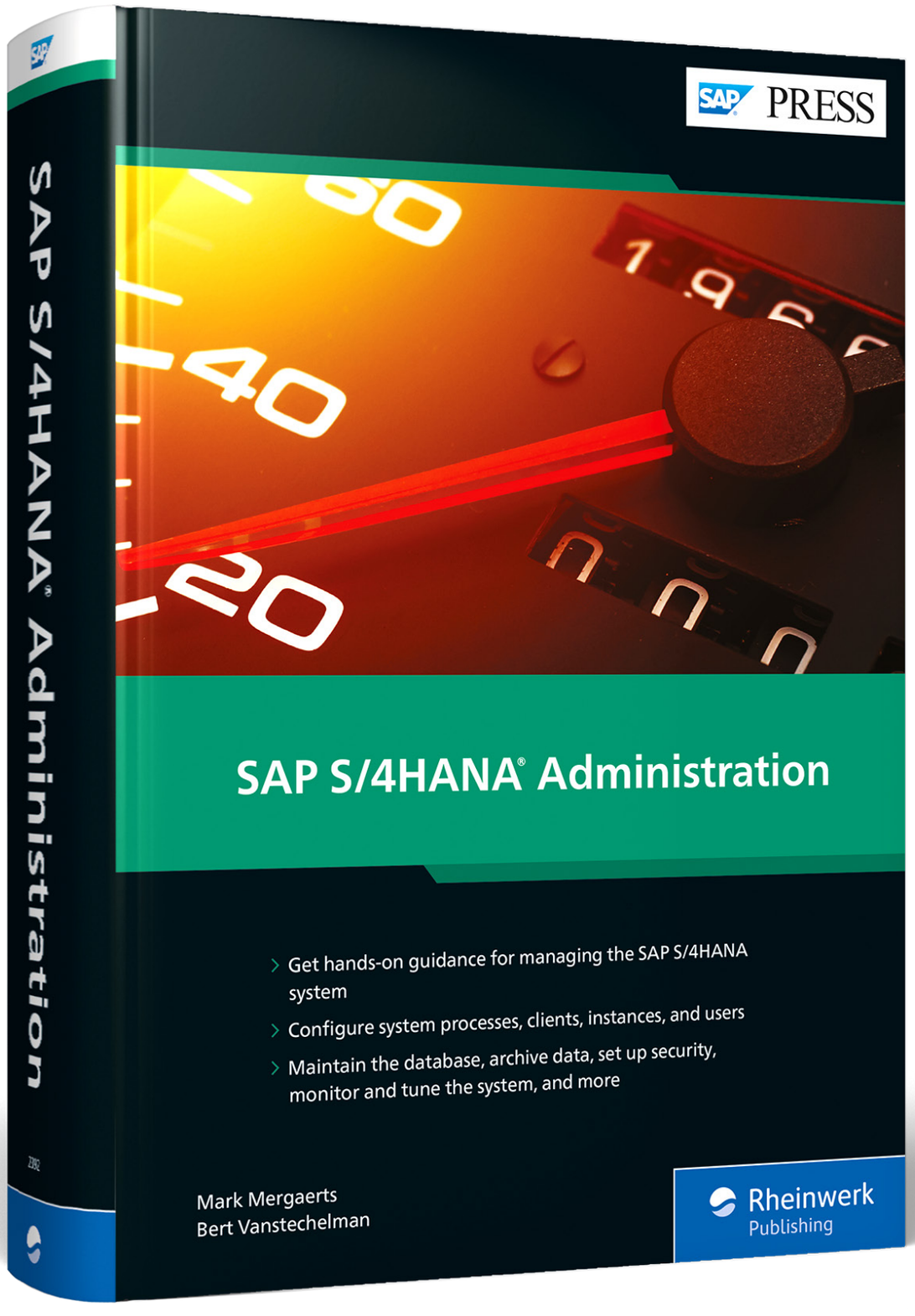

Reading Sample

This sample chapter discusses client administration in SAP S/4HANA. Topics covered include data types, how the system is able to keep data from different clients apart in a manner that is transparent to users and applications, how to create clients, and the tools for client copy and client transport. The chapter also walks through table snapshots, deleting clients, how subsets of data can be copied selectively between clients using transport requests, and table logging, which is used to create an audit trail of changes made to critical tables.

"Client Administration"

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Chapter 5
Client Administration

Clients are fundamental to the architecture of the SAP system. Most data, and all users, always belong to a specific client and the data can only be accessed inside the client where it resides. In this chapter we look at the various instruments to manage the client structure, including the tools you need to set up, refresh, or delete clients.

A client is a fully independent unit of business data. Application data, such as financial and sales information, always belongs to a specific client and can only be read and modified in that client. The data is not visible to users in other clients in the same SAP system. The same concept of logical separation applies to users of the system: a user always belongs to one and just one client.

Having multiple clients in one SAP system makes it possible to run the business of several autonomous companies within one technical system while ensuring that each of those companies only sees its own data. We were told by older hands than ourselves that the client concept goes back to the early days when SAP systems typically ran on large and expensive mainframe computers where it made good technical (and financial) sense to have as many businesses as possible share the same infrastructure, while still preserving the confidentiality and integrity of their own data.

In today's far more nimble server architecture, having different clients in one system rather than lots of separate systems may still be useful to facilitate systems management: running many systems also means having to do many backups, many upgrades, and so on. It is true that most production systems today have only one application client, but this is not true for development and test systems, where multiple clients are the norm. In such systems, the reason for keeping data separate is not so much business-related as functional. A test system, for example, might contain both a test client and a training client. Users performing tests have the possibility to change—and possibly damage or corrupt—data, whereas users attending a training course need stable and predictable behavior. Distinct and fully separate clients for the two communities will make sure they will not come to blows.

To understand the client concept, it is important to know the distinction between different types of data in the system because the data type determines whether the data is visible only to one client or to the whole system. We explain the data types in Section 5.1. We then introduce the clients and their function in the ABAP system in Section 5.2.

In Section 5.3, you learn how the system is able to keep data from different clients apart in a manner that is transparent to users and applications. Section 5.4 explains how to create clients and describes the different attributes you assign to a client. One of these attributes is the logical system, which is crucial for interclient and intersystem data exchange; we discuss logical systems in Section 5.5. It is possible to copy one client to another within one SAP system or from one SAP system to another. The tools for doing this have been extensively redesigned in SAP S/4HANA and we describe these tools, the client copy and client transport, in Section 5.6 and Section 5.7, respectively. Even the new design client transports are a somewhat cumbersome procedure; in Section 5.8 we talk about a new feature, table snapshots, that provides an easier-to-use alternative. Some clients live forever, but others are only needed for a limited period; in Section 5.9, we explain how a client can be deleted. We continue our coverage of the client tools in Section 5.10, where we describe how subsets of data can be copied selectively between clients using transport requests. Section 5.11 deals with two functions that support the administrator with the management of clients: the first calculates the size of a client and the second compares data between clients. All the tools create logs which will eventually outlive their usefulness, and in Section 5.12 we explain how old logs can be cleaned up. Finally, Section 5.13 describes table logging, which is used to create an audit trail of changes made to critical tables.

5.1 Data Types

From the perspective of visibility, an SAP ABAP system contains two types of data:

1. *Client-dependent data* is data that, as described in the introduction, belongs to and is only accessible from within one client.
2. *Cross-client data* (sometimes the older term *client-independent data* is used) is data that is accessible system-wide and is therefore the same for all clients.

The most important cross-client data is the *repository*. The repository contains all development objects, such as ABAP programs, function modules, object classes and also dictionary objects like tables, views, and data types. The fact that the repository is cross-client has two important consequences. First, although the data in different clients is strictly separated, the *structures* in which that data resides (database tables) are the same for all clients in the system. Second, changes to the repository apply to all clients. If a new version of an ABAP program is imported or new fields are added to a database table, this change will affect every client.

System data is also cross-client. This is for the most part technical data pertaining to the SAP system as a whole. Good examples of this are output devices, RFC destinations and server groups for load-balancing. Log data such as the system log and historical workload and performance data is always cross-client as well.

Customizing data is vitally important for all applications in the system. Customizing controls how an application operates. By changing the customizing data, the functionality can be adapted to the specific needs of the business. With the initial installation, SAP delivers a set of standard settings, which functional specialists can then adjust in function of the company's requirements. Things like pay grades and credit policies are just some examples; there are literally thousands of customizing settings. Most but not all customizing data is client-dependent. Some cross-client customizing also exists when the customizing settings by their nature affect the entire system. Archiving objects and geocoding settings are good examples of cross-client customizing.

Application data and *user data* are always client-dependent. Application data consists of both *master data* and *transaction data*. Master data defines the entities that participate in the different business processes—for example, factories, customers, vendors, or products. Transaction data encompasses all information about transactions by and between these entities, such as invoices, sales orders, or production orders. Because application data contains all the details about the operation of the business, it is perfectly logical that this data is strictly client-dependent.

User data comprise things like user names, roles, and authorizations. A user belongs to one client and one client only. When logging on, a user must always supply both the client number and the user ID.

5.2 Clients in an SAP System

A client in an ABAP system is always identified by a three-digit number. Every ABAP system has a client 000; a newly installed SAP S/4HANA system contains only this client. Client 000 is used for certain system management tasks, for example during upgrades, when installing software add-ons, applying support packages (patches), or installing new languages. Using client 000 for actual business-related transactions is not allowed, and application users must never have access to this client. The client also contains a basic organizational company structure, which can be copied to operational clients and customized in those clients. If the SAP S/4HANA system was migrated from an SAP ERP system, then it will also contain client 001. This client is a leftover from old installations (unless it is used productively).

Because client 000 cannot be used for business, one of the first tasks after installing a new system is to create one or more new clients using the client copy or transport transactions that we'll see later in this chapter. Which and how many clients are created in each system in the landscape depends on the requirements not just of the business but also of the development and test community. In a development system, there will almost always be more than one client (apart from 000). In test systems, there is one client for testing and quite often also another client for training. Production systems in most cases have just one operational client, except in the rare cases where one production system serves several distinct companies (a practical example of this is a healthcare

group that manages a large number of hospitals, with each hospital running in its own production client).

Figure 5.1 shows a possible organization of clients in an ABAP landscape. Three clients are created in the development system. All development and customizing work takes place in client 100; changes made here are transported to the test system and ultimately to the production system. Client 200 is a sandbox that can be used freely for experimenting; development and customizing changes are allowed here but these changes are never transported to other clients and systems. Client 900 is a "golden" client; this is a client containing a clean copy of all customizing and configuration. The golden client does not contain master or transaction data. In the test system, client 100 is used for the actual testing, while client 200 is used for training. The production system contains only a single client 100 where all productive activity happens.

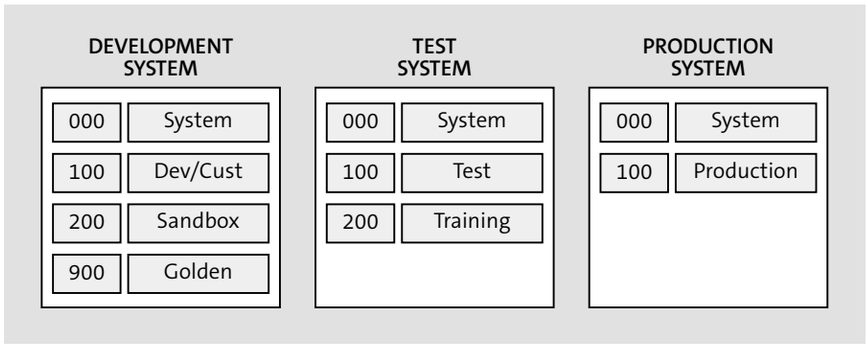


Figure 5.1 Example of Client Organization

Over the lifetime of a system, other clients may temporarily appear, such as for special projects, data migrations, security tests, and others. These clients are deleted once they are no longer needed.

Client 066

If you have previous experience with SAP NetWeaver systems, you may have heard of client 066. In the past, this client was also installed automatically and was used for the generation of SAP EarlyWatch reports. In SAP S/4HANA (and in all recent SAP NetWeaver versions), client 066 no longer exists.

5.3 How the System Keeps Clients Apart

We don't want to go into the subject of development just yet, but as a side note we'd like to briefly explain how the system makes sure that client-dependent data is indeed visible to only one client.

Client-dependency is an attribute defined in the Data Dictionary at the level of a database table. If a table is client-dependent, then the first field in every row of that table has the data type `CLNT`. The name of that field is most often `MANDT` (from German *Mandant*) but can also be `CLIENT`, `CLNT`, or similar. When an ABAP program sends an SQL statement like `SELECT` or `UPDATE` to the database, the ABAP database interface, which is a layer of the process architecture, checks whether the table addressed in the SQL is client-dependent or not. If it is, the database interface automatically inserts an extra condition into the `WHERE` clause, restricting the selection to rows whose client field has the same value as the logon client. Figure 5.2 illustrates this with an example.

