

SAP BusinessObjects

Connecting to the Oracle Autonomous Data
Warehouse Cloud Service using an Oracle Wallet

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Introduction

This guide will demonstrate the steps necessary to connect SAP BusinessObjects (SAP BO) to an Oracle Autonomous Data Warehouse Cloud (ADWC) for reporting. The primary focus is to validate the ability to use Oracle Wallet, required by ADWC, to make a secure connection to an Oracle Database. This guide illustrates how to create a simple SAP BO Universe relying on the Oracle Call Interface (OCI), not to be confused with Oracle Cloud Infrastructure (OCI), as the driver for the connection. This document is by no means the only way to achieve connectivity to ADWC from SAP BO, it is just one example.

This walkthrough is not intended to be a detailed SAP BO reporting guide. The reporting examples simply demonstrate how to create very basic reports utilizing Crystal Reports and Web Intelligence.

Basic Skills

This guide relies on some basic skills necessary to configure the Oracle Client and use of SAP BO. This guide should provide the details needed to successfully complete the entire process of connecting SAP BusinessObjects to Oracle Autonomous Data Warehouse Cloud.

Required skills and tool knowledge:

- Connecting to Linux a host and the ability to transfer files. (i.e. `ssh` & `scp`)
- Navigating in a Linux server environment and a Windows desktop.
- Oracle Client concepts (`ORACLE_HOME` & `TNS_ADMIN`) and tools (`sqlplus` & `tnsping`).
- Oracle Database query understanding. (i.e. tables, columns & SQL)
- Use of text editors on both Linux and Windows. (i.e. `vi` & `notepad`)

Pre-Requirements

There are certain requirements necessary for this guide to be successful and are listed below:

- SAP BusinessObjects Server and application login credentials.
 - Access to the Central Management Console (<http://<hostname>:8080/BOE/CMC>).
 - Access to the BI Launch Pad (<http://<hostname>:8080/BOE/BI>).
 - A Windows desktop with client development tools for SAP BusinessObjects.
- SAP BusinessObjects Server administrator operating system access.
- An Oracle 12.2+ Client installed on SAP BusinessObjects server and Windows desktop.
- ADWC Oracle Wallet and login credentials.

<https://docs.oracle.com/en/cloud/paas/autonomous-data-warehouse-cloud/user/connect-download-wallet.html#GUID-B06202D2-0597-41AA-9481-3B174F75D4B1>

System Information

SAP BusinessObjects Server host details:

```
bodadm@rac1009rv11:~$ echo -e \\n `hostname` \\t `cat /etc/oracle-release` \\t `uname -r` \\n
rac1009rv11      Oracle Linux Server release 7.5          4.1.12-124.17.1.el7uek.x86_64

bodadm@rac1009rv11:~$ echo -e \\n `whoami` \\t $BOBJEVERSION \\t $BOBJ_HOME \\n
bodadm          XI 4.0                /usr/sap/BOD/sap_bobj

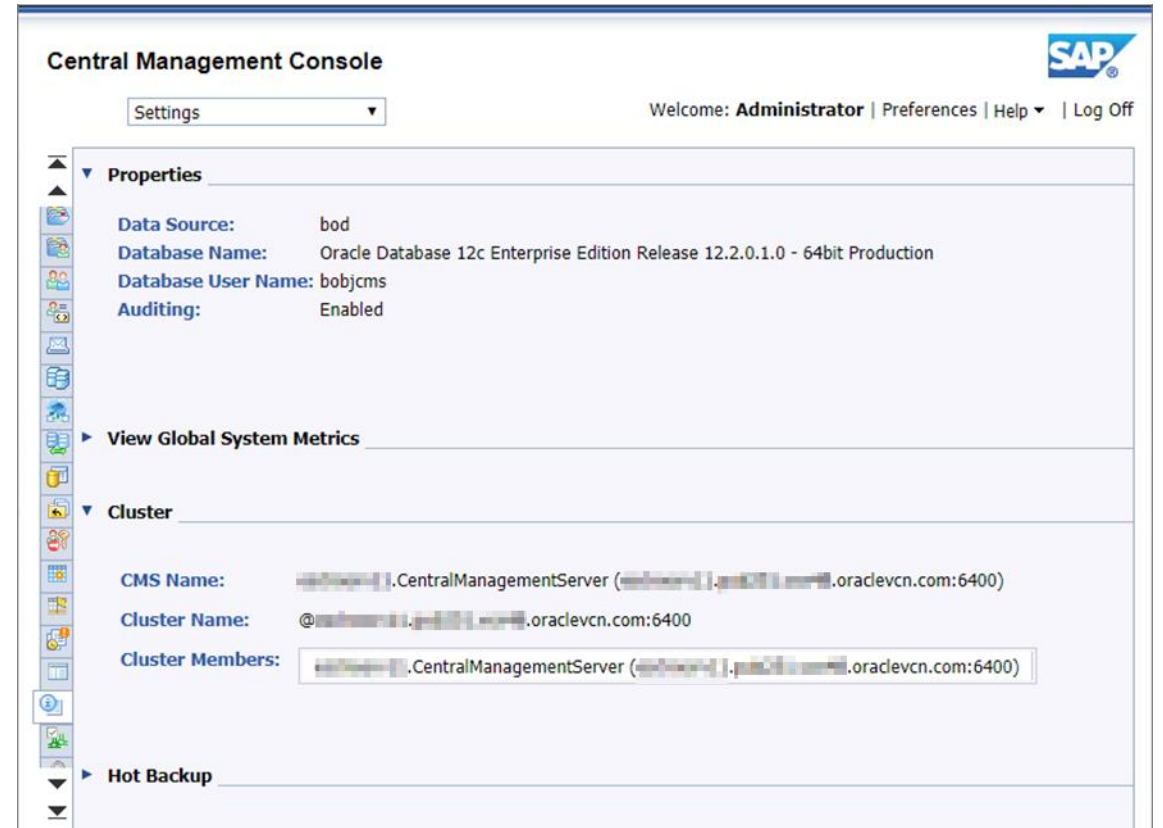
bodadm@rac1009rv11:~$ echo -e \\n $ORACLE_SID \\t $ORACLE_HOME \\t $TNS_ADMIN \\n
bod             /oracle/BOD/12201        /oracle/BOD/12201/network/admin

bodadm@rac1009rv11:~$
```

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System Information

SAP BusinessObjects Server details:



SAP BusinessObjects Server – Oracle Client Setup

This section will walkthrough the essential configuration to enable the Oracle Client on the SAP BO Server to communicate with a Oracle Autonomous Data Warehouse Cloud database. This section is very detailed.

The following requirements are needed.

- SAP BusinessObjects Server shell access via the admin user.
- The Oracle 12.2+ Client access for admin user.
- Oracle ADWC credentials and Oracle Wallet.

SAP BusinessObjects Server – Oracle Client Setup

Locate the SAP BO local Oracle Client `TNS_ADMIN` directory

- Log into the SAP BO server as the SAP BO admin user, in this example the user name is:
bodadm
- Navigate to active Oracle Client `TNS_ADMIN` directory. In this example, the SAP BO server is using the Oracle Database `TNS_ADMIN` directory:
`/oracle/BOD/12201/network/admin`

```
bodadm@bodadm:~$ cd /oracle/BOD/12201/network/admin
bodadm@bodadm:~/oracle/BOD/12201/network/admin$ pwd
/oracle/BOD/12201/network/admin
bodadm@bodadm:~/oracle/BOD/12201/network/admin$ ll -l
total 16
-rw-rw---- 1 oracle oinstall 343 Jun 21 02:36 listener.ora
drwxrwxr-x 2 oracle oinstall 64 Jun 20 16:17 samples
-rw-rw-r-- 1 oracle oinstall 1441 Aug 28 2015 shrept.lst
-rw-rw---- 1 oracle oinstall 180 Jul 12 15:48 sqlnet.ora
-rw-rw---- 1 oracle oinstall 456 Jul 12 15:49 tnsnames.ora
bodadm@bodadm:~/oracle/BOD/12201/network/admin$
```

SAP BusinessObjects Server – Oracle Client Setup

Validate `sqlnet.ora` file

- Display the contents of the existing `sqlnet.ora` file.
- In this example, the `sqlnet.ora` file is rather simple with only one parameter set.

```
bodadm@192.168.1.11:admin $  
bodadm@192.168.1.11:admin $ cat sqlnet.ora  
# sqlnet.ora Network Configuration File: /oracle/BOD/12201/network/admin/sqlnet.ora  
# Generated by Oracle configuration tools.  
  
NAMES.DIRECTORY_PATH= (TNSNAMES, ONAMES, HOSTNAME)  
bodadm@192.168.1.11:admin $
```

SAP BusinessObjects Server – Oracle Client Setup

Validate `tnsnames.ora` file

- Display the contents of the existing `tnsnames.ora` file.
- In this example, the `tnsnames.ora` file contains one database alias and listener.
- The listener is defined in the example `tnsnames.ora` file because this file is also used by the Oracle Database and not required by an Oracle Client only setup.

```
bodadm@192.168.1.11:admin $ cat tnsnames.ora
# tnsnames.ora Network Configuration File: /oracle/BOD/12201/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.

BOD =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.1.11:1521) (PORT = 1528))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = bod.us.oracle.com)
    )
  )
)

LISTENER_BOD =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.1.11:1521) (PORT = 1528))

bodadm@192.168.1.11:admin $ █
```

SAP BusinessObjects Server – Oracle Client Setup

Validate the SAP BO local Oracle Client functionality

- Validate the Oracle Client is able to communicate with the SAP BO Oracle Database or another Oracle Database by using the `tnsping` command.
- In this example `tnsping bod` returned `OK (0 msec)`.
- This was a successful connection test that completed in 0 milliseconds.
- This can be expected because the Oracle database is located on the same host.

```
bodadm@bod12201:admin $ tnsping bod
TNS Ping Utility for Linux: Version 12.2.0.1.0 - Production on 12-JUL-2018 15:53:45
Copyright (c) 1997, 2016, Oracle. All rights reserved.

Used parameter files:
/oracle/BOD/12201/network/admin/sqlnet.ora

Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = bod12201.oraclevm.com)(PORT = 1528)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = bod12201)))
OK (0 msec)
bodadm@bod12201:admin $
```

SAP BusinessObjects Server – Oracle Client Setup

Extract the contents of ADWC Oracle Wallet

- Copy the required ADWC Oracle Wallet to the SAP BO server in a location accessible to the SAP BO admin user.
- In this example, SCP was used to copy `wallet_ADWCbobj.zip` to SAP BO admin (`bodadm`) user's home directory.
- Extract the contents of the Oracle Wallet to a subdirectory in the `TNS_ADMIN` location.
- In this example, the command `unzip ~/wallet_ADWCbobj.zip -d wallet_ADWCbobj` extracted the contents of the zip file in to the directory `wallet_ADWCbobj`.

```
bodadm@192.168.1.13:admin $
bodadm@192.168.1.13:admin $ unzip ~/wallet_ADWCbobj.zip -d wallet_ADWCbobj
Archive:  /home/bodadm/wallet_ADWCbobj.zip
  inflating: wallet_ADWCbobj/cwallet.sso
  inflating: wallet_ADWCbobj/ewallet.p12
  inflating: wallet_ADWCbobj/keystore.jks
  inflating: wallet_ADWCbobj/ojdbc.properties
  inflating: wallet_ADWCbobj/sqlnet.ora
  inflating: wallet_ADWCbobj/tnsnames.ora
  inflating: wallet_ADWCbobj/truststore.jks
bodadm@192.168.1.13:admin $
bodadm@192.168.1.13:admin $ ls -l wallet_ADWCbobj/
total 36
-rw-r--r-- 1 bodadm sapsys 6661 May  1 22:56 cwallet.sso
-rw-r--r-- 1 bodadm sapsys 6616 May  1 22:56 ewallet.p12
-rw-r--r-- 1 bodadm sapsys 3241 May  1 22:56 keystore.jks
-rw-r--r-- 1 bodadm sapsys   87 May  1 22:56 ojdbc.properties
-rw-r--r-- 1 bodadm sapsys  114 May  1 22:56 sqlnet.ora
-rw-r--r-- 1 bodadm sapsys 1031 Jul 12 10:50 tnsnames.ora
-rw-r--r-- 1 bodadm sapsys 3336 May  1 22:56 truststore.jks
bodadm@192.168.1.13:admin $
```

SAP BusinessObjects Server – Oracle Client Setup

Update `sqlnet.ora` file

- Add the contents of the Oracle Wallet's `sqlnet.ora` file to the `TNS_ADMIN sqlnet.ora` file.
- In this example, the `cat` command was first used to merge the two files together.
`cat wallet_ADWCbobj/sqlnet.ora >> sqlnet.ora`
- Next the `cat` command was used to verify the contents of the updated file.
`cat sqlnet.ora`
- Two parameters are added to the existing `sqlnet.ora` file, `WALLET_LOCATION` and `SSL_SERVER_DN_MATCH`.

```
bodadm@bodadm:~$
bodadm@bodadm:~$ cat wallet_ADWCbobj/sqlnet.ora >> sqlnet.ora
bodadm@bodadm:~$
bodadm@bodadm:~$ cat sqlnet.ora
# sqlnet.ora Network Configuration File: /oracle/BOD/12201/network/admin/sqlnet.ora
# Generated by Oracle configuration tools.

NAMES.DIRECTORY_PATH= (TNSNAMES, ONAMES, HOSTNAME)

WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA = (DIRECTORY="?/network/admin")))
SSL_SERVER_DN_MATCH=yes

bodadm@bodadm:~$
```

SAP BusinessObjects Server – Oracle Client Setup

Modify updated `sqlnet.ora` file

- The `DIRECTORY` value of the parameter `WALLET_LOCATION` in the updated `sqlnet.ora` file needs adjusted to reflect the path of the extracted Oracle Wallet files.
- In this example, `vi` was used to modify the `sqlnet.ora` file to add `/wallet_ADWCbobj` after `/admin` to be:
`DIRECTORY="~/network/admin/wallet_ADWCbobj"`

before modification

```
# sqlnet.ora Network Configuration File: /oracle/BOD/12201/network/admin/sqlnet.ora
# Generated by Oracle configuration tools.

NAMES.DIRECTORY_PATH= (TNSNAMES, ONAMES, HOSTNAME)

WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA = (DIRECTORY="~/network/admin")))
SSL_SERVER_DN_MATCH=yes

~
~
~
~
~
```

after modification

```
# sqlnet.ora Network Configuration File: /oracle/BOD/12201/network/admin/sqlnet.ora
# Generated by Oracle configuration tools.

NAMES.DIRECTORY_PATH= (TNSNAMES, ONAMES, HOSTNAME)

WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA = (DIRECTORY="~/network/admin/wallet_ADWCbobj")))
SSL_SERVER_DN_MATCH=yes

~
~
~
~
~
```

SAP BusinessObjects Server – Oracle Client Setup

Update `tnsnames.ora` file

- Add the contents of the Oracle Wallet's `tnsnames.ora` file to the `TNS_ADMIN tnsnames.ora` file.
- In this example, the `cat` command was first used to merge the two files together.
`cat wallet_ADWCbobj/tnsnames.ora >> tnsnames.ora`
- Next the `cat` command was used to verify the contents of the updated file.
`cat tnsnames.ora`
- Three database aliases are added to the `tnsnames.ora` file for the ADWC database.

```
bodadm@aws11000011:admin $  
bodadm@aws11000011:admin $ cat wallet_ADWCbobj/tnsnames.ora >> tnsnames.ora  
bodadm@aws11000011:admin $
```

```
(CONNECT_DATA =  
  (SERVER = DEDICATED)  
  (SERVICE_NAME = bod.uscom-east-1.us.oraclecloud.com)  
)  
)  
  
LISTENER_BOD =  
  (ADDRESS = (PROTOCOL = TCP)(HOST = aws11000011.us-east-1.elb.amazonaws.com)(PORT = 1528))  
  
ADWCbobj_high = (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=(service_name=uscom-east-1.us.oraclecloud.com/adwc/adwc_high.adwc.oraclecloud.com))(security=(ssl_server_cert_dn="CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")) )  
  
ADWCbobj_low = (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=(service_name=uscom-east-1.us.oraclecloud.com/adwc/adwc_low.adwc.oraclecloud.com))(security=(ssl_server_cert_dn="CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")) )  
  
ADWCbobj_medium = (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=(service_name=uscom-east-1.us.oraclecloud.com/adwc/adwc_medium.adwc.oraclecloud.com))(security=(ssl_server_cert_dn="CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")) )  
  
bodadm@aws11000011:admin $
```


SAP BusinessObjects Server – Oracle Client Setup

Verify ADWC connectivity

- Validate the Oracle Client is able to communicate with an ADWC database using the `tnsping` command.
- In this example `tnsping ADWCbobj_low` returned OK (340 msec).
- This was a successful connection test that completed in 340 milliseconds.

```
bodadm@adwc12201.uscom-1.oraclecloud.com:admin $ tnsping ADWCbobj_low
TNS Ping Utility for Linux: Version 12.2.0.1.0 - Production on 12-JUL-2018 16:07:59
Copyright (c) 1997, 2016, Oracle. All rights reserved.

Used parameter files:
/oracle/BOD/12201/network/admin/sqlnet.ora

Used TNSNAMES adapter to resolve the alias
Attempting to contact (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))
(connect_data=(service_name=ADWCbobj_low.adwc.oraclecloud.com))(security=(ssl_server_certificate_dn= CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US)))
OK (340 msec)
bodadm@adwc12201.uscom-1.oraclecloud.com:admin $
```

SAP BusinessObjects Server – Oracle Client Setup

Example of failed ADWC connectivity

- Here is an example of what a failed Oracle Client connection attempt to an ADWC database using the `tnsping` command would look like.
- In this example `tnsping ADWCbobj_low` returned `TNS-12560: TNS:protocol adapter error`.
- The cause for this failure was a deliberate removal of the `cwallet.sso` file from the Oracle Wallet directory in order to showcase a failure.

```
bodadm@10.10.10.12:admin $ tnsping ADWCbobj_low
TNS Ping Utility for Linux: Version 12.2.0.1.0 - Production on 12-JUL-2018 16:08:59
Copyright (c) 1997, 2016, Oracle. All rights reserved.

Used parameter files:
/oracle/BOD/12201/network/admin/sqlnet.ora

Used TNSNAMES adapter to resolve the alias
Attempting to contact (description=(address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=(service_name=adwc.uscom-east-1.oraclecloud.com)))(security=(ssl_server_certificate=(dn= CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US)))
TNS-12560: TNS:protocol adapter error
bodadm@10.10.10.12:admin $
```

SAP BusinessObjects Server – Oracle Client Setup

Validate ADWC login

- Finally validate the ability to login to the ADWC database via the `sqlplus` command.
- In this example, the command `sqlplus <user>@ADWCbobj_low` was issued, followed by the password. A successful connection to the database was established.

```
bodadm@bodadm:~$ sqlplus bodadm@ADWCbobj_low
SQL*Plus: Release 12.2.0.1.0 Production on Thu Jul 12 16:10:27 2018
Copyright (c) 1982, 2016, Oracle. All rights reserved.

Enter password:
Last Successful login time: Wed Jul 11 2018 20:37:05 +00:00

Connected to:
Oracle Database 18c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> exit
Disconnected from Oracle Database 18c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
bodadm@bodadm:~$
```

Windows Desktop – Oracle Client Setup

This section will document configuration to enable a Windows desktop to communicate with an Oracle Autonomous Data Warehouse Cloud database. This section is not as detailed as the previous because the steps are very similar. Please refer back to section [“SAP BusinessObjects Server – Oracle Client Setup”](#) for details.

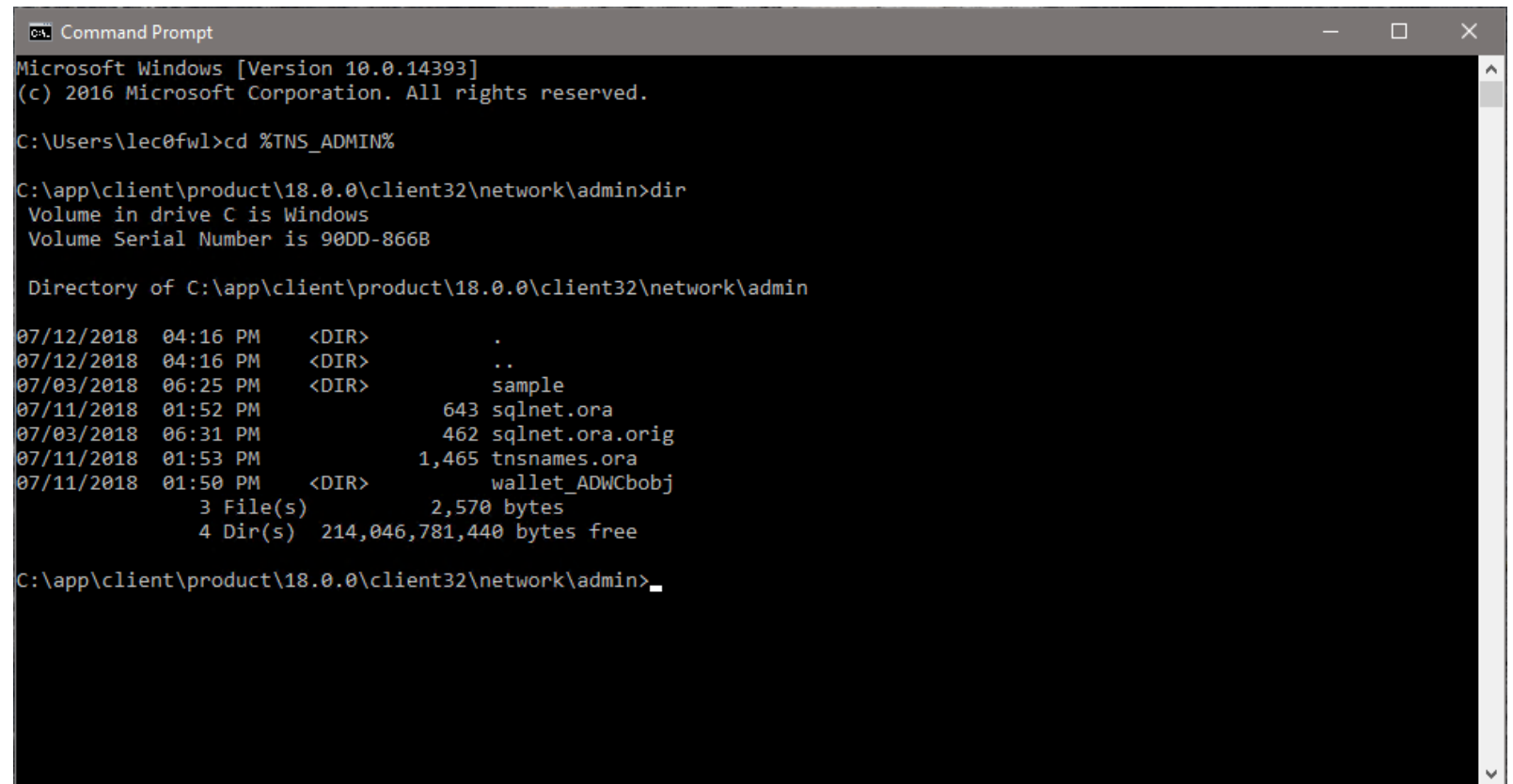
The following requirements are needed.

- A Windows desktop with Oracle 12.2+ Client access.
- Oracle ADWC credentials and Oracle Wallet.

