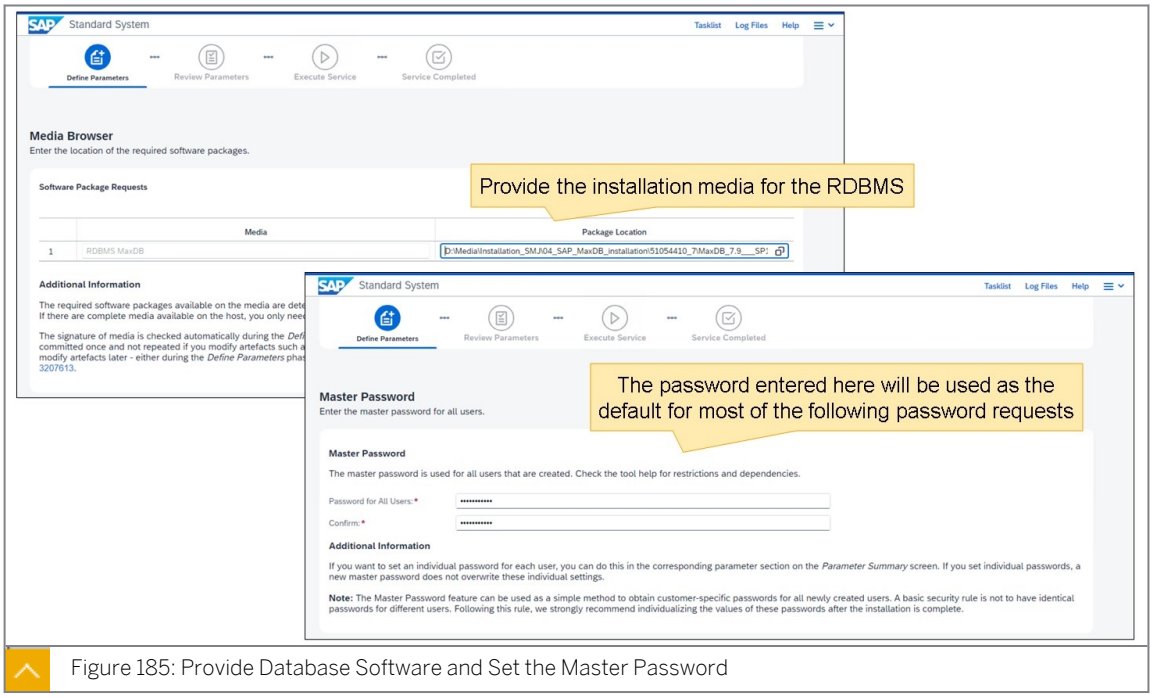

Figure 185: Provide Database Software and Set the Master Password

Above you see the request for installation media for SAP MaxDB - the installation of this database will be executed by SAPinst (SAP HANA and Oracle DB need to be installed before starting SAPinst).

The previous figure is of essential significance. Here you provide the so-called Master Password for this installation. The master password is used for standard users in the SAP system and for users on the operating system and database level, in case the database is installed by SAPinst — which is true for SAP MaxDB. We recommend that after installation, you set individual passwords for the different users.

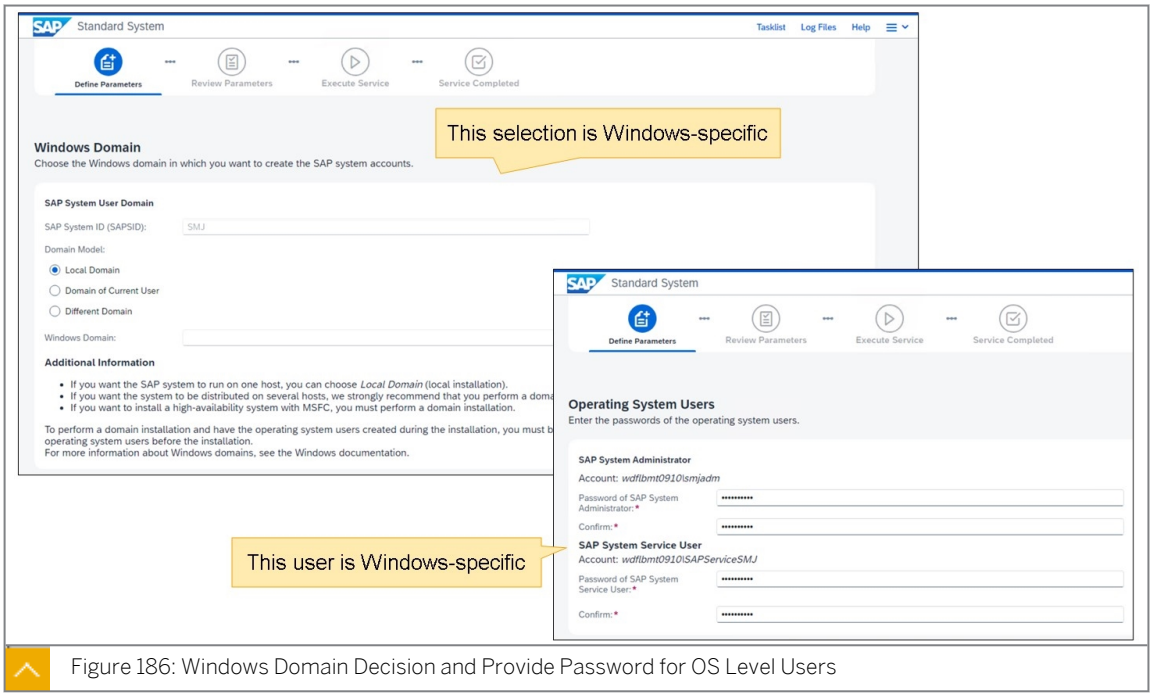

Figure 186: Windows Domain Decision and Provide Password for OS Level Users

On operating system Windows you can decide on the Domain Model for this installation. Usually, SAP systems are installed with admin users created on Domain level. In this training environment we select a so-called Local Domain installation.

The figure above shows the setting of the passwords for two users created during installation on Windows OS: The default for this password is the master password you chose previously. You can specify a different password for these users.

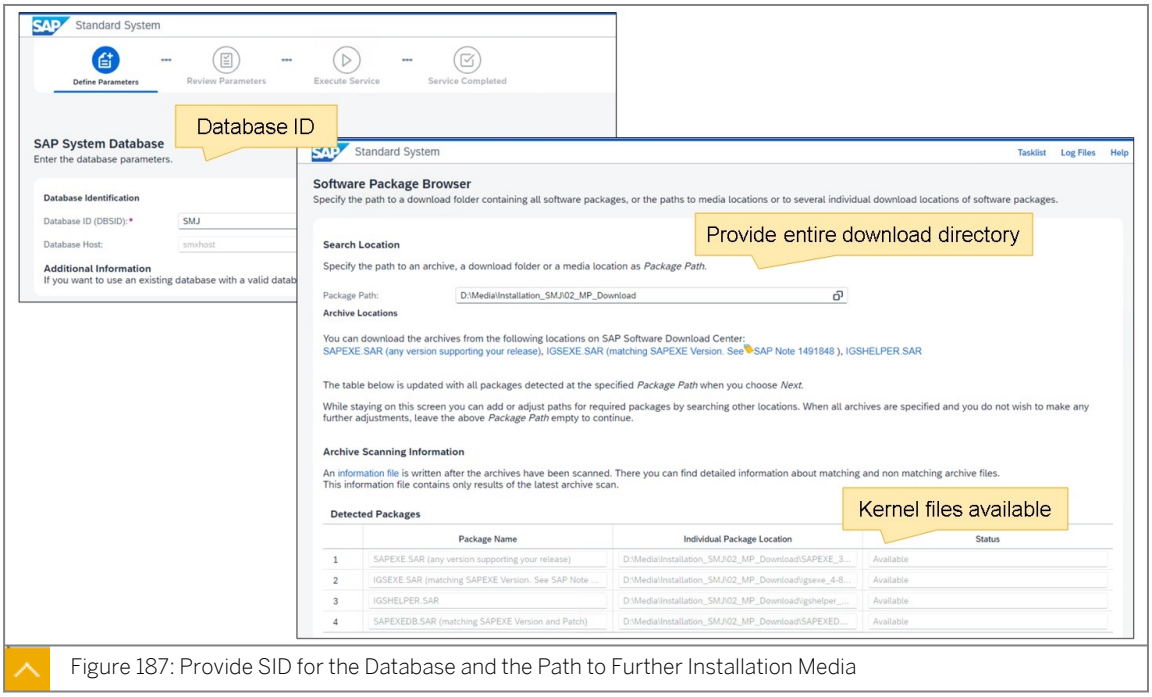

Figure 187: Provide SID for the Database and the Path to Further Installation Media

On the upper screen shot in the figure above you find the setting of the SID for the DB system (DBSID).

The lower screen above asks you to enter the path to the kernel archives that should be used for the installation. Theoretically, SAPinst should be able to identify several different installation media stored in the same location. At least the kernel installation is required to be found at that location. Also, you are required to provide archives (as listed) for kernel components in the same location.

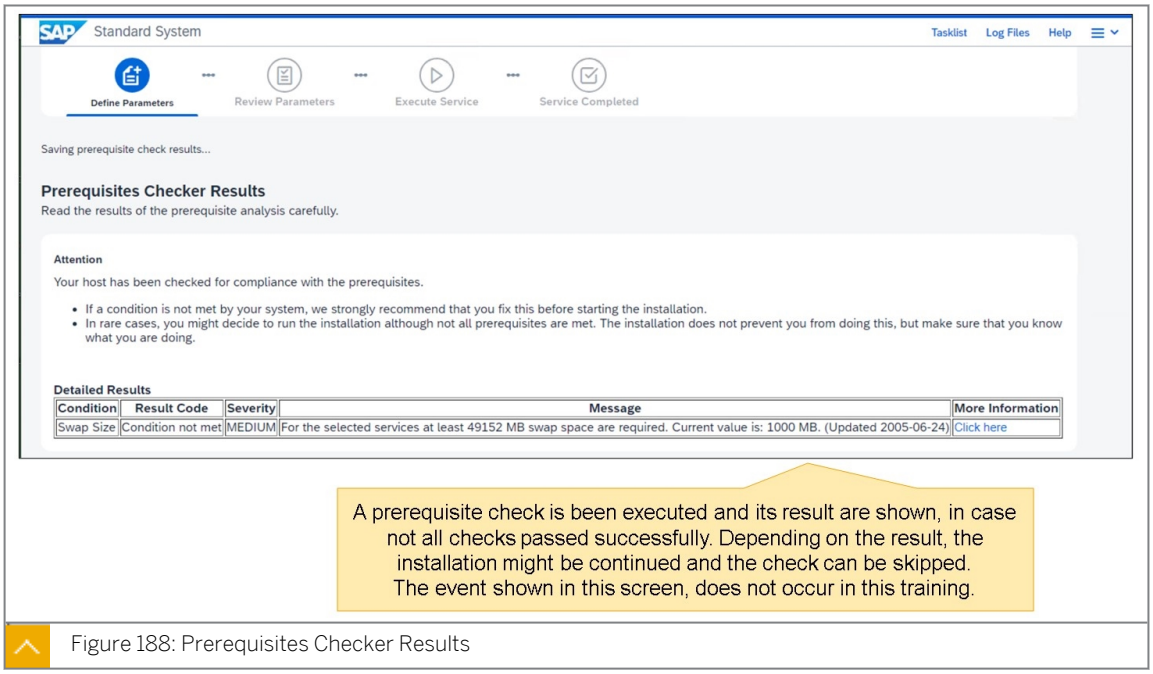

Figure 188: Prerequisites Checker Results

A Prerequisite Check is always performed, its results shown.

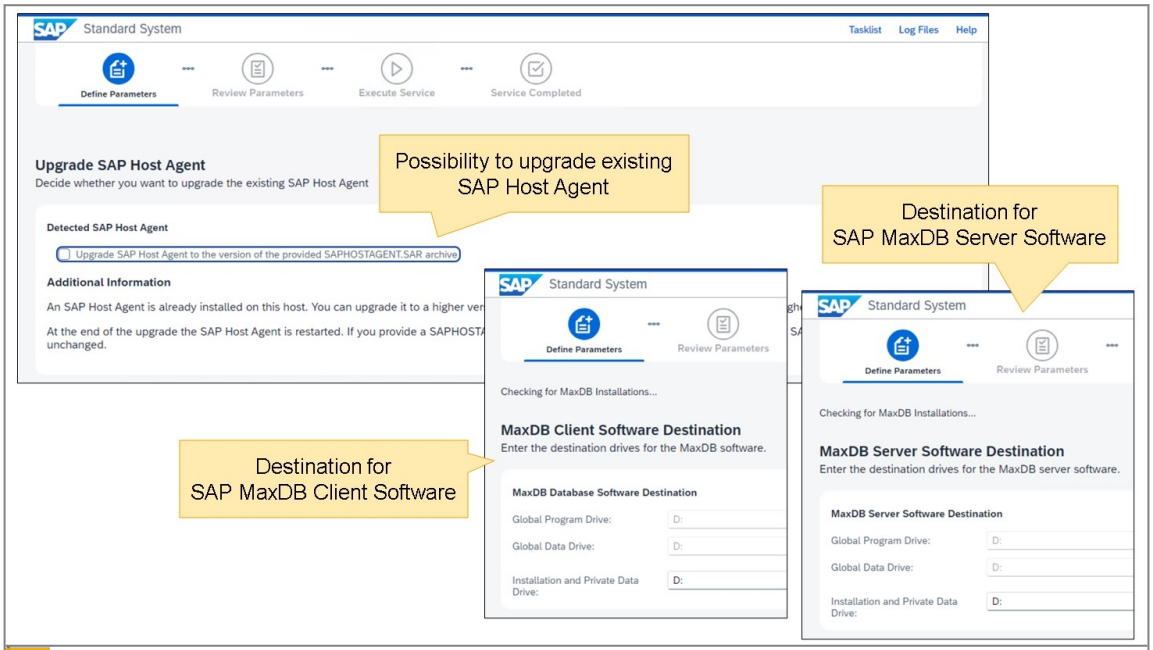

Figure 189: SAP Host Agent and Path for SAP MaxDB Software

There is the option to upgrade an existing SAP Host Agent using a newer archive, also you are asked to decide on the location of the SAP MaxDB Client Software.

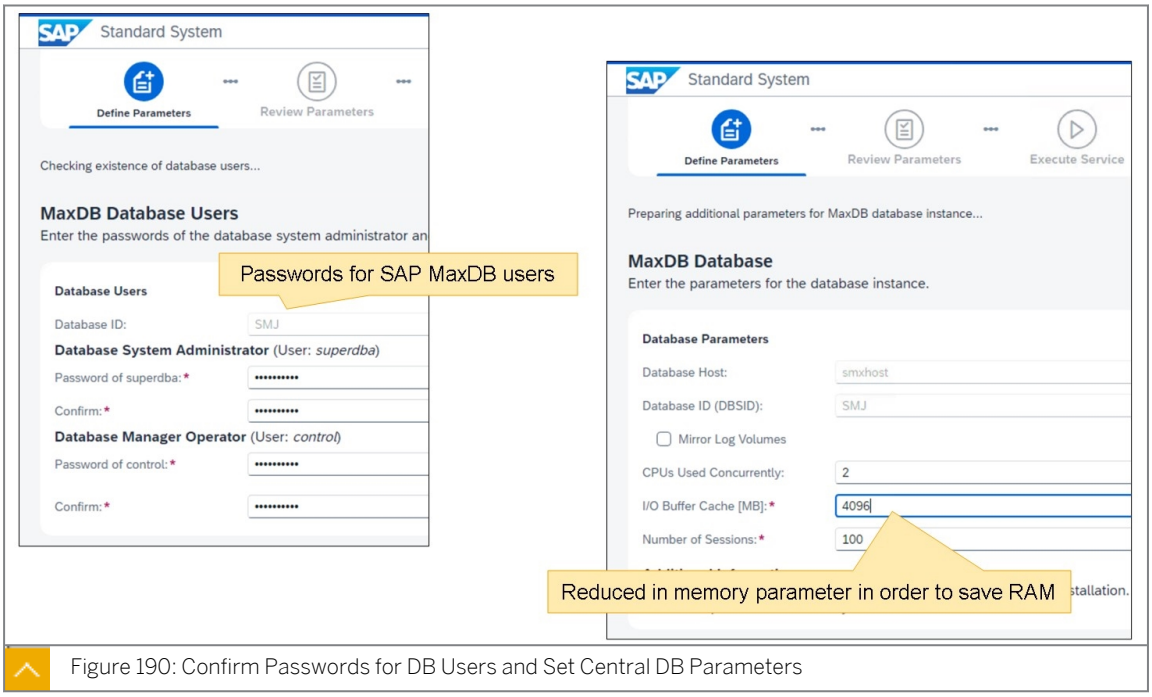

Figure 190: Confirm Passwords for DB Users and Set Central DB Parameters

Later in this course, you will use the user **`control`** for SAP MaxDB.

Some important parameters for the database can be set during installation.

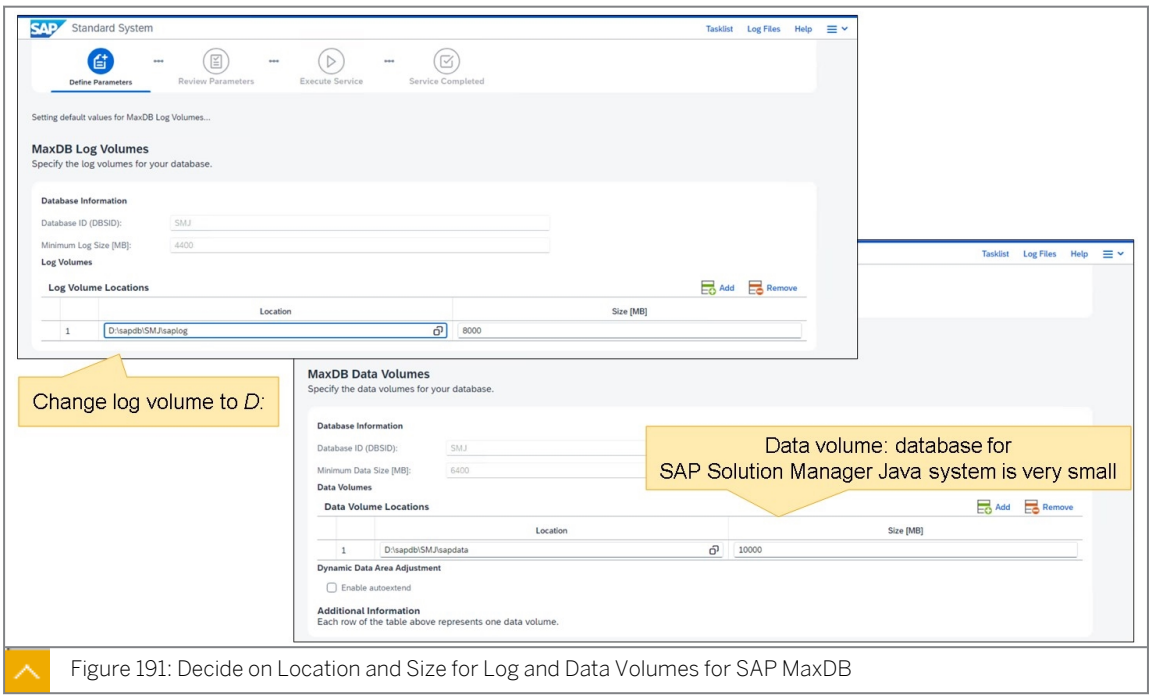

Figure 191: Decide on Location and Size for Log and Data Volumes for SAP MaxDB

Please adapt the location and size of the Log and Data Volumes to your needs.

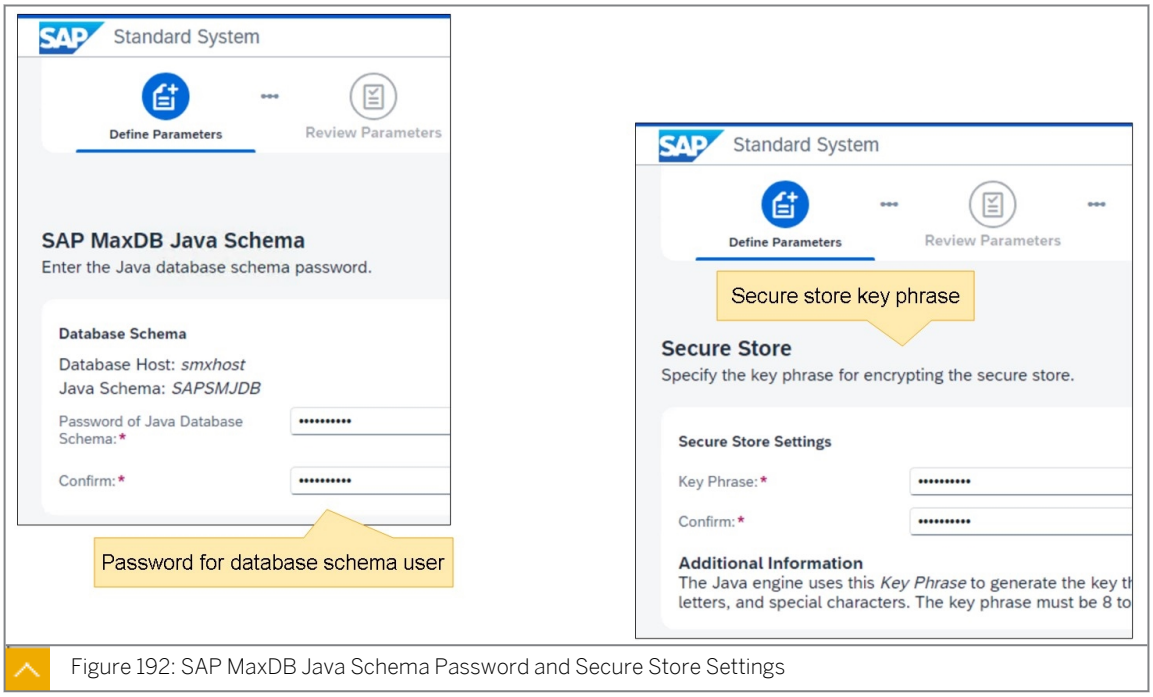

Figure 192: SAP MaxDB Java Schema Password and Secure Store Settings

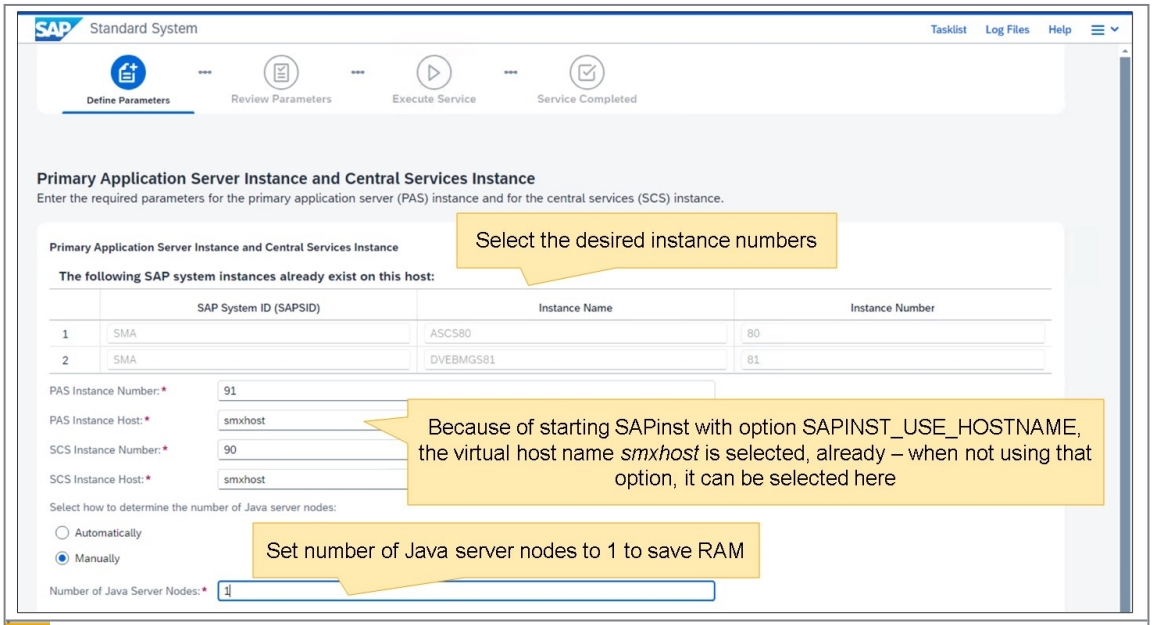

Figure 193: Set the Instance Numbers and Number of Java Server Nodes

The figure above shows the selection screen for setting the instance numbers for the Primary Application Server (PAS) instance and the Central Services (SCS) instance of your SAP system. The two-digit instance number needs to be chosen from the numbers between 00 and 97 and they must be unique on an individual host.

As you can see on the screen above, certain number are already in use: 80 and 81. The instance number defines several port numbers used for communication by your SAP system. For example, an ABAP dispatcher process communicates via port 32## where ## signifies the instance number. Therefore, in case any software on your SAP host uses ports in the range of 3200 to 3299 (for example), this need to be taken into consideration. SAPinst can only list ports used by SAP instances — so further restrictions need to be consider by you.

On the screen above, you can also decide on how the number of Java server nodes will be determined. When set to **`Manually`**, you can set the number of Java server nodes on this screen.

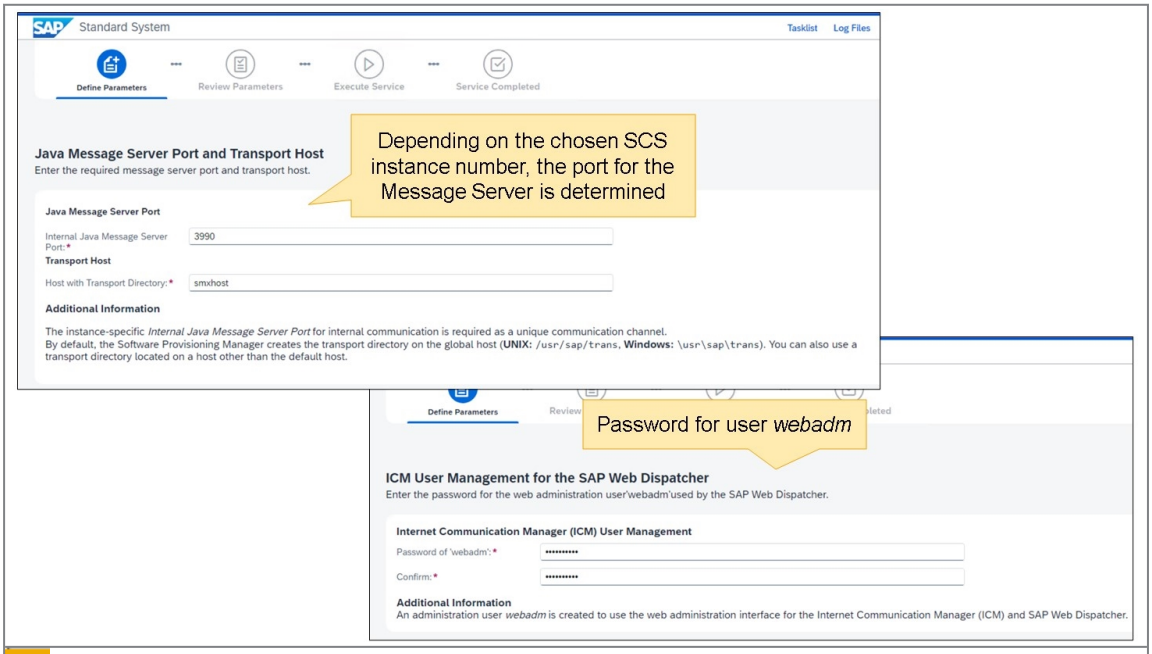

Figure 194: Java Message Server Port and webadm Password

The default value of the Internal Java message server port is determined by your previous entry for the Central Services Instance. The internal port number for the Java message server is 39##, where ## is the value that you specified for the SCS instance. You can choose different port numbers (even outside the 36## and 39## range) if those port numbers are not already in use.

When an installed component offers an Internet Communication Manager (ICM) process then you are prompted to enter a password for the user webadm. This user can access administration functions offered by ICM via Web interface.

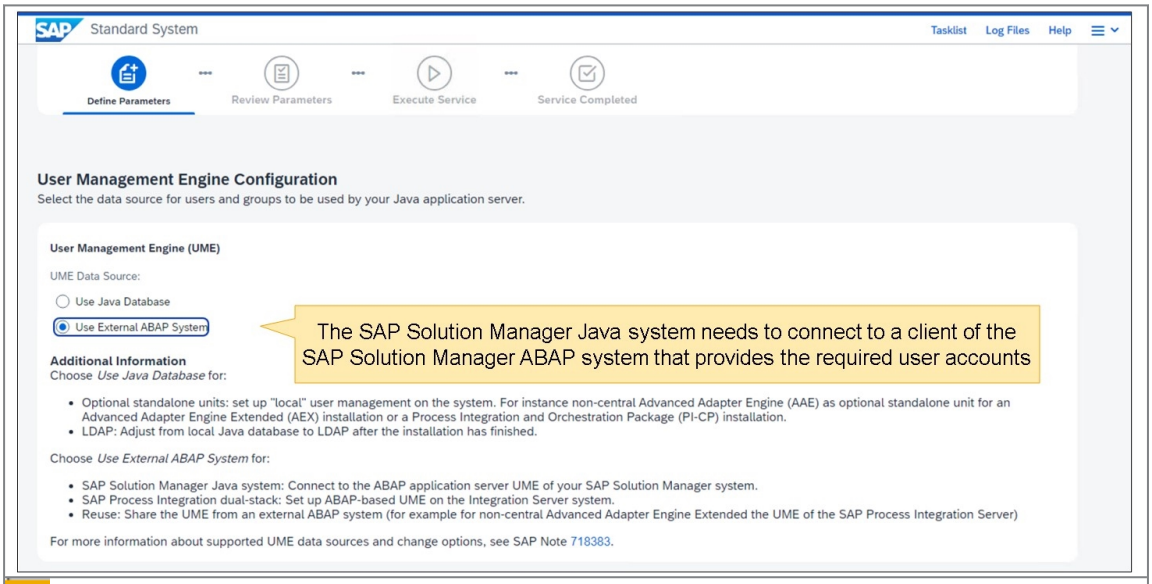

Figure 195: Determine the User Management Engine Data Source

When installing an SAP Solution Manager 7.2 Java system, you are required to connect it to the SAP Solution Manager ABAP system. For this, you need to select *Use External ABAP System*.

