IBM Netcool Operations Insight Version 1.4 Deployment Guide

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**IBM Netcool Operations Insight Version 1.4
Deployment Guide**

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Note: Before using this information and the product it supports, read the information in "Notices" on page v.

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This edition applies to IBM Netcool Operations Insight Version 1.4.

Contents

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Preface

IBM® Netcool® Operations Insight integrates infrastructure and operations management into a single coherent structure across business applications, virtualized servers, network devices and protocols, internet protocols, and security and storage devices. This IBM Redbooks® publication will help you install, tailor, and configure Netcool Operations Insight Version 1.4.

Netcool Operations Insight consists of several products and components that can be installed on many servers in many combinations. You must make many decisions, both critical and personal preference. The purpose of this document is to accelerate the initial deployment of Netcool Operations Insight by making preferred practice choices.

The target audience of this book is Netcool Operations Insight deployment specialists.

Authors

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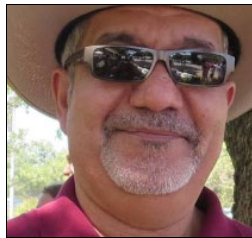
Shaker Al-Muaber is an Infrastructure Architect for IBM Cloud. He is also an IT Specialist in D&SP who is certified in Specialization Software Architecture. Shaker is also a network specialist, who manages the network for the worldwide IT cloud labs. He also supports the Watson lab network in Austin. Additionally, he manages the IT/DevOps environment that uses Netcool and Analytics products, including Netcool Configuration Manager (NCM), Network Manager for IP Edition (NM-IP), Netcool Performance Manager (NPM), Predictive Insight (PI), IBM Operations Analytics - Log Analysis, and IBM Alert Notification on Bluemix.
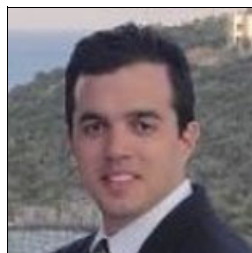
Fernando de Andrade Cavalcanti is an IBM IT Specialist Expert/L2 who has been certified since 2010. He is also certified at the IBM IT Architect Foundation Level. Fernando has 17 years of experience in IT. He joined IBM in 2007 (from the acquisition of Vallent) and worked mainly with the IBM Tivoli® portfolio. He worked as the subject matter expert (SME) and IT Architect who was responsible for the Netcool environments of large GTS Strategic Outsourcing accounts. He is responsible for designing architectures for Netcool infrastructures, migrating from Tivoli Enterprise Console to Netcool, integrating new event sources, developing automation, managing the health of Netcool complex environments, and maintaining the lifecycle of Netcool products.

Vasfi Gucer is an IBM Redbooks Project Leader with the IBM International Technical Support Organization. He has more than 18 years of experience in the areas of systems management, networking hardware, and software. He writes extensively and teaches IBM classes worldwide about IBM products. His focus has been cloud computing for the last three years. Vasfi is also an IBM Certified Senior IT Specialist, Project Management Professional (PMP), IT Infrastructure Library (ITIL) V2 Manager, and ITIL V3 Expert.

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Steven Shuman started as an electrical and acoustics engineer. He now works to solve network configuration management issues at companies around the globe as an IBM Netcool Configuration Manager Architect, as part of IBM Systems/Middleware Group. He has over 20 years of software, IT, and networking experience with deep expertise in network device operations and configuration. Steve has been associated with the Netcool Configuration Manager product and its clients from the beginning of Netcool Configuration Manager.

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Introduction to IBM Netcool Operations Insight deployment

IBM Netcool Operations Insight (Netcool Operations Insight) is a bundle of products that is based on the IBM Netcool suite. All of these products need to be configured to exchange data among them. This book begins with a brief description of the Netcool Operations Insight components to better clarify the available features and capabilities. Then, we describe the architecture and the environment that will be used in this book, including the relationships and connections between the Netcool Operations Insight components. You can reference the contents of this chapter while you execute the actual deployment in your environment.

This chapter has the following sections:

1.1 Netcool Operations Insight at a glance

IBM Netcool Operations Insight uses real-time alarm and alert analytics, which are combined with broader historic data analytics. Netcool Operations Insight is powered by the fault management capabilities of IBM Tivoli Netcool/OMNIbus and IBM leading big data technologies within IBM Operations Analytics - Log Analysis, providing powerful event search and historical analysis in a single solution.

Netcool Operations Insight consists of a base solution for managing and analyzing application monitoring environments and also an optional extension that is called *Networks for Operations Insight*. This optional extension widens the scope to include network discovery, visualization, event correlation, topology-based root-cause analysis, and configuration and compliance management. The Networks for Operations Insight capability is provided through the Network Manager and Netcool Configuration Manager products.

In addition, you can also set up IBM Network Performance Insight as part of your Netcool Operations Insight solution to monitor network traffic performance, and you can integrate with further solutions, such as IBM Alert Notification and IBM Runbook Automation.

Netcool Operations Insight integrates infrastructure and operations management into a single coherent structure across business applications, virtualized servers, network devices and protocols, internet protocols, and security and storage devices.

Netcool Operations Insight includes the following capabilities.

1.1.1 Event search

Event search applies the search and analysis capabilities of Operations Analytics - Log Analysis to events that are monitored and managed by Tivoli Netcool/OMNIbus. Events are transferred from the ObjectServer through the Gateway for Message Bus to Operations Analytics - Log Analysis, where they are ingested into a data source and indexed for searching. After the events are indexed, you can search every occurrence of real-time and historical events.

The Tivoli Netcool/OMNIbus Insight Pack is installed in Operations Analytics - Log Analysis and provides custom apps that search the events based on various criteria. The custom apps can generate dashboards that present event information to show how your monitoring environment is performing over time. With keyword searches and dynamic drill-down functions, you can go deeper into the event data for detailed information. The apps can be run from the Operations Analytics - Log Analysis.

Tooling can be installed into the Web GUI that launches the apps from the right-click menus of the Event Viewer and the Active Event List. An "event reduction wizard" is also supplied that includes information and apps that can help you analyze and reduce volumes of events and minimize the "noise" in your monitored environment.

1.1.2 Event Analytics

Event Analytics performs statistical analysis of Tivoli Netcool/OMNIbus historical event data. It can identify seasonal patterns, such as when, and how frequently events occur. Seasonality analyses are output in reports and graphs so that you can easily find seasonal patterns. For example, an event that periodically occurs at an unscheduled specific time is highlighted. You can use the information from the seasonality reports to create network, device, or suppression rules to reduce the number of events.

Event Analytics can determine the events that have a statistical tendency to occur together and output the results on a scheduled basis as *event groups*. You can deploy valid event groups as Netcool/Impact *correlation rules*. The rules act on the event data and show a single parent event from the event group, with all other events in the group as children. Event groups reduce the number of events that are presented to operators.

Event Analytics is installed as two separate packages. One package is installed in Netcool/Impact, and the other package is installed in the Netcool/OMNIbus Web GUI. Both packages are required for Event Analytics to work.

1.1.3 Networks for Operations Insight

Networks for Operations Insight is an optional feature that can be added to a deployment of the base Netcool Operations Insight solution to provide service assurance in dynamic network infrastructures. The capabilities of Networks for Operations Insight include network discovery, visualization, event correlation and root-cause analysis, and configuration and compliance management. It contributes to overall operational insight into application and network performance management. The Networks for Operations Insight capability is provided through the Network Manager and Netcool Configuration Manager products.

1.1.4 Topology search

The *topology search* capability is an extension of the Networks for Operations Insight feature. It applies the search and analysis capabilities of Operations Analytics - Log Analysis to give insight into network performance. Events that were enriched with network data are analyzed by the Network Manager Insight Pack and are used to calculate the lowest-cost routes between two endpoints on the network topology over time. The events that occurred along the routes over the specified time period are identified and shown by severity. The topology search requires the Networks for Operations Insight feature to be installed and configured.

1.1.5 IBM Connections integration

IBM Connections is a leading social software platform that can help your organization to engage the right people, accelerate innovation, and deliver results. Netcool/Impact enables social collaboration through IBM Connections by automatically providing updates to key stakeholders. It provides integration to IBM Connections by using a Netcool/Impact *IBMConnections* action function. Users can use the IBMConnections action function to query forums and topics lists, create a new forum, create a new topic, and update existing topics.

This integrated, security-rich platform helps people engage with networks of experts in the context of critical business processes. Now, everyone can act with confidence and anticipate and respond to emerging opportunities.

1.1.6 Network performance monitoring

Network Performance Insight is a flow-based network traffic performance monitoring system. It provides comprehensive and scalable visibility of network traffic with visualization and reporting of network performance data for complex, multivendor, and multitechnology networks.

1.1.7 IBM Alert Notification

IBM Alert Notification provides instant notification of alerts for any critical IT issues across multiple monitoring tools. It gives IT staff instant notification of alerts for any issues in your IT operations environment.

1.1.8 IBM Runbook Automation

IBM Runbook Automation empowers IT operations teams to be more efficient and effective. Operators can focus their attention where it is needed and receive guidance to the best resolution with recommended actions and pre-filled context. With Runbook Automation, you can perform these tasks:

► Investigate and delegate problems faster and more efficiently.
► Diagnose and fix problems faster and build operational knowledge.
► Create, publish, and manage runbooks and automations easily.
► Track achievements and identify opportunities for improvement.

1.2 Netcool Operations Insight in an IT Service Management context

Netcool Operations Insight provides end-to-end insight for smarter business decisions. It simplifies operations and reduces the cost of operations. Netcool Operations Insight provides services management personnel with improved visibility with the introduction of Network Health Dashboard, Network discovery, visualization, monitoring and event correlation, and root-cause analysis, which drives down the meantime to repair.

Netcool Operations Insight gives IT Service Management personnel agile operations by providing the following functions (Figure 1-1 on page 5):

► Consolidated management:
  – Use off-the-shelf integrations for rapid deployment
  – Correlate, enrich, and consolidate events into a single view
  – Scale from the smallest to the largest environments
► Analytics:
  – Gain data-driven actionable insight from high-volume operations data
  – Identify frequent events
  – Recognize patterns
  – Recommend grouping and suppression
► Automation:
  – Streamline operations
  – Eliminate manual steps by automating actions
  – Automate routing processes
  – Take immediate action
► Built-in expertise:
  – Take advantage of decades of IBM experience across thousands of clients
  – Reduce actionable events as a default

Figure 1-1 shows Netcool Operations Insight in an IT Service Management context.
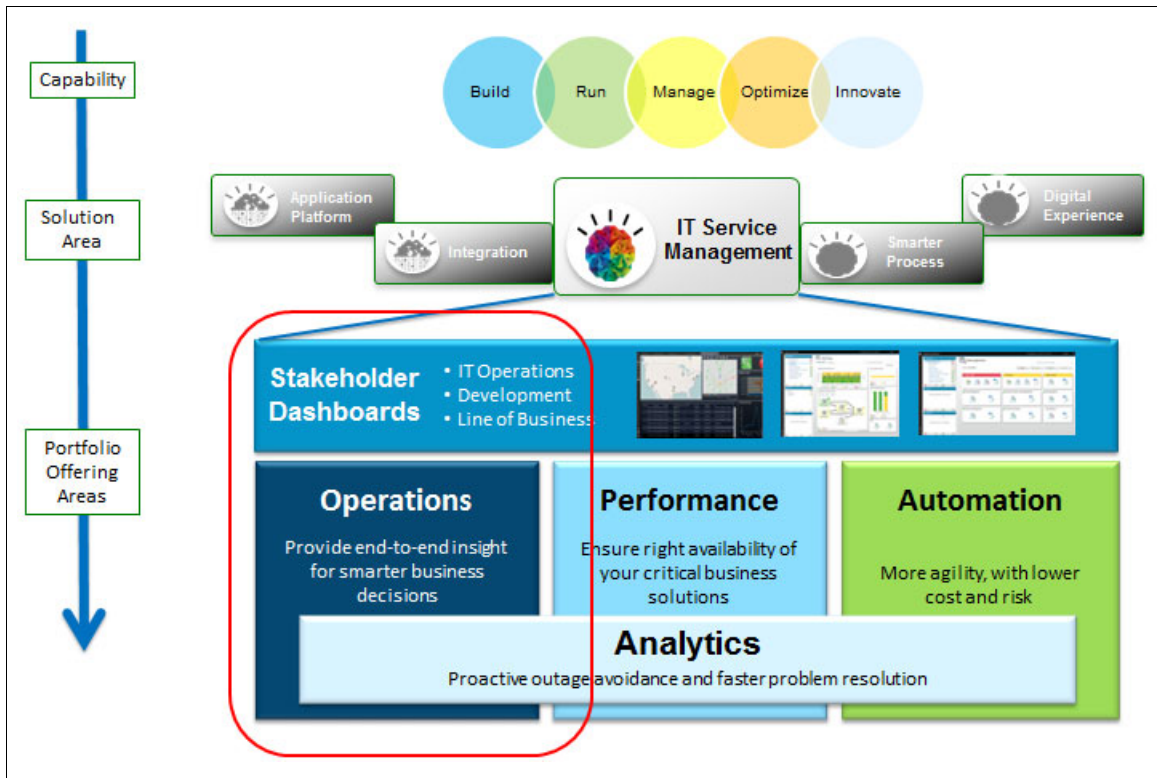
Figure 1-1   Netcool Operations Insight in an IT Service Management context

1.3 Netcool Operations Insight Dashboard Application Services Hub

Netcool Operations Insight combines Netcool OMNIbus and Netcool Impact with the power of analytics and modern mobile dashboards to increase the effectiveness, efficiency, and reliability of operations management while it simplifies or removes administrative tasks, radically improving time to value and total cost of ownership (TCO).

IBM Dashboard Application Services Hub (DASH) service is a common web portal for IBM Netcool suite. When you log in to the DASH, you will get access to the Content Page, OMNIbus Web GUI, Network Manager topology views, discovery configuration, and other integrations.

Through the navigation bar, you can access navigation tools, such as the Search, Favorites, and Product pages. See Figure 1-2. Product pages provide access to DASH pages for each integrated product.

Figure 1-2   DASH navigation bar

Follow these steps to explore the options:

1. Click any folder to navigate to its content pages. (A *folder* is a logical grouping for related pages, and you can assign any icon to it.) Click the **Samples** folder icon to see its contents (Figure 1-3).
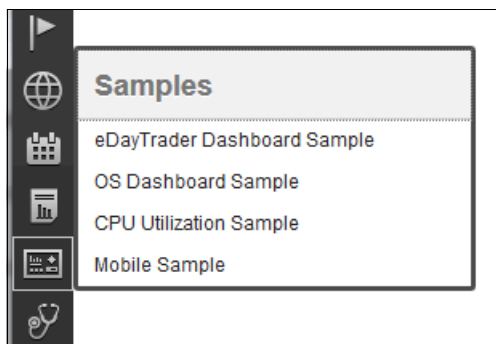
Figure 1-3   Samples folder

2. Open the eDayTrader Dashboard Sample application to see a page with an example dashboard. Figure 1-4 shows an example dashboard.
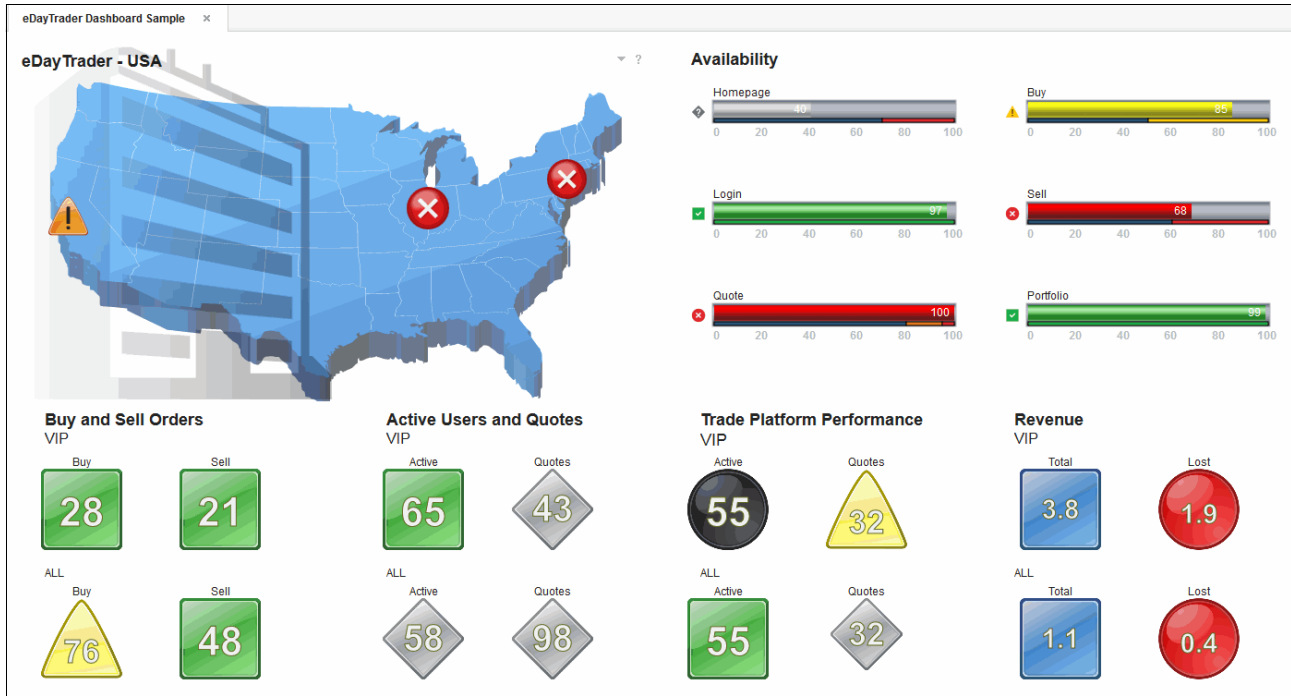
Figure 1-4   Example dashboard

3. Click the **Administration** folder, as shown in Figure 1-5. It contains the Netcool OMNIbus Web GUI and Network Manager administration GUI. Use it to create OMNIbus filters, views, tool, menus, and Network Manager polling policies.
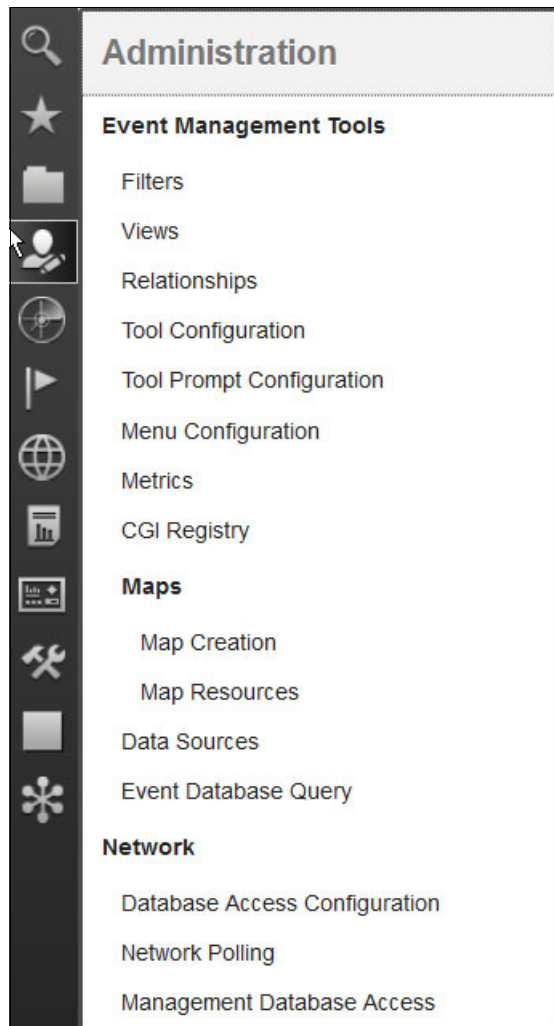
Figure 1-5   Administration folder

4. Click the **Discovery** folder, as shown in Figure 1-6, to open the Network Discovery Configuration page and the Network Discovery Status page. The pages are the same pages that were in Tivoli Integrated Portal.

Figure 1-6   Network Discovery configuration and status pages

Enhancements were added in V1.4, such as the discovery of Cisco WiFi Access Point (Figure 1-7), which performs modeling for layer 2/3, subsystem identifier (SSID), 802.11 spec, channels, and dependencies on Dynamic Host Configuration Protocol (DHCP).
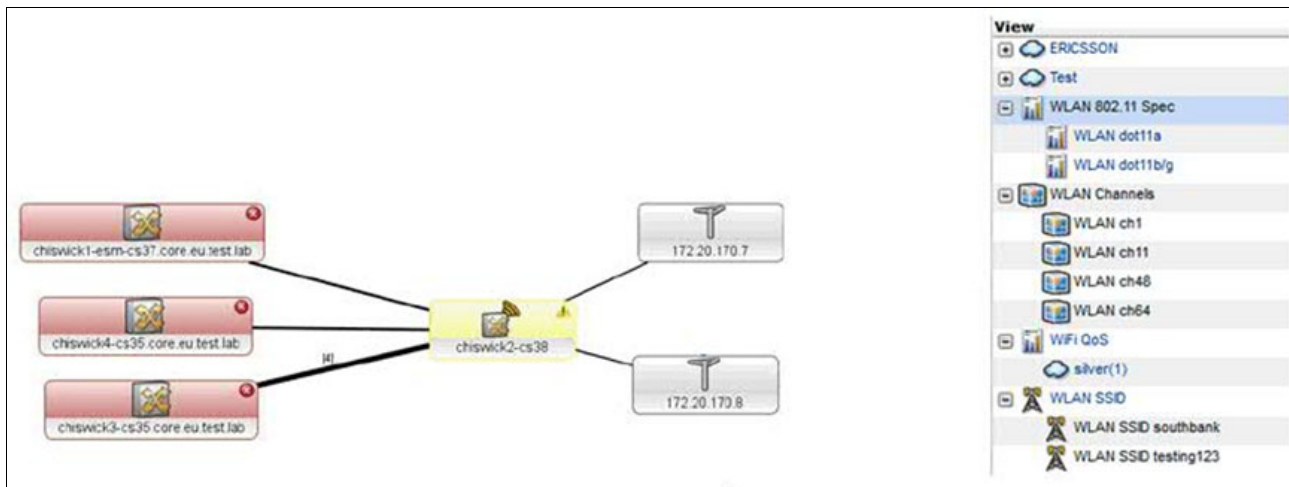
Figure 1-7   Cisco WiFi discovery

5. Click the **Incident** folder, as shown in Figure 1-8, to open OMNIbus Web GUI views and Network views. You can navigate through the Event Dashboard, Event List, and Active Event List (AEL), and work with OMNIbus events. You can navigate through the Network views, Hop view, Health view, Fault-Finding view, Simple Network Management Protocol (SNMP) Management Information Base (MIB) Browser view, and real-time graphing.
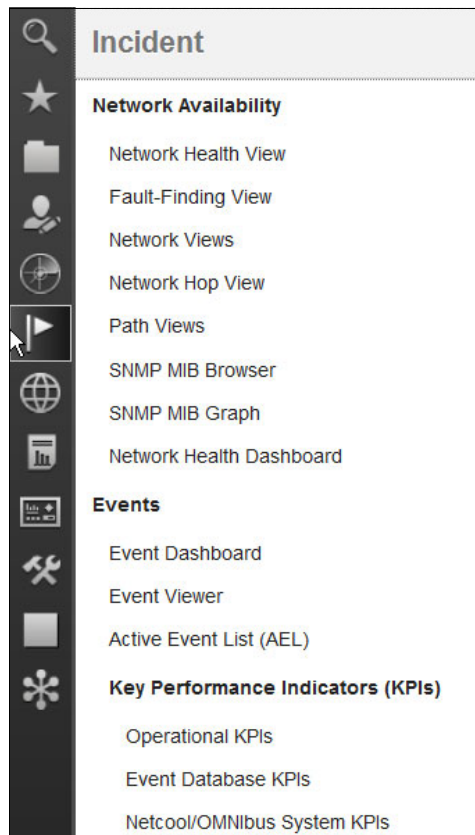
Figure 1-8   Events and Network Availability views

6. Pay attention to the new feature in this release, which is the Network Health Dashboard. The Network Health Dashboard answers these questions at a glance (Figure 1-9):

  – What devices or interfaces were down longer than 1 hour or 24 hours?
  – How is the availability level trending over the last 24 hours?
  – What are the worst performers?
  – Did any configuration changes coincide with this incident?
  – What events are active?
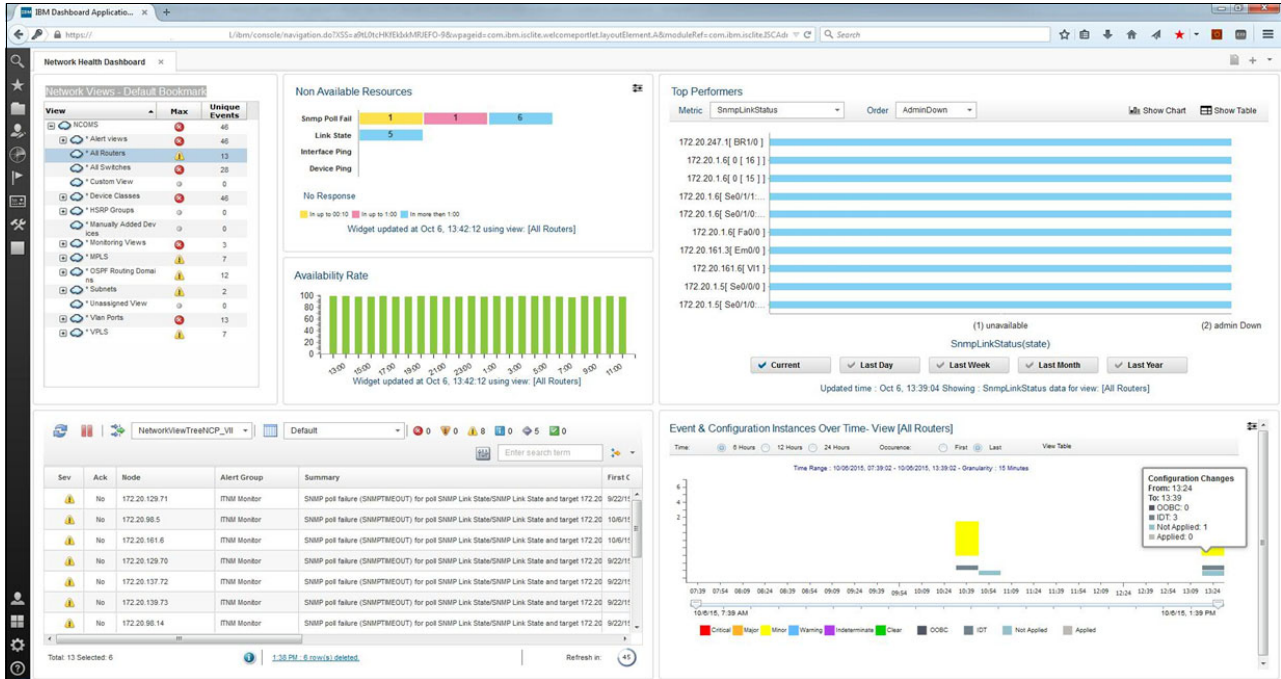
Figure 1-9   Network Health Dashboard

7. Use the Unavailable Resources and Percentage Availability widgets to understand your network availability status in real time. This display gives you information about SNMP polling failures and your ability to ping a device. It provides information about the interface link state and your ability to ping the interface. You use the Network Views bookmark to segment your network, for example, if you want to see only router availability, click the **All Routers** bookmark. See Figure 1-10.
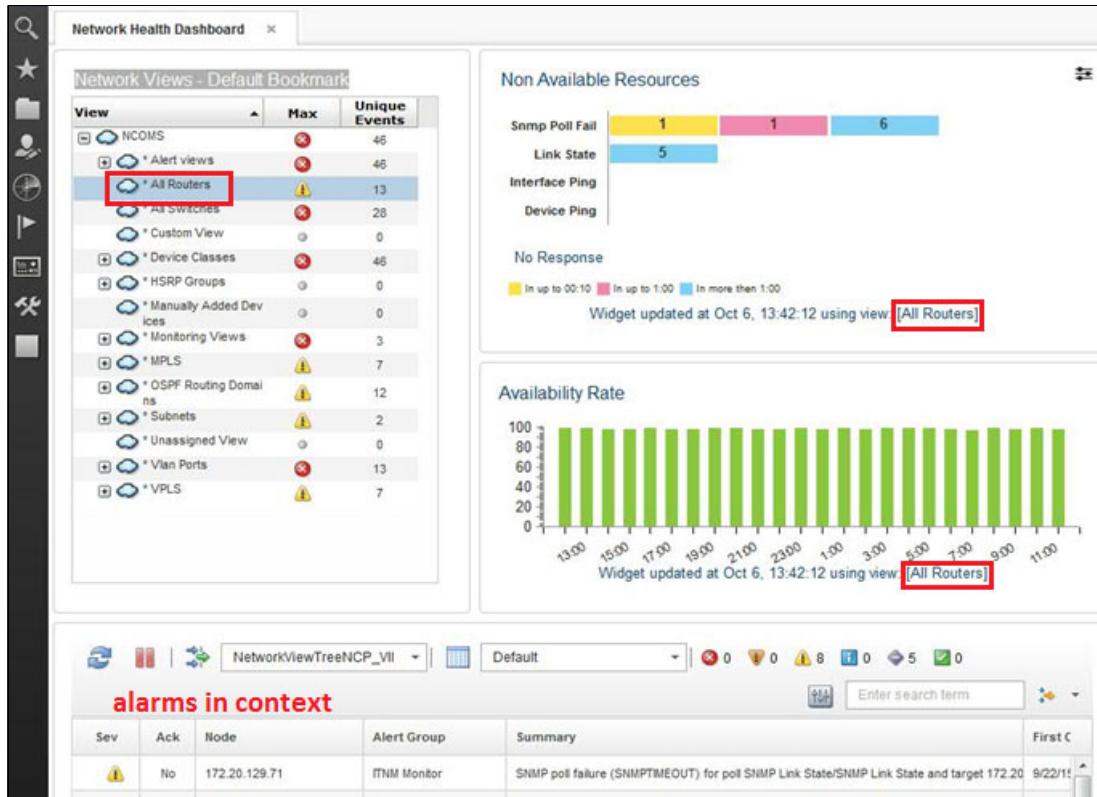
Figure 1-10   Resource availability

8. In the All Routers health dashboard (Figure 1-11), you can view your network configuration timeline of changes. Moreover, you can drill down into the configuration history to see device listings and the details about changes that were made. If a change in your configuration caused an error in your network, you can trace it.
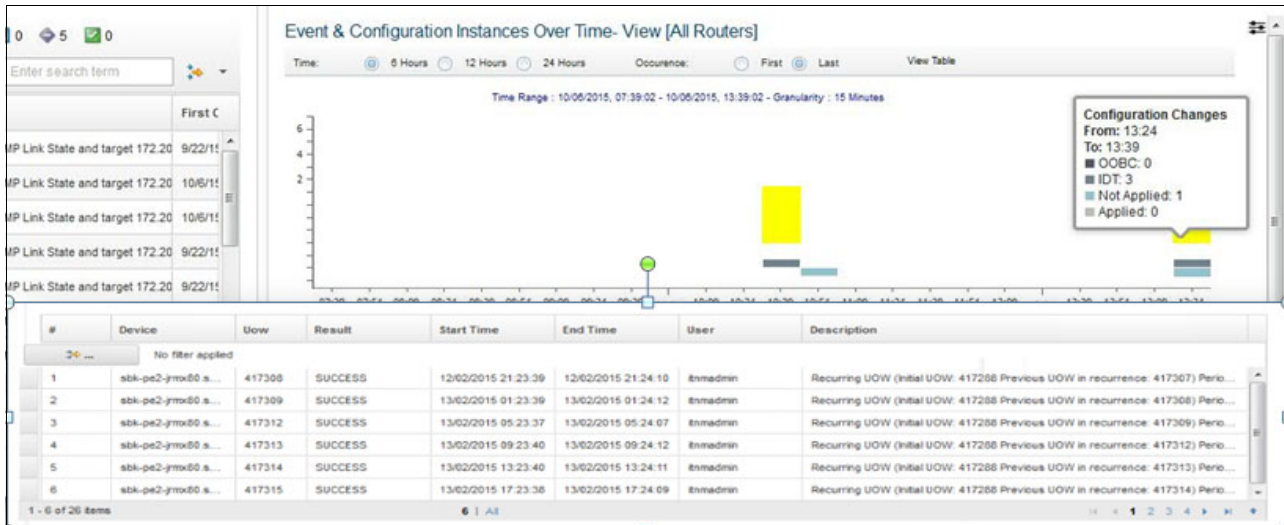
Figure 1-11   Network Configuration Manager configuration changes over time

9. Click the **Insights** folder (Figure 1-12) to open the analytics pages:

   – Seasonal Events
   – Related Events

   Both pages are empty after installation and require configuration. Statistical analysis of Tivoli Netcool/OMNIbus historical event data is shown here. Insights can identify seasonal patterns, such as when and how frequently events occur.

Figure 1-12   Netcool Operations Insight Analytics

Seasonality analyses are output in reports and graphs so that you can discover recurring event patterns. See Figure 1-13.
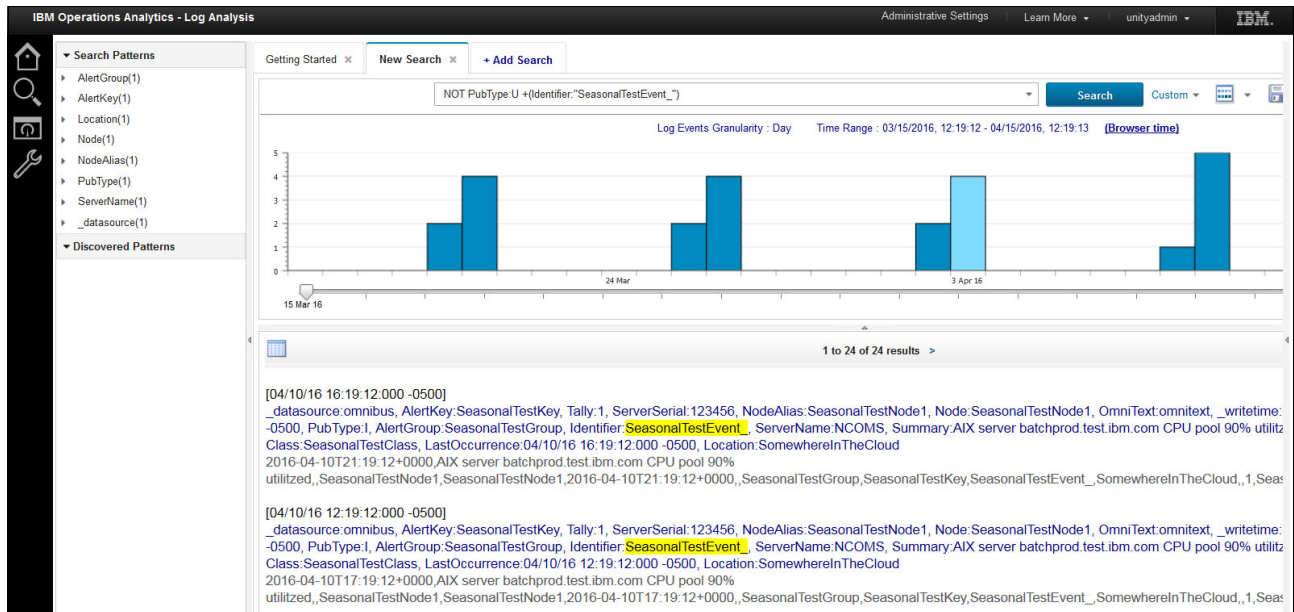
Figure 1-13   Seasonality analysis in Netcool Operations Insight

10.Click the **Reporting** folder icon (Figure 1-14) to navigate through tens of predefined reports that are installed and ship with the Netcool Operations Insight components. Reports are built on top of the IBM Tivoli Common Reporting engine. You get OMNIbus historical reports as part of the OMNIbus installation, which is used by the analytics engine. Approximately 55 reports for Tivoli Network Manager are available if you install the product. For Tivoli Netcool Configuration Manager, approximately 15 reports about compliance and security are available. Moreover, a customized report is available by using the Report Studio tool.
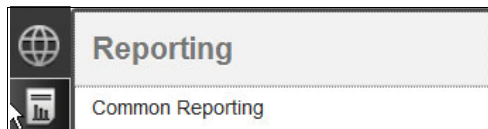
Figure 1-14   Reporting link

11.See Figure 1-15 for the installed package reports.
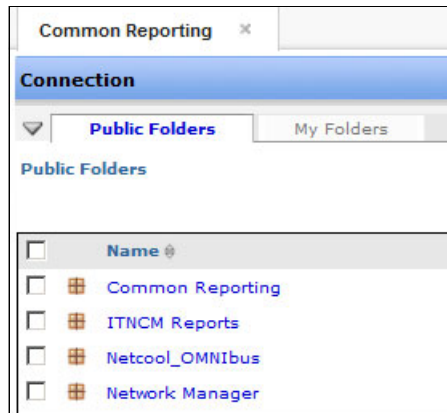
Figure 1-15   Preformatted reporting

12.Click the **Configurations** folder icon to open the IBM Tivoli Netcool Configuration Manager (ITNCM) base and compliance GUI. See Figure 1-16. You still get the JNLP application when you click one of the applications.
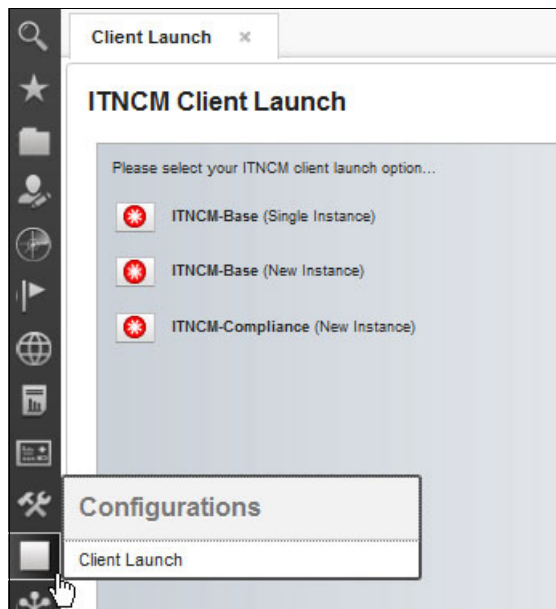
Figure 1-16   Netcool Configuration Manager client launch

13. Click the **Console Integrations** icon to open any integrated product. Based on your installation, only Netcool Impact might be installed, or Netcool Impact and Network Performance Insight (NPI) might be installed. See Figure 1-17.
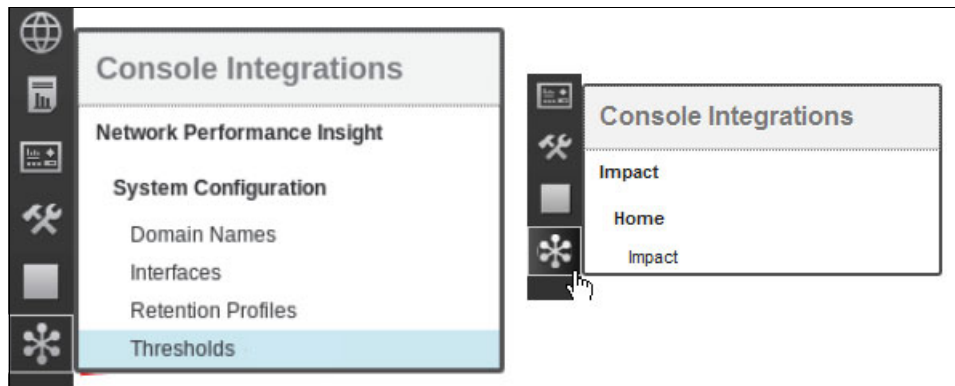
Figure 1-17   Console Integrations

14. Click **Impact** to open the Netcool Impact GUI. See Figure 1-18. *Impact* is a core component for Netcool Operations Insight. All enhancements and event analytics depend on it.
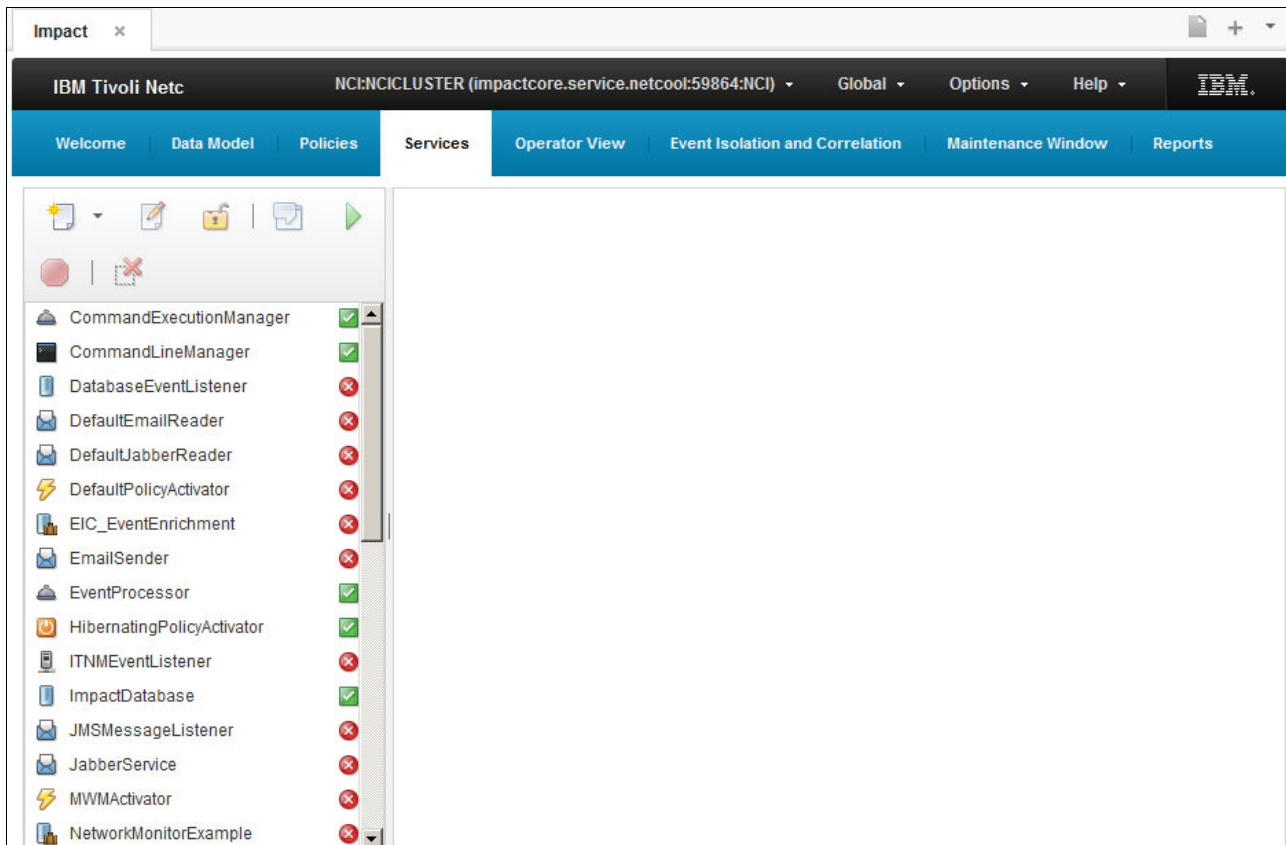
Figure 1-18   Impact GUI

1.4 Architecture

This section shows the high-level architecture of the environment that was used in this book. It also includes other details, such as the necessary IBM DB2® instances and the relationships and connections among the Netcool Operations Insight components.

1.4.1 High-level architecture

Figure 1-19 on page 17 shows the high-level architecture that was used to deploy a multiple tiered Netcool Operations Insight environment with high availability (HA). The following Netcool Operations Insight components are depicted in this diagram:

► IBM Tivoli Netcool/OMNIbus (OMNI)
► IBM Jazz™ for Service Management (JazzSM)
► IBM DB2
► IBM Tivoli Netcool Impact (NCI)
► IBM Tivoli Network Manager (NM)
► IBM Tivoli Netcool Configuration Manager (NCM)
► IBM Operations Analytics - Log Analysis (IOALA)

Figure 1-19 shows a high-level view of the architecture.
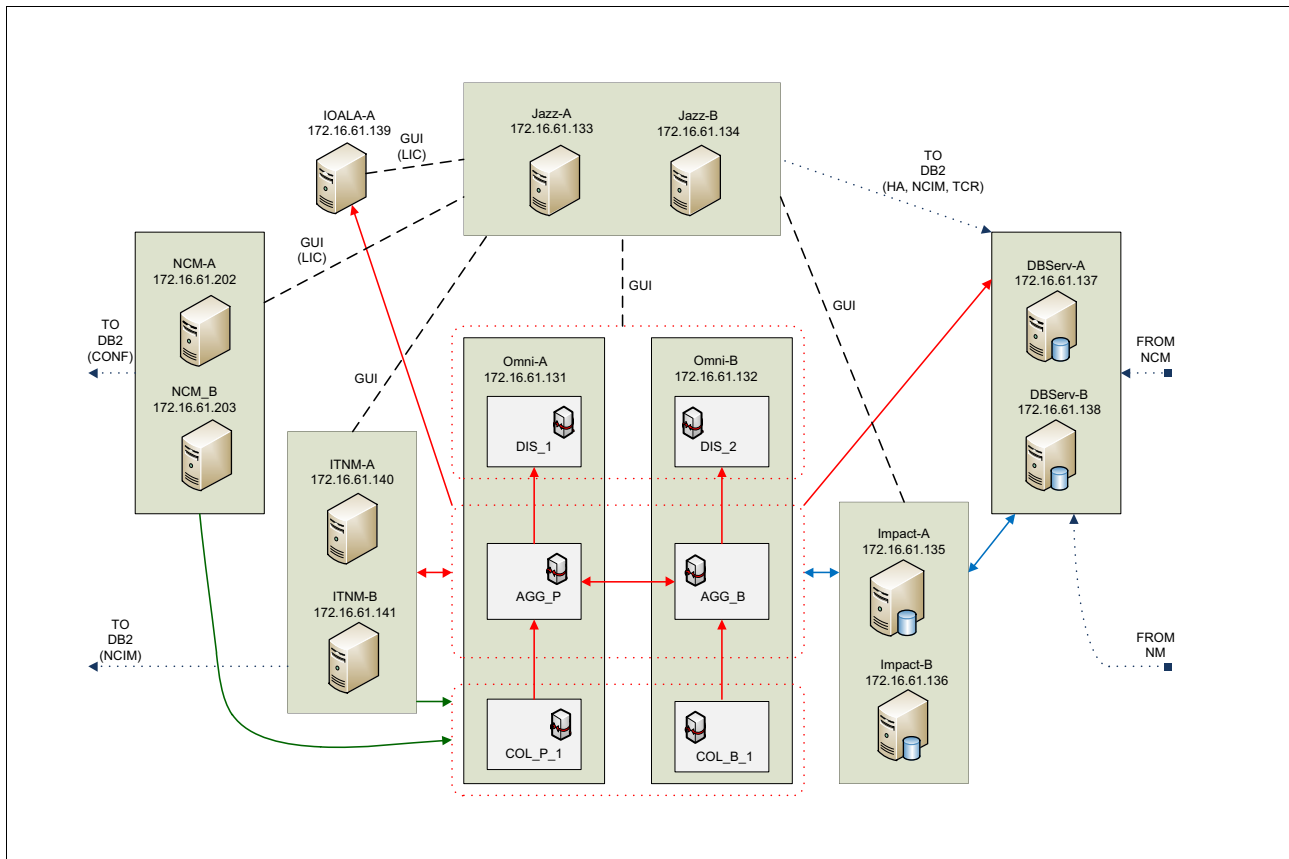
Figure 1-19   High-level architecture

Legend for Figure 1-19:

► Red arrows are gateways.
► Dashed lines are user interface connections.
► Gray boxes are servers.
► Dotted red boxes are virtual server pairs.

In Figure 1-19, JazzSM is deployed for HA. It collects data from the following sources:

► Network Manager servers
► Netcool Configuration Manager
► Netcool Impact
► DB2
► IBM Operations Analytics - Log Analysis
► Netcool/OMNIbus

1.4.2 Database and connections that were used in the environment

Figure 1-20 shows the Netcool Operations Insight environment from a database perspective. It shows the relationships of each Netcool Operations Insight component and the DB2 instance that they connect to.
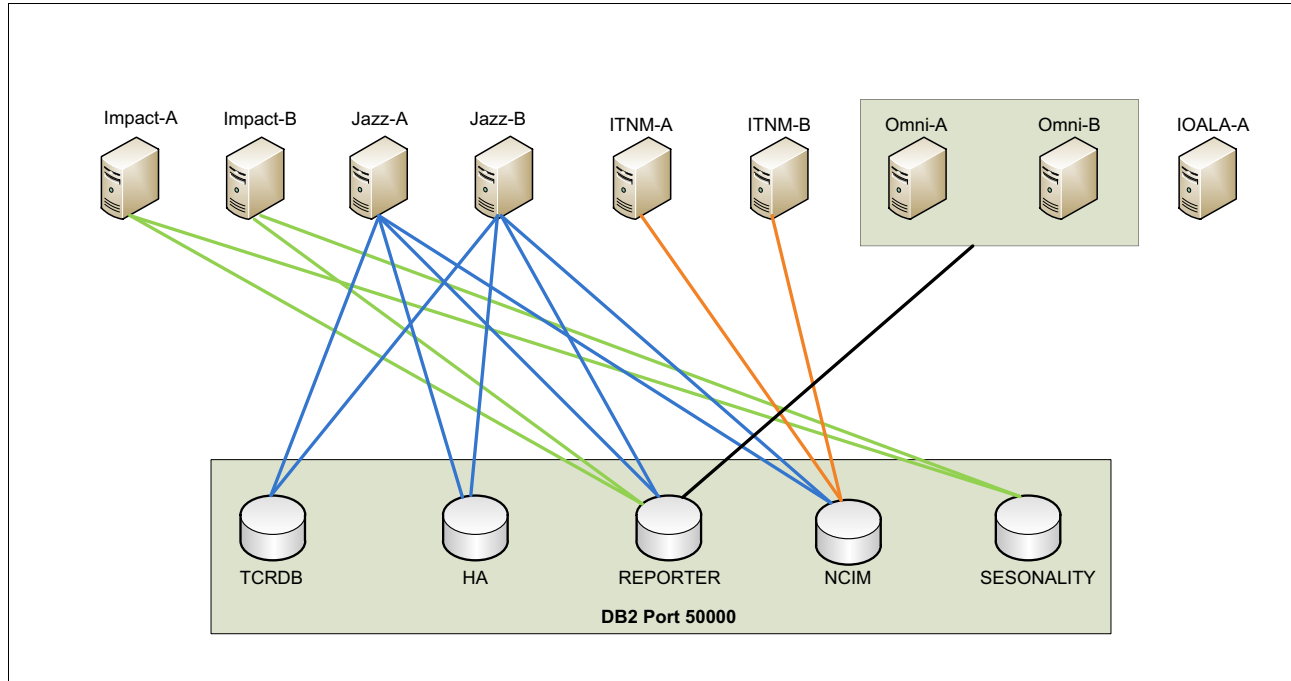
Figure 1-20   Database connections in Netcool Operations Insight

1.4.3 Ports that are used

Table 1-1 shows the main ports that are needed during the Netcool Operations Insight deployment.

Table 1-1   Main ports that are used for Netcool Operations Insight

Netcool Operations Insight component	Port used
Omnibus - Aggregation Layer (AGG)	4100
Omnibus - Collection Layer	4101
Omnibus - Display Layer	4102
JazzSM	16310 - 16316
Impact	16311
Log Analysis	9987
Network Manager	7968

Note: The Network Configuration Manager ports are not included in Table 1-1 because Network Configuration Manager was not part of the basic deployment that we performed in this book. The ports for Network Configuration Manager will be mentioned in 2.8, "IBM Netcool Configuration Manager" on page 175.

Figure 1-21 show a diagram from the perspective of the ports. It shows the ports that were used in our environment for the connections among all of the Netcool Operations Insight components.
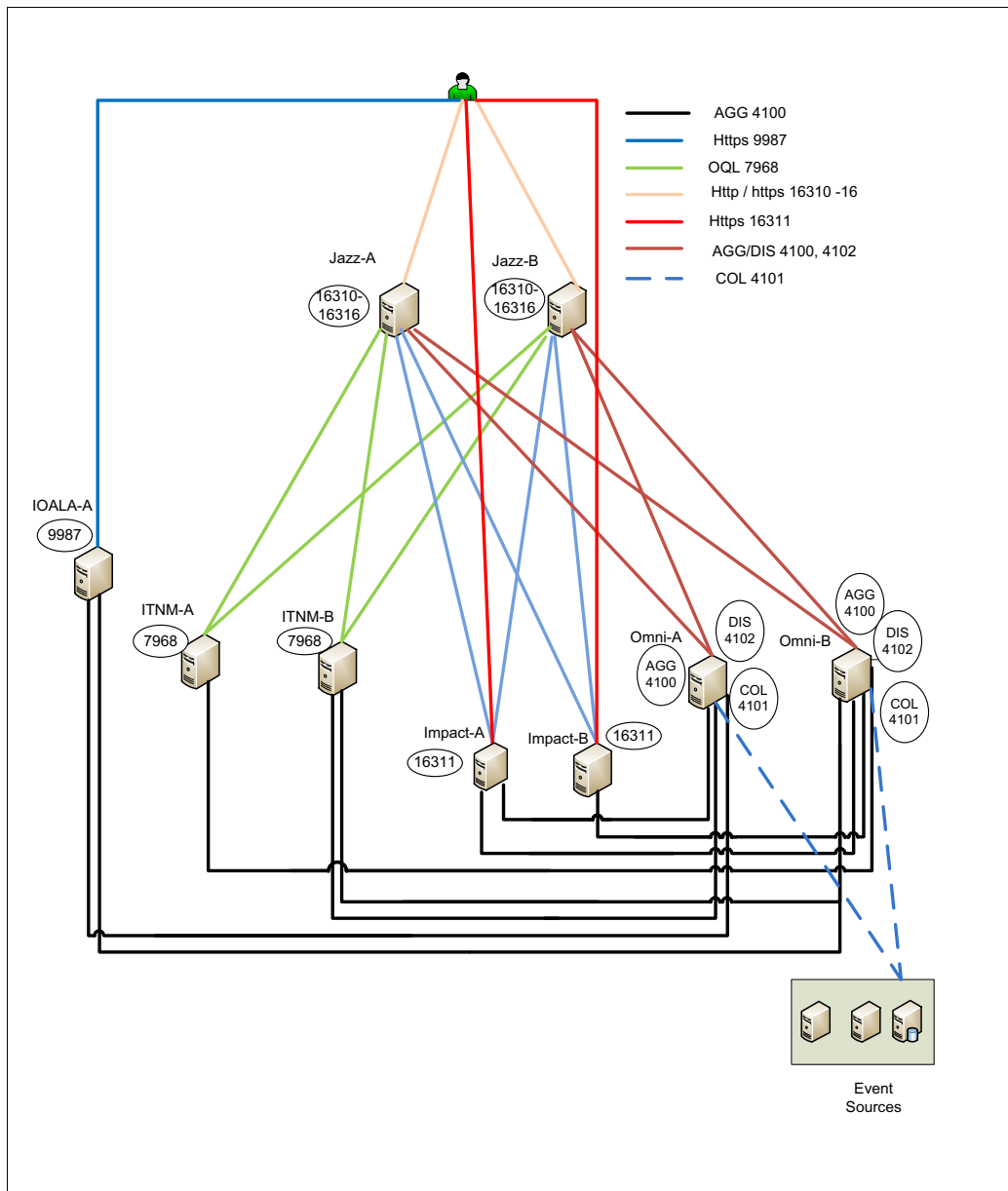
Figure 1-21   Ports that are used to connect the Netcool Operations Insight components

In addition to these environment-specific ports, each product also uses other ports. A full list of ports that are used for each product is available in the IBM Knowledge Center documentation for each product:

https://ibm.biz/BdrFcE

For instance, Figure 1-22 shows a full list of the ports that are used for the Netcool Impact deployment.

Data source	Default port number
DB2 data source	50000
Derby data source	1527. The default Derby replication port is 4851.
Generic SQL data source	5432
HSQLDB data source	9001
Informix data source	1526
MS_SQL Server data source	1433
MYSQL data source	3306
Object Server data source	4100
Oracle data source	1521
PostGreSQL data source	5432
Sybase data source	5000
UI data provider data source	16310
LDAP data source	The default value is set to a common port number: 389.

Figure 1-22   Full list of ports for Netcool Impact

Another example, which is shown in Figure 1-23, shows a full list of ports that are used for Network Manager.

Port	Protocol	Description
22	SSH over TCP/IP	If SSH support is enabled, the Telnet Helper uses this port to communicate with network devices.
23	Telnet over TCP/IP	If SSH support is not enabled, the Telnet Helper uses this port to communicate with network devices.
161	SNMP	Port 161 is the default port on network devices to which SNMP queries are sent during the discovery and monitoring processes. Defined in the column m_SnmpPort in the database table snmpStack.verSecurityTable.
162	UDP	Default trap port. Used by the Trap polling agent. If more than one application/process needs access to this port, ncp_trapmux, the SNMP trap multiplexer, can be used to forward traps. The SNMP trap multiplexer, the Trap discovery agent, and the Trap polling agent can all be configured to use a different port.
1883	Message Queuing Telemetry Transport (MQTT)	Default port used by Really Small Message Broker for inter-process communication.
4100	TCP/IP	Default ObjectServer port. This must be entered at install time. Defined in `interfaces.Arch` on the ObjectServer workstation. This port is used by the `ncp_g_event` process to communicate with the ObjectServer.
7968	TCP/IP	Default port for access to the Network Manager server from Dashboard Application Services Hub. This is used by the Discovery Configuration GUI and it is defined in the `ServiceData.cfg` configuration file. If you want to change this port, edit the `ServiceData.cfg` configuration file and restart the ncp_model process and the ncp_config process using CTRL.
16310	HTTP	Default port for the Dashboard Application Services Hub. The Dashboard Application Services Hub allocates the next thirteen ports up from the port specified for the Dashboard Application Services Hub during the installation for its own use. By default, this port redirects to 16316.
16311	HTTPS	Default secure port for the Dashboard Application Services Hub.
33000	TCP/IP	By default, the multicast IP address 225.13.13.13 and port 33000 are used to enable the discovery helpers and discovery agents to locate the Helper server. This multicast address is specified in the file `$NCHOME/etc/precision/ServiceData.cfg`. Once a process has located the Helper server, a TCP connection is established on a port assigned by the operating system.
50000	TCP/IP	Default DB2® database port.

Figure 1-23   Full list of ports that are used for Network Manager deployment

1.4.4 Usernames and passwords that are used for each component

The usernames and passwords that are used in our deployment for each component of Netcool Operations Insights are listed.

Operating system users and groups

Table 1-2 lists the operating system users.

Table 1-2   Users

Username	Password	Where used
root	r00to1	Secure Shell (SSH) login
netcool	object00	Installation of products
db2inst1	object00	DB2
db2fenc1	object00	DB2
dasusr1	object00	DB2
ncim	object00	IBM Tivoli Network Manager DB2 user

Table 1-3 lists the operating system groups that we used.

Table 1-3   Groups

GroupName	Where used
ncoadmin	omnibus nco_pa

Jazz users (file-based repository)
Table 1-4 lists the Jazz users.

Table 1-4   Jazz users

Username	Password	Where used
smadmin	object00	JazzSM administration

LDAP users (Active Directory)
Table 1-5 lists the Lightweight Directory Access Protocol (LDAP) users.

Table 1-5   LDAP users

Username	Password	Where used
smadmin2	netcool	Jazz
ncoadmin	netcool	Omnibus
impactadmin	netcool	Impact
unityadmin	netcool	Log Analysis

Important: Do not create `smadmin` in the LDAP server because Jazz requires that the username variables are unique across all repositories. The `smadmin` username is a fixed internal "FileBased" variable.

Netcool Omnibus
Table 1-6 lists the Netcool Omnibus users.

Table 1-6   Netcool Omnibus

Username	Password	Where used
impactconnect	netcool	Impact connections
itnmconnect	netcool	Network Manager connections
jazzconnect	netcool	Jazz and Web GUI

2

IBM Netcool Operations Insight installation and basic configuration

This chapter describes the installation and the basic configuration of the following IBM Netcool Operations Insight components:

- ► 2.1, "Installation Manager" on page 24
- ► 2.2, "IBM DB2" on page 27
- ► 2.3, "IBM Tivoli Netcool/OMNIbus" on page 41
- ► 2.4, "IBM Tivoli Netcool Impact" on page 77
- ► 2.5, "IBM Tivoli Network Manager" on page 95
- ► 2.6, "IBM Jazz for Service Management (JazzSM)" on page 116
- ► 2.7, "IBM Operations Analytics - Log Analysis" on page 147
- ► 2.8, "IBM Netcool Configuration Manager" on page 175

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2.1 Installation Manager

This section describes the installation and basic configuration of IBM Installation Manager (Installation Manager).

2.1.1 Introduction

This section covers the *basic* installation of Installation Manager only. Installation Manager is required to be installed in all servers that are used in the environment of this book. As a preferred practice, follow the standard settings in Table 2-1 for the remainder of this book when you install Installation Manager in each server.

Table 2-1   Installation Manager settings

Setting	Value
Installation Manager Installation directory	`/opt/IBM/netcool/IM/InstallationManager/eclipse`
Installation Manager Data directory	`/opt/IBM/netcool/IM/IBMIMData`
Installation Manager Shared Data directory	`/opt/IBM/netcool/IM/IBMIMShared`

Note: Installation Manager replaces the Deployment Engine (DE) that was used to install the previous versions of the Netcool products.

2.1.2 Check the prerequisites

No prerequisites exist for Installation Manager.

2.1.3 Installation and basic configuration

The installation packages of the products include Installation Manager. If needed, you can download the *latest* version of IBM Installation Manager from IBM Fix Central and search for `IBM Installation Manager`:

http://www.ibm.com/support/fixcentral/

We will install the Installation Manager by using the `groupinst` command. Other options are described in the following link if you need further information:

https://ibm.biz/Bdrr5e

Preparing the environment

Example 2-1 shows the commands to prepare the environment for the Installation Manager installation. You can reuse them in all of the servers of the environment where a Netcool Operations Insight component will be installed.

Example 2-1   Preparing the environment for the Installation Manager installation

```
# As root user:
#-------------
# Assuming netcool user has not been created yet:
groupadd ncoadmin
useradd -c "Netcool User" -g ncoadmin netcool
```

```
passwd netcool
# in our case 'object00' for the netcool user

mkdir -p /opt/IBM/netcool

cd /opt
chown -R netcool:ncoadmin IBM

# As netcool user:
# ----------------
cd /opt/IBM/netcool

mkdir IM
cd IM
mkdir -p InstallationManager/eclipse
mkdir IBMIMData
mkdir IBMIMShared

cd /opt/IBM/netcool
mkdir core NcKL

# Assuming the installation file of IM was downloaded to /mnt/ITSO_SHARE/IM
cd /mnt/ITSO_SHARE/IM
unzip agent.installer.linux.gtk.x86_64_1.8.4001.20160217_1716.zip
```

Running the installer

Example 2-2 shows the command to install the Installation Manager in one step by using the console mode and setting up the preferred practice directories.

Example 2-2   Installing Installation Manager

```
cd /mnt/ITSO_SHARE/IM
./groupinstc -dL /opt/IBM/netcool/IM/IBMIMData -acceptLicense
-installationDirectory /opt/IBM/netcool/IM/InstallationManager/eclipse
Installed com.ibm.cic.agent_1.8.4001.20160217_1716 to the
/opt/IBM/netcool/IM/InstallationManager/eclipse directory.
```

When you run Installation Manager in *group* mode as we did in Example 2-2, you might see the following error when you start Installation Manager, "Locking is not possible in the directory when running in group mode." This error is a known error, and it is described in the following technote:

https://ibm.biz/BdrD7R

Example 2-3 shows the commands that must be executed to avoid the issue that is described in the previous URL.

> **Note:** The issue that is described in the URL was seen in Installation Manager 1.8.4. It is possible that you will not experience the same issue in recent versions of Installation Manager.

Example 2-3   Changing file permissions after the Installation Manager installation

```
# As root:
# --------
```

```
chmod 777
/opt/IBM/netcool/IM/InstallationManager/eclipse/configuration/org.eclipse.osgi/.ma
nager/.fileTableLock

chmod 777
/opt/IBM/netcool/IM/InstallationManager/eclipse/configuration/org.eclipse.core.run
time/.manager/.fileTableLock
chmod 777
/opt/IBM/netcool/IM/InstallationManager/eclipse/configuration/org.eclipse.equinox.
app/.manager/.fileTableLock

chmod -R g+rwx /opt/IBM/netcool/IM/InstallationManager/eclipse/configuration
chgrp -R ncoadmin /opt/IBM/netcool/IM/InstallationManager/eclipse/configuration
```

2.1.4 Verification

To verify the Installation Manager installation, you can try to register repositories in Installation Manager.

Registering the repositories in Installation Manager on each server

We assume that Network File System (NFS) is mounted in the central repository directory on each server, the next step is to launch Installation Manager and register the repositories.

> **Important:** Installation Manager supports several installation modes, such as GUI, Console, Silent, and HTTP. However, not all products support all modes. So, we assume that you have X/vnc setup, or equivalent, and will use the GUI mode.

Follow these steps:

1. Start the Installation Manager GUI by running this command:

   `/opt/IBM/netcool/IM/InstallationManager/eclipse/IBMIM`

2. Select **File → Preferences → Repositories**.

3. Click **Add Repository** to browse for the repository. If the repositories are on the disk or DVD, click **Browse** to locate the `repository.config` file or the `diskTag.inf` file inside the repository that you want to add.

   > **Tip:** If the top-level directory contains both the `repository.config` file and the **groupinst** command, this directory is the Installation Manager installation media. Look for a subdirectory that contains the actual repository.

Figure 2-1 shows an example of a repository that is added to the Installation Manager repositories.
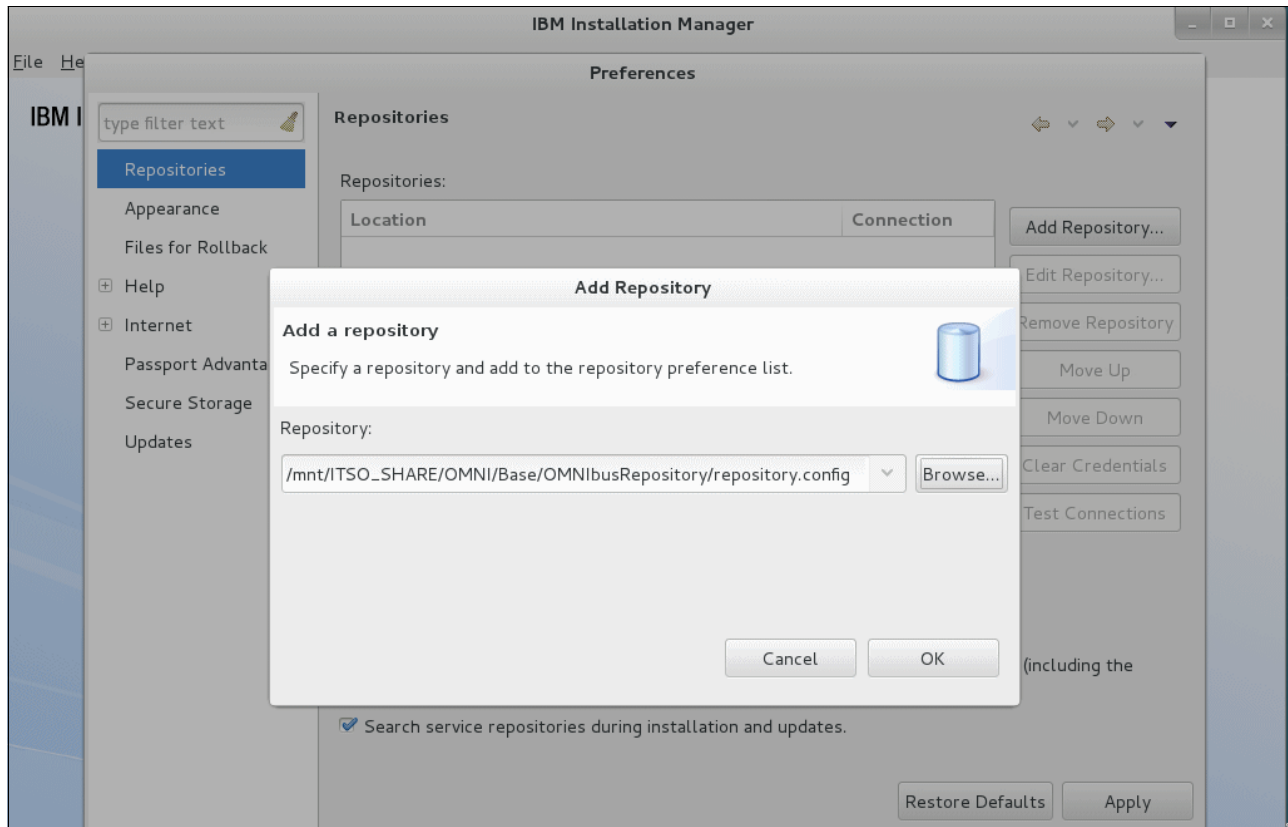

Figure 2-1   Adding a repository in Installation Manager

4. If the repository is available through HTTP, type the URL.

5. For IBM Passport Advantage®, select **File → Preferences → Passport Advantage**. You will need your IBM ID and password.

6. Click **OK** to verify access to the repository. Also, you can click **Test Connections** to check all added repositories.

2.2 IBM DB2

This section describes the installation and basic configuration of IBM DB2 Version 10.5.03.

> **Note:** In this example, we use the DB2 package, `DB2_Svr_10.5.0.3_Linux_x86-64.tar.gz`, which corresponds to the part number CRYY2ML. To download IBM Netcool Operations Insight V1.4, see this website:
>
> `https://ibm.biz/BdrD7y`

2.2.1 Introduction

This environment uses two servers for DB2 for high availability (HA). We describe both the installation and initial setup of DB2 for use in this environment.

For this deployment, we used the settings in Table 2-2.

Table 2-2   Settings for the DB2 installation

Setting	Value
DB2 installation directory	`/opt/ibm/db2/v10.5_03`
DB2 Admin User/password	`dasusr1/object00`
DB2 User/password	`db2inst1/object00`
DB2 Fenced User/password	`db2fenc1/object00`

2.2.2 Check the prerequisites

For this version, the name of the prerequisite check script for DB2 is called **db2prereqcheck**. In our environment, this script is in the `/mnt/ITSO_SHARE/DB2` directory. The script will check for all of the packages that are needed for DB2. Example 2-4 shows how we ran the script.

> **Important:** The script must be run as the `root` user. The DB2 prerequisites tool is in the DB2 installation image.

Example 2-4   db2prereqcheck script

```
# su - root
Password:
[root@DBServ-a server2]# cd /mnt/ITSO_SHARE/DB2
[root@DBServ-a server2]# ls
db2                     db2checkCOL.tar.gz  db2_deinstall  db2ls
db2setup  ibm_im        nlpack
db2checkCOL_readme.txt  db2ckupgrade        db2_install    db2prereqcheck  doc
installFixPack
[root@DBServ-a server2]# ./db2prereqcheck
```

Example 2-5 shows the output of this script.

Example 2-5   db2prereqcheck output

```
Checking DB2 prerequisites for DB2 database version "10.5.0.3" on operating system
"Linux"

Validating "openibd" ...
DBT3564E  The db2prereqcheck utility was unable to find the package "openibd" on
host "DBServ-a".
   ERROR : Requirement not matched.
for some of the few errors as an example:
Install pam.i686 and this will clear a lot of the errors
As for this error:
Validating "openibd" ...
DBT3564E  The db2prereqcheck utility was unable to find the package "openibd" on
host "DBServ-a". ERROR : Requirement not matched
```

```
Ignore it, since this is for Purescale and it is not needed for DB2 installation.
Then, run db2_install.
```

> **Tip:** In the last line of Example 2-5 on page 28, the **db2prereqcheck** output states "Then,
> run db2_install." However, we install DB2 by using **db2setup**, not **db2_install**.

A few required files are missing. DB2 requires the `dapl sg3_utils`, `sg_persist libstdc++`,
`rdma.noarch pam.i686`, and `glibc-utils.x86` files. You can install these files by using the **yum
install** command in Linux.

You need to set the **ulimit** on the operating system as shown in Example 2-6 and in
Example 2-7.

Example 2-6   Setting the ulimit

```
ulimit -n 4096
```

Configuring Linux

You need to disable `SELINUX` in the `/etc/selinux/config` file, as shown in Example 2-7.

Example 2-7   Disable SELINUX

```
vi /etc/selinux/config
SELINUX=disabled
```

Increase the number of open files (Example 2-8).

Example 2-8   Increasing the nofile

```
vi /etc/security/limits.conf
netcool         hard    nofile          1048576
netcool         soft    nofile          1048576
@ncoadmin       hard    nofile          1048576
@ncoadmin       soft    nofile          1048576
```

Increase the number of processes (Example 2-9).

Example 2-9   Increasing nproc

```
vi /etc/security/limits.d/90-nproc.conf
*         soft    nproc     1048576
root      soft    nproc     unlimited
```

> **Note:** Depending on the type of Linux that you use, the nproc configuration can also be in
> `/etc/security/limits.conf`.

2.2.3 Installation and basic configuration

Perform the following steps as the `root` user to install DB2:

1. To start the installation, type **db2setup** from `/mnt/ITSO_SHARE/db2/server`.

Example 2-10 shows the output of this command.

Example 2-10 db2setup command output

```
[root@DBServ-a db2]# cd server/
[root@DBServ-a server]# ls
db2                     db2checkCOL.tar.gz  db2_deinstall  db2ls
db2setup  installFixPack
db2checkCOL_readme.txt  db2ckupgrade        db2_install    db2prereqcheck  ibm_im
nlpack
[root@DBServ-a server]# ./db2setup
DBI1190I  db2setup is preparing the DB2 Setup wizard which will guide
      you through the program setup process. Please wait.
```

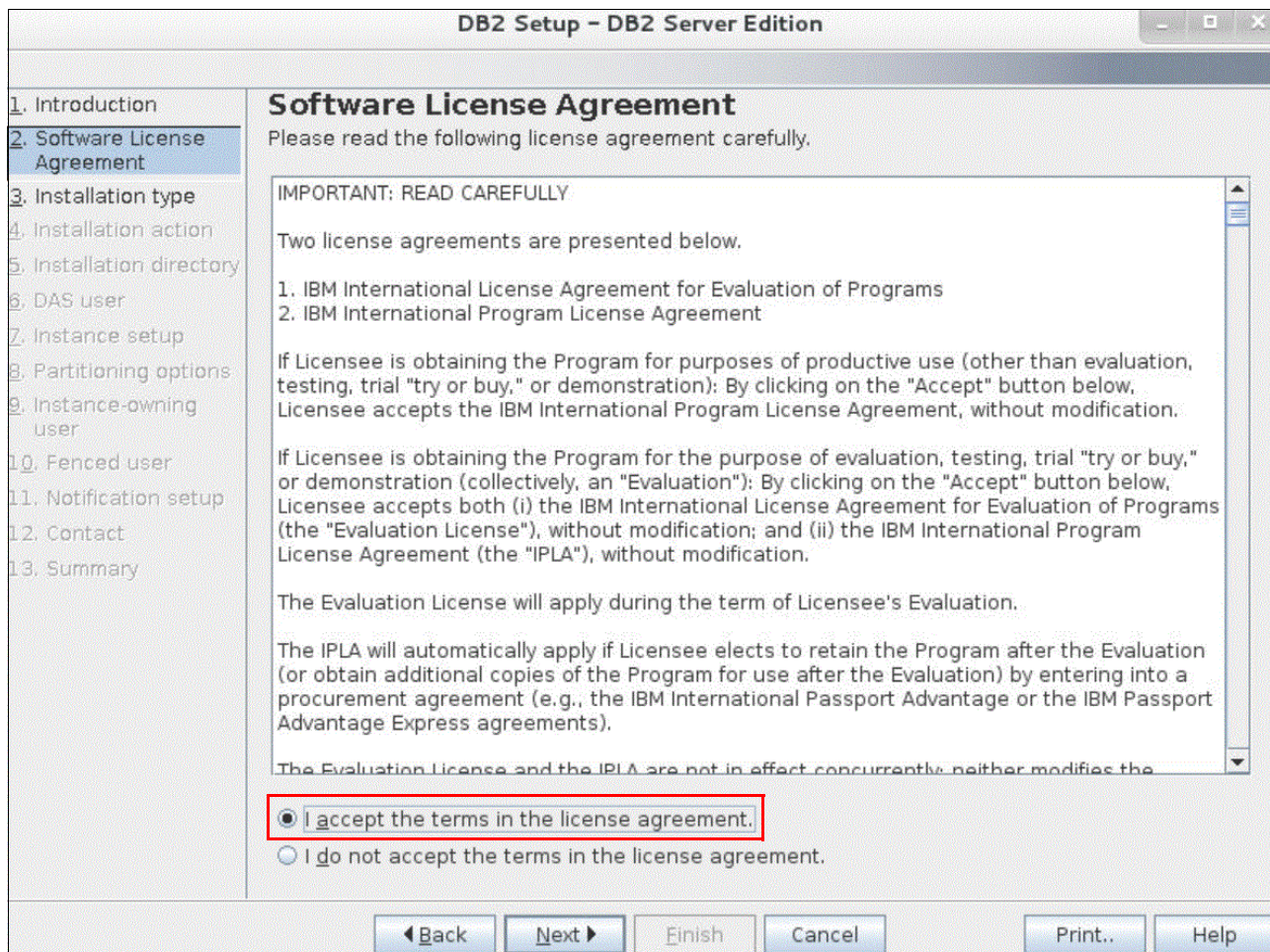2. As shown in Figure 2-2, click **I accept the terms in the license agreement**. Click **Next**.

Figure 2-2 Accept the license agreement

3. Choose the installation type, as shown in Figure 2-3. Click **Typical** and click **Next**.
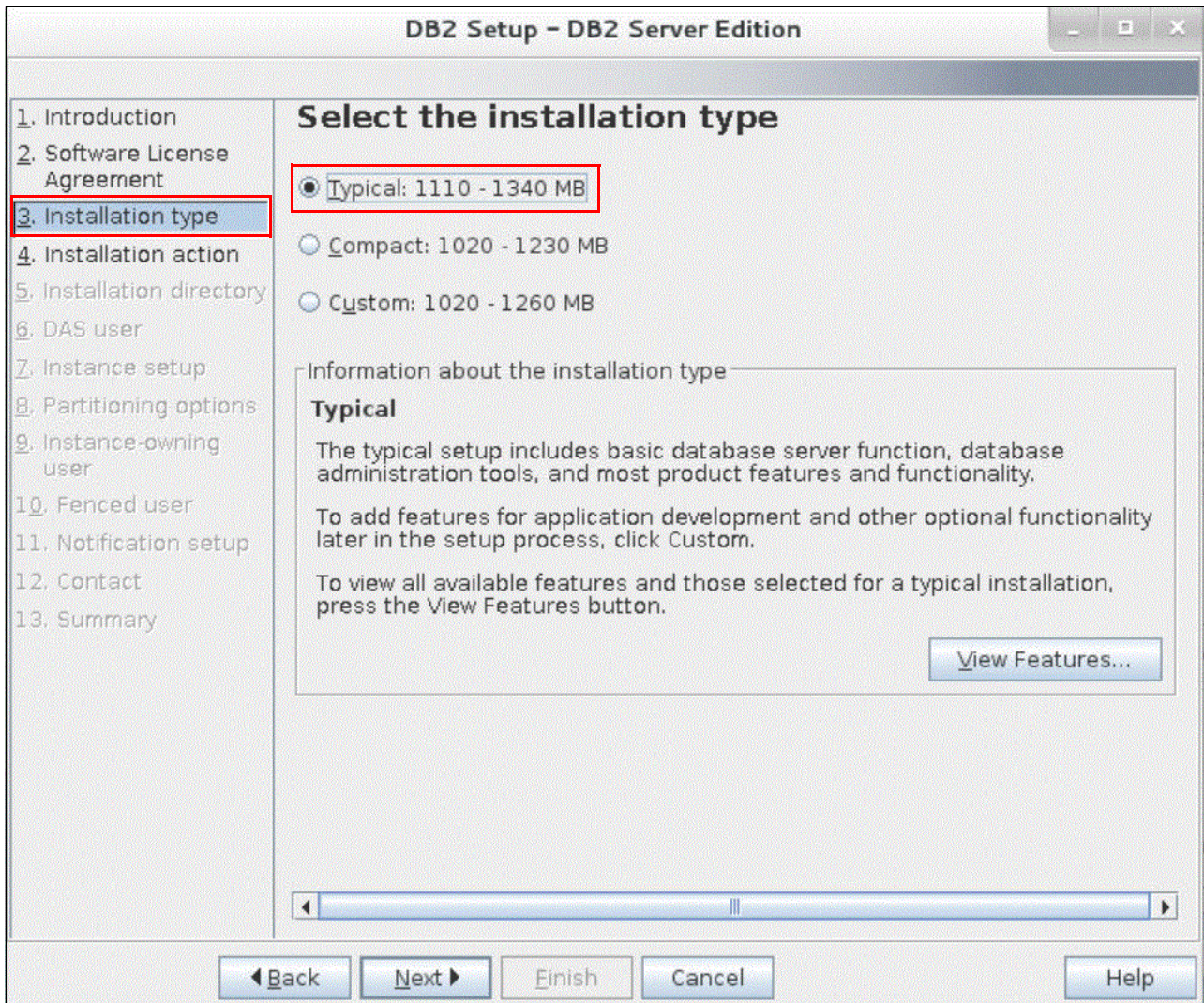

Figure 2-3   Installation type

4. For the installation action, select **Install DB2 Server Edition on this computer** as the product to install, as shown in Figure 2-4. Click **Next**.
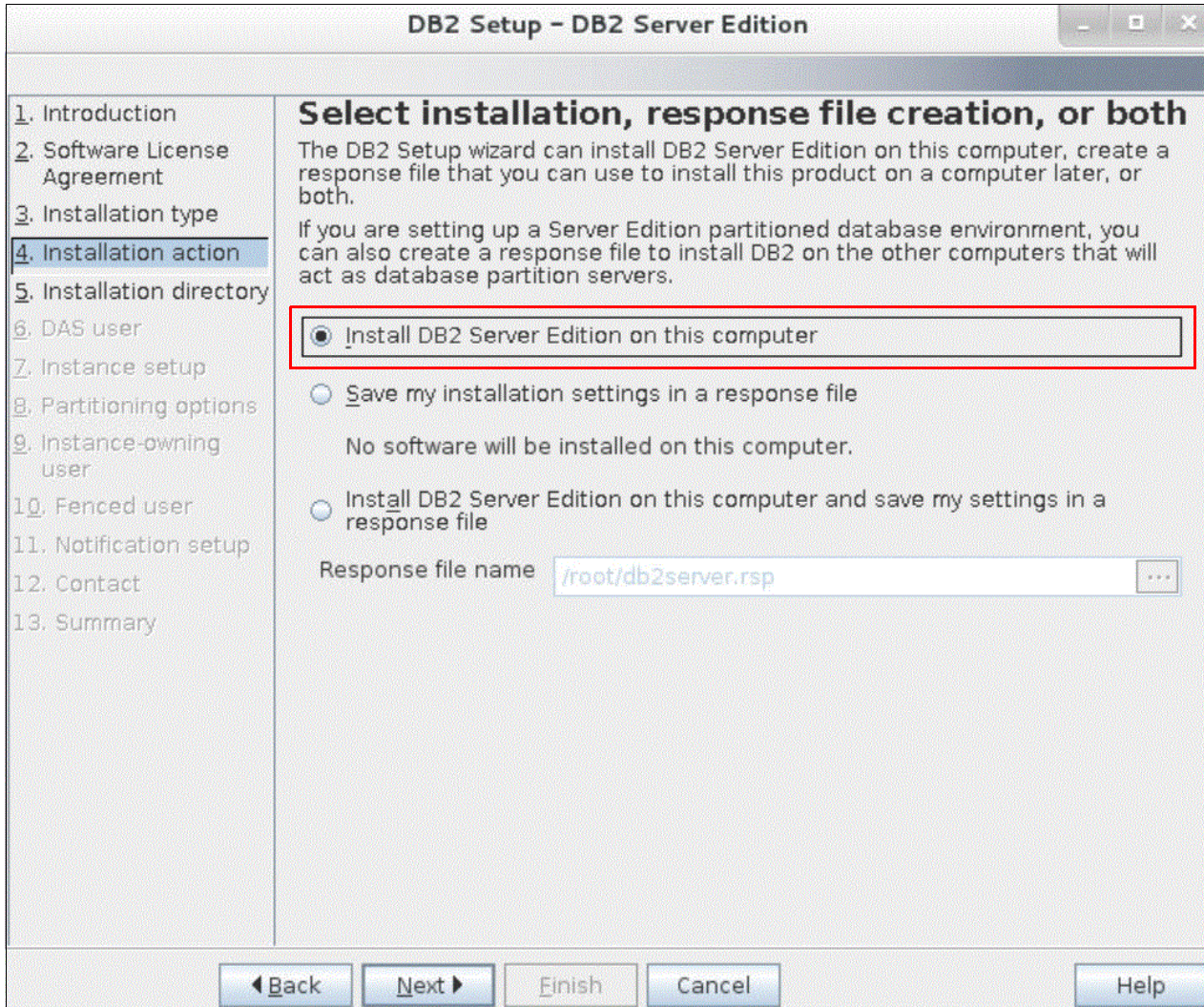

Figure 2-4   Select DB2 Server Edition

5. Choose the installation directory, as shown in Figure 2-5. We chose
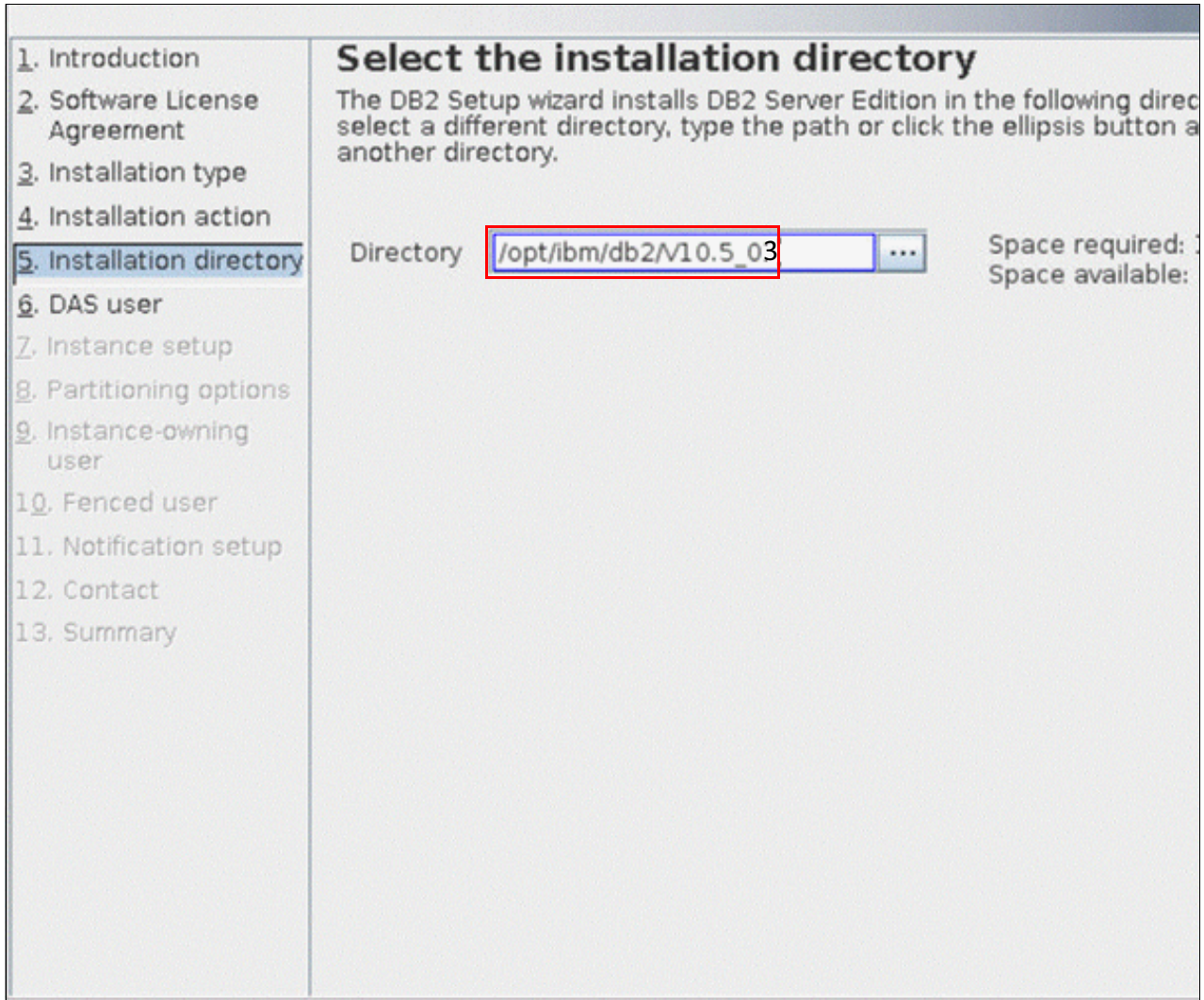   **/opt/ibm/db2/V10.5_03** for our location.

Figure 2-5   Choose the directory

6. Select the user to run the DB2 Administration Server (DAS). See Figure 2-6. The preferred practice is to use the default, which is `dasusr1`. Click **Next**.

Figure 2-6   Create the DB2 administration user

7. For the partitioning options, select **Single partition instance** to create the DB2 instance (Figure 2-7). Click **Next**.
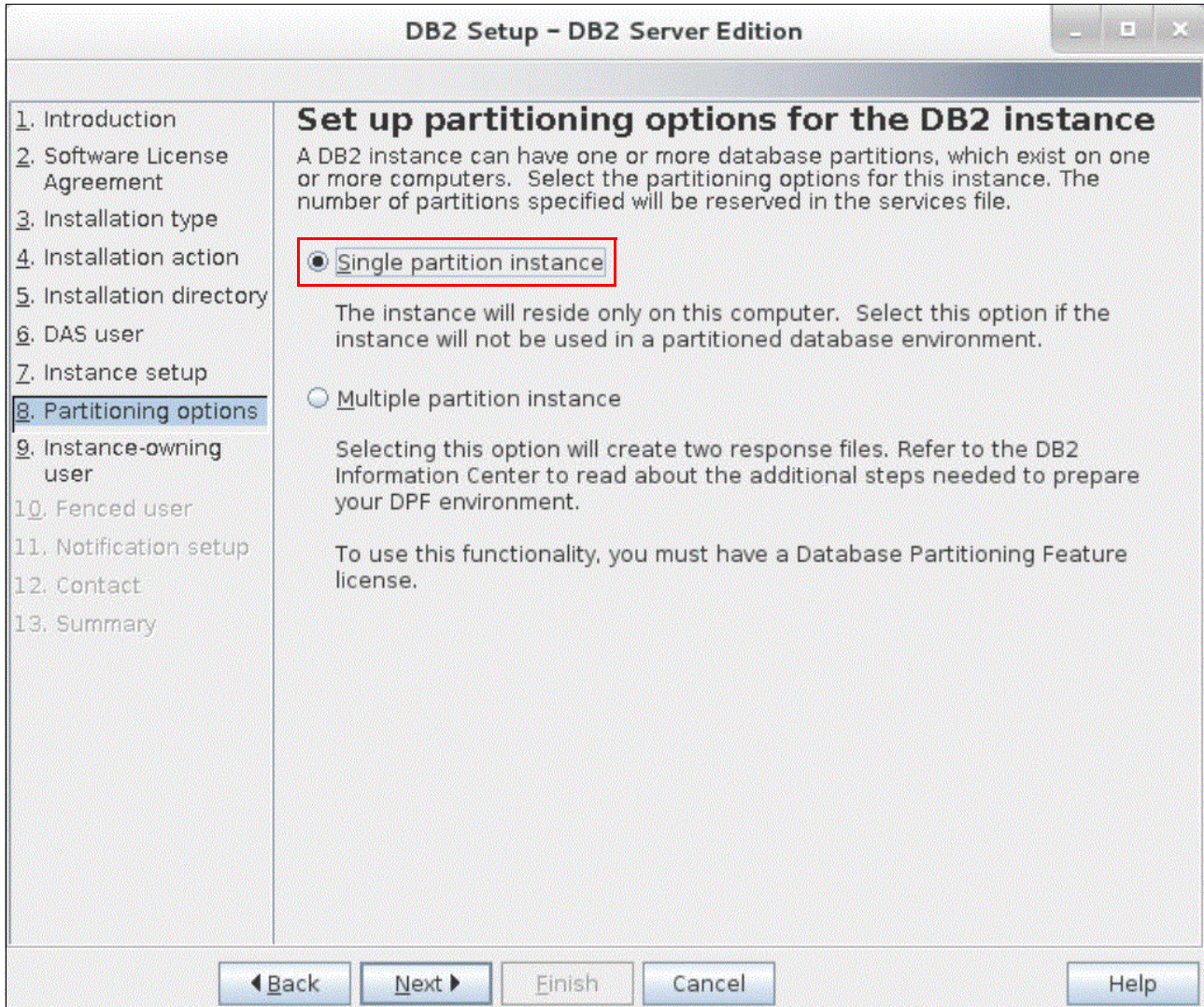

Figure 2-7   Create the instance

8. As shown in Figure 2-8, you enter the password for the user that owns the instance. The default for the DB2 instance is `db2inst1`. Enter the password. Click **Next**.

Figure 2-8   Enter the password for the db2inst1 user

9. Enter the user information for the fenced user. The default is `db2fenc1`. Enter the
    password, as shown in Figure 2-9. Click **Next**.

