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## 1 What's New in Predictive Factory Installation and Administration Guide

Links to information about the new features and documentation changes for Predictive Factory.

**SAP BusinessObjects Predictive Analytics 3.1**

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<td>Update of Server authentication</td>
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</table>

The Source tab has been deleted. Sources are now defined when you set a modeling server up.
2 Overview of Predictive Factory

Predictive Factory is a thin-client, Web server-based application that lets you automate the management of predictive models created in SAP BusinessObjects Predictive Analytics Modeler. Users can automate much of the production lifecycle, such as retraining a model, applying a model to a new data set, and detecting model deviations.

Predictive Factory is installed as part of an SAP BusinessObjects Predictive Analytics client-server configuration. Once your Automated Analytics server is deployed, a Predictive Factory server can be installed and configured.

The diagram shows Predictive Factory in the SAP BusinessObjects Predictive Analytics client-server landscape.

- The Predictive Factory server contains a group of services handled by the Server Intelligence Agent (SIA). The services can be stopped and started with the Start and Stop Predictive Factory commands.
- Communication between the Predictive Factory server and clients uses HTTP. You can configure encrypted communication (HTTPS) using Secure Sockets Layer (SSL) or Transport Layer Security (TLS).
- In Predictive Factory, you declare one or more modeling servers. (A modeling server is the machine that hosts the Automated Analytics server that will run the modeling tasks). Predictive Factory communicates with the Automated Analytics server using CORBA. All connections to data and model sources are handled via the modeling server.
- Users create models using the SAP BusinessObjects Predictive Analytics client connected to the same Automated Analytics server.
- Predictive Pipelines can be imported in Predictive Factory. To apply or run predictive pipelines, Predictive Factory connects directly to SAP HANA using a JDBC communication.
2.1 Authentication in Predictive Factory

Overview of authenticated access to model, data, and project resources.

Predictive Factory uses user roles, and server and source authentication to manage access to resources.

User Authentication

All users must have an account with a login and password to access Predictive Factory.

The default user authentication type in Predictive Factory is called Predictive Factory Authentication. An administrator creates user login names and passwords in Predictive Factory. You can also configure Windows Active Directory (Kerberos) to allow users to log in with Windows AD Authentication.

User Roles

Application roles can be assigned to give certain users additional privileges. The administrator assigns these roles in the Users tab:

<table>
<thead>
<tr>
<th>Application Role</th>
<th>Privileges</th>
</tr>
</thead>
</table>
| **Project Creator** | • Create projects  
                          • Assign project members as analysts or project managers |
| **Supervisor**    | • Access variable statistics for all projects   |
| **Administrator** | • Create users and assign application roles  
                          • Define access to modeling servers, data, and model sources  
                          • Define external commands  
                          • Configure application settings |

Users do not have access to projects until they are assigned as a member of the project by a project manager. Project creators are automatically managers of the projects they create. They can assign the following project roles to members when adding or editing a project:

<table>
<thead>
<tr>
<th>Project Role</th>
<th>Privileges</th>
</tr>
</thead>
</table>
| **Analyst**      | • Import models  
                          • Create, schedule, and run tasks  
                          • Segment time series models  
                          • Review task results  
                          • Monitor model statistics |
| **Project Manager** | Edit all project settings (in addition to analyst tasks) |
Server authentication

Administrators configure the modeling servers and define the data connection access while adding a new modeling server in Predictive Factory:

- Automated server: To define access for users while adding an Automated server, administrators can choose between two policies:
  - Shared: The administrator provides the user and password. All users implicitly use these credentials.
  - Private: Each user enters a user and password before accessing the server or source for the first time. Users can manage their access credentials on the user menu under User Settings.
- SAP HANA server: Administrators enter the valid credentials to access the SAP HANA server.
3 Installing Predictive Factory

Before installing Predictive Factory, check the following requirements:

- The operating system is Microsoft Windows 64-bit.
- You have administrator rights.
- You have minimum of 3 GB available drive space.
- You have not installed any of the following software on the same machine:
  - SAP BusinessObjects Business Intelligence platform
  - SAP Lumira, server for teams
  - SAP Lumira, Edge edition
  - SAP Crystal Server
- Ports are free on the Windows system in the following ranges:
  - 6400-6800 for the CMS (default 6400)
  - 6100-6800 for the SIA
  - 2200-9800 for the SQL Anywhere database
  - 6200-6900 for the Web server (default 6405)
- If you are using Windows AD to authenticate users, Predictive Factory must be installed in the same domain as Windows AD.

The Predictive Factory Setup program is contained within the self-extracting archive called SAPPredictiveFactorySetup. The wizard first checks for platform requirements. If all requirements are met, it installs the required resources on your machine.


   If any requirement is not met, a prerequisite page opens. Close the wizard and correct any missing prerequisites before restarting the setup program.

   If all the installation requirements are confirmed, the License Agreement page opens.

2. Review the license agreement, select the I accept the License Agreement check box, and click Next.

3. In the Configure Destination Folder page, enter the following information:
   - In the Destination Folder Information you can keep the suggested default, or click the browse button to navigate to another folder for installation.
   - In the Administrator Logon Information section, enter the password for the administrator account. The password must be at least 6 characters long and contain at least 2 of the following types of characters: upper case, lower case, number, or punctuation mark.
   - Enter the same password in Confirm Password and click Next.

   An error message displays if your password doesn’t meet the security requirements. Click OK and modify your password according to the rules provided in the message.