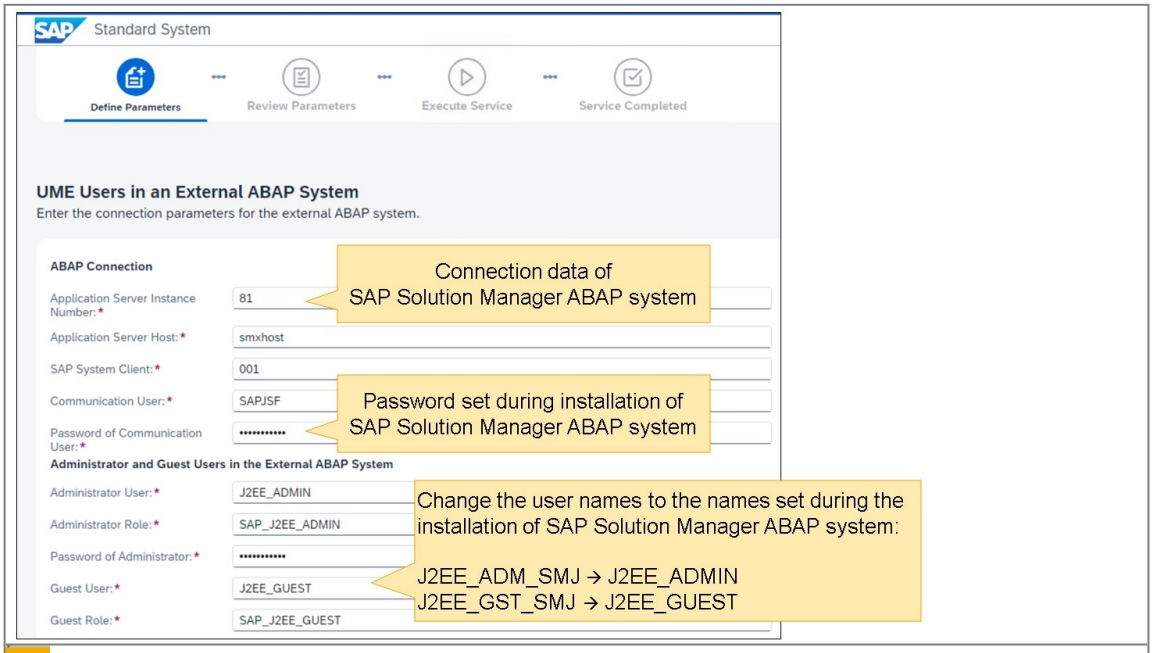

Figure 196: Connection to SAP Solution Manager ABAP

When installing an SAP Solution Manager 7.2 Java system, you are required to connect it to the SAP Solution Manager ABAP system. For this, you need to provide connection data, as shown above and below. Remember that the passwords you provide here are passwords for users in another SAP system, the SAP Solution Manager ABAP system.

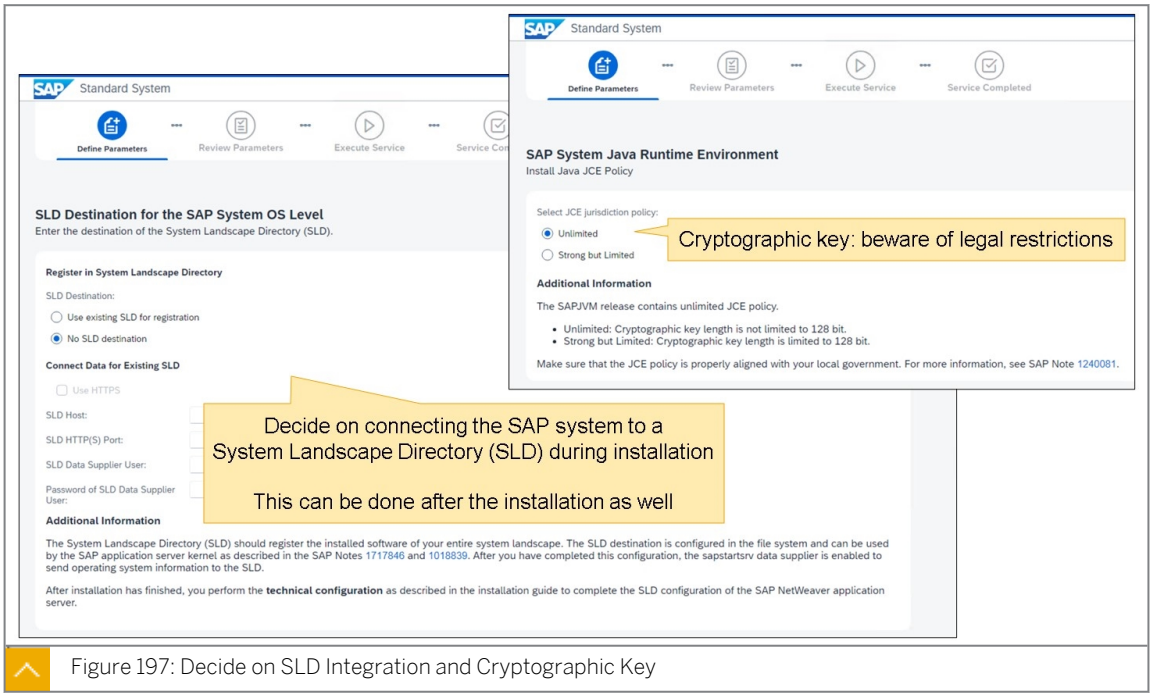

Figure 197: Decide on SLD Integration and Cryptographic Key

When installing a new SAP system, you are offered to connect it to an already existing System Landscape Directory (SLD) or to set up this connection at a later time — in which case you choose *No SLD destination* on the screen shown above.

Decide for the cryptographic key – but beware of legal restrictions!

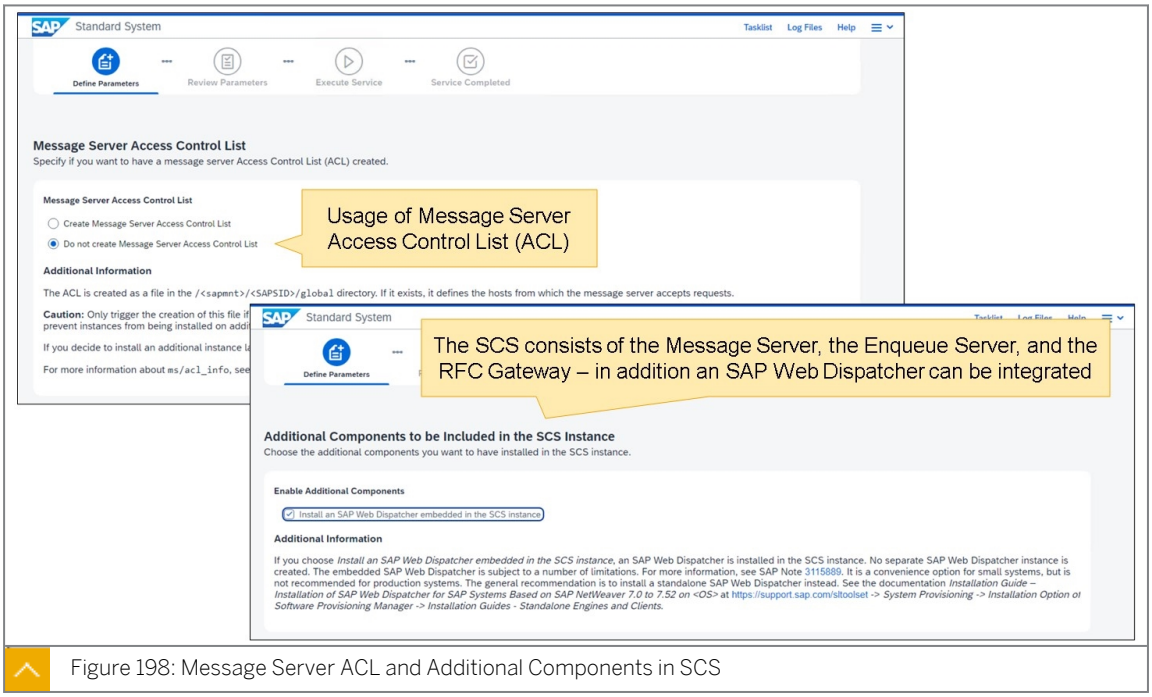

Figure 198: Message Server ACL and Additional Components in SCS

To increase the security of your SAP system, you can create a Message Server Access Control List (ACL) that can be used to limit access to the Message Server. In this training, we do not create such an ACL because we would be required to delete it before installing an Additional Application Server. For more information, please read the SAP Notes mentioned on the screen shot above.

You decide on including an SAP Web Dispatcher into the SCS instance of your SAP Solution Manager Java system.

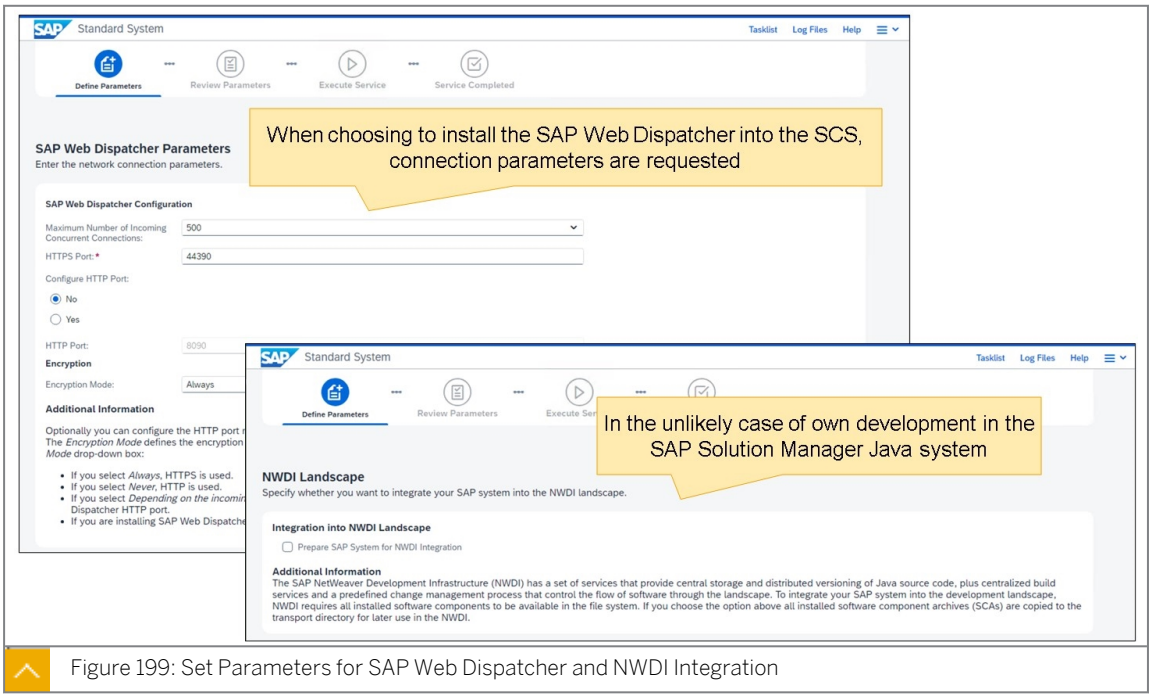

Figure 199: Set Parameters for SAP Web Dispatcher and NWDI Integration

If you decide to include SAP Web Dispatcher into the SCS instance of your SAP Solution Manager Java system, you can provide some central parameters on the screen shown above.

If you decide to create own applications for the SAP Solution Manager Java system, you might want to prepare the SAP Solution Manager Java system to be installed for NWDI (SAP NetWeaver Development Infrastructure) integration. If you choose this option, all installed software components archives will be copied the transport directory, for later use in the NWDI.

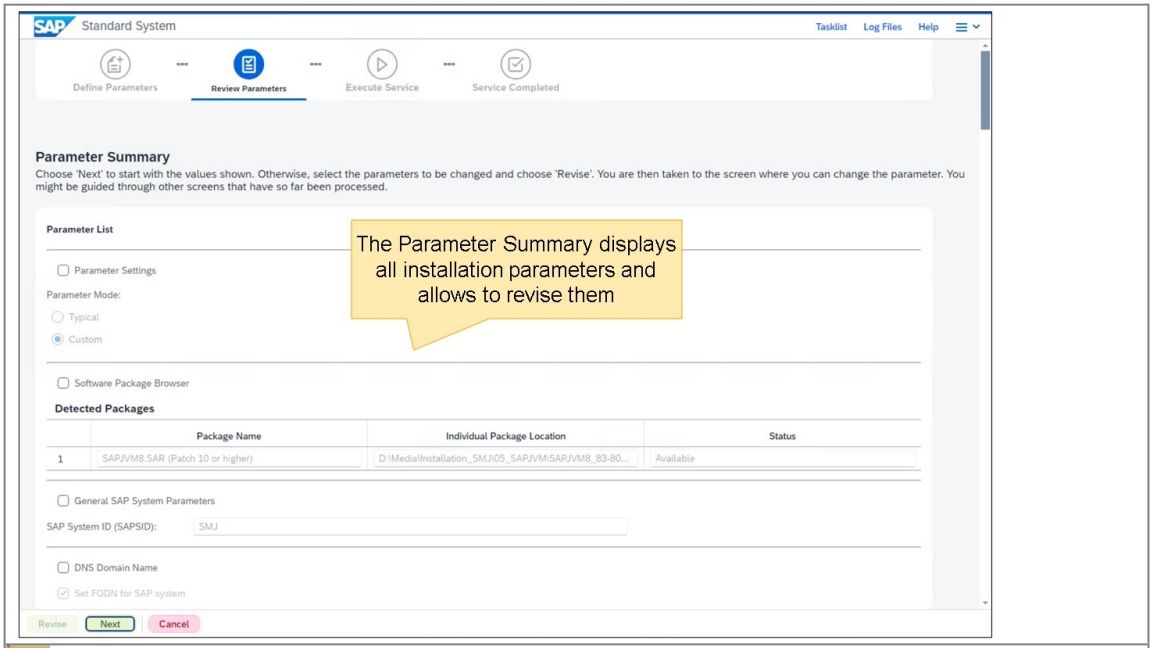

Figure 200: Parameter Summary

The screen above shows the first part of the **Parameter Summary**. You can select individual parameters and choose to revise them. If you don't select at least one parameter, the button *Revise* will remain grayed out.

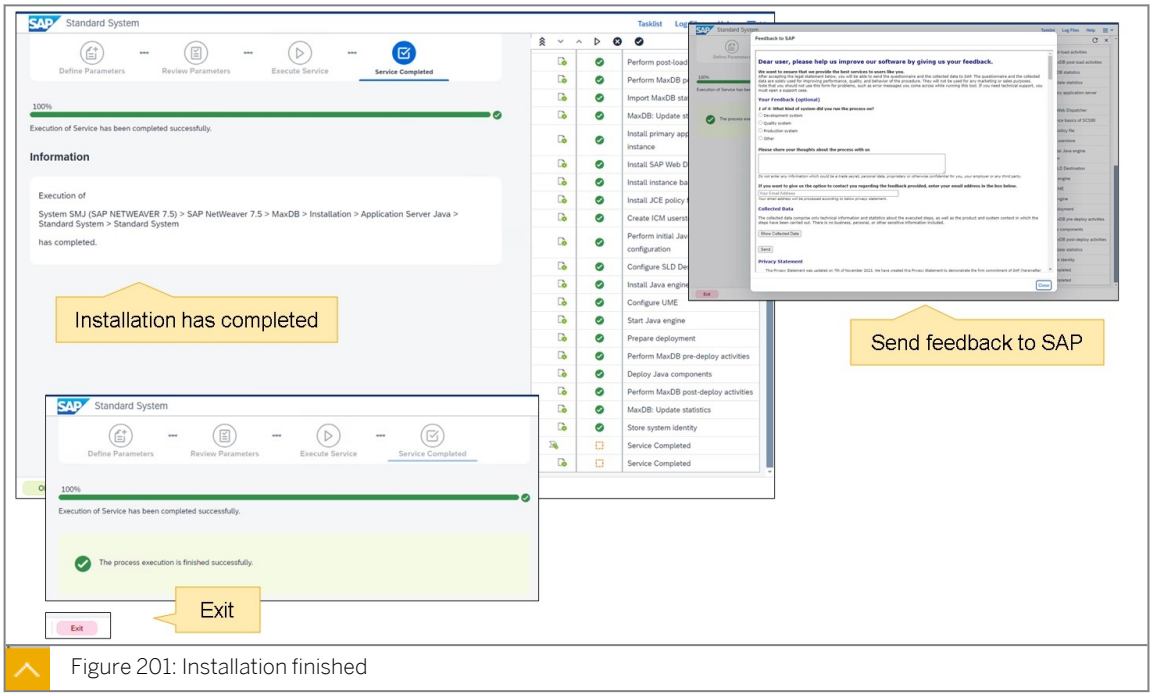

Figure 201: Installation finished

Congratulations: The installation of your SAP Solution Manager Java system finished successfully!

LESSON SUMMARY
You should now be able to:

- Install an SAP Solution Manager Java System

Learning Assessment

1. You are installing an SAP Solution Manager Java system. What is the minimum number of Java Server Nodes that you can set during the installation?

   Choose the correct answer.

   ☐ **A** 0

   ☐ **B** 1

   ☐ **C** 2

   ☐ **D** The minimum number is equal to the number of CPU cores available on the server used for installation

Learning Assessment - Answers

1. You are installing an SAP Solution Manager Java system. What is the minimum number of Java Server Nodes that you can set during the installation?

   Choose the correct answer.

   ☐ A 0

   ☒ B 1

   ☐ C 2

   ☐ D The minimum number is equal to the number of CPU cores available on the server used for installation

   You are correct! The SAP Solution Manager Java system requires at least one Java Server Node. Read more on this in the lesson Installing an SAP Solution Manager Java System of the course ADM110.

UNIT 8 Updating an SAP Solution Manager Java System using SUM

Lesson 1

UNIT OBJECTIVES

- Update an SAP Solution Manager Java System using SUM

Unit 8
Lesson 1

Updating an SAP Solution Manager Java System using SUM

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Update an SAP Solution Manager Java System using SUM