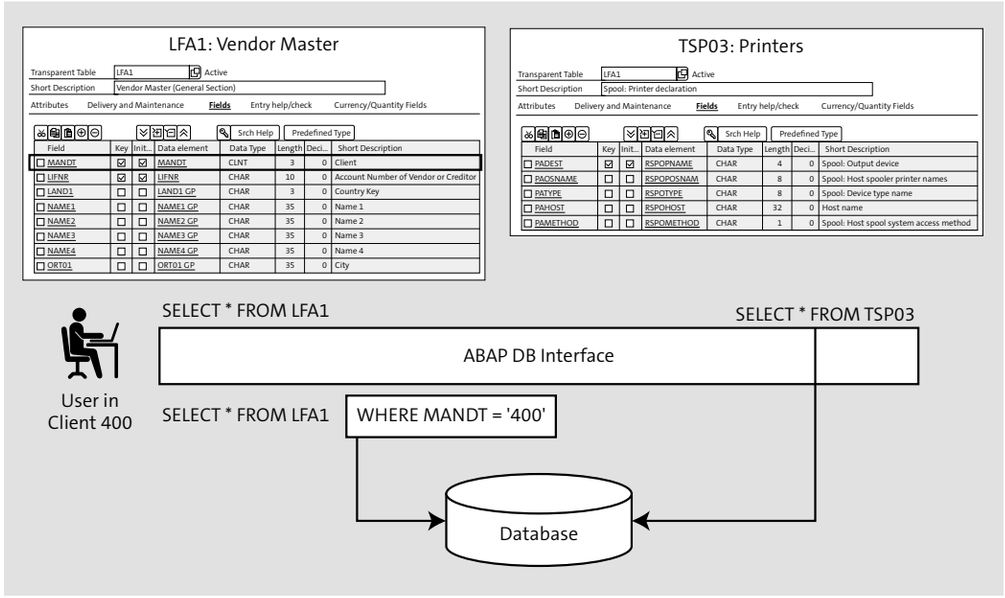


Figure 5.2 Accessing Client-Dependent versus Cross-Client Database Tables

A user logged on to client 400 runs a program that produces a list of all vendors. The vendor master is in database table `LFA1`; the first column of an `LFA1` record has the data type `CLNT`, which means that `LFA1`—like all master data—is client-dependent. The program issues a simple `SELECT *` statement to retrieve all the vendors. However, the ABAP database interface knows that the table is client-dependent and therefore adds an implicit condition that limits the selection to the vendors configured in client 400 only. If the system contains other clients, say 200 and 800, that also have their own vendor data, then that data will also reside in table `LFA1` but will not be visible to programs running in client 400.

Table `TSP03` contains the printer definitions. This is system data and therefore cross-client: `TSP03` does not have a field of type `CLNT` as its leading column. Hence, a `SELECT *` query on this table is not altered by the database interface and will indeed retrieve all printers, regardless of the client from where the query executes.

5.4 Creating Clients

The first step in setting up a new client is to create its definition. This is done with Transaction SCC4. The opening screen lists the existing clients, as shown in Figure 5.3.

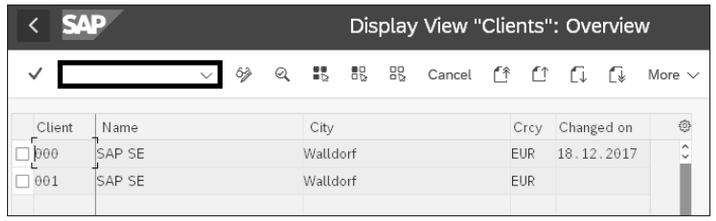


Figure 5.3 Transaction SCC4: List of Clients

The transaction always starts in display-only mode. To display the configuration of an existing client, simply double-click its entry in the list. To create a client or modify an existing client, you must first switch to change mode by clicking **Display <> Change**. Confirm the warning that the table is cross-client.

In the following sections, we'll explain the settings needed to set up a client as well as the use of client roles.

5.4.1 Client Settings

The menu at the top now shows a **New Entries** button; click this button to open the client creation screen shown in Figure 5.4.

Let's walk through all the fields of this screen:

- **Client**
  This is the three-digit number of the new client. You may assign any value that does not yet exist, in this case everything from 002 to 999 (although we advise against using 066). In our experience, many SAP customers use multiples of 100 or multiples of 10, which are easy to remember, but the choice is yours.
- **City**
  Enter a city name here; this field is purely informational.
- **Logical system**
  The logical system is an identifier used by applications that access the client externally. Examples of this are extractions by SAP BW or SAP BW/4HANA data warehouse systems or data exchange between SAP S/4HANA and SAP CRM or SAP Customer Experience. You will see how to define a logical system later in Section 5.5. Specifying a logical system is optional, and the field may be left empty, but if the client is to be in any way involved in external communications, then assigning a logical system to it is necessary. Client 000 does not have a logical system and does not need one.

- **Currency**
  Here you enter the code of the standard currency used by the business, like USD or EUR.
- **Client role**
  This field describes the function of the client. Use F4 to display a dropdown list that offers the following choices: **Production**, **Test**, **Customizing**, **Demo**, **Training/Education**, and **SAP Reference**. These roles are more or less self-explanatory, except that in development systems the customizing role is usually assigned to both the development client and the client used for actual customizing.

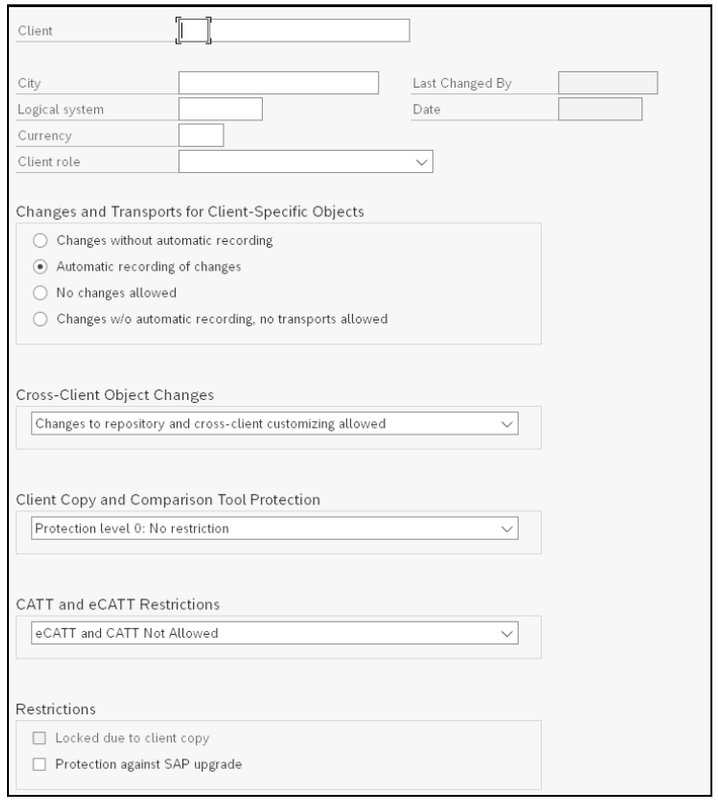


Figure 5.4 Transaction SCC4, create new client

- **Changes and Transport for Client-Specific Objects**
  Under this heading, there is a set of four radio buttons. These specify whether client-dependent customizing can be changed in this client. The possibilities are as follows:
  - **Changes without Automatic Recording**
    Client-dependent customizing can be changed, but the changes are not automatically recorded in a transport request. However, it is still possible to create a transport request manually and add the changes to this request.

- **Automatic Recording of Changes**
  Client-dependent customizing can be changed, and these changes are recorded in transport requests.
- **No Changes Allowed**
  Client-dependent customizing is not allowed in this client.
- **Changes without Automatic Recording, No Transports Allowed**
  Client-dependent customizing can be changed, but the changes are not automatically recorded in a transport request. Moreover, it is not allowed to record them in a transport request manually. Any customizing changes thus remain strictly local to the client.

■ **Cross-Client Object Changes**
This field sets the ability to make changes to cross-client objects from this client. As you saw before, the two main types of cross-client objects are repository data (development) and cross-client customizing. Use F4 to show a dropdown list with following options:

- **Changes to Repository and Cross-Client Customizing Allowed**
  Both types of data can be changed—that is, this client can be used both for development and for system-wide customizing.
- **No Changes to Repository and Cross-Client Customizing Objects**
  The opposite of the first option: no cross-client data can be changed at all.
- **No Changes to Cross-Client Customizing Objects**
  Development changes are allowed but cross-client customizing is not. It is not quite clear why SAP uses a negative expression here (why not call it "only repository changes allowed"?), but it has been like this since the beginning.
- **No Changes to Repository Objects**
  Cross-client customizing is allowed but repository changes are not.

■ **Client Copy and Comparison Tool Protection**
It is possible to copy the contents of one client to another; actually, that is one of the main subjects in this chapter. Technically it is also possible to overwrite the data of a client with data from another client. There are also tools that enable a properly authorized user to compare the data in two clients (which may be in the same SAP system or in different systems). While this is very useful functionality, it means that the data in the client is exposed to the outside world, which may pose an issue of confidentiality, especially in production systems. This field lets you control to what extent the data in the client should be accessible to the copy and comparison tools. The dropdown list lets you choose among three protection levels:

- **Protection Level 0: No Restriction**
  The data in the client is not protected. It can be copied to another client or compared with the data in another client, and the data can be overwritten by a client copy that uses another client as the source.

- **Protection Level 1: No Overwriting**
  The data in the client can be used as the source for a client copy to another client, and it can also be used in data comparisons between clients. However, it cannot be overwritten by a client copy.
- **Protection Level 2: No Overwriting, No External Availability**
  The data in the client is fully protected: it cannot be used as the source of a client copy, it cannot be compared, nor can it be overwritten.

Table 5.1 summarizes the effect of the different protection levels on the availability of the data in a client XXX.

Protection Level	Client Copy XXX -> YYY	Client Copy YYY -> XXX	Client Comparison XXX <-> YYY
0	Yes	Yes	Yes
1	Yes	No	Yes
2	No	No	No

Table 5.1 Effect of Protection Levels for a Client XXX

■ **CATT and eCATT Restrictions**
Computer Aided Test Tool (CATT) and Extended CATT (eCATT) are powerful tools that allow creating extensive automatic test scenarios. CATT runs within the confines of one SAP system, while eCATT is a script-driven tool that runs in the frontend and can be used to test entire business processes across system boundaries. While primarily intended as test tools in development or acceptance environments, CATT and eCATT are also frequently used for mass data uploads (although more appropriate tools exist for this purpose). Running large tests or large uploads may of course have a great (and, if not handled carefully, devastating) impact on the data in the client, and for that reason their usage can be restricted. From the dropdown list, you can choose among five possible settings:

- **eCATT and CATT Not Allowed**
  Does what it says on the tin.
- **eCATT and CATT Allowed**
  Same.
- **eCATT and CATT Only Allowed for Trusted RFC**
  A trusted RFC connection is a connection between systems that have a trusted/trusting relationship, which for instance allows logging on without the need for a password. With this option, only trusted connections can use eCATT and CATT in the client.
- **eCATT Allowed, but FUN/ABAP and CATT Not Allowed**
  FUN is an eCATT command that allows executing function modules remotely

even if those functions are not explicitly enabled for RFC in the repository. This setting allows using eCATT in the client but with the exception of FUN. CATT is not allowed.

  - **eCATT Allowed, but FUN/ABAP and CATT Only for Trusted RFC**
    Like the previous with regard to eCATT, but allowing FUN and CATT if originating from a trusted connection.

- **Locked Due to Client Copy**
  You cannot change this field. The system sets this flag while a client copy with this client as source or target is active.
- **Protection against SAP Upgrade**
  If this flag is set, the client will no longer be supplied with new data during release upgrades. This effectively makes the client unusable after the upgrade. The only reason you would ever use this flag is if you want to preserve a "frozen" image of a client for backup or archival purposes. This setting is rarely, if ever, used.

5.4.2 Client Roles and Recommended Settings

There are various types of clients in the SAP landscape, and each usage type comes with its own requirements, especially with regard to changeability and access to the data. If we assume a typical three-system landscape with a development, test (quality assurance), and production system, then the organization described here is recommended by SAP and commonly used by SAP customers.

The development system normally has at least two clients (of course, ignoring client 000). The first, known in SAP parlance as the *golden client*, is where all development and customizing is carried out and from where these are transported to the test system. The golden client is "clean" in that it does not contain any master or transaction data. Another client in the development system has the role of sandbox; this client is used for research and experimentation and also for unit tests of the development and customizing imported from the golden client.

The test system typically has one client, which is used for quality assurance and integration testing. Here the imported changes to repository objects and customizing data are tested in scenarios that resemble the production processes as closely as possible. This client contains a representative set of master and transaction data. In addition, there may be one or more training clients, which are refreshed before each training session, either from the test client or from a "model" client containing master data and a limited amount of transaction data.

Finally, the production system in most cases has just one client, unless the system is used for separate autonomous entities, which is relatively rare.

Table 5.2 shows the recommended settings for the different client types. These are the settings the client should have during normal operation; occasional deviations may occur (e.g., temporarily opening the test or even the production system for changes to apply an urgent fix), but these deviations should be temporary.

