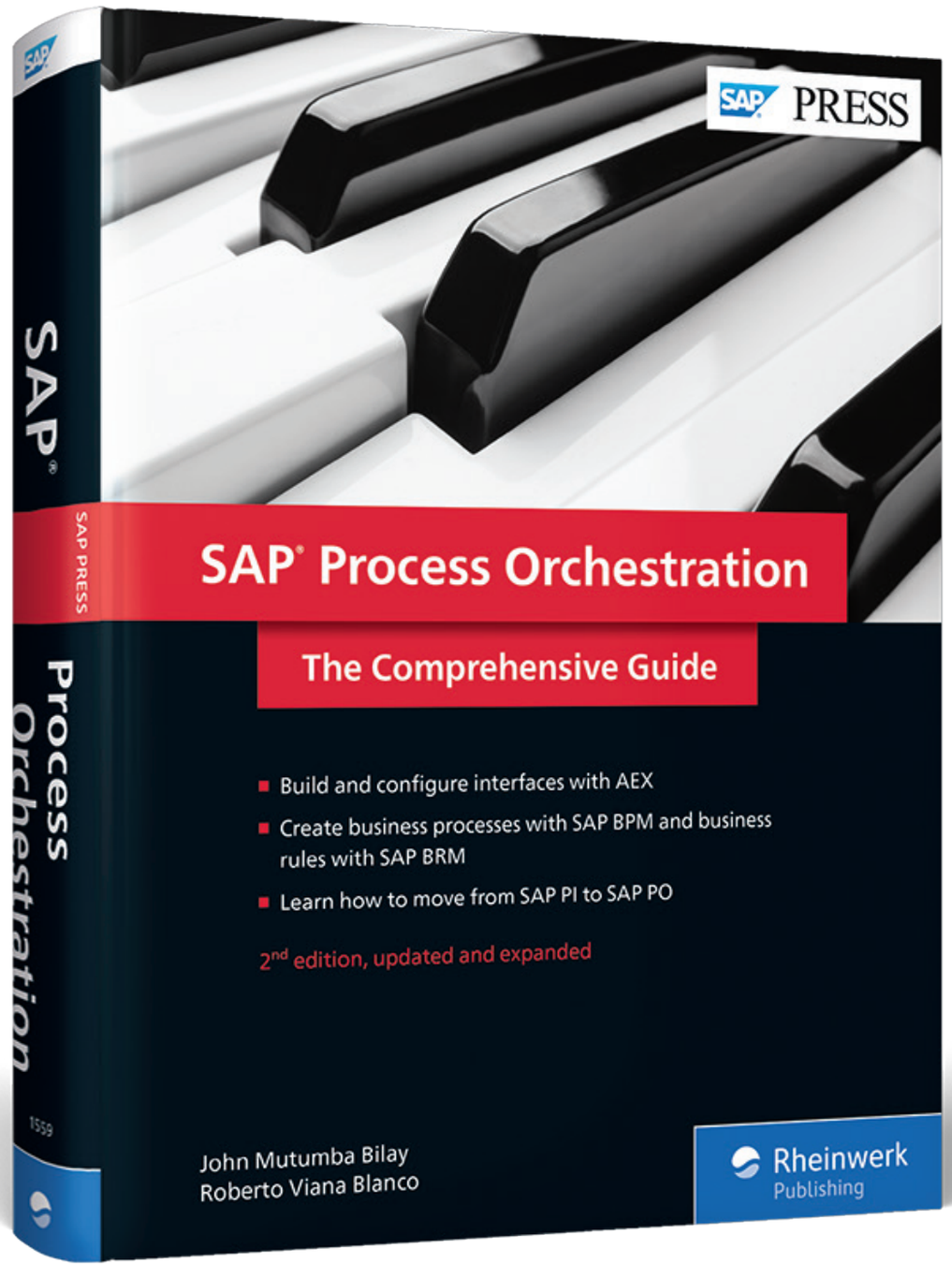

Reading Sample

This sample chapter explains the role of the System Landscape Directory (SLD) in the context of SAP integration. It shows you how to register systems to the SLD, what administration of the SLD looks like, and provides some helpful tips and tricks for working with the SLD. It also contains a practical exercise for you to test what you've learned.

"Configuring the System Landscape Directory"

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The Authors

John Bilay, Roberto Viana Blanco

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Chapter 3

Configuring the System Landscape Directory

Finally we shall place the Sun himself at the center of the Universe.

—Nicolaus Copernicus

The System Landscape Directory (SLD) plays a critical role in an SAP system landscape. As a central repository, it manages information about all installable and installed elements of your system landscape in your organization. The repository includes a list of SAP and non-SAP systems from a technical and business perspective, and the information available is used by other SAP applications, such as SAP Process Orchestration (SAP PO), SAP Solution Manager, SAP NetWeaver Administrator, and the SAP NetWeaver development infrastructure.

The information contained in the SLD also includes which products and software component versions (SWCVs) are installed in a particular application or system. You can make systems that participate in the landscape automatically register themselves and update the SLD with recent information as they become available. As time goes by, the initially installed SLD content becomes outdated and will need to be updated with a more recent version. The most up-to-date SLD content can be found on the SAP Service Marketplace.

You can access the SLD via *http://<hostname>:<port>/sld*, where *<hostname>* is the hostname of the SAP NetWeaver system and *<port>* is the port number of the SAP NetWeaver system. The SLD is a Java-based component that can be installed on an SAP NetWeaver Application Server for Java (SAP NetWeaver AS Java). The SLD is included in the `SAP_JTECHT` software component (SC) delivered by SAP.

A newly installed SLD comes prepopulated by default with some initial data provided by SAP, including a catalog of all possible installable SAP products, SCs, and details about support packages. You can use this default data and these SCs as dependencies for your own custom content.

In this chapter, we'll explain the SLD's roles within the context of SAP integration. We'll discuss the SLD components and explain their functionalities. This chapter also includes an exercise, which serves as an implementation example.

3.1 System Landscape Directory Components and Features

To fulfill its role of central information repository for the entire system landscape, the SLD facilitates easy access to the information of different systems and software. In the **System Landscape Directory** landing page (see Figure 3.1), the information is categorized in the following sections or categories:

- **Landscape**
- **Software Catalog**
- **Development**

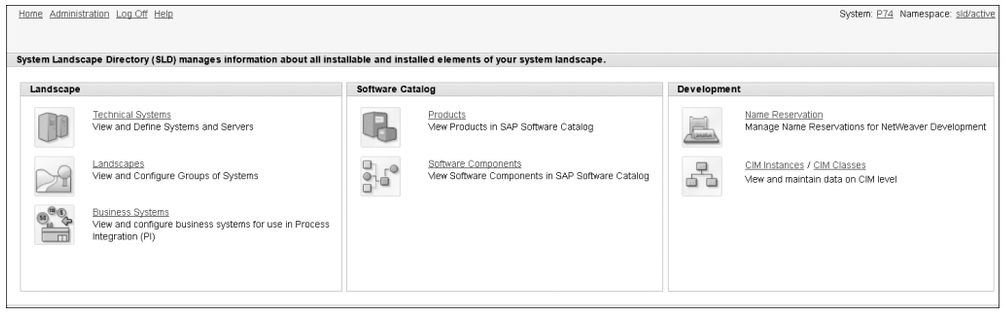

Figure 3.1 System Landscape Directory Landing Page

In the next sections, we'll explore each of these categories in more detail.

3.1.1 Landscape

The **Landscape** category includes functionalities covering the maintenance of technical systems, landscapes, and business systems.

Technical Systems

Technical systems are SAP and non-SAP backend applications in your landscape. Any SAP components (SAP ERP Human Capital Management [SAP ERP HCM], SAP Customer Relationship Management [SAP CRM], etc.), SAP NetWeaver applications,

third-party applications, or legacy systems in your landscape can be considered technical systems to be maintained in your SLD. If an application registers itself with the SLD (as discussed in Section 3.2), then a technical system will be created in the SLD to represent it.

Assume that an SAP CRM system has a system ID of ECD. In that case, a technical system with the name ECD will be created in the SLD. As demonstrated in Figure 3.2, a lot of information about the ECD system is maintained in the SLD. Some of this information includes the following:

- System name
- Hostname of the server
- Version number of the system
- Type of system
- When the data was last updated
- Details about the database (see the **Database** tab)
- List of existing clients (see the **Clients** tab)
- Details of the message server of the application

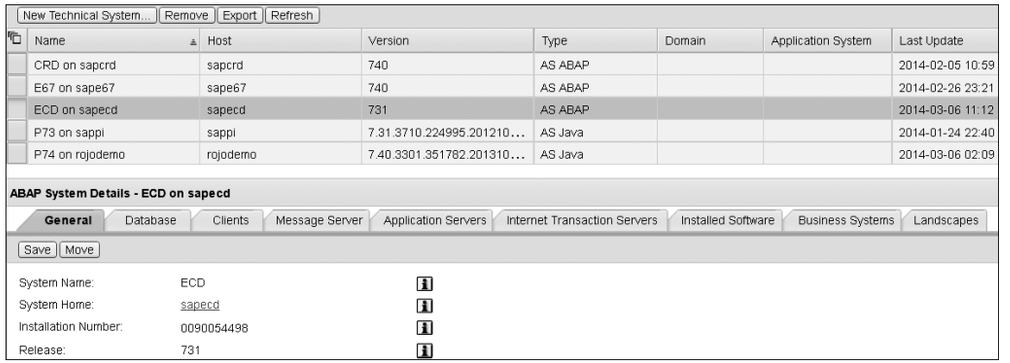

Figure 3.2 A Technical System in the SLD and Various Tabs Containing Its Data

If a system wasn't automatically registered in the SLD (especially in the case of a third-party system), then you can manually create a new technical system. To do so, click the **New Technical System** button (as shown in Figure 3.2) and follow the wizard. You'll be required to specify the type of technical system to be created. The possible choices include the following:

- **SAP NetWeaver AS ABAP**
  Systems with an SAP NetWeaver AS ABAP. Most SAP backend systems will fit into this category.
- **SAP NetWeaver AS Java**
  Systems with SAP NetWeaver AS Java. Such a system can consist of one or multiple instances.
- **Standalone**
  Standalone Java applications.
- **Third-party**
  Systems containing third-party (non-SAP) applications and products.

Landscapes

Landscapes provide the facility to group systems in a logical manner. A landscape can be seen as a development environment that includes a number of servers and applications intended for a specific stage in a release process.

For each landscape, you can create a group in the SLD and include all applications and systems belonging to that stage. To create a new landscape for the development stage, follow these steps:

1. Choose **Landscape** from the **System Landscape Directory** landing page.
2. Click on **New Landscape** to define a new landscape.
3. Add all the relevant systems belonging to this stage (see Figure 3.3).

