HP Propel Service Exchange

Installation and Configuration Guide

For the CentOS Operating System

Software Version 1.00 – July 2014

Contents

Overview

HP Propel provides a single, user-friendly portal that delivers a consistent user experience regardless of the IT services involved. It enables automated service delivery and can orchestrate a single request to reach multiple backend systems for fulfillment. This is made possible by HP Propel Service Exchange (HP SX) – the component that brings the Propel experience together, integrating the portal, catalog, and back-end fulfilment engines to deliver efficiently from multiple providers. HP SX features built-in content that exchanges service messages, orchestrates and dramatically simplifies the integration of new and existing products, services and solutions. And for all this to happen, each component only needs to integrate with HP SX once.

Installing HP SX

This section provides information on how to install and configure HP SX 1.00. For HP SX to work together with HP Propel, the HP Propel Portal must also be installed, hence the installation process outlined in this guide covers the installation of both appliances. For more information about HP Propel see the *HP Propel 1.00 Installation and Configuration Guide*.

The person who installs and configures HP SX should have knowledge of, or work with someone who has knowledge of, the following:

- Working with VMware ESX 4.1
- Installing OVA packages
- Virtual machine (VM) configuration and administration
- Configuring VM networking

Product Integrations

HP Propel 1.00

HP Cloud Service Automation (HP CSA) 4.1

HP Service Manager (HP SM) 9.32 and 9.33

Install steps

Procedure overview

The procedure to install and configure HP SX involves the following steps:

1. Using the VMware VSphere Client, deploy the HP Propel SX and Portal VMs by importing the OVA templates into your VMware ESX 4.1 environment.
2. Power on the VMs.
3. Run the HP Propel Portal VM network configuration script and reboot.
4. Download the external system certificates for the HP Propel Portal VM.
5. Run the HP Propel Portal VM certificate configuration scripts.
6. Run the HP SX VM network configuration script and reboot.
7. Edit the HP SX VM `installer.properties` file, including specifying the HP SM and HP CSA instances.
8. Download the external system certificates for HP SX and run `propelCA.crt`.
9. Run the HP SX certificate configuration scripts.
10. On the HP SX VM, restart RabbitMQ, OO and HP SX.
11. On the HP Propel Portal VM, retrieve the HP SX certificate.
12. On the HP Propel Portal VM, import all certificates.
13. On the HP Propel Portal VM, update the CA attributes to match the certificates downloaded.
14. On the HP Propel Portal VM, restart jboss and microservices.
15. On the HP CSA host, obtain the HP SX certificate and import it into the CSA truststore.

Install HP Propel SX and Portal appliances

Perform the following steps:

1. On the ESX server, use the VMware VSphere Client to deploy HP Propel SX and Portal OVA templates.

2. After the VMs are deployed and available, power on.

3. **On the Portal VM:**
   Log in as `root`, and use `propel2014` as the password.
   Configure the VM network from `/opt/hp/propel/bin` NOTE: The script must be run directly from this location.
   ```
   ./reconfigurePropelCat.sh --hostname <CATALOG_HOSTNAME> --configuredhcp
   ```
   A reboot is required.
   Note: Now that you have the network configured you can use a remote terminal to execute the next steps.

4. **On the Portal VM:**
   Download the external system certificates.
   NOTE: The following commands expect that the external systems are already up and running with the correct certificates. If this is not the case you have to first obtain the certificates.

   a. Run `mkdir /opt/hp/propel/security/certs`

   b. **HP CSA**
   If HP CSA uses a self-signed certificate, use:
   ```
   openssl s_client -connect <CSA_HOSTNAME>:8444 </dev/null | sed -ne '/-BEGIN
   CERTIFICATE-/,/-END CERTIFICATE-/p' >/opt/hp/propel/security/certs/csa.crt
   ```