Figure 2-9   Enter the password

10.The Set up notifications window is shown in Figure 2-10. We do not set up our DB2 server to send notifications in this example. Click **Do not set up your DB2 server to send notifications at this time** (default). Click **Next**.
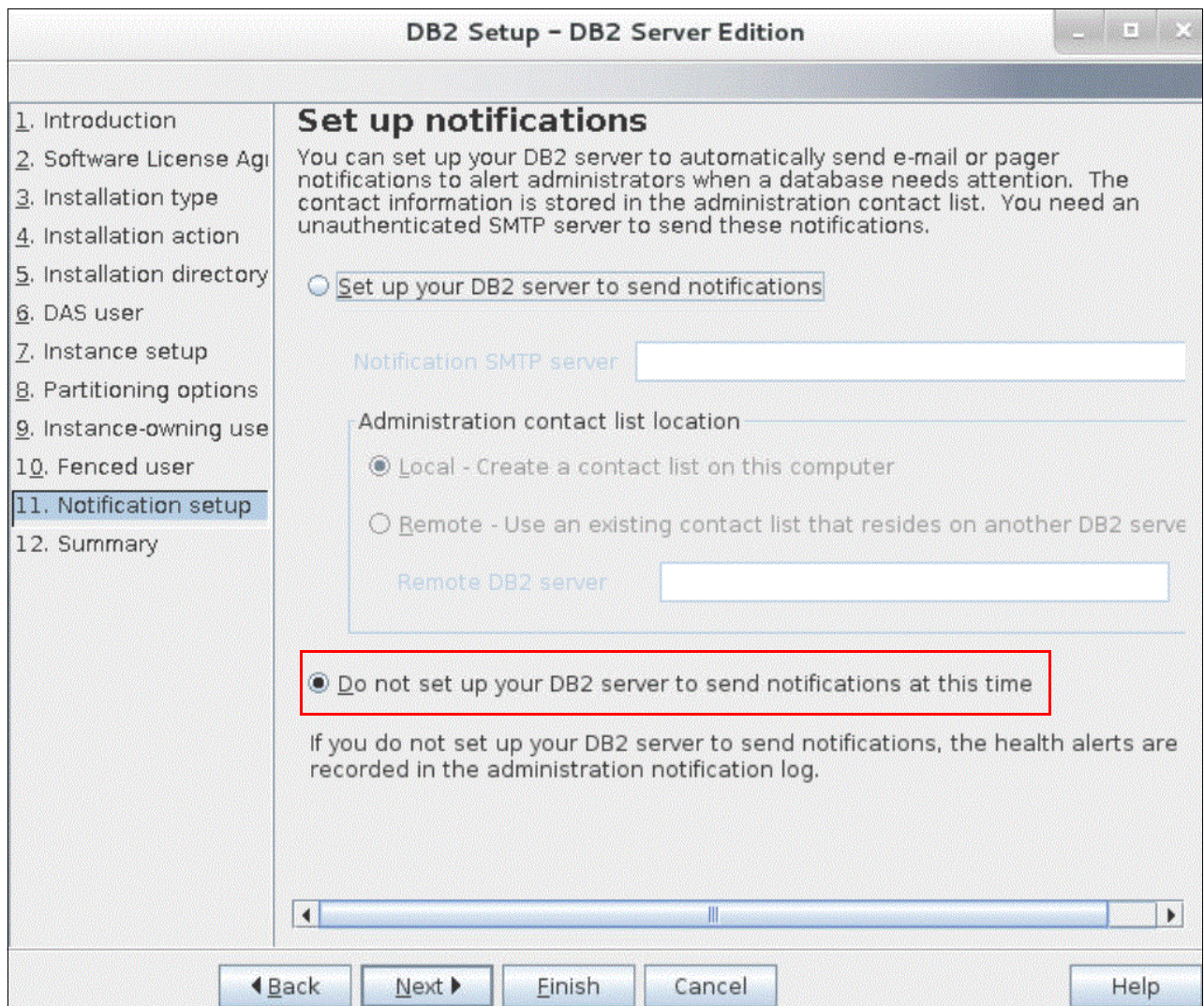
Figure 2-10   Set up notifications window

11. The summary window is shown in Figure 2-11. If you are satisfied with the settings, click **Finish** to start copying files.
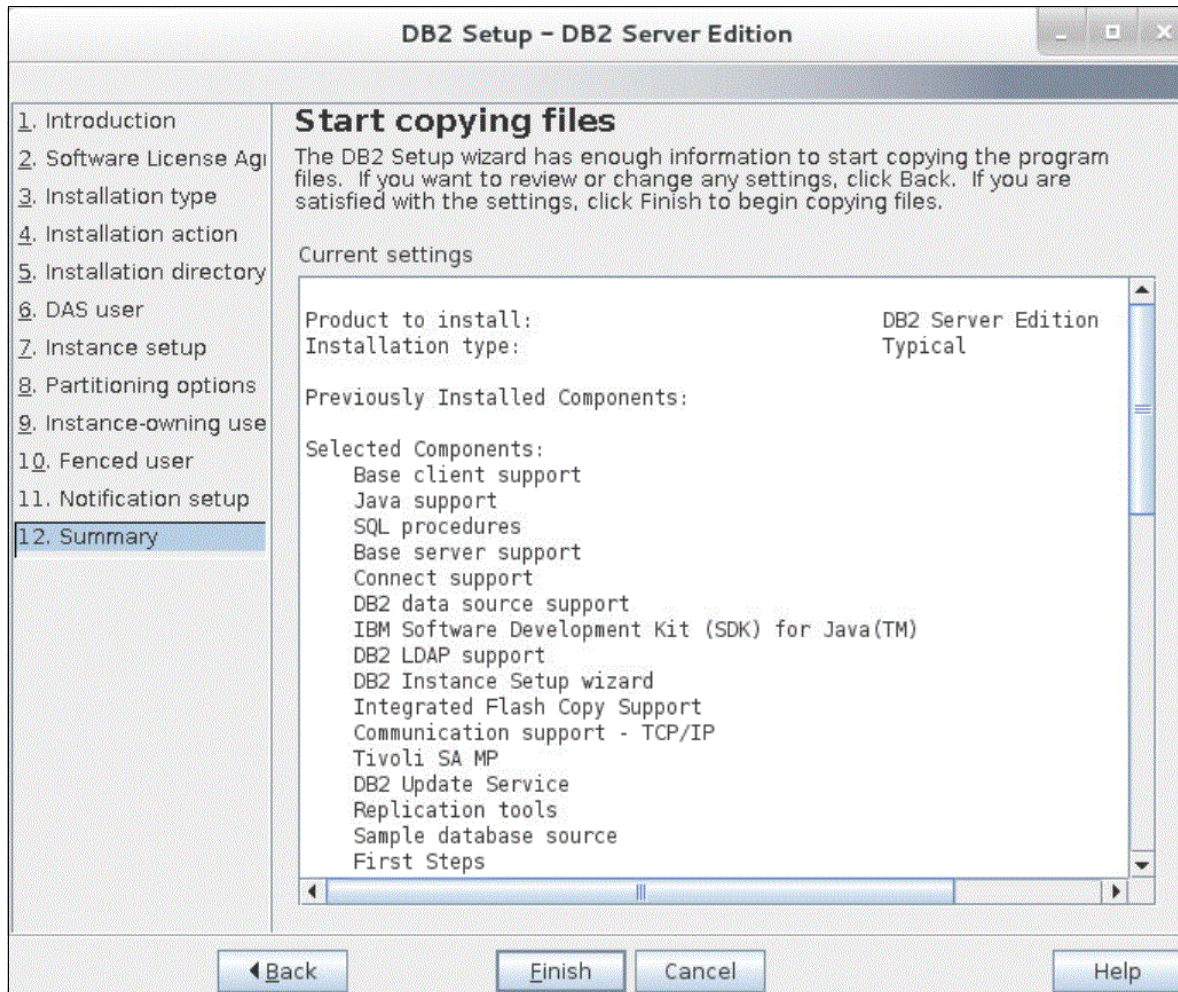
Figure 2-11   Summary page

12.The DB2 installation progress window is displayed. Click **Next**. See Figure 2-12.
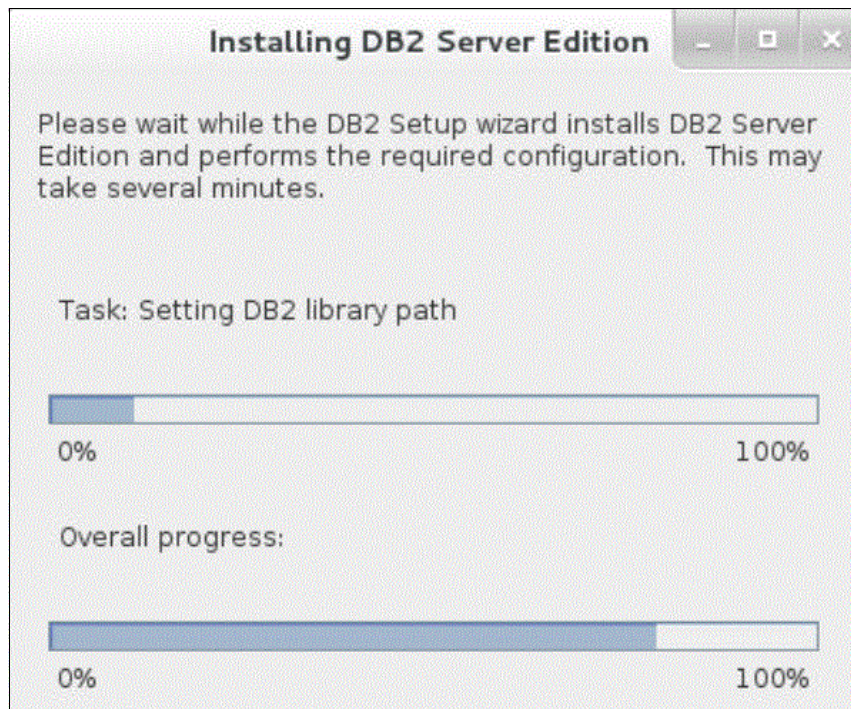
Figure 2-12   Installation progress

13. As shown in Figure 2-13, the installation setup was successful. Click **Finish**.
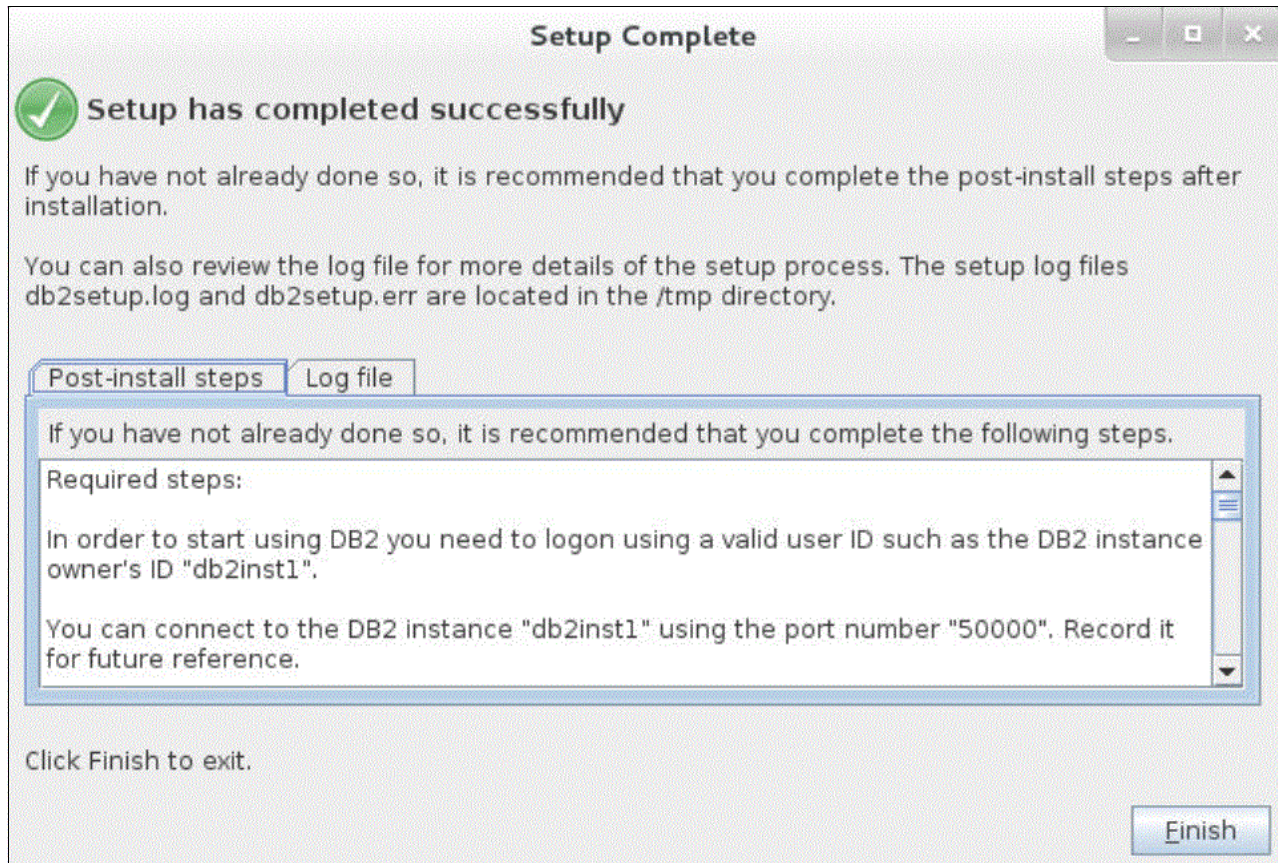
Figure 2-13   Setup complete

2.2.4 Verification

To verify the DB2 installation, as the `db2inst1` user, try to start and stop DB2 with the **db2start** and **db2stop** commands. The path for these commands is `/home/db2inst1/sqllib/adm/`.

2.3 IBM Tivoli Netcool/OMNIbus

This section describes the installation and basic configuration of IBM Tivoli Netcool/OMNIbus (Netcool/OMNIbus or OMNIbus).

2.3.1 Introduction

Netcool/OMNIbus comes with a set of predefined requirements for the operating system. To verify the requirements that are needed for the installation of each Netcool Operations Insight component, we use the IBM Prerequisite Scanner, which is documented at the following website:

`https://ibm.biz/Bdrr5b`

Follow the instructions at the website to download the IBM Prerequisite Scanner. You must download it and extract the files in the package before you can use it.

The IBM Prerequisite Scanner checks the requirements against the installed operating system. (IBM Prerequisite Scanner Version 1.2.0.17 was used in this document.)

For this deployment, the settings in Table 2-3 were used.

Table 2-3   Settings for the OMNIbus installation

Setting	Value
OMNIbus installation directory	/opt/IBM/tivoli/netcool/
OMNIbus Linux User/password	netcool/object00
OMNIbus ObjectServer Admin User/password	root/<no password>
$NCHOME	/opt/IBM/tivoli/netcool/
$OMNIHOME	/opt/IBM/tivoli/netcool/omnibus

2.3.2 Check the prerequisites

The same user who installs the products must run the Prerequisite Scanner. In this case, the user is netcool. Follow these steps to check the prerequisites:

1. Run the **prereq_checker.sh** script for OMNIbus as the user netcool, as shown in Example 2-11.

Example 2-11   Running the prerequisite checker script for OMNIbus

```
[netcool@Omni-A prereq]# ./prereq_checker.sh "NOC 08010000" detail
IBM Prerequisite Scanner
     Version: 1.2.0.17
     Build  : 20150827
     OS name: Linux
  User name: netcool


 Machine Information
 Machine name: Omni-A
 Serial number:  VMware-42 16 c7 bb 11 31 ef 63-35 bc 57 c1 01 c6 cd fb



Scenario: Prerequisite Scan

NOC - Tivoli Netcool/OMNIbus All Components [version 08010000]:
Property                      Result    Found                          Expected
========                      ======    =====                          ========
OS Version                    PASS      Red Hat Enterprise Linux Server rel... AIX V6.1
                                                                        AIX V7.1
                                                                        Solaris V10 (SPARC)
                                                                        Solaris V11.* (SPARC)
                                                                        RedHat Enterprise Linux Server 5.*
                                                                        RedHat Enterprise Linux Server 6.*
                                                                        SRedHat Enterprise Linux Server 7.*
                                                                        SuSE Linux Enterprise Server 11
                                                                        SuSE Linux Enterprise Server 12
CpuArchitecture               PASS      x86_64                         x86_64
Memory                        PASS      4.58GB                         4GB
Disk                          PASS      33792.00MB                     614MB
os.space.imshared             PASS      33792MB                        [dir:root=/opt;non_root=USERHOME]331MB
os.space.imdata               PASS      33792MB                        [dir:root=/var;non_root=USERHOME]2MB
os.package.audit-libs.x86_64  PASS      audit-libs-2.4.1-5.el7.x86_64  audit-libs-2.3.3-4.el7.x86_64+
os.package.expat.x86_64       PASS      expat-2.1.0-8.el7.x86_64       expat-2.1.0-8.el7.x86_64+
os.package.fontconfig.x86_64  PASS      fontconfig-2.10.95-7.el7.x86_64 fontconfig-2.10.95-7.el7.x86_64+
os.package.freetype.x86_64    PASS      freetype-2.4.11-9.el7.x86_64   freetype-2.4.11-9.el7.x86_64+
os.package.glibc.x86_64       PASS      glibc-2.17-78.el7.x86_64       glibc-2.17-55.el7_0.3.x86_64+
os.package.libICE.x86_64      PASS      libICE-1.0.8-7.el7.x86_64      libICE-1.0.8-7.el7.x86_64+
```

```
os.package.libSM.x86_64                PASS    libSM-1.2.1-7.el7.x86_64              libSM-1.2.1-7.el7.x86_64+
os.package.libX11.x86_64               PASS    libX11-1.6.0-2.1.el7.x86_64          libX11-1.6.0-2.1.el7.x86_64+
os.package.libXau.x86_64               PASS    libXau-1.0.8-2.1.el7.x86_64          libXau-1.0.8-2.1.el7.x86_64+
os.package.libXcursor.x86_64           PASS    libXcursor-1.1.14-2.1.el7.x86_64     libXcursor-1.1.14-2.1.el7.x86_64+
os.package.libXext.x86_64              PASS    libXext-1.3.2-2.1.el7.x86_64         libXext-1.3.2-2.1.el7.x86_64+
os.package.libXfixes.x86_64            PASS    libXfixes-5.0.1-2.1.el7.x86_64       libXfixes-5.0.1-2.1.el7.x86_64+
os.package.libXft.x86_64               PASS    libXft-2.3.1-5.1.el7.x86_64          libXft-2.3.1-5.1.el7.x86_64+
os.package.libXi.x86_64                PASS    libXi-1.7.2-2.1.el7.x86_64           libXi-1.7.2-2.1.el7.x86_64+
os.package.libXmu.x86_64               PASS    libXmu-1.1.1-5.1.el7.x86_64          libXmu-1.1.1-5.1.el7.x86_64+
os.package.libXp.x86_64                FAIL    Unavailable                          libXp-1.0.2-2.1.el7.x86_64+
os.package.libXpm.x86_64               PASS    libXpm-3.5.10-5.1.el7.x86_64         libXpm-3.5.10-5.1.el7.x86_64+
os.package.libXrender.x86_64           PASS    libXrender-0.9.8-2.1.el7.x86_64      libXrender-0.9.8-2.1.el7.x86_64+
os.package.libXt.x86_64                PASS    libXt-1.1.4-6.1.el7.x86_64           libXt-1.1.4-6.1.el7.x86_64+
os.package.libXtst.x86_64              PASS    libXtst-1.2.2-2.1.el7.x86_64         libXtst-1.2.2-2.1.el7.x86_64+
os.package.libgcc.x86_64               PASS    libgcc-4.8.3-9.el7.x86_64            libgcc-4.8.2-16.el7.x86_64+
os.package.libidn.x86_64               PASS    libidn-1.28-3.el7.x86_64             libidn-1.28-3.el7.x86_64+
os.package.libjpeg-turbo.x86_64        PASS    libjpeg-turbo-1.2.90-5.el7.x86_64    libjpeg-turbo-1.2.90-5.el7.x86_64+
os.package.libpng12.x86_64             FAIL    Unavailable                          libpng12-1.2.50-6.el7.x86_64+
os.package.libstdc++.x86_64            PASS    libstdc++-4.8.3-9.el7.x86_64         libstdc++-4.8.2-16.el7.x86_64+
os.package.libuuid.x86_64              PASS    libuuid-2.23.2-21.el7.x86_64         libuuid-2.23.2-16.el7.x86_64+
os.package.libxcb.x86_64               PASS    libxcb-1.9-5.el7.x86_64              libxcb-1.9-5.el7.x86_64+
os.package.motif.x86_64                FAIL    Unavailable                          motif-2.3.4-7.el7.x86_64+
os.package.nss-softokn-freebl.x86_64 PASS      nss-softokn-freebl-3.16.2.3-9.el7.x...  nss-softokn-freebl-3.15.4-2.el7.x86_64+
os.package.pam.x86_64                  PASS    pam-1.1.8-12.el7.x86_64              pam-1.1.8-9.el7.x86_64+
os.package.zlib.x86_64                 PASS    zlib-1.2.7-13.el7.x86_64             zlib-1.2.7-13.el7.x86_64+
os.package.gtk2.x86_64                 PASS    gtk2-2.24.22-5.el7_0.1.x86_64        gtk2-2.24.22-5.el7.x86_64+

Aggregated Properties for Scanned Products:
Property                          Result   Found                         Expected
========                          ======   =====                         ========
/                                 PASS     33792.00MB                    947MB
Memory                            PASS     4.58GB                        4.00GB

Overall result:   FAIL  (NOC 08010000: FAIL)

Detailed results are also available in /tmp/prereq/result.txt
```

2. Install each of the missing packages until you get the overall result of PASS. Example 2-12 shows how to fix this problem in a Linux environment.

Example 2-12   Installing missing packages

```
[root@Omni-A prereq]# yum install libXp.x86_64 libpng12.x86_64 motif.x86_64
```

3. After you install the missing packages and fix any other errors, rerun the prerequisite checker script.

4. After all of the prerequisites are fulfilled, the following message is shown at the end of the script's execution:

```
Overall result:   PASS  (NOC 08010000: PASS)
```

2.3.3 Installation and basic configuration

This section describes the OMNIbus installation and the initial configuration of the high-availability, three-tiered architecture that we will use in our environment. During the following installation, the user netcool was used unless another user is specified.

Installing OMNIbus

Perform the following steps on all servers with an OMNIbus component:

1. Use the following command to start the Installation Manager that was installed in 2.1, "Installation Manager" on page 24 (Example 2-13).

Example 2-13   Starting the Installation Manager

```
cd /opt/IBM/netcool/IM/InstallationManager/eclipse
./IBMIM
```

Figure 2-14 shows the installation Manager GUI.
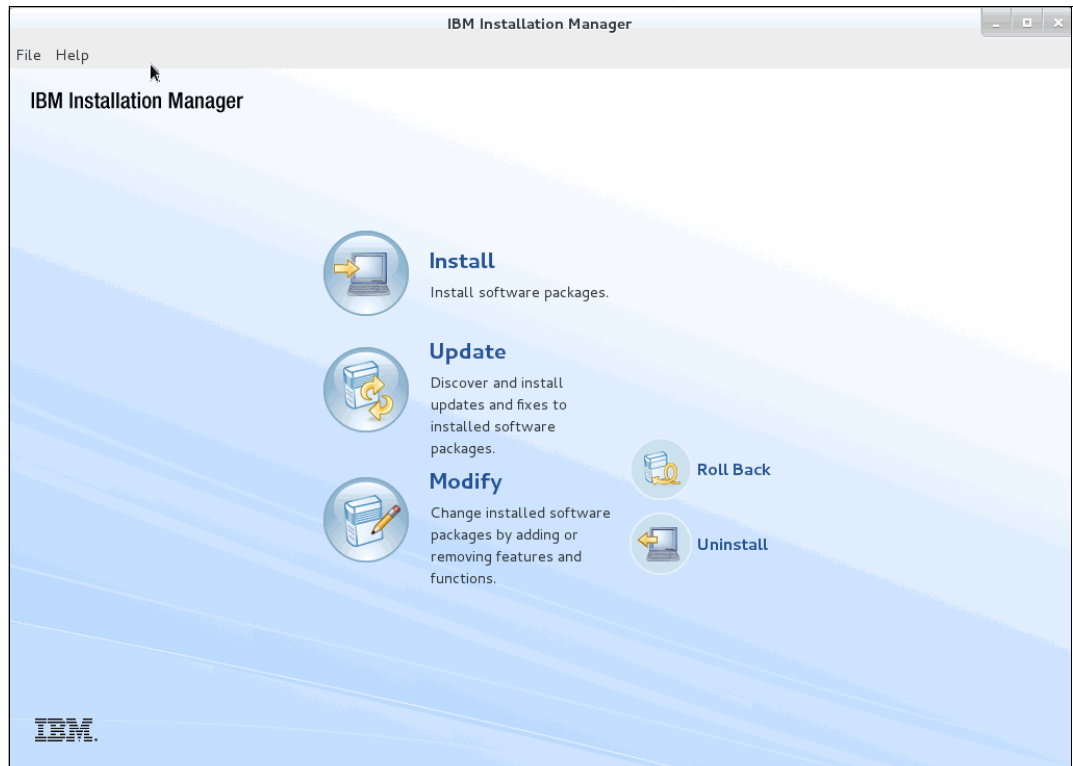
Figure 2-14   Installation Manager GUI

2. Add all of the ObjectServer repositories by using **File** → **Preferences** → **Repositories**. Browse for and select a repository name on the Add Repository window to add to the repository preference list. Click **OK**. See Figure 2-15.
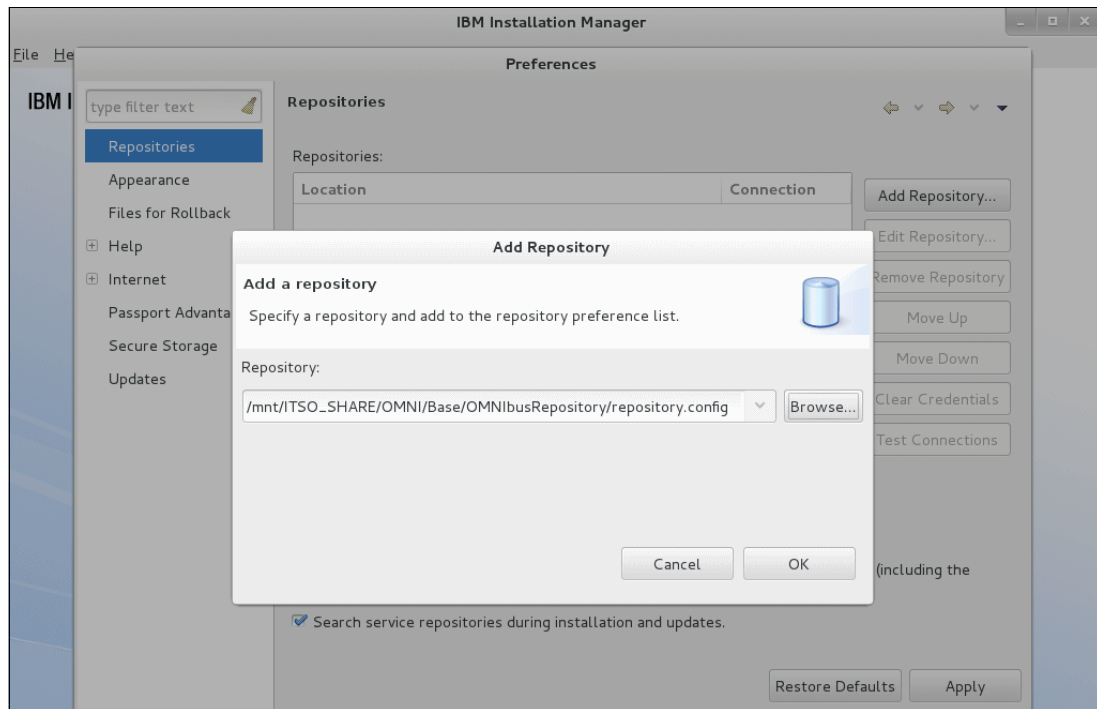

Figure 2-15   Add one repository

3. As shown in Table 2-4, add multiple repositories that are included in the following source files:
   - `OMNIbus-v8.1.0.5-Core.linux64.zip`, which is the core package for OMNIbus, including Fix Pack 5 (FP5)
   - `8.1.0-TIV-OMNIbusCore-linux-x86_64-FP0007.zip`, which is Fix Pack 7 (FP7)

Table 2-4   Installation repositories

Installation file	Repository directory
`OMNIbus-v8.1.0.5-Core.linux64.zip`	`<EXTRACTED_DIR>/Base/OMNIbusRepository`
`8.1.0-TIV-OMNIbusCore-linux-x86_64-FP0007.zip`	`<EXTRACTED_DIR>/OMNIbusRepository/composite`

4. Two options are available for this installation:
   - You can add all of the repositories together and run the installation. This approach installs OMNIbus Core plus FP5 and FP7 in a single execution of the Installation Manager.
   - You can install OMNIbus Core plus FP5 first and then use the update process to install FP7.

> **Note:** For the next few steps, until step 8 of this procedure, OMNIbus Core plus FP5 was installed in advance. Therefore, the window captures show only the steps to upgrade to FP7 because they are similar to the clean installation.

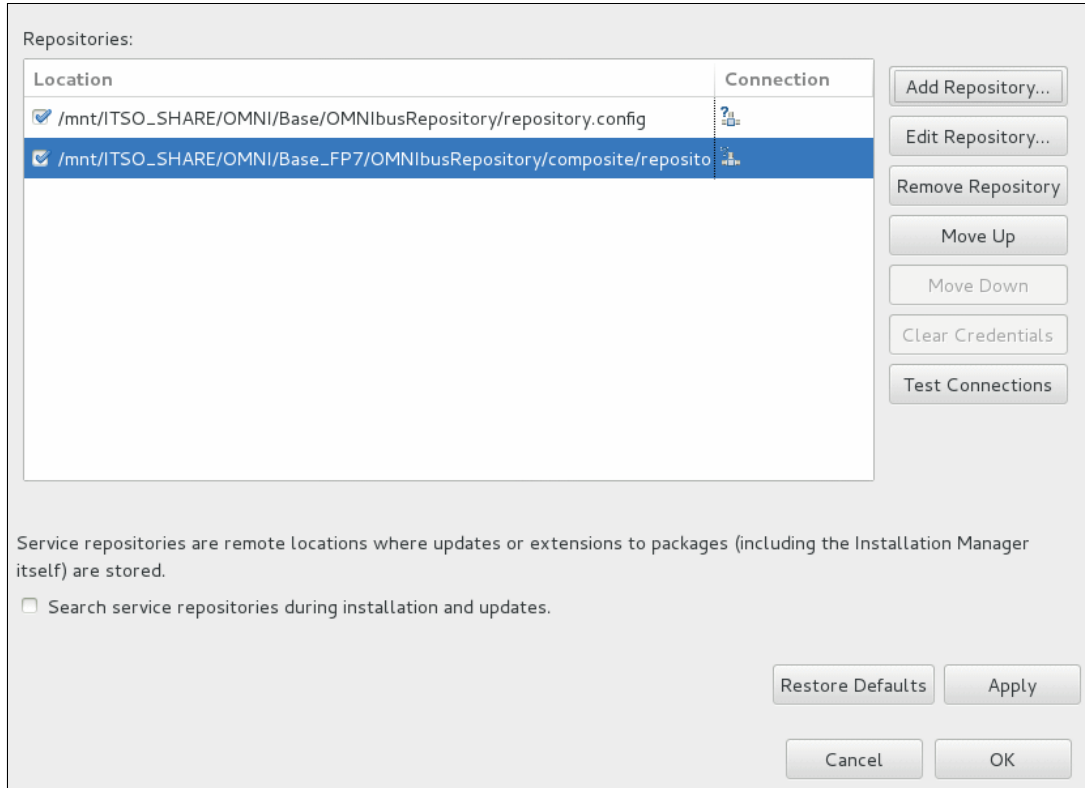5. Figure 2-16 shows the OMNIbus repositories. Click **OK**.

Figure 2-16   OMNIbus repositories

6. In the main Installation Manager window, because OMNIbus Core plus FP5 was installed in advance, click **Update** (Figure 2-14 on page 44). For the initial installation of OMNIbus Core plus FP5, we selected **Install** on this step.

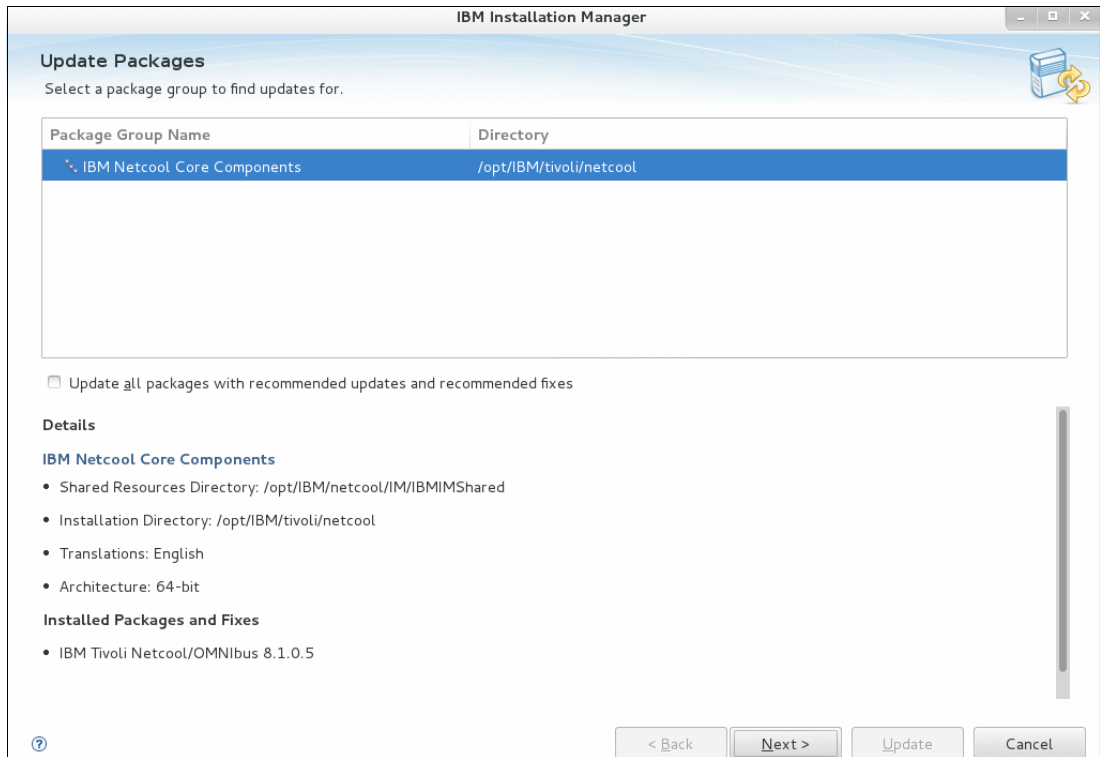7. Start the installation (Figure 2-17). Click **Next**.

Figure 2-17   Installation packages

8. Click **I accept the terms of the license agreement**. Click **Next**.

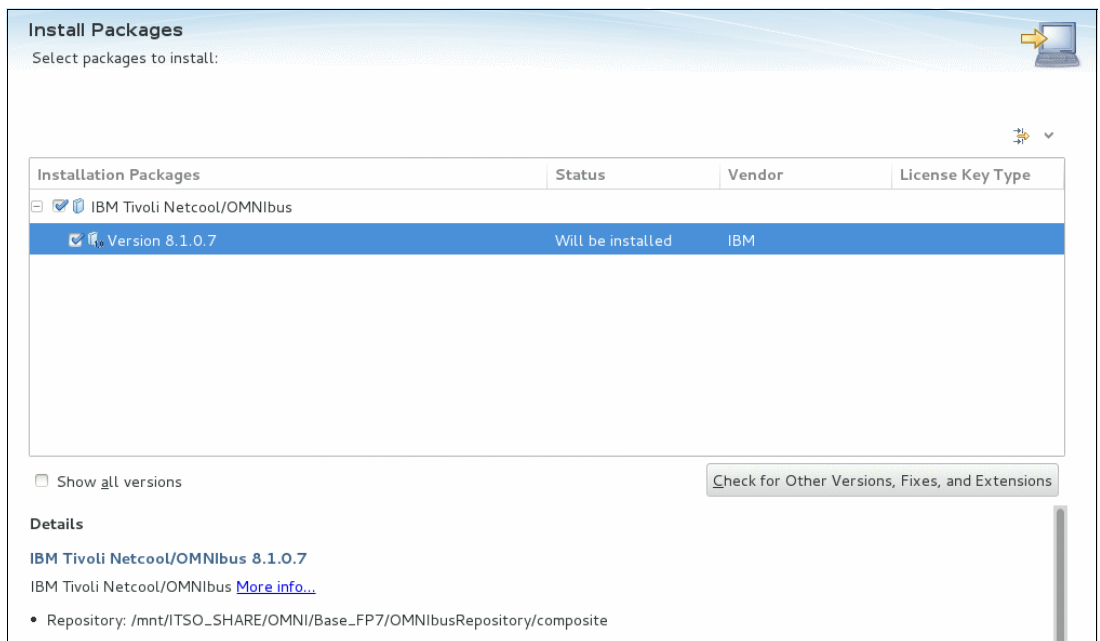9. Select **Version 8.1.0.7** (Figure 2-18) and click **Next**.

Figure 2-18   Selecting the packages

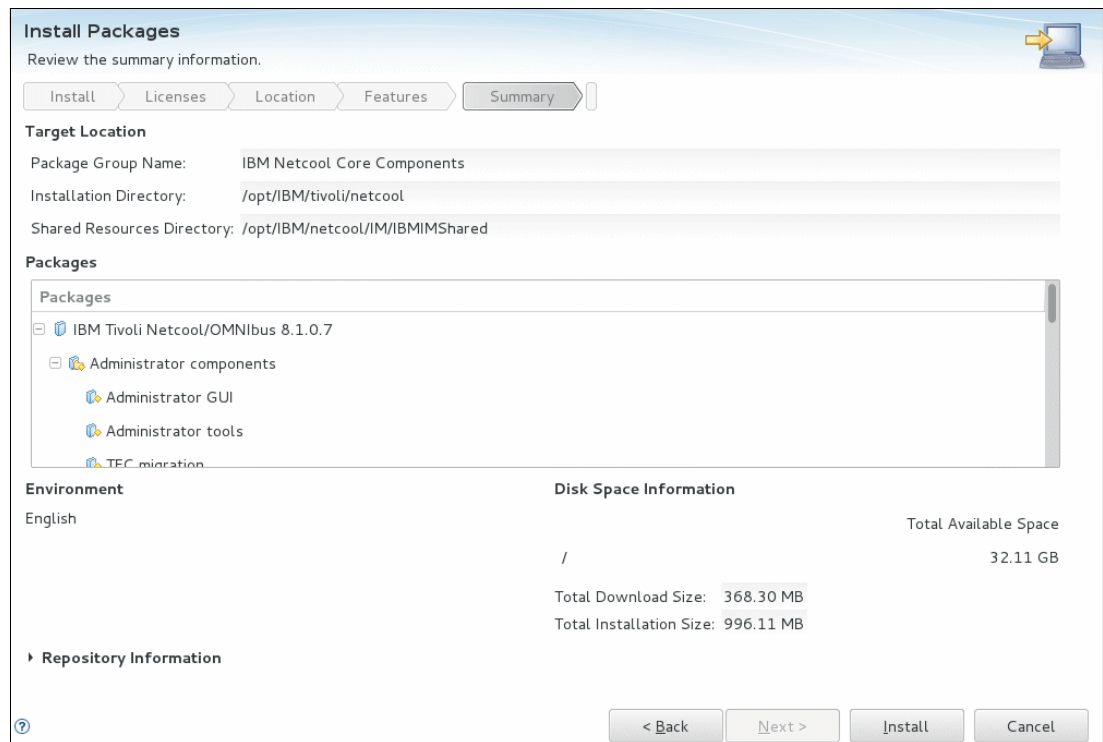10.Review the Summary information and click **Install** (Figure 2-19).

Figure 2-19   Summary window

11. When the installation is complete, review the information. If you did not perform the initial OMNIbus configuration, configure it now. In this case, select **Netcool/OMNIbus Initial Configuration Wizard**, and click **Finish** (Figure 2-20).

> **Netcool/OMNIbus Initial Configuration Wizard option:** This important feature was recently added to Netcool Operations Insight. It saves significant initial configuration effort.
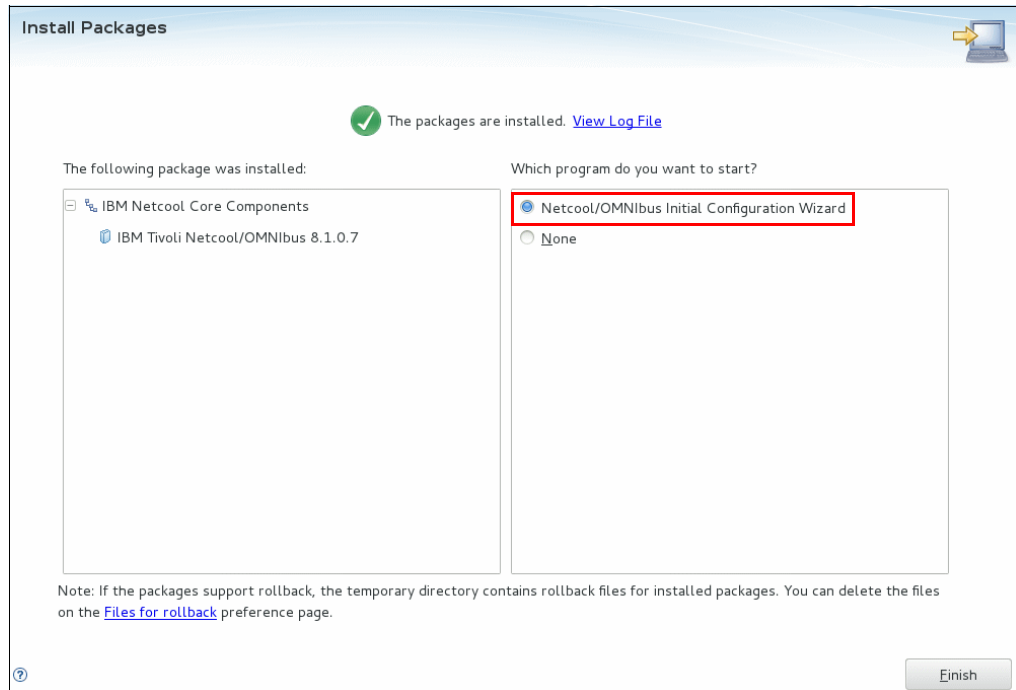

Figure 2-20   Packages that were installed

Initial configuration

If you selected Netcool/OMNIbus Initial Configuration Wizard and clicked Finish in Figure 2-20 on page 49, the Initial Configuration Wizard opens (Figure 2-21).

Perform these steps:

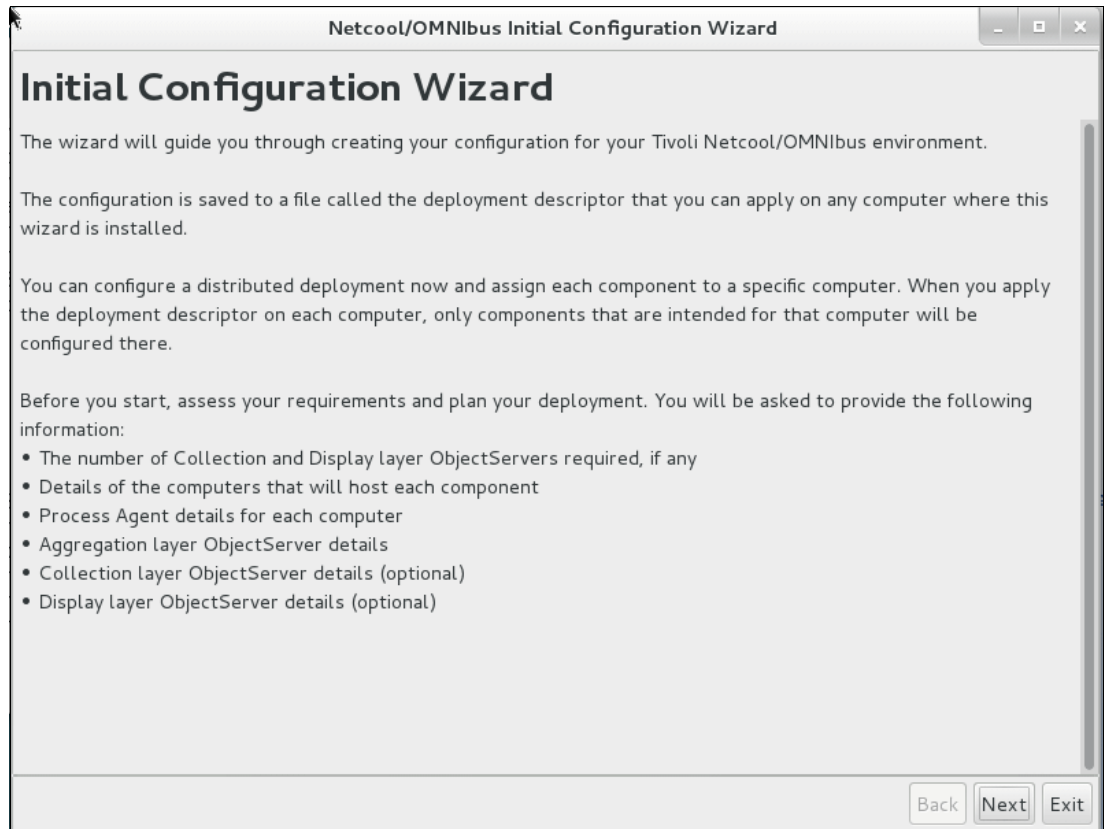1. Click **Next** to start the basic configuration of OMNIbus.

Figure 2-21   Initial Configuration Wizard

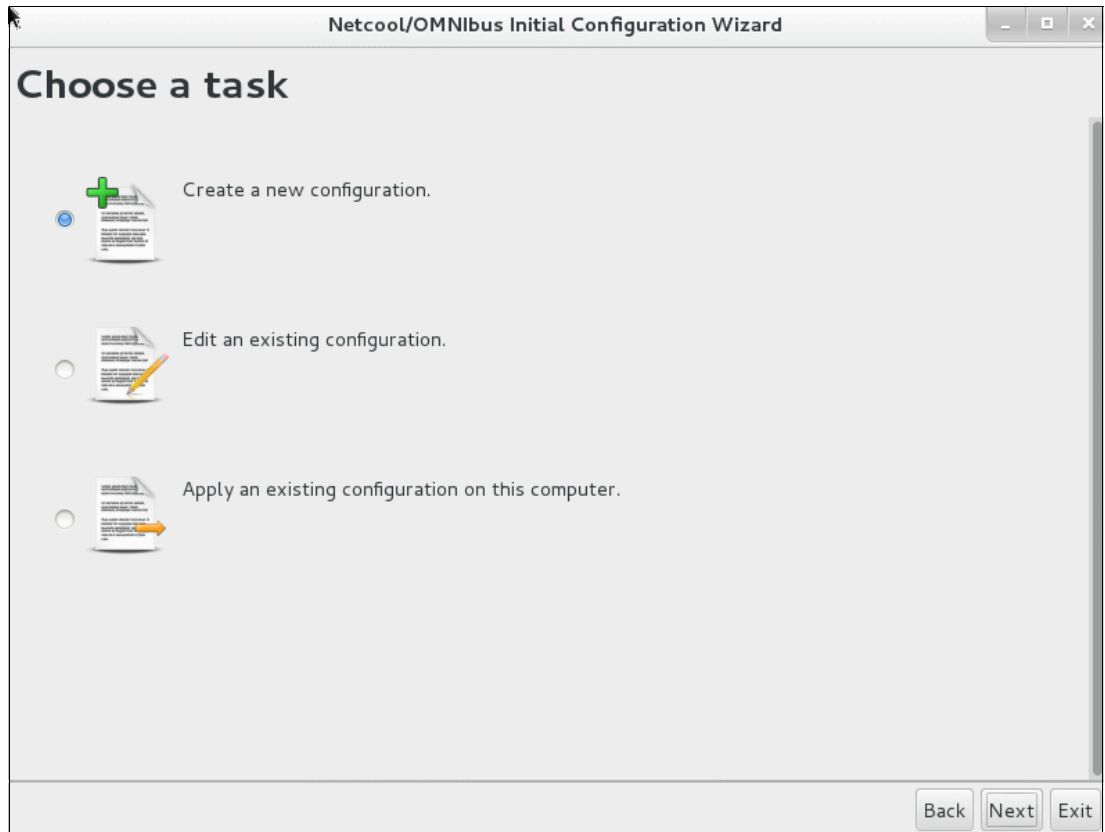2. Select **Create a new configuration** and click **Next** (Figure 2-22).

Figure 2-22   Create a new configuration

3. For the multitiered architecture that we are building, follow these steps (Figure 2-23):

    a. Check **Aggregation backup**.
    b. Set the Primary Collection ObjectServer to **1**.
    c. Check **Collection backup**.
    d. Set the Display ObjectServers to **2**.
    e. Click **Next**.

> **Note:** For more information about the multitiered environment, see the following link:
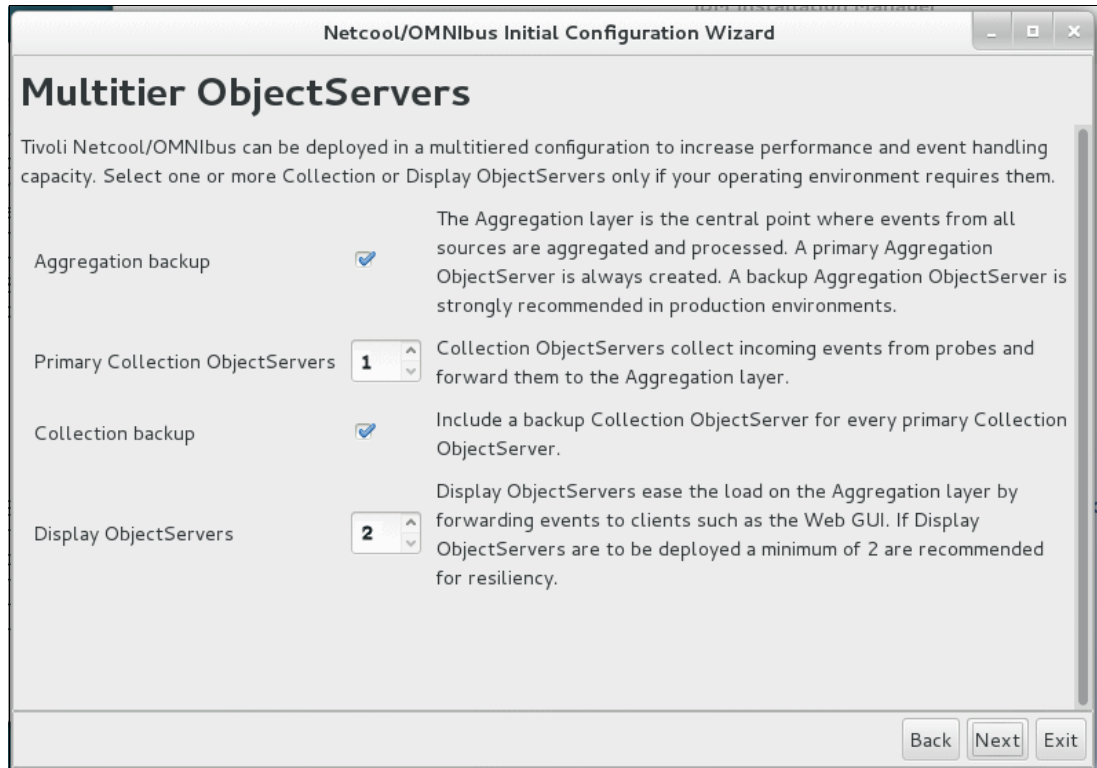>
> https://ibm.biz/BdrRn4

Figure 2-23   Configuring a multitiered environment

4. Add the fully qualified domain name (FQDN) host name of the primary OMNIbus and the NCHOME directory and click **Add**. Add the same information for the secondary OMNIbus server. Click **Next** (Figure 2-24).
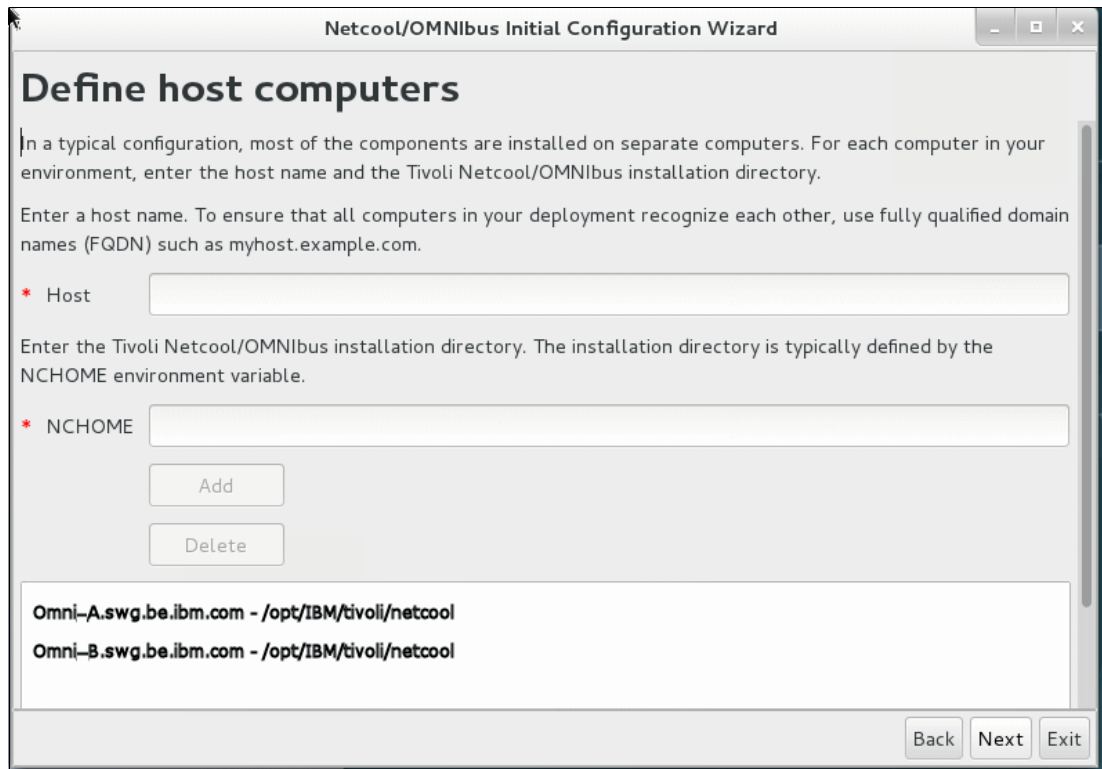

Figure 2-24   Defining host computers

5. Enter the settings for the Process Agent and click **Next** (Figure 2-25).
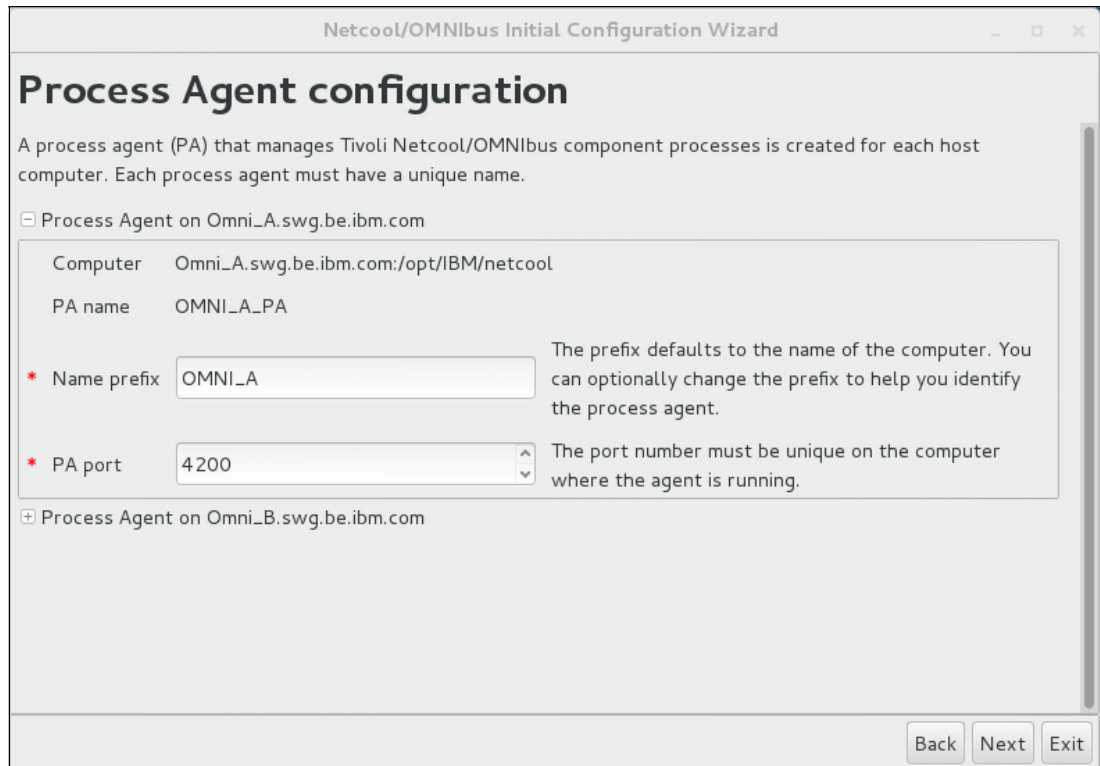

Figure 2-25   Process agent settings

6. Enter the settings for the Aggregation layer and click **Next** (Figure 2-26).

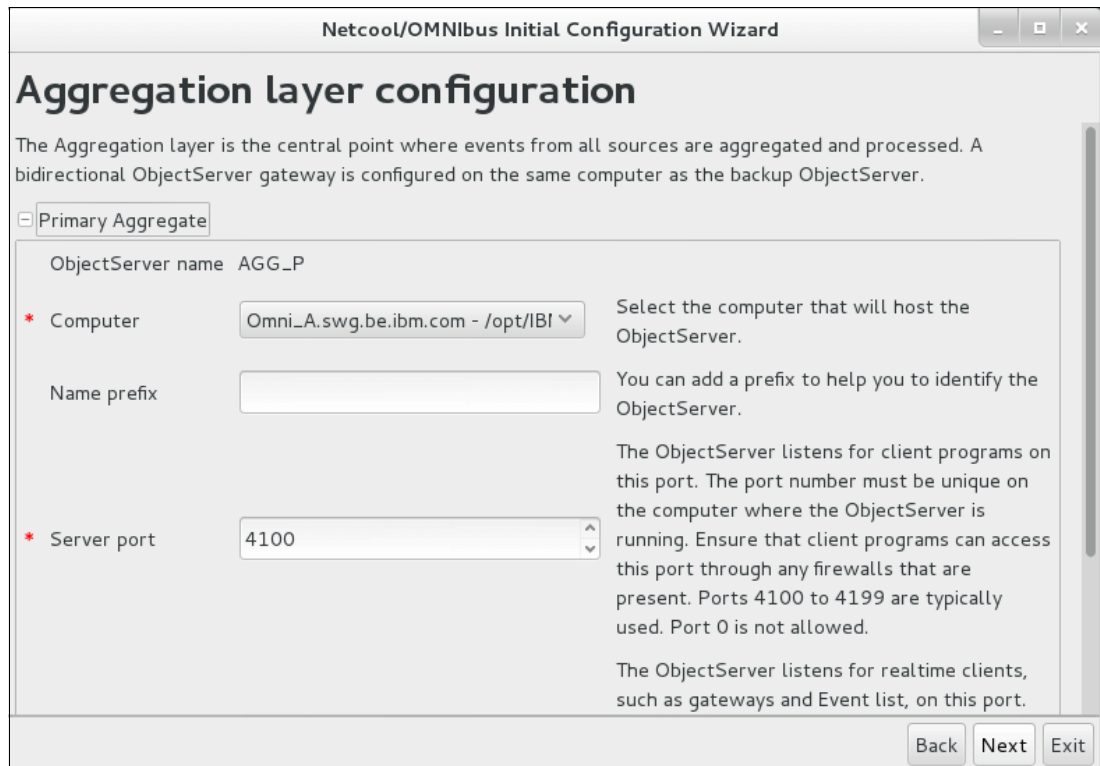*Figure 2-26   Aggregation layer configuration*

7. Enter the settings for the Collection layer and click **Next** (Figure 2-27).

Figure 2-27   Collection layer configuration

8. Continue the configuration of the other layers and gateways. In the Configuration summary window, confirm that all of the settings are configured and click **Next** (Figure 2-28).
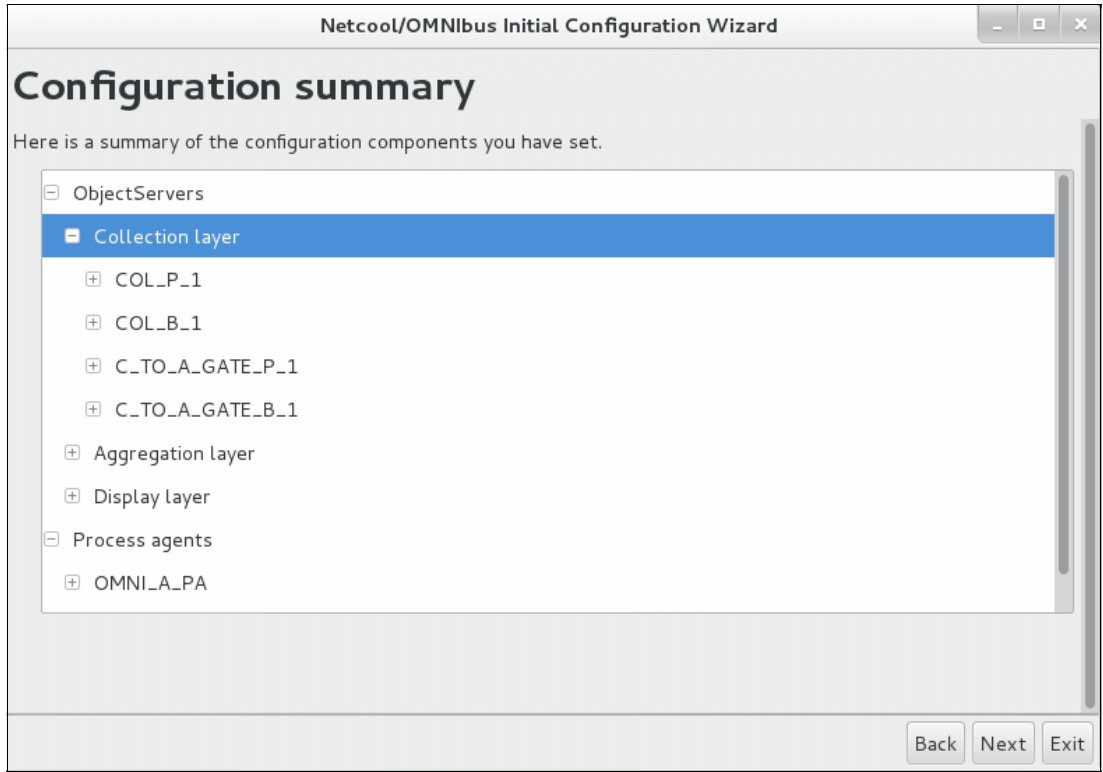

Figure 2-28   Configuration summary

9. Review the Save configuration window. We will import the descriptor and the instruction files to the Backup OMNIbus server. Click **Next** (Figure 2-29).
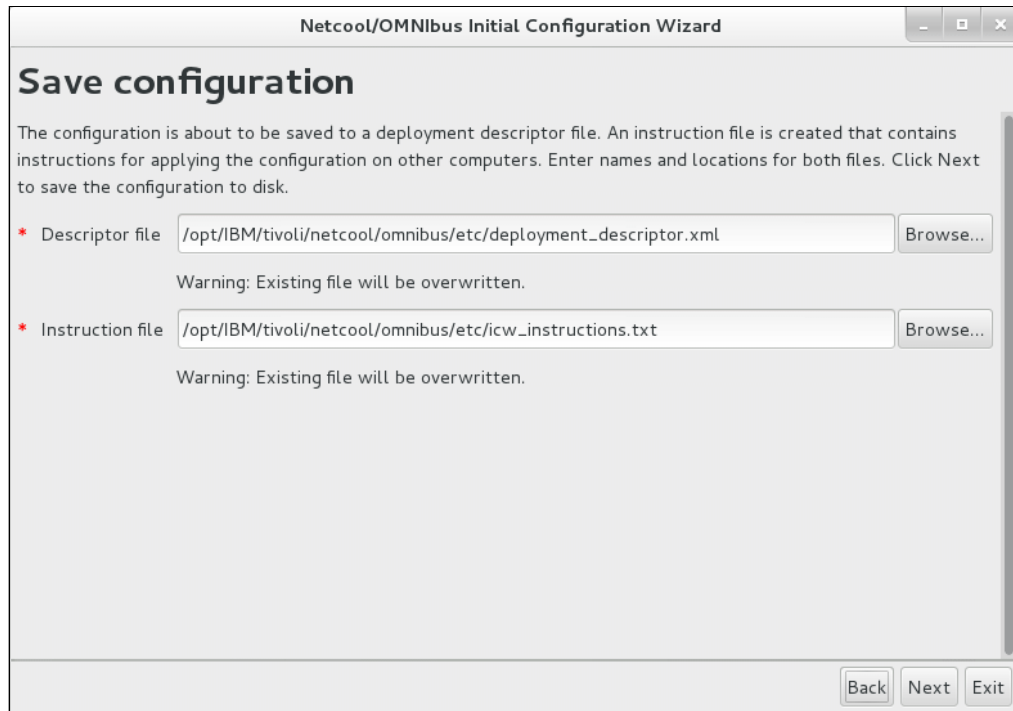
Figure 2-29   Save the configuration

10. Review the "Apply the configuration" window and click **Next** (Figure 2-30).
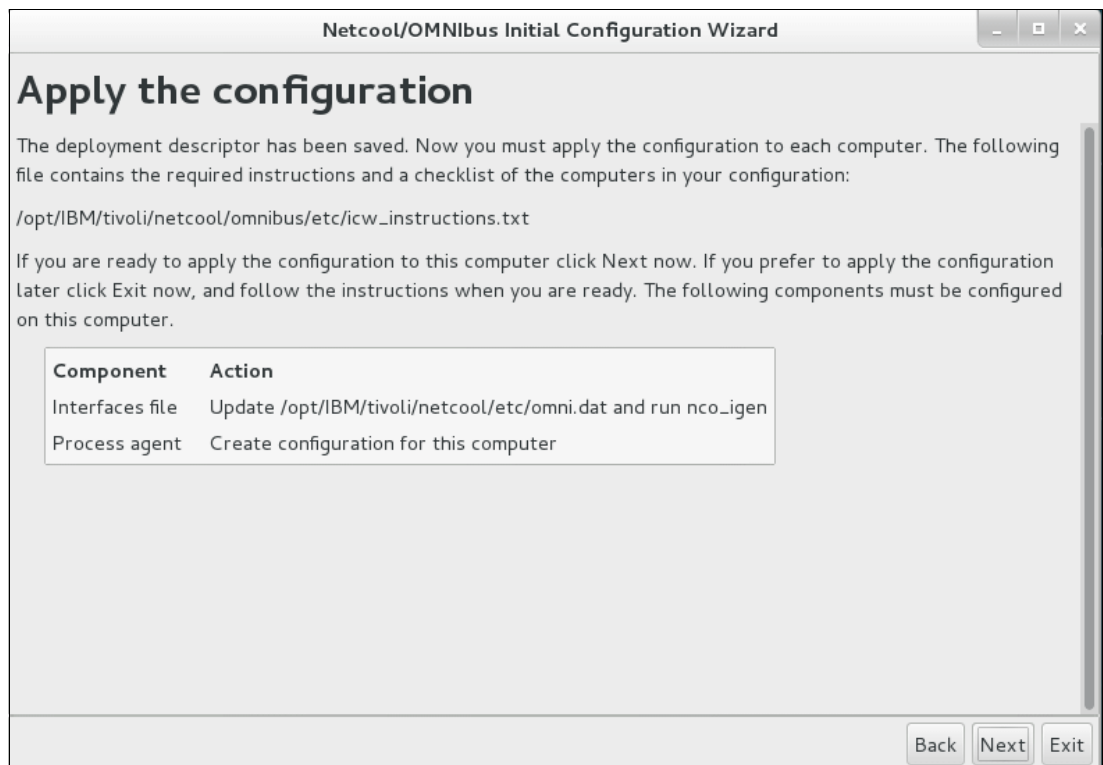
Figure 2-30   Apply the configuration

The installation and basic configuration of OMNIbus are complete.

Follow these steps to install and configure the Backup OMNIbus server, Omni-B:

1. After you complete the steps in the Primary OMNIbus server, you must install and configure the Backup OMNIbus server, Omni-B. Repeat the steps of the "Installing OMNIbus" on page 44. When you are ready to perform the basic configuration ("Initial configuration" on page 50), instead of selecting "Create a new configuration", select **Apply an existing configuration in this computer**.

2. Ensure that the `deployment_descriptor.xml` file is copied from the Primary OMNIbus server to the Backup OMNIbus server. Click **Next** (Figure 2-31), and browse to locate the XML file in the Backup OMNIbus server.
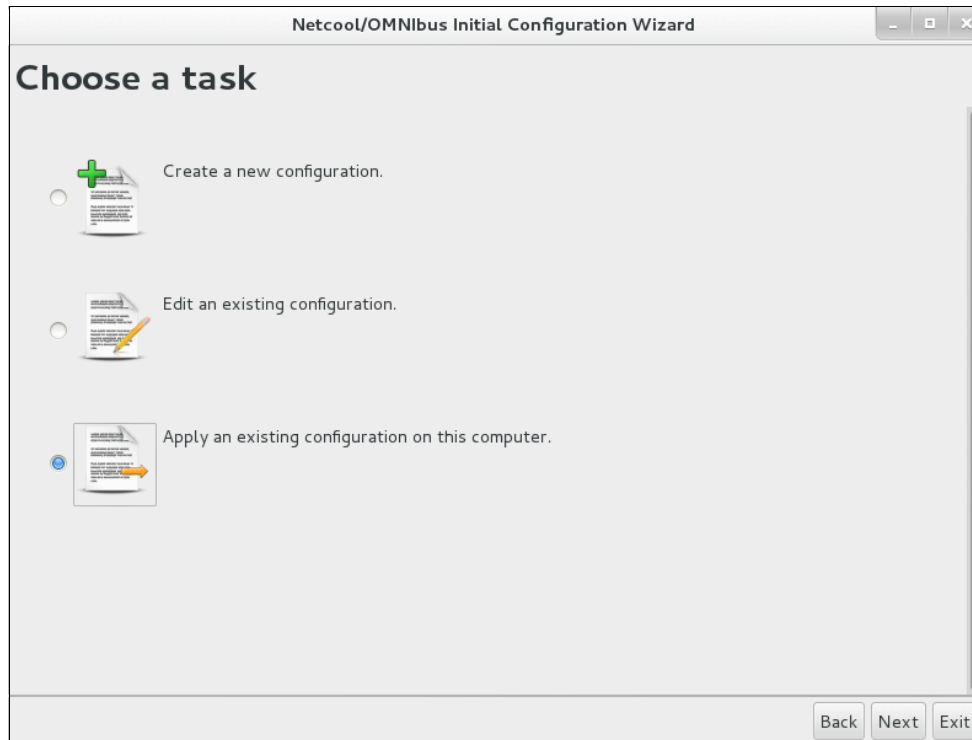
Figure 2-31   Reusing the previous configuration

3. Complete the steps of the wizard to finish the configuration of the Backup OMNIbus server, Omni-B.

Initializing the primary aggregation ObjectServer

In Omni-A, initialize the ObjectServer AGG_P and include the SQL import file to apply to this AGG_P ObjectServer (Example 2-14).

Example 2-14   Initializing the ObjectServer

```
cd $NCHOME/omnibus/extensions/multitier/objectserver
$NCHOME/omnibus/bin/nco_dbinit -server AGG_P -customconfigfile aggregation.sql
```

The following objects are created for the ObjectServer:

► Properties file
► Default database tables
► Default data

- ► Default users
- ► Default groups
- ► Default roles

The SQL customization is also applied.

Example 2-15 shows how to start the ObjectServer AGG_P.

Example 2-15   Starting the ObjectServer AGG_P

```
$NCHOME/omnibus/bin/nco_objserv -name AGG_P &
```

After you start the ObjectServer, you can run the following command to confirm that the nco_objserv process is running:

```
ps -ef | grep nco_objserv
```

Initializing the backup aggregation ObjectServer

In Omni-B, initialize the ObjectServer AGG_B and include the SQL import file to apply to this ObjectServer (Example 2-16).

Example 2-16   Initializing the ObjectServer AGG_B

```
cd $NCHOME/omnibus/extensions/multitier/objectserver
$NCHOME/omnibus/bin/nco_dbinit -server AGG_B -customconfigfile aggregation.sql
```

The properties file, default database tables, default data, default users, default groups, and default roles are created for the ObjectServer. The SQL customization is also applied. If the ObjectServer name ends in _B (based on the naming conventions), the *backup ObjectServer* property is automatically set to TRUE and the corresponding automations that are required by the backup ObjectServer are enabled.

Example 2-17 shows how to start the ObjectServer AGG_B.

Example 2-17   Starting the ObjectServer AGG_B

```
$NCHOME/omnibus/bin/nco_objserv -name AGG_B &
```

Configuring the bidirectional aggregation ObjectServer gateway

In Omni-B, perform the following steps to configure the bidirectional aggregation ObjectServer gateway:

1. Copy the multitiered property files for the gateway to the default location where configuration and properties files are held as shown in Example 2-18.

Example 2-18   Copy the multitiered files for the gateway

```
cp $NCHOME/omnibus/extensions/multitier/gateway/AGG_GATE.* $NCHOME/omnibus/etc/.
```

2. Start the gateway. Example 2-19 shows how to start the gateway AGG_GATE.

Example 2-19   Starting the aggregation gateway

```
$NCHOME/omnibus/bin/nco_g_objserv_bi -propsfile $NCHOME/omnibus/etc/AGG_GATE.props&
```

Initializing the primary collection ObjectServer

Initialize the ObjectServer COL_P_1 and apply the SQL import file to be applied to this ObjectServer (Example 2-20).

Example 2-20   Initializing the ObjectServer

```
cd $NCHOME/omnibus/extensions/multitier/objectserver
$NCHOME/omnibus/bin/nco_dbinit -server COL_P_1 -customconfigfile collection.sql
```

The properties file, and the default database tables, data, users, groups, and roles are created for the ObjectServer. The SQL customization is also applied.

Example 2-21 shows how to start the ObjectServer COL_P_1.

Example 2-21   Starting the ObjectServer

```
$NCHOME/omnibus/bin/nco_objserv -name COL_P_1 &
```

Configuring the unidirectional primary collection ObjectServer gateway

Copy the multitiered property files for the gateway to the default location where configuration and properties files are held (Example 2-22).

Example 2-22   Copy the multitier files for the gateway

```
cp $NCHOME/omnibus/extensions/multitier/gateway/C_TO_A_GATE.map \
$NCHOME/omnibus/etc/.

cp $NCHOME/omnibus/extensions/multitier/gateway/C_TO_A_GATE_P_1.* \
$NCHOME/omnibus/etc/.
```

Example 2-23 shows how to start the gateway C_TO_A_GATE_P_1.

Example 2-23   Starting the collection gateway

```
$NCHOME/omnibus/bin/nco_g_objserv_uni -propsfile \
$NCHOME/omnibus/etc/C_TO_A_GATE_P_1.props &
```

Initializing the backup collection ObjectServer

Run the following steps in the backup collection ObjectServer COL_B_1.

Initialize the ObjectServer COL_B_1 and apply the SQL import file to apply to this ObjectServer (Example 2-24).

Example 2-24   Initializing the ObjectServer

```
cd $NCHOME/omnibus/extensions/multitier/objectserver
$NCHOME/omnibus/bin/nco_dbinit -server COL_B_1 -customconfigfile collection.sql
```

The properties file, and the default database tables, data, users, groups, and roles are created for the ObjectServer. The SQL customization is also applied.

Example 2-25 shows how to start the ObjectServer COL_B_1.

Example 2-25   Starting the ObjectServer

```
$NCHOME/omnibus/bin/nco_objserv -name COL_B_1 &
```

Configuring the unidirectional backup collection ObjectServer gateway

Run the following steps for the *backup* collection ObjectServer COL_B_1.

Copy the multitiered property files for the gateway to the default location where configuration and properties files are held (Example 2-26).

Example 2-26   Copy the multitier files for the gateway

```
cp $NCHOME/omnibus/extensions/multitier/gateway/C_TO_A_GATE.map \
$NCHOME/omnibus/etc/.

cp $NCHOME/omnibus/extensions/multitier/gateway/C_TO_A_GATE_B_1.* \
$NCHOME/omnibus/etc/.
```

Example 2-27 shows how to start the gateway C_TO_A_GATE_B_1.

Example 2-27   Starting the collection gateway

```
$NCHOME/omnibus/bin/nco_g_objserv_uni -propsfile \
$NCHOME/omnibus/etc/C_TO_A_GATE_B_1.props &
```

Initializing the display ObjectServer 1

Initialize the ObjectServer DIS_1 and include the SQL import file to apply to this ObjectServer. The additional command-line options -desktopserver, -dsddualwrite, and -dsdprimary are required for the initialization of display layer ObjectServers.

Note: The -dsdprimary command-line option is set to the name of the virtual ObjectServer pair in the aggregation layer. See Example 2-28.

Example 2-28   Initializing the ObjectServer

```
$NCHOME/omnibus/bin/nco_dbinit -server DIS_1 -desktopserver -dsddualwrite \
-dsdprimary AGG_V -customconfigfile \
$NCHOME/omnibus/extensions/multitier/objectserver/display.sql
```

The properties file, and the default database tables, data, users, groups, and roles are created for the ObjectServer. The ObjectServer is created as a desktop ObjectServer with dual-write mode enabled. The SQL customization is also applied.

Example 2-29 shows how to start the ObjectServer DIS_1.

Example 2-29   Starting the ObjectServer

```
$NCHOME/omnibus/bin/nco_objserv -name DIS_1 &
```

Configuring the unidirectional display ObjectServer 1 gateway

Perform the following steps to configure the unidirectional display ObjectServer 1 gateway:

1. Copy the multitiered property files for the gateway to the default location where configuration and properties files are held (Example 2-30).

Example 2-30   Copy the multitier files for the gateway

```
cp $NCHOME/omnibus/extensions/multitier/gateway/A_TO_D_GATE.map \
$NCHOME/omnibus/etc/.

cp $NCHOME/omnibus/extensions/multitier/gateway/A_TO_D_GATE.tblrep.def \
$NCHOME/omnibus/etc/.

cp $NCHOME/omnibus/extensions/multitier/gateway/A_TO_D_GATE_1.props \
$NCHOME/omnibus/etc/.
```

2. Start the gateway. Example 2-31 shows how to start the gateway A_TO_D_GATE_1.

Example 2-31   Starting the collection gateway

```
$NCHOME/omnibus/bin/nco_g_objserv_uni -propsfile \
$NCHOME/omnibus/etc/A_TO_D_GATE_1.props &
```

Initializing the display ObjectServer 2

On Omni-B, initialize the ObjectServer DIS_2 and include the SQL import file to apply to this ObjectServer (Example 2-32).

Example 2-32   Initializing the ObjectServer on Omni-B

```
$NCHOME/omnibus/bin/nco_dbinit -server DIS_2 -desktopserver -dsddualwrite \
-dsdprimary AGG_V -customconfigfile \
$NCHOME/omnibus/extensions/multitier/objectserver/display.sql
```

The properties file, and the default database tables, data, users, groups, and roles are created for the ObjectServer. The ObjectServer is created as a desktop ObjectServer with dual-write mode enabled. The SQL customization is also applied.

Example 2-33 shows how to start the ObjectServer DIS_2.

Example 2-33   Starting the ObjectServer

```
$NCHOME/omnibus/bin/nco_objserv -name DIS_2 &
```

Configuring the unidirectional display ObjectServer 2 gateway

Perform the following steps to configure the unidirectional display ObjectServer 2 gateway:

1. Copy the multitiered property files for the gateway to the default location where configuration and properties files are held (Example 2-34).

Example 2-34   Copy the multitier files for the gateway

```
cp $NCHOME/omnibus/extensions/multitier/gateway/A_TO_D_GATE.map \
$NCHOME/omnibus/etc/.

cp $NCHOME/omnibus/extensions/multitier/gateway/A_TO_D_GATE.tblrep.def \
$NCHOME/omnibus/etc/.

cp $NCHOME/omnibus/extensions/multitier/gateway/A_TO_D_GATE_2.props \
$NCHOME/omnibus/etc/.
```

2. Start the gateway. Example 2-35 shows how to start the gateway A_TO_D_GATE_2.

Example 2-35   Starting the collection gateway

```
$NCHOME/omnibus/bin/nco_g_objserv_uni -propsfile \
$NCHOME/omnibus/etc/A_TO_D_GATE_2.props
```

Configuring the historical event database

ObjectServers and Gateways are now all up and running. Next, you need to enable historical event data. Perform the following steps:

1. Create the REPORTER database in DB2.

2. On Omni-A, install and configure the Java Database Connectivity (JDBC) gateway to send the event data to DB2 tables.

For more information about this configuration, see the following link:

https://ibm.biz/Bdrr5p

Use the following steps to configure the historical event database in the environment.

Installing the JDBC gateway

> **Note:** In our scenario, we deploy the JDBC gateway in Omni-A where the Primary ObjectServer, AGG_P, is running. Another option is to install the JDBC gateway in the DB2 server where the REPORTER database will be located.

Perform the following steps to install the JDBC gateway:

1. In the Primary ObjectServer, start Installation Manager to add the necessary repositories:

   `/opt/IBM/netcool/IM/InstallationManager/eclipse/IBMIM`

2. Add the JDBC gateway repositories by selecting **File** → **Preferences** → **Repositories** → **Add Repository**.

3. Table 2-5 shows the necessary files for the JDBC gateway installation.

Table 2-5   JDBC gateway repositories

Installation file	Description
`NCOMNI_GTW_JDBC.zip`	JDBC gateway installation file
`im-nco-g-reporter-4_0.zip`	Patch for the JDBC gateway
`im-nco-g-jdbc-rpt-scripts-1_0.zip`	Reporting database creation scripts

Tip: One of the features of Installation Manager is that all platforms can be shipped in a single compressed file, which means that you do not need to select the platform that you require. Installation Manager selects the platform for you.

4. Figure 2-32 shows the JDBC gateway repositories that are imported to Installation Manager.
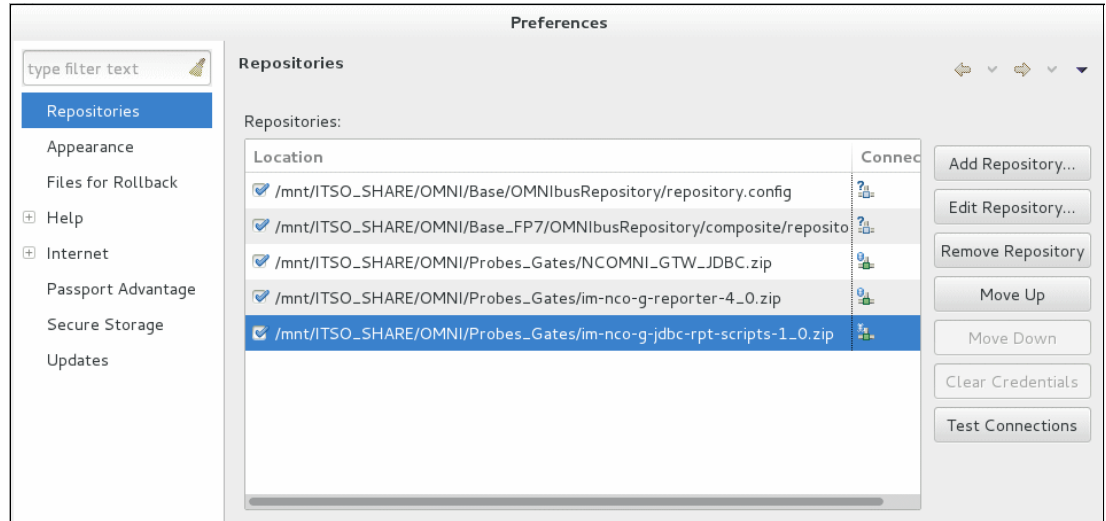

Figure 2-32   Importing JDBC gateway repositories

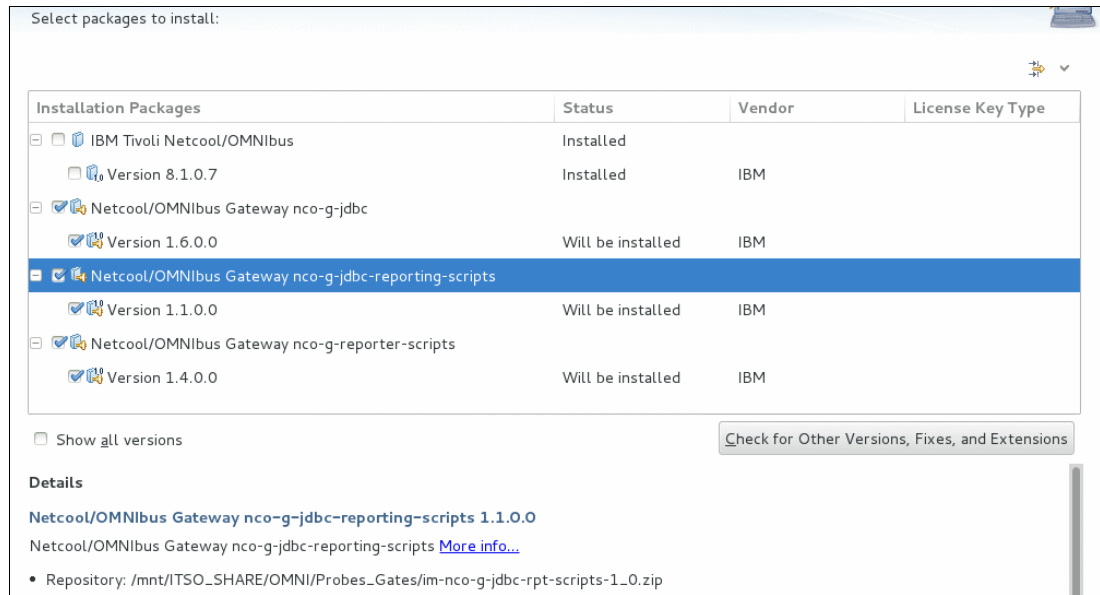5. Select the OMNIbus Gateway packages to install as shown in Figure 2-33.

Figure 2-33 Selecting the JDBC gateway packages

6. Review the installation summary and complete the installation (Figure 2-34).
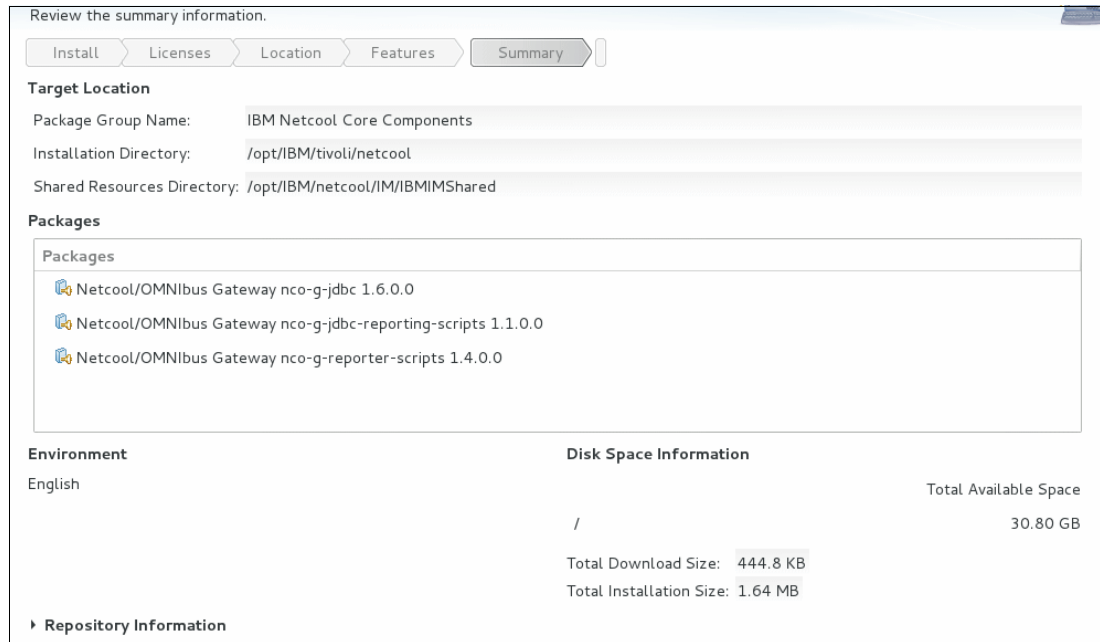
Figure 2-34 Reviewing the summary for the JDBC installation

7. Review the installation results and click **Finish** (Figure 2-35).
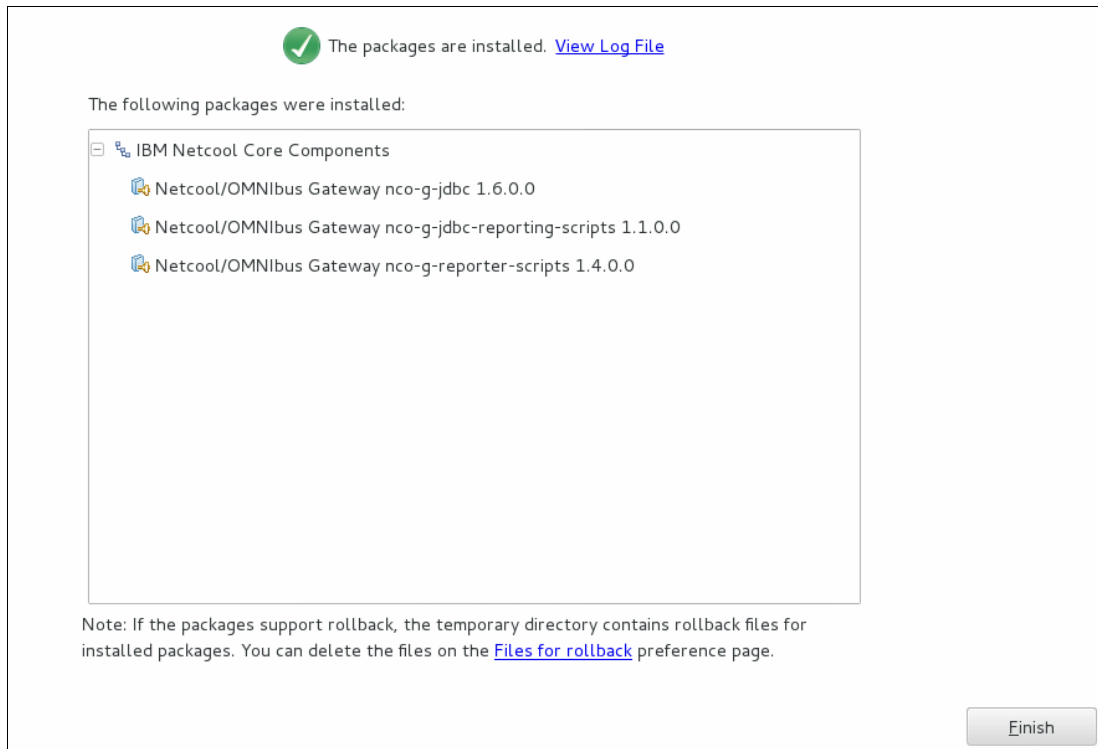
Figure 2-35   JDBC gateway installation results

Configuring the interfaces file

Perform the following steps to configure the interfaces file:

1. Append the following lines to `$NCHOME/etc/omni.dat` in Omni-A, as shown in Example 2-36.

Example 2-36   Configure the interface for the Reporter gateway

```
[G_JDBC]
{
 Primary: Omni-A.swg.be.ibm.com 4320
}
```

2. Run the `nco_igen` command to regenerate the interfaces file:

   `$NCHOME/bin/nco_igen`

Configuring the database schema

This step needs to be executed in the DB_A server of the environment. If DB2 is not installed yet, you must perform the DB2 installation. See 2.2, "IBM DB2" on page 27. Resume with the following steps:

If DB2 is installed in the DB_A server, proceed with the following steps:

1. Copy the file `$OMNIHOME/gates/reporting/db2/db2.reporting.old.sql` from Omni-A to the DB_A server.

> **Note:** The file name is `db2.reporting.`*`old`*`.sql`. This script has additional code that is needed to create the REPORTER database.

2. Log in as `db2inst1` in DBServ-a and execute the SQL script:

   `[db2inst1@DBServ-a]$  db2 -td@ -vf db2.reporting.old.sql`

   The following output is expected:

   ```
   COMMIT WORK
   DB20000I  The SQL command completed successfully.
   ```

Configuring the database connection

Perform the following steps to configure the database connection:

1. Copy the DB2 drivers to `$OMNIHOME/gates/java`. The DB2 drivers are in the `/opt/ibm/db2/V10.5*/java` directory in DBServ-a. You need to copy the driver files from the DBServ-a server to Omni-A. Then, on the Omni-A server, copy the driver to `$OMNIHOME/gates/java` as shown in Example 2-37.

Example 2-37   Copying the DB2 driver files

```
cp db2jcc.jar db2jcc_license_cu.jar $OMNIHOME/gates/java
```

2. Create the `gateway` user in the AGG_P server with password `netcool`. If you need more information about how to create a user in OMNIbus, see the following link:

   https://ibm.biz/Bdrr58

Configuring the props file

Perform the following steps to configure the props file:

1. Edit the JDBC gateway properties files. Example 2-38 shows the properties that you need to modify in `$OMNIHOME/etc/G_JDBC.props`.

> **Important:** The first property in Example 2-38, the *Gate.Jdbc.Mode: 'REPORTING'* property, is important because this property is the only mode that is supported by IBM Operations Analytics - Log Analysis, which we will install later in this book.

Example 2-38   Properties of the G_JDBC gateway

```
#
# Reporting mode properties
#
Gate.Jdbc.Mode: 'REPORTING' # STRING (JDBC gateway mode (AUDIT|REPORTING))

# Table properties
Gate.Jdbc.StatusTableName: 'REPORTER_STATUS' # STRING (Target table for alerts.status)
Gate.Jdbc.JournalTableName: 'REPORTER_JOURNAL' # STRING (Target table for alerts.journal)
```

```
Gate.Jdbc.DetailsTableName: 'REPORTER_DETAILS' # STRING (Target table for alerts.details)

# JDBC Connection properties
Gate.MapFile: '$OMNIHOME/gates/jdbc/reporting.jdbc.map' # STRING (Path to data mapping
file.)
Gate.Jdbc.Driver: 'com.ibm.db2.jcc.DB2Driver' # STRING (JDBC Driver)
Gate.Jdbc.Url: 'jdbc:db2://172.16.61.137:50000/REPORTER' # STRING (JDBC connection URL)
Gate.Jdbc.Username: 'db2inst1' # STRING (JDBC username)
Gate.Jdbc.Password: 'object00
' # STRING (JDBC password)
Gate.Jdbc.ReconnectTimeout: 30 # INTEGER (JDBC database reconnection timeout)
Gate.Jdbc.InitializationString: '' # STRING (JDBC connection initialization string)

# ObjectServer Connection properties
Gate.RdrWtr.Server: 'AGG_P' # STRING ([RdrWtr] Name of the ObjectServer to connect too.)
Gate.RdrWtr.Username: 'gateway' # STRING ([RdrWtr] Name of the user to connect as.)
Gate.RdrWtr.Password: 'netcool' # STRING ([RdrWtr] Password of the user to connect as.)
```

2. To start the gateway, execute following command:

   `$OMNIHOME/bin/nco_g_jdbc`

3. Check the `$OMNIHOME/log/G_JDBC.log` to confirm the gateway is running with no errors.

Configuring the Process Agent

The Process Agent (PA) needs to be configured to control all of the OMNIbus processes.

> **The Tivoli Netcool/OMNIbus process control system:** The process control system
> performs two primary tasks. It manages local and remote processes, and it runs external
> procedures that are specified in automations. You can use process control to simplify the
> management of Tivoli Netcool/OMNIbus components, such as ObjectServers, probes, and
> gateways. You can install process agents (PA) on each host and configure them to
> manage processes.
>
> The configured process agents cooperate automatically and understand their own
> configuration. They start processes, and they can keep those processes running. You can
> define processes that are dependent on other processes, and processes that have timed
> threshold dependencies. If a managed host is restarted, the process agent can be
> configured to restart local components automatically.
>
> In this deployment scenario, the PA needs to be configured on all servers that carry an
> Omnibus component, which are Omni-A and Omni-B in our environment.

Follow these steps to configure the PA:

1. Set up the PA authentication by installing the **startup** script by running the following
   command as the root user, as shown in Example 2-39.

Example 2-39   Installing the startup script

```
# /opt/IBM/tivoli/netcool/omnibus/install/startup/linux2x86install
Enter value for $NCHOME [/opt/IBM/tivoli/netcool]:
This script copies a startup script into the /etc/init.d directory to enable
you to automatically start and stop Netcool/OMNIbus processes.
It does this by:
        Copying linux2x86/etc/rc.d/init.d/nco to /etc/init.d/nco
        Running "/sbin/chkconfig --add nco"
```

```
Do you wish to continue (y/n)? [y] y
Name of the Process Agent Daemon [NCO_PA]: OMNI_A_PA
Should OMNI_A_PA run in secure mode (y/n)? [y] n
Enif required [27000@localhost]:
Scripts installed.
```

2. Edit /etc/init.d/nco (Example 2-40).

Example 2-40   Configuring the nco file

 # vi /etc/init.d/nco
Change the following line to append **"-admingroup ncoadmin"** at the end of the
command line:
${OMNIHOME}/bin/nco_pad -name ${NCO_PA} -authenticate PAM *-admingroup ncoadmin*
-redirectfile ${OMNIHOME}/log/pa_redir.log > /dev/null 2> /dev/null

3. Create the configuration files for Tivoli Netcool/OMNIbus services by running the following
   commands (Example 2-41).

Example 2-41   Create the service configuration files

```
cd /etc/pam.d
cp system-auth /etc/pam.d/nco_objserv # Required for the ObjectServer
cp system-auth /etc/pam.d/netcool     # Required for the process agent
cp system-auth /etc/pam.d/nco_g_objserv_uni # Required for the gateway
cp system-auth /etc/pam.d/nco_g_objserv_bi  # Required for the gateway
cp system-auth /etc/pam.d/nco_g_jdbc        # Required for the gateway
```

4. As the netcool user, copy the configuration files by running the following commands
   (Example 2-42).

Example 2-42   Copying the configuration files

```
cd $OMNIHOME/etc
cp nco_pa.props OMNI_A_PA.props
cp nco_pa.conf OMNI_A_PA.conf
```

5. Configure the props file by appending the following lines (Example 2-43).

Example 2-43   Configure the props file

```
vi OMNI_A_PA.props
Name: 'OMNI_A_PA'                          # STRING (Name that server is to use)
ConfigFile: '$OMNIHOME/etc/OMNI_A_PA.conf' # STRING (The name of the configuration file)
MessageLog: '$OMNIHOME/log/OMNI_A_PA.log'  # STRING (Path to the message log file)
PropsFile: '$OMNIHOME/etc/OMNI_A_PA.props' # STRING (Path to the properties file)
PidFile: './var/OMNI_A_PA.pid'             # STRING (Filename for pid storage relative to $OMNIHOME (UNIX))
```

6. Configure the OMNI_A_PA.conf file. Example 2-44 shows how you need to configure the
   .conf file.

> **Note:** The *SCALAGateway* configuration is included in Example 2-44 for later usage.