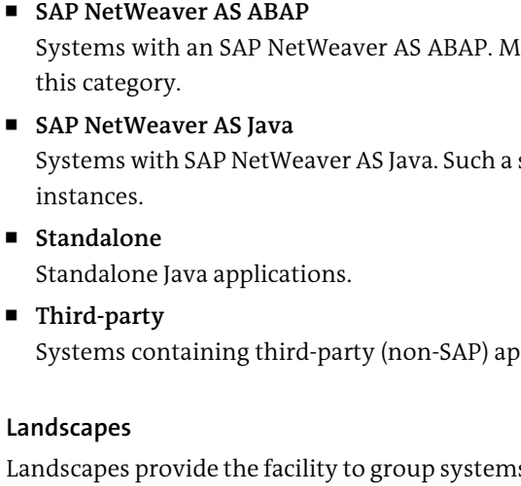

Figure 3.3 Adding Different Systems to a Landscape

You can add systems to a particular landscape by performing the following steps:

1. Select the desired landscape.
2. Click the **Systems** tab.
3. Click the **Add System** button.
4. Choose the type of system from the **Type** dropdown.
5. Select the desired system, and click **OK**.

Business Systems

A business system is a logical name given to a particular system or application. In general, the business system name is unique in the landscape and is used in an SAP PO scenario to represent the system or application as a sender or receiver. There is a direct relationship between a business system and a technical system. Every technical system can have at least one business system. For an SAP ABAP backend system, every client can have its own business system. This is only relevant for SAP NetWeaver AS ABAP systems because SAP NetWeaver AS Java-based systems aren't partitioned in clients.

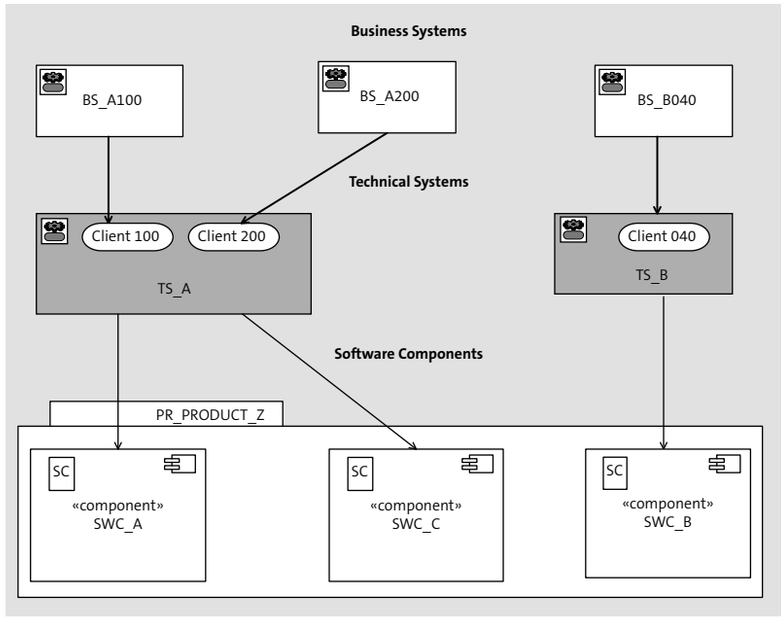

Figure 3.4 Relationship among Business Systems, Technical Systems, and Software Components

Figure 3.4 depicts a situation with a technical system called TS_A that has two clients (100 and 200). Each client is linked to a different business system—namely, BS_A and BS_B.

> **Note**
>
> The backend systems (ABAP) regularly retrieve their business system names from the SLD. If the SLD becomes unavailable, then the SAP backend system won't be able to update its current business system name and might be using an outdated business system name that it keeps in its cache.

You can perform all management tasks from the SLD: create, update, delete, and search or filter on business systems. Compared to technical systems (which are created automatically when the application systems register themselves to the SLD), the business systems need to be manually created. To create a business system, follow these steps:

1. From the **System Landscape Directory** landing page, choose **Business Systems • New Business System** to start the wizard.
2. Select the type of technical system that the new business system will be linked with.
3. In the next step of the wizard, you'll be asked to choose the related technical system and client (for the ABAP system).
4. Give your business system a logical name.
5. Choose the products and SCs that are installed in your business systems.
6. Select the role of your business system. The following options are available:
   - **Application System**
     This option will be used most of the time and is relevant whenever the business system to be added represents a backend application or system, in which case, it's required to specify its *related integration server*. The related integration server represents the SAP Process Integration (SAP PI)/SAP PO system that will act as the enterprise service bus (ESB) for the business system in question (see Figure 3.5).
   - **Integration Server**
     This is relevant in cases in which the system in question is middleware: an SAP PI or SAP PO system.

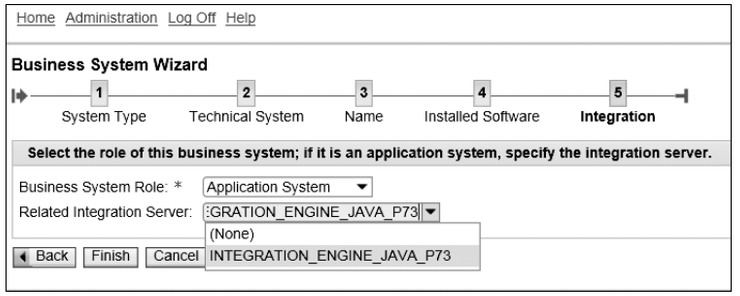

Figure 3.5 Specifying a Business System's Role While Creating a New Business System

A business system can be described by a number of attributes. After selecting a particular business system from the SLD, a few tabs are presented: **General**, **Integration**, **Transport,** and **Installed Software** (see Figure 3.6).

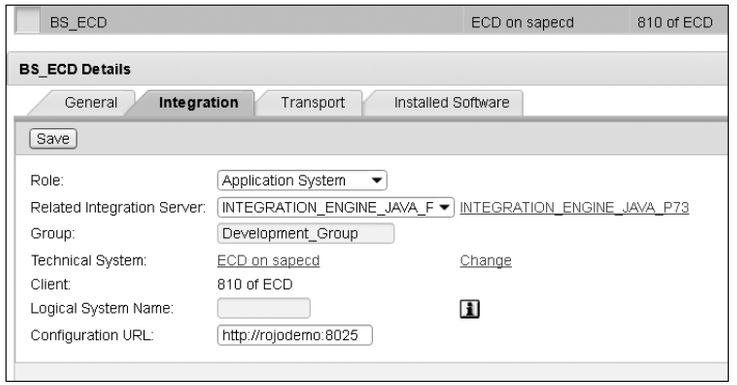

Figure 3.6 Business System: Integration Details

When dealing with business systems, it's very useful to understand the concept of business system groups, which represent a grouping of business systems that belong to the same environment, thus effectively dividing your landscape into different controllable parts. Most organizations have the following four environments in their landscapes:

- Development
- Test
- Acceptance
- Production

In most organizations, systems belonging to the same group will often be named in similar ways. Of course, this depends very much on the organization's naming conventions. For example, all systems of the development environment might have the format `SYSTEMNAME_D`, where `D` represents "development," and all test systems might have the suffix `_T`. In this way, it's easy visually to identify the environment that the system belongs to based on its name.

It's common to have a group of business systems defined in the SLD for each one of the environments or stages of your landscape. SLD groups play an important role in managing transport targets. To manage groups, follow these steps:

1. From the **System Landscape Directory** landing page, select **Business System**.
2. From the **Groups** dropdown, choose **Edit Groups**.
3. Select **New Group**.
4. Give the group a name, and select an integration server responsible for all integrations in this group (this is basically the SAP PO server for this group).

You don't have to add a business system to the group; it's only required to link a group of business systems to an integration server. In addition, all the business systems linked to the same integration server automatically belong to the same group.

3.1.2 Software Catalog

The SLD is also equipped with a repository of SAP products and SCs (see Figure 3.7). This repository contains a catalog of SCs and their dependency relationships with each other. In the software catalog, you can differentiate products and SCs.

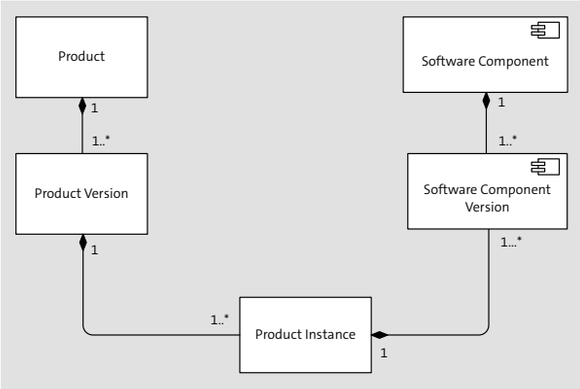

Figure 3.7 Relationships among Products and Software Components

In the next sections, we'll explore products and SCs in more detail.

Product

A *product* is an installable unit of software that includes a logical bundling or grouping of multiple SCs. A product is the highest object in the software catalog hierarchy. A product has a version.

As illustrated in Figure 3.7, the intention is to group SCs in a logical way together into the same product. Therefore, a product called "Banking" assumes a grouping of various SCs related to banking services. To create a new product, follow these steps:

1. From the **System Landscape Directory** landing page, select **Products**.
2. Select **New**, and follow the wizard.
3. You'll be prompted to create a SC as part of this wizard. Be aware that it's also possible to add more SCs later.

Software Component

A *software component* (SC) is a reusable module of a product. It can be upgraded or patched for bugs. A SC is the foundation on top of which an integration developer will develop his interfaces and mappings.

SCs can be dependent on other SCs. The dependency encourages reusability and is also called usage dependency. Usage dependency is used to define a relationship toward other SCs and therefore reuse their functionality.

When setting up dependencies, it's possible to choose from among the following options:

- **InstallationTime**
  With this dependency type, a particular SC needs another SC to be installed. This SC can't work without the dependencies being installed first.
- **BuildTime**
  This dependency type defines the dependencies that are required during compilation of sources and archives. The SC's sources need the resources of the SC that it depends on to be built and compiled.
- **MetaDataRequest**
  This dependency type is used when the metadata of another SC is required during the installation time.

To create a new SC, follow these steps:

1. From the **System Landscape Directory** landing page, select **Software Components**.
2. Select **New**, and follow the wizard.
3. Select the product version and product instance that this new SC should belong to.
4. Specify the SC name and version.
5. Click **Finish**.
6. After successfully creating a SC, you can create dependencies by clicking the **Dependencies** tab.
7. From the **Context** dropdown, select the desired dependency type: **BuildTime**, **InstallationTime**, or **MetaDataRequest** (see Figure 3.8).
8. Select the **Define Prerequisite Software Component Versions** option and the required SC.