Updating an SAP Solution Manager Java System using SUM

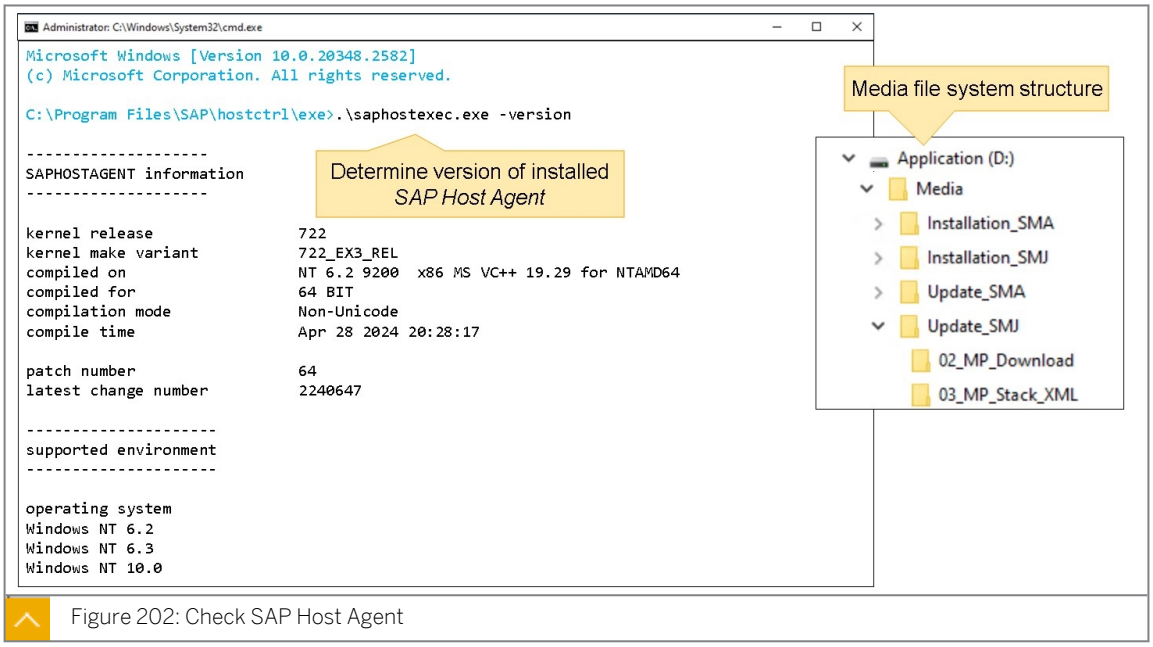

Figure 202: Check SAP Host Agent

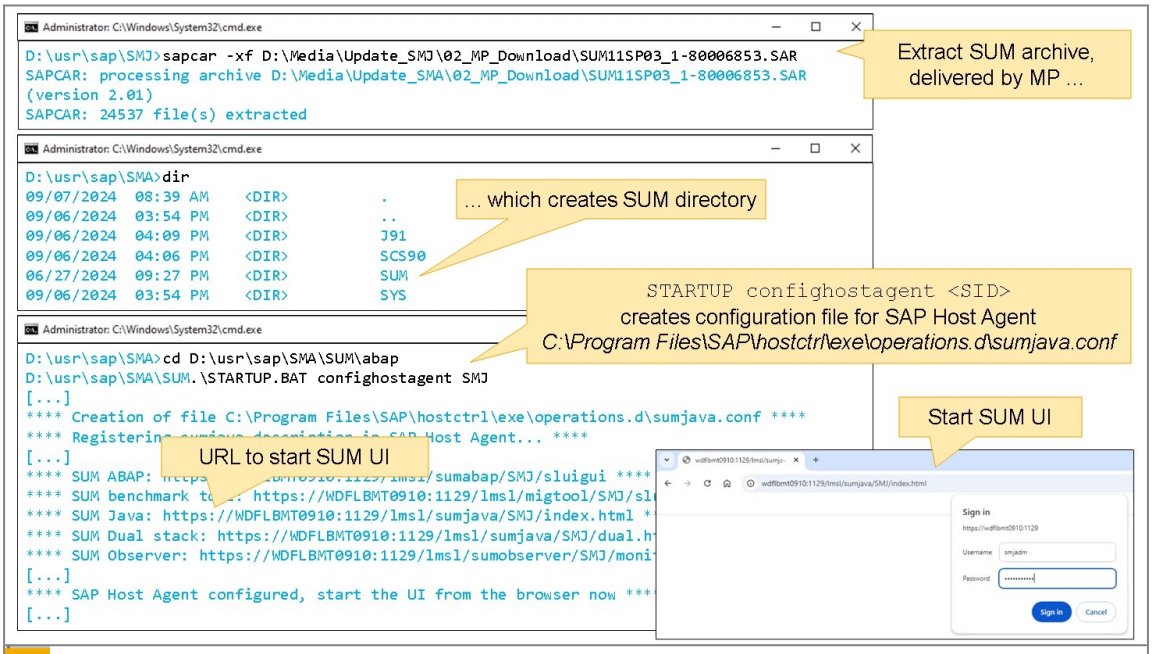

Figure 203: Extract SUM Archive, Configure SAP Host Agent, and Start SUM UI

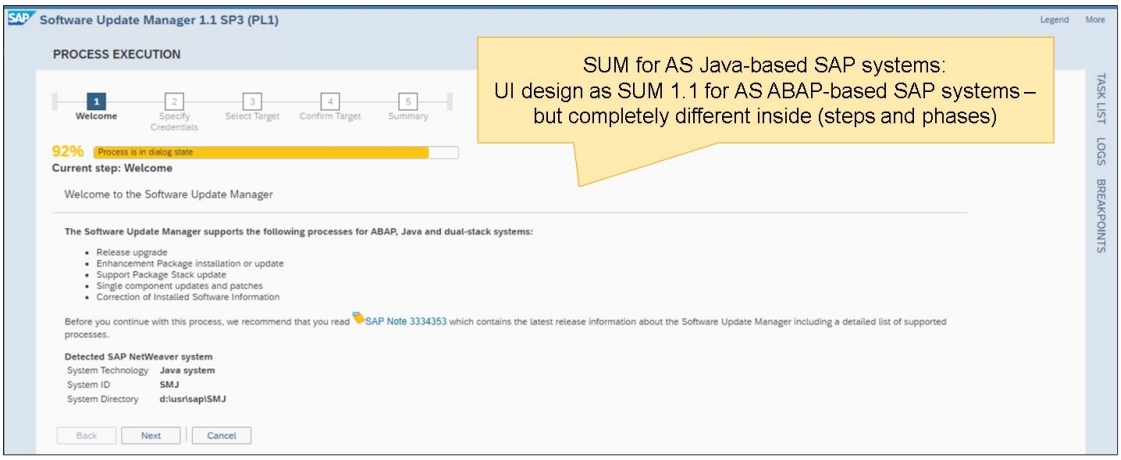

Figure 204: SUM for AS Java-based SAP Systems Welcome Screen

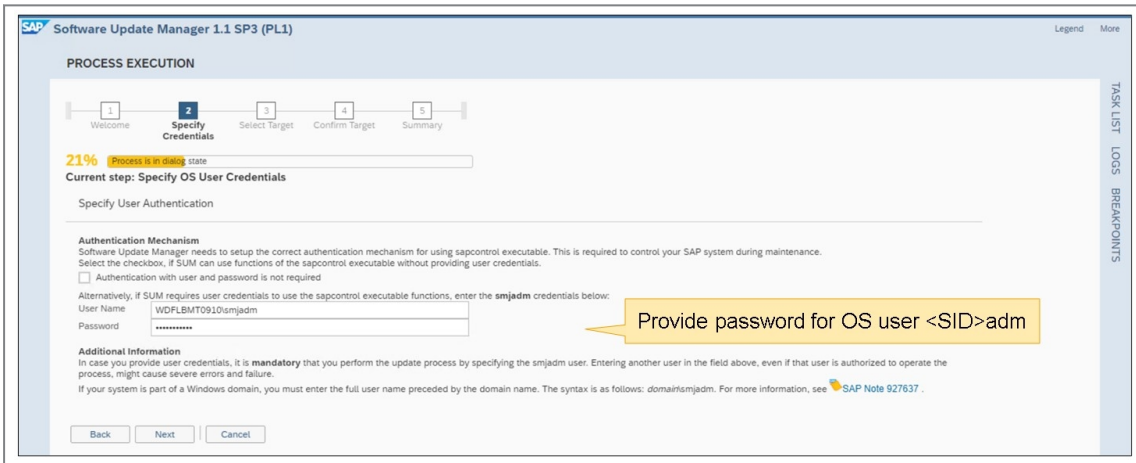

Figure 205: Provide Credentials for OS User

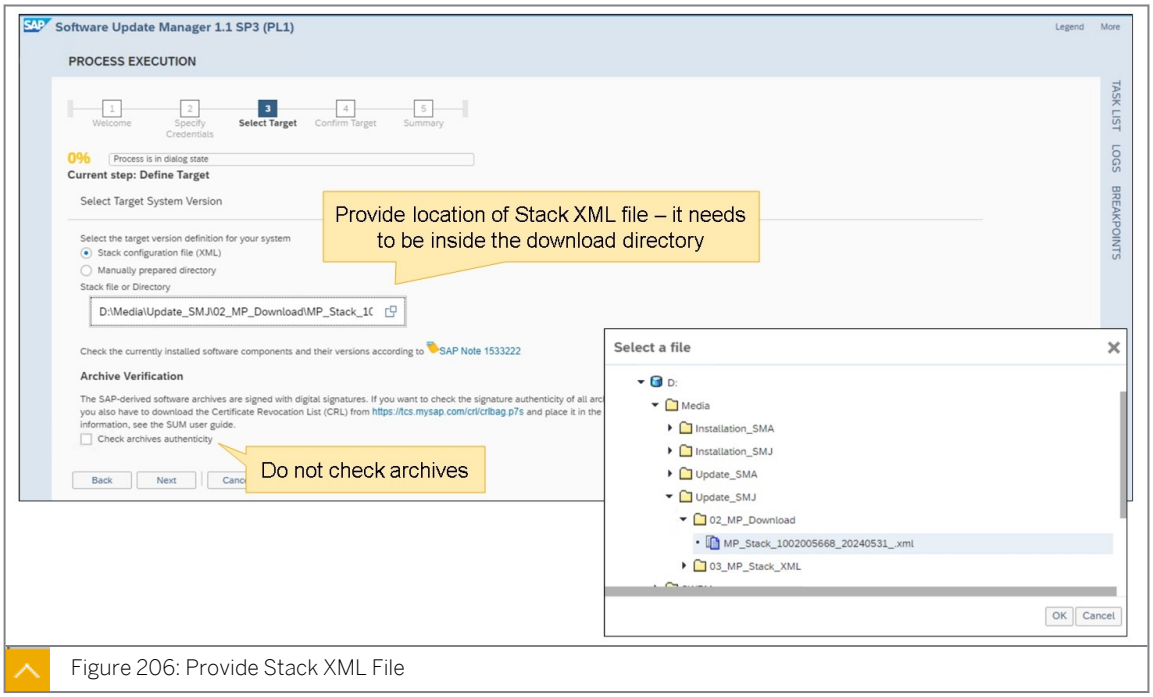

Figure 206: Provide Stack XML File

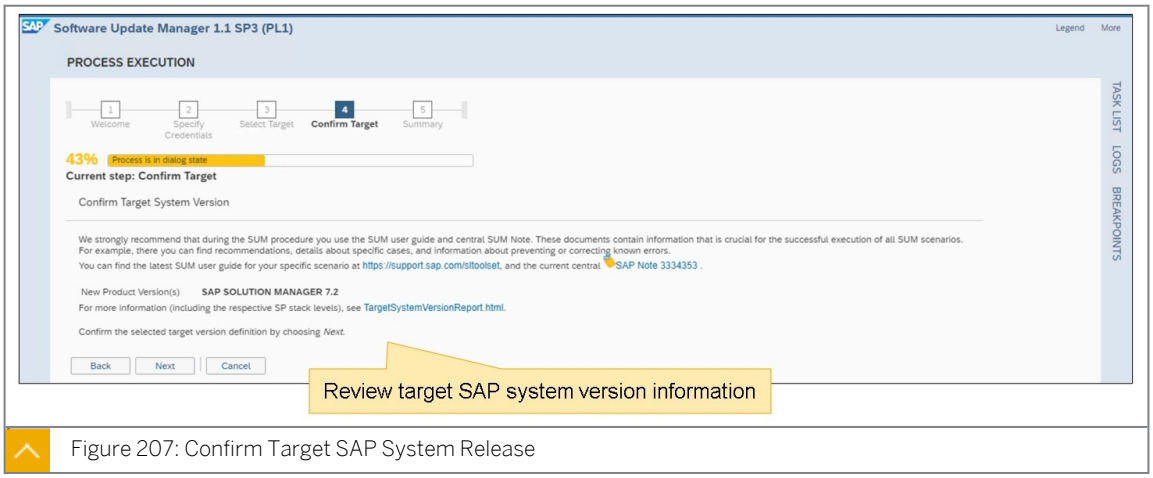

Figure 207: Confirm Target SAP System Release

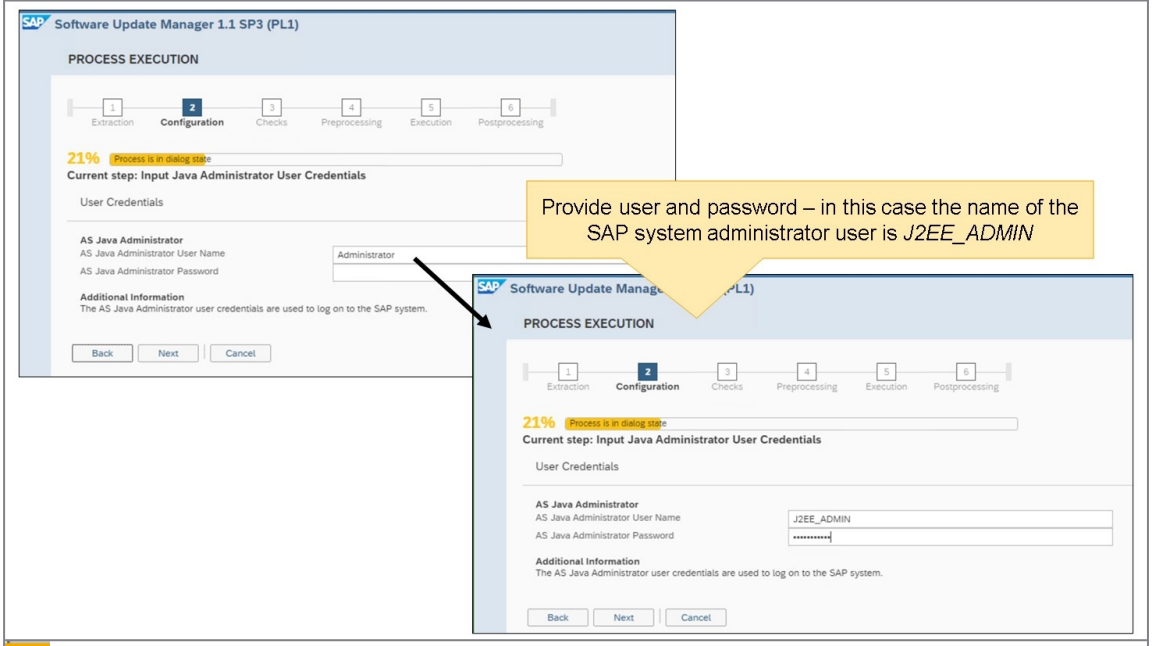

Figure 208: Provide Credentials for SAP System Administrator

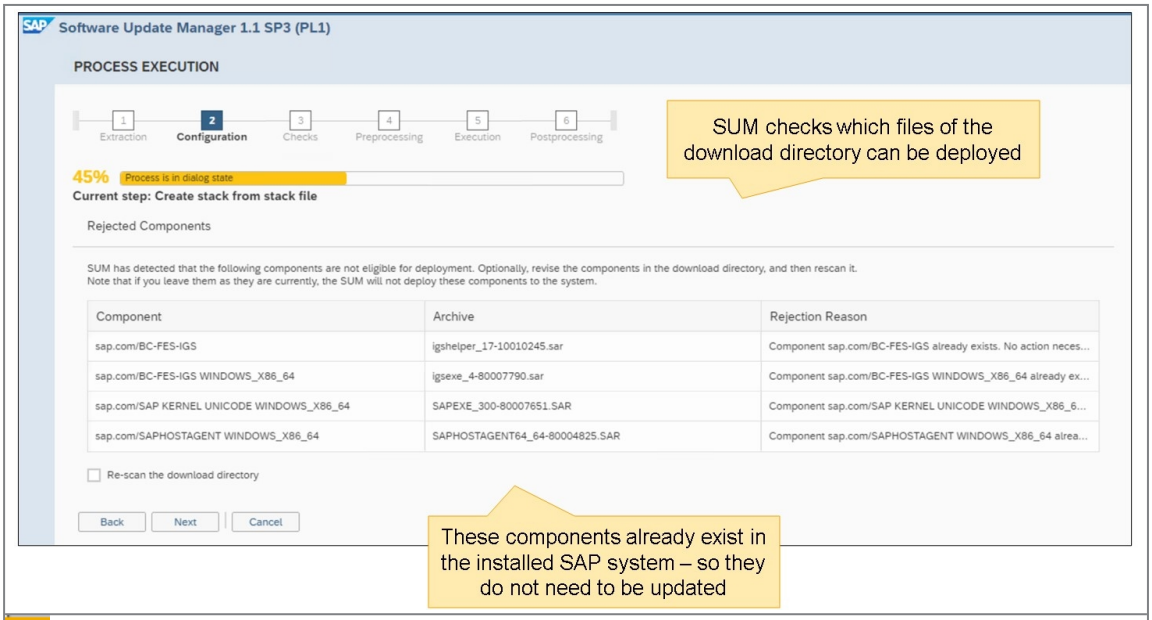

Figure 209: Confirm Components which won't be Updated

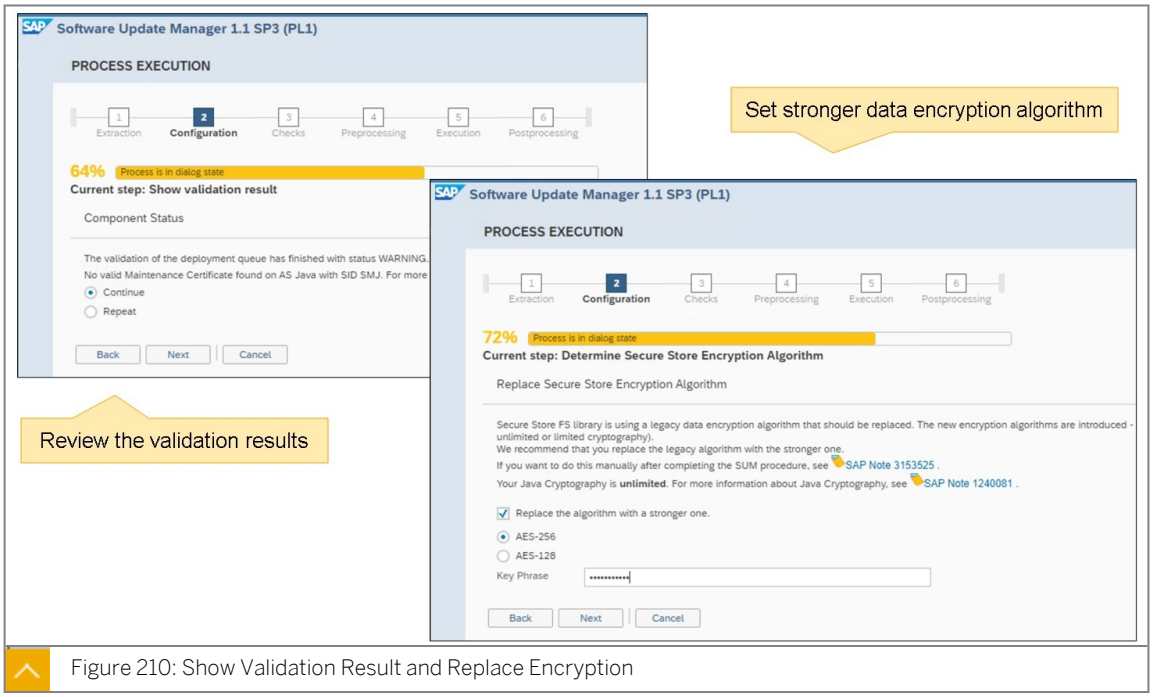

Figure 210: Show Validation Result and Replace Encryption

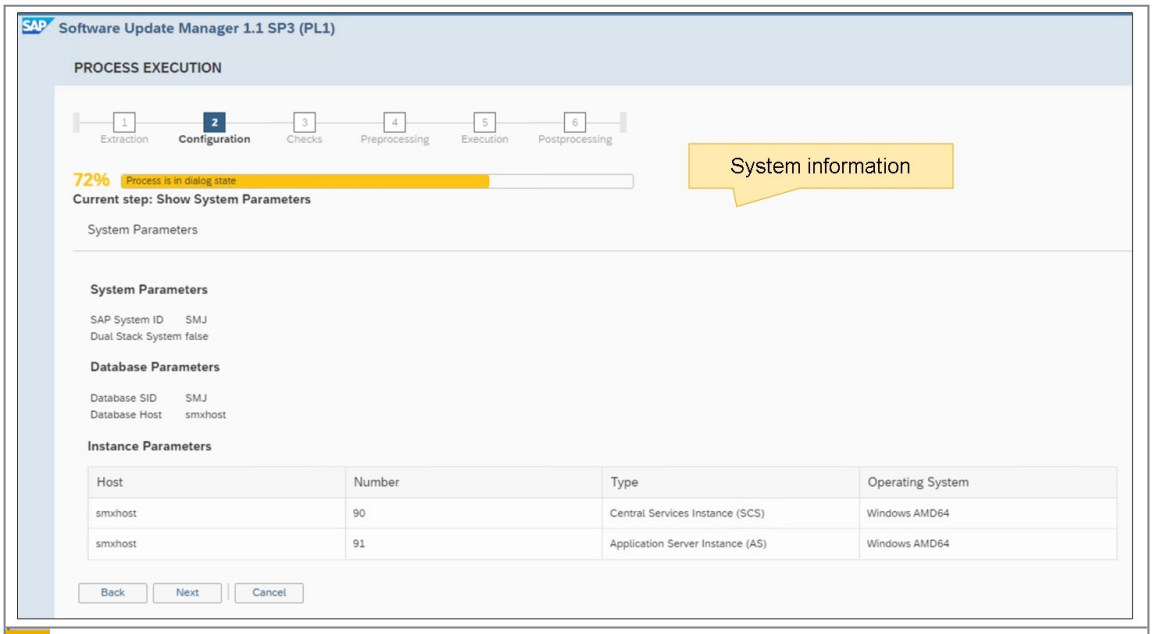

Figure 211: Show SAP System Parameters

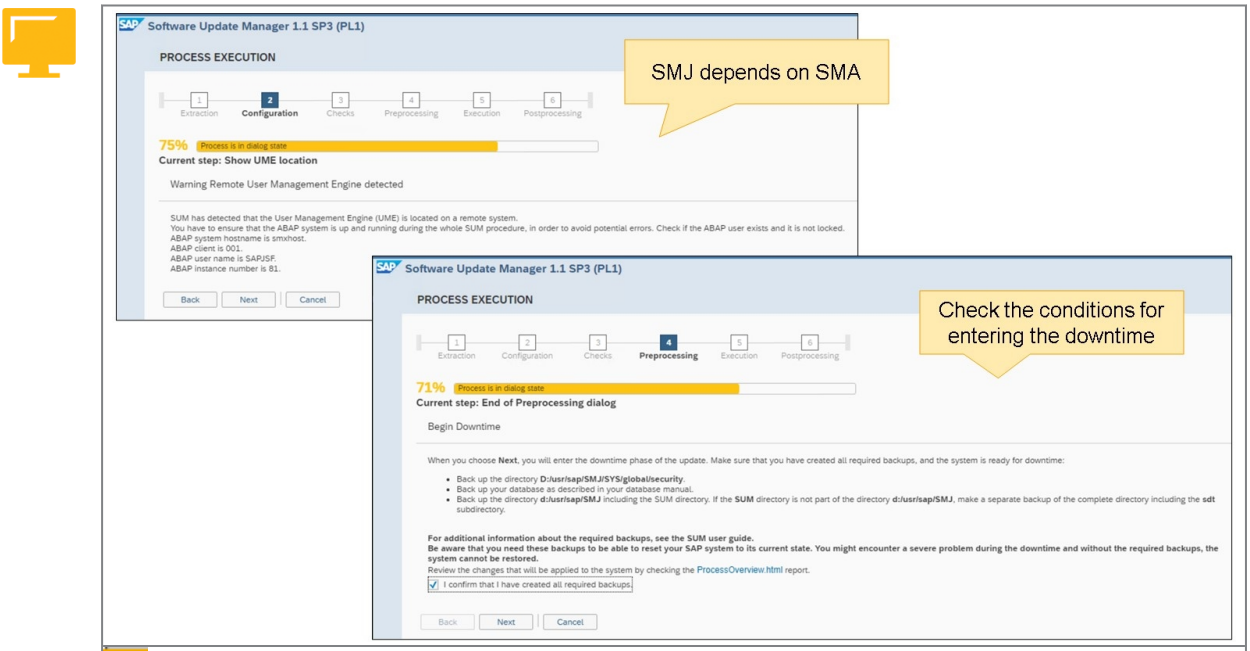

Figure 212: Begin of Downtime

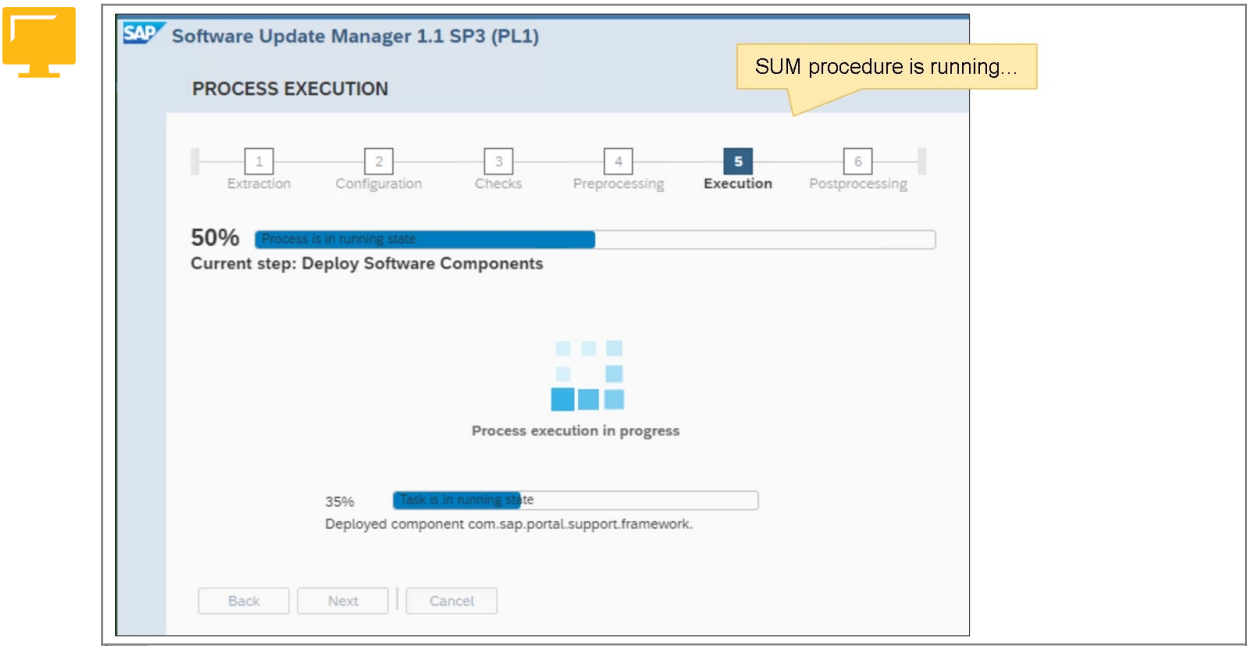

Figure 213: SUM Procedure is Running

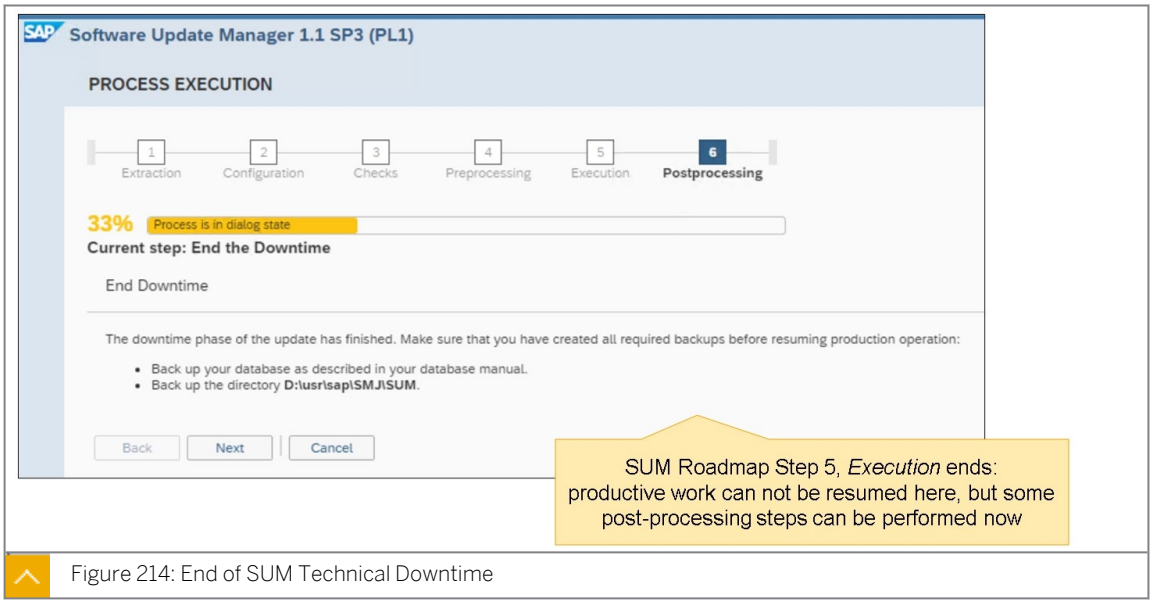

Figure 214: End of SUM Technical Downtime

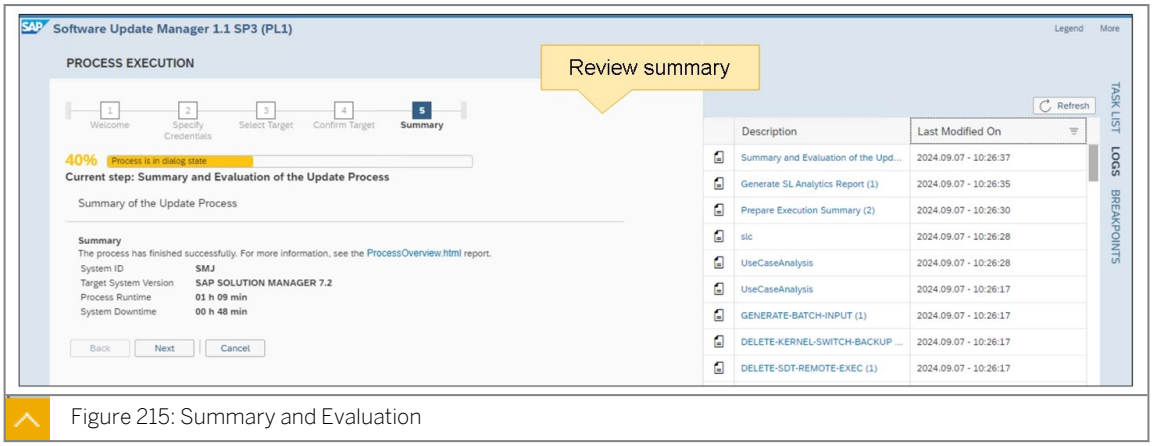

Figure 215: Summary and Evaluation

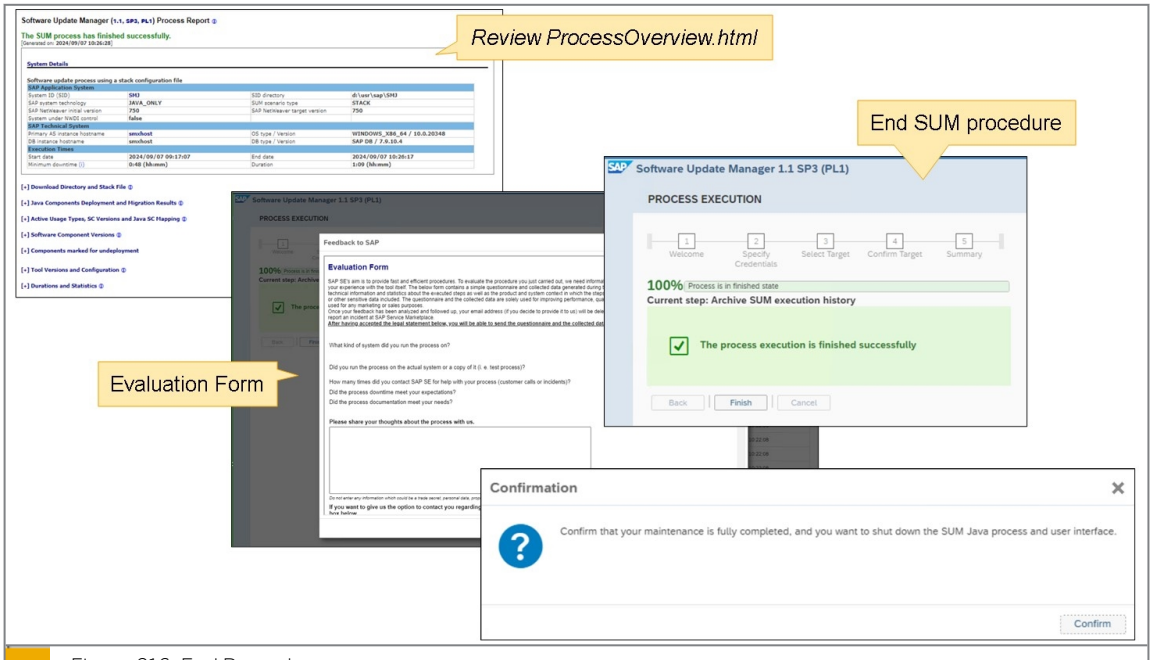

Figure 216: End Procedure

Check the software components and their respective SAP Support Package levels.

You have successfully updated your SAP Solution Manager Java system!

Note:
Please note, that the end of the technical update procedure is not sufficient to start productive work again. Further checks are required before end users can return to productive use. See SUM guide and major SUM notes from https://support.sap.com/sltoolset for details. These steps will not be performed in this course.

LESSON SUMMARY
You should now be able to:

- Update an SAP Solution Manager Java System using SUM

UNIT 9

Installing Additional Instances for AS ABAP-based SAP Systems

UNIT OBJECTIVES

- Install an AAS
- Install an ERS

Unit 9
Lesson 1

Installing an AAS

LESSON OVERVIEW
This lesson describes how to install an Additional Application Server (AAS) for an SAP S/4HANA system.

Business Example

You need to install an additional application server. For this reason, you require the following knowledge:

- An understanding of how to install an additional application server

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Install an AAS

Installing an AAS for an SAP S/4HANA Server System

After installing the SAP S/4HANA Server system with a Primary Application Server and an ABAP Central Services instance you might want to install an Additional Application Server (AAS) for your SAP system.

An AAS for AS ABAP can be installed in a few minutes.

Installing an Additional Application Server

In addition to the Primary Application Server and the ABAP Central Server Instance (ASCS) you can install additional application server instances (AAS instances) for providing scalability for your SAP S/4HANA Server system.

SAPinst offers some command line options for being started. We will use the option allowing to use a virtual host name and a stack xml file, for this installation procedure.

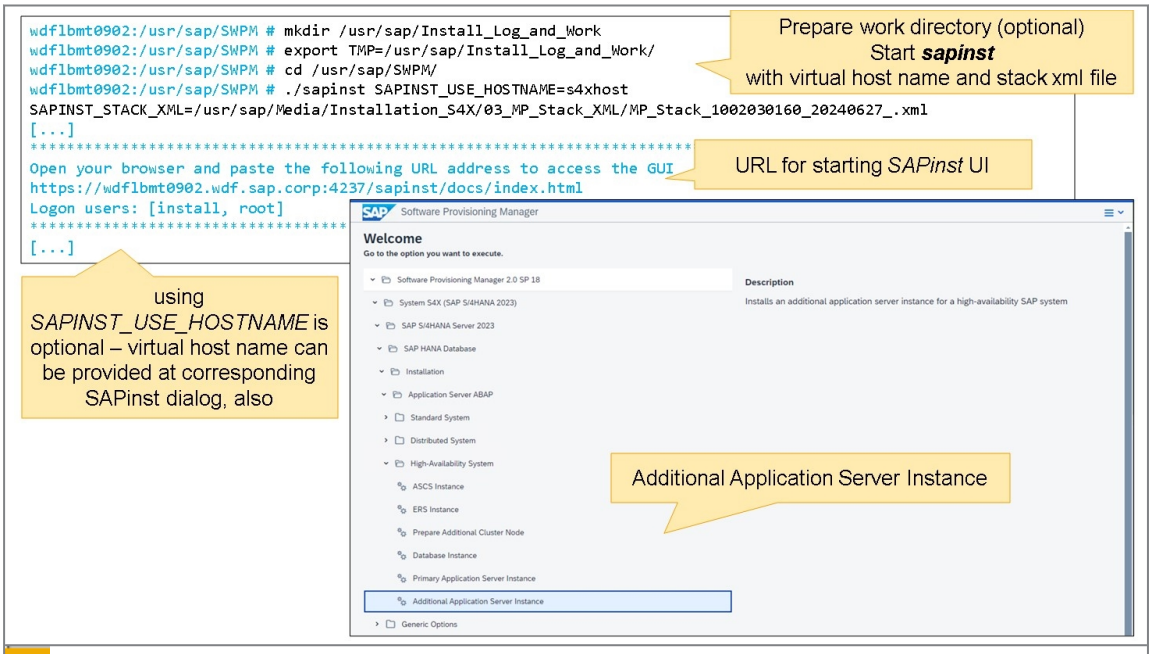

Figure 217: Prepare File System and Start SAPinst

Within Software Provisioning Manager drill down to the installation that you would like to conduct. The figure above highlights the selection (Additional Application Server Instance) that we will use.

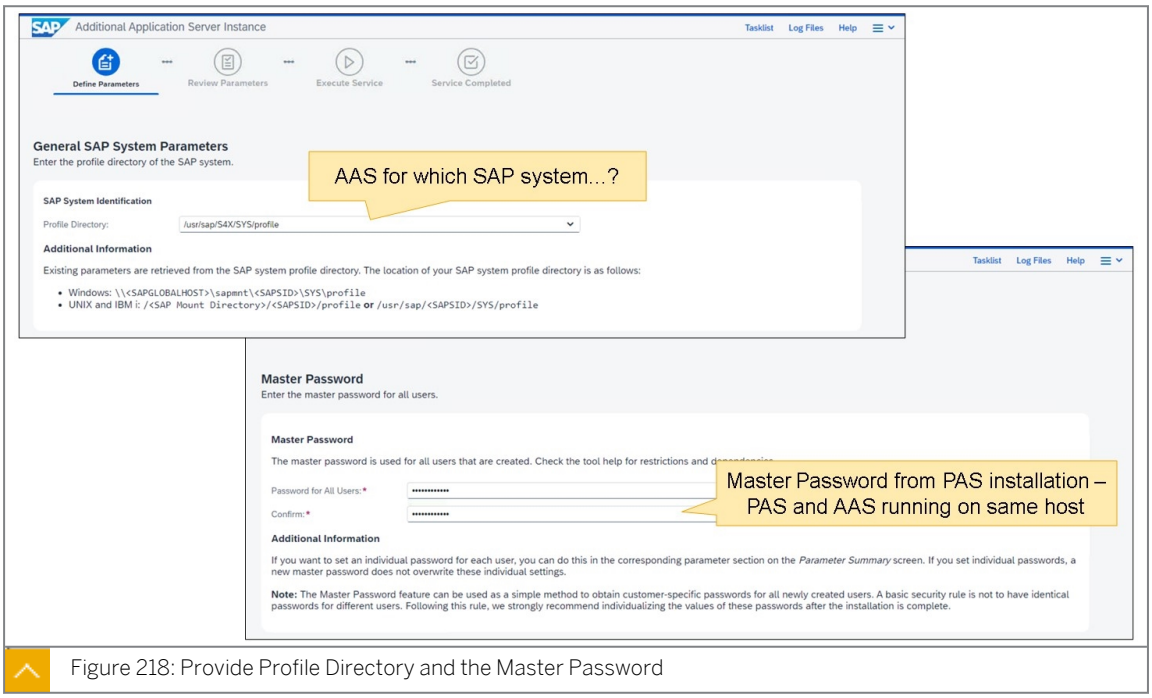

Figure 218: Provide Profile Directory and the Master Password

AAS instances are usually installed on a different host from the PAS. So, how does SAPinst know which SAP system the AAS should belong to?

SAPinst asks for the location of the system-wide used profile directory of the SAP system, the AAS should belong to. By evaluating the location and content of the files therein, SAPinst acquires the essential information on the SAP system, the AAS should belong to.

SAPinst will create users (on operating system level, if required) for use by the AAS instance. Therefore, SAPinst asks for a Master Password. We recommend that you set the Master Password identical to the one used during the installation of PAS and ASCS.

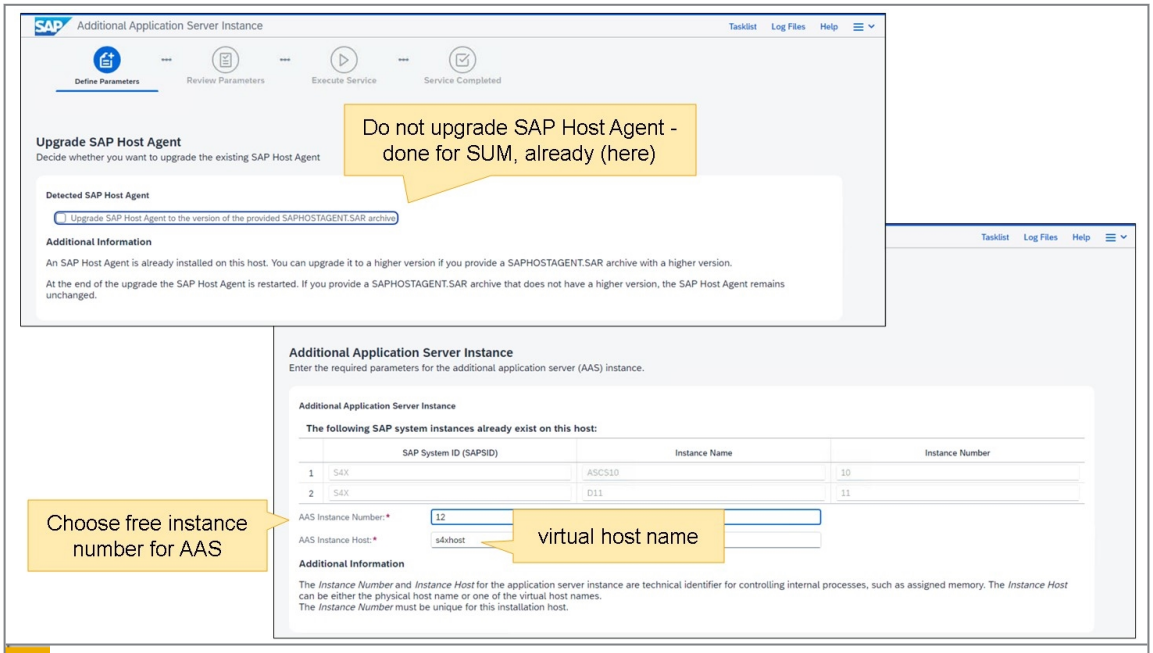

Figure 219: Upgrade Information for SAP Host Agent and Selection of Instance Number

The figure above also shows the selection screen for setting the instance numbers for the Additional Application Server (AAS) instance of your SAP system. The two-digit instance number needs to be chosen from the numbers between 00 and 97 and it must be unique on an individual host.

As you can see on the screen above, certain number are already in use: 10 and 11. The instance number defines several port numbers used for communication by your SAP system. For example, an ABAP dispatcher process communicates via port 32## where ## signifies the instance number. Therefore, in case any software on your SAP host uses ports in the range of 3200 to 3299 (for example), this need to be taken into consideration. SAPinst can only list ports used by SAP instances — so further restrictions need to be consider by you.