Example 2-44   OMNI_A_PA.conf file

```
#NCO_PA3
#
# Process Agent Daemon Configuration File 1.1
#
```

```
#
# List of Processes.
#
nco_process 'AggObjectServer_P'
{
        Command '$OMNIHOME/bin/nco_objserv -name AGG_P -pa OMNI_A_PA' run as 1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

nco_process 'ColObjectServer_P_1'
{
        Command '$OMNIHOME/bin/nco_objserv -name COL_P_1 -pa OMNI_A_PA' run as
1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

nco_process 'DispObjectServer_1'
{
        Command '$OMNIHOME/bin/nco_objserv -name DIS_1 -pa OMNI_A_PA' run as 1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

nco_process 'ColToAggP_1'
{
        Command '$OMNIHOME/bin/nco_g_objserv_uni -propsfile
$OMNIHOME/etc/C_TO_A_GATE_P_1.props' run as 1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

nco_process 'AggToDisp_1'
{
```

```
        Command '$OMNIHOME/bin/nco_g_objserv_uni -propsfile
$OMNIHOME/etc/A_TO_D_GATE_1.props' run as 1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

nco_process 'JDBCGateway'
{
        Command '$OMNIHOME/bin/nco_g_jdbc -propsfile $OMNIHOME/etc/G_JDBC.props'
run as 1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

nco_process 'SCALAGateway'
{
        Command '$OMNIHOME/bin/nco_g_xml -propsfile
$OMNIHOME/gates/xml/scala/G_SCALA.props' run as 1001
        Host            =       'Omni-A'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}

#
# List of Services.
#
nco_service 'Core'
{
        ServiceType     =       Master
        ServiceStart    =       Auto
        process 'AggObjectServer_P' NONE
        process 'ColObjectServer_P_1' NONE
        process 'DispObjectServer_1' NONE
        process 'ColToAggP_1' 'AggObjectServer_P'
        process 'AggToDisp_1' 'AggObjectServer_P'
        process 'JDBCGateway' 'AggObjectServer_P'
        process 'SCALAGateway' 'AggObjectServer_P'
}

nco_service 'InactiveProcesses'
{
```

```
        ServiceType     =         Non-Master
        ServiceStart    =         Non-Auto
}



#
# Routing Table Entries.
#
# 'user'        - (optional) only required for secure mode PAD on target host
#                 'user' must be member of UNIX group 'ncoadmin'
# 'password'    - (optional) only required for secure mode PAD on target host
#                 use nco_pa_crypt to encrypt.
nco_routing
{
        host 'Omni-B.swg.be.ibm.com' 'OMNI_B_PA'
        host 'Omni-A' 'OMNI_A_PA'
}
```

7. Start the Process Agent (PA).

Note: Ensure that you stop any Netcool processes that are running before you restart the PA.

8. The PA can be started in one of the following two ways:

   – Call the script from init.d as the `root` user (Example 2-45).

Example 2-45   First option to start PA

```
/etc/init.d/nco start
```

Note: Due to a current known issue in RedHat 7 where the nco.service is not configured correctly, this method does not start the PA. If you use RedHat 7, until this issue is resolved, use the second method to start PA.

   – Call the **nco_pad** with all of the arguments as the `root` user. See Example 2-46.

Example 2-46   Second option to start PA

```
/opt/IBM/tivoli/netcool/omnibus/bin/nco_pad -name OMNI_A_PA -authenticate PAM
-admingroup ncoadmin
```

Example 2-47 shows the commands to manage PA.

Tip: You can also install the history gateway on the Tivoli Data Warehouse server.

Example 2-47   Commands to manage PA

```
Check the status of the services and processes of the PA:
[netcool@Omni-A ~]$ nco_pa_status -server OMNI_A_PA  -user netcool -password
object00
------------------------------------------------------------------------------
Service Name        Process Name        Hostname  User      Status     PID
------------------------------------------------------------------------------
Core                AggObjectServer_P   Omni-A    netcool   RUNNING    1018
```

```
                              ColObjectServer_P_1  Omni-A     netcool   RUNNING   1019
                              DispObjectServer_1   Omni-A     netcool   RUNNING   1020
                              ColToAggP_1          Omni-A     netcool   RUNNING   1021
                              AggToDisp_1          Omni-A     netcool   RUNNING   1022
                              JDBCGateway          Omni-A     netcool   RUNNING   1024
----------------------------------------------------------------------------------
```
Start a service (this command will start all of the components of the defined
Service, according to the sequence defined in Example 2-44 on page 69):
nco_pa_start -server OMNI_A_PA -user netcool -password object00 -service Core

Start a process:
**nco_pa_start -server OMNI_A_PA -user netcool -password object00 -process
AggObjectServer_P**

Stop a process:
**nco_pa_stop -server OMNI_A_PA -user netcool -password object00 -process
AggObjectServer_P**

Stop PA:
nco_pa_shutdown -server OMNI_A_PA -user netcool -password object00

9. Repeat steps 1 - 7 for the backup ObjectServer, Omni-B. When you run the steps, replace
    OMNI_A_PA with *OMNI_B_PA*.

10. Also, you neeed to make a few changes in the OMNI_B_PA.conf file in your environment.
    Example 2-48 shows the differences in *OMNI_B_PA* in our environment in **bold**.

Example 2-48   OMNI_B_PA.conf file

```
#NCO_PA3
#
# Process Agent Daemon Configuration File 1.1
#


#
# List of Processes.
#
nco_process 'AggObjectServer_B'
{
        Command '$OMNIHOME/bin/nco_objserv -name AGG_B -pa OMNI_B_PA' run as 1001
        Host            =       'Omni-B'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
        AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
        RetryCount      =       0
        ProcessType     =       PaPA_AWARE
}


nco_process 'ColObjectServer_B_1'
{
        Command '$OMNIHOME/bin/nco_objserv -name COL_B_1 -pa OMNI_B_PA' run as
1001
        Host            =       'Omni-B'
        Managed         =       True
        RestartMsg      =       '${NAME} running as ${EUID} has been restored on
${HOST}.'
```

```
            AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
            RetryCount      =       0
            ProcessType     =       PaPA_AWARE
}

nco_process 'DispObjectServer_2'
{
            Command '$OMNIHOME/bin/nco_objserv -name DIS_2 -pa OMNI_B_PA' run as 1001
            Host            =       'Omni-B'
            Managed         =       True
            RestartMsg      =       '${NAME} running as ${EUID} has been restored on
$(HOST}.'
            AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
            RetryCount      =       0
            ProcessType     =       PaPA_AWARE
}

nco_process 'ColToAggB_1'
{
            Command '$OMNIHOME/bin/nco_g_objserv_uni -propsfile
$OMNIHOME/etc/C_TO_A_GATE_B_1.props' run as 1001
            Host            =       'Omni-B'
            Managed         =       True
            RestartMsg      =       '${NAME} running as ${EUID} has been restored on
$(HOST}.'
            AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
            RetryCount      =       0
            ProcessType     =       PaPA_AWARE
}

nco_process 'AggToDisp_2'
{
            Command '$OMNIHOME/bin/nco_g_objserv_uni -propsfile
$OMNIHOME/etc/A_TO_D_GATE_2.props' run as 1001
            Host            =       'Omni-B'
            Managed         =       True
            RestartMsg      =       '${NAME} running as ${EUID} has been restored on
$(HOST}.'
            AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
            RetryCount      =       0
            ProcessType     =       PaPA_AWARE
}

nco_process 'AggregationGateway'
{
            Command '$OMNIHOME/bin/nco_g_objserv_bi -propsfile
$OMNIHOME/etc/AGG_GATE.props' run as 1001
            Host            =       'Omni-B'
            Managed         =       True
            RestartMsg      =       '${NAME} running as ${EUID} has been restored on
$(HOST}.'
            AlertMsg        =       '${NAME} running as ${EUID} has died on ${HOST}.'
            RetryCount      =       0
            ProcessType     =       PaPA_AWARE
}
```

```
#
# List of Services.
#
nco_service 'Core'
{
        ServiceType     =       Master
        ServiceStart    =       Auto
        process 'AggObjectServer_B' NONE
        process 'ColObjectServer_B_1' NONE
        process 'DispObjectServer_2' NONE
        process 'ColToAggB_1' 'AggObjectServer_B'
        process 'AggToDisp_2' 'AggObjectServer_B'
        process 'AggregationGateway' 'AggObjectServer_B'
}

nco_service 'InactiveProcesses'
{
        ServiceType     =       Non-Master
        ServiceStart    =       Non-Auto
}



#
# Routing Table Entries.
#
# 'user'        -  (optional) only required for secure mode PAD on target host
#                  'user' must be member of UNIX group 'ncoadmin'
# 'password'    -  (optional) only required for secure mode PAD on target host
#                  use nco_pa_crypt to encrypt.
nco_routing
{
        host 'Omni-B.swg.be.ibm.com' 'OMNI_B_PA'
        host 'Omni-A' 'OMNI_A_PA'
}
```

2.3.4 Verification

Perform the following steps to verify the installation:

1. Example 2-49 shows the complete $OMNIHOME/etc/omni.dat for this environment (including the G_SCALA configuration that will be performed later in this book). Review the omni.dat file in Omni-A and Omni-B to confirm that they are correct.

Example 2-49   The omni.dat file

```
[netcool@Omni-A etc]$ cat omni.dat
[AGG_P]
{
        Primary: Omni-A.swg.be.ibm.com 4100
}
[AGG_B]
{
        Primary: Omni-B.swg.be.ibm.com 4100
```

```
}
[COL_P_1]
{
        Primary: Omni-A.swg.be.ibm.com 4101
}
[COL_B_1]
{
        Primary: Omni-B.swg.be.ibm.com 4101
}
[DIS_1]
{
        Primary: Omni-A.swg.be.ibm.com 4102
}
[DIS_2]
{
        Primary: Omni-B.swg.be.ibm.com 4102
}
[AGG_V]
{
        Primary: Omni-A.swg.be.ibm.com 4100
        Backup: Omni-B.swg.be.ibm.com 4100
}
[AGG_GATE]
{
        Primary: Omni-B.swg.be.ibm.com 4300
}
[C_TO_A_GATE_P_1]
{
        Primary: Omni-A.swg.be.ibm.com 4300
}
[C_TO_A_GATE_B_1]
{
        Primary: Omni-B.swg.be.ibm.com 4303
}
[A_TO_D_GATE_1]
{
        Primary: Omni-A.swg.be.ibm.com 4301
}
[A_TO_D_GATE_2]
{
        Primary: Omni-B.swg.be.ibm.com 4302
}
[OMNI_A_PA]
{
        Primary: Omni-A.swg.be.ibm.com 4200
}
[OMNI_B_PA]
{
        Primary: Omni-B.swg.be.ibm.com 4200
}
[G_JDBC]
{
        Primary: Omni-A.swg.be.ibm.com 4320
}
```

```
[G_SCALA]
{
        Primary: Omni-A.swg.be.ibm.com 4305
}
```

2. If any event sources point to your Netcool Operations Insight environment, configure them to the COL_P OMNIbus server. If you need to perform initial tests, use the Simnet Probe to send sample alerts:

   a. Append the following line to the `$OMNIHOME/probes/linux2x86/simnet.props` file:

      `Server : 'COL_P_1'`

   b. Start the probe (Example 2-50).

Example 2-50   Starting the Simnet Probe

```
/opt/IBM/tivoli/netcool/omnibus/probes/nco_p_simnet &
```

3. To view the events, you can start an Event List. For more information about monitoring events, see the following link:

   https://ibm.biz/Bdrr5g

2.4 IBM Tivoli Netcool Impact

The installation and basic configuration of IBM Tivoli Netcool Impact (Impact) are described.

2.4.1 Introduction

Netcool Impact offers a set of predefined requirements for the operating system. These requirements are documented on the IBM documentation server:

https://ibm.biz/Bdrr5b

The IBM Prerequisite Scanner (version 1.2.0.17 in this book) checks these requirements against the installed operating system. For this deployment, the settings that are shown in Table 2-6 were used.

Table 2-6   Settings for the Netcool Impact installation

Setting	Value
Default Directory	`/opt/IBM/tivoli/netcool/impact/`
OMNIbus User/password	`impactconnect/netcool`
Impact GUI user/password	`impactadmin/netcool`
$IMPACT_HOME	`/opt/IBM/tivoli/netcool/impact/`

2.4.2 Check the prerequisites

> **Important:** The Prerequisite Scanner must be run by the same user that installs the products.

Run the command to start the scanner. Add the missing packages and correct the operating system settings. Set the environment variable **IMPACT_PREREQ_BOTH** based on your type of installation. Because we installed both Netcool Impact (NCI) and the Impact GUI components on the same server, we ran **export IMPACT_PREREQ_BOTH=True**. See Example 2-51.

> **Tip:** In the **export IMPACT_PREREQ_BOTH** parameter, TRUE means check for both Netcool Impact and Impact GUI and FALSE means check for Netcool Impact only.

Example 2-51   Prerequisite Scanner command

```
su - netcool
export IMPACT_PREREQ_BOTH=True
mkdir /tmp/prereq
cd /tmp/prereq/
tar xvf /mnt/ITSO_SHARE/precheck_unix_20150827.tar
[netcool@Impact-a prereck]$ ./prereq_checker.sh NCI detail
IBM Prerequisite Scanner
     Version: 1.2.0.17
     Build  : 20150827
     OS name: Linux
   User name: netcool

 Machine Information
 Machine name: Impact-a
 Serial number:


Scenario: Prerequisite Scan

NCI - Tivoli Netcool/Impact [version 07010001]:
Property                        Result  Found                                Expected
========                        ======  =====                                ========
OS Version                      PASS    Red Hat Enterprise Linux Server rel... RedHat Enterprise Linux Server 5.5
                                                                             RedHat Enterprise Linux Server 5.6
                                                                             RedHat Enterprise Linux Server 5.7
                                                                             RedHat Enterprise Linux Server 5.8
                                                                             RedHat Enterprise Linux Server 5.9
                                                                             RedHat Enterprise Linux Server 5.10
                                                                             RedHat Enterprise Linux Server 6.0
                                                                             RedHat Enterprise Linux Server 6.1
                                                                             RedHat Enterprise Linux Server 6.2
                                                                             RedHat Enterprise Linux Server 6.3
                                                                             RedHat Enterprise Linux Server 6.4
                                                                             RedHat Enterprise Linux Server 6.5
                                                                             RedHat Enterprise Linux Server 7.0
                                                                             RedHat Enterprise Linux Server 7.1
                                                                             SUSE Linux Enterprise Server 11
                                                                             AIX V6.1
                                                                             AIX V7.1
                                                                             Solaris V10 (SPARC)
                                                                             Solaris V11 (SPARC)
os.architecture                 PASS    64-bit                               64-bit
os.space.opt_root               PASS    NOT_REQ_CHECK_ID                     [dir:root=/opt]30GB
os.space.opt_nonroot            PASS    33GB                                 [dir:non_root=/opt]30GB
os.space.home_root              PASS    NOT_REQ_CHECK_ID                     [dir:root=/var,unit:MB]700
os.space.home_nonroot           PASS    33792MB                              [dir:non_root=USERHOME,unit:MB]700
os.RAMSize                      PASS    7.6GB                                6GB
os.swapSize                     PASS 7.87GB                          6GB+
numLogicalCPU                   PASS    8                                    2
intel.cpu                       PASS    2.70GHz                              2GHz
os.package.libgcc.i686          FAIL libgcc-4.8.3-9.el7.i686        libgcc-4.8+
os.package.glibc.i686           FAIL glibc-2.17-78.el7.i686         glibc-2.17+

Aggregated Properties for Scanned Products:
Property                        Result  Found                                Expected
========                        ======  =====                                ========
/                               PASS    33.00GB                              30.68GB

Overall result: FAIL (NCI 07010001: FAIL)

Environment variable settings: [ IMPACT_PREREQ_BOTH=True, IMPACT_PREREQ_GUI=[Not Found], IMPACT_PREREQ_IMPACT=[Not Found] ]

Detailed results are also available in /tmp/prereck/result.txt

sudo su -
yum install libgcc.i686 glibc.i686
```

2.4.3 Installation and basic configuration

Perform the following steps:

1. Start the previously installed Installation Manager by using the following commands (Example 2-52). Figure 2-36 shows the Installation Manager GUI.

Example 2-52   Starting the Installation Manager

```
cd /opt/IBM/netcool/IM/InstallationManager/eclipse
./IBMIM
```

Tip: If you see unexpected results, check the following logs to help in troubleshooting:

▶ `$IMPACT_HOME/logs/impactserver.log`
▶ `$IMPACT_HOME/logs/guiserver.log`
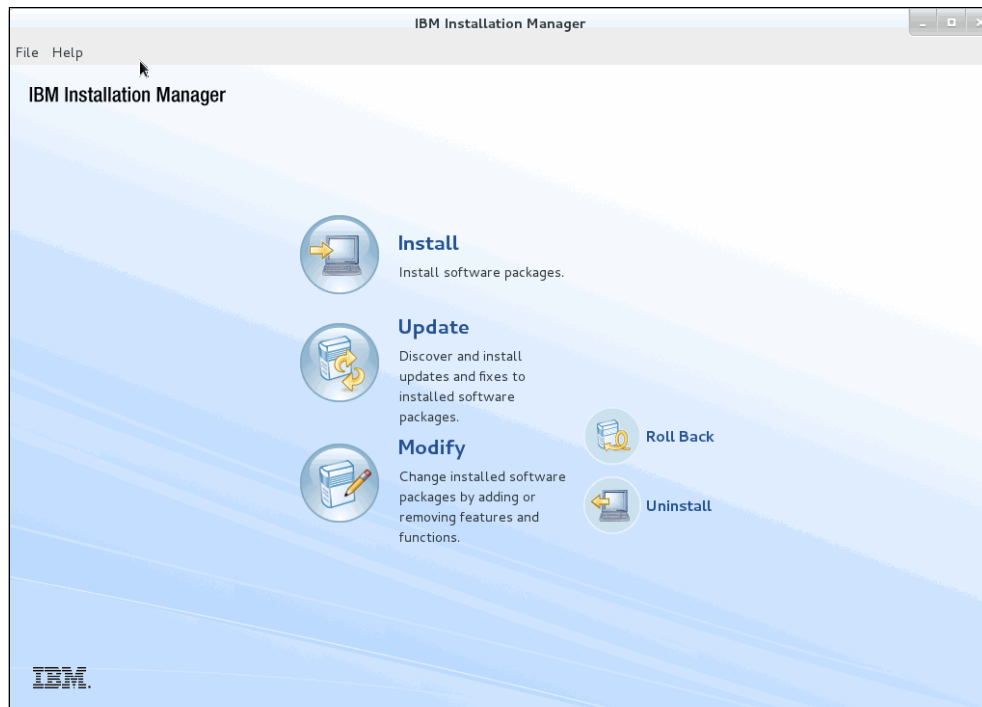
Figure 2-36   Installation Manager GUI

2. Add all of the Impact server repositories by selecting **File** → **Preferences** →
   Repositories → **Add Repository**. See Figure 2-37.
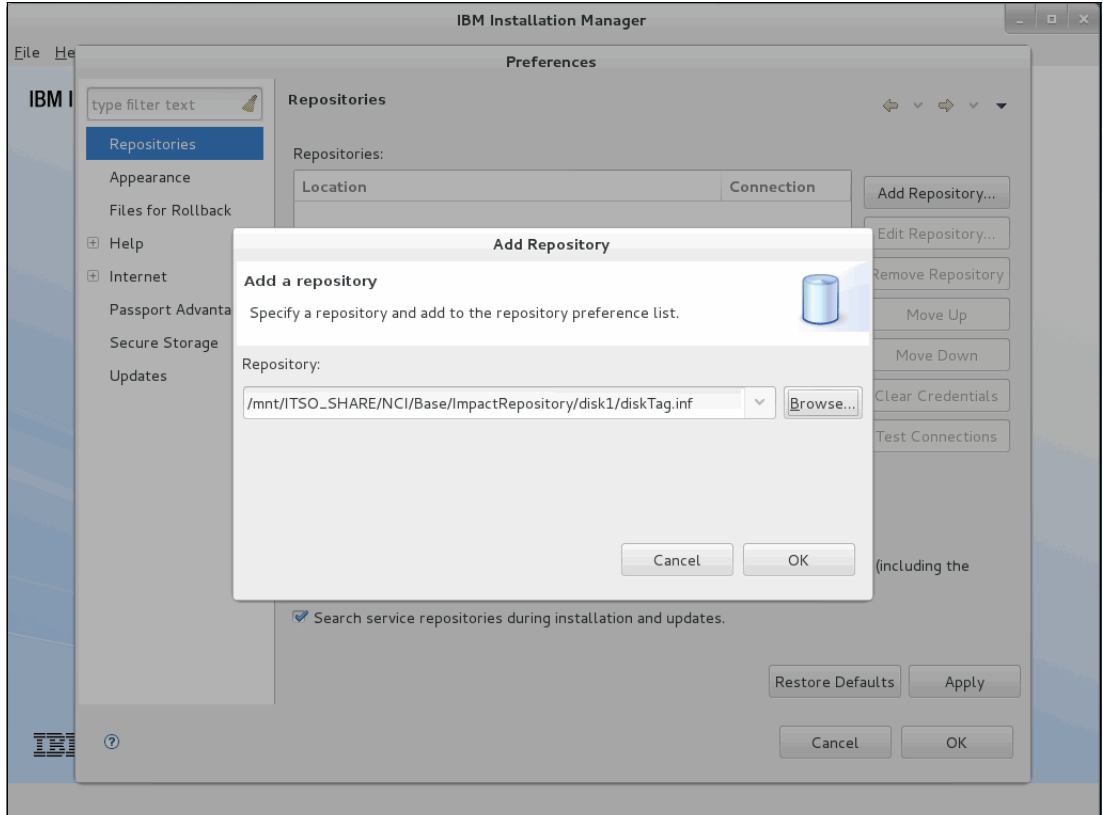
Figure 2-37   Add a repository

As shown in Table 2-7, multiple repositories are included in the following source files:

- `Impact-v7.1.0.4.linux64.zip` is the core package for Impact.
- `Impact-v7.1.0.4-NOI.linux64.zip` is the Netcool Operations Insight extensions package.
- `7.1.0-TIV-NCI-LINUX-FP0005.zip` is Fix Pack 5.

Table 2-7   Installation repositories

Installation file	Repository directory
`Impact-v7.1.0.4.linux64.zip`	`<EXTRACTED_DIR>/ImpactRepository/disk1`
`Impact-v7.1.0.4-NOI.linux64.zip`	`<EXTRACTED_DIR>/ImpactRepository/disk1`
`Impact-v7.1.0.4-NOI.linux64.zip`	`<EXTRACTED_DIR>/ImpactExtRepository/disk1`
`7.1.0-TIV-NCI-LINUX-FP0005.zip`	`<EXTRACTED_DIR>/ImpactRepository/disk1`
`7.1.0-TIV-NCI-LINUX-FP0005.zip`	`<EXTRACTED_DIR>/ImpactExtRepository/disk1`

3. Add all of them together (Figure 2-38). Click **OK**.
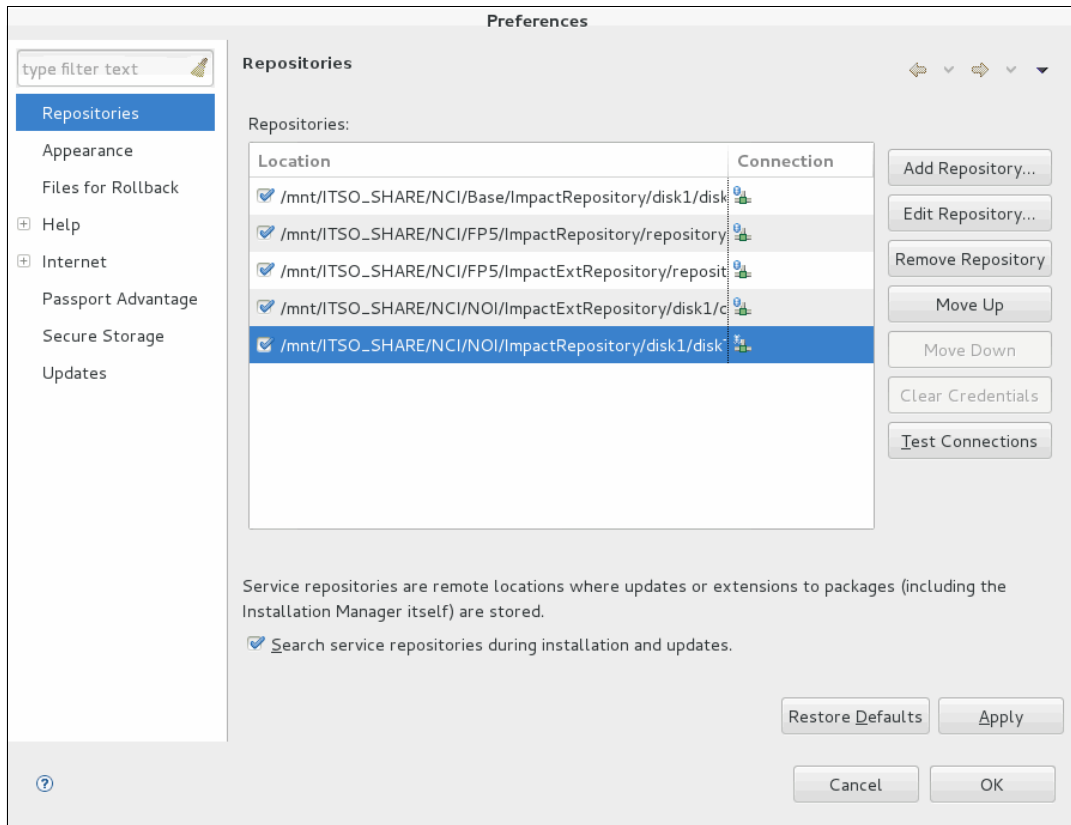
Figure 2-38   All Impact repositories

4. Start the installation. Select all of the packages (Figure 2-39). Because you added all of the repositories, including the fix packs, Installation Manager, which is patched to the latest version, such as 7.1.0.5, installs directly. Click **Next**.

5. Click **I accept the terms of the license agreement** (Figure 2-17 on page 47). Click **Next**.
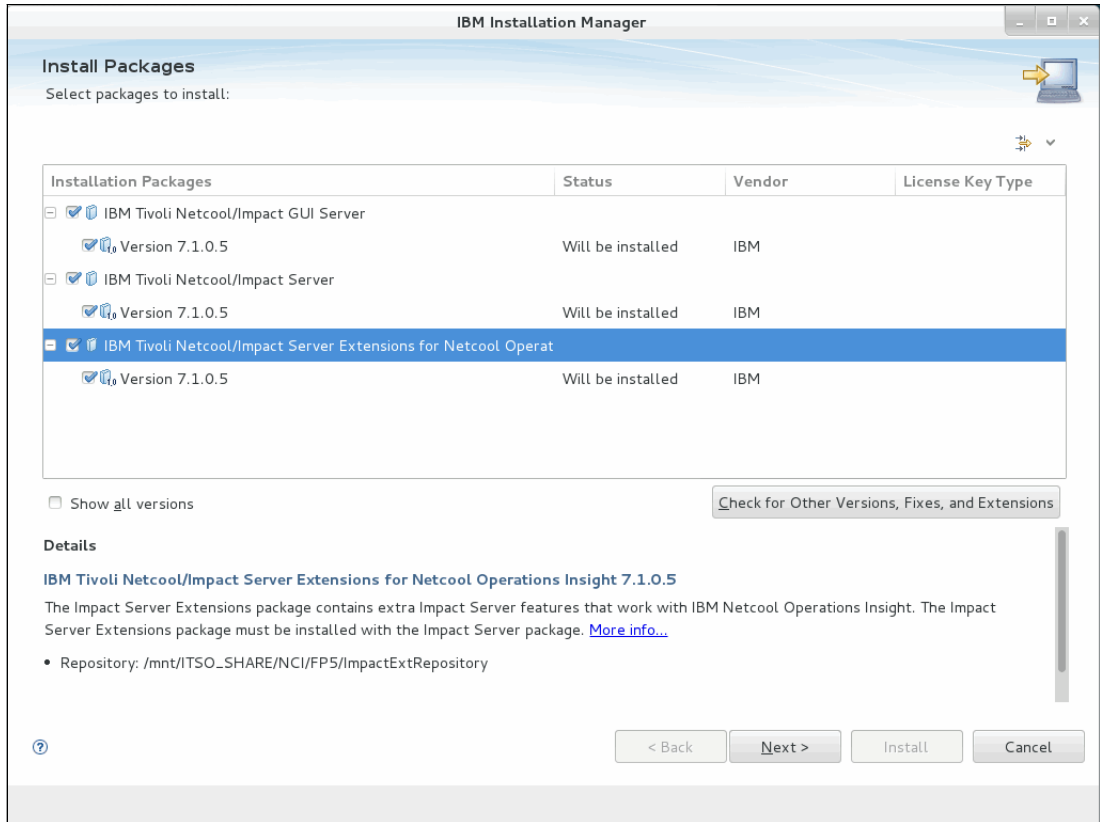
Figure 2-39   Install packages

6. Modify the Shared Resources Directory with the correct path as shown in Figure 2-40. Click **Next**.
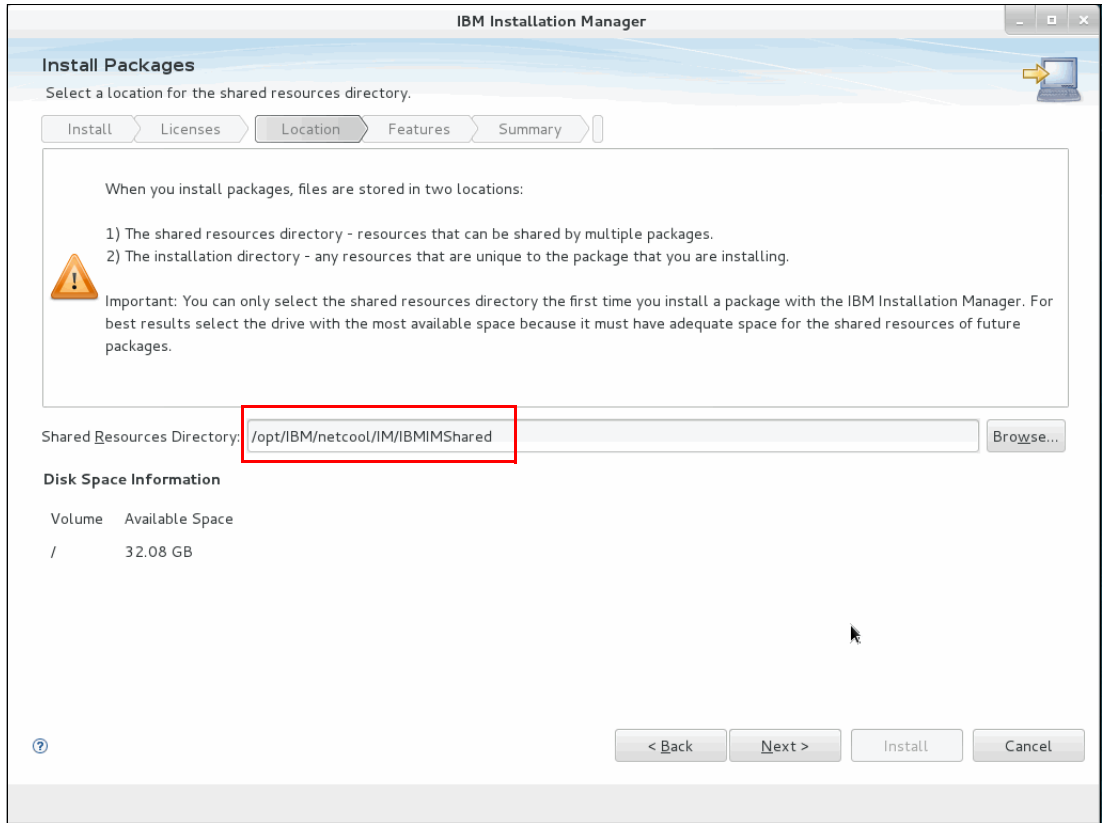
Figure 2-40   Shared Resources Directory

7. You can see the installation directory (Figure 2-41).
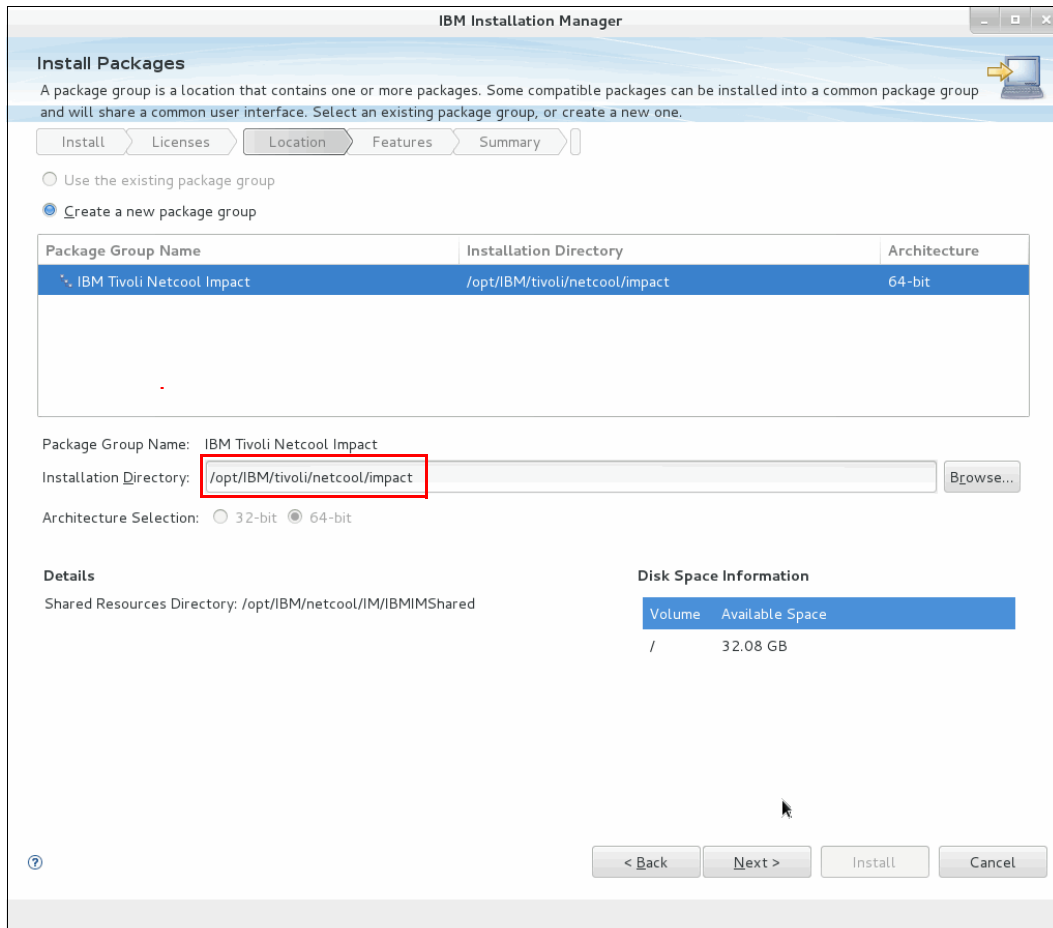
Figure 2-41   Installation directory

8. Click **Next** again after you change the path to `/opt/IBM/tivoli/netcool/impact.`

9. The next window that opens is the User Registry configuration (Figure 2-42).
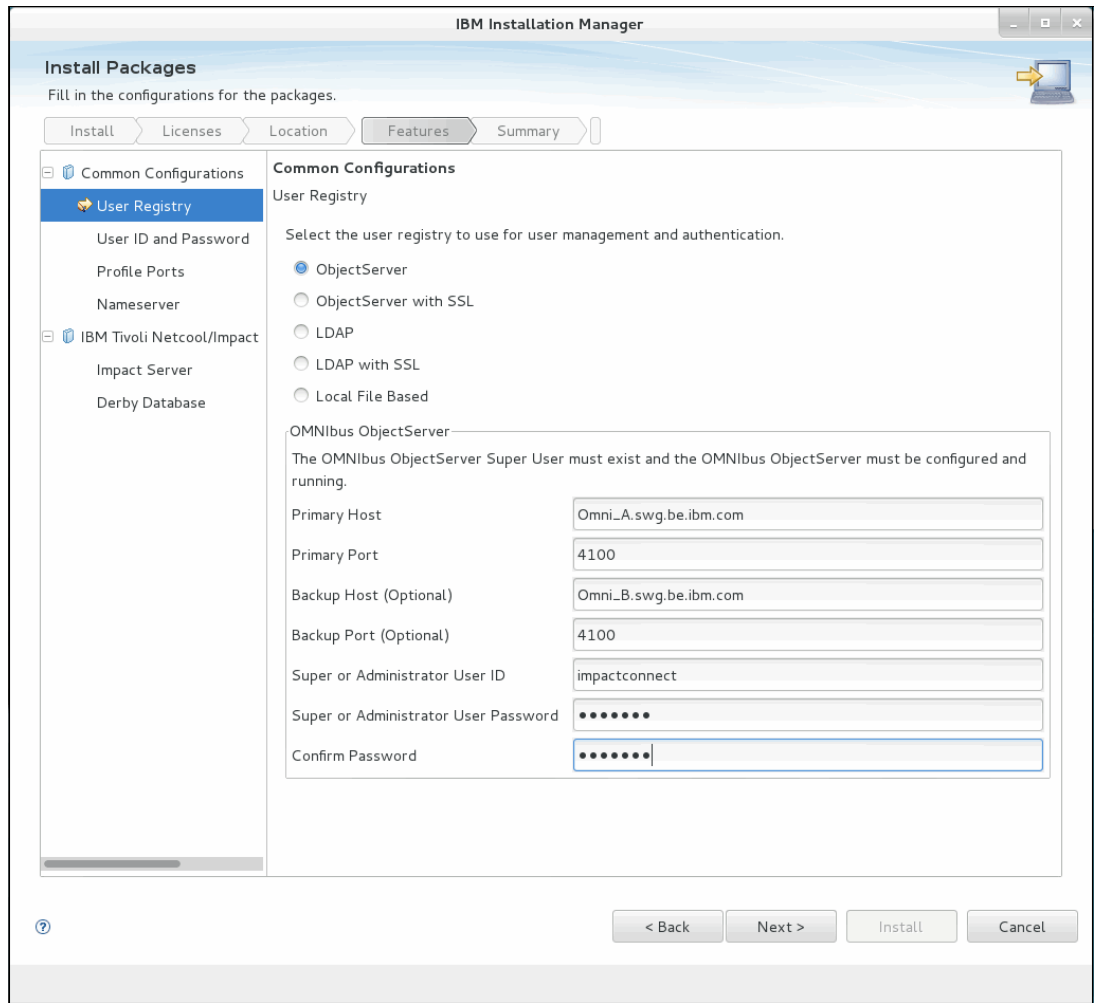
Figure 2-42   User Registry

10.The `impactconnect` user must exist in the user repository. In this installation, the `impactconnect` user is created in the aggregation ObjectServers. Ensure that the `impactconnect` user is created in the aggregation ObjectServers before you continue (Figure 2-43). If you need more information about how to create a user in OMNIbus, see the following link:

https://ibm.biz/Bdrr58

> **Note:** The ObjectServer repository is used for the initial configuration of Impact only. Later, we configure the Lightweight Directory Access Protocol (LDAP) repository and use it instead. Then, we remove the ObjectServer repository.

Click **Next**.
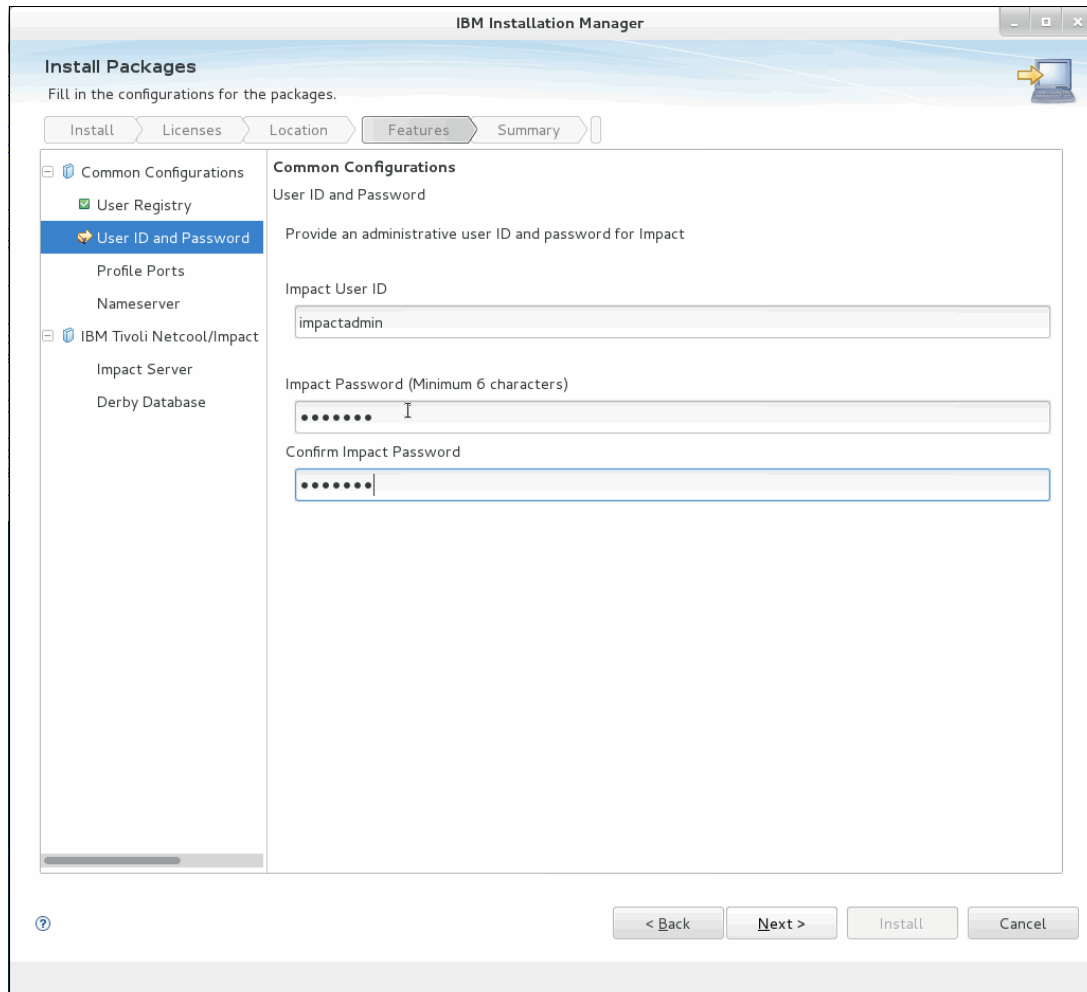
Figure 2-43   User ID and Password for the Impact administrator

11.Leave the default ports in Figure 2-44 and click **Next**.
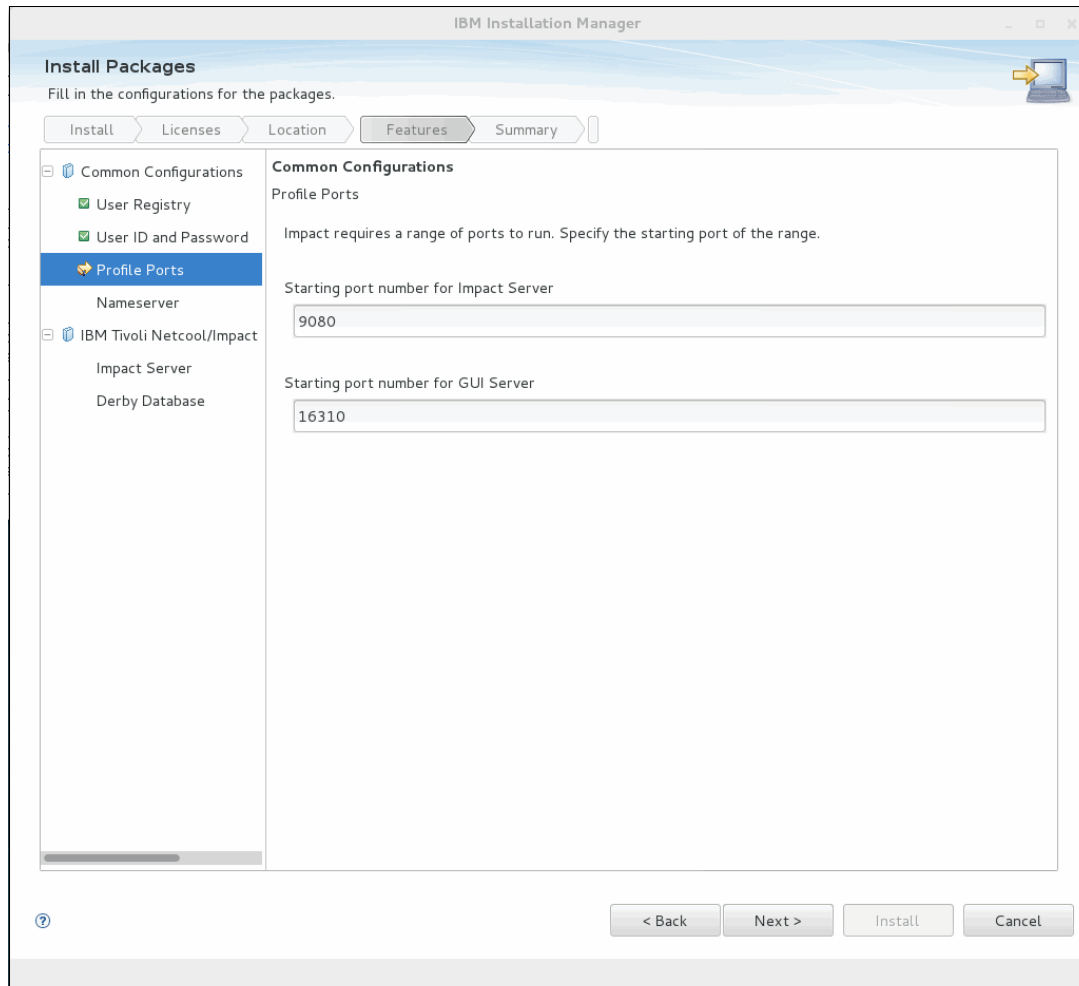
Figure 2-44   Ports that are used

12. Configure the nameserver. This configuration is identical for both Impact servers, as shown in Figure 2-45.

> **Note:** Ignore the error about the nameserver that cannot be found.
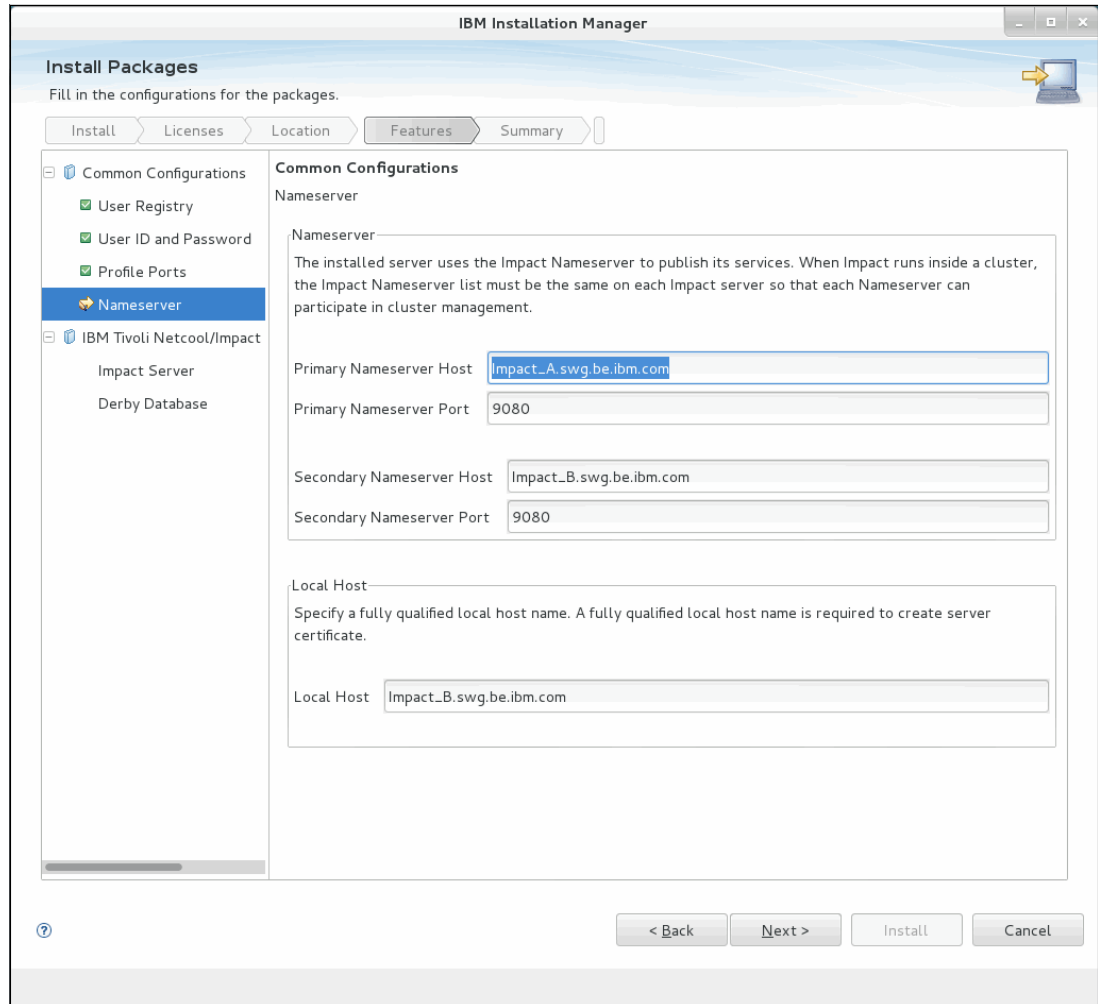
Figure 2-45   Secondary nameserver configuration

13. Configure the panel for a unique Impact instance name. Figure 2-46 shows the configuration for Impact-a.

Tip: The instance name is different, but both configurations use the same cluster name.
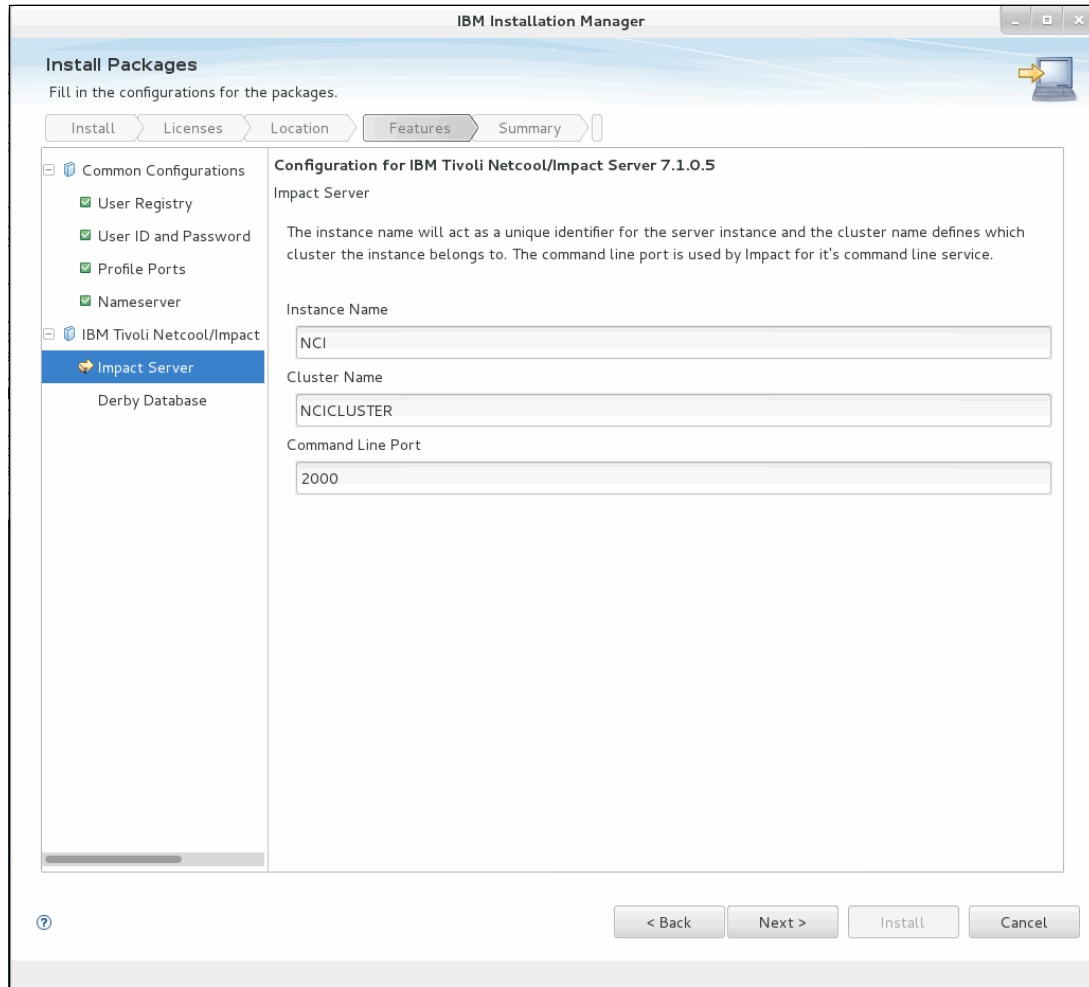
Figure 2-46   Configure the Impact name

14.Figure 2-47 shows the configuration for impact-b.
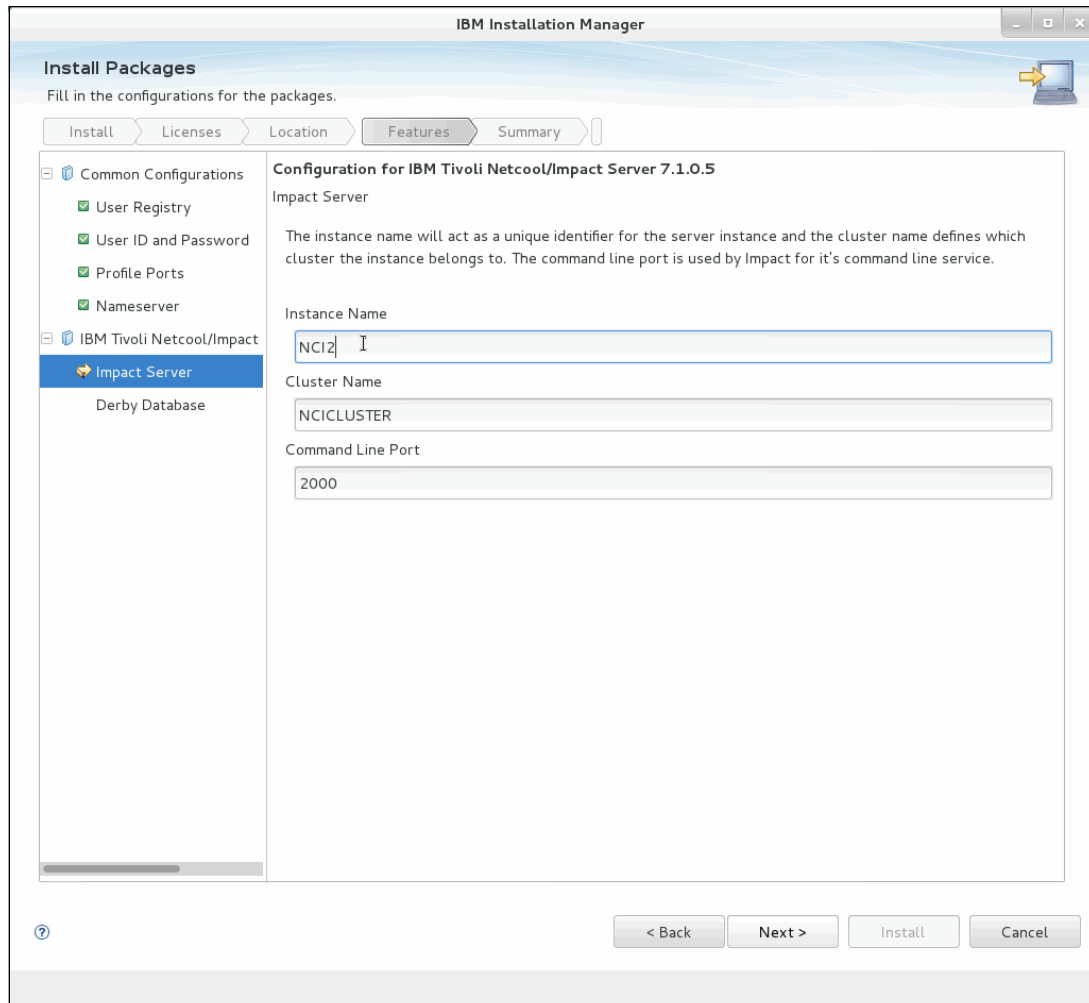
Figure 2-47   Configure the secondary Impact name

15.Next, configure the purpose of the Impact server, which differs for the Impact servers:

a. For Impact-A.swg.be.ibm.com, choose **Primary - Database on this machine which also functions in a clustered environment and needs a Backup Database defined.** See Figure 2-48.
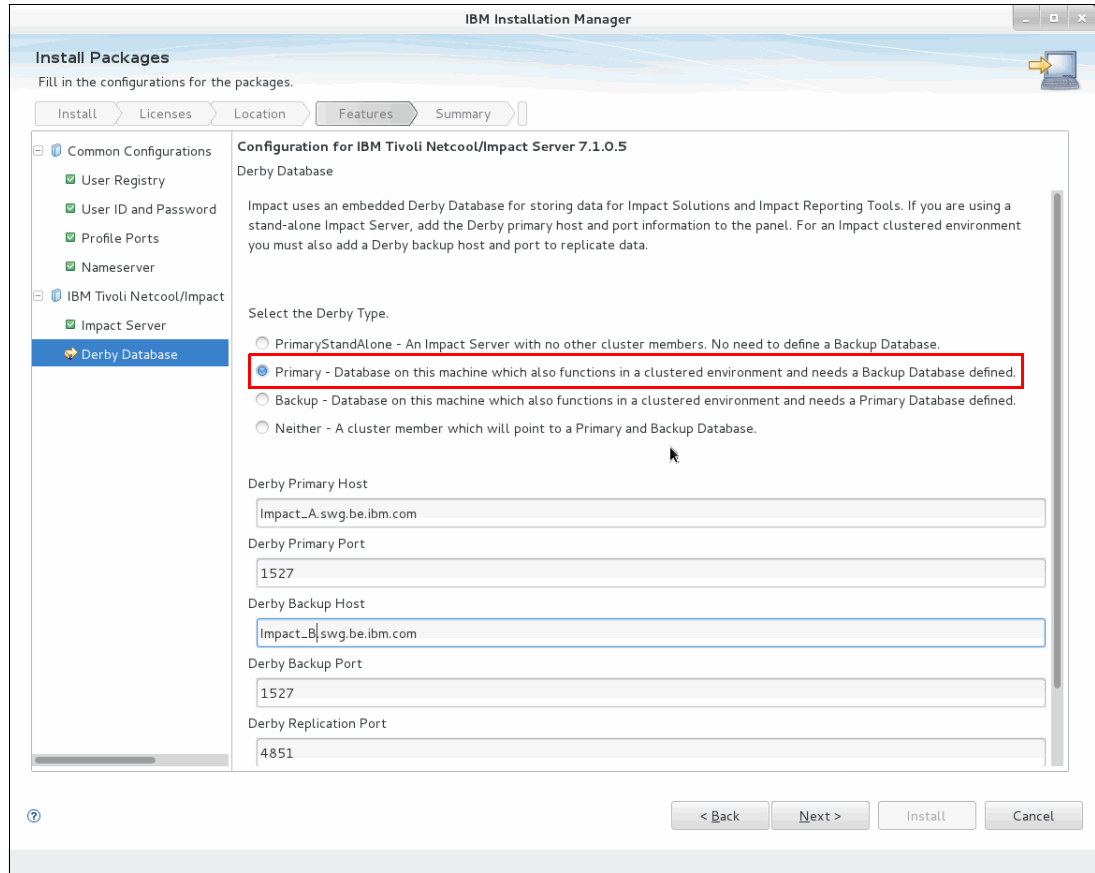
Figure 2-48   Configure the primary derby database

b. For Impact-B.swg.be.ibm.com, choose **Backup - Database on this machine which also functions in a clustered environment and needs a Primary Database defined.** See Figure 2-49. Click **Next**.
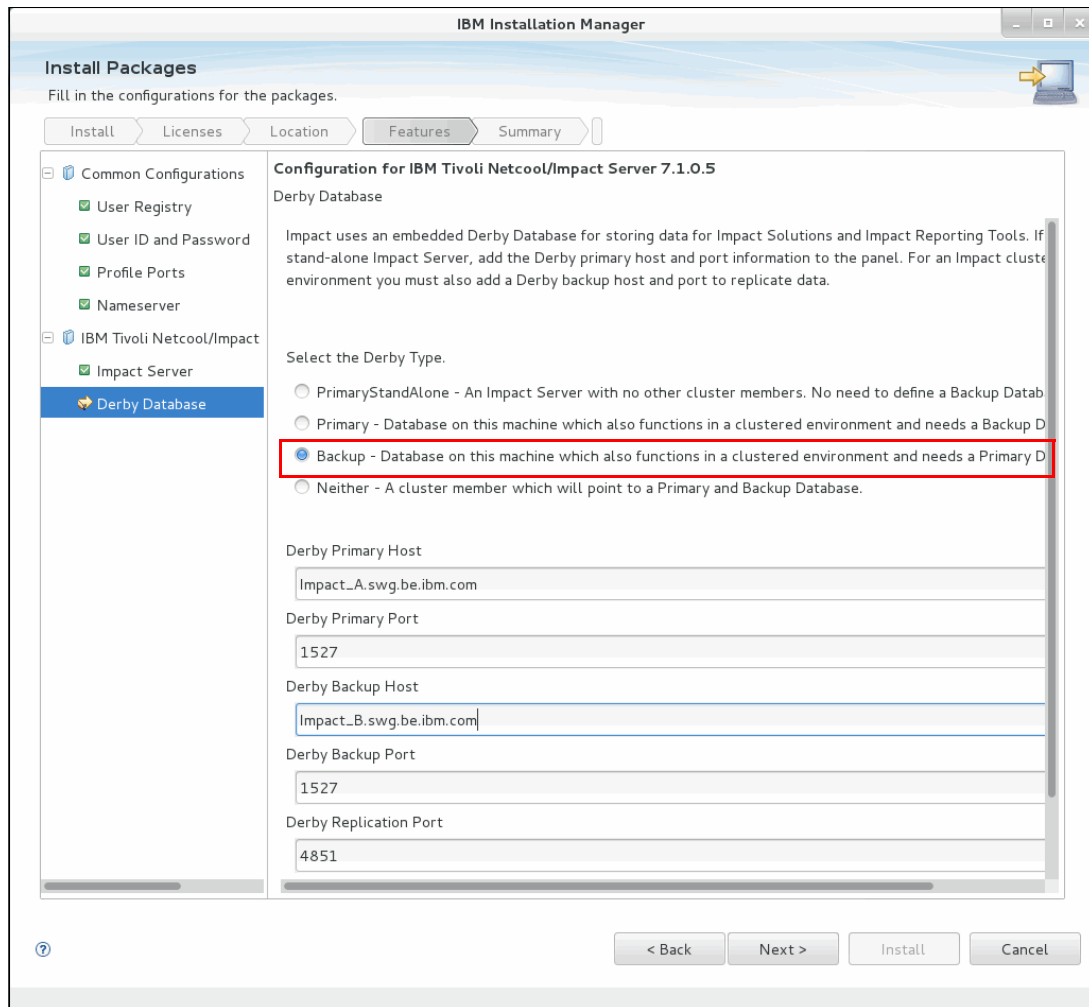
Figure 2-49   Configure the secondary derby database

16.Start the installation (Figure 2-50) by clicking **Install**.
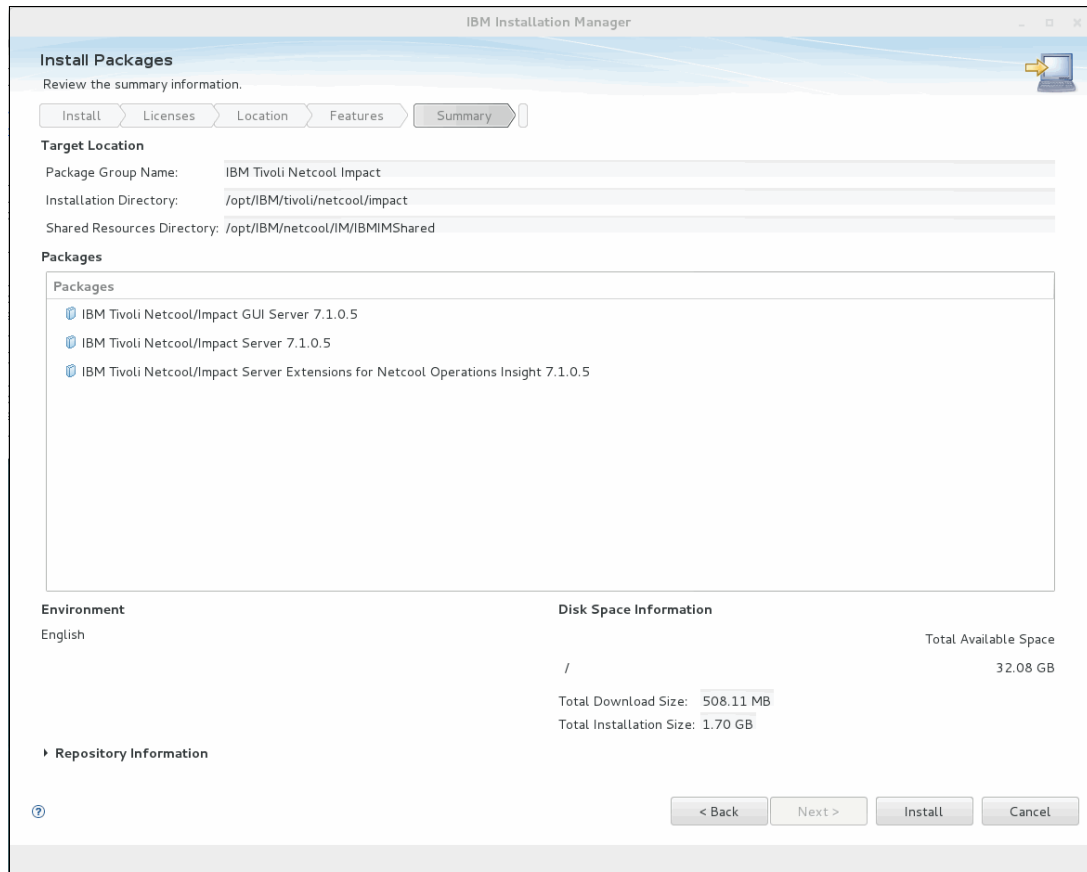
Figure 2-50   Installation summary review and start

17.Wait for the installation to finish (Figure 2-51).

Note: You can ignore the error to connect to the backup ObjectServer in Figure 2-51 if you know that the backup ObjectServer is not running.
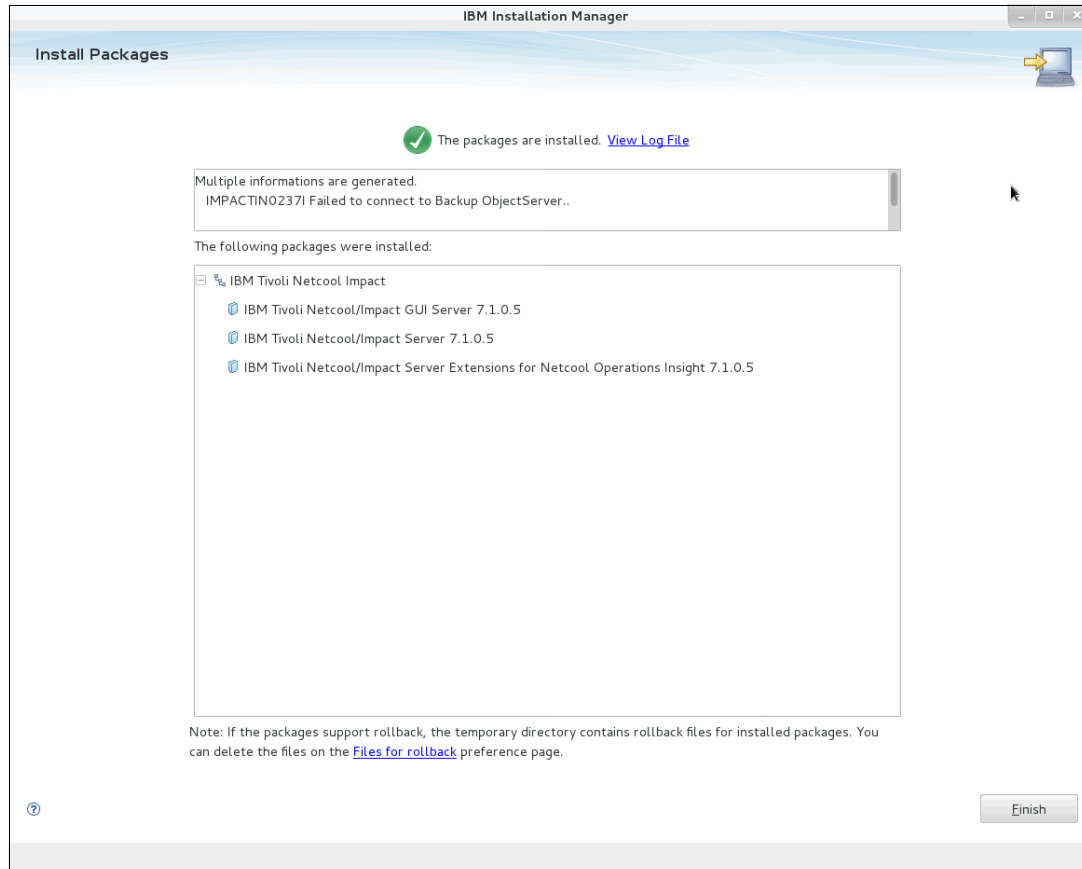
Figure 2-51   Successful installation

2.4.4 Verification
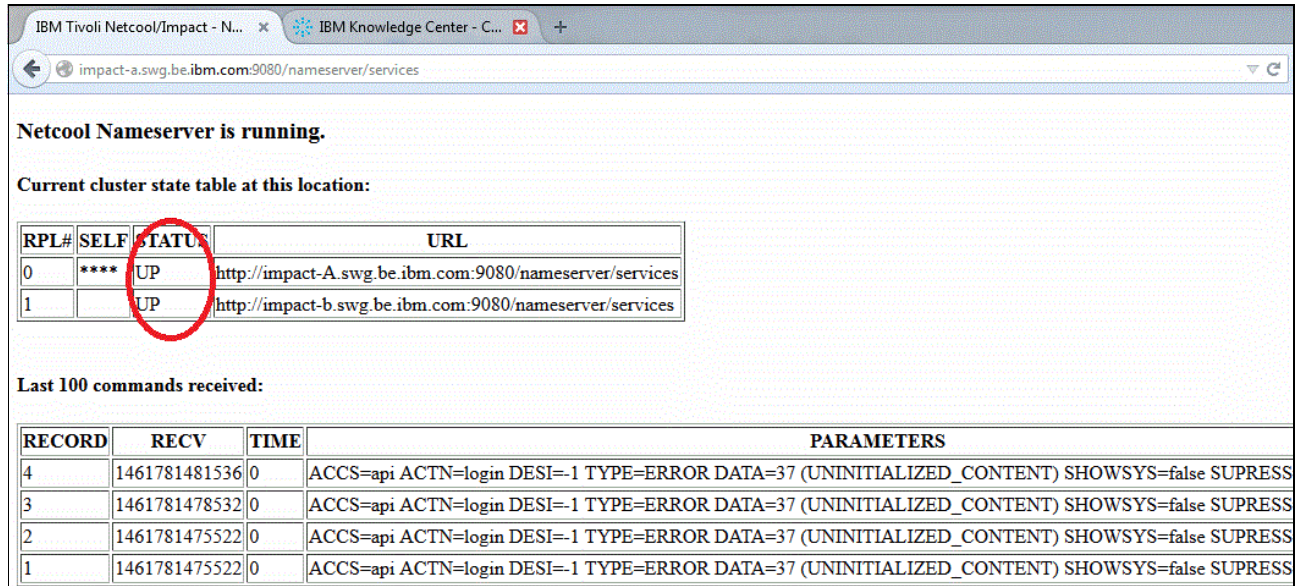
You can verify the installation.

Impact NameServer

You can check the running nameserver cluster through this URL:

`http://impact-a.swg.be.ibm.com:9080/nameserver/services`

Log in with `impactadmin`. The result is similar to Figure 2-52.

Figure 2-52   Nameserver status

2.5 IBM Tivoli Network Manager

This section describes the installation and basic configuration of IBM Tivoli Network Manager (Network Manager).

2.5.1 Introduction

Network Manager comes with a set of predefined requirements for the operating system. These requirements are documented on the IBM documentation server:

`https://ibm.biz/BdrrNb`

The IBM Prerequisite Scanner (version 1.2.0.17 in this book) will check these requirements against the installed operating system.

> **Note:** The prerequisite configuration file for Tivoli Network Manager 4.2 is included in IBM Prerequisite Scanner 1.2.0.18. You can refer to the following Quick Start Guide for Prerequisite Scanner 1.2.0.18:
>
> `https://ibm.biz/BdrrNg`

For this deployment, we used the settings in Table 2-8.

Table 2-8   Settings for the Network Manager installation

Setting	Value
Default directory	/opt/IBM/netcool/core/
OMNIbus user/password	itnmconnect/netcool
Network Manager GUI user/password	itnmadmin/netcool
$NCHOME	/opt/IBM/netcool/core
$ITNMHOME	$NCHOME/precision

2.5.2 Check the prerequisites

The Prerequisite Scanner must be run by the user that installs the products. Run the command, add the missing packages, and correct the operating system settings. On the Tivoli Network Manager Core server, set the environment variable **tnmCORE**=True. This value forces the Prerequisite Scanner to detect the requirement for that component only. Example 2-53 shows how to run the command to check the prerequisites.

Example 2-53   Prerequisite Scanner command

```
su - netcool
export tnmCORE=True

[root@itnm-a precheck]# ./prereq_checker.sh "TNM 04200000" details
IBM Prerequisite Scanner
     Version: 1.2.0.17
     Build  : 20150827
     OS name: Linux
   User name: root

 Machine Information
 Machine name: itnm-a
 Serial number:  VMware-42 16 f2 60 a4 6d 2c da-e2 e8 2f f4 d0 d9 b0 51


Scenario: Prerequisite Scan

TNM - IBM Tivoli Network Manager [version 04200000]:
Property                      Result   Found                          Expected
========                      ======   =====                          ========
OS Version                    PASS     Red Hat Enterprise Linux Server rel... AIX V6.1
                                                                      AIX V7.1
                                                                       RedHat Enterprise Linux Server 6.*
                                                                       RedHat Enterprise Linux Server 7.*
                                                                       SuSE Linux Enterprise Server 11.*

Memory                        WARN     5.88GB                         2-8GB
os.space.tmp                  PASS     93GB                           1GB
os.space.var                  PASS     93GB                           1GB
os.localhostInHostsFile       PASS     True                           True
network.ipv4Available         PASS     True                           True
network.dns                   PASS     True                           True
network.pingLocalhost         PASS     True                           True
network.pingSelf              PASS     True                           True
os.ulimit                     PASS     8192                           [type:filedescriptorlimit]8192+,unlimited
os.ulimit                     PASS     65536                          [type:maxprocesseslimit]16384+,unlimited
Disk                          PASS     93.00GB                        70GB
os.swapSize                   WARN     3.87GB                         4GB+
os.SELinux                    PASS     Disabled                       [source:Command]Disabled
os.lib.libstdc.so.6_64        PASS     /usr/lib64/libstdc++.so.6      /usr/lib64/libstdc++.so.6
```

```
os.package.python               PASS    python-2.7.5-16.el7.x86_64          python-2.6.6+
os.package.libstdc++.x86_64     PASS    libstdc++-4.8.3-9.el7.x86_64        libstdc++-4.8.2+

Aggregated Properties for Scanned Products:
Property                        Result  Found                              Expected
========                        ======  =====                              ========
/                               PASS    93.00GB                            72.00GB
Memory                          WARN    5.88GB                             2.00-8.00GB

Overall result:   WARNING  (TNM 04200000: WARNING)

Environment variable settings: [ tnmCORE=true, tnmGUI=[Not Found] ]

Detailed results are also available in /mnt/ITSO_SHARE/ITNM/precheck/result.txt
```

2.5.3 Installation

Follow these steps:

1. Before you install the Network Manager core, extract the db2_creation_scripts.tar.gz DB2 creation scripts into a temporary folder on the DB2 database server DBServ-a.swg.be.ibm.com, as shown in Example 2-54. You can find this file in the top directory of the ITNM repository.

Example 2-54   Extract the DB2 creation scripts

```
tar xzvf /mnt/ITSO_SHARE/ITNM/Base/db2_creation_scripts.tar.gz


As root, create the ncim user on the OS.
useradd ncim -g db2iadm1
passwd ncim (netcool)


As db2inst1, create the database.
su - db2inst1
./create_db2_database.sh ITNM ncim


DB20000I  The CREATE DATABASE command completed successfully.
(c) Copyright IBM Corporation 1993,2007
Command Line Processor for DB2 Client 10.5.3

You can issue database manager commands and SQL statements from the command
prompt. For example:
    db2 => connect to sample
    db2 => bind sample.bnd

For general help, type: ?.
For command help, type: ? command, where command can be
the first few keywords of a database manager command. For example:
 ? CATALOG DATABASE for help on the CATALOG DATABASE command
 ? CATALOG          for help on all of the CATALOG commands.

To exit db2 interactive mode, type QUIT at the command prompt. Outside
interactive mode, all commands must be prefixed with 'db2'.
To list the current command option settings, type LIST COMMAND OPTIONS.

For more detailed help, refer to the Online Reference Manual.

db2 =>
    Database Connection Information

 Database server       = DB2/LINUXX8664 10.5.3
 SQL authorization ID  = DB2INST1
```

```
 Local database alias    = ITNM

db2 => db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
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db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
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db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => DB20000I  The SQL command completed successfully.
db2 => db2 => DB20000I  The SQL command completed successfully.
db2 => db2 => DB20000I  The UPDATE DATABASE MANAGER CONFIGURATION command completed successfully.
SQL1362W  One or more of the parameters submitted for immediate modification
were not changed dynamically. Client changes will not be effective until the
next time the application is started or the TERMINATE command has been issued.
Server changes will not be effective until the next DB2START command.
db2 => DB20000I  The UPDATE DATABASE MANAGER CONFIGURATION command completed successfully.
db2 => db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
SQL1363W  One or more of the parameters submitted for immediate modification
were not changed dynamically. For these configuration parameters, the database
must be shut down and reactivated before the configuration parameter changes
become effective.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
SQL1363W  One or more of the parameters submitted for immediate modification
were not changed dynamically. For these configuration parameters, the database
must be shut down and reactivated before the configuration parameter changes
become effective.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
SQL1363W  One or more of the parameters submitted for immediate modification
were not changed dynamically. For these configuration parameters, the database
must be shut down and reactivated before the configuration parameter changes
become effective.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
SQL1363W  One or more of the parameters submitted for immediate modification
were not changed dynamically. For these configuration parameters, the database
must be shut down and reactivated before the configuration parameter changes
become effective.
db2 => DB20000I  The UPDATE DATABASE CONFIGURATION command completed successfully.
db2 => db2 => DB20000I  The SQL command completed successfully.
```

```
db2 => DB20000I   The SQL command completed successfully.
db2 => DB20000I   The SQL command completed successfully.
db2 => DB20000I   The SQL command completed successfully.
db2 => DB20000I   The SQL command completed successfully.
db2 => DB20000I   The SQL command completed successfully.
db2 => db2 => DB20000I   The SQL command completed successfully.
db2 => db2 => DB20000I   The SQL DISCONNECT command completed successfully.
db2 => DB20000I   The QUIT command completed successfully.

   Database Connection Information

 Database server        = DB2/LINUXX8664 10.5.3
 SQL authorization ID   = DB2INST1
 Local database alias   = ITNM

DB20000I   The SQL DISCONNECT command completed successfully.
```

2. Start the core installation on the `itnm-a.swg.be.ibm.com` core server. Start the previously installed Installation Manager as shown in Example 2-55.

Example 2-55   Starting the Installation Manager

```
cd /opt/IBM/netcool/IM/InstallationManager/eclipse
./IBMIM
```

3. Figure 2-53 shows the Installation Manager GUI.
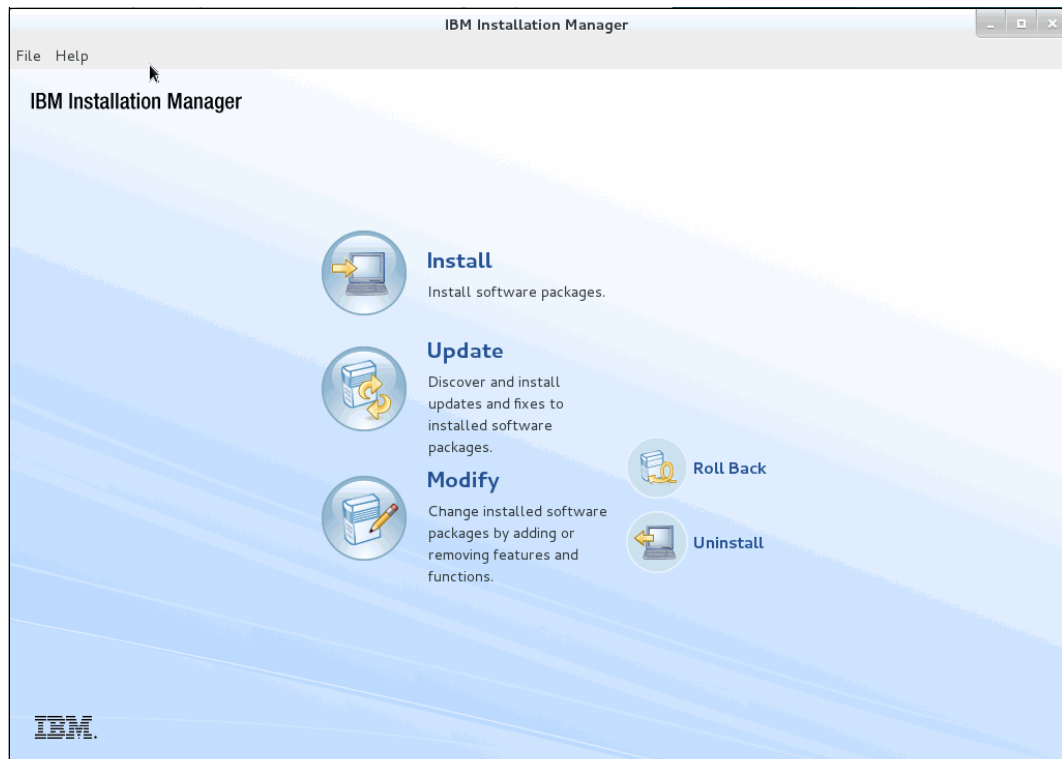
Figure 2-53   Installation Manager GUI

4. Add all of the Network Manager server repositories by selecting **File** → **Preferences** → **Repositories** → **Add Repository**. Browse for the repository. Click **OK**.

Figure 2-54 shows how to add the Network Manager core repository.
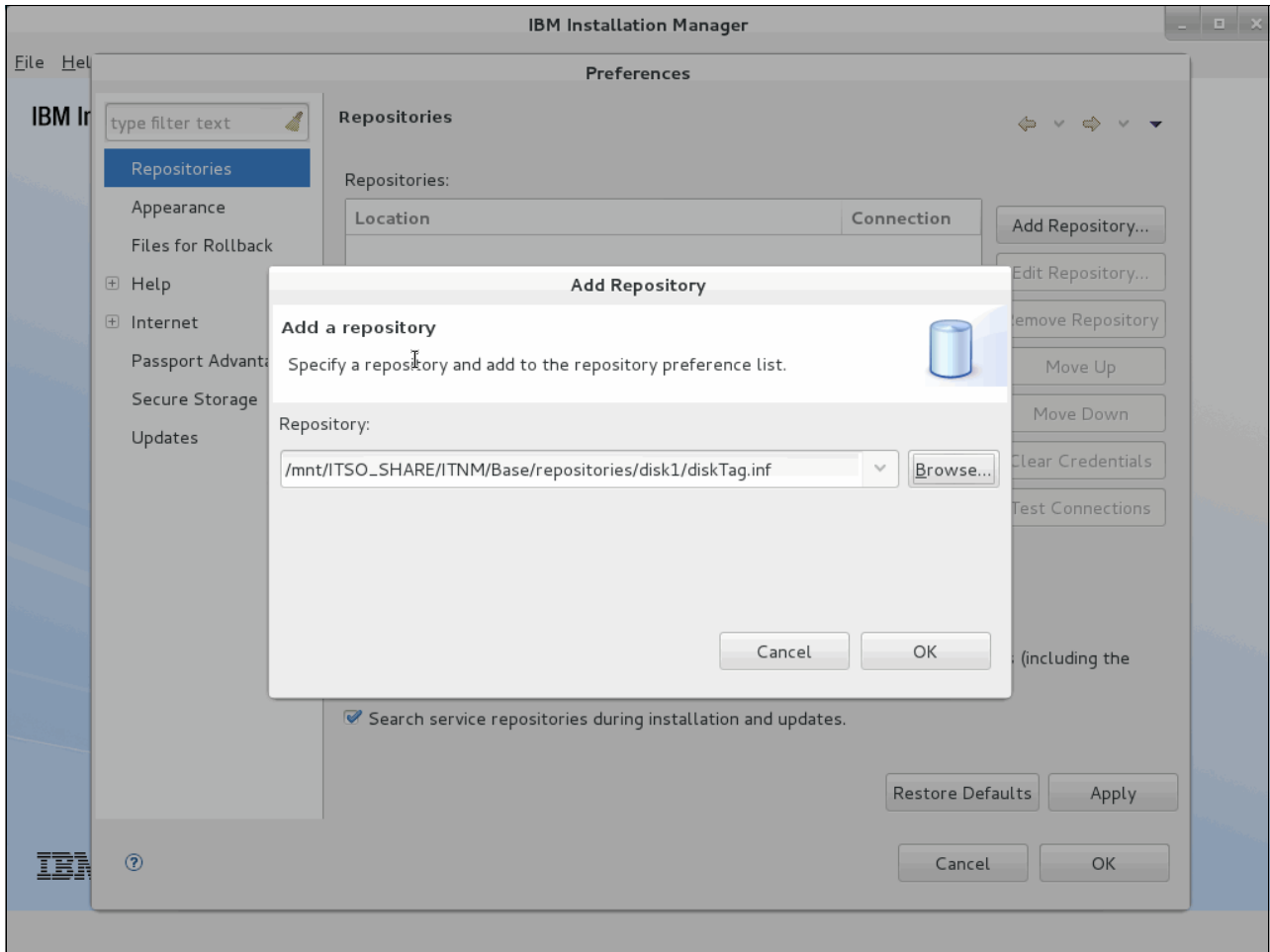
Figure 2-54   Add a repository

5. Start the installation. Figure 2-55 shows the Installation Packages component selection panel. Select only the **Network Manager Core Components** and **Network Manager topology database creation scripts** and click **Next**.
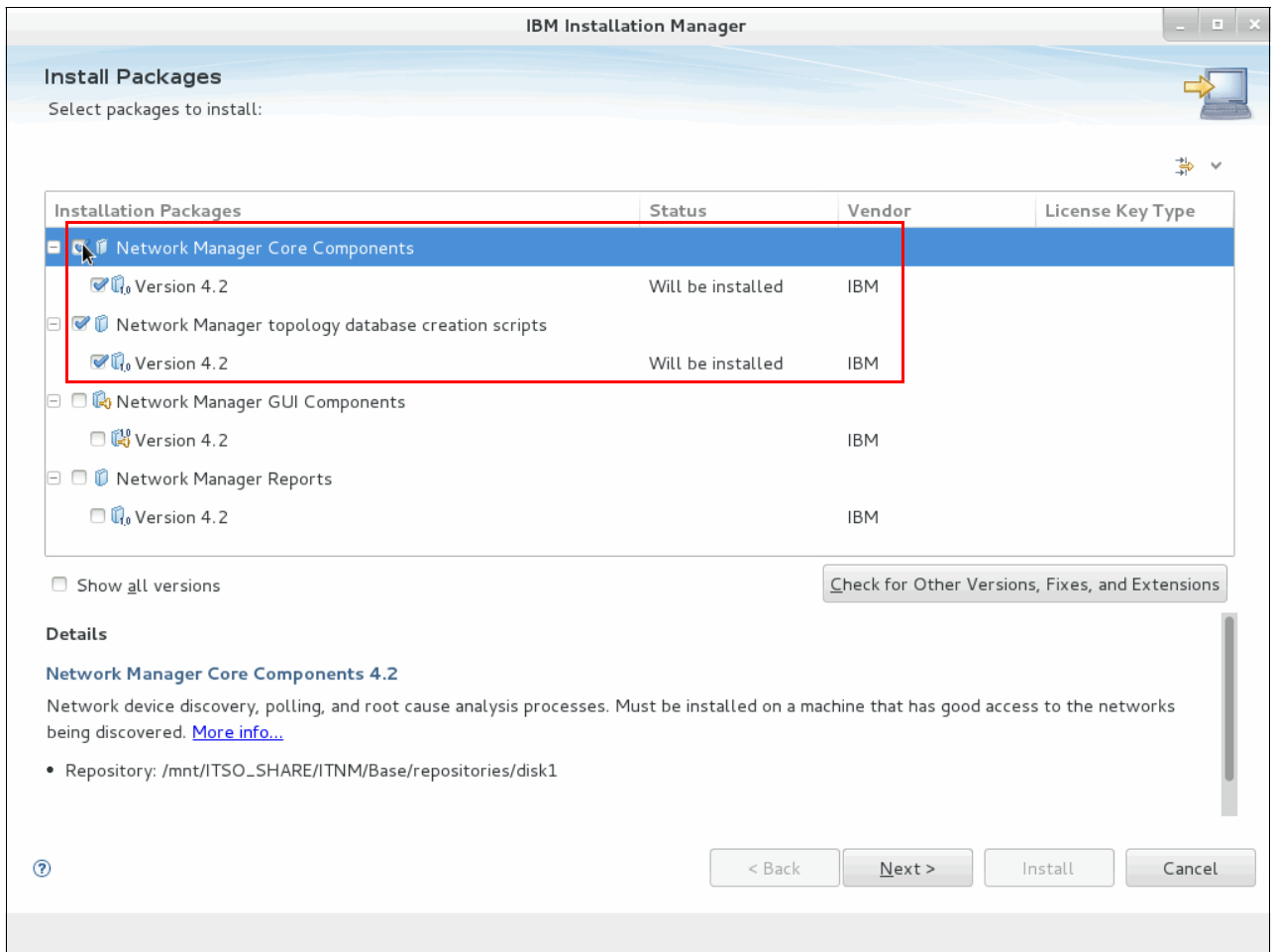
Figure 2-55   Select Network Manager components

6. Select **Next** to accept the license agreement, as shown in Figure 2-56.
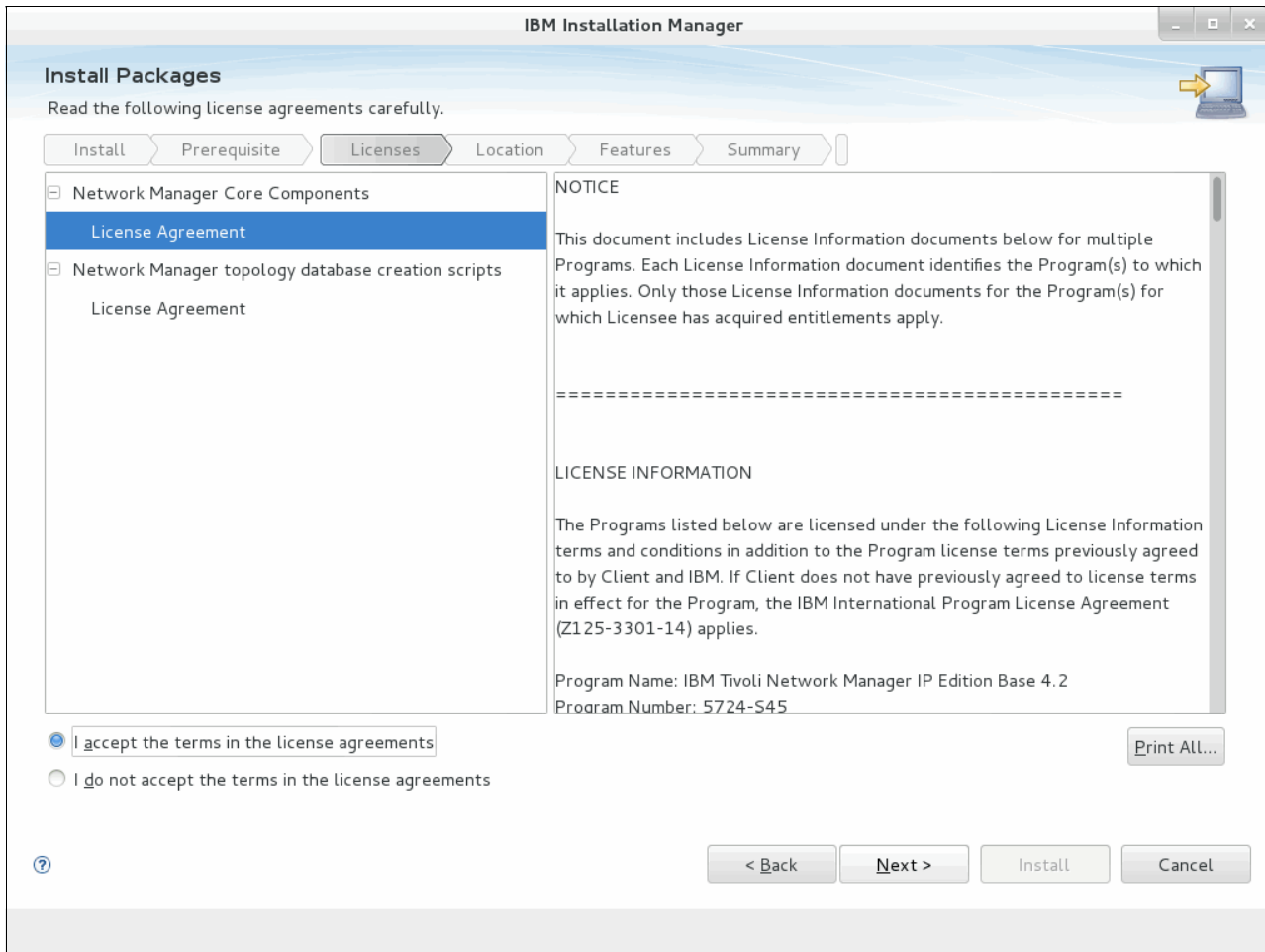
Figure 2-56   License Agreement

7. As shown in Figure 2-57, change the default shared resources directory. We used the `/opt/IBM/netcool/IM/IBMIMShared` shared resources directory. Click **Next**.
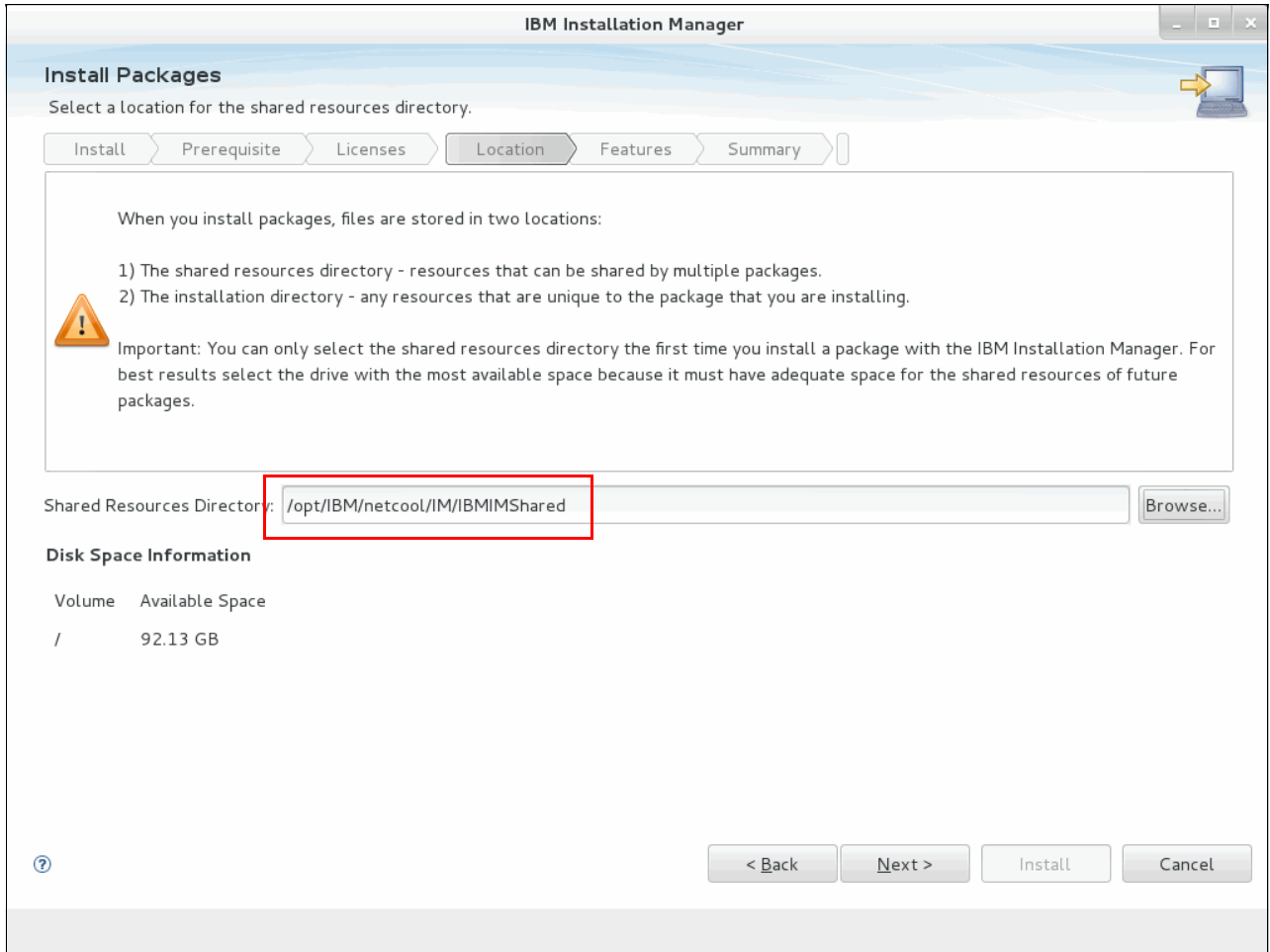
Figure 2-57   Shared resources

8. Figure 2-58 shows the installation directory selection. Leave it as it is. Click **Next**.
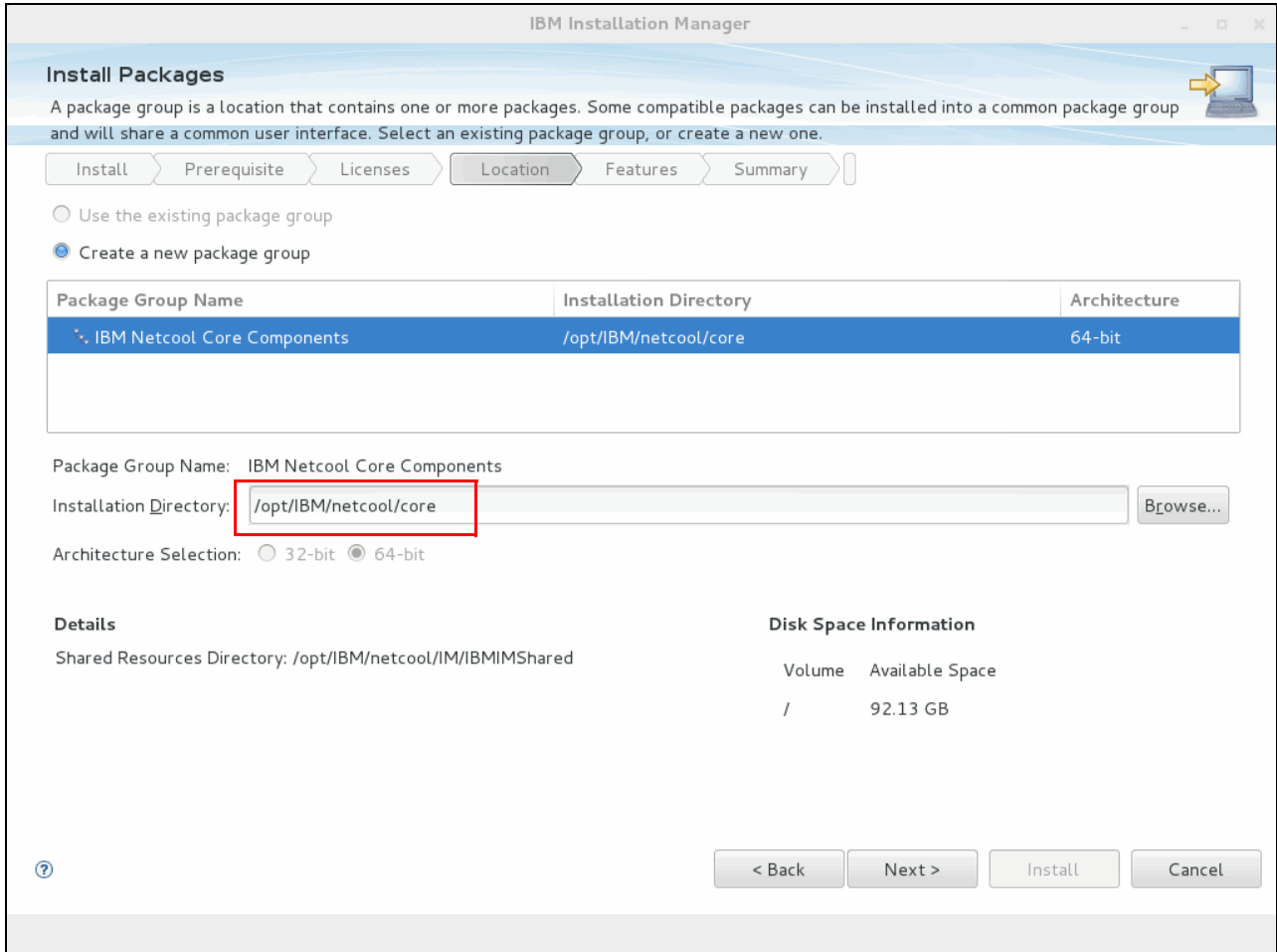
Figure 2-58   Installation directory

9. As shown in Figure 2-59, all selected packages will be installed. Click **Next**.
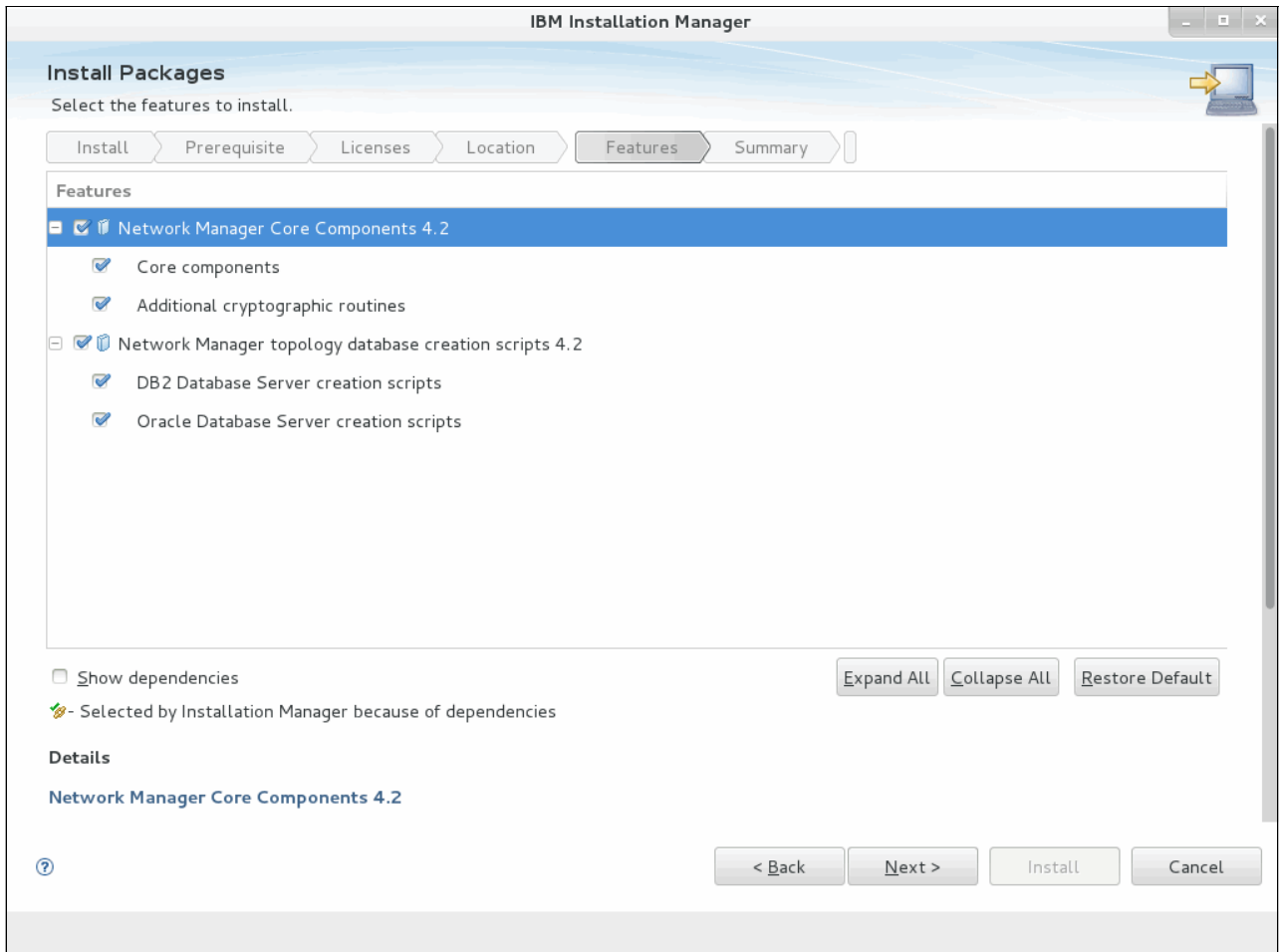
Figure 2-59   Install Packages window

10. Figure 2-60 shows the ObjectServer configuration panel. You cannot configure the failover capability yet. Therefore, we use the Primary Aggregation ObjectServer (AGG_P). We change this name later. Click **Next**.

