Christian Ah-Soon and David François Gonzalez

SAP® BusinessObjects™ BI Security

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Connections are the keys to the database containing your production data. Different types of connections support different reporting tools and authentication modes.

6 Connections and Database Authentications

In the BI 4.0 system, a connection is an object containing the parameters used to connect to the database containing the data to query. For this reason, a connection is mandatory for any workflows where you need to access this database.

Because of the different evolutions in SAP BusinessObjects releases, different connections exist in BI 4.0, based on different components; there are some that have existed for several releases and some that have been introduced to support new technologies.

In all cases, the databases that a connection references contain your production and sensitive data; therefore, you need to make sure that this connection is properly secured in order to avoid misuse of the databases.

This chapter focuses on the different connections in BI 4.0:

- Those that can exist in a CMS repository
- The local connections the authoring tools can manage
- The different authentication modes used by the connections to authenticate to the database
- The use of credentials mapping for single sign-on
- The different workflows in Information Design Tool, Universe Design Tool, and the Central Management Console to manage connections

Let's begin by exploring secured connections.
6.1 **Secured Connections**

A secured connection is a connection that has been saved in the CMS repository. Connections saved in the CMS repository give you the benefit of a security framework that controls who can view this connection and use it to query the database. Furthermore, because the connection is stored on a server, its access is more secure than if it were saved locally on a file system.

Different connections exist in the CMS repository:

- Relational connection used for the universe (created by Universe Design Tool and Information Design Tool)
- Relational connection used by Crystal Reports 2011 only and their business views
- Data Federator data source created with Information Design Tool (uses Data Federator technology to access two specific databases: SAP NetWeaver BW and SAS)
- OLAP connection used by OLAP universes (created by Universe Design Tool)
- OLAP connection created by Information Design Tool or the Central Management Console to refer to OLAP databases such as SAP NetWeaver BW, Microsoft SSAS, and so on. This connection is used by Analysis, Edition for OLAP, Web Intelligence, Crystal Reports for Enterprise, Dashboard, and multidimensional universes created by Information Design Tool

Since the BI 4.0 release, except for the relational connections used by Crystal Reports 2011, these connections are all located under the same Connections top-root folder. Furthermore, sub-folders can be created in this folder to make managing connections easier.

Let’s spend some time on each type of connection.

6.1.1 **Relational Connections**

Relational connections are the historical file format for relational connections supported by SAP BusinessObjects products. They are initially created by Universe Design Tool and cover a wide range of relational databases. They have also been extended to file text format, Java Bean, and others.

In BI 4.0, these relational connections are common to Universe Design Tool and Information Design Tool, in order to support interoperability between these two
tools. A relational connection can be created in either the Information Design Tool or Universe Design Tool and subsequently used by a universe in either tool.

However, there are very slight differences between the database vendors and versions supported by the two tools. Refer to the Product Availability Matrix (PAM), available at [http://service.sap.com/pam](http://service.sap.com/pam) to check the databases supported by each tool.

For example, for relational connections, some databases or versions supported by Universe Design Tool are not supported by Information Design Tool. Similarly, some new databases or versions are supported by Information Design Tool but not by Universe Design Tool.

These connections are operated by a connection server component. This component is available in two modes:

- In server mode, in which the connection server is running server-side and answer requests
- In library mode, in which it is embedded in other applications

In the CMS repository, these connections (even the OLAP ones) are saved as relational connection InfoObjects.

---

**Warning!**

To set security rights at folder level and to have them inherited by these relational connections, you need to set them for the relational connection InfoObject and not for the connection InfoObject.

---

### 6.1.2 Data Federator Data Sources

Data Federator data sources were introduced in BI 4.0 with the integration of Data Federator technology. This data source InfoObject is the format used by Information Design Tool to store the connections to some relational drivers that require the use of the Data Federator technology in the CMS repository. These connections can be used to access two different databases:

- The underlying relational model of SAP NetWeaver BW
- SAS

These connections can be used only for relational universes created in Information Design Tool. These connections rely on the Data Federator Query Server, so when
you create such a universe, you need to explicitly choose to create a multi-source data foundation used by a multi-source universe.

Furthermore, in contrast to the other connections you can create in Information Design Tool, Data Federator data sources can be created only in the CMS repository, and not locally on your file system.

### 6.1.3 OLAP Connections (Universe Design Tool)

With the introduction of the OLAP universe in Universe Design Tool (see Chapter 7, Section 7.1.2), the relational connection created in Universe Design Tool and based on the Connection Server component was extended to OLAP databases.