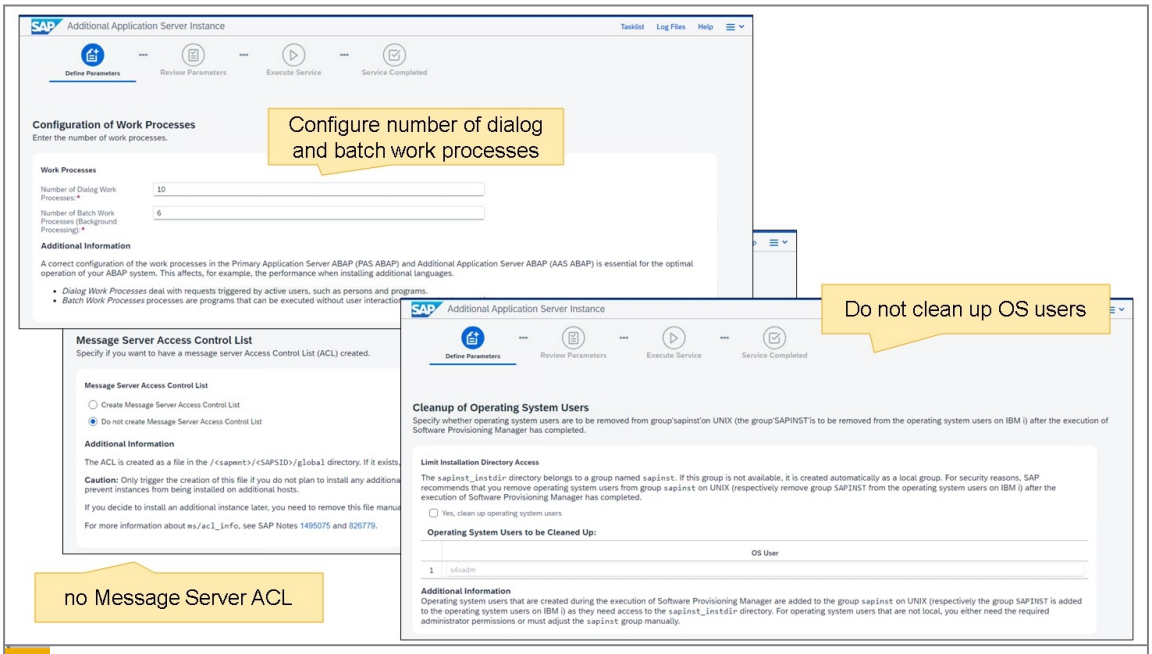

Figure 220: Number of Work Processes, Message Server ACL, and Cleanup of OS Users

To increase the security of your SAP system, you can create a Message Server Access Control List (ACL) that can be used to limit access to the Message Server. For more information, please read the SAP Notes mentioned on the screen shot above.

Also, you can choose to remove access rights to the installation directory from user <sid>adm. This will improve security.

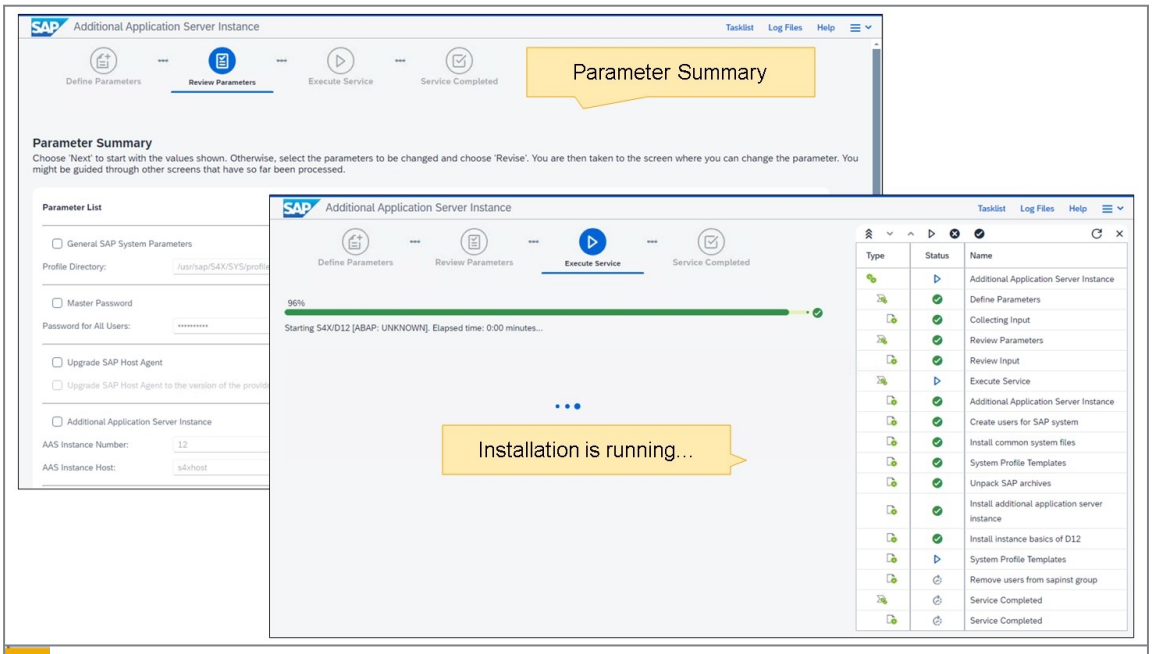

Figure 221: Parameter Summary and Start of Installation

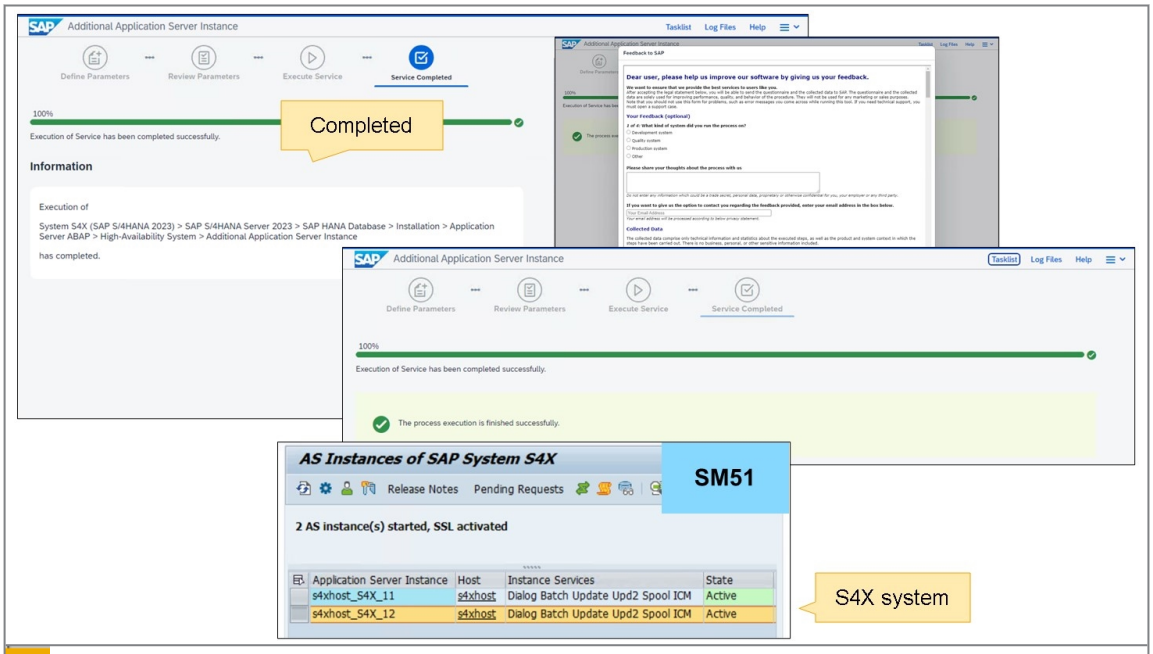

Figure 222: Installation Finished, Check of Result

The installation of the AAS finished successfully!

You can check the result via transaction `SM51`.

You can review the installation procedure by checking the logs.

LESSON SUMMARY

You should now be able to:

- Install an AAS

Installing an ERS

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Install an ERS

Installing an ERS

Installing an ERS for an SAP S/4HANA Server System

After installing the SAP S/4HANA Server system with a Primary Application Server Instance, ABAP Central Services Instance and Additional Application Server Instance, you want to install an Enqueue Replication Server Instance (ERS) for your SAP system.

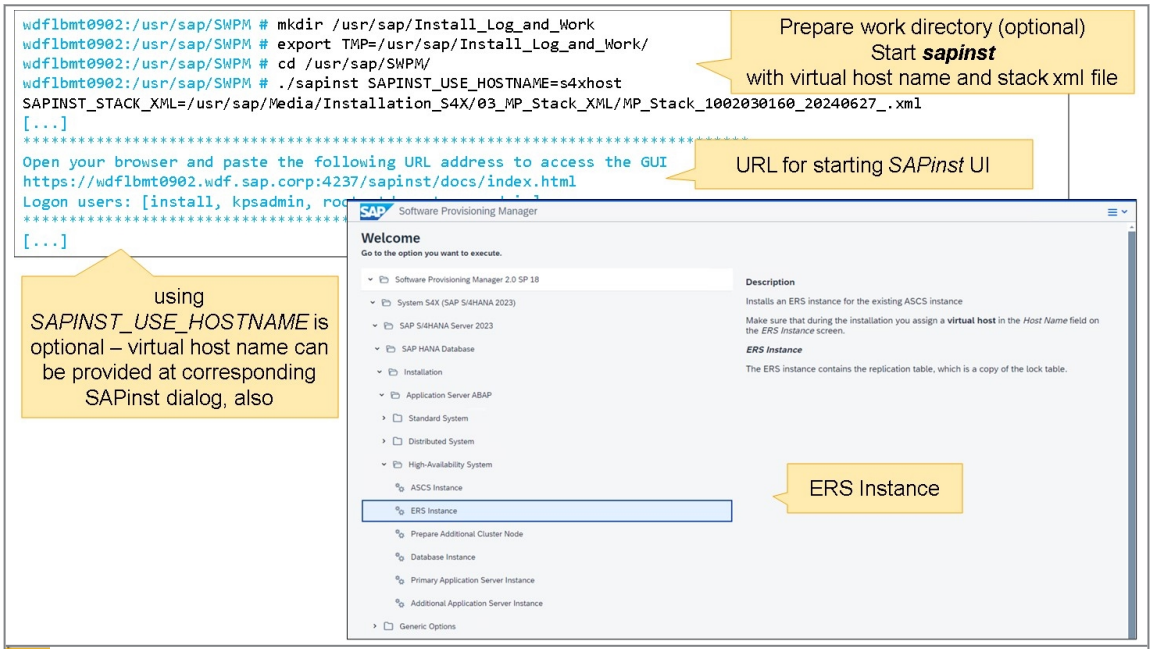

Figure 223: Prepare the File System and Start SAPinst

For this installation, we would like to make use of the option SAPinst offers to install the SAP system using a virtual host name and a stack xml file, calculated by Maintenance Planner.

The installation options offered, depend on the version of SWPM used.

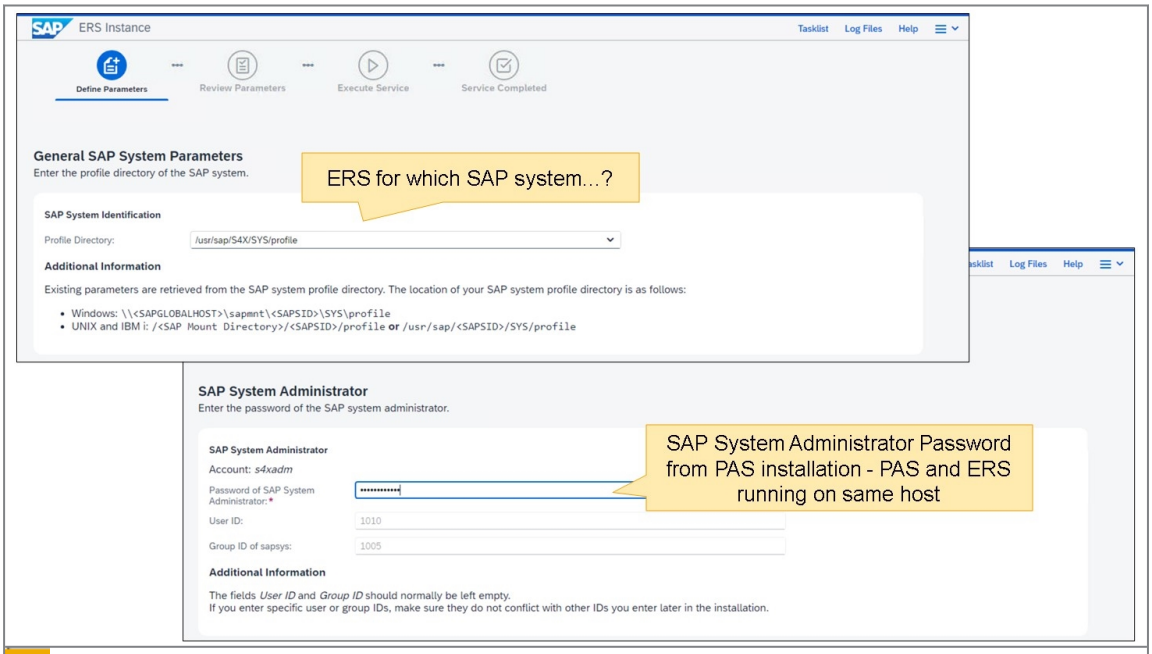

Figure 224: Select the Profile Directory

SAPinst asks for the location of the system-wide used profile directory of the SAP system, the ERS should belong to. By evaluating the location and content of the files therein, SAPinst acquires the essential information on the SAP system, the ERS should belong to.

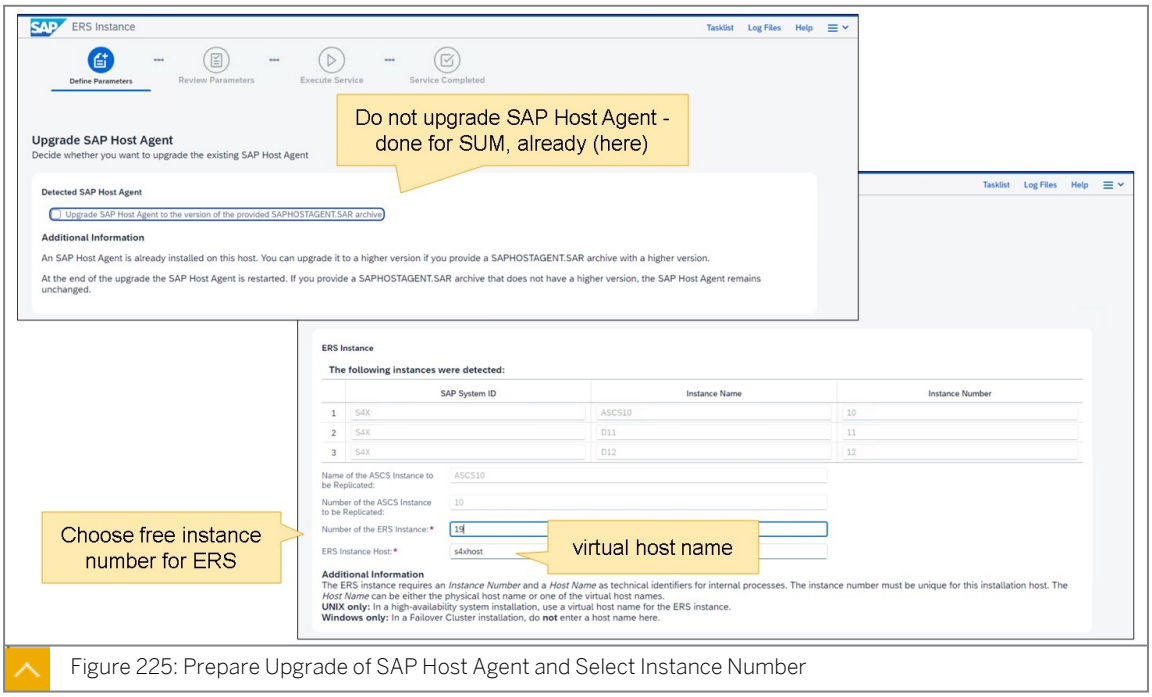

Figure 225: Prepare Upgrade of SAP Host Agent and Select Instance Number

We already performed a SUM run, which updated the SAP Host Agent.

Choose an instance number for the ERS.

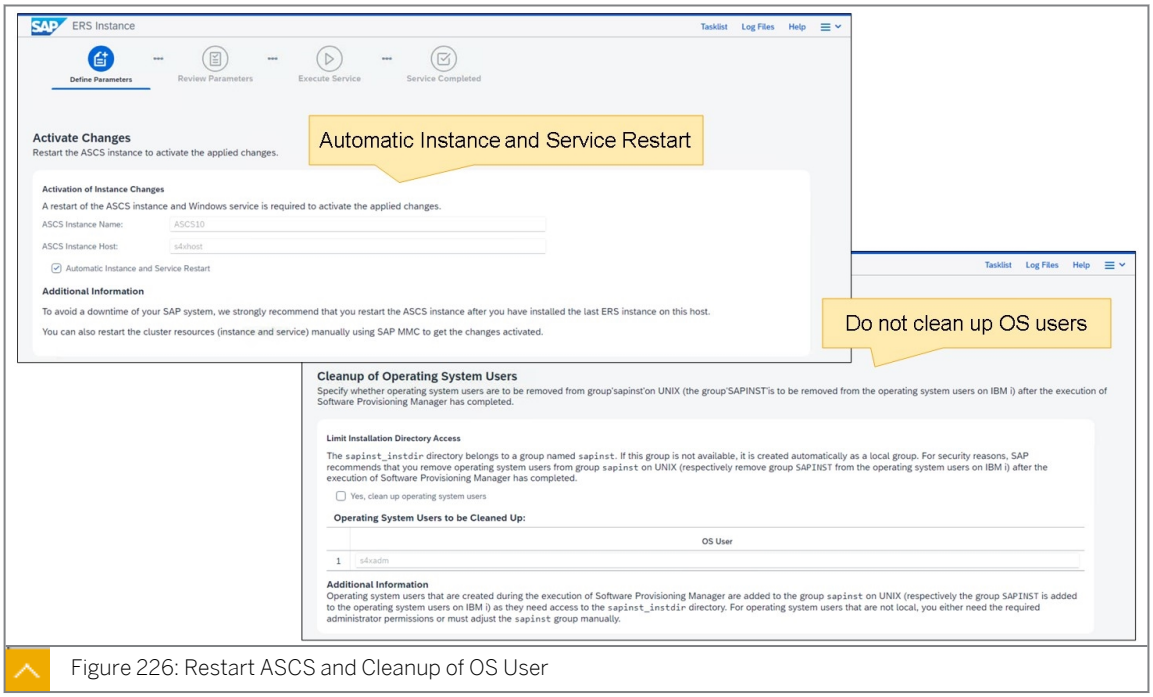

Figure 226: Restart ASCS and Cleanup of OS User

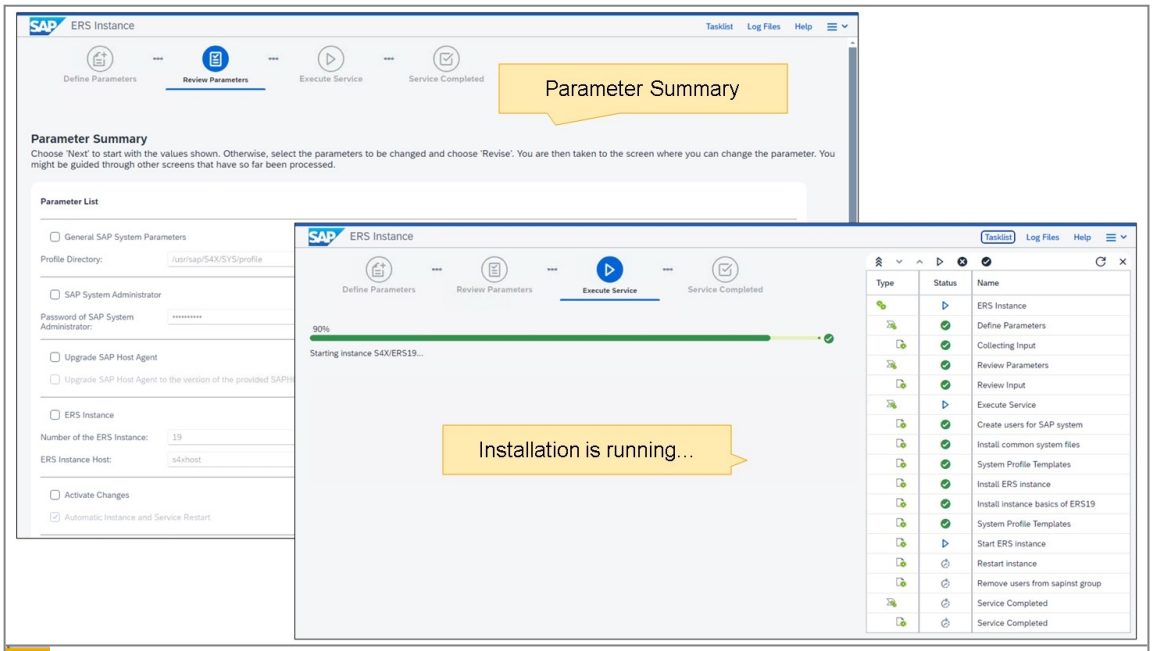

Figure 227: Parameter Summary and Start of Installation

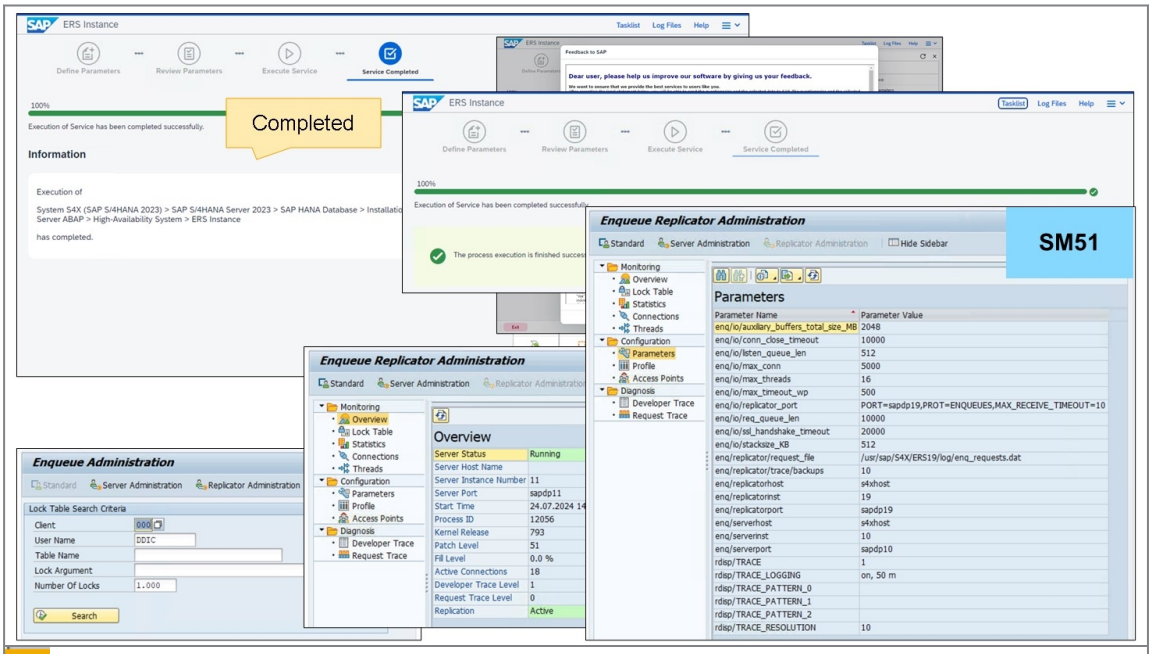

Figure 228: Installation Finished, Check of Result

The installation of the ERS finished successfully!

You can check the result via transaction SM12.

> Note:
> In older releases with Enqueue Server 1 active, you used transaction SM12 for monitoring the enqueue process. For newer releases using Enqueue Server 2, you can use SMENQ for monitoring the enqueue process. In SAP_BASIS 755 and above SM12 and SMENQ lead to the same transaction.

You can review the installation procedure by checking the Logs.

LESSON SUMMARY

You should now be able to:

- Install an ERS

Learning Assessment

1. On the installation dialog screens relating to the installation of an Additional Application Server for an SAP S/4HANA Server system, you are required to provide the profile directory of the SAP system.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

2. You are installing an SAP S/4HANA Server system that should use an Enqueue Replication Server (ERS). How do you install the ERS?

   Choose the correct answer.

   ☐ **A** The installation of an ERS is optionally included within the installation of the ABAP Central Services Instance (ASCS)

   ☐ **B** The installation of an ERS is automatically included into the installation of the Primary Application Server

   ☐ **C** The installation of an ERS needs to be executed by a dedicated run of SAPinst

   ☐ **D** The installation of an ERS is mandatory included within the installation of the ABAP Central Services Instance (ASCS)

Learning Assessment - Answers

1. On the installation dialog screens relating to the installation of an Additional Application Server for an SAP S/4HANA Server system, you are required to provide the profile directory of the SAP system.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! During the installation of an Additional Application Server for an SAP S/4HANA Server system, you are required to provide the profile directory of the SAP system. Read more on this in the lesson Installing an AAS for an SAP S/4HANA Server system of the course ADM110.

2. You are installing an SAP S/4HANA Server system that should use an Enqueue Replication Server (ERS). How do you install the ERS?

   Choose the correct answer.

   [ ] A The installation of an ERS is optionally included within the installation of the ABAP Central Services Instance (ASCS)

   [ ] B The installation of an ERS is automatically included into the installation of the Primary Application Server

   [X] C The installation of an ERS needs to be executed by a dedicated run of SAPinst

   [ ] D The installation of an ERS is mandatory included within the installation of the ABAP Central Services Instance (ASCS)

   You are correct! The optional installation of an ERS needs to be executed by a dedicated run of SAPinst. Read more on this in the lesson Installing an ERS for an SAP S/4HANA System of the course ADM110.

UNIT 10 Planning an Installation

Lesson 1

UNIT OBJECTIVES

- List the planning requirements for an SAP system installation

Unit 10
Lesson 1

Planning an Installation

LESSON OVERVIEW

This lesson describes how to plan the installation of an SAP system and discusses topics such as hardware sizing and the technical requirements of an SAP system.

Business Example

You want to plan the installation of an SAP system. For this reason, you require the following knowledge:

- An understanding of the hardware sizing
- An understanding of the rules concerning the SAP system ID
- An understanding of the considerations for a production client
- An understanding of the System Landscape Directory (SLD) and Landscape Management Database (LMDB)
- An understanding of the network and database requirements

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- List the planning requirements for an SAP system installation

SAP System Installation Planning

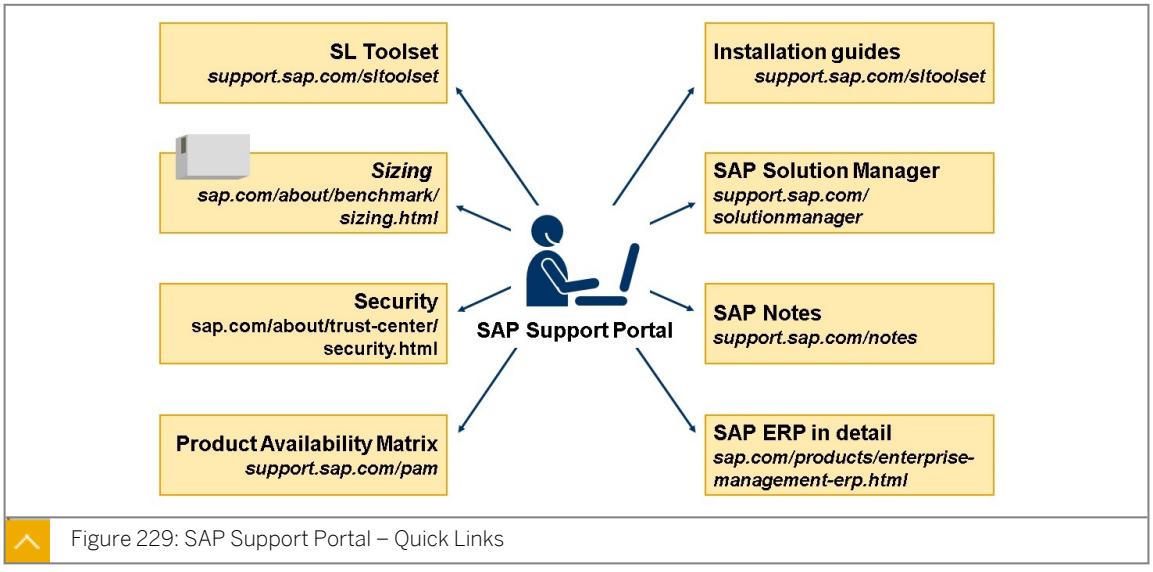

Figure 229: SAP Support Portal – Quick Links

SAP supports you through the complete software life cycle from planning and implementation to operations and maintenance. SAP Support Portal (https://support.sap.com) provides access to the various tools and services throughout the software life cycle.

Hardware Sizing

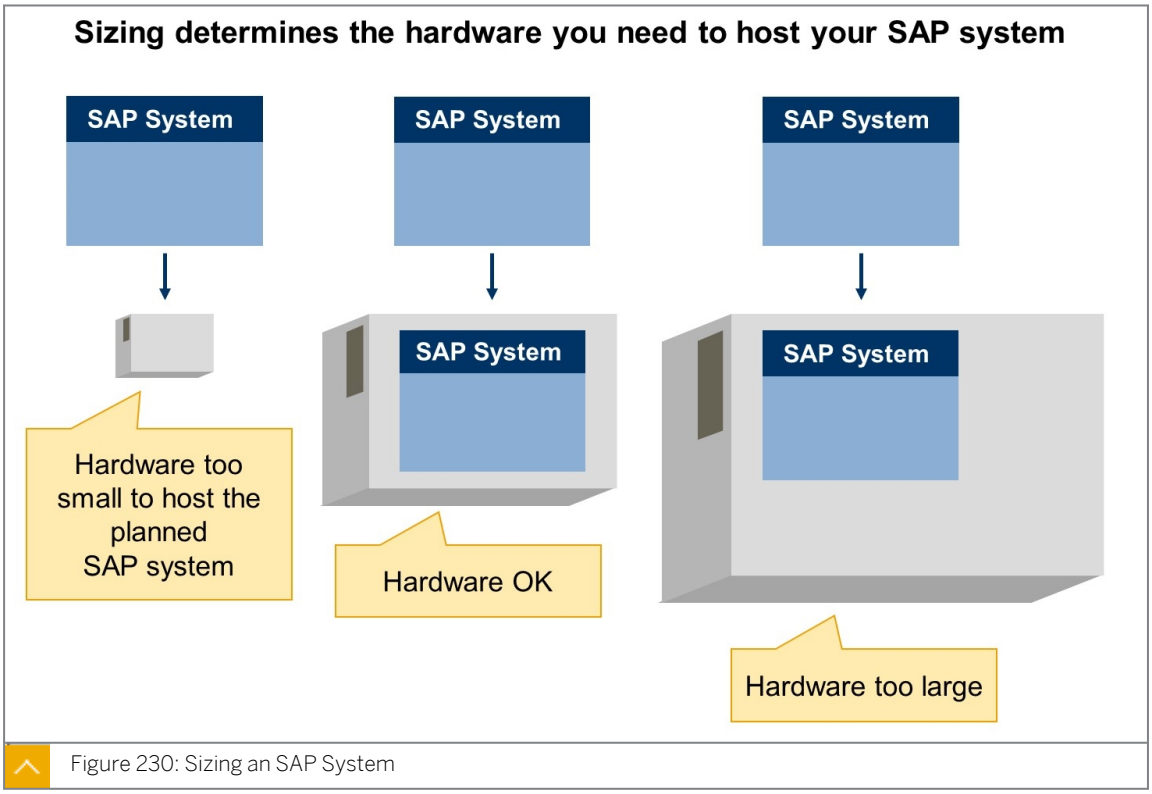

Figure 230: Sizing an SAP System

Hardware Sizing Issues

- Hardware that is sized too small results in additional costs arising from performance issues related to the SAP system. High response times lead to an inefficient productive operation.
- Adequate hardware prevents performance losses and avoids unnecessary hardware costs.
- Hardware sized too large means you invested too much money to reach your goal of good performance.