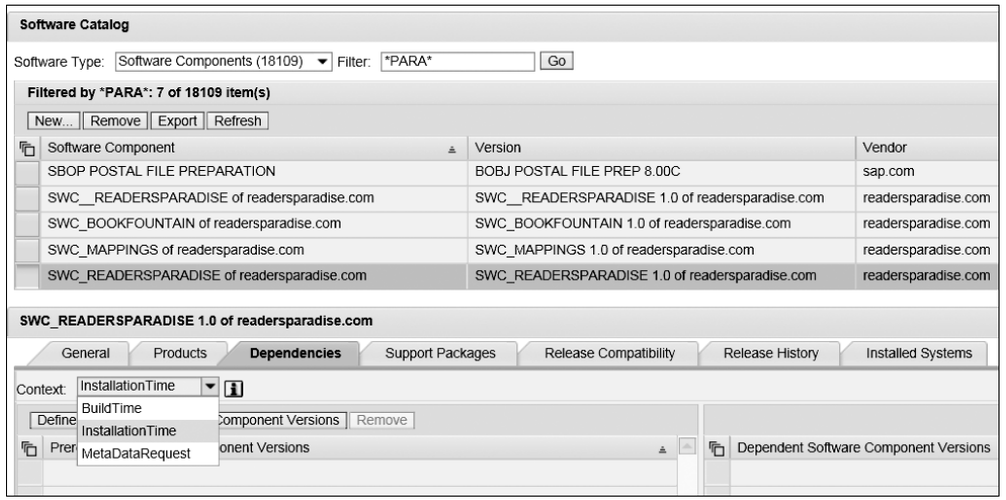

Figure 3.8 Adding Software Component Dependencies in the SLD

To properly manage the SCs in your landscape, you need to have a good approach for how to classify and organize them. This is also referred to as the SLD SC model. The SLD SC model helps you determine how many SCs should be used to represent a particular integration scenario. It's important to think about the component model or strategy to be used and to choose one that fits best in your situation. The SLD SC model will typically be part of your development standard.

In general, three SC model strategies are widely used (see Table 3.1 for more details).

Model Name	Description
One SC model (also referred to as the horizontal approach)	In this approach, a single SC is created for all interfaces of the entire organization. Namespaces are then used to separate the different domains or groups of objects. The obvious big disadvantage of this approach is that there is no reusable unit of software.
Two SC model (also called the vertical approach)	In this approach, two SCs are created: one encapsulating the sender and the other encapsulating the receiver. All objects and message structures belonging to the sender systems are placed in one SC. The same applies to the SC of the receiver system. The question to be asked with this approach is where to place common or shared objects (e.g., mappings) to make the translation between the sender's message structure and the receiver's message structure.
Three SC model	This approach uses three SCs: the first for the sender system, the second for the receiver system, and the third for all shared objects. This means that objects such as mappings should be placed in the third software component. This model represents a clear separation between the different SCs and encourages reusability. This model is the most commonly used.

Table 3.1 Software Component Models

Note

You can also come up with your own SC model and a strategy that will best suit your own needs.

3.1.3 Development

This section of the SLD contains tools designed to facilitate SAP NetWeaver development activities: name reservation and Common Information Model (CIM) instances and classes. We'll explore each of these tools and explain their roles.

Name Reservation

All organizations should have a naming convention. In addition to all the benefits stated in the previous section, a good naming convention allows the developers to create unique development objects and avoid name clashes and confusion between different objects. This is especially relevant when different developers and teams are working on the same project. In a typical project, not everyone is allowed to define the name of the development component (DC) as they wish. These names are predefined by an administrator, and the developers only need to use them. This approach introduces a high level of control and avoids inconsistent definition of DC names.

Name reservation (or the name server) enables the Java development team to define and reserve some names globally throughout the entire landscape. This guarantees the uniqueness of the reserved name. It's also possible to use the namespace concept to reserve a unique name in the name server.

A namespace always starts with a namespace prefix. Namespace prefixes defined in a name reservation can later be used in the SAP NetWeaver development infrastructure. You should use your Internet domain names in the namespace definitions to make sure they are globally unique.

It's important to note that the SLD isn't automatically activated as the name server for your SAP NetWeaver development infrastructure developments. You can activate the name server role in the SLD used by SAP NetWeaver development infrastructure by following these steps:

1. From the **System Landscape Directory** landing page, click on **Name Reservation**.
2. Choose **Enable This SLD as Name Server for NWDI**.

After the name server has been activated for the SAP NetWeaver development infrastructure development, you can create prefixes in advance. To add a new prefix, follow these steps:

1. From the **System Landscape Directory** landing page, click on **Name Reservation**.
2. Make sure you're in the **Name Prefixes** tab.
3. Click the **New Name Prefix** button. You'll see the screen shown in Figure 3.9.
4. Choose the desired **Name Category**. Because this is for an SAP PO development, choose either **Development Component Name** or **Software Component Name**.

What you choose depends on whether you want to reserve names for a SC or a DC. The concept of DCs is relevant for Java development and will be explored in Chapter 16.

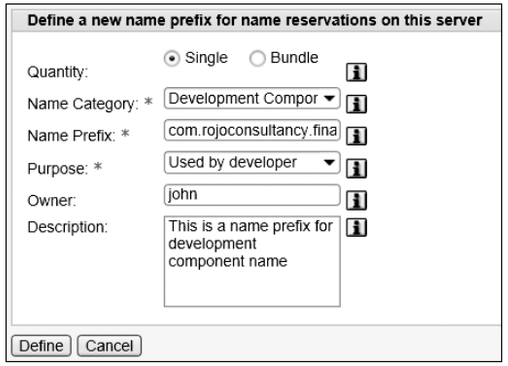

Figure 3.9 Adding a New Name Prefix in the SLD Name Reservation

5. Specify the name prefix. You can specify a name up to 256 characters long. In our example, we used the name **com.rojoconsultancy.finance**. As you can see, this name contains an Internet domain name and department. In this way, you can categorize your namespaces.
6. To complete the task, click **Define**.

Now that you've reserved a name prefix, you can predefine some DCs in the name server and make use of the previously reserved name prefix. To define a name (for a DC or SC), follow these steps:

1. From the **System Landscape Directory** landing page, click on **Name Reservation**.
2. Make sure to be in the **Names** tab.
3. Click the **New Name** button. You'll see the screen shown in Figure 3.10.
4. Select the desired **Name Prefix**. In this case, the previously created **com.rojoconsultancy.finance** is selected.
5. Specify the name of the DC by adding a name after the "/" character.
6. Specify the **Caption** (a short description) for the DC name.
7. Click **Reserve**.

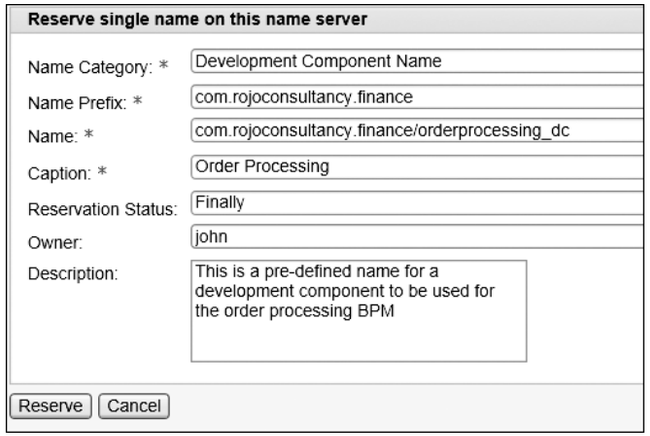

Figure 3.10 Adding a Name in the SLD Name Server

Now, we're ready to use this DC name during development in the SAP NetWeaver development infrastructure.

Common Information Model Instances and Classes

The Common Information Model (CIM) is a standard based on an object-oriented modeling approach. The standard is championed by the Distributed Management Task Force (DMTF). CIM is used to model hardware and software objects and elements. SAP uses the CIM to capture key properties to identify and to specify a product. It contains metadata information such as the name, vendor, description, and caption of a product. The CIM class and CIM instance are two key concepts of the CIM.

A CIM class represents a group of artifacts and objects with similar properties. A CIM class can be associated with one or more other CIM classes. For more information on the CIM standard, visit *www.dmtf.org*.

For the purpose of SAP PO, the CIM is used to hold the description of components, products, and the system landscape. To view and maintain the CIM Instance and classes in your SLD, select the **CIM Instance and Classes** link from the **System Landscape Directory** landing page.

You can update existing descriptions or CIM content in your SLD by using the import functionality. See Section 3.3 to learn more about how to update your existing CIM.

3.2 Registering Systems to the System Landscape Directory

As the previous section explained, it's important to make all participating systems in your SAP landscape register themselves and report to the SLD. To register your system, you need to create a connection between these systems and the SLD. These connections can be achieved using Remote Function Calls (RFCs) or HTTP and are commonly referred to as *data suppliers*. Data suppliers collect a range of data from SAP systems, including the following:

- Application servers and instances
- RFC gateways
- SAP products
- Installed software components
- Installed support packages
- Compound systems
- HTTP ports
- Network services
- liveCaches
- SAP message servers
- RFC destinations
- Hosts
- Clients
- Databases
- CIM associations between generated objects

The collected data is periodically sent to the SLD using CIM over HTTP.

3.2.1 Connecting to ABAP-Based Systems

For ABAP-based systems (from SAP Basis release 6.4.0 and up), it's possible to use data suppliers to send the data to the SLD bridge via an RFC connection and SAP Gateway (as depicted in Figure 3.11). In an ABAP-based system, the data supplier uses data collection programs to collect the needed data. For SAP NetWeaver AS ABAP systems, you can modify data collection programs to change their behavior.

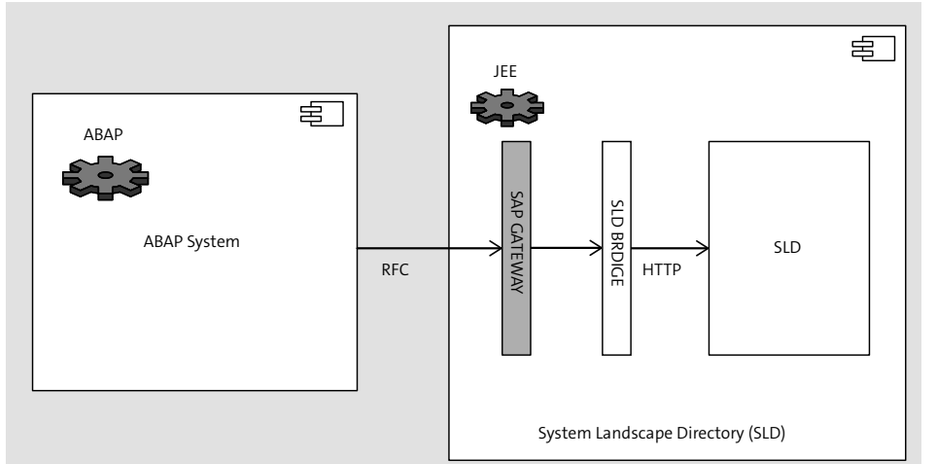

Figure 3.11 Connecting an ABAP System to the SLD

Tip

For an ABAP-based system on SAP Basis release 4.0B and up, use Transaction RZ70 to set up SLD data suppliers.

