As you see in the figure above, the first import step *DDIC* is processed for transport requests where it is required (DEVK900827, DEVK900840 and DEVK900865); then the *ACTIV* step (for the same transport requests); then the *MAIN I* step for all transport requests; and so on.

The `tp import all` command does **not** process all steps for one transport request before moving on to the steps for the next transport request. For example, if you detect an error in a program that has already been exported, you will need to correct the program and release the corresponding transport request again. *Import all requests* then will import the transport requests of the whole transport buffer in the correct sequence and the faulty program will be overwritten. Because the generation step is the last step and is performed only once for all programs in the requests, the faulty program does not affect your production system. Only the correct version of the program will be generated.

Figure 120: Steps during Import

There are four major steps when importing transport requests:

1. Importing dictionary objects
2. Handling of dictionary objects
3. Importing “everything else”
4. Handling of “everything else”

These steps in the import process are in detail:

DDIC: ABAP Dictionary import

- In an import with *R3trans*, all ABAP Dictionary structural data is imported inactively, thus enabling you to import into an active SAP system.
- Log file: *<source SID>H9<number>.<target SID>*
- transport tool: *R3trans*

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ACTIV: ABAP Dictionary activation

- Runtime descriptions (nametabs) are generated. This is the begin of the downtime.
- Log file: *<source SID>A9<number>.<target SID>*
- transport tool: *RDDMASGL*

ACTIV: ABAP Dictionary distribution

- After activation and running logical checks for the new dictionary structures, the distribution program decides what actions are required to adopt the object on database level.
- Log file: *DS<date>.<target SID>*
- transport tool: *RDDGENBB*

ACTIV: Structure conversion

- If necessary, changes are made to table structures.
- Log file: *N<date>.<target SID>*
- transport tool: *RDDGENBB*

ACTIV: Move nametabs

- The new ABAP runtime objects are put into the active runtime environment, database structures are adjusted if necessary.
- Log file: *P<date>.<target SID>*
- transport tool: *RDDMNTAB*

MAIN I: Main import

- All other objects are and all data is imported.
- Log file: *<source SID>I9<number>.<target SID>*
- transport tool: *R3trans*

VERSF: Versioning

- Versions of repository objects are only created if *tp* parameter *VERS_AT_IMPORT* is active.
- Log file: *<source SID>V9<number>.<target SID>*
- transport tool: *RDDVERSL*

XPRA: Execution of user-defined activities

- XPRAs are programs the are started during import in the target system. The XPRA object has the same name as the program.
- Log file: *<source SID>R9<number>.<target SID>*
- transport tool: *RDDEXECL*

GENERA: Generation of ABAP programs

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- During this step, the ABAP programs are generated.
- Log file: *<source SID>G9<number>.<target SID>*
- transport tool: *RDDIC03L*

> Note:
> Starting with AS ABAP 7.00 it is possible to import non-ABAP objects using the enhanced Change and Transport System (*enhanced CTS*, formerly known as *CTS +*). In this case an additional deployment step for importing the objects into the non-ABAP system takes place after the main import. The corresponding log file is *<source SID>T9<number>.<target SID>* , the transport tool is *RDDEPLOY*.

Figure 121: Introducing tp and R3trans

R3trans is a transport tool at operating system level used to transport data between SAP systems. *R3trans* is usually called by other programs such as *tp*, the transport control program.

For transports between SAP systems, to access the database, *tp* indirectly calls *R3trans* – by causing UNIX to issue a `fork()`, Windows to issue a `CreateProcess()`, and AS/400 to issue a `spawn()`. During export, *R3trans* stores the object data extracted from the database in data files in the transport subdirectory *data*. The format of these data files, *R3trans* format, is independent of the platform. During import, *R3trans* reuses these data files.

Direct use of *R3trans* is not supported but may be required in exceptional cases. In case of transports, *R3trans* should always be used through *tp*. Import steps differ for the different object types. Further activities may be required in addition to *R3trans* activities. *tp* ensures that all export and import steps, including *R3trans* activities, are completed successfully.

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Upward compatibility: *R3trans* writes data using a standard transport format. Thus you can export data with an old *R3trans* version and import data with a new version of *R3trans*. You can also transport between different databases or operating systems.

> Note:
> Although exports and imports are independent of the *R3trans* version, the database platform, or the operating system, SAP does not support using *tp* or *R3trans* for transports between different SAP system releases.

Figure 122: Import Process: tp and the Import Buffer

The first step of an import process is the *tp* call, triggered by starting an import through TMS or by a *tp import* command at operating system level.

During the whole import process, *tp* reads the transport buffer file that includes all the necessary steps for the specific request.

If you trigger an *tp import all*, *tp* has to ensure that at the beginning of the import process all transport requests stored at this time in the transport buffer are imported. This is done by executing command *tp setstopmark* each time a *tp import all* process is started. After the steps of the import process are completed, the command *tp delstopmark* is performed automatically, and a *tp cleanbuffer* deletes the transport requests from the transport buffer.

After all involved tools have finished their work, *tp* exits to operating system level and writes a return code to the appropriate log file for the activity. For example, *tp import* and *tp setstopmark* commands are recorded in the *ULOG* file.

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> Note:
> The command `tp import` is re-entrant. If an error occurs during import, after you eliminate the error condition and restart *tp*, *tp* finds the correct point to restart.

By default, *tp* aborts if one import phase receives a return code larger than 8. The transport profile parameter *STOPONERROR* defines what return code value should cause *tp* to abort.

Figure 123: Import Process: R3trans

tp reads the transport buffer file that includes all the necessary steps for the specific request and calls *R3trans* at operating system level.

For each import step, *tp* passes information from the transport buffer file to *R3trans*. *R3trans* reads the corresponding data files in the transport subdirectory *data* and connects directly to the database to perform inserts or updates to the included objects. After *R3trans* finishes performing inserts or updates, it passes an exit code to *tp*.

For each transport action, *R3trans* writes a log file in transport subdirectory *tmp*. After *R3trans* completes its work, *tp* moves these log files to the transport subdirectory *log*.

During the import process, *R3trans* is executed by the import steps *ABAP dictionary import* (for the import of ABAP dictionary definitions) and *main import* (for the import of table contents).

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Figure 124: tp SAP System Communication (1)

In addition to the steps performed by *R3trans*, *tp* triggers the so-called import dispatcher. The import dispatcher is a background job with the name *RDDIMPDP* in the SAP system, which performs steps in the import process.

tp and *RDDIMPDP* communicate via table *TRBAT*. For every transport request, *tp* writes an entry in table *TRBAT*. The import function currently being performed for the request is represented by a character.

In the example below, there are three transport requests waiting for DDIC activation in the table *TRBAT*.

Request	Function	Return Code	Timestamp
DEVK904711	J	9999	00000001
DEVK904714	J	9999	00000002
DEVK904718	J	9999	00000003
HEADER	J	B	20163008181000

tp inserts a header entry to request *RDDIMPDP* to start processing. Some activities that are independent of transport requests, such as distribution and structure conversion, only have a header entry in table *TRBAT*. Return code *9999* indicates that the step is waiting to be performed. For the header entry, *tp* inserts a *B* (for begin) as return code.

To trigger the transport daemon *RDDIMPDP* in the SAP System, *tp* uses the operating system level tool *sapevt*.

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Figure 125: tp SAP System Communication (2)

When *RDDIMPDP* is started, it checks the table *TRBAT* to find out if there is an action to be performed for the transport requests such as *mass activation*, *distribution*, or *table conversion*. It sets the header entry to *R* (for run), and starts the appropriate *RDD** program as a background task, reschedules itself, and exits. The activated program (in this example, the mass activator) sets the status of the first entry in *TRBAT* to active (return code *8888*):

Request	Function	Return Code	Timestamp
DEVK904711	J	8888	00000001
DEVK904714	J	9999	00000002
DEVK904718	J	9999	00000003
HEADER	J	R	20163008181000

Each of the required background tasks receives a job number generated by background processing. This job number and the step ID are inserted into table *TRJOB* by the *RDD** jobs.

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Figure 126: tp SAP System Communication (3)

The background tasks write their return codes in table *TRBAT* and delete the corresponding entry in table *TRJOB*. Return codes of *12* or less indicate that the step is finished. In *TRBAT*, the column *TIMESTAMP* contains the finishing time. When all the necessary actions are performed for all transport requests, the header entry is set to *F* (for finished) by the *RDD** jobs.

Request	Function	Return Code	Timestamp
DEVK904711	J	4	00000001
DEVK904714	J	0	00000002
DEVK904718	J	0	00000003
HEADER	J	F	20163008181000

All the background jobs log the performed steps either in the database or in transport subdirectory *tmp*.

tp monitors the entries in table *TRBAT* and table *TRJOB*. When the header entry in table *TRBAT* is set to *F* and table *TRJOB* is empty, *tp* copies the logs of the completed steps from directory *tmp* to directory *log* and deletes the corresponding entries in table *TRBAT*.

If problems are detected by *tp* when monitoring table *TRBAT* and table*TRJOB*, *tp* re-triggers *RDDIMPDP* through *sapevt*. *RDDIMPDP* automatically recognizes if a previous step is still active or was aborted by checking tables *TRJOB* and *TRBAT*. If a step was aborted, *RDDIMPDP* restarts this step.

tp uses the tables *TRBAT* and *TRJOB* to communicate with the various ABAP programs. These ABAP programs run as background processes, there must be at least two background work processes running in the SAP System.

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tp and the background jobs needed for transports communicate using table *TRBAT*, which contains temporary data. *tp* inserts information into *TRBAT* specifying the steps to be performed for a specific request. *tp* then triggers *RDDIMPDP* to read *TRBAT* and to execute the required programs as background jobs whose names start with *RDD*. For example, *RDDMASGL* is for mass activation, *RDDGENBB* for conversion, and *RDDVERSL* for versioning. Each *RDD** job receives a job number that is recorded in table *TRJOB*. The jobs report their current status back to *TRJOB*.

When imports are performed, *tp* triggers the import dispatcher *RDDIMPDP* by sending the event *SAP_TRIGGER_RDDIMPDP* with the help of the tool *sapevt*. In client *000* and each client that is to receive imports, user DDIC must schedule the job *RDDIMDP* with event-based scheduling.

> Hint:
> *RDDIMPDP* can be scheduled by running the ABAP program *RDDNEWPP*.

Normally, *RDDIMPDP* is automatically scheduled after a client copy. To verify if the required import dispatchers are scheduled, check the job overview using transaction `SM37`. The correct name of the import dispatcher for each client is *RDDIMPDP_CLIENT_<###>*, where *<###>* represents the client's name. The corresponding event is *SAP_TRIGGER_RDDIMPDP_CLIENT*.

> Note:
> Starting with AS ABAP 7.00 it is possible to import non-ABAP objects using the enhanced Change and Transport System (*enhanced CTS*, formerly known as *CTS +*). In this case, table TRBATS is used. TRBATS works like TRBAT, but TRBATS includes the SID of the non-ABAP system in its primary key. So it is possible to trigger imports in multiple systems. The AS ABAP based SAP system is used as communication system.

Transport Commands

The transport control program tp is used for controlling transports between SAP systems, applying SAP Support Packages, and for performing release upgrades. The *tp* program tracks transports by controlling exports and imports of objects between SAP systems. The program also ensures that the steps in exporting and importing objects are performed in the correct sequence and that imports into a target system are done in the same sequence as the exports from the source systems.

tp is an operating system level program, which uses special programs, such as C programs, operating system commands, and ABAP programs in the SAP system.

tp performs exports and imports separately. In the export phase, the objects to be transported are extracted from the database of the source system and stored in files in the transport directory. In the import phase, the objects are added to the database of the target system. An export always takes place immediately after the transport request has been released so that the objects are freed for further changes. *tp* uses the program R3trans at operating system level to establish a connection to the database and to perform the necessary steps in the database.

There is no automatic mechanism that imports a transport request into a target system immediately after export.

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Although most transport activities can be performed using TMS, you may find the need to use *tp* commands for exceptional cases. Because import buffers and import queues are identical, use of *tp* and TMS produces consistent results.

Usage: tp <command> [argument(s)] [option(s)], where <command> may be one of:

```
-----------------------------+-----------------------------+-------------------
 Exporting                   I Buffer Actions              I Disk Space
-----------------------------+-----------------------------+------------------
 EXPORT        I EXPWBO      I ADDTOBUFFER  I DELFROMBUFFERI CLEAROLD
 R3E           I VERSE       I SETSYNCMARK  I ADDSYNCMARK  I DELSYNCMARK
 CHECK         I SDE         I SETSTOPMARK  I DELSTOPMARK  I TESTOLD
 TST           I             I MARK         I UNMARK       I
               I             I CLEANBUFFER  I              I
-----------------------------+-----------------------------+------------------
 Importing                   I Special Functions           I Information
-----------------------------+-----------------------------+------------------
 PUT           I             I LOCKSYS      I UNLOCKSYS    I SHOWBUFFER
 IMPORT        I             I LOCK_EU      I UNLOCK_EU    I COUNT
 CMD           I R3I         I WRITELOG     I GETPROTS     I SHOWPARAMS
               I             I SAPSTART     I SAPSTOP      I GO
 R3H           I             I GETTBATGENT  I GETTRBATENT  I CONNECT
 ACT           I MVKERNEL    I GETDDXTTENT  I GETDDXTFENT  I CHECKIMPDP
 SXPRA         I SDI         I GETOPENCORR  I CREATECOFILE I SHOWINFO
 GENTB         I GENT1       I PREPAREBUFFERI CREATEINFO   I GETOBJLIST
 GENT2         I GEN         I CONTP        I EXPCHK       I EXTRDOCU
 DIST          I XPA         I SHOWSEMAPHOREI SHOWSEMACLIENI GETCONVENT
 MVNTABS       I VERSI       I SETSEMAPHORE I DELSEMACLIENTI EXPLAINRC
 IMPSYNC       I DELIVER     I DELSEMAPHORE I GETTPSTATENT I GETTPSTATENT
 DEPLOY        I IMPORTPREVIEWI CHECKIN     I CHECKINMOVE  I CHECKOUT
 CHECKDEPLOY   I GETKEYTRACE I MERGELOGS    I MEPP         I CHECK-IN_VCS
For more details call tp with the desired command (and no other parameters)
```

Figure 127: Overview of tp Commands (tp help)

tp commands are executed in the transport subdirectory bin by user *<SID>adm*. *tp* commands are called using syntax *tp <command> [argument(s)] [option(s)]* .