Usage	Recommended Configuration
Golden Client	■ **Client Role: Customizing** ■ **Client-Dependent: Automatic Recording of Changes** ■ **Cross-Client: Repository and Cross-Client Customizing** ■ **Protection Level 1 (No Overwriting)** ■ **CATT and eCATT Not Allowed**
Sandbox / Unit Testing	■ **Client Role: Customizing** ■ **Client-Dependent: Changes without Automatic Recording; No Transports Allowed** ■ **Cross-Client: None Allowed** ■ **Protection Level 1 (No Overwriting)** ■ **CATT and eCATT Allowed**
Integration Testing / Quality Assurance	■ **Client Role: Test** ■ **Client-Dependent: Changes without Automatic Recording** or **No Changes Allowed** ■ **Cross-Client: No Changes Allowed** ■ **Protection Level 0 (No Protection)**; can be set to 1 during normal operation and lowered to 0 when the client needs to be refreshed ■ **CATT and eCATT allowed**
Training	■ **Client Role: Training / Education** ■ **Client-Dependent: No Changes Allowed** ■ **Cross-Client: No Changes Allowed** ■ **Protection Level: 0 (No Protection)**; can be set to 1 during normal operation and lowered to 0 when the client needs to be refreshed ■ **CATT and eCATT Allowed**
Production	■ **Client Role: Production** ■ **Client-Dependent: No Changes Allowed** ■ **Cross-Client: No Changes Allowed** ■ **Protection Level: 2 (No Copy, No Comparison)**; can be temporarily set to 1 (comparison allowed) if there is a need to compare/validate data, for example between the production and acceptance clients ■ **CATT and eCATT Not Allowed**

Table 5.2 Client Types and Recommended Settings

Client Changes Are Logged

The settings made with Transaction SCC4 are in database table T000. This table has logging enabled by default. We discuss table logging in Section 5.13.

5.5 Logical Systems

As explained in the previous section, a client must have a logical system assigned to it if that client is to be accessed externally. Before you can assign the logical system in Transaction SCC4, you must first create it. The logical system must be known to all connected systems; therefore, it is recorded in a transport request, which you must import into these systems.

The creation of a logical system is a task defined in the SAP Implementation Guide (IMG). First make sure that you are logged on to a client where cross-client customizing is allowed. To call the relevant part of the IMG ,use Transaction SALE and expand **IDoc Interface/Application Link Enabling (ALE)** • **Basic Settings** • **Logical Systems** • **Define Logical System** (see Figure 5.5).

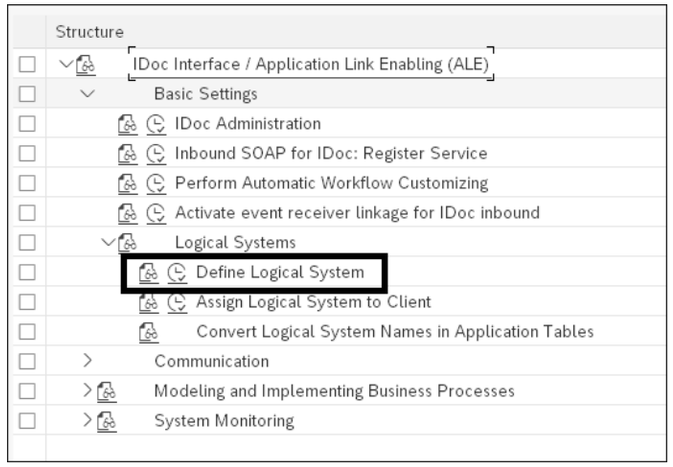


Figure 5.5 Menu Path in Transaction SALE

Confirm the warning that the table is cross-client. To create a new logical system, choose **New Entries**. Enter the logical system name and a description. In Figure 5.6, we create a logical system for client 400 in system S4D.

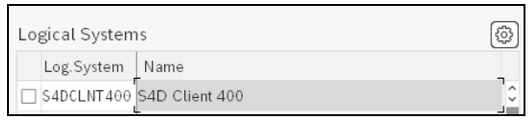


Figure 5.6 Transaction SALE: Create a New Logical System

Although you can freely choose the name, an almost universally followed naming convention for logical systems is to use *<SID>CLNT<NNN>*, where *<SID>* is the SAP system ID and *<NNN>* the client number. We strongly advise that you adopt this convention. In our example, the logical system name then becomes *S4DCLNT400*.

Choose **Save**. A popup window will appear to prompt you for a workbench request. If this is the first logical system you are creating, click the **New Request** icon; for subsequent logical systems that you want to transport together, accept the request shown in the window. For a new request, enter a meaningful description as in Figure 5.7, choose **Save**, and then press Enter to confirm the prompt for the request.

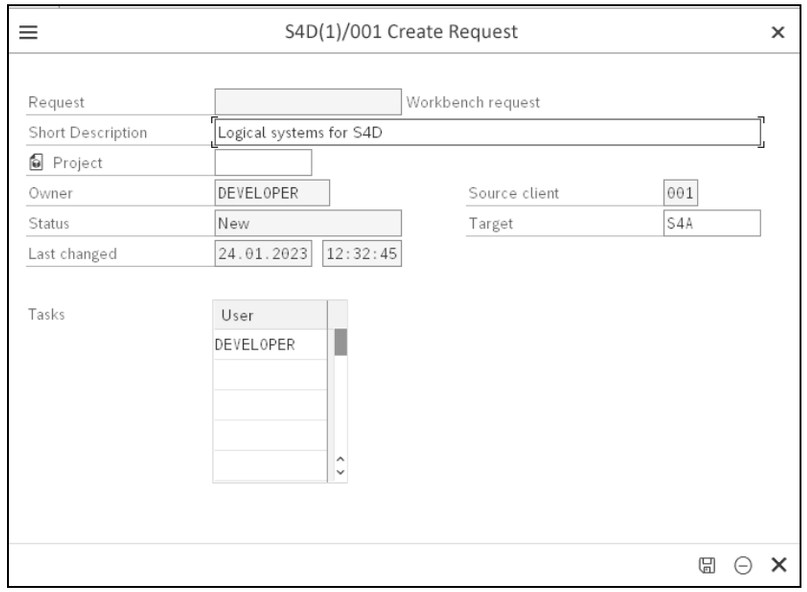


Figure 5.7 Workbench Request for Logical Systems

You can now return to Transaction SCC4 (the **Assign Logical System to Client** function in the Transaction SALE menu calls this transaction) and assign the logical system you have just created. Assuming that we are creating a golden client in a development system, Figure 5.8 shows the fully configured client.

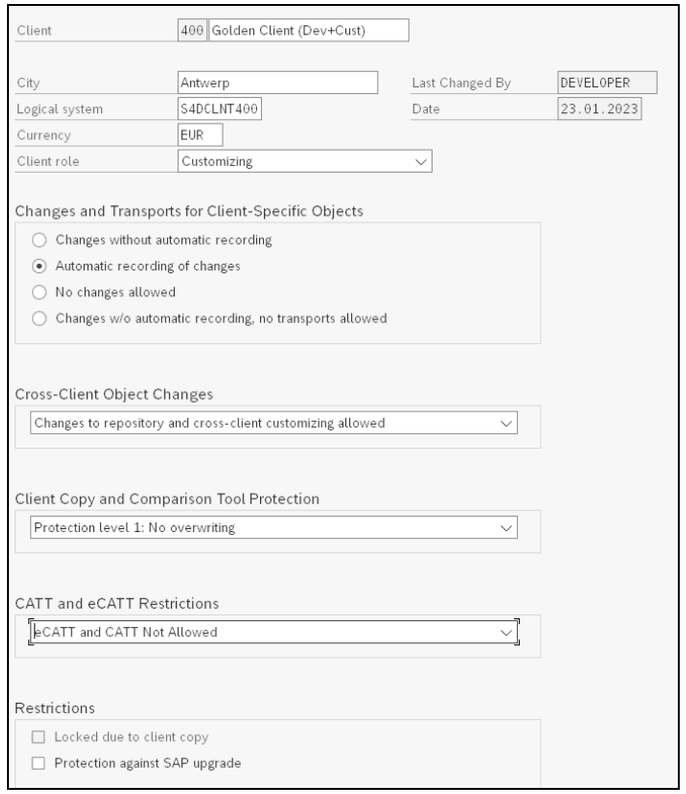


Figure 5.8 Transaction SCC4: Configuration Complete

5.6 Copying Clients

Creating a client in Transaction SCC4 means nothing more than that the attributes of the client are saved in table T000. The client does not yet physically exist: it contains neither users (meaning it is impossible to log on) nor customizing or transaction data. Constructing the client data from zero would be a senseless task: you would have to manually enter all customizing data, including things like countries, currencies, units of measurement, and innumerable others. You would also have to reenter the thousands of authorizations of roles that form a central part of the user data. To supply initial data to the new client, you use a *client copy*. This operation copies all data, or selected data, from one client (the source client) to another (the target client—in this case, the newly created client). Client copies have existed since the early days of SAP and are one of the most used procedures to create a working environment—for instance, for development, testing, or training—and populate it with fresh and consistent data (another procedure, the system copy, will be covered in a later chapter).

Client copies are used not only to build new clients but also to refresh existing clients. For example, a training client will very probably be in an unusable state at the end of a training session because the course participants have executed business transactions and possibly modified master or customizing data. Before the next session, the training manager will want to return the client to an initial state with all the data intact. A client copy will serve this purpose; the source client could be a "clean" reference client containing all the training data or perhaps the client used for integration testing.

In the following sections we first introduce the different types of client copy, as well as the copy profiles, which define which data actually gets copied. We then describe the local and remote client copy procedure and end with a look at the logs created by the copy processes.

5.6.1 Types, Profiles, and Tools

There are three types of client copies: the local client copy, the remote client copy, and the client transport. In a *local client copy*, both the source and target client belong to the same SAP system. With a *remote client copy*, the source and target clients are in different SAP systems. Remote client copies use RFC to transfer data between the two clients. A *client transport*, which we'll cover in Section 5.7, makes use of the transport system: the contents of the source client are written to transport requests and these requests are then imported into the target client. Originally, client transports were the only way to copy clients between different systems; with the introduction of remote client copies, their usage has declined.

It is possible to restrict the data involved in the client copy or transport to certain data types. For this purpose, SAP provides a set of *copy profiles*. These profiles are predefined; you cannot change them nor can you create your own. Table 5.3 lists all available copy profiles. Don't worry if the description is not always clear; in practice you will only be using a few of them.

Copy Profile	Contents
SAP_000E	Copy Customizing E Tables (no C, G) from Client 000
SAP_000V	Client 000 E Table Customizing and User Variants
SAP_000X	E-Table Customizing w/o Profiles and Roles (000)
SAP_ALL	All Client-Specific Data w/o Change Documents
SAP_APPL	Customizing and Application Data w/o Change Docs
SAP_APPX	SAP_APPL w/o Authorization Profiles and Roles
SAP_CUST	Customizing

Table 5.3 Copy Profiles

Copy Profile	Contents
SAP_CUSV	Customizing and User Variants
SAP_CUSX	Customizing w/o Authorization Profiles and Roles
SAP_PROF	Only Authorization Profiles and Roles
SAP_Q2PC	S/4 CE - Q-Syst Q2P LM Clean Client Setup
SAP_Q2PL	S/4 CE - Q-Syst Q2P LM Lifecycle Client Setup
SAP_Q2PQ	S/4 CE - Q-Syst Q2P Q2P LM Client Refresh
SAP_Q2PR	S/4 CE - Q-Syst Q2P LM Lifecycle Tenant Refresh
SAP_U000	Client 000 E-Table Customizing and User Masters
SAP_U00V	E-Table Customizing, Users and User Variants (000)
SAP_UCSV	Customizing, User Master Records and User Variants
SAP_UCUS	Customizing and User Master Records
SAP_UONL	User Without Authorization Profiles and Roles
SAP_USER	User Master Records and Authorization Profiles

Table 5.3 Copy Profiles (Cont.)

The original client copy tool dated back to the early 1990s and its age was showing. Not only did the user interface feel old and tired, but also its performance was unimpressive because very few optimizations were used and the process had some serious drawbacks that were no longer acceptable in today's security-conscious environment. Starting with SAP S/4HANA 1909 (SAP BASIS 7.54), SAP delivers a completely new and much improved client copy tool, which covers not just the local and remote client copy but also the client transport, client deletion, and data comparison between clients or systems. It also introduces a new tool for calculating client and table sizes.

The new tool also makes use of native SAP HANA database features, which results in dramatically better performance. According to SAP, the new local client copy is up to 10 times faster than the old procedure and a remote client copy up to five times.

5.6.2 Local Client Copy

Before you can start the client copy, you must define the new client with Transaction SCC4 as explained earlier in this chapter. For the actual copy, you should then log into a third client, typically client 000. One of the main drawbacks of the old procedure was that the copy had to be started from the *target* client. Because initially this client does not contain any users, a special type of "ghost" logon had to be used, which represented

a glaring (and widely known) security risk. We will briefly discuss this mechanism in Chapter 8. Fortunately, the new client copy procedure solves this issue by allowing the copy to be started from any client.

To perform a client copy with the new procedure, call Transaction SCCLN. The screen shown in Figure 5.9 opens. As you can see in the status bar at the top of the window, we are currently connected to client 200, which is neither the source (000) nor the target (400) client of the copy.