Hint:
When sizing your hardware, consider the future development of load on the SAP system. For sizing information related to the SAP system, see SAP Library for System Sizing on SAP Help Portal at http://help.sap.com. For information about how to perform sizing, see SAP Library for Quick Sizer tool on SAP Help Portal at http://help.sap.com

Sizing – An Ongoing Process

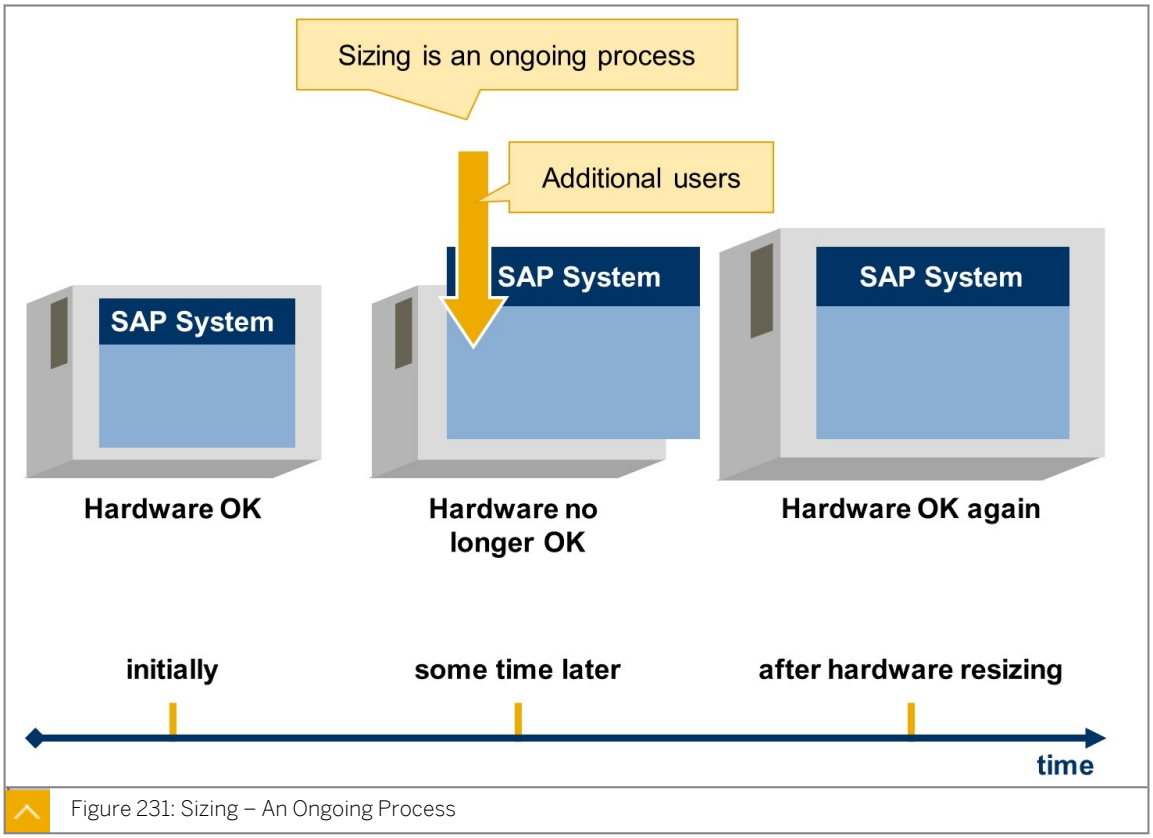

Figure 231: Sizing – An Ongoing Process

Sizing plays a role very early in the planning of your SAP system landscape. It determines the hardware resources needed for your SAP system.

Sizing Considerations

- The number of concurrent users in the system and their activity levels.
- The expected response time.
- The number of high availability (HA) systems needed (Extensive HA solutions may be cost-prohibitive).
- The type of SAP system (SAP ECC, SAP BW, SAP CRM Server, and so on).
- The functions used in the SAP system, such as SAP ECC: lean (Human Resource (HR) and Financial Accounting (FI) or complex (production planning (PP)).
- The SAP system release (SAP ECC 750, SAP S/4HANA Server 758, and so on).
- The type of operating system (Linux, Advanced Interactive eXecutive (AIX), Windows, and so on).
- The type of database used (SAP HANA, SAP Adaptive Server Enterprise (SAP ASE), SAP MaxDB, DB2 Universal Database (DB2 UDB), Microsoft Structured Query Language (SQL) Server, and Oracle).
- The type of access to the SAP system (LAN, WAN, SAP GUI type, and so on).
- The preferred backup concept (for example, an online backup parallel to productive use requires more hardware).

If any of these factors is subject to change, a new sizing or hardware improvement may become necessary.

A new SAP system release usually has additional hardware requirements. To check the sizing information of the system with its documentation, see SAP Library for system sizing on SAP Help Portal at https://help.sap.com.

Distribution Among Hardware

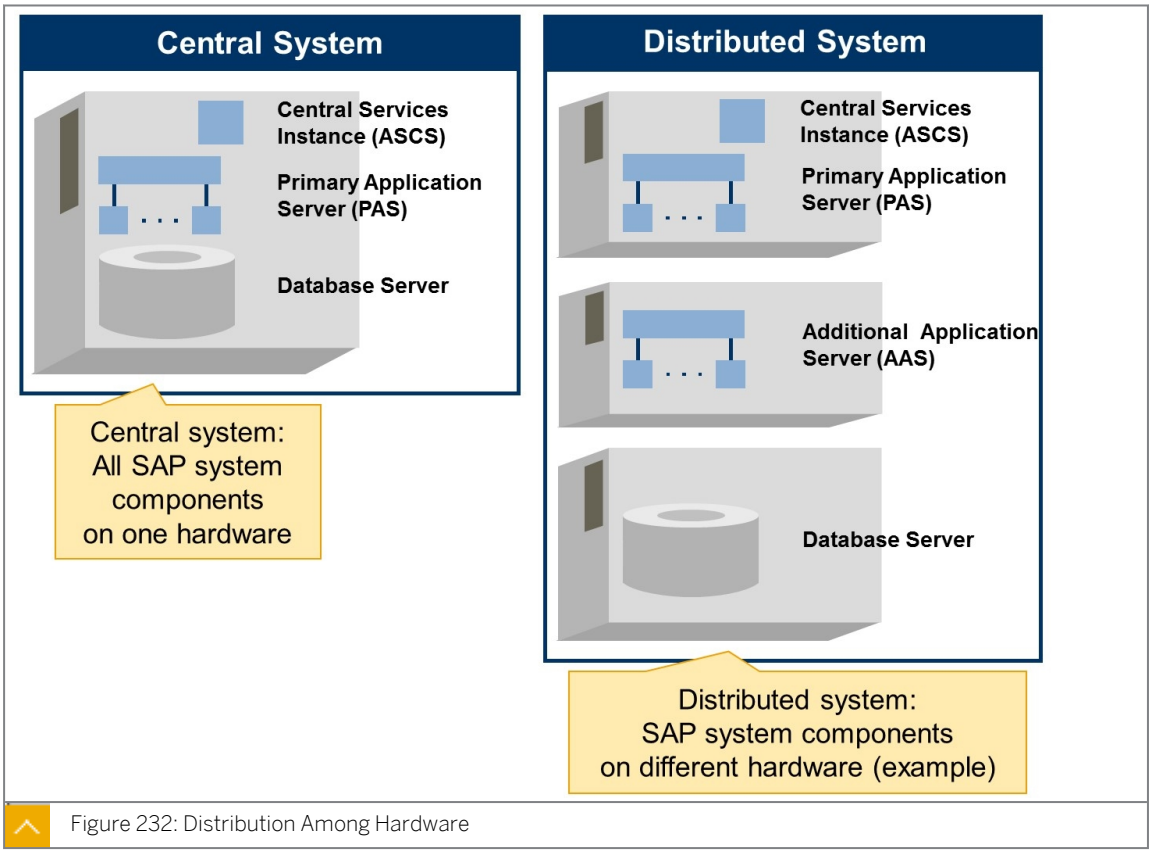

Figure 232: Distribution Among Hardware

You can distribute SAP software in several ways across the available hardware. The result of hardware sizing may influence the distribution of SAP software because the distribution of the software can affect SAP system performance.

Hardware Distribution Considerations

- Central system

  In case of a central SAP system, the database and the PAS are installed on the same host; there is no other instance.

- Distributed system

  In case of a distributed SAP system, AASs are installed on additional hosts.

  In distributed systems, the following options for installation are available:

  - The database and PAS are installed on one host and all additional instances are installed on separate hosts.
  - The database, PAS, and AASs are all installed on different hosts.
  - The database is installed on one host, the PAS and AAS on another host, and other AASs are installed on different hosts.

If you decide to install the database on a separate host, interferences from the SAP application servers on database performance on host level are excluded.

If you decide to install a central system and a need arises for additional SAP system users, an AAS is a possible solution. An AAS may host as many users as the corresponding hardware allows, as long as not more than 100 dialog work processes are necessary. If you need more than 100 dialog work processes, you should install more than one AAS on the same host. SAP systems may have many AASs. Productive systems with more than 20 AASs exist.

Note:
As a rule of thumb, you can estimate for an SAP S/4HANA Server system – one dispatcher can handle 100 dialog work processes and one dialog work process can handle 10 high load parallel users. This means that one dispatcher can handle 1000 high load parallel users per application server and as many named users as you want per application server.

Rules Concerning the SAP System ID

The SAP system ID must conform to specific naming conventions.

SAP system ID (SID) Naming Conventions

- The SAP system ID (SAPSID or SID) and database system ID (DBSID) should be unique per customer.
- The SAP system ID must consist of three alphanumeric characters.
- Only uppercase letters are allowed.
- The first character must be a letter and the subsequent characters may be letters or digits.
- For information on reserved (forbidden) SIDs, like ADD, SAP, SET, and so on, see SAP Note 1979280 - Reserved SAP System Identifiers (SAPSID) with Software Provisioning Manager 1.0 .

SAP Solution Manager

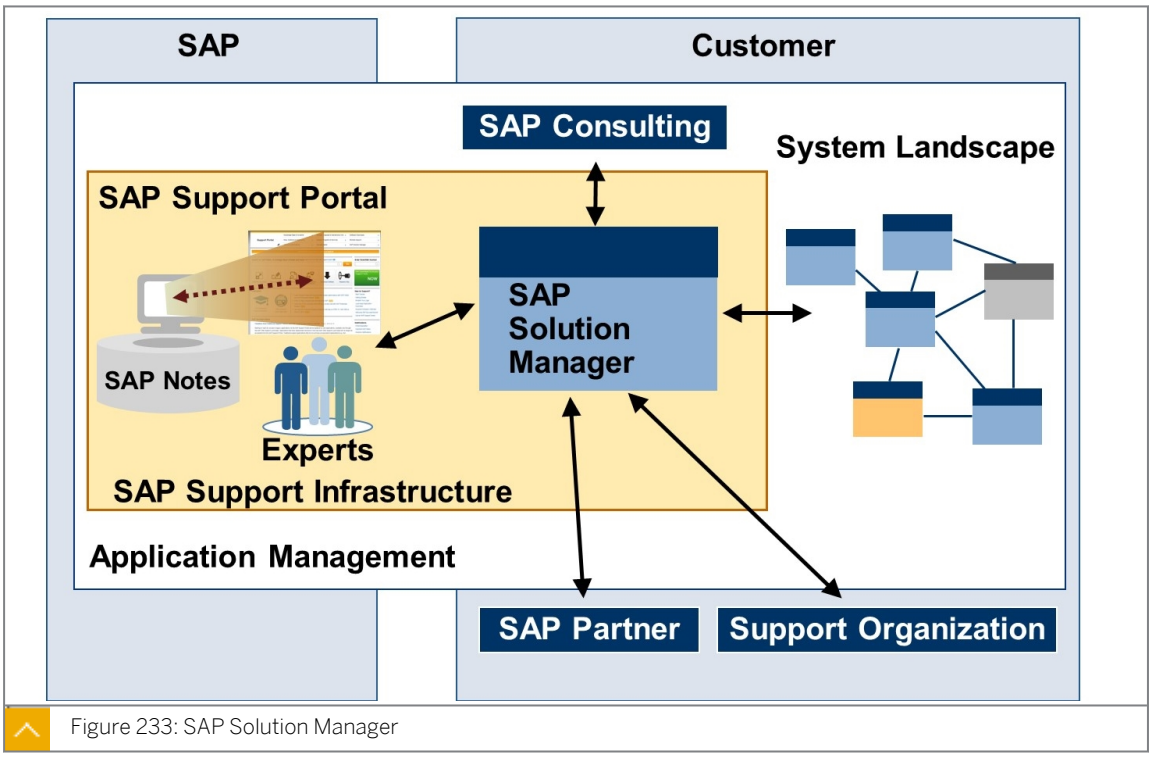

Figure 233: SAP Solution Manager

A solution in this context is the combination of SAP systems, you as a customer are using in combination. A solution represents a bundle of business functions.

The SAP Solution Manager system supports you through the entire life cycle of your SAP solutions, from the business blueprint stage to configuration and production processing. It provides a central access to the tools, methods, and preconfigured contents that you can use during the evaluation, implementation, and operational processing of your SAP systems.

The SAP Solution Manager system also provides central access to all tools, methods, documents, and other data required in the implementation environment. You can use implementation contents, delivered with SAP Solution Manager and regularly updated, and adjust the SAP Solution Manager system to your requirements.

Production Client Considerations

A client is a self-contained business unit in an SAP system having separate user master records, customizing and application data. After the installation of an up to date AS ABAP-based SAP systems (AS ABAP 7.50 and above), either only client 000 exists or client 000 and client 001. Client 000 contains the SAP standard customizing – and can be used to copy your own clients from it. Client 001 – if exists – is a copy of client 000 already – use it or delete it! Do not change the content of client 000! In older AS ABAP-based SAP systems a client 066 was delivered, also. It is not used at all anymore – and should be deleted.

Setting Up the Production Client

- Client 000 is used for special administrative purposes, such as initially setting up Transport Management System (TMS), importing languages, applying SAP Support Packages, and performing SAP system upgrades. Client 000 holds the default SAP customizing. You should not change client 000. Client 000 is delivered with a new installation.

- Client 001 is a copy of client 000. Client 001 is meant to be your production client. Delete client 001 if you do not want to use it as your production client and copy your own client(s) from client 000. Depending on the SAP system type, client 001 is delivered with a new installation or not.
- Client 066 was the client reserved to access the SAP system by SAP support. Depending on the software to be installed, client 066 might still be created during installation. Client 066 is not needed anymore and should be deleted for security reasons.

System Landscape Directory (SLD)

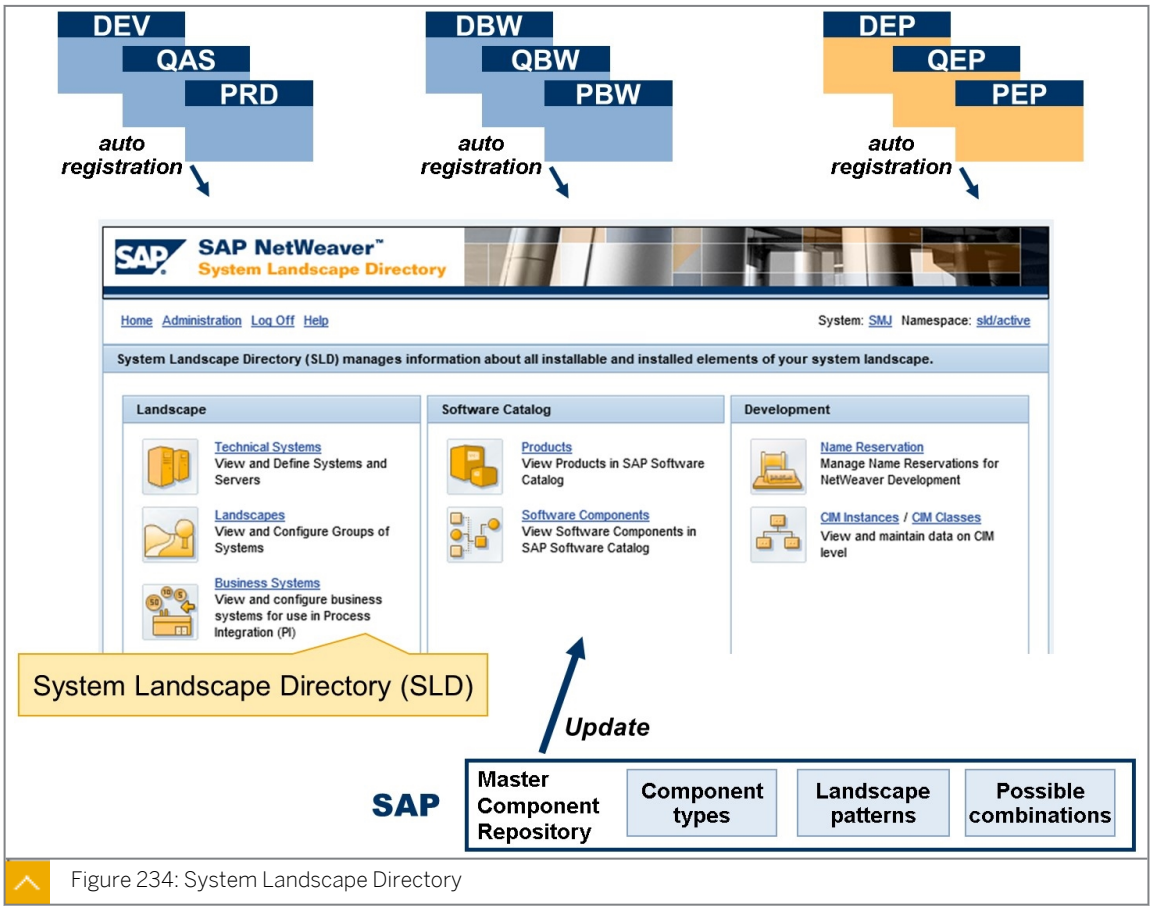

Figure 234: System Landscape Directory

The System Landscape Directory (SLD) serves as a central information repository for your SAP system landscape. An SAP system landscape consists of a number of hardware and software components that depend on one another with regard to installation, software updates, and demands on interfaces. A SAP system landscape in this context is not a transport landscape, but – more or less – all SAP systems of one customer.

Note:
Please note that this section on the System Landscape directory is only contained in the handbook, but not in the instructor's presentation. The reason is, that the significance of the SLD is far lower than in the past. For new systems, it is possible to connect SAP systems directly to the Landscape Management Database (LMDB), without involving the SLD.

The SLD stores information about all the installable and installed components of an SAP system landscape. SAP provides information about installable SAP software, dependencies, and recommended scenarios. In addition, it regularly publishes updates on SAP Support Portal. SAP software components installed on SAP Systems (so called technical systems) are registered automatically and on a regular basis in the SLD; therefore, the SLD always contains up-to-date information about the installed SAP system landscape.

During Installation of a new SAP system you can select the *Register in existing central SLD (default)* function.

Usually there is one SLD per customer. In case of several independent SAP system landscapes, there is also the possibility to configure several SLDs and even forward the stored information to a central SLD.

The connected SAP systems actively push their information to the SLD. In AS ABAP-based SAP system this so-called SLD Bridge is defined in transaction `RZ70`..

The SLD can be configured and used in any AS Java-based SAP system, for example in the SAP Solution Manager Java. A better option would be, to install a dedicated, separate AS Java-based SAP system only for the SLD.

Landscape Management Database (LMDB)

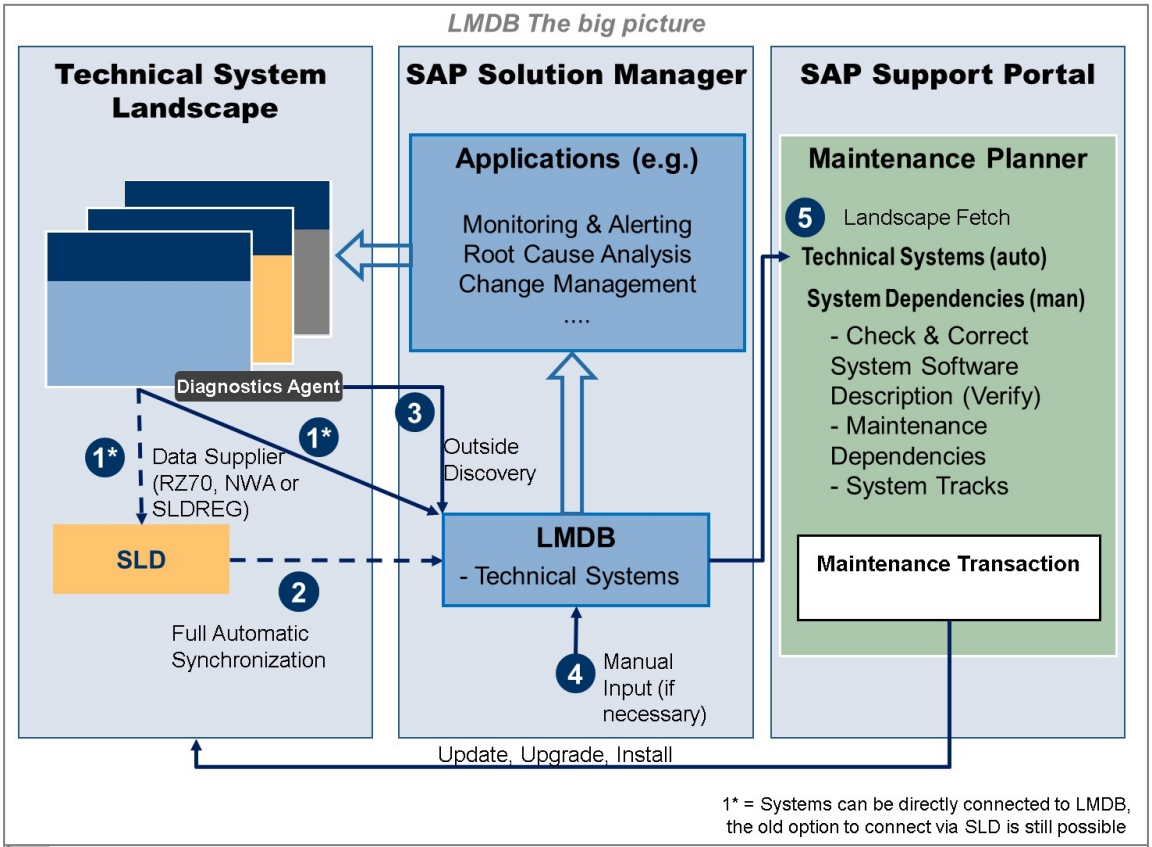

Figure 235: Landscape Management Database (LMDB)

While the SLD only contains technical information about the SAP systems of the SAP system landscape, the Landscape Management Database (LMDB) contains more information.

The LMDB is part of the SAP Solution Manager ABAP system; it retrieves the technical SAP system information from the SLD as a basis for landscape data to manage SAP systems (so-called technical systems) in monitoring and maintenance processes. The LMDB acts as a

single source of truth in the SAP Solution Manager system. As of SAP Solution Manager 7.1 SP04, the LMDB manages information for example about SAP systems and hosts.

Without a valid entry for an SAP system within LMDB, you cannot (for example) create a new Maintenance Transaction via Maintenance Planner for this SAP system. LMDB is required to patch and upgrade SAP systems using Maintenance Planner.

For primary information about LMDB see https://support.sap.com/en/tools/software-logistics-tools/landscape-management-process/database.html.

Network Requirements

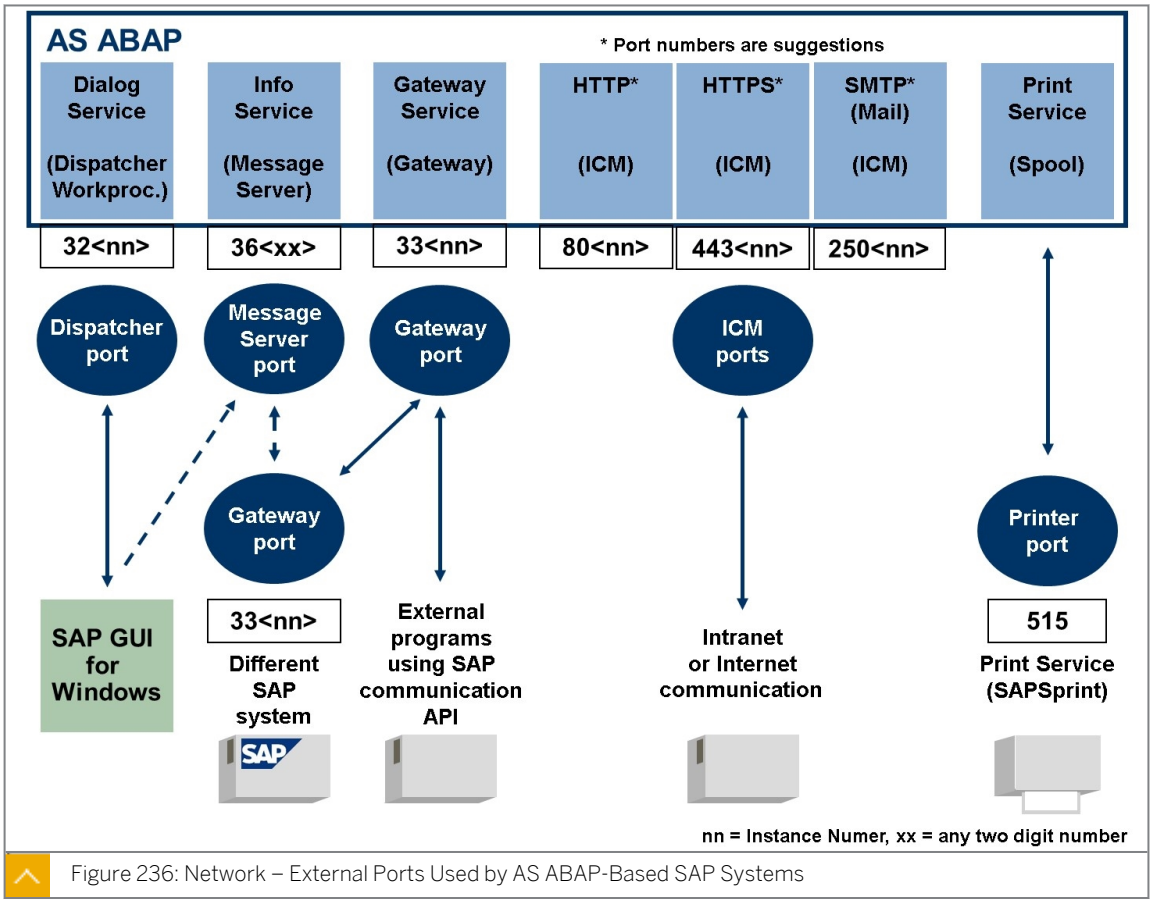

Figure 236: Network – External Ports Used by AS ABAP-Based SAP Systems

Benefits of a Well-Designed Technical Infrastructure

In addition to ensuring the lowest cost of ownership, a well-designed infrastructure improves the following system parameters:

- Lower cost of ownership
- Performance
- Functionality
- Availability
- Scalability
- Security

Note:
For more information, see SAP Library for installation guides on SAP Help Portal at https://help.sap.com.

The technical infrastructure describes the technical setup of an AS ABAP-based SAP system. The technical setup includes the network layout, the server layout, the disk layout of the database, the type of computer interface used, and many more details.

The technical infrastructure influences these technical setup areas.

As shown in the figure, AS ABAP-based SAP systems use different ports for external communication. All these ports should be secured by some means, such as firewalls, routers, and the SAP router, to ensure the SAP system's security. In addition, SAP systems use several internal connections to communicate with the database. The number of connections and the ports used depend on the type of database employed.

The figure shows only the AS ABAP-based SAP system ports. For AS Java-based SAP systems, ports 50000 and higher are used.

Note:
For more information about ports used in the SAP environment and infrastructure security, see SAP Library for network security on SAP Help Portal at https://help.sap.com.

Network – Load Caused by SAP System Communication

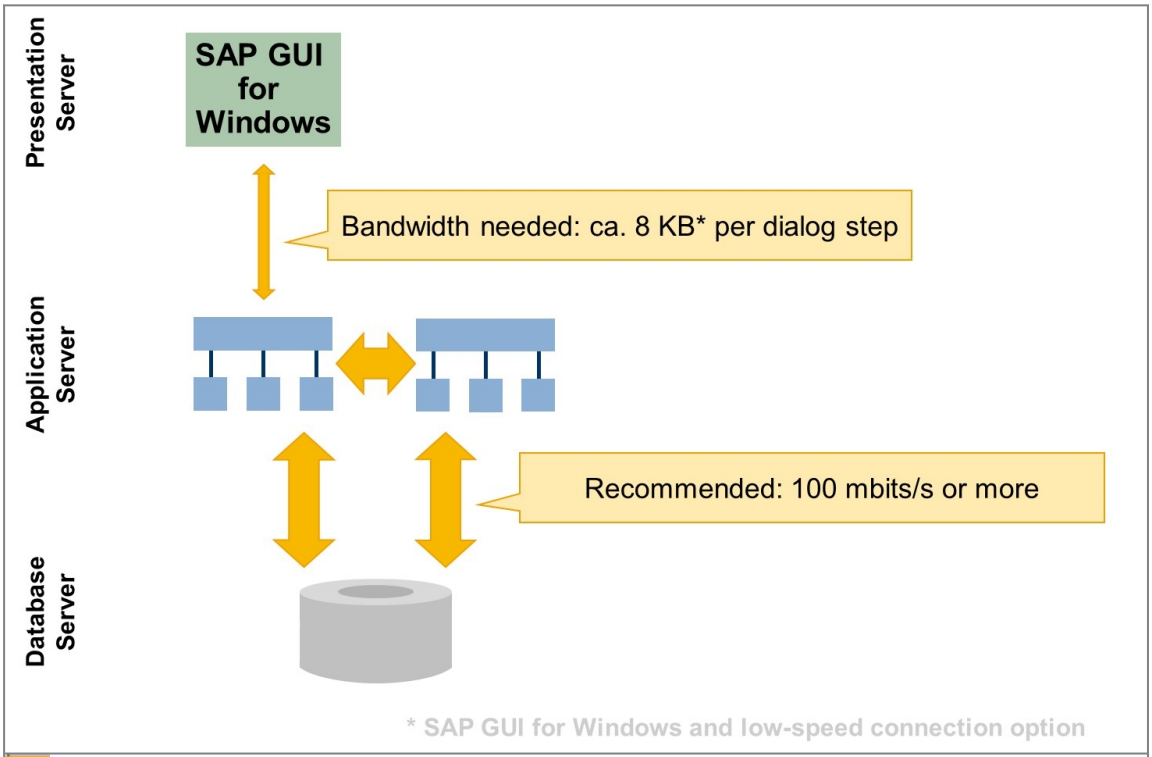

Figure 237: Network – Load Caused by SAP System Communication

Network Bandwidth Dependencies

- The type of GUI used (SAP GUI for Windows, SAP Business Client (BC), SAP Fiori, SAP GUI for HTML, and so on)
- The type of application (within SAP S/4HANA Server and SAP ECC: FI, HR, SD, and so on)
- The type of SAP system used (SAP S/4HANA Server, SAP ECC, SAP CRM Server, and so on)
- The low-speed connection flag used (for details, see SAP Note 21151 - Using SAP GUI in WAN)
- Other applications on the front end (office products) using the same connection

Note:
For more information, see SAP Library for system sizing on SAP Help Portal at https://help.sap.com.