Windows Desktop – Oracle Client Setup

Locate the Windows Desktop Oracle Client `TNS_ADMIN` directory

- This may be a difficult step because the `TNS_ADMIN` environment value is not set by default during the Oracle Client installation.
- The default location is derived from the `ORACLE_HOME` as:
`%ORACLE_HOME%\network\admin`
- Extract the contents of the Oracle Wallet to a subdirectory in the `TNS_ADMIN` location.



```
CA: Command Prompt
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\lec0fwl>cd %TNS_ADMIN%

C:\app\client\product\18.0.0\client32\network\admin>dir
Volume in drive C is Windows
Volume Serial Number is 90DD-866B

Directory of C:\app\client\product\18.0.0\client32\network\admin

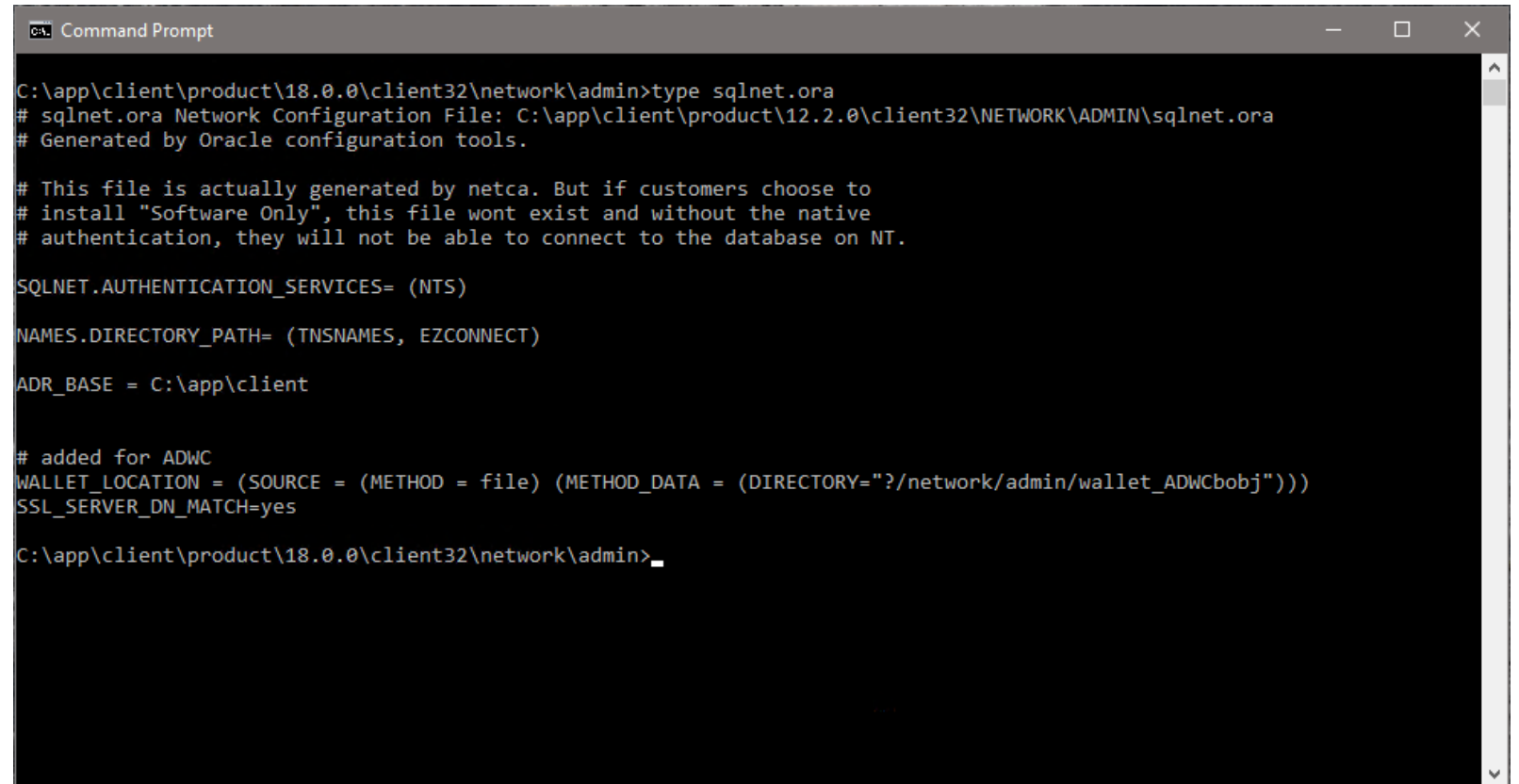
07/12/2018  04:16 PM  <DIR>          .
07/12/2018  04:16 PM  <DIR>          ..
07/03/2018  06:25 PM  <DIR>          sample
07/11/2018  01:52 PM             643 sqlnet.ora
07/03/2018  06:31 PM             462 sqlnet.ora.orig
07/11/2018  01:53 PM          1,465 tnsnames.ora
07/11/2018  01:50 PM  <DIR>          wallet_ADWCobj
               3 File(s)          2,570 bytes
               4 Dir(s) 214,046,781,440 bytes free

C:\app\client\product\18.0.0\client32\network\admin>
```

Windows Desktop – Oracle Client Setup

Update the `sqlnet.ora` file

- Update the `TNS_ADMIN sqlnet.ora` file with the contents of the Oracle Wallet's `sqlnet.ora` file.
- This is similar to the SAP BO Server setup above.
- The `DIRECTORY` value of the `WALLET_LOCATION` parameter needs updated to reflect the location of the Oracle Wallet.
- The updated parameter for this example:
`DIRECTORY=""/network/admin/wallet_ADWCbobj"`



```
CA: Command Prompt
C:\app\client\product\18.0.0\client32\network\admin>type sqlnet.ora
# sqlnet.ora Network Configuration File: C:\app\client\product\12.2.0\client32\NETWORK\ADMIN\sqlnet.ora
# Generated by Oracle configuration tools.

# This file is actually generated by netca. But if customers choose to
# install "Software Only", this file wont exist and without the native
# authentication, they will not be able to connect to the database on NT.

SQLNET.AUTHENTICATION_SERVICES= (NTS)

NAMES.DIRECTORY_PATH= (TNSNAMES, EZCONNECT)

ADR_BASE = C:\app\client

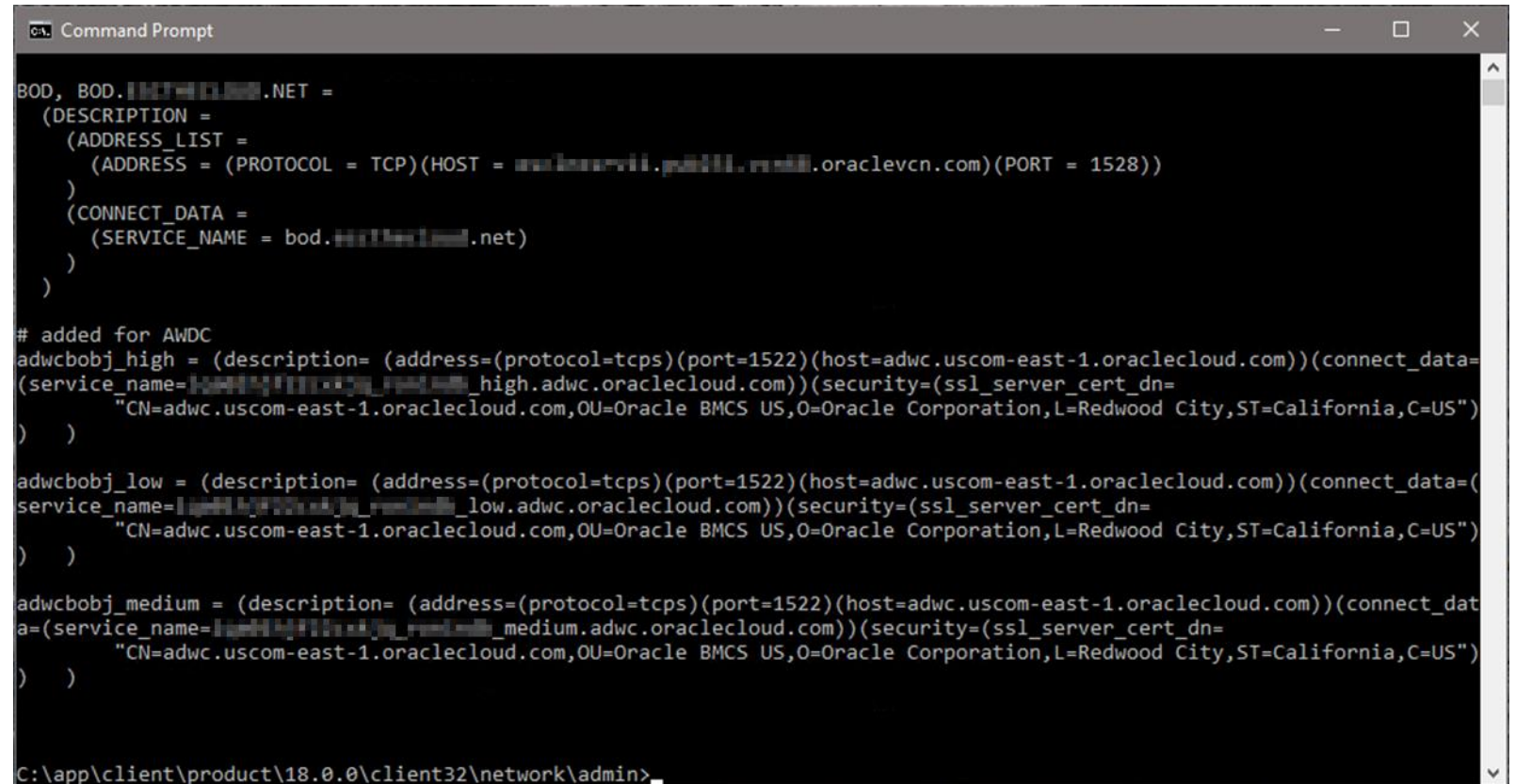
# added for ADWC
WALLET_LOCATION = (SOURCE = (METHOD = file) (METHOD_DATA = (DIRECTORY=""/network/admin/wallet_ADWCbobj")))
SSL_SERVER_DN_MATCH=yes

C:\app\client\product\18.0.0\client32\network\admin>
```

Windows Desktop – Oracle Client Setup

Update the `tnsnames.ora` file

- Update the `TNS_ADMIN` `tnsnames.ora` file with the contents of the Oracle Wallet's `tnsnames.ora` file.
- This is similar to the SAP BO Server setup above and the updated `tnsnames.ora` file should now have the additional ADWC database aliases.



```
CA: Command Prompt
BOD, BOD.OracleCloud.NET =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = oraclecloud.us.com)(PORT = 1528))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = bod.OracleCloud.net)
    )
  )

# added for ADWC
adwcbobj_high = (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=
(service_name=adwc.uscom-east-1.oraclecloud.com))(security=(ssl_server_cert_dn=
"CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")
) )

adwcbobj_low = (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=
(service_name=adwc.uscom-east-1.oraclecloud.com))(security=(ssl_server_cert_dn=
"CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")
) )

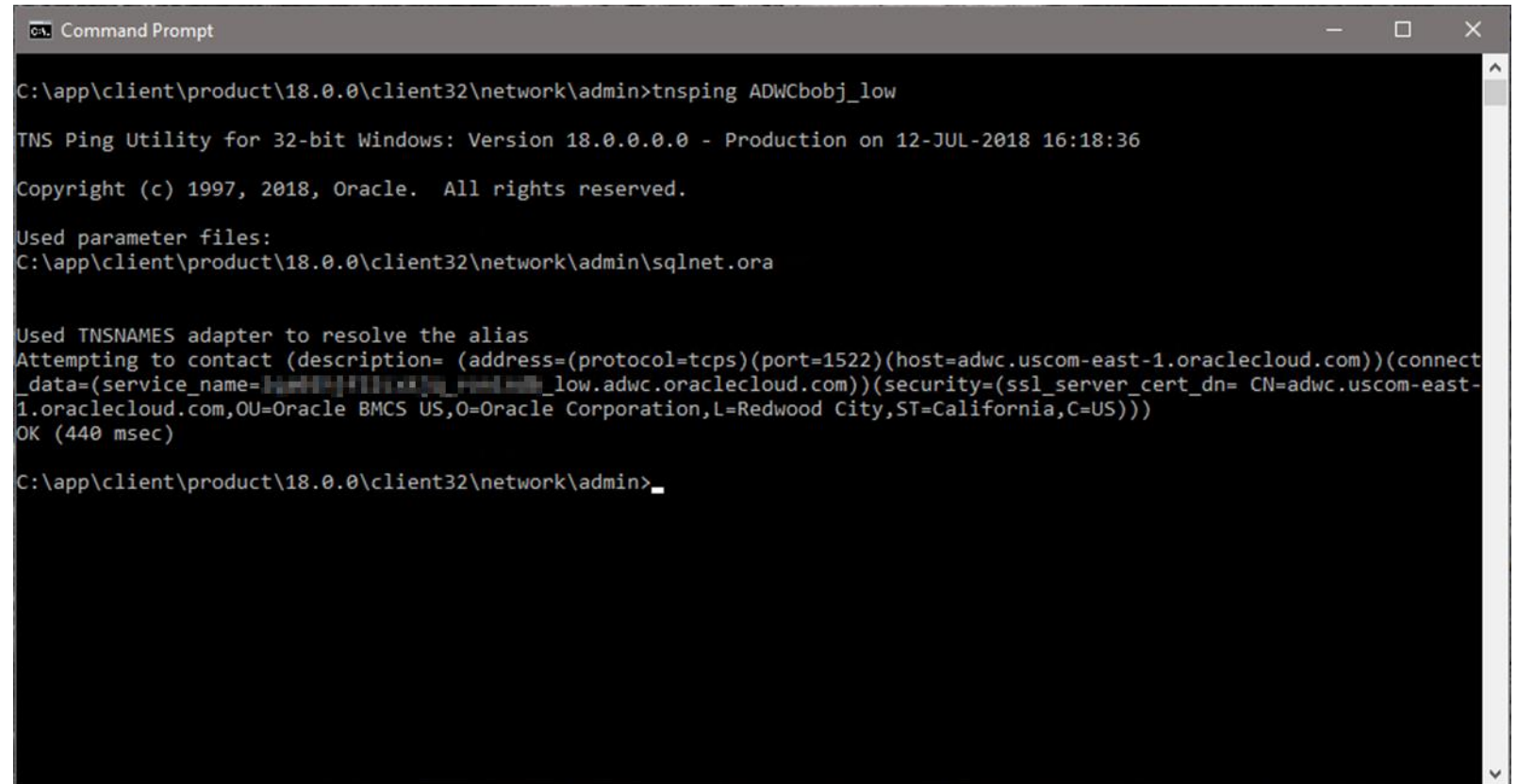
adwcbobj_medium = (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=
(service_name=adwc.uscom-east-1.oraclecloud.com))(security=(ssl_server_cert_dn=
"CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US")
) )

C:\app\client\product\18.0.0\client32\network\admin>
```

Windows Desktop – Oracle Client Setup

Verify ADWC connectivity

- Validate the Oracle Client is able to communicate with an ADWC database using the `tnsping` command.
- In this example `tnsping ADWCbobj_low` returned OK (440 msec).
- This was a successful connection test that completed in 440 milliseconds.



```
CA\ Command Prompt
C:\app\client\product\18.0.0\client32\network\admin>tnsping ADWCbobj_low

TNS Ping Utility for 32-bit Windows: Version 18.0.0.0.0 - Production on 12-JUL-2018 16:18:36

Copyright (c) 1997, 2018, Oracle. All rights reserved.

Used parameter files:
C:\app\client\product\18.0.0\client32\network\admin\sqlnet.ora

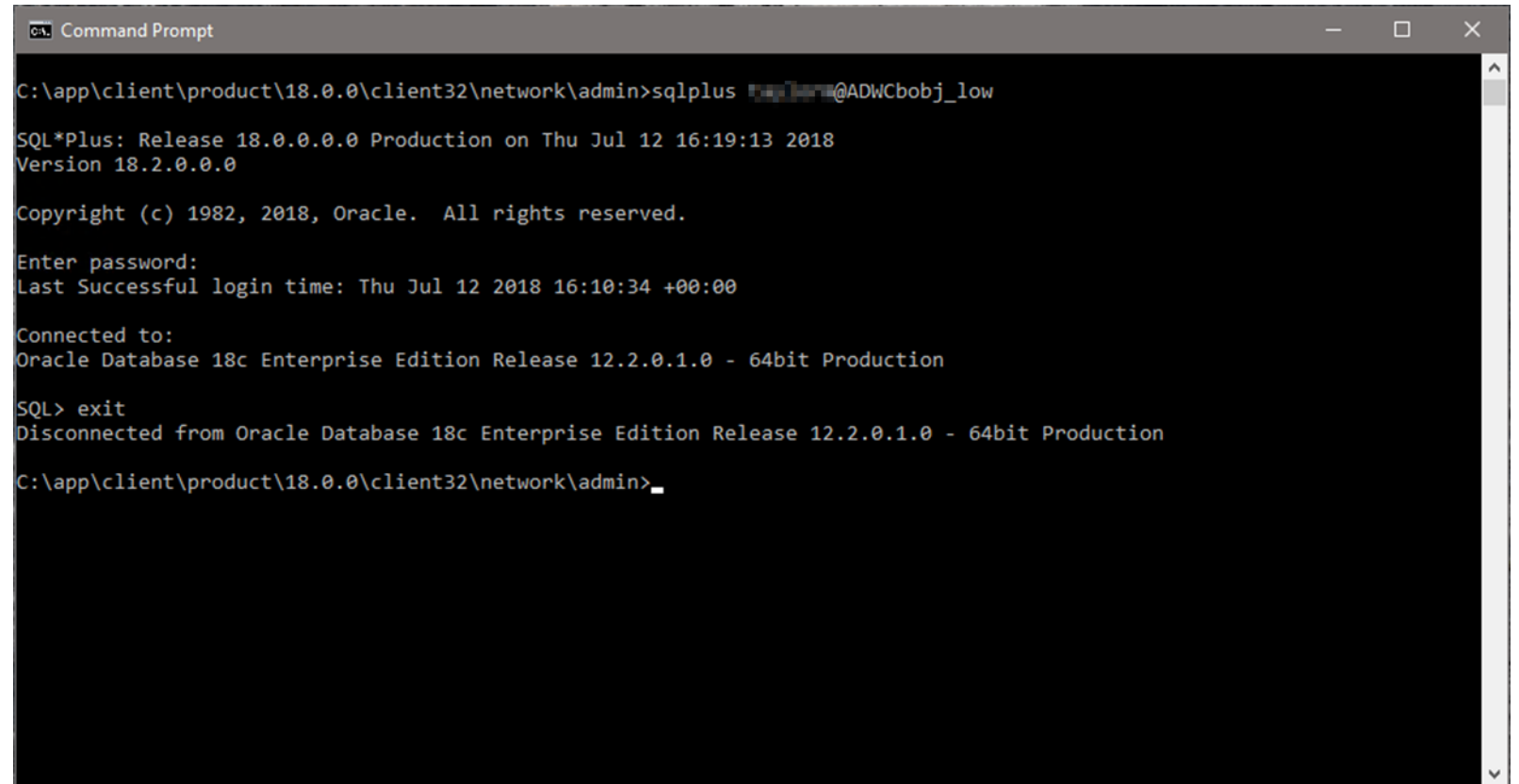
Used TNSNAMES adapter to resolve the alias
Attempting to contact (description= (address=(protocol=tcps)(port=1522)(host=adwc.uscom-east-1.oraclecloud.com))(connect_data=(service_name=ADWCbobj_low.adwc.oraclecloud.com))(security=(ssl_server_cert_dn= CN=adwc.uscom-east-1.oraclecloud.com,OU=Oracle BMCS US,O=Oracle Corporation,L=Redwood City,ST=California,C=US)))
OK (440 msec)

C:\app\client\product\18.0.0\client32\network\admin>
```


Windows Desktop – Oracle Client Setup

Validate ADWC login

- Finally validate the ability to login to the ADWC database via the `sqlplus` command.
- In this example, the command `sqlplus <user>@ADWCbobj_low nsping ADWCbobj_low` was issued, followed by the password. A successful connection to the database was established.



```
C:\app\client\product\18.0.0\client32\network\admin>sqlplus <redacted>@ADWCbobj_low
SQL*Plus: Release 18.0.0.0.0 Production on Thu Jul 12 16:19:13 2018
Version 18.2.0.0.0

Copyright (c) 1982, 2018, Oracle. All rights reserved.

Enter password:
Last Successful login time: Thu Jul 12 2018 16:10:34 +00:00

Connected to:
Oracle Database 18c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> exit
Disconnected from Oracle Database 18c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

C:\app\client\product\18.0.0\client32\network\admin>
```

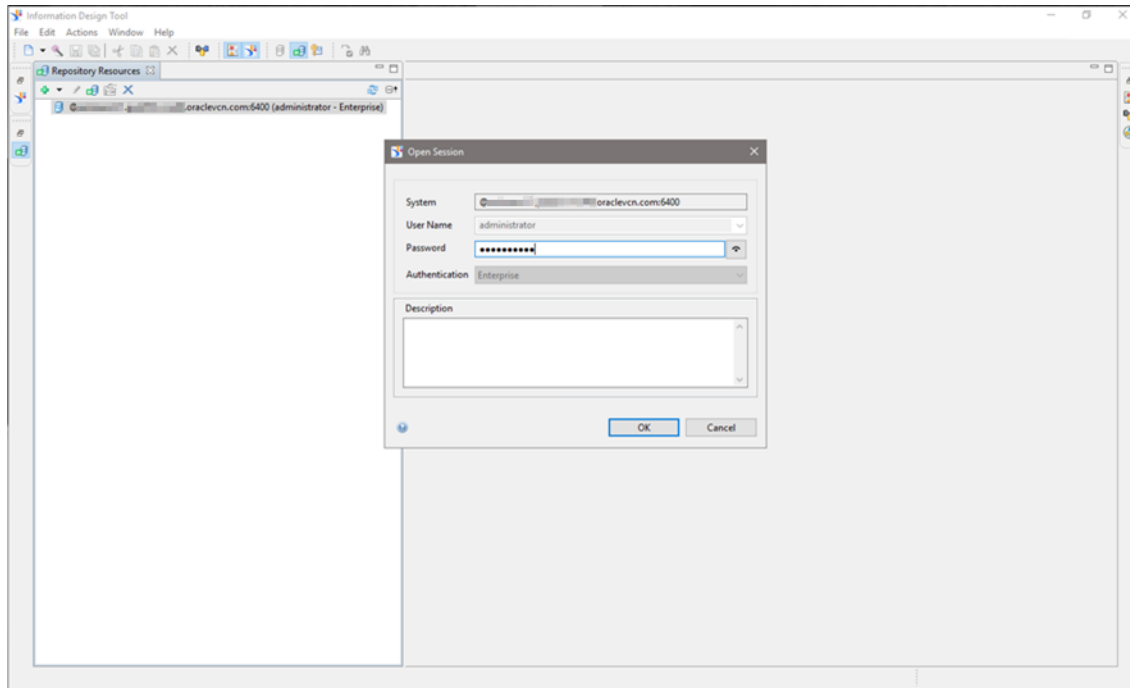
Creating and Publishing a SAP BusinessObjects Universe

This is the longest segment of document. It goes through the process of creating a connection to the ADWC, building a Universe with queries and publishing to the SAP BO Server. By no means is this section designed to be a complete guide to SAP BO's, only a basic "to get started" reference. There are numerous ways to achieve the same objective and many other detailed guides documenting SAP BO reporting.

The following requirements are needed.

- SAP BusinessObjects application login credentials.
- Access to the Central Management Console (<http://<hostname>:8080/BOE/CMC>).
- Access to the BI Launch Pad (<http://<hostname>:8080/BOE/BI>).
- A Windows desktop with client development tools for SAP BusinessObjects.
- Oracle ADWC credentials.

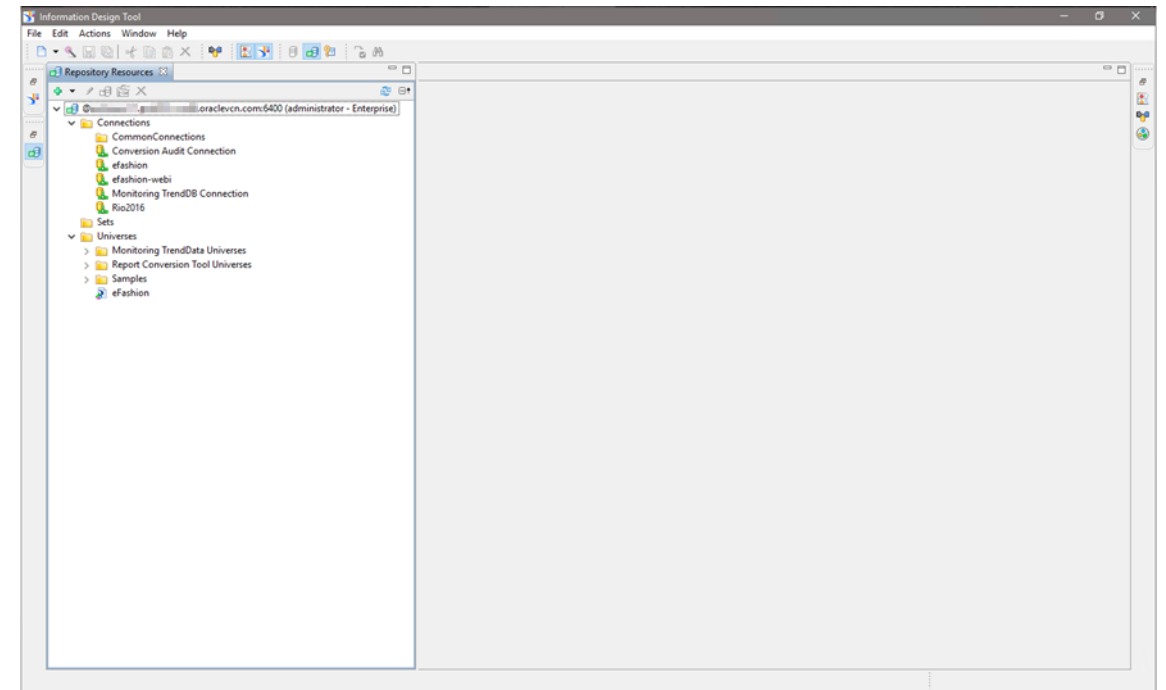
Information Design Tool Repository Resources: Open Session



- Open the Repository Resources tab (located under the Windows menu).
- Insert a new or Open a previous session to the SAP BO Server. In this example:

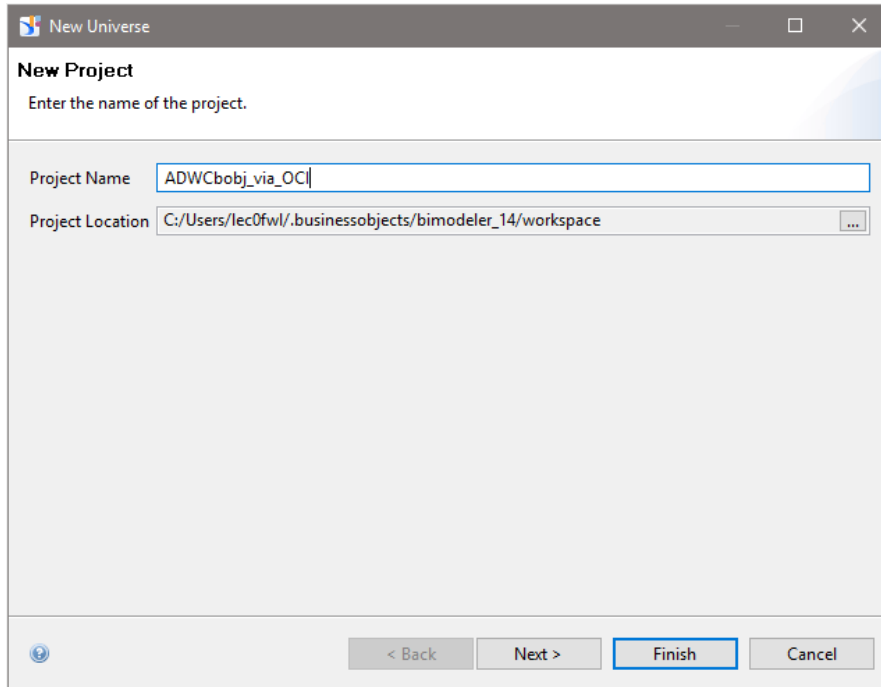
```
*****.*****.oraclevcn.com:6400.
```

- Provide the appropriate User Name, Password, Authentication type, and Description (if desired).
- Once connected, you are able to browse the existing Connections and Universes.