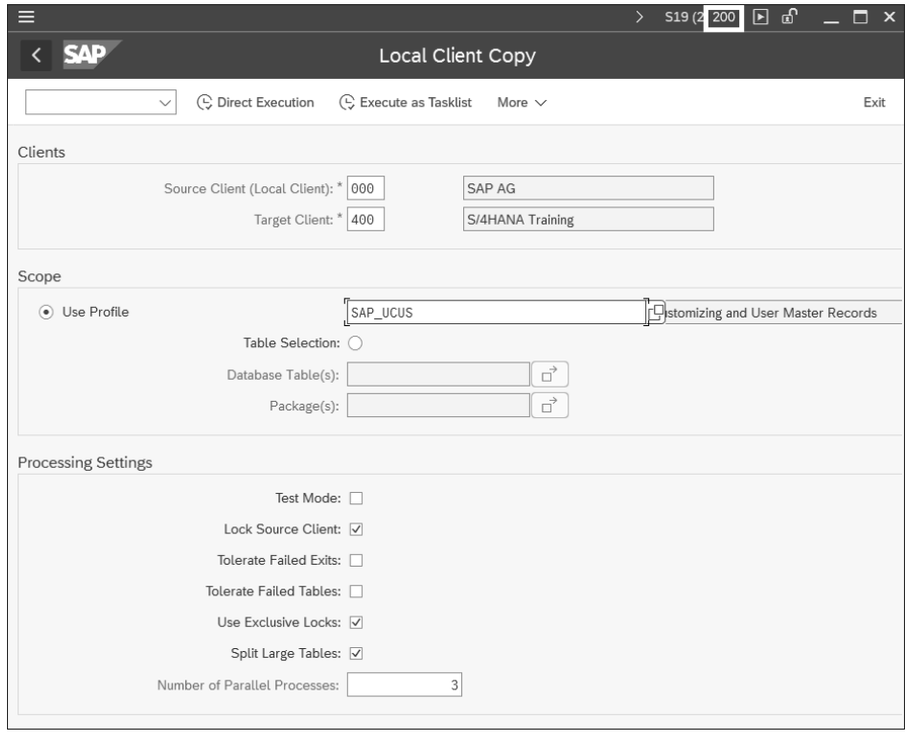


Figure 5.9 Transaction SCCLN: Input Screen for Local Client Copy

In the **Scope** section, mark the **Use Profile** radio button and choose a copy profile from the dropdown list. Instead of using a predefined copy profile, you can also copy a set of database tables. To do this, mark the **Table Selection** radio button and enter the tables whose data must be copied between the two clients. Wildcards and ranges are allowed. Alternatively, you may also specify the packages the tables belong to.

Under **Processing Settings**, you configure the operational parameters of the client copy:

- **Test Mode**
  When this option is enabled, the logic of the client copy process is carried out completely but without making any actual database changes.

- **Lock Source Client**
  The source client is locked during the client copy. Users already logged on to the client will be allowed to keep their sessions but new logons are not possible. It is recommended to leave this option enabled.
- **Tolerate Failed Exits**
  The client copy process not only copies data in tables but also performs a series of application-related exits. These exits are necessary to ensure the logical consistency of the data in the target client. By default, the failure of an exit causes the copy process to terminate. By enabling this option, the copy will continue even if errors occur in an exit.
- **Tolerate Failed Tables**
  A failure to copy the data in one or more tables also normally terminates the client copy. With this option, failures for individual tables are allowed. All other tables will still be copied.
- **Use Exclusive Locks**
  The client copy sets an exclusive table lock at the database level for as long as copying the data of that table takes. This both speeds up the copy and reduces memory usage; however, as long as the table is locked no other program or transaction can modify the table (read access is still possible).
- **Split Large Tables**
  To deal with very large database tables, the client copy process is equipped with a splitter algorithm. This algorithm splits the copy process for a table into different statements by generating `WHERE` conditions, which can then be handled by several processes in parallel. This parallelism both improves performance and prevents the database process from hitting the SAP HANA allocation limit. As of SAP Basis release 7.56, table splitting is always enabled and this option is no longer shown.

The client copy can be started in two ways: interactively or via a task list. Using a task list is necessary if you want the copy to run as a background job. If you choose **Execute as Tasklist**, the screen shown in Figure 5.10 is displayed.

To start execution, click the **Start Task List in Background** icon ❶. You may also choose **Start Task List in Dialog** ❷, but because the task is flagged as long-running you will still be offered the option of running in the background.

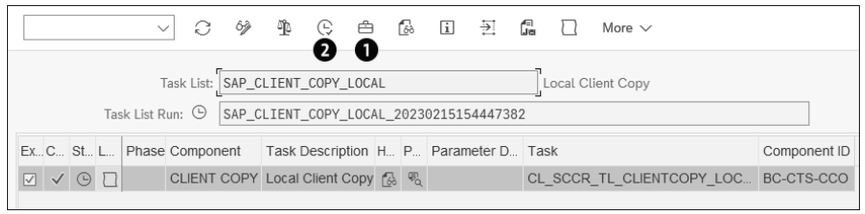


Figure 5.10 Execute Local Client Copy as Task List

As soon as the client copy is running, you can start monitoring the process, which is what we will look at next.

5.6.3 Remote Client Copy

A remote client copy can be used to copy a client between SAP systems using RFC. To run a remote client copy, call Transaction SCC9N. The configuration screen is shown in Figure 5.11.

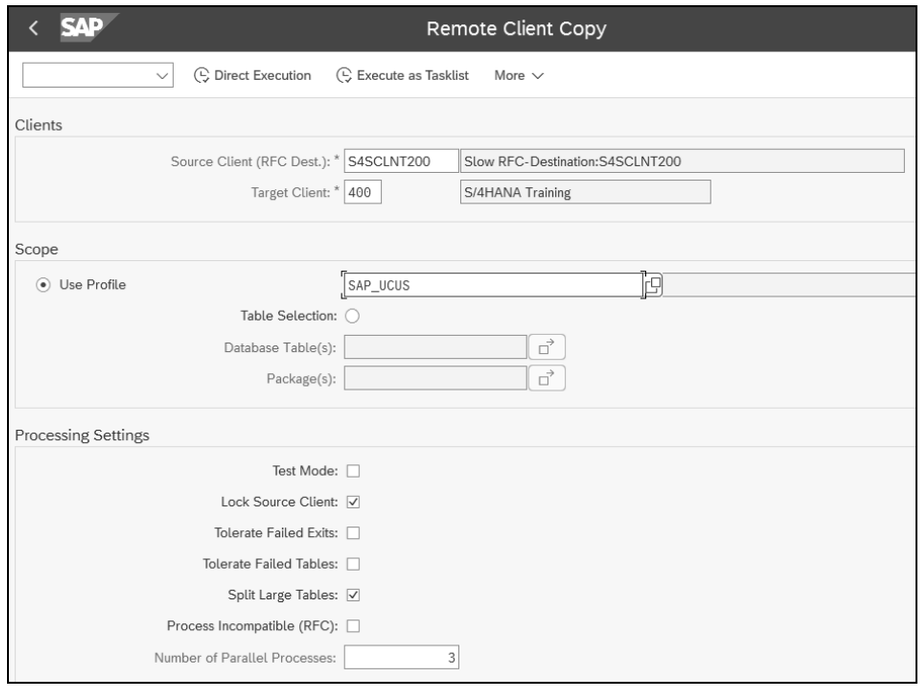


Figure 5.11 Transaction SCC9N: Input Screen for Remote Client Copy

The screen is similar to that for the local client copy, with two important differences:

1. The source client is identified using an RFC destination instead of a local client number. The destination must be configured and tested in Transaction SM59.
2. The **Process Incompatible (RFC)** option determines what to do if a table is structurally different between the source and the target system. This is impossible with a local client copy because the two clients share the same repository, but if the clients reside in different systems, then such differences might occur. If the option is disabled, then incompatible tables are skipped (and marked `INCOMPATIBLE` in the copy log). If it is enabled, the data will be copied to the extent possible. For example, if the target table has fewer fields than the source table, then only the data for the common fields is copied.

5.6.4 Client Tools Log

All operations on clients, like copy, transport or delete, write a detailed log. To view the logs, you use Transaction SCC3 or SCC3_ADMIN. The only difference between the two is that with the latter, you can also clean up old logs, whereas Transaction SCC3 only displays logs, although this was changed in the most recent versions. On the main screen of the transaction, you can select different tabs. If an operation like a client copy or delete is currently active, then the first tab shows status information for the running operation. In the situation shown in Figure 5.12, a local copy from client 000 to client 400 is active. Notice the progress percentages for the delete and copy steps; use the **Refresh** button to get an update of these.

▲ Local Copy (000 -> 400) | Client Overview | Client 200 | Timeline View (26) | Local Copy (22) | Client Deletion (4)

Exception	Name	Value
■	Run Id	20230215161835
■	Mode	Local Copy
■	Source Client	000
■	Target Client	400
▲	Processing Status	Delete and Copy
■	Exit Status - Analysis	Success
■	Runtime	00:09:00
■	Progress (Deletion)	100.00%
■	Total Number of Tables (Deletion)	113.466
■	Progress (Copy)	57.27%
■	Total Number of Tables (Copy)	62.912
■	Number of Active Processes (Copy)	4

Figure 5.12 Transaction SCC3: Log of Client Copy

The other tables, starting with **Client Overview**, show historical information about all client operations ever performed in the system.

To drill down to the detailed log of the active client copy, double-click anywhere in the status list. This displays the screen shown in Figure 5.13, where you find again a series of tabs.

Of particular interest here are the **Exit Messages** and **Processed Tables** tabs. The first shows all messages returned by the exits; if anything goes wrong and the operation is canceled owing to an exit failure, then this is where you will find the relevant error messages. The second tab lists all tables involved in the copy. Here you can find per database table statistics on the number of rows copied, the processing time, and the number of segments (table splits) used. An example is shown in Figure 5.14. You can use the sort icons in the toolbar to display the tables with the highest number of rows and/or the longest runtime.

SAP — Local Copy (000 -> 400), 15.02.2023 17:18:36, Delete and Copy

Refresh | Stop Process | More

▲ Log Header | ▲ Active Process | Options | ▲ Exit Messages (268) | ▲ Processed Tables (113.466) | Included/Excluded Tables (694) | ▲ Exit

Exception	Option	Value
■	Mode	Local Copy
■	Run Id	20230215161835
■	Test Mode	Off
■	Profile	SAP_UCUS
■	Profile Description	Customizing and User Master Records
■	Source Client	000
■	Target Client	400
▲	Highest Message Severity	Warning
■	Runtime	00:09:22
▲	Processing Status	Delete and Copy
■	Exit Status: Initialization	Success
■	Exit Status: Analysis Phase	Success
■	Created By	EXPERTUM
■	Created On	15.02.2023 17:18:36 CET
■	Changed By	EXPERTUM
■	Changed On	15.02.2023 17:27:58 CET

Figure 5.13 Transaction SCC3: Detail Log of Running Copy

▲ Log Header | ▲ Active Process | Options | ▲ Exit Messages (268) | ▲ Processed Tables (113.466) | Included/Excluded Tables (694) | ▲ Exit

Excep..	Table	Delivery C	Applicatio	Delete Sta	Records De	Deletion r	Copy Status	Records Co	Copy Runti	Number of Segments
▲	CNV_PE_TPM_CLU	S	CA-LT	Finished	0	0 ms	Processing	13.398	40.446 ms	11
■	/SMB/Q2P_CC_EXT	S	SV-CLD-FRM-INF	Finished	0	0 ms	Finished	197	30.328 ms	1
■	T509F	C	PA-PA-US	Finished	0	0 ms	Finished	394		1
■	UJT_TRANS_OBJECT	E	EPM-BPC-NW-T...	Finished	0	0 ms	Finished	3.652	28.193 ms	1
■	/SAPAPO/OPTIPRF	E	SCM-APO-PPS	Finished	0	0 ms	Finished	7	19.744 ms	1
■	CRM_SVY_DB_SD	E	CRM-BF-SVY	Finished	0	0 ms	Finished	52		1
■	SRAL_FIELD_PROP	C	BC-SEC-RAL	Finished	0	0 ms	Finished	6.089		1
■	TMFK	G	LO-AB	Finished	0	0 ms	Finished	256		1
■	TRLC_DFT_ASSGN_G	C	FIN-FSCM-TRM-...	Finished	0	0 ms	Finished	42		1
■	TVAK	G	SD-SLS-GF	Finished	0	0 ms	Finished	190		1
■	UPBX	C	FIN-SEM-BPS-BP	Finished	0	0 ms	Finished	383		1
■	/SAPAPO/FCSGEN	E	SCM-APO-SPP-S...	Finished	0	0 ms	Finished	10	17.961 ms	1

Figure 5.14 Transaction SCC3: Statistics per Table

5.7 Client Transport

Remote client copies are the preferred method for copying clients between different SAP systems, but if for some reason this is not possible (e.g., because no network connection between the systems exists), then client transports can be used as an alternative. In a client transport, the data of the client is written to a transport request, which is then exported to the file system of the application server of the source system. This transport request is then imported into the target system and client. Simply importing

the data in the transport is not sufficient to result in a workable client; in addition, a series of post-processing activities must be carried out after the import. These activities can be triggered automatically by the import or started manually immediately after the import.

Before we proceed, some unusual but well-meant advice: only use client transports if there is really no other option. The procedure is widely disliked among SAP administrators and technical consultants and with good reason: where the old process, dating back to the 1990s, was buggy and poorly documented, the new procedure in SAP S/4HANA does not do much better. If you have no choice but to use it, make sure you plan plenty of time and be prepared to send a few support calls to SAP. A new and better alternative is to use table snapshots, which we describe later in Section 5.8.

5.7.1 Exporting the Client

To export the client, run Transaction SCC8N. The input screen shown in Figure 5.15 appears.