This OLAP connection can be created only in Universe Design Tool and used by OLAP universes created in Universe Design Tool. Information Design Tool does not support this connection.

For BI 4.0, we recommend that you use new multidimensional universes (UNX) and OLAP connections created in Information Design Tool (see Section 6.1.4) rather than OLAP universes created in Universe Design Tool. Using OLAP universes and connections in Universe Design Tool can be done for existing projects or if Information Design Tool does not support the equivalent feature.

### 6.1.4 OLAP Connections (Information Design Tool/CMC)

In XI 3.x, Voyager (which is the predecessor of Analysis, Edition for OLAP) relies on an OLAP connection different from the one used for OLAP universe and used to access OLAP databases.

Unlike the OLAP connections created in Universe Design Tool, these OLAP connections benefit from the hierarchical dimensions in the OLAP database.

In BI 4.0, this OLAP connection has been extended and can be used both for Analysis, Edition for OLAP, and multidimensional universes created in Information Design Tool.

This OLAP connection covers two connections:

- **SAP NetWeaver BW connection**, which are based on the SAP Java Connector driver: This connection can be used only for direct access from reporting tools (Web Intelligence; Crystal Reports for Enterprise; Analysis, Edition for OLAP;
Secured Connections

6.1

Dashboard). It is not possible to create a universe on top of it. It is more fully described in Chapter 10.

- OLAP connections for other OLAP databases different than SAP NetWeaver BW, such as Microsoft SQL Server Analysis Services and Essbase: This connection is used by Analysis, Edition for OLAP, and multidimensional universes created in Information Design Tool.

Both of these OLAP connections can be created both in Information Design Tool and CMC. They are interoperable, even if some differences exist:

- The list of OLAP databases supported by Information Design Tool and the CMC slightly differs. Refer to the PAM for more details.

- The authentication modes supported when creating the connection in the two tools are different (see Section 6.3).

Note that an OLAP connection can refer to an OLAP server or a cube on this server:

- If the connection refers to an OLAP server, then when the connection must be used in Information Design Tool or any reporting tool supporting this OLAP connection, users must select one cube on this server.

- If the connection refers to a cube, then the connection is self-sufficient and the reporting tool can directly query the cube referenced by the connection.

6.1.5 Relational Connections (Business View Manager)

Crystal Reports 2011 uses connections based on its own drivers. These connections are directly saved in the Crystal Reports documents and cannot be saved as standalone objects.

In the CMS repository, Crystal Reports 2011 also uses connections on which it can create business views. These connections are manageable only in Business View Manager: creation, edition, security rights setting. Even if they are published in the CMS repository, they cannot be viewed in the CMC.

In Crystal Reports for Enterprise, business views are replaced by universes created with Information Design Tool. We don’t spend any more time on these connections in this chapter.
6.1.6 Product Consumptions

Because of the different connection types and technologies used, not all connections are supported in the same manner by the different reporting tools.

Table 6.1 lists the connections the reporting tools support and how they use them. In this table, UNV designates universes created with Universe Design Tool and UNX designates universes created with Information Design Tool.

Note that this table does not cover the OLAP SAP NetWeaver BW connection (which is instead covered in Chapter 10) or relational connections used by Crystal Reports 2011 for business views.

<table>
<thead>
<tr>
<th></th>
<th>Relational connection (Universe Design Tool or Information Design Tool)</th>
<th>Data Federator data source (Information Design Tool)</th>
<th>OLAP connection (Universe Design Tool)</th>
<th>OLAP connection, except SAP NetWeaver BW (CMC or Information Design Tool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis, Edition for OLAP</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>▶ Direct access</td>
</tr>
<tr>
<td>Crystal Reports 2011</td>
<td>▶ Relational UNV</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Crystal Reports for Enterprise</td>
<td>▶ Relational monosource UNX</td>
<td>▶ Relational multi-source UNX</td>
<td>N/A</td>
<td>▶ Multi-dimensional UNX</td>
</tr>
<tr>
<td></td>
<td>▶ Relational multi-source UNX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dashboard</td>
<td>▶ Relational monosource UNX</td>
<td>▶ Relational multi-source UNX</td>
<td>N/A</td>
<td>▶ Multi-dimensional UNX</td>
</tr>
<tr>
<td></td>
<td>▶ Relational multi-source UNX</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 6.1 Connections and How Reporting Tools Use Them*
Local Connections

### Local Connections

In addition to the secured connections saved in the CMS repository, Information Design Tool and Universe Design Tool can also create local connections for local use.