> **Tip:** If you do not select the check box, you also choose to skip the configuration of the ObjectServer for Network Manager. We configure the Network Manager, triggers, and user accounts later in "Configuration" on page 113 when we finish the failover changes.
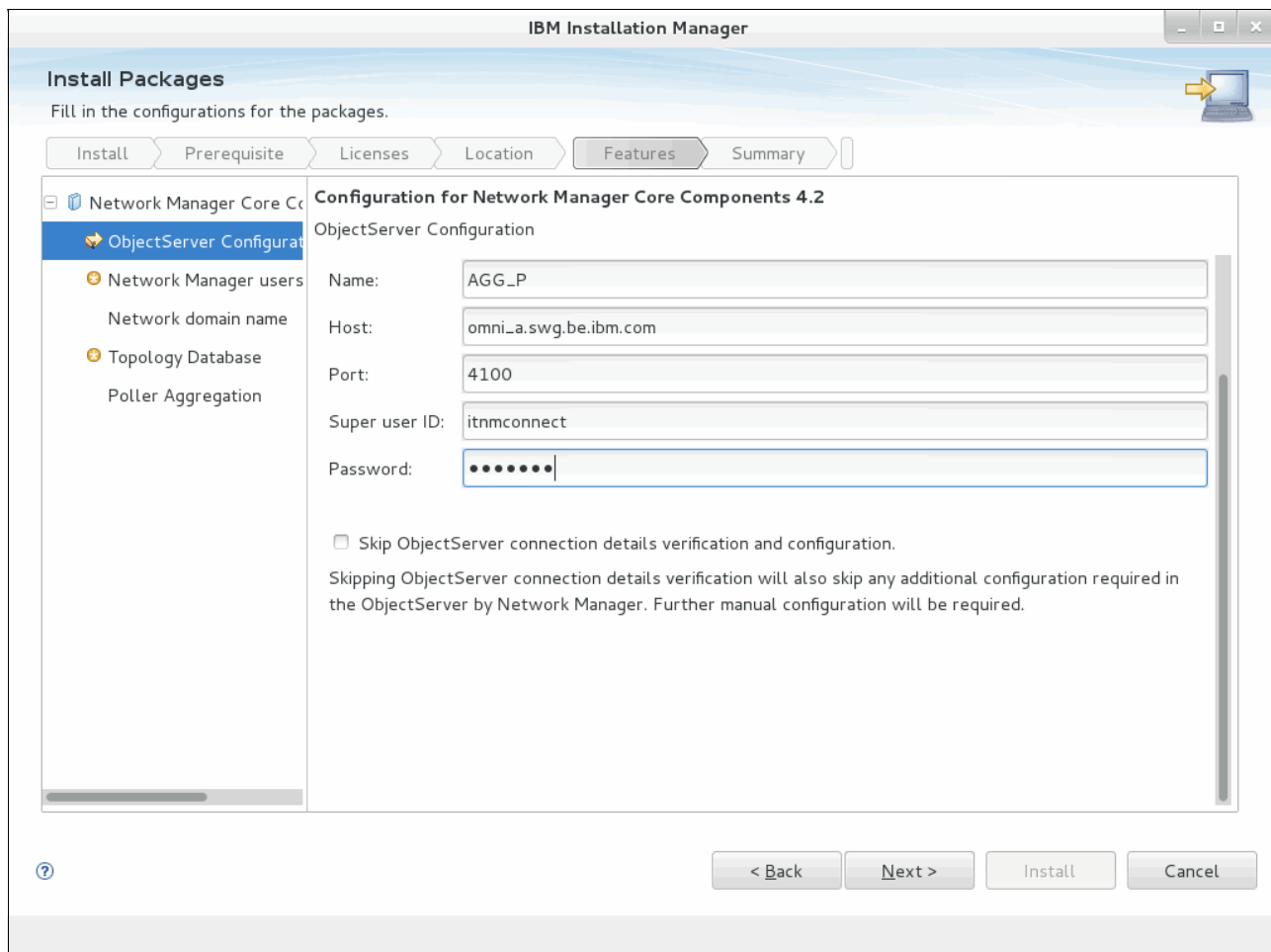
Figure 2-60   OMNIbus configuration panel

> **Note:** The user `itnmconnect` needs to be configured in ObjectServer before you execute the step in Figure 2-60.

11.Figure 2-61 configures the default Network Manager users and password. The same
password is used for both users.
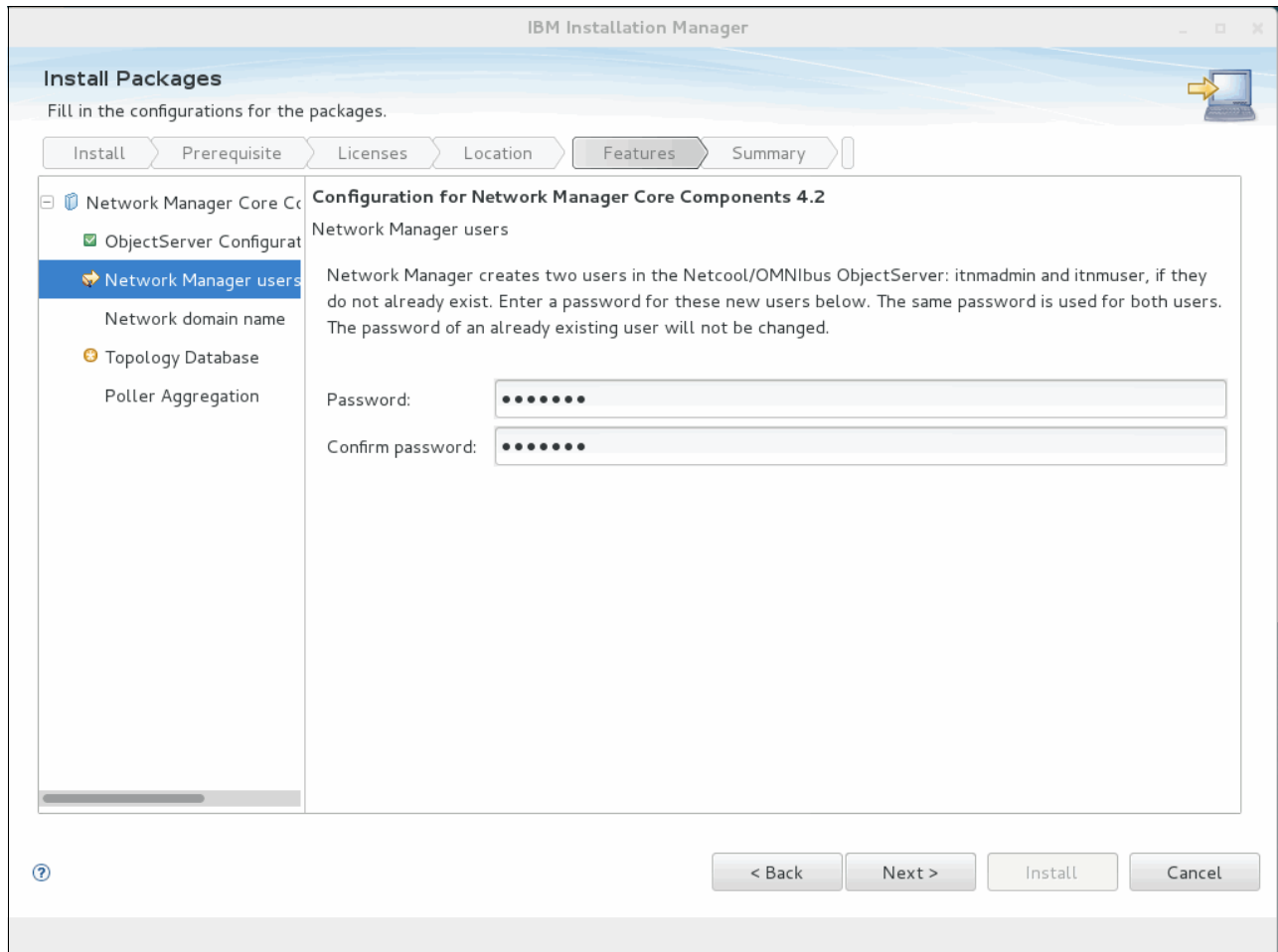
Figure 2-61   Network Manager users and password

12. Figure 2-62 shows the configuration of the network domain name.
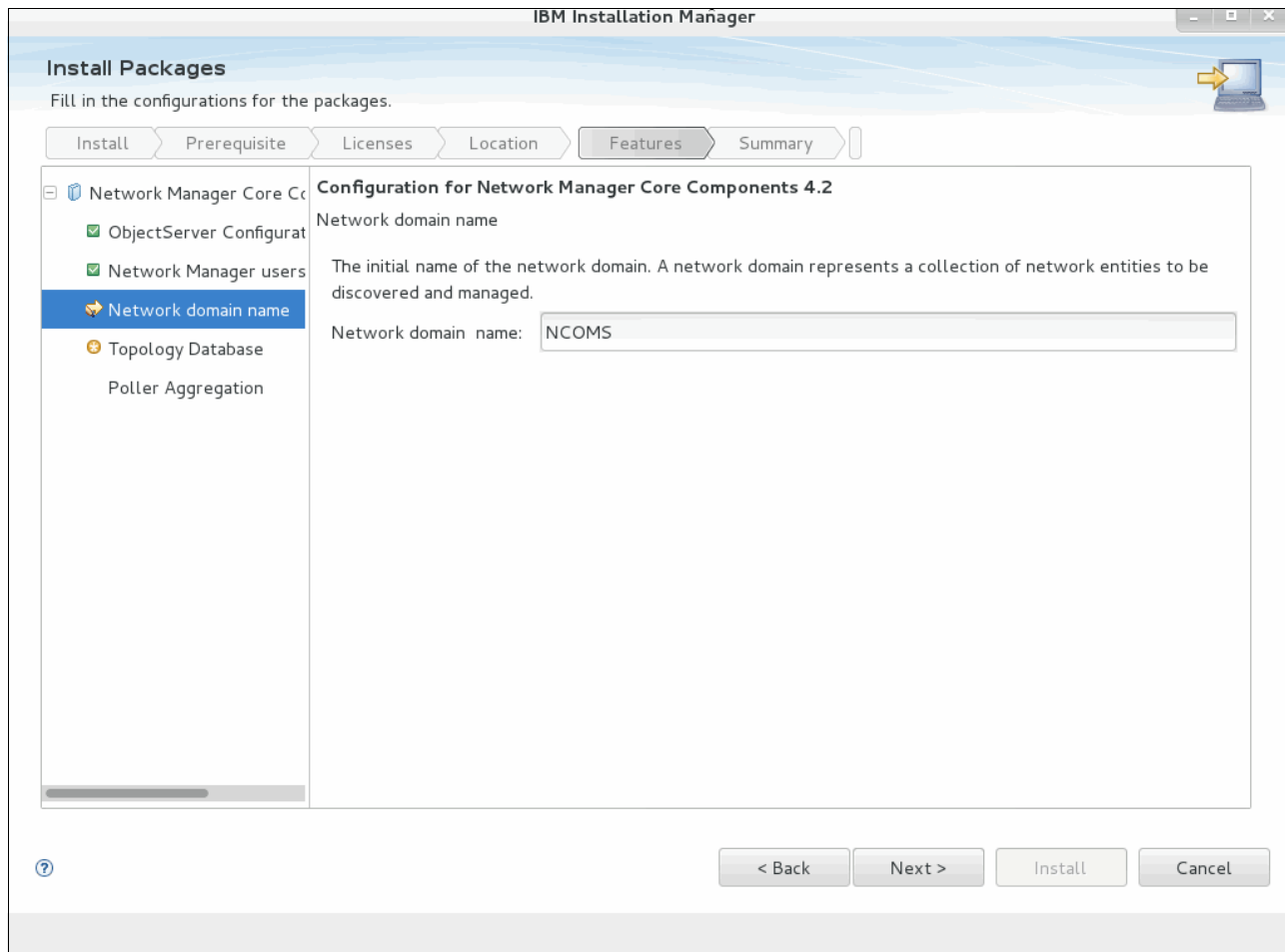
Figure 2-62   Network domain name

> **Important:** This name is *not* the name of the ObjectServer. This name is used inside Network Manager to label the network partition that will be discovered and monitored.

13.Figure 2-63 shows the DB2 configuration window.
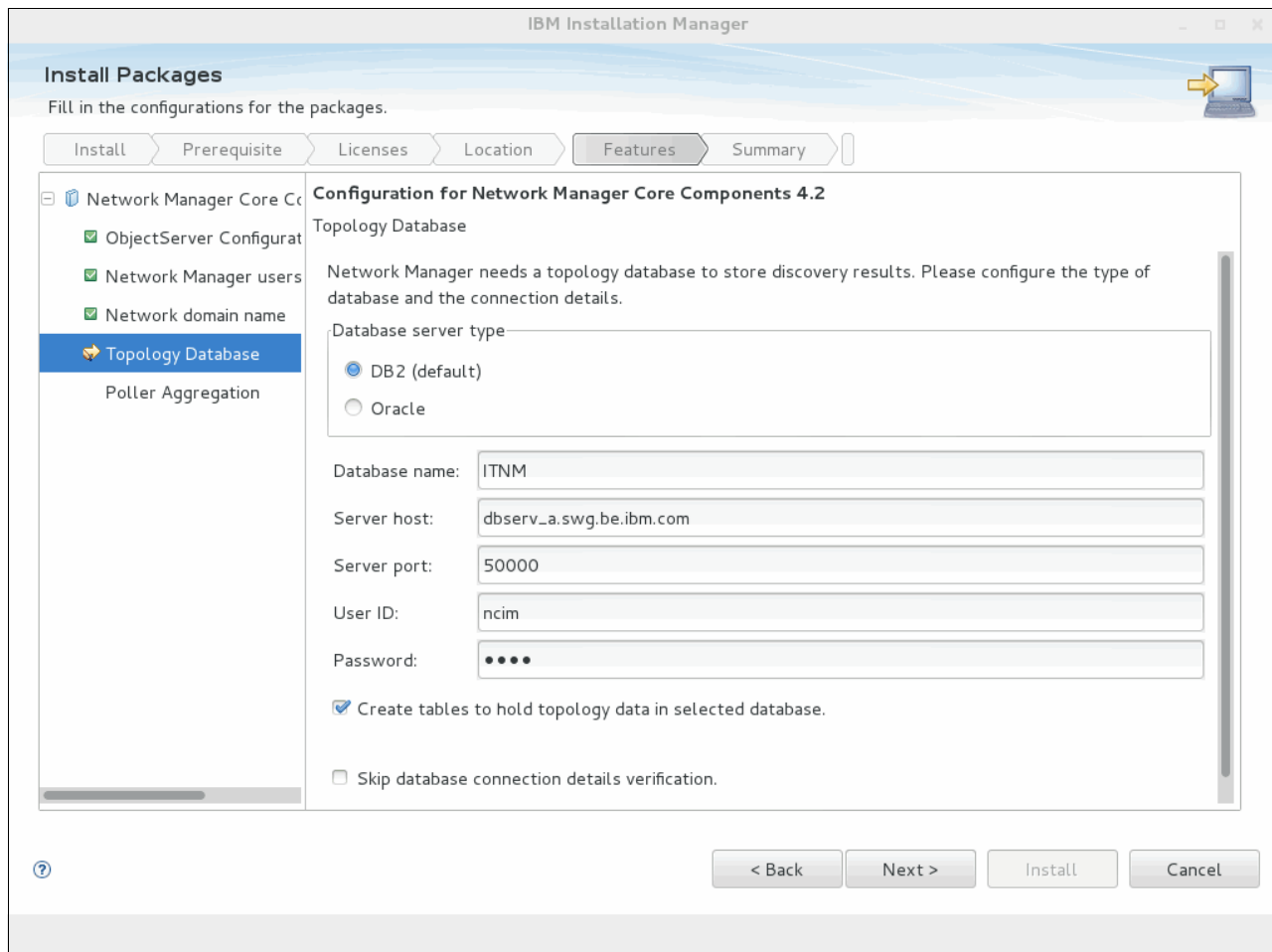
Figure 2-63   DB2 configuration

Note: The user and database must exist already.

14.Do not change the Python path, as shown in Figure 2-64. Click **Next**.
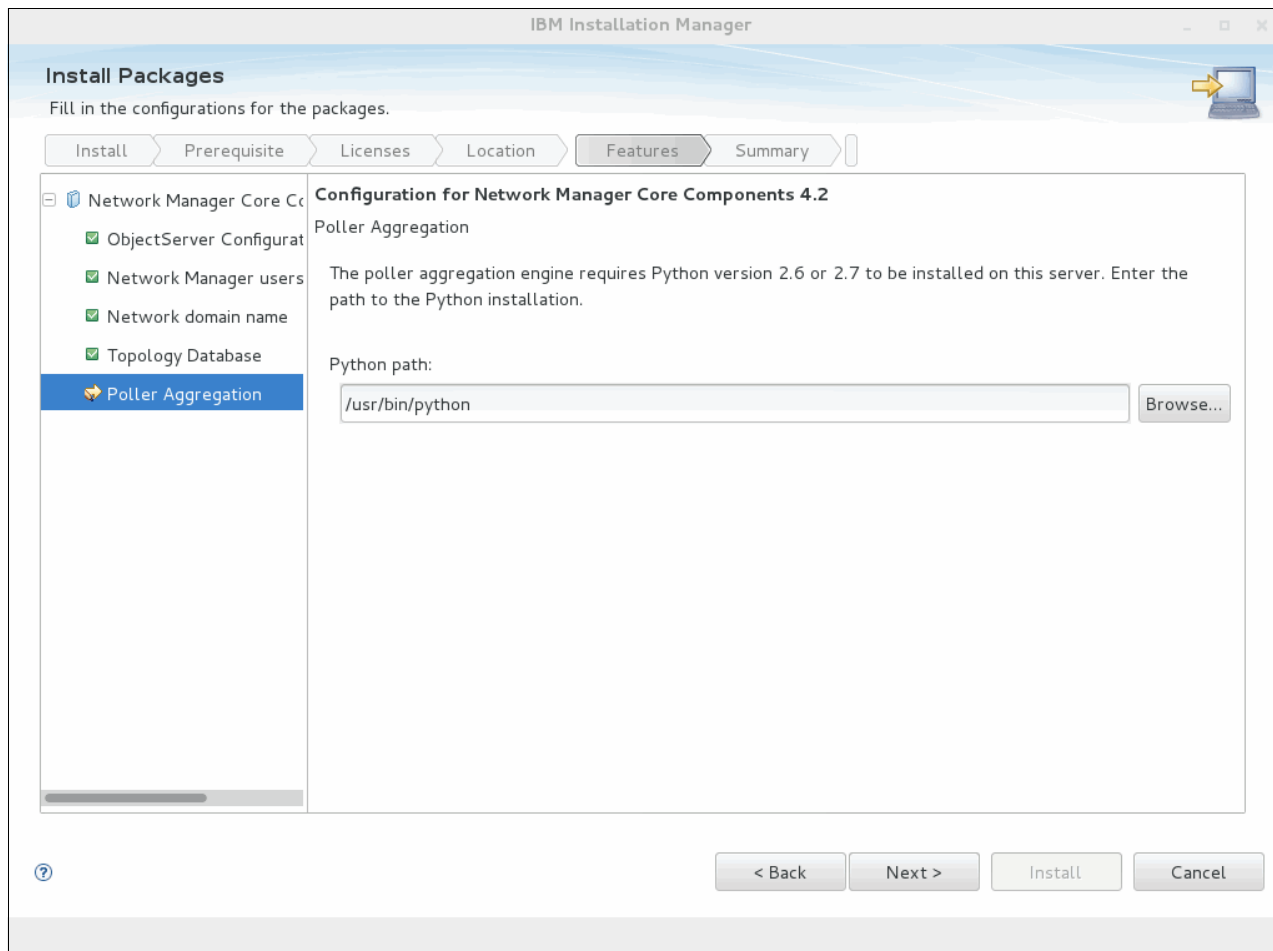
Figure 2-64   Python path

15. Figure 2-65 shows the Install Packages panel. Click **Install** and wait until the installation completes.
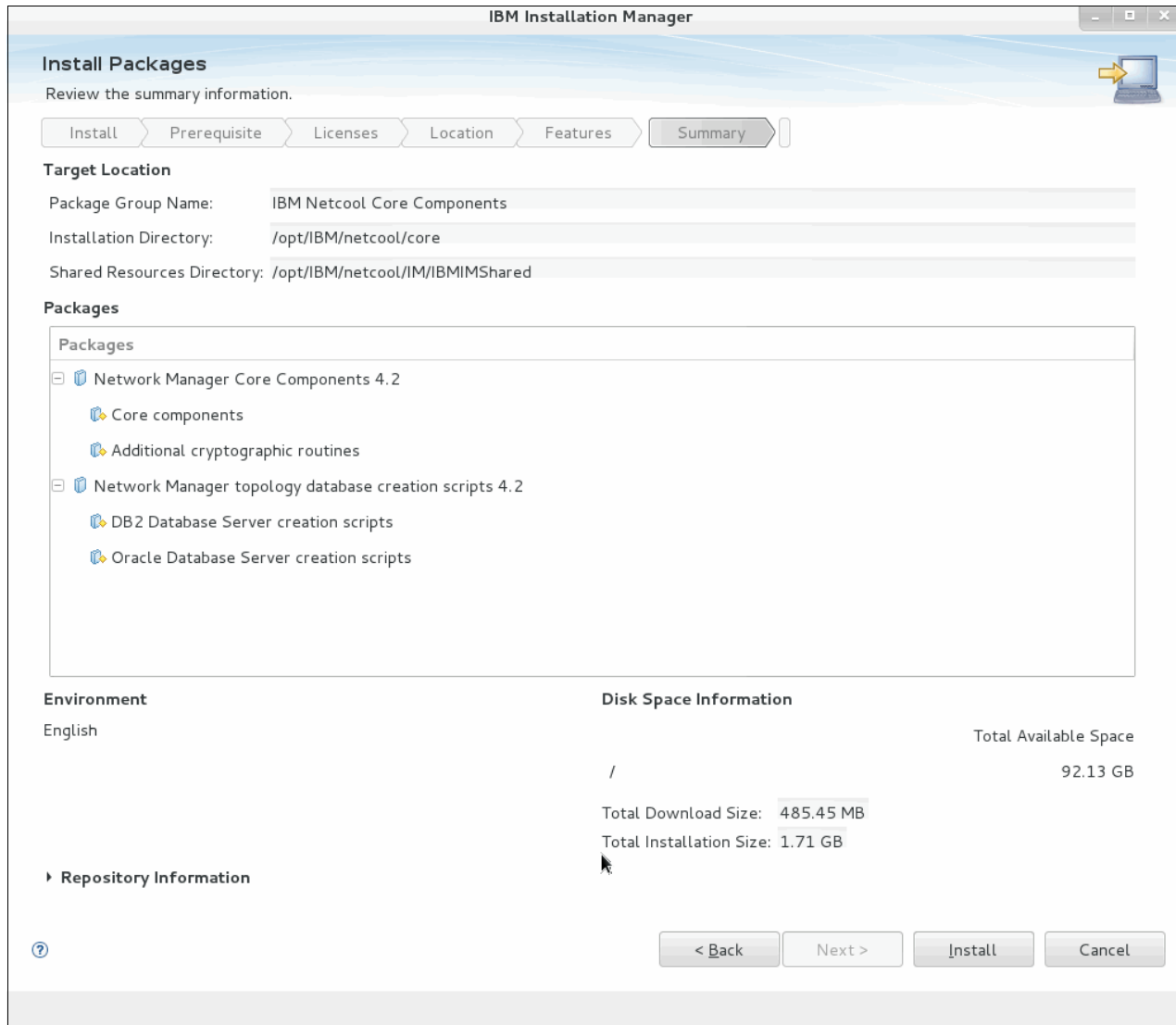
Figure 2-65   Install Packages Summary

16.Figure 2-66 shows the completed installation.
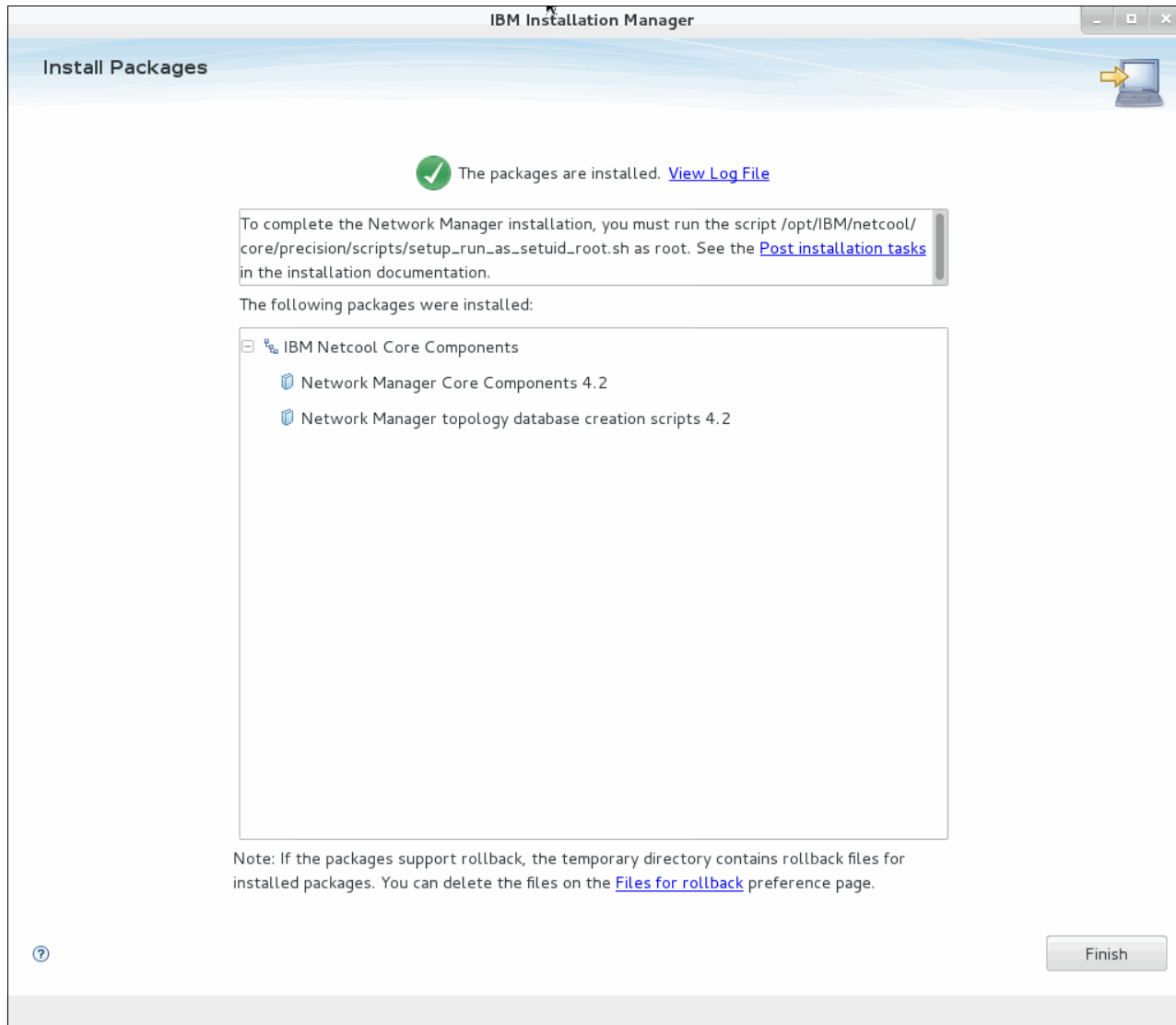
Figure 2-66   Installation summary

After a successful installation, post-installation steps for non-`root` users are required, as described in the following document:

https://ibm.biz/BdrrNV

Example 2-56 shows the implementation of these steps in our environment.

Example 2-56   Steps for non-root users

```
su - root
/opt/IBM/netcool/core/precision/scripts/
./setup_run_as_setuid_root.sh
. /opt/IBM/netcool/core/env.sh
cd /opt/IBM/netcool/core/precision/install/scripts
./create_all_control.sh
```

> **Tip:** Edit `create_all_control.sh` and comment out (by using the # sign) the "nco" line below:
>
> ```
> $NCHOME/precision/install/scripts/nco_create_control_scripts.sh $1
> ```
>
> Note that only two lines ar in the file. All other lines are the header comments:
>
> ```
> $NCHOME/precision/install/scripts/nco_create_control_scripts.sh $1
> $NCHOME/precision/install/scripts/ncp_create_control_scripts.sh $1
> ```
>
> The edited version is shown:
>
> ```
> #$NCHOME/precision/install/scripts/nco_create_control_scripts.sh $1
> $NCHOME/precision/install/scripts/ncp_create_control_scripts.sh $1
> ```

The GUI is installed during the installation of IBM Jazz for Service Management (JazzSM).

Configuration

You need to configure the Network Manager core server for failover, as described in the following document:

https://ibm.biz/BdrrNA

Configuring the ObjectServer for Network Manager

Configure the ObjectServer for Network Manager if you skipped this step during the installation:

1. Connect to any ObjectServer of the failover pair, for example, the Omni-A server. Copy the `$NCHOME/etc/interfaces.arch` file from the `NCHOME` location of the ObjectServer to the `NCHOME` installation location on the server where Network Manager is installed. See Example 2-57.

Example 2-57   Interfaces.arch file copy

```
Connect to Omni-a, then:
cd $NCHOME/etc
scp interfaces.linux2x86 itnm-a.swg.be.ibm.com:/opt/IBM/netcool/core/etc
netcool@itnm-a.swg.be.ibm.com's password:
interfaces.linux2x86                          100% 2689     2.6KB/s   00:00
scp interfaces.linux2x86 itnm-b.swg.be.ibm.com:/opt/IBM/netcool/core/etc
netcool@itnm-b.swg.be.ibm.com's password:
interfaces.linux2x86
```

2. Change the `ConfigItnm.<DOMAIN>.cfg` configuration to point to the primary and secondary Network Manager domains, and change the `itnmDomain.objectServer` to point to the AGG_V virtual ObjectServer. Perform these functions on both itnm core servers, as shown in Example 2-58.

Example 2-58   Change the ConfigItnm.<DOMAIN>.cfg configuration

```
vi /opt/IBM/netcool/core/etc/precision/ConfigItnm.NCOMS.cfg
insert into itnmDomain.failover
(
    FailoverEnabled,
    PrimaryDomainName,
    BackupDomainName,
    VirtualDomainName
)
```

```
values
(
    1,
    "NCOMS",
    "NCOMS_B",
    "NCOMS_V"
);

insert into itnmDomain.objectServer
(
        ServerName
)
values
(
        "AGG_V"
);
```

3. Add the Network Manager triggers and GUI user accounts to the ObjectServer:

   a. Move this file to the ObjectServer server:

      ```
      $NCHOME/precision/install/data/create_itnm_triggers.sql
      create_itnm_triggers.sql
      ```

   b. Add the Network Manager triggers by running this command:

      ```
      nco_sql -server AGG_P  -user root -password ''  < create_itnm_triggers.sql
      ```

   c. Create the accounts in the ObjectServer by using the nco_config administration GUI:

      ```
      itnmadmin in the System group
      itnmuser in the Normal and ISQLWrite groups
      ```

Completing the Network Manager failover configuration

Complete the Network Manager failover configuration with the following steps:

1. You must use the `$NCHOME/etc/precision/ServiceData.cfg` file to set up a TCP socket connection between the primary and backup Network Manager domains on the primary itnm core server. See Example 2-59. This step adds the default line that is shown in step 4 to the `ServiceData.cfg` file.

Example 2-59   Set up a TCP socket connection

```
cd /opt/IBM/netcool/core/precision/bin
./ncp_virtualdomain -domain NCOMS
 ( IBM Tivoli Network Manager  )
Copyright (C) 1997 - 2015 By IBM Corporation.  All Rights Reserved.  See product
license for details.

IBM Tivoli Network Manager Version 4.2 (Build 11) 64 bit created by ncpbuild at
08:57:51 Sat Jan 23 GMT 2016

ncp_virtualdomain[9621] Becoming Primary for tier 1
```

2. Add the following lines to `$NCHOME/etc/precision/ServiceData.cfg` on the backup itnm server on itnm-b:

   ```
   SERVICE: ncp_virtualdomain DOMAIN: NCOMS_V ADDRESS: 172.16.61.140 PORT: 49810
   SERVERNAME: itnm-a DYNAMIC: NO
   ```

See Example 2-60.

Example 2-60   ServiceData.cfg

```
vi $NCHOME/etc/precision/ServiceData.cfg
SERVICE: ncp_virtualdomain DOMAIN: NCOMS_V ADDRESS: 172.16.61.140 PORT: 49810
SERVERNAME: itnm-a DYNAMIC: NO
```

3. Restart the itnm core service on the primary server as the user `netcool`. See Example 2-61.

Example 2-61   Restart the itnm core service

```
itnm_stop ncp
itnm_start ncp
```

4. On the itnm-b server, edit **env.sh** to include `PRECISION_DOMAIN=NCOMS_B`, as shown in Example 2-62.

Example 2-62   Edit env.sh

```
vi /opt/IBM/netcool/core/env.sh
NCHOME=/opt/IBM/netcool/core; export NCHOME
ITNMHOME=$NCHOME/precision; export ITNMHOME
PRECISION_DOMAIN=NCOMS_B; export PRECISION_DOMAIN
```

5. Restart the backup itnm instance (Example 2-63). It now restarts as domain NCOMS_B.

Example 2-63   Restart the backup itnm instance

```
itnm_stop ncp
itnm_start ncp
```

2.5.4 Verification

Verify the installation. Review the log file for the ncp_virtualdomain that is in `/opt/IBM/netcool/core/log/precision`, as shown in Example 2-64. Look for the "Connection" messages and determine whether any errors exist.

Example 2-64   The log file for the ncp_virtualdomain

```
2016-05-05T19:29:50: Information: I-VER-001-001: [990959424t] Logging for ncp_virtualdomain
initialized at level 'warn'
2016-05-05T19:29:50: Information: I-VER-001-023: [990959424t] Process run as: ncp_virtualdomain
2016-05-05T19:29:50: Information: I-VER-001-022: [990959424t] Command line args:  -domain
NCOMS_B -latency 200000 -debug 0 -messagelevel warn -logdir /opt/IBM/netcool/core/log/precision
-tracefd 4
2016-05-05T19:29:50: Information: I-FAI-001-003: [990959424t] Operating as the backup domain in
a failover pair to primary domain 'NCOMS'
2016-05-05T19:29:50: Information: I-VIR-001-016: [990959424t] Primary domain is 'NCOMS'
2016-05-05T19:29:50: Information: I-VIR-001-017: [990959424t] Backup domain is 'NCOMS_B'
2016-05-05T19:29:50: Information: I-VIR-001-018: [990959424t] Virtual domain is 'NCOMS_V'
2016-05-05T19:29:51: Information: I-MOM-001-013: [990959424t] Connected to broker: 127.0.0.1:1883
using clientId: ncp_virtualdomain_15295_NCOMS_B
2016-05-05T19:29:51: Information: I-VIR-001-035: [990959424t] Waiting 2 health check periods
before accepting health check updates and OQL queries
2016-05-05T19:29:51: Information: I-MOM-001-056: [990959424t] Starting process heartbeat
```

```
2016-05-05T19:29:51: Information: I-MOM-001-001: [990959424t] ncp_virtualdomain[15295] Version
4.2 (Build 11) 64 bit on linux2x86 becoming Primary
2016-05-05T19:29:53: Information: I-VIR-001-028: [930039552t] Requesting initial topology from
Primary domain
```
2016-05-05T19:29:53: Information: I-VIR-001-020: [930039552t] Connection made to primary domain
NCOMS
```
2016-05-05T19:29:53: Information: I-VIR-001-022: [923735808t] Updating topology in backup domain
```

2.6 IBM Jazz for Service Management (JazzSM)

This section describes the installation and basic configuration of IBM JazzSM.

2.6.1 Introduction

JazzSM combines data from integrated services to provide access to users to all data within a
single page, including reporting, security, and administration. Users can use JazzSM to
connect to DB2, IBM WebSphere®, Dashboard Application Services Hub (DASH), registry
services, security services, and reporting services.

JazzSM adds value through these capabilities:

► Functions as the main entry point for the configuration of several Netcool Operations
  Insight components
► Offers users the capability to link resources to management capabilities
► Provides real-time data

2.6.2 Check the prerequisites

We show you how to get your server ready and how to check for all requirements before you
install any of the products.

JazzSM has a set of predefined requirements for operating systems. These requirements are
documented on the IBM documentation server:

https://ibm.biz/Bdrr7d

Example 2-65 shows an example from the command output.

> **Note:** In Example 2-65, we show the prerequisite checking for Tivoli Common Reporting
> (TCR) because the checking is the most complete checking for JazzSM. Depending on
> your deployment needs, additional scripts exist in **JazzSMScripts** that you might need to
> run. For our scenario, the checking for Tivoli Common Reporting was enough.

Example 2-65   Running the precheck script for JazzSM

```
Run the precheck script for JazzSM
[root@jazz-a PrereqScanner]# ls
api       codename.cfg  LCM.sh            lib    NCM.sh precheck.log    properties   Readme.html TAD_720.sh
TADDMScripts TCR.sh     UNIX_Linux build.num JazzSMScripts LCM_TAD_plugin_readme.txt licenses nls   prereq_checker.sh
PRSResults.xsd result.txt  TAD_722_plugin_readme.txt TAD.sh     TWSScripts  xml
[root@jazz-a PrereqScanner]# ./prereq_checker.sh TCR detail
IBM Prerequisite Scanner
    Version: 1.2.0.16
    Build  : 20150429
    OS name: Linux
```

```
User name: root

 Machine Information
 Machine name: jazz-a
 Serial number:  VMware-42 16 ce f3 3b b3 c8 27-be 2b ed 20 9b 19 a5 58


Scenario: Prerequisite Scan

TCR - Tivoli Common Reporting [version 03010200]:
Property                        Result   Found                               Expected
========                        ======   =====                               ========
OS Version                      PASS     Red Hat Enterprise Linux Server rel...  AIX V6.1
                                                                             AIX V7.1
                                                                             Red Hat Enterprise Linux Server release 5.6+
                                                                             Red Hat Enterprise Linux Server release 6.*
                                                                             Red Hat Enterprise Linux Server release 7.*
                                                                             SuSE Linux Enterprise Server 10 (*)
                                                                             SuSE Linux Enterprise Server 11 (*)
os.architecture                 PASS     64-bit                              64-bit
os.ulimit                       FAIL     1024                                [type:filedescriptorlimit]2048+,unlimited
os.RAMSize                      PASS     3.7GB                               3GB
os.space.tmp                    PASS     33GB                                1GB
os.localhostInHostsFile         PASS     True                                True
os.space.opt_root_min           PASS     33792MB                             [dir:root=/opt/IBM,unit:MB]1024
os.space.opt_non_root_min       PASS     NOT_REQ_CHECK_ID                    [dir:non_root=USERHOME/IBM,unit:MB]1024
os.package.compat-libstdc++-33  FAIL     Unavailable                         compat-libstdc++-33-3.2.3-61+
os.package.compat-glibc         PASS     compat-glibc-2.12-4.el7.x86_64      compat-glibc-2.3.4-2.26+
os.package.openmotif22          FAIL     Unavailable                         openmotif22-2.2.3-18+
os.package.openmotif            FAIL     Unavailable                         openmotif-2.3+
os.tar                          PASS     Available                           Available
os.ulimit                       FAIL     1024                                [type:filedescriptorlimit]2048+,unlimited
os.lib.libXm.so.4_32            FAIL     Unavailable                         /usr/lib/libXm.so.4
os.lib.libXm.so.4_64            FAIL     Unavailable                         /usr/lib64/libXm.so.4
os.lib.libXmu.so.6_32           FAIL     Unavailable                         /usr/lib/libXmu.so.6
os.lib.libXt.so.6_32            FAIL     Unavailable                         /usr/lib/libXt.so.6
os.lib.libX11.so.6_32           FAIL     Unavailable                         /usr/lib/libX11.so.6
os.lib.libSM.so.6_32            FAIL     Unavailable                         /usr/lib/libSM.so.6
os.lib.libICE.so.6_32           FAIL     Unavailable                         /usr/lib/libICE.so.6
os.lib.libXext.so.6_32          FAIL     Unavailable                         /usr/lib/libXext.so.6
os.lib.libXp.so.6_32            FAIL     Unavailable                         /usr/lib/libXp.so.6
os.lib.libxcb.so.1_32           FAIL     Unavailable                         /usr/lib/libxcb.so.1
os.lib.libXau.so.6_32           FAIL     Unavailable                         /usr/lib/libXau.so.6
os.lib.libXtst.so.6_32          FAIL     Unavailable                         /usr/lib/libXtst.so.6
os.lib.libfreetype.so.6_32      FAIL     Unavailable                         /usr/lib/libfreetype.so.6
os.lib.libuuid.so.1_32          FAIL     Unavailable                         /lib/libuuid.so.1
os.lib.libgcc_s.so.1_32         FAIL     Unavailable                         /lib/libgcc_s.so.1
os.lib.libc.so.6_32             FAIL     Unavailable                         /lib/libc.so.6
os.lib.libXft.so.2_32           FAIL     Unavailable                         /usr/lib/libXft.so.2
os.lib.libXrender.so.1_32       FAIL     Unavailable                         /usr/lib/libXrender.so.1
os.lib.libfontconfig.so.1_32    FAIL     Unavailable                         /usr/lib/libfontconfig.so.1
os.lib.libjpeg.so.62_32         FAIL     Unavailable                         /usr/lib/libjpeg.so.62
os.lib.libpng12.so.0_32         FAIL     Unavailable                         /usr/lib/libpng12.so.0
os.lib.libdl.so.2_32            FAIL     Unavailable                         /lib/libdl.so.2
os.lib.libexpat.so.1_32         FAIL     Unavailable                         /lib/libexpat.so.1
os.lib.libz.so.1_32             FAIL     Unavailable                         /lib/libz.so.1
os.lib.libm.so.6_32             FAIL     Unavailable                         /lib/libm.so.6
os.lib.libstdc.so.5_32          FAIL     Unavailable                         /usr/lib/libstdc++.so.5
os.lib.libstdc.so.6_32          FAIL     Unavailable                         /usr/lib/libstdc++.so.6
os.lib.libLdLinux               FAIL     Unavailable                         /lib/ld-linux.so.2
os.lib.libFreebl3               FAIL     Unavailable                         /lib/libfreebl3.so
os.package.glibc.i686           FAIL     Unavailable                         glibc.i686+

Aggregated Properties for Scanned Products:
Property                        Result   Found                               Expected
========                        ======   =====                               ========
/                               PASS     33.00GB                             2.00GB

Overall result:   FAIL  (TCR 03010200: FAIL)

Environment variable settings: [ JazzSM_FreshInstall=[Not Found] ]

Detailed results are also available in /mnt/ITSO_SHARE/Jazz/PrereqScanner/result.txt
```

You need to fix any of the FAIL messages before you proceed, which we did in the other products that are already installed in this book.

Configuring Linux

You need to disable `SELinux` in `/etc/selinux/config`, as shown in Example 2-66.

Example 2-66   Disable SELinux

```
vi /etc/selinux/config
SELINUX=disabled
```

Increase the number of open files (nofile), as shown in Example 2-67.

Example 2-67   Increasing the nofile

```
vi /etc/security/limits.conf
netcool          hard    nofile          1048576
netcool          soft    nofile          1048576
@ncoadmin        hard    nofile          1048576
@ncoadmin        soft    nofile          1048576
```

Increase the number of processes (nproc), as shown in Example 2-68.

Example 2-68   Increasing nproc

```
vi/etc/security/limits.d/90-nproc.conf
*          soft    nproc      1048576
root     soft    nproc      unlimited
```

> **Note:** Depending on the type of Linux distribution, the nproc configuration can also be in `/etc/security/limits.conf`.

2.6.3 Installation

Because of the distributed installation of our scenario (DB2 and JazzSM are installed on different servers), you need to create the Tivoli Common Reporting database (TCRDB) before you install JazzSM. The following URL has more details about these steps:

https://ibm.biz/Bdrr57

Follow these steps:

1. Create the `tcruser` and the TCRDB on the DB2 server first (Example 2-69).

Example 2-69   Creating the tcruser

```
For example, as root, on DBServ-a:
useradd tcruser
```

2. Run the command to generate the `tcr_create_db2_cs.sql` in the ContentStoreDatabase directory (Example 2-70).

Example 2-70   Generate content store

```
cd /mnt/ITSO_SHARE/Jazz/JazzSM/TCRCognos/ContentStoreDatabase
./TCR_generate_content_store_db2_definition.sh <database_name> tcruser
```

3. As the `db2inst1` user, run the SQL script that was generated (Example 2-71).

> **Note:** Because DB2 is on a remote server in this example, you must copy the file to the DB2 server to run the following example. For more information, see the IBM Knowledge Center:
>
> https://ibm.biz/BdrrN3

Example 2-71   Running the SQL script

```
su - db2inst1
db2 -vtf
/mnt/ITSO_SHARE/Jazz/JazzSM/TCRCognos/ContentStoreDatabase/tcr_create_db2_cs.sql
```

4. On the JazzSM servers, install the DB2 client. The following URLs explain how to install the DB2 client:

   – https://ibm.biz/BdrrNk

   – https://ibm.biz/BdrrNt

5. Catalog the remote server (Example 2-72).

Example 2-72   Catalog the remote server

```
db2 catalog tcpip4 node DBServ-a remote 172.16.61.137 server db2inst1
```

After you configure the TCRDB, perform the following steps to install JazzSM:

1. Install JazzSM as the user `netcool`. From `/mnt/ITSO_SHARE/Jazz/JazzSM`, start the Installation Manager (Example 2-73).

Example 2-73   Starting the Installation Manager

```
su - netcool
export DISPLAY=:1
cd /opt/IBM/netcool/IM/InstallationManager/eclipse
./IBMIM
```

2. After you issue the command, launch the GUI. Select **File** → **Preferences**. See Figure 2-67.
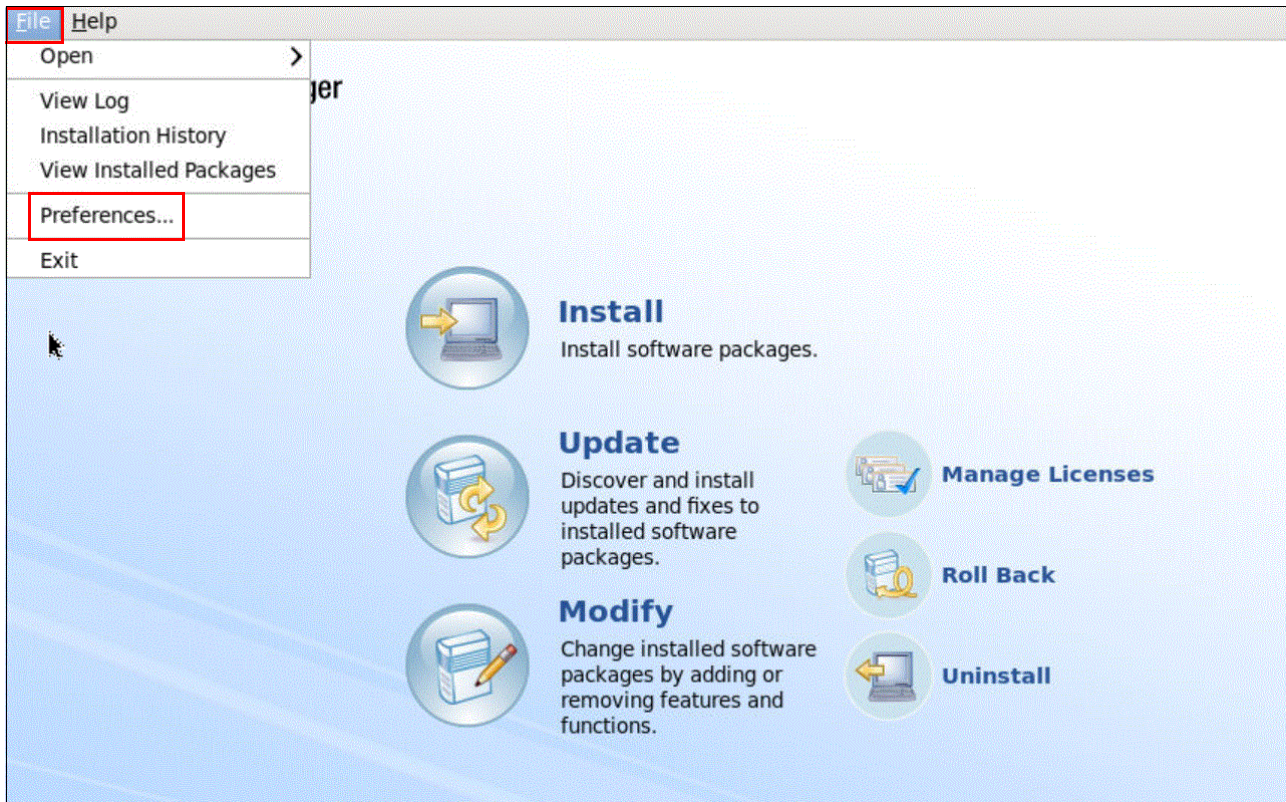
Figure 2-67   Choose a custom installation

3. The Preferences window (Figure 2-68) opens, where you add a repository. Click **Add Repository**. Add a repository for all of the products to install.
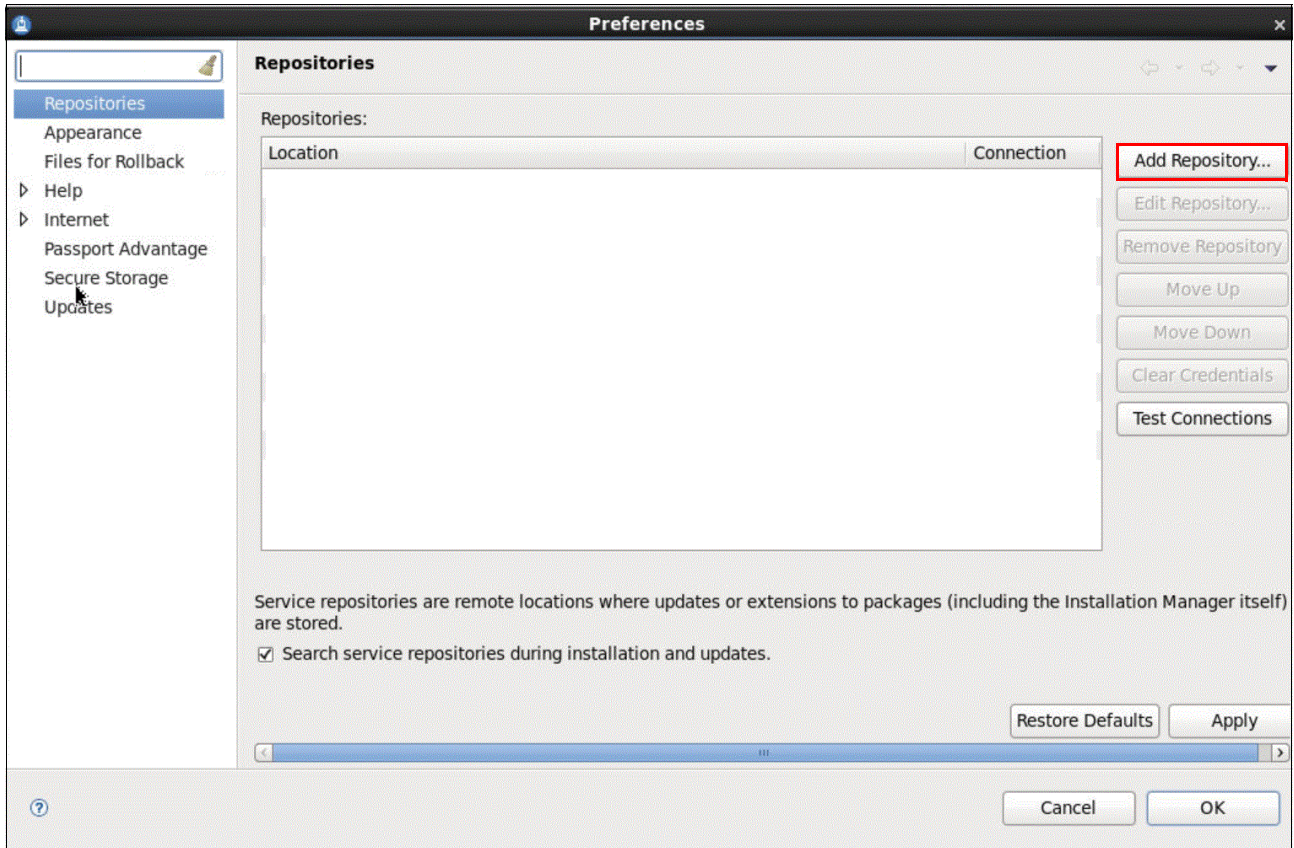
Figure 2-68   Add a repository

Table 2-9 shows all of the repositories that we used in this book for the JazzSM installation. Several packages need more than one repository.

Table 2-9   Repositories that are needed for JazzSM

Packages	Repositories
IBM_WAS_FOR_JSM_FOR_LNX_ML.zip	/mnt/ITSO_SHARE/Jazz/JazzSM/WASRepository/disk1
JAZZ_FOR_SM_1.1.2.0_FOR_LNX.zip	/mnt/ITSO_SHARE/Jazz/JazzSM/JazzSMRepository/disk1
1.1.2-TIV-JazzSM-multi-FP001.zip	/mnt/ITSO_SHARE/Jazz/JazzSM_FP1.1.2.1/JazzSMFPRepository/disk1
ITCR_3.1.2.1_FOR_LINUX.tar.gz	/mnt/ITSO_SHARE/Jazz/JazzSM/TCRCognos
OMNIbus-v8.1.0.4-WebGUI.Linux64.zip	/mnt/ITSO_SHARE/OMNI/core/OMNIbusWebGUI_NOIExtensionsRepository /mnt/ITSO_SHARE/OMNI/core/OMNIbusWebGUIRepository
OMNIbus-v8.1.0-WebGUI-FP5-IM-Extensions-linux64-UpdatePack.zip	/mnt/ITSO_SHARE/OMNI/webGUI_NOI_FP5/OMNIbusWebGUI_NOIExtensionsRepository /mnt/ITSO_SHARE/OMNI/webGUI_NOI_FP5/OMNIbusWebGUIRepository
OMNIbus-v8.1.0-WebGUI-FP5-IM-linux64-UpdatePack.zip	/mnt/ITSO_SHARE/OMNI/webGUI_FP5/OMNIbusWebGUIRepository
ITNP_IP_LIN.zip	/mnt/ITSO_SHARE/ITNM/Base/repositories/disk1
NTWRK_HLTH_DSHBRD_V4.2_LNX.zip	/mnt/ITSO_SHARE/ITNM/NTWRK_HLTH_DSHBRD_V4.2_LNX/repositories/disk1

4. The following screen captures show the repositories for the products that we will install.

5. Add a repository for WebSphere Application Server (WAS). Click **Browse**. Drill down to `Jazz/JazzSM/WASRepository/disk1/`. Choose **diskTag.inf**. See Figure 2-69. Click **OK**.
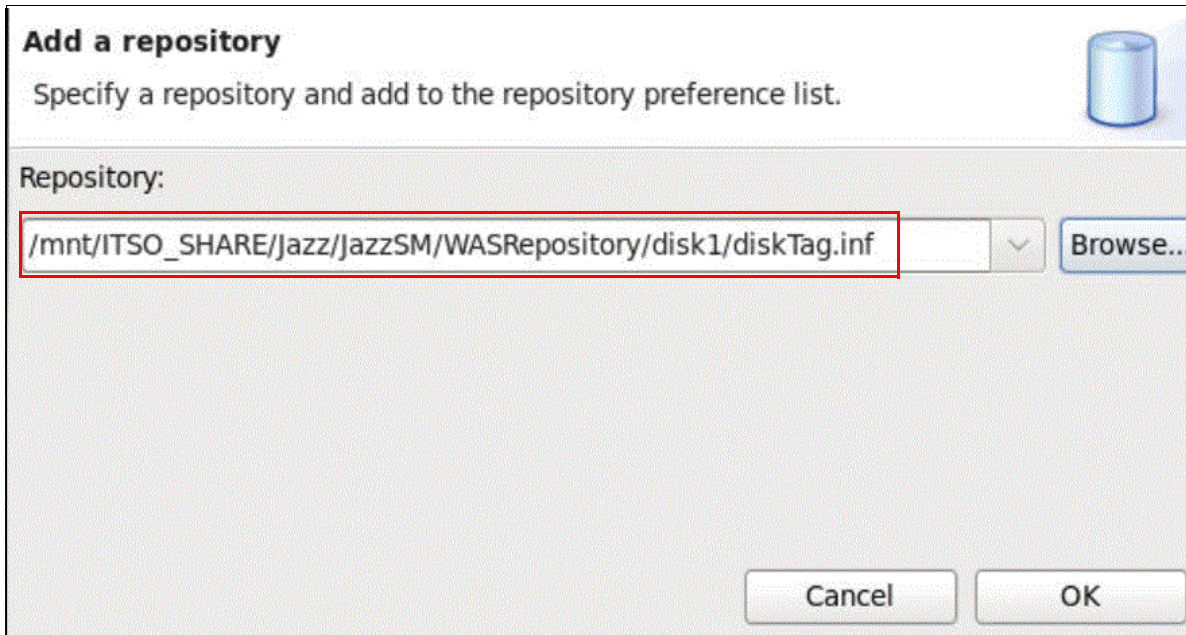
Figure 2-69   Add a repository for WebSphere Application Server

6. Add a repository for JazzSM. Click **Browse**. Drill down to `Jazz/JazzSM/JazzSMRepository/disk1/` and choose **diskTag.inf**. See Figure 2-70. Click **OK**.
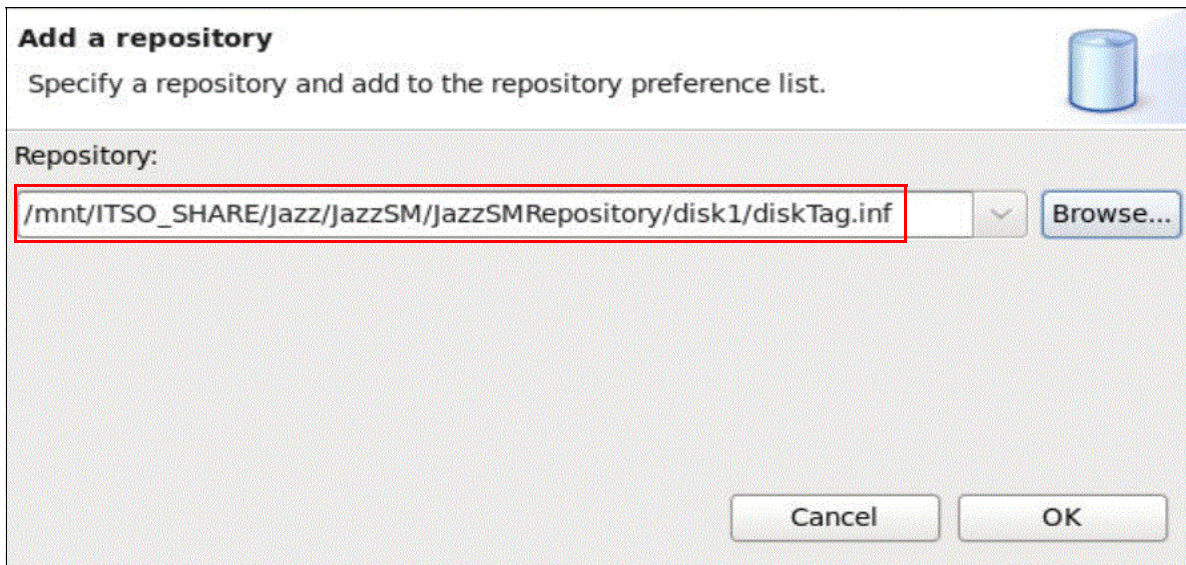
Figure 2-70   Add a repository for JazzSM

7. Add a repository for OMNIbus Web GUI. Click **Browse**. Drill down to
   `/OMNI/webGUIOMNIbusWebGUIRepository/composite/`. Under
   `/OMNI/webGUIOMNIbusWebGUIRepository/composite/`, choose **repository.config**. See
   Figure 2-71. Click **OK**.
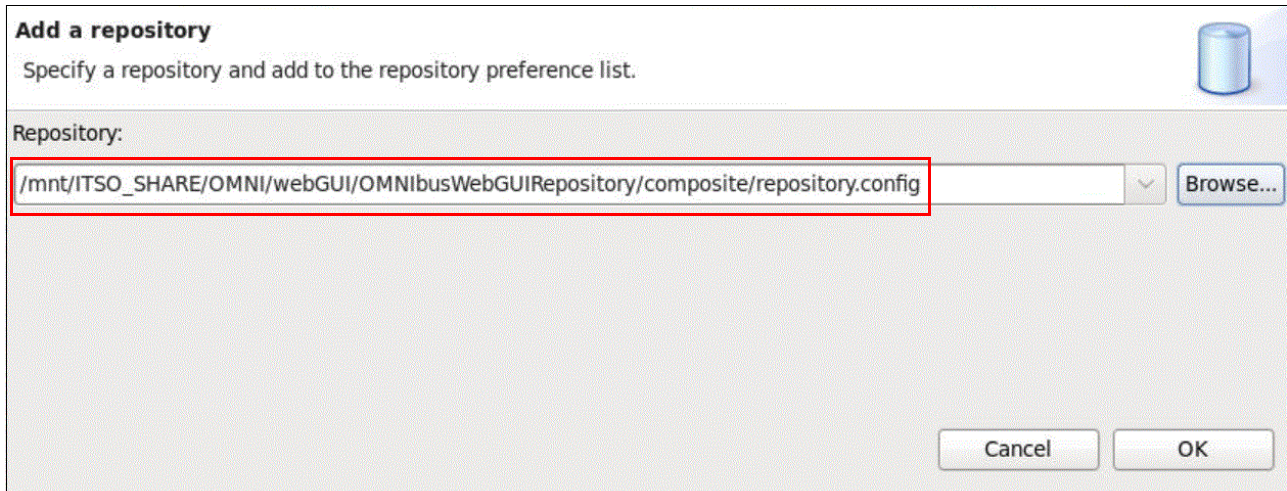
Figure 2-71   Add a repository for OMNIbus Web GUI

8. Add a repository for Network Manager. Click **Browse**. Under
   `/ITNM/Base/repositories/disk1/`, choose **diskTag.inf**. See Figure 2-72. Click **OK**.
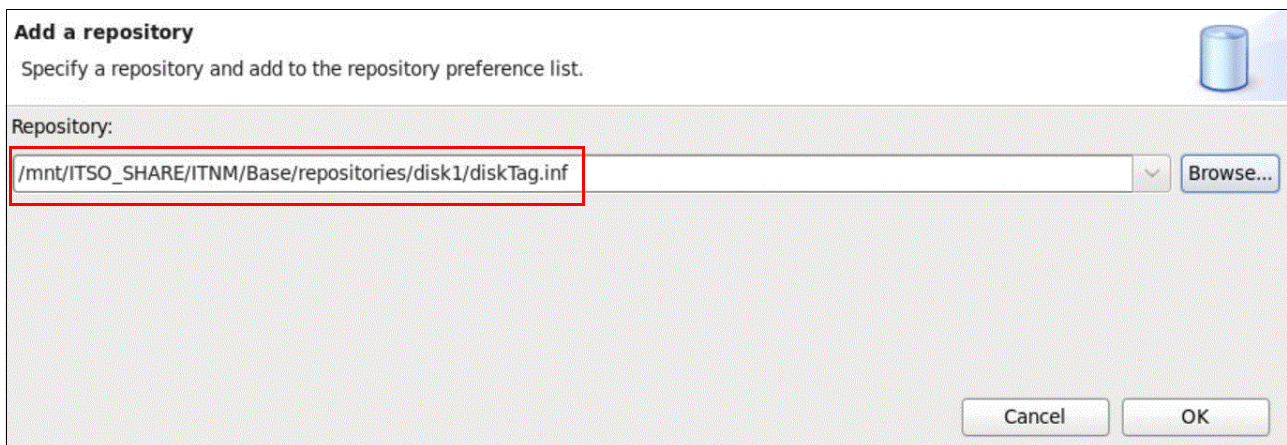
Figure 2-72   Add a repository for Network Manager

9. Add a repository for the JazzSM fix pack. Click **Browse**. Under `/Jazz/JazzSM_FP1.1.2.1/JazzSMFPRepository/disk1/`, choose **diskTag.inf**. See Figure 2-73. Click **OK**.
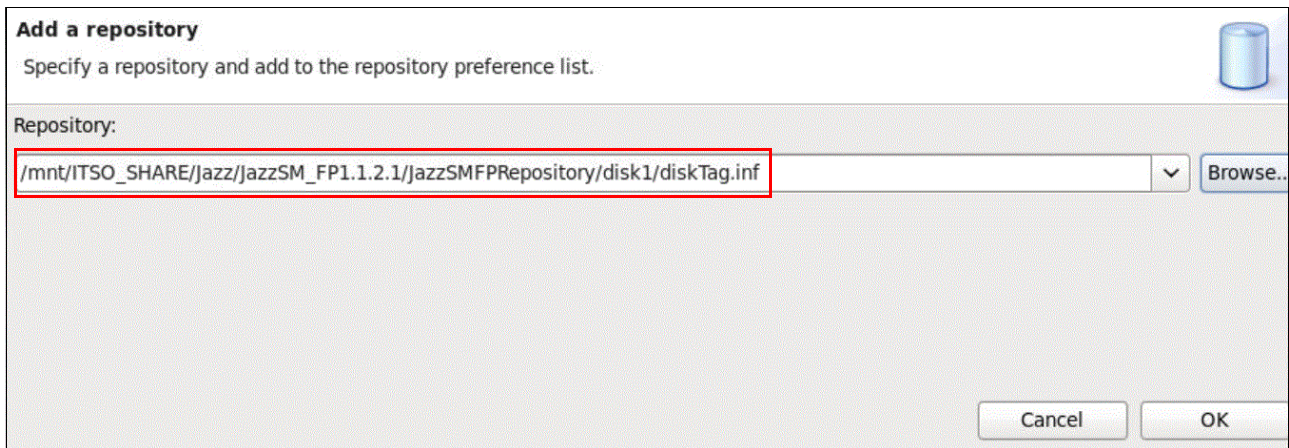
Figure 2-73   Add a repository for the JazzSM fix pack

10. Add a repository for WebGUI_NOI. Click **Browse**. Under `/OMNI/core/OMNIbusWebGUI_NOIExtensionsRepository/`, choose **repository.config**. See Figure 2-74. Click **OK**.
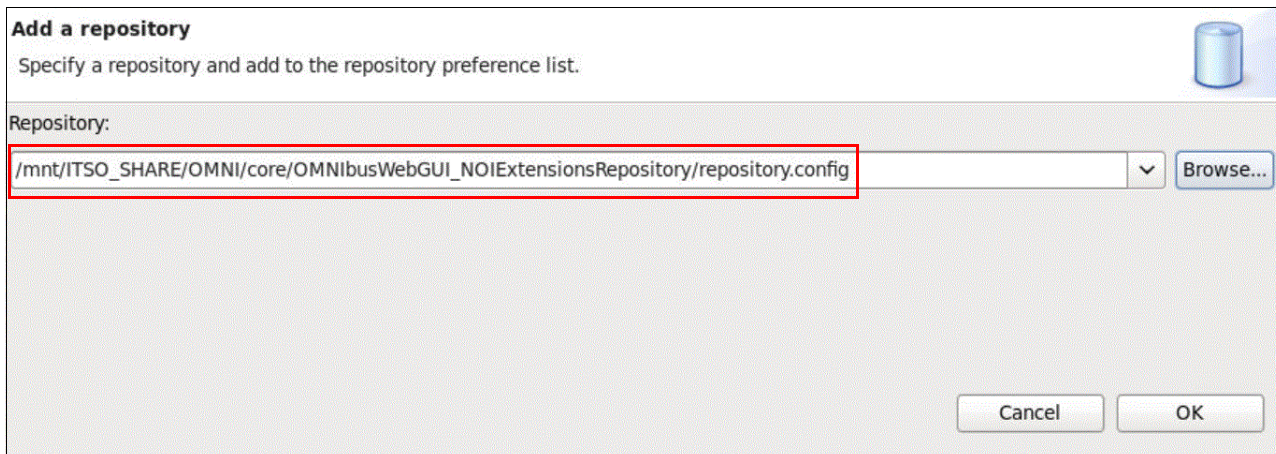
Figure 2-74   Add a repository for the WebGUI_NOI

11. After you add all of the repositories that you need, click **OK**. See Figure 2-75.
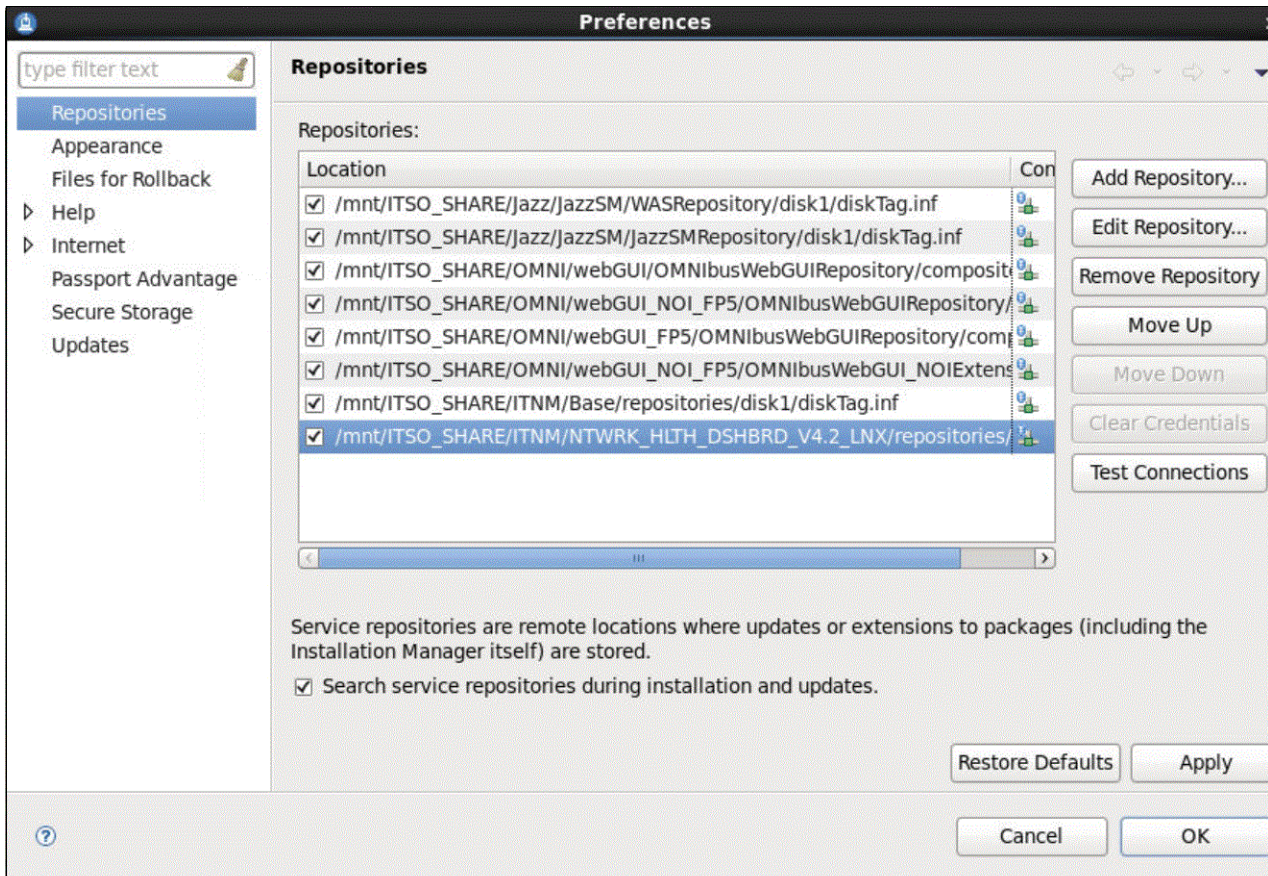
Figure 2-75   List of repositories

12. Click **Install** to start the installation, as shown in Figure 2-76.
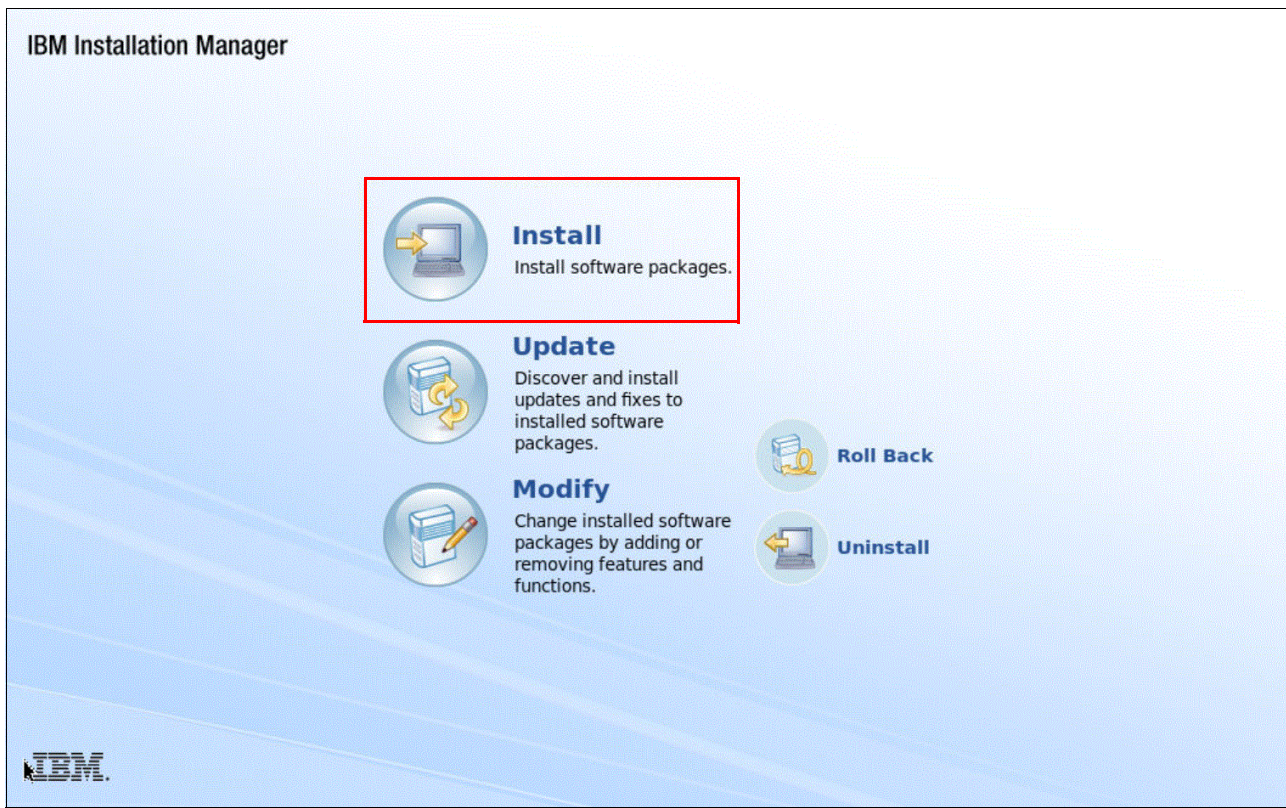
Figure 2-76   Click Install to start the installation

13. Install the WebSphere Application Server packages first. Figure 2-77 shows our selections. Click **Next**.
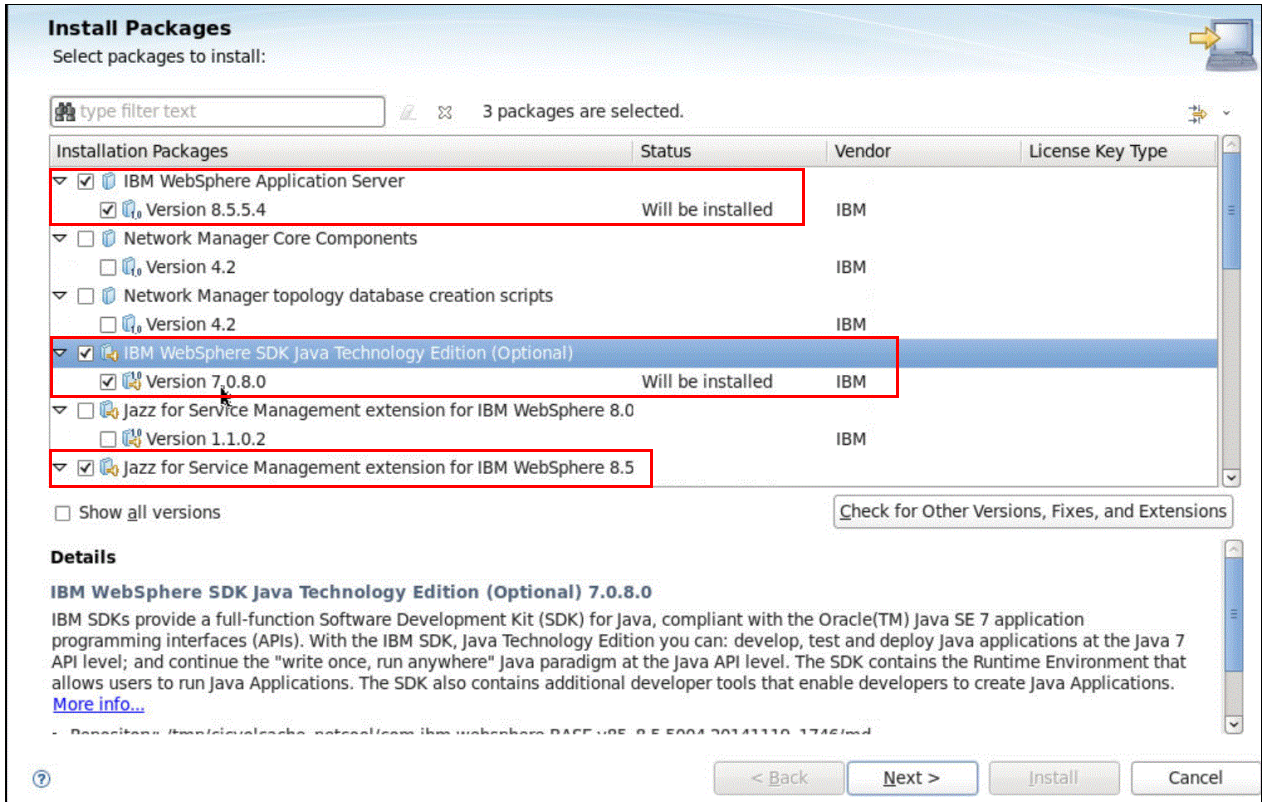
Figure 2-77   Install WebSphere Application Server packages first

14. Accept the terms of the license agreements. See Figure 2-78. Click **Next**.
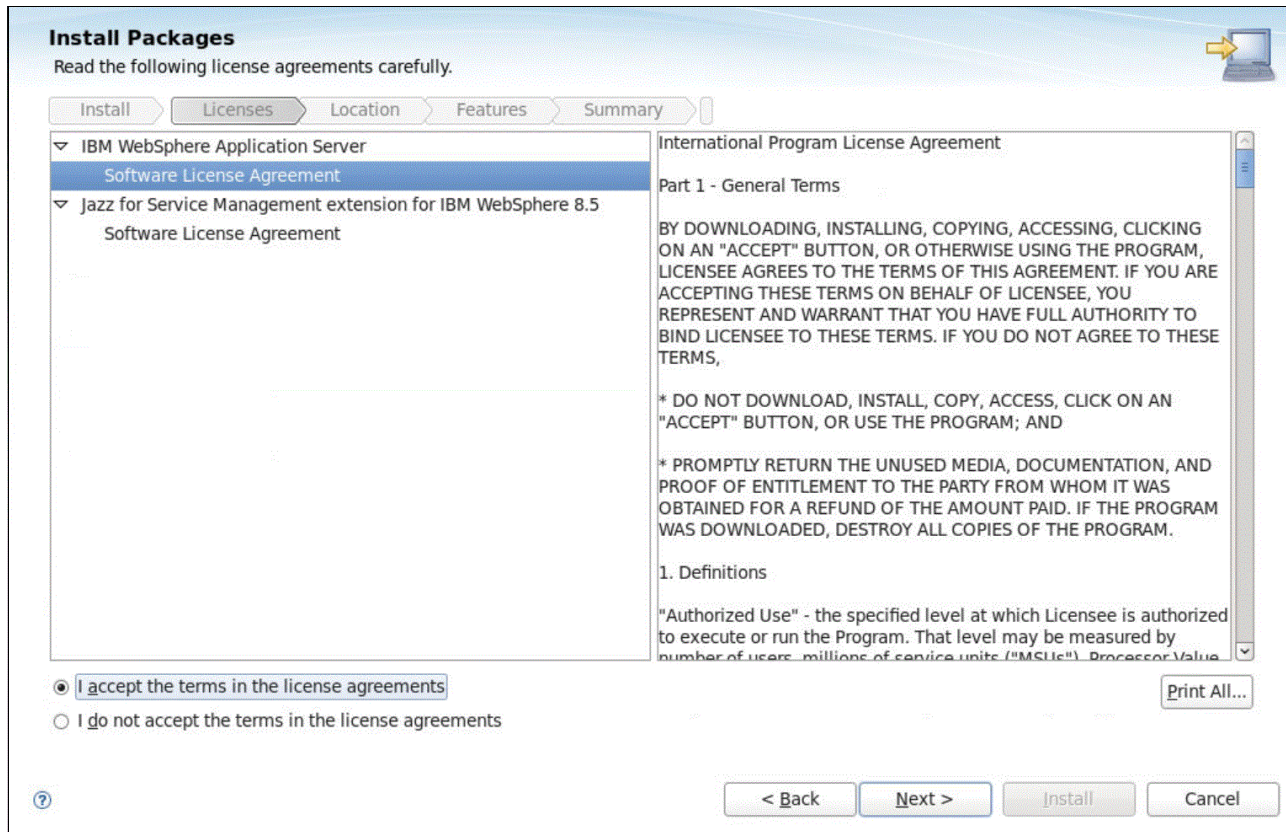
Figure 2-78   Accept the terms of the license agreements

15. On the Install Packages window (Figure 2-79), verify the installation directory *for each package*, and click **Next**.
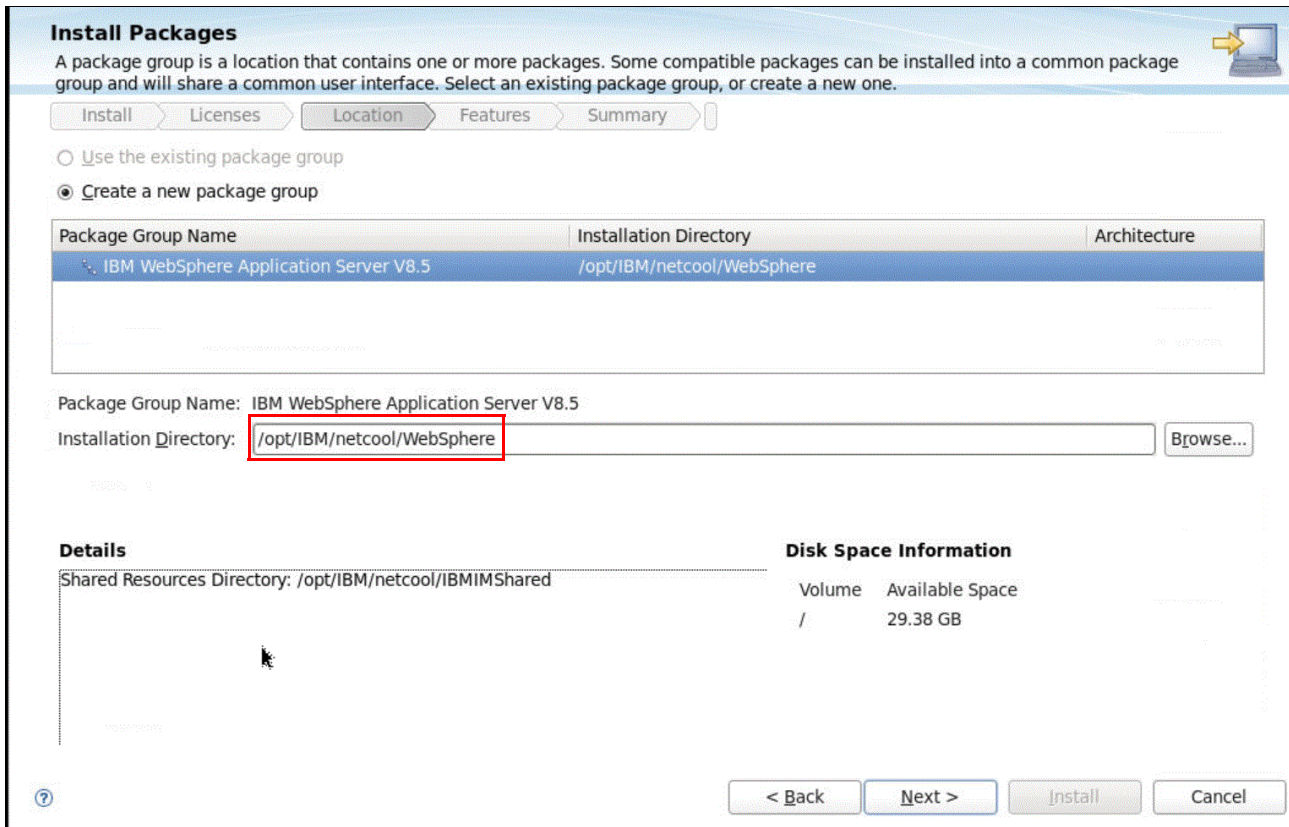
Figure 2-79   Verify the installation directory

16. Figure 2-80 shows the packages to install. Click **Next**.
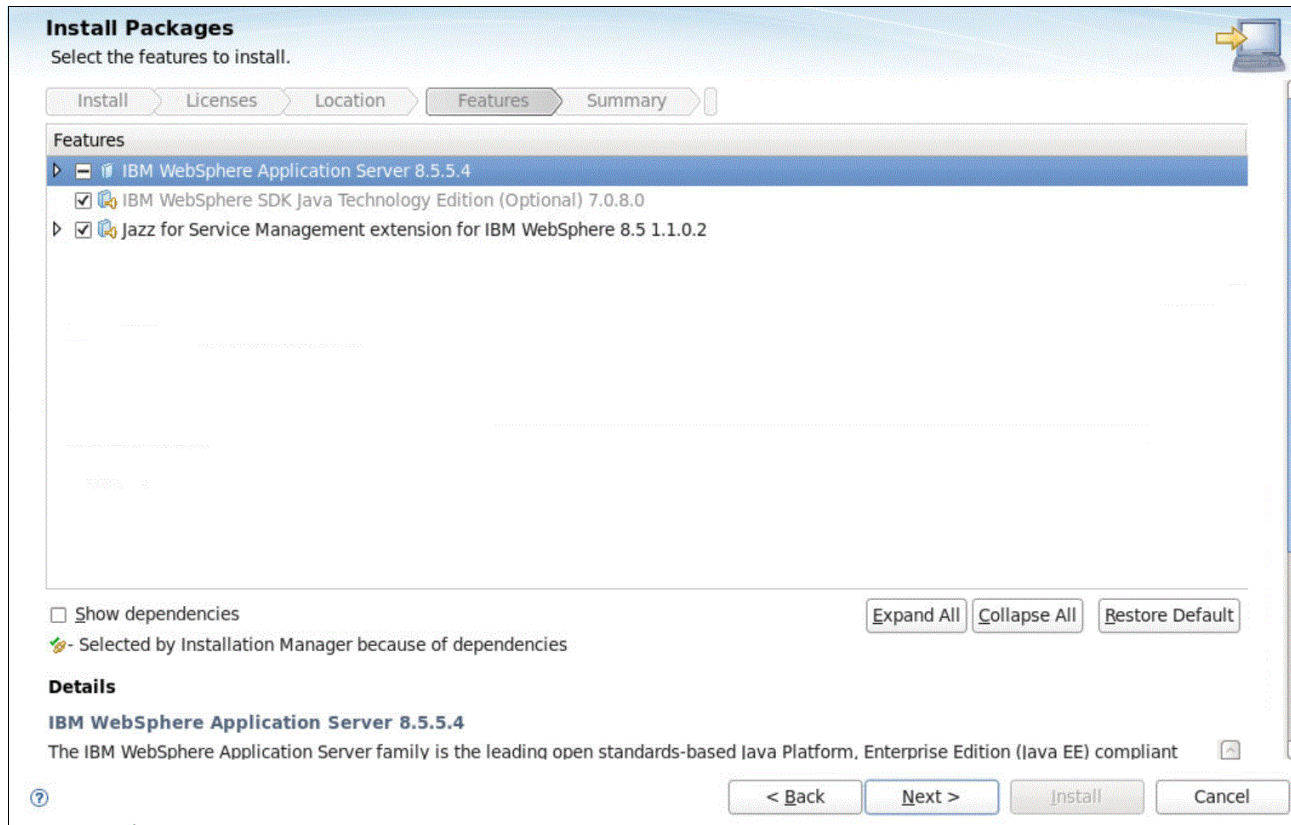
Figure 2-80 Packages to install

17. Click **Install**. See Figure 2-81.

Install Packages
Review the summary information.