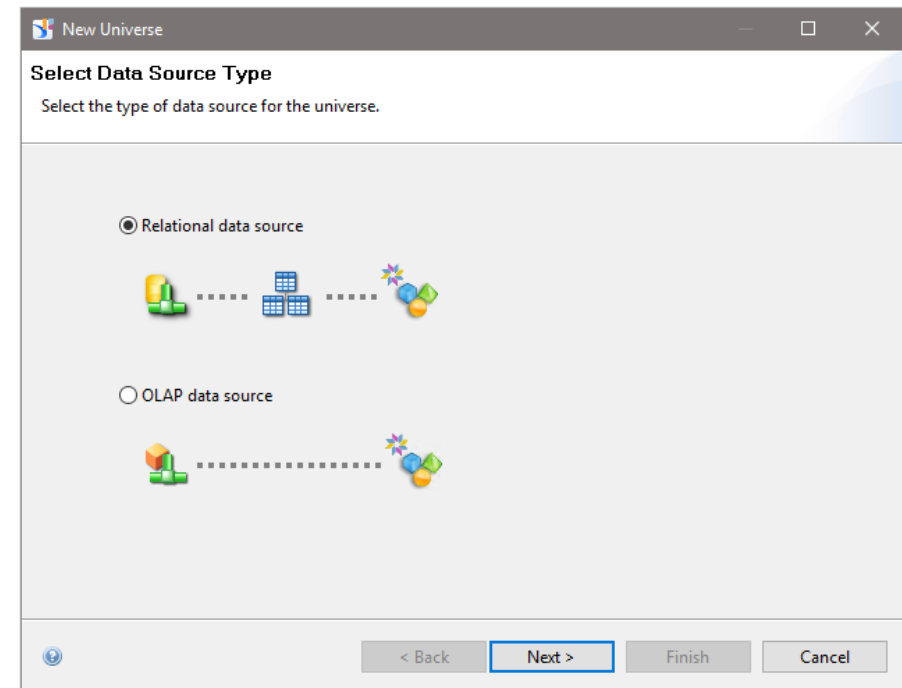
Information Design Tool

New Universe: Project Name & Data Source Type



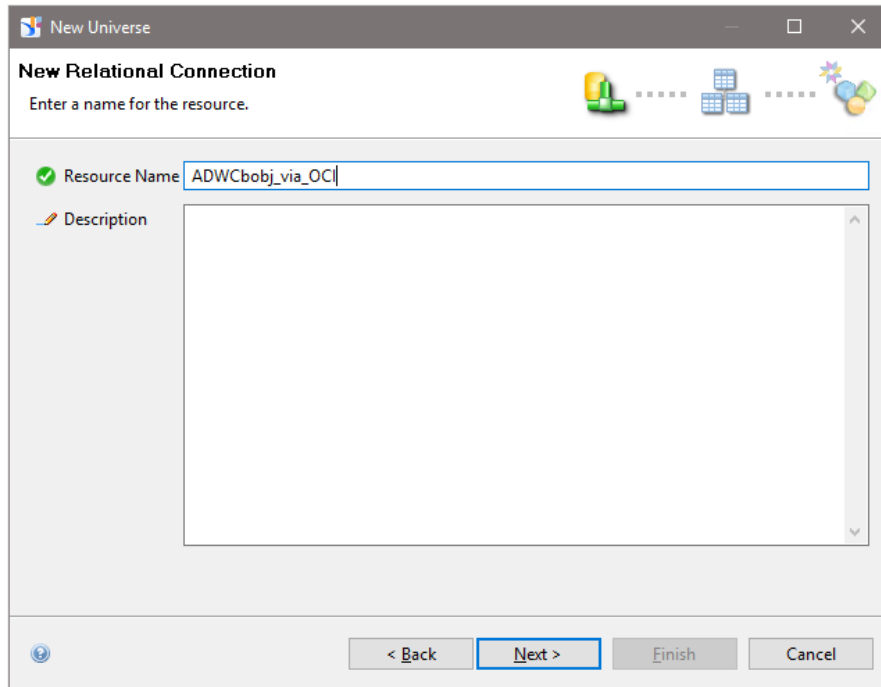
- Create a New Universe (located under the File menu) by creating a new Project.
- Provide a Project Name (i.e. ADWCbobj_via_OCI), Project Location and press Next to continue.

- The Data Source should be of type Relational and then proceed by pressing Next.



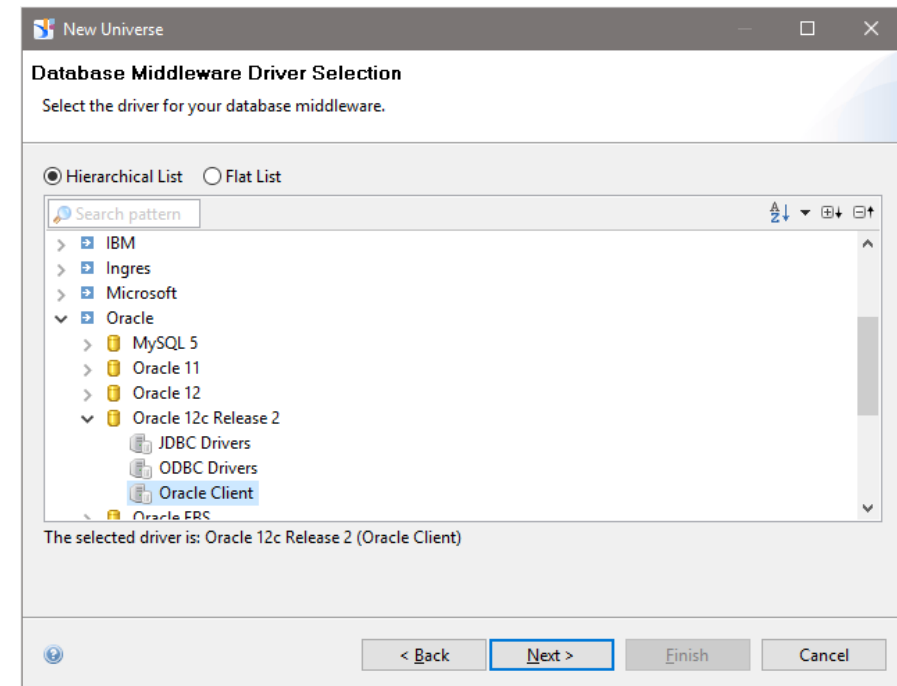
Information Design Tool

New Universe: New Relational Connection



- Provide a Resource Name (i.e. ADWCbobj_via_OCI), a meaningful Description (if desired) for the New Relational Connection and press Next.

- Navigate the Driver Selection tree to Oracle -> Oracle 12c Release 2. Select the Oracle Client driver and continue by pressing Next.



Information Design Tool

New Universe: Relational Connection Credentials

Parameters for Oracle 12c Release 2 Connection (1/3)

Authentication Mode: Use specified username and password

User Name: [Redacted]

Password: [Redacted]

Service: ADWCbobj_low

Test Connection

< Back Next > Finish Cancel

- Select the appropriate Authentication Mode, User Name and Password for the target ADWC Database.
- Type in the appropriate database alias from the client `tnsnames.ora` file (the drop down selection may be empty or not display the desired alias).

- Press the Test Connection button followed by Show Details to display the connection information.
- Pressing the Close button will continue to the next step.

Test Result

Test Successful

Name	Value
BusinessObjects Configuration	
Version	3.3.0.0
Build	14.2.5.2618
Network Layer	Oracle OCI
DBMS Engine	Oracle 12c Release 2
Language	en
Charset	CP1252
Library	C:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\drivers\lib32\dbd_oci.dll
SBO	C:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\oracle\oracle.sbo
RSS	C:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\oracle\oracle.rss
PRM	C:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\oracle\oracle.prm
Strategies	C:\Program Files (x86)\SAP BusinessObjects\SAP BusinessObjects Enterprise XI 4.0\dataAccess\connectionServer\oracle\oracle.stg
Middleware and DBMS Configuration	
Driver architecture	32
Charset	CP1252
DBMS name	Oracle
DBMS version	Oracle Database 18c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

Hide Details Close

Information Design Tool

New Universe: Relational Connection Parameters

Parameters for Oracle 12c Release 2 Connection (2/3)

Connection Pool Mode: Keep the connection active for

Pool Timeout: 10 Minutes

Array Fetch Size: 250

Array Bind Size: 32767

Login Timeout: 600 Seconds

Maximum Parallel Queries: 4

< Back Next > Finish Cancel

- No changes were made to these default values.

- Change or add parameters as needed or preferred and press Next to continue on.

Parameters for Oracle 12c Release 2 Connection (3/3)

Custom Parameters

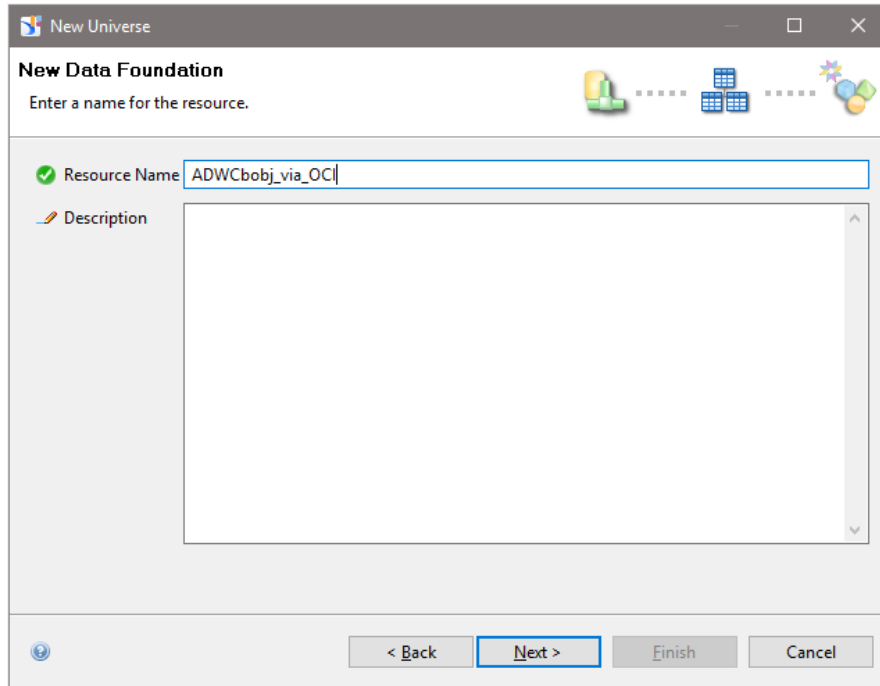
Name	Value
Hint	
Connectinit	

Add Parameter Delete Parameter

< Back Next > Finish Cancel

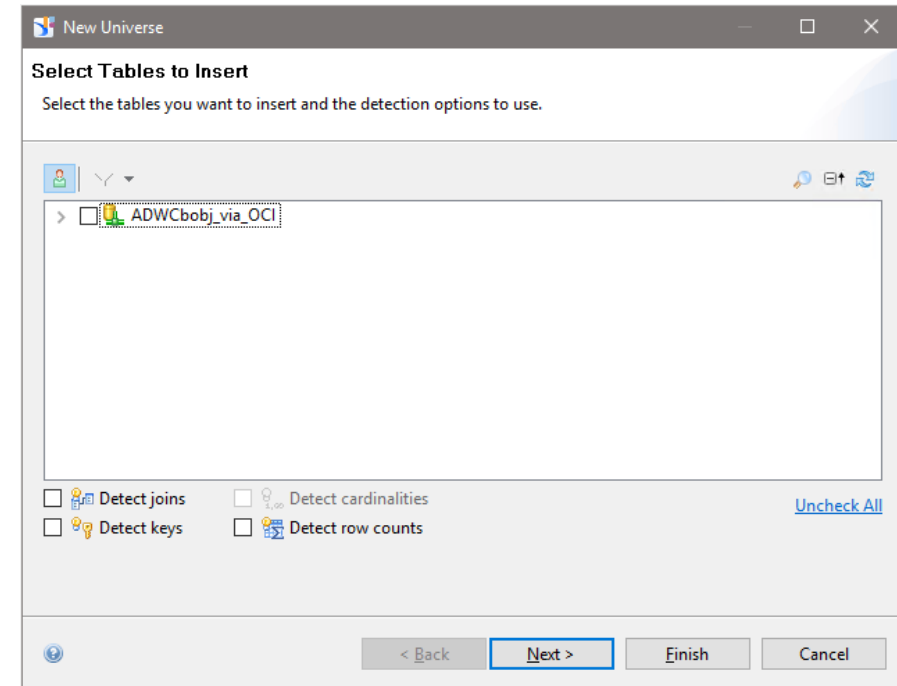
Information Design Tool

New Universe: New Data Foundation



- Provide a Resource Name (i.e. ADWCbobj_via_OCI), a meaningful Description (if desired) for the New Data Foundation and press Next to begin database table selection.

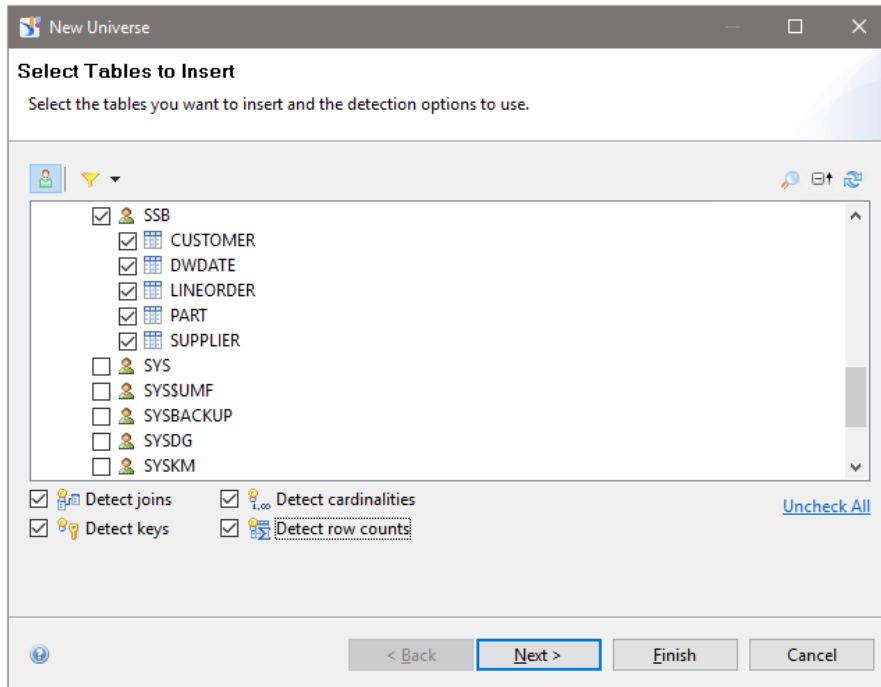
- Navigate the newly created Relational Connection to select the tables to be included in the New Universe.
- Review the below screenshot_1 and screenshot_2 on the following page before continuing.



screenshot_1

Information Design Tool

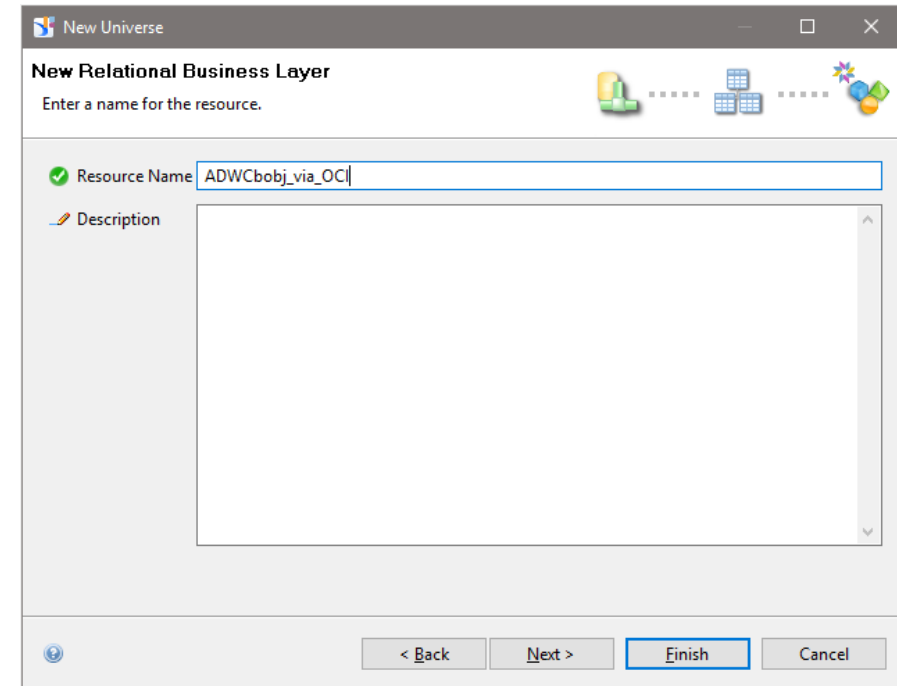
New Universe: Data Foundation Table Selection & Business Layer



screenshot_2

- After selecting all the sought after tables for the Universe, choose any or all of the Detect check boxes to allow the Information Design Tool to discover relationships about the tables and press Next.

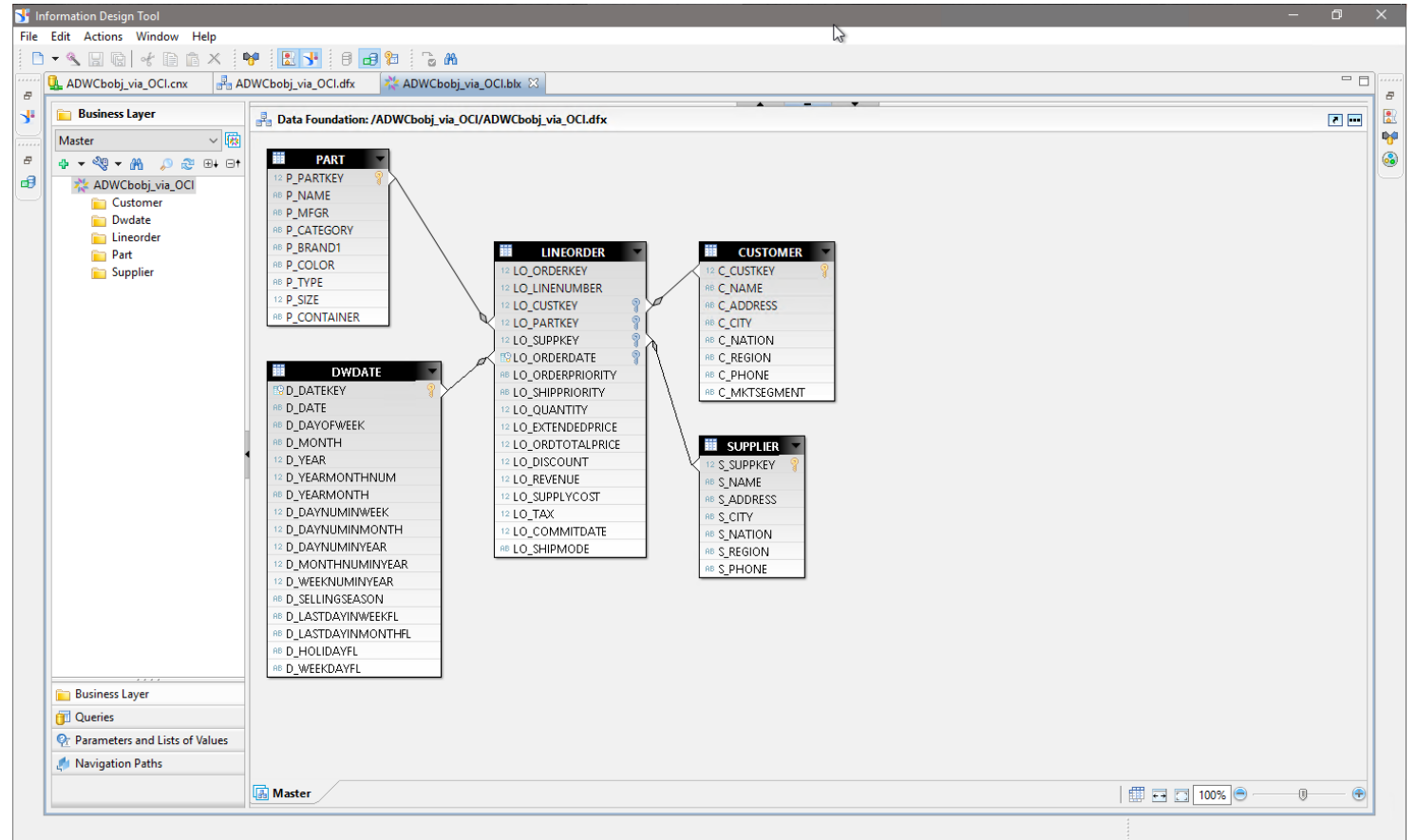
- The final step of the wizard is to provide a Resource Name (i.e. ADWCbobj_via_OCI) and a meaningful Description (if desired) for the New Relational Business Layer.



Information Design Tool

Universe Business Layer

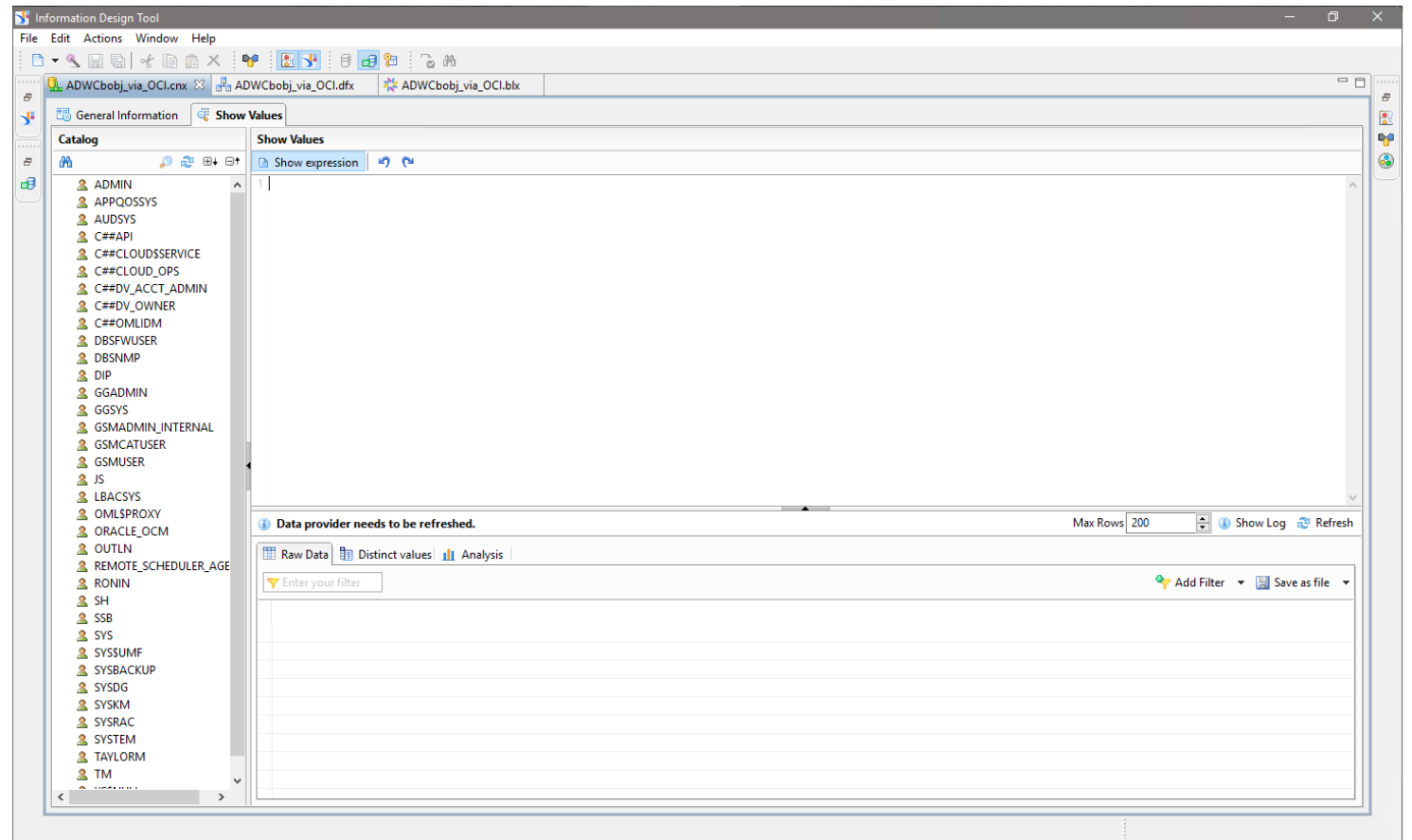
- After completing the Wizard the Business Layer (identified by the .blx file type in the tab name) is displayed.
- The Business Layer displays the Data Foundation (identified by the .dfx file type) showing the previously included tables and relationships.
- This completes the initial Universe creation.



Information Design Tool

Universe Connection: SQL Test

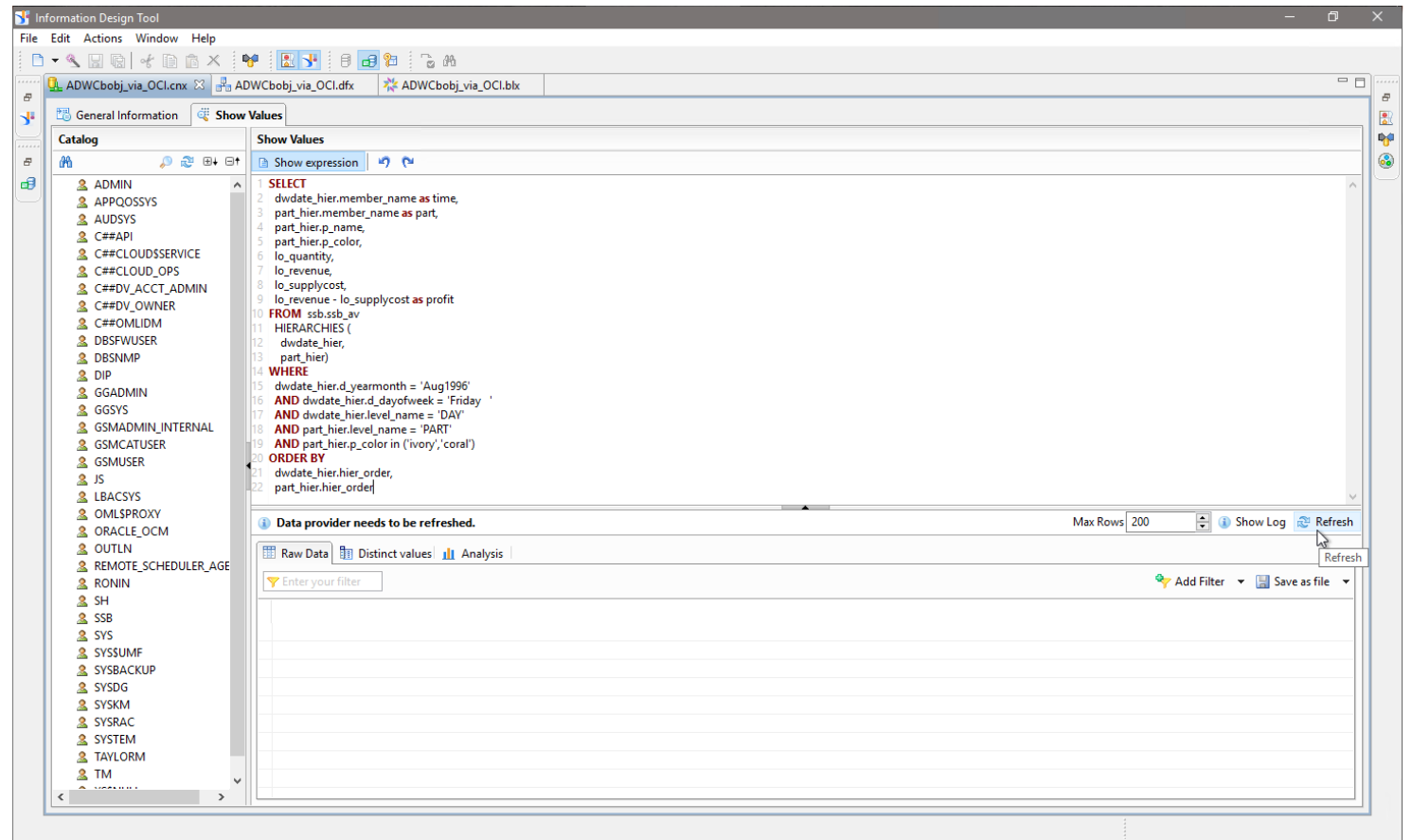
- After successfully completing the New Universe wizard, the locally created connection should be published to the SAP BO Server.
- Before publishing the connection a SQL query can be entered to validate the connection, if desired.
- Click on the Connection tab (identified by the .cnx file type in the tab name) and then the Show Values sub tab.