#### 6.2.1 Information Design Tool

With Information Design Tool, you can create connections in a local project stored in your file system. In Information Design Tool, local projects are used only for authoring mode when you create different resources that are merged to create the universe: data foundation and business layer (Chapter 8, Section 8.1 covers this topic in more detail).

<table>
<thead>
<tr>
<th>Connection Type</th>
<th>Reporting Tool</th>
<th>Data Federator Data Source (Information Design Tool)</th>
<th>OLAP Connection (Universe Design Tool)</th>
<th>OLAP Connection, except SAP NetWeaver BW (CMC or Information Design Tool)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relational</strong></td>
<td>Explorer</td>
<td>▶ Relational monosource UNIX</td>
<td>▶ N/A</td>
<td>▶ N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Relational multi-source UNIX</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Live Office</strong></td>
<td></td>
<td>▶ Relational UNV, through Web Intelligence</td>
<td>▶ N/A</td>
<td>▶ N/A</td>
</tr>
<tr>
<td><strong>Web Intelligence</strong></td>
<td></td>
<td>▶ Relational monosource UNIX</td>
<td>▶ Relational multi-source UNIX</td>
<td>▶ OLAP UNV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▶ Relational monosource UNV</td>
<td></td>
<td>▶ Multi-dimensional UNX</td>
</tr>
</tbody>
</table>

**Table 6.1** Connections and How Reporting Tools Use Them (Cont.)
In local projects, connections that rely on a server component can’t be created, so you can only create two kinds of connections with Information Design Tool in local projects:

- Relational connections, except the SAP NetWeaver BW and SAS that are based on Data Federator data sources
- OLAP connections

When you can create a local connection, you can select any authentication mode from among the ones supported by Information Design Tool for the database (fixed credentials, credentials mapping, or single sign-on). But because credentials mapping or single sign-on require to retrieve credentials from the server, to use this connection in Information Design Tool, you need to open a session to a BI 4.0 system.

A local connection created in Information Design Tool can only be used in Information Design Tool. It is used by a universe when you generate and publish the universe from the resources that makes it (connection, data foundation, and business layer).

When you publish a universe locally, the connection is embedded in the generated universe that can be directly used by Web Intelligence Desktop interface (see Chapter 5, Section 5.19).

When you publish a universe in a CMS repository, it must rely on a secured connection already published in the CMS repository. You can do two things: Create the connection directly in the CMS repository or create the connection in a local project and then publish it in the CMS repository.

In both cases, you must create a connection shortcut from the connection stored in the CMS repository. This connection shortcut is used to reference a connection in a CMS repository. Before publishing the universe in the CMS repository, its data foundation (if it is a relational universe) or its business layer (if it is a multidimensional universe) must be linked to this connection shortcut so it knows which connection (or connections) to use once the universe is published in the CMS repository.

### 6.2.2 Universe Design Tool

In addition to the secured connections you can create in Universe Design Tool (see Section 6.1), you can create two types of local connections:
Connection Authentication Mode

A database has its own security repository. The connection authentication mode defines how the connection authenticates to the database when it needs to connect to it. We'll next describe these existing authentication modes:

- Fixed credentials
- Credentials mapping
- Prompted authentication
- Single sign-on

However, due to the different technologies used, not all connections and products support the same list of authentication modes. This list is presented in Table 6.2.
Let's begin with the most basic authentication mode—fixed credentials.

### 6.3.1 Fixed Credentials

This is the simplest authentication mode because the credentials you use in order to connect to the database are stored in the connection. This account created at database level must be dedicated to the BI 4.0 system. We recommend that you grant this account read-only rights at database level because for reporting use, this authentication mode does not require the rights to write in the database. These credentials are always used when the connection must be used, whenever the user calls it.
The fixed credentials authentication mode does not allow you to trace who has sent different requests at the database level in detail. But we consider this authentication mode to be relatively less secure because it directly contains the credentials.

If a connection with fixed credentials authentication mode is saved locally, then it can be seen as vulnerable and, for this reason, it should contain only parameters to test database rather than production database.

When it is published in the CMS repository, it can be secured with CMS security framework. Starting with BI 4.0 FP3, for relational connections stored in the CMS repository, you can deny the “Download connection locally” connection right in order to force database queries to be run on the server and prevent the connection credentials from being retrieved on client machines.

In Universe Design Tool, it is possible to use `@VARIABLE ('DBUSER')` or `@VARIABLE ('DBPASS')` as fixed credentials in order to have a dynamic user name and password, but this mode should be replaced by credentials mapping.

### 6.3.2 Credentials Mapping

This authentication mode is available only when the connection is used with a session opened to the CMS repository. The connection does not store any credentials to connect to the database, but they are saved as a user's properties.