- To display general information on the syntax of all *tp* calls, use *tp help*. To display a description of the syntax and function of a specific command, use *tp <command>* without any options.
- To display a count of all transport requests registered for import into a specific SAP system, use *tp count <SID>*.
- To test whether a connection to an SAP system's database was successful, use *tp connect <SID>*.
- To display how the import dispatcher *RDDIMPDP* is scheduled for a specific SAP System, use *tp checkimpdp <SID>*.
- To display all current settings of the parameter file, use *tp showparams <SID>*.

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Figure 128: tp Import Command Line Option

Imports performed using *tp* at operating system level should be restricted to exceptional cases, for example if the TMS is not available or special *tp* commands are needed.

There are two commands to start an import using *tp* at the operating system level:

- `tp import all <target SID> client=<client number> pf=TP_<domain name>.PFL`

  Analogous to the default import of TMS, this command imports all waiting transport requests in the correct sequence.

- `tp import <transport request> <target SID> client=<client number> u0 pf=TP_<domain name>.PFL`

Importing individual transport requests is not recommended as the correct sequence of transport requests is not necessarily maintained and thus newer versions of objects may be overwritten by older versions through the regular import of all waiting transport requests. To ensure that the objects imported through an individual transport request are not overwritten by an older version, only use unconditional mode *0*, that is, the option *u0*, when starting individual imports. Using this mode is analogous to the TMS preliminary import and causes the transport request to remain in the list of transport requests to be imported. When the regular (mass) transport takes place, the transport request will automatically be imported again in the sequence of the import queue. Individual imports only should be performed in exceptional cases.

Processing imports out of order can result in severe inconsistencies in the target system. These are hard to diagnose. If you do not want to import single transport requests as preliminary import (NOT recommended), you would use *tp import <transport request> <target SID> client=<client number> pf=TP_<domain name>.PFL* , without the option *u0*.

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> Hint:
> You always have to specify the full qualified path to the *tp* parameter file *TP_<domain name>.PFL* by using the parameter *pf=TP_<domain name>.PFL*.

The content of transport buffer files in the transport subdirectory *buffer* is organized as a table. Each line contains information on a specific transport request. One column includes the unconditional mode that is linked to the transport request. Other columns specify import actions.

tp offers several commands for accessing buffers:

- `tp showbuffer <SID>`

  This command displays transport buffer entries.

- `tp addtobuffer <transport request> <target SID>`

  This command registers the request as the last transport request to be imported.

- `tp delfrombuffer <transport request> <target SID>`

  This command deletes a single request from the transport buffer.

- `tp cleanbuffer <SID>`

  This command removes successfully imported transport requests from the transport buffer. This function is included in the command *tp import all <target SID>*. This action can be started in transaction `STMS` by choosing *Overview* → *Imports*, then *Import Queue* → *Display* and finally *Extras* → *Delete Imported Requests*.

- `tp setstopmark <SID>`

  This command places a stopmark at the end of a transport buffer so that subsequent *tp import* commands only process the transport requests that are located before the stopmark.

- `tp mvstopmark <TR> <SID>`

  This command moves the stopmark in front of the transport request in the transport buffer.

- `tp delstopmark <SID>`

  This command deletes the stopmark from a transport buffer.

The *tp* unconditional import modes are as follows:

Table 2: Unconditional Modes

0	Overtaker	Leave transport request in queue for later import: Import from the transport buffer without deleting and set unconditional mode 1 in the transport buffer to trigger another import
1	During export	Ignore incorrect status of a transport request.
	During import	Import transport request again: ignore that this transport request was already imported into this SAP system and import everything again
2	During import	Overwrite originals

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3	During import	Ignore predecessor relations
4	During import	Ignore invalid component version
6	During import	Overwrite objects in unconfirmed repairs
8	During export	Ignore invalid table class: allow direct selection of forbidden tables – some tables are part of complex objects and generally cannot be exported alone
	During import	Ignore invalid table class: ignore the restriction resulting from table classifications and import all table entries into specified clients
9	During import	Ignore invalid transport type

Hint:
The unconditional modes may vary in dependence of the SAP system and *tp* release.

Unconditional modes are among the options that can be assigned to *tp* commands. They are used to cause specific rules of the Change and Transport System (CTS) to be ignored.

Each unconditional mode is represented by a digit. To use an unconditional mode, add a `u` to the *tp* command line and add the required digit(s). For example, if you want to import request DEVK900132 into the quality assurance system and overwrite originals, enter the following command: `tp import DEVK900132 QAS u2`.

Use unconditional modes carefully. It is preferable to transport according to the rules of the Change and Transport System (CTS).

Some unconditional modes can be used directly in TMS.

LESSON SUMMARY
You should now be able to:

- Explain the import process

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Unit 5
Lesson 5

Monitoring Tools

LESSON OVERVIEW
In this lesson, you will learn about the tools provided by the Transport Management System (TMS) for monitoring transport activity in your transport domain. You will also learn ways to ensure a stable test and development environment.

Business Example

As the Change and Transport System (CTS) administrator, you must be able to track the progress of the imports and make sure that only the required transport requests are being transported. TMS provides the administrator with a variety of tools to monitor all aspects of the import process and to ensure that the import is being performed with few or no errors.

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

- List Monitoring tools

Types of Monitoring Tools

TMS provides various tools with which you can monitor transport activities in your transport domain.

Types of Monitoring Tools

- RFC connection test
- Transport directory check
- Transport control program check
- Import history
- Import monitor
- Import queue consistency check
- tp system log

The tools can be accessed in the following way:

In transaction `STMS` choose *Overview → Imports* and double-click on the SAP system in question:

- *Import monitor*: To display *tp* status information from table *TPSTAT*, choose *Goto → Import Monitor*.
- *Import history*: To display the import history, choose *Goto → History*.

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> Note:
> The import history is collected from the log file *ALOG* and is kept in tables *TPALOG* and *TPALOGHDR*. For details see SAP Note 375230 – *TMS: incomplete import history*.

- *tp system log*: To display all *tp* calls and errors for the current SAP system in the file *SLOG*, choose *Goto → tp System Log*. To display the file *ALOG* containing the return codes of all individual transport steps for the current transport group, choose from the *tp system log* view *Goto → Transport Steps*.
- *Import queue consistency check*: To check if the data files and cofiles of transport requests in an import queue exist in buffers of the transport directory and can be read, choose *Queue → Check → Consistency*.

In transaction `STMS` choose *Overview → Systems* and mark one or more SAP systems:

- *Transport control program check*: To check the transport control program *tp* for all or just one specific SAP system within the domain, choose *SAP System → Check → Transport Tool*.
- *Transport directory check*: To verify the availability of the transport directories of all SAP systems within the domain, choose *SAP System → Check → Transport Directory*.
- *RFC connection test*: To check RFC connections in both directions, choose *SAP System → Check → Connection Test*.

Checking for Critical Objects

Figure 129: Checking for Critical Objects

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There are two options to check for critical objects:

- **before the import of transport requests into the target system**

  This option has to be performed manually and is only a display of the list of transport requests that contain critical objects.

- **during the release of the transport request**

  This option is performed automatically, if tp parameter *CHK_CRIOBJ_AT_EXPORT* is set to *W* (warning) or *E* (error).

To check if the transport requests in an import queue contain critical objects that should not be imported into the target system, go to the *Import Overview* (transaction `STMS`, *Overview → Imports*) and choose *Queue → Check → Critical Objects* . The object lists of the transport requests are checked to see if they contain critical objects. The result is displayed in a hierarchical list. Transport requests containing critical objects are marked with the appropriate icon. The critical objects are highlighted in color.

Before performing this check, you must have maintained which objects are classified as critical. For this, you must be logged on to the transport domain controller system. The information about critical objects is distributed to the whole domain when you save your changes.

To display or maintain the critical transport objects defined for the transport domain, call transaction `STMS`. Choose *Overview → Imports* and then *Extras → Critical Transport Objects* .

> Note:
> You can also check requests for critical objects in the QA worklist. This supports the decisions you make on approving or rejecting requests.
>
> If you want to check the whole QA worklist for critical objects, choose from within the QA work list *Worklist → Check → Critical Objects* . Confirm the pop-up. An overview of the requests with critical objects appears. If you only want to check certain requests for critical objects, filter them in the display.

Only objects of the form object type *R3TR* are checked as transport objects. Transport objects that start with *LIMU* are sub-objects of a repository object with an object directory entry. To check these, you must find out the object directory entry, and enter it in the table of critical objects.

> Hint:
> Interesting objects to be classified as critical, would be for example *R3TR XPRA* (XPRAs) or *R3TR TABL* (table definitions) or *R3TR TABU* (table content, for interesting tables)

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Code Freezing and Testing

Figure 130: Code Freeze and Testing

To ensure a stable test and development environment, use a development deadline to freeze work on objects in the development system until the completion of the quality assurance verification.

Follow this procedure during object development and testing:

1. Release the transport requests containing the developed objects.
2. Freeze development of the objects in the development system.
3. Import the objects and verify the changes in the quality assurance environment.
4. Sign off the changes.
5. If necessary, allow further development on the objects in the development system.

With the following tools, an administrator can force code freezing for an SAP system landscape:

- stop exports by creating a file *T_OFF.<SID>*. in transport directory */usr/sap/trans/bin* . The first line of this file will be displayed, whenever you start a release of a transport request from the Transport Organizer.
- stop imports by creating a file *NOIMPORT.<SID>* in transport directory */usr/sap/trans/tmp* . The content of this file is not evaluated.

If an object has gone through the error fixing cycle, it is included in at least two different transport requests within the import queue of the production system. If you import the

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complete import queue – using *import all requests* – into the production system after sign-off, the pre-corrected object has no impact on your production environment.

Change management includes creating, releasing, distributing, and verifying transport requests for all SAP systems in the SAP system landscape. Ensure that your distribution procedures are supported by the TMS setup. Determine release, import, and verification requirements for all transport points in your SAP system landscape. For each transport point, define the following:

- When will transports take place?
- Who is responsible for a transport request during its various transport phases?
- How will transports be verified before being distributed or redistributed?
- What happens if a transport is successful but testing proves that the contents are incorrect?
- Are sign-offs required for transporting?

Assign persons to be responsible for all transport steps. Use authorizations to restrict access to transport request management tasks and to operating system level.

SAP provides techniques for the distribution and management of changes using transport buffers. These transport buffers indicate the changes to be transported to the target system and the transport request order. You must control the transport buffers and the distribution or redistribution process. To verify all imports, review transport logs, establish testing standards and quality assurance procedures, and define sign-off procedures.

SAP recommends transporting a whole project when all objects are in an acceptable state rather than each single object as soon it is ready.

Transport Directory Naming Conventions

Because the transport control program *tp* runs on many different operating systems, restrictive naming conventions are required. Transport requests are always represented in the following format *<source SID>K9<5 digits or characters>* , where *<source SID>* is the SAP system in which the transport request was created and *K9* indicates a customer transport request. The five digits form a serial number, which can be expanded using characters.

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Figure 131: The Transport Directory

The transport directory contains subdirectories, such as bin, data, cofiles, buffer, log, tmp, sapnames, actlog, EPS.

bin

This subdirectory contains the configuration files for the transport domain.

data

This subdirectory contains files named *R9<5 digits >.<source SID>* containing the exported objects.

cofiles

This subdirectory contains command files named *K9<5 digits>.<source SID>*. They contain, for example, import steps.

buffer

This subdirectory contains a transport buffer for each SAP System named after the SID. When a transport request is released, the transport buffer of the target systems is updated.

log

This subdirectory contains all log files, such as *ULOGs*, *ALOGs*, *SLOGs*, log files named *<source SID><action>9<5 digits>.<action SID>* for each executed step, and log files named *<action><date>.<action SID>* for steps that are collectively executed, for example, step *N* (*structure conversion*) and step *P* (*move nametabs*).

tmp

This subdirectory contains log files before written to the log directory.

sapnames

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This subdirectory contains files named after the user's logon name (without any non-standard characters). A file is created for each SAP system user, who works with the CTS, and is updated when the user releases a transport request. Note that for repair-related transport requests, the owner of the repaired objects is listed as well.

actlog

This subdirectory contains files named after the transport requests. A file is created for each transport requests, for which actions have taken place, and is updated when a new actions takes place - e.g. releasing or importing of a transport request.

EPS

This subdirectory (Electronic Parcel Service) contains the directory *in*, to which SAP Support Packages are copied in order to apply them with the Support Package Manager (transaction `SPAM`).

Troubleshooting Steps

Figure 132: Monitoring and Analysis: Transport Tool Log Files

The various transport tools write a log for each transport action to the transport subdirectory *tmp*. After completion of this step, *tp* moves these logs from *tmp* to *log*. The log files are named *<source SID><action>9<5 digits>.<target SID>* , where *<action>* is represented by a single character and *<5 digits>* is taken from the corresponding transport request.

Each log file can be seen in the SAP system. You can choose different detail-levels in the log file. The possible levels are as follows:

- Performed actions and return code
- Additional error messages

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- End-user logs
- Details for developers and hotline

Figure 133: Monitoring and Analysis: tp Log Files

For long-running imports, it may be helpful to monitor the log files written at the operating system level. All logs in the transport environment are stored in the transport subdirectory *log*. These logs include logs created by *tp* (*ULOG*, *SLOG* and *ALOG*), and logs created by the various transport tools.

The current *ULOG* file records all *tp* commands that are free of syntax errors, and is named using the name convention *ULOG<YY>_<Q>* (YY is the year, Q is the quarter of the year). Each line in the ULOG file represents a *tp* command.

The *SLOG* file is used to monitor the transport activities of a specific SAP system. It contains a general overview of performed imports indicating the return code and thus the success of each import. The name of the SLOG file can be set as *tp* parameter using the global *tp* parameter *SYSLOG* . The default setting is *SLOG<YY><WW>.<SID>* (YY is the year, WW the calendar week).

The *ALOG* file records the return code for all transport steps handled in the common transport directory. The name of the ALOG file can be set as *tp* parameter using the global *tp* parameter *ALLLOG*. The default value is *ALOG<YY><WW>.<SID>*.