Information Design Tool

Universe Connection: SQL Test

- Type or paste the chosen SQL query in to the Show Expression text box.
- Do not place a semicolon at the end of the query.
- Press the Refresh button to execute the Query.
- In this test: the query used was copied from ADWC Star Schema Benchmark Analytic Views documentation.
- For more information goto: <https://docs.oracle.com/en/cloud/paas/autonomous-data-warehouse-cloud/user/sample-queries.html#GUID-431A16E8-4C4D-4786-BE5C-30029AC1EFD8>



Information Design Tool

Universe Connection: SQL Test

- The query's results will be displayed in the Raw Data tab.

The screenshot displays the Oracle Information Design Tool interface. On the left, a 'Catalog' pane lists various system users. The main area shows a SQL query in the 'Show Values' tab. The query is as follows:

```
1 SELECT
2   dwdate_hier.member_name as time,
3   part_hier.member_name as part,
4   part_hier.p_name,
5   part_hier.p_color,
6   lo_quantity,
7   lo_revenue,
8   lo_supplycost,
9   lo_revenue - lo_supplycost as profit
10  FROM   esb.ssb_av
11  HIERARCHIES (
12    dwdate_hier,
13    part_hier)
14  WHERE
15    dwdate_hier.d_yearmonth = 'Aug1996'
16    AND dwdate_hier.d_dayofweek = 'Friday'
17    AND dwdate_hier.level_name = 'DAY'
18    AND part_hier.level_name = 'PART'
19    AND part_hier.p_color in ('ivory','coral')
20  ORDER BY
21    dwdate_hier.hier_order,
22    part_hier.hier_order
```

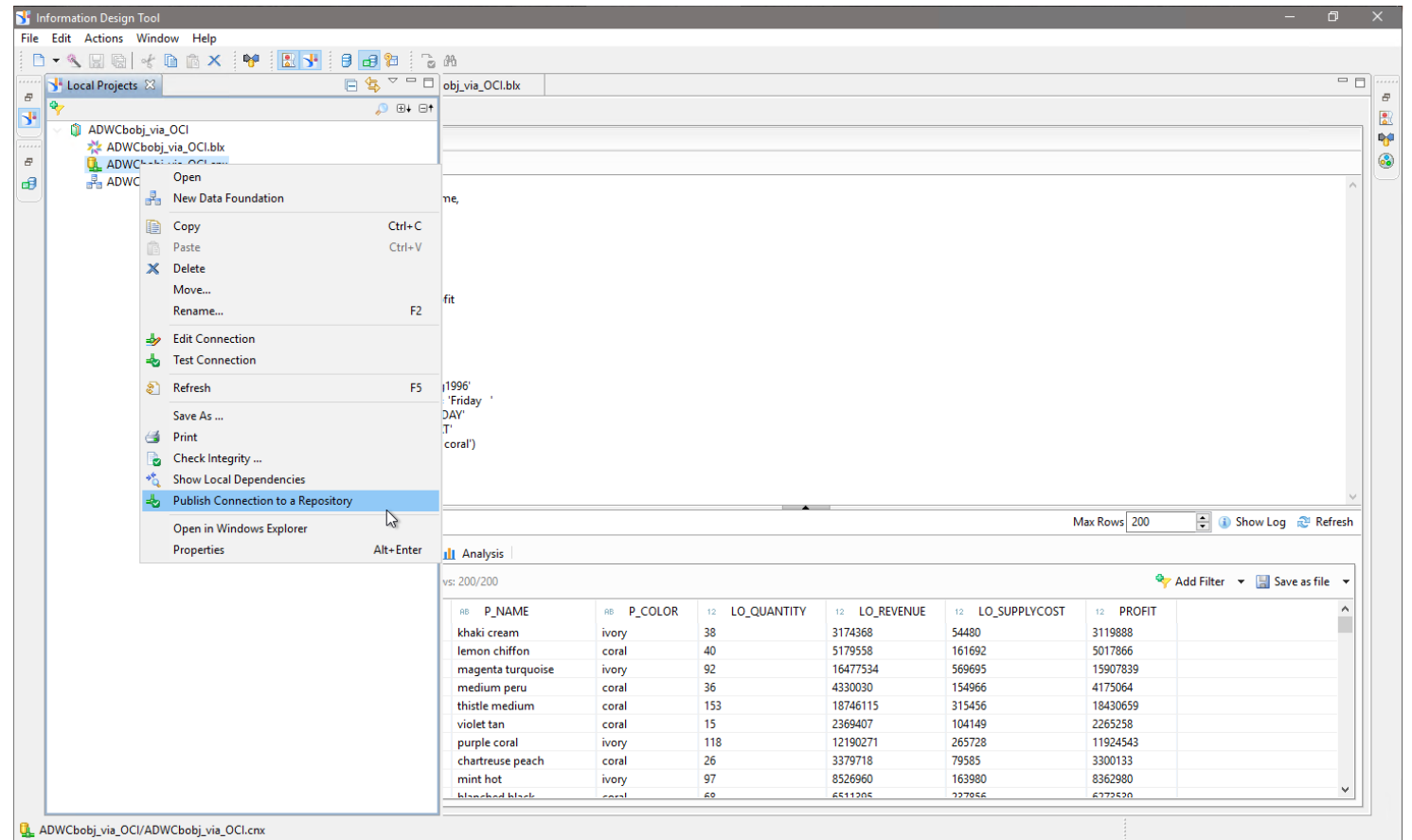
Below the query, the results are shown in the 'Raw Data' tab. The results indicate 200 rows were returned in 11437 ms. The data is presented in a table with the following columns: RB, TIME, RB, PART, RB, P_NAME, RB, P_COLOR, 12, LO_QUANTITY, 12, LO_REVENUE, 12, LO_SUPPLYCOST, 12, PROFIT.

RB	TIME	RB	PART	RB	P_NAME	RB	P_COLOR	12	LO_QUANTITY	12	LO_REVENUE	12	LO_SUPPLYCOST	12	PROFIT
	August 1, 1996	8			khaki cream		ivory		38		3174368		54480		3119888
	August 1, 1996	447			lemon chiffon		coral		40		5179558		161692		5017866
	August 1, 1996	998			magenta turquoise		ivory		92		16477534		569695		15907839
	August 1, 1996	1390			medium peru		coral		36		4330030		154966		4175064
	August 1, 1996	1413			thistle medium		coral		153		18746115		315456		18430659
	August 1, 1996	1834			violet tan		coral		15		2369407		104149		2265258
	August 1, 1996	2205			purple coral		ivory		118		12190271		265728		11924543
	August 1, 1996	2424			chartreuse peach		coral		26		3379718		79585		3300133
	August 1, 1996	3008			mint hot		ivory		97		8526960		163980		8362980
	August 1, 1996	3088			bleached black		coral		69		6511205		227056		6272629

Information Design Tool

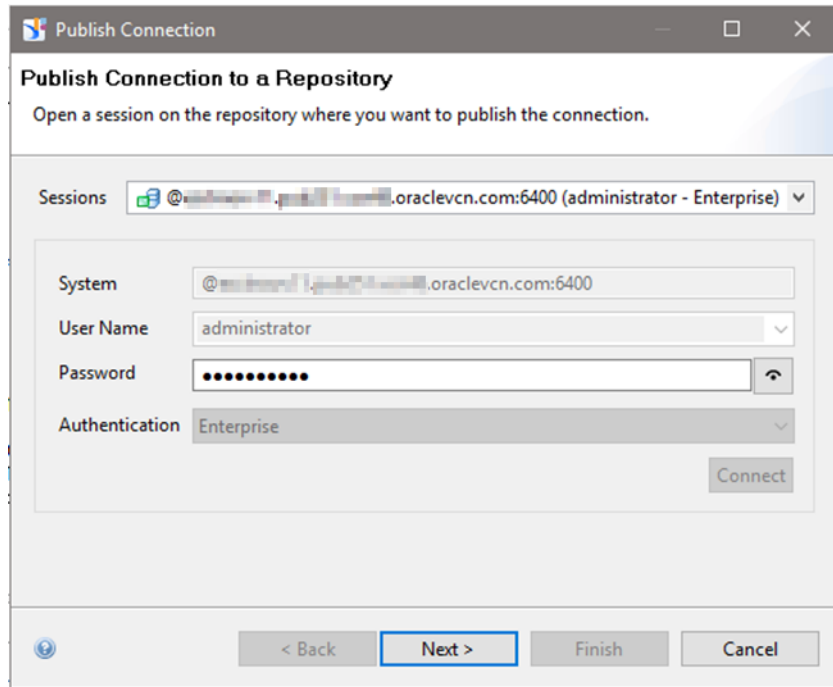
Universe Connection: Publish

- To publish the local connection to the SAP BO server, first navigate to the Local Projects tab (located under the Windows menu).
- If not already, Expand the active Local Project (ADWCbobj_via_OCI).
- Right click on the local connection (.cnx) and select Publish Connection to a Repository.



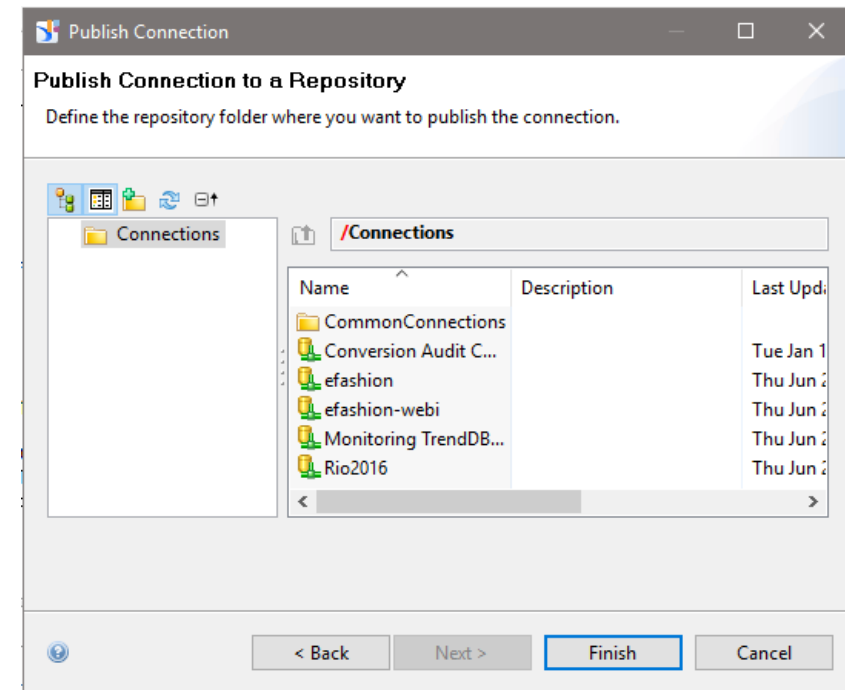
Information Design Tool

Universe Connection: Publish



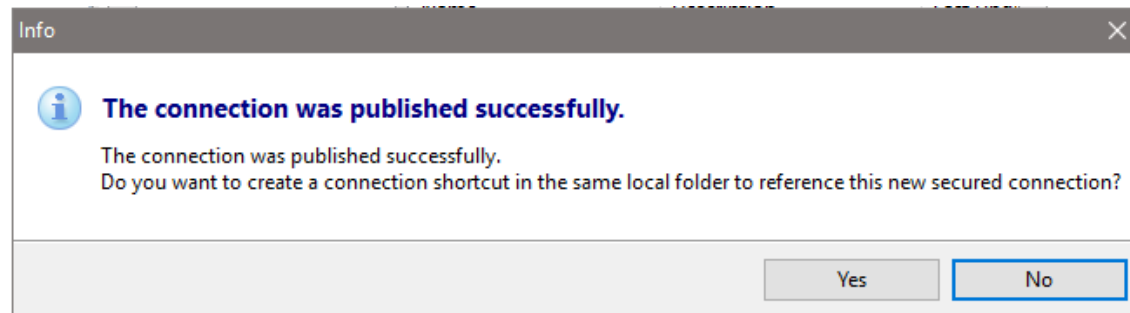
- Provide the required Password for the current Session.

- Select a folder to store the connection on the SAP BO server.



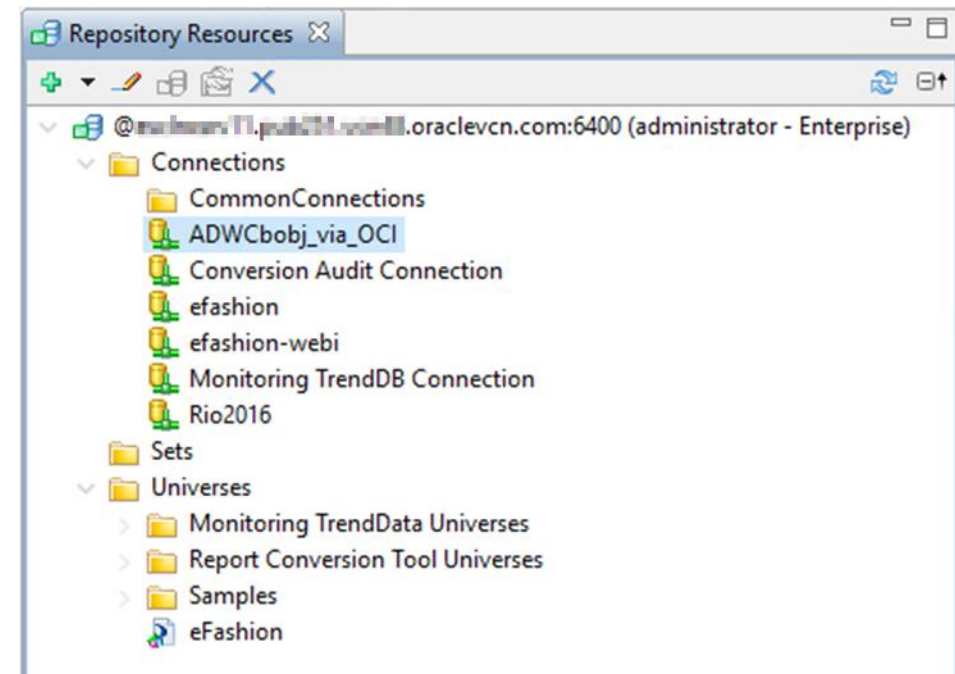
Information Design Tool

Universe Connection: Publish



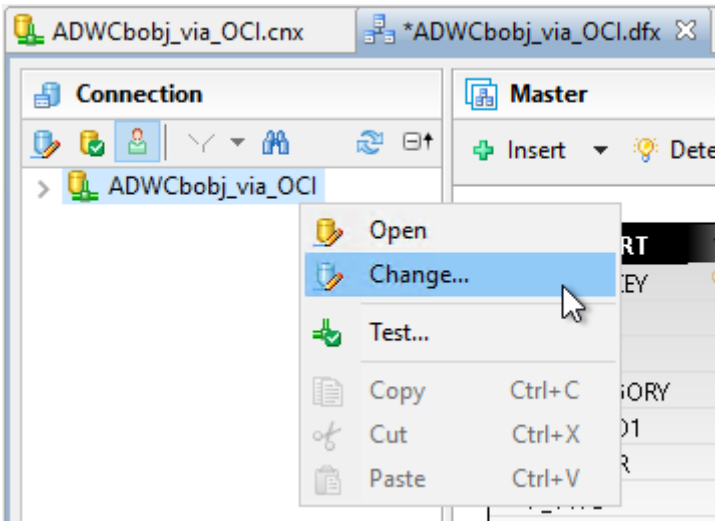
- Select Yes to create a shortcut to the published connection in the Local Project.

- Verify the newly published connection is visible under the Repository Resources tab.



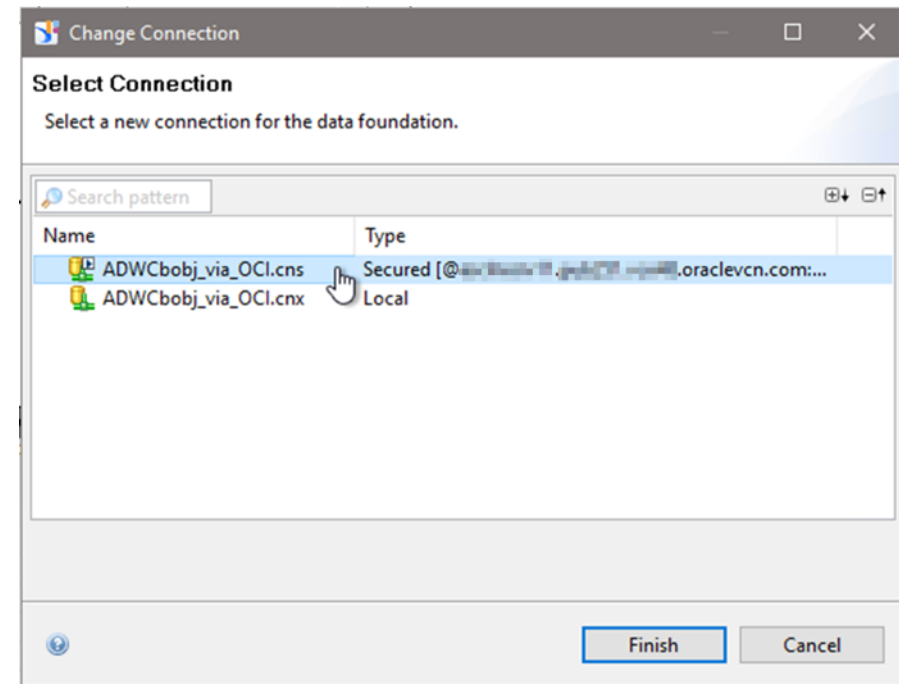
Information Design Tool

Universe Connection: Data Foundation Connection



- Change the local connection in the Data Foundation to use the new published connection.
- On the Data Foundation tab, right click on the connection and select Change.

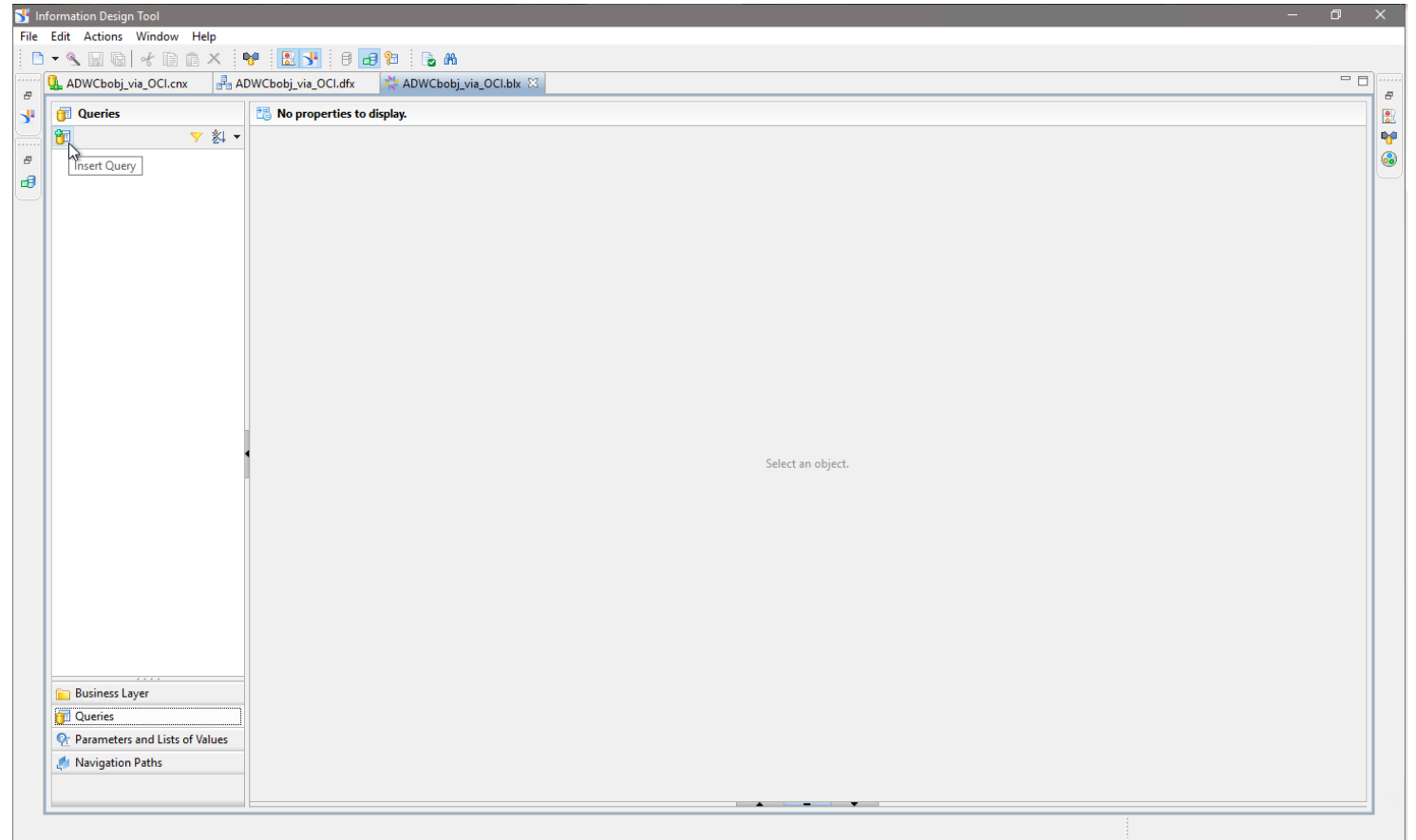
- Select the newly published connection (.cns) and press Finish to switch the connection.



Information Design Tool

Universe Business Layer: Query

- The next step would be to add a query to the Universe's Business Layer.
- Select the Queries section on the Business Layer tab and press the Insert Query button.



Information Design Tool

Universe Business Layer: Query

- Drag columns or entire tables to Result Objects section to start building a query.
- Where clause can be added and Ranking in the Query Filters section.
- Pressing the Refresh button updates the results of the query.
- In the example the enter Customer table was used with no filters.
- When the desired query is complete, press OK.

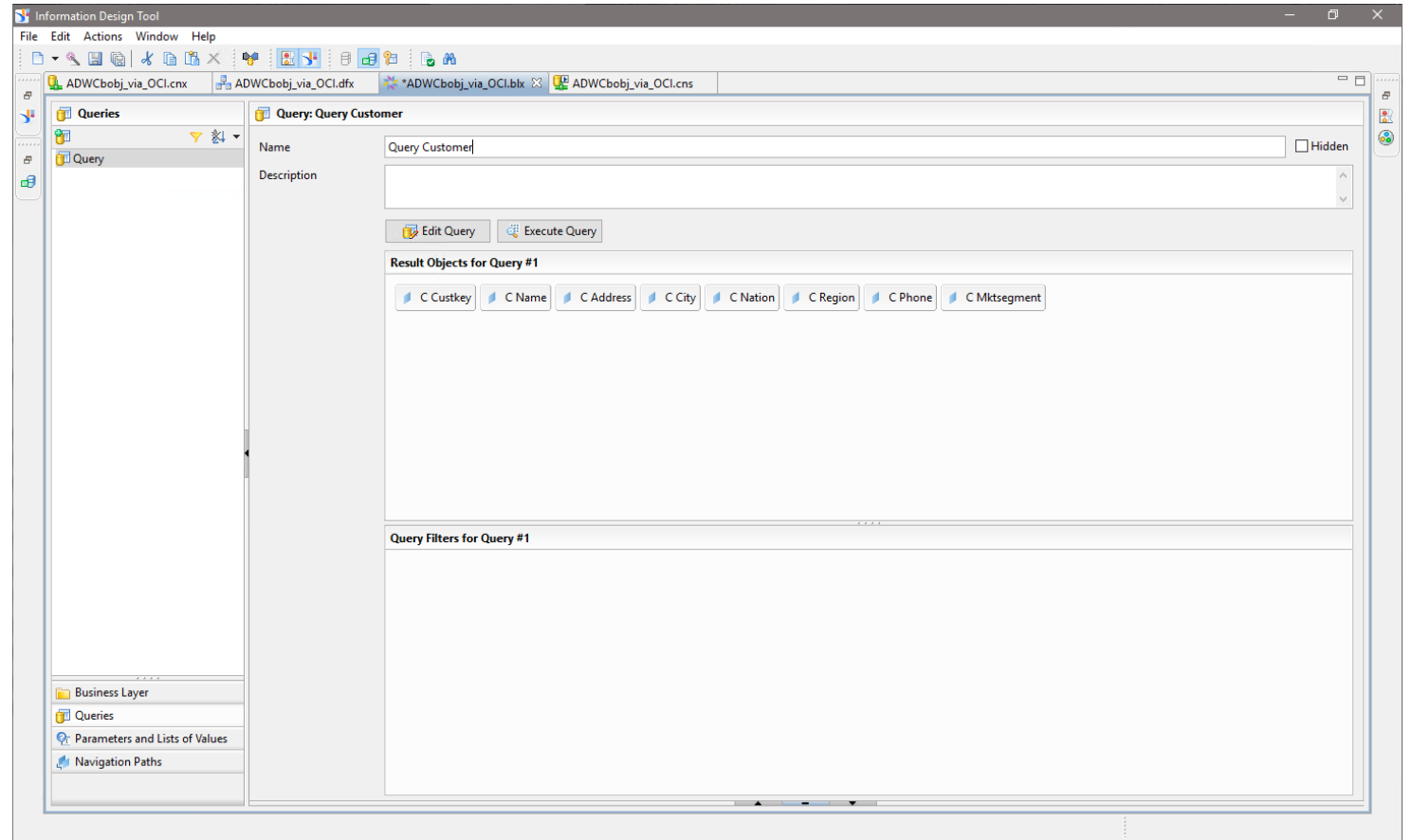
The screenshot shows the Oracle Information Design Tool Query Panel. The interface includes a left-hand pane for the 'Universe: ADWCbobj_via_OCI' with a tree view containing tables like Customer, Dwdate, Lineorder, Part, and Supplier. The main area is divided into sections: 'Result Objects for Query #1' with buttons for columns (C Custkey, C Name, C Address, C City, C Nation, C Region, C Phone, C Mktsegment); 'Query Filters for Query #1' with a 'Drop your filters here.' prompt; and 'Partial Results (200 rows - 609 ms)' which displays a table of data. The table has columns for C Custkey, C Name, C Address, C City, C Nation, C Region, C Phone, and C Mktsegment. At the bottom right, there are 'OK' and 'Close' buttons.