The load between the application and database layer is considerable. As a result, SAP recommends offering a bandwidth of at least 100 megabits per second for the communication between application and database layer. It is usually not possible to separate the database by more than the LAN width from the application layer.

Note:
For more information about the network layout for SAP servers, see SAP Note 21151 - Multiple Network adapters in SAP Servers and read the *Network Integration of SAP Servers* document.

Database Requirements

Type of Data Stored in SAP Databases

- Business data (user master records, customizing data, master data, transaction data, and so on) and the corresponding index data – if exists
- Logging data for the database (needed for recovery)

Databases of SAP systems are usually stored on disks combined with some Redundant Array of Inexpensive Disks (RAID) level (usually 1 or 5) or on Storage Area Networks (SANs). Databases used for SAP systems can hold up to several terabytes of business data because practically you are unable to restore a large database and you have to ensure that data loss is avoided under almost all circumstances. The disk layout for databases used for SAP systems affects not only the performance of SAP systems but also their reliability and availability.

System Availability Considerations

- Disk failure
- RAID controller failure
- Network card failure
- Network failure

- Power supply failure
- Massive environmental damages (fire, flood, earthquake, and so on)

Table 1: Database Users for SAP Systems

Database	Schema User	Other Users
SAP HANA	SAPHANADB	system
SAP ASE	SAPSR3/SAPSR3DB	sa, sapsso, sapsa, and so on
SAP MaxDB	sap<sapsid>	control, superdba, and so on
Oracle	SAP<SCHEMA_ID>	system and sys
MS SQL Server	SAP<SAPSID>	sa, <sid>adm, and SAPSer-vice<SID>
DB2 UDB	sap<sapsid>	db2<dbsid>
DB2 zOS	sap<sapsid>	See the installation guide
DB2 i (Series)	sap<sapsid>	<sid>OFR and see the installation guide

Note:
For more information about enhancing the security of the databases of your SAP system, read the following SAP Notes:

- For SAP ASE: SAP Note 2008256 - How to reset master password for sapsso user - SAP ASE for BS
- For SAP MaxDB read the “SAP MaxDB Security Guide”: http://help.sap.de/saphelp_nw74/helpdata/en/44/bbe0dc91407006e10000000a155369/frameset.htm
- For Oracle: SAP Notes 1622837 - Secure connection of AS ABAP to Oracle via SSFS and 926023 - Oracle database security
- For MS SQL Server access http://help.sap.com/saphelp_nw74/helpdata/en/95/fb1f6ca5504992839b16370fdeb701/frameset.htm

Note:
Multiple database users for SAP systems might be needed.

Hint:
The schema user for AS Java-based installations is sap<schema_id>db.

For this training, we use different operating systems (Windows and Linux) and different databases (SAP HANA and SAP MaxDB). Most of the installation and patch procedures are not impacted by the type of operating system or database that you are using. However, some

differences exist. For example, Oracle database systems are NOT installed during the installation of the SAP system using SWPM/SAPinst; instead they are installed in a separate step before starting SWPM/SAPinst. Also, the procedures for patching the different databases supported by SAP vary significantly. For example, patching SAP MaxDB, usually consists of three or four very easy activities and takes about 5-10 minutes, whereas patching an Oracle database requires a full, new installation of the database software (not of the SAP system), and might take some hours (including preparation).

Caution:
Read the installation guide and related SAP Notes carefully. There are critical differences in the naming conventions. For example, for Microsoft SQL Server, user <sid>adm must be named using lowercase characters <sid>, such as tstadm, while user SAPService<SID> must be named using uppercase characters <SID>, such as SAPServiceTST.

LESSON SUMMARY
You should now be able to:

- List the planning requirements for an SAP system installation

Learning Assessment

1. You are installing an AS ABAP-based SAP system. Identify the SAP System IDs that are allowed, according to the corresponding naming conventions.

   Choose the correct answers.

   - [ ] **A** SAP
   - [ ] **B** 007
   - [ ] **C** NYC
   - [ ] **D** B_1
   - [ ] **E** LA6

Learning Assessment - Answers

1. You are installing an AS ABAP-based SAP system. Identify the SAP System IDs that are allowed, according to the corresponding naming conventions.

   Choose the correct answers.

   - [ ] **A** SAP
   - [ ] **B** 007
   - [x] **C** NYC
   - [ ] **D** B_1
   - [x] **E** LA6

   You are correct! According to the rules, the SAP system ID must consist of three alphanumeric characters, only uppercase letters are allowed, the first character must be a letter and the subsequent characters may be letters or digits. Some SIDs are not allowed, among them, the SID *SAP*.

UNIT 11 Preparing an Installation

UNIT OBJECTIVES

- Download and use SWPM
- Start the installation tool SAPinst
- Perform the general preparation steps required to install an SAP system
- Prepare the OS for an Installation of an SAP System

Unit 11
Lesson 1

Installing an SAP System Using Software Provisioning Manager (SWPM)

LESSON OVERVIEW
This lesson describes how to install an SAP system using Software Provisioning Manager (SWPM).

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Download and use SWPM

Software Provisioning Manager (SWPM)

Software Provisioning Manager (SWPM) Overview

- SWPM is a tool that provides easier and more reliable software provisioning.
- SWPM is the successor of the product and release specific delivery of provisioning tools.
- SWPM provides the latest SAPinst version with software provisioning services for several products and releases for all platforms. These services enable you to profit directly from up-to-date procedures that are powered by a reliable tool that is available and used for years.
- SWPM offers the relevant procedures that are required to install, copy, and transform SAP systems in your SAP system landscape.
- SWPM is delivered in regular intervals, independent from SAP application product shipments via the **Software Logistics Toolset (SL Toolset)**. This toolset is a central collection of software logistic tools and is always up to date.

Characteristics of the SL Toolset

- The SL Toolset consists of software that can be downloaded from the SAP Support Portal.
- The SL Toolset is being updated quarterly, product independent, and downward compatible.
- Software updates include new tools as well as recent improvements and enhancements.

SWPM Identification and Downloading

You can download the current version of SWPM at https://support.sap.com/sltoolset.

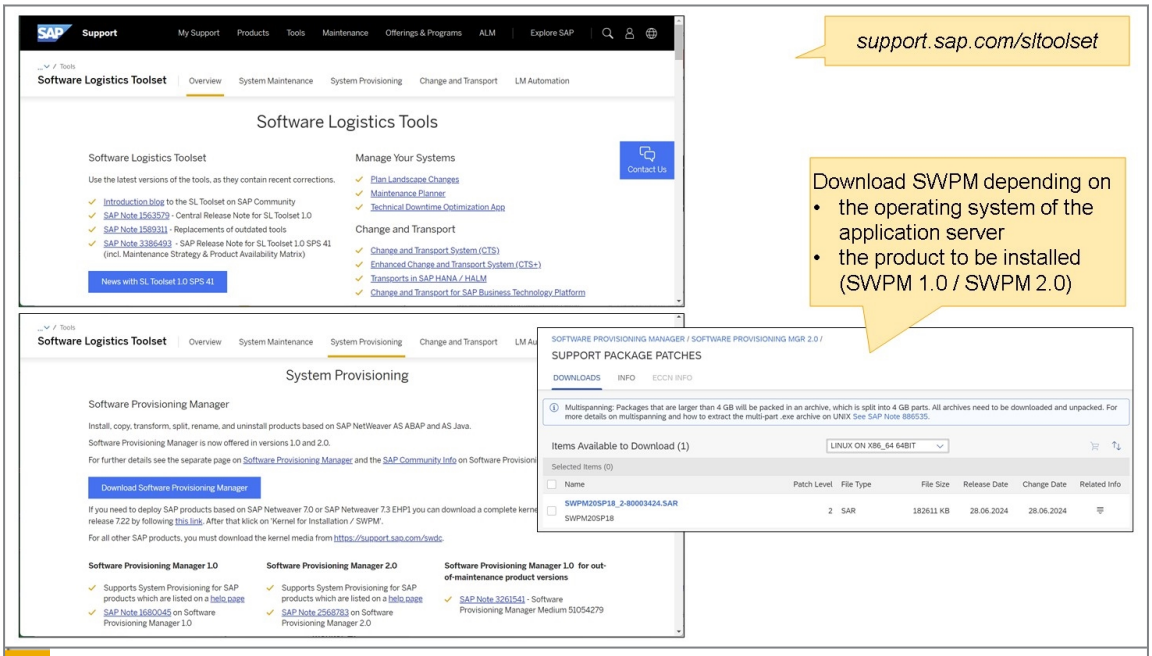

Figure 238: Downloading Software Provisioning Manager and Corresponding Kernel Media

> Caution:
> We recommend that you download the latest version of the tool, as it contains latest corrections.

SWPM Extraction and Checking

After downloading the relevant archive and the corresponding kernel installation media, extract the SWPM archive by using the tool `sapcar`.

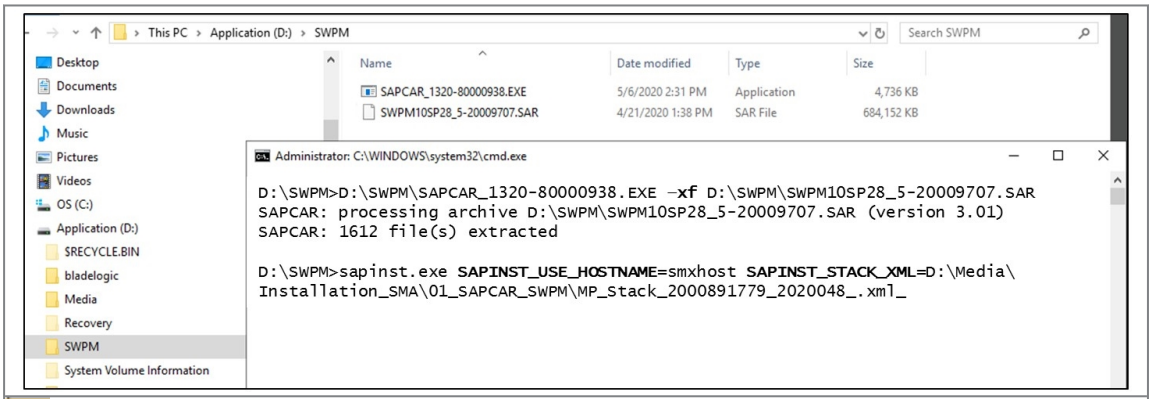

Figure 239: Extracting SWPM

LESSON SUMMARY

You should now be able to:

- Download and use SWPM

Unit 11
Lesson 2

Installing an SAP System Using SAPinst

LESSON OVERVIEW
This lesson describes how to install an SAP system, both locally and remotely, with SAPinst .

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Start the installation tool SAPinst

Starting SAPinst

Steps to Start SAPinst

To start SAPinst for Windows on a single host, proceed as follows:

1. Log on to your host as a user who is a member of the local administration group.
2. Start SAPinst from the root directory of the uncompressed archive from SWPM.

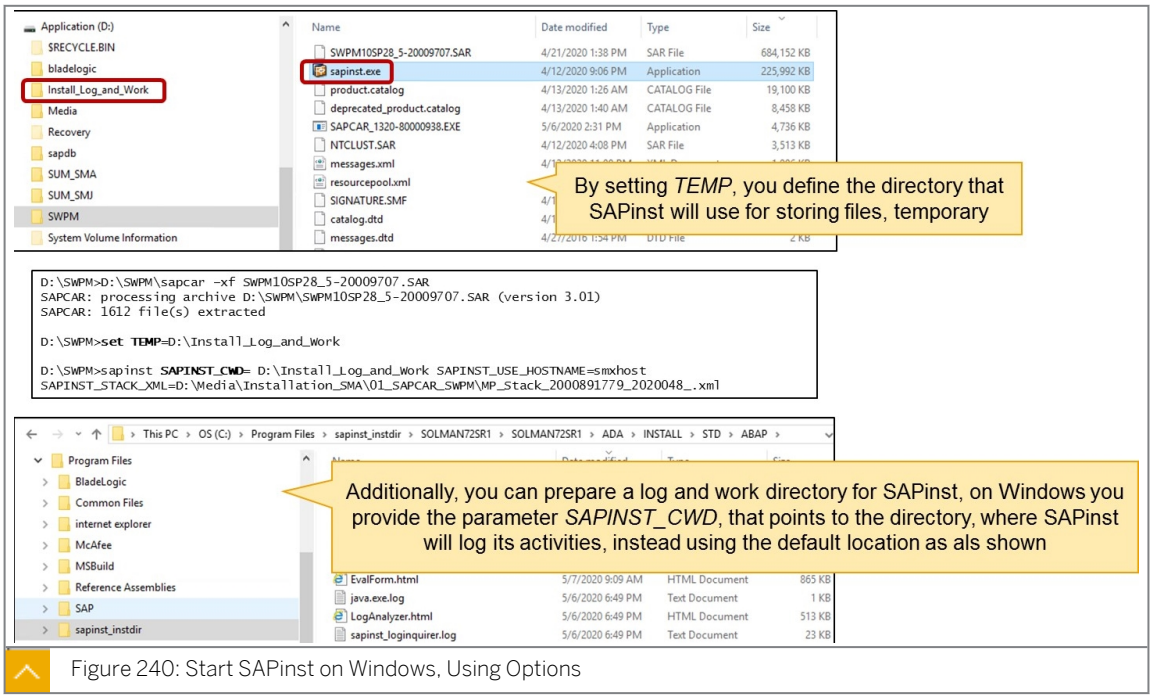

Figure 240: Start SAPinst on Windows, Using Options

> Caution:
> Do not use the user <sid>adm for **installation** procedures.

SAPinst creates the installation directory **sapinst_instdir** where it keeps the log files and that is located directly in the Program Files directory. If SAPinst is not able to create sapinst_instdir in the Program Files directory, SAPinst tries to create sapinst_instdir in the directory defined by the environment variable TEMP. SAPinst creates a subdirectory for each installation service.

Note:
We recommend that you keep all the installation directories until the system is completely and correctly installed.

The SAPinst Self-Extractor extracts the executables to a temporary directory (TEMP, TMP, TMPDIR, or SystemRoot). These executables are deleted after SAPinst has stopped running. Directories, which are called as sapinst_exe.xxxxxx.xxxx, sometimes remain in the temporary directory. You can safely delete the temporary directories.

The temporary directory also contains the SAPinst Self-Extractor log file `dev_selfex.out`, which may be useful if an error occurs. To terminate SAPinst and the SAPinst Self-Extractor, press CTRL + C.

Hint:
If SAPinst cannot find a temporary directory, the installation terminates with the error FCO-00058.

To terminate SAPinst and the SAPinst Self-Extractor, right-click the icon for the SAPinst output view located in the Windows tray and choose *Exit*. Alternatively, you can choose the icon for the SAPinst output view located in the Windows tray and then choose *File* → *Exit* .

To start SAPinst on Unix, proceed as follows:

1. Log on to your host as user root.
2. Start SAPinst from the root directory of the uncompressed archive for SWPM.

Caution:
Make sure that the root user has not set any environment variables for a different SAP system or database.

SAPinst creates the installation directory sapinst_instdir directly below the temporary directory. SAPinst finds the temporary directory by checking the value of the environment variables TEMP, TMP, or TMPDIR. If no value is set for these variables, SAPinst uses `/tmp` as default installation directory. Make sure that the temporary directory has the permissions 777.

Caution:
Make sure that your operating system does not delete the contents of the temporary directory `/tmp`. It must also not delete the contents of the directories to which the variables TEMP, TMP, or TMPDIR point, for example, by using a crontab (third party tool) entry.

Communication Ports Used During SAP System Installation

SAPinst includes an SAPinst GUI and the GUI server, both of which use a Java Runtime Environment (JRE).

In a standard installation, SAPinst, SAPinst GUI, and the GUI server run on the same host. If required, you can instead perform a remote installation with SAPinst, where SAPinst GUI runs on a separate host from SAPinst and the GUI server.

When you start SAPinst, SAPinst GUI and the GUI server also start. SAPinst GUI connects to the GUI server using a Secure Socket Layer (SSL) connection and the GUI server connects to SAPinst.

During installation, the default ports 21200, 21212, and 4239 are used for communication between SAPinst, GUI server, SAPinst GUI, and HTTP server.

Default Communication Ports

- SAPinst communicates with the GUI server through port 21200.
- The GUI server communicates with SAPinst GUI through port 21212.
- The HTTP server port is 4239, which is a part of the GUI server.

You receive an error notification if one of these ports is already in use by another service. In this case, start SAPinst with the command line parameters.

SAPinst Command Line Parameters

- `SAPINST_DIALOG_PORT=<free_port_number_sapinst_gui_to_gui_server>`
- `GUISERVER_DIALOG_PORT=<free_port_number_gui_server_to_sapinst_gui>`
- `GUISERVER_HTTP_PORT=<free_port_number_http_server>`

For a list of all available SAPinst properties, start SAPinst with the parameter -p, as follows:

- For Windows: **`sapinst.exe -p`**
- For Linux and UNIX: **`sapinst -p`**

Troubleshooting with SAPinst

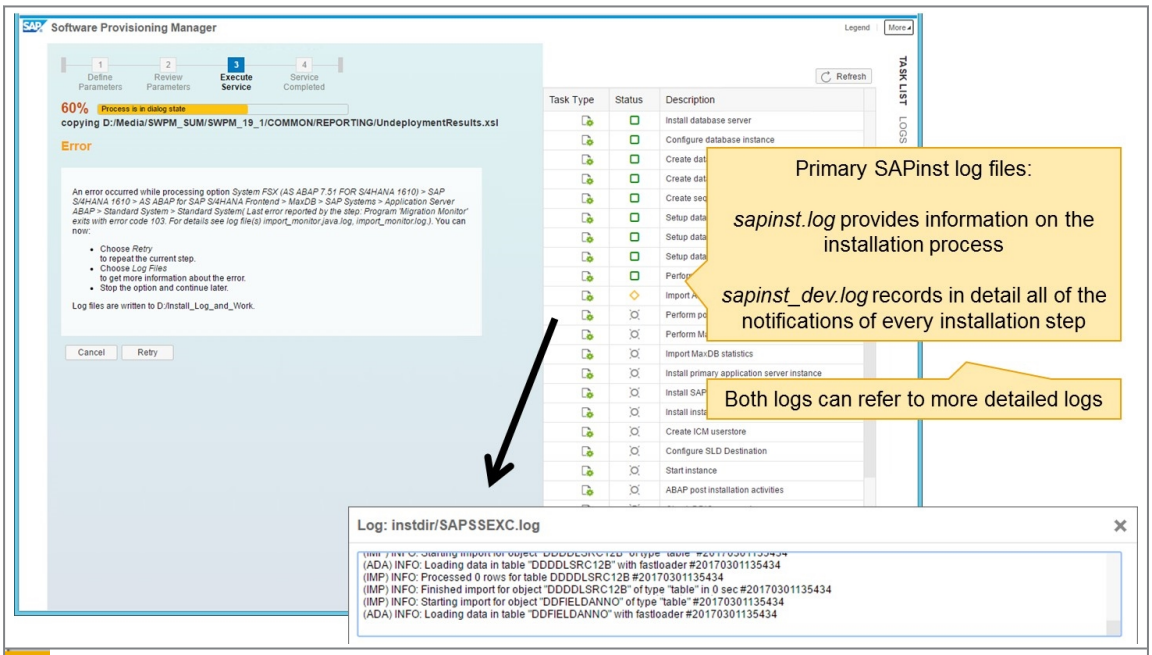

Figure 241: SAPinst Troubleshooting

If an error occurs, SAPinst stops the installation and displays a dialog box informing you about the error. In this case, you can view the log file by choosing the *View Log* button. If you can manually solve the error, leave the SAPinst in open state. Fix the error, and then choose the *Retry* button to continue the installation.

Hint:
There are some known error situations where you can choose the *Retry* button and SAPinst continues without any error.

All the installation information is logged in several log files.

Special SAPinst options

sapinst -p

Using this option, you receive a list of more common SAPinst command line options.

SAPINST_USE_HOSTNAME

Using this parameter, you can use virtual host names for the installation of your SAP system. The use of virtual host names requires additional OS-dependent work.

SAPINST_STACK_XML

This parameter shows SAPinst provides the location of a Stack-XML file that should be used during the installation. The installation options will be different from an installation without that file.

SAPINST_CWD

On Windows, this parameter allows to define a directory that SAPinst will use for logging its activities. Such a directory can only be used for one single installation run. Create an individual log directory for each installation run.

Up-To-Date Installation

Use the Maintenance Planner to plan the installation and update procedure for your SAP system to be installed. With the help of this Stack-XML file you can start SAPinst, which will then offer some additional options during the installation, like setting up a minimum TMS configuration, importing a SPAM/SAINT update and importing additional languages. Also, you can prepare the subsequent start of Software Update Manager (SUM) to update the newly installed SAP system to the SP level determined within Maintenance Planner. Find more information here https://blogs.sap.com/2016/10/21/up-to-date-installation-2/.

Note:

In this training we won't execute an up-to-date installation. In general, there might be several obstacles using this option, like: The system to be installed should belong to a transport group that already exists (then the automatic setup of TMS will fail), the update procedure requires (e.g.) the database software to be patched BEFORE the update will be started or it requires the application of some SAP Notes BEFORE the update starts and similar. In this training, we will start the update separately.

Primary SAPinst Log Files

- `sapinst.log`

  Information on the installation progress

- `sapinst_dev.log`

  Records in detail all of the notifications of every installation step

You can find the log files `sapinst.log` and `sapinst_dev.log` in the current installation directory.

Additional log files may be written during the installation process. The additional logs are referenced in `sapinst.log` and `sapinst_dev.log`.

Location of SAPinst GUI and the GUI Server Log Files

- Windows: `%userprofile%\.stdgui`
- UNIX: `<user_home>/.stdgui`

If SAPinst GUI does not start, check the `sdtstart.err` file in the current `%userprofile%` (Windows) or `<user_home>` (Linux) directory.

SAPinst is controlled by the XML files described in the following table.

Table 2: SAPinst XML Files

File Name	Description
`dialog.xml`	Contains all the dialogs (services) used in the installation
`keydb.xml`	Contains the installation progress and user input information that is recorded by SAPinst
`messages.xml`	Contains all the notifications used in the installation
`control.xml`	Contains the component definition used by SAPinst

File Name	Description
`packages.xml`	Used for software package administration

SAPinst GUI Handling

Within the SAPinst GUI, several functions are available on various SAPinst GUI dialogs. These dialogs are input views, installation progress view, and notification boxes.

Table 3: SAP GUI Dialog Functions

Function	Description
F1	Displays detailed information about each input parameter.
Back	Displays the previous dialog box for editing.
Next	Displays the next dialog box for editing.
Cancel	During the installation, the cancel function provides the following options: • *Stop* Stops the installation without further changing the installation files. You can restart `SAPinst` to continue the installation later. • *Continue* Continues the installation.
Log Off	Stops SAPinst GUI, but SAPinst and the GUI server continue running. You can later reconnect to the same SAPinst installation from the same or another host by starting SAPinst GUI separately.
View Log	Displays the content of the `SAPinst.log` file during the installation.
Retry	Allows you to perform an installation step again (if an error has occurred).
Stop	Stops the installation without further changing the installation files. You can continue the installation later from this stopping point.
Continue	Allows you to continue with the option you previously selected.

Special options for SAPinst

Installation using a Stack XML file

The following explains how to proceed with SAPinst, using a Stack XML file for installation, also called *Up-to-date installation* (UDI).

How to

To use SAPinst with a Stack XML file, you can call SAPinst like this:**`sapinst SAPINST_STACK_XML=<path to Stack XML file>`**. This option can be combined with other options, like, e.g. SAPINST_USE_HOSTNAME.

Advantages

Using a Stack XML file allows for further operations during the installation, like, e.g. automated basic setup of TMS, import of additional languages, ...

Changes

SAPinst might not offer a prerequisites check (depending on SAPinst version), the SID of the SAP system is already pre-filled, additional options become available during the installation.

More information

See SAP Note 2277574 - Central Note for Up-To-Date Installation using Maintenance Planner, Software Provisioning Manager and succeeding update tools

Executing an unattended installation using inifile.params

The following explains how to execute an unattended installation with SAPinst.

How to

From a previous installation run, that you would like to replicate, take the file named **`inifile.params`** from the working directory of SAPinst.

Follow the information found in SAP Note 2230669 - System Provisioning Using a Parameter Input File.

Advantages

You can re-run installation procedures in “Observer mode” or “Non-Observer mode”. Most typing activity can be saved.

Changes

SAPinst might run repeated, identical installations with far less interaction.

More information

See SAP Note 2609804 - SWPM Unattended Installation: password handling.

LESSON SUMMARY

You should now be able to:

- Start the installation tool SAPinst

Unit 11
Lesson 3

Preparing for the Installation

LESSON OVERVIEW
This lesson describes the tasks that you must complete before you install an SAP system.

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Perform the general preparation steps required to install an SAP system

Preparation for an SAP System Installation

Before you begin an SAP system installation, you need to prepare several things.

SAP System Installation: Preparatory Steps

1. Please note: Maintenance Planner will support you in some of the following activities, so a manual/separate download is not required for alle elements.
2. Download the latest SWPM package.
3. Download the required installation media.
4. Read the corresponding installation guides.
5. Read all the required SAP Notes as listed in the installation guides.
6. Install or update SAP front end components, such as SAP GUI for Windows.
7. Perform a prerequisite check to see whether the necessary hardware and software requirements are fulfilled.

Installation Media Download

To perform an installation of an SAP system, you need the right media. The Maintenance Planner helps you to calculate this media. The following slides show a maintenance transaction for a new SAP system. In this example, the media for the SAP S/4HANA Server system S4X is calculated.

