Better Management of Change Requests with Extended Transport Control

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(complete bio appears on page 103)

Every implementation and development team instinctively knows that the transporting of change requests — the containers for the development and Customizing efforts that need to be distributed to R/3 systems within that solution's system landscape — is vital to the success of an R/3 implementation.

SAP supports the transport of development and Customizing changes from one R/3 system to another using the tools of the Change and Transport Organizer (CTO).[1] These tools make transport of *development* changes to the quality assurance and production systems' clients a standard procedure. Development changes are client-independent changes (often to Repository objects) that immediately impact all clients in an R/3 system when imported into that system.[2] Since Repository objects are shared by all clients, development changes can be transported just once into the R/3 system, rather than on a client-by-client basis, hence the term "client-independent."

The tricky part is getting client-dependent Customizing changes to the various clients of the quality assurance system and production system. These changes must be distributed in a precisely ordered manner to all pertinent clients in order for clients to remain synchronized with the proper client-dependent settings.

[1] A comprehensive look at CTS is provided in "An Insider's Guide to the SAP Change and Transport System (CTS)," *SAP Professional Journal*, Premiere Issue.

[2] Client-independent changes are often development changes to Repository objects, such as programs, screens, and dictionary structures. In addition, there are some Customizing activities and settings that affect all clients in the R/3 system and are therefore classified as client-independent.

That's not necessarily an easy thing to do. The transport of change requests in a three-system (DEV/QAS/PRD) landscape facilitates the movement of all development (client-independent) changes. It does not allow for the distribution of Customizing (client-dependent) changes to multiple clients within the quality assurance system, and herein lies the difficulty.

A system landscape often requires multiple clients in a single R/3 system, where each client has a specific role. For example, a quality assurance system typically contains more clients than just the quality assurance client. One or two additional clients may be dedicated to end-user training, and another client may be reserved for data conversion tests. Regardless of the number of clients, your import procedure needs to ensure that all clients in the quality assurance system receive the change requests in the same order that they were exported from the development system. Unfortunately, prior to R/3 Release 4.5, the transport routes you define in the TMS can't target specific clients. They can only move change requests from one R/3 system to another R/3 system.

Take a look at **Figure 1**. In this system landscape, all change requests released from client 100 in the development system are added to the import queue of the quality assurance system. The change requests in the import queue need to be imported into client 200, client 210, and client 230 to ensure that all clients in the quality assurance system are synchronized and have the same client-dependent settings. Does any of this have a painfully familiar ring to it?

A system landscape often requires multiple clients in a single R/3 system, where each client has a specific role. Regardless of the number of clients, your import procedure needs to ensure that all clients in the quality assurance system receive the change requests in the same order that they were exported from the development system.

In the pre-Release 4.5 world, there is no easy way to import change requests into multiple R/3 clients. The import of change requests into multiple clients within the quality assurance system requires that you ensure that all change requests are imported into all clients in the same sequence. To accomplish this, you would:

- Perform the import of a change request several times, once for each client in the R/3 system. Referring again to Figure 1, this system landscape would require that a group of change requests be first imported into client 200, then immediately into client 210, and then into client 230.

- Import change requests into the different clients within the same time period, rather than at different times, to ensure that client-independent functionality is not overwritten by older versions of the functionality delivered in earlier change requests.

Importing change requests into multiple clients in a sequential process like this is the only way to ensure consistency in the import queues, and to ensure that all clients have received the latest change requests.

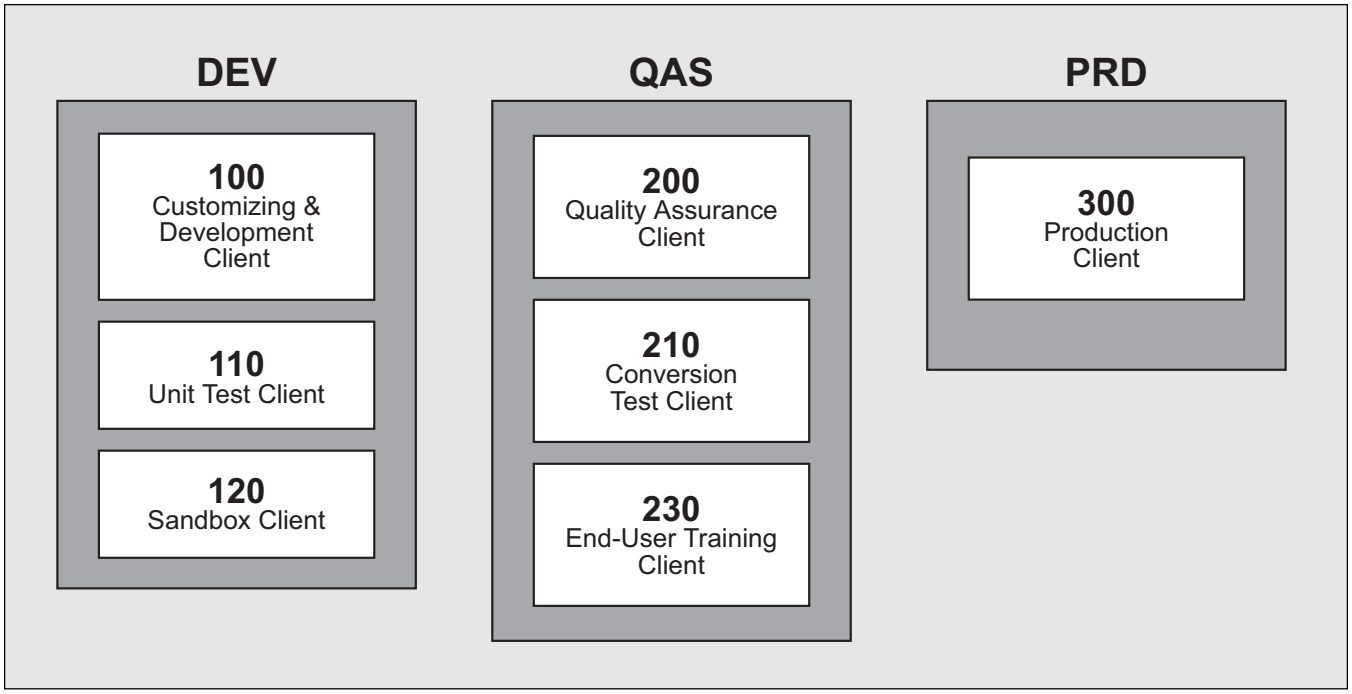
Recognizing that this process can become overwhelming, SAP introduced *extended transport control* with Release 4.5. Extended transport control takes the transport of change requests beyond the limitations of system-to-system movement and into the movement of change requests from one client to another client, so that you can:

- Be sure that all change requests are transported to all clients (and not just R/3 systems) in your system landscape.

- Schedule imports into a client based on the role and needs of that client rather than the demands of the R/3 system.

- Establish transport routes that distribute changes to multiple clients in the same or other R/3 systems.

Figure 1 *R/3 Systems with Multiple Clients*



Extended transport control takes the transport of change requests beyond the limitations of system-to-system movement and into the movement of change requests from one client to another client, so that you can be sure that all change requests are transported to all clients in your system landscape, schedule imports into a client based on the role and needs of that client rather than the demands of the R/3 system, and establish transport routes that distribute changes to multiple clients in the same or other R/3 systems.