C Custkey	C Name	C Address	C City	C Nation	C Region	C Phone	C Mktsegment
17635532	Customer#017635532	vZYASXLARjB8pS	UNITED ST8	UNITED STATES	AMERICA	34-113-411-8772	MACHINERY
17635533	Customer#017635533	Q2Bv2lPN,	ETHIOPIA 8	ETHIOPIA	AFRICA	15-922-544-9678	BUILDING
17635534	Customer#017635534	hvHOx1N9DeW5LwiWJzQm7	ETHIOPIA 4	ETHIOPIA	AFRICA	15-455-270-1411	MACHINERY
17635535	Customer#017635535	wJmDOr	CHINA 9	CHINA	ASIA	28-756-199-5197	AUTOMOBILE
17635536	Customer#017635536	Nq1YMYBx	UNITED K18	UNITED KINGDOM	EUROPE	33-241-398-9805	FURNITURE
17635537	Customer#017635537	FmoXreHDvdxKRRJfzUx7	ARGENTINA3	ARGENTINA	AMERICA	11-154-695-3334	AUTOMOBILE
17635538	Customer#017635538	3nN yLr3AFV	IRAN 5	IRAN	MIDDLE EAST	20-377-896-1772	HOUSEHOLD
17635539	Customer#017635539	6NO12P9D5E,aFO4gLF7	CANADA 4	CANADA	AMERICA	13-927-680-5829	FURNITURE
17635540	Customer#017635540	Tw2AkE,9Sa 1FqxFe3zXPO	JAPAN 6	JAPAN	ASIA	22-242-885-8134	AUTOMOBILE
17635541	Customer#017635541	IDgMcCrM7sL	MOZAMBIQU5	MOZAMBIQUE	AFRICA	26-856-865-6645	AUTOMOBILE
17635542	Customer#017635542	A9UPjx,4cCP67OkmHef	JAPAN 1	JAPAN	ASIA	22-756-855-9633	AUTOMOBILE
17635543	Customer#017635543	Bh44AwxGZeeUFn	INDIA 6	INDIA	ASIA	18-836-722-5403	MACHINERY
17635544	Customer#017635544	p3piA2Fc	ROMANIA 4	ROMANIA	EUROPE	29-933-674-2351	FURNITURE

Information Design Tool

Universe Business Layer: Query

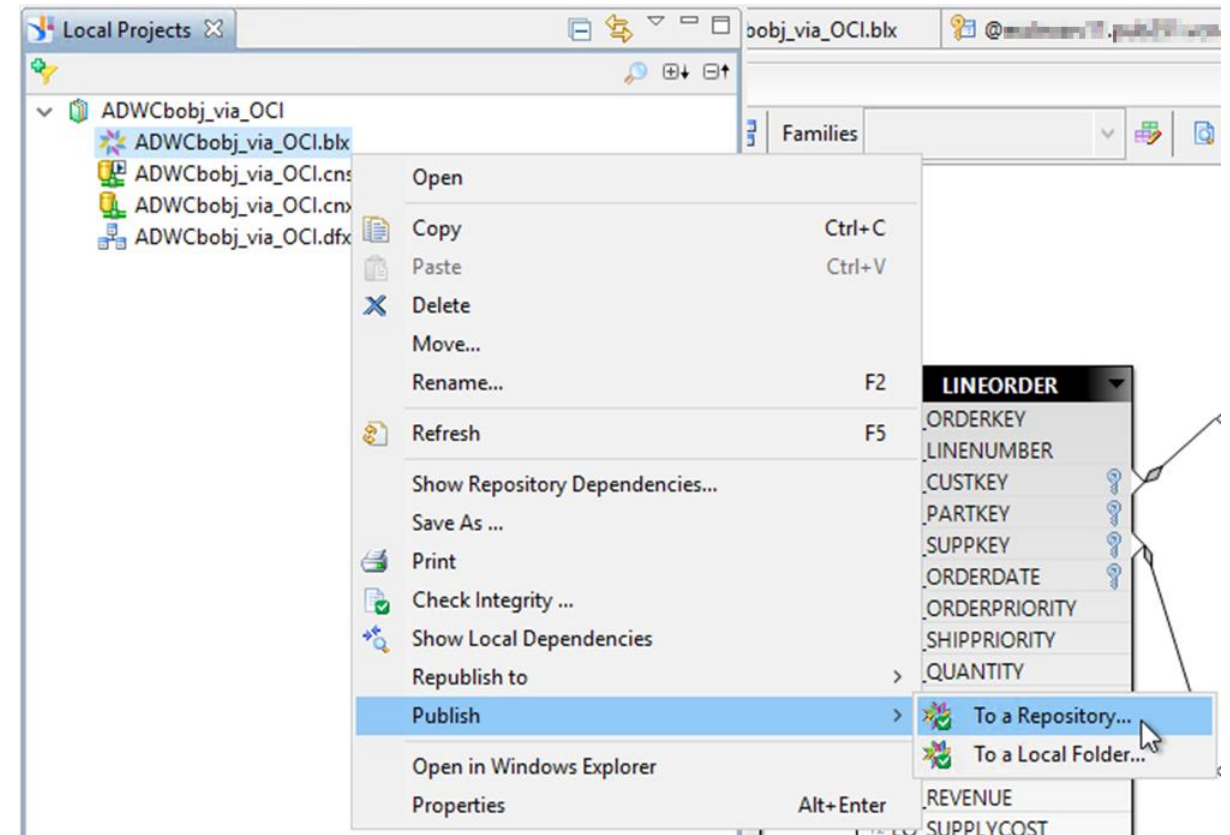
- One last step would be to provide a meaningful name to the new query.
- In this example it was named `Query Customer`.



Information Design Tool

Universe: Publish

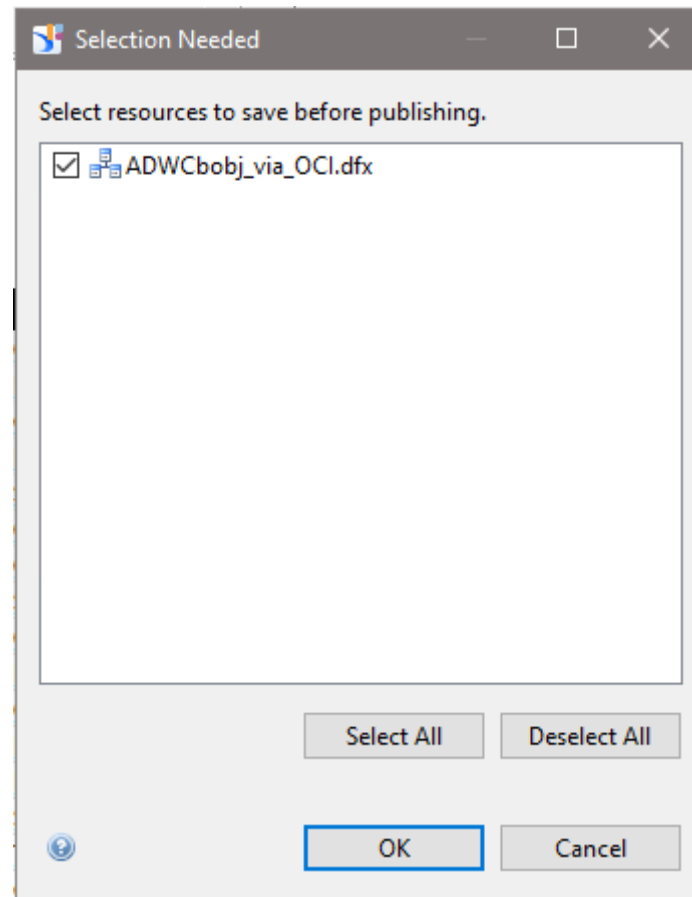
- To publish a local Universe to the SAP BO server, navigate back to the Local Projects tab.
- If not already, Expand the active Local Project (ADWCbobj_via_OCI).
- Go back to the Local Projects tab and right click on the Business Layer (.blx).
- Select To a Repository under the Publish menu entry.



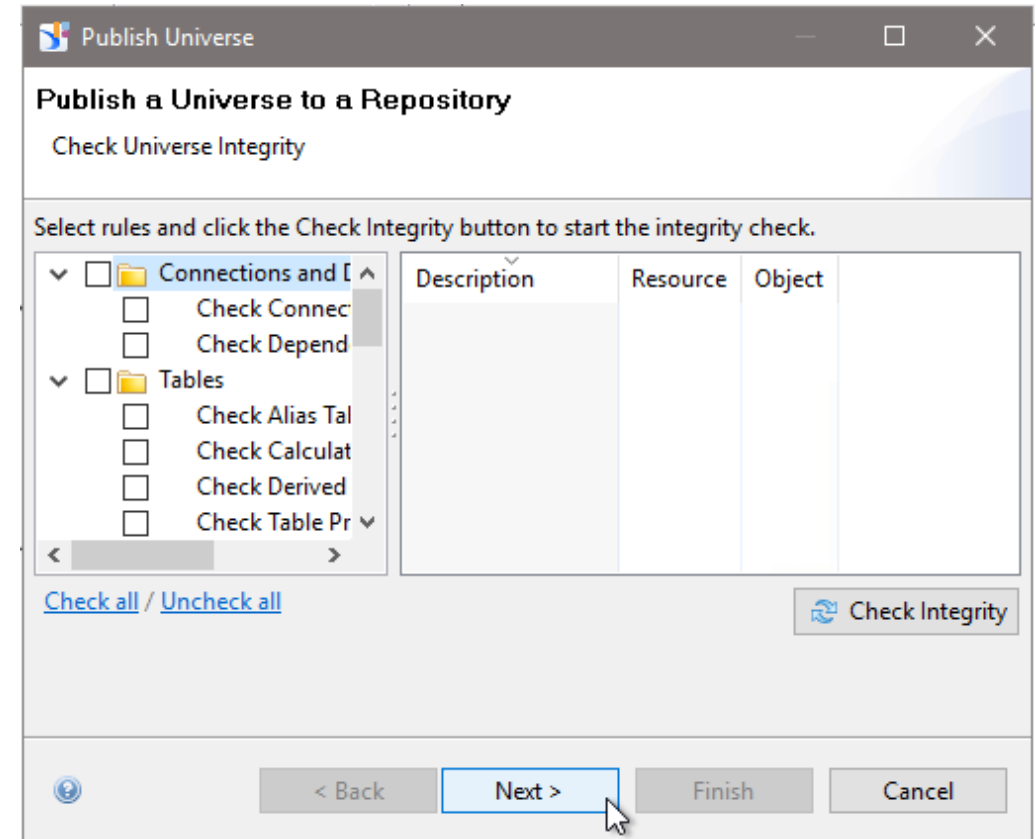
Information Design Tool

Universe: Publish

- Select any resource needing to be saved prior to publishing the universe.

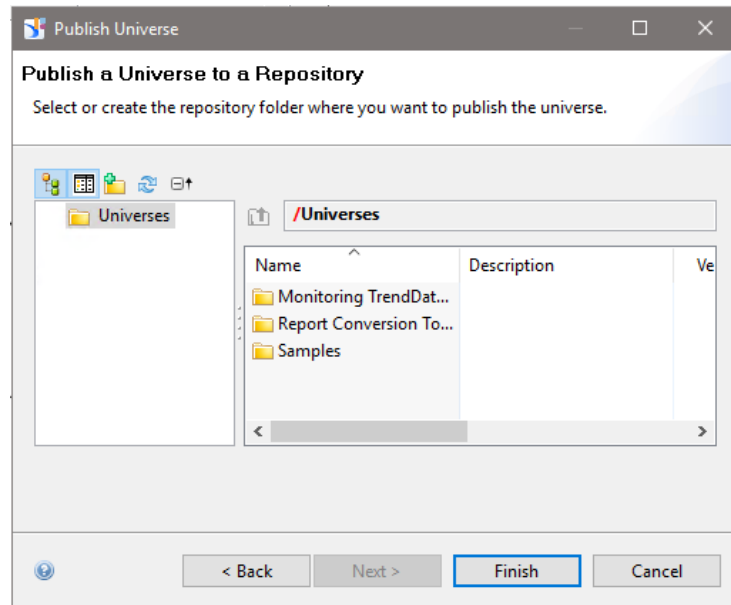


- Choose any desired Integrity Checks.

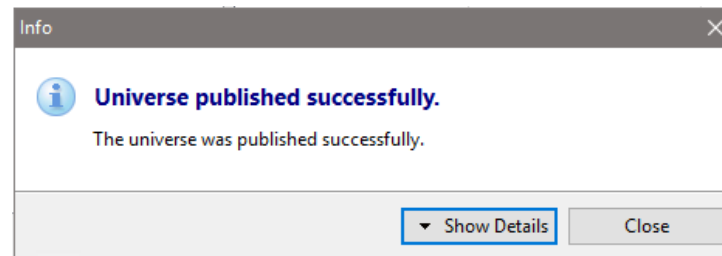


Information Design Tool

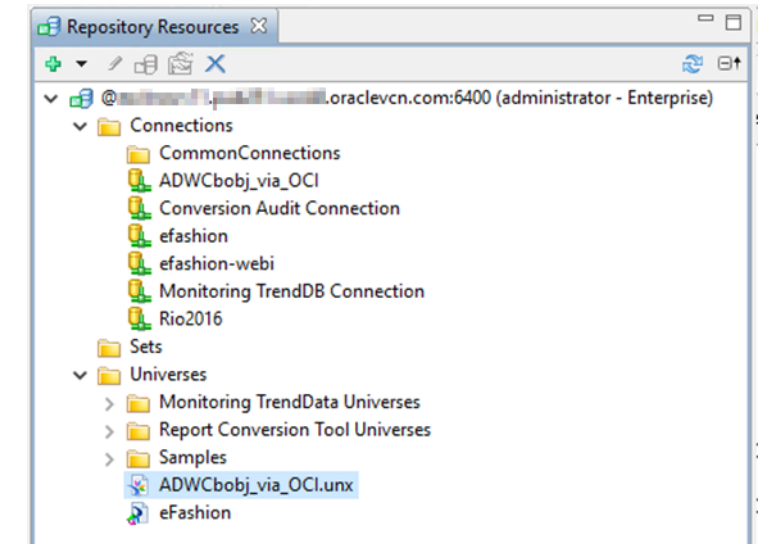
Universe: Publish



- Select a folder to store the Universe on the SAP BO server.



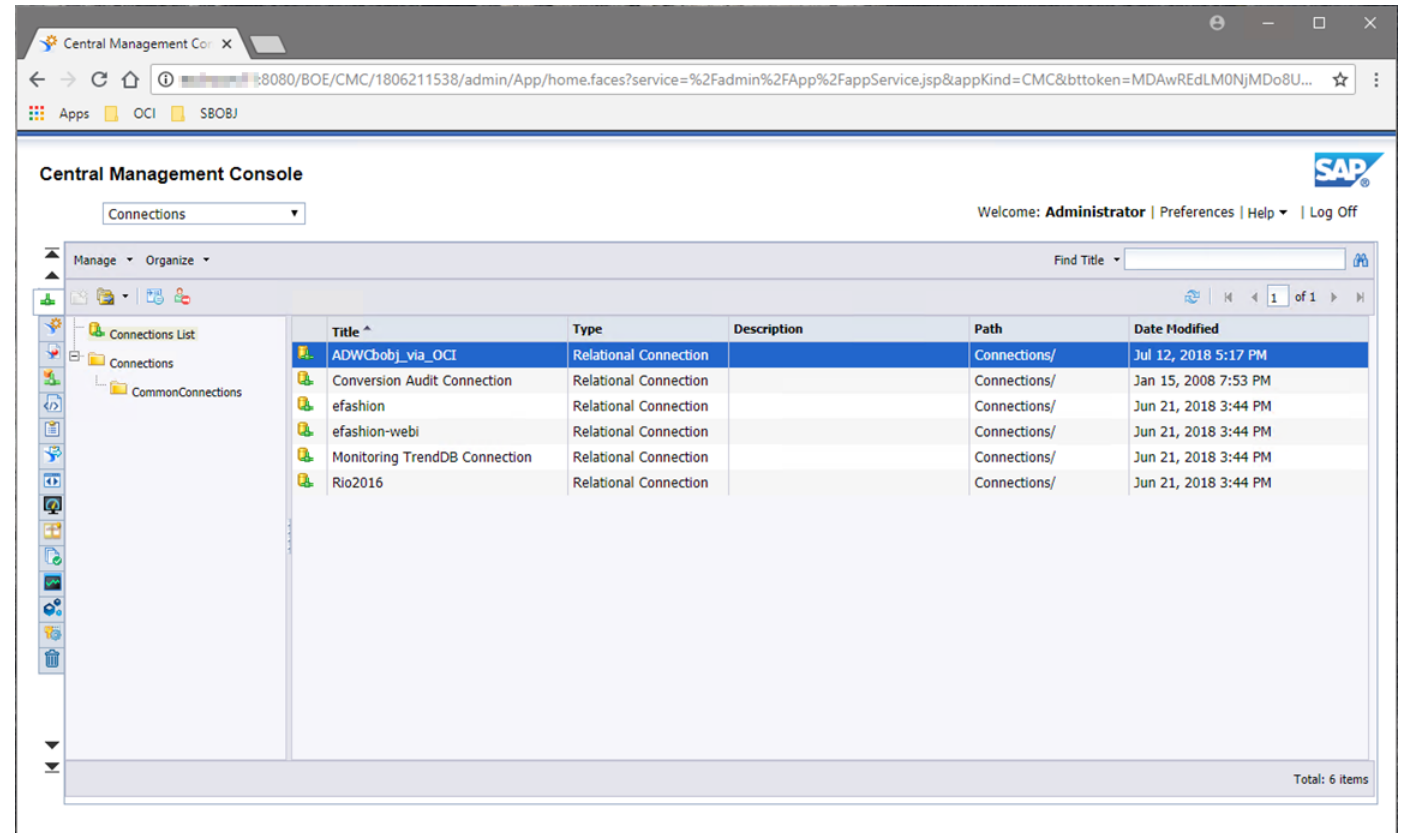
- Verify the newly published Universe is visible under the Repository Resources Tab.



Center Management Console

Published Connection Verification

- After a connection is published to the SAP BO server it should be visible via the CMC.
- Login in to the CMC and go to the Connections view to see all published connections to validate.



The screenshot displays the SAP Central Management Console (CMC) interface. The browser address bar shows the URL: `http://18080/BOE/CMC/1806211538/admin/App/home.faces?service=%2Fadmin%2Fapp%2FappService.jsp&appKind=CMC&bttoken=MDAwRedLM0NjMDo8U...`. The page title is "Central Management Console". The user is logged in as "Administrator". The main content area shows a table of connections under the "Connections" view.

Title	Type	Description	Path	Date Modified
ADWCobj_via_OCI	Relational Connection		Connections/	Jul 12, 2018 5:17 PM
Conversion Audit Connection	Relational Connection		Connections/	Jan 15, 2008 7:53 PM
efashion	Relational Connection		Connections/	Jun 21, 2018 3:44 PM
efashion-webi	Relational Connection		Connections/	Jun 21, 2018 3:44 PM
Monitoring TrendDB Connection	Relational Connection		Connections/	Jun 21, 2018 3:44 PM
Rio2016	Relational Connection		Connections/	Jun 21, 2018 3:44 PM

Total: 6 items

Center Management Console

Published Universe Verification

- After a universe is published to the SAP BO server it should be visible via the CMC.
- Login in to the CMC and go to the Universes view to see all published universes to validate.

The screenshot shows the SAP Central Management Console (CMC) interface. The browser address bar indicates the URL: `http://localhost:8080/BOE/CMC/1806211538/admin/App/home.faces?service=%2Fadmin%2Fapp%2FappService.jsp&appKind=CMC&bttoken=MDAwRedLM0NjMDo8U...`. The page title is "Central Management Console" and the user is logged in as "Administrator".

The main content area displays a table of published universes. The table has the following columns: Title, Type, Description, Path, and Date Modified. The data rows are as follows:

Title	Type	Description	Path	Date Modified
ADWCobj_via_OCI.unx	Universe (Information de		Universes/	Jul 12, 2018 5:17 PM
eFashion	Universe	eFashion retail Data Warehouse data	Universes/Samples/	Jun 21, 2018 3:44 PM
eFashion	Universe	eFashion retail Data Warehouse creat	Universes/	Jun 21, 2018 3:44 PM
Monitoring TrendData Universe	Universe		Universes/Monitoring Tre	Jun 21, 2018 3:44 PM
Report Conversion Tool Audit Univers	Universe		Universes/Report Conver	Jan 15, 2008 8:19 PM
Rio2016.unx	Universe (Information de		Universes/Samples/	Jun 21, 2018 3:44 PM

The interface also shows a left-hand navigation pane with "Universes List" and "Samples" folders. The bottom right corner of the table indicates "Total: 6 items".

Report Creation with Crystal Reports

At this point the guide is dependent on the success of all the previous sections. Crystal Reports will use the published Universe to build a basic report utilizing the ADWC connection.

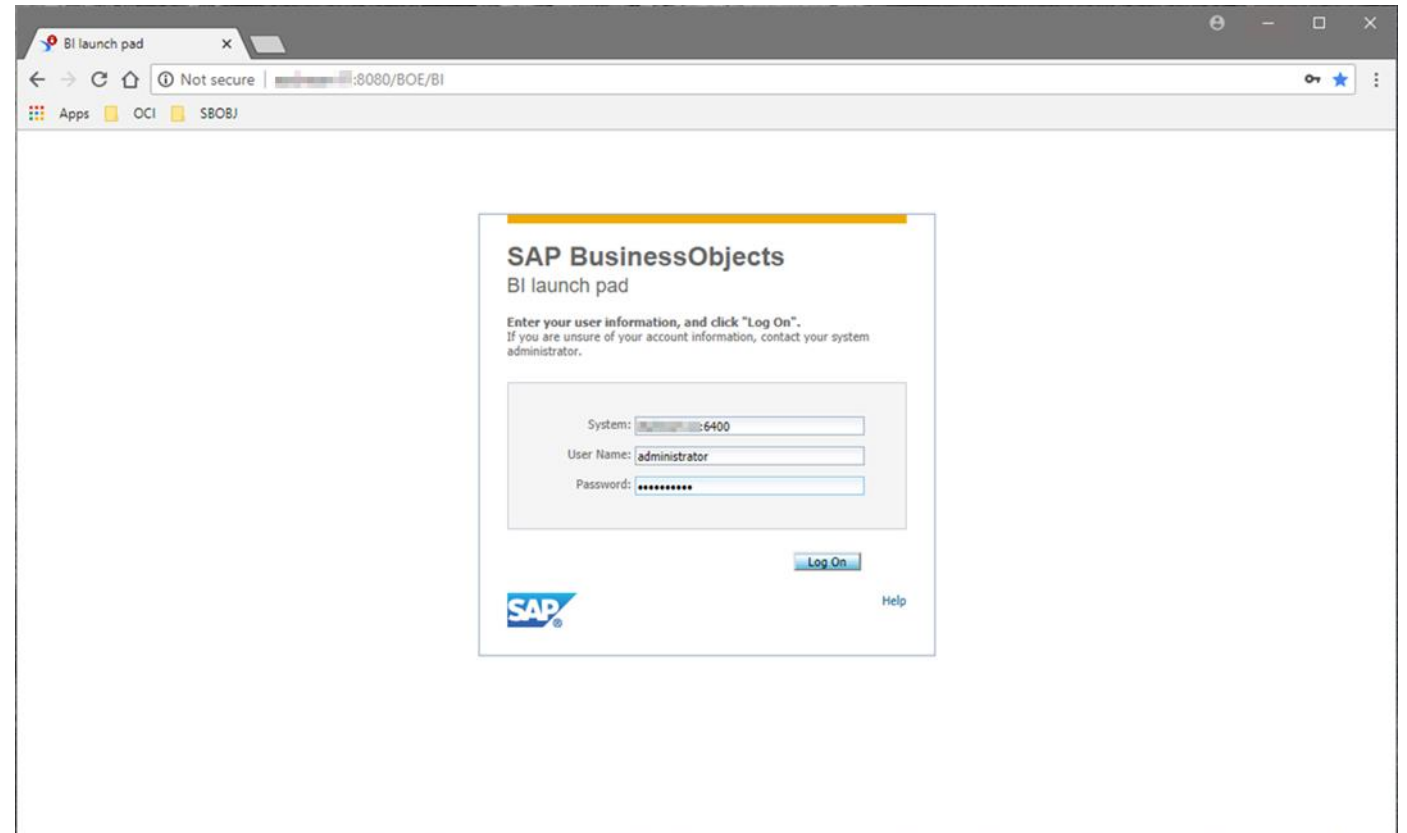
The following requirements are needed.

- SAP BusinessObjects application login credentials.
- Access to the Central Management Console (<http://<hostname>:8080/BOE/CMC>).
- Access to the BI Launch Pad (<http://<hostname>:8080/BOE/BI>).
- A Windows desktop with client development tools for SAP BusinessObjects.

BI Launch Pad

Report Creation

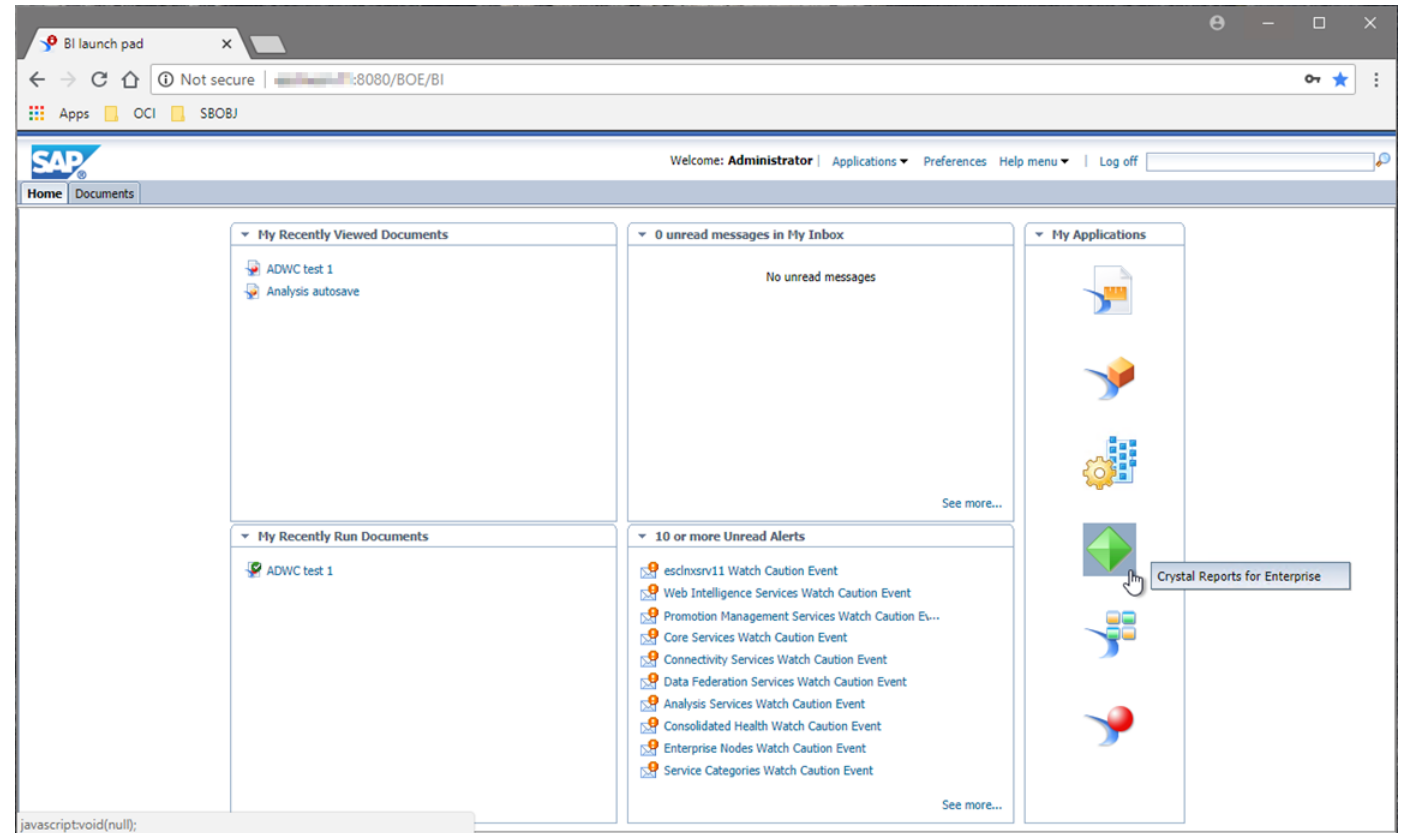
- Login in to BI Launch Pad.