For SAP systems running on an SAP NetWeaver AS ABAP older than 6.40, you can't configure data suppliers using Transaction RZ70. This configuration will need to be manually performed for such systems.

3.2.2 Connecting to Java-Based Systems

For Java-based systems, configuration of data suppliers is automatically performed during the installation of the system (see Figure 3.12). You can manually change it afterward using SAP NetWeaver Administrator.

To change the data supplier in a Java-based system, follow these steps:

1. Go to the SAP NetWeaver Administrator via *http://<hostname>:<port>/nwa*.
2. Navigate to **Configuration • Security • Destinations**.
3. Change or create a destination with the name "SLD_DataSupplier" and of type **HTTP**.

4. You can now enter or change the details in the **URL** field to point to the SLD system. Don't forget to enter the login details under the **Logon Data** tab.
5. Test your destination by using the **Ping Destination** button.

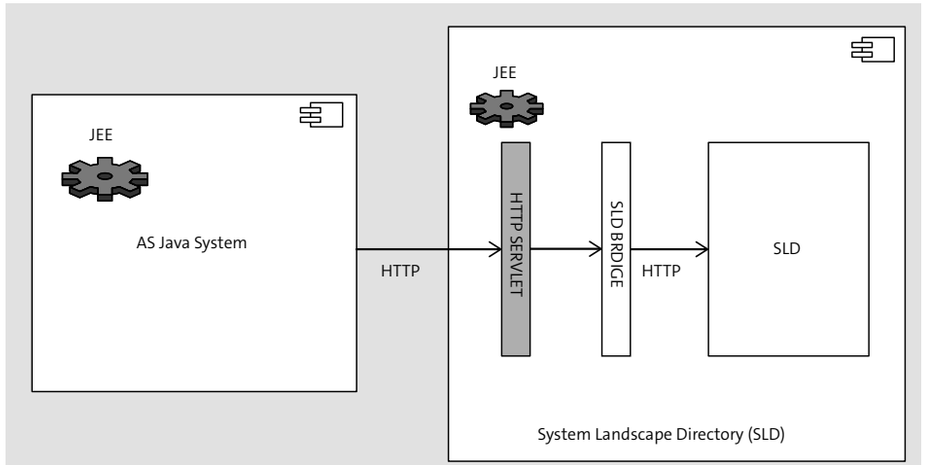

Figure 3.12 Connecting an SAP NetWeaver AS Java System to the SLD

You also have the option to force an SAP NetWeaver AS Java system to collect and send the data to the SLD server at any given time by performing the following steps:

1. Go to the SAP NetWeaver Administrator via *http://<hostname>:<port>/nwa*.
2. Navigate to **Configuration • Infrastructure • SLD Data Supplier Configuration**.
3. Click on the **Collect and Send Data** button (see Figure 3.13).

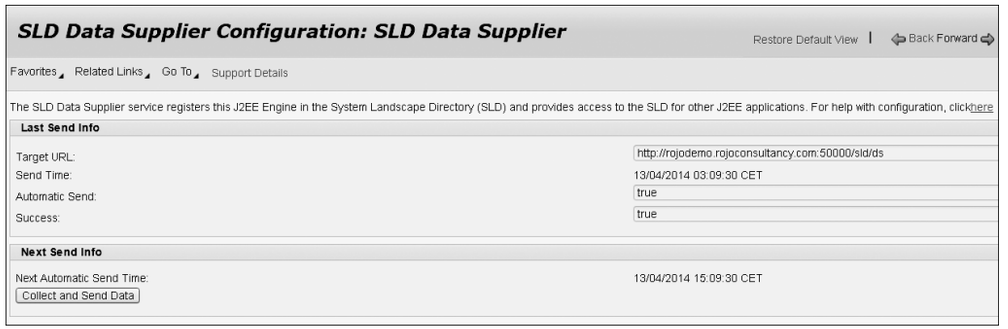

Figure 3.13 Forcing an SAP NetWeaver AS Java System to Push Data to the SLD

3.2.3 Connecting to Other Systems

Systems other than ABAP or those based on SAP NetWeaver AS Java can also be connected to the SLD and can send their data using an executable program called `sldreg`. See Table 3.2 for a summary of the approaches to follow to connect a given application system to the SLD, depending on its type and version.

System type	Approach
SAP system with SAP NetWeaver AS ABAP older than 6.40	Manually update SLD data.
SAP System with SAP NetWeaver AS ABAP equal to or greater than 6.40	Configure data suppliers to automatically update SLD using Transaction RZ70.
SAP system with SAP NetWeaver AS Java older than 7.1	Configure via the Visual Administrator tool.
SAP system with SAP NetWeaver AS Java equal to or greater than 7.1	Configure via the SAP NetWeaver Administrator tool.
Standalone and third party	Manually update SLD data.

Table 3.2 Overview of Approaches to Connect a System to the SLD

The next section discusses the components and available features of the SLD.

3.3 Administration of the System Landscape Directory

In this section, we'll explore some administrative functionalities of the SLD, focusing on those functionalities that are commonly used and relevant to an SAP PO installation. The main page used for the administration of your SLD can be reached by clicking on the **Administration** menu link from the **System Landscape Directory** landing page. From this page, you can distinguish the server and content categories, which will be explored in this section.

3.3.1 Server

This category contains applications that expose different aspects of the SLD server. We'll explore each application.

Status of the System Landscape Directory

To view the current status of the SLD, whether it's currently running or not, check the traffic light on the top left of the SLD **Administration** screen (see Figure 3.14).

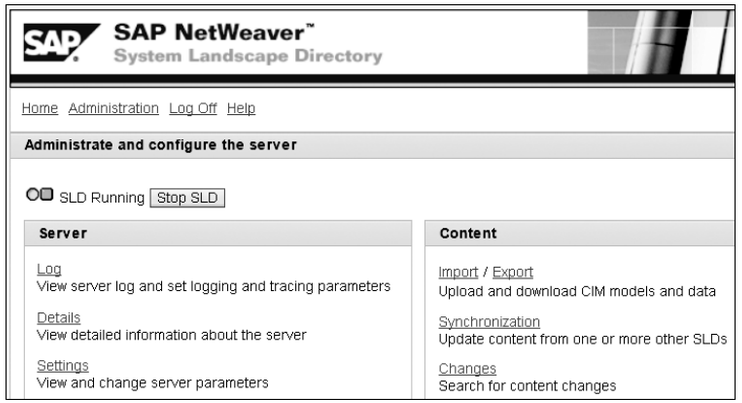

Figure 3.14 SLD Administration Screen

Like any conventional traffic light, a green light will mean that your SLD is up and kicking, whereas a red light will indicate that it's down and might require manual action.

Stop or Start the System Landscape Directory

You can temporarily stop or start the SLD using either the **Stop SLD** or **Start SLD** button, located at the right side of the traffic light (refer to Figure 3.14).

Log

With this logging functionality, you can view the SLD server logs. From this page, for example, you could get more details about failing data imports or exports. It's also possible to set logging and tracing parameters here.

Details

From the **Details** page, it's possible to see all detailed information about your SLD server. As shown in Figure 3.15, the following details are displayed:

- **General**
  This tab contains details of the SLD such as running statuses, versions, SAP Java Virtual Machine (SAP JVM) memory, JVM version, Java system properties, and so on.

- **Data**
  This tab contains CIM-related totals and information such as counts of CIM classes, instances, and associations.
- **Data Suppliers**
  This tab has details about the data supplier and which other SLDs are being updated by the local SLD. Figure 3.15 shows that the local SLD server is forwarding data to another (central) SLD.
- **Server**
  This tab has information such as CIM service version, utilization capacity, hit rate, and so on.

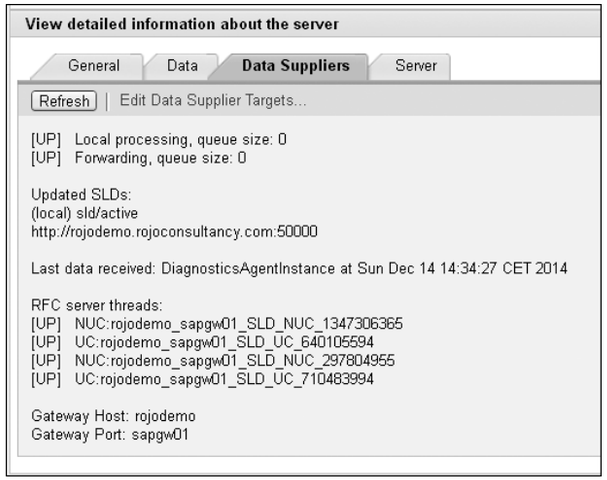

Figure 3.15 SLD Administration Details Page and Available Information

3.3.2 Data and Content

Data and content can be added to the SLD via three different options: data import, system self-registration, and manual creation of data.

Import and Export

This functionality enables the import of the CIM and data from a local file. You can also export the CIM and data of the current SLD via the export functionality.

You can use the export function to perform a full backup of the current SLD data. It's also possible to perform an incremental export. Incremental exports only export the

delta objects that were added to the SLD since the last time an export happened. As such, the incremental method of performing an export requires good administration.

Synchronization

If you have multiple SLDs, and you need to keep their content in sync, then you might opt to synchronize them or to transport the content between the different SLDs. It's then possible to choose between a fully automated synchronization and a manual synchronization. The synchronization of SLD content will be broadly explored in Section 3.4, when we discuss the different SLD strategies. During a typical synchronization, the data and content from one source SLD are propagated to another target SLD.

3.4 System Landscape Directory Strategies

Given the role played by the SLD, it's important to come up with a proper SLD strategy to be used in your organization. There are many approaches to run an SLD in your landscape. To start with, ask yourself if you need one or multiple SLDs in the landscape. To properly answer this question, you need to look at the organization's landscape and requirements. Consider the following questions:

- How big is the landscape, and how many systems will be using the SLD?
- How spread out are these systems? Are all the systems part of the same network, or are they spread across the globe?
- Do you want to keep the data of your different environments or stages separated?