Using extended transport control, change requests in an import queue are waiting not just for import into the R/3 system, but for import into a specific client within the system. After you define client-specific transport routes, you will not have to worry about managing into which clients a change request must be imported, or whether older versions of client-independent changes will be overwritten. This article will show you, step by step, how this can be accomplished as I cover how to:

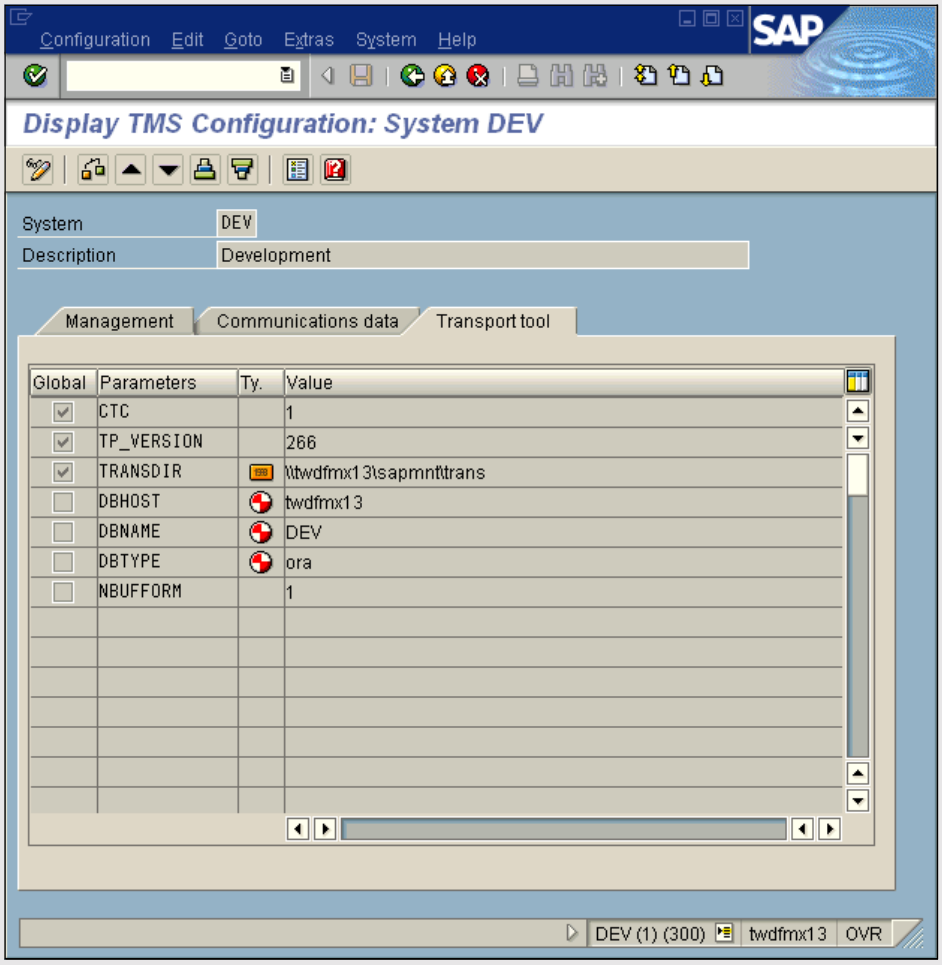
- Activate extended transport control
- Define client-specific transport routes
- Import with extended transport control
- Create and use "target groups" to facilitate the distribution of change requests to multiple clients

Activating Extended Transport Control

To take advantage of extended transport control, you must explicitly set the transport profile parameter CTC to 1. The default value for this parameter is 0, which deactivates extended transport control.

The transport profile parameter is set from within

Figure 2 Activating Extended Transport Control



Systems Overview in TMS.[3] The parameter can be set either locally for each R/3 system, or globally for all R/3 systems defined by TMS. **Figure 2** shows that extended transport control has been activated globally for all systems defined in TMS, including the system DEV.

After setting the parameter CTC to 1 to activate extended transport control, you must define client-specific transport routes, which we will discuss next.

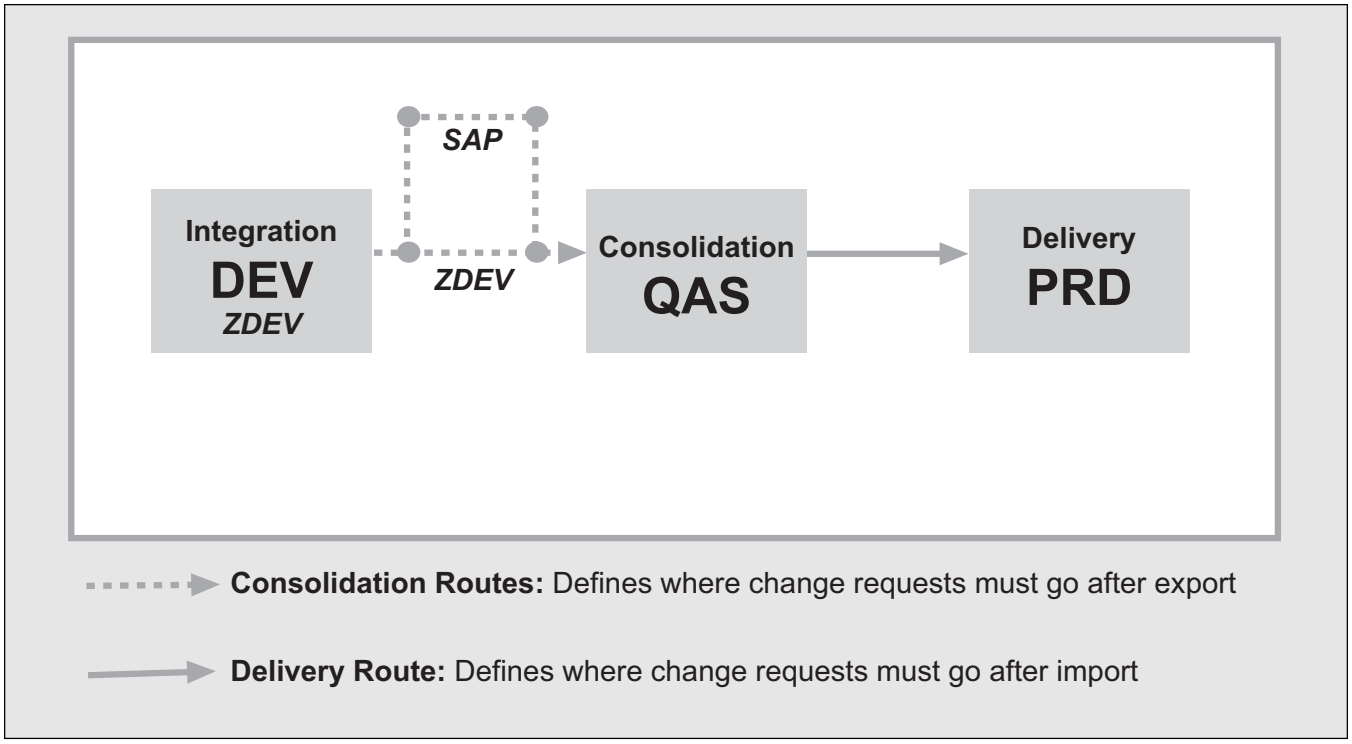
[3] As of R/3 Release 4.0, transport profile parameters are maintained using TMS, and not by editing the file TPPARAM at the operating system level.