If HP CSA uses a CA signed certificate, use:

```
openssl s_client -showcerts -connect <CSA_HOSTNAME>:8444 </dev/null | perl -ne 'if
(/-BEGIN CERTIFICATE-/../-END CERTIFICATE-/) {if ($i++>0 and /-BEGIN CERTIFICATE-
/../-END CERTIFICATE-/) {print}}' > /opt/hp/propel/security/certs/csa-ca.crt
```

c. **HP SM**

When HP SM uses a self-signed certificate, use:

```
openssl s_client -connect <SERVICE_MANAGER_HOSTNAME>:13443 </dev/null | sed -ne '/-
BEGIN CERTIFICATE-/,/-END CERTIFICATE-/p' >/opt/hp/propel/security/certs/sm.crt
```

When HP SM uses a CA signed certificate, use:

```
openssl s_client -showcerts -connect <SERVICE_MANAGER_HOSTNAME>:13443 </dev/null |
perl -ne 'if (/-BEGIN CERTIFICATE-/../-END CERTIFICATE-/) {if ($i++>0 and /-BEGIN
CERTIFICATE-/../-END CERTIFICATE-/) {print}}' > /opt/hp/propel/security/certs/sm-
ca.crt
```

5. **On the Portal VM:**

Run the following scripts from `/opt/hp/propel/bin` NOTE: The scripts must be run directly from this location.) Whenever prompted, use `propel2014` as the password.

```
./configureKeys.sh --generateCSR --selfsign --importks
```

```
./reconfigurePropelCat.sh --sxhostname <SX_HOST_NAME> --smhostname
<SERVICE_MANAGER_HOSTNAME>
```

```
./reconfigurePropelCat.sh --enableservices
```

6. **On the HP SX VM:**

Log in as `root`, and use `propel2014` as the password.

Configure the VM network from `/opt/hp/propel/bin` NOTE: This script must be run directly from this location.

```
./reconfigurePropelSx.sh --hostname <SX_HOST_NAME> --configuredhcp
```

A reboot is required.

NOTE: Now that you have the network configured you can use a remote terminal to execute the next steps.

7. **On the HP SX VM:**

Edit `installer.properties`, entering your unique names, passwords and urls. See the example below.

NOTE: An HP SM and an HP CSA instance must be specified in this file. Only one instance of each product can be specified here, any additional instances must be added into the relevant `instances.json` file, see **ADDING ADDITIONAL HP CSA INSTANCES** and **ADDING ADDITIONAL HP SM INSTANCES** for details.

```
# CCUE CATALOG INTEGRATION
CATALOG_HOSTNAME=<yourCATALOGhostname>

# SERVICE MANAGER INTEGRATION
# The host name of the machine where Service Manager is installed
SM_HOSTNAME=<yourSMhostname>
# The port at which the Service Manager Web Services are running
```

```
SM_PORT=<yourPORT>
# If true, secure connection to Service Manager will be used; otherwise, plain HTTP
will be used
SM_SSL=true
# The user name used to connect to the Service Manager
SM_USER=<yourSMusername>
# The password used to connect to the Service Manager
SM_PASS=<yourSMpassword>
# The host name of the machine where the database used by the Service Manager is
running
SM_DB_HOSTNAME=<yourSMdbhostname>
# The port at which the Service Manager database is running
SM_DB_PORT=<yourSMdbport>
# The DB name of Service Manager
SM_DB_NAME=<yoursmdbname>
# The user name used to connect to the Service Manager database
SM_DB_USER=<yoursmdbusername>
# The password used to connect to the Service Manager database
SM_DB_PASS=<yoursmdbuserpassword>


# CSA INTEGRATION
# The host name of the machine where Cloud Service Automation is installed
CSA_HOSTNAME=<yourCSAhostname>
# The port at which the CSA REST API is running
CSA_PORT=<yourCSAport>
# If true, secure connection to CSA will be used; otherwise, plain HTTP will be
used
CSA_SSL=true
# The user name used to connect to CSA
CSA_USER=<yourCSAusername>
# The password used to connect to CSA
CSA_PASS=<yourCSAuserpassword>
# The organization within CSA to be used for operations
CSA_ORG=<yourCSAorg>


# MAILING PROPERTIES
# The SMTP server to be used for sending emails
SMTP_SERVER=<yoursmtpserver>
# The SMTP server port
SMTP_PORT=<yoursmtpport>
# The From mail address to be used for emails
MAIL_FROM=<yourfrommailaddress>
# The BCC mail address to be used for emails
MAIL_BCC=<yourbccmailaddress>
# The smtp authentication, leave blank if not used
SMTP_USER=
SMTP_PASS=
```