BI Launch Pad

Crystal Reports

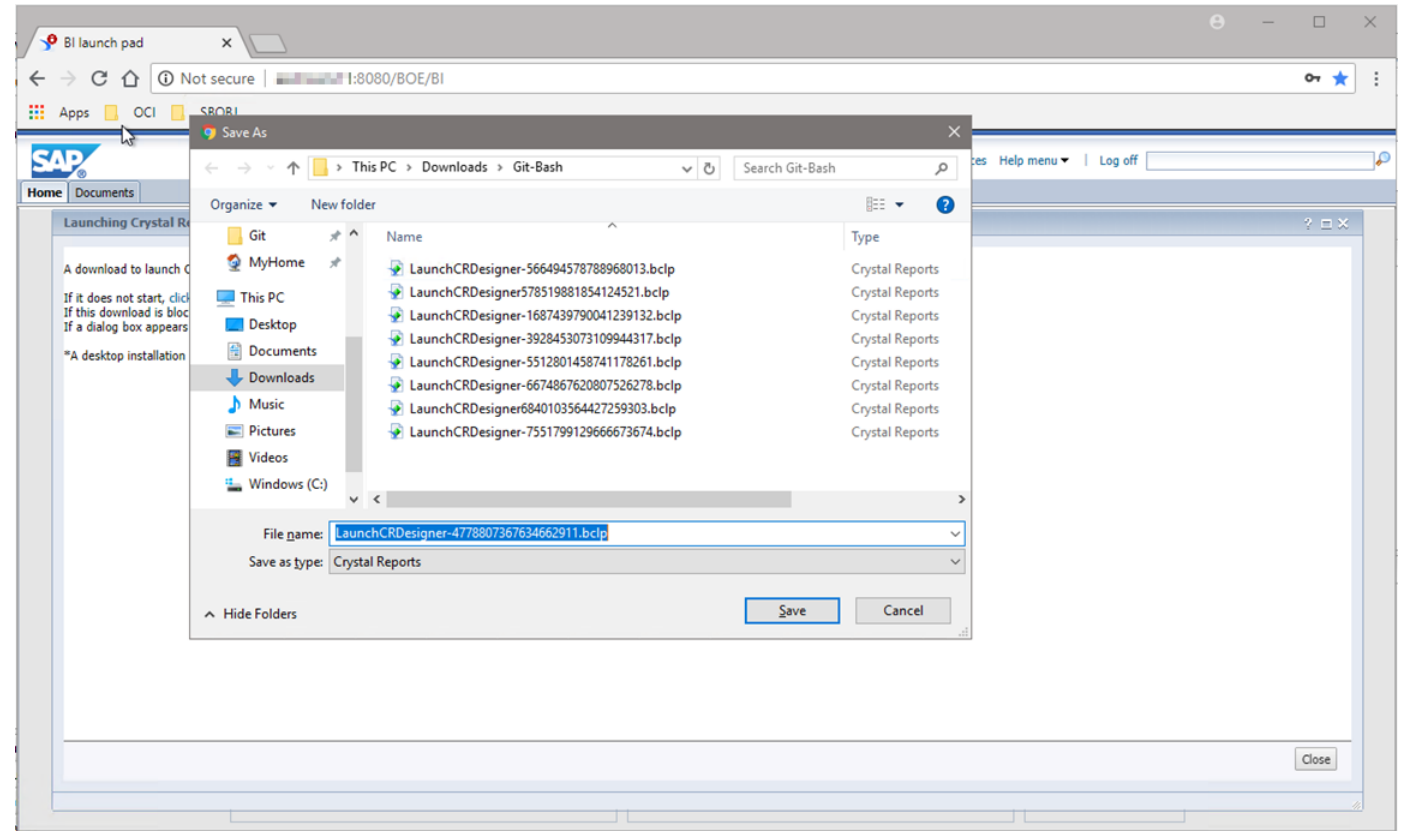
- Select the Crystal Reports designer application.



BI Launch Pad

Crystal Reports

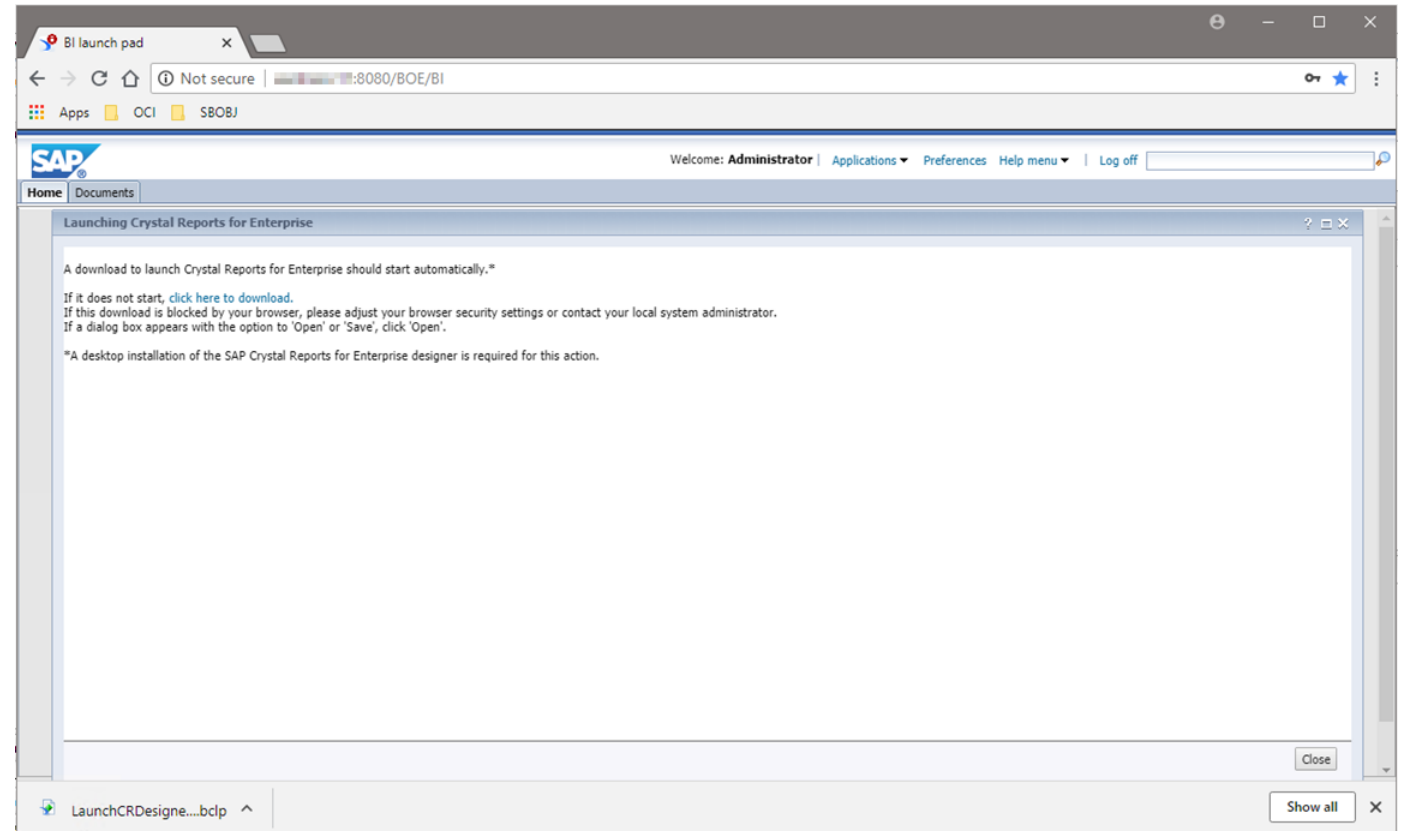
- In Chrome this typically prompts to download a file of type .bclp.



BI Launch Pad

Crystal Reports

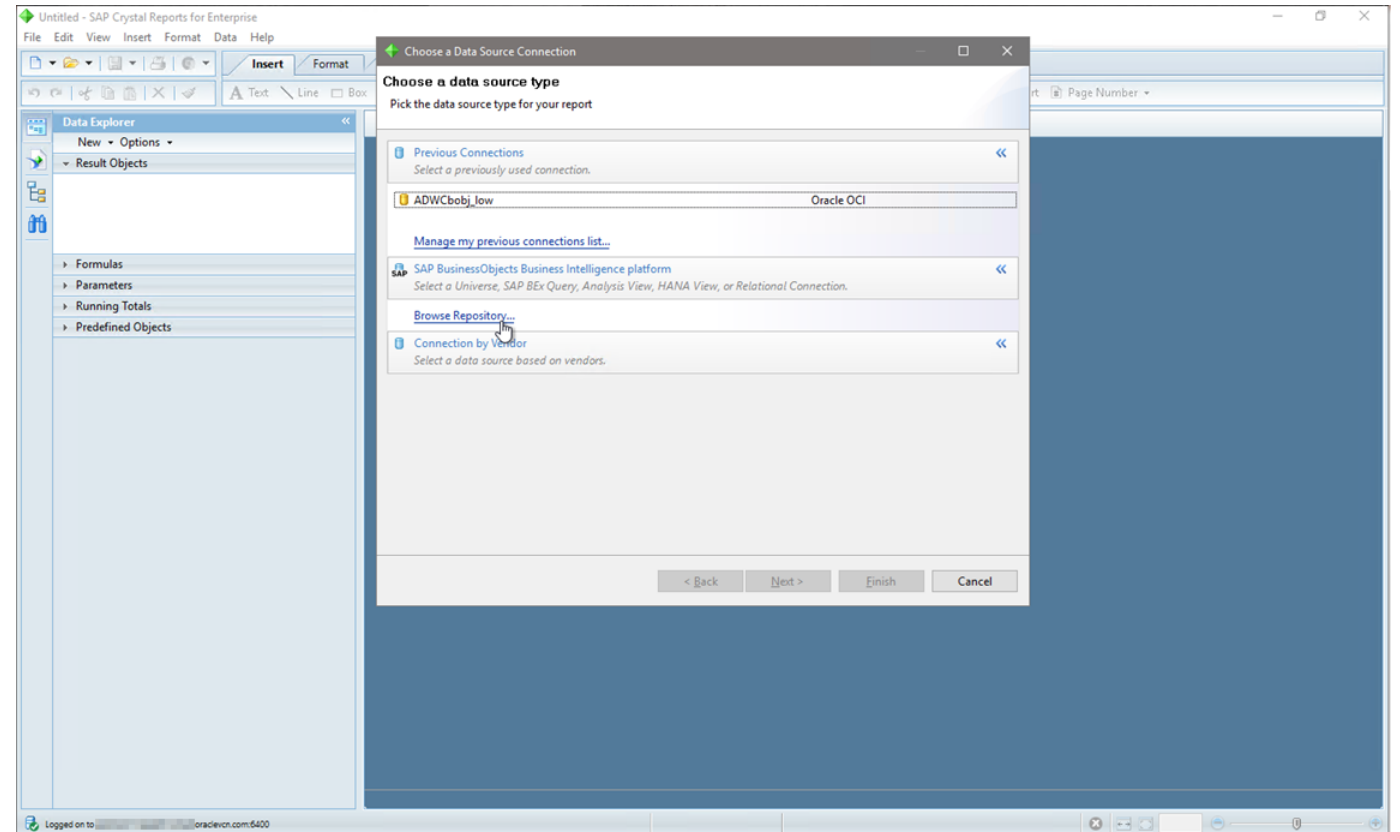
- Follow the directions displayed in the BI Launch Pad window.
- Typically one can simply click on the file name displayed in the browser footer. This will launch the file via the associated application.



BI Launch Pad

Crystal Reports: Create Report

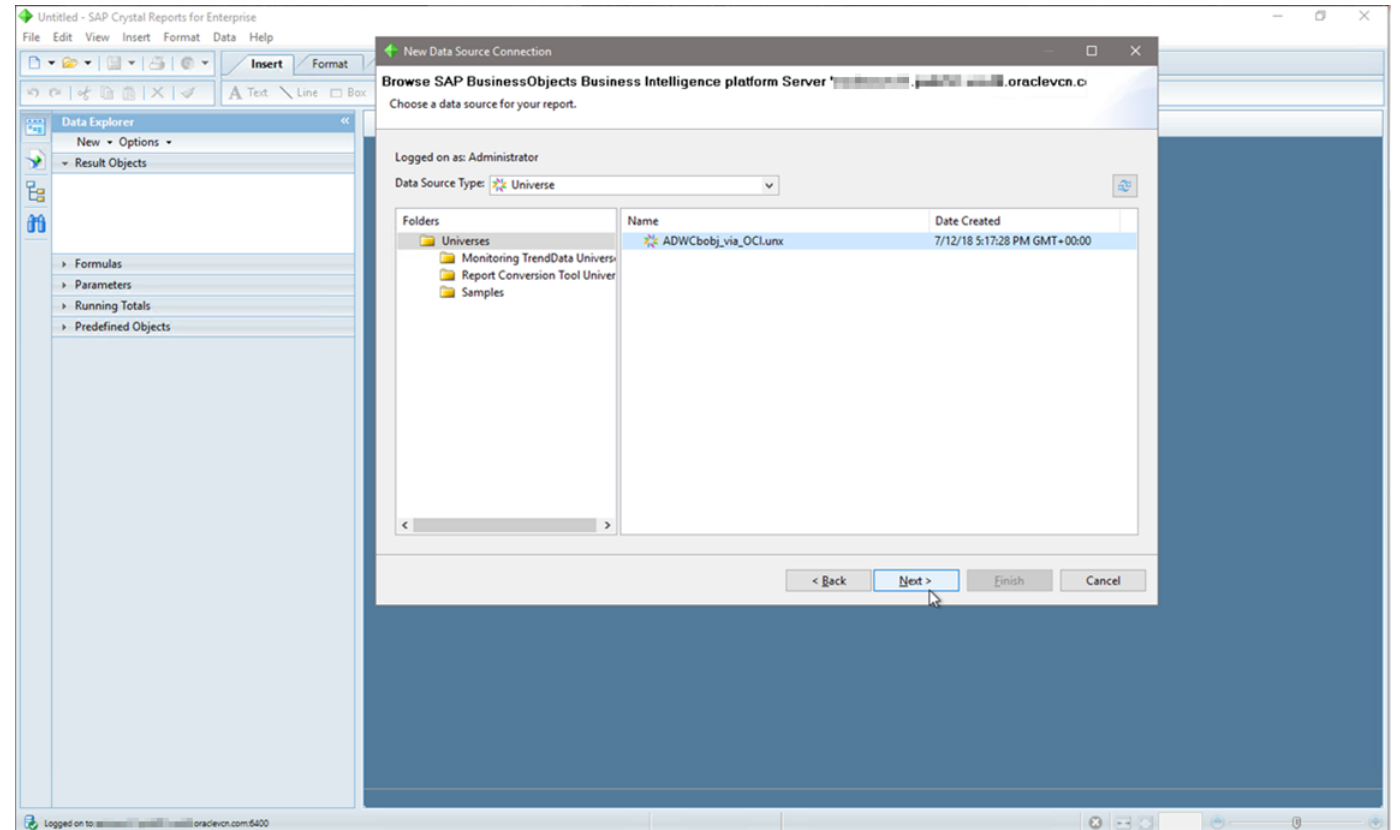
- To create a new report derived from a previously published universe, click on the Browse Repository... link.
- Reports can also be created by manually entering the necessary connection information. This can be achieved by selecting Connection by Vendor.



BI Launch Pad

Crystal Reports: Create Report

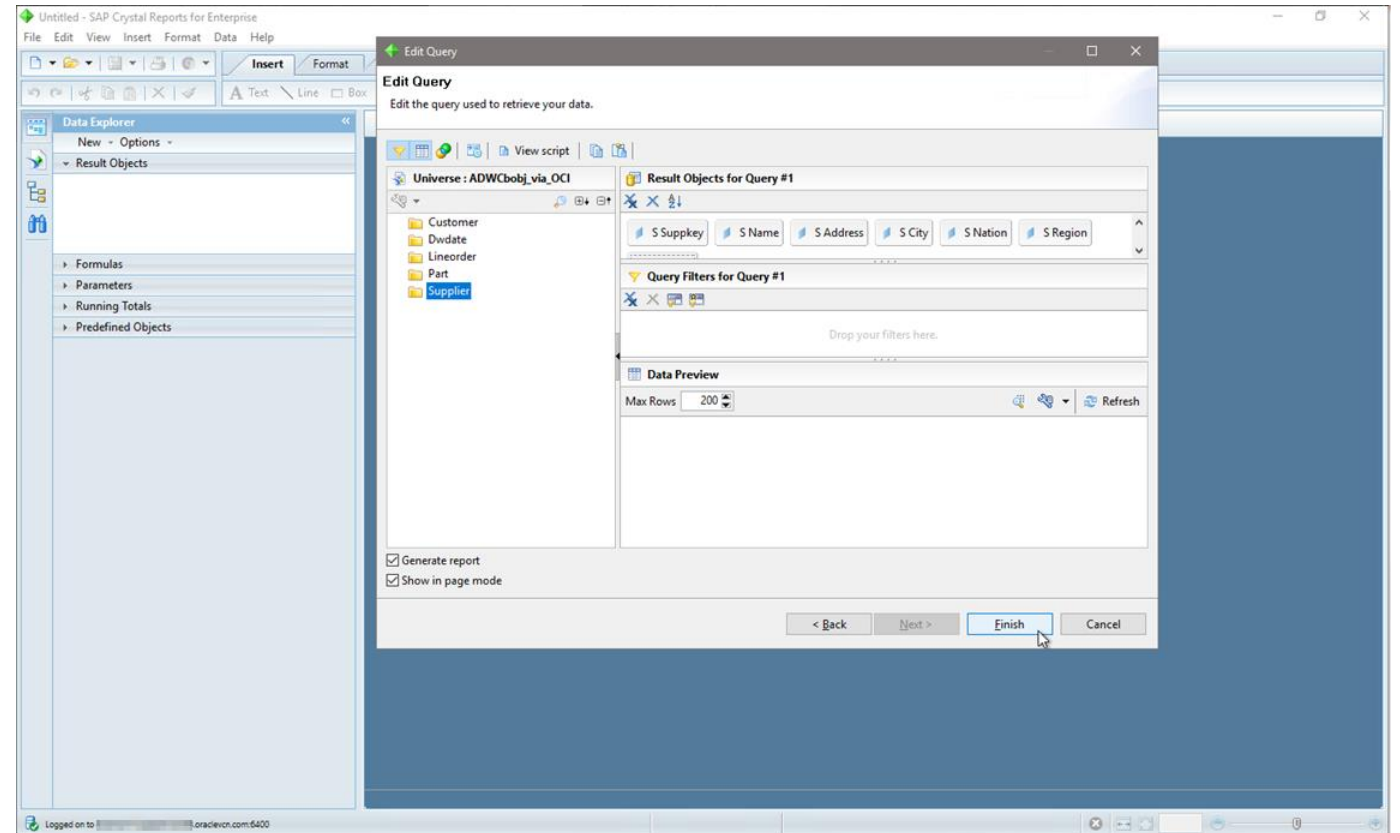
- Locate the sought after universe and click next.
- In this example, the universe `ADWCbobj_via_OCI` was used.



BI Launch Pad

Crystal Reports: Create Report

- Choose the tables and columns for the report.
- Add any filters and/or ranking to the query.
- Pressing the Refresh button displays the results of the query.
- Press Finish when complete to enter designer.



BI Launch Pad

Crystal Reports: Designer

- Crystal Reports will autogenerate a simple report from the query.
- Customize the report and save.

The screenshot displays the SAP Crystal Reports Designer interface. The main window shows a report layout with a data table. The table has the following columns: S Suppkey, S Name, S Address, S City, S Nation, S Region, and S Phone. The data is organized into a grid with 10 rows and 7 columns. The report is titled '7/12/18' and is displayed on page 1 of 52. The interface includes a menu bar (File, Edit, View, Insert, Format, Data, Help), a toolbar, and a Data Explorer pane on the left showing the report structure and data sources.

S Suppkey	S Name	S Address	S City	S Nation	S Region	S Phone	
499,764.00	Supplier#000499764	GLok62Vf61LV1C	MOZAMBIQU9	MOZAMBIQUE	AFRICA	26-478-184-5381	
499,861.00	Supplier#000499861	02_IR3AR90	IRAQ 9	IRAQ	MIDDLE EAST	21-268-152-2878	
499,865.00	Supplier#000499865	IY8 p7.2lxI	INDIA 3	INDIA	ASIA	18-951-149-9804	
499,911.00	Supplier#000499911	jc1tkV6	INDIA 8	INDIA	ASIA	18-114-914-4257	
500,003.00	Supplier#000500003	2dHk0PVP5yWR3	UNITED ST0	UNITED STATES	AMERICA	34-976-779-6099	
1,333,868.00	Supplier#001333868	5Ep1nhOP	IRAN 0	IRAN	MIDDLE EAST	20-547-333-3448	
1,333,890.00	Supplier#001333890	zEDCYJ wrf,ed7127s	bP5	CHINA	ASIA	28-420-577-1403	
1,333,909.00	Supplier#001333909	UAI4vu	ETHIOPIA 1	ETHIOPIA	AFRICA	15-974-624-3683	
1,333,931.00	Supplier#001333931	Y8xEAlr	VIETNAM 8	VIETNAM	ASIA	31-118-797-1146	
1,333,959.00	Supplier#001333959	DS2BDFXuWu3UbXm	UMNmEv	UNITED ST4	UNITED STATES	AMERICA	34-129-681-3973
1,334,061.00	Supplier#001334061	11iIGIErzg4K4M8rtzf	RUSSIA 2	RUSSIA	EUROPE	32-683-648-1376	
1,334,111.00	Supplier#001334111	47MS7UZS166S kmLU	JORDAN 7	JORDAN	MIDDLE EAST	23-888-597-7709	
1,334,150.00	Supplier#001334150	65dwsQY2ol	EGYPT 1	EGYPT	MIDDLE EAST	14-694-669-4984	
1,334,178.00	Supplier#001334178	TJGzY JoP2	Zk8w6Bj9	UNITED ST5	UNITED STATES	AMERICA	34-245-145-4375
1,334,230.00	Supplier#001334230	M8eMzfxSi9gDgMRJ	KENYA 7	KENYA	AFRICA	24-379-101-7490	
1,334,322.00	Supplier#001334322	PFBBo0	GERMANY 6	GERMANY	EUROPE	17-543-505-1291	
1,334,366.00	Supplier#001334366	V_AWMNZNSovK5I	v4XZXE1h	INDIA 7	INDIA	ASIA	18-588-742-7939
1,334,375.00	Supplier#001334375	15qrO7OstyhYQzU46	Bc JJ5	KENYA 7	KENYA	AFRICA	24-284-853-5669
1,334,406.00	Supplier#001334406	aXgy_sDCe,	NU9o1V6sx	CANADA 2	CANADA	AMERICA	13-275-398-9958
1,334,431.00	Supplier#001334431	XA0Dw5JphwYDIU8KL	SxF9	WOURC2OH	KENYA 1	AFRICA	24-654-983-4946
1,334,432.00	Supplier#001334432	gT0mZYSoI7x6gS1fbx	MOZAMBIQU0	MOZAMBIQUE	AFRICA	26-764-796-7198	
1,334,469.00	Supplier#001334469	ZOL3eNWvavp7d	IRAQ 8	IRAQ	MIDDLE EAST	21-168-363-6134	
1,334,482.00	Supplier#001334482	QzS44ptlonnxpG3epp	WH	GERMANY 4	GERMANY	EUROPE	17-170-388-8446
1,334,486.00	Supplier#001334486	mBeAL5	PERU 2	PERU	AMERICA	27-922-706-3159	
1,334,522.00	Supplier#001334522	17rC2MmmlfVY	SAIINI ARA1	SAIINI ARA1	MIDDLE EAST	30-121-470-0001	

BI Launch Pad

Crystal Reports: Designer

- Saving the report will display Folders located on the SAP BO server.
- Select a location and name for the report.
- For this example, the report was named `Supplier Query` and saved to My Folders -> Inbox.