Depending on your answers to these questions, you may want to consider multiple SLDs. Having more than one SLD can bring some advantages:

- Data views are separated (the administrator of each group can only see a limited view or subset of data).
- Your SLD data and content are highly available.
- Any changes to a local SLD's data will only impact a limited part of the organization. Because of the separation of SLDs, it becomes possible to choose the right time to reflect the changes in the rest of the organization (e.g., after a successful test of the performed changes and after you feel comfortable reflecting the changes in the rest of the organization).

With more than one SLD instance in your landscape, the need arises to distribute the data between the different SLDs and to set up a synchronization mechanism between them. There are different approaches to synchronize data between the SLDs, including the following:

- Manual export and import of data (full or delta) using the enhanced Change and Transport System (CTS+)
- Automatic forwarding of data suppliers
- Full automatic synchronization

In the next sections, we'll explore each of these approaches.

3.4.1 Manual Export and Import of Data

If you facilitate the manual export of any selected data from your SLD, then the exported data can be manually imported into the next environment or local SLD. This approach has the major downside of requiring human manual action. It's better to couple this approach with a CTS+. To manually export an SLD object (using a business system here as an example), follow these steps:

1. From the **System Landscape Directory** landing page, select **Business Systems**.
2. Filter and select the business system that you would like to export.
3. With the business system selected, click on the **Export** button (see Figure 3.16 ❶).

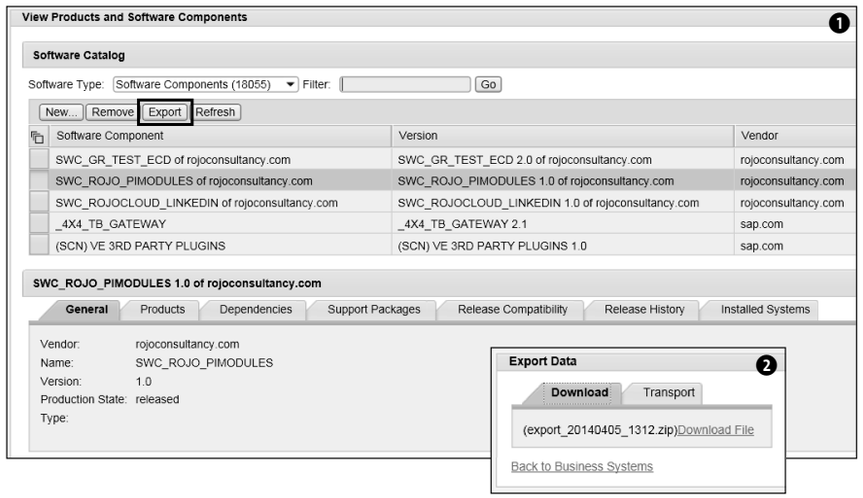

Figure 3.16 Steps to Manually Export an SLD to a Business System

4. Click on **Download File** from the **Download** tab ❷, and save the resulting TPZ file on your local file system.
5. The saved TPZ file can then be imported into the target SLD system.

3.4.2 Automatic Bridge Forwarding

The automatic bridge forwarding approach copies all technical systems data in the source SLD and distributes them to the next SLD system. Most of the time, this approach is used to synchronize the central or master SLD with local SLDs. It's also referred to as one-way distribution or SLD bridge forwarding. This approach only forwards data that is received in the SLD via a data supplier. The manually entered data isn't propagated. To set up automatic bridge forwarding, follow these steps:

1. From the **System Landscape Directory** landing page, select **Administration** and **Data Suppliers**.
2. Under **Update Other SLDs**, click on the **Add** button (Figure 3.17 ❶).
3. Fill in the details of the target SLD system ❷.

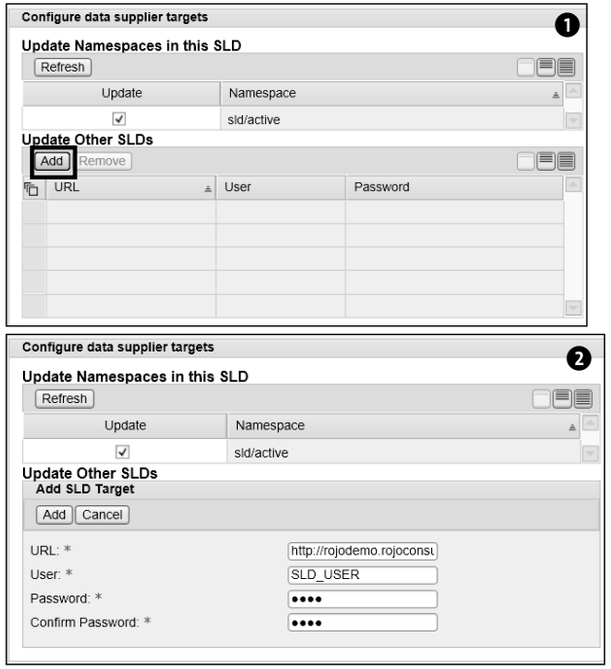

Figure 3.17 Steps to Set Up an SLD Automatic Bridge Forwarding

3.4.3 Full Automatic Synchronization

The automatic synchronization mechanism ensures that all data entered manually in the local SLD and updated by the data supplier is automatically replicated and pushed to the target SLDs. This is a favorable mechanism because it reduces the need to manually keep the SLDs in sync and therefore reduces the risk of human error. It's important to note that the automatic synchronization is supported as of SAP NetWeaver AS Java 7.1 SPS 1 and higher. A synchronization can be unidirectional or bidirectional:

- **Unidirectional**
  Data from the source SLD is synchronized with the target system. This implies that all the data present in the source SLD is also present in the target SLD, but the target SLD might have more data.
- **Bidirectional**
  In this situation, both SLDs are identical. The SLDs can be seen as each other's clones, in terms of their data. Bidirectional SLD synchronization can be used as a way to create an SLD backup or redundancy (see Figure 3.18).

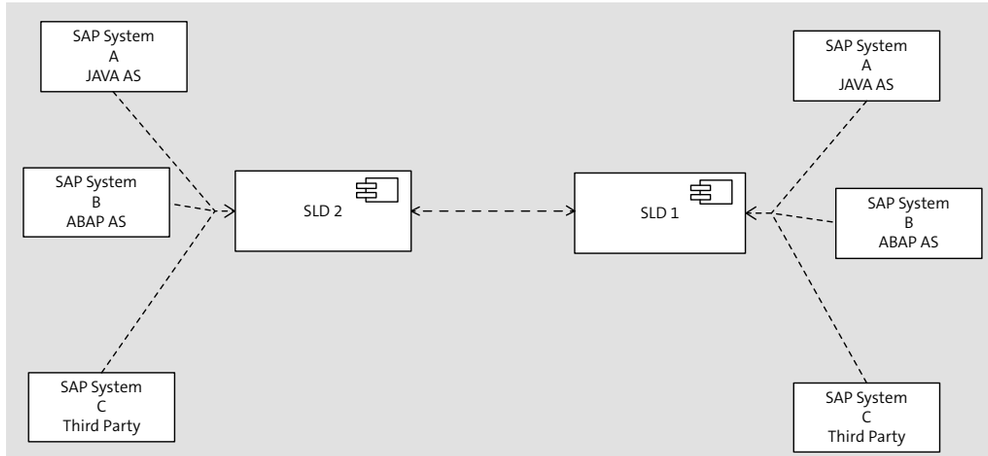

Figure 3.18 Bidirectional Full Automatic Synchronization Example

The automatic synchronization uses HTTP and is asynchronous. To configure the full automatic synchronization of your SLD, follow these steps:

1. From the **System Landscape Directory** landing page, choose the **Administration** link on the top menu and then the **Synchronization** link in the resulting page.

2. You're then forwarded to a **Maintain SLD Content Synchronization** screen. Click the **Add** button (see Figure 3.19 ❶).
3. In the next screen, select the following values:
   - For the **Source**, select the **Remote (Sync with another SLD)** radio button ❷.
   - Make sure the **Bidirectional** checkbox is selected.
4. In the subsequent screen, maintain the hostname and logon details to be used to connect to the target SLD.

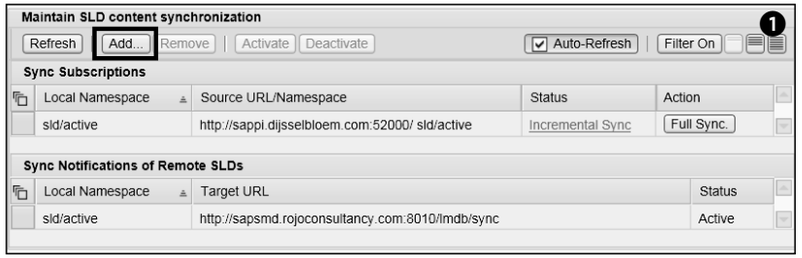

Figure 3.19 Steps to Configure the SLD Full Automatic Synchronization

After you've finished providing details in the second step of the wizard, follow these steps:

1. Define the source namespace and rank. The source namespace represents the namespace from the source SLD to be synchronized. By default, the **sld/active** namespace is selected. However, you can choose another namespace from the dropdown values. Follow the wizard's steps.

   The rank helps resolve conflicts. The namespace rank number specifies the priorities of SLD data in the synchronization process. A higher rank number means that the data of the source SLD namespace will "win" in conflicts with data of the target SLD's namespace (see Figure 3.20 ❶).

2. Maintain the URL and login details of the local SLD. In addition, you need to choose the target namespace and its rank.
3. You'll be presented with a summary of all the values you entered. Click **Finish** after checking that the summary is correct.
4. You can now check the status of the full sync by selecting the **Full Sync (Active)** link. You can also force a full sync by clicking on the **Full Sync** button ❷.