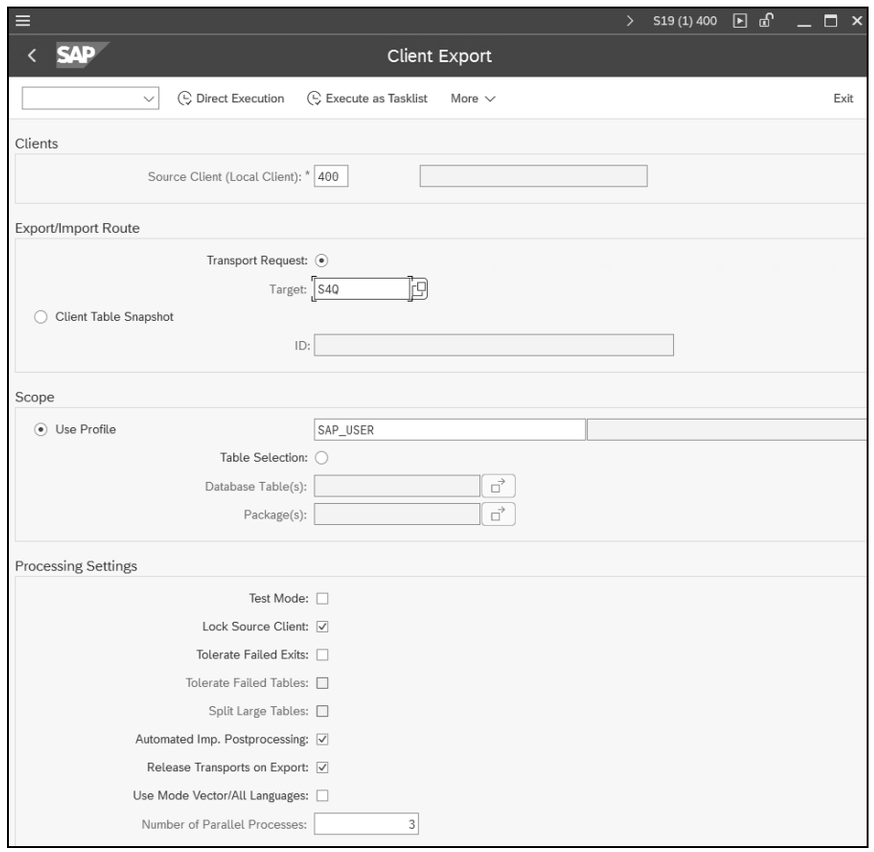


Figure 5.15 Transaction SCC8N: Input Screen for Client Export

As with the local and remote client copy, specify which client you want to export. In this case you do not specify a target client. Instead you choose between a transport request or a table snapshot; we discuss table snapshots later in this section. For a transport request, use F4 to select a target system or target group.

As always, you must also select a copy profile; however, the list of profiles here is a little different from the one we presented in Table 5.3. The main difference is that with client transports there is also the option to export both client-dependent and cross-client customizing. If you want to include cross-client customizing data, then choose one of the profiles in Table 5.4.

Copy Profile	Contents
SAP_EXBC	Customizing, Users and Cross-Client Customizing
SAP_EXPA	SAP_ALL with Cross-Client Customizing
SAP_EXPC	Customizing Including Cross-Client Customizing

Table 5.4 Copy Profiles for Cross-Client Customizing

If you only want to export the client-dependent customizing data, then use the same profiles (SAP_USER, SAP_CUST, etc.) as with local and remote client copies.

No Other Cross-Client Data Is Exported

The only type of cross-client data that can be exported is customizing data. Workbench objects (which are also cross-client) are never included in a client export.

Most of the options under **Processing Settings** will be familiar from the client copy procedures, but there are a few additional ones:

- **Automated Import Postprocessing**
  Mark this option if you want the postprocessing tasks in the target client to run automatically after the data import. If this option is disabled, you will need to run Transaction SCC7N in the target client to start postprocessing explicitly.
- **Release Transports on Export**
  With this option enabled, the transport request or requests will be released and exported automatically. *Always* enable this option: if you don't, then you'll walk straight into a trap—as we'll discuss in a moment.
- **Use Mode Vector / All Languages**
  This option controls whether for language-dependent data, such as descriptive texts, all languages are exported or only a subset. See SAP Note 45548 for more information.

So what about this "trap"? The client export creates transport requests of a special type (client transport request), and this type of transport cannot be released manually in transactions like SE09 or SE01. So if you do not specify that the client export itself should release the request, then there is no other possibility to release it and as a result you are stuck with an open transport request that might have taken hours to create but is perfectly useless. This leads to another warning: test the transport system first!

[!]

Test the Transport System First!

Before starting the client export, make absolutely sure that the transport system is fully operational. You can do this, for example, by creating a customizing request; making a few dummy changes to customizing tables, which get recorded in that request; and then releasing and exporting the customizing transport. If the transport system encounters an error and the export of the client transport fails, you will again end up with a dud request.

As with the client copy procedures, you can either run the client export online or in the background by using a task list. Use Transaction SCC3 to monitor the process. When the export is finished, the detail log contains the names of the transport request (or requests if cross-client customizing was included). The names of the requests are formatted as shown in Table 5.5.

Transport Request	Contents
<SID>**KT**<nnnnn>	Client-dependent data
<SID>**KO**<nnnnn>	Cross-client customizing data

Table 5.5 Transport Request Naming for Client Export

Figure 5.16 ❶ shows the log header for a client export with a profile that only includes client-dependent data. Here only the KT transport is created. The second screen in Figure 5.16 ❷ is the log header for a client export with profile SAP_EXBC, which also exports cross-client customizing. In this case both the KT and KO transports exist.

[»]

What about the KX Transport?

For people familiar with the old client export/import: that procedure also created a transport with *KX* in the name, which contained the texts. In the new procedure, the KX transport no longer exists.

Exception	Option	Value
■	Mode	Client Export
■	Run Id	20230216155723
■	Profile	SAP_USER
■	Profile Description	User Master Records and Authorization Profiles
■	Client	400
■	Transport Request	S19KT00003 ❶

Exception	Option	Value
■	Mode	Client Export
■	Run Id	20230216132832
■	Profile	SAP_EXBC
■	Profile Description	Customizing, Users and Cross-Client Customizing
■	Client	400
■	Transport Request	S19KT00002,S19KO00001 ❷

Figure 5.16 Transport Requests for Client Export

5.7.2 Importing the Client

The import of the client transport into the target system is done in the normal way, with Transaction STMS. When you start the import, an extra screen like the one shown in Figure 5.17 opens. Here you enter the target client—in this case, client 700—in SAP system S4Q.

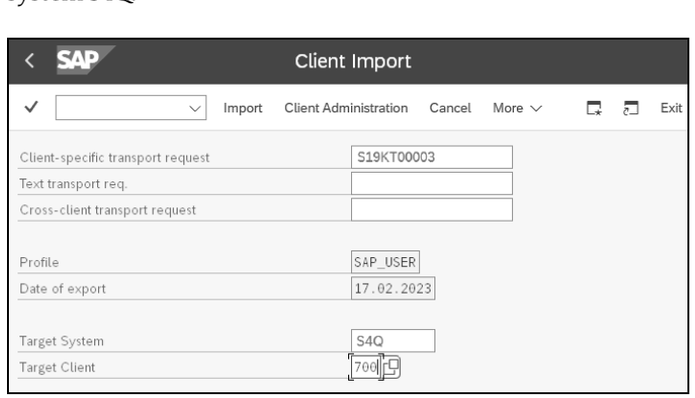


Figure 5.17 Import Client Transport

5.7.3 Import Postprocessing

If you ran the client export with the **Automated Import Postprocessing** option, then no further action is needed and the target client is ready for use. Otherwise, you must now start the postprocessing manually by running Transaction SCC7N. This brings up the screen shown in Figure 5.18.

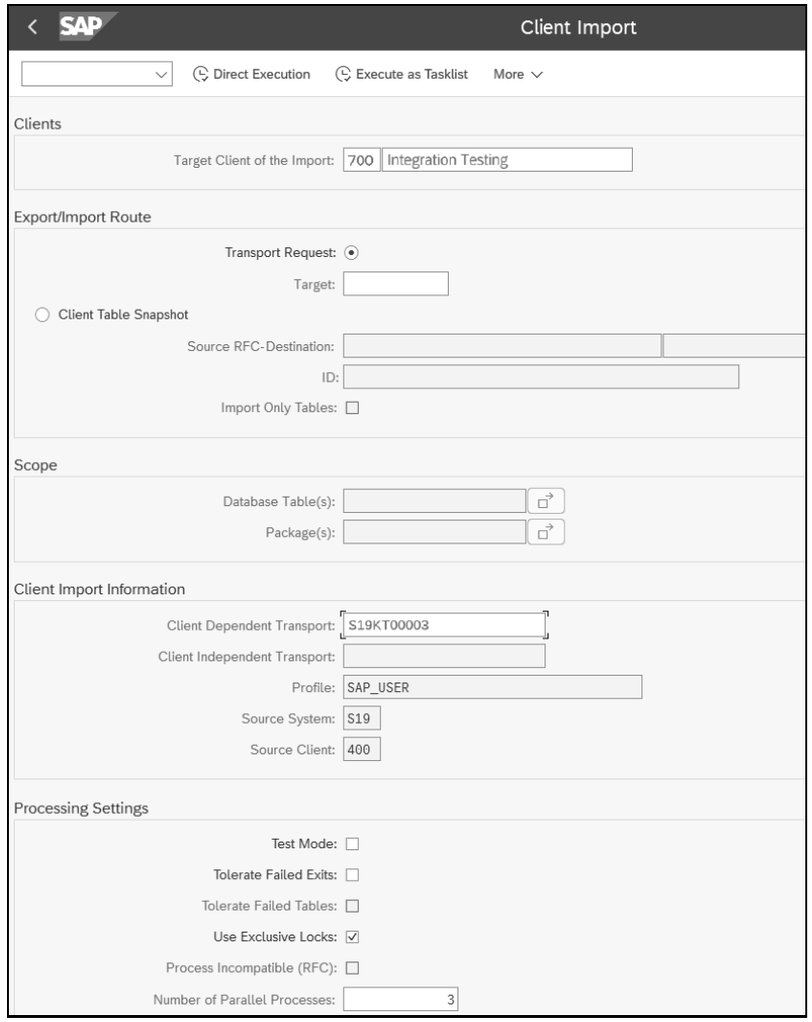


Figure 5.18 Transaction SCC7N: Input Screen for Client Import Postprocessing

Use F4 in the **Client** field to select the target client. Only the client into which you just imported the client transport request will be shown. If instead you receive the message **No clients in the system are available for import**, then the postprocessing steps were executed automatically and there is no need to use Transaction SCC7N.

As with the other procedures, you can either run the process online or use a task list, which you then execute in background.

5.8 Working with Table Snapshots

Table snapshots, sometimes also called *snapshot containers*, are a new feature introduced with SAP Basis release 755. Table snapshots provide a new and convenient way to copy clients between systems, much more convenient than client transports. In the following sections, we'll introduce snapshots and then walk through how to export to and import from a table snapshot.

5.8.1 How Snapshots Work

On the export side, the contents of the client, or of selected database tables, are written to a special table in the source database. The snapshot is then imported remotely (or locally) via RFC. Figure 5.19 shows the process flow. Client number XXX in the source client (simplified here to just three tables, TAB_A, TAB_B, and TAB_C) is exported to a snapshot in the local database. Each of the three tables forms a set of records in the snapshot, and each of these sets has a checksum.

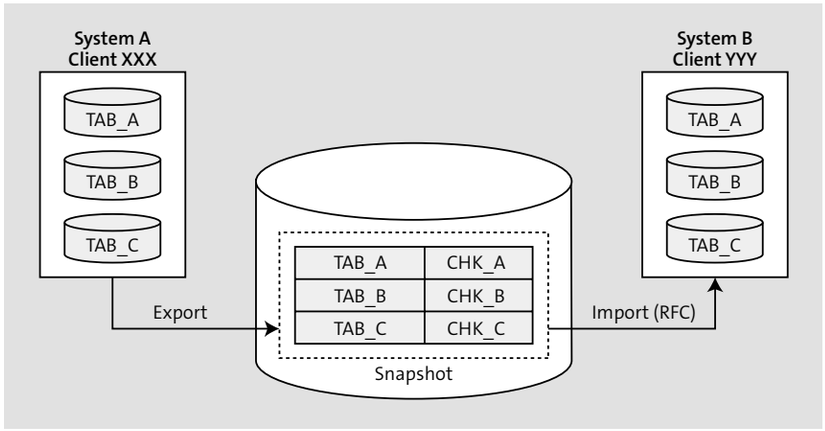


Figure 5.19 Table Snapshots

These checksums are used to verify whether a table has changed between two snapshot exports. A new export of the same client will only process the data of a table if that data has effectively changed. This is shown in Figure 5.20. Here we do a second export from the same client XXX to a new table snapshot. The export sees that the new checksum only differs from the old checksum for table TAB_B. For TAB_A and TAB_C, the checksums have not changed, which implies that the data stored in snapshot 1 is still valid.

Table snapshots are especially useful when you want to regularly recreate a client using the same source data; for instance, you want to initialize a training client with identical starting data prior to each training session. You cannot use a local or remote client copy for this because those procedures always read the source client as it exists here and now.