8. **On the HP SX VM:**

   Download the external system certificates. The following commands expect that the external systems
   are already up and running with the correct certificates. If this is not the case you have to first obtain
   the certificates.

   a. Run `mkdir /opt/hp/propel/security/certs`

   b. **HP CSA**

If HP CSA uses a self-signed certificate, use:

```
openssl s_client -connect <CSA_HOSTNAME>:8444 </dev/null | sed -ne '/-BEGIN
CERTIFICATE-/,/-END CERTIFICATE-/p' >/opt/hp/propel/security/certs/csa.crt
```

If HP CSA uses a CA signed certificate, use:

```
openssl s_client -showcerts -connect <CSA_HOSTNAME>:8444 </dev/null | perl -ne 'if
(/-BEGIN CERTIFICATE-/../-END CERTIFICATE-/) {if ($i++>0 and /-BEGIN CERTIFICATE-
/../-END CERTIFICATE-/) {print}}' > /opt/hp/propel/security/certs/csa-ca.crt
```

c. **HP SM**

When HP SM uses a self-signed certificate, use:

```
openssl s_client -connect <SERVICE_MANAGER_HOSTNAME>:13443 </dev/null | sed -ne '/-
BEGIN CERTIFICATE-/,/-END CERTIFICATE-/p' >/opt/hp/propel/security/certs/sm.crt
```

When HP SM uses a CA signed certificate, use:

```
openssl s_client -showcerts -connect <SERVICE_MANAGER_HOSTNAME>:13443 </dev/null |
perl -ne 'if (/-BEGIN CERTIFICATE-/../-END CERTIFICATE-/) {if ($i++>0 and /-BEGIN
CERTIFICATE-/../-END CERTIFICATE-/) {print}}' > /opt/hp/propel/security/certs/sm-
ca.crt
```

d. Run `scp root@<CATALOG_HOSTNAME>:/opt/hp/propel/security/propelCA.crt /opt/hp/propel/security/certs/propelCA.crt`

    i.   Accept the server key.

    ii.   Enter `propel2014` for the password.

9. **On the HP SX VM:**

Run the following scripts from `/opt/hp/propel/bin` NOTE: The scripts must be run directly from this location.

Whenever asked for a password enter `propel2014`

- `./configureKeysSx.sh --selfsign --importks`

- `./reconfigurePropelSx.sh --configuresx --enableservices`

- `./configureKeysSx.sh --userkeydir /opt/hp/propel/security/certs --importuserkeys`

NOTE: You can specify non-default keystore and/or truststore passwords via the respective command-line options: `--kspassword <KS_PASSWORD>` and `--tspassword <TS_PASSWORD>`.

    –   The keystore will be generated by the script and you can select any password for it.

    –   The truststore already exists and so the provided TS_PASSWORD must match the existing truststore password.

10. **On the HP SX VM:**

Restart RabbitMQ, OO and HP SX by running the following script from `/opt/hp/propel/bin`

NOTE: The script must be run directly from this location.

```
./reconfigurePropelSx.sh --enableservices
```

11. **On the Portal VM:**

Retrieve the HP SX certificate:

```
openssl s_client -connect <SX_HOSTNAME>:8444 </dev/null | sed -ne '/-BEGIN
CERTIFICATE-/,/-END CERTIFICATE-/p' >/opt/hp/propel/security/certs/sx.crt
```

12. **On the Portal VM:**

    Import all certificates from -
    ```
    /opt/hp/propel/security/certs
    ```
    Into -
    ```
    /opt/hp/propel/security/propel.truststore.
    ```

    Use this command for each certificate:
    ```
    keytool -import -keystore /opt/hp/propel/security/propel.truststore -
    file /opt/hp/propel/security/certs/<CERT_NAME> -alias <CERT_NAME> -
    storepass propel2014
    ```