Defining Client-Specific Transport Routes

You're all familiar with the classic transport of changes in a three-system landscape, where all change requests released from DEV, the development system, are targeted for QAS, the quality assurance system.[4] Once imported into the quality assurance system, change requests are delivered to PRD, the

[4] In R/3, the quality assurance system is technically referred to as the consolidation system in a three-system landscape, because all changes released from the development system are "consolidated" to the quality assurance system.

Figure 3 *Transport of Change Requests in a Three-System Landscape Without the Use of Extended Transport Control*



production system.[5] This allows for the verification of change requests in a test environment before the import of the same change requests into the production environment.

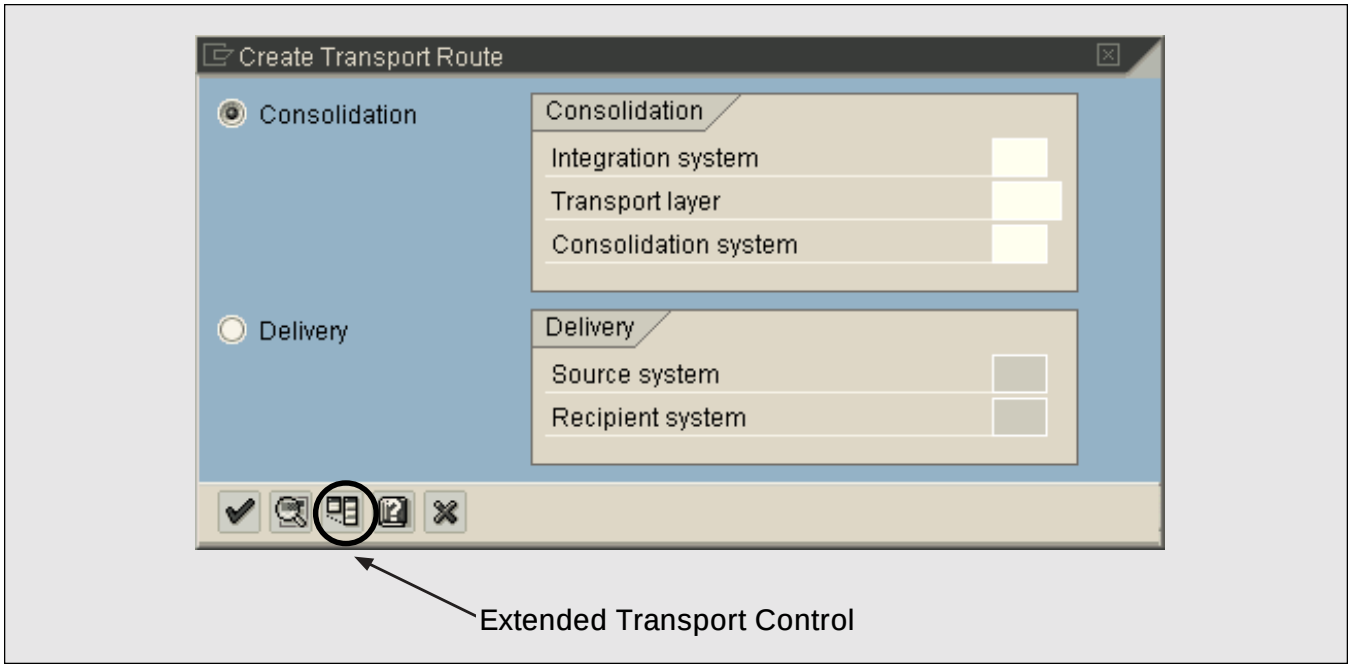
To facilitate the movement of changes in this classic three-system landscape, you define two consolidation routes and one delivery route (see **Figure 3**):

- The first consolidation route you define is the one from the development system to the quality assurance system (a.k.a. the "consolidation" system) through the standard transport layer ZDEV. ZDEV is commonly thought of as the default transport layer. It is used to facilitate the movement of all Customizing changes and customer development.
- The second consolidation route you define is through the transport layer SAP. This route transports changes to SAP Standard Objects from the development system to the quality assurance system.
- A delivery route is then created from the quality assurance system to the production system. The production system is the recipient system for the consolidated changes.

You can equate *consolidation routes* with the *export* of change requests and *delivery routes* with the *import* of change requests. When a change request is exported from an R/3 system, it must follow a consolidation route that directs it to a target import queue. Upon import, if another delivery route is defined, the change request will be delivered to the import queue defined by that delivery route. Therefore, in Figure 3, all change requests exported from the development system are added to the import queue of the quality assurance system. Upon successful import into the quality assurance system, the

[5] In R/3, the production system is technically referred to as the delivery system in a three-system landscape, because all change requests imported into the quality assurance system are "delivered" to the production system.

Figure 4 *To Create Client-Specific Transport Routes, Choose the Option "Extended Transport Control"*



change requests are added to the import queue of the production system. Upon import into the production system, the change requests are not added to any other import queue, because no delivery route is defined for the production system.

You define the client-specific transport routes used by extended transport control in much the same way you define these traditional system-to-system transport routes. You use the Transport Management System (TMS), which is called with transaction STMS. The TMS is essentially the "traffic cop" of change requests — it centrally defines the movement of change requests within the system landscape (more technically defined as the "transport domain").[6] Once these transport routes have been defined, TMS is then used to perform and monitor the import process to ensure that changes are delivered in the correct order, and that you are notified of errors.

Defining client-specific transport routes requires that you provide system-client combinations rather than simply the traditional system specification when creating transport routes. For example, if you wish to create a transport route from the development system to client 200 in the quality assurance system, the transport route target is defined as QAS.200. (The system and client combinations are always recorded using first the system name, a period, and then the client number.)

To create a client-specific transport route, proceed as usual using the TMS. From either the TMS hierarchical list editor or the graphical editor,[7] choose the **Create Transport Route** button, which launches the Create Transport Route dialog. From within this dialog, click on the **Extended Transport Control** button. This new option is highlighted in **Figure 4**.

[6] All R/3 systems that are managed centrally using TMS form a transport domain. Often the transport domain contains a single system landscape, but in a complex environment, a transport domain may contain multiple system landscapes.

[7] To help define a transport route, the TMS provides a graphical editor and a hierarchical list editor, which can be used interchangeably.