4. When the message appears that the installation was successful, click Finish.

Predictive Factory is automatically launched in a browser window. Log in using the administrator account and the password you entered during the installation.
**Note**

A temporary license key is included in the software. Apply for a permanent license key immediately after installing your SAP software on the SAP Support Portal at [http://support.sap.com/keys-system-installations/keys.html](http://support.sap.com/keys-system-installations/keys.html).
4 Configuring Predictive Factory

Configuration Overview

Once you have installed Predictive Factory, you need to do the following configuration:

- If you want to use Windows Active Directory (AD) to create Predictive Factory users, first configure Windows AD.
- Communication between the Predictive Factory server and clients uses HTTP. If you want to use encrypted communication (HTTPS), configure the HTTPS secure protocol.
- Configure client authentication if you want Predictive Factory to only accept HTTPS requests from certain clients.

**Note**

Client authentication does not authenticate users, it ensures that Predictive Factory only serves HTTPS requests to certain clients.

- Create users (or import users from Windows AD) and assign application roles.
- Update the Predictive Factory license key with a permanent key.
- Enable the In-App help.
- Set up the modeling servers that will run modeling tasks.
- Set up the access to stored model, data, and metadata repository sources.
- Set up external commands.
- Configure the server log files.

For more information on each configuration step, see the related topic.

Related Information

- Configuring Windows AD Authentication [page 10]
- Configuring Encrypted Communication (HTTPS) [page 15]
- Configuring Client Authentication [page 16]
- Setting Up Users and Assigning Application Roles [page 16]
- Updating the License Key [page 19]
- Enabling and Testing the In-App Help [page 20]
- Setting Up Modeling Servers - Automated Server [page 21]
- Declaring External Commands [page 26]
- Configuring the Server Logs [page 29]
4.1 Configuring Windows AD Authentication

The default user authentication type in Predictive Factory is called Predictive Factory Authentication. You create user login names and passwords in Predictive Factory. You can also configure Windows Active Directory (Kerberos) to allow users to log in with Windows AD authentication.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictive Factory must be installed in the same domain as Windows AD.</td>
</tr>
</tbody>
</table>

To configure Windows AD authentication:

1. Set up a service account on the Active Directory Domain Controller.
2. On the Predictive Factory server, grant rights to the service account.
3. Configure the Predictive Factory Server to use the service account.
4. Create the Kerberos and BSClogin configuration files.
5. In Predictive Factory, configure Windows AD and map the Windows AD users.

Once Windows AD is configured, you can select it as the default user authentication type.

Example

To guide you through the Windows AD configuration, we use the following names in the examples:

- The Active Directory service account is named paservice.
- The domain name of the Predictive Factory and Windows AD domain is MYDOMAIN.
- The local host name where Predictive Factory is installed is MyPFserver.

Related Information

- Setting up the Service Account [page 10]
- Configuring the Predictive Factory Server to Use the Service Account [page 11]
- Creating the Kerberos and BSClogin Configuration Files [page 12]
- Configuring Windows AD Users in Predictive Factory [page 13]
- Setting the Default User Authentication Method [page 19]

4.1.1 Setting up the Service Account

To configure Predictive Factory to work with Windows AD (Kerberos) authentication, you need to set up a service account on the Active Directory Domain Controller. You can either create a new domain account or use an existing domain account. The service account will be used to run the Predictive Factory processes.

After setting up the account, you will need to set up a service principal name (SPN) for the service account.

1. On the Active Directory Domain Controller, create a new service account in Active Directory. Be sure to select the Password never expires option.
2. Add a service principal name (SPN) for the service account you created in Step 1 using the following command:

```
setspn -a <service>/<host_name.domain_name>.COM <service_account_name>
```

For example:
```
setspn -a BOEXI40SIAMyPFserver/MyPFserver.MYDOMAIN.COM paservice
```

- `<service>` is the service name for the Server Intelligent Agent. To find this name, on the Predictive Factory server, open the Windows local services and right-click the Server Intelligent Agent in the list and select Properties. On the General tab you see the service name. It consists of `BOEXI40SIA` followed by the local host name.
- `<host_name.domain_name>` is the fully-qualified name of the Predictive Factory server. The domain name usually needs to be followed by `.COM`.
- `<service_account_name>` is the name you gave your Windows Directory service account.

Use the following commands to add two SPNs for the Predictive Factory Web server, one with the host name, and one with the fully-qualified host name using these commands:

```
setspn -a HTTP/<host_name>.COM <service_account_name>
setspn -a HTTP/<host_name.domain_name>.COM <service_account_name>
```

For example:
```
setspn -a HTTP/MyPFserver paservice
setspn -a HTTP/MyPFserver.MYDOMAIN.COM paservice
```

3. To change the user configuration of your service account, perform the following:
   a. In your Active Directory domain controller, navigate to your service account.
   b. Right click the account and select `Properties`.
   c. Choose the `Delegation` tab.
   d. Select the `trust this user for delegation to any service (Kerberos only)` radio button.
   e. Choose `OK`.

The next task in setting up Windows AD is Configuring the Predictive Factory Server to Use the Service Account [page 11].

### 4.1.2 Configuring the Predictive Factory Server to Use the Service Account

In order to support Windows AD and Kerberos, you must grant the service account certain rights where Predictive Factory is installed.

Before beginning, do the following:

- Create an Active Directory service account on the domain controller.
- Add the required service principal names (SPN) to the service account.

1. On the Predictive Factory server, in the Windows local services, right click the `Server Intelligent Agent` and select `Properties`. 
2. In the Properties dialog, select the Log On tab.

