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ENTERPRISE CONNECT

User Guide

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doc@ge.com

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Enterprise Connect Overview

About Enterprise Connect

Securely manage and scale connectivity between the Predix Cloud and your enterprise.

Use the Enterprise Connect service to connect to internal and external resources from the Predix environment. Enterprise Connect is a secure gateway that supports all TCP protocols through native websockets. Use your existing software for integration and perform extract, transform, and load (ETL) operations to and from both cloud and on-premise resources.

Users have complete control over all components of their Enterprise Connect service, requiring only a few minutes to deploy the server component and less than 30 minutes to deploy all components.

- CLI and Binary libraries for both Server and Client
- Node Oracle Database support
- Java Library Support with examples and Product Benchmark for sizing document
- Auto Token Refresh for UAA
- Two-way Mutual Authentication Transport Layer Security (TLS) for both Server and Gateway and with manual cert provisioning
- Efficient error handling and graceful exits for slow or congested networks

Enterprise Connect is cloud-agnostic and includes these Security features:

- Single tenant service
- Web WSS - Secure Sockets
- UAA and OAth integration
- TLS & PKI authorization
- IPv4 and IPv6 compatible whitelisting and blocklisting
- Configurable proxy

Additional References

For additional examples and architecture information, refer to the Enterprise Connect Wiki. https://github.com/Enterprise-connect/ec-sdk/wiki/EC-Agent

Getting Started with Enterprise Connect

Enterprise Connect Service Setup

Create the secure environment for setting up your Enterprise Connect service.

To use the Enterprise Connect service, you must first subscribe to the Predix User Account and Authentication (UAA) service as the trusted issuer. You can use the UAA dashboard or the Cloud Foundry command line interface to create and configure your service.

Setup Task Roadmap

> 📝 **Note:**
>
> If you have used other services from the Predix Catalog, you probably have UAA services set up and can use the existing UAA credentials. You can create up to 10 service instances from the same UAA client. If this is the case, you can start with Step 4 in the Setup Task Roadmap to create your Enterprise Connect service instance.

Table 1. Enterprise Connect Setup Tasks

	Task	Instructions and Links
1	(Optional) Configure your proxy settings if necessary.	Depending on your location and network configuration, you may need to configure your proxy settings to access remote resources. See #unique_3 *(on page)*.
2	Create the UAA service instance as the trusted issuer.	You can create a maximum of 10 UAA instances in your space. As a best practice, use the same UAA instance for your services. See #unique_4 *(on page)*.
3	Bind your application to the UAA service instance.	See #unique_5 *(on page)*.
4	Create an instance of the Enterprise Connect service.	See Creating an Enterprise Connect Service Instance *(on page v)*.
5	Create OAuth2 clients to setup access to your service authenticated using UAA.	When you create a UAA instance, an admin client is automatically created for you to access UAA for additional configuration. You can create a new client for your service instance with specific scopes. If an OAuth2 client already exists, you can update the client to add your service instance.

Table 1. Enterprise Connect Setup Tasks (continued)

	Task	Instructions and Links
		See #unique_7 *(on page).*
6	Update the OAuth2 client to add service specific scopes or authorities.	To enable your application to access a platform service, your JSON Web Token (JWT) must contain the scopes required for a platform service. For more information see #unique_8 *(on page).*
7	Bind your application to the service instance.	See #unique_5 *(on page).*

Creating an Enterprise Connect Service Instance

Create a service instance for the Enterprise Connect service in the Predix environment.

Before you Begin ...

Before creating a service instance for Enterprise Connect you must have the base URLs for UAA instances that the Enterprise Connect service instance will trust. See Enterprise Connect Service Setup *(on page iv).*

Procedure

1. Sign into your Predix account at `https://www.predix.io.`
2. Navigate to **Catalog** > **Services** tab, and click the **Enterprise Connect** service tile.
3. Click **Subscribe** on the required plan.
4. On the new Service Instance page, enter the following information:

Field	Description
Org	Select your org.
Space	Select the space for your application.
User Account & Authentication (UAA)	Choose an existing UAA instance or create a new instance of UAA. For more information, see #unique_4 *(on page)*
Service instance name	Specify a unique name for your instance.
Service Plan	Select a plan.