You can define a different set of credentials for each user. However, each user only gets assigned one set of database credentials, meaning that the same credentials are used for a user if he tries to authenticate through different connections that use this authentication mode.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depending on the context, credentials mapping is also called secondary credentials, SAP BusinessObjects credentials mapping, user's database credentials, or user's data source credentials.</td>
</tr>
</tbody>
</table>

Connections can use a user's database credentials to authenticate in two ways:

- By using credentials mapping authentication mode. In this case, when the connection tries to connect to the database, it retrieves database credentials saved
as properties of the logged on user. These credentials are used by the connection to authenticate to the database.

- By using fixed credentials authentication mode and by setting \texttt{@VARIABLE\('DBUSER'\)} as the user name to use by fixed credentials and \texttt{@VARIABLE\('DBPASS'\)} as the password to use by fixed credentials.

This substitution is supported in Universe Design Tool and universes created with it. But it is no longer supported in Information Design Tool.

You can enable or disable credentials mapping for each different user. If credentials mapping is disabled for a user, then the user cannot use connections whose authentication mode is credentials mapping.

You can define this authentication mode for any relational or OLAP connections. But because it is not supported by Analysis, Edition for OLAP, it is not possible to set this authentication mode when you create this connection in the CMC. On the other hand, even if you set this authentication mode for an OLAP connection in Information Design Tool, it is not supported by Analysis, Edition for OLAP.

**Defining User’s Database Credentials**

To define user’s credentials mapping in the CMC, follow these steps:

1. Go to the Users and Groups tab in the CMC.
2. In the left pane, navigate in the User List, Group List or Group Hierarchy branch in order to display the list of users or of groups in the right pane.
3. In the menu bar, select Manage • Properties or right-click the user and, in the contextual menu, select Properties. The Properties panel opens.
4. In the Database Credentials section, as shown in Figure 6.1, select the Enable checkbox.
5. In the Account Name text field, enter the username to use for this user.
6. In the Password and Confirm text fields, enter the password to use for this user.
7. Click the Save & Close button to close the panel and save the database credentials.

These steps must be done for each user who needs to authenticate with credentials mapping. As this task may be tedious, you can either use SDK to automate it or use an option to fill credentials mapping when users log on (see Section 6.4).
Credentials Mapping Evolution

In SAP BusinessObjects Enterprise 6.x, it was possible to define a connection and use the `@VARIABLE ('BOUSER')` and `@VARIABLE ('BOPASS')` as the user name and password used by the connection to authenticate to the database. When the connection had to connect to the database, these variables were substituted by the username and password of the user logged on to the SAP BusinessObjects system. This method was a simple way to implement a single sign-on.

In XI R2, this capability was no longer possible since the system did not allow the retrieval of the password. For this reason, in order to support a similar workflow for a customer who didn’t want to deploy a full single sign-on infrastructure, this set of credentials has been introduced as user's properties. This property can be used as `@VARIABLE ('DBUSER')` and `@VARIABLE ('DBPASS')` in fixed credentials.

However, in BI 4.0, Information Design Tool does not support the use of these variables in fixed credentials, so you must explicitly use credentials mapping.

6.3.3 Prompted Authentication

In this mode, when the connection must connect to the database, the user is prompted to explicitly provide some database credentials to authenticate to the database. It means the database credentials must be given to all users who need to query the database and that they must provide these credentials to connect to the database.

As for credentials mapping, this connection does not explicitly store database credentials. However, it requires giving users the credentials they need to provide when querying the database.

This authentication mode is supported only for OLAP connections created in the CMC. Usually, OLAP connections created in Information Design Tool and in CMC
are compatible, except for OLAP connection with prompted authentication mode, which can be created and edited only in CMC (see Section 6.5). Furthermore, only Analysis, Edition for OLAP can use this connection to query data from the database.

### 6.3.4 Single Sign-On

This authentication mode is also called *single sign-on to database* in order to avoid confusion with the single sign-on used to log on to BI 4.0 products (see Chapter 3, Section 3.1).

If the connection authentication mode is single sign-on to database, then the credentials used to connect to the BI 4.0 are reused by the connection to authenticate to the database and query data from it. It means the database and the BI 4.0 system must share the same authentication information.

Single sign-on is supported only for a limited set of databases and in specific configurations, as described in Table 6.3.