Figure 5 Defining a Consolidation Route with Extended Transport Control

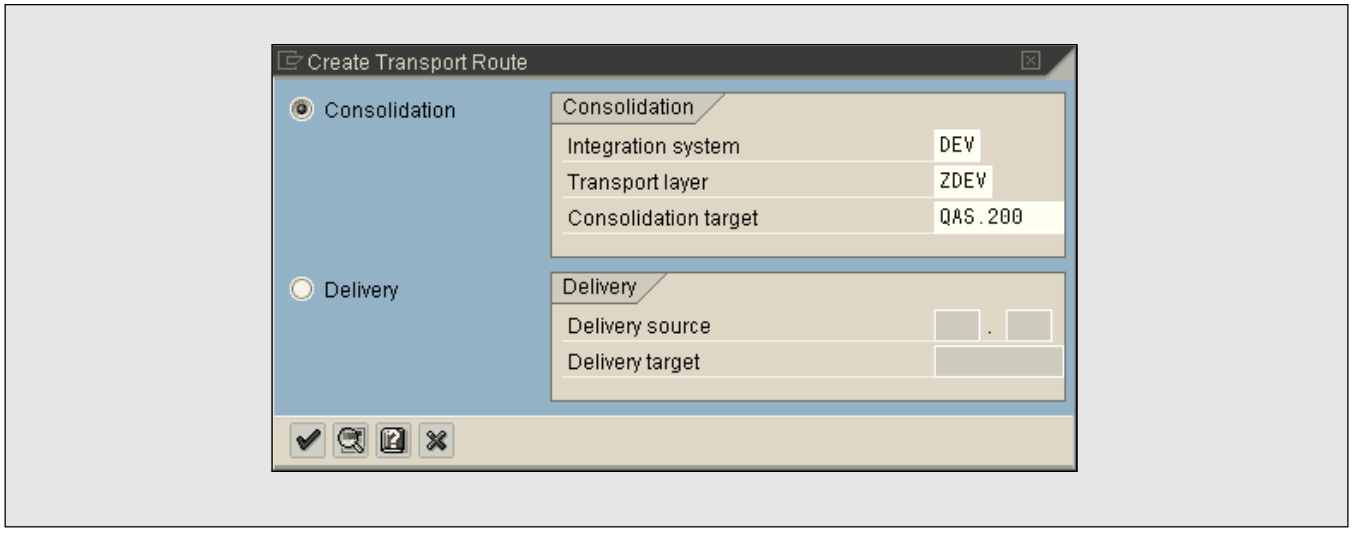
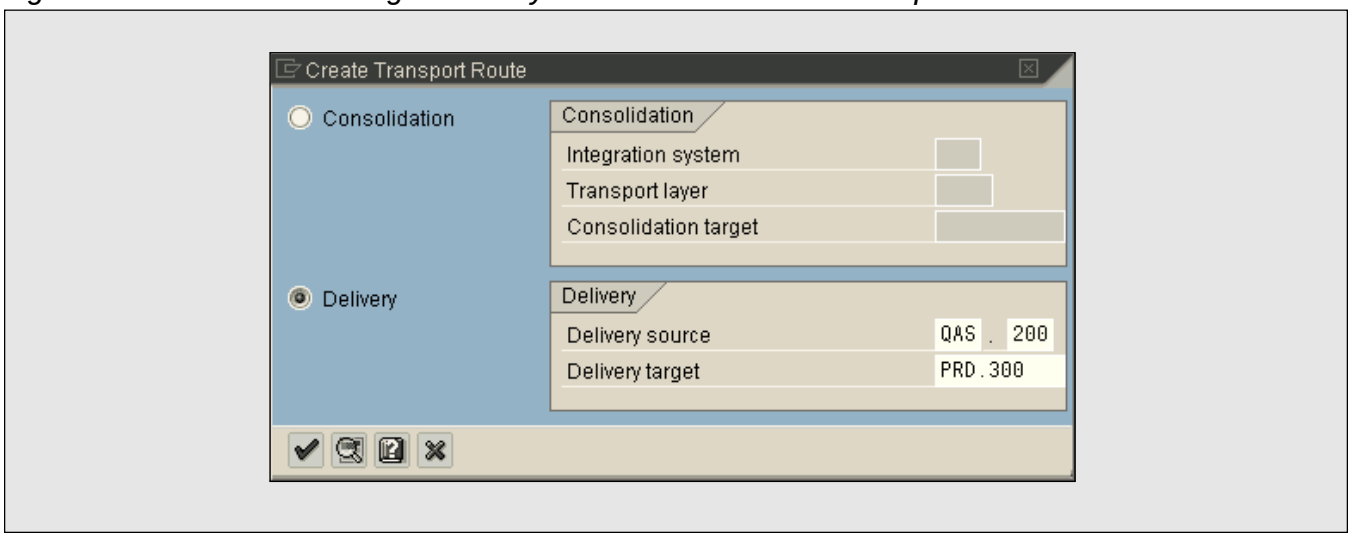


Figure 6 Defining a Delivery Route with Extended Transport Control



Because there are two different types of transport routes, you first select **Consolidation** or **Delivery**, and then proceed as follows:

- To create a consolidation route, enter the source system (or integration system) from which changes will be released, along with the transport layer to be used to export the changes. In the "Consolidation target" field, enter the target R/3 system and client to which change requests will be imported. **Figure 5** depicts the creation of the consolidation route from the development system, DEV, to client 200 in the quality assurance system, QAS.

- To create a delivery route, enter the delivery source R/3 system and client, and the system and client combination to which the change requests should be delivered. **Figure 6** depicts the creation of a delivery route that will ensure that all change requests imported into QAS.200 are then added to the import queue of the production system client 300, PRD.300.