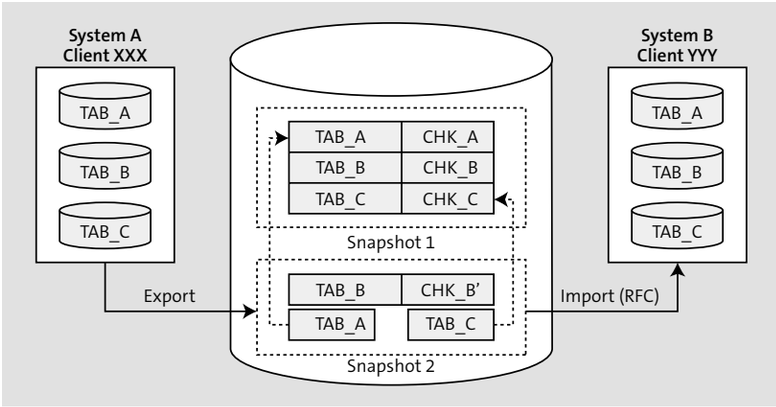


Figure 5.20 Use of Checksums for Later Snapshots

5.8.2 Exporting to a Table Snapshot

To export a client to a table snapshot, use Transaction SCC8N (the same transaction as for the export side of a client transport). The input screen is shown in Figure 5.21.

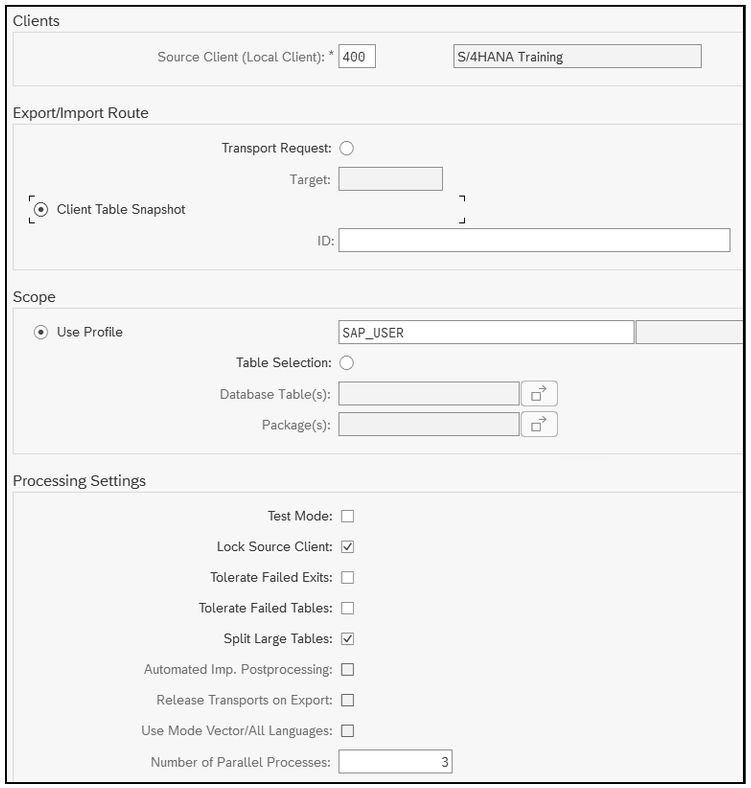


Figure 5.21 Transaction SCC8N: Input Screen for Export to Table Snapshot

Under **Export/Import Route**, select **Client Table Snapshot**. The ID is a descriptive identifier that you can supply yourself or leave empty, in which case the system will generate an ID. As with the other procedures, choose a profile for the export and set the processing options (the options that apply only to transports are grayed out). Choose between **Direct Execution** or **Execute as Tasklist** and monitor the process in Transaction SCC3 or SCC3_ADMIN.

5.8.3 Importing from a Table Snapshot

Table snapshots are imported with Transaction SCC7N. In the context of a client transport this is the transaction that you use for the import postprocessing (if not done automatically after importing the transport request), but in the case of table snapshots the transaction is used to perform the actual import.

Figure 5.22 shows the input screen. Specify the target client for the import and mark the **Client Table Snapshot** option. Type the name of the RFC destination pointing to the source (export) system and the ID of the snapshot you want to import. You can find this ID with Transaction SCC3 on the source side under the **Client Table Snapshot** tab.

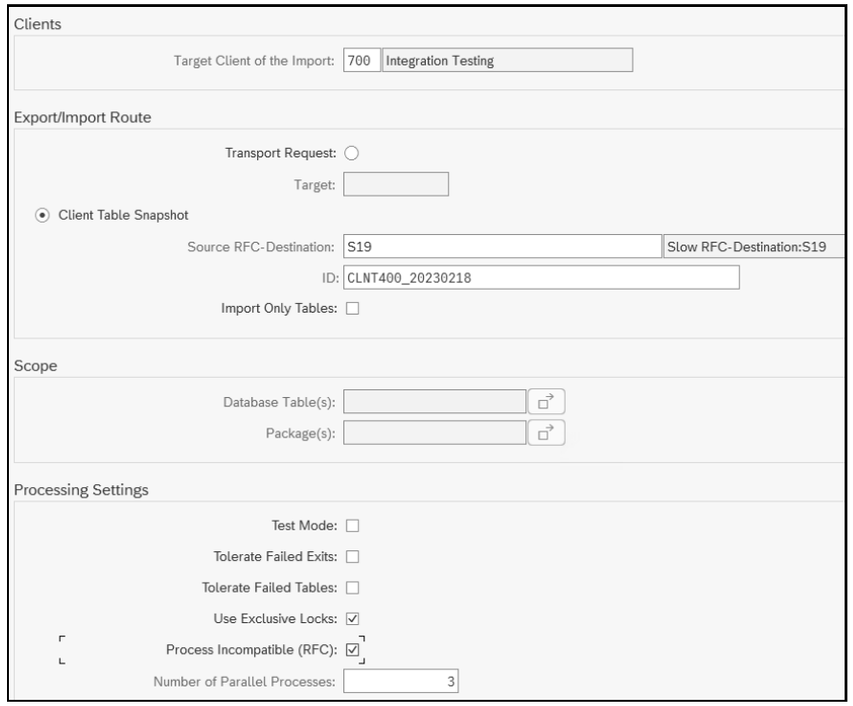


Figure 5.22 Transaction SCC7N: Input Screen for Import from Table Snapshot

Normally the import will use the same copy profile that was used for the export, such as SAP_USER or SAP_CUST. However, if you mark the **Import Only Tables** option, the

import will use a special copy profile, TABRANGE, which amounts to simply writing the data of all tables in the snapshot without further profile-dependent postprocessing.

5.9 Deleting a Client

It is also possible to delete a client, either because it is no longer needed or because the data in it is no longer usable and you want to recreate it with fresh data. Like the client copy, the client deletion process supports parallel processing to speed up the operation. To delete a client, log on to another client than the one you want to delete and start Transaction SCC5N. The screen shown in Figure 5.23 appears.

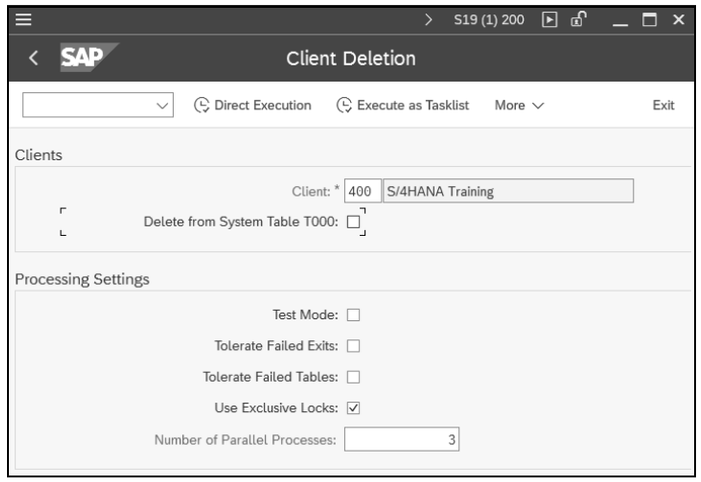


Figure 5.23 Client Deletion with Transaction SCC5N

Enter the number of the client to be deleted and press Enter to display its description. If you enable the **Delete from System Table T000** option, then the client will also be removed from the client configuration (Transaction SCC4) when the physical deletion is finished. Leave this option disabled if you are planning a new copy to the same client later and you want to preserve its configuration. The other fields have the same meaning as with the client copy.

Like the client copy, you can run the client delete directly online or, via a task list, in background. As always, the log of the delete operation can be seen using Transaction SCC3.

5.10 Transport-Based Copy

It is possible to copy data between clients based on the entries in one or more transport requests. This is useful, for example, to copy all the customizing created in the context

of a new project from the golden client to a test client. This customizing may be contained in multiple change requests and the developers and testers will only want to copy the contents of those requests without touching other data in the target client.

For a transport-based client copy use Transaction SCC1N. The selection screen is shown in Figure 5.24. Under **Transport Request** specify the request(s) whose data you want to copy. By default only requests of type W (the internal code for customizing requests) are selected and there is little reason to change this. You can also use alternate selections based on the transport target, user (owner of the change request) or project.

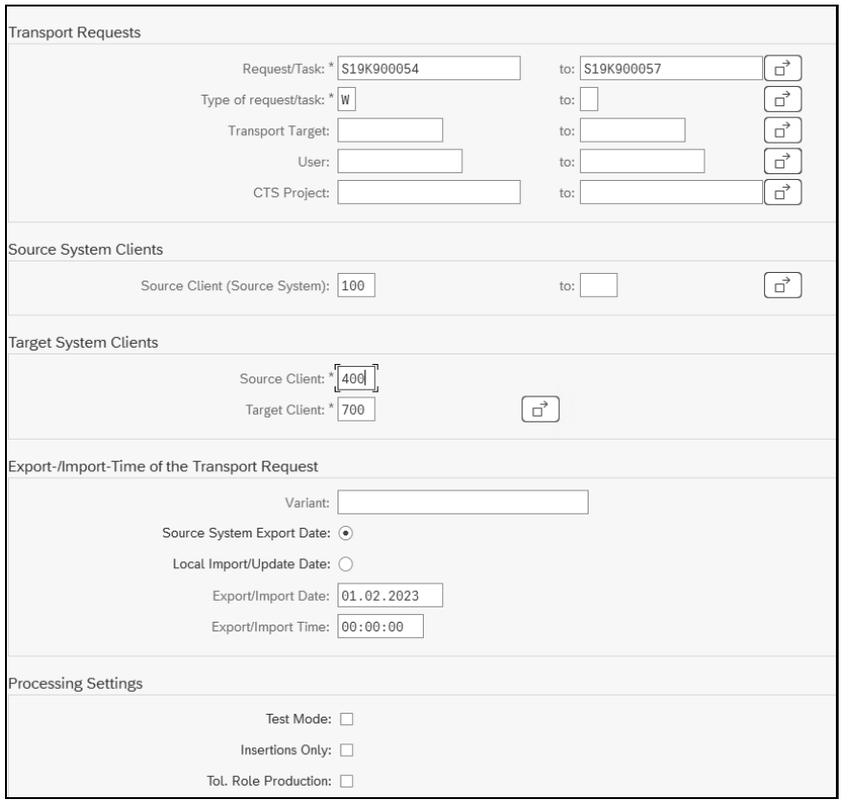


Figure 5.24 Transaction SCC1N: Input Screen for Transport-Based Copy

The source and target clients need some explanation. The source client refers to the client in which the change request was created in the development/customizing system. Specifying a source client is optional but is advisable nonetheless if you want to ensure that only requests from an authoritative source (such as the golden client) are used. The source client in the **Target System Clients** section is the client from where the copy process will read the data. The target client is the client the data will be written to. It is possible to specify more than one target client here (a practice known as *client cascading*); in that case the copy process will copy the data from the source client to all the

specified target clients in a single run. In the example in Figure 5.24, we want to copy data based on a group of customizing requests created in client 100 of the development system S19. The actual data will be copied from client 200 in the target system to client 700 in that same system.

By default, a transport-based copy will not write into a production client. You can override this protection if needed by enabling the **Tolerate Role Production** processing setting.

To run the copy, choose **Execute** or **Program • Execute in Background**. The program produces its own log output; transport-based copies are not visible in Transaction SCC3.

5.11 Special Operations for Clients

The new client copy procedure provides a few more tools, which we'll briefly discuss in this section.

5.11.1 Client Size Determination

Before copying a client, especially with a copy profile like SAP_ALL that covers large volumes of data, you will probably want to have an idea of how large the client actually is. You can use Transaction SCC_CLIENT_SIZE for this purpose. The transaction has a very simple input screen, which is shown in Figure 5.25.

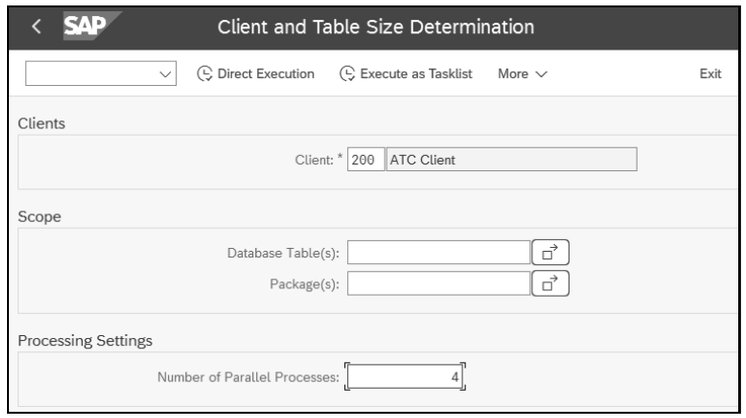


Figure 5.25 Client Size Determination

You can find the log of the operation in Transaction SCC3 under the **Size Calculation** tab. A good way to see how the calculation progresses is to open the detail log and go to the **Size by Delivery Class** tab, as shown in Figure 5.26. Use the **Refresh** button to update the information.