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Figure 134: tp Return Codes

tp receives return codes from all the transport tools involved in an import process. *tp*'s own return code is interpreted as follows:

- 0 to 16 indicate the maximum value of all return codes from transport tools.
- 17 to 99 are values that are calculated from the return codes of the transport tools and a *tp* warning, for example, the transport buffer of the target system has no write permission.
- 100 to 199 indicates warnings. Warnings mean that something went wrong and *tp* could not perform all the tasks. 100 to 149 are normal *tp* warnings, for example, RDDIMPDP cannot be triggered by *sapevt*. Return codes of 150 to 199 are rare and indicate incorrect operation by a user. For example, a return code of 152 is received if *tp* tries to import a transport request that is not included in the transport buffer.
- 200 or more indicates *tp* errors. For example, if a file could not be accessed as required by the import process, the return code is 212.

The accompanying text is more significant than the value of a return code. To display the text of a specific *tp* return code, use the *tp* command `tp explainrc <value of return code>`.

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Figure 135: Troubleshooting (1)

The first step in troubleshooting transport errors is use the *alert monitor*, which records all TMS transport actions. The alert monitor is available in transaction `STMS` by choosing *Monitor –TMS Alerts –TMS Alert Viewer* . The information displays the date and time, the user name, the TMS status message, and the target SAP system. To display the full text of an error message, double-click the error message.

More detailed information can be seen in the *SLOG* file, which is used to monitor the transport activities of SAP systems and determine the success of import requests.

If import failures are recorded in the *SLOG* file, drill down to the *ALOG* file and locate the import step that produced the return code listed in *SLOG*.

Use the *ALOG* file to identify the detailed log file, which is written for each step of a transport request. These log files can be accessed from the SAP system using the Transport Organizer (transaction `SE09`). To locate the log file for the request that produced an error, use the *ALOG* file.

All log files that are not dependent on specific requests, such as the log files for structure conversion and nametab moving (mvntab) can be accessed at the operating system level in the transport directory.

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Figure 136: Troubleshooting (2)

Additionally you can check whether the import dispatcher *RDDIMPDP* is scheduled correctly and is event-triggered. Use the job overview `SM37` to monitor the related background jobs (RDD*). Enter **`RDD*`** in the *Job name* field and an asterisk **`*`** in the *or after event* field.

Problems might result from

- wrong versions of *tp* or *R3trans*
- *tp* not running, as in UNIX “ps -ef | grep tp”
- permission or share problems with the common transport directory
- or no free disk space.

When analyzing a problem, compare the logs and transport buffer entries with the entries in tables *TRBAT* and *TRJOB* (using transaction `SE16`). If required, insert the transport request or header in *TRBAT* and restart *RDDIMPDP*.

If a communication problem between *tp* and the SAP system is indicated, try to start *sapevt* at operating system level and trigger *RDDIMPDP*.

LESSON SUMMARY

You should now be able to:

- List Monitoring tools

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Unit 5
Lesson 6

Cleaning up the Transport Directory

LESSON OVERVIEW
In this lesson, you will learn how to clean up the transport directory.

Business Example

From time to time it makes sense to clean up the transport directory.

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

- Clean up the transport directory

Cleaning up the Transport Directory

Data files, cofiles and different log files are written to the transport directory. These files are not deleted, overwritten or reorganized automatically. So the transport administrator has to take care of them.

To clean up the transport directory, use the commands `tp check all` and `tp clearold all`. In the course of time, many files accumulate in the transport directories. These files contain important information, but they also use up disk space and become obsolete over time.

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Figure 137: Cleaning up the Transport Directory

The command `tp check all` searches for transport requests that are not marked for import into any SAP system, as revealed by the transport buffer entries. The transport requests are listed in file *ALL_old.lis* which is located in transport subdirectory *tmp*.

The command `tp clearold all` uses the result list of the command `tp check all` to find files that are not needed anymore for import and that have exceeded a maximum age. To specify the maximum age, use the *tp* parameters *DATALIFETIME* , *OLDDATALIFETIME* , *COFILELIFETIME*, and *LOGLIFETIME*. Data files in the transport subdirectory *data* that are older than the parameter *DATALIFETIME* are moved to the transport subdirectory *olddata*. Files in the subdirectories *log* and *cofiles* are immediately deleted if they exceed the age specified by *LOGLIFETIME* or *COFILELIFETIME*. Files in *olddata* are deleted if they are older than *OLDDATALIFETIME* .

Hint:
Before cleaning up the transport directory, SAP recommends making a copy of the transport directory and saving it for audit purposes.

Hint:
With the command `tp testold all` it is possible to create a list of files which will be deleted by the command `tp clearold all`. The result is located in subdirectory *tmp*.

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Note:
The files in the *EPS* subdirectory of the transport directory are not affected by this clean-up. The transport administrator has to care about them manually.

Related Information

- See SAP Note 41732 – *Deletion of data in transport directory* .

LESSON SUMMARY
You should now be able to:

- Clean up the transport directory

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Learning Assessment

1. You are running a development project in a three-system landscape using the Quality Assurance (QA) procedure. Quality assurance testing in the quality assurance system for the project is positive. Which transport requests should you import into the production system?

   Choose the correct answer.

   - [ ] A The entire project which includes all approved transport requests assigned to the project
   - [ ] B Exactly those transport requests that contain only error-free objects
   - [ ] C If the same objects are contained in multiple transport requests, only import the newest transport requests
   - [ ] D All transport requests from the import queue of the production system

2. You are using a standard three-system landscape: When releasing a transportable transport request from the development system, it is being exported from the development system and immediately imported into the quality assurance system.

   Determine whether this statement is true or false.

   - [ ] True
   - [ ] False

3. You are using client independent transport routes. Which information can be seen in the import queue (transaction `STMS`) for transport requests that were not imported yet?

   Choose the correct answers.

   - [ ] A The owner
   - [ ] B The source client
   - [ ] C The component check result
   - [ ] D The type
   - [ ] E The target client

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4. You are using a standard three-system landscape. You did not add or delete any transport requests manually from the import queues. What is the sequence of the transport requests in the import queue of the production system?

   Choose the correct answer.

   - [ ] A The sequence the transport requests were imported into the quality assurance system
   - [ ] B The sequence the transport requests were released from the development system
   - [ ] C The sequence of the time stamp of the creation of the transport requests
   - [ ] D The sequence of the 5-digit number of the transport requests

5. You are using a standard three-system landscape. By using the Transport Management System (transaction `STMS`), it is possible to perform an automatic, periodically import of all transport requests of the import queue into the quality assurance system, for example once every 24 hours.

   Determine whether this statement is true or false.

   - [ ] True
   - [ ] False

6. Which of the following are transport strategies of the Transport Management System (TMS)?

   Choose the correct answers.

   - [ ] A Queue-Driven Transports. Mass transports
   - [ ] B Queue-Driven Transports. Single transports
   - [ ] C Workflow-driven transports
   - [ ] D Queue-Driven Transports: Project based transports

7. What is different when using a transport of copies instead of a workbench request?

   Choose the correct answers.

   - [ ] A You can choose any SAP system of the transport domain as the target system
   - [ ] B You do not need any consolidation route to the target system
   - [ ] C You can transport together any transportable objects
   - [ ] D Copies of the objects are being transported, not the originals
   - [ ] E The objects are being copied from the source system

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8. You are using a standard three-system landscape with standard transport routes: For increased transport security, it makes sense to define the Quality Assurance (QA) procedure not only in the quality assurance system but also in the production system.

   Determine whether this statement is true or false.

   - [ ] True
   - [ ] False

9. You are defining the Quality Assurance (QA) procedure. Which standard approval steps are selectable?

   Choose the correct answers.

   - [ ] A To be approved by department
   - [ ] B To be approved by request owner
   - [ ] C To be approved by system administration
   - [ ] D To be approved by developer
   - [ ] E To be approved by task owner

10. You are using a standard three-system landscape with quality assurance (QA) procedure. There are five transport requests in the import queue of the production system. The second transport request has not been approved yet, the others are approved. What happens in general, when you start an import all (import of all transport requests) into the production system?

    Choose the correct answer.

    - [ ] A The behavior depends on the setting of tp parameter HANDLING_OF_INACTIVE_TRANSPORTS
    - [ ] B All approved transport requests are imported
    - [ ] C Only the first transport request is being imported
    - [ ] D The behavior depends on the setting of the transport strategy

11. During the import of transport requests, several steps are performed. Bring the following steps into the right sequence, regarding the import procedure.

    Arrange these steps into the correct sequence.

    - [ ] Handling of dictionary objects (e.g. activation)
    - [ ] Import of other objects (e.g. programs)
    - [ ] Import of dictionary objects (e.g. table structures)
    - [ ] Handling of other objects (e.g. generation)

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12. Which tool is performing the dictionary import during the import of transport requests?

    Choose the correct answer.

    - [ ] A R3trans
    - [ ] B RDDIMPDP
    - [ ] C RDDMASGL
    - [ ] D R3load

13. Which of the following are monitoring tools when importing transport requests?

    Choose the correct answers.

    - [ ] A Check for critical objects
    - [ ] B Import monitor
    - [ ] C Import history
    - [ ] D Performance monitor

14. When importing transport requests, all log files are first written to DIR_TRANS\tmp and moved to DIR_TRANS\log when completed.

    Determine whether this statement is true or false.

    - [ ] True
    - [ ] False

15. When importing a transport request, a return code 8 occurs. This is being interpreted as an unsuccessful import by the Transport Management System (TMS), in any case.

    Determine whether this statement is true or false.

    - [ ] True
    - [ ] False

16. What is the SAP standard procedure to clean up the transport directory?

    Choose the correct answer.

    - [ ] A Using command line options of tp
    - [ ] B Scheduling one of the standard batch job
    - [ ] C Switching on the automatic cleanup in TMS
    - [ ] D Setting the corresponding attribute for transport requests

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Learning Assessment - Answers

1. You are running a development project in a three-system landscape using the Quality Assurance (QA) procedure. Quality assurance testing in the quality assurance system for the project is positive. Which transport requests should you import into the production system?

   Choose the correct answer.

   [X] A The entire project which includes all approved transport requests assigned to the project

   [ ] B Exactly those transport requests that contain only error-free objects

   [ ] C If the same objects are contained in multiple transport requests, only import the newest transport requests

   [ ] D All transport requests from the import queue of the production system

   You are correct! You should import the entire project which causes all approved transport requests assigned to the project to be imported. You should not leave away any approved transport requests of the project or import additional transport requests. Read more on this in the lesson 'The Transport Process' of the course ADM325.

2. You are using a standard three-system landscape: When releasing a transportable transport request from the development system, it is being exported from the development system and immediately imported into the quality assurance system.

   Determine whether this statement is true or false.

   [ ] True

   [X] False

   You are correct! Releasing a transportable transport request does not cause an immediate import into the subsequent system(s). Read more on this in the lesson 'The Transport Process' of the course ADM325.

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3. You are using client independent transport routes. Which information can be seen in the import queue (transaction `STMS`) for transport requests that were not imported yet?

   Choose the correct answers.

   [X] A The owner

   [X] B The source client

   [X] C The component check result

   [X] D The type

   [ ] E The target client

   You are correct! The owner, source client, component check result, and type of the transport request can be seen in the import queue. The target client is not set and therefore not visible in case of client independent transport routes. Read more on this in the lesson 'Imports Using TMS' of the course ADM325.

4. You are using a standard three-system landscape. You did not add or delete any transport requests manually from the import queues. What is the sequence of the transport requests in the import queue of the production system?

   Choose the correct answer.

   [X] A The sequence the transport requests were imported into the quality assurance system

   [ ] B The sequence the transport requests were released from the development system

   [ ] C The sequence of the time stamp of the creation of the transport requests

   [ ] D The sequence of the 5-digit number of the transport requests

   You are correct! The sequence of the transport requests in the import queue of the production system is the sequence the transport requests were imported into the quality assurance system. Read more on this in the lesson 'Imports Using TMS' of the course ADM325.

5. You are using a standard three-system landscape. By using the Transport Management System (transaction `STMS`), it is possible to perform an automatic, periodically import of all transport requests of the import queue into the quality assurance system, for example once every 24 hours.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! It is possible to perform an automatic, periodically import of all transport requests of the import queue into the quality assurance system. Read more on this in the lesson 'Imports Using TMS' of the course ADM325

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6. Which of the following are transport strategies of the Transport Management System (TMS)?

   Choose the correct answers.

   - [X] A Queue-Driven Transports. Mass transports
   - [X] B Queue-Driven Transports. Single transports
   - [X] C Workflow-driven transports
   - [ ] D Queue-Driven Transports: Project based transports

   You are correct! Queue-Driven Transports. Mass transports, Queue-Driven Transports. Single transports, and Workflow-driven transports are transport strategies. Queue-Driven Transports: Project based transports is not a transport strategy. Read more on this in the lesson 'Imports Using TMS' of the course ADM325.

7. What is different when using a transport of copies instead of a workbench request?

   Choose the correct answers.

   - [X] A You can choose any SAP system of the transport domain as the target system
   - [X] B You do not need any consolidation route to the target system
   - [X] C You can transport together any transportable objects
   - [ ] D Copies of the objects are being transported, not the originals
   - [ ] E The objects are being copied from the source system

   You are correct! The differences are that you can choose any SAP system of the transport domain as the target system, you do not need any consolidation route to the target system, and you can transport together any transportable objects. There is no difference in copies of the objects are being transported, not the originals, or objects are being copied from the source system. This is the same with workbench requests. Read more on this in the lesson 'Imports Using TMS' of the course ADM325

8. You are using a standard three-system landscape with standard transport routes: For increased transport security, it makes sense to define the Quality Assurance (QA) procedure not only in the quality assurance system but also in the production system.

   Determine whether this statement is true or false.

   - [ ] True
   - [X] False

   You are correct! It makes no sense to define the QA procedure in the production system because there are no subsequent systems to be secured. Read more on this in the lesson 'QA Approval Procedure and Transport Proposals' of the course ADM325.

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9. You are defining the Quality Assurance (QA) procedure. Which standard approval steps are selectable?

   Choose the correct answers.

   [X] A To be approved by department

   [X] B To be approved by request owner

   [X] C To be approved by system administration

   [ ] D To be approved by developer

   [ ] E To be approved by task owner

   You are correct! The selectable standard approval steps are: To be approved by department, to be approved by request owner, and to be approved by system administration. To be approved by developer and to be approved by task owner are no standard approval steps. Read more on this in the lesson 'QA Approval Procedure and Transport Proposals' of the course ADM325.