Figure 7 A View of the Hierarchical Transport Environment

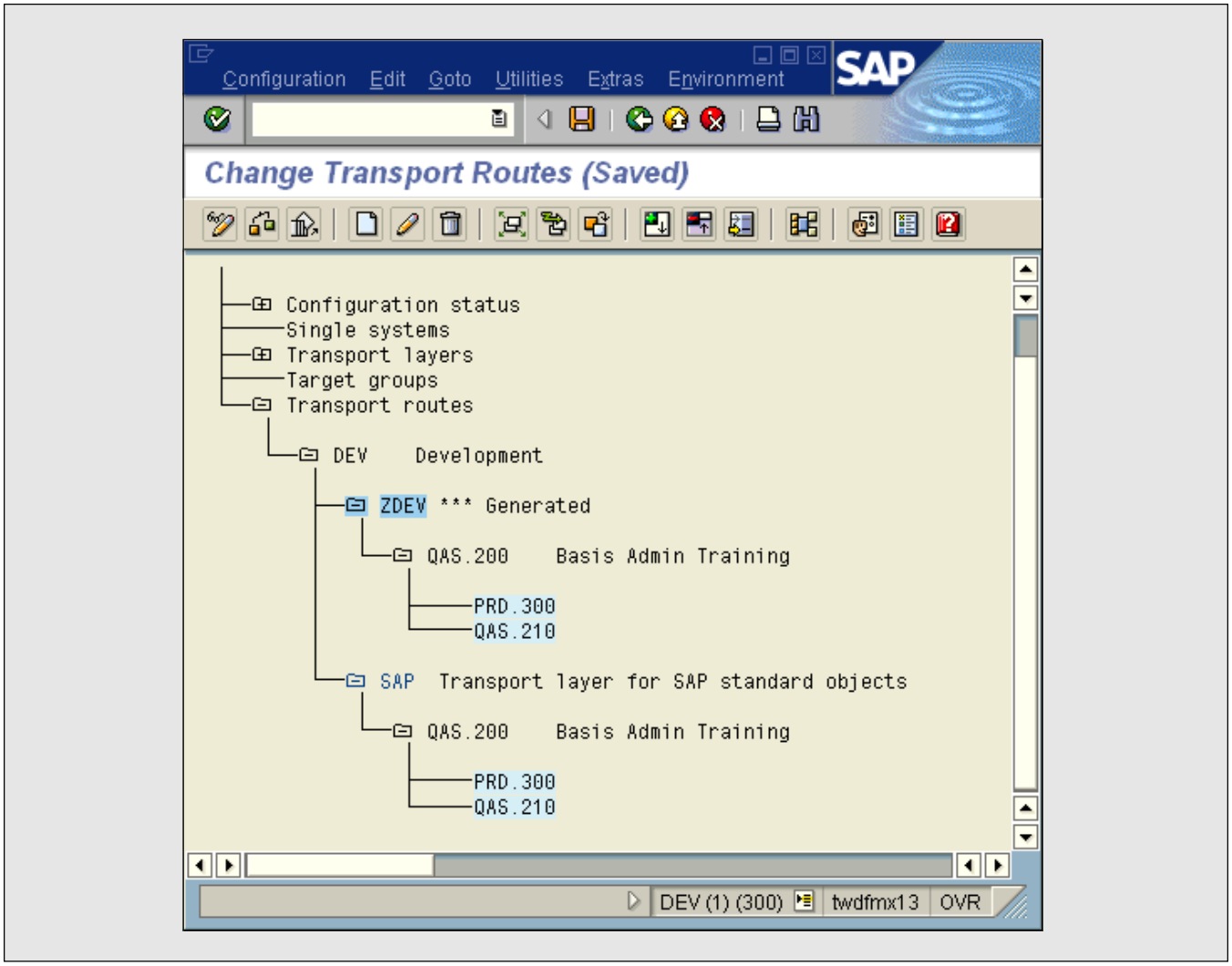


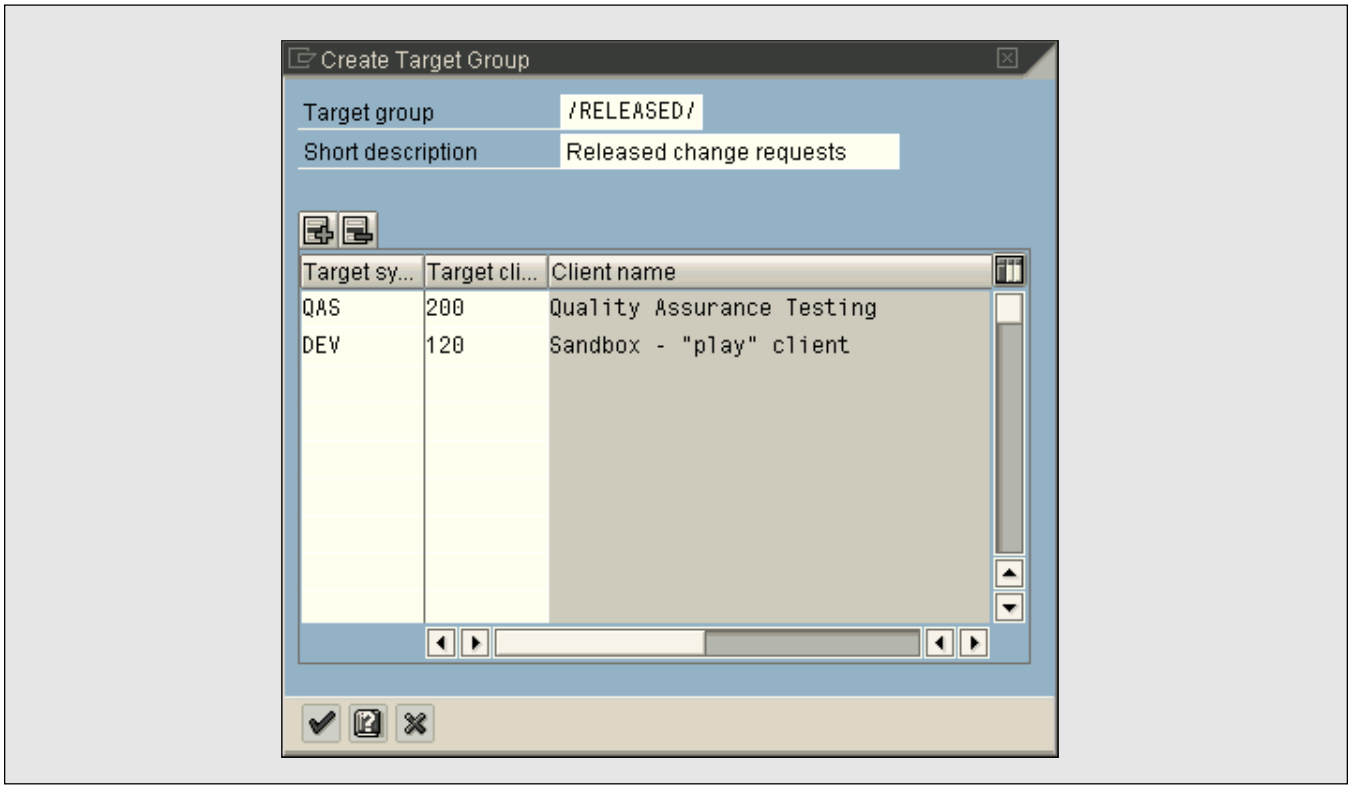
Figure 7 shows the TMS hierarchical depiction of such a transport environment. Changes in the development system, DEV, are transported to client 200 of the quality assurance system, QAS. The target of the consolidation routes is QAS.200. After import into client 200, the change requests follow two different delivery routes and are delivered to two clients:

- Client 300 of PRD is the production client, so the target of the client-specific delivery route is PRD.300.
- To ensure that client 210 of the quality assurance system is synchronized with the latest changes, a delivery route exists from QAS.200 to QAS.210.

Creating and Using Target Groups

Up until now, you have read about the use of client-specific transport routes that allow for the consolidation of change requests to a specific client in the quality assurance system, and the delivery of change requests to different target clients. This usage of client-specific transport routes in support of your

Figure 8 Establishing Consolidation or Delivery of Change Requests to More Than One System-Client Combination



transport needs can be extended with the use of *target groups*.

A target group constitutes a set of target clients. Each target client is specified in terms of an R/3 system and a client number within that system. Extended transport control enables you to create target groups for both consolidation routes and delivery routes. For example, a consolidation route can be created to consolidate to a target group rather than to a specific system-client combination. Thus, when you release a change request from the source system to a target group, the change request is automatically added to the import queues of all targets in the target group.

The **Create Target Group** menu option is available from within the hierarchical and graphical editors of TMS. **Figure 8** shows the Create Target Group dialog box that appears, requiring you to provide a name, a description, and system-client combinations that characterize the target group. When creating a target group, keep in mind that:

- The name of a target group must begin and end with a forward slash (/). Here, you see I named this target group /RELEASED/.
- Each target system-client combination requires a separate line in this dialog.

The use of client-specific transport routes in support of your transport needs can be extended with the use of target groups. A target group constitutes a set of target clients. Each target client is specified in terms of an R/3 system and a client number within that system. Extended transport control enables you to create target groups for both consolidation routes and delivery routes.