Figure 5.26 Client Size by Table Delivery Class

The delivery class is a table attribute in the Data Dictionary, which indicates the type of data that table contains. The most important delivery classes are `A` for application (master and transaction) data, and `C` and `G` for customizing data.

5.11.2 Client Comparison

It is possible to make a comparison between clients or between table snapshots. This comparison will produce a detailed report of all compared tables and the differences in their data. Comparisons can be made both within one SAP system and between two different systems.

To perform a data comparison run Transaction SCC_COMPARE. Figure 5.27 shows the input screen. You always specify two data sources. The first data source can be local or remote; if it is remote, enter the name of an RFC destination to the other SAP system. The second source is always local. Possible data sources are clients, table snapshots or client template containers (more on those in a moment). Under **Scope** choose a profile for the comparison or enter a list of specific tables or table ranges; you can also leave the profile name empty, in which case the comparison will use the implicit TABRANGE profile (Section 5.8.3) and only examine the tables. Under **Table Comparison Mode** you can choose between a quick comparison based on the checksums only or a detailed comparison that actually looks at the data records. A checksum comparison will reveal whether differences are present or not but will not show the affected data.

Start the comparison in the usual manner, directly or via a task list, and monitor the results in Transaction SCC3. Figure 5.28 shows the result for a comparison (between two table snapshots of the same client created at different times with the SAP_USER profile) where differences were found.

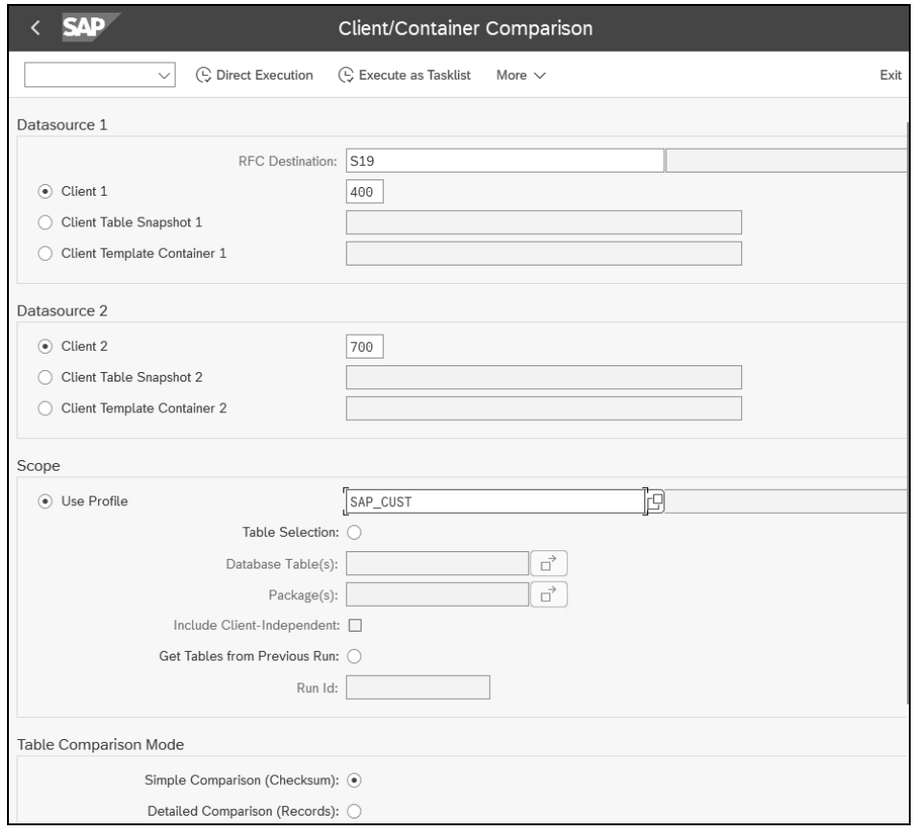
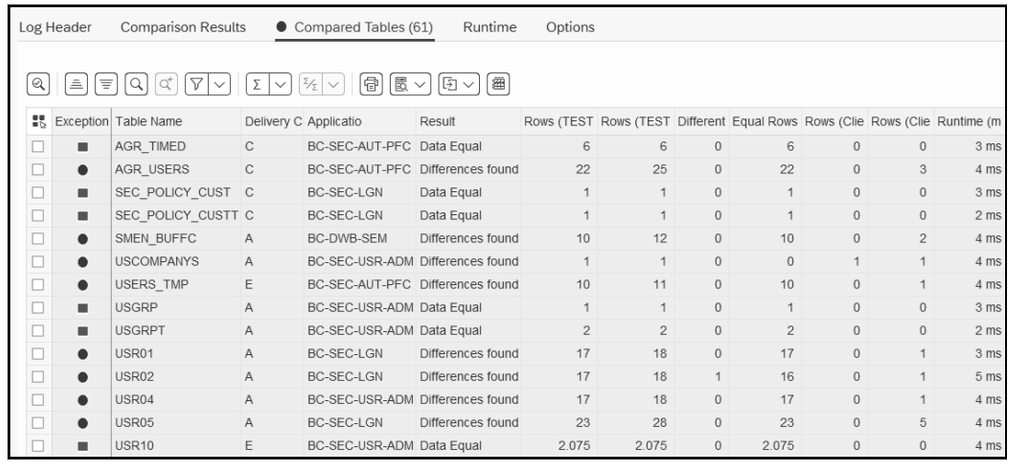


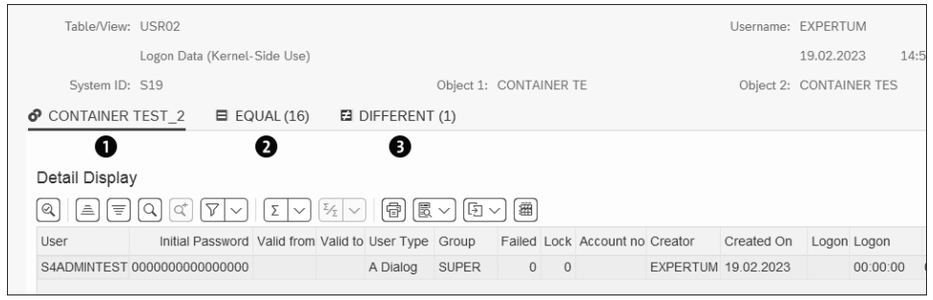
Figure 5.27 Client Comparison



Exception	Table Name	Delivery C	Applicatio	Result	Rows (TEST	Rows (TEST	Different	Equal Rows	Rows (Clie	Rows (Clie	Runtime (m
■	AGR_TIMED	C	BC-SEC-AUT-PFC	Data Equal	6	6	0	6	0	0	3 ms
●	AGR_USERS	C	BC-SEC-AUT-PFC	Differences found	22	25	0	22	0	3	4 ms
■	SEC_POLICY_CUST	C	BC-SEC-LGN	Data Equal	1	1	0	1	0	0	3 ms
■	SEC_POLICY_CUSTT	C	BC-SEC-LGN	Data Equal	1	1	0	1	0	0	2 ms
●	SMEN_BUFFC	A	BC-DWB-SEM	Differences found	10	12	0	10	0	2	4 ms
●	USCOMPANYS	A	BC-SEC-USR-ADM	Differences found	1	1	0	0	1	1	4 ms
●	USERS_TMP	E	BC-SEC-AUT-PFC	Differences found	10	11	0	10	0	1	4 ms
■	USGRP	A	BC-SEC-USR-ADM	Data Equal	1	1	0	1	0	0	3 ms
■	USGRPT	A	BC-SEC-USR-ADM	Data Equal	2	2	0	2	0	0	2 ms
●	USR01	A	BC-SEC-LGN	Differences found	17	18	0	17	0	1	3 ms
●	USR02	A	BC-SEC-LGN	Differences found	17	18	1	16	0	1	5 ms
●	USR04	A	BC-SEC-USR-ADM	Differences found	17	18	0	17	0	1	4 ms
●	USR05	A	BC-SEC-LGN	Differences found	23	28	0	23	0	5	4 ms
■	USR10	E	BC-SEC-USR-ADM	Data Equal	2.075	2.075	0	2.075	0	0	4 ms

Figure 5.28 Comparison Result

Double-click a table name to see the actual data differences. Figure 5.29 shows the comparison result for table USR02 (user master records). The first tab ❶ shown in the screenshot shows the table records that exist only in the CONTAINER_TEST_2 snapshot. The second tab ❷ lists all unchanged records and the third tab ❸ the records that exist in both snapshots (based on their primary key) but with different data in the nonkey fields.



User	Initial Password	Valid from	Valid to	User Type	Group	Failed	Lock	Account no	Creator	Created On	Logon	Logon
S4ADMINTEST	0000000000000000			A Dialog	SUPER	0	0		EXPERTUM	19.02.2023		00:00:00

Figure 5.29 Data Comparison for a Single Table

Apart from checksum-based and full data comparisons, there is a third usage mode for Transaction SCC_COMPARE, which is to create a client template. A *client template* is a transportable snapshot that can be used to set up new clients. To select this operation, mark the **Store as Template Container** option in the lower part of the input screen (shown in Figure 5.30).

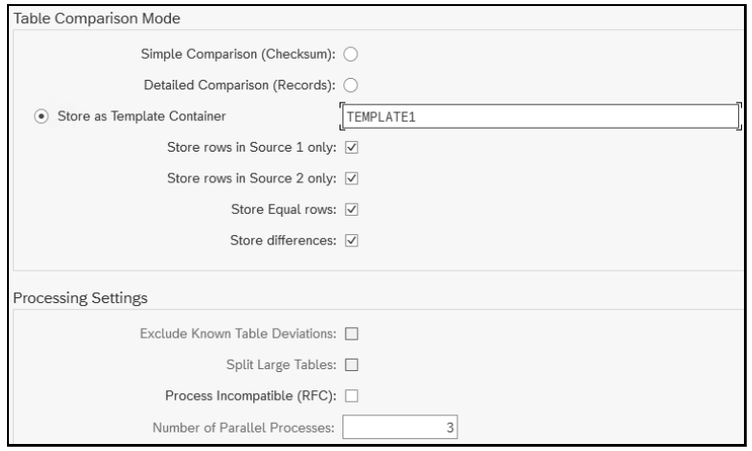


Figure 5.30 Creating a Template Container

Specify a name for the template and indicate which data records you want to include: those that exist only in the first data source, those that exist only in the second, those that are identical, and/or those that exist in both sources with different contents. We must point out that at the time of writing of this book, not one iota of documentation

about client templates was available from SAP, so we are unable to say whether there is any point in using them.

5.12 Cleaning Up Logs

To delete old logs of client copies, transports, and deletions, you can use Transaction SCC3_ADMIN. The original SAP documentation about the new client copy tools states that you can only use Transaction SCC3_ADMIN and not Transaction SCC3 because the latter only lets you display logs but not remove them. However, in the version used when writing this book (SAP Basis 7.56 Support Package 2), this was no longer true and the cleanup functionality existed in both transactions.

The opening screen of Transaction SCC3_ADMIN is the same as that of Transaction SCC3. Choose **Goto • Log Cleanup** and enter the deletion criteria in the selection screen shown in Figure 5.31. In this example, we want to delete all logs of deletions of client 400 that are older than 365 days (which is the default).

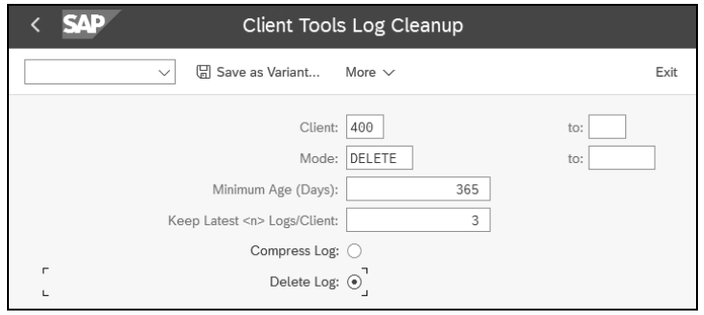


Figure 5.31 Transaction SCC3_ADMIN: Log Cleanup

It is also possible to delete table snapshots, but for that you do need Transaction SCC3_ADMIN. Open the **Client Table Snapshot** tab to see the list where all snapshots are listed. Then select the snapshots you want to delete and choose either **Delete in Background** or **Delete in Foreground**, as shown in Figure 5.32.

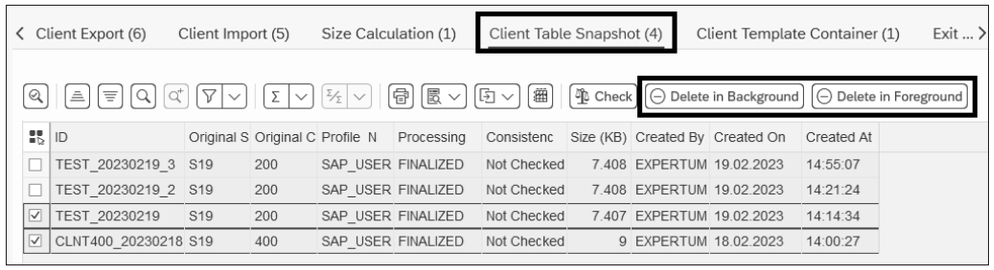


Figure 5.32 Delete Table Snapshots

5.13 Table Logging

Changing customizing data can have far-reaching effects: the behavior of applications might change or transactions might simply stop working. It is important therefore to have a reliable audit trail of such changes so that the administrator can always find out who changed what when. Table logging provides a mechanism to track such changes. This topic is part of the current chapter because logging is controlled at the level of the individual clients.