Install | Licenses | Location | Features | Summary

Target Location

Package Group Name: IBM WebSphere Application Server V8.5

Installation Directory: /opt/IBM/netcool/WebSphere

Shared Resources Directory: /opt/IBM/netcool/IBMIMShared

Packages

Packages

▽ 📦 IBM WebSphere Application Server 8.5.5.4
  ▷ 📦 WebSphere Application Server Full Profile
  ▷ 📦 IBM WebSphere SDK for Java Technology Edition 6
    📦 IBM WebSphere SDK Java Technology Edition (Optional) 7.0.8.0
▽ 📦 Jazz for Service Management extension for IBM WebSphere 8.5 1.1.0.2
    📦 Install JazzSM WebSphere Extension

Environment

English

Disk Space Information

Total Available Space

/   29.38 GB

Total Download Size: 1.08 GB
Total Installation Size: 2.37 GB

▸ **Repository Information**

⑦   < Back   Next >   Install   Cancel

Figure 2-81   Review the summary information and start the installation

18. Figure 2-82 shows the progress of the package installation.
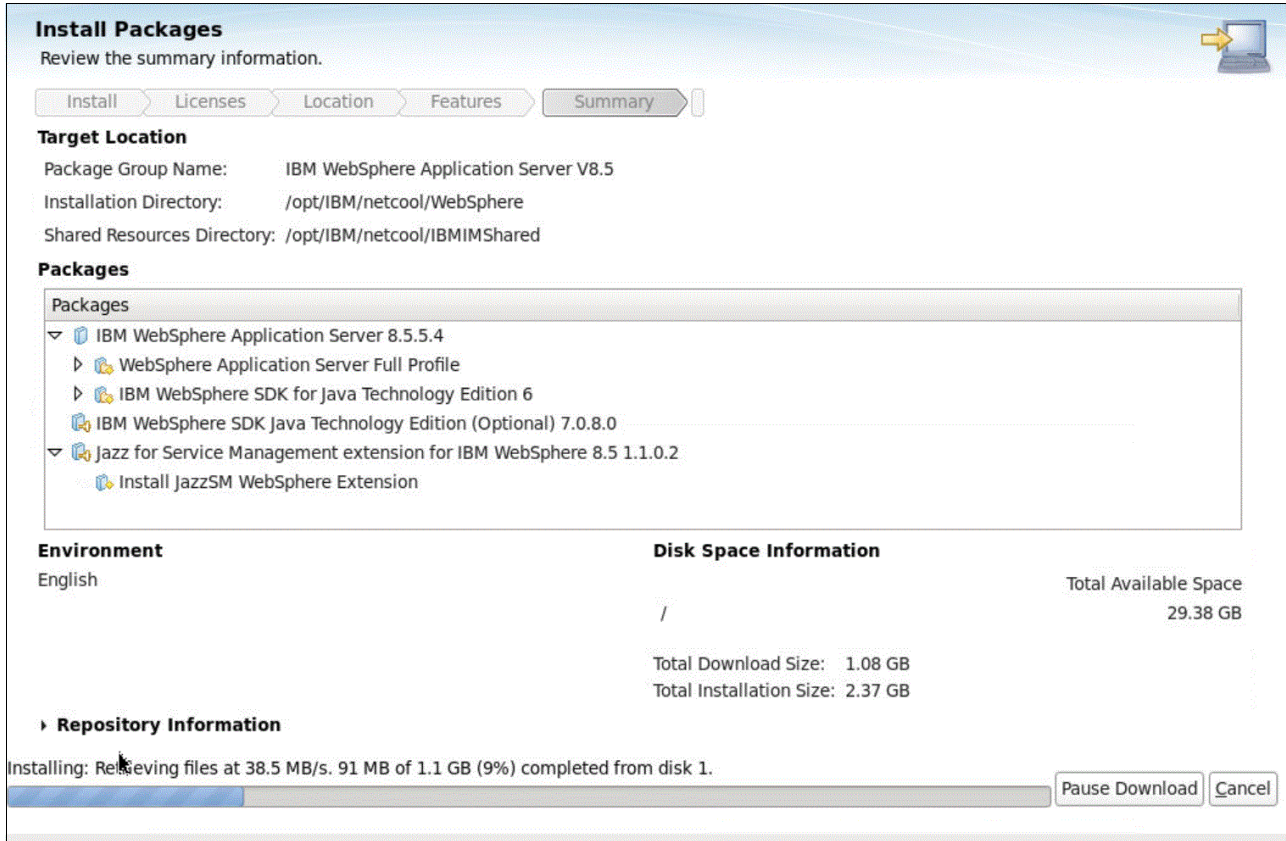
Figure 2-82   Installation in progress

19. Ensure that you select **None** in Figure 2-83 and click **Finish**.
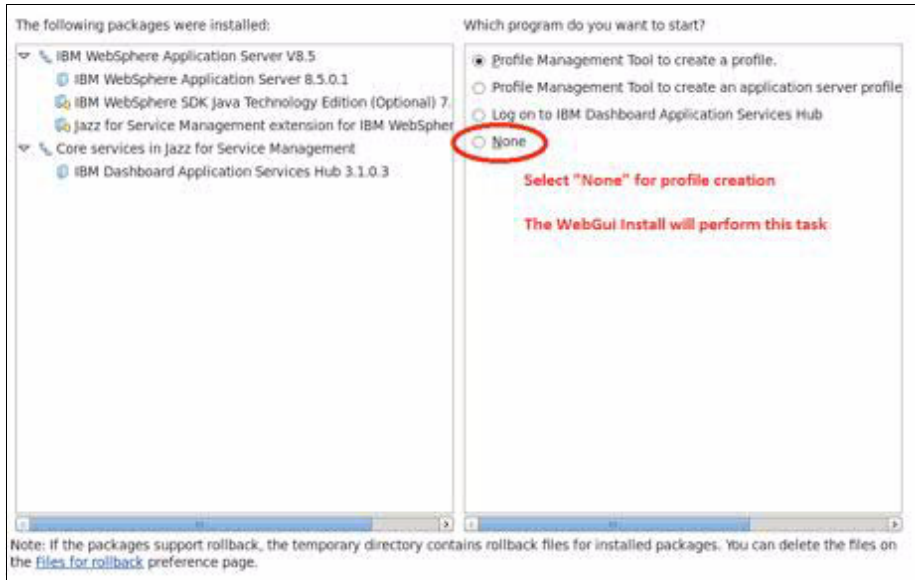
Figure 2-83   Select None and click Finish

20. At this point, WebSphere and JazzSM are installed. You will repeat the installation and select the rest of the GUI components. Or, you might choose to select all of these GUI components in a single installation.

You will select the following packages to complete the GUI installation:

– Reporting Services
– IBM Dashboard Application Services Hub (DASH)
– IBM Tivoli Netcool/OMNIbus Web GUI
– Network Manager GUI Components
– Network Health Dashboard
– Network Manager Reports

21. Install Dashboard Application Services Hub (DASH) and Network Manager GUI Components. Figure 2-84 shows our selections. Click **Next**.

Figure 2-84   Installing DASH and Network Manager GUI Components

22. Accept the terms of the license agreements. See Figure 2-85. Click **Next**.

Install Packages
Read the following license agreements carefully.

Install → Licenses → Location → Features → Summary

▽ IBM Dashboard Application Services Hub
   Software License Agreement
▽ Network Manager Reports
   License Agreement
▽ Reporting Services
   Software License Agreement

LICENSE INFORMATION

The Programs listed below are licensed under the following License Information terms and conditions in addition to the Program license terms previously agreed to by Client and IBM. If Client does not have previously agreed to license terms in effect for the Program, the IBM International Program License Agreement (Z125-3301-14) applies.

Program Name: Jazz for Service Management 1.1.2.0
Program Number: Component

As described in the International Program License Agreement ("IPLA") and this License Information, IBM grants Licensee a limited right to use the Program. This right is limited to the level of Authorized Use, such as a Processor Value Unit ("PVU"), a Value Unit ("VU"), or other specified level of use, paid for by Licensee as evidenced in the Proof of Entitlement. Licensee's use may also be limited to a specified machine, or only as a Supporting Program, or subject to other restrictions. As Licensee has not paid for all of the economic value of the Program, no other use is permitted without the payment of additional fees. In addition, as stated in the IPLA, Licensee is not authorized to use the Program to provide commercial IT services to any third party, to provide commercial hosting or timesharing, or to sublicense, rent, or lease the Program unless expressly provided for in the applicable agreements under which Licensee obtains authorizations to use the Program. Additional rights may be available to Licensee subject to the payment of additional fees or under different or supplementary terms. IBM reserves the right to determine whether to make such additional rights available to Licensee.

◉ I accept the terms in the license agreements
○ I do not accept the terms in the license agreements

Print All...

?   < Back   Next >   Install   Cancel

Figure 2-85 Accept the terms of the license agreements

23.Verify the installation directory for each package group and click **Next**, as shown in Figure 2-86.

Figure 2-86   JazzSM installation

24. Accept the WebSphere default user ID, as shown in Figure 2-87.

Figure 2-87   Accept the WebSphere default user ID

Tip: After you enter the password in Figure 2-87, click **Validate** to verify the connections.

25. Accept the default ports in Figure 2-88. Click **Next**.
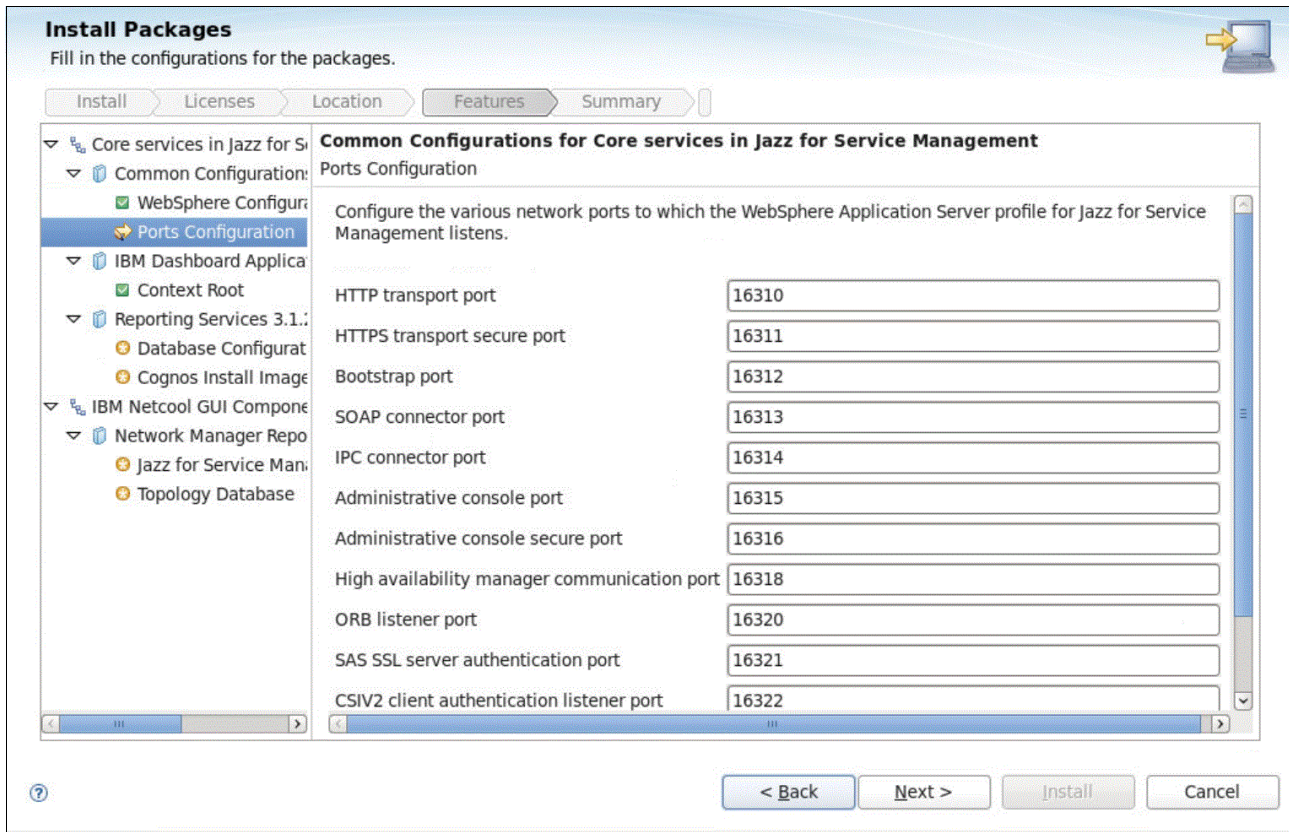
Figure 2-88   Accept the default ports

26. The installation of the JazzSM (DASH) packages starts. See Figure 2-89.
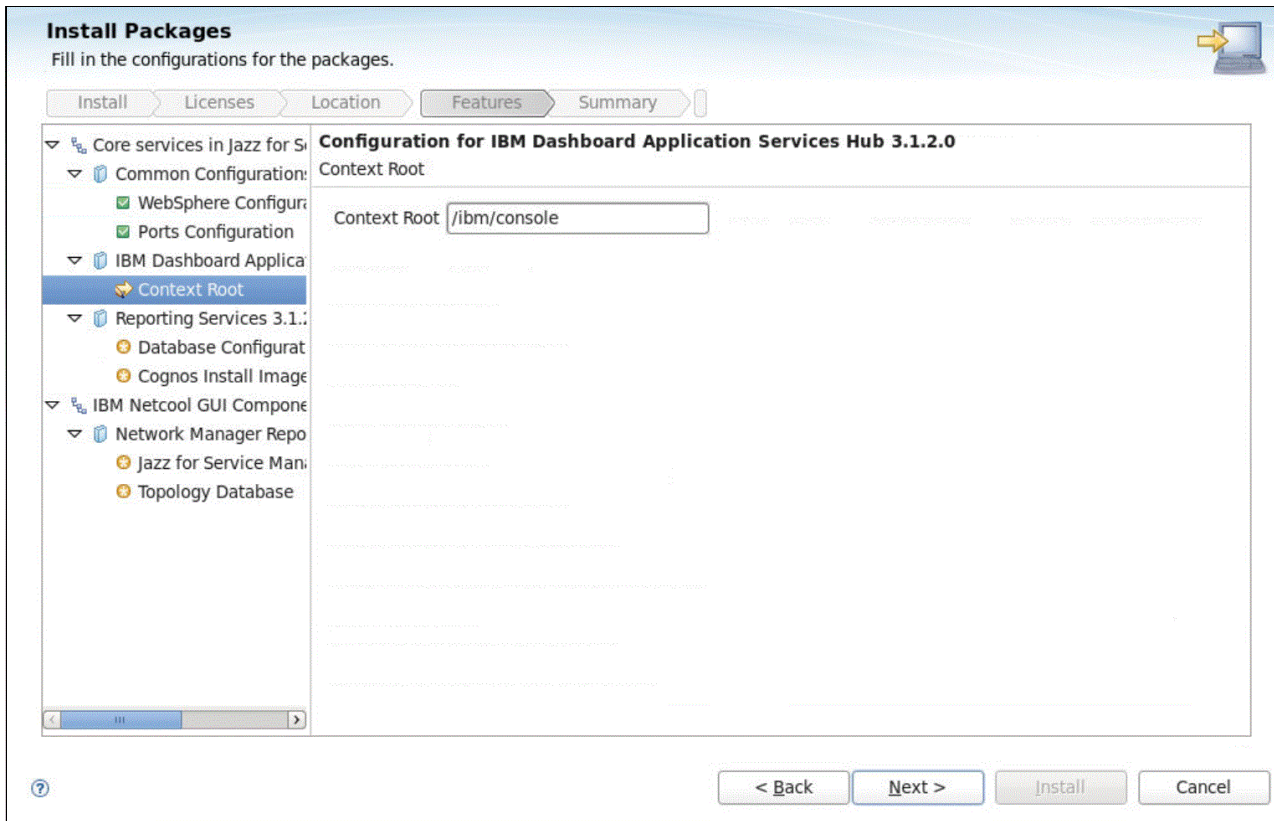
Figure 2-89   Install the DASH packages

27. Install the Tivoli Common Reporting package. See Figure 2-90. Click **Next**.
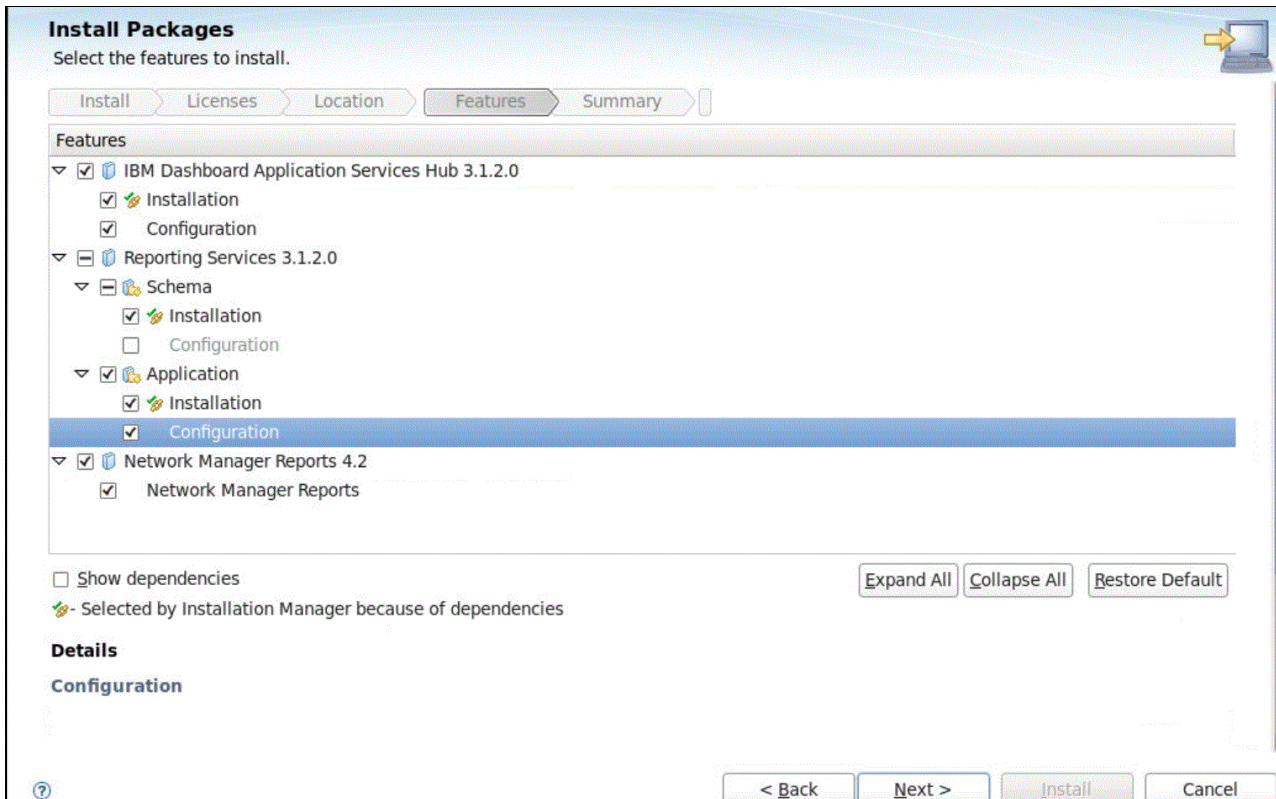
Figure 2-90   Tivoli Common Reporting installation

> **Tip:** To avoid the message, "`Unable to connect to the Cognos content store`", ensure that you create the `tcruser` first by using the command **`useradd tcruser`** on the DB2 server and initialize and start the TCRDB. See 2.6.3, "Installation" on page 118.

28. As shown in Figure 2-91, install the database client for Tivoli Common Reporting and click **Test connection**.
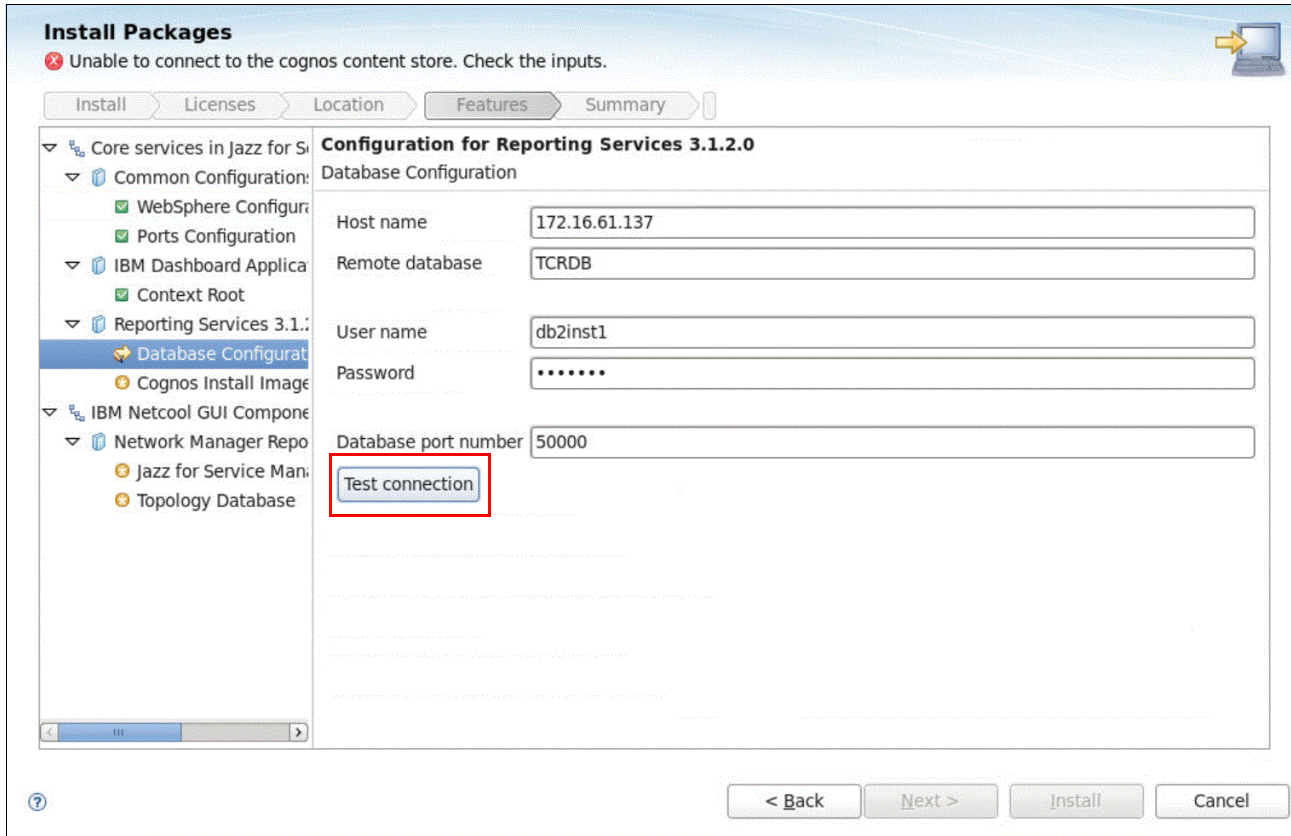
Figure 2-91   Install the database client for Tivoli Common Reporting

29. As shown in Figure 2-92, confirm the Tivoli Common Reporting (TCR) directory and click **Validate**. In our environment, the TCR directory is under `/mnt/ITSO_SHARE/Jazz/JazzSM/TCRCognos`.

> **Note:** These files are the same files that you unpacked from `ITCR_3.1.2.1_FOR_LINUX.tar.gz`.
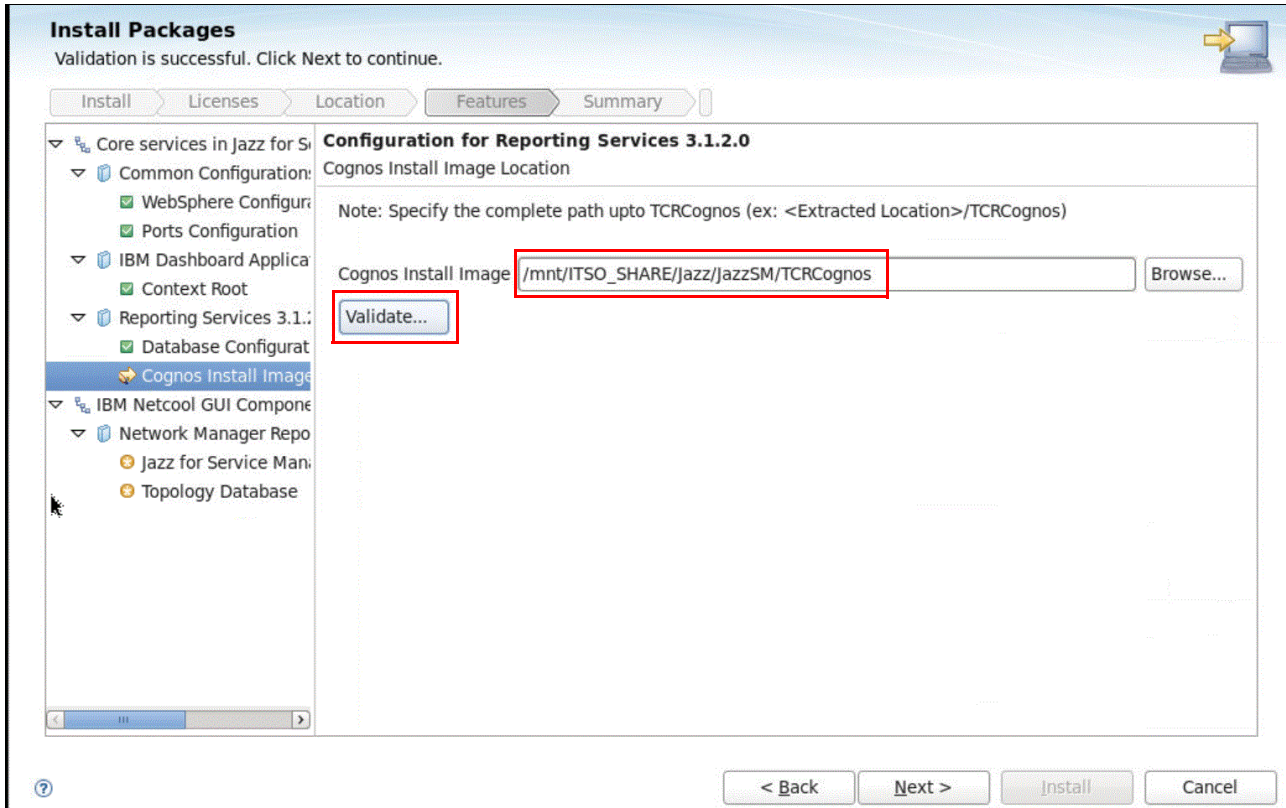
Figure 2-92   Validate the connection

30. As shown in Figure 2-93, verify the packages that you need to install and click **Next**.

> **Note:** As shown in Figure 2-93, we did not check the option "Install event search with IBM Operations Analytics - Log Analysis" on purpose because event search needs the Log Analysis server to be installed and running.
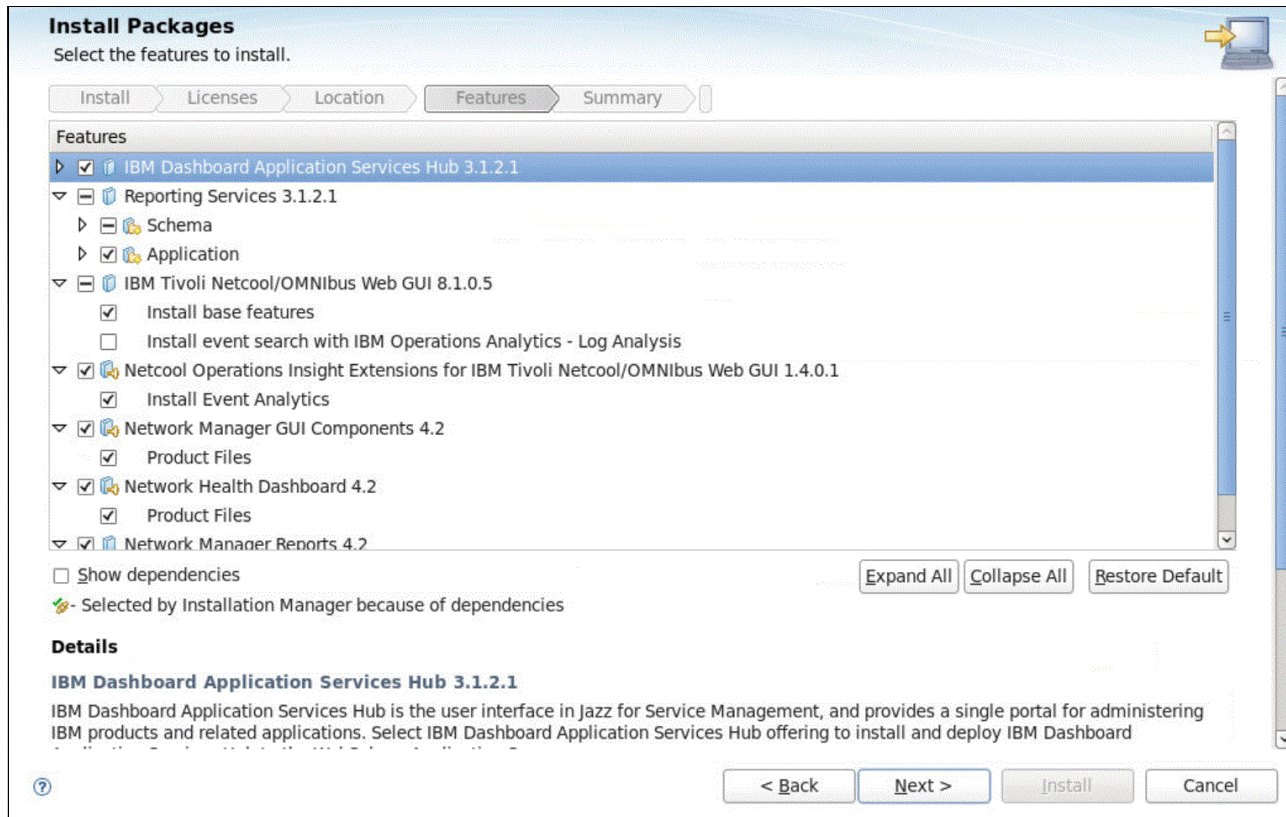
Figure 2-93   Verify the packages that you need to install

31.Install the Network Manager packages. As shown in Figure 2-94, we accept the default port, `4100`.

> **Note:** As shown in Figure 2-94, due to a limitation of the configuration wizard, for now, we set up the connection to the primary ObjectServer, AGG_P, but we will modify the data source later for high availability.
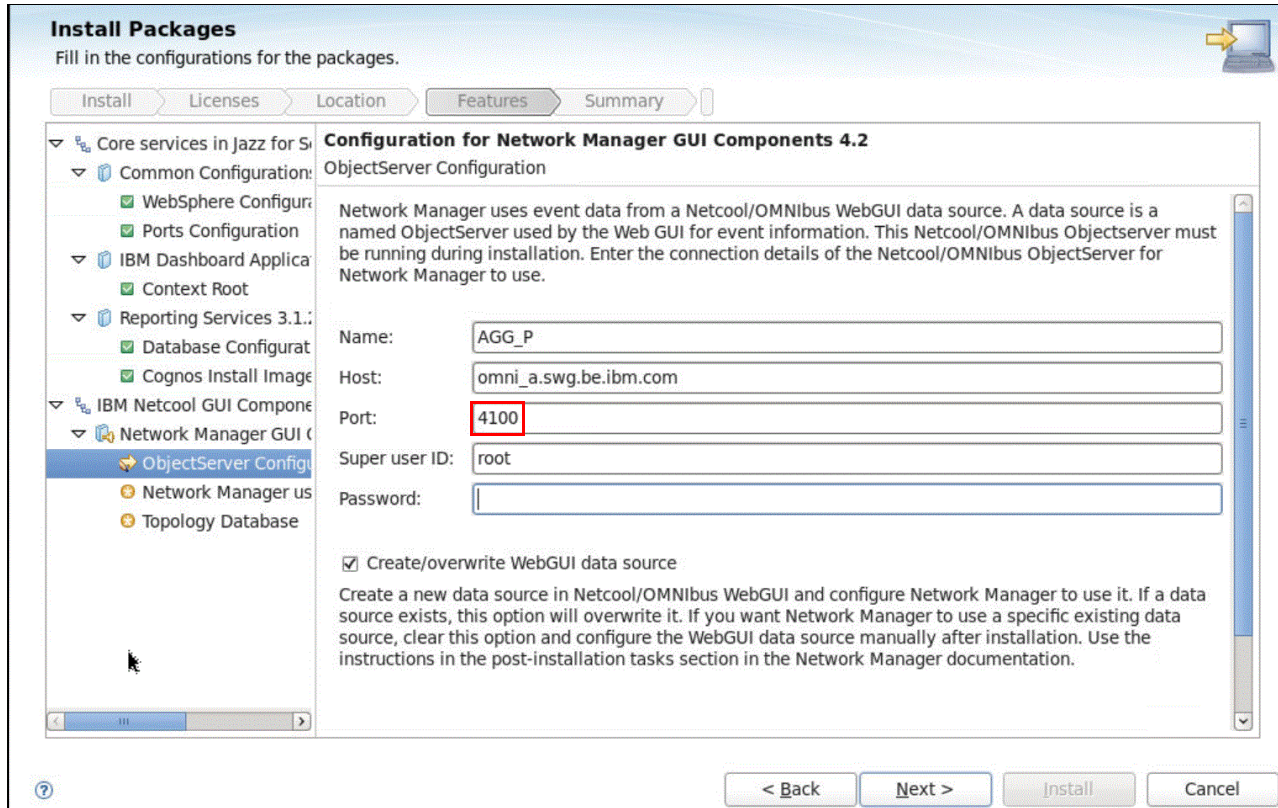
Figure 2-94   Accept the default port

> **Important:** Whether you check "Create/overwrite WebGUI data source" or not, ensure that the `$NCHOME/etc/precision/ModelNcimDb.<domain>.cfg` file on the Network Manager core server contains the correct data source name that you want to use to calculate the status in the topology maps. Here, we checked the box because we are installing Web GUI and Network Manager GUI at the same time, which will create a data source with the name of the ObjectServer (AGG_P).

32. Enter the password, as shown in Figure 2-95, and click **Next**.
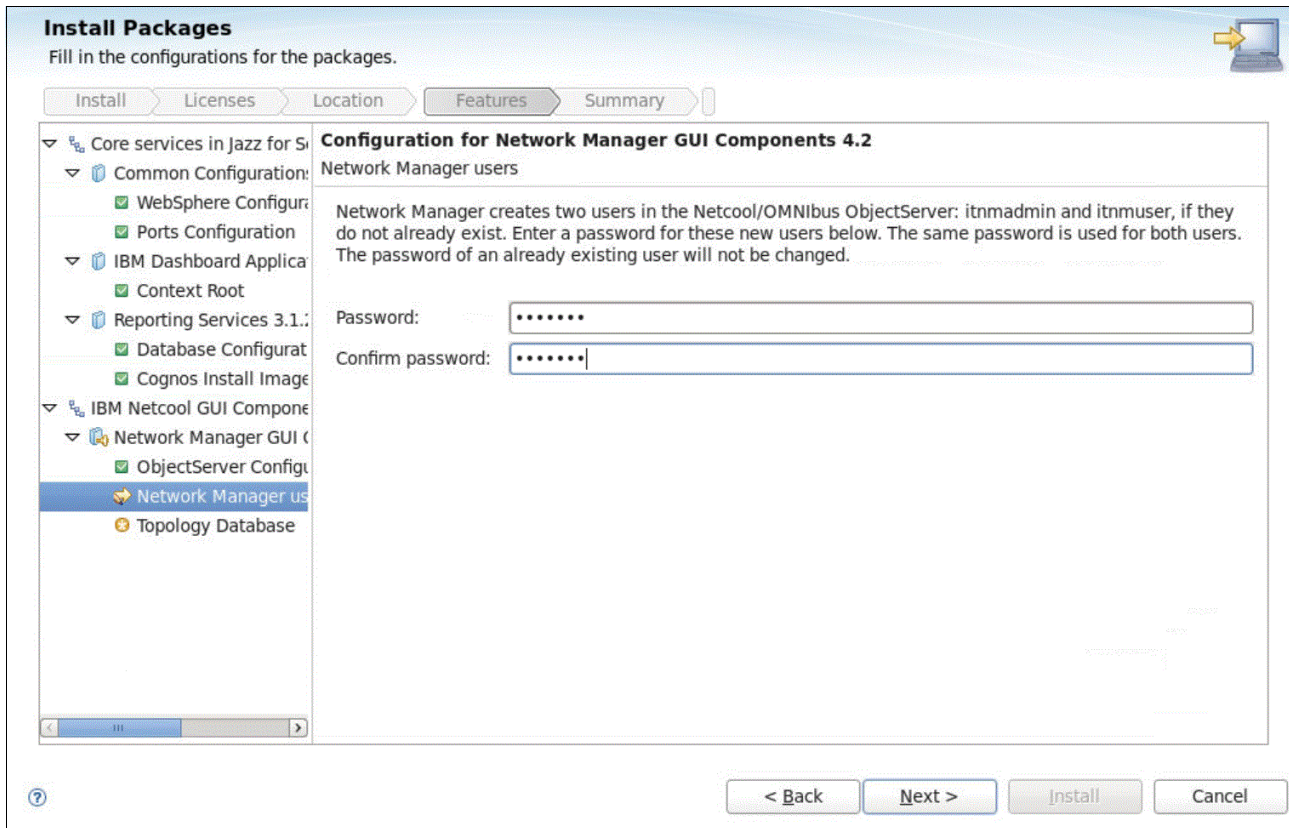
Figure 2-95   Set the password

33. Configure the topology database connection. Enter the values that are shown in Figure 2-96:

  – For the database name, enter `ITNM`.
  – For the server host, enter `172.16.61.137`.
  – For the server port, enter `50000`.
  – For the user ID, enter `ncim`.
  – For the password, enter the password for the `ncim` user.

Accept all of the defaults.

Figure 2-96   Configure the topology database connection

34. Verify the installation packages and click **Install** as shown in Figure 2-97.

Install Packages
Review the summary information.

Install > Licenses > Location > Features > Summary

Target Location
Shared Resources Directory: /opt/IBM/netcool/IBMIMShared

Packages

Packages	Installation Directory
▽ ⌖ Core services in Jazz for Service Management	/opt/IBM/netcool/JazzSM
▽ 🗊 IBM Dashboard Application Services Hub 3.1.2.1	
🖳 Installation	
🖳 Configuration	
▽ 🗊 Reporting Services 3.1.2.1	
▷ 🖳 Schema	
▷ 🖳 Application	
▽ ⌖ IBM Netcool GUI Components	/opt/IBM/netcool/gui
▽ 🗊 IBM Tivoli Netcool/OMNIbus Web GUI 8.1.0.5	

Environment
English

Disk Space Information

/

Total Download Size: 774.50 MB
Total Installation Size: 5.25 GB

Figure 2-97   Verify the installation packages

35. Click **Finish** when it completes.

2.6.4 Verification

You can perform the following verification of the installation.

Open the DASH login page. For instance, to verify the jazz-a installation in our scenario, we opened the following URL in the browser:

`https://jazz-a.swg.be.ibm.com:16311/ibm/console/`

Ensure that you use the correct host name for your scenario and open the URL in your browser. You see the DASH login page. Log in with the `smadmin` user to verify that DASH works.

2.7 IBM Operations Analytics - Log Analysis

This section describes the installation and basic configuration of IBM Operations Analytics - Log Analysis (Log Analysis).

2.7.1 Introduction

Log Analysis comes with set of predefined requirements for the operating system. These requirements are documented on the IBM documentation server:

https://ibm.biz/BdrrNc

Prepare your system for the installation based on these requirements.

Table 2-10 shows the default installation directory.

Table 2-10   Settings for installing the IBM Operations Analytics - Log Analysis

Setting	Value
Default Directory	/opt/IBM/netcool/LogAnalysis/
$SCALA_HOME	/opt/IBM/netcool/LogAnalysis/
$UNITY_HOME	/opt/IBM/netcool/LogAnalysis/

2.7.2 Check the prerequisites

At the time of writing this book, Prerequisite Scanner did not support Log Analysis. This support became available shortly before we published the book. For more information, see the following link:

https://ibm.biz/BdrrNB

2.7.3 Setting the ulimit

You need to set the ulimit on the operating system (Example 2-74).

Example 2-74   Setting the ulimit

```
vi /etc/security/limits.conf
netcool         hard    nofile          4096
netcool         soft    nofile          4096
@ncoadmin       hard    nofile          4096
@ncoadmin       soft    nofile          4096
```

2.7.4 Installation and basic configuration

Due to a known limitation, Log Analysis cannot reuse an existing "group-mode" Installation Manager. You need to install a new one by using the `install.sh` script:

1. As the `netcool` user, launch the Installation Manager, as shown in Example 2-75.

Example 2-75   Launch the Installation Manager

```
mkdir LA
cd LA
tar xvzf OALA_1.3.2_ENTRY_LINUX_64_BIT.tar.gz
./install.sh
```

2. Select all packages to install and click **Next**. See Figure 2-98.
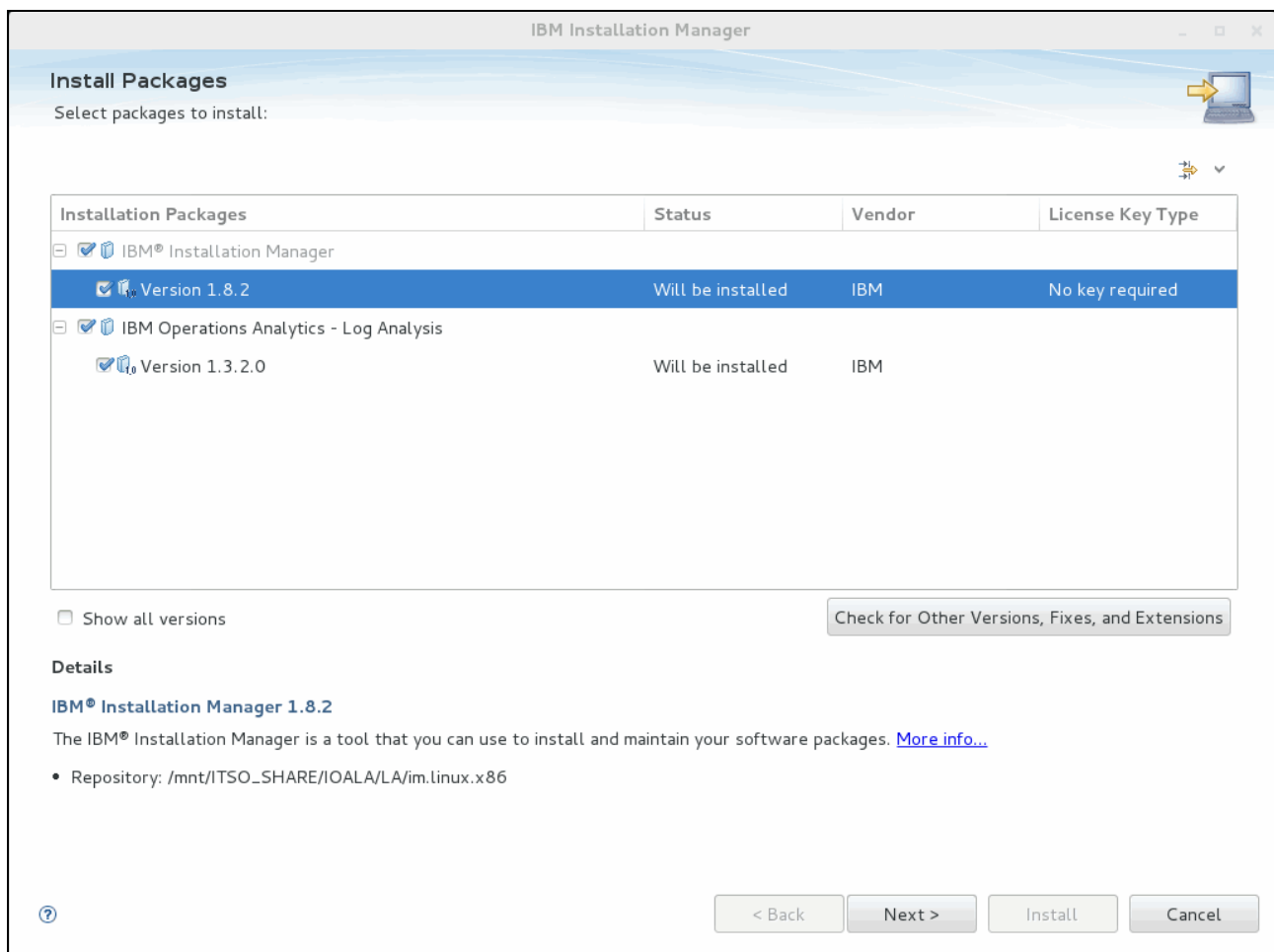
Figure 2-98   Installation packages

3. Click **I accept the terms in the license agreements**, as shown in Figure 2-99, and click **Next**.
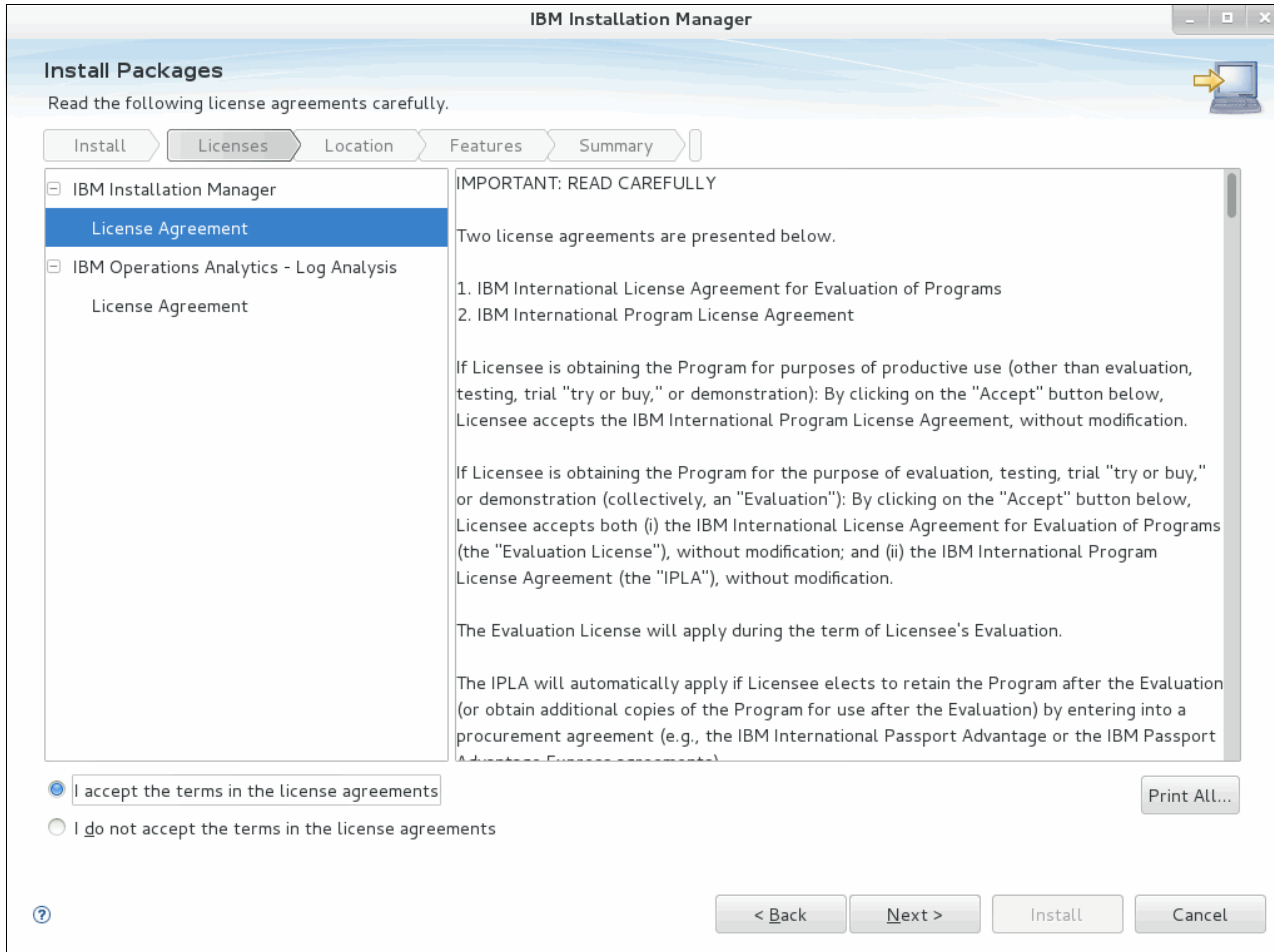
Figure 2-99   Accept the licensing agreement terms for both licenses

4. As shown in Figure 2-100, change the shared resources directory to
   `/opt/IBM/netcool/IM/IBMIMShared` and the installation manager directory to
   `/opt/IBM/netcool/IM/InstallationManager/eclipse`. Click **Next**.
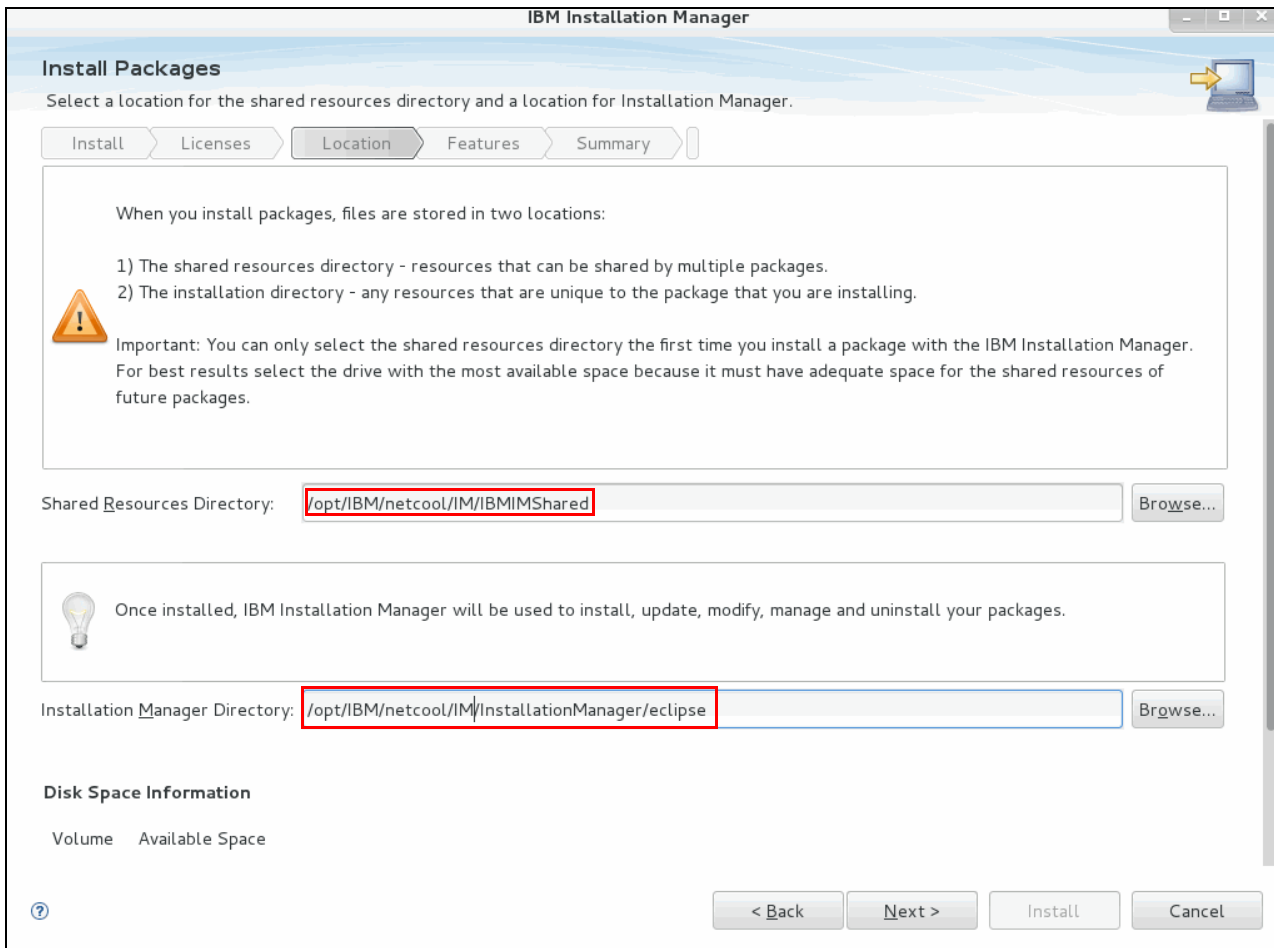
Figure 2-100   Installation Manager paths

5. As shown in Figure 2-101, keep the default installation directory and click **Next**.
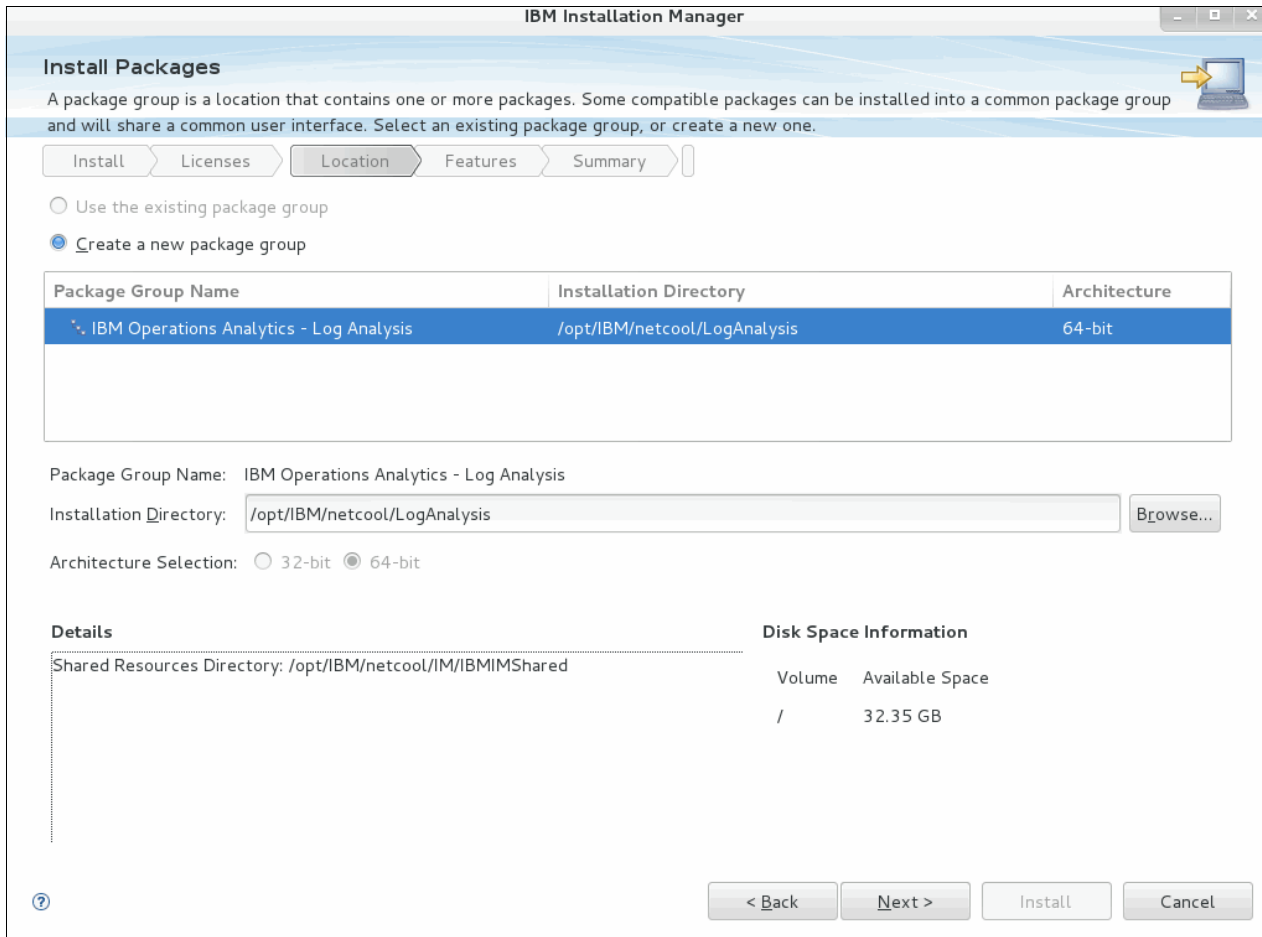
Figure 2-101   Installation directory

6. Select the packages that are shown as selected in Figure 2-102 and click **Next**.
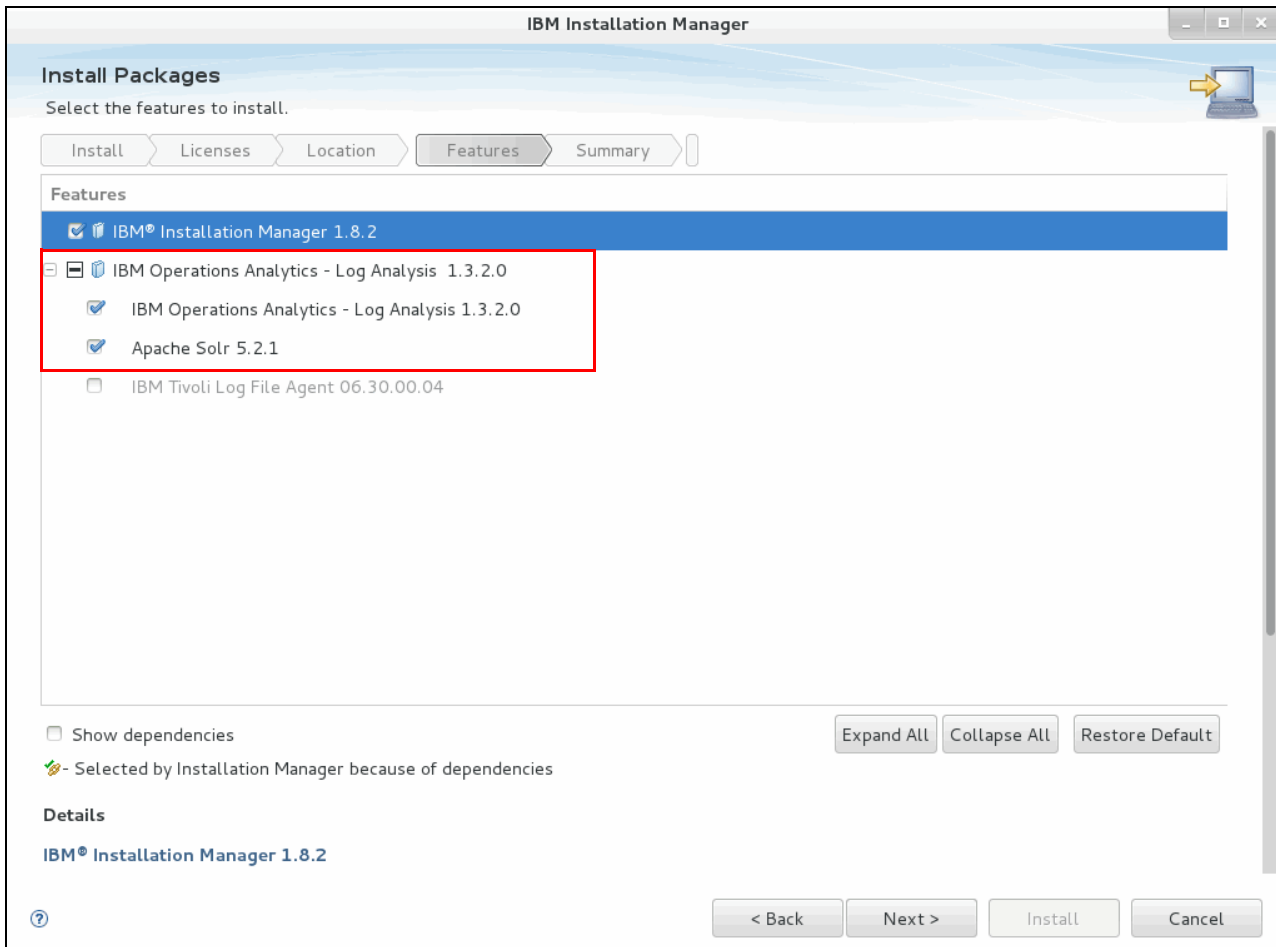
Figure 2-102   Installation packages

> **Tip:** The Apache Solr package can be distributed on another server, if necessary. For more information, see this website:
>
> https://ibm.biz/BdrrNE

7. Leave the default ports as shown in Figure 2-103 and click **Next**.
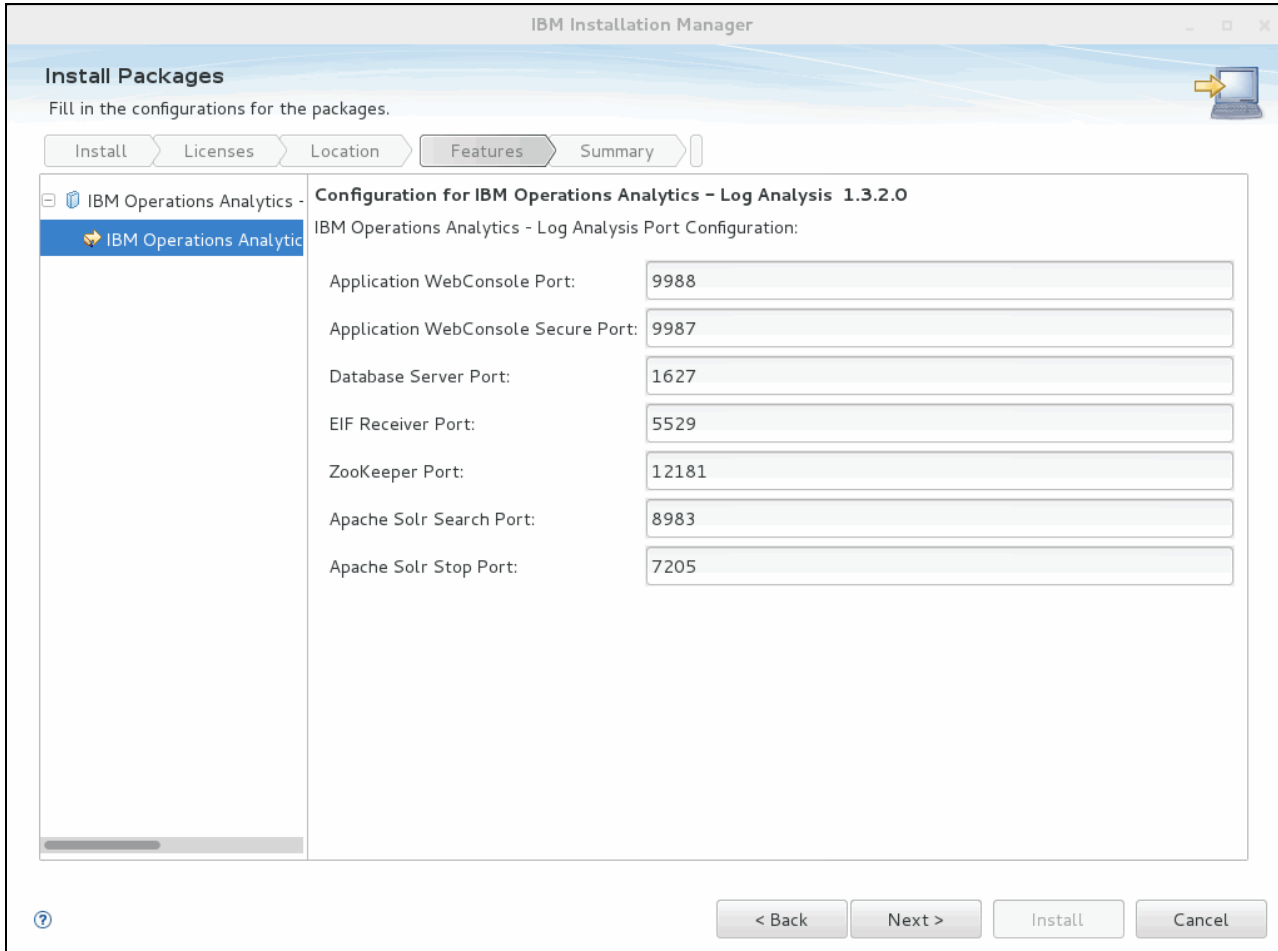
Figure 2-103   Default ports

8. Click **Install** as shown in Figure 2-104.
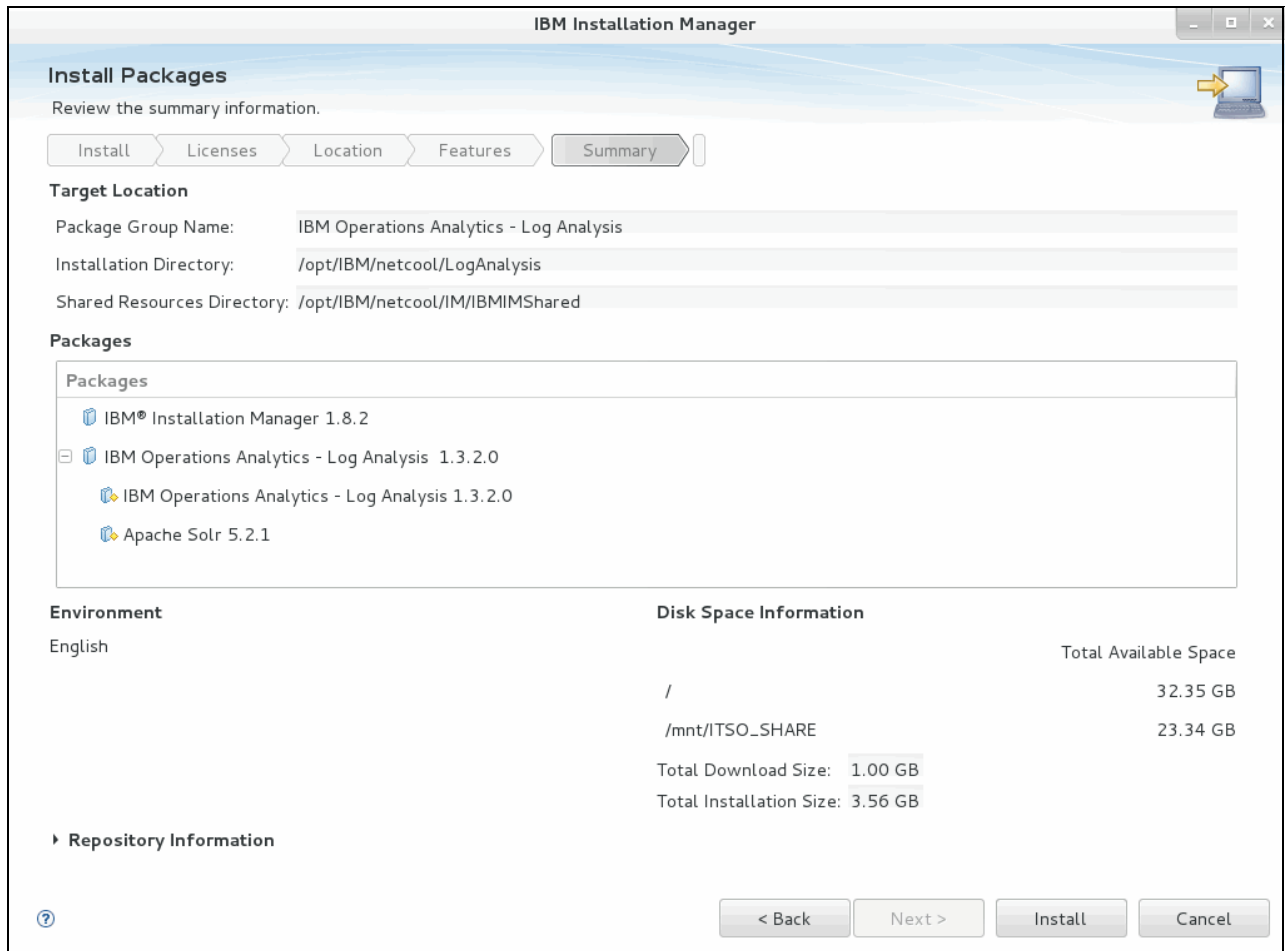
Figure 2-104   Install

9. Wait for the installation to finish.

Configuration

The configuration of Log Analysis is documented in the following document:

https://ibm.biz/BdrrNX

Follow these steps to configure Log Analysis:

1. Alter the Aggregation ObjectServers to enable the *scala_triggers* trigger group as shown in Example 2-76.

Example 2-76   Alter triggers

```
./nco_sql -server AGG_P -user root -password ''
1> alter trigger group scala_triggers set enabled true;
2> go
(0 rows affected)
1> alter trigger scala_reinsert set enabled true;
2> go
(0 rows affected)
1> alter trigger scala_insert set enabled true;
```

```
2> go
(0 rows affected)
1>exit
```

2. Alter the ObjectServer AGG_B to enable the scala_triggers trigger group.

3. Apply the Insight Packs on the ioala-a server as shown in Example 2-77.

Example 2-77   Insight Pack command

```
su netcool
mkdir /opt/IBM/netcool/LogAnalysis/unity_content/OMNIbus
mkdir /opt/IBM/netcool/LogAnalysis/unity_content/NetworkManager/
cp /mnt/ITSO_SHARE/OMNI/OMNIbusInsightPack_v1.3.0.2.zip
/opt/IBM/netcool/LogAnalysis/unity_content/OMNIbus/
cp /mnt/ITSO_SHARE/ITNM/NetworkManagerInsightPack_v1.3.0.0.zip
/opt/IBM/netcool/LogAnalysis/unity_content/NetworkManager/
cd /opt/IBM/netcool/LogAnalysis/utilities
./pkg_mgmt.sh -install
/opt/IBM/netcool/LogAnalysis/unity_content/OMNIbus/OMNIbusInsightPack_v1.3.0.2.zip
BUILD SUCCESSFUL
Total time: 4 seconds

./pkg_mgmt.sh -install
/opt/IBM/netcool/LogAnalysis/unity_content/NetworkManager/NetworkManagerInsightPack_v1.3.0.0.zip
BUILD SUCCESSFUL
Total time: 4 seconds
```

4. Create the OMNIbus data source by using the following steps:

   a. Log in to the Operations Analytics - Log Analysis UI with the default login credentials
   (user: `unityadmin` and password: `unityadmin`) at this URL:

      https://ioala-a.swg.be.ibm.com:9987/Unity

   b. On the Operations Analytics - Log Analysis UI, select the **Create Data Source** wizard
   to create a data source into which the event data is ingested. The OMNIbus1100 data
   source can ingest data for both the Tivoli Netcool/OMNIbus Insight Pack and the
   Network Manager Insight Pack. Log in to this URL:

      https://ioala-a.swg.be.ibm.com:9987/Unity/

Figure 2-105 shows the initial window.
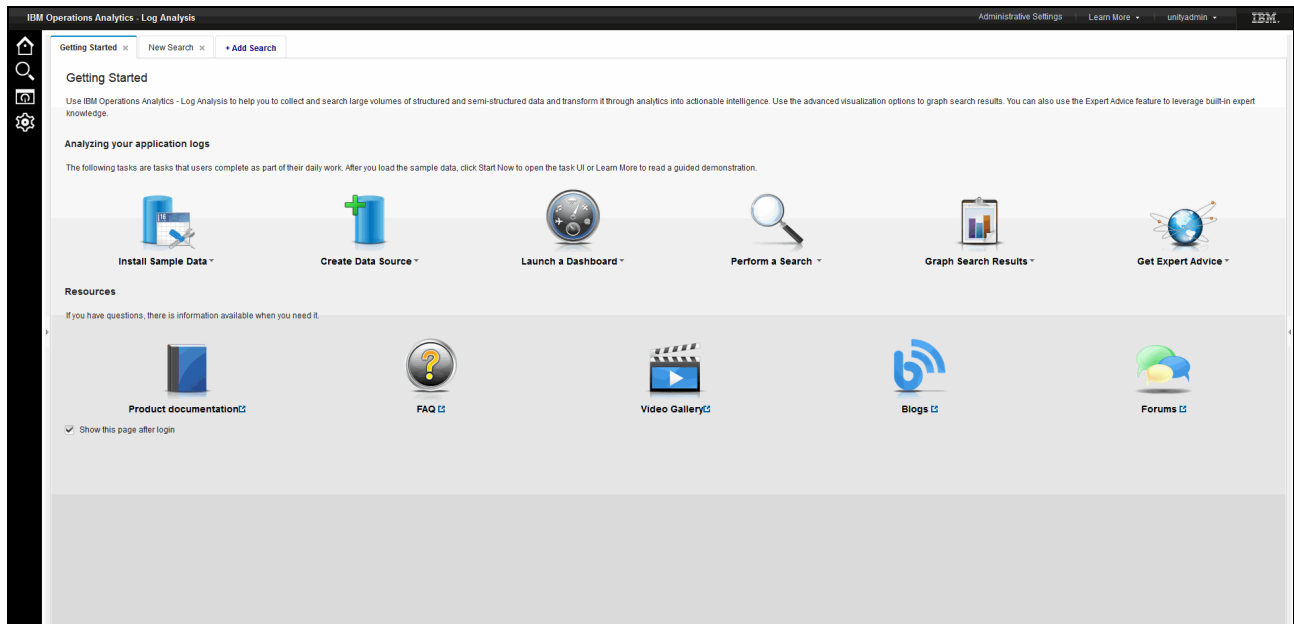
Figure 2-105   Getting Started window

c. Click **Start Now** under the Create Data Source wizard. Figure 2-106 shows the Create Data Source wizard.
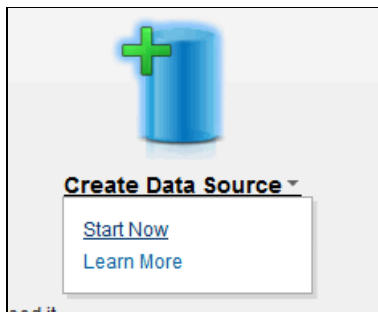
Figure 2-106   Create Data Source wizard

d. Configure the data source with the host name where the nco-g-xml gateway is configured, as shown in Figure 2-107, and click **Next**.

Edit Data Source

* **Select Location**   * Select Data   * Set Attributes

If you want to ingest data into the Log Analysis server, use the wizard to configure a data source. Select Local or Remote file to monitor changes to a file. Select Custom when data is sent to the Log Analysis server from external sources such as a remote log file agent, Logstash, or the data collector client. Learn More...

○ Local file
○ Remote file
● Custom
* Host name: ioala-a.swg.be.ibm.com

* Required

Note : Local and remote options disabled - Log file agent may not be installed

| Back | Next | Finish | Cancel |

Figure 2-107   Data source location host name

e. As shown in Figure 2-108, for the file path, enter `AGG_V`. For the type, enter `OMNIbus1100`. For Collection, enter `OMNIbus1100-Collection`. Click **Next**.

Figure 2-108   Selecting the data

f. As shown in Figure 2-109, enter `omnibus` for the name of the new data source and click **Finish**.

> **Note:** The name *omnibus* is mandatory because it was configured in the Insight Pack as the default data source name.

Figure 2-109 Add a data source

g. With the data source in place, you can configure the nco-g-xml gateway (or SCALA gateway) for OMNIbus. For more information, see this website:

https://ibm.biz/BdrrN4

The configuration of the nco-g-xml gateway (or SCALA gateway) for OMNIbus involves the following steps:

i. Add the nco-g-xml gateway on the IBM Operations Analytics - Log Analysis server. (You will need to install the gateway's support on this server, too.) Use IBMIM to add the repository from the Im-nco-g-xml-7_0.zip to the Installation Manager, as shown in Figure 2-110.

This gateway will be installed near the destination (ioala-a server) because the gateway and IBM Operations Analytics - Log Analysis cannot fail over.
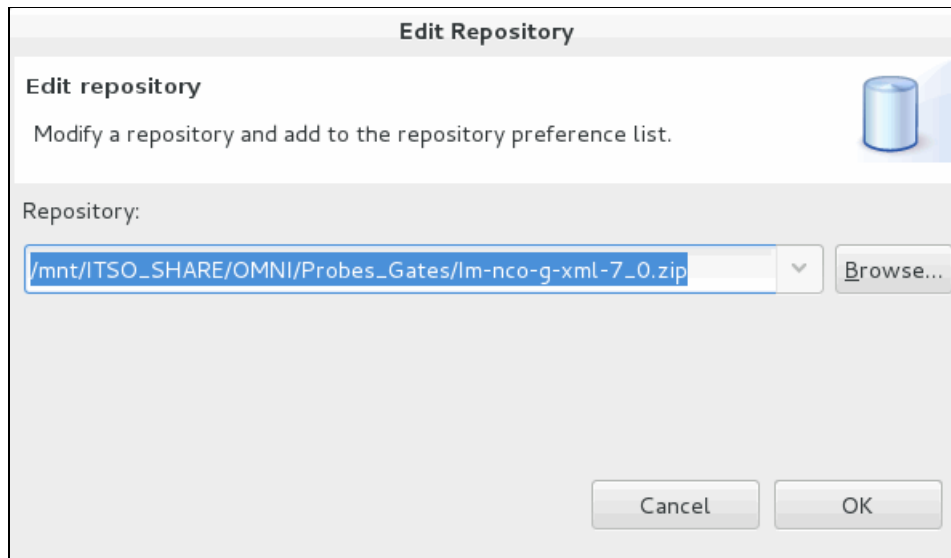
Figure 2-110   Configuring the nco-g-xml gateway

ii. Select **Netcool/OMNIbus Gateway nco-g-xml** as shown in Figure 2-111.
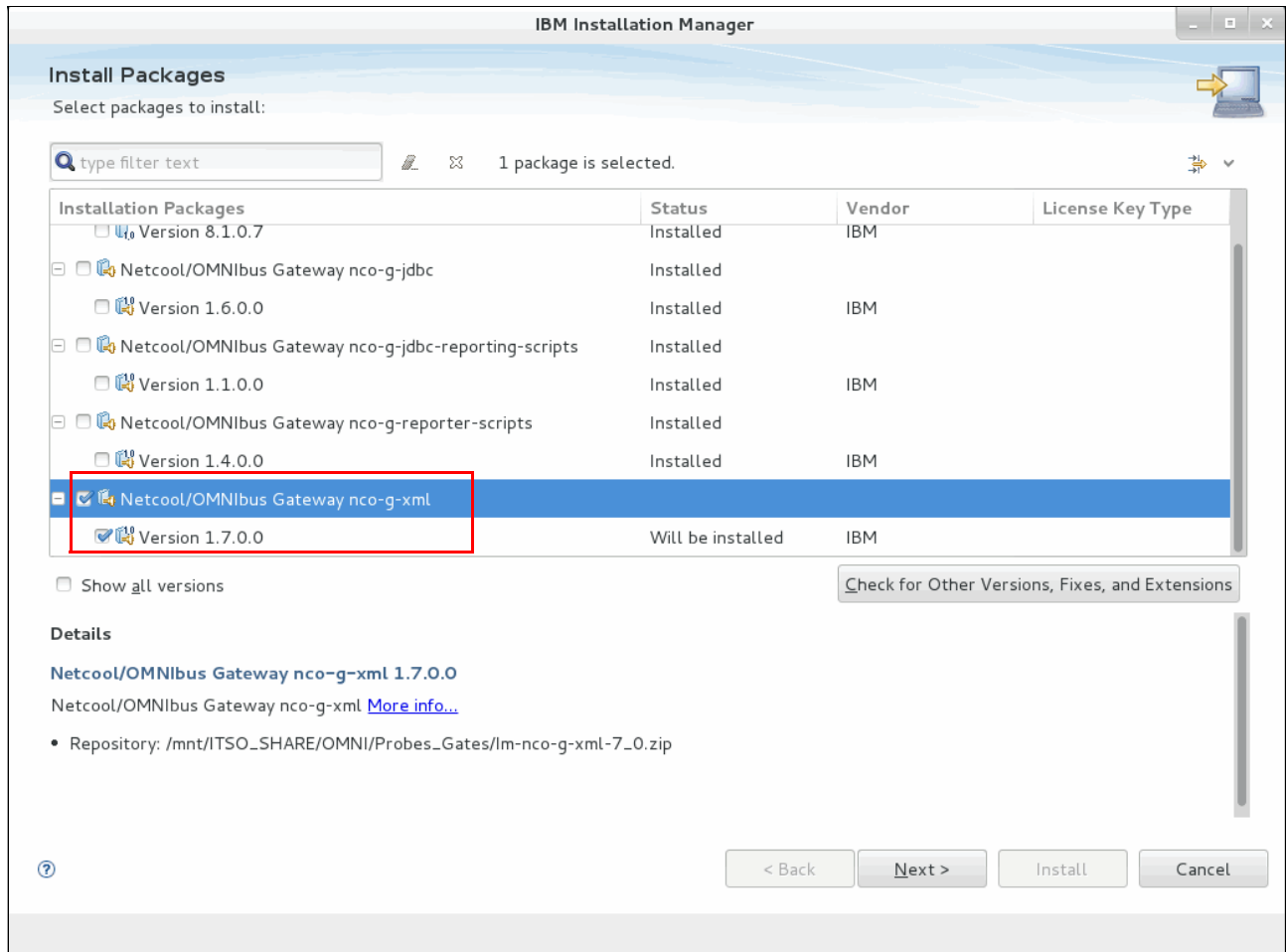
Figure 2-111   Select an installation package

iii. Click **Next** and wait until the installation is finished. Then, continue with the configuration.

5. Create a gateway server in the Netcool/OMNIbus interfaces file by using the following commands (Example 2-78).

Example 2-78   G_SCALA

```
vi $NCHOME/etc/omni.dat
[AGG_V]
{
Primary: Omni-A.swg.be.ibm.com 4100
Backup: Omni-B.swg.be.ibm.com 4100
}
[G_SCALA]
{
Primary: Omni-A.swg.be.ibm.com 4305
}
$NCHOME/bin/nco_igen
```

6. Configure the G_SCALA.props properties file, including the specification of the .map mapping file, as shown in Example 2-79.

Example 2-79   Configure the G_SCALA.props properties file

```
cd /opt/IBM/tivoli/netcool/omnibus/gates/xml/scala
vi G_SCALA.props
Gate.Reader.TblReplicateDefFile        : '$OMNIHOME/gates/xml/scala/xml.reader.tblrep.def'

# Gate.MapFile configures the gateway to send data required by the OMNIbus1100
# datasource in the Netcool/Operations Insight Pack. Use the map file that corresponds to
the version of the
# insight pack you have installed in SCALA.

# Map file for OMNNIbusInsightPack version 1.3.0.2 and above.
Gate.MapFile                           : '$OMNIHOME/gates/xml/scala/xml1302.map'
# Map file for OMNIbusInsightPack versions 1.3.0.0 and 1.3.0.1
#Gate.MapFile                          : '$OMNIHOME/gates/xml/scala/xml1300.map'
# Map file for the insight pack in Netcool/Operations Insight  Versions 1.1 and 1.2
#Gate.MapFile                          : '$OMNIHOME/gates/xml/scala/xml.map'
Gate.StartupCmdFile                    : '$OMNIHOME/gates/xml/scala/xml.startup.cmd'

Gate.XMLGateway.TransformerFile        : '$OMNIHOME/java/conf/scalaTransformers.xml'
Gate.XMLGateway.TransportFile          : '$OMNIHOME/java/conf/scalaTransport.properties'
Gate.XMLGateway.TransportType          : 'SCALA'
Gate.XMLGateway.DateFormat             : 'yyyy-MM-dd\'T\'HH:mm:ssZ'

#################
# Omnibus settings
Gate.Reader.Server                     : 'AGG_V'
Gate.Reader.Username                   : 'root'
Gate.Reader.Password                   : ''  # nco_g_crypt output
Gate.Reader.Description                : 'SCALA Gateway Reader'
```

7. Configure the endpoint in the scalaTransformers.xml file, as shown in Example 2-80.

Example 2-80   Configure the endpoint

```
cd /opt/IBM/tivoli/netcool/omnibus/java/conf
vi scalaTransformers.xml
<tns:transformer name="netcoolEvents" type="northbound"
endpoint="https://ioala-a:9987/Unity/DataCollector"
className="com.ibm.tivoli.netcool.integrations.transformer.XSLTThreadTransformer">
```

Important: The host name that is used in the configuration needs to be identical to the certificate that is imported in Example 2-81 on page 163.

8. If, due to network security reasons, a Secure Sockets Layer (SSL) connection is required from the Log Analysis server to the Object Servers, perform the following steps to configure the SSL connection. See the following document for details:

   https://ibm.biz/BdrrNr

Example 2-81 shows how we implemented this SSL connection in our environment.

Example 2-81   Configure the SSL connection

```
mkdir $OMNIHOME/java/security/
keytool -genkey -alias MyOmnibus -keystore $OMNIHOME/java/security/client.jks \
$OMNIHOME/bin/nc_httpcertimport -k $OMNIHOME/java/security/cacerts.jks -h \
ioala-a.swg.be.ibm.com:9987 --alias ioala-a
Enter password for keystore
Reenter password for keystore
Obtaining certificates from server ...
Server Sent 1 certificate(s):
1 Subject CN=ioala-a, OU=IT, O=IBM, C=US
   Issuer CN=ioala-a, OU=IT, O=IBM, C=US
   sha1 :b8 31 a1 ed 6c 51 ec 2d d4 31 75 06 18 3f 87 8d 3a d4 f6 f0
   Signature algorithm used:SHA1withRSA
   Valid from Apr 29, 2016 to Apr 29, 2018
   Certificate Subject Alternative Name(s)
   localhost
   ioala-a
   IOALA-A
   IOALA-a
   localhost.localdomain
   172.16.61.139
Enter the number of a certificate you trust and want to add to the keystore or 'q'
to quit: [1]
Added certificate to keystore file
'/opt/IBM/tivoli/netcool/omnibus/java/security/cacerts.jks' using alias 'ioala-a'.
```

> **Important:** In our environment, the server did not send a fully qualified domain name (FQDN) certificate. (See the response under "*Certificate Subject Alternative Name(s)*" in Example 2-81.) Confirm from the certificate response whether you received an FQDN certificate, and change the name in the scalaURL property correctly (in Example 2-82). Otherwise, the SSL connection fails.

9. Configure the transport properties in the `scalaTransport.properties` file, as shown in Example 2-82.

Example 2-82   Configuring the transport properties

```
cd /opt/IBM/tivoli/netcool/omnibus/java/conf
vi scalaTransport.properties
# Example format of SCA-LA properties file
# Uncomment the relevant lines and change the settings accordingly
#
# scalaURL - the URL of a target system to connect to
# scalaURL=http(s)://some.host.com:port/Unity/DataCollector
 scalaURL=https://ioala-a:9987/Unity/DataCollector
#
# scalaRetryMax - The maximum number of attempts to successfully connect to data
collector before dropping message. Value of zero is to retry indefinitely.
# scalaRetryMax=0
#
# scalaRetryPeriod - The amount of time in seconds between each reconnection
attempt to the data collector.
# scalaRetryPeriod=30
```

```
#
# keyStore - the keyStore that contains the private keys for any https ports (see
JVM property javax.net.ssl.keyStore)
# keyStore=/the/path/to/the/keystore
keyStore=$OMNIHOME/java/security/client.jks

#
# keyStorePassword - the password to the keyStore that contains the private keys
for any https ports (see JVM property javax.net.ssl.keyStorePassword)
 keyStorePassword=netcool
#
# trustStore - the trustStore that contains the server's public key for any https
clients (see JVM property javax.net.ssl.trustStore)
# trustStore=/the/path/to/the/truststore
trustStore=$OMNIHOME/java/security/cacerts.jks

#
# trustStorePassword - the password to the trustStore that contains the server's
public key for any https clients (see JVM property
javax.net.ssl.trustStorePassword)
 trustStorePassword=netcool
#
# threadPoolSize - the number of threads that the http servers share to process
incoming requests
# threadPoolSize = 16
#
# username - the username to use for authentication with the data collector.
username = unityadmin
#
# password - the password to use for authentication with the data collector.
password = unityadmin
#
# eventBufferSize - the maximum number of events to contain in each batch of log
record data sent to the SCA-LA data collector.
# eventBufferSize = 200
#eventBufferSize = 3
#
## eventBufferFlushTime - the amount of time to wait for new events in seconds
before flushing the buffer. Flush timer is reset on each event added to the batch.
# eventBufferFlushTime = 30
#
# enableTrace - enable diagnostic tracing of communications between the SCA-LA
transport and the data collector.
# enableTrace = true
#
# readTimeout - socket timeout for reading responses from SCA-LA, in seconds
# readTimeout = 30
#
# jsonMsgHostname - The hostname that corresponds to the data source for ingested
data.
jsonMsgHostname = IOALA-A.swg.be.ibm.com
#
# jsonMsgPath - The path that corresponds to the data source for ingested data.
jsonMsgPath = AGG_V
```

> **Tip:** During the installation and configuration, it is useful to set the eventBufferSize = 3 because this setting facilitates quicker debugging of the event flow in the logs. Two log files are associated with this event flow:
>
> ► On OMNIbus:
>
>   `/opt/IBM/tivoli/netcool/omnibus/log/G_SCALA.log`
>
> ► On Log Analysis:
>
>   `/opt/IBM/netcool/LogAnalysis/logs/GenericReceiver.log`

Configuring the Network Manager integration

Configure the Network Manager integration, which is documented at this website:

https://ibm.biz/BdrrNX

Follow these steps to configure the Network Manager integration:

1. On the JazzSM servers, edit the `Network_Topology_Search/NM_EndToEndSearch.properties` file as shown in Example 2-83.

Example 2-83   Network_Topology_Search/NM_EndToEndSearch.properties file

```
vi
$UNITY_HOME/AppFramework/Apps/NetworkManagerInsightPack_V1.3.0.0/Network_Topology_
Search/NM_EndToEndSearch.properties
```

2. Alter the fields as indicated in Example 2-84.

Example 2-84   Edit the Network_Topology_Search/NM_EndToEndSearch.properties file

```
ncp.dla.datasource.type = db
ncp.dla.datasource.driver                   = com.ibm.db2.jcc.DB2Driver
ncp.dla.datasource.url                      = jdbc:db2://172.16.61.137/ITNM
ncp.dla.datasource.schema                   = ncim
ncp.dla.datasource.ncpgui.schema            = ncpgui
ncp.dla.datasource.username                 = ncim
ncp.dla.datasource.password                 = netcool
ncp.dla.datasource.encrypted                = false
ncp.dla.datasource.keyFile                  =
$SCALA_HOME/wlp/usr/servers/Unity/keystore/unity.ks
ncp.dla.datasource.loginTimeout             = 5
```

3. Verify the installed Insight Packs with the following command (Example 2-85).

Example 2-85   Use the pkg_mgmt.sh

```
cd /opt/IBM/netcool/LogAnalysis/utilities/
./pkg_mgmt.sh -list

.Buildfile: /opt/IBM/netcool/LogAnalysis/utilities/pkg_mgmt.xml
initializeCustomTasks:
main:
[packagemanager] 04/30/16 17:23:24:363 CEST [main] INFO  - PrerequisitesManager :
CTGLC0044I : Running prerequisite checks...
[packagemanager] 04/30/16 17:23:24:368 CEST [main] INFO  - PrerequisitesManager :
CTGLC0045I : Prerequisite checks passed
```

```
[packagemanager] 04/30/16 17:23:24:369 CEST [main] INFO  - ContentPackManager :
CTGLC0030I : Listing installed insight packs started...
[packagemanager] 04/30/16 17:23:24:440 CEST [main] INFO  - ContentPackManager :
[packagemanager] GAInsightPack_v1.1.1.3                 -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] NetworkManagerInsightPack_v1.3.0.0    -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] DB2InsightPack_v1.1.0.2               -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] DB2AppInsightPack_v1.1.0.3            -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] OMNIbusInsightPack_v1.3.0.2           -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] WASInsightPack_v1.1.0.3               -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] WindowsOSEventsInsightPack_v1.1.0.4   -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] SyslogInsightPack_v1.1.0.3            -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] JavacoreInsightPack_v1.1.0.3          -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] WASAppInsightPack_v1.1.0.3            -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] WebAccessLogInsightPack_v1.1.0.2      -
/opt/IBM/netcool/LogAnalysis/unity_content
[packagemanager] 04/30/16 17:23:24:442 CEST [main] INFO  - ContentPackManager :
CTGLC0031I : Listing completed successfully

BUILD SUCCESSFUL
Total time: 1 second
```

Add Log Analysis integration to the OMNIbus Web GUI part of JazzSM

Perform the following steps to add the Log Analysiss integration to the OMNIbus Web GUI
part of JazzSM.

> **Important:** You must execute these steps on every JazzSM server.