10. You are using a standard three-system landscape with quality assurance (QA) procedure. There are five transport requests in the import queue of the production system. The second transport request has not been approved yet, the others are approved. What happens in general, when you start an import all (import of all transport requests) into the production system?

    Choose the correct answer.

    [X] A The behavior depends on the setting of tp parameter HANDLING_OF_INACTIVE_TRANSPORTS

    [ ] B All approved transport requests are imported

    [ ] C Only the first transport request is being imported

    [ ] D The behavior depends on the setting of the transport strategy

    You are correct! The behavior depends on the setting of tp parameter HANDLING_OF_INACTIVE_TRANSPORTS (BREAK, STOP, SKIP). In general, not all approved transport requests are imported and not only the first transport request is being imported. The behavior does not depend on the setting of the transport strategy. Read more on this in the lesson 'QA Approval Procedure and Transport Proposals' of the course ADM325.

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11. During the import of transport requests, several steps are performed. Bring the following steps into the right sequence, regarding the import procedure.

    Arrange these steps into the correct sequence.

    [2] Handling of dictionary objects (e.g. activation)

    [3] Import of other objects (e.g. programs)

    [1] Import of dictionary objects (e.g. table structures)

    [4] Handling of other objects (e.g. generation)

    You are correct! The import of the dictionary objects takes place first, then the dictionary objects are handled, followed by the other objects are being imported, and finally the other objects are being handled. Read more on this in the lesson 'Import Process' of the course ADM325.

12. Which tool is performing the dictionary import during the import of transport requests?

    Choose the correct answer.

    [X] A R3trans

    [ ] B RDDIMPDP

    [ ] C RDDMASGL

    [ ] D R3load

    You are correct! R3trans performs the dictionary import. RDDIMPDP is the import dispatcher, RDDMASGL does the activation of dictionary objects, and R3load is not used in the context of importing transport requests. Read more on this in the lesson 'Import Process' of the course ADM325.

13. Which of the following are monitoring tools when importing transport requests?

    Choose the correct answers.

    [X] A Check for critical objects

    [X] B Import monitor

    [X] C Import history

    [ ] D Performance monitor

    You are correct! Check for critical objects, import monitor, and import history are monitoring tools. A performance monitor does not exist for importing transport requests. Read more on this in the lesson 'Monitoring Tools' of the course ADM325.

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14. When importing transport requests, all log files are first written to DIR_TRANS\tmp and moved to DIR_TRANS\log when completed.

    Determine whether this statement is true or false.

    - [ ] True
    - [x] False

    You are correct! Only log files from R3trans and RDDIMPDP etc. are first written to DIR_TRANS\tmp and moved to DIR_TRANS\log when completed. Log files from tp (SLOG, ALOG, ULOG) are written to DIR_TRANS\log only. Read more on this in the lesson 'Monitoring Tools' of the course ADM325.

15. When importing a transport request, a return code 8 occurs. This is being interpreted as an unsuccessful import by the Transport Management System (TMS), in any case.

    Determine whether this statement is true or false.

    - [ ] True
    - [x] False

    You are correct! This depends on the transport strategy chosen. When using 'Single transports', a return code 8 is interpreted as an unsuccessful import. When using 'Mass transports', this is interpreted as a successful import. Read more on this in the lesson 'Monitoring Tools' of the course ADM325.

16. What is the SAP standard procedure to clean up the transport directory?

    Choose the correct answer.

    - [x] A Using command line options of tp
    - [ ] B Scheduling one of the standard batch job
    - [ ] C Switching on the automatic cleanup in TMS
    - [ ] D Setting the corresponding attribute for transport requests

    You are correct! Command line options of tp are used ('tp check all' and 'tp clearold all'). For this there is no standard batch job, no automatic cleanup in TMS, and no corresponding attribute for transport requests. Read more on this in the lesson 'Cleaning up the Transport Directory' of the course ADM325.

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UNIT 6 SAP Note Assistant, SAP Support Packages, SAP System Upgrades, SAP S/4HANA Conversion

Lesson 1

SAP Note Assistant 231

Lesson 2

SAP Support Packages 247

Lesson 3

SAP System Upgrade and SAP S/4HANA Conversion 261

UNIT OBJECTIVES

- List the advantages of automatically impementing SAP Notes
- Differentiate between SAP Notes with Correction Instructions and SAP Notes with Transport-based Correction Instructions
- Describe the import of SAP Support Packages
- Outline the difference between Support Package Stacks and Feature Package Stacks
- Outline the process flow for an SAP System Upgrade and SAP S/4HANA Conversion

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Unit 6
Lesson 1

SAP Note Assistant

LESSON OVERVIEW
In this lesson, you will learn about SAP Notes and the advantages of implementing an SAP Note automatically with the SAP Note Assistant. You will also learn about the goals, functions, and the features of the SAP Note Assistant. You will also learn about the Note Browser. Additionally, you will learn about how to cancel an SAP Note implementation and about the preconditions for handling SAP Notes.

Business Example

As the SAP system administrator, you should know the tools used for applying error fixes, legal changes, security fixes, and new functions to the SAP software components.

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

- List the advantages of automatically impementing SAP Notes
- Differentiate between SAP Notes with Correction Instructions and SAP Notes with Transport-based Correction Instructions

Maintenance Using SAP Note Assistant

There are SAP Notes for different reasons. SAP Notes can provide information of any kind for customers and partners of SAP. But often they also contain solutions for known problems within an SAP system.

> Note:
> When talking about SAP Notes in this lesson, we refer only to those SAP Notes that contain a change of a repository object. Not all repository objects can be handled with the SAP Note Assistant, for example dictionary objects cannot be handled. In this case, the corresponding SAP Notes will then describe how to change the repository object in the SAP system by providing the correct source code.

> Note:
> To overcome these limitations, the TCI (Transport based Corrections Instruction) was introduced. For details see the last part of this lesson.

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Figure 138: What is an SAP Note?

They include a description of the following:

- The symptoms of the problem
- The cause of the problem
- Descriptions of how to correct the source code
- The SAP release and SAP Support Package status for which the SAP Note is valid
- Links to SAP Support Packages that correct the problem

Carefully read the SAP Note before you implement it. The SAP Note can contain prerequisites, interactions, and references to post processing activities, such as making changes to a table structure that you must consider when you implement it.

Prior to making any modification based on SAP Notes, verify that the SAP Note is applicable to your SAP system release and that the symptoms in the SAP Note are the same as the symptoms apparent in your SAP system. In the case of uncertainty, contact SAP.

All modifications of SAP objects should be performed in the development system, tested in the quality assurance system and distributed to the production system only after thorough testing and verification.

Because modifications often lead to the need for a modification adjustment during a later SAP system upgrade or when applying SAP Support Packages, document the modification changes to help to speed up the modification adjustment process. When documenting, be sure to include the SAP Note number and SAP system release dependencies.

Automatic implementation of SAP Notes contributes to enhanced quality, because it reduces errors due to manual implementation.

Manually implementing an SAP Note leads to high costs. Resources, including personnel and time to implement the SAP Note are necessary.

If an SAP Note is implemented incorrectly, the quality of the SAP system suffers.

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Configuration Steps for SAP Note Assistant

Before you can start using SAP Note Assistant, you need to make a number of settings in your system:

- Define the system change option (transaction `SE06`): For the software components in which you want to implement the SAP Notes, set the status to *restricted modifiability* or *Modifiable*. In addition, for the general SAP name range, set the *status* to *Modifiable*.
- There are different ways in which you can load SAP Notes into your system. You can download SAP Notes directly using an RFC connection to SAP, or you can use SAP Note Assistant to upload SAP Notes that you have already loaded from SAP Support Portal. If you want to download an SAP Note with RFC, you first need to activate an RFC connection.

  If you want to download SAP Notes using an RFC connection, you first need create the RFC connection *SAPOSS* and For this, use transaction `OSS1`.

Note:
As there is a risk that the SAP Notes files can get maliciously modified and customers can unknowingly upload the maliciously modified SAP Notes files into their ABAP systems, SAP delivers all SAP Notes with digital signature to protect SAP Notes files with increased authenticity and improved security.

To consume digitally signed SAP Notes from *SAP ONE Support Launchpad*, you need to implement SAP Security Notes 2408073 – *Handling of Digitally Signed notes in SAP Note Assistant* and 2546220 – *[CVE-2017-16691] SNOTE: Digital signature verification along with note file extraction* in your AS ABAP based SAP system.

With the introduction of digitally signed SAP Notes, various procedures are offered for downloading SAP Notes:

- *Remote Function Call (RFC)* – not available as of January 1st 2020 for SAP systems based on SAP_BASIS 740 and higher any more. For background information, see SAP Note 2740667 – *RFC connection SAPOSS to SAP Service & Support backbone will change (latest) in January 2020*.
- *HTTP Protocol* – available as of SAP_BASIS 740.
- *Download Service Application* – available for SAP_BASIS release 700 onwards, any ABAP system having the download service can (for example the SAP Solution Manager 7.2 System) be used as download system. For more information concerning this scenario, see SAP Note 2554853 – *SAP NetWeaver download service for SAP Notes*.

For selecting and customizing the procedure, use *SAP Reference IMG* (transaction `SPRO`), area *SAP Customizing Implementation Guide* → *SAP NetWeaver* → *Application Server* → *Basis Services* → *SNOTE* → *Download of SAP Notes in SNOTE* or run report *RCWB_SNOTE_DWNLD_PROC_CONFIG*. This is a one-time set up. If required, you can change the settings in this report at any given point in time.

For more information, see SAP Note 2537133 – *FAQ - Digitally Signed SAP Notes*.

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- To view the Note text correctly in SAP Note Assistant, install Adobe Reader Version 7.0.1 or higher on the computer from which transaction `SNOTE` is started.
- Before you implement notes with SAP Note Assistant, you should upgrade to the latest version of SAP Note Assistant. Follow SAP Note 1668882 – *Note Assistant: Important notes for SAP_BASIS 730,731,740,750,751,752,753* for details.

SAP Note Assistant Goals

The goals of *SAP Note Assistant* are as follows:

- Automatically implement SAP Notes which handle repository object source code corrections
- Handle dependencies with other SAP Notes, SAP Support Packages, and modifications
- Display all SAP Notes implemented in the SAP system
- Handle updates (SAP Support Packages, SAP enhancement packages, SAP system upgrades)
- Correct only a single problem, not a replacement for SAP Support Packages

The *SAP Note Assistant* includes the following functions:

- *Reporting*: you can display an overview of all existing SAP Notes and their processing status, and all implemented source code corrections.
- *Workflow functions*: You can assign SAP Notes to users who then specify a processing status for the SAP Notes. The SAP system informs you if an SAP Note has an inconsistent status.
- *Logging*: the SAP system logs all processing steps.
- *Corrections*: you can automatically implement the source code corrections (correction instructions) contained in SAP Notes into your SAP system.
- *Integration*: when you apply SAP Support Packages or upgrade your SAP system, the SAP system automatically recognizes which SAP Notes have already been completed by an imported SAP Support Package or SAP system upgrade, and which correction instructions still need to be implemented.

You can apply the SAP Notes in two different ways with the *SAP Note Assistant*:

1. If a connection to the SAP Support Portal is configured in the SAP system, you can directly download the SAP Notes to your SAP system.
2. You can also separately download the SAP Notes from SAP Support Portal (for example, with the *Download Manager*) to your PC and then upload them to the SAP system.

   The upload then takes place from within the SAP Note Assistant.

SAP Notes that contain corrections for application transactions can be found with the help of the Automated Note Search Tool, transaction `ANST` or `ANST_SEARCH_TOOL` within the SAP system. For more information on this tool see SAP Note 1778716 – *Advanced Note Search Tool and SAP Note* 1818192 – *FAQ: Automated Note Search Tool* . There is also an *ANST Guide* available as attachment to SAP Note 1778716.

SAP Notes containing security relevant topics can be found either using the security notes search at https://launchpad.support.sap.com/#/securitynotes or by configuring and using *System Recommendations* in SAP Solution Manager (not part of this course).

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Hint:
Using program *RSECNOTE* (via transaction `SA38`) is not supported any longer since end of 2013.

Figure 139: How to Find SAP Notes

Once the needed SAP Notes have been identified, they have to be applied and distributed among the SAP system landscape.

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Figure 140: Distribution of Corrections

Follow these steps to apply SAP Notes in your SAP system landscape:

1. Implement the SAP Notes with the *SAP Note Assistant* in the development system (DEV).
2. Transport the SAP Notes from the development system to the quality assurance system (QAS) with the help of a transport request that contains the corrected objects. Do not implement the SAP Note with the *SAP Note Assistant* in QAS. Now you can test these corrections in QAS.
3. Import the SAP Notes into the production system (PRD). Use the transport request that contains the corrected objects. Do not implement the SAP Note with the SAP Note Assistant in PRD.

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Figure 141: SSCR Key

Changes to SAP repository objects that are introduced using the *SAP Note Assistant* do not require an SSCR key.

Handling the SAP Note Assistant

Figure 142: Download SAP Notes

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In *SAP Note Assistant* (transaction SNOTE): to download SAP Notes, choose *Goto → Download SAP Note*.

Figure 143: Worklist

The *SAP Note Assistant* is started with transaction SNOTE. The *Worklist* is your personal view on the SAP Notes (unlike the *Note Browser* that displays all SAP Notes that are available in the SAP system).

All users see inconsistent and new SAP Notes in their worklists. Under the category *In Processing*, you only see the SAP Notes that you process.

From your worklist, you can perform all actions such as download, implement, and display SAP Notes.

You can check the implementation status of an SAP Note.

You can classify an SAP Note or set the processing status.

If you want your colleague to process the SAP Note, enter your colleague's user name and set the SAP Note to *In Processing*. It will appear in the worklist of your colleague.

If the SAP Note does not correspond to your situation, you can set it to *Not Relevant*.

After implementing an SAP Note, you can set the status to *Completed*.

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Figure 144: Note Browser

The Note Browser gives an overview of all SAP Notes available in the SAP system.

To reduce the number of SAP Notes that are displayed in the results list, you can specify various criteria in the selection screen (processing status, application component, implementation status).

From the *Note Browser*, you can also implement or display SAP Notes.

SAP Note Assistant provides additional functions.