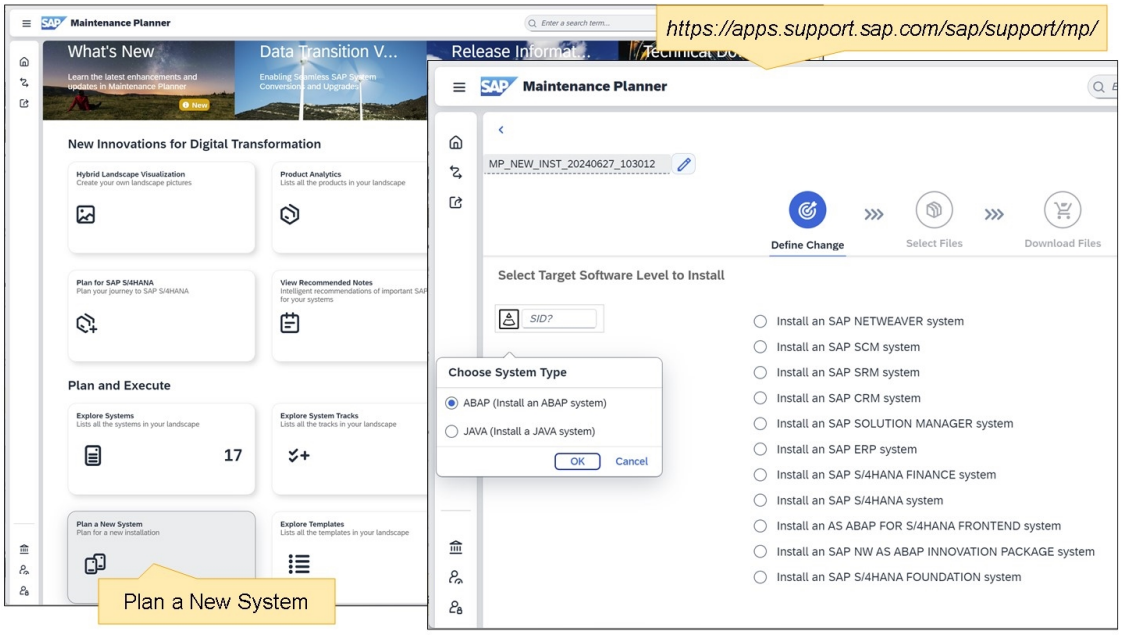

Figure 242: Start Maintenance Transaction

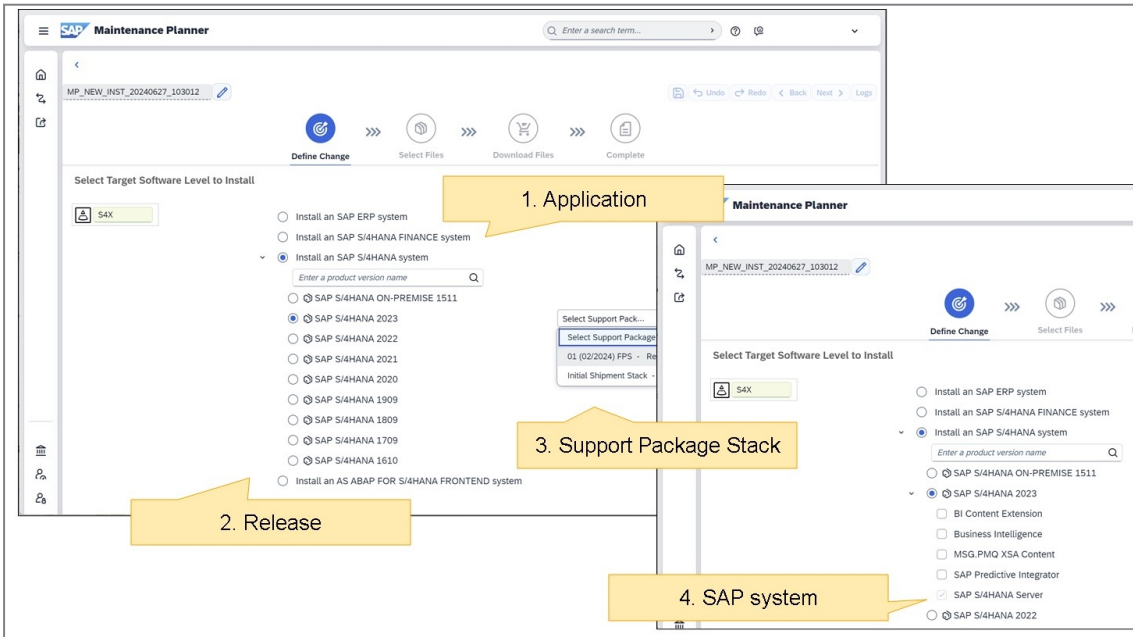

Figure 243: Select SAP System to Install

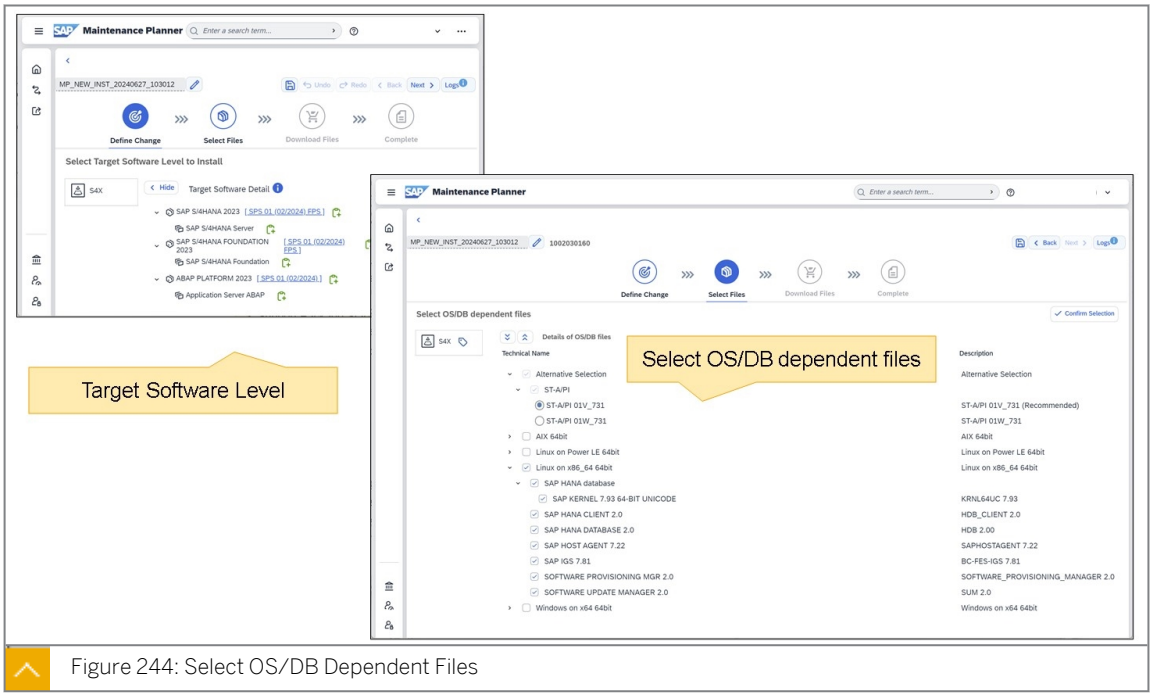

Figure 244: Select OS/DB Dependent Files

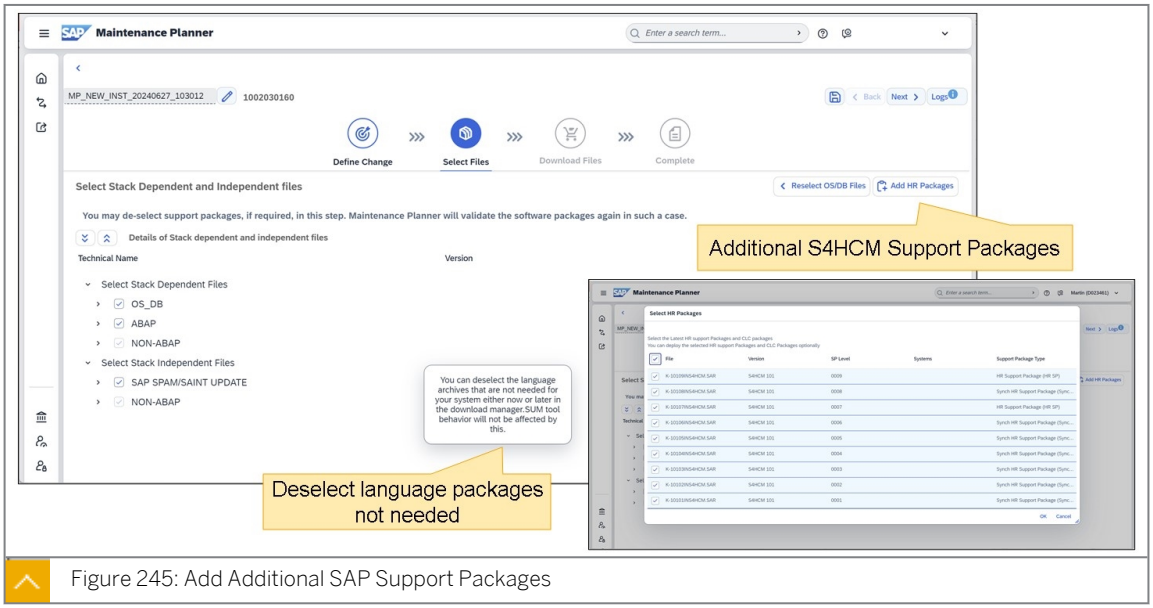

Figure 245: Add Additional SAP Support Packages

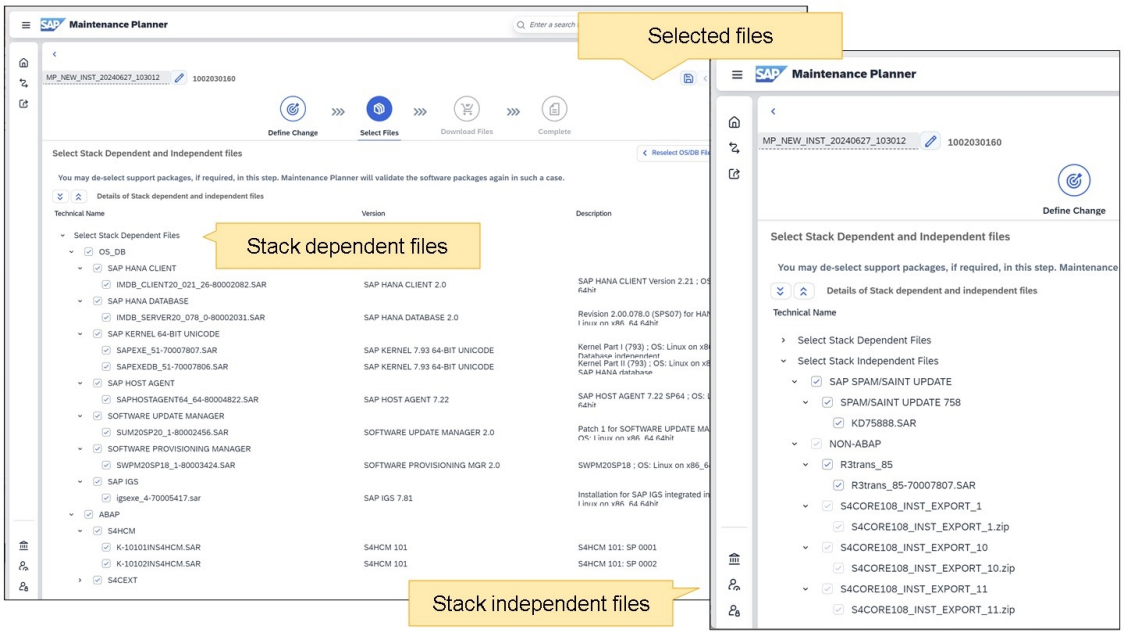

Figure 246: Check and Optionally Change Selected Files

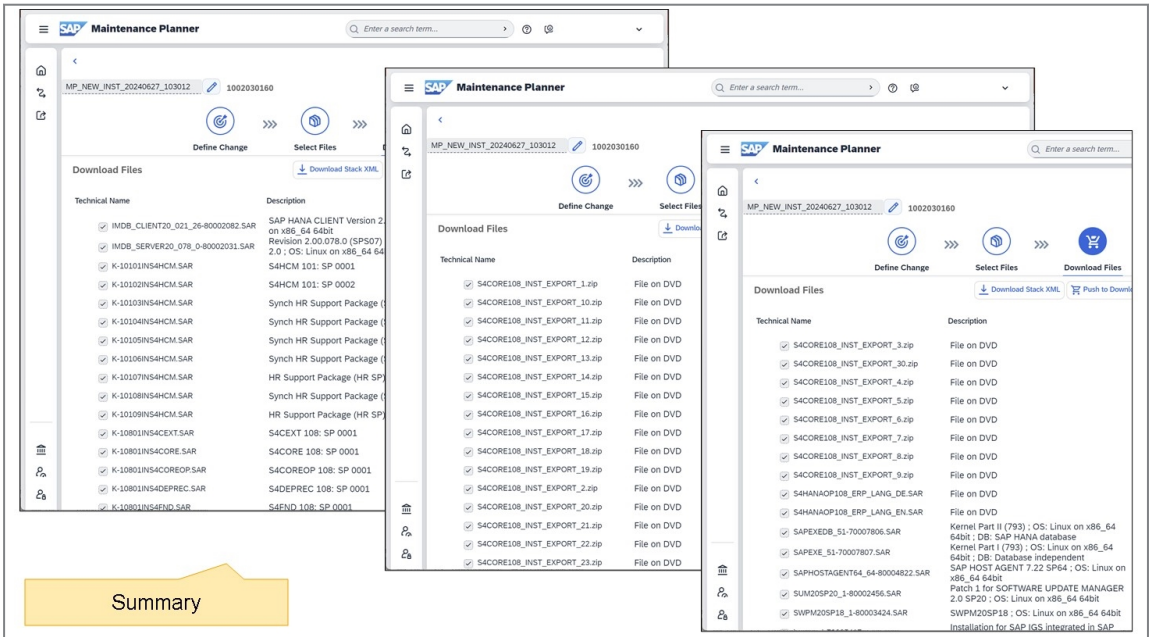

Figure 247: Check Summary of Calculated Files

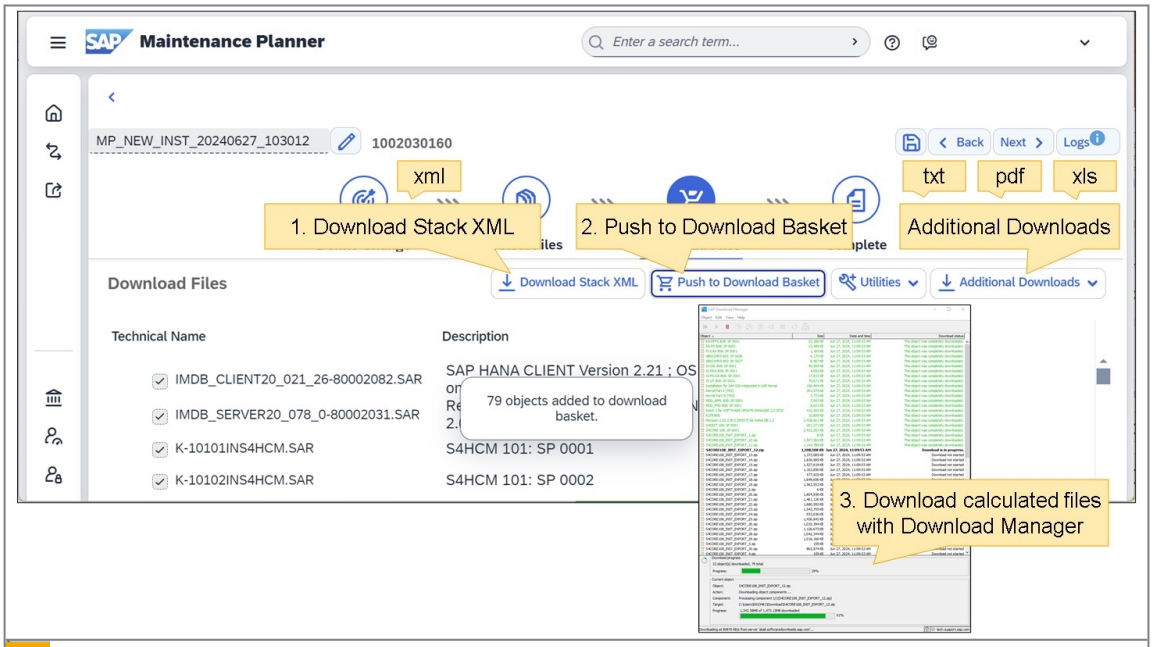

Figure 248: Download Stack XML File and Files for Installation

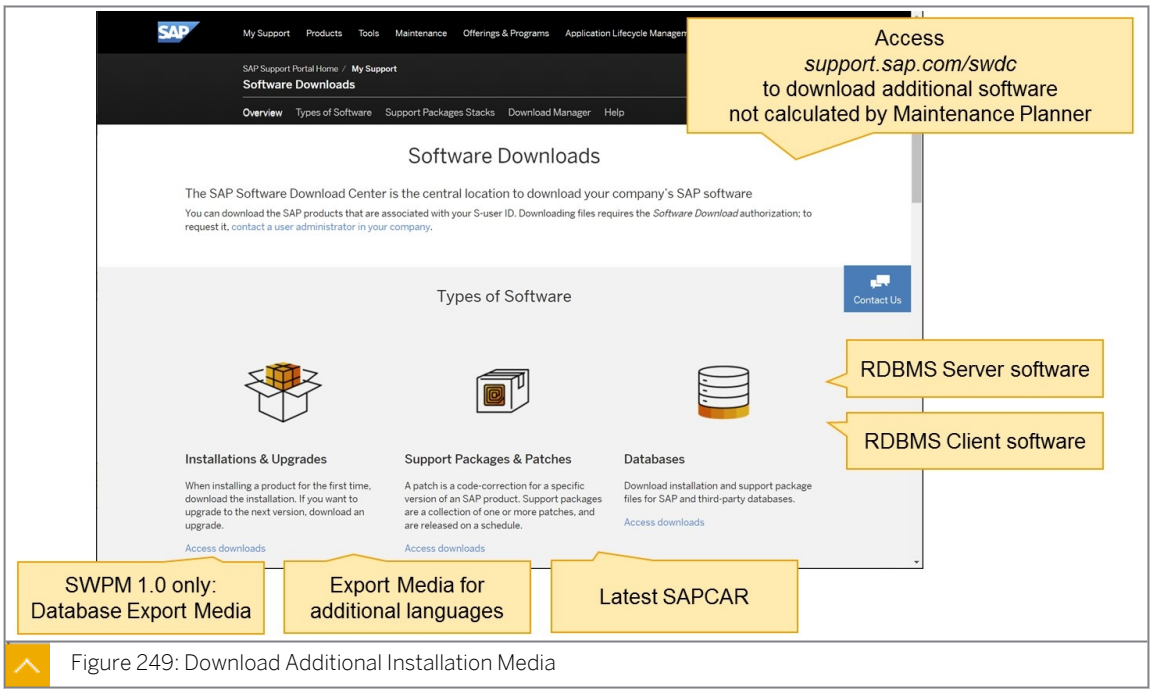

Figure 249: Download Additional Installation Media

The figure shows the location from where additional installation media can be downloaded.

The following objects will be provided by the Maintenance Planner:

- Stack-XML file
- SWPM and SUM
- Latest SAP Host Agent
- Latest Kernel

- SPAM/SAINT Update
- Database Backup files for products installed with SWPM 2.0
- RDBMS server software for products installed with SWPM 2.0
- RDBMS client software for products installed with SWPM 2.0
- Media for additional languages for products installed with SWPM 2.0
- Support Packages of Feature Package/Support Package Stack

The following objects need to be downloaded manually, most from Software Download Center (SWDC):

- Latest SAPCAR
- RDBMS server software for products installed with SWPM 1.0
- RDBMS client software for products installed with SWPM 1.0
- Database Export Media for products installed with SWPM 1.0
- Media for additional languages for products installed with SWPM 1.0
- Installation and Update Guides (SUM Guides) can be found at https://support.sap.com/sltoolset

Installation Guides and SAP Notes

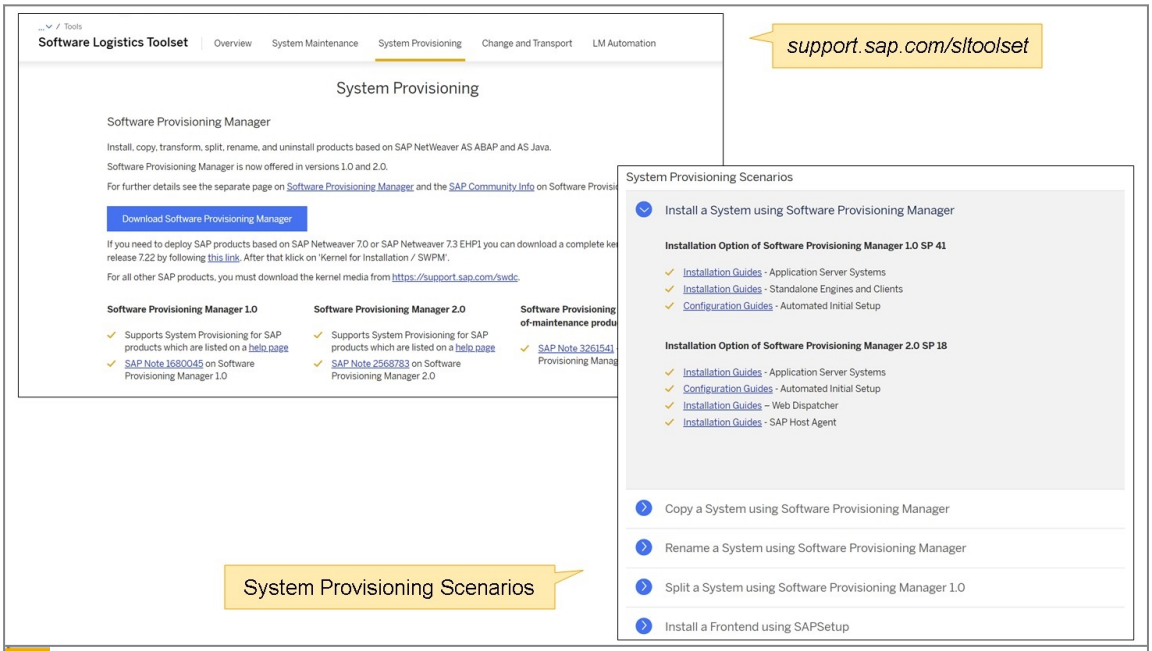

Figure 250: Read the Installation Guides

Before performing each installation, read the corresponding installation guide for your specific combination of operating system and database.

Keep the installation guide ready during the installation, so that you can follow each successive step of the installation procedure.

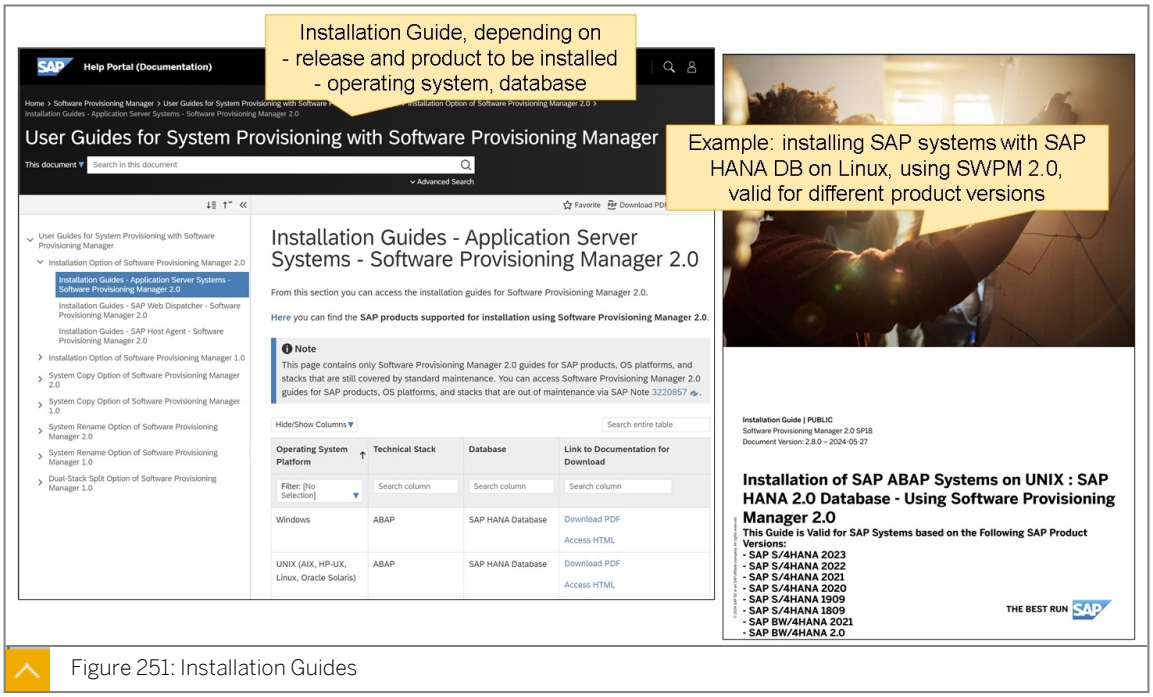

Figure 251: Installation Guides

SAP Notes

Read the current version of all relevant SAP Notes. These SAP Notes contain additional information that is required when performing an installation.

Read only the SAP Notes relevant for your specific installation. To avoid known problems, read the SAP Notes before beginning an installation.

Make sure that you have all the relevant SAP Notes available during the installation so that you can solve potential problems that may occur.

SAP Front End Software

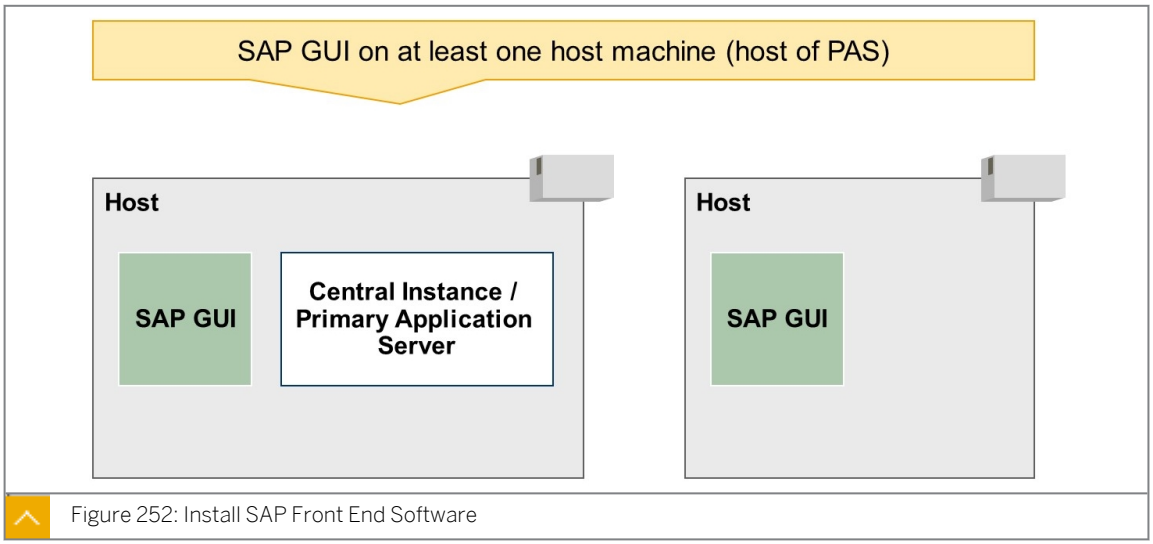

Figure 252: Install SAP Front End Software

To simplify SAP system administration, SAP recommends that you install the software on the host on which you start the installation of your SAP system.

Note:
For information on installing the front end software, refer to the following documentation:

- SAP front-end installation guide (English version)
- SAP Frontend Installationsleitfaden (German version)

Availability of Installation Media

The master guide lists the installation media you need for installation in the *Media Information* section. The installation guide lists the installation media you need for installation in the chapter, *Preparation*.

Download all the required installation media and make them available to the host where the SAP system is to be installed. Find more information on the required media within the installation guides.

LESSON SUMMARY
You should now be able to:

- Perform the general preparation steps required to install an SAP system

Unit 11
Lesson 4

Preparing the OS for an Installation of an SAP System

LESSON OVERVIEW

This lesson discusses the preparation steps that you need to perform in addition to the general preparation steps to install an SAP system on a Windows operating system.

LESSON OBJECTIVES

After completing this lesson, you will be able to:

- Prepare the OS for an Installation of an SAP System

Preparation Activities on the OS

Operating system-independent preparation steps

You should use the prerequisite checker tool to check the hardware and software requirements for your operating system and the SAP instances.

The prerequisite checker tool provides information about the requirements that you need to meet before you start the installation; for example, it checks the requirements for the various installation services. At the completion of the prerequisite check, a report displays the result of each check, the severity of issues, and links to more detailed information. The following figure *Results of Prerequisite Check - Page / Swap* shows a sample of the results report.

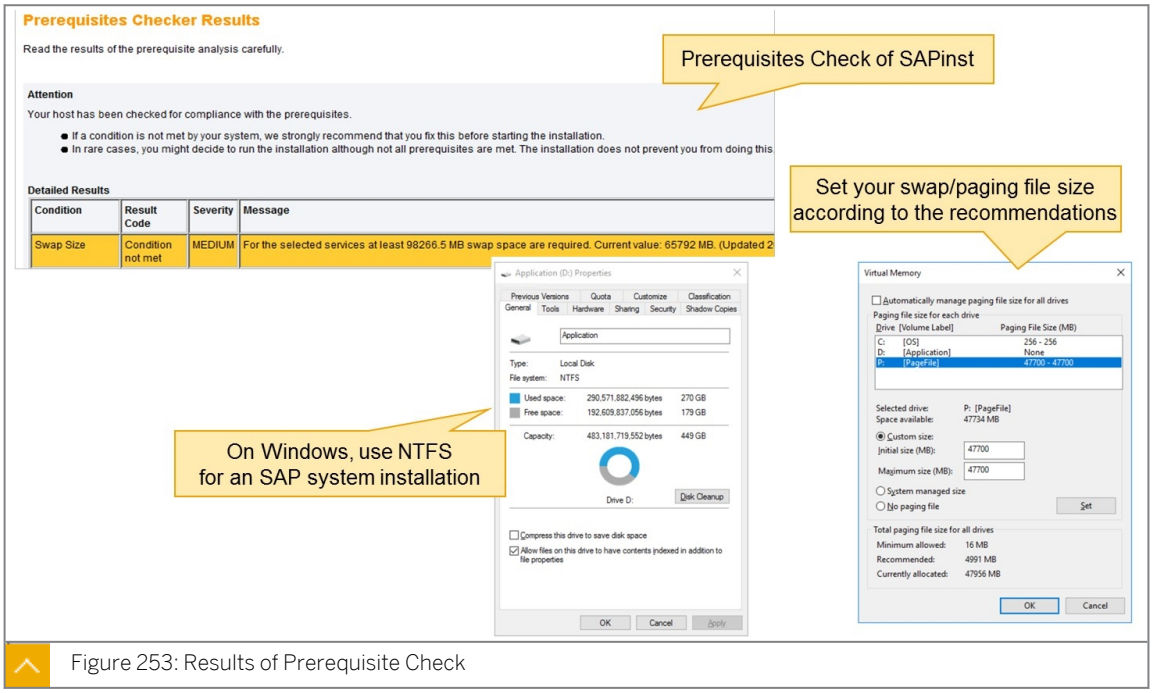

Figure 253: Results of Prerequisite Check

When you install an SAP system, you must first prepare the operating system.

OS-specific Preparations

- Check file system free space
- Prepare installation user

Set the paging/swap file size according to the recommendations of the installation guides and the Prerequisite Check tool.

Windows-specific preparation steps

Domain or Local Installation

You can decide whether you want to install your SAP system on the hosts locally or using a Windows domain. SAP recommends that you install your SAP system using a domain.

For a domain installation, SAP recommends that all SAP systems and database hosts are members of a single Windows domain. This recommendation is valid for all SAP system setups, whether standalone central systems or distributed systems. In the single Windows domain model, the SAP system and the user accounts are included in a single Windows domain.

Caution:
You cannot create local users and groups on the host that is used as a domain controller. Therefore, SAP does not support running an SAP instance (including the database instance) on the host where the Domain Name Server (DNS) service is installed.

For performance and security reasons, ensure that you do not run an SAP instance (including the database instance) on the host where the domain controller is running. SAP does not support an SAP system installation on a domain controller.

If you want to transport objects between different SAP systems using the Change and Transport System (CTS), ensure that all SAP systems are either members of a single domain or members of different domains with a trust relationship established between them. Only SAP application and SAP database servers, and no other software, should be members of the domains.

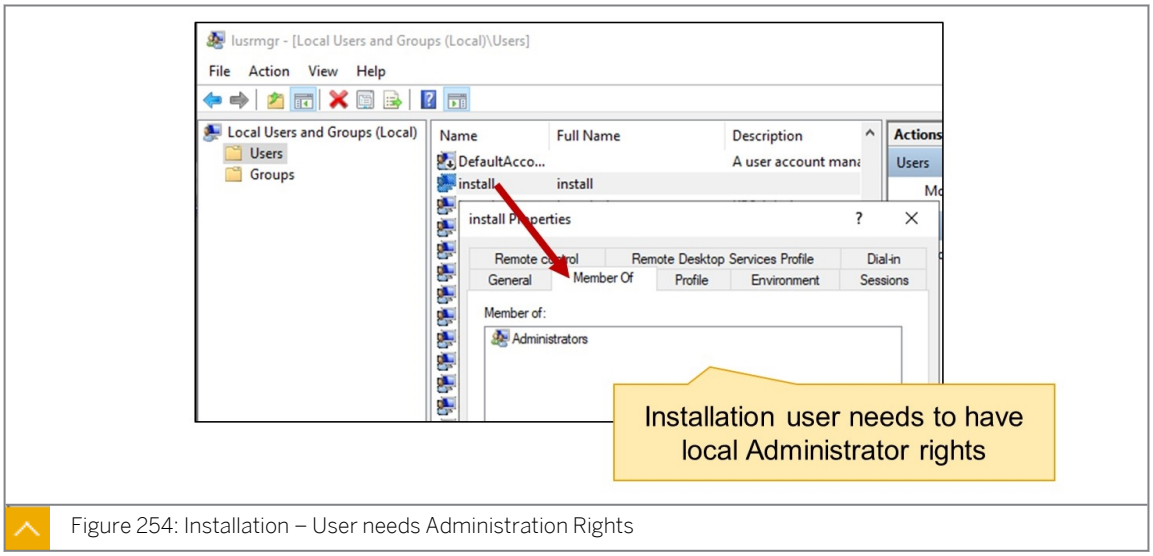

Figure 254: Installation – User needs Administration Rights

For a local installation, the installation user needs local administration rights. For a domain installation, the installation user needs domain administration rights.

For a local installation, you need an installation user who is a member of the local administrators group.

When you perform a domain installation, you must be a domain administrator. However, you can perform a domain installation even with local administration rights. In this case, the domain administrator has to make additional preparations. Refer to the installation guide for a detailed description of these preparations.

Caution:
Do not use the user <sid>adm for the installation of the SAP system.

Transport Host on Windows

The transport host has a directory structure that the SAP transport system uses to store transport and metadata. The SAP transport system stores the change information such as ABAP programs, data of dictionary data, customizing data, and SAP Support Packages from SAP Support Portal, in files that are located in transport directory structure. If you do not want to use the directory structure of the SAP system that you are going to install, prepare a directory structure on the transport host.

Prepare one host for the role of a transport host. This host controls the import or export of files between the current SAP system and other SAP systems, such as a test or production system.