3. Select This account and enter the service account credentials as <DOMAIN_NAME>\<service name>.

   For example, MYDOMAIN\paservice

4. Navigate to Start Control Panel Administrative Tools Local Security Policy and grant the service account the following rights on the Predictive Factory server:
   - The Act as part of operating system right.
   - The Logon as a service right.
   - The Replace a process level token right.
   - Full control rights to the folder where Predictive Factory is installed.
   - Full control rights to HKEY_LOCAL_MACHINE\SOFTWARE\SAP BusinessObjects in the system registry.

5. Choose OK.

6. Ensure that the Local Policy Setting check box is selected, and choose OK.

7. Restart the Server Intelligent Agent (SIA).

To verify that the Effective Right option is on: Select Start Control Panel Administrative Tools Local Security Policy Local Policies User Rights Assignment Act as part of the operating system and make sure that the Effective Right is checked. If, after restarting the server, this option is still not on, your Local Policy settings are being overridden by your Domain Policy settings.

The next task in setting up Windows AD is Creating the Kerberos and BSClogin Configuration Files [page 12].

### 4.1.3 Creating the Kerberos and BSClogin Configuration Files

The Kerberos and BSClogin (a Java Authentication and Authorization Service (JAAS) login configuration) configuration files are needed to configure Kerberos for the Predictive Factory Web server.

1. On the Predictive Factory server, create a Kerberos configuration file with the name krb5.ini.

   Following is an example of a krb5.ini file using MYDOMAIN as the service account domain name. Note the following requirements for the krb5.ini file:

   - The realm defined in the [realms] section must be the same as the default-realm in the [libdefaults] section.
   - The domain name must be in all capital letters. Use the fully-qualified domain name of the domain controller.

   ```ini
   [libdefaults]
   default_realm = MYDOMAIN.COM
   dns_lookup_kdc = true
   dns_lookup_realm = true
   default_tgs_enctypes = rc4-hmac
   default_tkt_enctypes = rc4-hmac
   udp_preference_limit = 1
   [realms]
   MYDOMAIN.COM ={
   kdc = HOSTNAME.MYDOMAIN.COM
   default_domain = MYDOMAIN.COM
   }
   ```
## Note
The key parameters are explained in the table below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOMAIN.COM</td>
<td>It is the DSN name of the domain. You must enter it in Uppercase in FQND Format.</td>
</tr>
<tr>
<td>kdc</td>
<td>It is the Host name of the Domain Controller.</td>
</tr>
<tr>
<td>default_realm</td>
<td>In multiple domain configuration, under [libdefaults], it can be any of the source domains. The best practice is to use the domain with the greatest number of users that will be authenticated with their AD accounts. If no UPN suffix is supplied at log on, it defaults to the value of default_realm. This value should be consistent with the default domain settings.</td>
</tr>
</tbody>
</table>

2. Create a BSC configuration file with the name `bsclogin.conf` with the following content:

```java
com.businessobjects.security.jgss.initiate {
    com.sun.security.auth.module.Krb5LoginModule required debug=true;
};
```

The next step in setting up Windows AD is Configuring Windows AD Users in Predictive Factory [page 13].

### 4.1.4 Configuring Windows AD Users in Predictive Factory

Before you configure the Windows AD in Predictive Factory, you must do the following tasks:

- Set up a service account on the Windows Active Directory Domain Controller.
- Configure the Predictive Factory Server to use the service account.
- Create the Kerberos and BSClogin configuration files.

1. Log into Predictive Factory using the administrator account.
2. Go to the **Settings** tab.
3. In the **Authentication** section, click **Configure Windows AD**.
4. In the **Active Directory Configuration** dialog, enter the following information:

<table>
<thead>
<tr>
<th>Domain Name</th>
<th>The domain name of Predictive Factory and service account, for example <strong>MYDOMAIN</strong>. Entry the domain name in all capital letters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Name</td>
<td>The service account login name.</td>
</tr>
<tr>
<td>Password</td>
<td>The service account login password.</td>
</tr>
</tbody>
</table>
5. Click Save.

In the Authentication section, you will now see that Windows AD is a configured authentication type.

6. To import Windows AD user mapping into Predictive Factory, click Update Users from Windows AD.

Now you will see the Windows AD user accounts listed in the Users tab.

7. To activate Windows AD as an authentication type in Predictive Factory, in the Settings tab, click the edit icon.

8. In the Authentication section, select Windows AD in the Active Authentication Types and click Save.

9. Before users can log in using Windows AD, you must restart the Server Intelligent Agent (SIA).

Once Windows AD is configured you may want to do the following tasks:

- Assign Predictive Factory application roles to specific users in the Users tab. See Setting Up Users and Assigning Application Roles [page 16]
- Set Windows AD as the default authentication type. See Setting the Default User Authentication Method [page 19].
- Activate or deactivate certain user accounts in Predictive Factory. See Deactivating and Reactivating User Accounts [page 17].
- Update Predictive Factory users with changes from Windows AD. See Updating Users from Windows AD [page 14]

Related Information

Setting the Default User Authentication Method [page 19]
Setting Up Users and Assigning Application Roles [page 16]

4.1.5 Updating Users from Windows AD

Once you have configured Windows AD for Predictive Factory, you can update user account information from Windows AD.