Follow these steps:

1. As the user `netcool`, launch the Installation Manager, as shown in Example 2-86.

Example 2-86   Launch the Installation Manager

```
cd
./IBMIM
```

2. Click **Modify**. Select **IBM Netcool GUI Components**, as shown in Figure 2-112. Click **Next**.
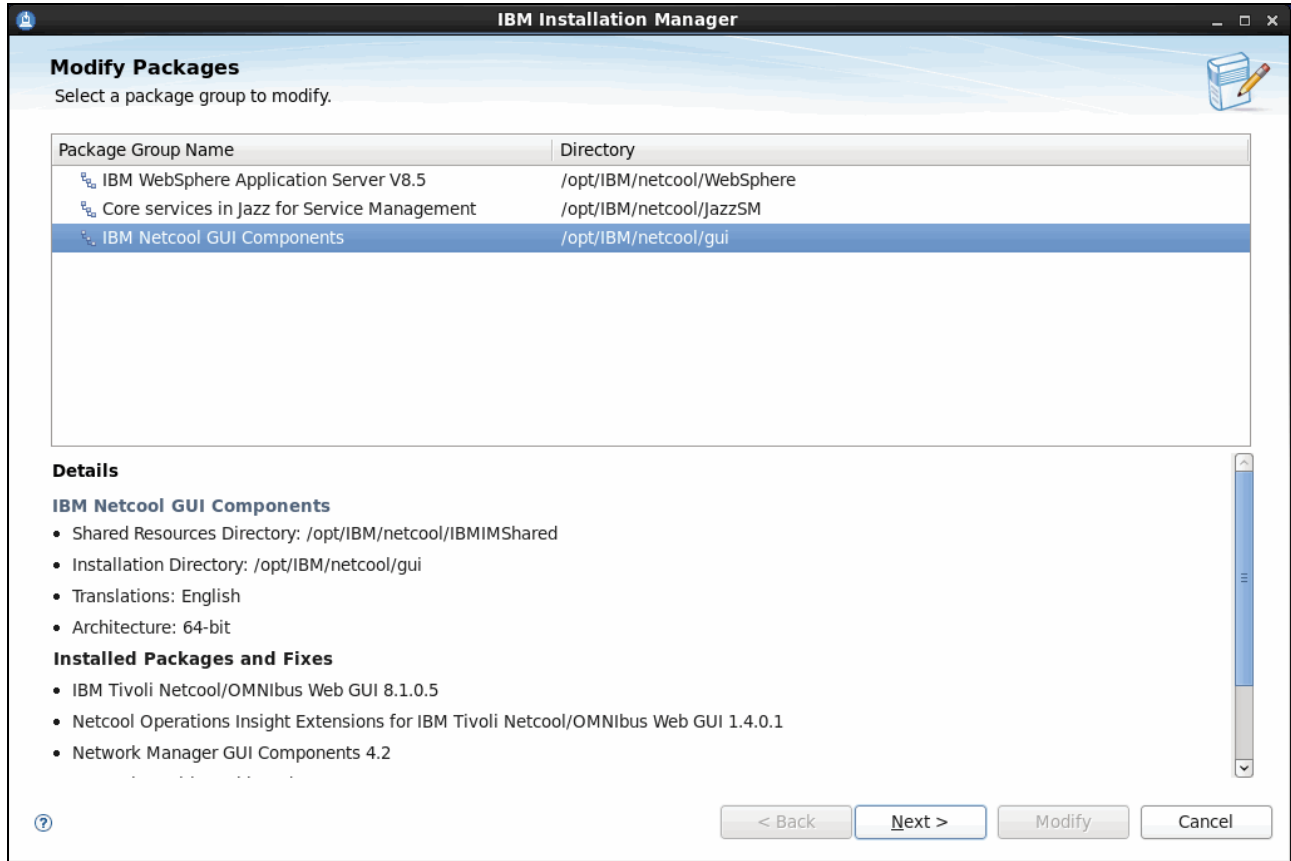
Figure 2-112   Netcool GUI Components

3. Select all features under IBM Tivoli Netcool/OMNIbus Web GUI to install. Ensure that you check **Install event search with IBM Operations Analytics - Log Analysis** (Figure 2-113) and click **Next**.
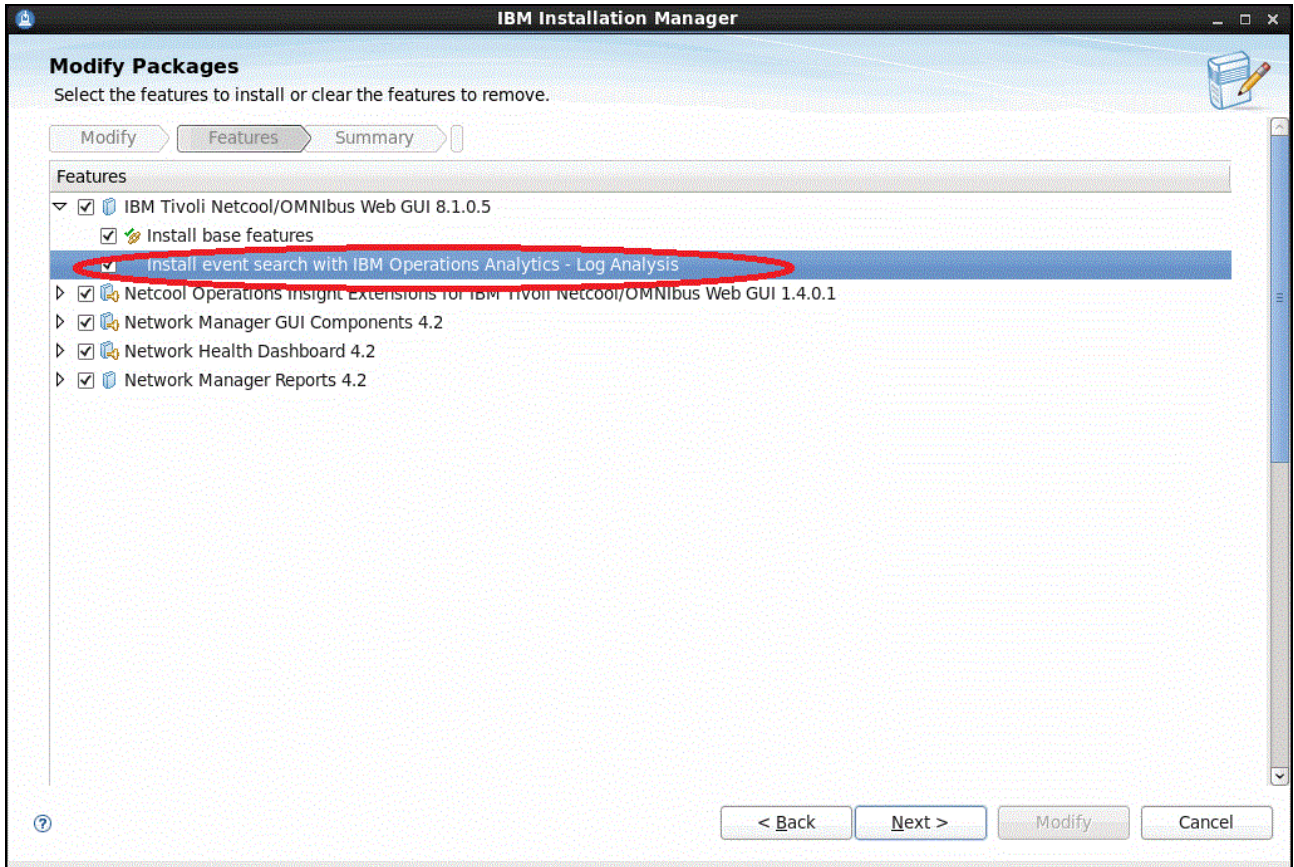
Figure 2-113   Select all Netcool/OMNIbus GUI components

4. As shown in Figure 2-114, leave the default paths. Enter the `smadmin` password and click **Next**.
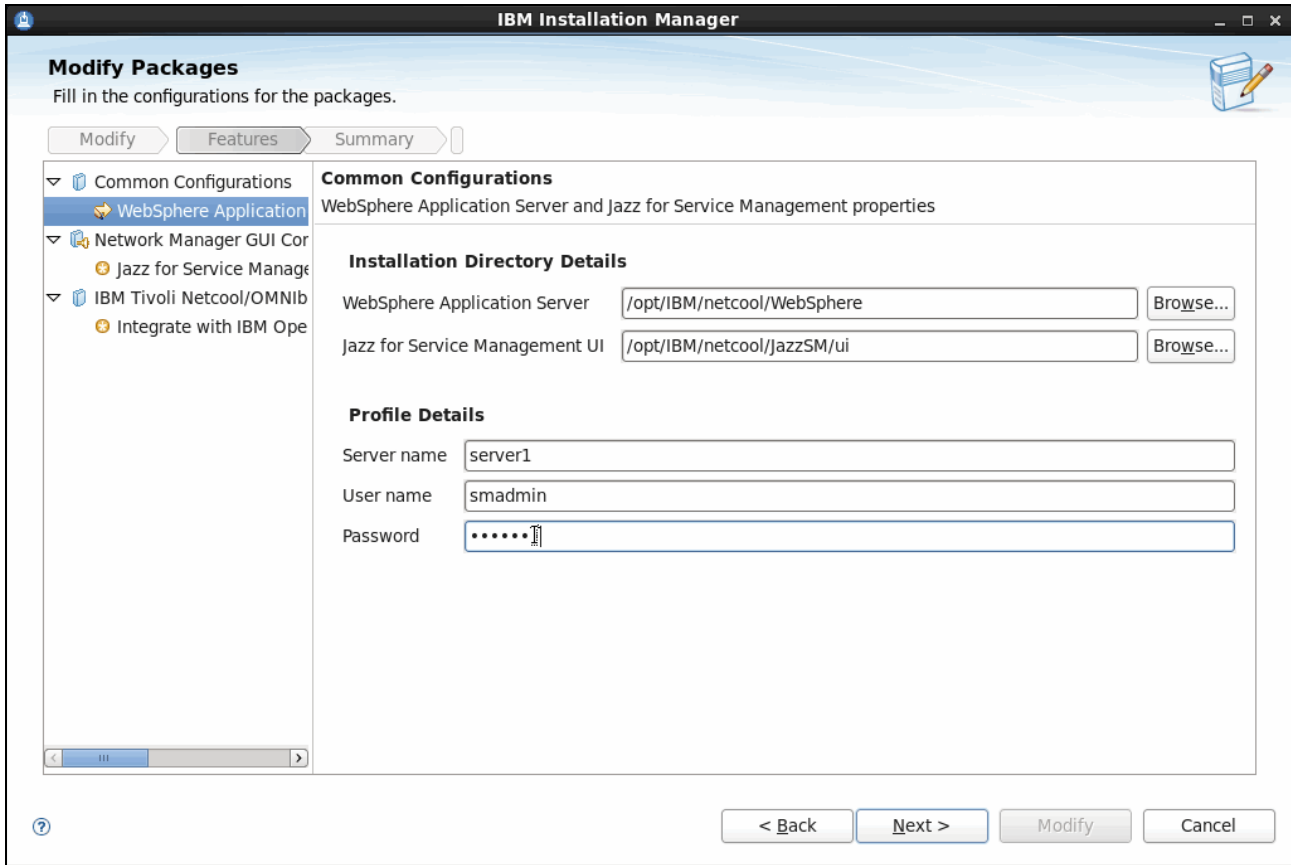
Figure 2-114   Enter profile details

5. As shown in Figure 2-115, type the `smadmin` password again and click **Next**.
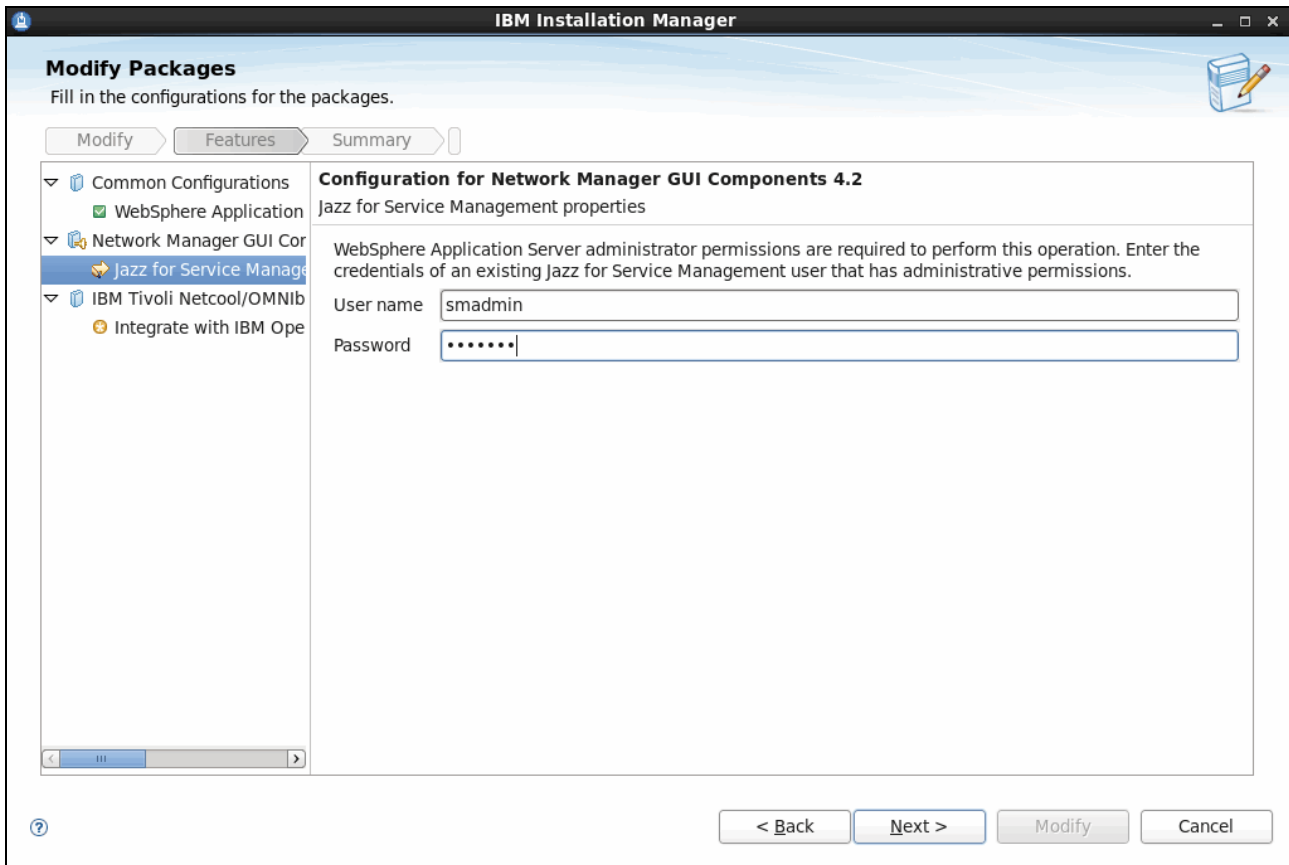
Figure 2-115   Type the password

6. Configure the panel as shown in Figure 2-116 and click **Next**:
   – For the URL protocol type, enter `https`.
   – For the URL host name, enter `ioala-a.swg.be.ibm.com`.
   – For the URL port number, enter `9987`.
   – For the URL context root, enter `Unity`.
   – For the data source name, enter `omnibus`.
   – For the user name, enter `Unityadmin`.
   – For the password, enter the password for the `Unityadmin` user.
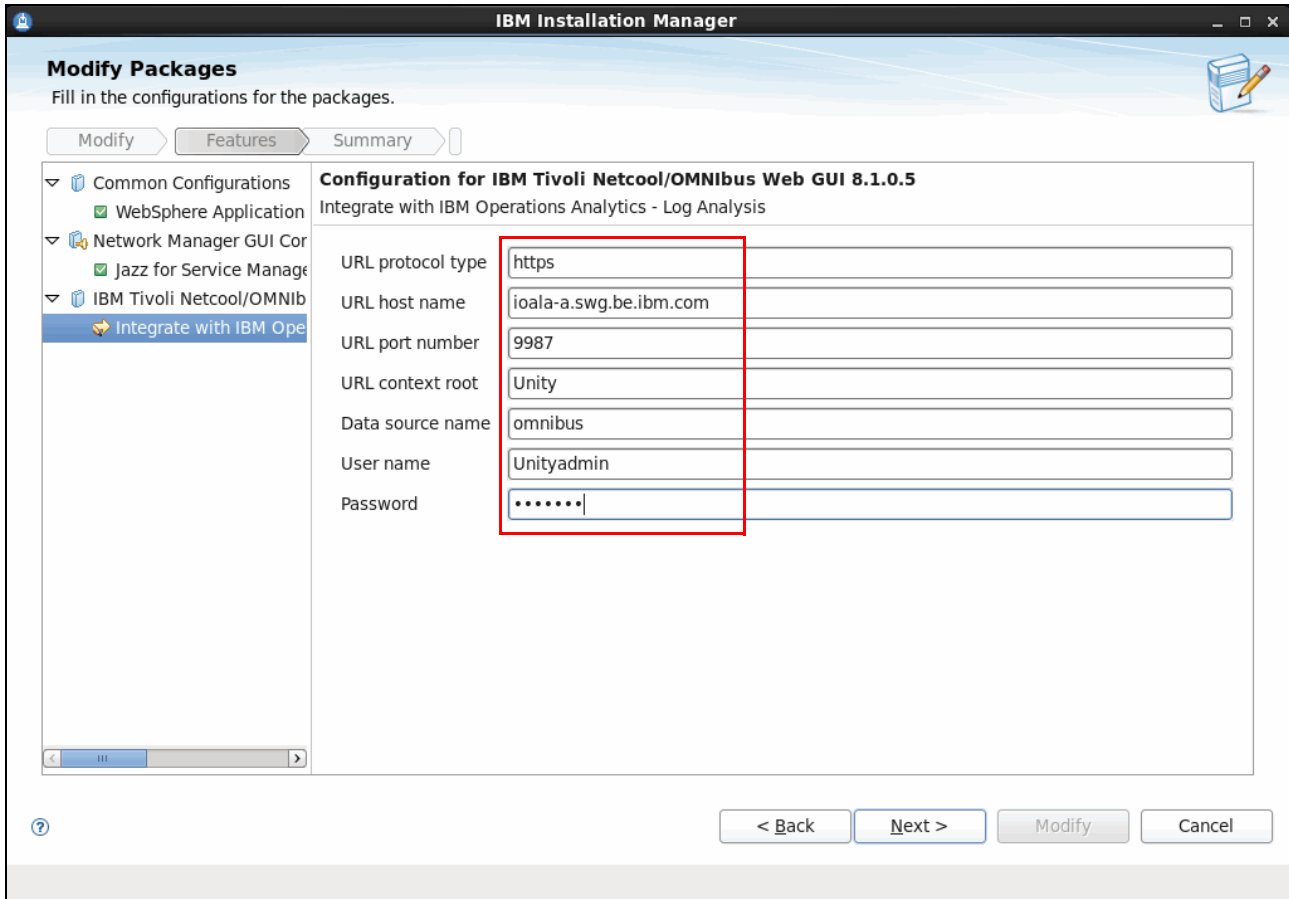
Figure 2-116   Log Analysis configuration

7. Click **Modify**, as shown in Figure 2-117.
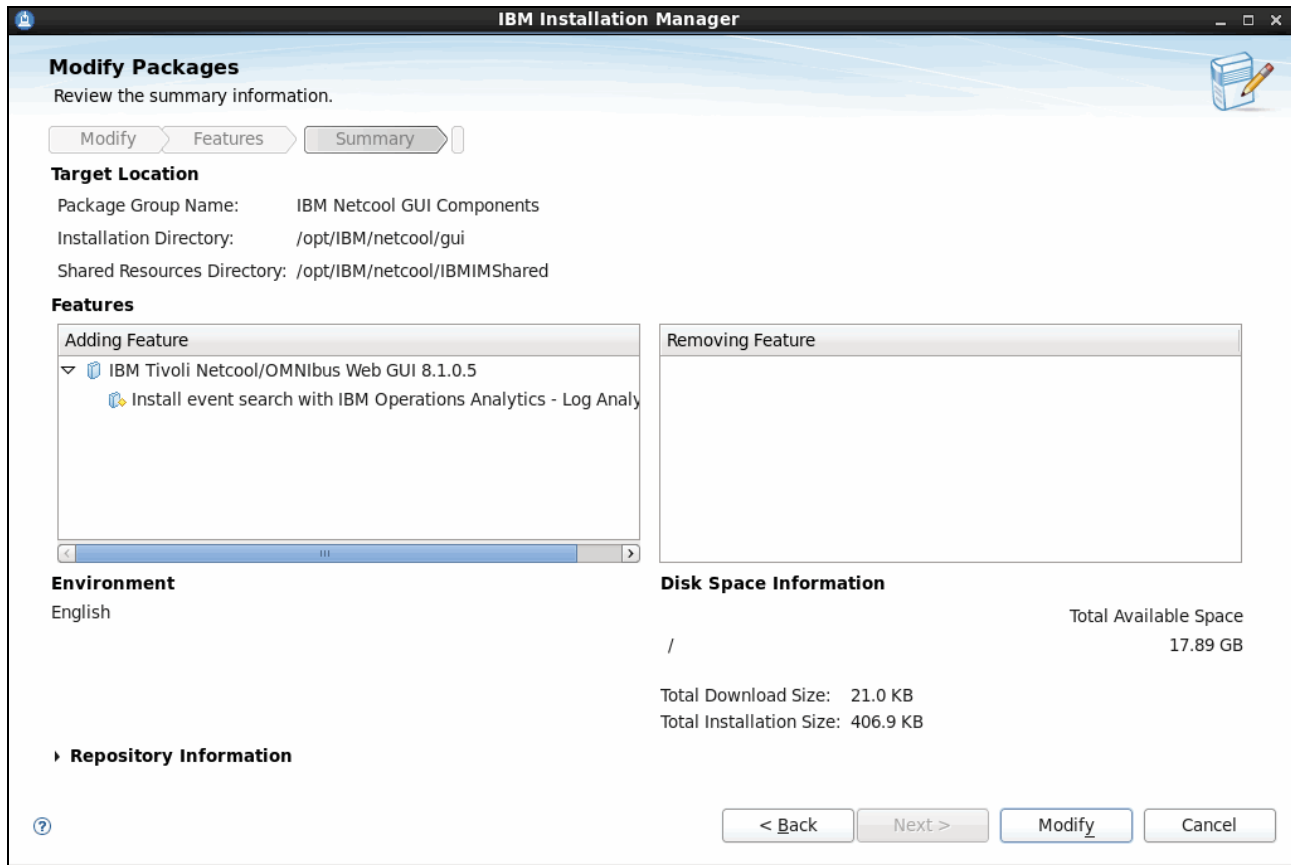
Figure 2-117   Modify Packages window

8. Wait until the installation is complete, as shown in Figure 2-118. Click **Finish**.
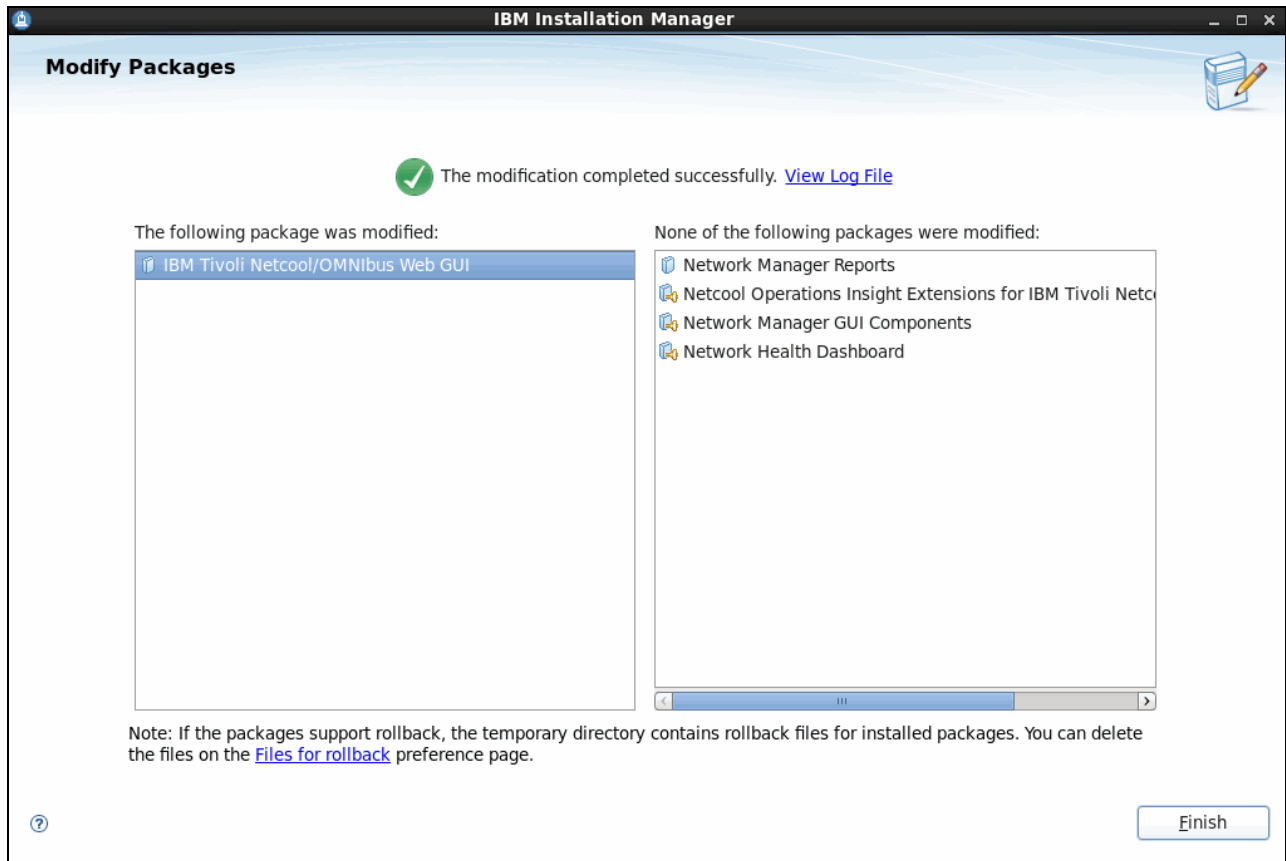
Figure 2-118   Installation completed

2.7.5 Verification

Perform the following steps to verify the successful installation:

1. Log in to `https://ioala-a.swg.be.ibm.com:9987/Unity` as shown on Figure 2-119.
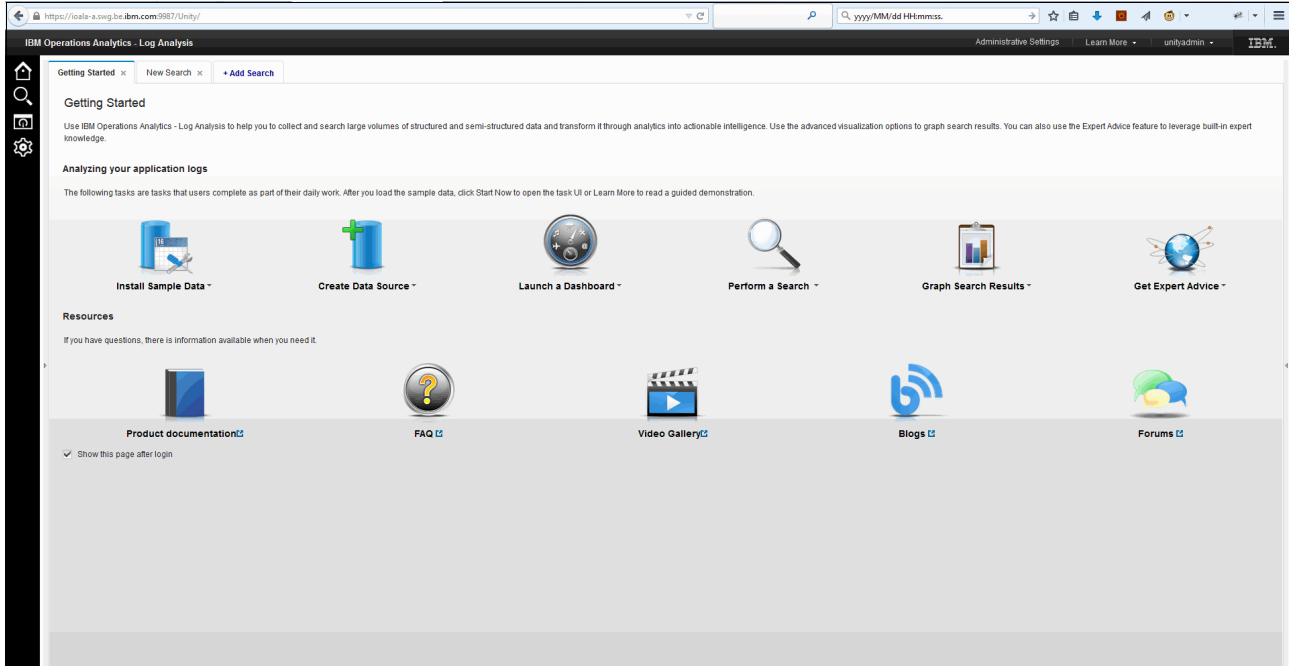
Figure 2-119   Login window

2. You can also see the ingestion of data from the nco-g-xml gateway by using the Administrative Settings option, as shown in Figure 2-120.
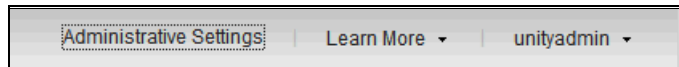
Figure 2-120   Administrative Settings option

3. Click **Server Statistics**, as shown in Figure 2-121.
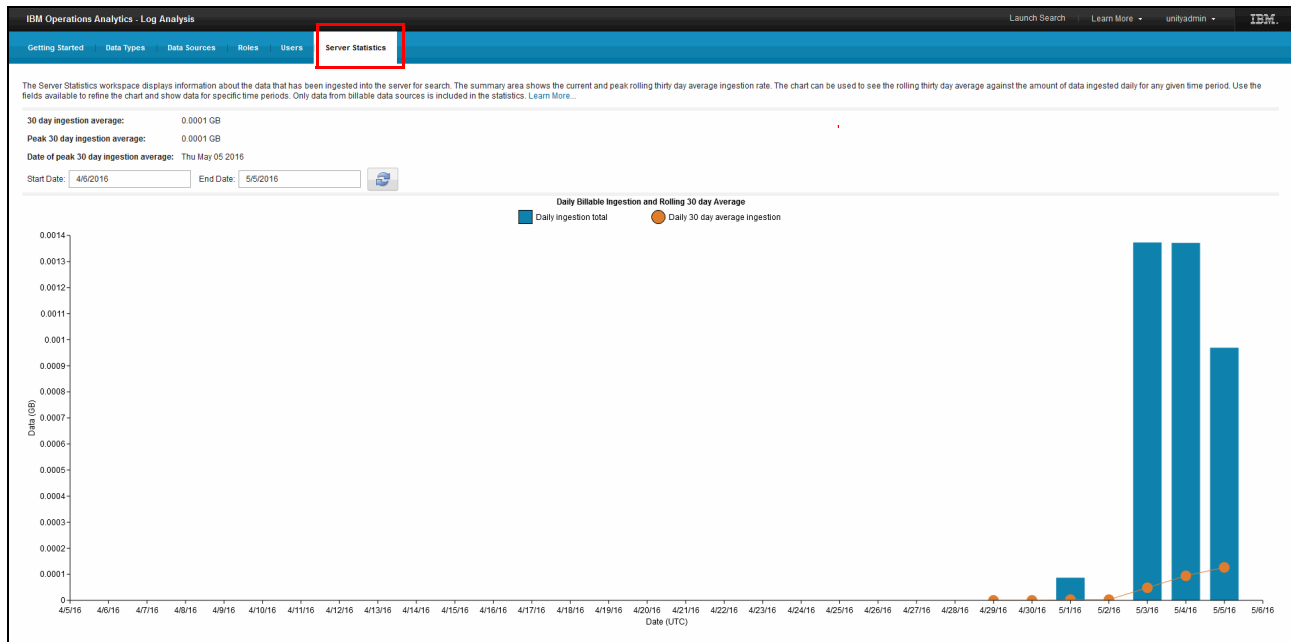
Figure 2-121   Server Statistics option

The Server Statistics window shows you the daily intake of events. You can also drill down to a more detailed view.

2.8 IBM Netcool Configuration Manager

The basic installation of IBM Netcool Configuration Manager is described.

> **Note:** Although Netcool Configuration Manager (NCM) is included in the high-level architecture in the beginning of the document, we installed it in a separate environment from the rest of the installed Netcool Operations Insight (NOI) components when we created this book. Therefore, you might see different servers and database names that are mentioned in this section.

2.8.1 Introduction

Netcool Configuration Manager comes with a set of predefined requirements for the operating systems, databases, and hardware.

These requirements are documented on the IBM documentation server:

https://ibm.biz/BdrrNz

> **Note:** The current Prerequisite Scanner does not support Netcool Configuration Manager Version 6.4.1.0/1. This support will be available for version 6.4.2.1, which was not available at the time of writing this book.

2.8.2 Installation and basic configuration

Perform the following steps:

1. Download and extract the necessary files that correspond to your server operating system. You can obtain the correct part numbers at this website:

   https://ibm.biz/BdrFAn

2. Create a set of repository directories, as shown in Table 2-11.

Table 2-11   Repository directories

Repository location	Contents
/opt/IBM/noi_repo/ncm	Netcool Configuration Manager
/opt/IBM/noi_repo/jazz	JazzSM
/opt/IBM/noi_repo/websphere	WebSphere

3. Start the previously installed Installation Manager by using the following command (Example 2-87).

Example 2-87   Starting the Installation Manager

```
cd /opt/IBM/netcool/IM/InstallationManager/eclipse
./IBMIM
```

Figure 2-122 shows the Installation Manager GUI.
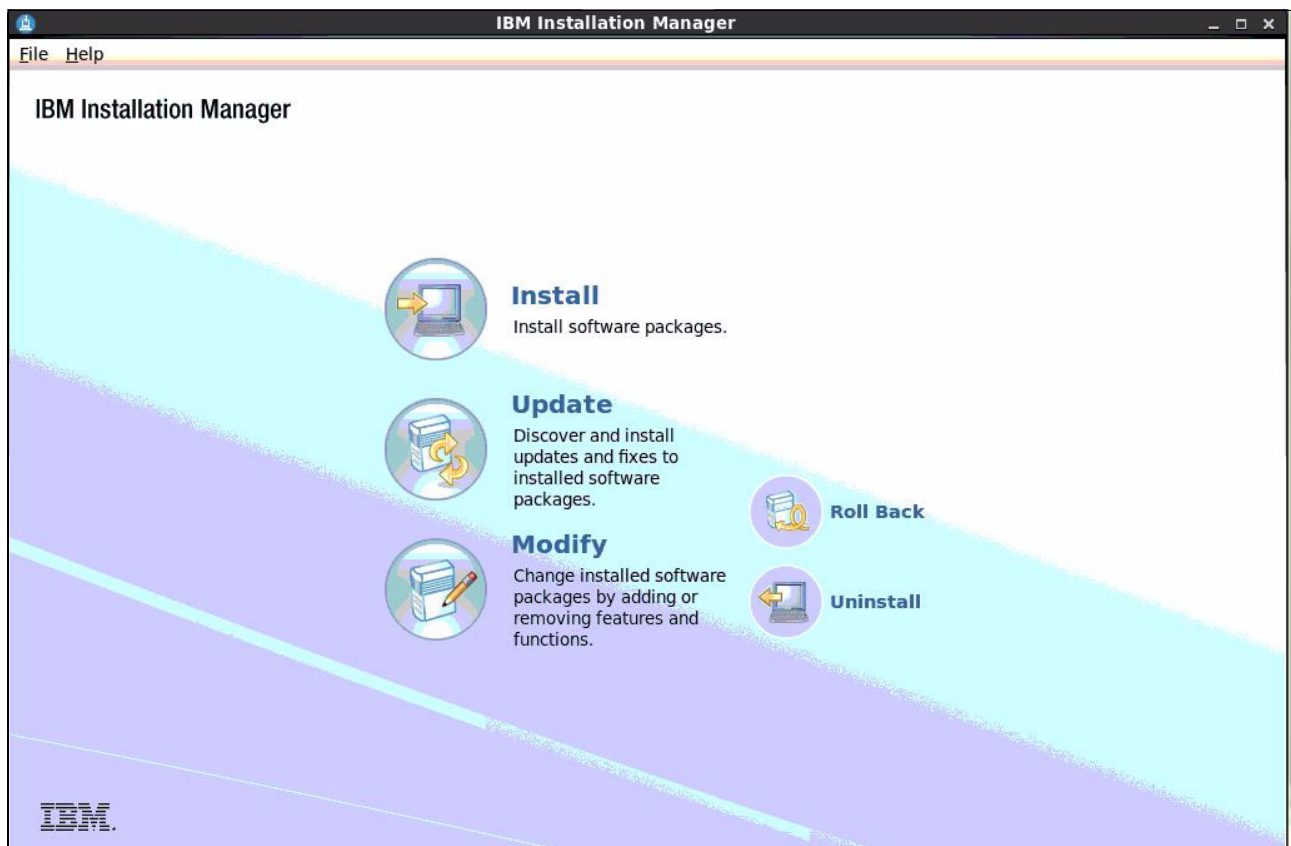
Figure 2-122   Installation Manager GUI

4. Add all of the Netcool Configuration Manager, WebSphere, and JazzSM server repositories to Installation Manager by clicking **File** → **Preferences** → **Repositories**. Select **Add Repository**. Click **OK**. See Figure 2-123.
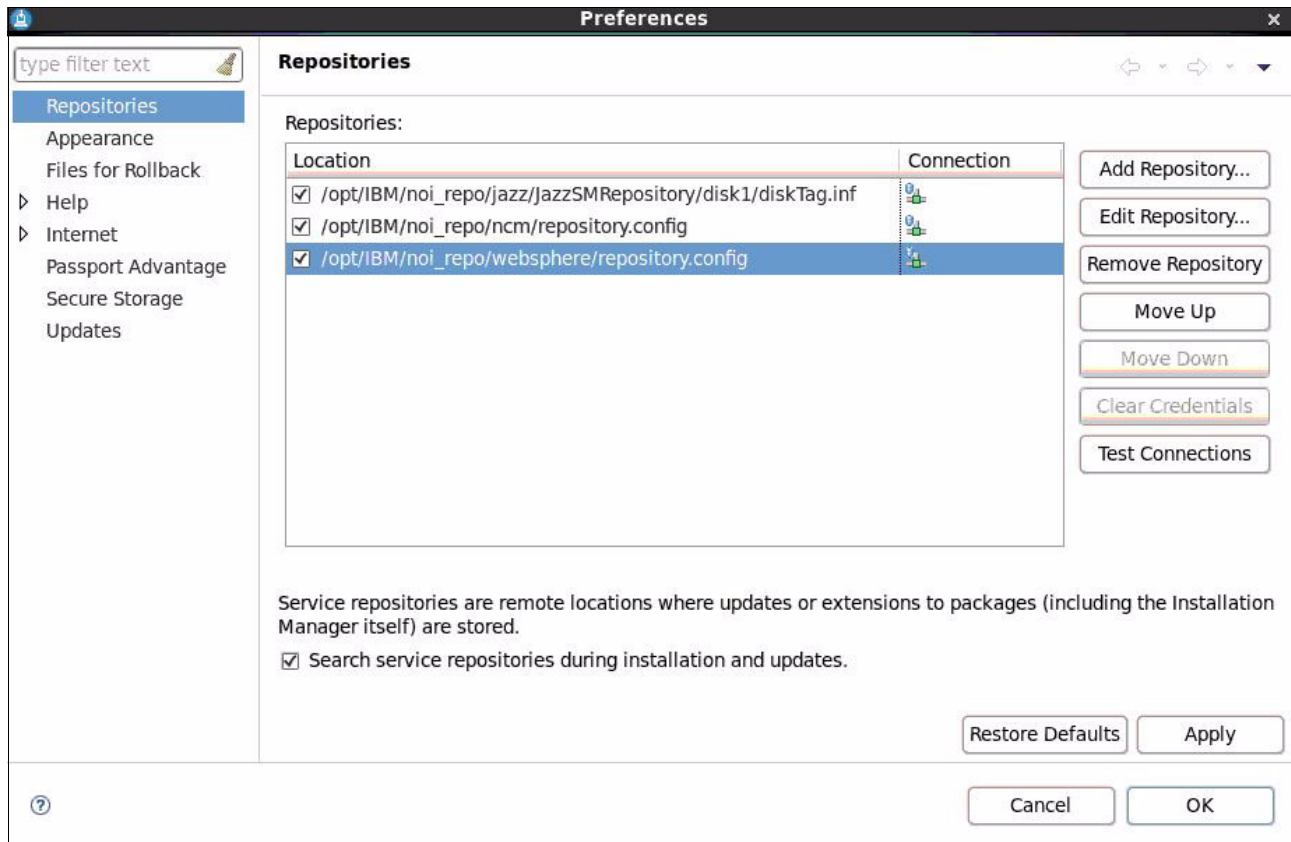
Figure 2-123   Adding the repositories

5. Start the installation. Due to Netcool Configuration Manager product requirements, a *second* installation of JazzSM is needed. You cannot reuse the existing JazzSM that we installed previously in this book. Therefore, you need to install WebSphere, IBM Dashboard Application Services Hub (DASH), and JazzSM before you install Netcool Configuration Manager. For this first run, select the following packages (Figure 2-125 on page 178):

   – IBM WebSphere Application Server Version 8.5.5.7
   – Optional: IBM WebSphere SDK Java Technology Edition
   – Jazz for Service Management extension for IBM WebSphere Application Server 8.5
   – IBM Dashboard Application Services Hub

6. Click **Next** and accept the terms of the license agreement.

7. Modify the Shared Resources Directory with the correct path
   (`/opt/IBM/netcool/IM/IBMIMShared`) as shown in Figure 2-124. Click **Next**.
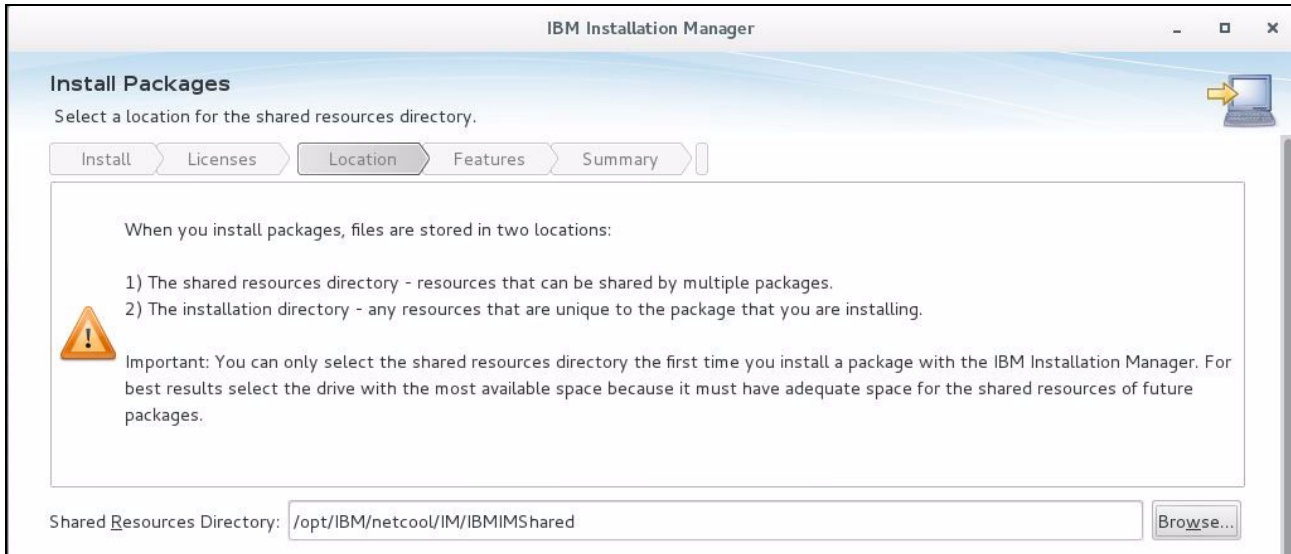
Figure 2-124   Shared Resources Directory

8. The installation directory for WebSphere and JazzSM is displayed, as shown in
   Figure 2-125.
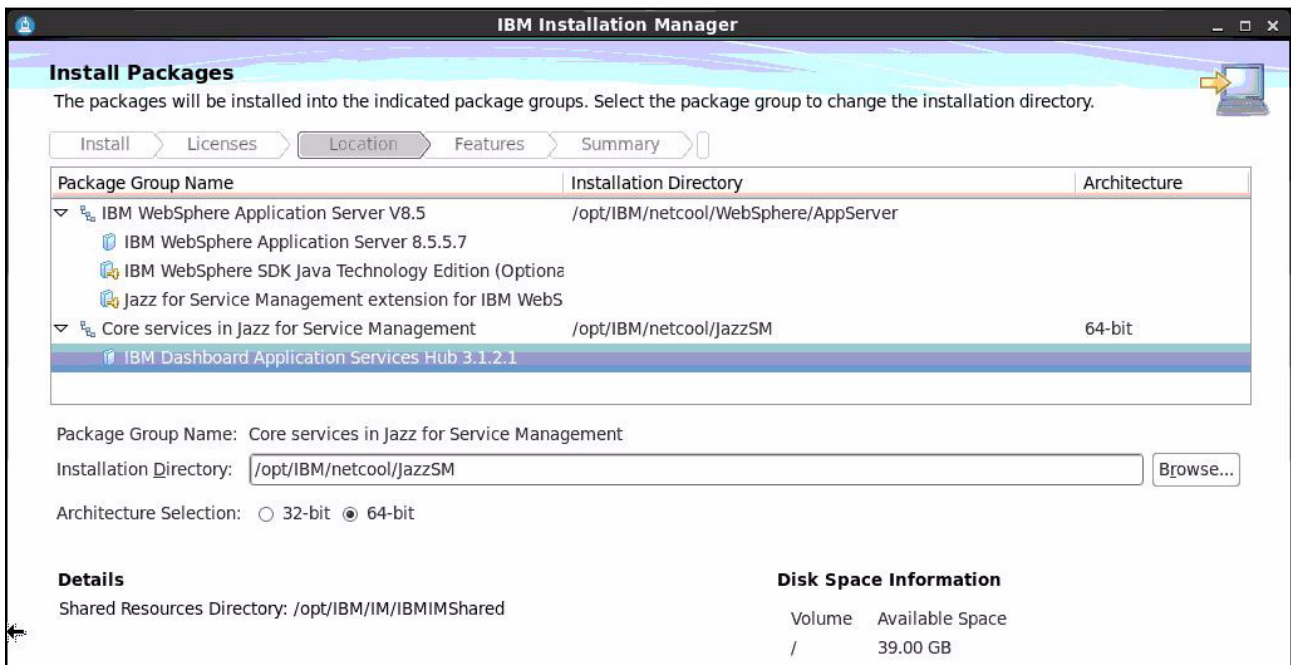
Figure 2-125   Installation Directory

9. Click **Next** again to select the language translations.

10. Click **Next** to verify the packages.

11.Enter the JazzSM password. See Figure 2-126. Click **Next**.

Figure 2-126   User ID and password

12.Click **Validate**. After the successful validation, click **Next**.

13.Leave the default ports that are shown in Figure 2-127 and click **Next**.

Figure 2-127   Leave the default ports

14. Accept the default context root by selecting **Next**, as shown in Figure 2-128.

Figure 2-128   Context Root window

15. Review the packages to install and select **Install**. See Figure 2-129.

Tip: Remember to scroll down in the Packages window to review all packages and expand the Repository Information to verify.
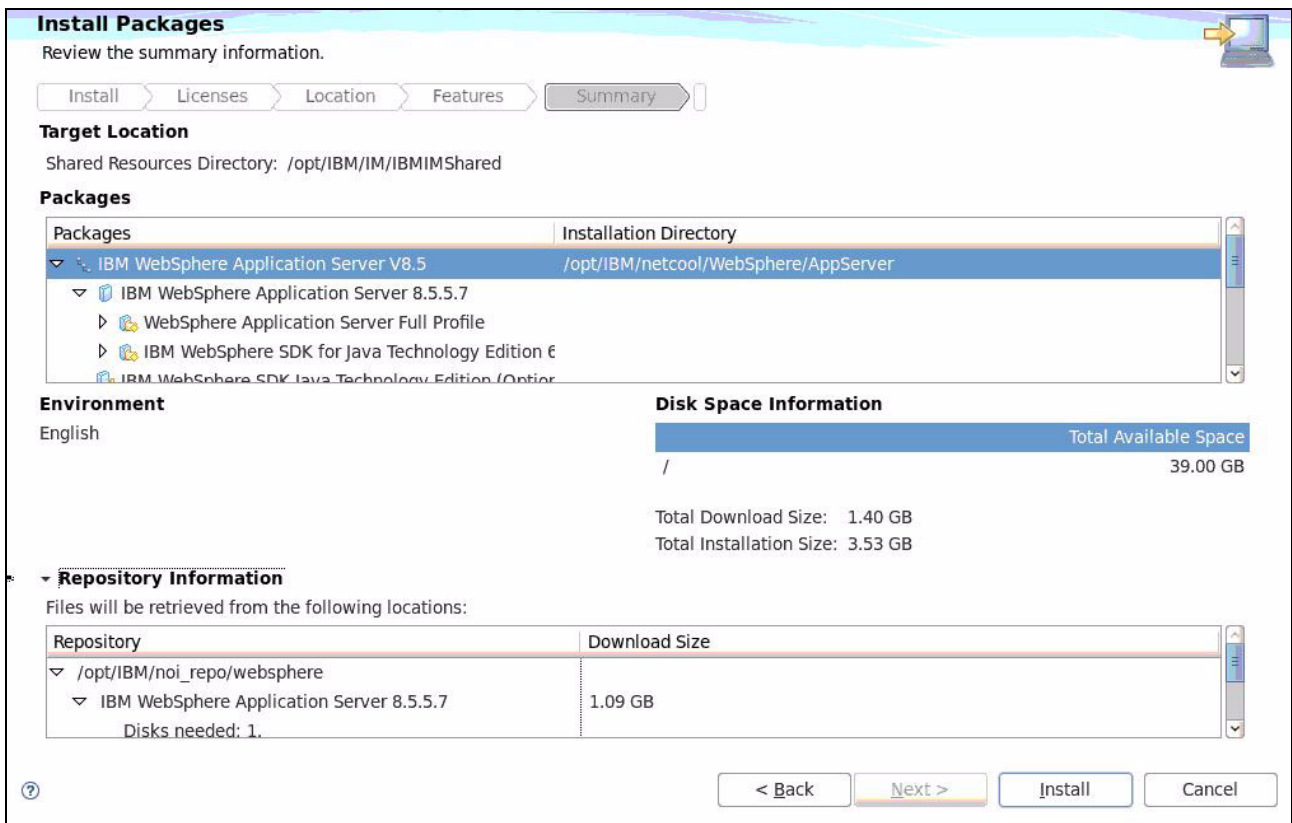
Figure 2-129   Install packages

16. After the installation of WebSphere and JazzSM completes, choose **None** on the final window and click **Finish**.

17. The IBM Installation Manager start window opens. Select **Install**.

18. Select the **Netcool Configuration Manager** package on the Install Packages window. Click **Next**, as shown in Figure 2-130.

Install Packages
Select packages to install:

Installation Packages	Status	Vendor	License Key Type
▽ ☐ Application Client for IBM WebSphere Application Server			
☐ Version 8.5.5.7		IBM	
▽ ☐ IBM HTTP Server for WebSphere Application Server			
☐ Version 8.5.5.7		IBM	
▽ ☐ IBM WebSphere Application Server	Installed		
☐ Version 8.5.5.7	Installed	IBM	
▽ ☑ Netcool Configuration Manager			
☑ Version 6.4.2.1	Will be installed	IBM	
☐ Pluggable Application Client for IBM WebSphere Application Se			
▽ ☐ Web Server Plug-ins for IBM WebSphere Application Server			
☐ Version 8.5.5.7		IBM	

☐ Show all versions   Check for Other Versions, Fixes, and Extensions

Details

Netcool Configuration Manager 6.4.2.1
Netcool Configuration Manager More info...
• Repository: /opt/IBM/noi_repo/ncm

Figure 2-130   Netcool Configuration Manager installation selection

19.On the next window, click **I accept the terms in the license agreement**. Click **Next**. See Figure 2-131.
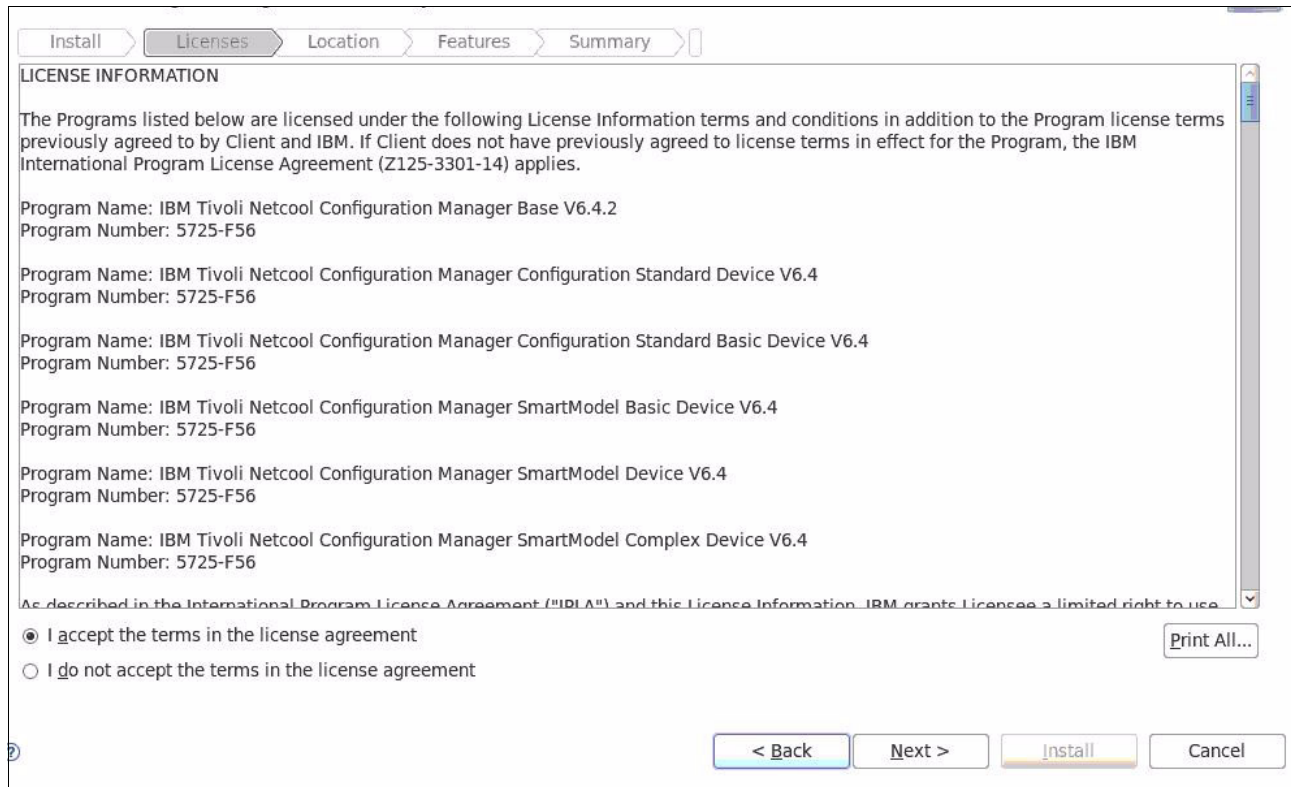
Figure 2-131   Netcool Configuration Manager licenses

20. Accept the default installation directory for the Netcool Configuration Manager installation, as shown in Figure 2-132. Click **Next**.
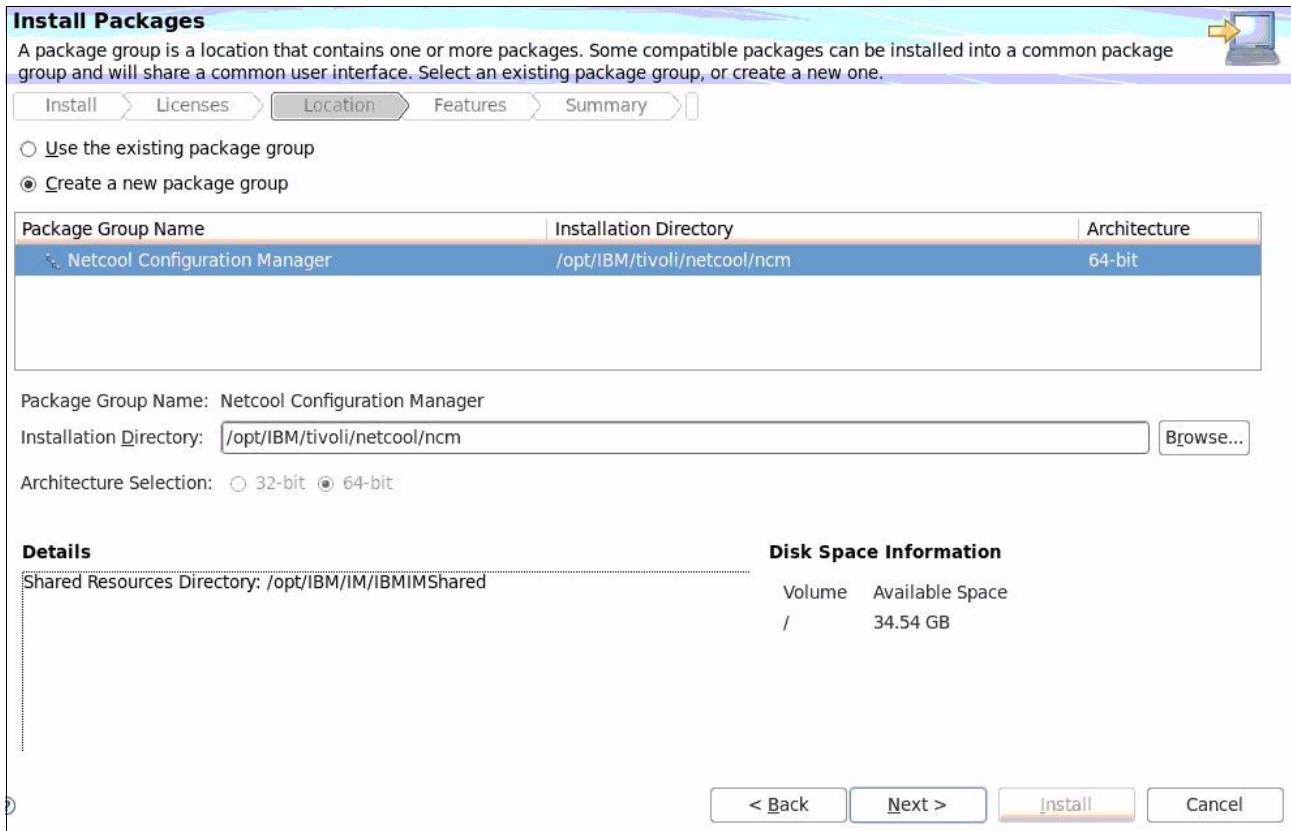
Figure 2-132   Default Installation Directory

21. Choose the type of installation that is required. In this example, we chose a combined Presentation Server and Worker Server type of installation, as shown in Figure 2-133. Click **Next**.
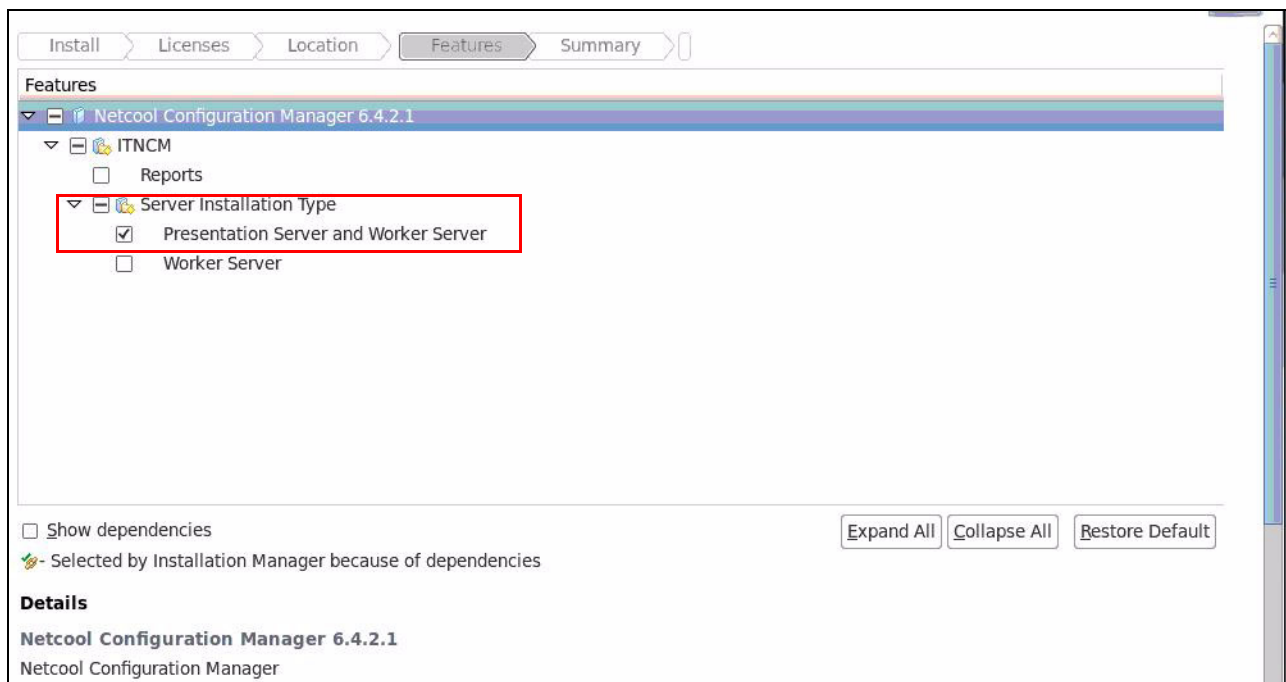
Figure 2-133   Netcool Configuration Manager Server Installation Type

22.Enter the database details:

– For the database name, enter `ncm6421`.
– For the server host, enter `localhost`.
– For the server port, enter `50000`.
– For the user ID, enter `icosuser`.
– For the password, enter the password for the `icosuser` user.

Important: The database must be created before you proceed.

After you enter the database details, click **Next**, as shown in Figure 2-134.
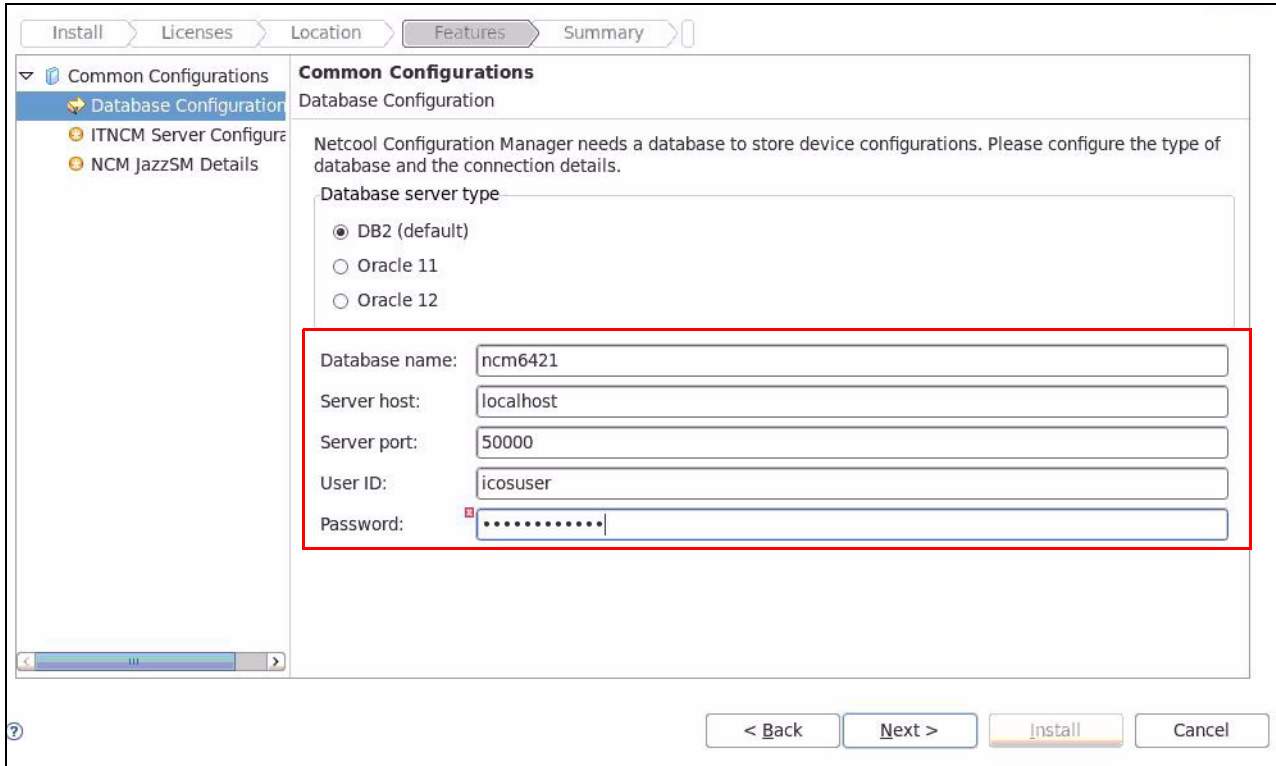
Figure 2-134   Entering the database details

23.The database connection details are verified. When the Warning pop-up window opens, you must confirm that this process will load the database at the conclusion of the Netcool Configuration Manager installation. Click **OK**. See Figure 2-135.
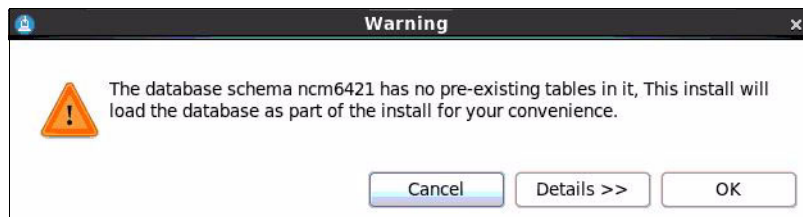
Figure 2-135   Database load warning

24. Complete the Netcool Configuration Manager Server configuration. Enter the `ftpuser` password, SMTP server (`localhost`), and Network Manager integration details. These settings are shown in Figure 2-136 and Figure 2-137 on page 187. (Scroll down to see the second window.)

Figure 2-136   Common configurations

Tip: The NM Hostname (see the red box in Figure 2-137) refers to the Network Manager GUI server.

Figure 2-137   Common configurations

Tips: Use an IP address for the FTP server because the Domain Name System (DNS) is not configured for many network devices, especially in a lab setting.

Provide a more meaningful name for the Netcool Configuration Manager unique name, such as NCMLab1, or a name that describes the specific installation.

25. On the next window, provide the JazzSM password that was used in the previous installation step. Click **Next** and a password verification pop-up window opens. After successful validation, the next window opens. See Figure 2-138.
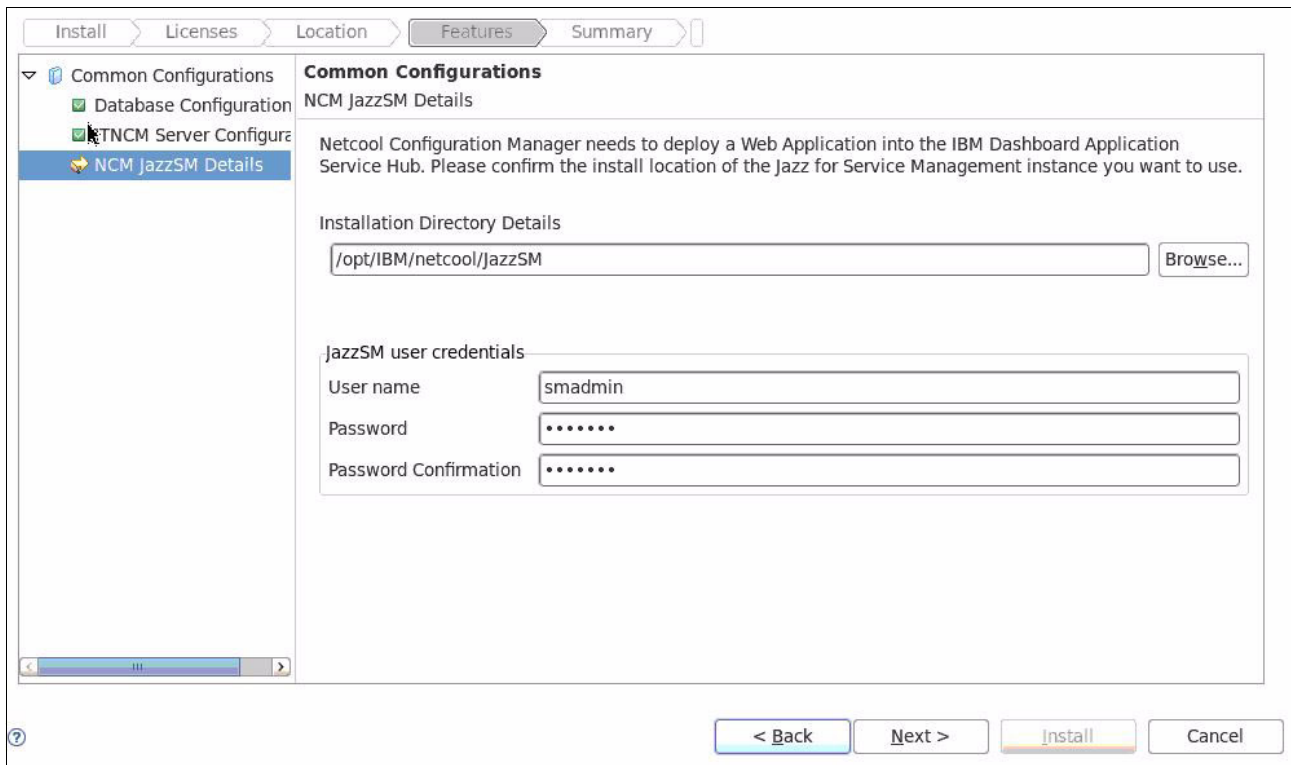
Figure 2-138   JazzSM password

26. The next window provides a summary of the installation. If acceptable, click **Install** to proceed. See Figure 2-139.
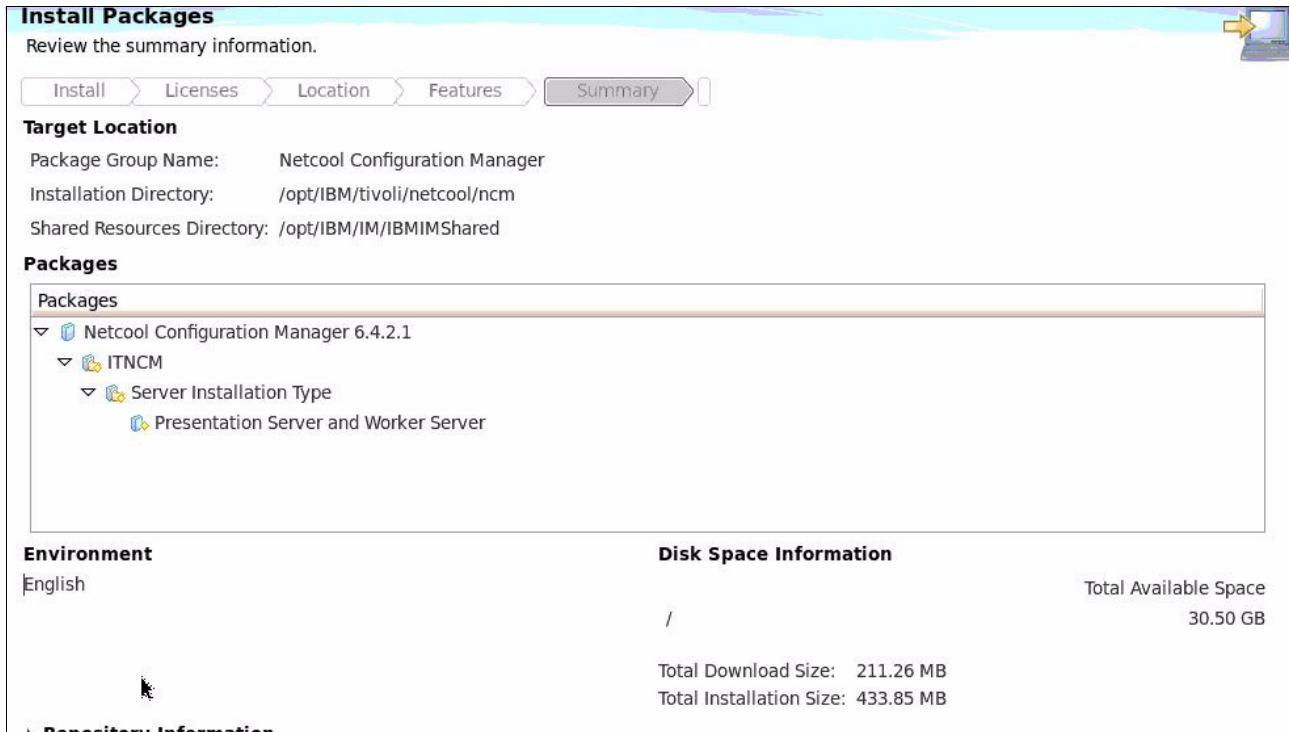
Figure 2-139   Installation summary

27. After the installation completes, the installed packages window opens. Click **Finish** to proceed, as shown in Figure 2-140.
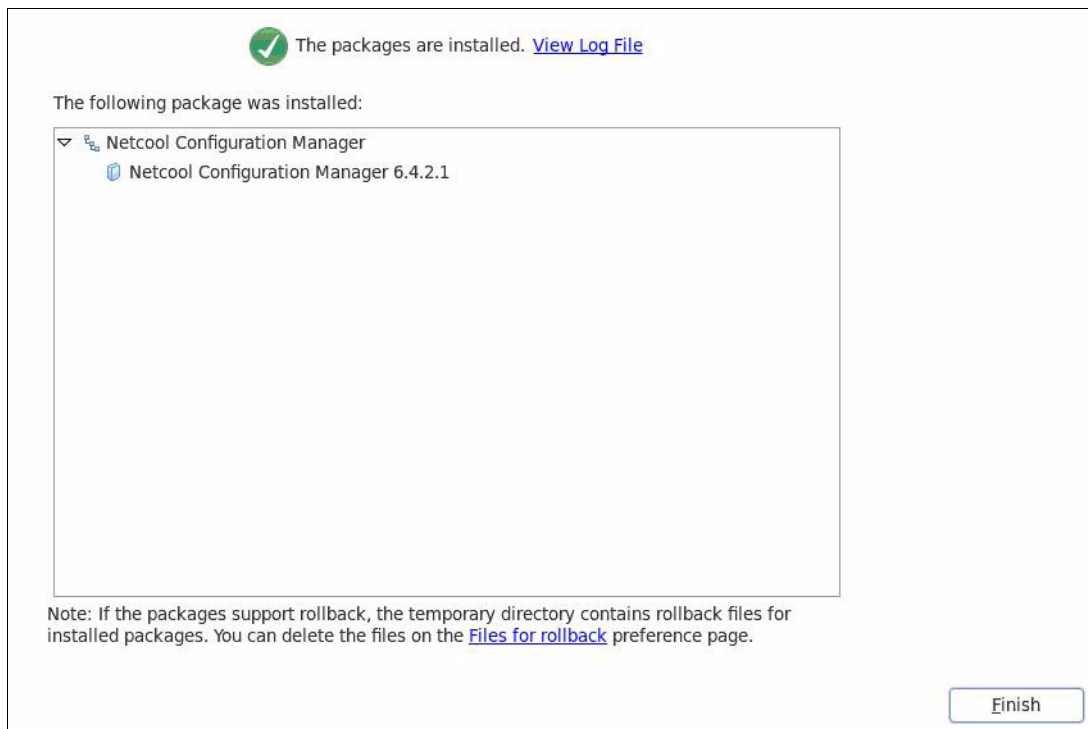
Figure 2-140   Successful installation

Verification

You can perform the following steps to verify the installation.

Netcool Configuration Manager Server

Check the installation of the Netcool Configuration Manager server by issuing the following command from the `/opt/IBM/tivoli/netcool/ncm/bin` directory:

```
./itncm.sh status
```

The result is similar to Example 2-88.

Example 2-88   Server status

```
-----------------------------------------------------
Netcool Configuration Manager Status
-----------------------------------------------------
Deployment Type = GUI + Worker Server
Base Worker Server = Enabled
Compliance Core    = Enabled

Components
----------
Worker Server     = NOT RUNNING
Compliance Core   = NOT RUNNING
GUI Server        = NOT RUNNING

Logging level
-------------
Log status unavailable

Load version
------------
6.4.2.1-0-32

Database
--------
Hostname/IP Address = localhost
Database Name       = ncm6421
```

Installing the Netcool Configuration Manager drivers

In this portion of the installation, the Netcool Configuration Manager drivers are installed. With the release of Drivers 20, new groupings of drivers were created:

- ► Standard Drivers
- ► SmartModel Basic
- ► SmartModel Cisco
- ► SmartModel Juniper
- ► SmartModel Other
- ► SmartModel Archive
- ► SmartModel Complex

For a complete listing of the driver assemblies, their individual installers, and the installation instructions, see the Netcool Configuration Manager Drivers 20 release notes:

https://ibm.biz/BdrrNm

Tip: Create separate directories on the servers for each of the driver assemblies to facilitate the installation.

Additional configuration

This chapter assumes that you completed the steps in Chapter 2, "IBM Netcool Operations Insight installation and basic configuration" on page 23". Therefore, the IBM Netcool Operations Insight environment works, and it receives and processes alerts. The basic automation occurs, and the IBM Jazz for Service Management (JazzSM) console shows events.

In addition to the basic configuration, you can configure several other features in Netcool Operations Insight. In this chapter, we describe how to configure these additional capabilities of Netcool Operations Insight.

This chapter has the following sections:

3.1 Configure single sign-on, LDAP, and SSL

You need to configure Dashboard Application Services Hub (DASH) as the main console that is accessed by the users. With DASH as the main console, you can open other GUIs, such as the Impact GUI and the Operations Analytics - Log Analysis GUI from DASH. You need to configure a central Lightweight Directory Access Protocol (LDAP) server and single sign-on (SSO). Also, the servers that are involved need to exchange Secure Sockets Layer (SSL) certificates.

> **Tip:** The central LDAP server will be required for the SSO (single sign-on) configuration. For a seamless integration among all of the Netcool Operations Insight components and consoles, it is a preferred practice to configure SSO in your environment.

For more information about these configurations, see the following resources:

► `https://ibm.biz/BdE79r`
► `https://ibm.biz/BdrEju`

3.1.1 Integrating DASH and Impact

The following general steps integrate the DASH and Impact consoles:

1. The DASH (Jazz for Service Management) installation must be configured to use a central user repository for user authentication.

2. The DASH installation must be configured for SSO.

3. The Netcool/Impact installation must be configured to use the same central user repository as your DASH to authenticate the users.

4. Your Netcool/Impact installation must be configured for SSO.

> **Important:** For the SSO to work, your Impact server must be on the same domain as your DASH server.

5. Restart both the Impact and DASH servers.

6. Complete the configuration steps in the DASH GUI for console integration.

7. Create the Impact data provider connection.

Detailed implementation steps

Perform the following steps to integrate DASH and Impact.

Configuring the Dashboard Application Services Hub to use a central user repository

Configure DASH to use a central user repository:

1. Add the LDAP user registry as a federated repository as described in the following document:

   `https://ibm.biz/Bdrr7R`

Figure 3-1 shows how to add the details for the LDAP server.

Figure 3-1   Details for the LDAP server

2. Configure the LDAP federated repository as described in the following document:

    https://ibm.biz/Bdrr7F

3. Figure 3-2 shows how to add a repository to the list of repositories of the realm. Click **Add repositories** and configure the base entry as shown.

Figure 3-2   LDAP base entry

It is a preferred practice to rename the realm to a more meaningful name. In our case, we renamed it to LDAPRealm.

Important: If the repository was configured for the ObjectServer, you must remove the repository now.

4. Figure 3-3 shows how the federated repositories appear at the end of this step.
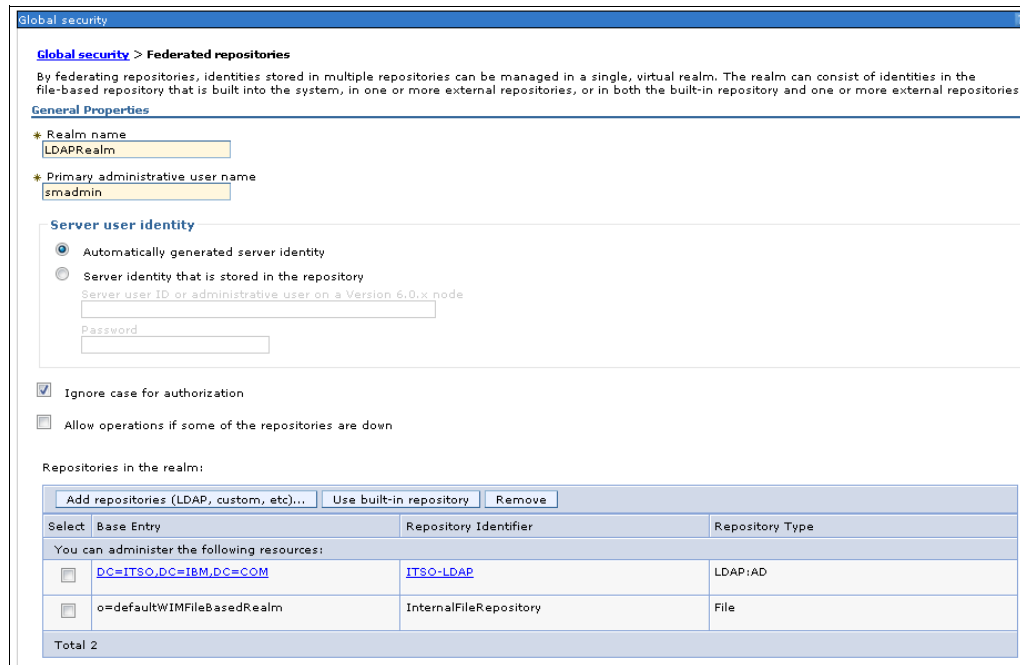
Figure 3-3   Federated repositories for the LDAP configuration

5. Configure the LDAP users in the console as described in the following document:

   https://ibm.biz/Bdrr7E

Tip: When the steps refer to Users and Groups → Manage Users, these steps are performed in the WebSphere Administrative Console.

Also, to log in to the WebSphere Administrative Console, you must log in as `smadmin`.

Configuring the Dashboard Application Services Hub for single sign-on

Configure DASH for SSO:

1. Configure SSO on the application server as described in following document:

   https://ibm.biz/Bdrr7H

Tip: Netcool/Impact and DASH must use the same domain name.

2. Figure 3-4 shows how to configure DASH for SSO.
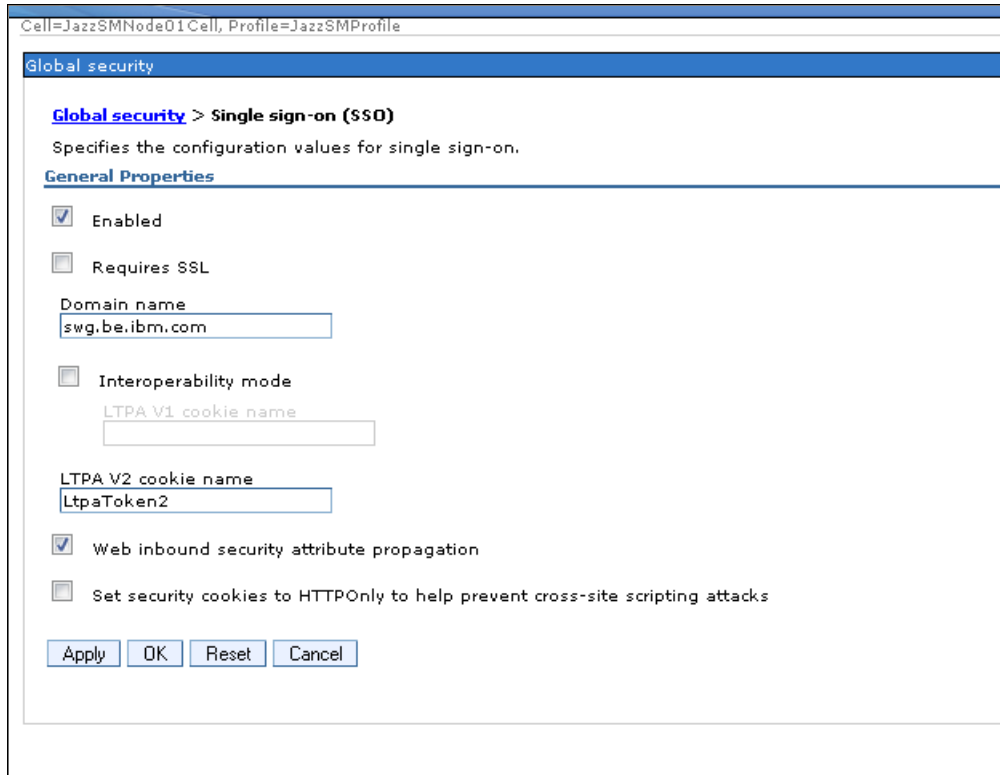
Figure 3-4   SSO for DASH

Configuring Netcool/Impact in the same central user repository as Dashboard Application Services Hub

Perform the following steps to configure Netcool/Impact in the same central user repository as DASH:

1. Configure LDAP for Netcool/Impact as described in the following document:

   https://ibm.biz/Bdrr7r

   Example 3-1 shows how the `$IMPACT_HOME/install/security/impactdap.properties` file was configured in our environment.

Example 3-1   Settings for the impactdap.properties file

```
LDAPServerType="Microsoft Active Directory"
LDAPHost="itso-ad.swg.be.ibm.com"
LDAPPort="389"
LDAPBindDN="CN=Administrator,CN=Users,DC=ITSO,DC=IBM,DC=COM"
LDAPBaseEntry="DC=ITSO,DC=IBM,DC=COM"
LDAPSSLEnabled="false"
LDAPSSORealm="LDAPRealm"

# Advanced LDAP Repository Settings
LDAPIgnoreCase="true"
LDAPCertificateMapMode="EXACT_DN"
LDAPCertificateFilter=""
LDAPSearchTimeout="8m"
```

```
# Custom LDAP Search Filtering (Default values for Microsoft Active Directory)
#LDAPUserFilter="(&(sAMAccountName=%v)(objectcategory=user))"
#LDAPGroupFilter="(&(cn=%v)(objectcategory=group))"
#LDAPUserIdMap="user:sAMAccountName"
#LDAPGroupIdMap="*:cn"
#LDAPGroupMemberIdMap="memberof:member"

# Custom LDAP Search Filtering (Default values for IBM Tivoli Directory Server)
#LDAPUserFilter="(&(uid=%v)(objectclass=ePerson))"
#LDAPGroupFilter="(&(cn=%v)(|(objectclass=groupOfNames)(objectclass=groupOfUniqueN
ames)(objectclass=groupOfURLs)))"
#LDAPUserIdMap="*:uid"
#LDAPGroupIdMap="*:cn"
#LDAPGroupMemberIdMap="ibm-allGroups:member;ibm-allGroups:uniqueMember;groupOfName
s:member;groupOfUniqueNames:uniqueMember"
```

2. After you configure the `impactdap.properties` file, run the **confAuth4LDAP.sh** script. Example 3-2 shows the **confAuth4LDAP.sh** script while it executes.

Example 3-2   Executing the confAuth4LDAP.sh script

```
[netcool@Impact-B ~]$ cd $IMPACT_HOME/install/security
netcool@Impact-B security]$ ./confAuth4LDAP.sh enable impactadmin netcool object00
netcool

The expected result for the command is the BUILD SUCCESSFUL message:

BUILD SUCCESSFUL
Total time: 2 minutes 9 seconds
```

3. To grant additional permissions to the users in Impact, you need to use the **mapRoles.sh** script. Example 3-3 shows how to grant permissions to a user.

Example 3-3   Use the mapRoles.sh script to grant permissions to users in Impact

```
[netcool@Impact-B ~]$ cd $IMPACT_HOME/install/security
[netcool@Impact-B security]$ ./mapRoles.sh -add -user johndoe -roles
"ConsoleUser|impactMWMUser|impactOSLCDataProviderUser|impactOpViewUser|impactRBAUs
er|impactSelectedOpViewUser|impactUIDataProviderUser|impactWebServiceUser"
Adding user johndoe to role ConsoleUser
Adding user johndoe to role impactMWMUser
Adding user johndoe to role impactOSLCDataProviderUser
Adding user johndoe to role impactOpViewUser
Adding user johndoe to role impactRBAUser
Adding user johndoe to role impactSelectedOpViewUser
Adding user johndoe to role impactUIDataProviderUser
Adding user johndoe to role impactwebserviceuser
```

Important: Impact does not verify the existence of the user/group that is used in the command in Example 3-3. So, check the syntax exactly and be aware of case sensitivity if the LDAP requires it.

For more information about each of the Impact roles, see the following website:

https://ibm.biz/Bdrr7s

Configuring single sign-on in Netcool/Impact

Perform the following steps to configure SSO in Netcool/Impact:

1. Configure SSO on Netcool/Impact to DASH as described in the following document:

   `https://ibm.biz/Bdrr7j`

2. Set up these parameters in the DASH web administrator console. Customize the parameter values for the SSO domain name parameters to avoid session issues between the SSO and non-SSO web application products that might use the same default SSO domain name value. (See Figure 3-4 on page 197.) We used the following parameters in our configuration:

   – LTPA cookie name: `LtpaToken2`
   – Domain name: `swg.be.ibm.com`
   – Realm name: `LDAPRealm`

3. In the WebSphere console, add the Netcool/Impact SSL certificate into the DASH truststore by using the following steps:

   a. Log in to the WebSphere Application Server on the JazzSM dashboard server by selecting **Console Settings** and **WebSphere Administrative Console**.

   b. Select **Launch WebSphere Administrative Console**.

   c. Under the Security node, select **SSL certificate and key management**.

   d. Under the Related Items section, select **Key stores and certificates**.

   e. Select **NodeDefaultTrustStore**.

   f. Under the Additional Properties section, select **Signer Certificates**.

   g. Select **Retrieve from port**.

   h. Enter the host, port, and alias details for the GUI server (Figure 3-5 on page 200).

   i. Select **Retrieve signer information**.

   j. Select **OK** and save the configuration.

k. Figure 3-5 shows an example of how to retrieve the signer information.
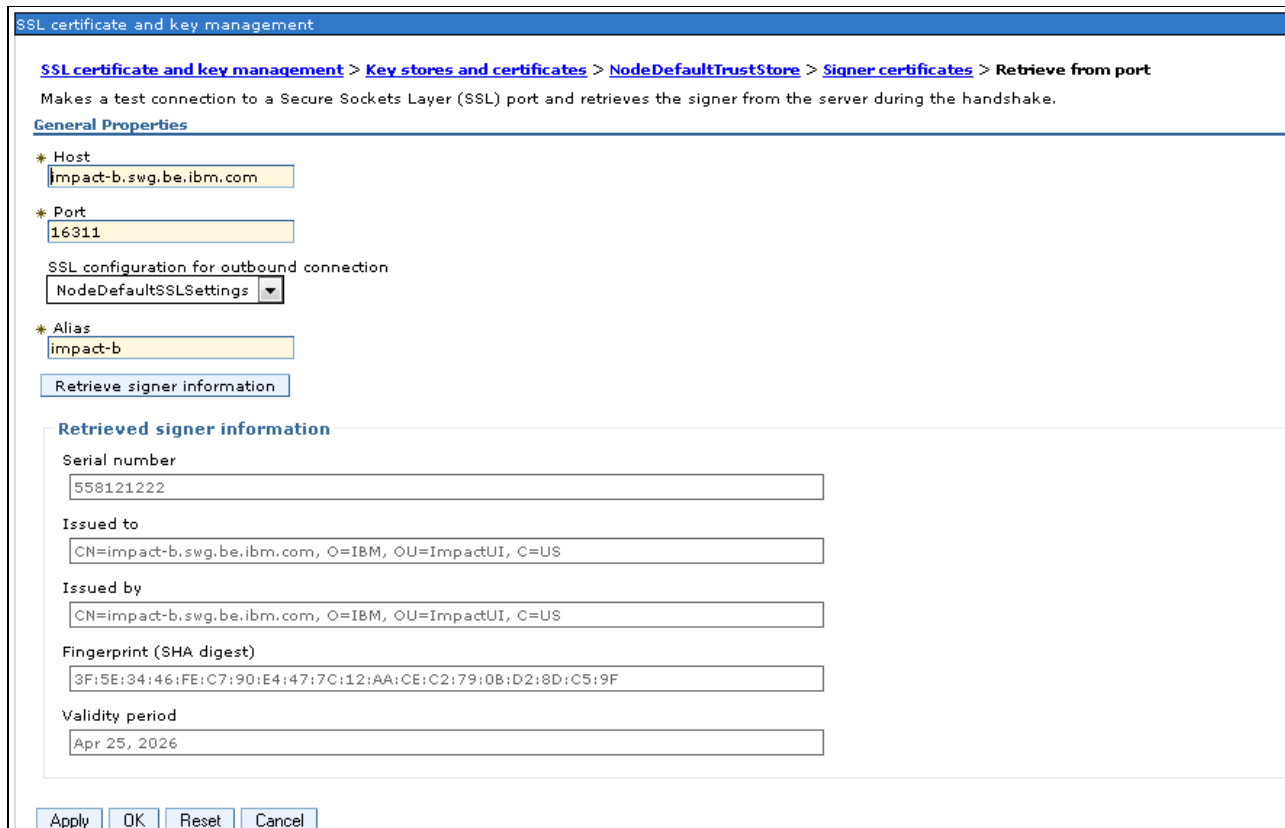
Figure 3-5   Retrieving signer information

l. On the same window, you can configure the signer certificates for all servers that will integrate with DASH. Figure 3-6 shows all of the certificates that are needed in our environment.
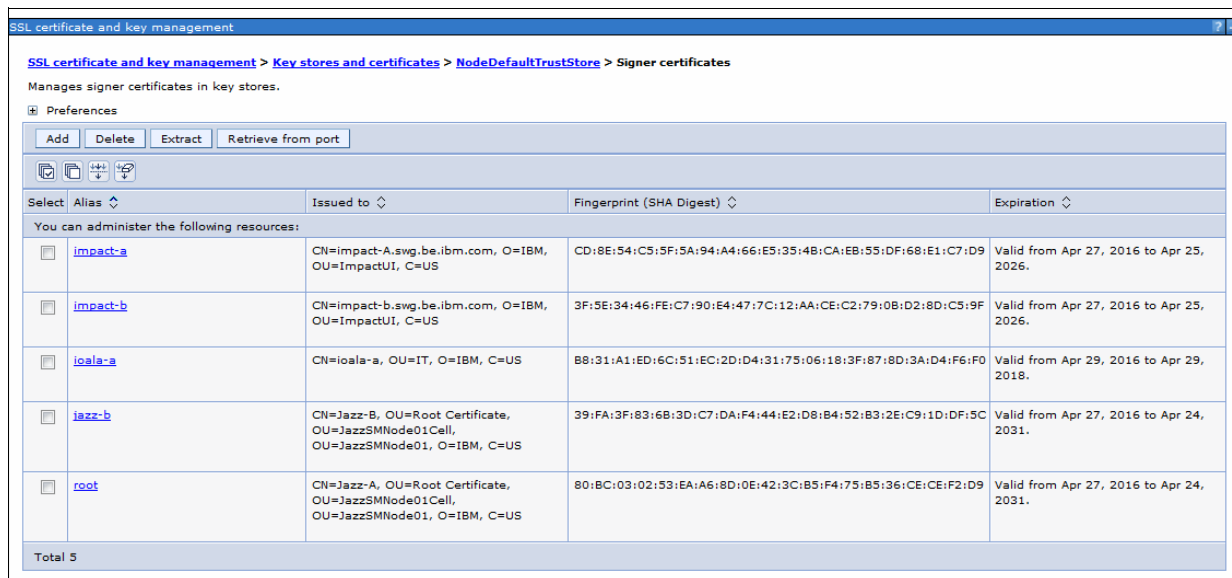
Figure 3-6   Signer certificates

4. For the Impact integration that is described in this section, we will need the *jazz-b*, *impact-a*, and *impact-b* certificates.

5. Export the `ltpa.keys` file from DASH and apply a password to the `ltpa.keys` file by using the following steps:

   a. Log in to the WebSphere Application Server on the JazzSM dashboard server by selecting **Console Settings** and **WebSphere Administrative Console**.

   b. Select **Launch WebSphere Administrative Console**.

   c. Under the Security node, start the **Global security page**.

   d. On the right, select the **LTPA link**.

   e. In the password fields, type a password to use for the `ltpa.keys`.

   f. Enter the location where the key will be exported, for example, `/tmp/ltpa.keys`.

   g. Select **Export Keys**.

   Figure 3-7 exports the LTPA keys to a temporary directory.

> **Tip:** It is a preferred practice to copy this file to a shared directory where all other servers in the environment can access this file.
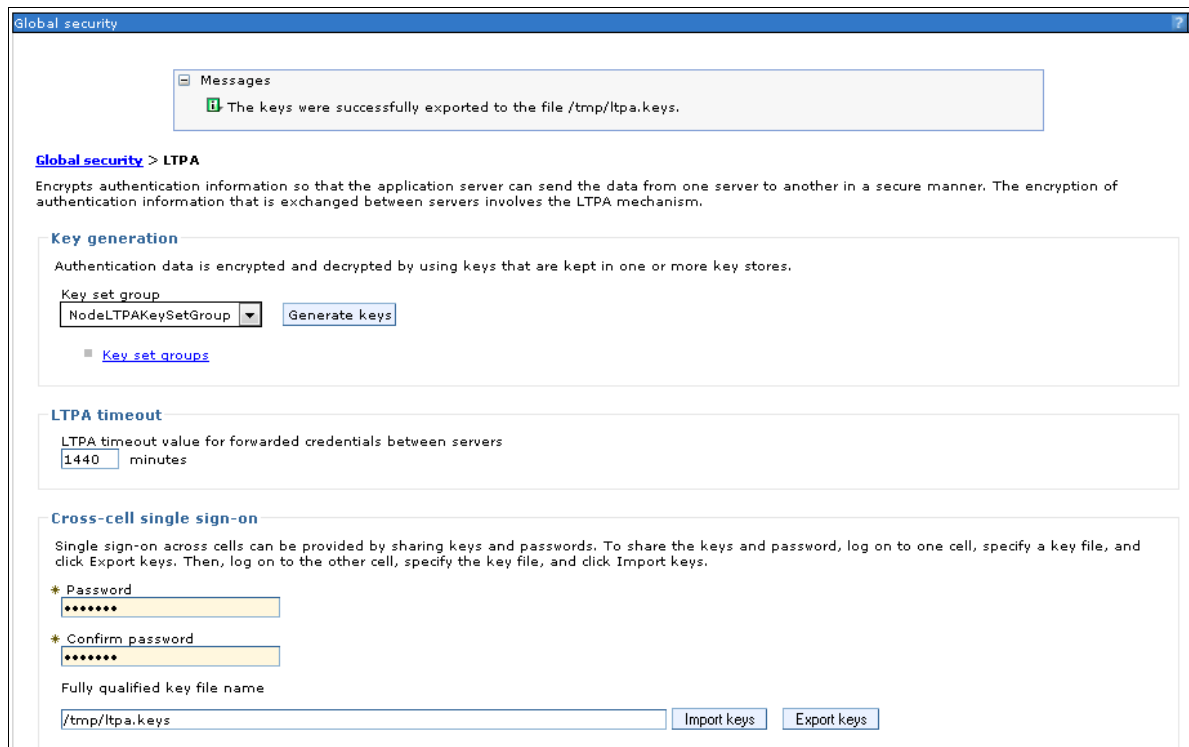
Figure 3-7   Exporting the LTPA keys to a temporary directory

6. Example 3-4 copies the LTPA keys in Impact.

Example 3-4   Copying the LTPA keys for Impact

```
For the Impact server, the ltpa.keys are stored in the following directory:
$IMPACT_HOME/wlp/usr/servers/<server name>/resources/security/
where <server name> = "NCI" in this case. Note that for the secondary Impact, the
<server name> will be different, for instance, "NCI2".
```

```
cp /mnt/ITSO_SHARE/Keys/ltpa.keys
$IMPACT_HOME/wlp/usr/servers/NCI/resources/security/ltpa.keys
```

Note that "/mnt/ITSO_SHARE/Keys/ltpa.keys" is where the shared LTPA keys file exported from DASH was copied to.