Viewing information

From your worklist, you can view the following information:

- SAP Notes that are assigned to you as a user
- All SAP Notes that are inconsistent, even if they are assigned to another user
- New SAP Notes that have not yet been processed

Finding SAP Notes

You can use the *Note Browser* to find any SAP Note that is available in the SAP system. Choose *Display SAP Note* to read through the SAP Note and see the source code changes.

Download SAP Notes

Download an SAP Note from the SAP Support Portal to your SAP system. Choose *Download SAP Note* in transaction `SNOTE`.

Upload SAP Notes

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Download an SAP Note from the SAP Support Portal to your front end. Then choose *Goto → Upload SAP Note* in transaction `SNOTE` to load the SAP Note into the SAP Note Assistant.

Checking SAP Notes

Choose *Check SAP Note* to check the implementation status.

Specifying processing status

You can specify the processing status by choosing *Set Processing Status* .

You can implement the correction instructions that are contained in the SAP Note. In the log, you can display the processing steps and add your own comments to the log.

You choose *Corrected Objects* to switch to the Modification Browser where you can see all the objects that an SAP Note has corrected.

Figure 145: Implement SAP Note

To implement the SAP Note, select the respective SAP Note and choose *Implement SAP Note*.

You must confirm that you have carefully read the SAP Note because it may contain pre-steps or post-processing activities that are described in the long text only.

You are prompted to include your changes in a transport request.

Traffic light indicates whether the changes can be copied, i.e. whether the correction instructions can be implemented. Double-clicking the message gives you more information.

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Figure 146: Reset SAP Note Implementation

In exceptional cases, you may want to de-implement an SAP Note that you have implemented. You can do this by choosing *Reset SAP Note Implementation*.

If you do this, the changes that have been introduced with the implementation of the SAP Note will be reset and the SAP Note will be reset to the status that it had before you implemented it.

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Figure 147: Handling SAP Notes with Preconditions

Sometimes, correction instructions can only be implemented if you implement other correction instructions before. These preconditions are described in the SAP Note. Because the *SAP Note Assistant* strictly follows the information in the SAP Note, you must implement the required SAP Notes before.

The required SAP Notes are automatically downloaded by *SAP Note Assistant*.

> Note:
> Make sure that you carefully read the prerequisite SAP Notes, too.

The *SAP Note Assistant* then tries to implement as many SAP Notes as possible in one step.

The *SAP Note Assistant* is closely related to the *Modification Assistant*. From within the *SAP Note Assistant* you can directly switch to the *Modification Browser* (transaction `SE95`). The *Modification Browser* displays an overview of all objects that are changed with this SAP Note.

If you have implemented corrections from SAP Notes manually before using the SAP Note Assistant, you must make these SAP Notes known to the *SAP Note Assistant*. Otherwise, the *SAP Note Assistant* does not know that this correction has already been implemented in your SAP system and implements it again. This may lead to inconsistencies.

You should first try to simply download the SAP Note with the *SAP Note Assistant*. Only if this does not work – for example because the SAP Note is not accessible any longer – you can manually register the SAP Note via program *SCWN_REGISTER_NOTES*.

Registration offers the following benefits:

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1. All the SAP Notes that have been implemented in your SAP system are displayed in the Note Browser.
2. If a manually implemented SAP Note is a prerequisite for an SAP Note that you want to implement using the *SAP Note Assistant*, the *SAP Note Assistant* recognizes that the prerequisite SAP Note has already been implemented and does not prompt you to implement it again.
3. For future SAP Support Packages or upgrades, the manually implemented SAP Notes are displayed during the modification adjustment in the category *SAP Note corrections*. The SAP system determines whether these SAP Notes have to be implemented again or reset to their original status.

To register the SAP Notes, the SAP system downloads the SAP Note and checks whether it is valid for your release and SAP Support Package level.

Problems with the SAP Note Assistant:

- If implementation fails, create a problem message in SAP Support Portal and assign it to the component of the SAP Note (for example, *FI-AR-CR*).
- If you experience any other problems with the SAP Note Assistant, create a problem message and assign it to the component *BC-UPG-NA.*

Transport-based Correction Instructions

Extensive changes to one functional area typically require a huge amount of SAP Notes and/or multiple manual changes. *SAP Note transport-based correction instruction* (TCI) is a new way to deliver ABAP correction instructions in a flexible manner.

From technical point of view, there are the following type of SAP Notes:

- SAP Notes without any correction instructions (such as *Consulting* notes or *Information for Installation* notes).
- SAP Notes with correction instruction(s).
- SAP Note Transport-Based Correction Instructions (TCIs).

SAP Notes with correction instruction(s) contain specific, single corrections. They can be implemented automatically for all supported objects. However, objects that are not supported must be implemented manually, which in turn might require developer knowledge.

SAP Note Transport-Based Correction Instructions (TCIs) in contrast contain corrections of only one specific functional area, which is an encapsulated subcomponent. They can contain multiple corrections, which reduces dependencies to other corrections and update artifacts. Technically, they contains an ABAP transport similar to SAP Support Packages deliveries, but they are delivered together with SAP Notes as a new type of correction instructions.

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Hint:
SAP Note 2489679 – *How to identify TCI Note* helps to differentiate a TCI Note from a non-TCI Note.

A TCI Note is a note which contains ABAP corrections in a package (such as *COMM SAPK70000LCPSAPBASIS*). In contrast, a non-TCI Note is a note which contains ABAP corrections to a object / new object (such as *REPS RSBDCOS0*). In-order to identify the kind of note, you need to check the delivered correction type.

TCIs support all ABAP objects that have a transport connection. A single TCI consists of exactly one ABAP transport request and a set of installation attributes, for example, software component version, minimal SAP Support Package, languages.

The validity of a TCI is defined by the software component version and a range of SAP Support Package levels.

Note:
As prerequisite, the system landscape has to be enabled by following the information in SAP Note 2187425 – *Information about SAP Note Transport based Correction Instructions (TCI)* . This SAP note contains a PDF as attachment that explains the configuration process in detail.

Benefits

Compared to SAP Notes with correction instructions, SAP Note transport-based correction instructions (TCI) support all transport-enabled SAP ABAP objects including Data Dictionary objects, table content and MIME objects. In addition, they allow a fast consumption of consolidated correction instructions and no development skills a needed for implementation due to an automated installation process. If needed, TCIs can also be de-implemented or rolled back. For details, see SAP Note 2408383 – *TCI - Enabling System for SAP Note Transport-Based Correction Instruction (TCI) Rollback* .

Implementation Process

The following figure outlines the implementation process for TCIs:

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Figure 148: Process Flow for Implementing Transport-based Correction Instructions

- In *SAP ONE Support Launchpad*, open the SAP Note that contains the TCI.
- Choose *Correction Instructions* and select the relevant software component.
- Choose *Download*. The system provides a SAR file. You have to save the downloaded SAR file into a directory of your front end computer or on operating system level of your SAP system.
- To implement the SAP Note with the corresponding TCI in your development system, use the *Note Assistant* through transaction `SNOTE`. In the *Note Assistant*, choose *Goto* → *Upload TCI* and select the SAR file that you have downloaded.
- Then choose *Goto* → *Download SAP Note* and enter the SAP Note number that matches the SAR file. Finally choose *Execute* and proceed as usual.
- Record your changes in a transport request. After a first test in the development system, release the transport request.

> Hint:
> Warnings about objects without directory entry can be ignored, since TCIs can contain deletions.

- Import the transport request into the quality assurance system and perform an (integration) test.
- After the integration test has successfully been passed, you can import the transport request into the production system.

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For more information on TCIs, see the PDF that is attached in SAP Note 2187425 – *Information about SAP Note Transport based Correction Instructions (TCI)* and the online documentation for *SAP S/4HANA* (*Product Assistance*), area *Enterprise Technology* → *Administrating the ABAP Platform* → *Administration Concepts and Tools* → *Solution Life Cycle Management* → *Software Logistics* → *Note Assistant* → *SAP Note Transport-Based Correction Instructions (TCI)*.

LESSON SUMMARY

You should now be able to:

- List the advantages of automatically impementing SAP Notes
- Differentiate between SAP Notes with Correction Instructions and SAP Notes with Transport-based Correction Instructions

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Unit 6
Lesson 2

SAP Support Packages

LESSON OVERVIEW
In this lesson, you will learn about modification adjustment and downtime when applying SAP Support Packages. In addition, you will learn about applying SAP Support Packages in a three system landscape.

Business Example

You want to import functional enhancements into your SAP system and correct problems in advance. Also you want to apply legal changes and security improvements. For this purpose, SAP makes SAP Support Packages available.

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

- Describe the import of SAP Support Packages
- Outline the difference between Support Package Stacks and Feature Package Stacks

Maintenance Using SAP Support Packages

An SAP system consists of different software components. All of these components are regularly updated using SAP Support Packages; that is, problems are solved, legal changes are shipped, security issues are being solved and new functions are provided using SAP Support Packages.

The SAP system should always be kept at an up to date level so that errors in the standard release are preventively removed.

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Figure 149: What is an SAP Support Package

What is an SAP Support Package?

An SAP Support Package is a group of corrected or new SAP objects. SAP Support Packages are required to correct problems in various components. This is done by replacing erroneous objects with corrected versions of these objects.

An SAP Support Package Stack is a combination of SAP Support Packages, recommended by SAP.

Each software component (such as *SAP_BASIS*) has a separate sequence of SAP Support Packages.

> Hint:
> In contrast to SAP Support Packages, *Feature Packages (FPs)* might include new innovations, product features, functions and/ or functionality in addition to corrections. With regards to technology, upgrade and administration, Feature Packages and SAP Support Packages are handled in the same manner, however. For details, see the end of this lesson.

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Requesting and Applying SAP Support Packages

Figure 150: Requesting SAP Support Packages

Before you can apply SAP Support Packages, you must first download them from the SAP Support Portal. You should apply whole SAP Support Package stacks rather than other combinations of SAP Support Packages.

For requesting SAP Support Packages, you need your SAP system registered in your SAP Solution Manager system. This SAP system information is brought to SAP Support Portal. Here you start the *Maintenance Planner* to calculate the SAP Support Packages.

1. Register your SAP system to be patched in a central System Landscape Directory (SLD). In this SLD technical information about your SAP system is stored.
2. Transfer the information from SLD via batch job to your central SAP Solution Manager system, into the *Landscape Management Database* (LMDB).
3. Manually check/define a so called *technical system* in LMDB.

> Note:
> The definition of a *product system* in LMDB is not needed any longer – since *Maintenance Planner* is used instead of *Maintenance Optimizer*.

4. Transfer the information from LMDB via batch job to the SAP Support Portal.
5. In SAP Support Portal, start the *Maintenance Planner*. Define SAP System dependencies and perform some verification.

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6. Use the *Maintenance Planner* to calculate the queue of SAP Support Packages to be applied.
7. From *Maintenance Planner*, download an XML file containing the description of the calculated SAP Support Packages to be applied. Also use *Maintenance Planner* to push the calculated SAP Support Packages to your download basket. Use the *Download Manager* to download the calculated SAP Support Packages from your download basket.
8. Start the tool to apply the SAP Support Packages: either `SPAM` or *SUM*. When using transaction `SPAM`, this transaction needs to be executed in client 000 of the system in question.

You also need a valid maintenance certificate in order to apply SAP Support Packages.

SAP recommends to create the maintenance certificates automatically with SAP Solution Manager. This causes much less effort than creating them manually, especially if maintenance certificates for several SAP systems are needed. A maintenance certificate can also be created manually using the SAP Support Portal.

> Hint:
> A maintenance certificate is valid for three months, only!

Figure 151: SPAM SAINT Update

The Support Package Manager (transaction `SPAM`) is the tool for applying SAP Support Packages.

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Before using the Support Package Manager, you should patch the tool itself with a *SPAM/SAINT update*. This is a patch to enhance the functions of `SPAM` and `SAINT`, for example when dealing with new attributes from new SAP Support Packages.

Transaction `SAINT` allows you to install and upgrade Add-Ons (industry solutions, plug-ins and so on) and preconfigured systems (PCS).

> Note:
> Please note that *SPAM/SAINT updates* come in German and English only. If you work in another language, new or updated user interface elements and texts might not be properly displayed. This is why SAP recommends to log on in German or English if you want to use the Support Package Manager.

Figure 152: Applying SAP Support Packages

The Support Package Manager ensures that only SAP Support Packages that match your SAP system are displayed in the queue. SAP Support Packages that are intended for a different release or an Add-on that is not installed do not appear in the queue.

You can compile a shared queue for all software components in the SAP system, by choosing *All Components*.

The queue contains the SAP Support Packages available for the selected component(s) in your SAP system and any required Conflict Resolution Transports (CRTs) and associated Add-on SAP Support Packages.

The following rules apply when you create a queue:

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- SAP Support Packages for a selected software component are placed in the queue according to their sequence.
- If SAP Support Packages in the queue are related to SAP Support Packages for another software component (predecessor relationship, CRT required), the extra SAP Support Packages will be added to the queue until all predecessor relationships are included.

If the SAP system has calculated a consistent queue, you can display it and check it by choosing the *Calculated Queue* tab.

Import Process

Figure 153: Support Package Manager: Import Process

> Note:
> Note that during the time needed for applying SAP Support Packages, no imports are allowed to take place, and no manual changes can be made to repository objects (ABAP programs, dictionary objects). The transport requests for modification adjustment are handled in a special way. So the time for applying SAP Support Packages should be kept as short as possible.

Due to the size and scope of current SAP Support Packages, importing SAP Support Packages requires longer SAP system downtime. The SAP system is not stopped and restarted during the import process, but it can not be used productively during this time. This restriction is a disadvantage for many production systems. To reduce the downtime during the import of SAP Support Packages, an import procedure has been developed that allows you to import a large proportion of the objects to be imported during production operation. These objects are mainly programs. The downtime can be significantly reduced if an SAP

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Support Package contains a high proportion of programs (the proportion might be up to 80%). With the *Downtime-minimized* import mode, the objects are imported into the database in an inactive state and are therefore 'invisible' to the SAP system. You can therefore continue to use the SAP system productively for a longer time.

> Hint:
> When importing SAP Support Packages, the Support Package Manager will check if there are still any transport requests in the import queue for the old SAP Support Package level. In this case, the Support Package Manager returns a warning. Nevertheless you can ignore the warning and still import the SAP Support Packages.