<table>
<thead>
<tr>
<th>Database</th>
<th>Middleware</th>
<th>Operating System</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS SQL Server</td>
<td>XMLA</td>
<td>Windows</td>
<td>The BI 4.0 system and the database have been configured to authenticate with Windows Active Directory and Kerberos (see Chapter 3, Section 3.8).</td>
</tr>
<tr>
<td>Analysis Services</td>
<td>ODBC</td>
<td>Windows</td>
<td>The BI 4.0 system and the database have been configured to authenticate with LDAP.</td>
</tr>
<tr>
<td>MS SQL Server</td>
<td>OLE DB</td>
<td>Windows</td>
<td>The BI 4.0 system and the database have been configured to authenticate with the Oracle EBS. The Oracle EBS account is used to connect to BI 4.0 and is then passed to the connection to connect to the Oracle EBS database.</td>
</tr>
<tr>
<td>Oracle</td>
<td>Oracle Client</td>
<td>Windows</td>
<td>The BI 4.0 system and the database have been configured to authenticate with the Oracle EBS. The Oracle EBS account is used to connect to BI 4.0 and is then passed to the connection to connect to the Oracle EBS database.</td>
</tr>
</tbody>
</table>

*Table 6.3* Databases for Which Single Sign-On Is Supported
Using Credentials Mapping for Single Sign-On

<table>
<thead>
<tr>
<th>Database</th>
<th>Middleware</th>
<th>Operating System</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver BW</td>
<td>OLAP BAPI</td>
<td>All</td>
<td>The BI 4.0 system has been configured to authenticate with the SAP NetWeaver BW database (see Chapter 10, Section 10.2).</td>
</tr>
<tr>
<td>SAP ERP</td>
<td>SAP Java Connectivity</td>
<td>All</td>
<td>The BI 4.0 system has been configured to authenticate with the SAP system (see Chapter 10, Section 10.2).</td>
</tr>
<tr>
<td>SAP HANA</td>
<td>JDBC</td>
<td>Windows Linux</td>
<td>The BI 4.0 system and the database have been configured to authenticate with Windows Active Directory and Kerberos (see Chapter 3, Section 3.8).</td>
</tr>
</tbody>
</table>

Table 6.3 Databases for Which Single Sign-On Is Supported (Cont.)

To work, single sign-on requires the authentication to be available. When you connect to BI 4.0 and use a connection defined with single sign-on authentication to query a database, the credentials you have used to connect can be passed to the database (through a token, for example) because you are already connected.

But single sign-on won't work in workflows where you are no longer connected. This is the case for scheduling or publishing workflows. In scheduling, if the schedule happens when you are no longer connected, then the refresh cannot happen. When publishing, if the report bursting option requires the recipient credentials to run the publication in its name, the credentials for the recipient are also not available.

In any case supported by single sign-on, you can only refresh when you are logged on. To work around this restriction, you may either use credentials mappings adapted for single sign-on (see Section 6.4) or, for SAP NetWeaver BW connections, configure SNC or STS (see Chapter 10, Section 10.6).

6.4 Using Credentials Mapping for Single Sign-On

For the different data sources where single sign-on is not supported, an option based on credentials mapping can be used to achieve single sign-on. This option assumes
that the CMS repository and the database share the same authentication information. This can be achieved either through a replication process that synchronizes the users and passwords between the two systems, or a common authentication system (Active Directory or LDAP).

Then, if your BI 4.0 system uses enterprise authentication mode or has been configured to authenticate with Active Directory or LDAP, you can use the use credentials mapping for single sign-on.

In this method, when a user logs on to any BI 4.0 product by authenticating with the CMS repository, his username and password are saved in the database credentials parameters for this user (even if the “Enable Database Credentials” option has not been selected for this user).

So when a user needs access to the database through a connection defined with secondary credentials as the authentication mode, then these database credentials can be reused to authenticate the user to the database.

Furthermore, even if the user logs off the BI 4.0 system, his credentials remain saved in his database credentials settings. Thus, they can also be used for scheduling or publication workflows, when the user is no longer logged on. However, if the user has not yet logged on to the system since the option was set, then his credentials are not saved, and scheduling or publication workflows fail.

**Setting Credentials Mapping for Single Sign-On Option**

To use credentials mapping for single sign-on, you can set this option for any authentication mode that supports it:

1. Log on to the CMC, and go to the Authentication tab.
2. Double-click the Enterprise, LDAP, or Windows AD line to open the panel used to configure the corresponding authentication mode.
3. In this pane, select the Enable and Update User’s Data Source Credentials at Logon Time checkbox.
4. Click the Update button to save this change and close the panel.

Once this option has been set, two things happen when a user logs on to the system using the corresponding authentication mode:
His “Enable Database Credentials” parameter is enabled.

The credentials he has provided to log on are saved in his “Database Credentials Account Name” and “Database Credentials Password” parameters.