Using Cloud Foundry Commands to Create your Enterprise Connect Service Instance

Procedure

1. List the services in the Cloud Foundry marketplace.

   ```
   cf marketplace
   ```

   The Enterprise Connect service, `enterprise-connect-service`, is listed as an available service.

2. Create an Enterprise Connect service instance.

   ```
   cf create-service enterprise_connect <plan> <my_service-enterprise_connect_instance>  -c
                     '{"trustedIssuerIds":["https://<predix-uaa-instance-uri>/oauth/token"]}'
   ```

   where:

   `<plan>` is the plan associated with a service.

3. Bind your Enterprise Connect gateway service instance to your application to provision connection details for your service instance in the VCAP environment variables. Cloud Foundry runtime uses VCAP_SERVICES environment variables to communicate with a deployed application about its environment.
   Use the Cloud Foundry CLI to log into Cloud Foundry:

   ```
   cf login
   ```

   > ✏️ **Note:**
   > If you are a GE employee, you must use the `cf login --sso` command to log into Cloud Foundry. After you enter your SSO, you will receive a one-time passcode URL. Copy this URL and paste it in a browser to retrieve your one-time passcode. Use this code with the `cf` command to complete the CF login process.

4. Bind your application to the service instance you created.

   ```
   cf bind-service <application_name> <my_enterprise_connect_instance>
   ```

5. Restage your application to ensure that environment variable changes take effect:

   ```
   cf restage <application_name>
   ```

6. View the environment variables for your application:

   ```
   cf env <application_name>
   ```

   The environment variables which contain your basic authorization credentials are shown:client ID and the endpoint URI:

```
"VCAP_SERVICES": {

  "enterprise-connect": [

   {

     "credentials": {

      "admin-token": "

YWRtaW46ZUVEMTkxdFBPOTgzMjZjMYMtNXIwOS00OGIzLTg2YzMtNDL1YTk5M2U0BzJj"

      "ec-info":  {

       "ids":  {

       "<random_string>",

       "<random_string>"

       ],

       "trustedIssuerIds": [

       "https://UAA-Instance-URL.predix-uaa.run.aws-usw02-pr.ice.predix.io/oauth/token"

       ]

      },

      "service-uri":  "https://<Predix-Zone-Id>.run.asv-pr.ice.predix.io"

      "usage-doc": "https://github.com/Enterprise-connect/ec-sdk/wiki",

      "zone": {

      "http-header-name": "Predix-Zone-Id",

      "http-header-value": "<Predix-Zone-Id>",

      "oauth-scope": "enterprise-connect.zones.<Predix-Zone-Id>.user"

      }

     },

     "label": "enterprise-connect",

     "name": "hello-world-app-1",

     "plan": "<plan>",

     "provider": null,

     "syslog_drain_url": null,

     "tags": [],

     "volume_mounts": []

    }

   ]

  }
```

7. Add the `oath-scope` to your client or user in the UAA Authority.
8. Add the Enterprise Connect scope to the UAA instance.

Binding an Application to the Enterprise Connect Instance

About this task

You must bind your application to your Enterprise Connect instance to provision its connection details in the VCAP_SERVICES environment variable. Cloud Foundry runtime uses VCAP_SERVICES environment variable to communicate with a deployed application about its environment.

You can retrieve the following Enterprise Connect instance details from the VCAP_SERVICES environment variable:

- An `enterprise_connect_instance_uri` for your instance.

- HTTP header information to access your Enterprise Connect instance. It includes:

    ◦ `http-header-name` as `Predix-Zone-Id`
    ◦ `http-header-value`

- An `oauth-scope` for your instance. The scope is required in the end-user token to access a specific Enterprise Connect instance.

> 📝 **Note:**
>
> The following steps are performed using the Cloud Foundry CLI. To complete the steps in a web browser, follow the instructions on the service page in the Predix Catalog.