1. Log into Predictive Factory using the administrator account.
2. Go the Settings tab.
3. In the Authentication section, click Update Users from Windows AD.
4.2 Configuring Encrypted Communication (HTTPS)

Connection through Transport Layer Security (TLS) or Secure Sockets Layer (SSL) is not activated by default when you install Predictive Factory. You have to enable it explicitly. To enable HTTPS, you will need:

- A PKCS12 or Java Key Store (JKS) file stored on the Predictive Factory server. This file contains a certified key pair (public key/private key) that encrypts communication between the server and client.

**Note**

If your company can't provide you with these elements, you can generate self-signed certificates with OpenSSL. Note that for security reasons, it is recommended to use certificates issued by a certification authority.

1. Log into Predictive Factory with an administrator account.
2. Go the Settings tab and click the edit icon.
3. In the SSL section, select Enabled.
4. Select the protocol you are using (TLS or SSL).
5. In Host, enter the host name or address for which the certificates were issued.
   - The name should match the value of the Common Name (CN) in the server certificate. HTTPS services will be provided through the IP address that you specify.
6. Enter the HTTPS Port (443 by default).
   - Make sure that the port you enter is free. If you plan to allow users to connect to Predictive Factory from outside a firewall, you also have to make sure that this port is open on the firewall.
7. Select the certificate Type, either PKCS12 or JKS.
8. In Location, enter the path to where you stored the PKCS12 or JKS file.
9. Enter the Access Password.
   - This is the password that protects access to the private key in the PKCS12 certificate store or Java Key Store.
10. Enter the Certificate Alias.
    - This is the name that uniquely identifies the key pair in the certificate file or key store.
11. Click Save.
12. Stop and restart the Predictive Factory server.

You can now connect to Predictive Factory in secured mode using the URL `https://<server_name>:<https-port>/PA/login.html`.

**Related Information**

Starting and Stopping Predictive Factory Services [page 31]
4.2.1 Configuring Client Authentication

If you want Predictive Factory to only accept HTTPS requests from certain clients, you have to enable client authentication. Client authentication does not authenticate users, it ensures that Predictive Factory only serves HTTPS requests to certain clients.

**Note**

If you enable client authentication and if a browser or web service consumer is not authenticated, the HTTPS connection is rejected.

To configure client authentication you will need the following:

- To first enable and configure HTTPS on the Predictive Factory server.
- A PKCS12 or Java Key Store (JKS) trust list file stored on the Predictive Factory server. A client is accepted if it is able to present to the server a certificate signed by one of the Certificate Authorities that has a certificate listed in this trust list.

**Note**

The certificate trust list type must be the same as the certificate store type used to configure HTTPS.

1. Log into Predictive Factory with an administrator account.
2. Go to the Settings tab and click the edit icon.
3. In the SSL Client Authentication section, select Enabled.
4. In File Location, enter the path to where you stored the certificate trust list file.
5. In Password, enter the password that protects access to the private keys in the certificate trust list file.
6. In Maximum HTTP Header Size you can change the default 32768.
7. Click Save.
8. Stop and restart the Predictive Factory server.

### Related Information

- Configuring Encrypted Communication (HTTPS) [page 15]
- Starting and Stopping Predictive Factory Services [page 31]

### 4.3 Setting Up Users and Assigning Application Roles

If you are using Predictive Factory authentication, you must create an account for users before they can log into the application or be assigned to a project. These users will have the Predictive Factory Authentication Type.
For users with Windows AD Authentication Type, you can change account names, assign application roles, or deactivate accounts.

1. Log into Predictive Factory with an administrator account.
2. Click the Users tab.

You will see the Administrator account listed. You cannot delete this account.
3. Click the add icon to create a new Predictive Factory user account.
4. To edit an existing user, click the user in the list and click the edit icon.
5. Enter the Name of the person for this account.
6. If the person needs privileges in the application, select the Application Roles:

<table>
<thead>
<tr>
<th>Application Role</th>
<th>Privileges</th>
</tr>
</thead>
</table>
   | Project Creator | ○ Create projects  
   |                 | ○ Assign project members as analysts or project managers |
   | Supervisor      | ○ Access variable statistics for all projects |
   | Administrator   | ○ Create users and assign application roles  
   |                 | ○ Define access to modeling servers, data, and model sources  
   |                 | ○ Define external commands  
   |                 | ○ Configure application settings |

7. For a Predictive Factory account, enter a Login Name and Password that the person will use to log into the application.

   The password must be at least 6 characters long and contain at least 2 of the following types of characters: upper case, lower case, number, or punctuation mark.
8. Click Save and repeat the procedure for every user account you want to create.

**Related Information**

Deactivating and Reactivating User Accounts [page 17]

### 4.3.1 Deactivating and Reactivating User Accounts

1. Log into Predictive Factory with an administrator account.
2. Click the Users tab.
3. Click the user in the list and click the edit icon.
4. To deactivate the user’s accounts, select Account is Deactivated.
5. To reactivate an account that is deactivated, deselect Account is Deactivated.

   To make changes to a reactivated account, you must save your change and edit the user account again.
4.4 Managing Password Policy

An administrator profile can set password and user account restrictions.

As an administrator, you can manage password characters, expiration, and account lockout policy from the Home ➔ Settings page.

The settings on this page affect all users.