Figure 9 Using a Target Group to Define a Consolidation Route

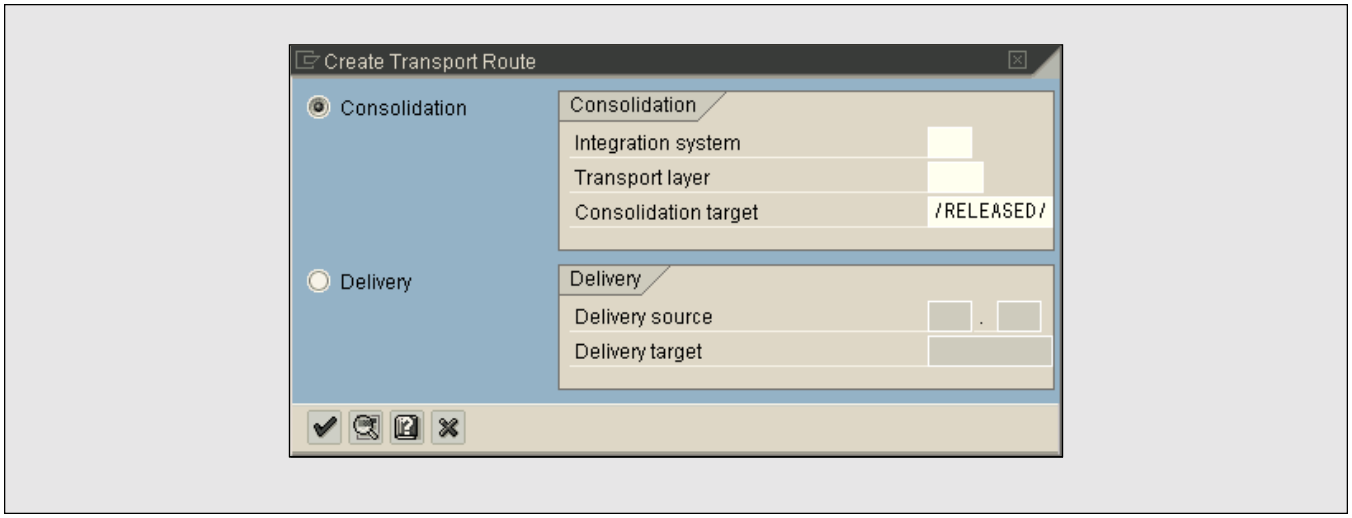
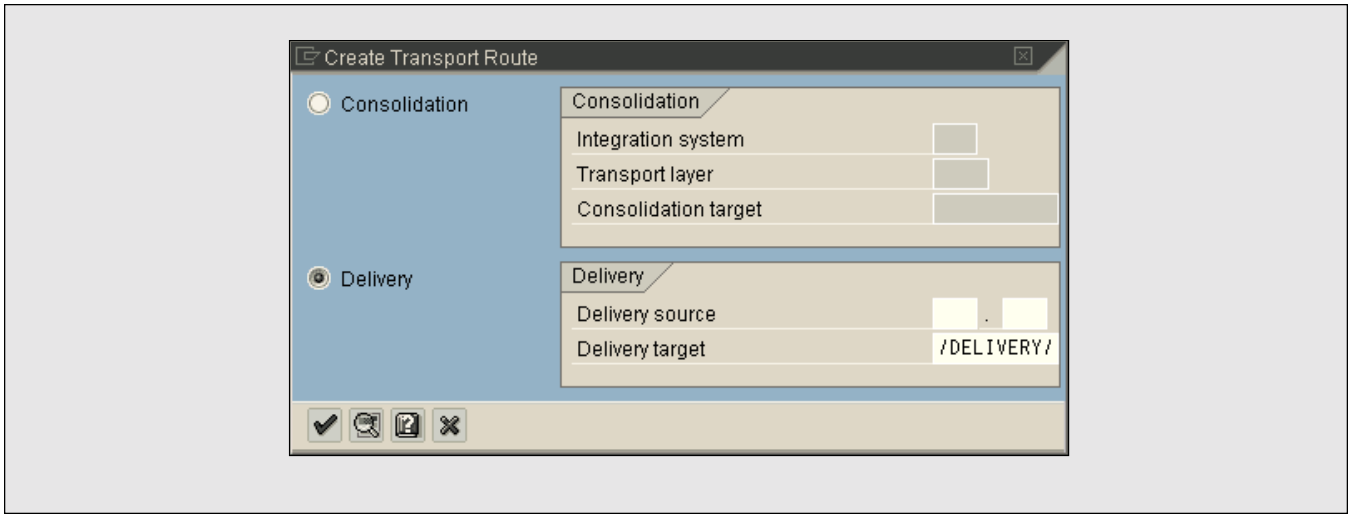


Figure 10 Using a Target Group to Define a Delivery Route



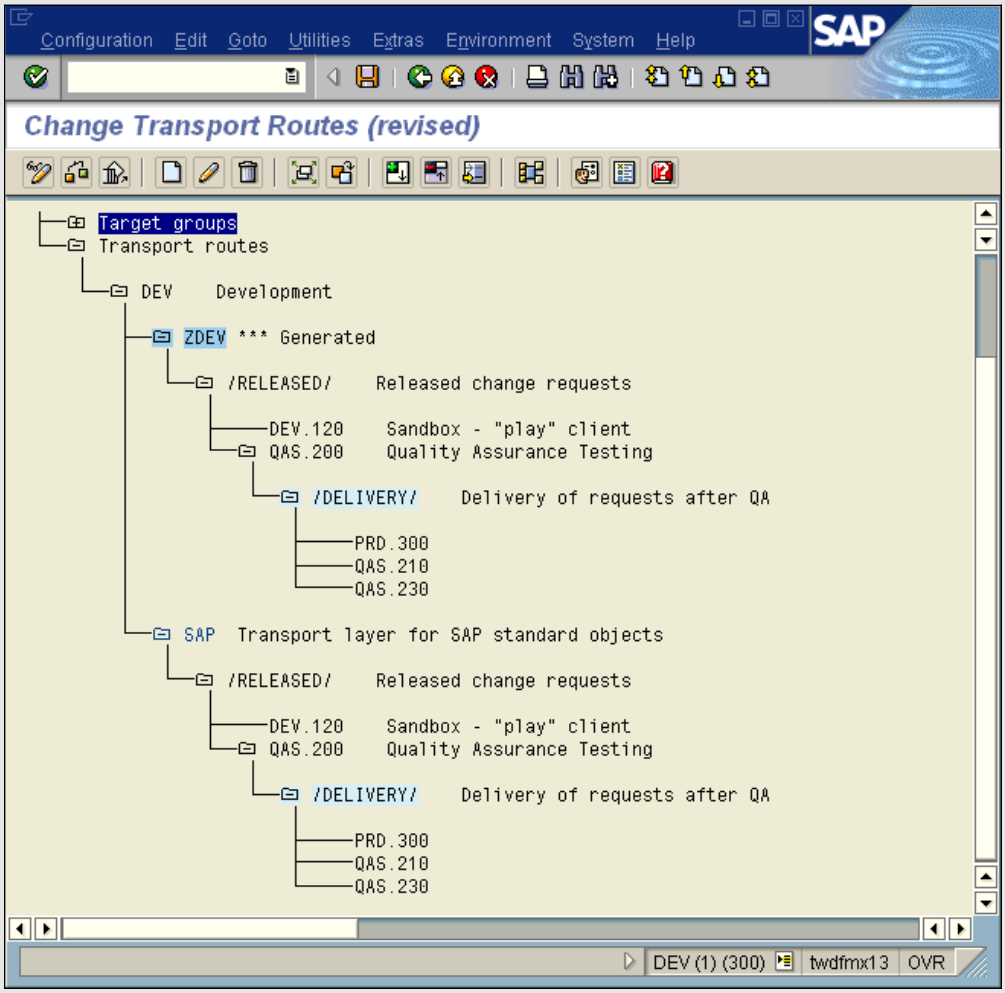
Once a target group has been created, you can use it to define transport routes in the TMS editors. For example, rather than supplying a target system-client combination when creating a consolidation route, you can provide the name of the target group in the "Consolidation target" field, as shown in **Figure 9**.