Procedure

1. Bind your application to the new Enterprise Connect instance.

   ```
   cf bind-service <your_app_name> <enterprise_connect_instance_name>
   ```

   The `<enterprise_connect_instance_name>` instance is bound to your application, and the following message is returned:

   ```
   Binding service <enterprise_connect_instance_name> to app <your_app_name> in org predix-platform / space predix
    as userx@ge.com...
   OK
   TIP: Use 'cf restage' to ensure your env variable changes take effect
   ```

2. Verify the binding:

   ```
   cf env <your_app_name>
   ```

   Messages that are similar to the following messages are returned:

```
"VCAP_SERVICES": {

  "enterprise-connect": [

   {

    "credentials": {

     "admin-token": "

YWRtaW46ZUVEMTkxdFBPOTgzMjZjMYMtNXIwOS00OGIzLTg2YzMtNDL1YTk5M2U0BzJj"

     "ec-info": {

      "ids": {

      "<random_string>",

      "<random_string>"

      ],

      "trustedIssuerIds": [

      "https://UAA-Instance-URL.predix-uaa.run.aws-usw02-pr.ice.predix.io/oauth/token"

      ]

     },

     "service-uri":  "https://<Predix-Zone-Id>.run.asv-pr.ice.predix.io"

     "usage-doc": "https://github.com/Enterprise-connect/ec-sdk/wiki",

     "zone": {

     "http-header-name": "Predix-Zone-Id",

     "http-header-value": "<Predix-Zone-Id>",

     "oauth-scope": "enterprise-connect.zones.<Predix-Zone-Id>.user"

     }

    },

    "label": "enterprise-connect",

    "name": "hello-world-app-1",

    "plan": "<plan>",

    "provider": null,

    "syslog_drain_url": null,

    "tags": [],

    "volume_mounts": []

   }

  ]

 }
```

Using Enterprise Connect

Using the Enterprise Connect Service

Understand Enterprise Connect architecture and learn about configuration options.

Prerequisites

To use Enterprise Connect you must have

- An active account in predix.io
- Cloud Foundry CLI installed

Enterprise Connect Business Cases

These business cases represent two common applications of the Enterprise Connect service.

Figure 1. Enterprise Connect Architecture and Components for Connecting an On-premise Data Source to the Predix Cloud
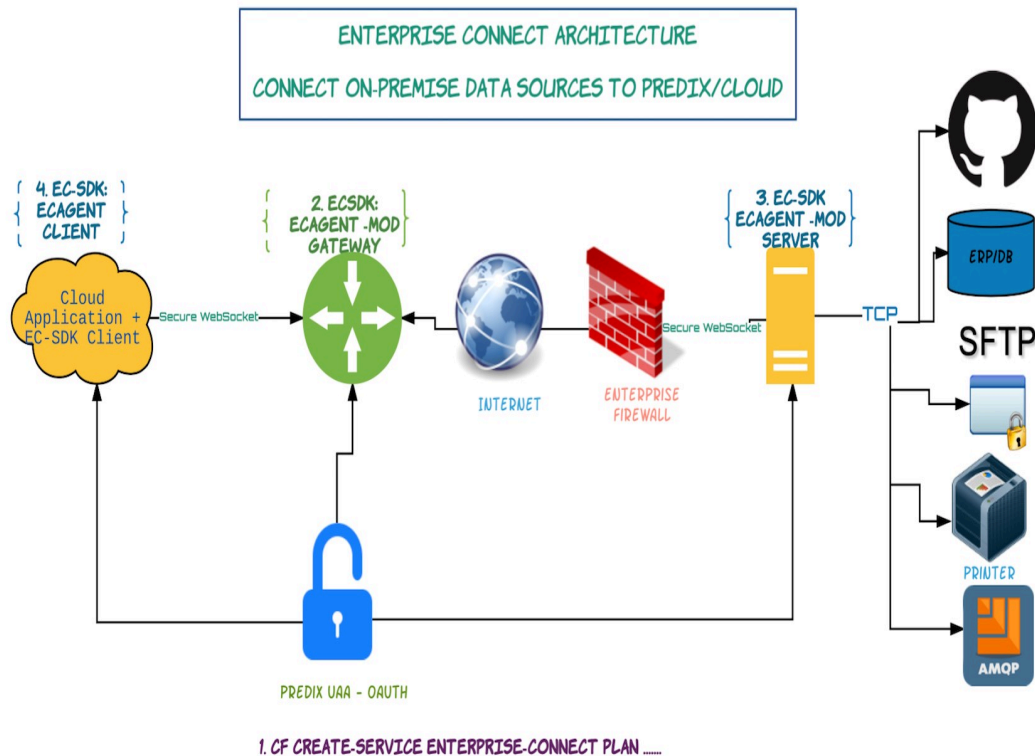
To connect an on-premise data source to the Predix cloud, follow the instructions provided in these links:

1. Set up your Predix environment. See Enterprise Connect Service Setup *(on page iv)*
2. Create your Enterprise Connect service. See Creating an Enterprise Connect Service Instance *(on page v)*
3. Configure additional required components described in these guidelines for a *Two-way Reach in Simulation*: https://github.com/Enterprise-connect/ec-sdk/wiki/Two-way-Reach-In-Simulation.

Enterprise Connect Architecture and Components for Connecting Predix Data Sources to an On-premise ETL
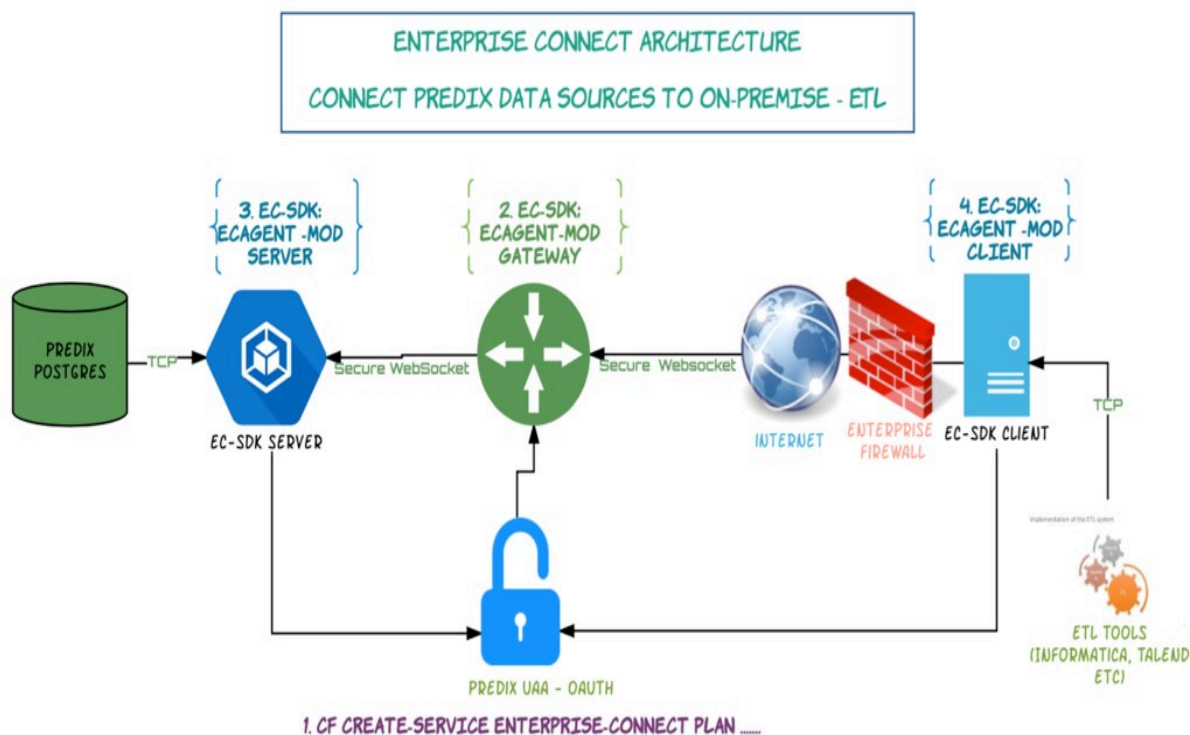
To connect a Predix data source to an on-premise ETL, follow the instructions provided in these links:

1. Set up your Predix environment. See Enterprise Connect Service Setup *(on page iv)*
2. Create your Enterprise Connect service. See Creating an Enterprise Connect Service Instance *(on page v)*
3. Configure additional required components described in these guidelines for a *Two-way Reach Back Simulation*: https://github.com/Enterprise-connect/ec-sdk/wiki/Two-way-Reach-Back-Simulation.