1. Log in with an administrator account.
2. Click the Home page link.
3. Click the Settings tab.

4. Click the edit icon to edit any of the password and user account settings.

You can specify the following settings to manage password characters, expiration, and account lockout policy:

<table>
<thead>
<tr>
<th>Password Policy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Password Characters</strong></td>
<td></td>
</tr>
<tr>
<td>Minimum number of characters</td>
<td>Number must be between 6 and 13.</td>
</tr>
<tr>
<td>Enforce mixed case characters</td>
<td>Select to force passwords to contain at least one upper and lower case char-</td>
</tr>
<tr>
<td></td>
<td>acter.</td>
</tr>
<tr>
<td><strong>Password Changes</strong></td>
<td></td>
</tr>
<tr>
<td>Password Expires</td>
<td></td>
</tr>
<tr>
<td>○ Never: Passwords never expire.</td>
<td></td>
</tr>
<tr>
<td>○ After: Enter a number equal or greater than 1 in the Days box to specify</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the time before expiration.</td>
</tr>
<tr>
<td>Can Change Password Every__Minutes</td>
<td>Number of minutes allowed between two password changes.</td>
</tr>
<tr>
<td>Cannot Reuse__Last Passwords</td>
<td>Number of passwords that can be used before reusing a previous one.</td>
</tr>
<tr>
<td><strong>Account Lockout</strong></td>
<td></td>
</tr>
<tr>
<td>Enable Account Lockout Options</td>
<td>Select to enable the options that allow you to define how account lockout is</td>
</tr>
<tr>
<td></td>
<td>managed. If you select No then accounts are never locked out.</td>
</tr>
<tr>
<td>Lock Account After__Unsuccessful</td>
<td>Number of unsuccessful login attempts allowed before the account is locked.</td>
</tr>
<tr>
<td>Login Attempts</td>
<td>Minimum is 3.</td>
</tr>
</tbody>
</table>
Password Policy

<table>
<thead>
<tr>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset Unsuccessful Login Attempts Counter</td>
<td>Number of minutes between the last unsuccessful attempt and the renewal of the login counter. For example, an account is set to lock after 10 unsuccessful attempts. A user enters 8 incorrect logins, then stops. If you have set 5 minutes for this option, then after 5 minutes, the user then has another 10 attempts again to try and log in. Value must be between 5 and 10.</td>
</tr>
<tr>
<td>Account Lock Duration</td>
<td>Number of minutes that an account is locked out before login attempts are again permitted. Minimum is 3.</td>
</tr>
</tbody>
</table>

4.5 Setting the Default User Authentication Method

When users log in, the default authentication type is Predictive Factory Authentication. If Windows AD is configured and active, you then have a choice to select Windows AD Authentication as the default. Users see Login Options on the login screen and can choose to override the default authentication type before logging in.

You can also choose to have no default authentication type. In this case, users see a drop-down list where they must select the authentication type before entering their login name and password.

1. Log into Predictive Factory using an administrator account.

2. Go the Settings tab and click the edit icon.

3. In the Authentication section, make sure that Windows AD is selected as an Active Authentication Type.

4. In Default Authentication Type select the option you want as default:

<table>
<thead>
<tr>
<th>Default Authentication Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictive Factory</td>
<td>Users are automatically authenticated with Predictive Factory.</td>
</tr>
<tr>
<td>Windows AD</td>
<td>Users are automatically authenticated with Windows AD.</td>
</tr>
<tr>
<td>None (Always Show Options on Login Screen)</td>
<td>Users must select the authentication type when logging in.</td>
</tr>
</tbody>
</table>

4.6 Updating the License Key


1. Log into Predictive Factory with an administrator account.

2. Click the Settings tab.

3. Click the edit icon.

4. In the License section, enter the new key and click Save.
4.7 Enabling and Testing the In-App Help

The help content for the In-App help (activated when you click the help icon) is stored in an SAP content platform in the cloud and requires Internet access. If you access the Internet through a proxy, it must be enabled, and the In-App access tested before users can use the In-App help.

Note

Help is also available in the user menu under Documentation. This opens the user documentation in a new browser window.

1. Log into Predictive Factory with an administrator account.
2. Click the Settings tab.
3. Click the edit icon.
4. In the Proxy For In-App Help section, select Enabled.
5. Enter the Proxy name and the Port number.
6. If the proxy accesses the Internet with an identified user, enter the relevant Login Name and Password.
7. Click Save. You are now ready to test access to the In-App help.
8. To test help access, log out of Predictive Factory and log in again with the administrator account.
9. Click the help icon in the main tool bar.

Caution

The first time you click the help icon, you may need to wait several minutes for a response and the help will display an error. When you get the error response, close the help, log off and back in again before clicking the help icon again to check for a correct display of the help.

4.8 Setting up Modeling Servers in Predictive Factory

A modeling server is a set of models repositories, data sources and processing capabilities that will be used by projects members to design and run modeling projects and associated tasks. Once the connections to a processing server have been set up, the administrator chooses among all the repositories accessible through this server the ones that users will be allowed to use in a project, to access to data sources and manage models and tasks.