For the GUI Server, the ltpa.keys are stored in the following directory: $IMPACT_HOME/wlp/usr/servers/ImpactUI/resources/security/

```
cp /mnt/ITSO_SHARE/Keys/ltpa.keys
$IMPACT_HOME/wlp/usr/servers/ImpactUI/resources/security/ltpa.keys
```

7. Run the SSO configuration script **configImpactSSO.sh**. Specify the same parameter values that are referenced in step 1 in "Configuring single sign-on in Netcool/Impact" on page 199. Example 3-5 shows the execution of the **configImpactSSO.sh** script.

Example 3-5   Executing the configImpactSSO.sh script

```
$ cd /opt/IBM/tivoli/netcool/impact/install/security

$ ./configImpactSSO.sh LDAPRealm LtpaToken2 swg.be.ibm.com netcool netcool


The expected result for the command is the BUILD SUCCESSFUL message:

BUILD SUCCESSFUL
Total time: 1 minute 5 seconds
```

Restart both the Dashboard Application Services Hub and Impact servers

Restart both the DASH and Impact servers for the changes to take effect.

Complete configuration steps in the Dashboard Application Services Hub GUI for console integration

Perform the steps for Console Integration as described in the following document:

https://ibm.biz/Bdrr7Y

Figure 3-8 shows the configuration and testing of the console integration of Impact in DASH.

Figure 3-8   Configuring the console integration

Create the Impact data provider connection

Follow these steps to create the Impact data provider connection:

1. In Figure 3-9, click **Connections**.
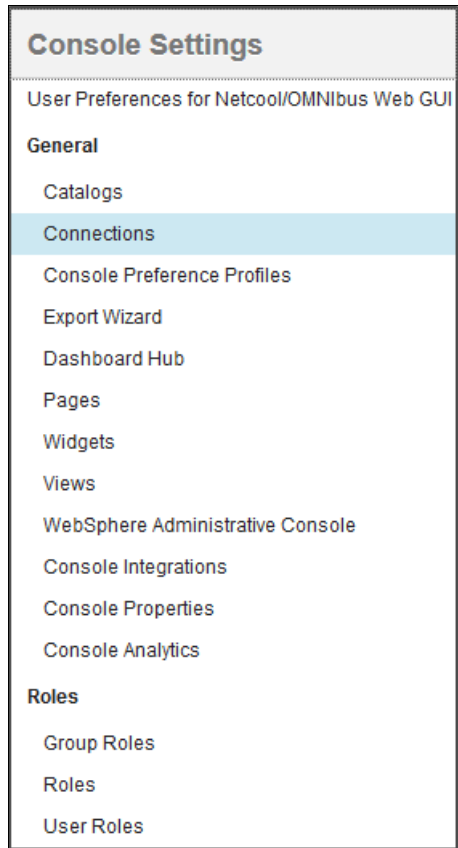
Figure 3-9   Click Connections on the Console Settings window

2. In Figure 3-10, click the **Create New Connection** icon.
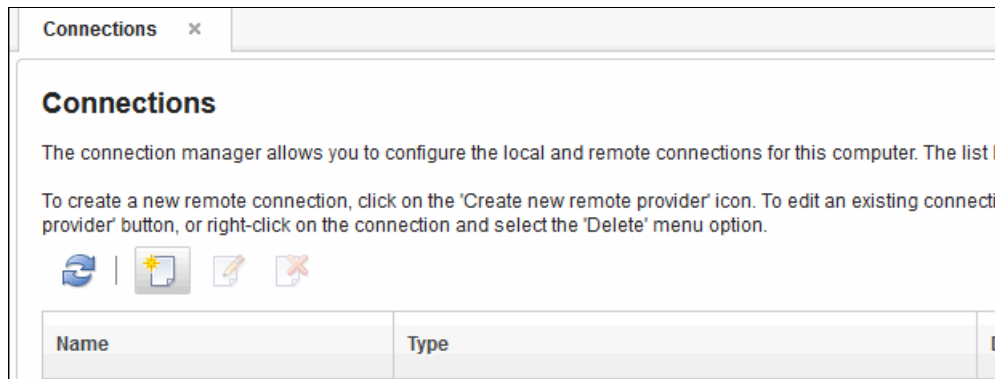
Figure 3-10   Create new connection

3. In Figure 3-11, set the connection details and click **Search**.

Figure 3-11   Connection details

4. Figure 3-12 shows the result of the search. Ensure that the Name field is Impact_NCICLUSTER. Click **OK**.

Figure 3-12   Result of the search

> **Important:** You need to execute the steps that relate to DASH in this section for both Jazz-A and Jazz-B.
>
> Also, you need to execute the steps that relate to Impact for both Impact-A and Impact-B.

3.1.2 Importing the LTPA keys for the SSO in the JAZZ secondary server

To configure SSO in the secondary JazzSM server, follow the steps in this document:

https://ibm.biz/Bdrr7z

Figure 3-13 shows the keys that are imported to the secondary DASH server.
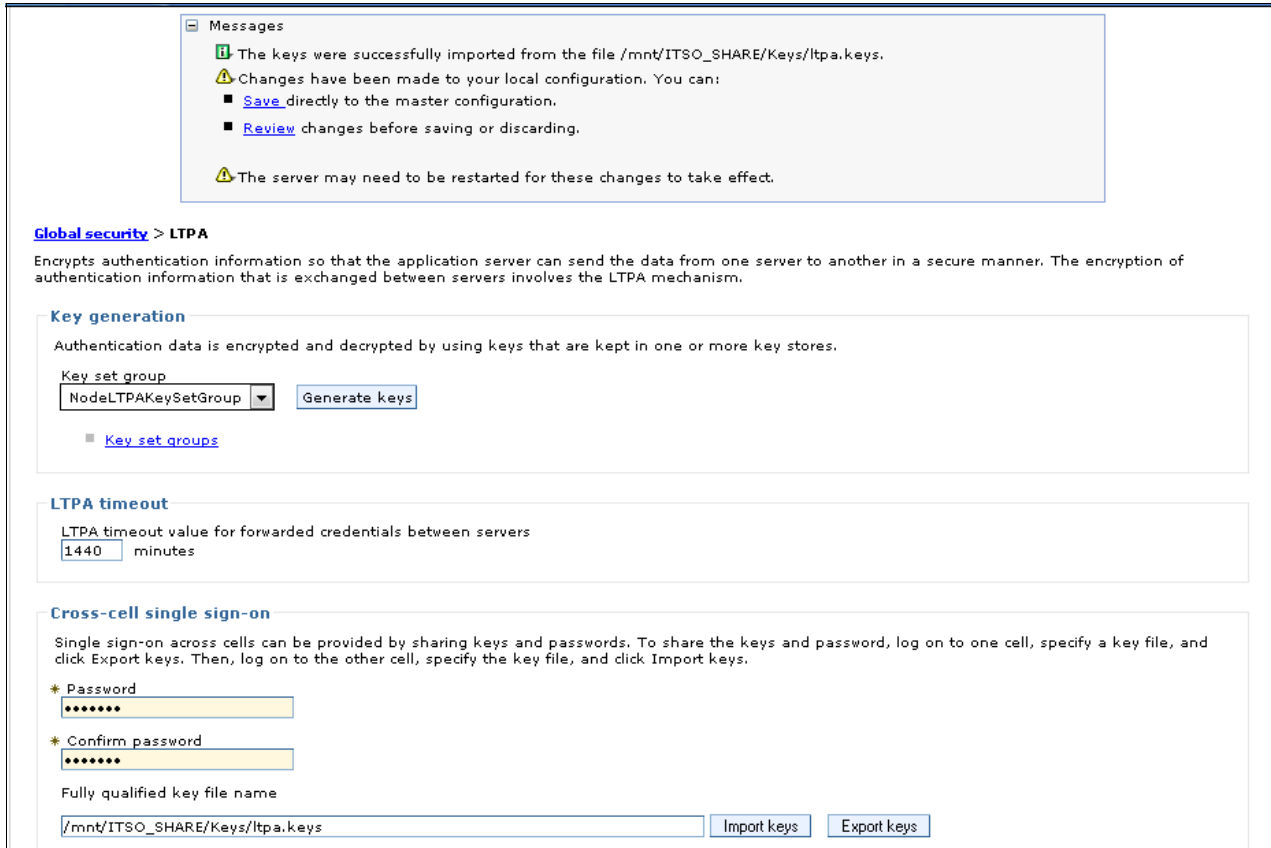
Figure 3-13   Importing LTPA keys in DASH

3.1.3 Configuring IBM Operations Analytics - Log Analysis for SSO with Jazz for Service Management

To configure IBM Operations Analytics - Log Analysis for SSO with JazzSM, follow the steps in this document:

https://ibm.biz/Bdrr7q

> **Important:** When you enable LDAP in Operations Analytics - Log Analysis, ensure that the props file for the G_SCALA gateway is updated with the LDAP user/password that can access Operations Analytics - Log Analysis.

Follow these steps:

1. In this document, for step 2 of this procedure, you need to edit the *ldap_realm_property property* in the `ldapRegistryHelper.properties` file. For step 3, you need to run the **ldapRegistryHelper.sh** script.

   Example 3-6 shows the edit of the ldap_realm_property property. It shows the execution of the **ldapRegistryHelper.sh** script in our environment. It also shows the `/opt/IBM/netcool/LogAnalysis/wlp/usr/servers/Unity/ldapRegistry.xml` file after you run these steps.

   Example 3-6   Configure LDAP for IBM Operations Analytics - Log Analysis

```
[netcool@IOALA-a utilities]$ pwd
/opt/IBM/netcool/LogAnalysis/utilities
vi /opt/IBM/netcool/LogAnalysis/utilities/ldapRegistryHelper.properties

ldap_type_property=Microsoft Active Directory

ldap_hostname_property=itso-ad.swg.be.ibm.com
ldap_port_property=389
ldap_baseDN_property=DC=ITSO,DC=IBM,DC=COM

ldap_bindDN_property=CN=Administrator,CN=Users,DC=ITSO,DC=IBM,DC=COM
ldap_bindPassword_property=Object00
ldap_realm_property=LDAPRealm
ldap_id_property=LdapRegistryId
ldap_ignoreCase_property=true

[netcool@IOALA-a utilities]$ ./ldapRegistryHelper.sh config

The expected result is the BUILD SUCCESSFUL message.

[netcool@IOALA-a Unity]$ cat
/opt/IBM/netcool/LogAnalysis/wlp/usr/servers/Unity/ldapRegistry.xml
<server>
    <ldapRegistry
        host="itso-ad.swg.be.ibm.com"
        port="389"
        baseDN="DC=ITSO,DC=IBM,DC=COM"
        bindDN="CN=Administrator,CN=Users,DC=ITSO,DC=IBM,DC=COM"
        bindPassword="{xor}EDO1Ojwrb28="
        realm="LDAPRealm"
        id="LdapRegistryId"
        ignoreCase="true"
        activedFilters="unityactivedfilters"
        ldapType="Microsoft Active Directory">
    </ldapRegistry>

    <activedLdapFilterProperties id="unityactivedfilters"
        userFilter="(&amp;(sAMAccountName=%v)(objectcategory=user))"
        groupFilter="(&amp;(cn=%v)(objectcategory=group))"
        userIdMap="user:sAMAccountName"
        groupIdMap="*:cn"
        groupMemberIdMap="memberOf:member"/>
</server>
```

```
Then, run the 'enable':
[netcool@IOALA-a utilities]$ ./ldapRegistryHelper.sh enable

The expected result is the BUILD SUCCESSFUL message.

[netcool@IOALA-a Unity]$ grep -i ldap
/opt/IBM/netcool/LogAnalysis/wlp/usr/servers/Unity/server.xml
    <feature>ldapRegistry-3.0</feature>
  <!-- Include the LDAP registry -->
  <include optional="true" location="${server.config.dir}/ldapRegistry.xml"/>
```

2. As part of step 4 of the procedure that was described in the URL in the beginning of this section, add the lines that are shown in Example 3-7 to the file /opt/IBM/netcool/LogAnalysis/wlp/usr/servers/Unity/server.xml.

Example 3-7   Added lines

```
<webAppSecurity ssoDomainNames="swg.be.ibm.com" />
<ltpa keysFileName="${server.output.dir}/resources/security/jazz.ltpa.keys"
    keysPassword="netcool" expiration="120" />
```

3. Add the LDAP admin group to the Log Analysis Admin users as described in the following document:

   https://ibm.biz/Bdrr7P

   Example 3-8 show how we performed this step in our environment.

Example 3-8   Adding the LDAP admin group to the Log Analysis Admin users

```
vi /opt/IBM//LogAnalysis/wlp/usr/servers/Unity/unityConfig.xml
<oauth-roles>
    <authenticated>
      <group name="UnityUsers"/>
      <group name="Jazz_Admins/>"
</authenticated>
</oauth-roles>
```

4. Restart the Log Analysis server. To verify that the SSO connection is set up correctly, log in to the JazzSM server. Open a new tab page in the browser and log in to Operations Analytics - Log Analysis.

5. To test the Operations Analytics - Log Analysis integration with DASH, open an Event Viewer in DASH. Figure 3-14 shows an Event Viewer with a selected event.

Figure 3-14   Event Viewer

6. Double-click an event to see more detailed information about it. On the Properties for event window, click the **Event Search** tab. Select a search type and a date range. Click **Search**.

   If a graph, such as the graph that is shown in Figure 3-15, is shown, even if the graph states "`No results found`", the IBM Operations Analytics - Log Analysis integration with DASH was configured correctly.
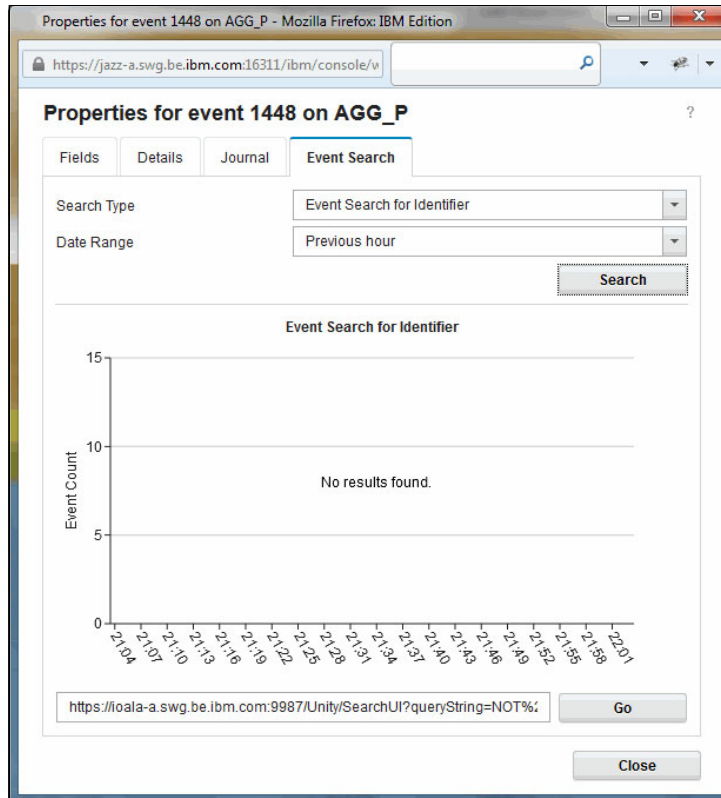
Figure 3-15   Event properties

3.2 Netcool Operations Insight extensions

Each of the Netcool Operations Insight components must be configured to enable Netcool Operations Insight extensions, which are additional features and capabilities, such as Seasonality, Event Analytics, and topology search.

3.2.1 Seasonality

You can check whether the seasonality works by logging in to the JazzSM server and clicking **Configure Analytics**, as shown in Figure 3-16.

> **Note:** You need to configure Event Analytics to see the options, as shown in Figure 3-16. For more information, see 3.2.3, "Event Analytics" on page 211.
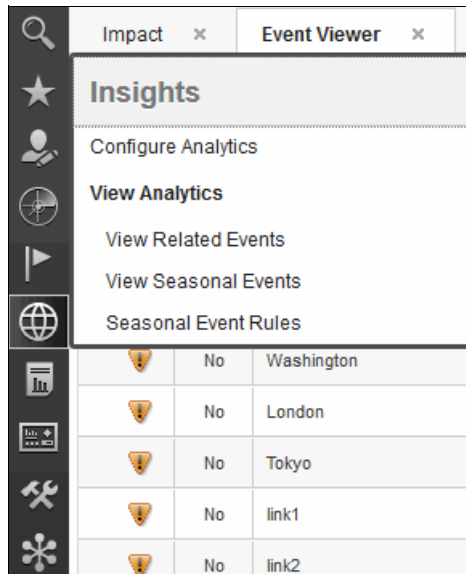
Figure 3-16   Insights options

Figure 3-17 shows the Configure Analytics page.

Figure 3-17   Configure Analytics with a status of pending

The status of the service shows a check mark in a green square, as shown in Figure 3-18. The service depends on the status of the current run of the configuration.

Figure 3-18   Configure Analytics with a successful run

3.2.2 Event integration

Check the `server.init` file in `/opt/IBM/netcool/gui/omnibus_webgui/etc`. See Example 3-9.

Example 3-9   The server.init file

```
scala.app.keyword=OMNIbus_Keyword_Search
scala.app.static.dashboard=OMNIbus_Static_Dashboard
scala.datasource=omnibus
scala.url=https://ioala-a.swg.be.ibm.com:9987
scala.version=1.2.0.3
```

This file was created by the event integration component of Web GUI. For more information, see 3.2.1, "Seasonality" on page 210.

3.2.3 Event Analytics

We configure the ObjectServer for Event Analytics, as documented at the following link:

https://ibm.biz/Bdrr7y

Follow these steps:

1. On any of the Impact servers, copy `relatedevents_objectserver.sql` to `/mnt/ITSO_SHARE/tmp` as shown in Example 3-10.

Example 3-10   Copy relatedevents_objectserver.sql to /mnt/ITSO_SHARE/tmp/

```
cd /opt/IBM/tivoli/netcool/impact/add-ons/RelatedEvents
cp db/relatedevents_objectserver.sql /mnt/ITSO_SHARE/tmp/
```

2. Import the custom sql `relatedevents_objectserver.sql` to *all* ObjectServers as shown in Example 3-11.

Example 3-11   Import the custom sql relatedevents_objectserver.sql

```
$OMNIHOME/bin/nco_sql -user root -password ''-server AGG_P
</mnt/ITSO_SHARE/tmp/relatedevents_objectserver.sql
$OMNIHOME/bin/nco_sql -user root -password ''-server AGG_B
</mnt/ITSO_SHARE/tmp/relatedevents_objectserver.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server DIS_1 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server DIS_2 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server COL_P_1 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server COL_B_1 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver.sql
$OMNIHOME/bin/nco_sql -user root -password ''-server AGG_P
</mnt/ITSO_SHARE/tmp/relatedevents_objectserver_update_fp5.sql
$OMNIHOME/bin/nco_sql -user root -password ''-server AGG_B
</mnt/ITSO_SHARE/tmp/relatedevents_objectserver_update_fp5.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server DIS_1 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver_update_fp5.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server DIS_2 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver_update_fp5.sql
$OMNIHOME/bin/nco_sql -user root -password '' -server COL_P_1 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver_update_fp5.sql
```

```
$OMNIHOME/bin/nco_sql -user root -password '' -server COL_B_1 <
/mnt/ITSO_SHARE/tmp/relatedevents_objectserver_update_fp5.sql
```

This action adds a set of new fields, triggers, and tables to the ObjectServers.

3. Reconfigure the gateways to support the new fields:

   – `IBMExtractedType`
   – `IBMProcessingStage`
   – `ParentIdentifier`

   This task is partially documented at this website:

   https://ibm.biz/Bdrr7v

4. Reconfigure the gateways to support the new fields by logging in to Omni-A as the user `netcool` and by running the command that is shown in Example 3-12.

Example 3-12   A_TO_D_GATE.map changes

```
cd $OMNIHOME/etc
vi A_TO_D_GATE.map
##############################################################################
#       CUSTOM alerts.status FIELD MAPPINGS GO HERE
#
##############################################################################
        'IBMExtractedType'      =       '@IBMExtractedType',
        'IBMProcessingStage'    =       '@IBMProcessingStage',
        'ParentIdentifier'      =       '@ParentIdentifier',
##############################################################################
```

5. You must make the same changes to the `AGG_GATE.map` file and the `A_TO_D_GATE.map` file on Omni-B as shown in Example 3-13.

Example 3-13   AGG_GATE.map file

```
cd $OMNIHOME/etc
vi AGG_GATE.map
##############################################################################
#
#       CUSTOM alerts.status FIELD MAPPINGS GO HERE
#
##############################################################################
        'IBMExtractedType'      =       '@IBMExtractedType',
        'IBMProcessingStage'    =       '@IBMProcessingStage',
        'ParentIdentifier'      =       '@ParentIdentifier',
##############################################################################
```

6. At the end of the `AGG_GATE.map` file, add the configuration for the extra failover capabilities as shown in Example 3-14. For more information, see this website:

   https://ibm.biz/Bdrr7v

Example 3-14   AGG_GATE.map

```
cd $OMNIHOME/etc
vi AGG_GATE.map
CREATE MAPPING RE_CACHEMAP
(
'name'  = '@name' ON INSERT ONLY,
```

```
'updates' = '@updates'
);
```

7. Edit the `AGG_GATE.tblrep.def` file to add the commands to the end of the file as shown in Example 3-15.

Example 3-15   AGG_GATE.tblrep.def

```
vi AGG_GATE.tblrep.def
REPLICATE ALL FROM TABLE 'relatedevents.cacheupdates'
        USING map 'RE_CACHEMAP';
```

8. On the Impact server, configure the data sources and services that are used by Netcool Operations Insight. Configure the ObjectServer data source as shown in Figure 3-19.
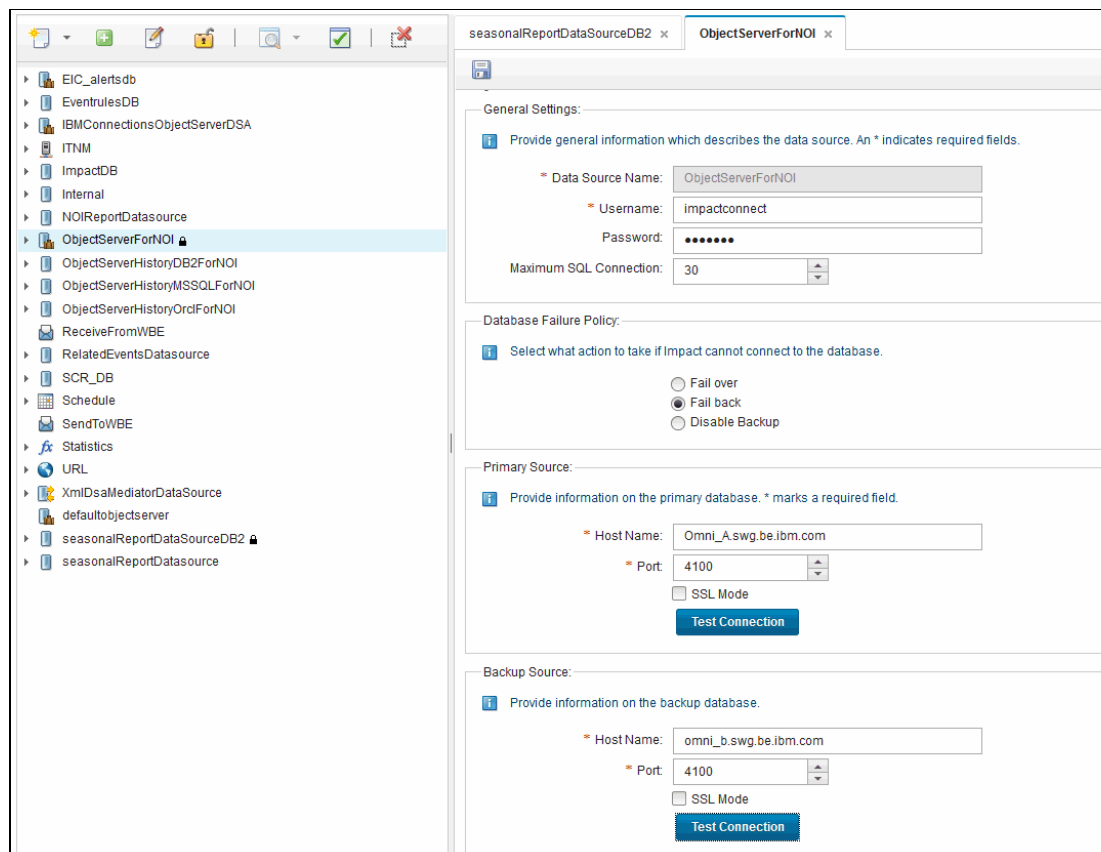
Figure 3-19   ObjectServer for Netcool Operations Insight

9. In this data source, enter the Primary ObjectServer, Secondary ObjectServer, and their ports. Point the Primary ObjectServer, Secondary ObjectServer, and their ports to the Aggregation Layer ObjectServers and use the previously created ObjectServer's user name: `impactconnect`.

10.Configure the SeasonalReportDataSourceDB2 data source, which is described at the following website:

https://ibm.biz/Bdrr7m

If you need to create the database manually, follow these steps:

a. Run the commands that are shown in Example 3-16 on any Impact server.

Example 3-16   The seasonality_db2.sql file

```
cd /opt/IBM/tivoli/netcool/impact/add-ons/Seasonality/db
cp seasonality_db2.sql /mnt/ITSO_SHARE/tmp
```

b. Run the database creation script on the DB2 Server as user db2inst1, as shown in Example 3-17.

> **Note:** You can change the Seasonality Database to the DB2 instance. For more information, see this website:
>
> https://ibm.biz/Bdrr7K

Example 3-17   Run the database creation script

```
db2 -tvf /mnt/ITSO_SHARE/tmp/seasonality_db2.sql
```

11. When the database is created, configure the seasonalReportDataSourceDB2 on the configuration panel, as shown in Figure 3-20.
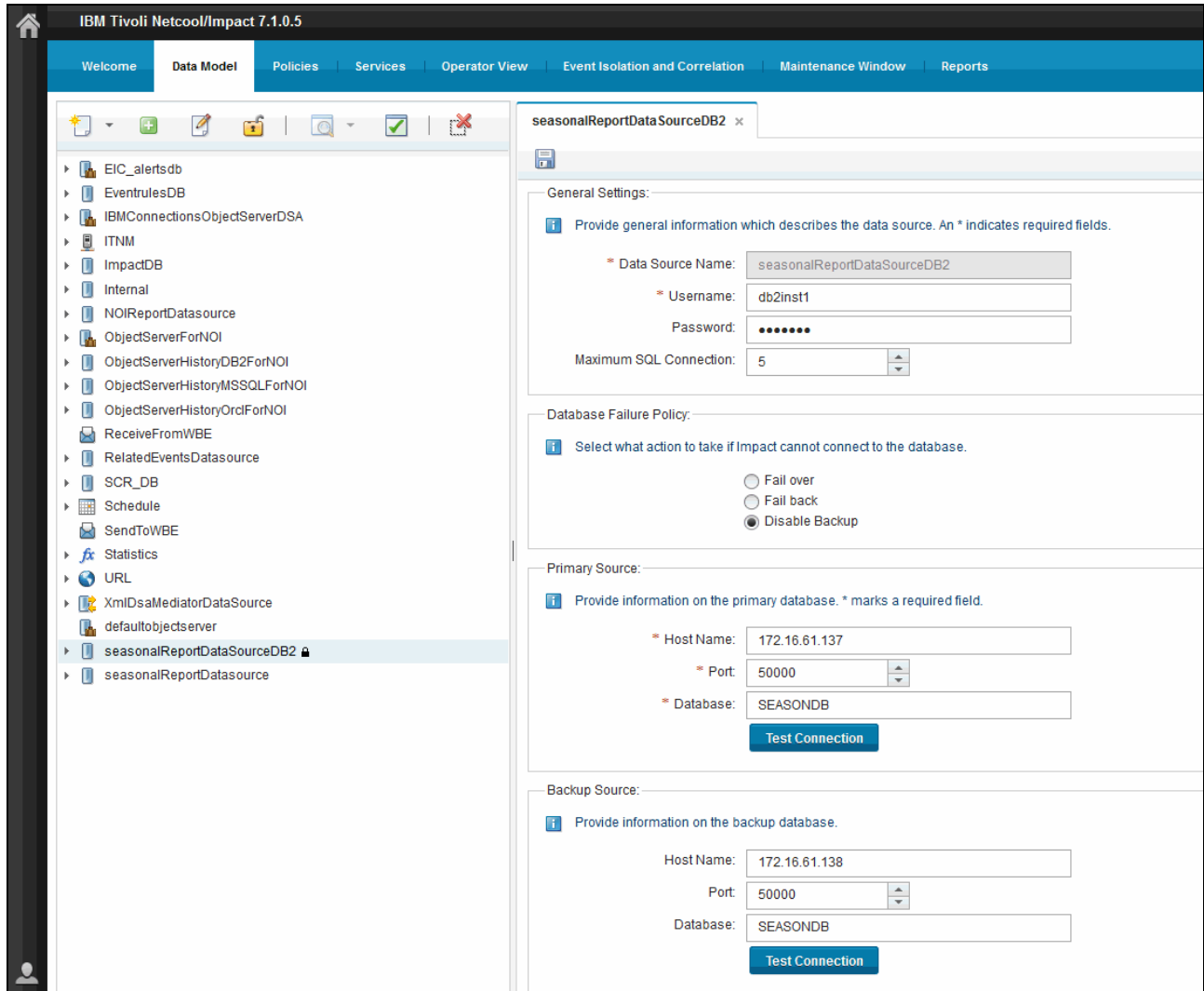
Figure 3-20   The seasonalReportDataSourceDB2 tab

12. Configure the ObjectServerHistoryDB2ForNOI data source. Figure 3-21 shows the historical database data source configuration.
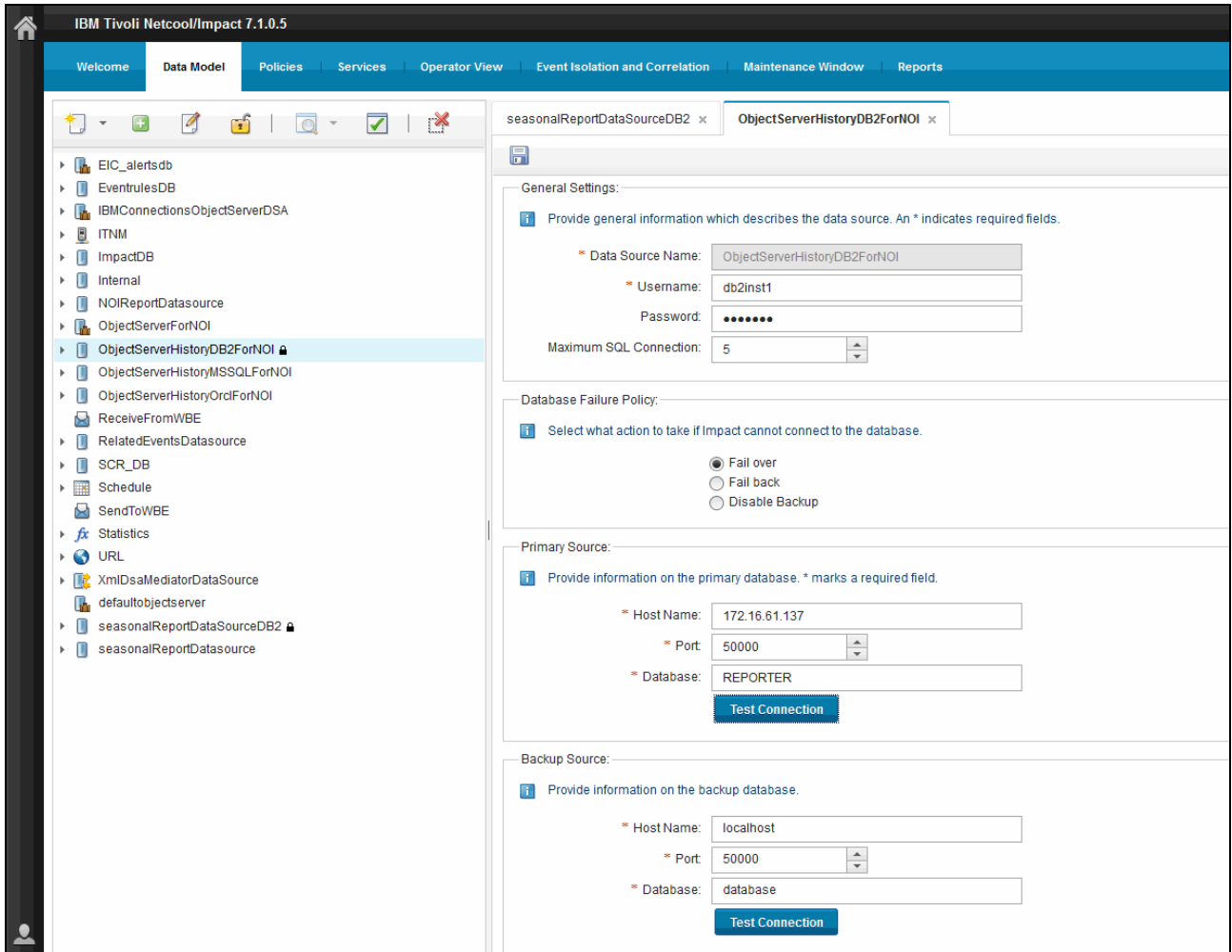
Figure 3-21   ObjectServerHistoryDB2ForNOI

13. Also, you must update the RelatedEventsDatasource, as shown in Figure 3-22.
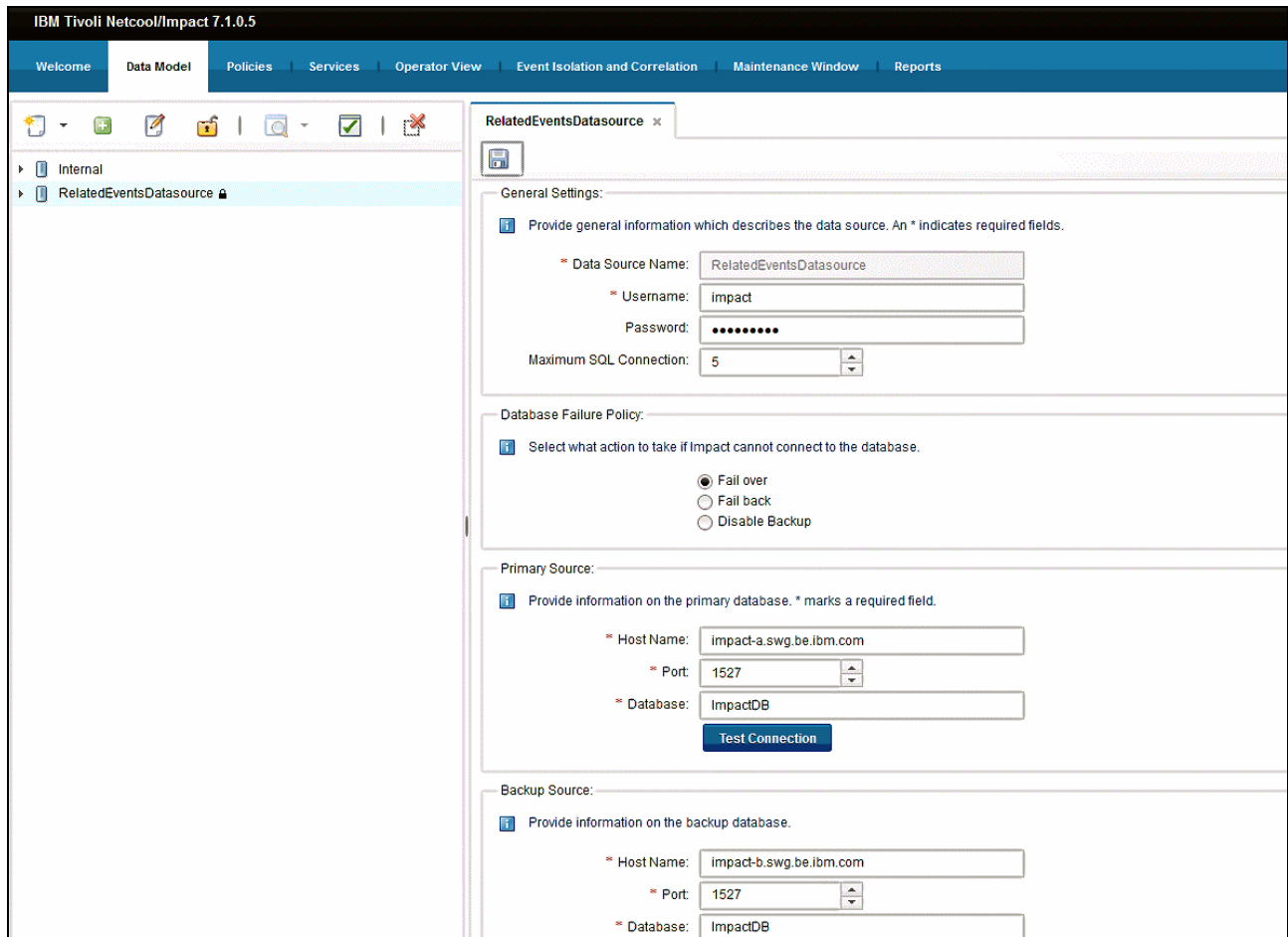
Figure 3-22   RelatedEventsDatasource

14. Change the internal seasonalReportDatasource as shown in Figure 3-23.
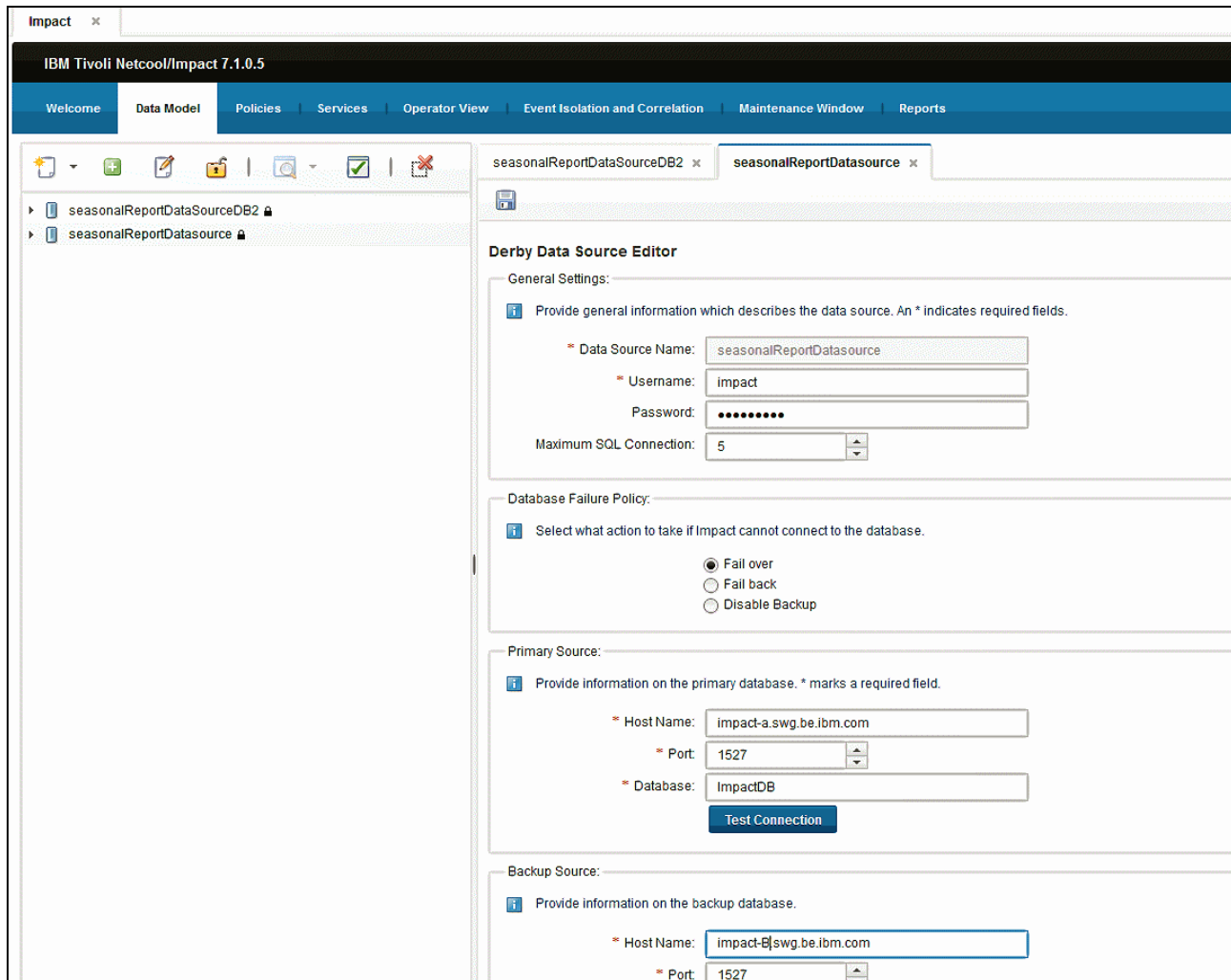
Figure 3-23   Change the seasonalReportDatasource

15. Start the services for the Netcool Operations Insight RelatedEvents project. Select **RelatedEvents** as shown in Figure 3-24.
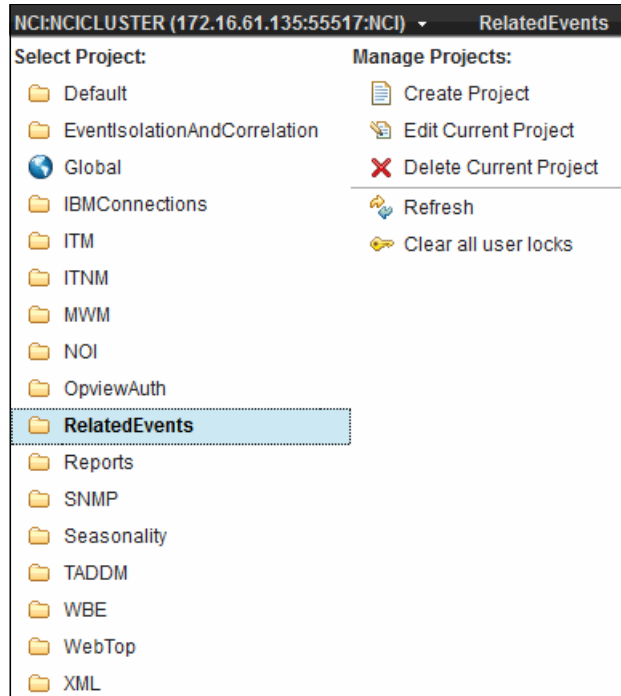
Figure 3-24   RelatedEvents project

16. Select the **Services** tab as shown in Figure 3-25.
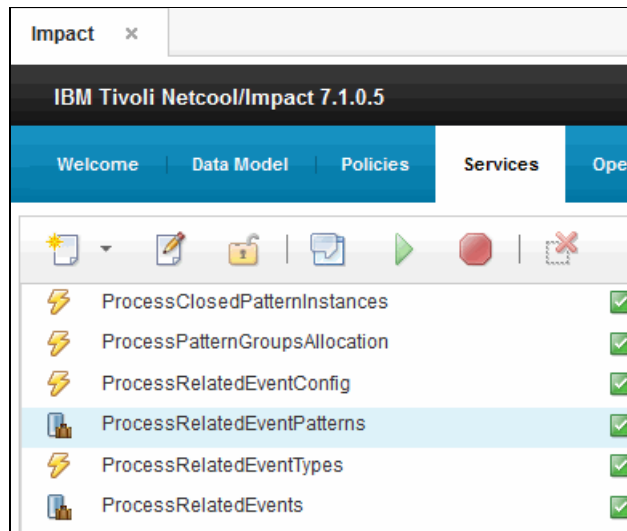
Figure 3-25   Services tab

17. Confirm that all services are started.

18. Start the services for the Netcool Operations Insight Seasonality project. Select **Seasonality** as shown in Figure 3-26.
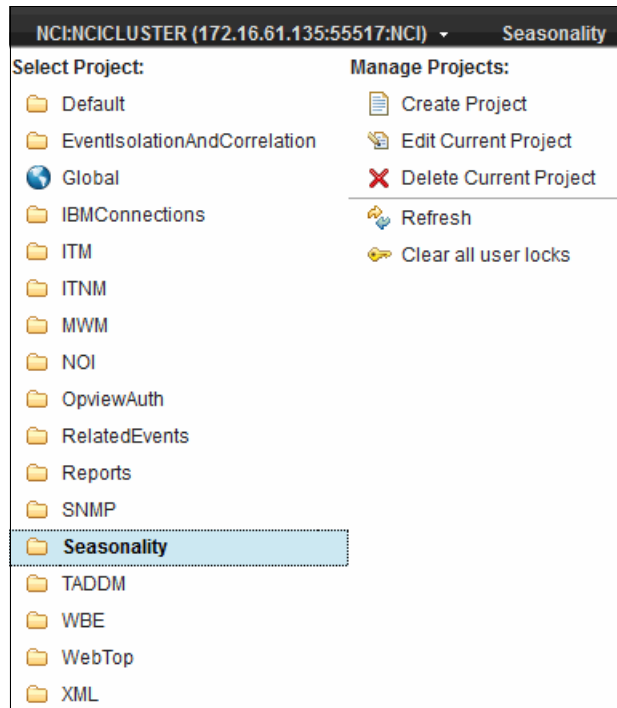
Figure 3-26   Seasonality Project

19. Select the **Services** tab, as shown in Figure 3-27.
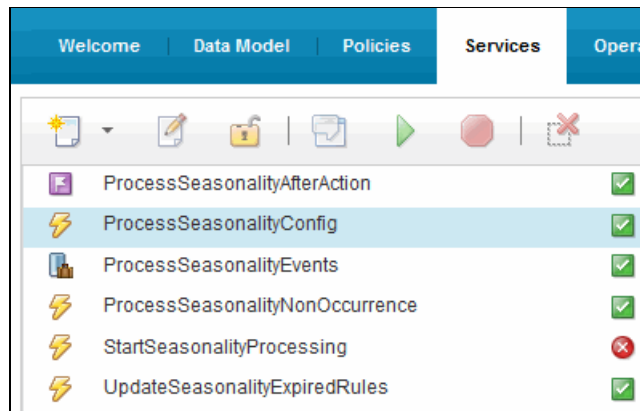
Figure 3-27   Services tab

20. Confirm that all services are started, except StartSeasonalityProcessing, which is only used to start the Seasonality whenever the server starts. If the services are marked with an X in a red circle, start them.

3.2.4 Topology search

The configuration of the topology search feature is documented at this website:

https://ibm.biz/Bdrr7G

To configure the topology search feature, follow these steps:

1. Apply the SQL files on the Aggregation and Display Server (Omni-A), as shown in Example 3-18.

Example 3-18   Apply the SQL files on the Aggregation and Display Server

```
cd /opt/IBM/tivoli/netcool/omnibus/bin
./nco_sql -user root -server AGG_P
</opt/IBM/tivoli/netcool/omnibus/extensions/scala/scala_itnm_configuration.sql
./nco_sql -user root -server AGG_B
</opt/IBM/tivoli/netcool/omnibus/extensions/scala/scala_itnm_configuration.sql
./nco_sql -user root -server DIS_1
</opt/IBM/tivoli/netcool/omnibus/extensions/scala/scala_itnm_configuration.sql
./nco_sql -user root -server DIS_2
</opt/IBM/tivoli/netcool/omnibus/extensions/scala/scala_itnm_configuration.sql
```

2. For the menus, apply the changes to the JazzSM servers. On *both* JazzSM servers, set the username/password in the `waapi.init` file. See Example 3-19.

Example 3-19   Set the username/password in waapi.init

```
vi /opt/IBM/netcool/gui/omnibus_webgui/waapi/etc/waapi.init
waapi.user:smadmin2
waapi.password:netcool
```

> **Important:** If LDAP is activated, you must use an LDAP user name. Otherwise, use the `smadmin` user name.

3. Apply the `scalaEventTopology.xml` file by using the **runwaapi** command. See Example 3-20.

Example 3-20   Apply the scalaEventTopology.xml file

```
cd /opt/IBM/netcool/gui/omnibus_webgui/waapi/bin
./runwaapi -file
/opt/IBM/netcool/gui/omnibus_webgui/extensions/LogAnalytics/scalaEventTopology.xml
```

4. Edit the `topoviz.properties` file. See Example 3-21.

Example 3-21   Edit the topoviz.properties file

```
vi /opt/IBM/netcool/gui/precision_gui/profile/etc/tnm/topoviz.properties
topoviz.unity.customappsui=https://ioala-a.swg.be.ibm.com:9987/Unity/CustomAppsUI
```

5. Add the menu item to the Network view by adding `<menu id="Event Search"/>` to the `ncp_topoviz_device_menu.xml` as shown in Example 3-22.

Example 3-22   Add the menu item to the Network view

```
vi /opt/IBM/netcool/gui/precision_gui/profile/etc/tnm/menus/ncp_topoviz_device_menu.xml
<tool id="showConnectivityInformation" />
                <separator />
                <menu id="Event Search"/>
```

3.3 Load balancing for JazzSM

This section describes the load balancing configuration for JazzSM and for the UI Data Provider connections to Netcool/Impact.

3.3.1 Load balancing for the Jazz configuration

For more information, see the following document to turn on load balancing for the Jazz configuration:

https://ibm.biz/BdrsBy

> **Note:** Before you join nodes to a cluster, ensure that *each* node uses the same *file-based* repository user ID, which is assigned the role of `iscadmins`.

Follow these steps to turn on load balancing for JazzSM:

1. Create a DB2 database that is named `dashdb`.

2. On the JazzSM servers, copy the `db2jcc*` files to the directory `/opt/IBM/netcool/WebSphere/universalDriver/lib/db2/`. See Example 3-23.

Example 3-23   Copy the db2jcc files to /opt/IBM/netcool/WebSphere/universalDriver/lib/db2/*

```
cp /opt/IBM/netcool/JazzSM/lib/db2/db2jcc*
/opt/IBM/netcool/WebSphere/universalDriver/lib/db2/

/opt/IBM/netcool/JazzSM/lib/db2/db2jcc.jar
/opt/IBM/netcool/JazzSM/lib/db2/db2jcc_license_cu.jar
```

3. Configure a data source in the WebSphereAdministrative Console.

   Click **Launch WebSphere Administrative Console** and log in. See Figure 3-28.
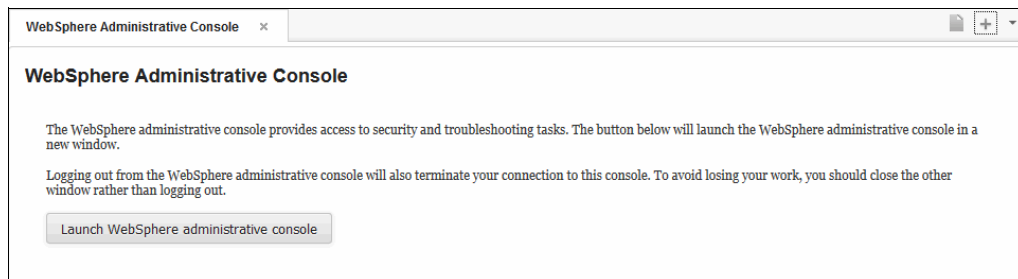
Figure 3-28   Launch the WebSphere Administrative Console

4. Figure 3-29 shows the WebSphere Administrative Console. Click **Resources**.
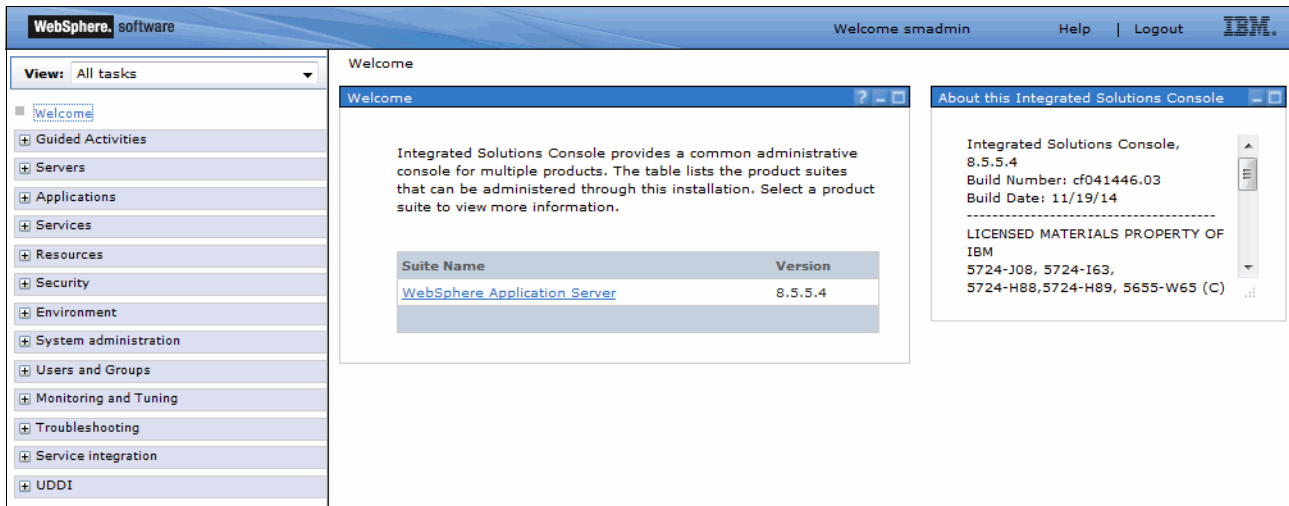
Figure 3-29   WebSphere Administrative Console

5. Click **JDBC** → **JDBC providers**. See Figure 3-30.
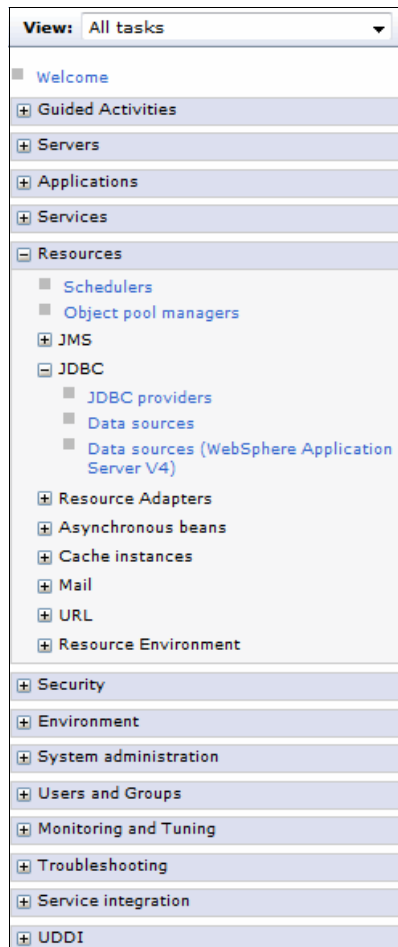
Figure 3-30   Click JDBC and select JDBC providers

6. Select **Node=JazzSMNode01, Server=server1**, as shown in Figure 3-31.
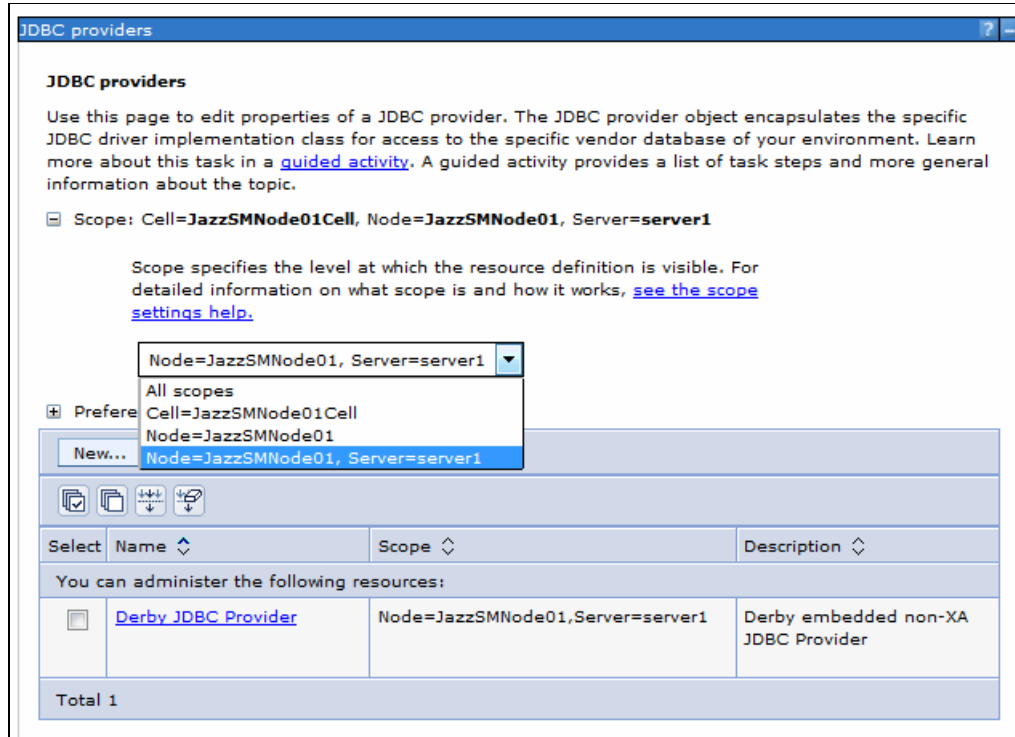
Figure 3-31   Edit the scope

7. Select the following options (Figure 3-32):

   – For the database type, select **DB2**.

   – For the provider type, select **DB2 Universal JDBC Driver Provider**.

   – For the implementation type, select **Connection pool data source**.

8. Click **Next**.
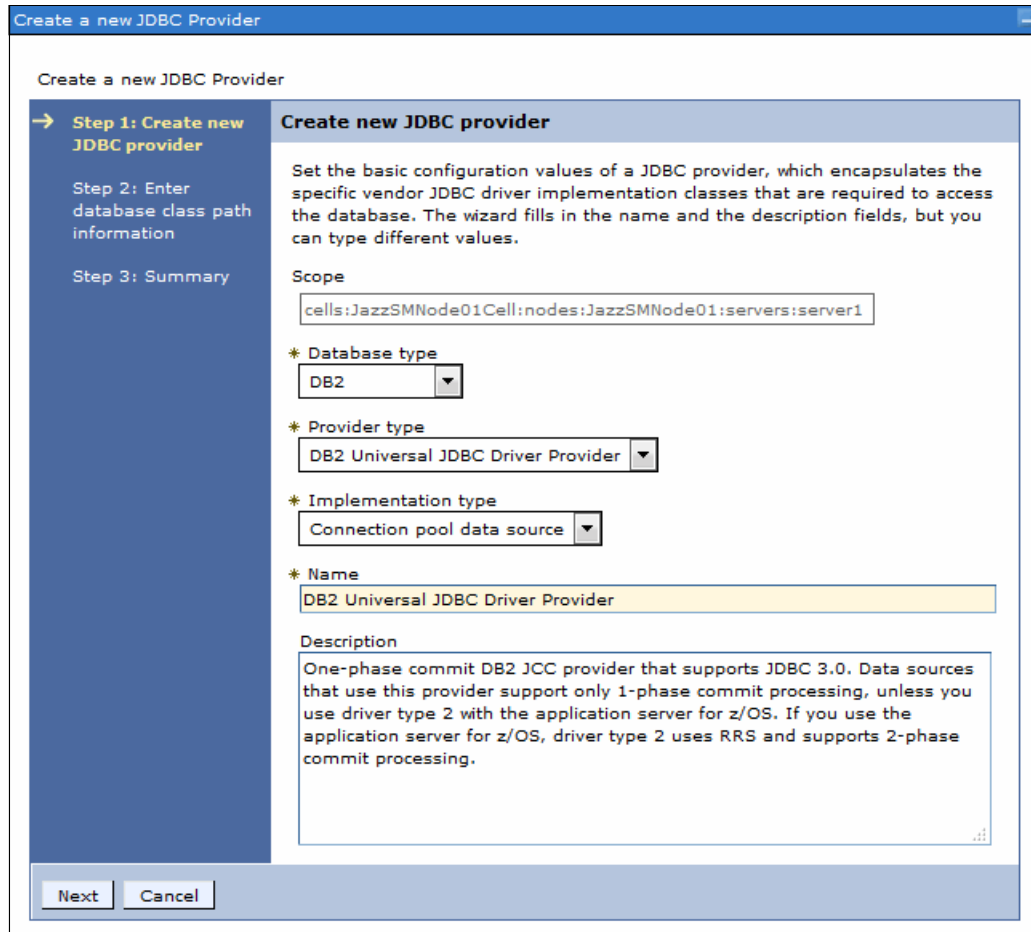
Figure 3-32   Data source

9. If you use DB2, change the class path to `/opt/IBM/netcool/JazzSM/lib/db2/` and click **OK**, as shown in Figure 3-33.

Figure 3-33 Change the class path to /opt/IBM/netcool/JazzSM/lib/db2/

10.Figure 3-34 shows the Summary. Click **Finish**.

Create a new JDBC Provider

Create a new JDBC Provider

	Summary
Step 1: Create new JDBC provider	**Summary**
Step 2: Enter database class path information	Summary of actions:
→ Step 3: Summary	

Options	Values
Scope	cells:JazzSMNode01Cell:nodes:JazzSMNode01:servers:server1
JDBC provider name	DB2 Universal JDBC Driver Provider
Description	One-phase commit DB2 JCC provider that supports JDBC 3.0. Data sources that use this provider support only 1-phase commit processing, unless you use driver type 2 with the application server for z/OS. If you use the application server for z/OS, driver type 2 uses RRS and supports 2-phase commit processing.
Class path	${DB2UNIVERSAL_JDBC_DRIVER_PATH}/db2jcc.jar ${UNIVERSAL_JDBC_DRIVER_PATH}/db2jcc_license_cu.jar ${DB2UNIVERSAL_JDBC_DRIVER_PATH}/db2jcc_license_cisuz.jar
${DB2UNIVERSAL_JDBC_DRIVER_PATH}	
${UNIVERSAL_JDBC_DRIVER_PATH}	
Native path	${DB2UNIVERSAL_JDBC_DRIVER_NATIVEPATH}
${DB2UNIVERSAL_JDBC_DRIVER_NATIVEPATH}	
Implementation class name	com.ibm.db2.jcc.DB2ConnectionPoolDataSource

Previous   Finish   Cancel

Figure 3-34   Summary

11. Click **Data sources**.

12. Select the scope and click **New** (Figure 3-35).
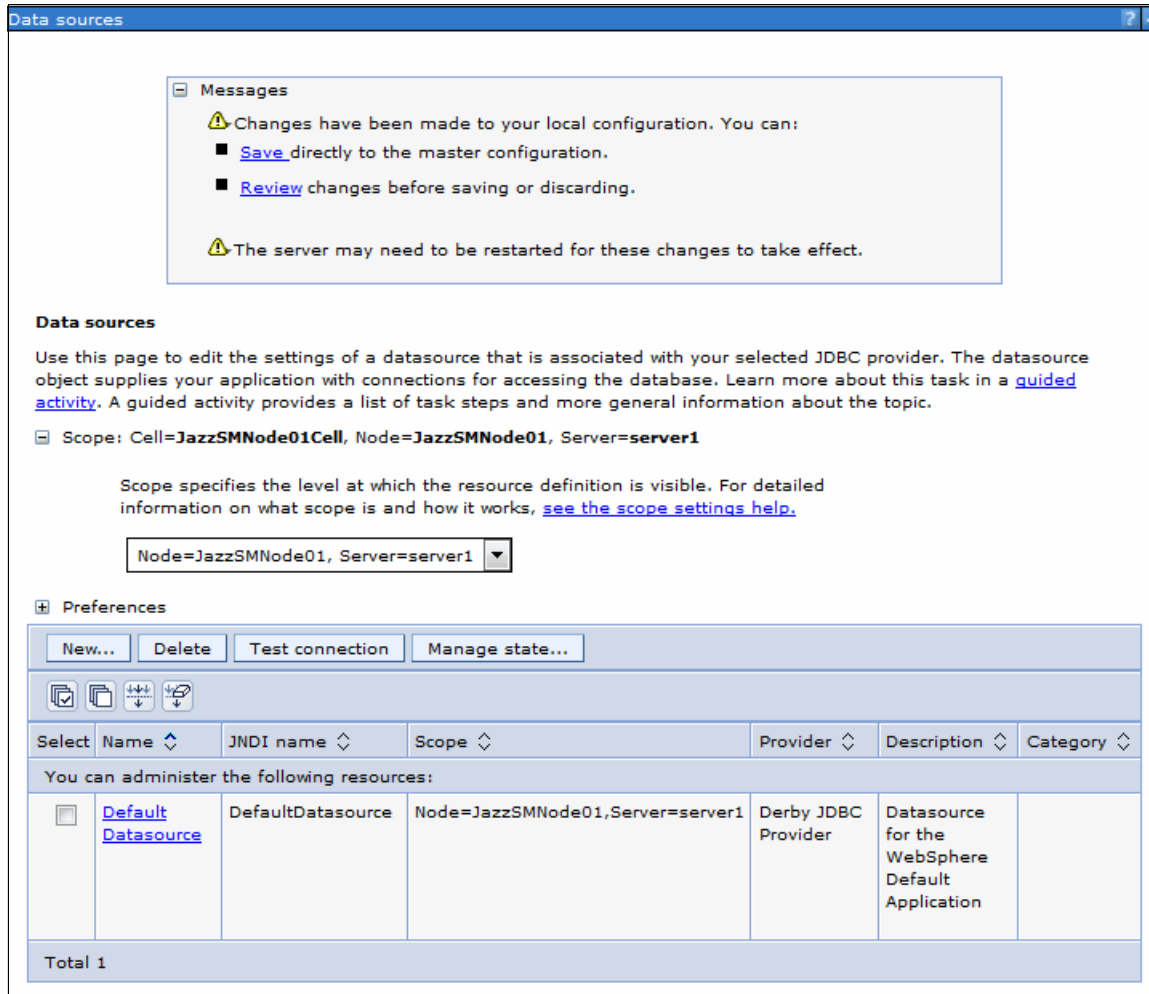
Figure 3-35   New data source

13. Type the following information and click **Next** (Figure 3-36):

   – For the data source name, type `tipds`.
   – For the Java Naming and Directory Interface (JNDI) name, type `jdbc/tipds`.

Figure 3-36   Data source

14. Select the JDBC provider that you created, for example, DB2 Universal JDBC Driver Provider, and click **Next** (Figure 3-37).

Figure 3-37   Select JDBC Provider

15. Change the following properties (Figure 3-38):

   – For the driver type, select **4**.
   – For the database name, type `dashdb`.
   – For the server name, type `172.16.61.137`.
   – For the port number, type `50000`.

> **Important:** Click **Use this data source in container managed persistence (CMP)**.

Figure 3-38   Data source properties

16.For the mapping-configuration alias, select **DefaultPrincipalMapping** (Figure 3-39) and click **Global J2C authentication alias** to open it in a *new* window.
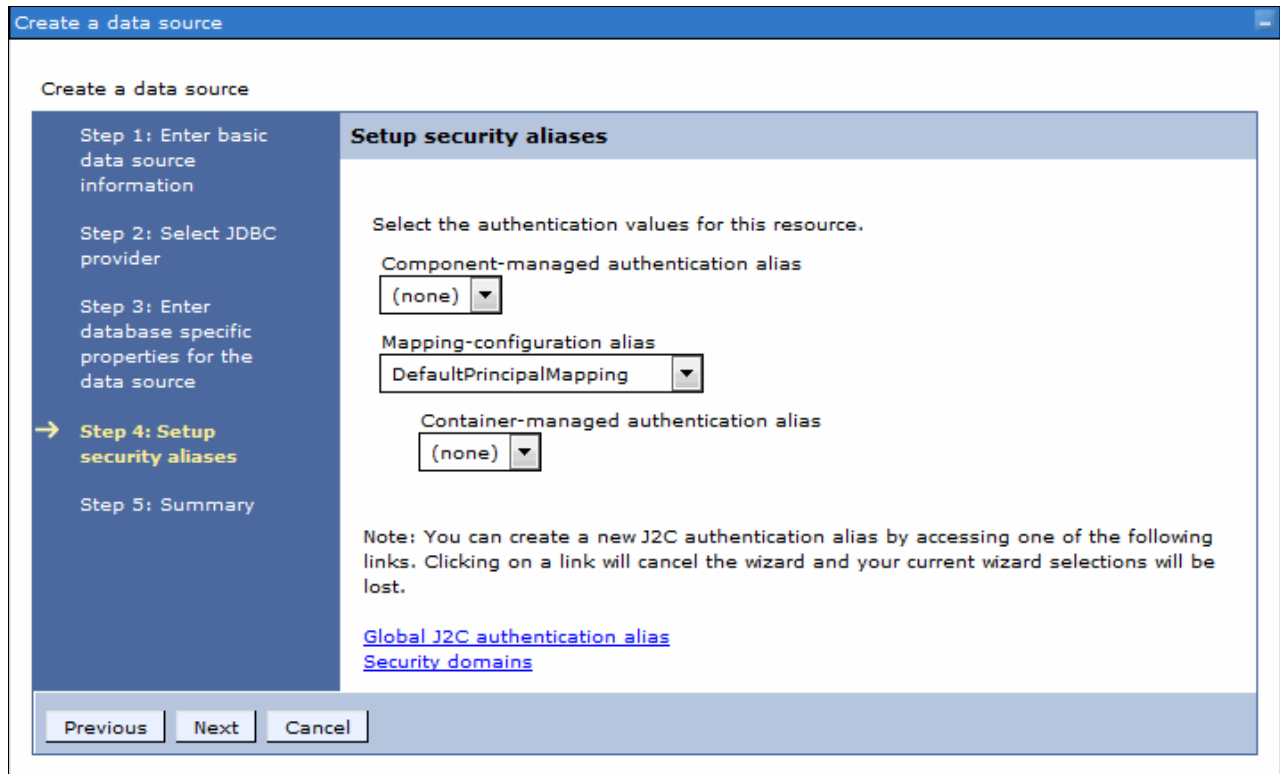
Figure 3-39 Mapping-configuration alias

17. Click **JAAS - J2C authentication data** (Figure 3-40) to open a second window and click **New**.
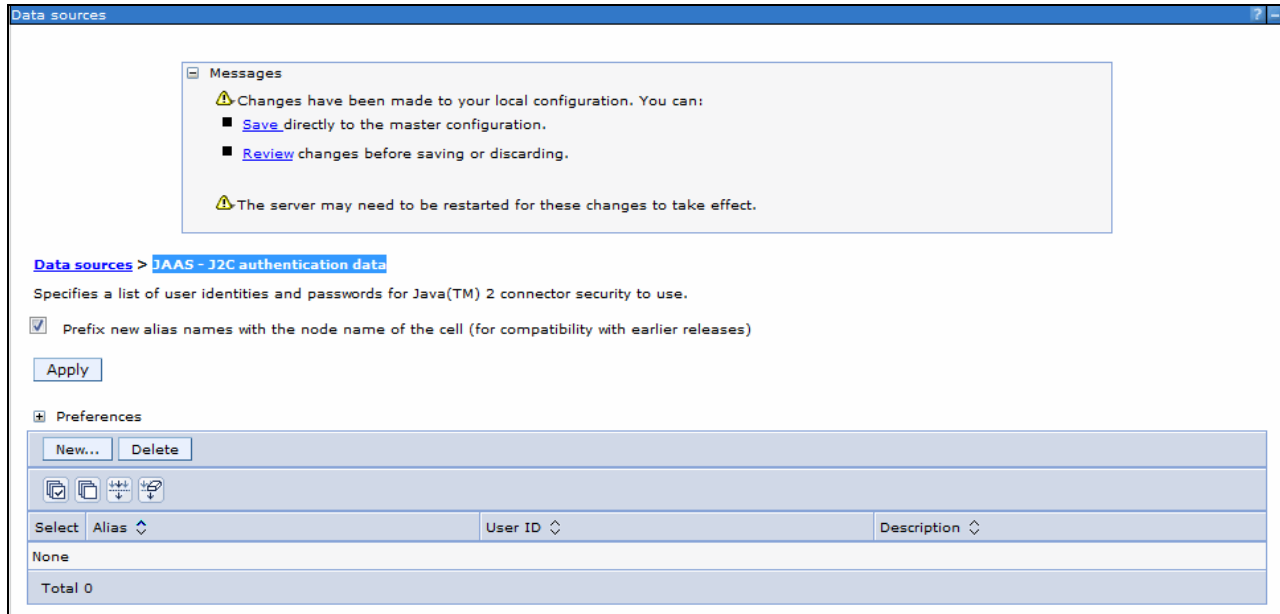
Figure 3-40   Click JAAS - J2C authentication data

18. Type the following information and click **OK** (Figure 3-41):

   – For the alias, enter `db2`.
   – For the user ID, enter `db2inst1`.
   – For the password, enter `netcool`.
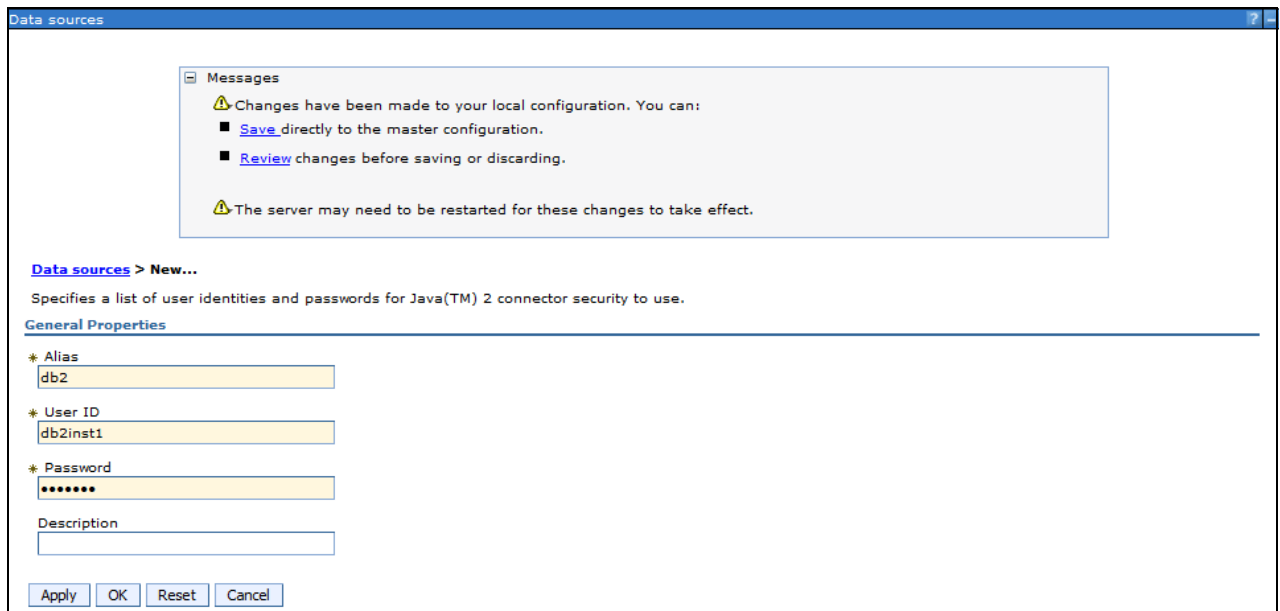
Figure 3-41   DB2 alias

19. Click **Save**.

20. Click **Previous** and **Next** to refresh the window and show the DB2 username.

21. Click **Next**. The next window is the Create a data source window, as shown in Figure 3-42. Click **Next**.
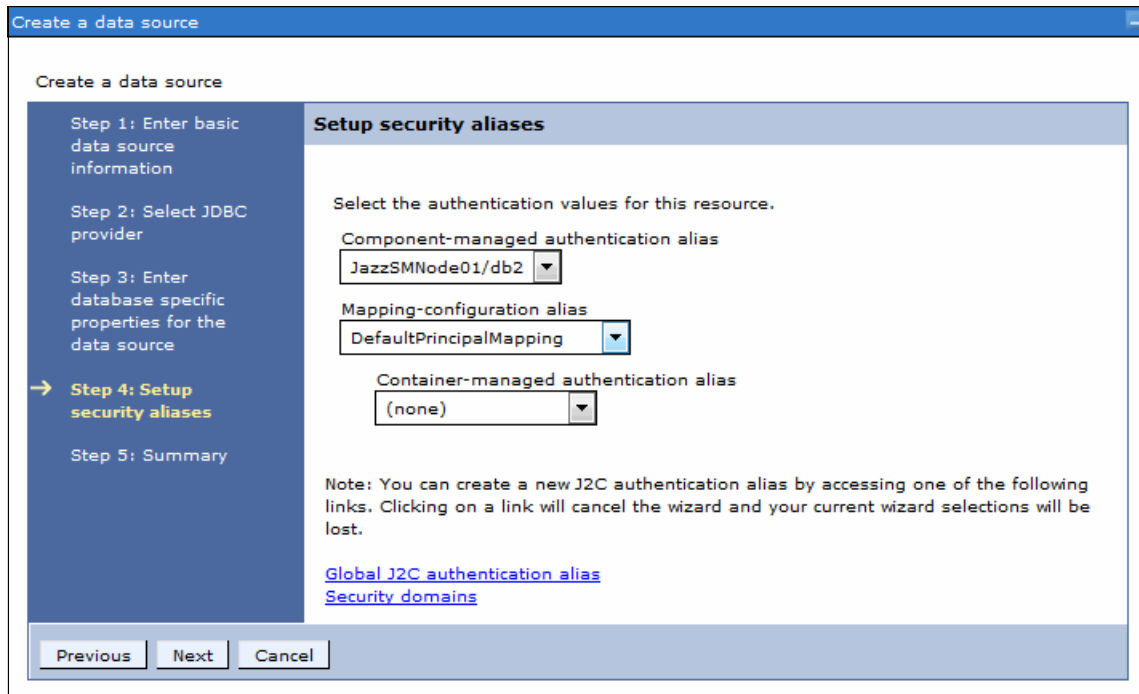
Figure 3-42   Mapping

22. Verify the summary and click **Finish** (Figure 3-43).

Figure 3-43   Summary

Figure 3-44 shows the final window, which shows the data sources.
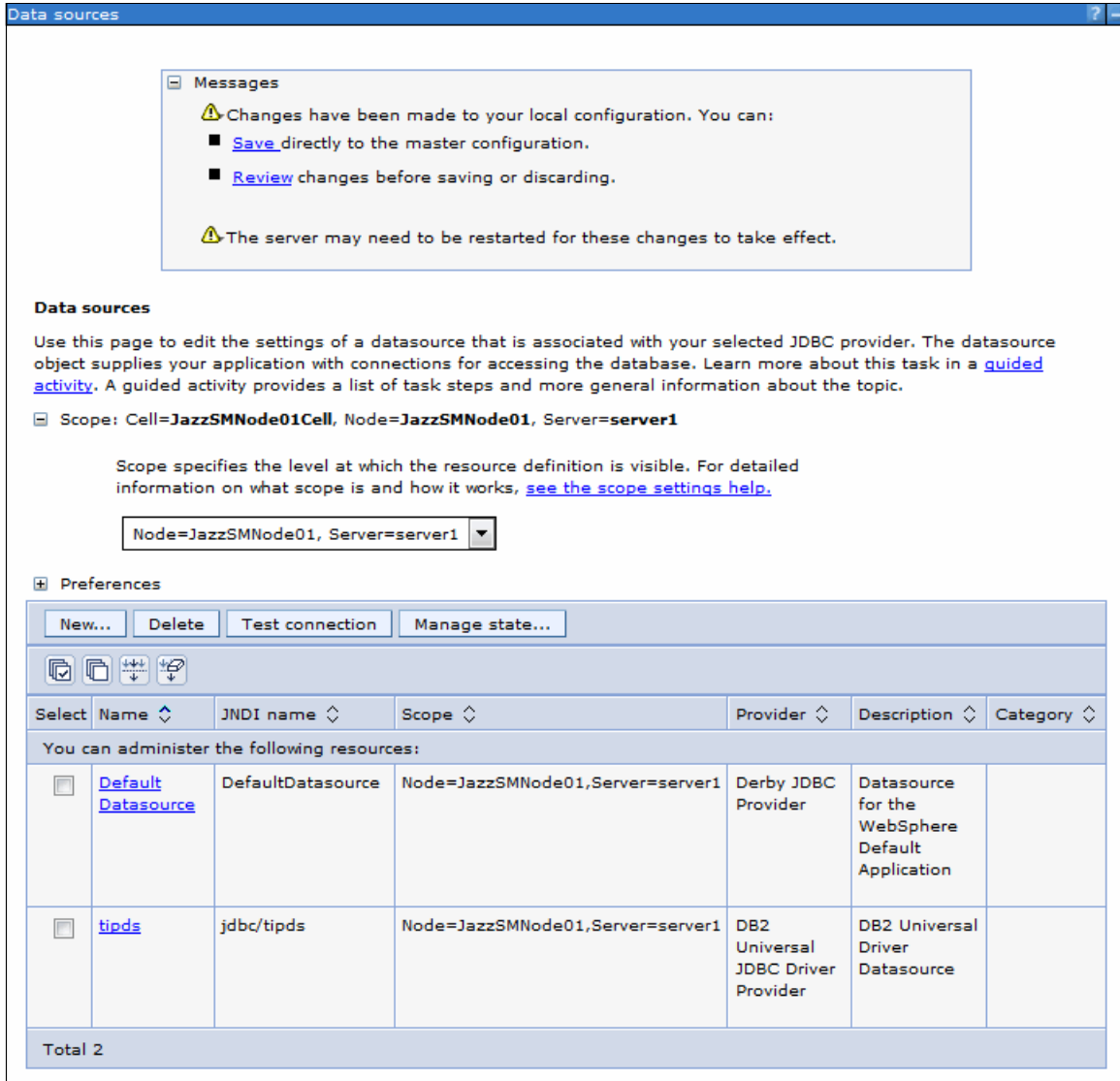
Figure 3-44   Result

23.Click **Save** (Figure 3-45).
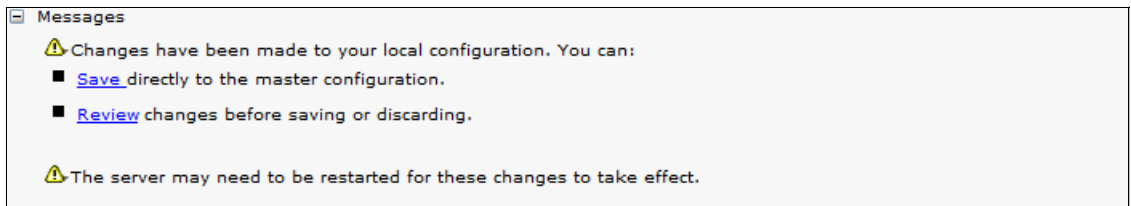
Figure 3-45   Save

24. Select **tipds** and click **Test connection** (Figure 3-46) to verify the successful creation of the data source.

Select	Name	JNDI name	Scope	Provider	Description	Category
You can administer the following resources:						
☐	Default Datasource	DefaultDatasource	Node=JazzSMNode01,Server=server1	Derby JDBC Provider	Datasource for the WebSphere Default Application	
☐	tipds	jdbc/tipds	Node=JazzSMNode01,Server=server1	DB2 Universal JDBC Driver Provider	DB2 Universal Driver Datasource	

Total 2

Figure 3-46   Test the connection

25. If the connection test is successful, close the web page and restart the server. See Example 3-24.

Example 3-24   Restart the server

```
./stopServer.sh server1 -username smadmin -password netcool
```

Tip: To stop and start Jazz without typing the user name and password, change the following file:

/opt/IBM/netcool/JazzSM/profile/properties/soap.client.props

Edit the following lines to include the `smadmin` user ID and password:

▶   com.ibm.SOAP.loginUserid=smadmin
▶   com.ibm.SOAP.loginPassword=netcool

26. Enable server-to-server trust on both servers. Edit the `ssl.client.props` file and uncomment the section that starts with `com.ibm.ssl.trustStoreName=AnotherTrustStore` so that it looks like Example 3-25.

Example 3-25   Edit the ssl.client.props file

vi /opt/IBM/netcool/JazzSM/profile/properties/ssl.client.props
 # TrustStore information
com.ibm.ssl.trustStoreName=AnotherTrustStore
com.ibm.ssl.trustStore=${user.root}/config/cells/JazzSMNode01Cell/nodes/JazzSMNode01/trust.p12
com.ibm.ssl.trustStorePassword={xor}CDo9Hgw=
com.ibm.ssl.trustStoreType=PKCS12
com.ibm.ssl.trustStoreProvider=IBMJCE
com.ibm.ssl.trustStoreFileBased=true
com.ibm.ssl.trustStoreReadOnly=false

27. Restart the servers.

28. Retrieve the signers on both servers:

– Example 3-26 shows the operation on Jazz-A.

Example 3-26   Retrieve the signers

```
retrieveSigners.sh NodeDefaultTrustStore AnotherTrustStore -host
jazz-a.swg.be.ibm.com -port 16313
....
```

– Example 3-27 shows the operation on Jazz-B.

Example 3-27   Retrieve the signers

```
./retrieveSigners.sh NodeDefaultTrustStore AnotherTrustStore -host
jazz-b.swg.be.ibm.com -port 16313 -username smadmin -password netcool

*** SSL SIGNER EXCHANGE PROMPT ***
SSL signer from target host 172.16.61.133 is not found in trust store
/opt/IBM/netcool/JazzSM/profile/config/cells/JazzSMNode01Cell/nodes/JazzSMNode01/trust.p12.

Here is the signer information (verify the digest value matches what is displayed at the server):

Subject DN:    CN=Jazz-A, OU=JazzSMNode01Cell, OU=JazzSMNode01, O=IBM, C=US
Issuer DN:     CN=Jazz-A, OU=Root Certificate, OU=JazzSMNode01Cell, OU=JazzSMNode01, O=IBM, C=US
Serial number: 76549804258695
Expires:       Thu Apr 27 16:30:34 CEST 2017
SHA-1 Digest:  80:BC:03:02:53:EA:A6:8D:0E:42:3C:B5:F4:75:B5:36:CE:CE:F2:D9
MD5 Digest:    EF:F8:94:A2:D8:F9:F3:18:A7:D2:8E:66:73:8A:AF:67

Subject DN:    CN=Jazz-A, OU=Root Certificate, OU=JazzSMNode01Cell, OU=JazzSMNode01, O=IBM, C=US
Issuer DN:     CN=Jazz-A, OU=Root Certificate, OU=JazzSMNode01Cell, OU=JazzSMNode01, O=IBM, C=US
Serial number: 76548459208984
Expires:       Thu Apr 24 16:30:33 CEST 2031
SHA-1 Digest:  80:BC:03:02:53:EA:A6:8D:0E:42:3C:B5:F4:75:B5:36:CE:CE:F2:D9
MD5 Digest:    EF:F8:94:A2:D8:F9:F3:18:A7:D2:8E:66:73:8A:AF:67

Add signer to the trust store now? (y/n)y
```

29. Verify the load balancing implementation. You can verify the status of the cluster by using the following command (Example 3-28).

Example 3-28   Verify the load balancing implementation

```
cd /opt/IBM/netcool/JazzSM/ui/bin
./consolecli.sh ListHANodes --username smadmin --password netcool
NodeName             NodeStatus      NodeSync       NodeVersion
Jazz-A:16311          ACTIVE         InSync          3.1.2.1
Jazz-B:16311          ACTIVE         InSync          3.1.2.1
```

3.3.2 Preparing the HTTP server for load balancing

This implementation is based on the documentation at this website:

https://ibm.biz/BdrsBM

You can set up a load-balanced cluster of console nodes with identical configurations to evenly distribute user sessions.

You can create a load-balanced cluster from an existing stand-alone JazzSM application server instance. Its custom data is added to the central repository and later replicated to new nodes as they are added to the cluster.

If you want to add a node to a cluster and the node contains custom data, you must export the data before you join the node to the cluster. The exported data is later imported to one of the nodes in the cluster so that it is replicated across the other nodes in the cluster.

> **Important:** Be careful when you add new nodes to an existing cluster. The custom content of the new nodes will be replaced with the content that is stored in DB2.

Implementation steps

First, you must prepare the HTTP server for load balancing:

1. On the load balancer server, you need to install the IBM HTTP server and the IBM HTTP Server Plug-in for IBM WebSphere Application Server as the user `netcool`. Perform the following steps:

   a. Extract the `WAS_V8.5.5_SUPPL_1_OF_3.zip` file, the `WAS_V8.5.5_SUPPL_2_OF_3.zip` file, and the `WAS_V8.5.5_SUPPL_3_OF_3.zip` file into the same directory by using the following commands. See Example 3-29.

Example 3-29   Extract the .zip files

```
mkdir /mnt/ITSO_SHARE/Jazz/Websphere_Supp
cd /mnt/ITSO_SHARE/Jazz/Websphere_Supp
unzip WAS_V8.5.5_SUPPL_1_OF_3.zip
unzip WAS_V8.5.5_SUPPL_2_OF_3.zip
unzip WAS_V8.5.5_SUPPL_3_OF_3.zip
```

   b. The included Java code (`iKeyman`) needs 32-bit libraries that are added to the operating system. As the `root` user, run these commands (Example 3-30).

Example 3-30   Add 32-bit libraries to the operating system

```
yum install glibc.i686
yum install libgcc.i686
yum install libXext.i686
yum install libXtst.i686
yum install libXft.i686
```

   c. Launch the previously installed Installation Manager. See Example 3-31.