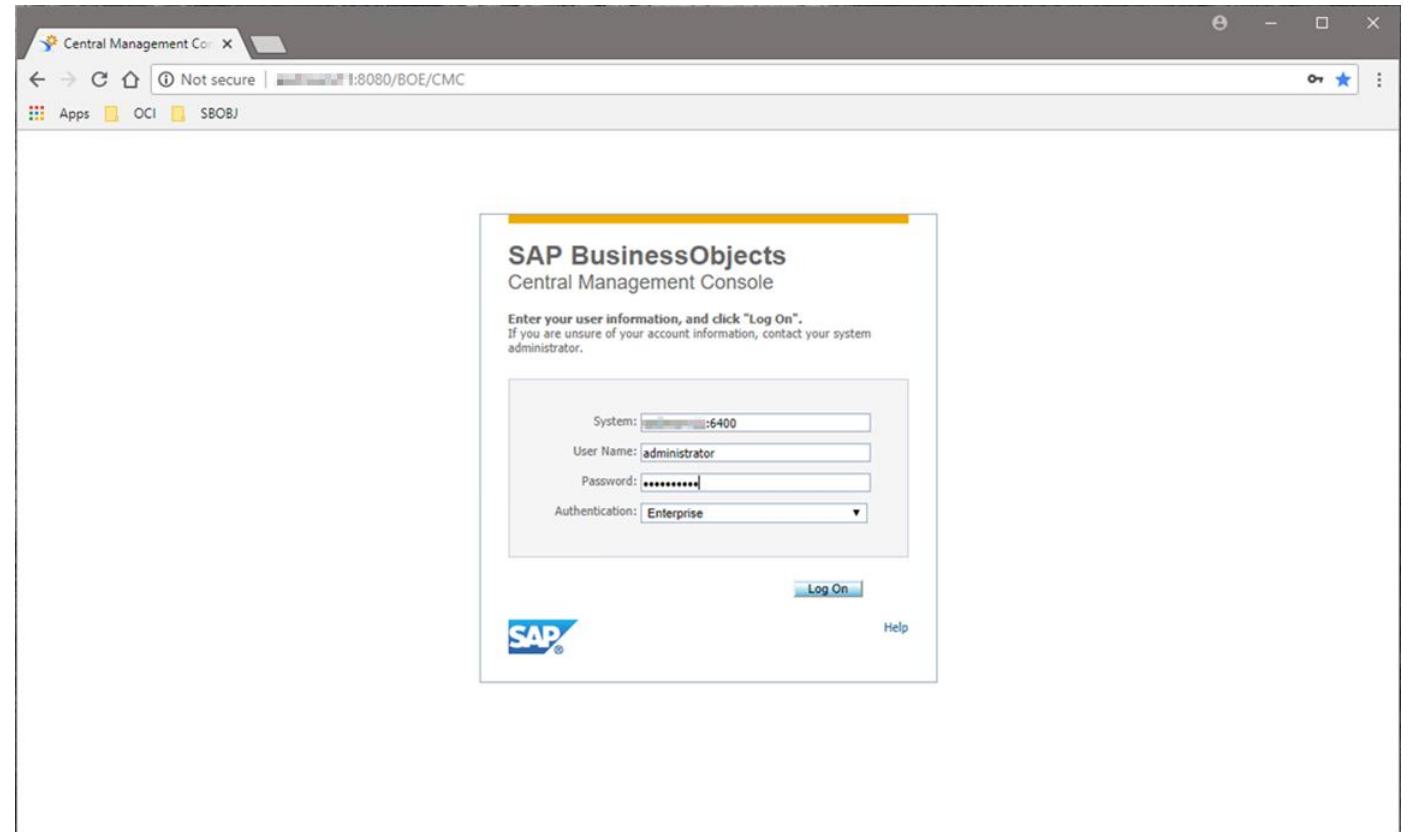
The screenshot shows the SAP Crystal Reports for Enterprise interface. A 'Save Report to' dialog box is open, displaying a file explorer view. The 'Folders' pane shows 'My Folders' selected. The 'Display Name' field contains 'supplier query'. The background shows a preview of a report with a table of supplier data.

Body									
	1,334,230.00	Supplier#001334230	PFBBooO	KENYA	7	KENYA	AFRICA		
	1,334,322.00	Supplier#001334322	V,AWMNZNSovK5I	GERMANY	6	GERMANY	EUROPE		
	1,334,366.00	Supplier#001334366	v4XZXE1n	INDIA	7	INDIA	ASIA		
	1,334,375.00	Supplier#001334375	15qrO7OstYhYPQzU46	KENYA	7	KENYA	AFRICA		
	1,334,406.00	Supplier#001334406	Bc JJ5	CANADA	2	CANADA	AMERICA		
	1,334,431.00	Supplier#001334431	aXgy_sDCe,	KENYA	1	KENYA	AFRICA		
	1,334,432.00	Supplier#001334432	NJ9o1V6sx	MOZAMBIQUE	0	MOZAMBIQUE	AFRICA		
	1,334,469.00	Supplier#001334469	XA00Dw5JphwYDIJ8KL	IRAQ	8	IRAQ	MIDDLE EAST		
	1,334,482.00	Supplier#001334482	SxF9	GERMANY	4	GERMANY	EUROPE		
	1,334,486.00	Supplier#001334486	WHDURC2OH	PERU	2	PERU	AMERICA		
	1,334,523.00	Supplier#001334523	gY0mZYSoI7x6gS1fbx	SAUDI ARA1		SAUDI ARABIA	MIDDLE EAST		
	1,334,567.00	Supplier#001334567	ZOL8eNwvavp7d	ROMANIA	2	ROMANIA	EUROPE		
			OizS44ptlonnxpG3epp						
			WH						
			mBeAL5						
			I7tc02MmqIDY						
			V3J025I3ARF12xX9H						

Central Management Console

View Crystal Report

- Login in to the CMC.



Central Management Console

View Crystal Report

- Login back in to the CMC and navigate to Inboxes.
- Select Administrator and locate the Supplier Query Crystal Report

The screenshot shows the SAP Central Management Console (CMC) interface. The browser address bar indicates the URL: `:8080/BOE/CMC/1806211538/admin/App/home.faces?service=%2Fadmin%2Fapp%2FappService.jsp&appKind=CMC&bttoken=MDAwRF4wPmJUbklqNjho...`. The page title is "Central Management Console" and the user is logged in as "Administrator".

The interface displays a list of Inboxes. The selected inbox is "Administrator". The table below shows the contents of the inbox:

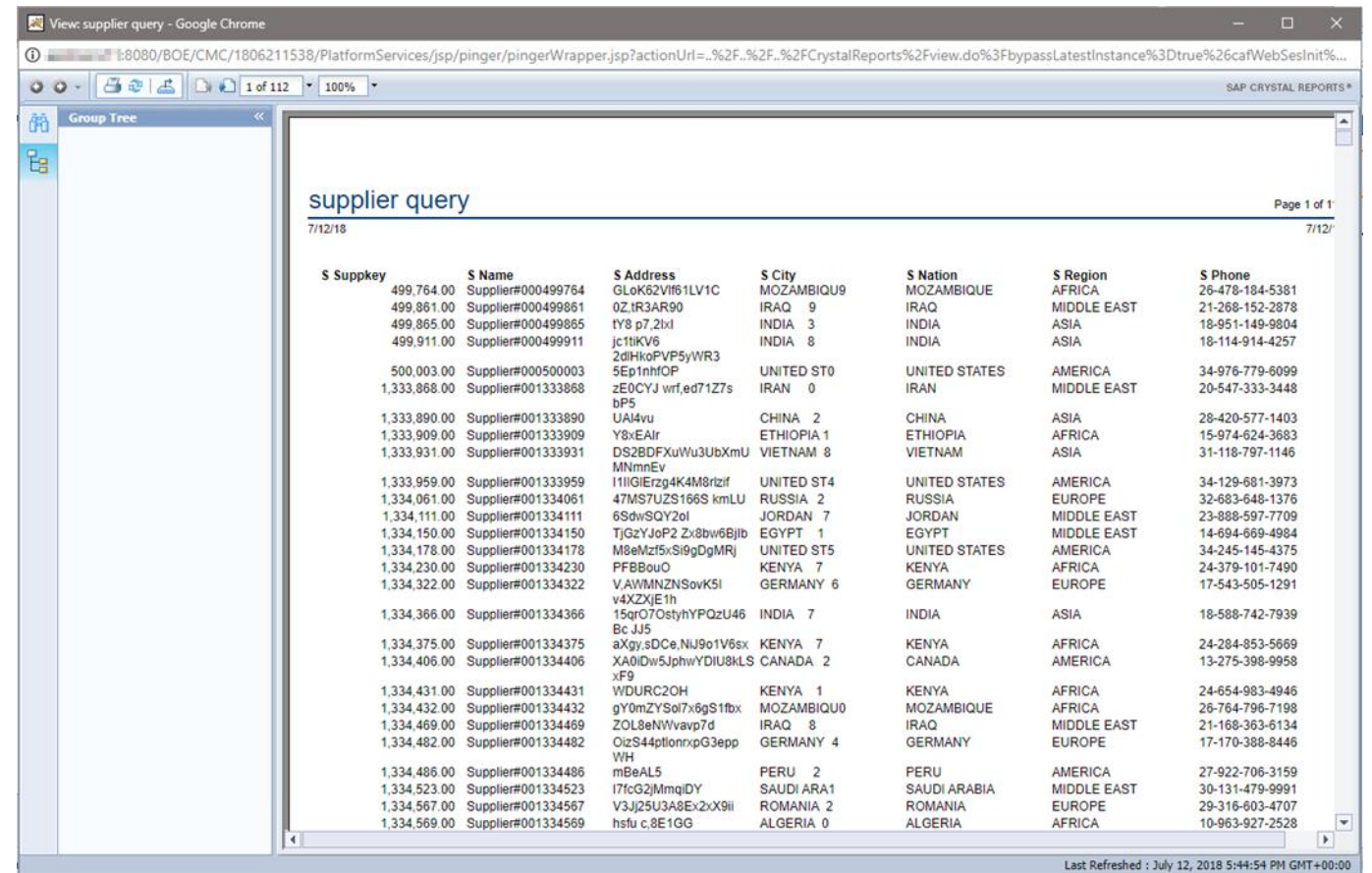
Read	Title	Sent	From	Type	Description	Instances
	supplier query	Jul 12, 2018 5:46		Crystal Reports for		0

Total: 1 items

Central Management Console

View Crystal Report

- Double click on the report to view.



The screenshot displays a SAP Crystal Reports window titled "supplier query". The report is a table with 7 columns: S Suppkey, S Name, S Address, S City, S Nation, S Region, and S Phone. The data is sorted by S Suppkey in descending order. The report is dated 7/12/18 and is page 1 of 1.

S Suppkey	S Name	S Address	S City	S Nation	S Region	S Phone
499,764.00	Supplier#000499764	GLoK62Vff61LV1C	MOZAMBIQU9	MOZAMBIQUE	AFRICA	26-478-184-5381
499,861.00	Supplier#000499861	0Z,IR3AR90	IRAQ 9	IRAQ	MIDDLE EAST	21-268-152-2878
499,865.00	Supplier#000499865	Y8 p7,2lxl	INDIA 3	INDIA	ASIA	18-951-149-9804
499,911.00	Supplier#000499911	jc1tkV6	INDIA 8	INDIA	ASIA	18-114-914-4257
500,003.00	Supplier#000500003	2dHkoPVP5yWR3	UNITED ST0	UNITED STATES	AMERICA	34-976-779-6099
1,333,868.00	Supplier#001333868	5Ep1nHOP	IRAN 0	IRAN	MIDDLE EAST	20-547-333-3448
1,333,890.00	Supplier#001333890	zE0CYJ wrf,ed71Z7s	CHINA 2	CHINA	ASIA	28-420-577-1403
1,333,909.00	Supplier#001333909	bP5	ETHIOPIA 1	ETHIOPIA	AFRICA	15-974-624-3683
1,333,931.00	Supplier#001333931	UA14vu	VIETNAM 8	VIETNAM	ASIA	31-118-797-1146
1,333,959.00	Supplier#001333959	DS2BDFXuWu3UbXmU	MNnmEv	UNITED STATES	AMERICA	34-129-681-3973
1,334,061.00	Supplier#001334061	11IIGErzg4K4M8rtzf	UNITED ST4	RUSSIA	EUROPE	32-683-648-1376
1,334,111.00	Supplier#001334111	47MS7UZS166S kmLU	RUSSIA 2	JORDAN	MIDDLE EAST	23-888-597-7709
1,334,150.00	Supplier#001334150	6SdvSQY2ol	JORDAN 7	JORDAN	MIDDLE EAST	14-694-669-4984
1,334,178.00	Supplier#001334178	TJGzYJoP2 Zx8bw6Bjlb	EGYPT 1	EGYPT	MIDDLE EAST	34-245-145-4375
1,334,230.00	Supplier#001334230	M8eMzf5xS19gDgMRj	UNITED ST5	UNITED STATES	AMERICA	24-379-101-7490
1,334,322.00	Supplier#001334322	PFBBouO	KENYA 7	KENYA	AFRICA	17-543-505-1291
1,334,366.00	Supplier#001334366	V,AWMZNzSovK5I	GERMANY 6	GERMANY	EUROPE	18-588-742-7939
1,334,375.00	Supplier#001334375	v4XZXE1h	INDIA 7	INDIA	ASIA	24-284-853-5669
1,334,406.00	Supplier#001334406	15qrO7OstyhYPQzU46	KENYA 7	KENYA	AFRICA	13-275-398-9958
1,334,431.00	Supplier#001334431	Bc JJ5	CANADA 2	CANADA	AMERICA	24-654-983-4946
1,334,432.00	Supplier#001334432	aXgy.sDCe,NU9o1V6sx	KENYA 7	KENYA	AFRICA	26-764-796-7198
1,334,469.00	Supplier#001334469	XA0IDw5JphwYDIU8kLS	CANADA 2	MOZAMBIQUE	AFRICA	21-168-363-6134
1,334,482.00	Supplier#001334482	xF9	KENYA 1	IRAQ	MIDDLE EAST	17-170-388-8446
1,334,486.00	Supplier#001334486	WDURC2OH	KENYA 1	GERMANY	EUROPE	27-922-706-3159
1,334,523.00	Supplier#001334523	gY0mZYSol7x6gS1ftx	MOZAMBIQU0	PERU	AMERICA	30-131-479-9991
1,334,567.00	Supplier#001334567	ZOL8eNWvavp7d	IRAQ 8	SAUDI ARABIA	MIDDLE EAST	29-316-603-4707
1,334,569.00	Supplier#001334569	OizS44ptlonrxpG3epp	GERMANY 4	ROMANIA	EUROPE	10-963-927-2528
		WH		ALGERIA	AFRICA	
		mBeAL5	PERU 2	ALGERIA	AFRICA	
		I7fcG2JmmqIDY	SAUDI ARA1			
		V3Jj25U3A8Ex2xX9il	ROMANIA 2			
		hsfu c.8E1GG	ALGERIA 0			

Report Creation with Web Intelligence

This section of guide is also dependent on the success of the previous configuration steps. Web Intelligence will use the published Universe to build a basic report utilizing the ADWC connection.

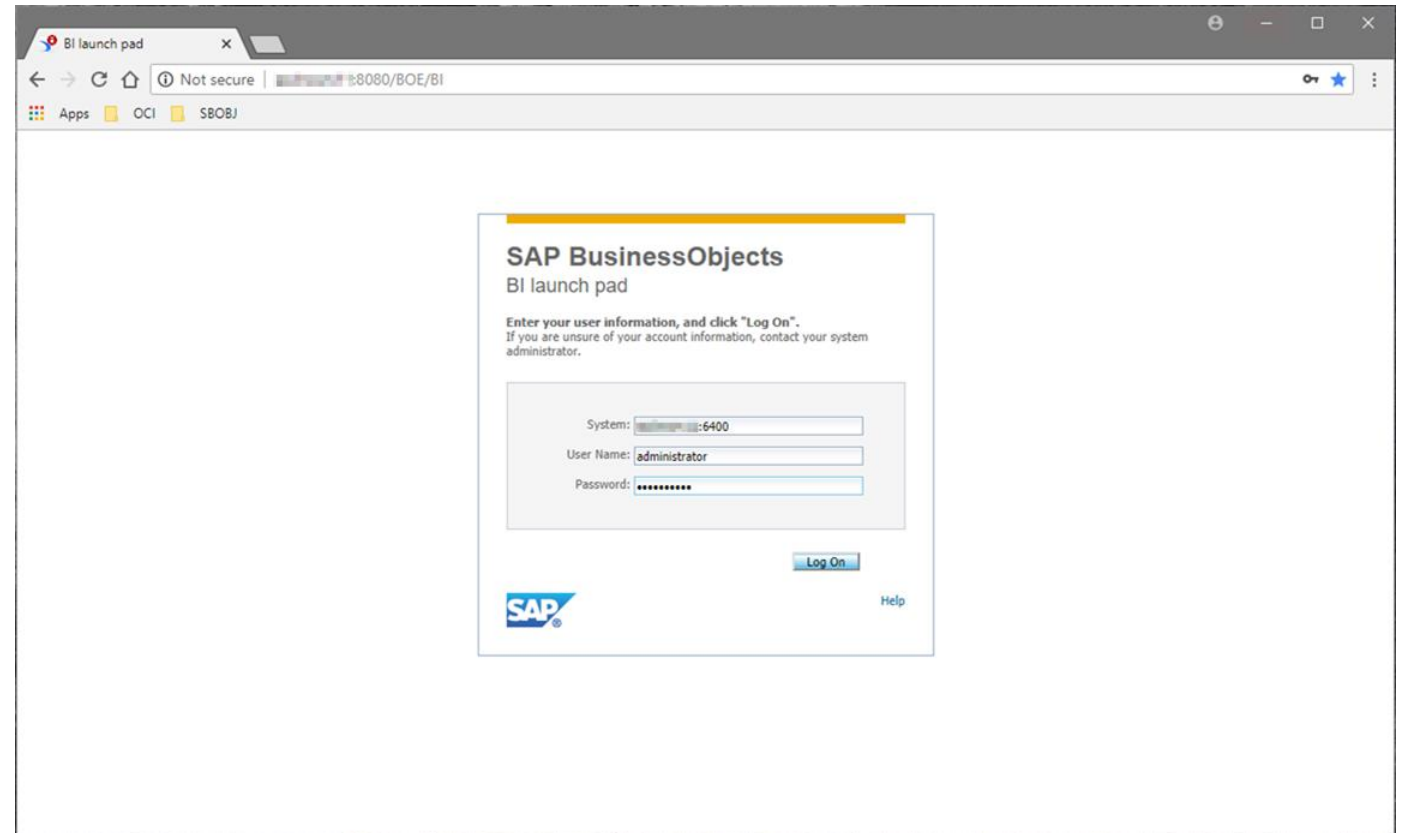
The following requirements are needed.

- SAP BusinessObjects application login credentials.
- Access to the Central Management Console (<http://<hostname>:8080/BOE/CMC>).
- Access to the BI Launch Pad (<http://<hostname>:8080/BOE/BI>).
- A Windows desktop with client development tools for SAP BusinessObjects.

BI Launch Pad

Report Creation

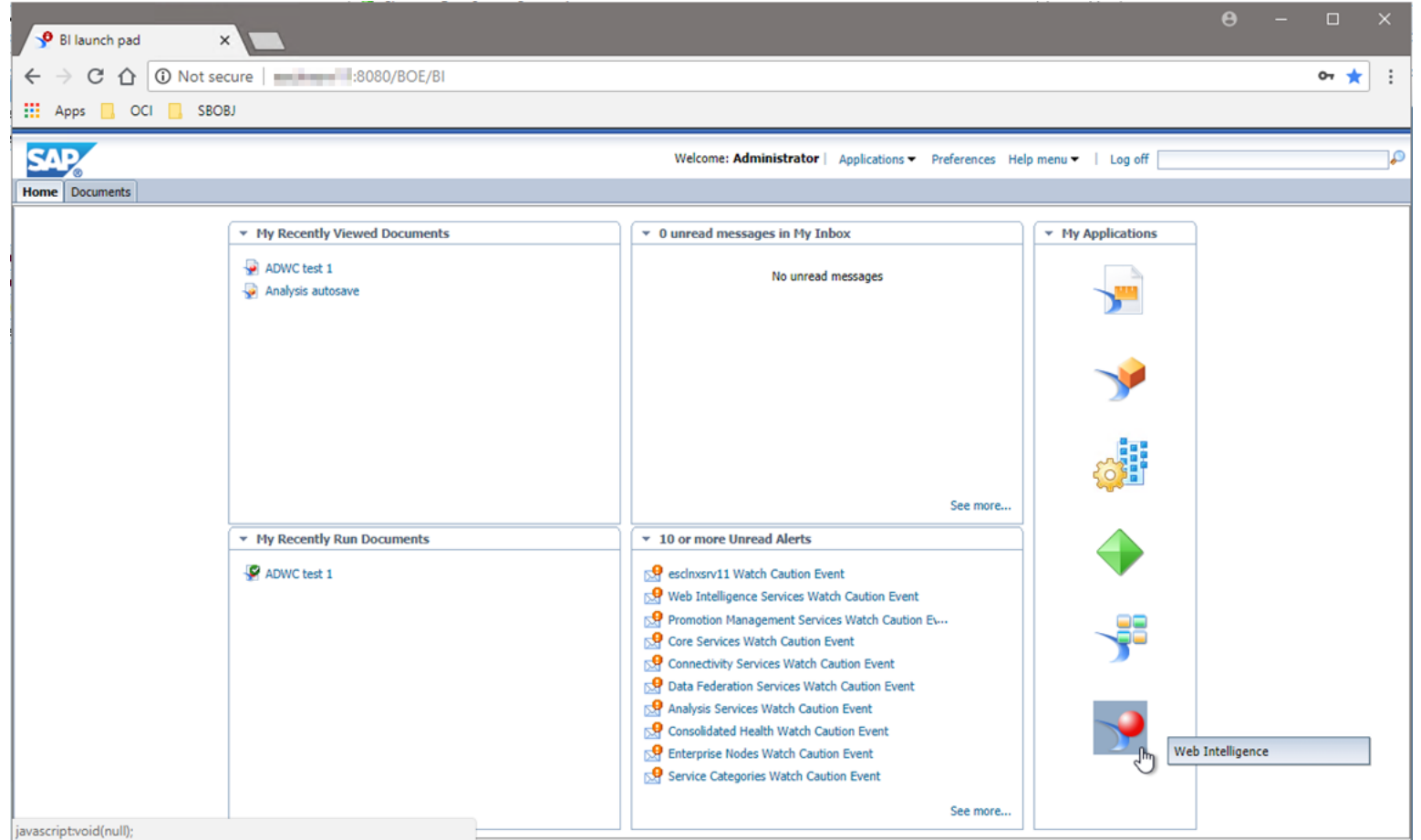
- Login in to BI Launch Pad.



BI Launch Pad

Web Intelligence

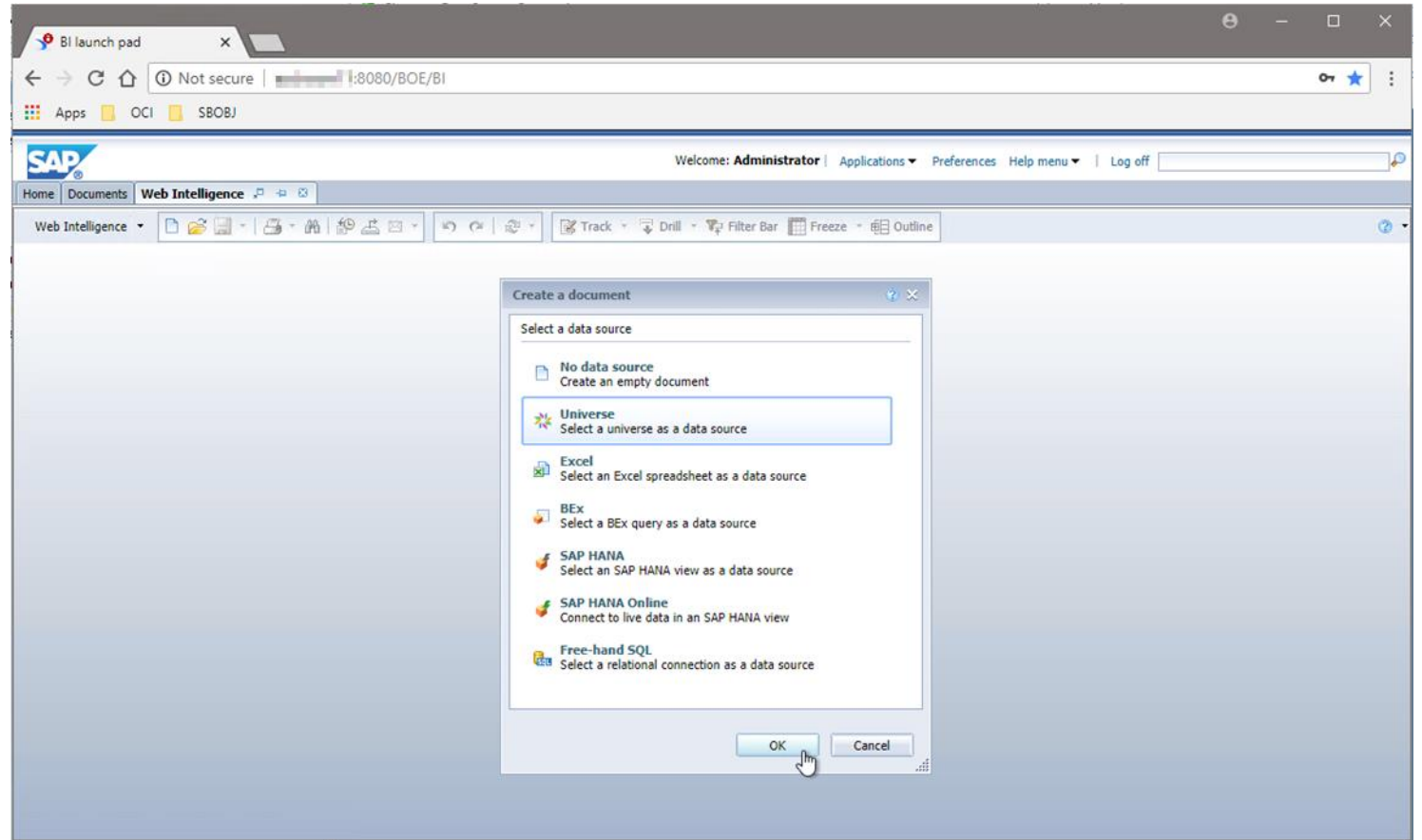
- Select the Web Intelligence application.