In Predictive Factory, you can set up two types of modeling servers:

- Automated server
- SAP HANA server

The following table shows the differences between an Automated Server and a SAP HANA server in Predictive Factory:
<table>
<thead>
<tr>
<th>Automated Server</th>
<th>SAP HANA server</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>An automated server is a processing server which has multiple data connections.</td>
<td>A SAP HANA Server is both a processing server and a data server at once.</td>
<td>You can connect one Automated Server per project only.</td>
</tr>
<tr>
<td>You must associate an Automated Server to the project in order to:</td>
<td>Your must associate a SAP HANA Server to the project in order to:</td>
<td>An Automated Server is mandatory for the guided modeling workflow proposed in Predictive Factory.</td>
</tr>
<tr>
<td>• Import SAP Automated Analytics models in the project (for example, models created in SAP Automated Analytics as a solution).</td>
<td>• Import SAP Expert Predictive Pipes.</td>
<td>A SAP HANA Server is mandatory to import and manage Predictive Pipelines.</td>
</tr>
<tr>
<td>• Create models directly in Predictive Factory through the guided modeling workflow.</td>
<td>• If associated with an Automated Server: Create models directly in Predictive Factory leveraging data stored in the SAP HANA Database (through the Guided workflow).</td>
<td></td>
</tr>
<tr>
<td>• Schedule tasks on these models in the framework of data connections available on this server.</td>
<td>• Schedule tasks on the models of the project, in the framework of this SAP HANA database.</td>
<td></td>
</tr>
</tbody>
</table>

The data connections are managed outside of Predictive Factory, directly on the server. Therefore, the list of sources depends on data providers’ available through the ODBC drivers of the server.

You do not need to do additional setup to connect sources as all contents is already accessible.

A SAP HANA database can be both a Predictive Factory Modeling Server and a data connection of an Automated Server.

We recommend that you declare the SAP HANA database as a Predictive Factory Modeling Server so that the data access will not be made through a data connection of the Automated server:

• if you want to create models through the Predictive Factory guided workflow using data stored in a SAP HANA database.
• if you want to create Predictive Factory tasks based on those data.

### 4.8.1 Setting Up Modeling Servers - Automated Server

The Automated Analytics server that you want to declare as your modeling server must be at the same version of SAP BusinessObjects Predictive Analytics as Predictive Factory.

**Note**

No configuration is needed in Predictive Factory to enable Communication Channel Encryption once the appropriate certificates have been configured on the Automated Analytics server. For more information, refer to the Automated Analytics Server Installation Guides on the SAP Help Portal at [http://help.sap.com/pa](http://help.sap.com/pa).

To set up an Automated server in Predictive Factory, you have to go through different steps. The figure below gives an overview of these different steps:
Follow the steps in details:

1. Log into Predictive Factory with an administrator account.
2. Click the Modeling Servers tab.
3. Click the add icon to declare a new modeling server. Select Automated Server.
4. Enter a unique Name for the modeling server.
   Give the server a meaningful name because it is used by project creators to select the modeling server for their projects.
5. Enter Host, the network address or name of the machine hosting the SAP BusinessObjects Predictive Analytics server.

   The Port is the TCP port assigned to the Name Server on the machine hosting the SAP BusinessObjects Predictive Analytics server. For a default installation, the value is 12345.
6. To be able to run tasks, analysts need authentication to the modeling server. Select the Access Policy for the modeling server. When defining access, you can choose between two policies:

<table>
<thead>
<tr>
<th>Access Policy</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared</td>
<td>You provide the User and Password. All analysts implicitly use these credentials.</td>
</tr>
<tr>
<td>Private</td>
<td>Each analyst enters a user and password before accessing the server for the first time. Users can manage their login names and passwords in user menu under User Settings.</td>
</tr>
</tbody>
</table>

7. Click Test Connection to test that the connection settings that you just entered for the modeling server are correct.
8. You can change the default Maximum Concurrent Executions.

   At any given time, a modeling server may be running scheduled tasks and tasks requested interactively by one or more analysts. Since modeling tasks often use a lot of CPU and memory, the number of simultaneous tasks on the modeling engine is limited to avoid CPU and memory overload.
The **Maximum Concurrent Executions** is the maximum number of tasks that can run simultaneously on the modeling server. The ideal value for this number depends on the CPU and memory capacity and the number of expected simultaneous users. The default value is 10.

9. Click **Add Data Connection** to add both data sources and repositories that must be used to import models. You will see all data providers accessible through this server.

**Note**
The data connections capabilities (drivers, DSN) must have been set up outside of Predictive Factory, on the server itself.

10. Define your data connection:

<table>
<thead>
<tr>
<th>Field</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;Name&gt;</code></td>
<td>Give a unique and meaningful name as it will be reused by analysts.</td>
</tr>
<tr>
<td><code>&lt;Description&gt;</code></td>
<td>Enter a description that might be useful for other users. This information will be visible to project members.</td>
</tr>
<tr>
<td><code>&lt;Data Source Name&gt;</code></td>
<td>Select the data source.</td>
</tr>
</tbody>
</table>

11. Click **OK** to close the **Add data connection** dialog box.

12. Redo the steps 9 to 10 for each source that need to be added.

13. Click **Save** to add the modeling server in the modeling server list.

Once a server is declared, a connection test is performed automatically every minute. If an automatic connection test fails, a message appears in the notifications so that you can take appropriate action. The last connection status shows for the server in the **Modeling Servers** tab.

The number of days before expiration of the server’s license is also displayed in the **Modeling Servers** tab. As the expiration of the license approaches, a message appears in the notifications so that you can take appropriate action. The license must be updated on the machine hosting the modeling server.

**Related Information**

- Authentication in Predictive Factory [page 5]
- Reviewing Notifications [page 30]

**4.8.2 Setting Up Modeling Servers - SAP HANA server**

SAP HANA 1.0 SP11 or above is installed. For more information on SAP HANA installation, refer to the SAP HANA Installation guide available at [http://help.sap.com/hana](http://help.sap.com/hana).
If you intend to allow project members to select an APL model repository schema, make sure their users have the select rights on SCHEMA _SYS_BI and SCHEMA _SYS_BIC. If you are unsure or if the user has not the relevant right, contact your SAP HANA database administrator to get them.