> Hint:
> It is also possible to import SAP Support Packages with the Software Update Manager (SUM). Importing SAP Support Packages with SUM is more difficult for the SAP system administrator, but can lead to an even much shorter downtime – if configured correctly!

Modification Adjustment

Figure 154: Support Package Manager: Performing the Modification Adjustment

The modification adjustment works as follows:

1. The Support Package Manager stops in order to allow the modification adjustment.

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2. Create a transport request in the Transport Organizer and tasks inside the transport request for the developers so that your developers can perform the modification adjustment.
3. Ask the developers to perform the modification adjustment for their objects. After the adjustment is complete, the developers must release their tasks and inform you. **The adjustment should be performed in the development client, not client 000, of course.**
4. If you left the transaction, call the Support Package Manager (transaction `SPAM`) again, and choose *Support Package → Import Queue* . The SAP system prompts you again to perform the modification adjustment. As it has already been completed, ignore the message and choose *Continue*. The Support Package Manager completes the processing and displays the status.

The *Import logs of the queue* function displays logs for steps of the Support Package Manager that use the transport control program *tp*. After the queue has been successfully imported, you should always check these logs. To jump to the log display, choose *Goto → Import Logs → Queue* in the initial screen of the Support Package Manager.

Confirm the successful import of the queue into your SAP system. This ensures that you can import other SAP Support Packages in future. Without this confirmation, it is not possible to import additional SAP Support Packages. If you have not yet confirmed successfully imported SAP Support Packages, you will be prompted to confirm these packages during the upgrade of the SAP system.

SAP Support Packages and TMS

A transport request that has been released from an SAP system with a certain release should only be imported into an SAP system with the same release. This is obvious when transporting objects from the SAP standard, for example modifications and customizing. But this restriction should also be considered, when transporting customer developments – because these can be related to SAP standard objects.

Not only the release, as for example SAP S/4HANA Server 1709 versus SAP S/4HANA Server 1809 has to be considered, but also the level of the corresponding software components and the SAP Support Package level. So a transport request that has been exported, for example, from an SAP S/4HANA 1809 Server with S4CORE Support Package 6 shouldn't be imported into an SAP S/4HANA 1809 Server with S4CORE Support Package 5.

> Hint:
> Export release should be equal to import release: Transport requests usually rely on a certain release of the corresponding software components and their SAP Support Package level! They shouldn't be imported in an SAP system with a different level than the one they were exported from.

As a result of this, the applying of SAP Support Packages and the importing of transport requests have to be coordinated (see the following figure).

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Figure 155: Synchronization between SAP Support Packages and TMS (1/2)

TMS checks if a transport requests fits the software component and SAP Support Package level of the target SAP system. The result of this check can be seen in the import queue, in column *CV*. This is been done by comparing the software component vector of the transport request with the software components of the target system. If the check is negative, the column *Status* shows the icon for *Request does not match component version* .

Hint:
A transport request that does not fit the target system can still be imported choosing the import option *Ignore Invalid Component Version* .

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Figure 156: Synchronization between SAP Support Packages and TMS (2/2)

> Hint:
> The version check will be performed only if the *tp* parameter *SP_TRANS_SYNC* is set to *ON* for the SAP system to be imported in.

A corresponding check is also performed when importing SAP Support Packages: if there are still any transport requests in the import queue for the old SAP Support Package level, the Support Package Manager will return a warning. Nevertheless, it is possible to the warning and still import the SAP Support Packages.

Applying SAP Support Packages with SUM

It is also possible to apply SAP Support Packages with *SUM* (Software Update Manager). *SUM* is the tool used for an SAP system update/upgrade. But it can also be used to apply SAP Support Packages. SUM is somewhat more complicated to use, compared with the Support Package Manager, transaction `SPAM`, but it can generate a much shorter downtime then `SPAM` – when configured correctly.

> Hint:
> In case that downtime is a big issue and you have to apply many SAP Support Packages, consider to use *SUM* instead of `SPAM`.

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Note:
In some seldom cases, SPAM can not be used to apply SAP Support Packages - here using *SUM* is mandatory. For details see SAP Note 1795865 – *SP Update to SAP NW AS ABAP 7.40 SP02, SP05, SP08 or a higher SP (incl. SP08) with SUM Tool*.

Figure 157: Applying SAP Support Packages with SUM

The *SUM Standard* and *Advanced* modes use a shadow system in which activities take place during the preparation phase, shifted from downtime.

Note:
Because there is almost no difference between *Standard* and *Advanced*, there is no *Advanced* mode any longer in newer SUM versions (SUM 2.0 SP 06 and above).

Hint:
For more details about *SUM*, see the lesson dealing with SAP system update/upgrade.

Both, SPAM and *SUM* can be used for now and in the future. Both tools have scenarios in which they are the preferred choice.

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Note:
Both tools – `SPAM` and *SUM* – can be used to apply SAP Support Packages. In most cases you would choose the `SPAM`, but you should choose *SUM* for applying a huge amount of SAP Support Packages in downtime critical SAP systems. For more information, see SAP Note 1803986 – *Rules to use SUM or SPAM/SAINT to apply SPs for ABAP stacks*.

The following slide provides advantages of both methods:

SPAM/SAINT	SUM
Easy handling	Short downtime possible
Short runtime	Shows point of no return with reset option
Test mode, showing modification preview	Checks available database free space
Does not require SAP Solution Manager and Maintenance Planner	Stack.xml for valid setup mandatory
Can work with Third Party Add-ons unknown to Maintenance Planner	Runs separately, outside SAP system
Runs as transaction, inside SAP system, possible as dialog or batch	Can restart the SAP system, and switch the kernel

Figure 158: SPAM vs. SUM

Feature Package Stacks and SAP Support Package Stacks

SAP continuously improves SAP software through the SAP Notes service as well as feature packages and support packages.

For SAP systems based on AS ABAP, an SAP **Support Package** is a bundle of software corrections available as a support package for the ABAP programming language.

Feature Packages in turn are packages that deliver non-disruptive innovation for generally available product versions, also bundling software corrections and legal changes. A feature package delivery comes as a Feature Package stack. Like an SAP Support Package stack, it must be used in the given combination. Feature Package stacks should be seen as an entity in themselves – customers must heed the minimum requirements and dependencies between individual components and apply the Feature Packages and patches specified in the Feature Package stack together.

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> Note:
> Feature Packages are not provided for all product versions. SAP decides case by case whether a Feature Package phase is offered after general availability of a product version for a defined time period.

For on-premise software products, SAP S/4HANA provides innovations on a regular basis through releases and feature packages.

> Note:
> At the time when this handbook was created, there are currently no planned enhancement packages for SAP S/4HANA.

Figure 159: Feature Packages and SAP Support Packages for SAP S/4HANA on Premise

The last Feature Package stack for a given release before a new release is shipped is usually the starting point of the maintenance-only phase. This Feature Package stack is also called *Go-to feature package* . During a maintenance-only phase, SAP provides corrections but no new innovations for the release.

- During the *feature package phase* of a product version, the focus is on *Time to Impact*. In this phase, the functional scope of the product version evolves based on customer and market demands. Therefore moving to the latest product version is recommended for customers that regularly deploy SAP Support Package updates and want to follow the quick innovation track.
- During the *maintenance-only phase*, the focus is on *maintenance*. Not moving to the latest product version is recommended for customers that do not plan for regular SAP Support Package updates and want to keep their system running as-is.

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LESSON SUMMARY

You should now be able to:

- Describe the import of SAP Support Packages
- Outline the difference between Support Package Stacks and Feature Package Stacks

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Unit 6
Lesson 3

SAP System Upgrade and SAP S/4HANA Conversion

LESSON OVERVIEW
In this lesson, you will get a brief overview about planning and performing an SAP enhancement package installation and an SAP system upgrade.

Business Example

The SAP administrator of your company should at least roughly understand how an SAP enhancement package installation and an SAP system upgrade works.

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

- Outline the process flow for an SAP System Upgrade and SAP S/4HANA Conversion

SAP System Upgrade and SAP S/4HANA Conversion

Hint:
In the following, the term *update* will be used for applying SAP Support Packages or installing parts of an SAP Enhancement Package.

Note:
When performing a release change of an SAP system, sometimes the phrase *installing parts of an SAP Enhancement Package* is used (e.g. when going from SAP ECC 6.05 to SAP ECC 6.07) and sometimes the phrase *upgrade* is used (e.g. when going from SAP ECC 6.05 to SAP ECC 6.08). This depends on the start and the target release. There are two different phrases, because the technique used differs at one point. A release change of an SAP S/4HANA Server system is always called *upgrade*.

Note:
Changing the product from SAP ECC to SAP S/4HANA Server is called *SAP S/4HANA Conversion*. This procedure is technically related to an *upgrade* procedure but needs many additional manual steps to be performed.

The central tool used is the *SUM* (Software Update Manager). The SUM can be used for one of the following:

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Capabilities of *SUM* (Software Update Manager)

- Import customer transport requests
- Apply SAP Support Packages
- Install and upgrade add-ons
- Perform a release change of the SAP system
  - Install parts of an SAP Enhancement Package
  - Perform an SAP system upgrade
- Migrate the database with DMO (Database Migration Option) to
  - SAP HDB
  - SAP ASE
  - MS SQL Server
  - IBM DB2
  - SAP MaxDB
  - Oracle
- Perform an SAP S/4HANA Conversion
  - Including DMO
  - Without DMO

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Figure 160: SAP System Upgrade and SAP S/4HANA Conversion

Note:
An *SAP system upgrade* and an *SAP S/4HANA Conversion* exchange software components of the old release with software components of the new release. In case of an SAP system upgrade the type of the SAP system remains as it is (e.g. SAP ECC or SAP S/4HANA Server) – in case of an SAP S/4HANA conversion the type of the SAP system is exchanged from SAP ECC to SAP S/4HANA Server.

Hint:
For detailed information see https://support.sap.com/sltoolset

Planning and Performing an SAP System Upgrade

The first thing that must happen is to recognize the need for an upgrade. This recognition of the need to upgrade could be at a number of different levels of upgrade recognition triggers; some are very operational in nature, while others are much more strategic. On the operational side, you may realize that you have a serious technical SAP system limitation within your current environment.

At some time, an SAP release reaches its end of maintenance. This means that SAP delivers no more SAP Support Packages that adapt your processes for legal requirements and correct errors. See https://support.sap.com/pam (product availability matrix) in the SAP Support Portal.

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The new release can contain many new functions that your company requires. New features can be added on the basis side (new administration tools) or on the application side (new and enhanced business functionality).

The following factors are also important when deciding whether to update/upgrade:

- *Costs*: what will the upgrade cost me in total?
- *Payback/ROI*: will the upgrade have financial advantages for me?
- *Benefit*: what advantages will the upgrade have?
- *Risks*: are there risks involved in the upgrade?

Change and improvements are integral parts of today's business environment. SAP supports and embraces the process of continuous change as

- new SAP functions becomes available.
- market technology changes.
- new business requirements are defined.

Focus on the typical problem areas such as solution gaps: assuming you have documented your initial implementation, one of the easiest things to evaluate during an upgrade planning is whether or not any of the original gaps can be replaced by standard functions in the target release.

Review each component of new release functions. Determine how these enhancements can add value to your company's operations.

Figure 161: Upgrading a Three-System Landscape

When planning an SAP system upgrade, consider the following topics:

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- Release customizing
- Modification adjustment and migration of modifications into SAP standard
- Adaptation and testing of customer enhancements
- Adaptation and testing of interfaces
- End-user training
- Validation and testing of the new release

The biggest part of the upgrade project represents the adaptation of the current business processes to the new features of the new SAP system. There are not only changes to the customizing and the repository. There are also changes for the end users how to work with the new applications. When the development system has been upgraded to the new release, it can still be necessary to develop bug fixes for the productive system which is still working with the start release.

Some additional technical upgrade process related issues are:

- Hardware requirement on new release: server, front-end, network
- Sizing forecast and SAP system configuration for new release
- Planning of OS, DB, and SAP system upgrade
- Testing and validating of a backup strategy for the upgrade and on the new release
- Performing technical update/upgrade on the whole SAP system landscape (transport landscape)
- Post-upgrade activities including performance monitoring

Since the requirements of the new release are changing, you need a sizing forecast which in turn requires changes to the configuration. Finally, the whole environment is concerned, for example, the server hardware, the client hardware, the network, the operating system, and the database. Especially when upgrading the operating system, other software on this computer has to be tested. For example, the backup software has to be tested.

Because of the new requirements, performance monitoring gets more important after the upgrade.

When deciding to which SAP release you want to upgrade, consider

- SAP's release strategy
- IT costs for upgrade and maintenance
- Cost for adapting business processes
- Business requirements versus SAP functions
- Costs versus Payback/ROI

Note:
When considering an upgrade of an AS ABAP based SAP systems, many aspects stated here depend on the activation of business functions. See below in this lesson for details.

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An SAP system upgrade is more than just a technical upgrade! The upgrade of an SAP system landscape should be executed as a project. A significant amount of planning and lots of steps are required in order to perform a release change for the SAP system landscape. Customer upgrade projects last several months! Update projects last about half as long. So do not forget to think about

- Budgeting and resource planning
- Upgrade project in relation to other implementation/roll out activities
- Availability of resources
- End of maintenance of the current release

A technical upgrade of one SAP system involves the following steps (see the following figure):

- When planning the upgrade, you should take decisions concerning the upgrade strategy. An exact upgrade schedule should be drawn up.

> Hint:
> It is vital to read the SAP Notes concerning the upgrade! If you don't, your SAP system upgrade likely will fail!

- Certain requirements (software, hardware, operating system, database) must be met before you can upgrade the SAP system. Careful preparation of the upgrade is the best guarantee that it will run without errors.
- After you have performed the preparations, you can start.
- The *prepare* part of the upgrade automatically checks if your SAP system is properly configured for performing the upgrade. However, you must perform many tests and actions manually before starting the upgrade.
- Perform the upgrade.
- Follow-up activities include all actions necessary for completing the upgrade. SAP recommends completing the actions in the order given in the update guidelines.