Likewise, when creating a delivery route (see **Figure 10**), you can provide a target group for the "Delivery target" field. This eliminates the need to create a lot of different delivery routes from one source client to each of the target clients.

The use of target groups in a three-system landscape can be seen through the TMS hierarchical editor. In the example shown in **Figure 11**, released Customizing and development changes from the development system DEV follow either the transport layer ZDEV or, in the case of SAP Repository Object, the transport layer SAP. Both transport layers of the development system consolidate to the target group /RELEASED/.

Once a change request is released and exported from the development system, the change request is

Figure 11 Target Groups in a Three-System Landscape



added in parallel to the import queues for client 200 of the quality assurance system QAS, as well as for client 120 of the development system DEV. This ensures that:

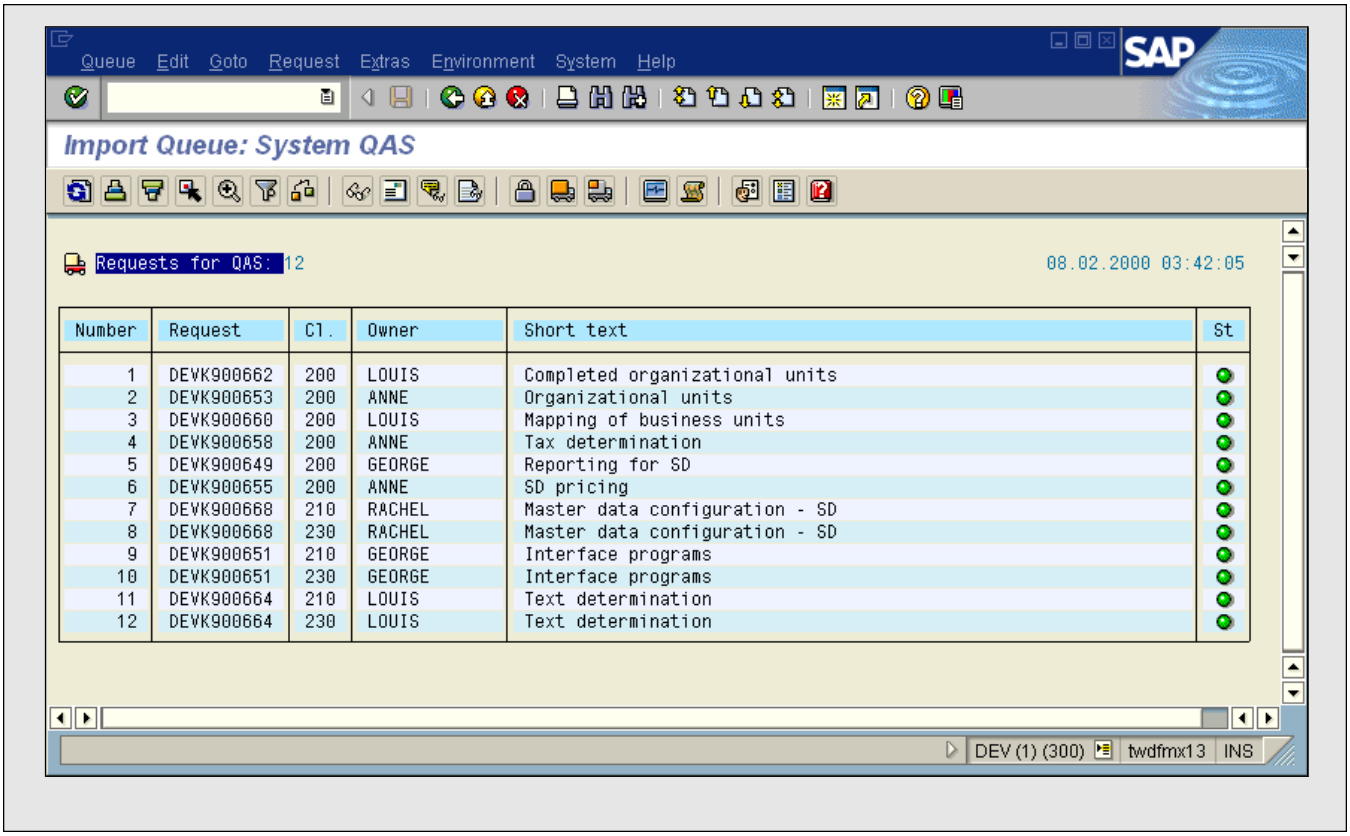
- Change requests are promoted to the quality assurance client for verification and business integration testing.
- A client in the development system, such as a sandbox client, is synchronized with the latest changes.

✔ Tip

After exporting changes from the client in which you perform Customizing and development, you can utilize target groups to transport change requests back into the other clients in the development system.

Further review of Figure 11 shows that the target group /DELIVERY/ has been specified as the delivery target of a delivery route with QAS.200 as the

Figure 12 Import Queue with Extended Transport Control Indicates the Client into Which a Change Request Must Be Imported



Number	Request	Cl.	Owner	Short text	St
1	DEVK900662	200	LOUIS	Completed organizational units	
2	DEVK900653	200	ANNE	Organizational units	
3	DEVK900660	200	LOUIS	Mapping of business units	
4	DEVK900658	200	ANNE	Tax determination	
5	DEVK900649	200	GEORGE	Reporting for SD	
6	DEVK900655	200	ANNE	SD pricing	
7	DEVK900668	210	RACHEL	Master data configuration - SD	
8	DEVK900668	230	RACHEL	Master data configuration - SD	
9	DEVK900651	210	GEORGE	Interface programs	
10	DEVK900651	230	GEORGE	Interface programs	
11	DEVK900664	210	LOUIS	Text determination	
12	DEVK900664	230	LOUIS	Text determination	

delivery source. After a change request is imported into QAS.200, the change request is then delivered to the target group /DELIVERY/. After change requests are validated in QAS, they can then be imported into client 300 of the production system PRD, as well as client 210 and client 230 of the quality assurance system QAS.