You can define multiple SAP HANA servers for a project.

A connection with a SAP HANA server is necessary if the user wants to import Predictive Pipelines.

To set up a SAP HANA server in Predictive Factory, you have to go through different steps. The figure below gives an overview of these different steps:

Follow the steps in details:

1. Log into Predictive Factory with an administrator account.
2. Click the Modeling Servers tab.
3. Click the add icon to declare a new modeling server. Select SAP HANA Server.
4. Enter a unique Name for the modeling server. Give the server a meaningful name because it is used by project creators to select the modeling server for their projects.
5. Define the connection to the SAP HANA server:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Host&gt;</td>
<td>Network address of the machine hosting the SAP HANA server.</td>
</tr>
<tr>
<td>&lt;Instance&gt;</td>
<td>The double-digit number which is assigned to SAP HANA server.</td>
</tr>
</tbody>
</table>
To be able to run tasks, analysts need authentication to the modeling server. Enter the valid credentials to connect the SAP HANA server:

### Field: User
- **Comment:** You provide the *User* name.

### Field: Password
- **Comment:** You provide the *Password*.

7. Click **Test Connection** to test that the connection settings that you have entered for the modeling server are correct.

8. Define the Database:

### Field: Description
- **Comment:** Give a meaningful and unique name to your database as it will be reused by the Predictive Factory users. Optionally, you can enter a description. This description will be visible to project members.
9. Once the modeling server settings are correct, click **Save**.

Once a server is declared, a connection test is performed automatically every minute. If an automatic connection test fails, a message appears in the notifications so that you can take appropriate action. The last connection status is shown for the server in the **Modeling Servers** tab.

The number of days before expiration of the server’s license is also displayed in the **Modeling Servers** tab. As the expiration of the license approaches, a message appears in the notifications so that you can take appropriate action. The license must be updated on the machine hosting the modeling server.

### 4.9 Declaring External Commands

Before beginning:

- By default, external command tasks run on the machine where Predictive Factory is installed. Create a user and password on the local machine (or in Windows Active Directory) with the rights needed for Predictive Factory to run the external command.
- Since external commands can potentially violate security protocol, the feature is deactivated by default. Before you can declare an external command, you must enable the feature: In Predictive Factory, select the **Settings** tab, select the edit icon, and in the **External Command** section, select **Enabled**. Save your change.

An external command is a script or application developed outside of SAP BusinessObjects Predictive Analytics. You declare the command in Predictive Factory so that analysts can schedule it as a task in their projects.

Before starting, see the topic Designing an External Command which gives detailed information about external commands. The following procedure shows how to declare an external command using the same example: You want to declare an external command that lets an analyst run the task `create.exe`, which creates a snapshot on the reference date of customers that bought a specified product in a specified region.

1. Log into Predictive Factory with an administrator account.
2. Select the **External Command** tab and click the **Add** icon.
3. In **Name**, enter a unique and meaningful name for your command. Analysts select the command from a list when defining an external command task.
   
   For example, enter **Create Customer Snapshot**

4. In **Description**, describe the purpose of the command. The analyst sees the description when selecting the command for a task.
   
   For example, enter **Creates a snapshot on the reference date of customers that bought a specified product in a specified region.**

5. In **Command**, enter the command line including the arguments.
   
   Arguments must be enclosed in curly brackets `{}`. Argument names must be a string without spaces that contains only alpha-numeric characters or the underscore `_`.
For example:

c:\my_commands\create.exe {my_product} -date {ref_date} {my_region}

6. In Working Directory, enter the path of the directory where the external command is started if it is different from the path in the command.

7. In Help Text, enter text that helps the analyst provide values for the parameters when defining the task.

For example, enter Enter a product code and a region code that will be used to filter the customers for the snapshot.

8. In User and Password enter the credentials for the Windows user that you set up to run the command.

9. For each argument in the command line that needs a value to be given by the analyst, click the add icon in the Command Parameters section. Enter the command parameter information:

<table>
<thead>
<tr>
<th>Parameter Item</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Name of the argument in the command line.</td>
<td>my_product</td>
</tr>
<tr>
<td>Question</td>
<td>The text to prompt the analyst for the parameter value.</td>
<td>Enter a product code:</td>
</tr>
<tr>
<td>Type</td>
<td>Data type of the parameter value.</td>
<td>Integer</td>
</tr>
<tr>
<td>Default Value</td>
<td>The default value is required. It can be overwritten by the analyst.</td>
<td>12</td>
</tr>
</tbody>
</table>

For our example, we need to enter a second command parameter:

<table>
<thead>
<tr>
<th>Parameter Item</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>my_region</td>
</tr>
<tr>
<td>Question</td>
<td>Enter a region code:</td>
</tr>
<tr>
<td>Type</td>
<td>String</td>
</tr>
<tr>
<td>Default Value</td>
<td>EMEA</td>
</tr>
</tbody>
</table>

10. Click Save.

In the example, if the analyst kept the default values for the command parameters, and the reference date given at run time is January 1, 2015, the command line sent the operating system at run time looks like this:

c:\my_commands\create.exe 12 -date 2015-01-01 12:00:00 EMEA

Related Information

Designing an External Command [page 28]
4.9.1 Designing an External Command

This topic helps you design external commands.

For a description and example of how to declare an external command in Predictive Factory, see the procedure for declaring external commands.

An external command is a script or application developed outside of SAP BusinessObjects Predictive Analytics. You declare the command so that analysts can schedule it as a task in their projects.