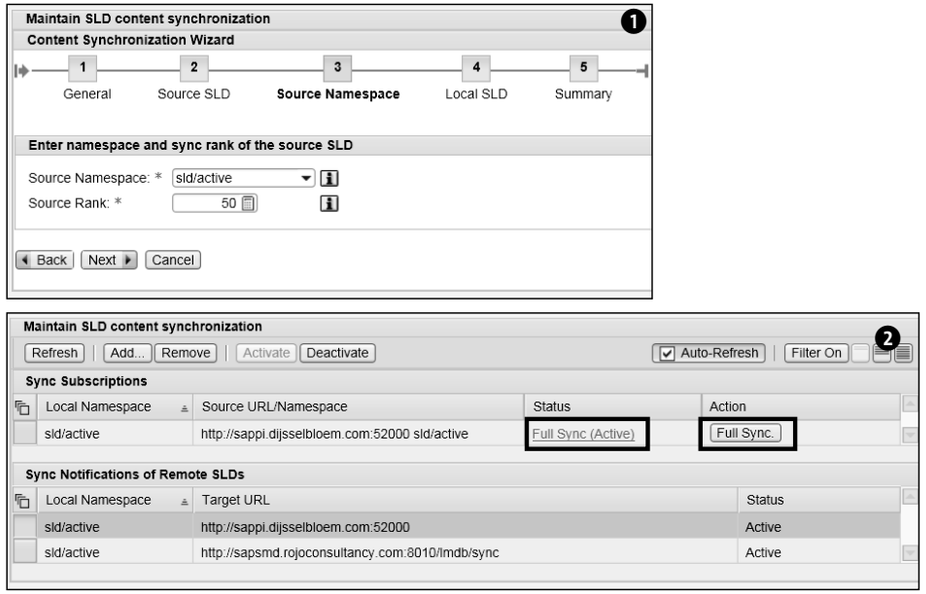

Figure 3.20 Configuring the SLD Full Automatic Synchronization: Defining Ranks

3.5 Tips and Tricks

In this section, we'll share some tips and step-by-step guides to perform some administrative tasks in the SLD.

3.5.1 Naming Convention

Consider using a convenient naming convention when naming your SLD objects. A good naming convention has numerous advantages, including the following:

- **Creates order**
  When the objects are named in a logical manner, their purposes will be obvious to every developer. When looking at the name of an object, it should be obvious which type of SLD object you're looking at, and you should have an idea of what role it plays in the landscape.
- **Creates a recognizable structure**
  A good naming convention makes life easier for the developers and people taking care of the operational side of the SLD, especially when you're dealing with a complex landscape and a growing number of systems and interfaces.
- **Increases productivity**
  When the naming convention is simple and logical, it becomes easier to group, sort, find, and search objects, which will help speed up and simplify the development process. This in turn will result in an easy adoption of the naming convention and increased productivity.

Having a naming convention alone won't cut it. It's important to encourage everyone to make a good habit of using the naming convention and to facilitate its adoption. Furthermore, someone needs to be responsible for enforcing the naming convention.

3.5.2 Keeping Your System Landscape Directory Catalogs Up to Date

It's strongly advised to always keep the SAP-provided catalogs of content up to date. You can update the SLD catalog content by following these steps:

1. Download SAP content from the SAP Service Marketplace via *http://service.sap.com/swdc*.
2. Navigate to **SAP Software Distribution Center** • **Download** • **Support Packages and Patches** • **Entry by Application Group** • **SAP Technology Components** • **SAP CR Content**. You can then download the relevant content (provided as ZIP files) and place it into a local file system. Be aware that you don't need to download the entire software catalog. Each package is a delta of the previous version, so you can download all the packages subsequent to your current version and import them in order.
3. Import the files into the SLD. From the **System Landscape Directory** landing page, go to **Administration** • **Import** (under **Content**).
4. Select the ZIP file via the **Browse** button.

5. Click the **Import** button. Depending on the size of the file to be imported, you can expect this update process to run for a while (see Figure 3.21).

> **Note**
>
> If you need to import multiple CIM files, make sure that you import them in the right order and sequence because each package is a delta of the previous version.

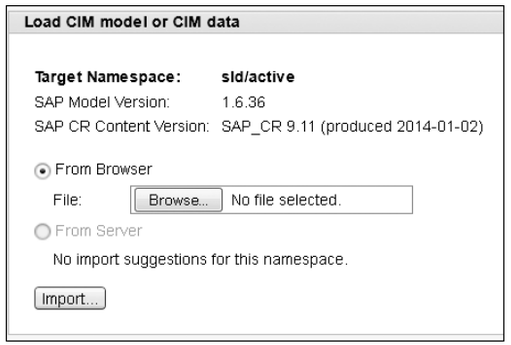

Figure 3.21 Import a New SLD CIM or Data

Figure 3.21 shows the CIM and data import functionality. On this screen, you can also see the version of the content currently loaded in the SLD. For obvious reasons, it's important to verify the current CIM version to determine the version to be imported.

3.5.3 Self-Registration of a Java-Based System with the SLD

To let an SAP NetWeaver AS Java-based system register its technical system with the SLD, you need to configure its data supplier. To configure data suppliers of the SAP NetWeaver AS Java-based system, perform the following tasks:

1. Log in to the SAP NetWeaver Administrator of the concerned system, via *https://<hostame>:<port>/nwa*.
2. Go to the **Destinations** section by following the path **Configuration • Connectivity • Destinations**.
3. Filter for and select the **SLD_DataSupplier** destination, and edit it (see Figure 3.22).
4. Change the URL field (in the **Connection and Transport** tab) to show the URL of the SLD that the system needs to register itself with. Note that the format of the URL should be *http://<hostname>:<port>*.

5. Add the required login details in the **Logon Data** tab.
6. Test your destination setup by clicking on **Ping Destination** (see Figure 3.22). After a successful ping, you're ready to register the system with the SLD and send some data.

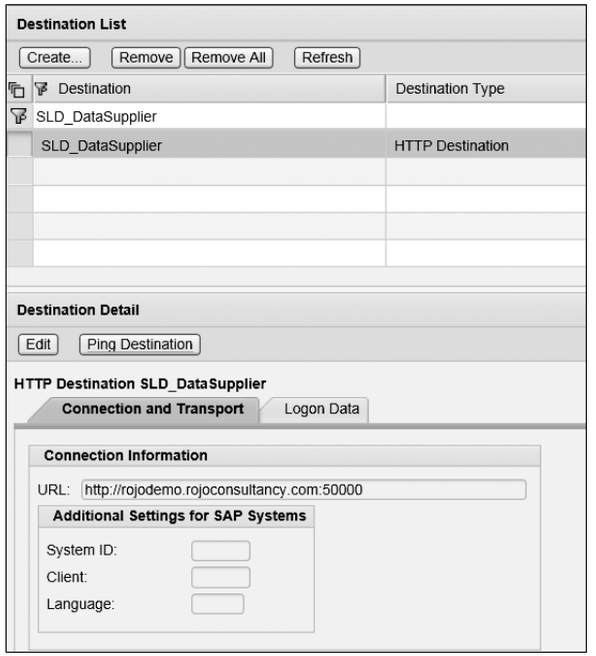

Figure 3.22 Steps to Self-Register a Java-Based System with the SLD

To manually push the data to the SLD or to force the self-registration of an SAP NetWeaver AS Java system, follow these steps:

1. From SAP NetWeaver Administrator, navigate to **Configuration • Infrastructure • SLD Data Supplier Configuration**.
2. You should see information about the next scheduled or automatic send time. Select the **Collect and Send Data** option. If everything was well configured, then you'll get a successful send data message.
3. You should now be able to log in to the target SLD and verify that the new system registered itself. You can find this out by looking up the list of technical systems in the target SLD.

3.5.4 Configuring Data Suppliers from One SLD to Another

All data about technical systems that an SLD receives can be forwarded to another SLD using the data supplier. It's important to stress that only data which arrived via data suppliers (such as technical systems) are forwarded. All manually created data (such as business systems) aren't included in the forwarded data. Use the manual export and import options described in the next section for manually created SLD data.

To set up data forwarding between a source and target SLD (or data supplier target), perform the same steps as described previously for automatic bridge forwarding (Section 3.4.2; also refer to Figure 3.17).

3.5.5 Manual Export and Import of Data

It's possible to manually export any data from a source SLD to a target SLD by using the import and export features. In this way, you could export and import manually created business systems, for instance. The steps to export a business system were described previously in Section 3.4.1. We'll extend those steps by mentioning the required steps to import an exported business system into a target SLD.

The required steps are as follows:

1. From the **System Landscape Directory** landing page of your target SLD, click on the **Administration** link.
2. Then click on **Import.**
3. You're offered the possibility to import an archive file. Choose the file that you exported from the source SLD.
4. Start the import procedure by clicking on the **Import** button.
5. You'll see another screen that requires you to confirm or cancel your import. Click **Continue Import.**
6. After this step, a message confirming the successful import of the new business system will be displayed.

3.5.6 Connecting the SLD to CTS+ to Facilitate the Export and Import of SLD Data

To facilitate the propagation of SLD data from one SLD to another, we recommend that you use a transport mechanism rather than the manual export and import feature.

CTS+ is the recommended tool to manage your SAP PO transports. To connect your development SLD to CTS+, follow these steps:

1. Make sure that you have a communication user in the SAP NetWeaver AS Java that belongs to the `SAP_SLD_Administrator` group. If such a user doesn't exist, then create it before proceeding to step 2.
2. Go to the SAP NetWeaver Administrator via *http://<hostname>:<port>/nwa*.
3. Navigate to **Configuration • Connectivity • Destinations**.
4. Create a destination called "sap.com/com.sap.tc.di.CTSserver" if it doesn't already exist. Give it the type **RFC,** and click **Next**. Note that the destination name is predefined by SAP and therefore must match exactly. It's also case sensitive (see Figure 3.23 ❶).
5. In the next wizard step, add details of the transport system, including logon details to be used to connect to it. Make sure to use a technical user for the logon data ❷.
6. Click **Finish**.

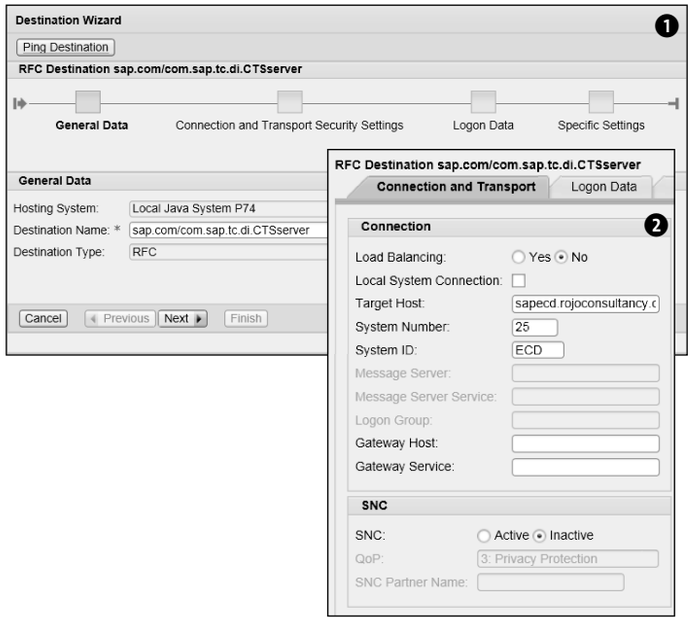

Figure 3.23 Steps to Set Up a Destination from SAP PO to CTS+

Now that you've connected your system to CTS+, you can test the export functionality via the following steps:

1. Log in to your SLD, and navigate to the object you want to export via CTS+. As an example, export a SC.
2. From the **System Landscape Directory** home or landing page, select **Software Components**.
3. Select the SCs in question, and click on **Export**.
4. You'll see an **Export** screen with the **Transport** tab enabled. If the steps for configuring the destination to CTS+ aren't performed properly, you'll see an error here, and the **Transport** tab won't be enabled (see Figure 3.24).