The global transport directory `\usr\sap\<name of the transport directory>` is used by the Change and Transport System (CTS). The CTS helps you to organize development projects in the ABAP Workbench and in customizing, and then transport the changes between the SAP systems in your SAP system landscape.

In the case that the Primary Application Server does not reside on the server that you want to use as the transport host, you must create the transport directory structure (including shares), manually.

1. To prepare the transport directory:

- If you install the first SAP system of the SAP system landscape, for example, the development system, you can use the installed file system structure on the host of the PAS instance of this SAP system.
- If the directory structure already exists, set up its security to allow the new SAP system to write into it.
- If the directory structure does not exist, create the core directory structure and a share to export it for other hosts as well as setting the security on it.

2. On the transport host, create the directory `\usr\sap\<name of the transport directory>`
3. Grant full control permission of the directory to <SID>adm and additionally, on Windows, to SAPService<SID>.
4. Share the `\usr\sap` directory on the transport host as *sapmnt*. This enables SAPinst to address the transport directory in the standard way as

   `\\SAPTRANSHOST\sapmnt\<name of the transport directory>`.

Note:
The control permissions are only necessary while installing SAPinst. Remove them after you have finished the installation. After the installation, you only have to grant full control on this directory to the `SAP_<SAPSID>_GlobalAdmin` groups of all the systems that are a part of your transport infrastructure. SAPinst assigns the appropriate rights with the help of an additional `SAP_<SAPSID>_LocalAdmin group`.

As of Release SAP NetWeaver 7.0, the structure of the Windows file system for the SAP system kernel has undergone minor changes.

Note:
For more information, see SAP Note 919046 - Upgrade to the New Instance-Specific Directory Structure.

Before you install an SAP system on Windows, perform the tasks in the following checklist.

Table 4: Checklist for Installing SAP Systems on Windows

YES or NO	Tasks
	Read installation guides
	Read SAP Notes
	Set up installation host
	Install SAP GUI software
	Store installation media on the host
	File system is NTFS
	User has admin rights

YES or NO	Tasks
	Perform prerequisites check

Linux/UNIX-specific preparation steps

For some Linux/UNIX operating system (OS) and database system combinations, you must modify the Linux/UNIX kernel parameters. You can find the information corresponding to your operating system in the installation guide. If you do not want SAPinst to create operating system users, groups, and services, you can create them before the installation.

Using Global Accounts Configured on a Separate Host

- Start SAPinst and choose *Generic Options* → *<Database>* → *Preparations* → *Operating System Users and Groups*.
- Create operating system users and groups manually.

Note:
For more information about which users to create and how, see the installation guide.

Hint:
If you install a distributed system and use the user account of the local operating system instead of the central user management (for example, NIS), <sid>adm and the user of the database host operating system must have the same password on all hosts.

Network Information Services (NIS)

If you use NIS, distribute users over the network.

SAPinst checks all the required users, groups, and services on the local machine. If you manage users, groups, and services across the network in your company, create the user and group NIS entries before running SAPinst.

SAPinst checks whether the required services are available on the host and creates them if necessary. See the log notifications about the service entries and adapt the network-wide NIS entries accordingly. SAPinst checks the NIS users, groups, and services using NIS commands. However, SAPinst does not change NIS configurations.

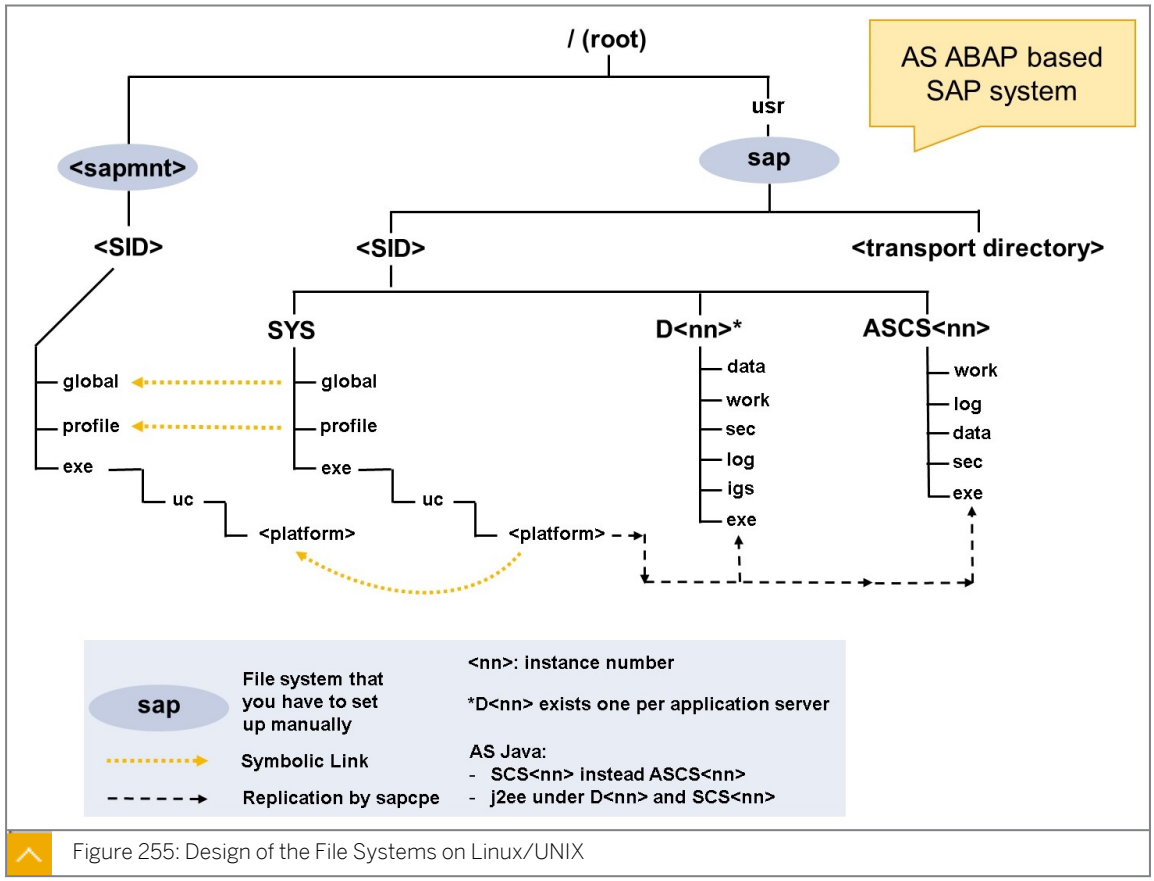

Figure 255: Design of the File Systems on Linux/UNIX

During the installation process, set up the file systems and raw devices for the SAP system and database. Manually set up the file systems as shown in the previous figure. SAPinst does the rest of the set up during the installation process. If you do not set up any file system on your installation host, SAPinst creates all directories in the root directory (/). SAPinst prompts you only for directory <sapmnt> during the installation.

The file system starting from ASCS<nn> is from the Central Services instance of an AS ABAP-based SAP system.

For the space required by various file systems, refer to the installation guide. The processes of creating and mounting file systems and creating raw devices for an SAP system and for different databases are described in the installation guide.

Note:
Depending on the database you choose, you have to set up additional file systems for the database.

Note:
For systems based on SAP NetWeaver AS 7.10 and above, the kernel file system structure for UNIX is adjusted so that it is the same as for Windows. This means that `.../SYS/exe/<codepage>/<platform>` folder replaces `.../SYS/exe/run` folder, where <codepage> stands for nuc or uc, depending on whether it is a non-Unicode or Unicode kernel. Here <platform> specifies the operating system platform, for example, linuxx86_64.

In your SAP system landscape, a global transport directory is required for all SAP systems. If a global transport directory already exists, confirm that it is exported on the global transport directory host and mount it on the SAP system installation host.

If a global transport directory does not exist, proceed as follows:

1. Create the transport directory (either on the central instance host or a file server).
2. Export the transport directory on the global transport directory host.
3. If you did not create the transport directory on your SAP instance installation host, mount it there.

The tasks that you must perform before you install and SAP system on UNIX are listed in the following table.

Table 5: Checklist for a UNIX Installation

YES or NO	Tasks
	Read installation guides
	Read SAP Notes
	Set up installation host
	Install SAP GUI software
	Store installation media on the host
	Optional: Create users
	Set and check UNIX kernel parameters
	Set up file system
	Perform prerequisites check

LESSON SUMMARY
You should now be able to:

- Prepare the OS for an Installation of an SAP System

Learning Assessment

1. What is the tool inside SWPM for an installation?

   Choose the correct answer.

   - ☐ A R3load
   - ☐ B SAPup
   - ☐ C SAPinst

2. Which file records all the notifications of every installation step?

   Choose the correct answer.

   - ☐ A `sapinst.log`
   - ☐ B `dialog.xml`
   - ☐ C `sapinst_dev.log`
   - ☐ D `packages.xml`

3. Using the browser-based interface of SAPinst you can directly access important log files created during the installation process. Decide if true or false.

   Determine whether this statement is true or false.

   - ☐ True
   - ☐ False

4. Before starting the installation of an SAP system, consider the following information source:

   Choose the correct answer.

   - ☐ A Conversion Guide
   - ☐ B Installation Guide
   - ☐ C SUM guide

5. Which characteristics help you to identify the exact installation guide document that you should use during the installation process?

   Choose the correct answers.

   - [ ] A Release of the SAP software to be installed
   - [ ] B Operating system that will be used
   - [ ] C Database Software that will be used
   - [ ] D Hardware Type that will be used
   - [ ] E Virtualization Technique that will be used

6. Which of the following Windows-specific preparations are performed when installing an SAP system on a Windows operating system?

   Choose the correct answers.

   - [ ] A Check Windows file system
   - [ ] B Prepare installation user
   - [ ] C Create the user group “Administrators”

7. Which condition does the user used for installing an SAP system on Windows need to fulfill?

   Choose the correct answer.

   - [ ] A Needs to be named SapServicesSID (SID being replaced by the chosen SID of the system to be installed
   - [ ] B Needs to be named sapSID (SID being replaced by the chosen SID of the system to be installed)
   - [ ] C Needs to have local administrator rights
   - [ ] D Needs to be named Install

8. Which file system paths can you find in an AS ABAP 7.5 (or higher) - based SAP system on Unix, right after a standard installation? (SID being replaced by the chosen SID of the system to be installed)

   Choose the correct answers.

   - [ ] A /usr/sap/trans
   - [ ] B /usr/sap/SID/SYS
   - [ ] C /usr/sap/SID/DVEBMGS
   - [ ] D /usr/sap/SID/SCS

Learning Assessment - Answers

1. What is the tool inside SWPM for an installation?

   Choose the correct answer.

   ☐ A R3load

   ☐ B SAPup

   ☒ C SAPinst

   You are correct! SAPinst is the tool inside SWPM. Read more on this in the lesson Installing an SAP System Using Software Provisioning Manager (SWPM) of the course ADM110.

2. Which file records all the notifications of every installation step?

   Choose the correct answer.

   ☐ A `sapinst.log`

   ☐ B `dialog.xml`

   ☒ C `sapinst_dev.log`

   ☐ D `packages.xml`

   You are correct! The `sapinst_dev.log` records all the notifications of every installation step. Read more on this in lesson Installing an SAP System Using SAPinst of the course ADM110.

3. Using the browser-based interface of SAPinst you can directly access important log files created during the installation process. Decide if true or false.

   Determine whether this statement is true or false.

   ☒ True

   ☐ False

   You are correct! The browser-based interface of SAPinst allows access to important log files written during the installation process. Read more on this in the lesson Installing an SAP system Using SAPinst of the course ADM110.

4. Before starting the installation of an SAP system, consider the following information source:

   Choose the correct answer.

   - [ ] A Conversion Guide
   - [x] B Installation Guide
   - [ ] C SUM guide

   You are correct! Before starting the installation of an SAP system, consider the Installation Guide as an information source. Read more on this in the lesson Preparing for the Installation of the course ADM110.

5. Which characteristics help you to identify the exact installation guide document that you should use during the installation process?

   Choose the correct answers.

   - [x] A Release of the SAP software to be installed
   - [x] B Operating system that will be used
   - [x] C Database Software that will be used
   - [ ] D Hardware Type that will be used
   - [ ] E Virtualization Technique that will be used

   You are correct! Besides release of the SAP software to be installed, the operating system to be used and the database software to be used, the type of SAP software (AS ABAP-based or AS Java-based) plays a role in identifying the fitting installation guide. The hardware type and the virtualization technique used are not selection criteria when searching for the correct installation guide document. Read more on this in the lesson Preparing for the Installation of the course ADM110.

6. Which of the following Windows-specific preparations are performed when installing an SAP system on a Windows operating system?

   Choose the correct answers.

   - [x] A Check Windows file system
   - [x] B Prepare installation user
   - [ ] C Create the user group “Administrators”

   You are correct! The Windows-specific preparations which are performed when installing an SAP system on a Windows operating system are Check Windows file system and Prepare installation user. Read more on this in the lesson Preparing the OS for an Installation of an SAP System of the course ADM110.

7. Which condition does the user used for installing an SAP system on Windows need to fulfill?

   Choose the correct answer.

   ☐ A Needs to be named SapServicesSID (SID being replaced by the chosen SID of the system to be installed

   ☐ B Needs to be named sapSID (SID being replaced by the chosen SID of the system to be installed)

   ☒ C Needs to have local administrator rights

   ☐ D Needs to be named Install

   You are correct! The user used for installing an SAP system on Windows needs to have local administrator rights. The name can be chosen freely with the exception of the names SAPServiceSID and sapSID (SID being replaced by the chosen SID of the system to be installed). Read more on this in the lesson Preparing the OS for an Installation of an SAP System of the course ADM110.

8. Which file system paths can you find in an AS ABAP 7.5 (or higher) - based SAP system on Unix, right after a standard installation? (SID being replaced by the chosen SID of the system to be installed)

   Choose the correct answers.

   ☒ A /usr/sap/trans

   ☒ B /usr/sap/SID/SYS

   ☐ C /usr/sap/SID/DVEBMGS

   ☐ D /usr/sap/SID/SCS

   You are correct! The directories /usr/sap/trans and /usr/sap/SID/SYS will be created by the installer when installing an AS ABAP 7.5 (or higher) -based SAP system on Unix, whereas the directory name /usr/sap/SID/DVEBMGS is incomplete (instance number missing) and is no longer used when installing AS ABAP 7.5 (or higher) and the directory /usr/sap/SID/SCS will only be created when installing an AS Java-based SAP system. Read more on this in the lesson Preparing for the Installation of an SAP System on UNIX of the course ADM110.

UNIT 12

Managing an Enqueue Replication Server (ERS)

Lesson 1

UNIT OBJECTIVES

- Manage an Enqueue Replication Server (ERS)

Unit 12
Lesson 1

Managing an Enqueue Replication Server (ERS)

LESSON OVERVIEW
This lesson explains how to manage an Enqueue Replication Server (ERS).

LESSON OBJECTIVES
After completing this lesson, you will be able to:

- Manage an Enqueue Replication Server (ERS)

Overview Enqueue Replication Server

In older SAP releases, AS ABAP-based SAP systems were installed with an enqueue as work process of the Primary Application Server, also called Central Instance. Starting with AS ABAP 7.00 it was possible to set up an AS ABAP-based SAP system with a stand-alone enqueue services, as part of the central service instance (ASCS). Starting from AS ABAP 7.03 the ASCS was the default installation options for new SAP systems. Starting from AS ABAP 7.50 there are no SAP systems supported any longer without ASCS, which have more than one application server. As of AS ABAP 7.51 the ASCS is mandatory in any case.

AS Java-based SAP systems are always installed with a central service instance (SCS).

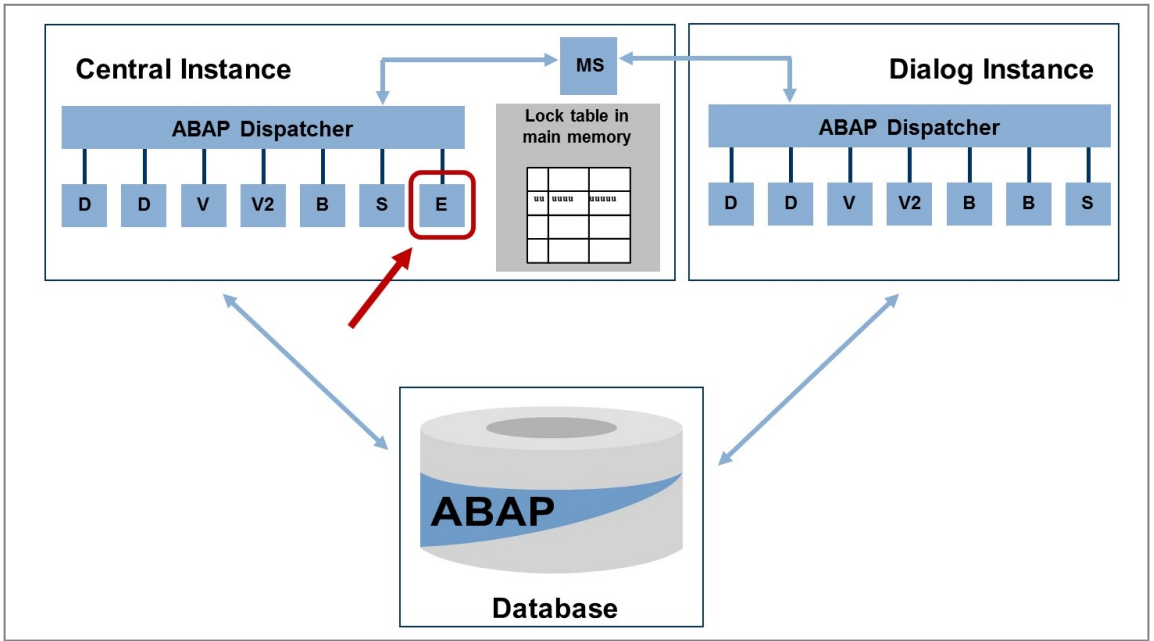

Figure 256: SAP System without ASCS

Using the classical setup without ASCS there are some single points of failure (SPOF):

- The SAP Message Server can be restarted quite fast. As long as it is not available, there is no communication possible between the application servers, but there is no loss of critical data.
- The PAS (or: central instance) is a SPOF, because it contains the enqueue service. The enqueue service contains the critical lock data in main memory. If the enqueue service fails, the lock data is lost. All transactions holding locks have to be reset.

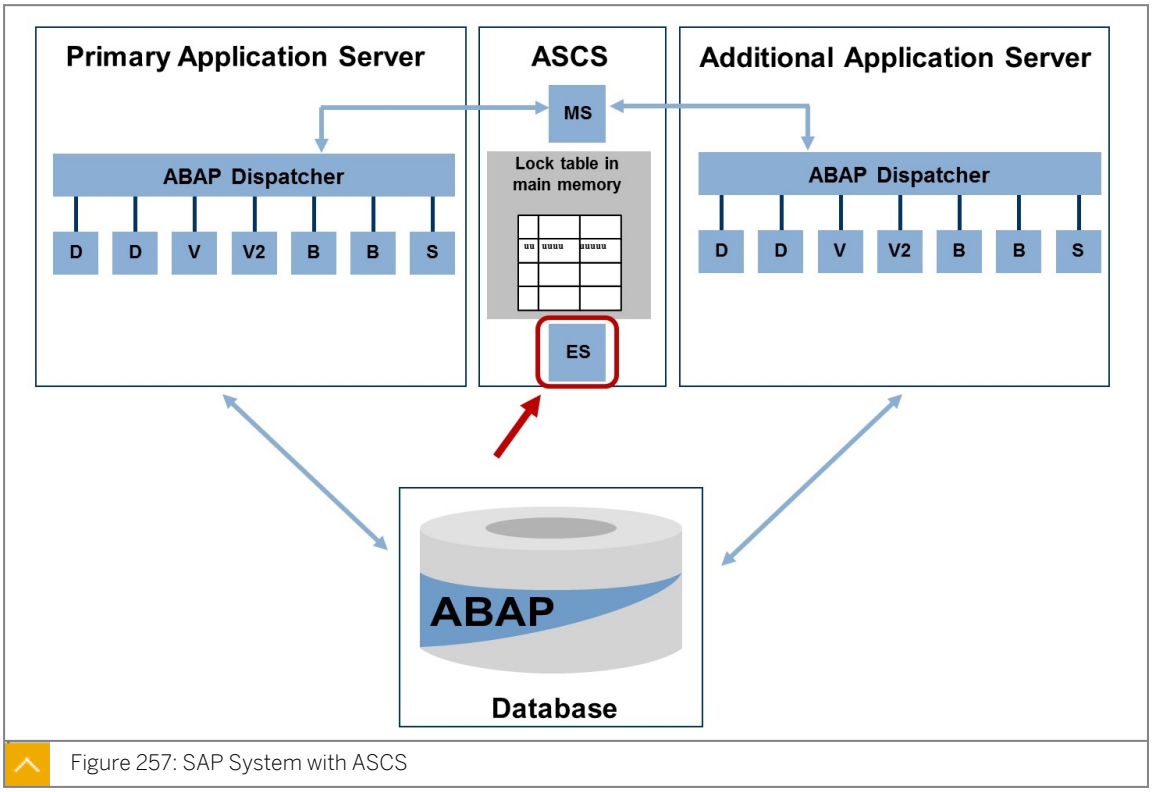

Figure 257: SAP System with ASCS

There are some advantage of a stand-alone enqueue service, as part of the ASCS:

- The communication between the enqueue clients (application servers) and the enqueue server is not established via the corresponding dispatcher any longer, but directly. There is a direct TCP connection between the work process and the enqueue server.
- An ASCS is a prerequisite to make the stand-alone enqueue server high available by using an Enqueue Replication Server (ERS). This can be combined with a suitable cluster software.

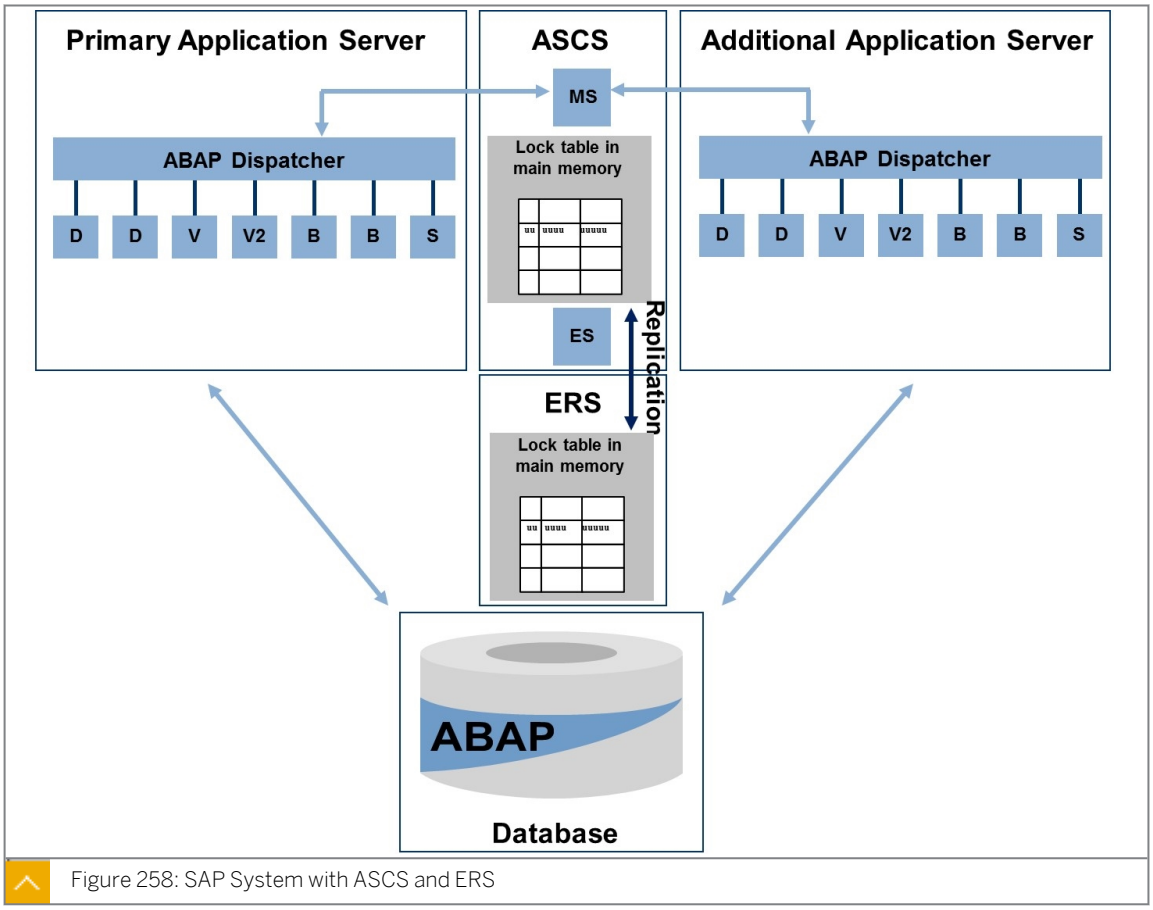

Figure 258: SAP System with ASCS and ERS

When using an ERS, each change of the lock table of the enqueue service is replicated to the ERS. The answer to the requesting enqueue client (the work process) is processed, as soon as the replication is successfully.

The multi threaded architecture of the stand-alone enqueue server allows parallel processing and synchronization with the ERS. The throughput is higher than with a classical set up, using a dispatcher with enqueue work process.

Each work process is connected with the stand-alone enqueue server. The enqueue server is connected with the ERS.

The stand-alone enqueue server communicates vie port *sapdp<nn>* with its clients. *<nn>* is the instance number of the ASCS. Because application servers running on the same host communicate using this port, also, the ASCS needs its own instance number.

Communication Between Enqueue Server and ERS

The enqueue server opens port *enq/replicatorport* to wait for the connection of the ERS.

- If the stand-alone enqueue server fails, it is restarted by the HA software on the host of the ERS and copies the replication table in main memory from the ERS in order to rebuild its lock table. In other words: the enqueue server follows the ERS.
- If the ERS fails, it can be restarted on a different host. the ERS can copy the entire lock table from the stand-alone enqueue server. During normal run the ERS only receives the delta information from the stand-alone enqueue server.

Configuration of the ERS

Before using the ERS, it has to be installed and configured. The following road map shows the essential steps for installation, configuration and usage of the ERS:

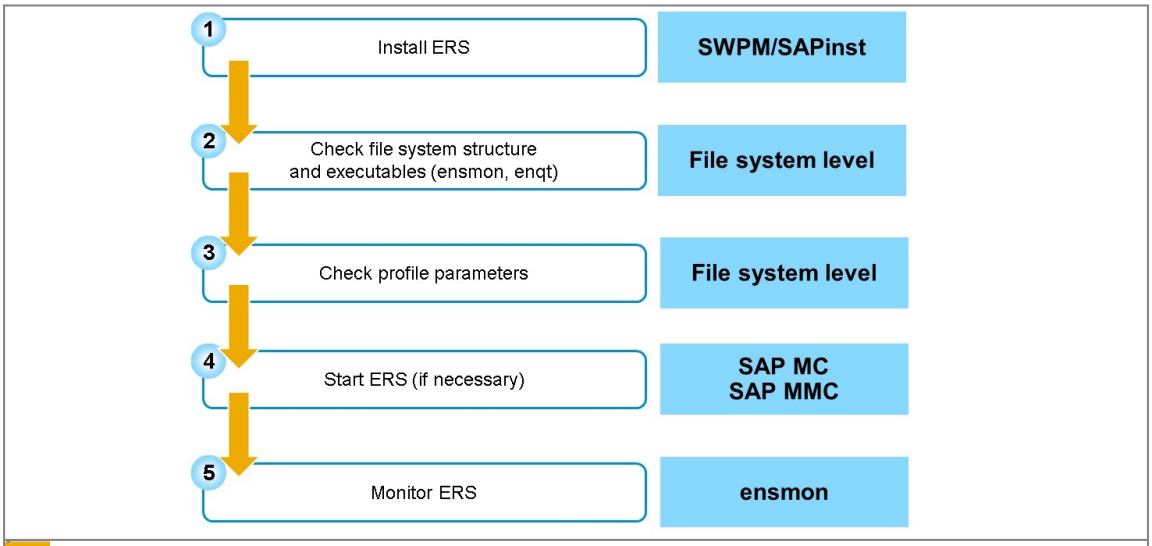

Figure 259: Installing and Configuring ERS

Installation

Before installing an ERS, the SAP system must be set up with an ASCS. If the SAP systems is was not installed with an ASCS, you can split off the ASCS, using SWPM (SAPinst). Now the ERS can be installed using SWPM (SAPinst). Use the menu options *Additional SAP System Instances* in the corresponding section.

File system structure

The ERS is been installed in the */usr/sap/<SID>/ERS<nn>* directory. Subdirectory *exe* contains programs that can check the correctness of replication (*ensmon*) and can view the lock table (*engf*).

Profile parameters

The parameters concerning the stand-alone enqueue server are also relevant when not using the ERS.

Profile parameter *enqueue/table_size* defines the size of the lock table, default is 262144 (= 262 MB).

Table 6: Important Profile Parameters for ERS

Profile	*Parameter*	*Value*
Instance profile of ASCS	enq/server/replication/ enable	true
Default profile of application servers	enq/replicatorhost	in this course: s4xhost
Default profile of application servers	enq/replicatorinst	in this course: 19

Start and stop

The ASCS and ERS can be started and stopped using the SAP MC or the SAP MMC. The ERS has to be stated before starting the ASCS. The ASCS has to be stopped before stopping the ERS.

Monitoring

The enqueue server and the ERS can be monitored using *ensmon*. *ensmon* connects with the enqueue server. The host name of the enqueue server has to be specified either by providing *pf=<profile>* or with the options *–H <host name>* and *–I <instance number>*. Type *ensmon –help* for help options.

The ERS is monitored by either the SAP start service or the HA software that monitors the enqueue server and ERS in the HA cluster.

The lock table of the ERS can be monitored using *enqt* by starting the program on the host of the ERS.

Log file *dev_enqsrv* is written when starting the enqueue server. Problems with the enqueue processing itself an written to file *dev_enqwork*. Files *dev_enqio_** contain the communication with the enqueue clients. The ERS writes file *dev_enrepsrv*.

LESSON SUMMARY

You should now be able to:

- Manage an Enqueue Replication Server (ERS)

Learning Assessment

1. An ASCS is a prerequisite for an ERS.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

2. You installed an Enqueue Replication Server (ERS) for your SAP system. It is recommended that you configure a dynamic work process of type E (Enqueue) as a fallback safeguard against a failure of the ERS.

   Determine whether this statement is true or false.

   ☐ True

   ☐ False

Learning Assessment - Answers

1. An ASCS is a prerequisite for an ERS.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! An ASCS is a prerequisite for an ERS. Read more on this in the lesson Managing an Enqueue Replication Server (ERS) of the course ADM110.

2. You installed an Enqueue Replication Server (ERS) for your SAP system. It is recommended that you configure a dynamic work process of type E (Enqueue) as a fallback safeguard against a failure of the ERS.

   Determine whether this statement is true or false.

   [ ] True

   [X] False

   You are correct! In AS ABAP-based SAP systems using an ERS, you are not allowed to use enqueue work processes at any time. Read more on this in the lesson Managing an Enqueue Replication Server (ERS) of the course ADM110.