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	Action	Tool/Information Source
Uptime	1 Define exact target release	Maintenance Planner
Uptime	2 Perform pre update steps	1. SAP Notes (sltoolset) 2. SUM Guide (sltoolset) 3. Application Guide (instguides) 4. ASU Toolbox (SAP Note 1000009)
Uptime	3 **Perform preparational steps (Prepare)**	**SAPup (SUM)**, Roadmap Steps 1-3
Uptime / Down time	4 **Perform actual update steps**	**SAPup (SUM)**, Roadmap Steps 4-6
Down time	5 Perform post update steps	1. SAP Notes (sltoolset) 2. SUM Guide (sltoolset) 3. Application Guide (instguides) 4. ASU Toolbox (SAP Note 1000009)

Figure 162: Upgrade Technical Overview

Note:
SUM (Software Update Manager) is the complete 'package' – *SAPup* is the main tool inside.

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Figure 163: The SUM/SAPup UI

Several tools help to perform the upgrade. They are part of the technical upgrade process.

- The *prepare* part of *SUM* has to run prior to the SAP system upgrade. You have to repeat it until it is error-free. The error messages are written to the log file *CHECKS.LOG*.

  Checks are performed on the source release. For example, it is checked whether or not the source release of the SAP system, the database, and the operating system is sufficient for this upgrade, whether or not there is enough space in the database available, whether or not modified SAP objects are still in unreleased transport requests.

  SAP enhancement package parts, SAP Support Packages and add-Ons are collected for binding them to the upgrade process. This is very important. If you, for example, do not bind enough SAP Support Packages to the upgrade, this will result in a loss of data during the SAP system upgrade. If you do not maintain your add-Ons, the whole SAP system can become unstable and inconsistent.

  > Note:
  > This is been done with the help of the *Maintenance Planner* in general – and by adding extra packages in detail.

  Furthermore, tools are imported in the source SAP system that are needed for the SAP system upgrade.

- With the SUM UI, the upgrade process runs independently from a dedicated front end server. So you can control and monitor the progress of the upgrade from a number of different places.

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This provides optimal support for a remote upgrade. The SUM provides an alert mechanism that lets you start an external program (for example: sending an SMS to your mobile) if it breaks down.

- With the new release, ABAP programs of the new software components are exchanged. They are delivered in their source code, but not with their load. This is not possible, because the load depends on the local environment (kernel, operating system, and hardware). When you call a program the first time, its load will automatically be generated if it does not already exist. This may, however, reduce production system performance for some time after the update/upgrade. To avoid this, you can use transaction `SGEN` to generate the loads at the end of the technical downtime, during the downtime – or let SUM do the generation before the begin of the downtime, during productive operation.

The latest *SUM* archive can be downloaded from SAP Support Portal at https://support.sap.com/sltoolset area *System Maintenance*.

Perform the following steps to start *SUM* (actually: start *SAPup*):

1. Copy the *SUM* archive to the host, the PAS of the SAP system runs on, for example to directory *usr/sap/<SID>* – or any other directory. This directory should have about 100 to 200 GB of free space.
2. Unpack the *SUM* archive – this results in around 20.000 files and several directories.
3. Update the *SAP Host Agent*, if necessary – it is being used to connect the *SUM* UI to *SAPup*. *SAP Host Agent* should be up to date.
4. Configure the SAP Host Agent from within the *SUM/abap* directory: **`SUMSTART confighostagent <SID>`**. On a Windows operating system, you have to perform this step as user *<sid>adm*, on a Linux/Unix operating system as user *root* (user *install* in this training system).
5. Connect a UI5 enabled browser via *http://<hostname>:1128/lmsl/sumabap/<SID>/doc/slui* – this connects the *SUM* UI (the browser) to the *SUM* tool *SAPup*.
6. Log on to *SUM* with user *<sid>adm*.

When using SUM – just as `SPAM` or `SAINT` – these steps are performed first on the development system, then on the quality assurance system, then on the productive system.

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Figure 164: Phases of an SAP System Update

The figure above shows the main phases of an update procedure.

- *RUN_RSDBSCPY* clones tables from the original to the shadow repository (update only).
- *EU_IMPORT* creates the shadow repository from upgrade DVDs (upgrade only).
- *DIFF...* copies customer-specific objects from the original to the shadow repository (upgrade only).
- *DDIC_UPG* imports dictionary objects from the download directory to the shadow repository.
- *ACT_UPG* activates all ABAP dictionary objects that are not delivered activated.
- *RUN_RSPTBFIL_ISUTABU* , *RUN_CRR...* for NZDM – if selected
- *PARDIST_SHD* starts the distributor.
- *SHADOW_IMPORT...* imports non-dictionary objects from the download directory to the shadow repository, also copies upgrade and language data from the download directory – only if it is inserted into new tables.
- *RUN_RSCPINTS_PREP_MIG* – calculation to optimize database migration in case of DMO
- *RUN_GEN_GENER8* runs SGEN – if selected
- *EU_CLONE_MIG_UT_RUN* performs the uptime migration – if the SUM run performs a DMO.
- *DOWNCONF_DTTRANS* begin of downtime, changes profiles.

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- *EU_CLONE_MIG_DT_RUN* performs the downtime migration – if the SUM run performs a DMO
- *EU_SWITCH* switches to new repository – if the SUM run does not perform a DMO.
- *PARCONV_UPG* converts application tables
- *PARMVNT_UPG* does move nametab of application tables
- *TABIM_UPG* imports upgrade and language data from the download directory
- *XPRAS_AIMMRG* executes XPRAs and AIMs (both are ABAP programs executed to adopt data to the new release).

Note:
Some features are available in certain scenarios, only. These are flagged with a * on the slide.

Figure 165: Modification Adjustment when using SUM (Standard/Advanced)

Note:
The terms *SAP system active* and *SAP system down* on this figure refers to *SUM* configuration *Standard* or *Advanced*. When choosing *SUM* configuration *Single System*, almost the entire procedure runs in downtime!

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The start of the update process involves the transfer of new data to the SAP system. SAP repository objects are imported into the SAP system. All repository objects that have been modified by customers must be compared to the new SAP standard during the update process.

In order to avoid loss of data and table fields that customers may have created, conflicting table structures must be merged before the activation of dictionary objects in the update process.

If objects need to be adjusted, use the transactions `SPDD` and `SPAU`. All modifications made by customers are then merged with the new SAP object versions to retain data; otherwise, the new SAP version will be activated and data may be lost.

When choosing the *Standard* or *Advanced* mode, the SAP system is available during the activation phase. The activation takes place via the shadow instance via the shadow system in the shadow repository.

When the update is completed, the SAP system is successfully running at the new release level. Customer-developed objects and modifications have been preserved.

> Hint:
> The two transport requests from `SPDD` and `SPAU` (one from `SPDD` and one from `SPAU`) can be included (**not imported**) into the update of the subsequent SAP systems in the same SAP system landscape. By doing this, the modification adjustment is performed automatically in this subsequent SAP systems. Here you only have to adjust those objects manually that were modified in the subsequent SAP systems, but not in the SAP system in which you have performed `SPDD` and `SPAU`.

The ABAP Dictionary objects (tables, data elements, domains, and so on) are adjusted during productive operation, before the activation of the ABAP Dictionary. The adjusted objects are collected in a transport request. You don't release this transport request; instead it must be flagged for export in transaction `SPDD`. Towards the end of the update/upgrade, *SUM* exports this transport request into the transport directory, and then registers it for transport in the file *<transport directory>/bin/umodauto.lst* .

Non-dictionary repository objects (reports, screens, and so on) are adjusted towards the end of the update during downtime. At this stage, the import of SAP objects has already been completed. However, the old, modified version is still available in the version database. As with ABAP Dictionary objects, all adjustments are released to a transport request that is flagged and then exported and registered by *SUM*.

> Caution:
> Do not attempt to import adjustment transport requests into the SAP system manually during `SPDD`. This can lead to a loss of data!

Do not activate any objects during `SPDD`. Activation is carried out automatically after the modification adjustment.

After you have completed the update/upgrade phases, you have a maximum of 14 days to execute transaction `SPAU` without a key check (SAP Software Change Registration, SSCR) for the objects that you changed.

For further information, see the upgrade manual and online application help for `SPDD/SPAU`.

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Activating Business Functions

By using the *Switch Framework* , it is possible to activate new business functions. Without activation of the business functions, the system would behave as in the source release of the update. Only needed business functions should be activated. This significantly reduces the effort of testing, adjusting customizing, adjusting own development, training end users, and others.

> Hint:
> This technique is available in SAP S/4HANA Server, SAP ECC, and other AS ABAP-based SAP systems.

Because most business functions can not be de-activated once they are activated, the activation and first testing should be done in an sandbox system. In case that the wrong business function was activated, the sandbox system could be reset. The needed business functions then can be activated in the development system using transaction `SFW5`. Now, a transport request should be created in `SFW5`, that contains the activated switches. It is transported to the quality assurance system. Here testing takes place. After adjusting customizing and adjusting own development via the development system, the transport request containing the switch settings can be imported together with the adjustment transport requests into the production system.

Figure 166: Activating Business Functions

Transactions used for handling the Switch Framework are

- `SFW5` – activate/deactivate business functions

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- `SFW_BROWSER` – investigate, which enhancements are related to the business function in question
- `SFW1` – create switches (only customer enhancements)
- `SFW2` – create business functions (only customer enhancements)
- `SFW3` – create business function sets for industry solutions (only customer enhancements)

Figure 167: Switch Framework

The Switch Framework enables optional activation of business functions: With the Switch Framework, it is possible to control the activation of repository objects. Activating a business function triggers switches, which then control the execution of the code enhancements. These switches ensure that you only work with the new functions if you have activated them. All functional changes and the impact of an activated business function are made transparent in advance by the documentation. Bear in mind that once a business function is activated you – mostly – cannot reverse it. Please note: The activation process starts a batch job in your SAP system which automatically performs all changes in the SAP system.

> Note:
> The Switch Framework is a proven concept as it was already used to retrofit industry solutions in SAP ECC 6.0 – which is 8 releases ago!

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LESSON SUMMARY

You should now be able to:

- Outline the process flow for an SAP System Upgrade and SAP S/4HANA Conversion

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Learning Assessment

1. You are running a standard three-system landscape. When applying an SAP note with the SAP Note Assistant, several steps are performed. Bring the following steps into the right sequence, regarding the applying of an SAP note.

   Arrange these steps into the correct sequence.

   - [ ] Apply SAP Note with SAP Note Assistant in development system
   - [ ] Download SAP note with SAP Note Assistant in development system
   - [ ] Check SAP note with SAP Note Assistant in development system
   - [ ] Import transport request into production system
   - [ ] Perform first test in development system and release corresponding transport request
   - [ ] Search for SAP note in SAP Support Portal
   - [ ] Import transport request into quality assurance system and perform quality assurance testing

2. When applying an SAP note with the SAP Note Assistant, neither a developer key nor an object key is necessary for applying the SAP note itself but both keys can be necessary for manual activities related to the SAP note.

   Determine whether this statement is true or false.

   - [ ] True
   - [ ] False

3. Which tools can be used to apply SAP Support Packages?

   Choose the correct answers.

   - [ ] A Support Package Manager (`SPAM`)
   - [ ] B Software Update Manager (SUM)
   - [ ] C Transport Management System (TMS)
   - [ ] D SAP Note Assistant (`SNOTE`)

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4. You want to apply SAP Support Packages using the Support Package Manager (SPAM). Bring the following steps into the right sequence, regarding the applying of SAP Support Packages.

   Arrange these steps into the correct sequence.

   - [ ] `SPAM`: 'Load Support Packages'
   - [ ] Download SAP Support Packages from SAP Support Portal
   - [ ] Copy SAP Support Packages to the transport directory
   - [ ] `SPAM`: final check of logs
   - [ ] Unpack SAP Support Packages
   - [ ] `SPAM`: define queue
   - [ ] `SPDD`: possibly modification adjustment of dictionary objects
   - [ ] `SPAM`: start importing queue of SAP Support Packages
   - [ ] Perform a maintenance transaction with the Maintenance Planner
   - [ ] `SPAU`: possibly modification adjustment of non-dictionary objects
   - [ ] `SPAM`: confirm queue
   - [ ] `SPAM`: set start conditions for the 4 modules

5. When applying SAP Support Packages with the Support Package Manager (SPAM), which of the following steps need to run in downtime?

   Choose the correct answers.

   - [ ] A Dictionary activation
   - [ ] B XPRAs execution
   - [ ] C Import of inactive dictionary objects
   - [ ] D Modification adjustment of dictionary objects (`SPDD`)

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6. You want to upgrade your SAP S/4HANA Server system to SAP S/4HANA 1809. Bring the following steps into the right sequence regarding the upgrade procedure.

   Arrange these steps into the correct sequence.

   - [ ] Check pre-upgrade steps from SAP notes, SUM guide, application guide and ASU Toolbox
   - [ ] Perform post-upgrade steps from SAP notes, SUM guide, application guide and ASU Toolbox
   - [ ] Perform actual upgrade steps with the Software Update Manager (SUM)
   - [ ] Define exact target release with Maintenance Planner
   - [ ] Perform preparational steps with the Software Update Manager (SUM)

7. It is possible to perform an SAP system upgrade from SAP ECC 6.05 to SAP S/4HANA Server 1809.

   Determine whether this statement is true or false.

   - [ ] True
   - [ ] False

8. You are running a three-system landscape. You want to activate a business function with the Switch Framework (transaction `SFW5`). Bring the following steps into the right sequence, regarding the activation procedure.

   Arrange these steps into the correct sequence.

   - [ ] In the development system, activate the correct business functions with `SFW5`
   - [ ] In the quality assurance system, import the transport request with `STMS` and perform quality assurance testing
   - [ ] In the production system, import the transport request with `STMS`
   - [ ] In the development system, create a transport request containing the activated business functions with `SFW5` and release the transport request
   - [ ] In a temporary sandbox system, activate the business functions for test purposes with `SFW5`

9. Modification adjustments should be performed by SAP system administrators.

   Determine whether this statement is true or false.

   - [ ] True
   - [ ] False

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Learning Assessment - Answers

1. You are running a standard three-system landscape. When applying an SAP note with the SAP Note Assistant, several steps are performed. Bring the following steps into the right sequence, regarding the applying of an SAP note.

   Arrange these steps into the correct sequence.