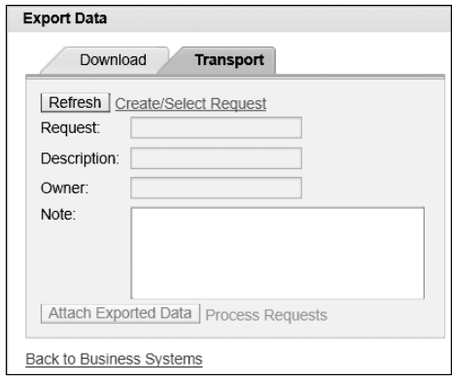

Figure 3.24 Exporting SLD Objects with CTS+ Enabled

3.6 Exercise: Configuring the System Landscape Directory

This exercise is meant to serve as an implementation example and provides a practical insight into the SLD and its objects. We begin with a description of the exercise, briefly touch on what the solution would look like, and then provide step-by-step instructions for the solution.

3.6.1 Exercise Description

Imagine that you're employed by a fictitious company called Reader's Paradise as an SAP integration expert. Reader's Paradise is a bookstore that specializes in selling exclusive books. The company uses SAP PO, and you've been asked to build an interface enabling Reader's Paradise to order books from its main supplier, Book Fountain. This means that you need to build an interface that will fetch a purchase order from Reader's Paradise's system and send the order to Book Fountain.

This first exercise focuses on creating all necessary SLD objects required to build the interface, as illustrated in Figure 3.25.

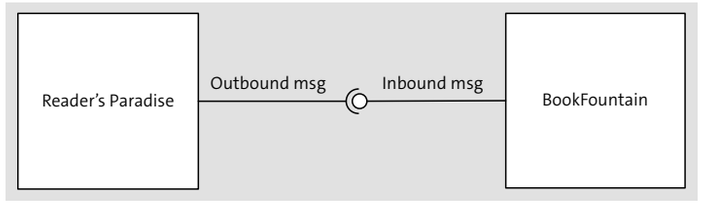

Figure 3.25 Scenario to be Built for Purchase Order Transfer

3.6.2 Exercise Solution Approach

In this first exercise, you're only required to create the relevant SLD objects. The SLD objects to be created include the following artifacts:

- A product
- Three SCs (given that we want to use the three components model, the SC containing the shared object needs to have a dependency to the other two SCs)
- Two technical systems (for sender and receiver of the third-party type)
- Two business systems (for sender and receiver of the third-party type)

A graphical representation of these artifacts and the relationships among them is depicted in Figure 3.26.

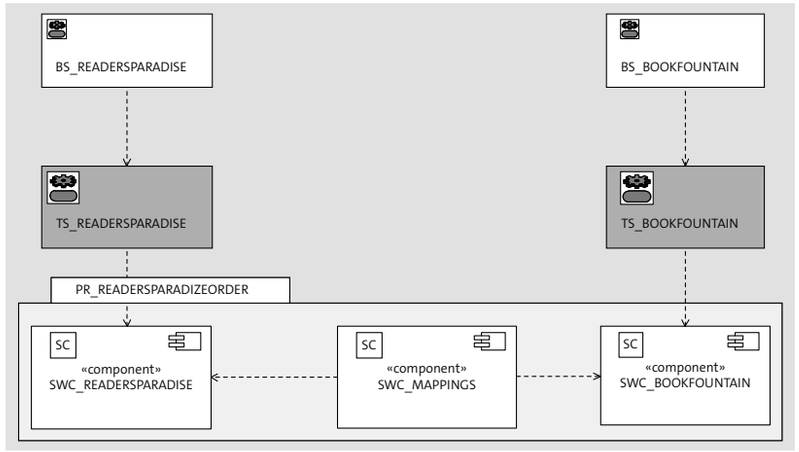

Figure 3.26 The SLD Artifacts and Their Relationships

We provide the step-by-step solution of the exercise in the next section.

3.6.3 Exercise Step-by-Step Solution

The activities and steps to create the objects (as listed in the exercise solution approach) are described in the following subsections.

Log On to the System Landscape Directory

To log on to the SLD, open a browser, go to *http://<hostname>:<port>/sld*, and log in with your credentials when prompted to do so. In the preceding URL, *<hostname>* is the hostname of the SAP NetWeaver system, and *<port>* is the port number of the SAP NetWeaver system.

Create a Product

To create a product that will hold the SCs, follow these steps:

1. Click on the **Products** tab of the **System Landscape Directory** landing page.
2. Click on the **New** button to follow the wizard for creating a product (see Figure 3.27).

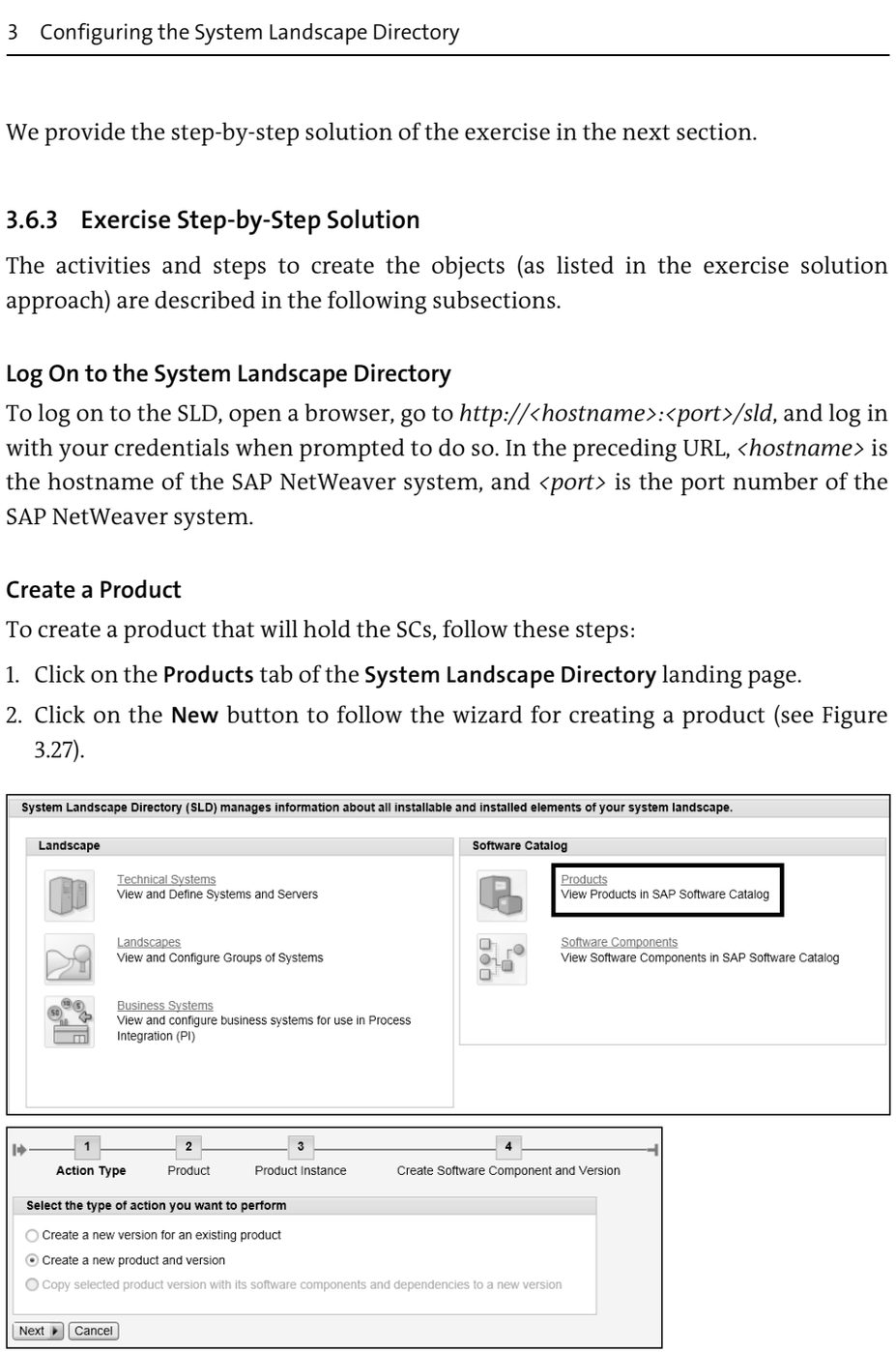

Figure 3.27 First Steps for Creating a Product in the SLD

3. Follow the wizard, and enter the name "PR_READERSPARADISE" for your product. Enter "ReadersParadise.com" as the product vendor (see Figure 3.28).
4. Click on **Next**, and you'll be asked to fill in data to create the SC.

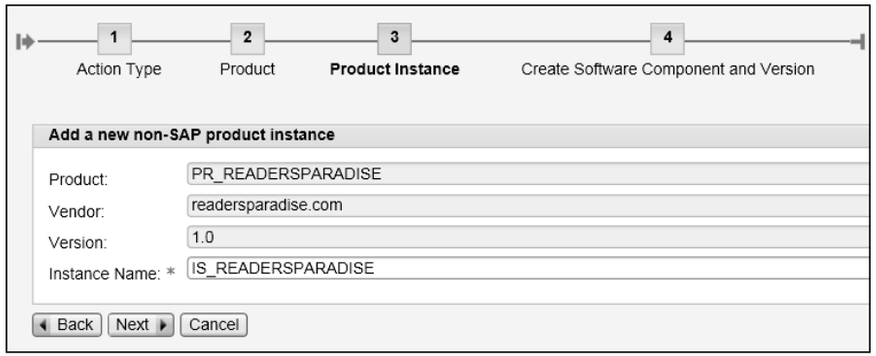

Figure 3.28 Creating a Product in the SLD

Create Three Software Components

Because we're following the three SC model, we'll need three separate SCs to hold the sender, receiver, and canonical objects.

To create the SCs that will hold the objects and artifacts during design time and with which the technical and business systems will be associated, follow these steps:

1. Click on the **Software components** tab of the **System Landscape Directory** landing page.
2. Click on the **New** button to follow the wizard for creating a new SC. Follow the wizard, and name the SC "SWC_READERSPARADISE". The final results are shown in Figure 3.29.
3. Click on **Finish**.
4. Repeat steps 2 and 3 to create two more SCs, with the names "SWC_BOOKFOUNTAIN" and "SWC_MAPPINGS".