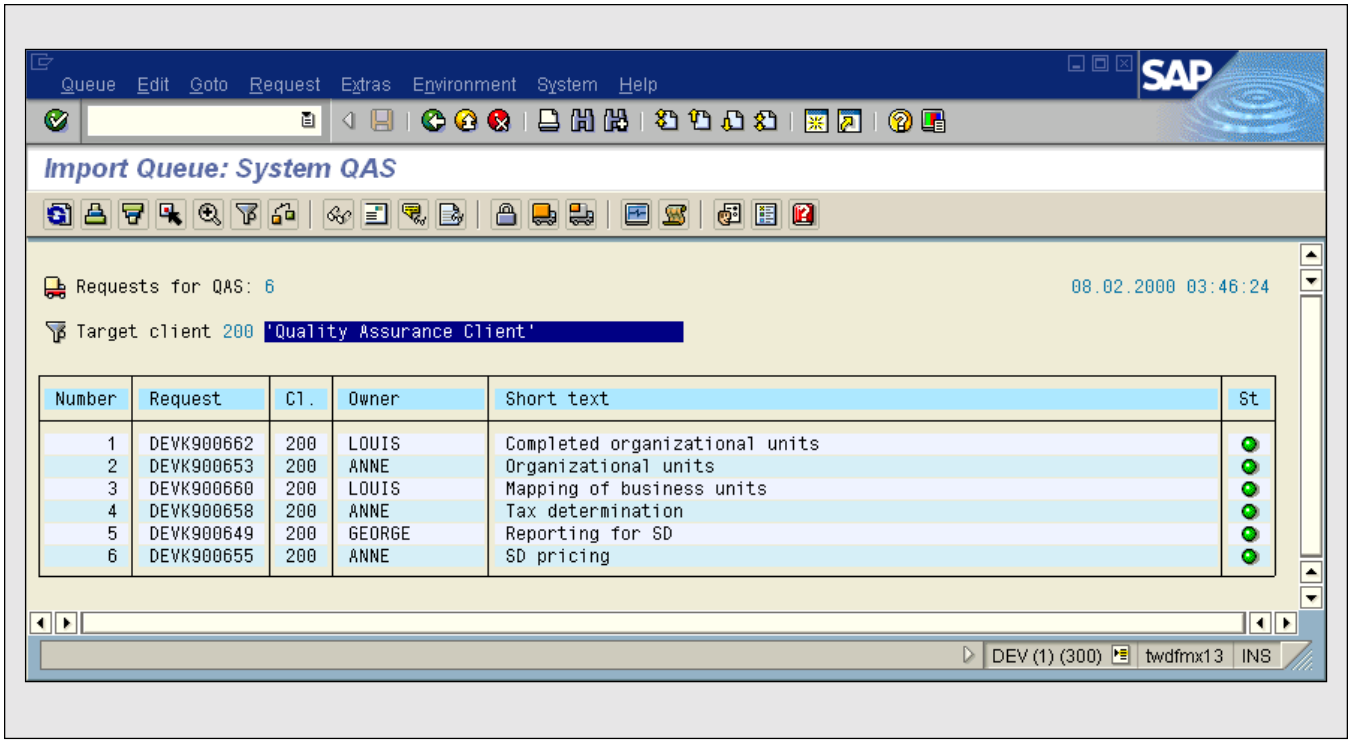
Importing with Extended Transport Control

When extended transport control is activated, all traditional import options still exist — such as importing all change requests in the import queue or performing preliminary imports. The advantage that extended transport control delivers is that there is no need to specify the target client number when performing an import. Because extended transport control requires that transport routes specify system-client combinations, every change request in the import queue will have associated with it the client number into which it needs to be imported. You do not have to provide a target client.

Figure 12 displays an import queue for the system QAS. The third column, **Cl.**, specifies the target client, which is an indication that extended transport control is currently activated for this system landscape. This import queue for QAS is part of a system landscape based on the transport route configuration displayed in Figure 11. Therefore, there are change requests waiting to be imported into client 200, client 210, and client 230.

Some change requests are in the QAS import

Figure 13 *Filtered Import Queues*



queue twice — once for client 210 and then again for client 230. Change request DEVK900651 is one such change request. Based on the transport route configuration, these change requests have already been imported into client 200 and are now not only in the QAS import queue for client 210 and client 230, but also in the import queue for client 300 in the production system. If we were to look at the import queue for the production system, we would see the change requests waiting to be imported into client 300 in the production system.

Because change requests now have an additional indicator in the import queue — the target client — you can choose to specifically import only the change requests destined for a particular target client by setting a *target client filter*. In **Figure 13**, you see the same import queue as in Figure 12, but here client 200 has been set as the filter. After setting a filter, only those change requests displayed in the import queue will be imported — for example, all change requests for client 200.

Managing the Import of Client-Independent Change Requests

During import of a change request, the import process evaluates the contents of each change request.[8] Since the extended transport control maintains a record of each imported change, all client-independent changes imported into the target R/3 system, in this case the QAS system, only need to be imported once.

As an example of a change request that contains client-independent changes, let's look at change request DEVK900651 in Figure 12. Assume that this request contains only a Repository Object, such as an ABAP program, and that this change request has already been imported into client 200. Even though this request is waiting to be imported into client 210

[8] The actual objects of the change request and not just the change request itself are evaluated. Therefore change requests that contain both client-dependent and client-independent changes are managed appropriately.

and client 230, the import of this change request into these clients will not re-import the Repository object. The import process will see that the Repository objects in this change request were already imported and that nothing further is required. This ensures that if a newer version of the object has been imported into client 200, the import of DEVK900651 into client 210 at a later time does not overwrite the newer version.

Helpful Hints

✔ Regardless of whether you transfer your change requests along transport routes defined in terms of clients or in terms of R/3 systems, the important issue is maintaining consistency. The clients and the R/3 systems in your system landscape will be synchronized only if all changes are promoted in an orderly way and the import of changes is verified. The TMS provides the necessary tools, but they need to be set up and used properly.

✔ While extended transport control helps to support the delivery of change requests to multiple clients, and in turn ensures their consistency with regard to client-dependent settings, multiple clients in a single R/3 system have a limitation in that they share all client-independent changes. The introduction of extended transport control does not eliminate problems associated with the sharing of client-independent settings.

✔ When extended transport control is activated, there is the possibility that change requests in an import queue do not have a target client specified. For example, if you activate the extended transport control while there are still change requests in any of the import queues, the requests will not have a target client specified. The column **Cl.** will be highlighted in red. You cannot perform any operations on the import queue until you specify a target client for these old requests.

✔ Prior to R/3 Release 4.5, many customers used the transport control program "tp" at the operating system level to help manage the import of change requests into multiple clients. While this functionality continues to exist, it is important to note that new Release 4.5 TMS functionality (such as QA Approval and Import Scheduler) is only supported from within TMS and not with the use of tp. You are encouraged to evaluate the new functionalities of TMS, including extended transport control, and no longer use scripted tp commands at the operating system level.

✔ During import, when extended transport control is activated, the evaluation of each change request is required to determine if client-independent changes have already been imported into the R/3 system. This evaluation process requires additional processing efforts not previously required. You may experience slightly longer import times when extended transport control is activated. However, most customers have found that the advantages of extended transport control make this increase negligible.

Regardless of whether you transfer your change requests along transport routes defined in terms of clients or in terms of R/3 systems, the important issue is maintaining consistency. The clients and the R/3 systems in your system landscape will be synchronized only if all changes are promoted in an orderly way and the import of changes is verified. The TMS provides the necessary tools, but they need to be set up and used properly.

Conclusion

As of R/3 Release 4.5, you can rely on extended transport control to ensure that all clients in the system landscape contain the latest changes that originate in the development and Customizing client. The change requests are automatically placed in the import queues of specified R/3 systems and clients. The advantage of extended transport control is that you can ensure change requests are delivered to all

clients in your system landscape in their correct sequence.

Extended transport control also ensures that client-independent objects in a change request are only imported into an R/3 system once, protecting newer versions of objects from being overwritten. For example, if a change request that contains an ABAP program is released from the development system, the program itself is only imported into the quality assurance system once, while the change request may be in the import queue for multiple clients. On the other hand, client-dependent changes are imported into each client.

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