13. **On the Portal VM:**

    Update the CA attributes in the microservice configurations (`/opt/hp/propel/msvc/conf`) to match the certificates downloaded in `/opt/hp/propel/security/certs`

    i.   `ticket.json` uses the **SX URL** in the **provider** section, and the CA in that section has to point to `sx.crt`

    ii. `idm.json` uses the **Portal URL** in the **provider** section, and the CA in that section has to point to `propelCA.crt`

    iii. `knowledge.json` uses the **HP SM** URL in the **provider** section, and the CA in that section has to point to `sm.crt` or `sm-ca.crt`

14. **On the Portal VM:**

    Restart jboss and microservices SX by running the following scripts from `/opt/hp/propel/bin` NOTE: The scripts must be run directly from this location.

    i.   `./reconfigurePropelCat.sh --disableservices`

    ii. `./reconfigurePropelCat.sh --enableservices`

15. **On the HP CSA host:**

    i.   Obtain the HP SX certificate. For example, by using `openssl s_client -connect <SX_HOST_NAME>:8444 </dev/null | sed -ne '/-BEGIN CERTIFICATE-/,/-END CERTIFICATE-/p' >sx.crt`

    ii. Import `sx.crt` into the CSA truststore. The location could vary depending on what JRE is used to run CSA.

        a. `keytool --import -file sx.crt -keystore` "C:\Program Files\Hewlett-Packard\CSA\openjre\lib\security\cacerts" -alias SX

        b. Enter password `changeit`

        c. Type `yes`

    iii. Restart the HP CSA service.

HP SX Content Management

In this guide [%SX_HOME%] is used as a shortcut for the path: `/opt/hp/propel/jboss-as/standalone/deployments/sx.war/`

HP SX enables Propel to work seamlessly with a customer's HP SM and HP CSA instances. It offers out-of-the-box functionality through content packs that can be used as-is or customized. The HP SX Content Management UI provides an easy interface to view available content packs, download, upload and remove them.

Upload and removal operations include the automatic upload or removal of relevant OO jar files, and the merging of HP SX customizations into the running HP SX server.

Setting user roles

HP SX contains a set of management pages, for example the Content Management UI and the Testing UI that are only accessible by users having certain roles. Users can have the following three possible roles:

- ADMINISTRATOR – An administrative user.
- UI – A general testing UI user.
- CONSUMPTION – This role is used for all API calls from and to the consumption component.

A user who does not have an ADMINISTRATOR or UI role is not allowed to access any of the HP SX UI pages.

A user who does not have an ADMINISTRATOR role is not allowed to access HP SX management UI pages.

Role association

Users are associated with roles in the `users.json` configuration file, located [%SX_HOME%]`/WEB-INF/config/users.json`

An example configuration:

```
{
    "Provider": {
        "sxCatalogTransportUser": {
            "roles": [
                "CONSUMPTION"
            ]
        },
        "admin": {
            "roles": [
                "ADMINISTRATOR"
            ]
        }
    }
}
```

The file structure looks like the organization. In this example the Provider is at the top level, with two users with their roles underneath. A user name can also be * which means all users within the organization will have the same roles. When multiple entries match a user all their roles are merged together.

Another example:

```
{
    "CONSUMER": {
        "admin" : {
            "roles": [
                "ADMINISTRATOR"
            ]
        },
        "*": {
            "roles": [
                "UI"
            ]
        }
    },
    "Provider": {
        "sxCatalogTransportUser": {
            "roles": [
                "CONSUMPTION"
            ]
        }
    }
}
```

In this example *all* the users of the CONSUMER organization have access to the *testing UI* for creating orders, and the *admin* user also has access to the administration section.

Selecting the organization

When a user tries to access the HP SX UI using the **http://sx_host:8444/sx** URL, he needs to log in but is not able to select organizations as only one organization can be specified in the HP SX configuration.

To change the organization:

- Open the `sx.properties` file at [%SX_HOME%]/`WEB-INF/sx.properties`
- Change the `security.idmTenant` property to match the organization name.