6.5 Managing Connections

Depending on the connection you use, you can create and manage it either in Information Design Tool, Universe Design Tool, or the CMC.

Specific workflows to create an SAP NetWeaver BW connection are described in Chapter 10, Section 10.4.

6.5.1 Managing Connections in Information Design Tool

To manage secured connections in Information Design Tool, you must have the Information Design Tool “Create, modify, or delete connections” right granted. To create a secured connection, you also need the “Add objects to the folder” right for the folder where you create the connection. To edit a secured connection, you also need the “Edit objects” right.

Creating a Secured Connection

To create a secured connection in Information Design Tool, follow these steps:

1. Open the Repository Resources view.
2. Open a predefined session to the CMS, or, if it does not exist, create and open one.
3. In the “Connections” tree folder, select the folder where the connection must be created.
4. In the Repository Resources toolbar:
   - Select Insert Relational Connection to open the New Relational Connection dialog box and create a relational connection.
   - Select Insert OLAP Connection to open the New OLAP Connection dialog box and create an OLAP connection.
5. In this dialog box, in the Resource Name text field, enter the name of the connection.
6. Click the Next button to display the **Database Middleware Driver Selection** page. This page displays the list of databases, versions, and middlewares supported by Information Design Tool, as shown in Figure 6.2.

![Database Middleware Driver Selection](image)

**Figure 6.2** Databases Supported in Information Design Tool

7. In the **Database Middleware Driver Selection** page, select the driver for the database you want to access from among the ones supported by Information Design Tool. Use the Hierarchical List or Flat List radio buttons to display these drivers as a tree or as a list.

8. Click the Next button.

9. In the **Authentication Mode** dropdown list, select the authentication mode (if it is supported by the connection):
   - Use Specified User Name and Password for fixed credentials
   - Use Single Sign-On when refreshing reports at view time for single sign-on
   - Use BusinessObjects Credentials Mapping for credentials mapping

10. Enter the different parameters that identify the connection. These parameters depend on the connection.

11. Click the Next button. Depending on the connection to create, you may have additional parameters to enter. For example, if you are creating an OLAP
connection, in the **Cube Selection** page, select the **Do not specify a cube in the connection** radio button if you want the connection to refer the database server. Otherwise, select the **Specify a cube in the connection** radio button and, in the tree list, navigate in the server content to select the cube the connection must refer, as shown in Figure 6.3.

![Figure 6.3 Cube Selection Page for OLAP Connection](image)

12. Click the **Finish** button to close the connection wizard and create the connection in the selected folder. In the right pane, a tab for the newly created connection is opened. This tab displays this connection parameters.

Table 6.4 presents connections icons displayed in Information Design Tool by type.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>![icon]</td>
<td>Relational connection</td>
</tr>
<tr>
<td>![icon]</td>
<td>OLAP connection</td>
</tr>
<tr>
<td>![icon]</td>
<td>Data Federator data source</td>
</tr>
</tbody>
</table>

**Table 6.4** Connection Icons in Information Design Tool
Creating a Local Connection

To create a local connection in Information Design Tool, follow these steps:

1. Open the Local Projects view.
2. Select the project and, if needed, the folder where the connection must be created.
3. Right-click the project or the folder where the connection must be created and, in the contextual menu:
   - Click **New • RELATIONAL connection** to open the New Relational Connection dialog box and create a relational connection.
   - Click **New • OLAP connection** to open the New OLAP Connection dialog box and create an OLAP connection.
4. The dialog box that opens is similar to the one used to create a secured connection. Follow the same workflow used when creating a connection to modify the connection parameters.
5. Click the Finish button to close the connection wizard and create the connection in the selected project or folder. In the right pane, a tab for the newly created connection is opened. This tab displays this connection parameters.

Publishing a Connection

Another way to create a secured connection is to create it locally and then publish it in a CMS repository. The connection is created with the same parameters as the local project. To do so, follow these steps:

1. In the Local Projects view, select the local connection to publish.
2. Right-click this connection and, in the contextual menu, select **Publish Connection to a Repository** to open the Publish Connection to a Repository dialog box.
   - In this dialog box, select a session to the CMS repository where the connection must be published. Type the session password to open it if it is not yet opened.
3. Click the Next button.
4. In the Connections tree folder, select the folder where the connection must be published. You must have the “Add objects to the folder” right granted for this folder.
5. Click the Finish button to close this dialog box and publish the connection in the CMS repository.

6. When you are asked whether to create a shortcut, click either Yes or No. The shortcut is created in the same folder as the local connection.