Example 3-31   Launch Installation Manager

```
su - netcool
./IBMIM
```

d. Add the repository from `/mnt/ITSO_SHARE/Jazz/Websphere_Supp`, as shown in Figure 3-47.
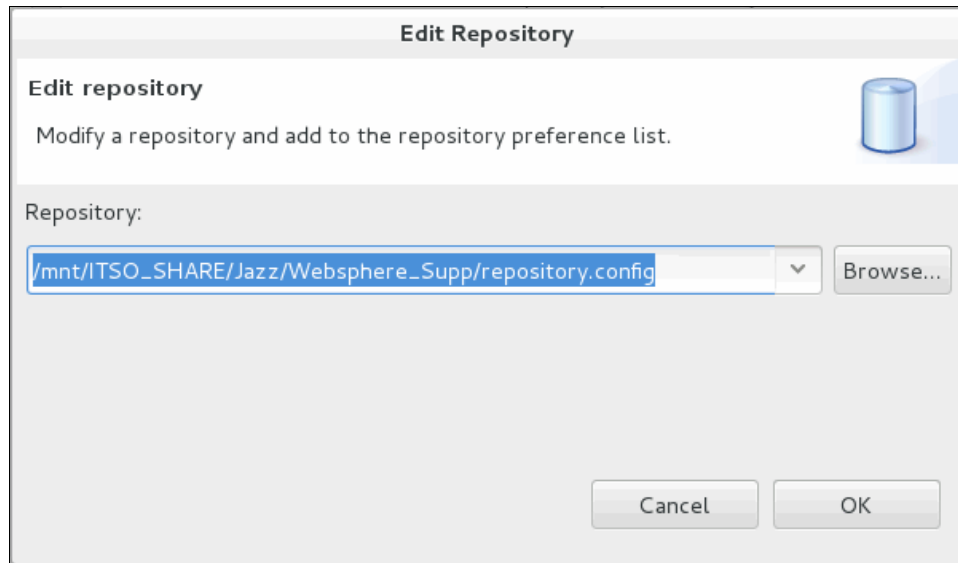
Figure 3-47   Edit Repository window

2. Now, you can start the installation:

a. Select the packages to install as shown in Figure 3-48 and click **Next**.
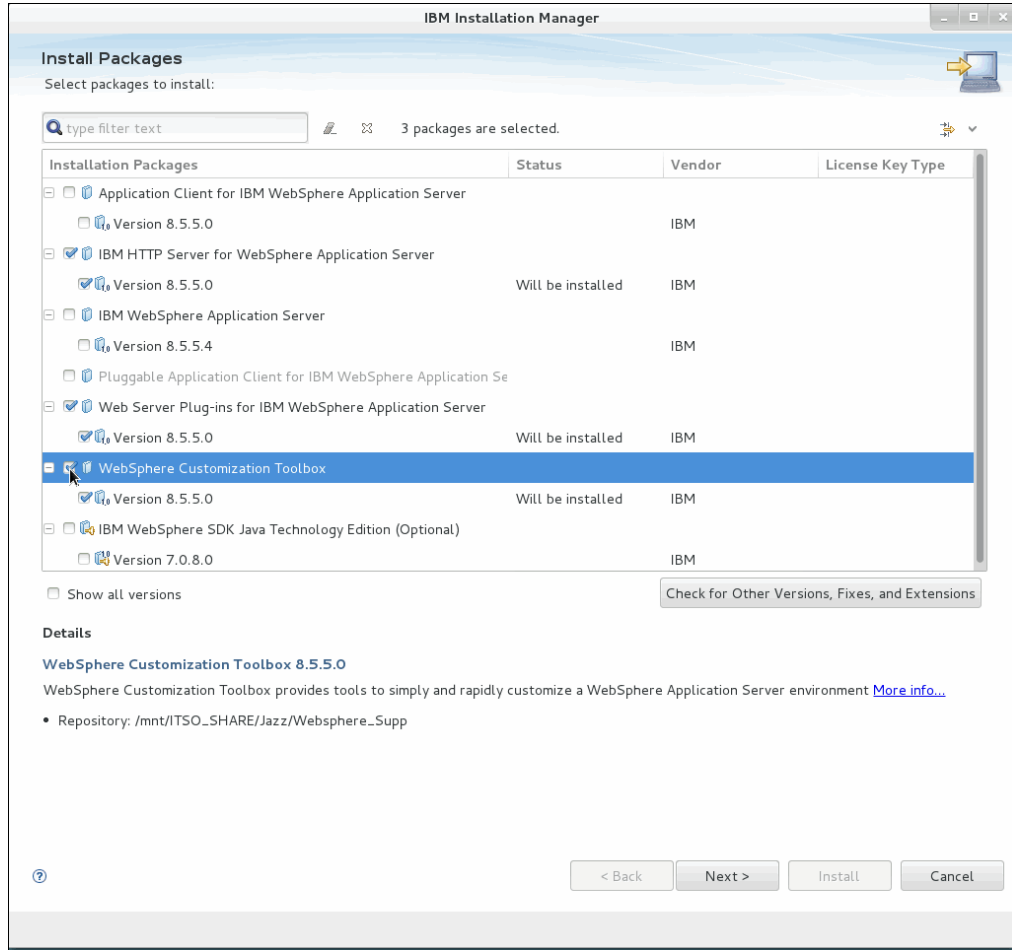
Figure 3-48   IBM HTTP Server installation

Tip: Ignore the error about an unsupported operating system. In this environment, the error was caused by the use of Red Hat Enterprise Linux 7.1.

b. Click **Next.** Accept the terms of the license agreement and click **Next**.

c. Change to the correct `IBMIMSHARED` path, as shown in Figure 3-49, and click **Next**. To see the Installation Manager installation path, see 2.1, "Installation Manager" on page 24.
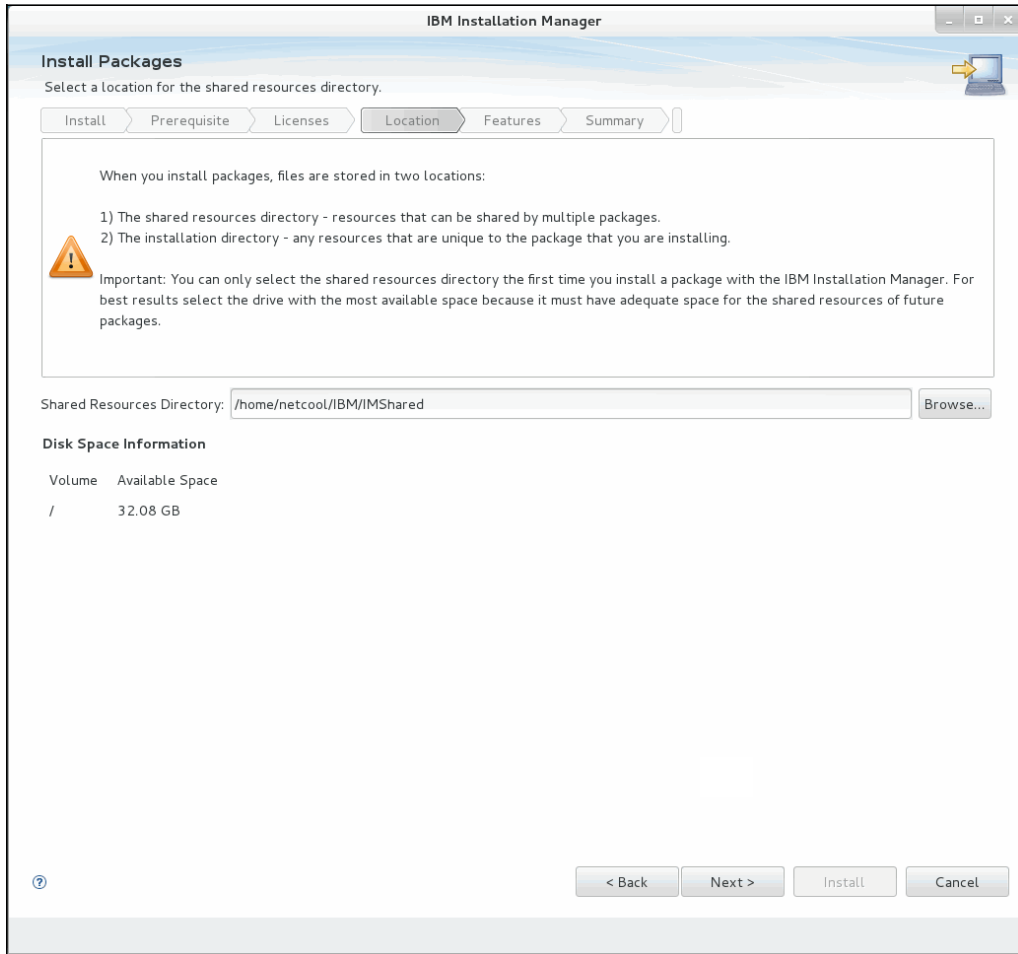
Figure 3-49   IBMIMSHARED directory

d. Change the installation directory on all of the selected components, as shown in Figure 3-50, and click **Next**.
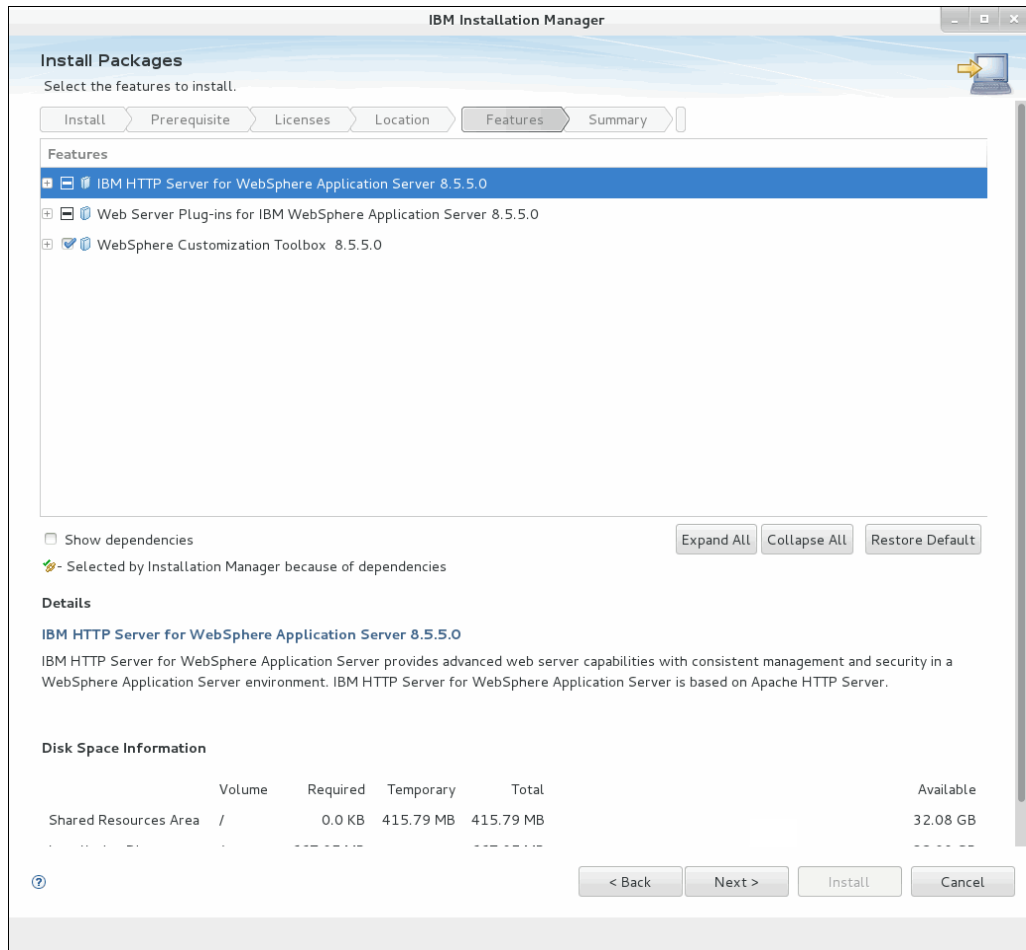
Figure 3-50   Install Packages window

e. Configure the default HTTP port and click **Next**. See Figure 3-51.
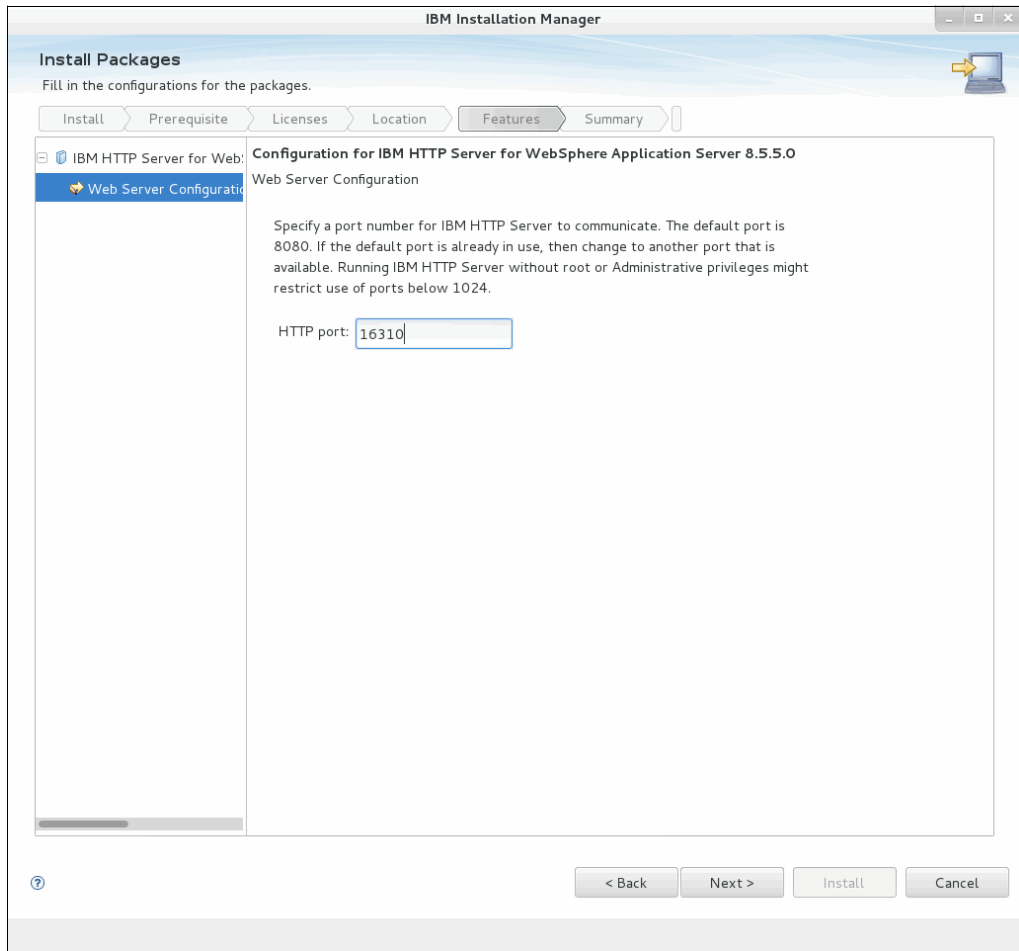
Figure 3-51   HTTP port

f. Start the installation by clicking **Install** as shown in Figure 3-52.
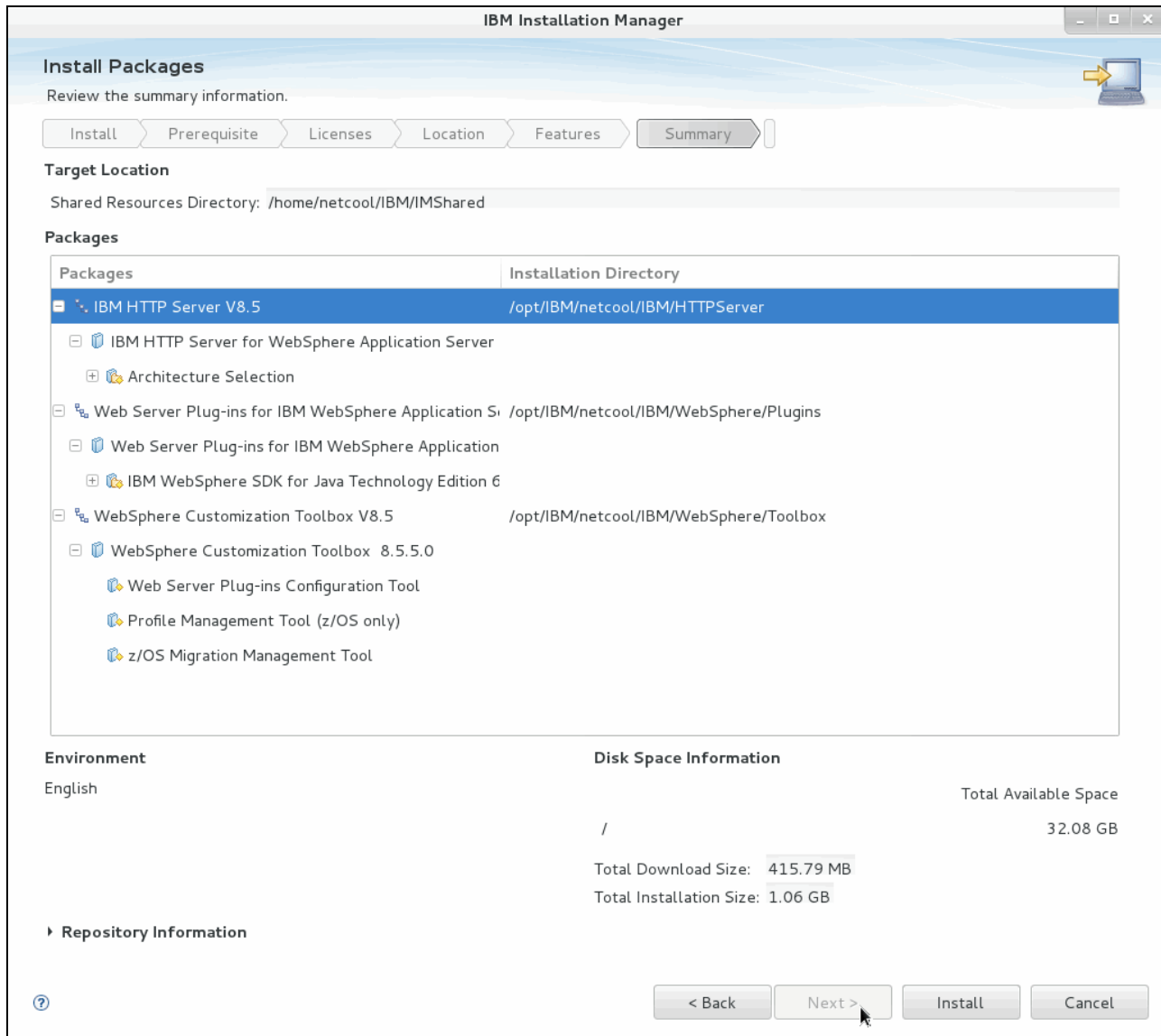
Figure 3-52   Installation summary window

g. Wait for the installation to complete, as shown in Figure 3-53. Select the option for the program that you want to start. For our environment, we clicked **WebSphere Customization Toolbox**. Click **Finish**.
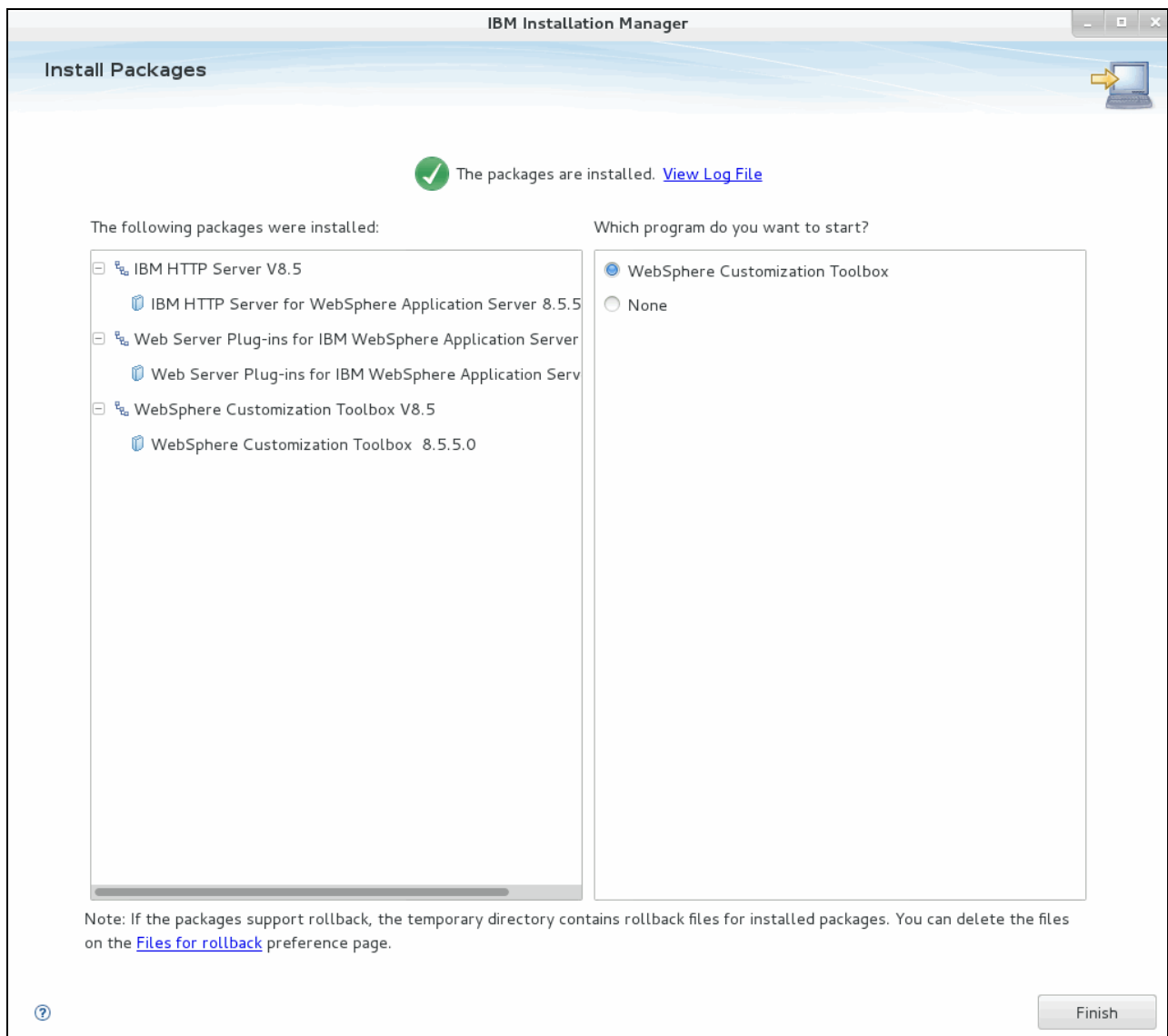
Figure 3-53   Finish

3. Create a CMS-type keystore as described in the following document:

https://ibm.biz/Bdrr7b

Figure 3-54 shows how we exported the SSL certificate from both of the JazzSM servers by using Mozilla Firefox.
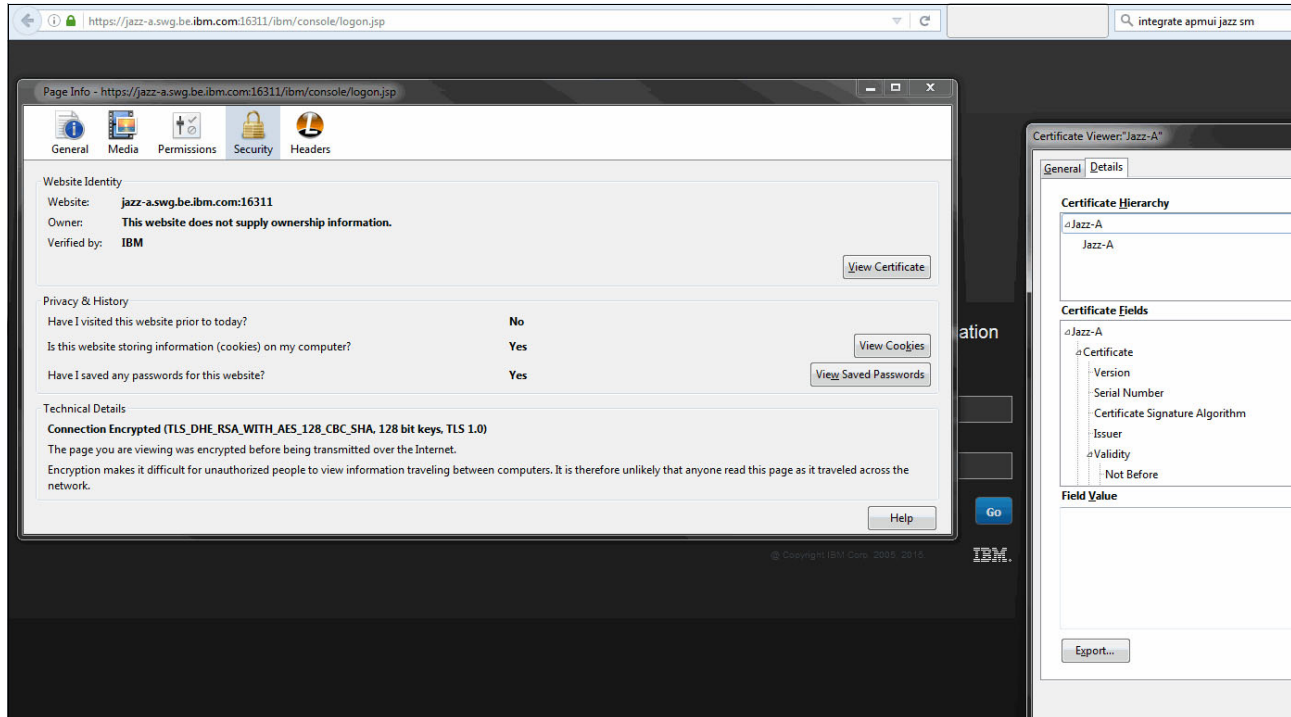
Figure 3-54   Export certificate

4. Save this certificate on the load balancer server. For instance, for Jazz-A, we saved the certificate in the shared directory `/mnt/ITSO_SHARE/Jazz/Jazz-A.crt`.

5. Create the keystore by using the commands that are shown in Example 3-32.

Example 3-32   Create the keystore

```
cd /opt/IBM/netcool/IBM/WebSphere/Toolbox/
./java/jre/bin/ikeyman
```

6. This command opens the `iKeyman` GUI as shown in Figure 3-55.
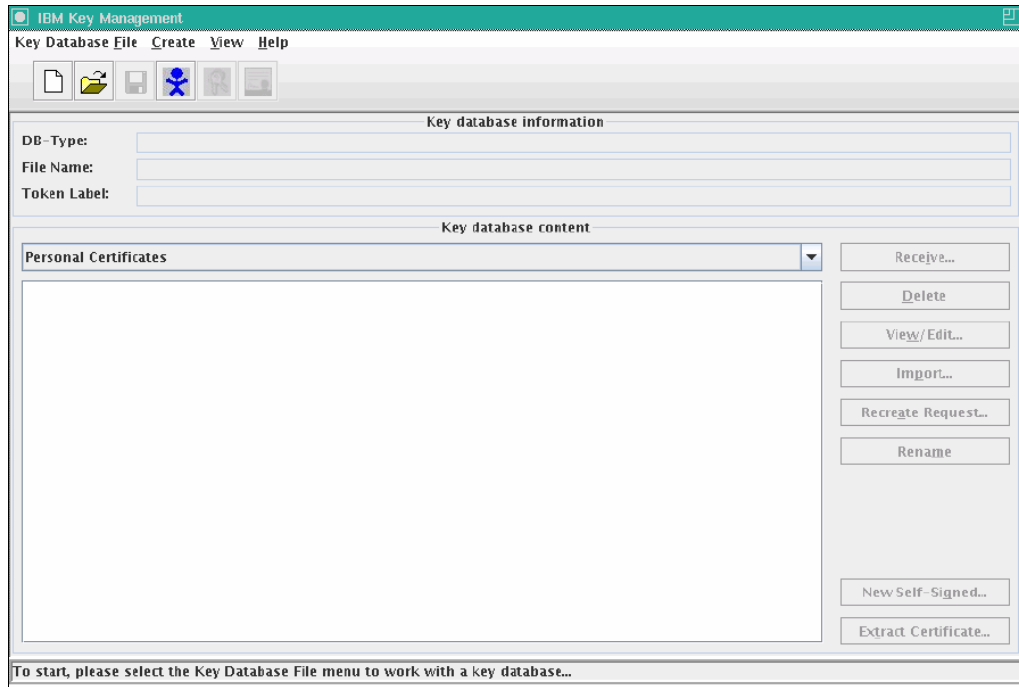
Figure 3-55   The iKkeyman GUI

7. Select the **Create a new key database file** icon. Change the file name and path as shown in Figure 3-56. Ensure that you select key database type **CMS**. Click **OK**.
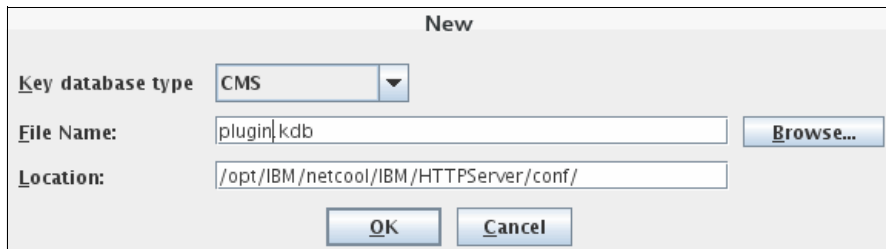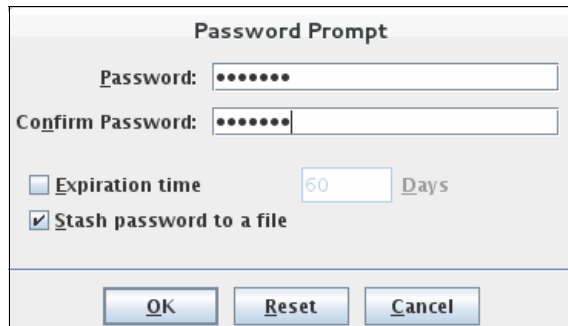
Figure 3-56   Enter file name plugin.kdb

Tip: The file is called `plugin-key.kdb` in several places in the product documentation. The name does not matter, but you must always use the same file name in the following configuration.

8. Type a password and select **Stash password to a file**. Click **OK**. See Figure 3-57.

Figure 3-57   Password Prompt window

9. Create at least one personal self-signed certificate. See Figure 3-58.
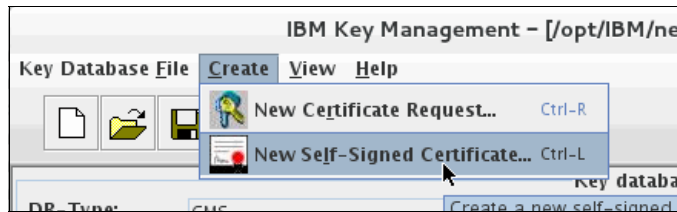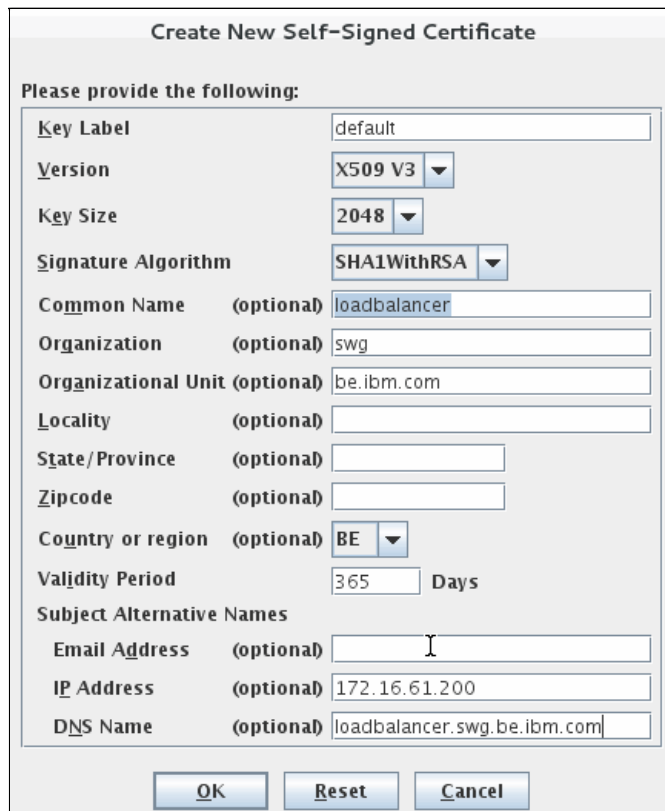
Figure 3-58   New Self-Signed Certificate option

10. Complete the creation of the certificate as shown in Figure 3-59.

Figure 3-59   Self-signed certificate creation

11. Import the Jazz certificates. First, switch to Signer Certificates as shown in Figure 3-60.
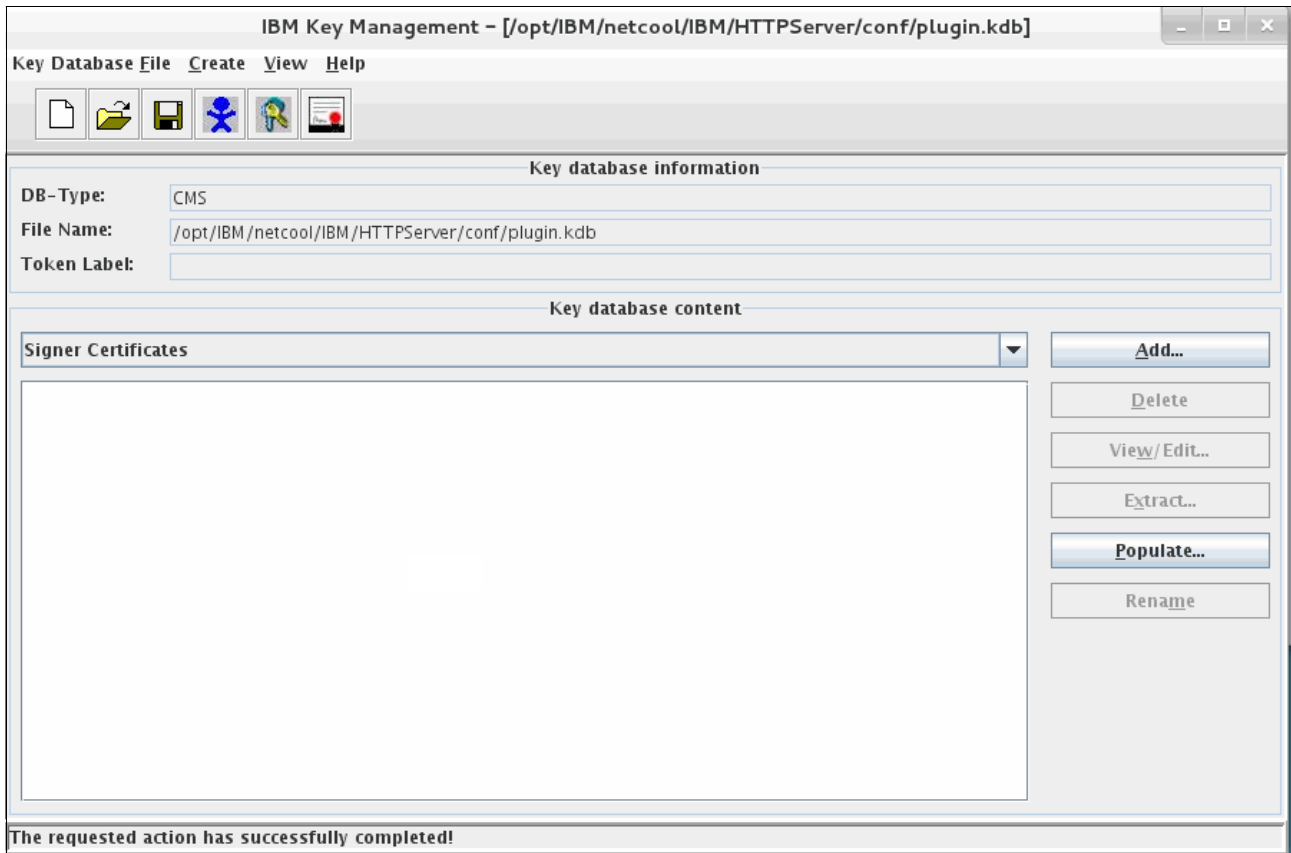
Figure 3-60   Signer certificates

12. Click **Add** and browse all of the Jazz certificates. See Figure 3-61.
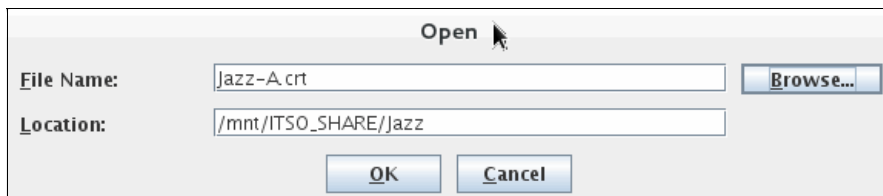
Figure 3-61   Jazz certificate

13. Type an alias for each certificate, for example, `Jazz-A`, as shown in Figure 3-62. Click **OK**.
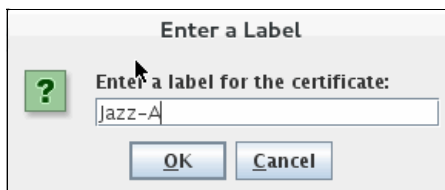
Figure 3-62   Jazz-A alias

14. Close the `iKeyman` utility.

15.Configure the HTTP Server for SSL by using the following commands, as shown in Example 3-33.

Example 3-33   Configure the HTTP Server for SSL

```
cd /opt/IBM/netcool/IBM/HTTPServer/conf/
vi http.conf

Look for the remarked (#) code below and change accordingly

LoadModule ibm_ssl_module modules/mod_ibm_ssl.so
Listen 16311
<VirtualHost *:16311>
SSLEnable
SSLProtocolDisable SSLv2
ErrorLog "/opt/IBM/netcool/IBM/HTTPServer/logs/sslerror.log"
TransferLog "/opt/IBM/netcool/IBM/HTTPServer/logs/sslaccess.log"
KeyFile "/opt/IBM/netcool/IBM/HTTPServer/conf/plugin.kdb"
SSLStashfile "/opt/IBM/netcool/IBM/HTTPServer/conf/plugin.sth"
</VirtualHost>
SSLDisable

cd ../bin
./apachectl
start
```

16.Try to open the URL `https://loadbalancer.swg.be.ibm.com:16311` in a browser. This action shows the window that is shown in Figure 3-63.
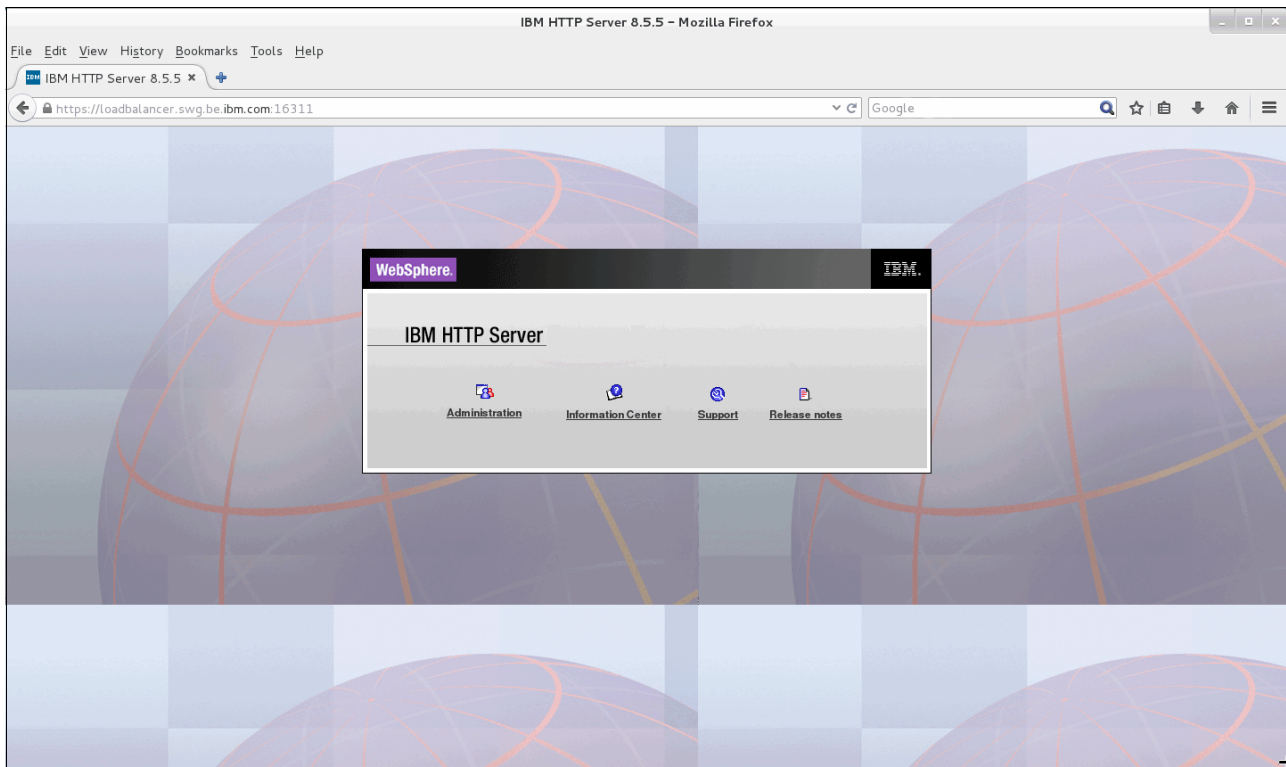
Figure 3-63   HTTP Server

17. Set the clone IDs for all jazz nodes. Edit the `server.xml` file in `/opt/IBM/netcool/JazzSM/profile/config/cells/JazzSMNode01Cell/nodes/JazzSMNode01/servers/server1` on all of the JazzSM servers, as shown in Example 3-34. Log in to the JazzSM servers as the `netcool` user. Make the following changes that are shown in red in Example 3-34.

Example 3-34   Edit the server.xml

```
cd /opt/IBM/netcool/JazzSM/profile/config/cells/JazzSMNode01Cell/nodes/JazzSMNode01/servers/server1
vi server.xml

<components xmi:type="applicationserver.webcontainer:WebContainer" xmi:id="WebContainer_1183122130078"
enableServletCaching="false" disablePooling="false" asyncRunnableWorkManager="wm/default">
    <stateManagement xmi:id="StateManageable_1183122130081" initialState="START"/>
    <services xmi:type="applicationserver.webcontainer:SessionManager" xmi:id="SessionManager_1183122130078"
enable="true" enableUrlRewriting="false" enableCookies="true" enableSSLTracking="false"
enableProtocolSwitchRewriting="false" sessionPersistenceMode="NONE" enableSecurityIntegration="true"
allowSerializedSessionAccess="false" maxWaitTime="5" accessSessionOnTimeout="true">
      <defaultCookieSettings xmi:id="Cookie_1183122130078" domain="" maximumAge="-1" secure="false"/>
      <sessionDatabasePersistence xmi:id="SessionDatabasePersistence_1183122130078"
datasourceJNDIName="jdbc/Sessions" userId="db2admin" password="{xor}OzItPjsyNjE=" db2RowSize="ROW_SIZE_4KB"
tableSpaceName=""/>
      <tuningParams xmi:id="TuningParams_1183122130078" usingMultiRowSchema="false" maxInMemorySessionCount="1000"
allowOverflow="true" scheduleInvalidation="false" writeFrequency="TIME_BASED_WRITE" writeInterval="10"
writeContents="ONLY_UPDATED_ATTRIBUTES" invalidationTimeout="30">
        <invalidationSchedule xmi:id="InvalidationSchedule_1183122130078" firstHour="14" secondHour="2"/>
      </tuningParams>
    </services>
    <properties xmi:id="WebContainer__1183122130078" name="HttpSessionCloneId" value="12345" required="false"/>
  </components>
```

> **Important**: The red _ prefixed number must match the number from the above container, as shown in Example 3-34. *The value="12345" needs to be unique on each JazzSM server.*

18. Generate the plug-in cfg files. Run the following commands, as shown in Example 3-35.

Example 3-35   Generate the plug-in cfg files

```
cd /opt/IBM/netcool/JazzSM/profile/bin/
./GenPluginCfg.sh
IBM WebSphere Application Server, Release 8.5
WebSphere Plugin Configuration Generator
Copyright IBM Corp., 1997-2012
PLGC0013I: The plug-in is generating a server plug-in configuration file for all of the servers in the cell.
JazzSMNode01Cell.
PLGC0005I: Plug-in configuration file = /opt/IBM/netcool/JazzSM/profile/config/cells/plugin-cfg.xml


cp /opt/IBM/netcool/JazzSM/profile/config/cells/plugin-cfg.xml
/mnt/ITSO_SHARE/Jazz/JazzA_plugin-cfg.xml
or
cp /opt/IBM/netcool/JazzSM/profile/config/cells/plugin-cfg.xml
/mnt/ITSO_SHARE/Jazz/JazzB_plugin-cfg.xml
```

19. On the load balancer server, merge the plug-in cfg files manually. Look for the `<ServerCluster` start and add the `<Server` entry from the other `.xml` file. See Example 3-36.

Example 3-36   Merge the plug-in cfg files manually

```
cd /mnt/ITSO_SHARE/Jazz/
cp JazzA_plugin-cfg.xml plugin-cfg.xml
vi plugin-cfg.xml
<ServerCluster CloneSeparatorChange="false" GetDWLMTable="false" IgnoreAffinityRequests="false" LoadBalance="Round
Robin" Name="server1_JazzSMNode01_Cluster" PostBufferSize="0" PostSizeLimit="-1" RemoveSpecialHeaders="true"
RetryInterval="60" ServerIOTimeoutRetry="-1">
    <Server CloneID="12345" ConnectTimeout="0" ExtendedHandshake="false" MaxConnections="-1"
Name="JazzSMNode01_server1" ServerIOTimeout="900" WaitForContinue="false">
      <Transport Hostname="Jazz-A.swg.be.ibm.com" Port="16310" Protocol="http"/>
```

```
            <Transport Hostname="Jazz-A.swg.be.ibm.com" Port="16311" Protocol="https">
                <Property Name="keyring" Value="/opt/IBM/netcool/IBM/HTTPServer/conf/plugin.kdb"/>
                <Property Name="stashfile" Value="/opt/IBM/netcool/IBM/HTTPServer/conf/plugin.sth"/>
            </Transport>
        </Server>
        <Server CloneID="23456" ConnectTimeout="0" ExtendedHandshake="false" MaxConnections="-1"
Name="JazzSMNode01_server2" ServerIOTimeout="900" WaitForContinue="false">
            <Transport Hostname="Jazz-B.swg.be.ibm.com" Port="16310" Protocol="http"/>
            <Transport Hostname="Jazz-B.swg.be.ibm.com" Port="16311" Protocol="https">
                <Property Name="keyring" Value="/opt/IBM/netcool/IBM/HTTPServer/conf/plugin.kdb"/>
                <Property Name="stashfile" Value="/opt/IBM/netcool/IBM/HTTPServer/conf/plugin.sth"/>
            </Transport>
        </Server>

        <PrimaryServers>
            <Server Name="JazzSMNode01_server1"/>
            <Server Name="JazzSMNode01_server2"/>
        </PrimaryServers>
    </ServerCluster>
```

> **Note:** Type the correct CloneID and server name. In our example, the generated `plugin-cfg.xml` file contained host names only, not the fully qualified domain name (FQDN) host name, so the file was changed to the FQDN.

20. Add this `plugin-cfg.xml` file in the HTTP Server `http.conf` file. See Example 3-37.

Example 3-37   Add the plugin-cfg.xml file in the HTTP Server http.conf file

```
cd /opt/IBM/netcool/IBM/HTTPServer/conf
vi http.conf
LoadModule was_ap22_module
"/opt/IBM/netcool/IBM/WebSphere/Plugins/bin/64bits/mod_was_ap22_http.so"
WebSpherePluginConfig "/opt/IBM/netcool/IBM/HTTPServer/conf/plugin-cfg.xml"
cd ../bin
./apachectl restart
```

21. Test the changes by opening a browser on
    `http://loadbalancer.swg.be.ibm.com:16311/ibm/console`.

> **Note:** For more detailed configuration options, see the following URLs:
>
> ► Understanding IBM HTTP Server plug-in Load Balancing in a clustered environment:
>
>   https://ibm.biz/BdrHji
>
> ► The `plugin-cfg.xml` options:
>
>   https://ibm.biz/BdrHjb
>
> ► Recommended values for web server plug-in config:
>
>   https://ibm.biz/BdrHje

3.3.3 Enabling load balancing and high availability UI Data Provider Connections to Netcool/Impact

> **Important:** Due to the technical limitations of the IBM HTTP Server, you must deploy this solution on a separate instance.
>
> For more information about this configuration, see the *How to load balance and provide high availability with JazzSM Dashboard Connections* white paper, which is authored by Brian R. Fabec. The paper is available at the following link:
>
> https://ibm.biz/BdrHjV

To provide load balancing for the connections from JazzSM dashboards to the Netcool/Impact GUI servers, you must install and configure an IBM HTTP Server.

The mode that we describe in this book is a round-robin type of configuration. In a round-robin type of configuration, when a connection from the dashboard is made to the HTTP Server, it is directed to one of the Netcool/Impact GUI servers. When another connection is made, it is directed to one of the other Netcool/Impact GUI servers.

The IBM HTTP Server is installed between the Netcool/Impact GUI servers and the JazzSM dashboard server.

JazzSM bundles the WebSphere Application Server Version 8.5 Supplements installation media, which contains the installation packages for the IBM HTTP Server.

Perform the following steps:

1. Install IBM HTTP Server 8.5 on the server. Log in as the `netcool` user and launch the IBMIM. See Example 3-38.

Example 3-38   Log in as the netcool user and launch the IBMIM

```
su - netcool
cd /opt/IBM/netcool/IM/InstallationManager/eclipse
./IBMIM
```

2. Add the repository for WebSphere Application Server Version 8.5 Supplements, as shown in Figure 3-64.
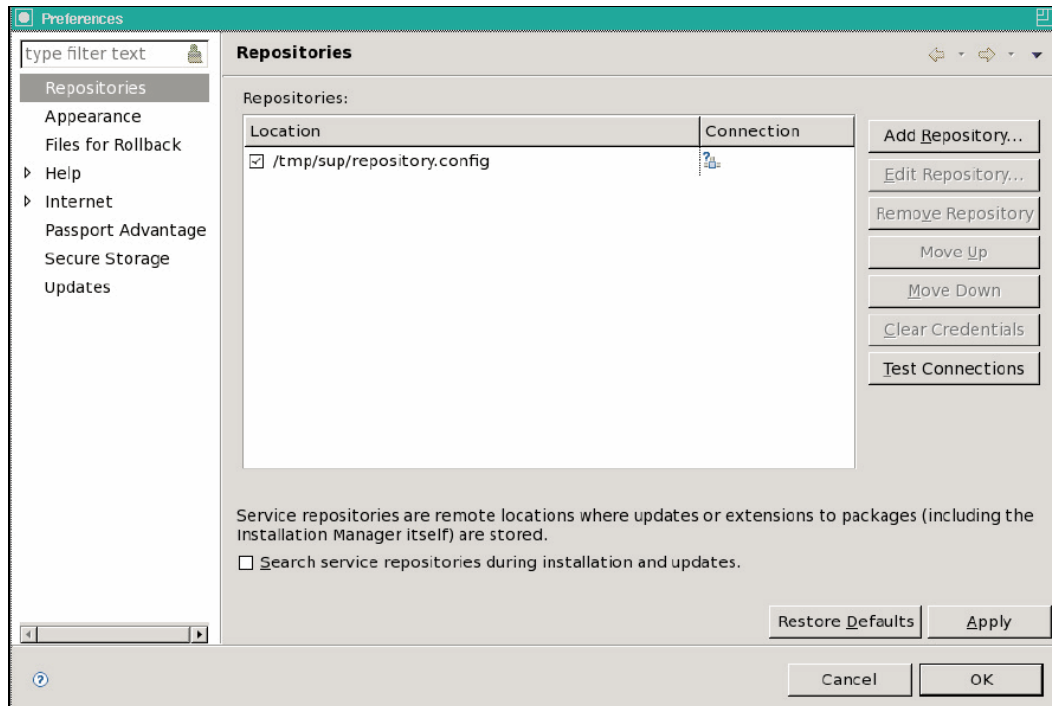
Figure 3-64   Repository

3. Start the installation. Click **Install** and select the packages that are shown in Figure 3-65.
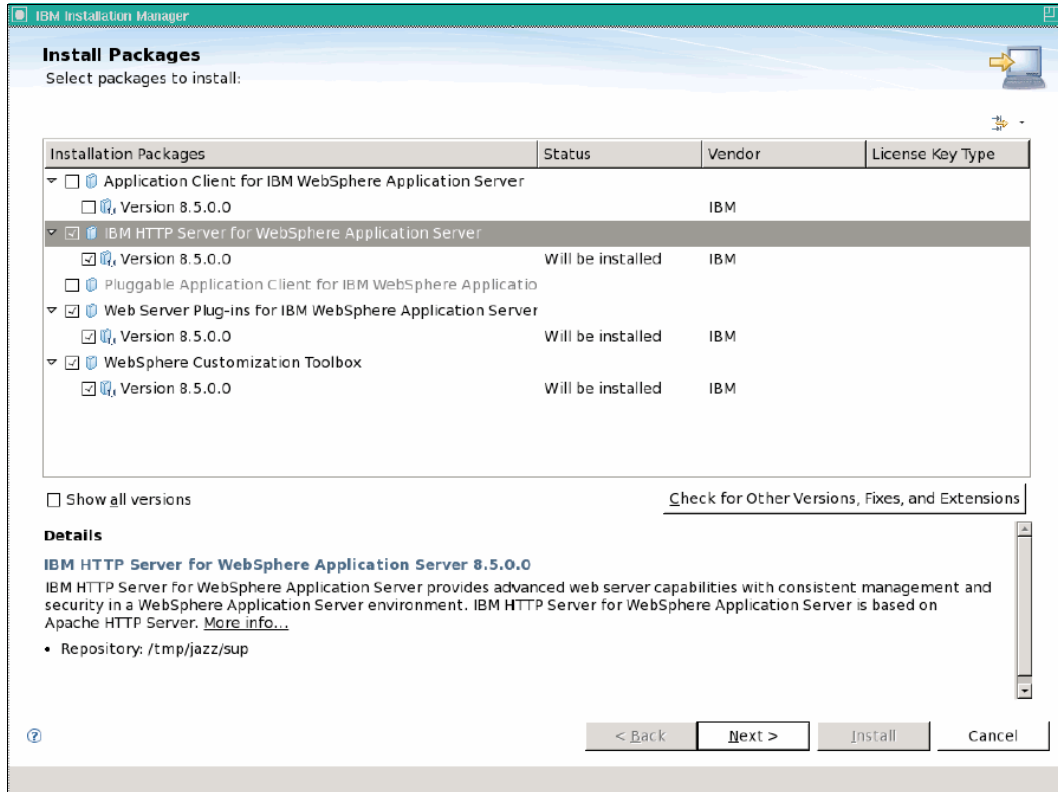
Figure 3-65   Packages

4. Accept the terms of the license agreement and click **Next**.

5. Choose an installation location and select **Next** as shown in Figure 3-66.
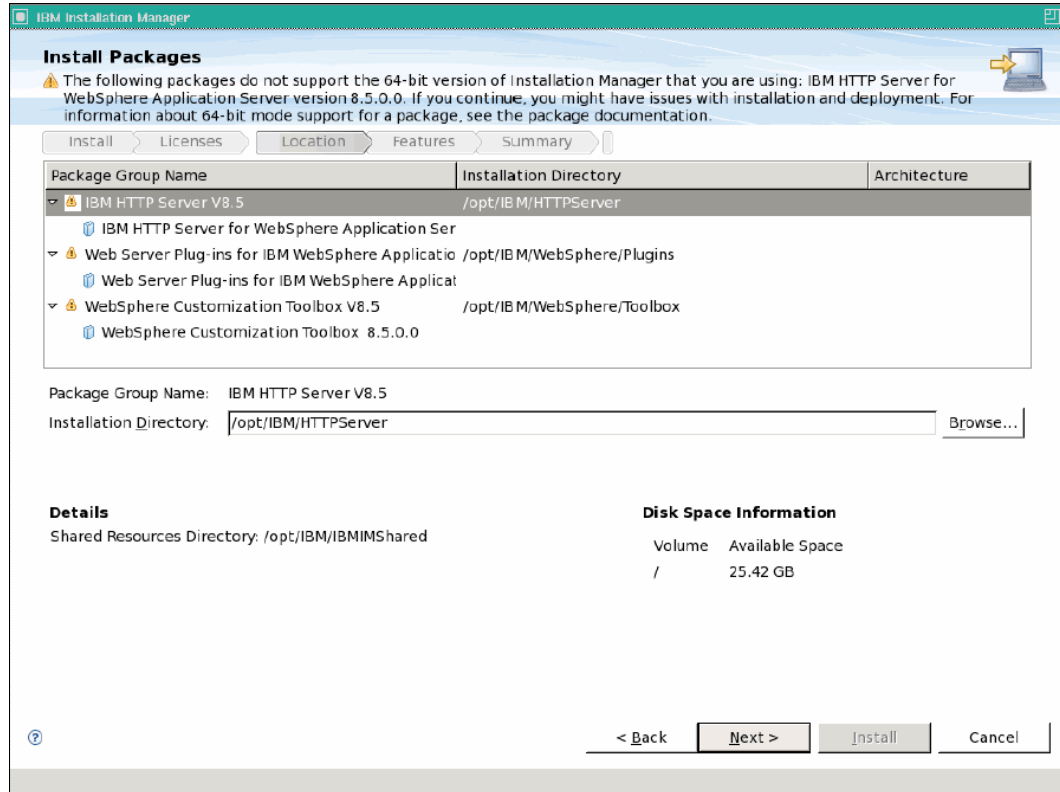
Figure 3-66   Installation directory

6. Select **Architecture Selection** and select **Next**. Choose **IBM HTTP Server 64-bit with Java, Version 6** and click **Next** as shown in Figure 3-67.
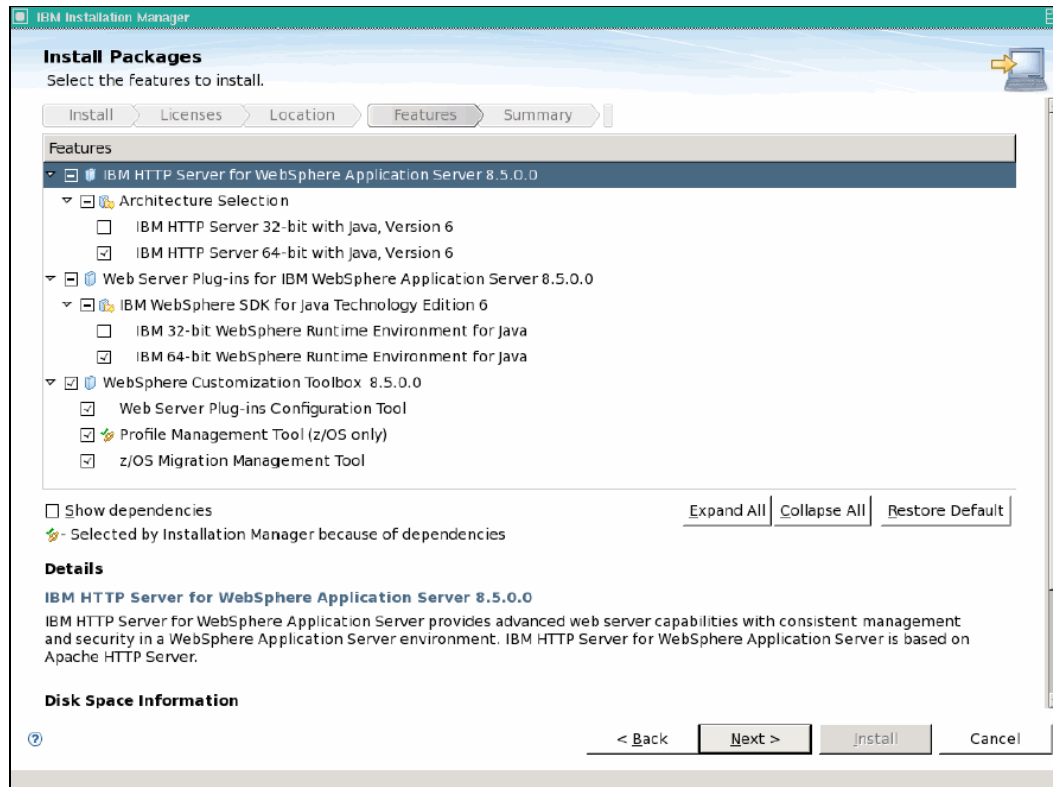
Figure 3-67   Architecture

7. Choose the HTTP port on which the IBM HTTP Server will communicate and select **Next**. See Figure 3-68.
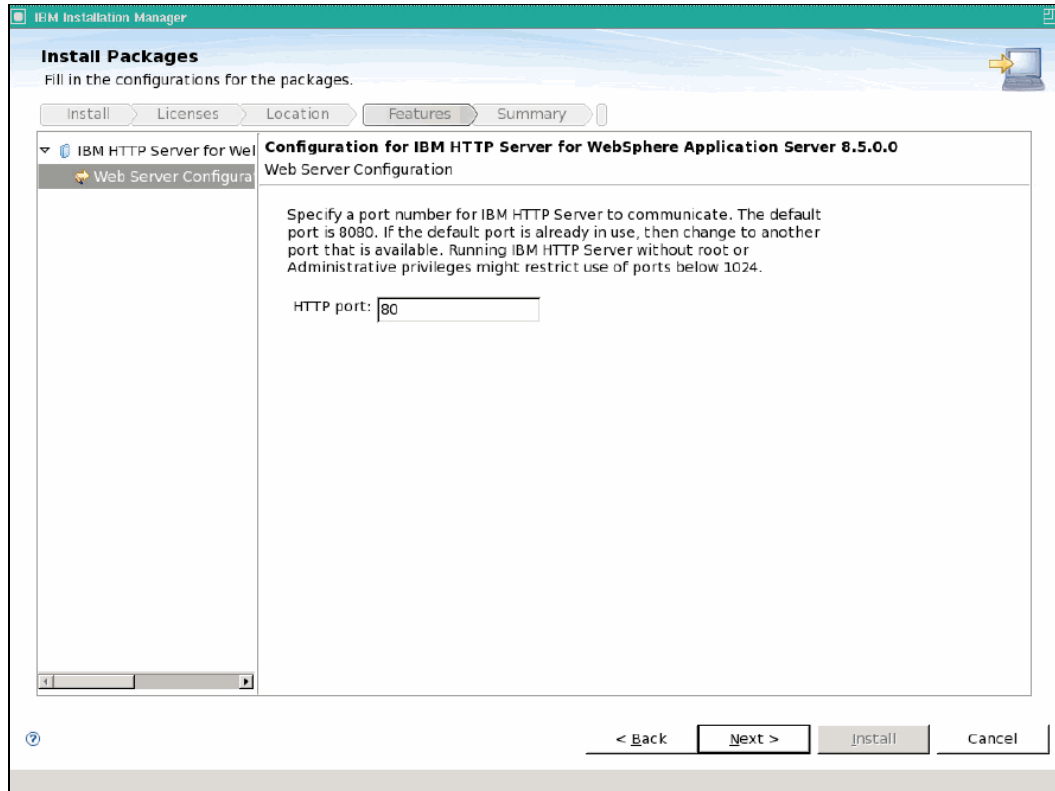
Figure 3-68   Port

8. Select **Install** to start the installation, as shown in Figure 3-69.
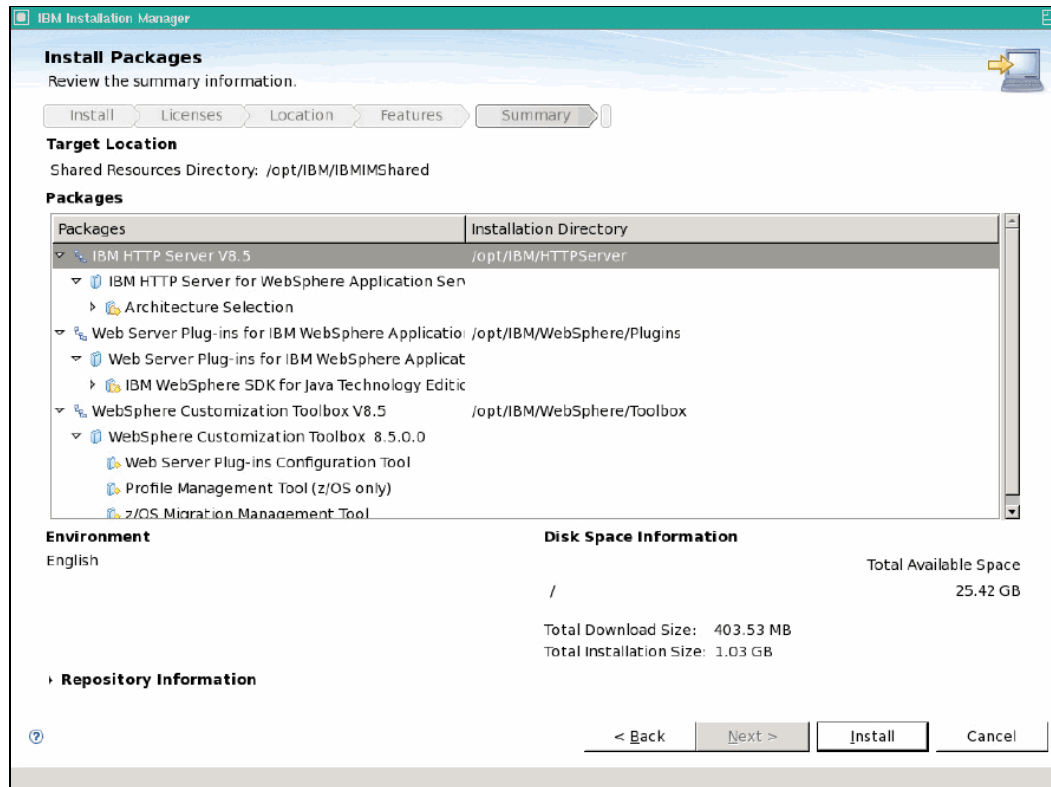
Figure 3-69   Install Packages window

9. Select **Finish** to complete the installation process. See Figure 3-70.
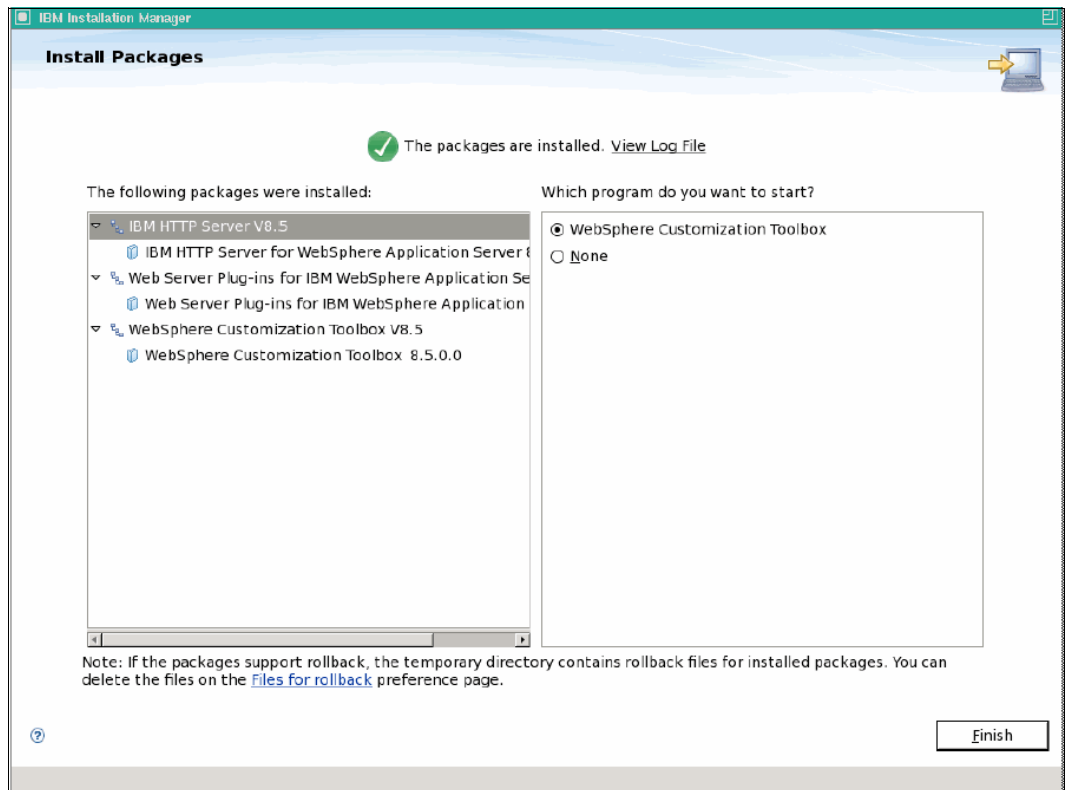
Figure 3-70   Packages are installed

10.Configure the Web Server Plug-in for SSL connectivity.

> **Important:** The keystore that is used by the Web Server Plug-in must be a configuration management system (CMS) keystore. The Java KeyStore (JKS) that is created by the Liberty profile and used by Netcool/Impact cannot be used.

11.The CMS keystore must be created by using the `iKeyman` utility and the certificates that are exchanged between the Web Server Plug-in CMS keystore and the Netcool/Impact JKS keystore.

12.For each Impact GUI server in the environment, export the SSL certificate from the Netcool/Impact JKS keystore by using the `keytool` command (Example 3-39).

Example 3-39   Using the keytool command

```
keytool -export -alias default -file /tmp/impact71devlin.crt -keystore
/opt/IBM/tivoli/impact_ha/wlp/usr/servers/ImpactUI/resources/security/key.jks
```

2. Copy all of the exported certificates to the IBM HTTP Web Server.

3. Start the `iKeyman` utility, which is under the WebSphere Customization Toolkit directory (Example 3-40).

Example 3-40   Using the iKeyman utility

```
$WCT_HOME/java/jre/bin/ikeyman
```

13. As shown in Figure 3-71, select the **Create a new key database file** icon (highlighted white page icon).
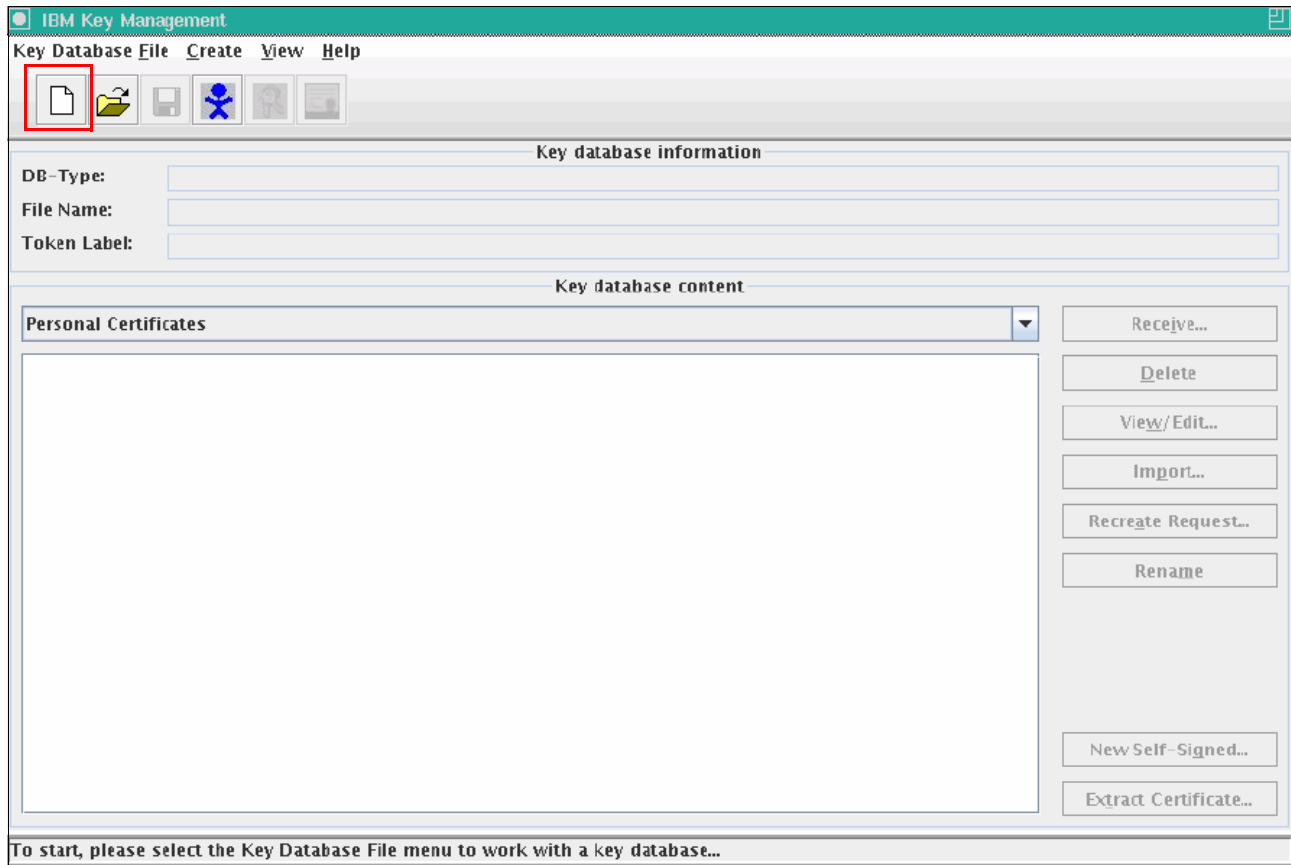
Figure 3-71   The iKeyman utility

14. Select the **CMS** key database type. Provide a location and file name to store the key database file for the WebSphere Customization Toolbox and select **OK**. See Figure 3-72.
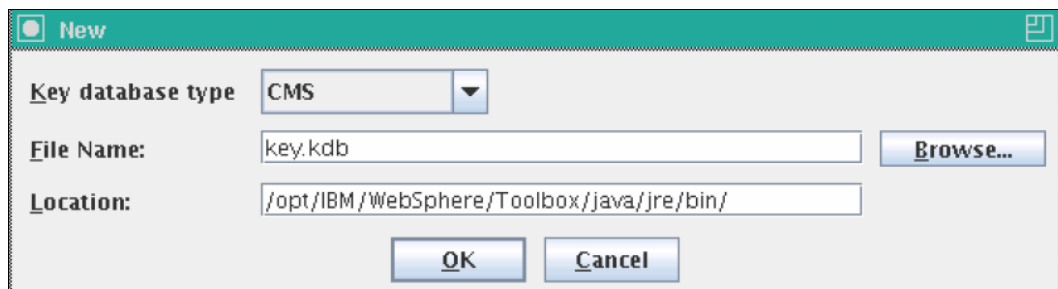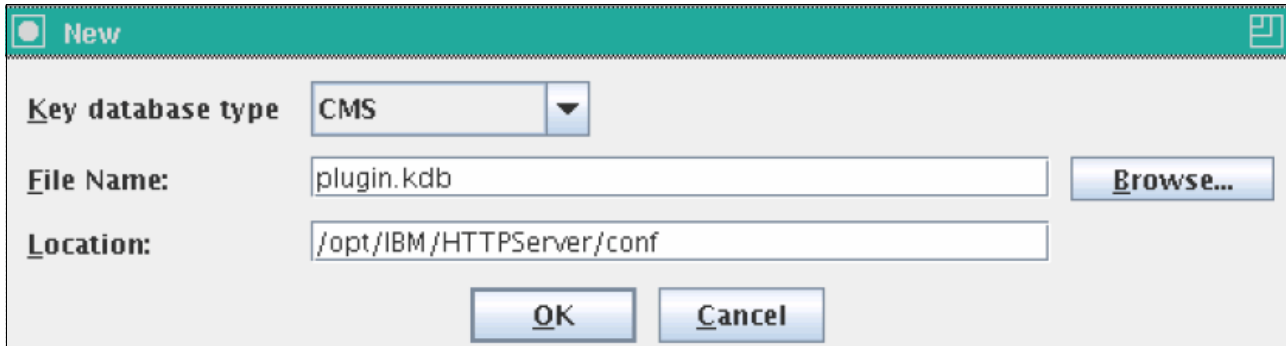

Figure 3-72   New key database file

15. Enter the key database type, location, and file name to store the key database file for the HTTP Server plug-in (Figure 3-73). Click **OK**.
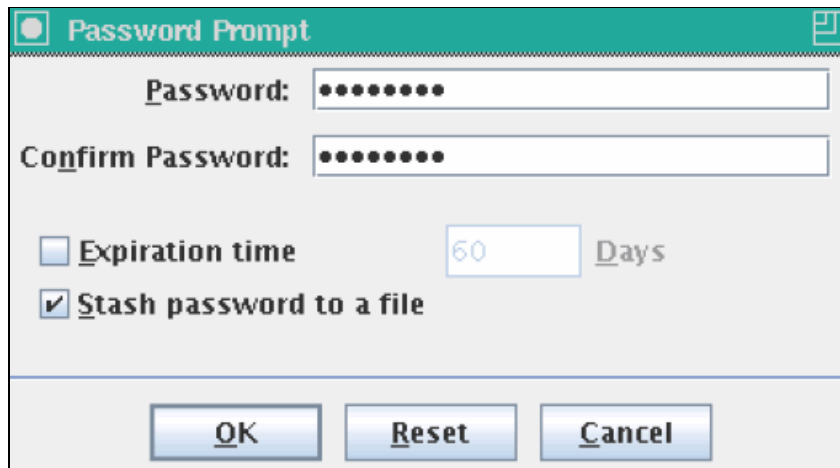
> **Note:** This location will be used for the rest of the configuration. In this scenario, we used the location `/opt/IBM/HTTPServer/conf/plugin.kdb` to store the database key file.

Figure 3-73   New key database file

16. Enter a keystore password and ensure that **Stash password to a file** is selected. Select **OK**. See Figure 3-74.

Figure 3-74   Password prompt

17.Create at least one personal self-signed certificate as shown in Figure 3-75.
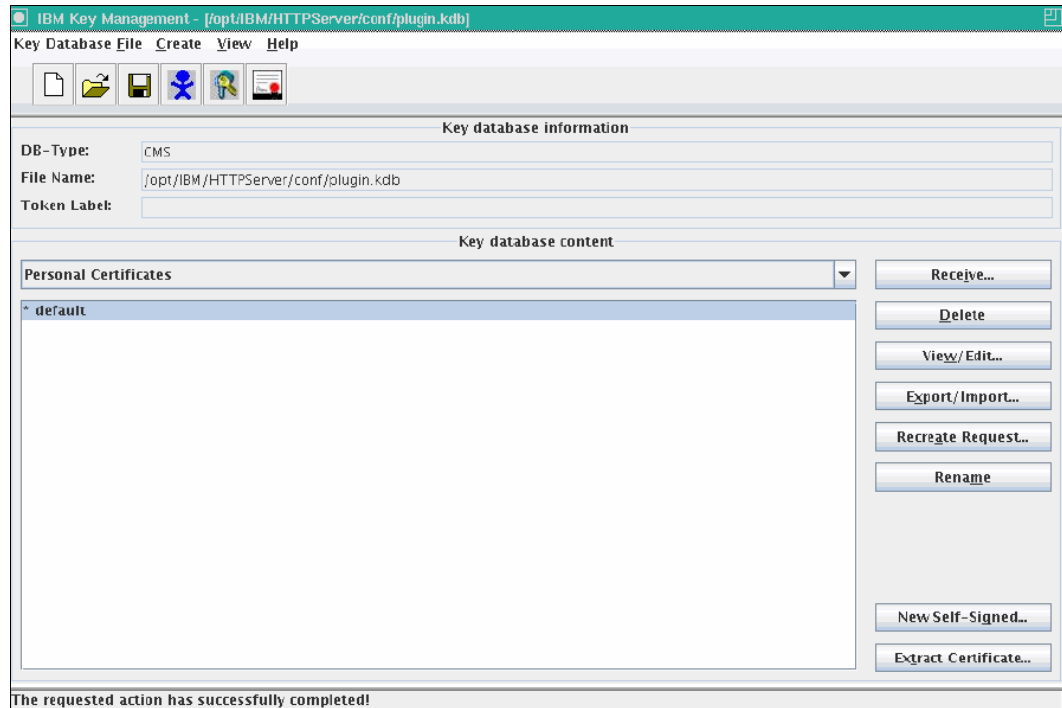
Figure 3-75   Menu for personal certificates

18.Select **Signer Certificates** from the Key database content drop-down list box. See Figure 3-76.
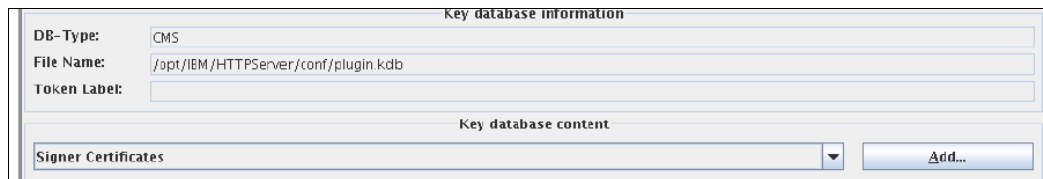

Figure 3-76   Self-signed certificate

19. Add each exported SSL certificate that was created to the key database. See Figure 3-77.
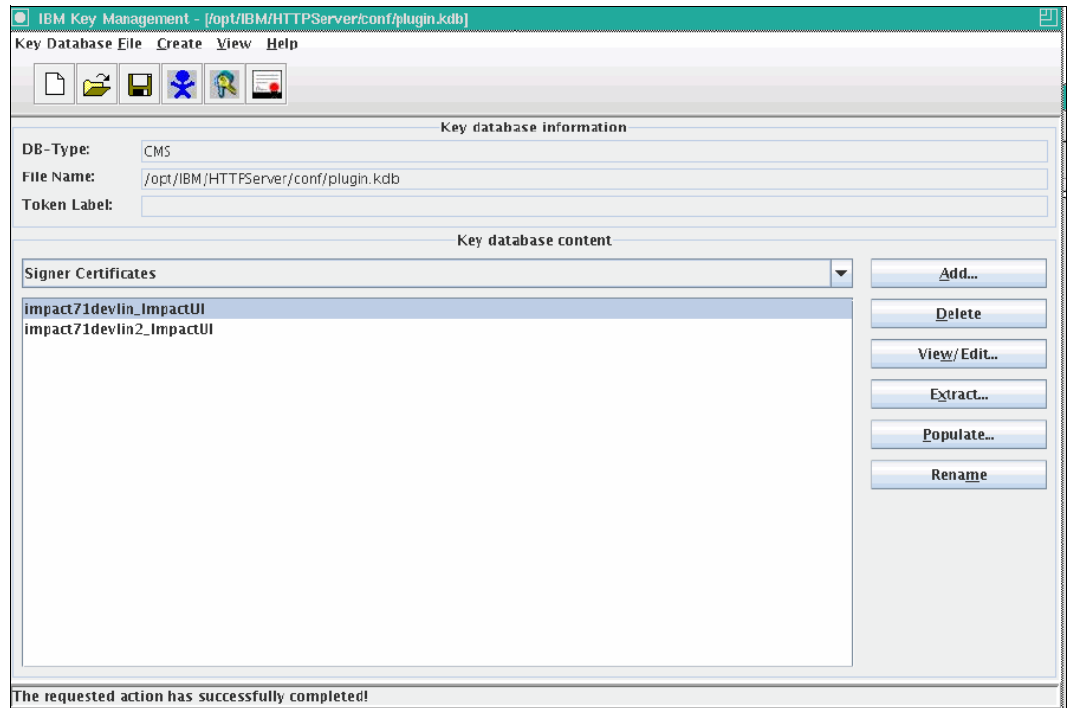

Figure 3-77   Import certificates

20. Close the **iKeyman** utility.

21. Configure the web server plug-in.

> **What is a web server plug-in?** A *web server plug-in* is used to forward HTTP requests
> from the IBM HTTP Server to one or more application servers, including WebSphere
> Liberty, which is the application server platform on top of which Netcool/Impact servers
> run. The plug-in takes the request and based on the configuration in the plugincfg.xml file
> maps the URI for the HTTP request to the host name and port number of an application
> server and forwards the request to the specified application server.

22. Log in to any server in the environment that is a host for an Impact GUI server.

23. Add the following pluginConfiguration element in the
    `$IMPACT_HOME/wlp/usr/servers/ImpactUI/server.xml` file between the `<server>` …
    `</server>` sections (Example 3-41).

Example 3-41   Add the pluginConfiguration element

```
<pluginConfiguration webserverPort="80"
webserverSecurePort="443"
sslKeyringLocation="/opt/IBM/HTTPServer/conf/plugin.kdb"
sslStashfileLocation="/opt/IBM/HTTPServer/conf/plugin.sth"
sslCertlabel="ImpactUI"/>
```

24. Add the following feature element in the
    `$IMPACT_HOME/wlp/usr/shared/config/features.xml` file between the `<featureManager>`
    … `</featureManager>` sections:

    `<feature>localConnector-1.0</feature>`

25. Restart the Netcool/Impact GUI server. Ensure that the Netcool/Impact GUI Server is online and connections are available.

26. Start the **JConsole** utility under the `$IMPACT_HOME/sdk/bin` directory. See Figure 3-78.
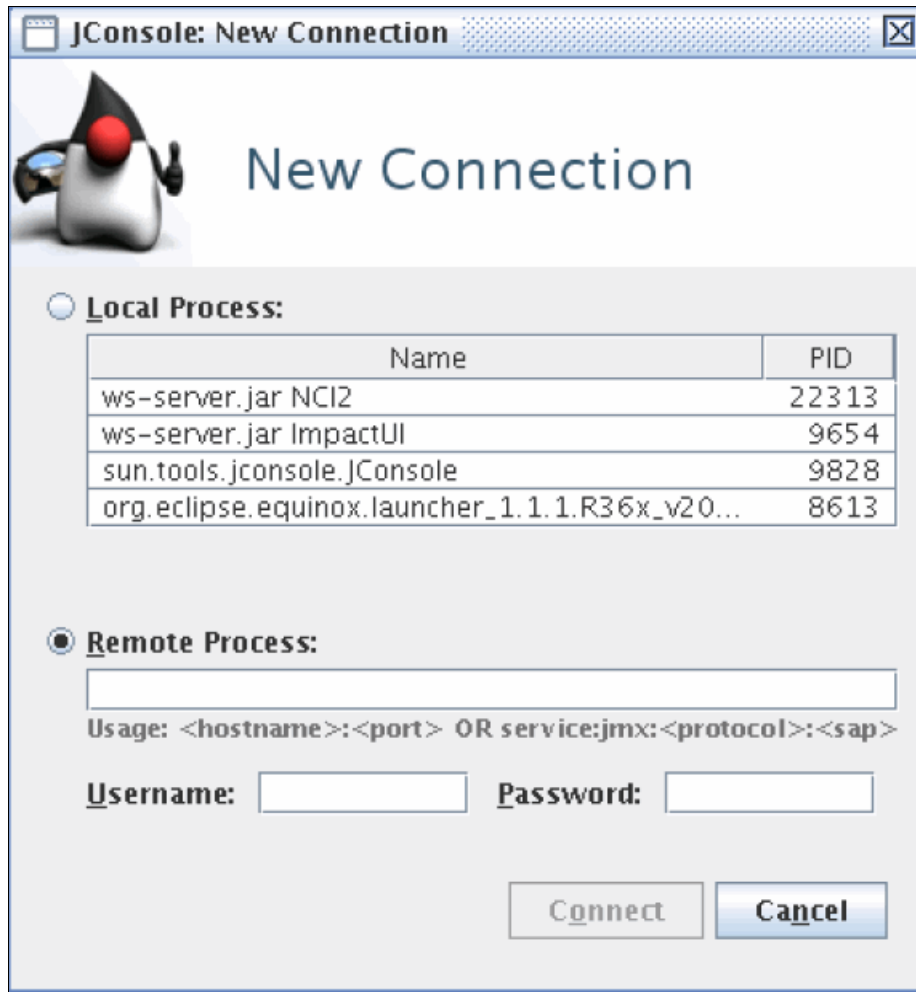

Figure 3-78   JConsole utility

27. Select **Local Process** and choose the ImpactUI process. Select **Connect** as shown in Figure 3-79.

> **Tip:** The connection operation can take several minutes.
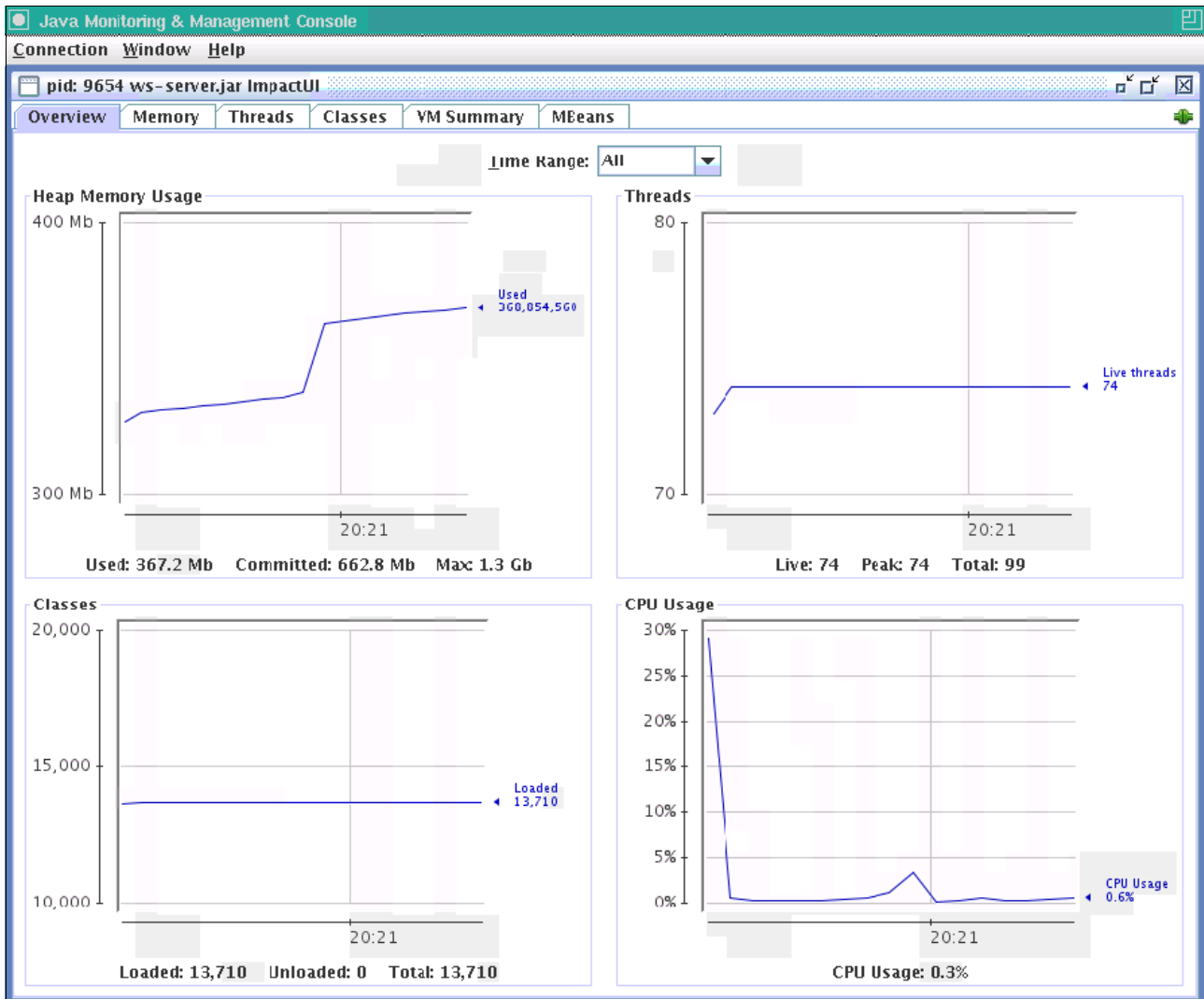

Figure 3-79   Local Process

Figure 3-80 shows the new connection.

Figure 3-80   Java console

28. Select the **MBeans** tab, and locate `com.ibm.ws.jmx.mbeans.generatePluginConfig`.

29. Under Operations, select the **generateDefaultPluginConfig** operation to generate the plug-in. See Figure 3-81.
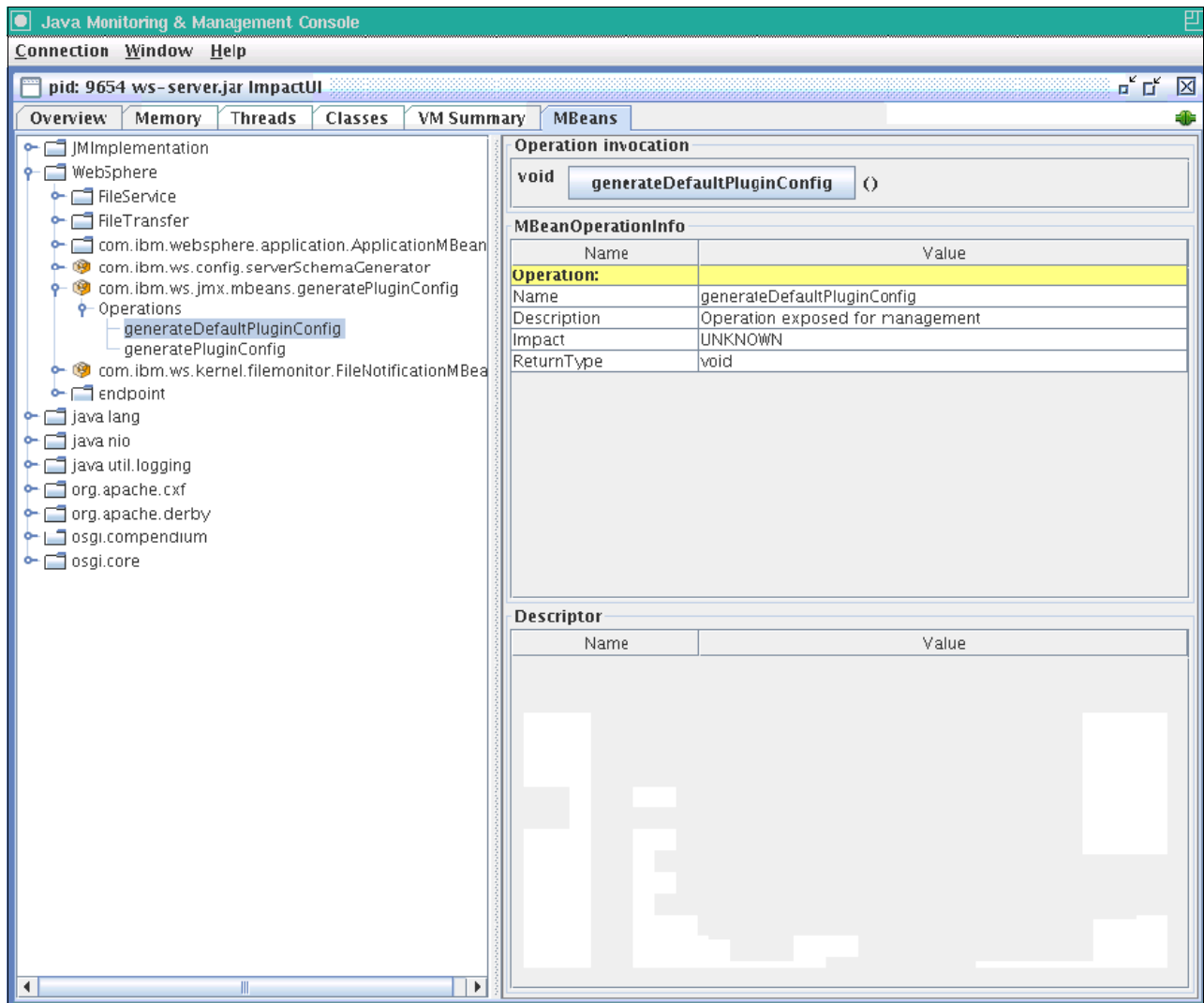

Figure 3-81   generateDefaultPluginConfig

30. Repeat the steps for each Impact GUI server in the environment. The `plugin-cfg.xml` is generated under the `$IMPACT_HOME/wlp/usr/servers/ImpactUI` directory.

31. Copy all of the generated `plugin-cfg.xml` files to the JazzSM Dashboard Component server.

32. In the `$JAZZSM/profile/bin` directory, use the **pluginCfgMerge** utility to merge all of the generated `plugin-cfg.xml` files that were copied. Use the following command to generate the `plugin-cfg.xml` file that will be used in the IBM HTTP Server by merging the `plug-cfg1.xml` and `plugin-cfg2.xml` files. See Example 3-42.

Example 3-42   Merge all of the generated plugin-cfg.xml files

```
./pluginCfgMerge.sh -sortVhostGrp -debug plugin-cfg1.xml plugin-cfg2.xml
plugin-cfg.xml
```

33.Copy the generated `plugin-cfg.xml` file to the server that hosts the IBM HTTP Server under the configuration directory, for example, `/opt/IBM/HTTPServer/conf`.

34.Configure the IBM HTTP Server.

35.Add the following lines to the end of the IBM HTTP Server configuration file (`httpd.conf`) so that the `mod_was_app22_http.so` has the correct path to the plug-in location. See Example 3-43.

Example 3-43   Add these lines to the end of the IBM HTTP Server configuration file

```
LoadModule was_ap22_module
"/opt/IBM/WebSphere/Plugins/bin/64bits/mod_was_ap22_http.so"
WebSpherePluginConfig "/opt/IBM/HTTPServer/conf/plugin-cfg.xml"
```

36.To enable SSL on the IBM HTTP Web Server, add the following section to the end of the `httpd.conf` file, as shown in Example 3-44.

Example 3-44   Add this section to the end of the httpd.conf file

```
LoadModule ibm_ssl_module modules/mod_ibm_ssl.so
Listen 443
<VirtualHost *:443>
SSLEnable
</VirtualHost>
KeyFile /opt/IBM/HTTPServer/conf/plugin.kdb
SSLDisable
```

37.Start the IBM HTTP Web Server by using the **`/apachectl start`** command.

> **Note:** You will not be able to log in to the Netcool/Impact GUI successfully by using the load balancer. However, HTTP and HTTPS UI data provider connections from the Dashboard will connect successfully.

38.Configure Dashboard Connections to the load balancer. If SSL UI data provider connections are required, the SSL certificate from the load balancer server needs to be imported into the truststore of the Dashboard server. Import the SSL certificates by using the same method that was used in Figure 3-5 on page 200 (when DASH was integrated with Impact).

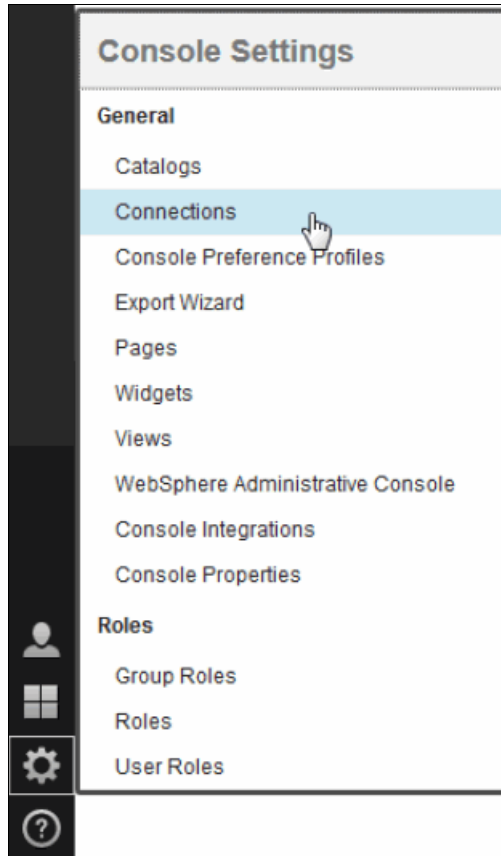39.Log in to the Dashboard server and select **Settings** → **Connections**. See Figure 3-82.

Figure 3-82   Connections

40.Select the previously created **Impact_NCICLUSTER** and click the **Edit existing provider** icon (or add an Impact_NCICLUSTER if it does not exist yet). See Figure 3-83.

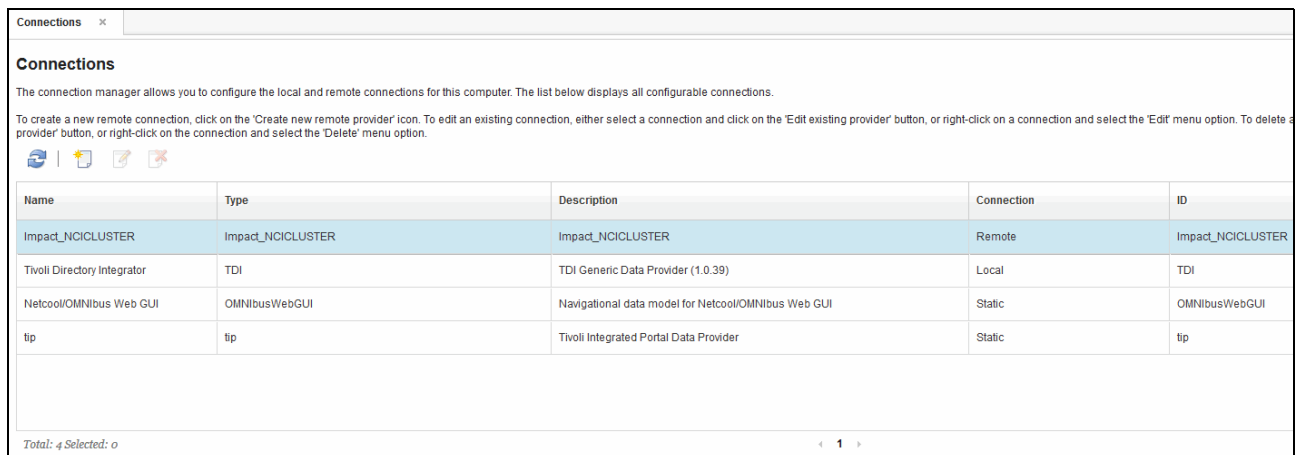*Figure 3-83   Edit Impact_NCICLUSTER*

41. Alter the host name to the server name as shown in Figure 3-84. Click **OK**.

Figure 3-84   New host name

Now, Dashboard pages can be created by using the IBM HTTP Server, providing load balancing and high availability connections to the Netcool/Impact UI data provider GUI servers.

Troubleshooting

To enable additional logging for the web server plug-in, edit the `plugin-cfg.xml` file in the configuration directory of the IBM HTTP Server and update the Log element with the correct location and log level for the plug-in logs, for example:

```
<Log LogLevel="Trace" Name="/opt/IBM/HTTPServer/logs/http-plugin.log"/>
```

References

For more information, see the following resources:

► Netcool/Impact Clustering overview:

   https://ibm.biz/Bdrr7p

► Load balancing for DASH:

   https://ibm.biz/Bdrr7h

- ► Configuring a web server plug-in for the Liberty profile:

  https://ibm.biz/Bdrr7V

- ► Understanding IBM HTTP Server plug-in Load Balancing in a clustered environment:

  https://ibm.biz/BdrHji

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks

The following IBM Redbooks publications provide additional information about the topic in this document. Note that some publications referenced in this list might be available in softcopy only.

► *Improving Operations Effectiveness and Efficiency with IBM Netcool Operations Insight: A Scenarios Guide*, SG24-8352

► *Delivering Consistency and Automation with Operational Runbooks,* REDP-5347

You can search for, view, download or order these documents and other Redbooks, Redpapers, Web Docs, draft and additional materials, at the following website:

ibm.com/redbooks

Online resources

These websites are also relevant as further information sources:

► IBM Netcool Operations Insight Version 1.4.0.1 Knowledge Center documentation:

https://www.ibm.com/support/knowledgecenter/SSTPTP_1.4.0.1/soc/collaterals/soc_netops_kc_welcome.html?lang=en

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