BI Launch Pad

Web Intelligence: Create Report

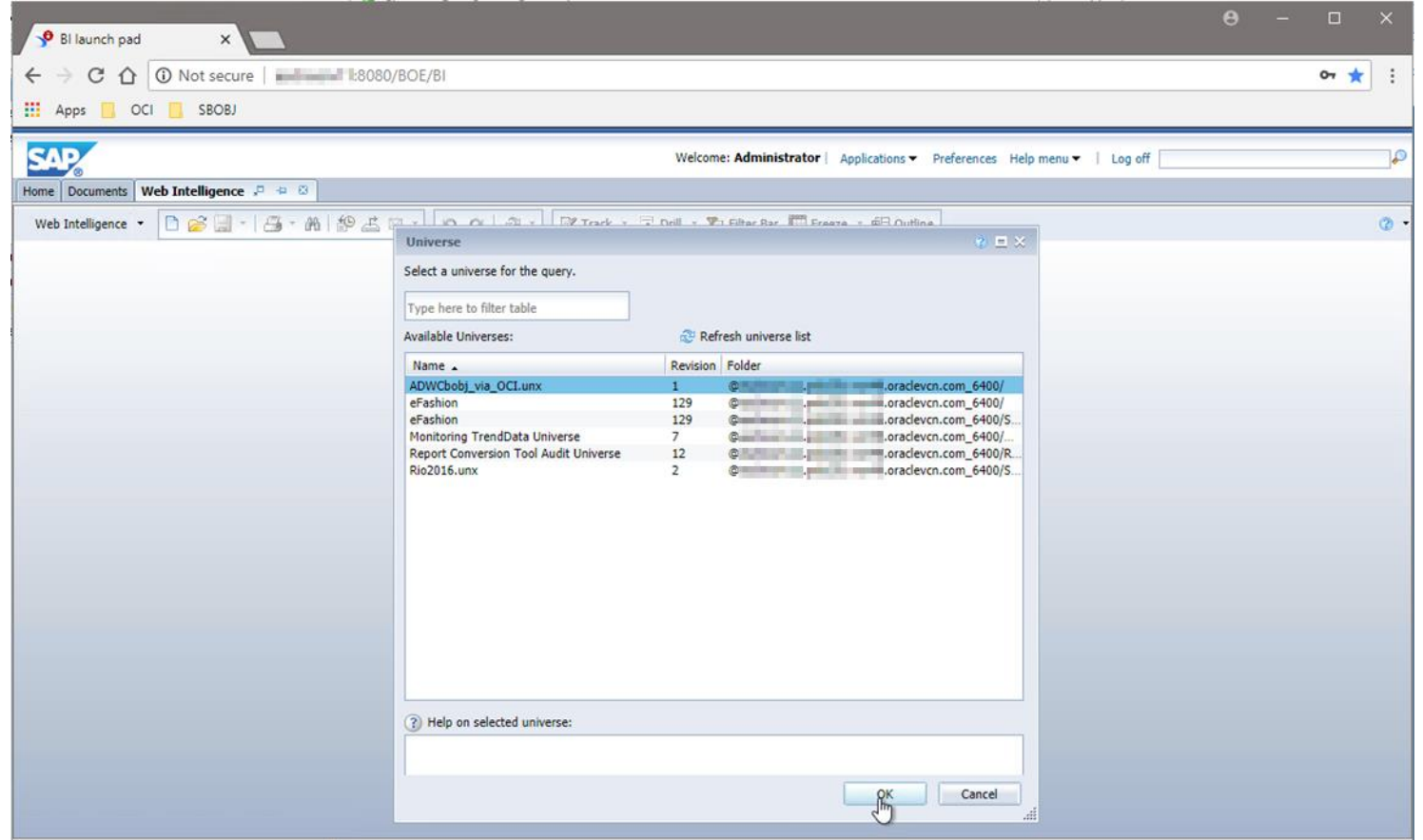
- After the Web Intelligence application launches, press the New button to begin the creation of a new report.
- The Create a document dialog boxes displays several data source choices.
- For this example the Universe option was chosen.
- Another possible choice could be to use Free-Hand SQL. This option requires a published connection SQL.



BI Launch Pad

Web Intelligence: Create Report

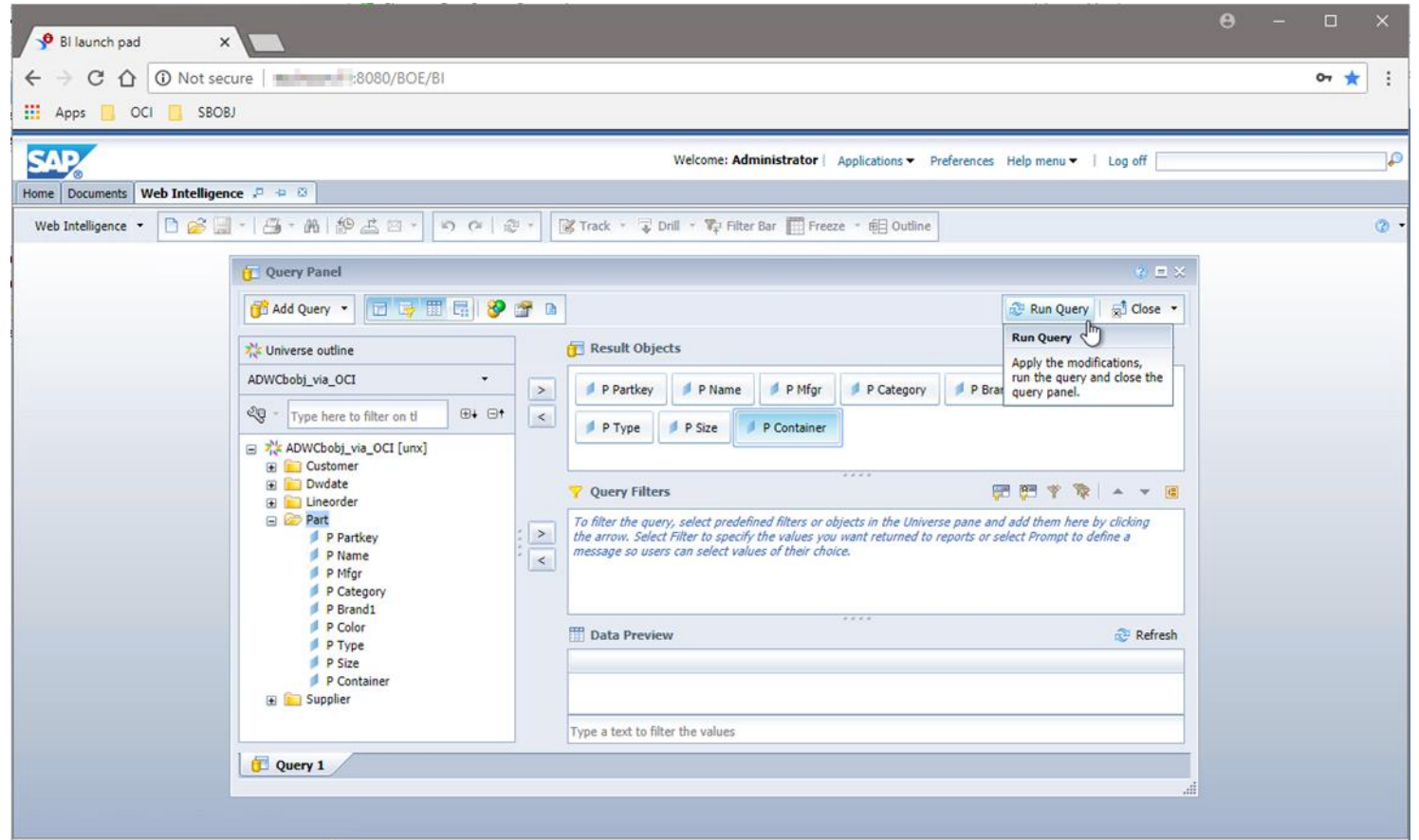
- Highlight a previously published universe and press the OK to continue.
- In this example the `ADWCbobj_via_OCI` universe was selected.



BI Launch Pad

Web Intelligence: Create Report

- Choose the tables and columns for the report.
- Add any filters and ranking to the query.
- Pressing the Refresh button displays the results of the query.
- Press the Run Query button when complete to start designing the report.



BI Launch Pad

Web Intelligence: Designer

- Web Intelligence will autogenerate a simple report from the query.
- Customize the report and save.

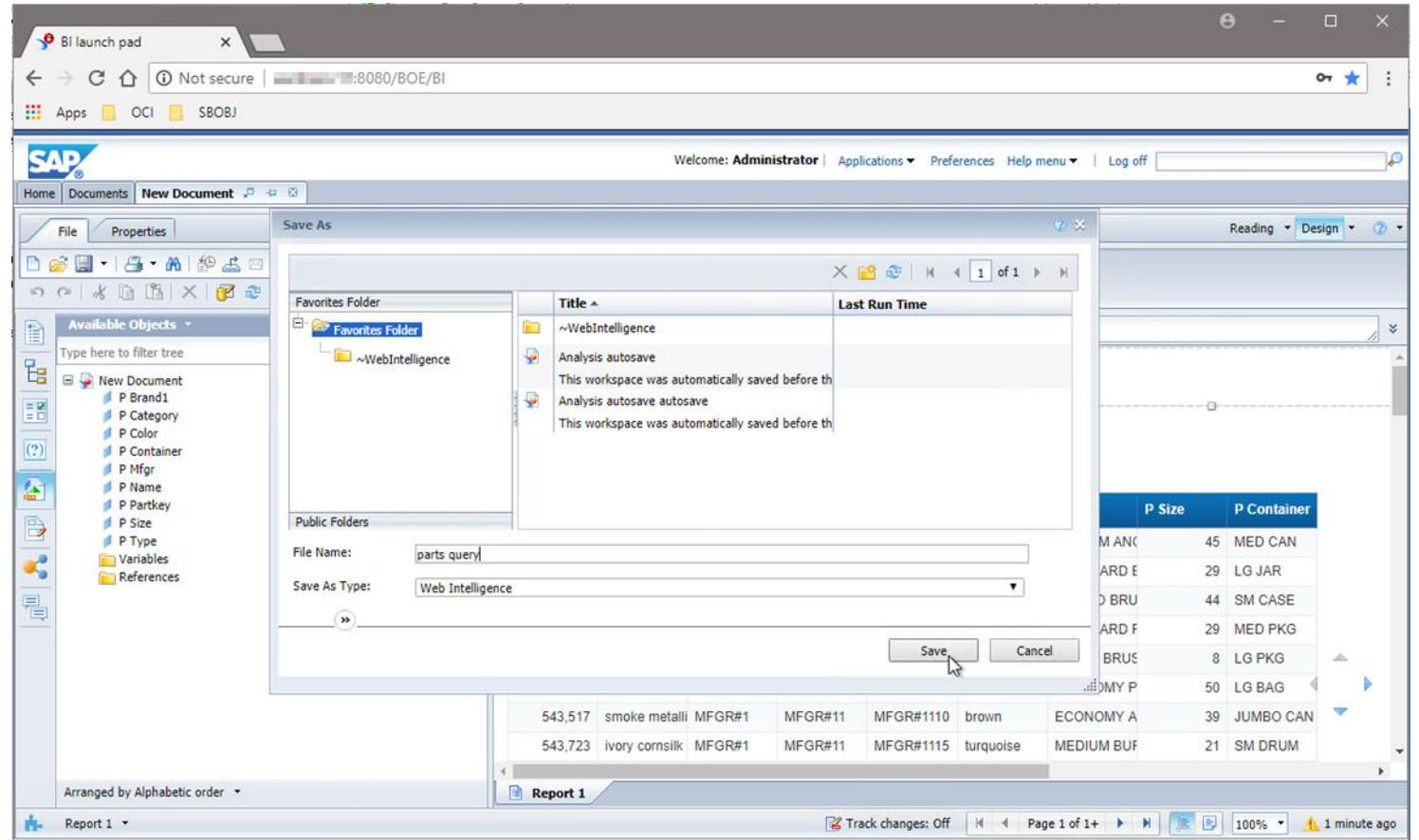
The screenshot displays the SAP BI Launch Pad Web Intelligence Designer interface. The browser address bar shows the URL `http://localhost:8080/BOE/BI`. The SAP logo and user information (Administrator) are visible at the top. The interface includes a menu bar with options like File, Properties, Report Elements, Formatting, Data Access, Analysis, and Page Setup. A toolbar contains various icons for report manipulation. On the left, the 'Available Objects' pane lists data sources such as P Brand1, P Category, P Color, P Container, P Mfgr, P Name, P Partkey, P Size, P Type, Variables, and References. The main workspace shows a report titled 'Report 1' with a data table. The table has the following columns: P Partkey, P Name, P Mfgr, P Category, P Brand1, P Color, P Type, P Size, and P Container. The data is sorted by P Partkey in ascending order.

P Partkey	P Name	P Mfgr	P Category	P Brand1	P Color	P Type	P Size	P Container
543,167	yellow cornflo	MFGR#1	MFGR#11	MFGR#1112	brown	MEDIUM ANC	45	MED CAN
543,360	cream seashe	MFGR#1	MFGR#11	MFGR#1112	gainsboro	STANDARD E	29	LG JAR
543,370	coral honeyde	MFGR#1	MFGR#11	MFGR#1115	grey	PROMO BRU	44	SM CASE
543,411	navajo floral	MFGR#1	MFGR#11	MFGR#1112	gainsboro	STANDARD F	29	MED PKG
543,438	snow thistle	MFGR#1	MFGR#11	MFGR#1113	tan	SMALL BRUS	8	LG PKG
543,476	burnished lerr	MFGR#1	MFGR#11	MFGR#1111	cyan	ECONOMY P	50	LG BAG
543,517	smoke metalli	MFGR#1	MFGR#11	MFGR#1110	brown	ECONOMY A	39	JUMBO CAN
543,723	ivory cornsilk	MFGR#1	MFGR#11	MFGR#1115	turquoise	MEDIUM BUF	21	SM DRUM

BI Launch Pad

Web Intelligence: Designer

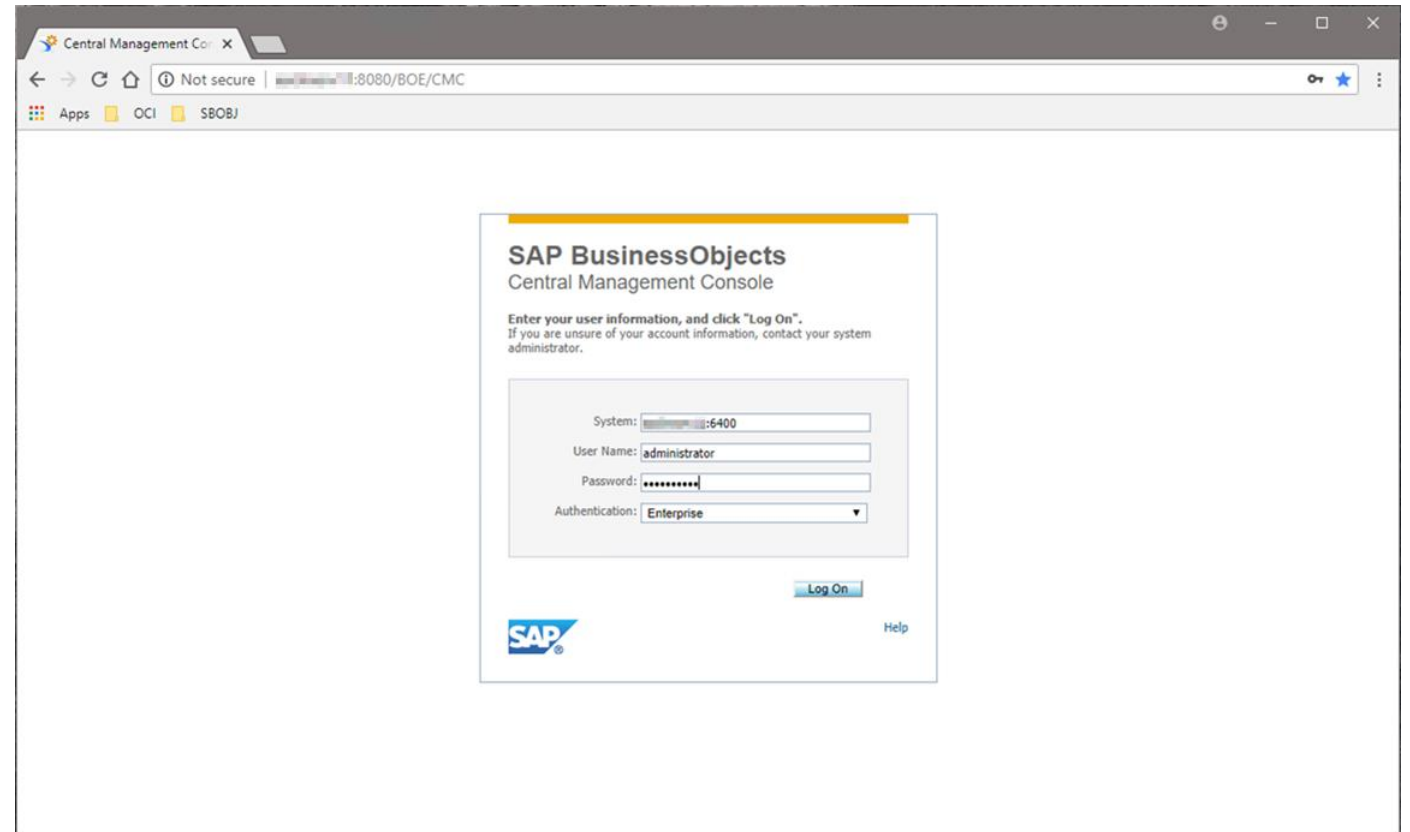
- Provide a name and location for this report.
- For this example, the report was named `parts query` and stored in Favorites Folder.



Central Management Console

View Web Intelligence Report

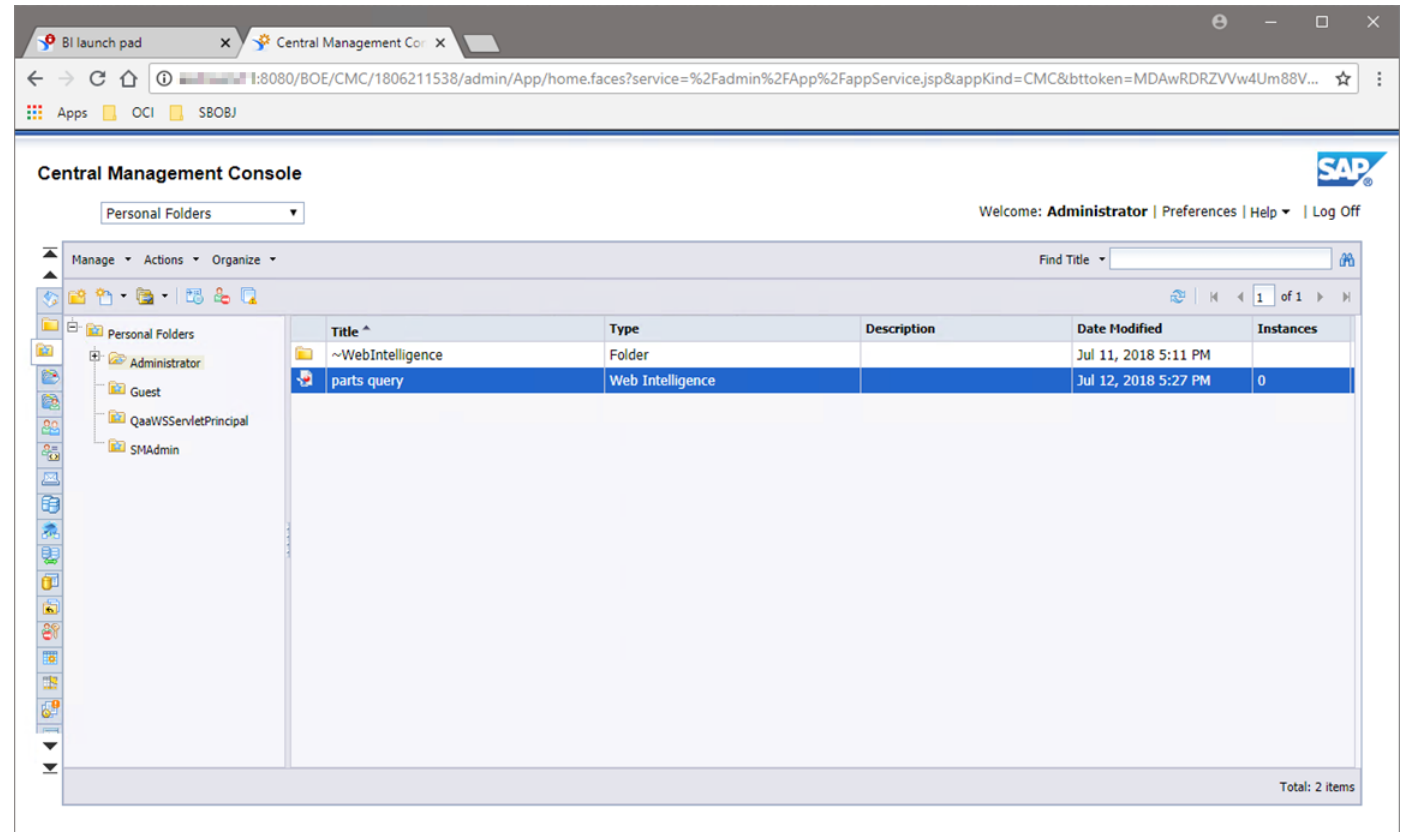
- Login in to the CMC.



Central Management Console

View Web Intelligence Report

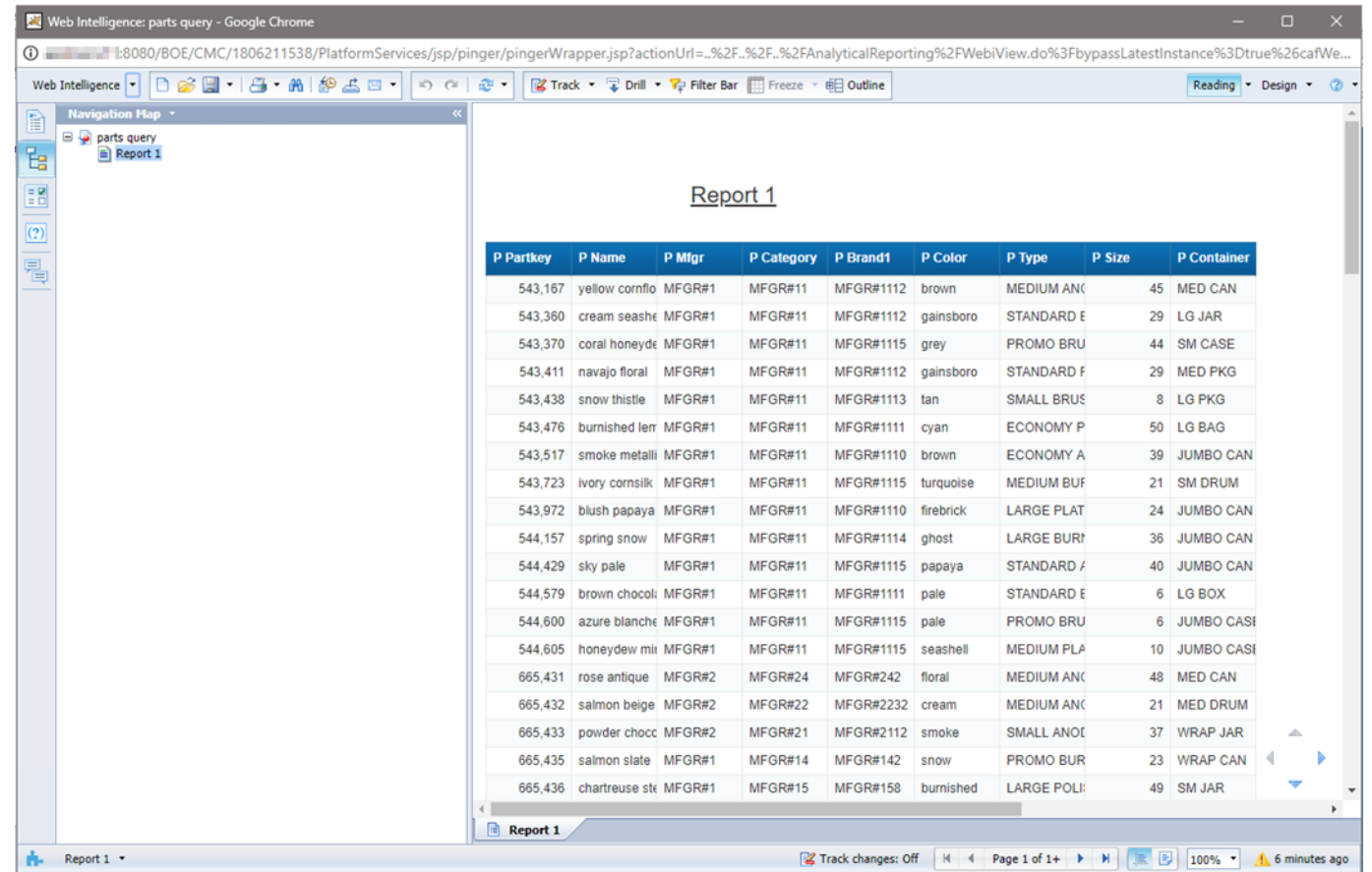
- Log back in to the CMC and navigate to Personal Folders.
- Select Administrator and locate the `parts query` Web Intelligence report.



Central Management Console

View Web Intelligence Report

- Double click on the report to view.



Report 1

P Partkey	P Name	P Mfgr	P Category	P Brand1	P Color	P Type	P Size	P Container
543,167	yellow cornflo	MFGR#1	MFGR#11	MFGR#1112	brown	MEDIUM AN	45	MED CAN
543,360	cream seash	MFGR#1	MFGR#11	MFGR#1112	gainsboro	STANDARD E	29	LG JAR
543,370	coral honeyde	MFGR#1	MFGR#11	MFGR#1115	grey	PROMO BRU	44	SM CASE
543,411	navajo floral	MFGR#1	MFGR#11	MFGR#1112	gainsboro	STANDARD F	29	MED PKG
543,438	snow thistle	MFGR#1	MFGR#11	MFGR#1113	tan	SMALL BRU	8	LG PKG
543,476	burnished len	MFGR#1	MFGR#11	MFGR#1111	cyan	ECONOMY P	50	LG BAG
543,517	smoke metall	MFGR#1	MFGR#11	MFGR#1110	brown	ECONOMY A	39	JUMBO CAN
543,723	ivory cornsil	MFGR#1	MFGR#11	MFGR#1115	turquoise	MEDIUM BUF	21	SM DRUM
543,972	blush papaya	MFGR#1	MFGR#11	MFGR#1110	firebrick	LARGE PLAT	24	JUMBO CAN
544,157	spring snow	MFGR#1	MFGR#11	MFGR#1114	ghost	LARGE BUR	36	JUMBO CAN
544,429	sky pale	MFGR#1	MFGR#11	MFGR#1115	papaya	STANDARD /	40	JUMBO CAN
544,579	brown chocol	MFGR#1	MFGR#11	MFGR#1111	pale	STANDARD E	6	LG BOX
544,600	azure blanc	MFGR#1	MFGR#11	MFGR#1115	pale	PROMO BRU	6	JUMBO CAS
544,605	honeydew mli	MFGR#1	MFGR#11	MFGR#1115	seashell	MEDIUM PLA	10	JUMBO CAS
665,431	rose antique	MFGR#2	MFGR#24	MFGR#242	floral	MEDIUM AN	48	MED CAN
665,432	salmon beige	MFGR#2	MFGR#22	MFGR#2232	cream	MEDIUM AN	21	MED DRUM
665,433	powder chocc	MFGR#2	MFGR#21	MFGR#2112	smoke	SMALL ANO	37	WRAP JAR
665,435	salmon slate	MFGR#1	MFGR#14	MFGR#142	snow	PROMO BUR	23	WRAP CAN
665,436	chartreuse st	MFGR#1	MFGR#15	MFGR#158	burnished	LARGE POL	49	SM JAR

References

This concludes the guide to connecting SAP BusinessObjects to Oracle Autonomous Data Warehouse Cloud.

The following are some useful references:

- Oracle Autonomous Data Warehouse Cloud online documentation:
<https://docs.oracle.com/en/cloud/paas/autonomous-data-warehouse-cloud/index.html>
- Oracle Database Online Client Guide
 - For Linux
<https://docs.oracle.com/en/database/oracle/oracle-database/18/lacli/index.html>
 - For Windows
<https://docs.oracle.com/en/database/oracle/oracle-database/18/ntcli/index.html>
- SAP BusinessObjects 4.2 SP5 online documentation
https://help.sap.com/viewer/product/SAP_BUSINESSOBJECTS_BUSINESS_INTELLIGENCE_PLATFORM/4.2.5/en-US