Another method to publish a connection is to drag and drop it from the Local Projects view to the destination folder in the Repository Resources view.

**Creating a Connection Shortcut**

At the end of the connection publication, Information Design Tool offers you a way to create a connection shortcut to this connection. You can also explicitly create it by following these steps:

1. In the Repository Resources view, open a session to the CMS repository containing the secured connection.

2. Navigate in the Connections tree folder to select the connection. Right-click it and, in the contextual menu, select Create Connection Shortcut to open the Select a Local Project dialog box.

   In this dialog box, select the project and folder where the connection must be created.

3. Click OK to close this dialog box and create the connection shortcut. It appears in the Local Projects view. If you double-click it, a tab opens with this connection shortcut parameters, as shown in Figure 6.4.

![Connection Shortcut in Information Design Tool](image)
Connections and Database Authentications

**Editing a Connection**

To edit a local or secured connection, follow these steps:

1. From the Published Resources or Local Projects views, select your connection and double-click it to open a tab for this connection in the right pane.
2. In this tab, click the **Edit** button to open the connection dialog box. This dialog box is the same as the one used to create the connection. Use the dialog box to modify the connection parameters.
3. Click the **Finish** button to save close the connection wizard. The modified parameters are updated in the tab containing the connection parameters.
4. In the toolbar, click the **Save** button to save your changes.

To edit secured connection, you must have the Information Design Tool “Create, modify, or delete connections” right granted. You must also have the connection “Edit objects” right granted.

If you have the “Download connection locally“ right denied for the relational connection, then the connection parameters remain on the server and only a limited set of parameters that are considered as not sensitive (authentication mode, driver, database) are displayed in the connection tab in the right pane. Furthermore, you cannot edit this connection.

**Naviagting in the Database**

In Information Design Tool, the connection editor allows you to navigate in the database in order to get samples of the data it contains. For relational connections, if the “Data Access” right for the connection is not denied to you, you can even directly type some SQL scripts and send them to the database.

In a relational connection editor tab, select the **SHOW VALUES** tab. In this tab, you can:

- Navigate in the database content using the **CATALOG** tree field.
- Type an SQL command in the **SHOW VALUES** text field and click the **REFRESH** button. The result of the query is displayed in the **VALUES** tab, as seen in Figure 6.5.

You have also the same capability for an OLAP connection (except for the SAP NetWeaver BW OLAP connection) in the **QUERY** tab, where you can type some commands in MDX to send to the database.
These capabilities can be handy to quickly analyze data contained in the database. However, the query is directly sent to the database. For this reason, we recommend that you carefully choose the database accounts dedicated to BI 4.0. If you want to avoid user changes in the database through this capability, use only accounts that have read-only privileges on the database. Additionally, check that the security defined at database level allows these accounts to see only the data they are allowed to see.

### 6.5.2 Managing Connections in Universe Design Tool

To manage secured connections in Universe Design Tool, you must have the Universe Design Tool “Create, modify, or delete connections” right granted.

**Creating a Connection**

To create a connection in Universe Design Tool, follow these steps:
1. In the menu bar, in the Tools menu, select Connections or, in the Standard toolbar, click the Connections button to open the Connection Panel dialog box, as shown in Figure 6.6.

![Figure 6.6 Connection Panel in Universe Design Tool](image)

2. In this dialog box toolbar, click the New Connection button to open the Define a New Connection dialog box.

3. In this dialog box, use the Connection Type dropdown list to select the connection type to create: Secured, Shared, or Personal.

4. In the Connection Name text field, enter the connection name.

5. If you have selected to create a secured connection, in the Connection Folder text field, enter the connection folder where the connection must be created. You can click the Folder button to open the Browse Connection Folder dialog box and select a connection folder.

6. Click the Next button to display the Database Middleware Selection page. This page contains the list of database vendors, databases, versions, and middleware supported by Universe Design Tool, as shown in Figure 6.7.

7. In this screen, select your database vendor, name, version, and the middleware to use to access it.
8. Click the Next button.

9. In the Login parameters pane, use the Authentication Mode dropdown list to select the authentication mode for this connection, if it is supported:
   - Use specified username and password for fixed credentials
   - Use BusinessObjects credentials mappings for single sign-on
   - Use Single Sign-On when refreshing reports at view time for secondary credentials

10. If you have selected fixed credentials, enter the username and password used by the connection to authenticate to the database.

11. Follow the dialog box to enter the remaining parameters used to define the connection. The additional parameters to enter may depend on the connection you create.

12. Click the Finish button to close the connection wizard and create the connection in the selected folder. The newly created connection is added to the list of connections.