For table logging to be active, two conditions must be met:

1. The database table must have the logging flag set in the Data Dictionary. This is the case by default for a large number of customizing tables. If developers create their own customizing tables, then they should set this flag themselves. We'll cover how to do this in Section 5.13.1.
2. Logging must be enabled either system-wide or for specific clients. This is done by changing a profile parameter of the system (see Chapter 7 for information about profile parameters). The default setting of this parameter is **OFF**, which means that no logging takes place. We discuss the parameter setting in Section 5.13.2.

5.13.1 Settings at Table Level

You can display the logging status for a database table by looking at the technical settings of the table in the dictionary. You do this as follows:

1. Call Transaction SE12.
2. Enter the name of the table in the **Database table** field.
3. Choose **Display**.
4. On the screen showing the table structure choose **Technical Settings**.
5. On the next screen scroll all the way down to **Data Changes**.

You can also go to the technical settings directly by calling Transaction SE13.

We show an example in Figure 5.33. Here table T009, which contains important customizing settings (fiscal year variants), has the **Log Changes** flag enabled. The **Rating** and **Reason** fields contain information on whether logging for this table is required or optional and the reason for assigning this rating.

Changing the logging flag, like all dictionary changes, must be done in the development system, and this change must then be transported to the test and production systems. The following rules should be observed:

- Use logging for customizing tables only, never for transaction tables. The logging facility is not suitable for data that changes often and in large numbers.
- Do not disable logging for an SAP-delivered table with a **Required** rating.

- If the rating is **May Be Required**, then enable logging if the system meets the condition given in the **Reason** field.
- For customer tables, determine whether logging should be enabled in function of organizational requirements—for example, auditing rules.

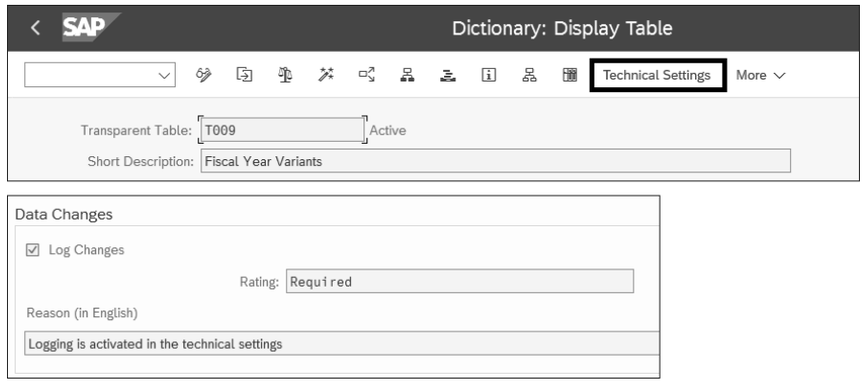


Figure 5.33 Logging Flag for Database Tables

5.13.2 System Parameter Settings

Simply setting the logging flag is not enough to ensure that all changes to the data in the table will indeed be logged. For this, profile parameter `rec/client` must be set. The parameter can take the following values:

1. `OFF`
   Table logging is switched off; this is the default setting.
2. `ALL`
   Table logging is active for all clients in the system.
3. `<cli1>,<cli2>,…,<cliN>`
   Table logging is active for the clients in the list. Up to 10 clients may be specified. The list is comma-separated without spaces.

Some examples of this are as follows:

- `rec/client = 100`
- `rec/client = 100,200,300`
- `rec/client = ALL`

The parameter is static, therefore the SAP system must be stopped and restarted to activate any changes.

5.13.3 Displaying Logged Data

Use Transaction SCU3 to display the change log for a table. On the initial screen choose **Evaluate Logs**. The selection screen shown in Figure 5.34 appears. Enter the name of the logged table and the time range for which you want to display the changes. For the object type to evaluate, choose **Tables**. We recommend that you choose **ALV Grid Display** as the output format. Press **Execute** to display the log.

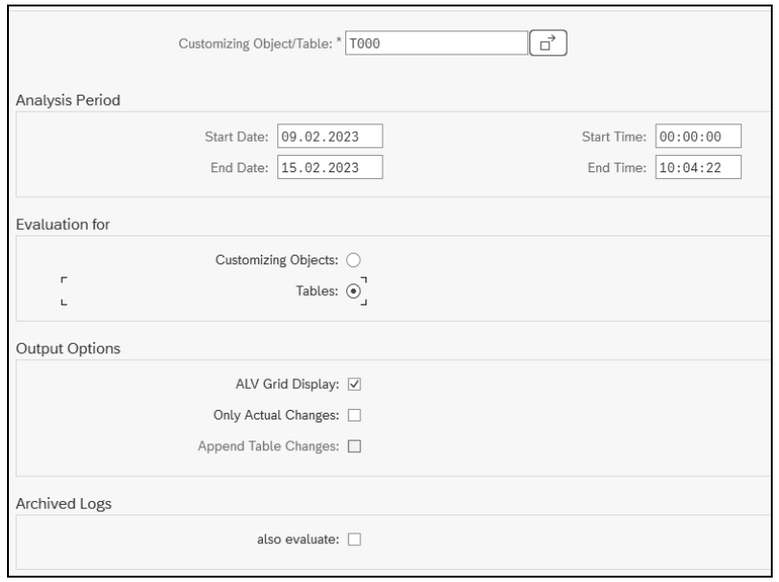


Figure 5.34 Transaction SCU3: Selection Screen for Change Logs

In the example, we want to check whether any changes were made in the last week to table T000, which contains the client definitions. Screenshot ❶ in Figure 5.35 shows that there was one change to the table in the chosen period, affecting client 400. The line with **Old** in the **Type** column shows the original data; the line with **New** has the data after the change. Each column on the right of **Type** represents one field of the table. Values are filled in only for the fields that were actually changed; unchanged fields are shown empty.

Here we also see that the **Client Role** was changed from **T** to **C** and the correction system (**Corr. Sys.**) from **3** to **1**. What these values mean will not be immediately obvious; to find out more, place your cursor on the value and choose F4. The system now lists the possible field values with their descriptions. Figure 5.35 ❷ shows the result for the **Corr. Sys.** field: this tells us that the change and transport policy for client 400 was changed from **Changes without Automatic Recording, No Transport Allowed** to **Automatic Recording of Changes**. Doing the same for the **Client Role** field reveals that the client type was changed from **Test** to **Customizing**.

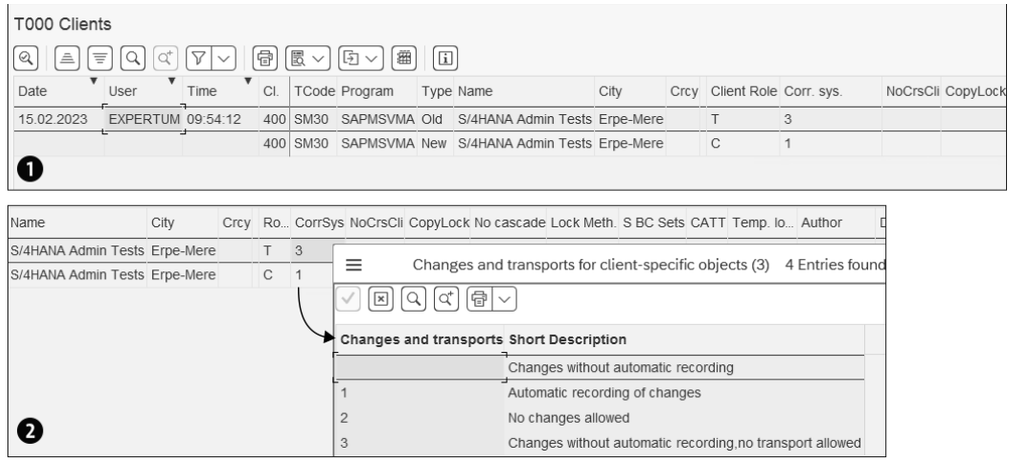


Figure 5.35 Transaction SCU3: Log of Data Change

5.13.4 Archiving and Deleting Logged Data

Although data logging is used only for customizing tables, where changes are relatively rare, over time the volume of the logs may grow quite large. The audit value of the data will also diminish as the changes lie further and further in the past. We have seen SAP systems in which change logs were allowed to accumulate for 10 or more years even though no one would ever look at the old data again. In these systems the table that holds the logs was among the largest tables, sometimes even *the* largest table, in the entire database. To avoid amassing huge amounts of data that is no longer of any use, it is recommended to periodically trim the contents of the log table. This can be done either by archiving log data or by deleting it altogether.

To archive change logs, you must set up an archiving process for the object type `BC_DBLOG` in the SAP archiving interface (Transaction SARA). Archiving is covered in Chapter 14, so we don't go into further details here. To delete log data, use report RSTBPDEL. On the selection screen you specify up to what date and time you want to delete logs (the default is one year ago), the tables whose logs you wish to delete (default is all tables), and the client (default is logs for all clients will be deleted). Preferably start the program in the background because the runtime could be very long. It is a good idea to schedule this program as a periodic background job—for instance, with a weekly or monthly frequency.

5.14 Summary

The client is the most essential organizational unit in the SAP S/4HANA system. Most customizing and all transaction data in the system belongs to just one client and can only be seen and altered by users logged onto that client. This ensures proper separation

between functions (e.g., between a development client and a test client) or, in multicompany systems, between data belonging to different companies. There is also cross-client data, which is visible across all clients in the system, but this is limited to repository objects (such as programs or dictionary objects), configuration tables, and some customizing.

A new SAP S/4HANA system only contains Client 000, which is intended exclusively for administration purposes and must never be used for business applications. The client or clients where the actual work will happen must be created and provisioned with data using one of the client copy tools that we saw in this chapter.

Since the early days of SAP R/3, SAP has provided procedures to set up new clients and copy data between clients, both locally within one SAP system and remotely between SAP systems. These procedures have been completely renovated and optimized for SAP S/4HANA. In addition, new utilities for calculating the size of a client and for comparing data between clients are now available.

For customizing data, it is important that an audit trail of changes to this data is always available because customizing changes can deeply impact the operation of the SAP applications. The table logging facility serves this purpose by automatically recording which customizing is changed, when, and by whom.

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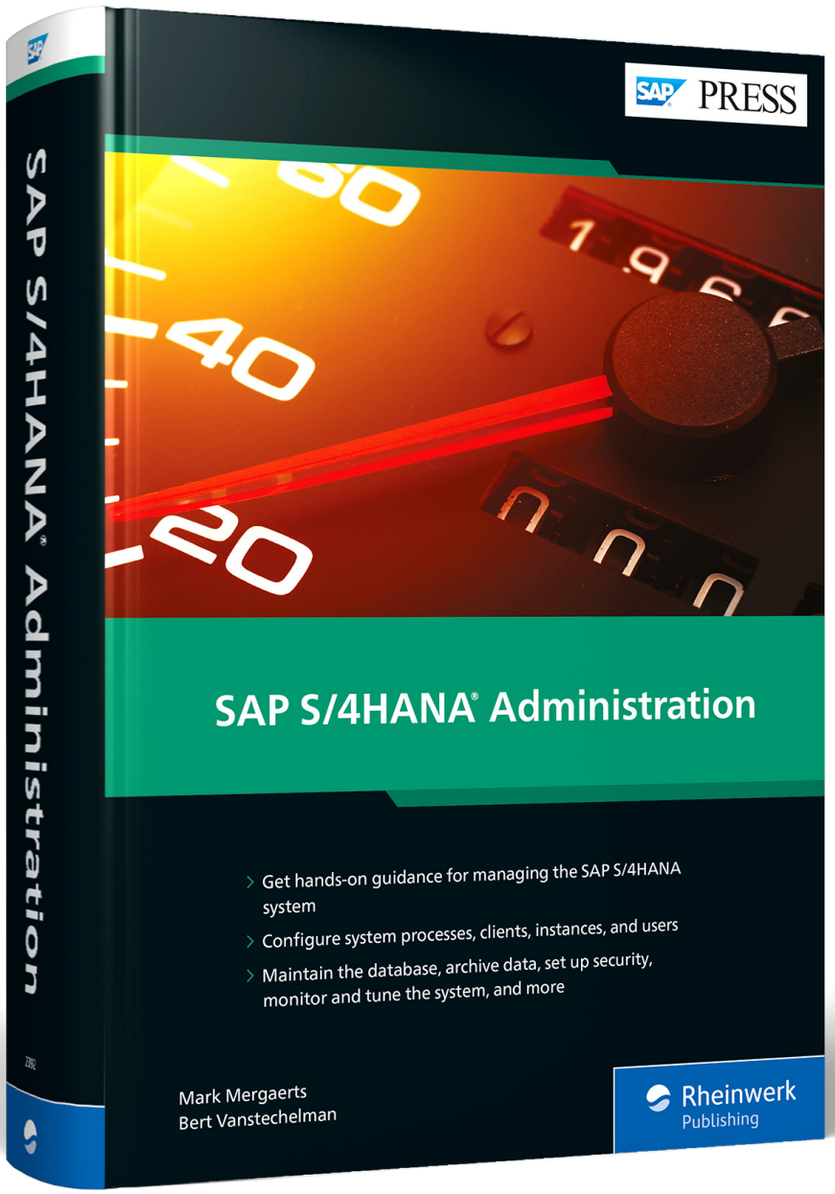

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