> **Note**
>
> You need to select the product (**PR_READERSPARADISE**) that was previously created for your SCs.

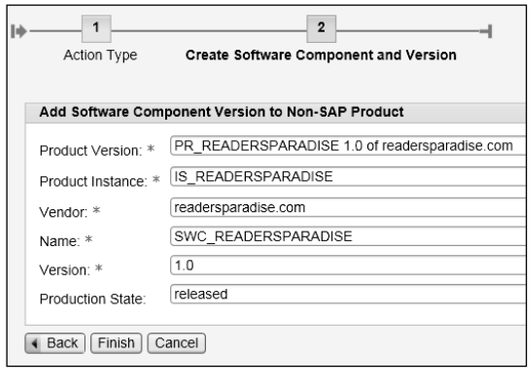

Figure 3.29 Creating a Software Component in the SLD

Given that the SC named SWC_MAPPINGS will contain the mapping and transformation object, it needs to have dependencies to both SWC_READERSPARADISE and SWC_BOOKFOUNTAIN SCs. To create dependencies for the SWC_MAPPINGS, follow these steps:

1. From the **System Landscape Directory** landing page, select **Software Components**.
2. Search or filter for the SC to which the dependencies need to added—in this case, the SC called SWC_MAPPINGS.
3. Click on the **Dependency** tab, and filter for or select the SC SWC_READERSPARADISE.
4. Click on **Define as Prerequisite Software Components**. The final result should look like Figure 3.30.

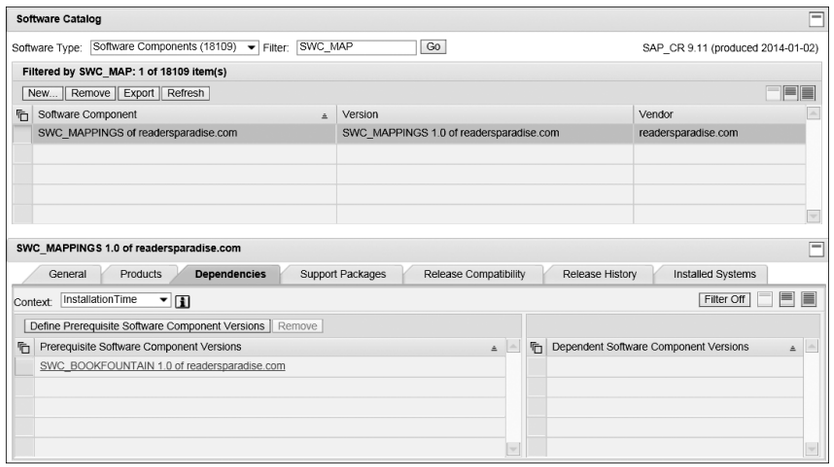

Figure 3.30 Creating Software Component Dependency to Other Software Components

5. Repeat steps 2, 3, and 4 to define another dependency from SWC_MAPPINGS to SWC_BOOKFOUNTAIN.

The dependencies are defined to ensure that the Enterprise Services Repository (ES Repository) objects (data, messages types, and service interfaces) of SWC_BOOKFOUNTAIN and SWC_READERSPARADISE can be accessed from the SC SWC_MAPPINGS.

Create Technical Systems (Sender and Receiver)

To create a technical system with which the business system will be associated, follow these steps:

1. Click on the **Technical Systems** tab of the **System Landscape Directory** landing page.
2. Click on the **New Technical System** button to follow the wizard for creating a new technical system.
3. Follow the wizard, and specify the type of the technical system as **Third Party**.
4. Click on the **Next** button to proceed to the next screen.
5. Name the technical system "TS_READERSPARADISE" to represent the sending system (see Figure 3.31).

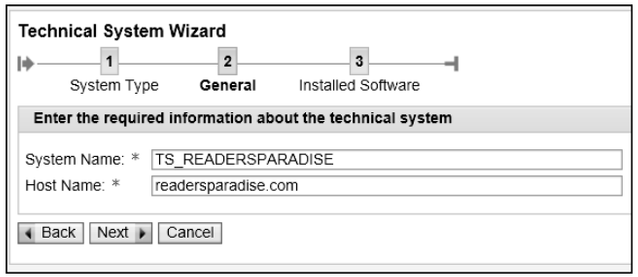

Figure 3.31 Creation of a Technical System

6. Select the products and SCs that are installed in this technical system. If you don't add a SC to a technical system, then it won't be possible to use its service interfaces in your scenario (see Figure 3.32).
7. Repeat steps 2, 3, and 4 to create a new technical system for the receiver system called TS_BOOKFOUNTAIN.

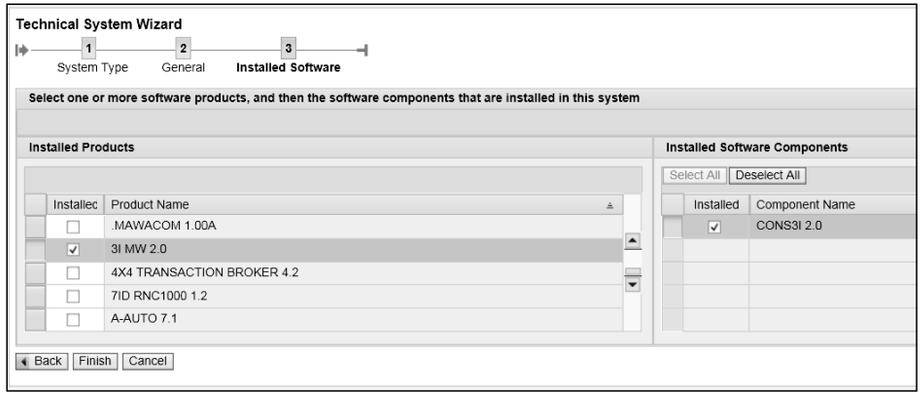

Figure 3.32 Adding Software Components to a Technical System

Create Two Business Systems (Sender and Receiver)

To create a business system that will represent the sender and receiver applications during configuration in the Integration Directory (see Chapter 5), follow these steps:

1. Click on the **Business Systems** tab of the **System Landscape Directory** landing page.
2. Click on the **New Business System** button to follow the wizard for creating a new business system. Click on **Next**.
3. Follow the wizard, and specify the **Type** of business system to be **Third Party/Other**. Click on **Next**.
4. On the next screen, choose the technical system for this business system. Choose **TS_READERSPARADISE** because you're required to create a relationship between a business system and its corresponding technical system. Click on **Next**.
5. On the next screen, name the business system "BS_READERSPARADISE" to represent the sending system. Click on **Next**.
6. Because you linked the new business system to an existing technical system, all products and SCs used in that technical system will be automatically loaded. You still have the option to select or deselect products and SCs on this screen.
7. In the final step, select the Integration Server (SAP PO system) to be used by this application system. You can select from a dropdown list of all SAP PO/SAP PI systems in your landscape.
8. Repeat steps 1 to 7 for a new business system for the receiving system. This last business system needs to be named `BS_BOOKFOUNTAIN` and will need to be linked to the technical system previously created and named `TS_BOOKFOUNTAIN`.

3.7 Summary

In this chapter, we demonstrated that the SLD is a critical component of your landscape, and we explored how it supports the SAP PO middleware by providing it with all necessary foundation objects. This chapter also explored all of the administrative tasks provided by the SLD. These administrative tasks include stopping and starting the SLD, exporting and importing SLD objects, configuring data suppliers, and viewing logs.

Given the critical role that the SLD plays in your organization, the chapter also explored different SLD strategies and approaches to take into consideration during your implementation.

After reading this chapter, you've obtained the foundation required to start building ES Repository objects, a topic that we'll cover in the next chapter.

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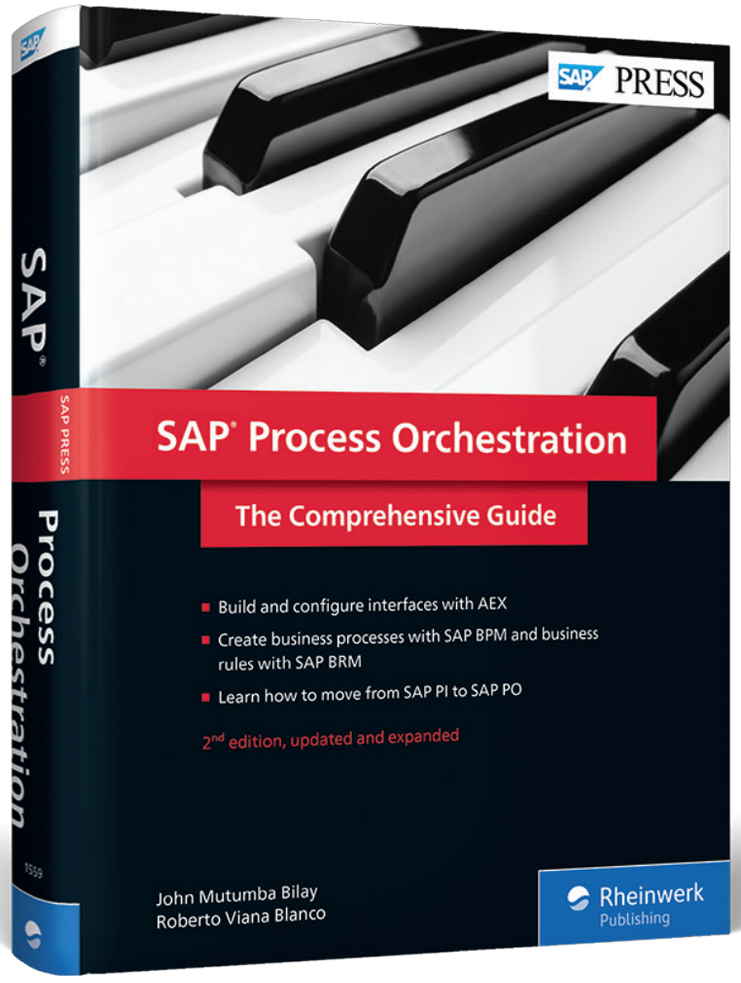

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John Mutumba Bilay is a senior software engineer and enterprise integration consultant at Rojo Consultancy. With more than 14 years of international experience in information technology, including eight specifically devoted to SAP, his speciality is software development, integration, and business process automation. You can visit his company's website at http://www.rojoconsultancy.com/en/.

Roberto Viana Blanco is an experienced SAP integration architect and co-founder of Rojo Consultancy. He has more than 17 years of SAP integration experience working across a number of industries. He has been working with SAP since the early versions of SAP NetWeaver Exchange Infrastructure (XI) and has helped several organizations adopt SAP Process Integration and then SAP Process Orchestration.

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