Table 6.5 displays connections icons displayed in Universe Design Tool by type.
Connections and Database Authentications

<table>
<thead>
<tr>
<th>Icon</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗝️</td>
<td>Secured connection</td>
</tr>
<tr>
<td>📦</td>
<td>Personal connection</td>
</tr>
<tr>
<td>🍄</td>
<td>Shared connection</td>
</tr>
</tbody>
</table>

Table 6.5 Connection Icons in Universe Design Tool

**Editing a Connection**

To edit a connection in Universe Design Tool, follow these steps:

1. In the menu bar, in the TOOLS menu, select CONNECTIONS or, in the STANDARD toolbar, click the CONNECTIONS button to open the CONNECTION PANEL dialog box.

2. Select the connection to edit in the connection list.

3. In the dialog box toolbar, click the EDIT CONNECTION button to open the EDIT CONNECTION dialog box. This dialog is similar to the one used to create the connection.

4. Modify the parameters in the dialog box and go to the last pane of dialog box to click the FINISH button and save the modified connection.

**6.5.3 Managing Connections in the CMC**

The CMC contains two tabs for connections:

- One CONNECTIONS tab, which is used to display, delete, and set security for all connections, except the connections used by Crystal Reports 2011 (see Section 6.1.5). In this tab, you cannot create or edit any connection.

- One OLAP CONNECTIONS tab, which is used to display, create, copy, edit, delete, and set security to OLAP connections compatible with Information Design Tool (see Section 6.1.4).

**Note**

In XI 3.x, relational connections used by Universe Designer and OLAP connections used by Voyager are stored in two different top-root folders, thus the two tabs. In BI 4.0, all connections have been gathered under the same Connections top-root folder for better interoperability between the reporting tools. But the tabs in the CMC have not been merged. These two tabs offer two different views of the same “Connections” top-root folder.
Creating a Connection

To create an OLAP connection in the CMC, follow these steps:

1. Log on to the CMC and go to the OLAP CONNECTIONS tab.
2. In the left pane, select the folder where the connection must be created.
3. In the toolbar, click the NEW CONNECTION button to open the panel where you can enter connection parameters, as shown in Figure 6.8.

![OLAP Connection Panel in CMC](image)

4. In the NAME text field, enter the name for the connection.
5. In the PROVIDER dropdown list, select the database to connect.
6. The list of parameters to enter is updated depending on the selected database provider. Enter the requested parameters to identify the database to query.
7. If your connection must point only to the database server, go to the next step. Otherwise, if your connection must point to a cube, click the CONNECT button:
   - The LOG ON TO THE DATA SOURCE dialog box opens. Enter a user name and password to authenticate to the database, and then click OK.
   - In the CUBE BROWSER dialog box, select the cube the connection must point to.
   - Click the SELECT button to close this dialog box.

The selected cube and its location are displayed in the CUBE and CATALOG text fields.
8. In the Authentication dropdown list, select the authentication mode:
   - **Predefined** for fixed credentials (in which case, enter the user name and password this connection must use to authenticate to the database in the User and Password text fields)
   - **SSO** for single sign-on
   - **Prompt** for prompted credentials

9. Click the Save button to save the connection and return to the connection list.

**Editing a Connection**

To edit an OLAP connection in the CMC, follow these steps:

1. Log on to the CMC and go to the OLAP Connections tab.
2. In the left pane, select the folder containing the connection to edit. The list of connections contained in this folder is displayed in the right pane.
3. In the right pane, select the connection to edit.
4. In the toolbar, click the Edit connection button to open the panel where you can edit connection parameters. Modify the connection parameters.
5. Click the Save button to save your changes and return to the connection list.

**6.6 Summary**

Connections contain the parameters used to connect to the database you want to query through reporting tools. The database contains its own security repository and, in addition to the database parameters you need, the connection must contain authentication information to log on to this database.

Because of the different products and technologies embedded in BI 4.0, there are different types of connections. The most commonly used are the relational connections, the Data Federator data sources, and the OLAP connections.

Because the connection contains sensitive data (credentials, server name, and so on), it must be properly secured by saving it in the CMS repository. In addition to explicitly saving some credentials in the connection, you can use three other authentication modes for these connections: credentials mapping, prompted authentication, and single sign-on. Because single sign-on is only supported by a
limited set of databases and drivers, it is possible to use the credentials mapping
to simulate single sign-on.

Depending on the connection type, you can use Universe Design Tool, Information
Design Tool, or the CMC to administrate connections.

With connections, security is defined at database level. With the use of the universe,
described in the next chapter, security can be defined at a higher level.
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