   4 Apply SAP Note with SAP Note Assistant in development system

   2 Download SAP note with SAP Note Assistant in development system

   3 Check SAP note with SAP Note Assistant in development system

   7 Import transport request into production system

   5 Perform first test in development system and release corresponding transport request

   1 Search for SAP note in SAP Support Portal

   6 Import transport request into quality assurance system and perform quality assurance testing

   You are correct! First, you search for the SAP note in the SAP Support Portal, you then download the SAP note with the SAP Note Assistant in the development system. You then check the SAP note with the SAP Note Assistant in the development system, followed by applying the SAP Note with the SAP Note Assistant in the development system. You will then perform a first test in the development system and release the corresponding transport request, then you import the transport request into the quality assurance system and perform quality assurance testing, finally you import the transport request into the production system. Read more on this in the lesson 'SAP Note Assistant' of the course ADM325.

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2. When applying an SAP note with the SAP Note Assistant, neither a developer key nor an object key is necessary for applying the SAP note itself but both keys can be necessary for manual activities related to the SAP note.

   Determine whether this statement is true or false.

   [X] True

   [ ] False

   You are correct! When applying an SAP note with the SAP Note Assistant, neither a developer key nor an object key is necessary for applying the SAP note itself but both keys can be necessary for manual activities related to the SAP note. For example, for creating a package or changing a table structure. Read more on this in the lesson 'SAP Note Assistant' of the course ADM325.

3. Which tools can be used to apply SAP Support Packages?

   Choose the correct answers.

   [X] A Support Package Manager (`SPAM`)

   [X] B Software Update Manager (SUM)

   [ ] C Transport Management System (TMS)

   [ ] D SAP Note Assistant (`SNOTE`)

   You are correct! You can apply SAP Support Packages using `SPAM` or SUM. TMS is used to import transport requests. `SNOTE` is used to apply SAP notes. Read more on this in the lesson 'SAP Support Packages' of the course ADM325.

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4. You want to apply SAP Support Packages using the Support Package Manager (SPAM). Bring the following steps into the right sequence, regarding the applying of SAP Support Packages.

   Arrange these steps into the correct sequence.

   5 SPAM: 'Load Support Packages'

   2 Download SAP Support Packages from SAP Support Portal

   3 Copy SAP Support Packages to the transport directory

   11 SPAM: final check of logs

   4 Unpack SAP Support Packages

   6 SPAM: define queue

   9 SPDD: possibly modification adjustment of dictionary objects

   8 SPAM: start importing queue of SAP Support Packages

   1 Perform a maintenance transaction with the Maintenance Planner

   10 SPAU: possibly modification adjustment of non-dictionary objects

   12 SPAM: confirm queue

   7 SPAM: set start conditions for the 4 modules

   You are correct! First you perform a maintenance transaction with the Maintenance Planner, then you download the SAP Support Packages from the SAP Support Portal. Next, you copy the SAP Support Packages to the transport directory, then you unpack the SAP Support Packages, and you 'Load Support Packages' with SPAM. You then define the queue with SPAM, and set the start conditions for the 4 modules with SPAM. After this, you start importing the queue of SAP Support Packages with SPAM, and possibly perform the modification adjustment of the dictionary objects with SPDD, and then possibly perform the modification adjustment of the non-dictionary objects with SPAU. After a final check of the logs with SPAM, you can then confirm the queue with SPAM. Read more on this in the lesson 'SAP Support Packages' of the course ADM325.

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5. When applying SAP Support Packages with the Support Package Manager (SPAM), which of the following steps need to run in downtime?

   Choose the correct answers.

   [X] A Dictionary activation

   [X] B XPRAs execution

   [ ] C Import of inactive dictionary objects

   [ ] D Modification adjustment of dictionary objects (`SPDD`)

   You are correct! The dictionary activation and XPRAs execution have to run in downtime. The import of inactive dictionary objects and modification adjustment of dictionary objects (`SPDD`) can be performed in uptime. Read more on this in the lesson 'SAP Support Packages' of the course ADM325.

6. You want to upgrade your SAP S/4HANA Server system to SAP S/4HANA 1809. Bring the following steps into the right sequence regarding the upgrade procedure.

   Arrange these steps into the correct sequence.

   [2] Check pre-upgrade steps from SAP notes, SUM guide, application guide and ASU Toolbox

   [5] Perform post-upgrade steps from SAP notes, SUM guide, application guide and ASU Toolbox

   [4] Perform actual upgrade steps with the Software Update Manager (SUM)

   [1] Define exact target release with Maintenance Planner

   [3] Perform preparational steps with the Software Update Manager (SUM)

   You are correct! First you define the exact target release with the Maintenance Planner, then you check the pre-upgrade steps from SAP notes, SUM guide, application guide and ASU Toolbox. Next, you perform the preparational steps with the Software Update Manager (SUM), then you perform the actual upgrade steps with the Software Update Manager (SUM), and finally you perform post-upgrade steps from SAP notes, SUM guide, application guide and ASU Toolbox. Read more on this in the lesson 'SAP System Upgrade and SAP S/4HANA Conversion' of the course ADM325.

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7. It is possible to perform an SAP system upgrade from SAP ECC 6.05 to SAP S/4HANA Server 1809.

   Determine whether this statement is true or false.

   [ ] True

   [X] False

   You are correct! You can not perform an upgrade from SAP ECC 6.05 to SAP S/4HANA Server 1809. But you can perform an SAP S/4HANA Conversion from SAP ECC 6.05 to SAP S/4HANA Server 1809! Read more on this in the lesson 'SAP System Upgrade and SAP S/4HANA Conversion' of the course ADM325.

8. You are running a three-system landscape. You want to activate a business function with the Switch Framework (transaction `SFW5`). Bring the following steps into the right sequence, regarding the activation procedure.

   Arrange these steps into the correct sequence.

   [2] In the development system, activate the correct business functions with `SFW5`

   [4] In the quality assurance system, import the transport request with `STMS` and perform quality assurance testing

   [5] In the production system, import the transport request with `STMS`

   [3] In the development system, create a transport request containing the activated business functions with `SFW5` and release the transport request

   [1] In a temporary sandbox system, activate the business functions for test purposes with `SFW5`

   You are correct! First you activate the business functions for test purposes with transaction `SFW5` in a temporary sandbox system, then you activate the correct business functions with transaction `SFW5` in the development system. You then create a transport request containing the activated business functions with transaction `SFW5` in the development system and release the transport request. Next, you import the transport request with transaction `STMS` in the quality assurance system and perform quality assurance testing, and finally you import the transport request with transaction `STMS` in the production system. Read more on this in the lesson 'SAP Enhancement Packages and SAP System Upgrade' of the course ADM325.

9. Modification adjustments should be performed by SAP system administrators.

   Determine whether this statement is true or false.

   [ ] True

   [X] False

   You are correct! Modification adjustments should be performed by developers and not by SAP system administrators. Read more on this in the lesson 'SAP Enhancement Packages and SAP System Upgrade' of the course ADM325.

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UNIT 7 Client Tools

Lesson 1

Client Copy and Client Transport Tools 285

Lesson 2

Client Compare and Client Maintenance Tools 302

UNIT OBJECTIVES

- List client copy and client transport tools
- Perform a client comparison

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Unit 7
Lesson 1

Client Copy and Client Transport Tools

LESSON OVERVIEW
In this lesson, you will get an overview of the client tools available in an SAP system landscape. You will learn the processes of client copy and client transport. You will explore SAP system requirements for processing a client copy.

Business Example

Several clients are required during the implementation of an SAP system. Your job as an SAP system administrator is to create and set up clients and then manage all the clients across the SAP system landscape.

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

- List client copy and client transport tools

Using Client Copy and Client Transport Tools

Client copy and transport tools are available.

Figure 168: Client Tools: Overview

Profiles define the tables to be copied through the delivery class of the table. Special data such as user master data can be selected by specifying criteria. These *delivery classes* are explained later in this lesson.

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Figure 169: Client Copy and Transport Tools

The client copy tools can copy the following components of the source client into the target client:

- *User master data*: user master data is only deleted in the target system if a profile with user master data is copied. Authorization profiles and roles belong to customizing and are therefore always copied with the customizing. Copying users without authorization profiles is problematic. The copy profile *SAP_USER* therefore contains authorization profiles and roles.
- *Customizing*: all profiles except *SAP_USER* contain customizing. Customizing data is generally stored in tables with delivery classes *C*,*G*,*E* and *S*.
- *Cross-client customizing*: choose a profile with this data type for example when you want to create a test system which is analogous to the production system, and no SAP system copy is to be made.
- Master/transaction (application) data: select this option, for example, if you want to set up a test system from the production client.

> Note:
> Application data depends on customizing data, so it can only exist consistently together with it. Application data is therefore always deleted from the target client, except for copies with *SAP_USER*. Application data is generally stored in tables with delivery class *A*.

If you have maintained a logical system in each of the source and target clients and assigned it to the client, the logical system names in the target client application data are automatically

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converted after copying the application data (e.g. with copy profile *SAP_ALL*). See transaction `BD54` (maintenance for logical systems).

Testing Customizing Transport Requests

Transport requests for customizing are usually created in the development system. They are then released and imported into the quality assurance system. It can be a good idea to additionally perform some pre-testing in a separate client of the development system. This should be done before releasing the transport request.

Before releasing a customizing transport request, perform a unit test to

- test the functionality of the transport request.
- verify that the content of the transport request is complete.

Maintaining a separate client for testing allows

- true unit testing.
- maintenance of test data without the risk of creating customizing-dependent data.

Transaction `SCC1` copies changes from one client to another based on

- either a task
- or a transport request
- or a transport request and its tasks.

Figure 170: Testing Customizing Transport Requests 1

To copy the contents of a transport request from one client to another client, use transaction `SCC1` from the target client. Enter both the source client and the transport request of which the objects should be copied.

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Only objects of one transport request may be copied at a time. As copying objects of each transport request individually may be time consuming, use the *Include Objects* option in transaction `SE09` to bundle several transport requests into one transport request. The resulting objects of this larger transport request can then be copied to the target client, saving time.

> Note:
> If the transport request contains cross-client objects, these objects are not copied, of course.

Local Client Copy

A local client copy copies data between clients within the same SAP system.

Figure 171: Local Client Copy

Both local and remote client copy must be initiated from the target client using the following steps:

1. Create an entry for the target client in the client maintenance table. For this, choose transaction `SCC4`.
2. Because no user exists in the new target client right now, also no user *SAP** exists. In this case you can log on to the target client as **`SAP*`** with the hard coded password **`pass`**. Perform the client copy using transaction `SCCL`. Select the data to be copied using a profile.

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> Note:
> The user name *SAP** with the password *pass* is only active if the profile parameter *login/no_automatic_user_sapstar* is set to the value *0*.

3. Assign the source client for customizing data, application data, and user master records.
4. Start the client copy. Because copying is a lengthy process, use background processing.

> Caution:
> To ensure data consistency, you may not work in the target client during a client copy. SAP also recommends that you do not work in the source client during a client copy.

> Note:
> SAP delivers the software with standard client 000. You may not work in client 000. But you may use client 001 as your productive client, if it exists. Client 001 is a copy of client 000. However, if you do not want to use client 001, SAP recommends that you begin the SAP system implementation by creating a new client as a copy of client 000. Don't forget to delete client 001 in this case!

You can improve the performance of the client copy, for example, by excluding tables or packages, with *Edit – Expert Settings* . You can exclude tables from the client copy, for example if they are not relevant for the target client, in the *Tables* tab. For further information about excluding tables from the client copy, choose the *Documentation* button in the expert settings. For further information about expert settings in the client copy, see SAP Note 446485 – *CC-ADMIN: Special copying options* .

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Remote Client Copy

Figure 172: Remote Client Copy

A remote client copy allows you to copy data between clients of different SAP systems. You can use a remote client copy to, for example, copy client dependent and cross-client customizing data between SAP systems.

A remote client copy proceeds in the same way as a local client copy, but sends the data through a remote function call (RFC) connection to the target client.

A remote client copy is easy to use and does not require file system space. Consider the following:

- A remote client copy does not create a file at file system level, so there is no hard copy of the client to be copied. Therefore, the same, identical client copy cannot be duplicated at a later time.
- Cross-client customizing can be copied during a remote client copy, depending on the client copy profile.
- To be able to copy all data during the client copy, the structures of all copied tables in both SAP systems must be identical. During remote client copy, an automatic repository consistency check is performed. If inconsistencies are detected, the client copy is terminated and an error message is displayed. You can also perform the consistency check yourself with the *RFC System Comparison* button.

If you experience problems copying from another SAP system, see SAP Note 557132 – *CC-TOPIC: Remote client copy* .

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For more information about remote client copies, see also SAP Note 47502 – *CC-REMOTE: Messages of the Remote Clientcopy* .

Figure 173: Client Copy Using Parallel Processing

The client copy function can be used with multiple parallel processes, which speeds up the copying process. Other factors that should be taken into consideration to optimize a client copy include the network performance and the database performance.

The client copy processes are generated at runtime. They are parallel RFC processes, managed by RFC server groups. You need to specify the maximum number of processes you want to use in the client copy program.

> Note:
> Parallel processing can only be used when performing a local or remote client copy, it cannot be used for client transports.

To specify the maximum number of client copy processes, use transaction `SCCL` for a local copy or transaction `SCC9` for a remote copy and then *Goto → Parallel Processes* .

To define an RFC server group, use transaction `RZ12`. For RFC server groups, the limitations on the SAP system parameters are explained in SAP Note 99284 – *RFC exception: RESOURCE_FAILURE* . Also see SAP Note 2001276 – *Changed configuration as of 7.40 SP2* for changes as of AS ABAP 7.40.

During the execution of a client copy using parallel processing, each parallel process checks the other to see if it is still running. If a process has failed, it will be restarted automatically.

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> Hint:
> Remember: in an existing client, application data, client dependent customizing, cross-client customizing and the repository rely on each other! So even when including the cross-client customizing, a remote client copy will only be 100% consistent, if the complete repository of the source and target system is identically. This will never be the case in "real" SAP systems!

Client Transport

Figure 174: Client Transport: Export Process

A **client transport** differs from a client copy in that it does not use RFC. Like a client copy, however, a client transport is used to copy data between different clients. A client transport can be used to replace a local or a remote client copy.

A client transport consists of two steps: First, a client export extracts client data from the source client to files at the operating system level. Then the data is imported from the operating system files into the target client.

To perform a client export, follow these steps:

1. Log on to the source client. Choose transaction `SCC8` (client export). Select the data to be copied using a profile.
2. Indicate the target system to which the client will be copied. The target system must be defined in TMS as part of the transport domain.

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