The command line contains the name of the script or executable and a list of arguments to be interpreted by the operating system.

The arguments are placeholders for parameters that analysts supply values for when they create the task.

Three pre-defined parameters let you use values available at run time. Values for these parameters are provided by the system:

<table>
<thead>
<tr>
<th>Pre-defined Command Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>{ref_date}</td>
<td>The task reference date. It is ISO formatted, for example: 2015-01-01 00:00:00.</td>
</tr>
<tr>
<td>{exec_date}</td>
<td>The task execution date. It is ISO formatted, for example: 2015-01-01 12:00:00.</td>
</tr>
<tr>
<td>{user}</td>
<td>The user name of the analyst who created the task.</td>
</tr>
</tbody>
</table>

Parameter values, either supplied by the analyst or by the system, are replaced in the command at run time.

Example

You want to create a command line for an executable (create.exe) that creates a snapshot on the task’s reference date of customers that bought a specified product in a specified region:

```
c:\my_commands\create.exe {my_product} -date {ref_date} {my_region}
```

The command line contains three arguments:

- `{my_product}` is the product code to be supplied by the analyst
- `{my_region}` is the region code to be supplied by the analyst
- `{ref_date}` is a pre-defined parameter supplied by the system at run time

When you declare the external command, you define command parameters for `my_product` and `my_region` so that the analyst is prompted to enter values. If the analyst entered a product code=12 and a region code = EMEA, and the reference date given at run time is January 1, 2015, the command line sent the operating system at run time looks like this:

```
C:\my_commands\create.exe 12 -date 2015-01-01 12:00:00 EMEA
```
Execution Status

When scheduling tasks, an analyst may want to run another task in response to the completion status of the external command task. After execution, an external command task can trigger only two events:

- Task execution succeeded
- Task execution failed

If the implementation is based on the Java Runtime.exec API, then:

- The execution succeeds if exitCode() == 0.
- The execution fails if exitCode() != 0 or an error is thrown by Runtime.exec(...)

**Note**

It is possible for the executed command to log errors and still end in success.

Related Information

Declaring External Commands [page 26]

4.10 Configuring the Server Logs

By default, traces are logged in <Installation Folder>\SAP BI\Analytics\logging\. There is a set of files for each service in the Predictive Factory server (see the landscape diagram in the overview topic). The names of the log files are prefixed with the service name (SIA, WACS, PJS, jobserver, fileserver, CMS).

To customize the configuration of the log files:

1. Edit the log configuration file BO_trace.ini in <Installation Folder>\SAP BI\Analytics\conf\.
2. Review the section Default values (for all processes) at the beginning of the file for a list of the parameters, their use and their possible values.

**Note**

The parameters apply to the log files for all services.

4. Save the BO_trace.ini and restart Predictive Factory server.
5  Reviewing Notifications

In Predictive Factory, Notifications provide information on the status of the completed tasks and system messages.

1. To open the list of notifications, click the Notifications icon.
2. From the Notifications list you can do the following:
   - See the task or resource that is producing the message.
   - Click the link in the notification message to see details of the task result or resource.
   - See when the notification was sent.
   - Check the notification’s status:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🛡️</td>
<td>A notification about neutral information.</td>
</tr>
<tr>
<td>✅</td>
<td>A notification related to a success.</td>
</tr>
<tr>
<td>⚠️</td>
<td>A notification related to a warning.</td>
</tr>
<tr>
<td>🚨</td>
<td>A notification related to a failure.</td>
</tr>
</tbody>
</table>

3. To dismiss one or several notification, click the delete icon to remove them from the list. To clear the list, select Dismiss All.
6 Starting and Stopping Predictive Factory Services

Predictive Factory Windows services are automatically started after installation. To stop and restart them if needed:

1. **In the Windows Start menu, chose SAP Business Intelligence > Stop Predictive Factory.**
   
   **Note**
   
   Stop Predictive Factory may time out before it can verify that all the processes are stopped. In this case, chose Stop Predictive Factory again until you see the confirmation that all processes are stopped.

2. **In Windows Start menu, chose SAP Business Intelligence > Start Predictive Factory.**
7  Upgrading Predictive Factory

⚠️ Caution

Do not uninstall the previous version of Predictive Factory: this will remove all objects created in Predictive Factory (projects, tasks, modeling servers, etc.).

When you upgrade Predictive Factory, the setup program will recognize that a previous version is already installed. To go on with the update, run the installation as described in the step Installing Predictive Factory [page 7].

ℹ️ Note

Do not forget to clean your browser cache and to restart it after the upgrade.
8 Uninstalling Predictive Factory

To remove Predictive Factory from your system, use the standard Windows uninstallation procedure:

1. In the Windows Control Panel Programs and Feature section, select SAP BusinessObjects Predictive Factory.
2. Click Uninstall.

**Note**

Predictive Factory uninstallation process does not delete the following two registry keys:

- HKEY_LOCAL_MACHINE\SOFTWARE\SAP BusinessObjects\Suite XI 4.0\CER
- HKEY_LOCAL_MACHINE\SOFTWARE\SAP BusinessObjects\Suite XI 4.0\CMS

There is no impact if you want to reinstall Predictive Factory or upgrade it. However, should you wish to, you can delete these entries manually.

**Caution**

Do not uninstall the previous version of Predictive Factory if you intend to simply do an upgrade. An uninstallation will remove all objects created in Predictive Factory (projects, tasks, modeling servers, and so on).
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