Using the Content Management UI

1. Open the **Content Management** section from the HP SX UI.
2. In the **Content Management UI**, view the available content packs and their details:
   - Version numbers
   - Which adapter they connect to
   - When last uploaded
   - Their high level features
   - The relevant OO content pack name.

Downloading content packs

1. To download a content pack, check the appropriate content pack in the **Id/Name** column.
2. Click the **Download** button.

3. When prompted, **Save** the *<contentpack>*.zip. Depending on your browser settings, select the location through **Save As…** or copy the *<contentpack>.*zip from the Downloads folder to another location.
4. View and customize the files.

Deleting content packs

To delete one or more content packs:

1. Check the appropriate content packs in the **Id/Name** column.
2. Click the **Delete** button.
3. A confirmation with the number of content packs deleted, appears below the buttons on the top of the **Content Management UI**.

Uploading content packs

To upload a content pack:

1. Click the **Upload** button.
2. Locate the .zip or .jar to be uploaded, for example, the `sm-case-exchange.jar` containing a customized `case-exchange.json` file.
3. Select **Open**.
4. It takes a moment for the upload to process. When it is complete a confirmation appears below the buttons on the top of the **Content Management UI** and the Upload Time for the relevant content pack is updated.

NOTE: HP SX will automatically locate the appropriate content pack to upload to, it does not need to be selected or specified. The upload creates a new content pack, or if there is one with matching ID already it replaces the existing one.

Content Packs and their contents

HP SX contains the following out-of-the-box content packs:
- **sx-base** - the base content for HP SX. This content pack is required and cannot be removed.
- **csa-r2f - t**he content pack providing files for HP CSA requests for fulfillment.
- **sm-r2f** - the content pack providing files for HP SM requests for fulfillment.
- **sm-ticketing** - the content pack providing files for HP SM ticketing.
- **sm-case-exchange** - the content pack providing files for HP SX Case Exchange customizations.
- **sm-test-ui-support -** the content pack providing files for HP SM related functions of HP SX UI.
- **csa-test-ui-support** - the content pack providing files for HP CSA related functions of HP SX UI.
- **mock-r2f** - an empty content pack without any function.

Content packs contain the following folders and files:
- **[oo**] – folder containing HP OO content packs of custom OO flows.
- **[sx]** – folder containing HP SX specific configuration files.

- o **[templates]** - folder containing Freemarker templates
- o **operations.json** - file containing SX operation definitions
- o **flows.json** - file containing mapping of message type to OO flow
- **[sm]** – folder containing HP SM-specific unload (UNL) and customization files.
- **metadata.json** - the content pack description file.

You can create your own content packs, or modify the provided content packs to fit particular needs (for example, unique HP SM naming and process flows), and then upload them.

Integrating HP SX with HP CSA

In this guide [`%SX_HOME%`] is used as a shortcut for the path: `/opt/hp/propel/jboss-as/standalone/deployments/sx.war/`

Adding additional HP CSA instances

During install, the script of the edited HP SX `installer.properties` file adds one HP CSA instance to the JSON file. If additional HP CSA instances are to be integrated into Propel, the following file must be edited manually:

[`%SX_HOME%`] `/WEB-INF/classes/config/csa/instances.json`

It is possible to add any number of instances of HP CSA.

Required fields: `endpoint,` `loginName` and `password`

Assuming *CSAEurope1* was added through the `installer.properties` file during install, add additional HP CSA instances as in the *CSAEurope2* example below, entering your unique instance names, URLs and passwords.
Example:

```
{
    "CSAEurope1": {
        "endpoint": "https://example1.com:8444/csa",
        "user": {
            "loginName": "johndoe",
            "password": "mypassword"
        },
        "organization": "CSA_CONSUMER"
    },

    "<CSAEurope2>": {
        "endpoint": "https://example2.com:8444/csa",
        "user": {
            "loginName": "janedoe",
            "password": "my2password"
        },
        "organization": "CSA_CONSUMER"
    }
```

NOTE: For a specific module to use the correct instance, relevant configuration files must be edited to include the appropriate HP CSA instance names.

LDAP and Approval settings

For CSA to work with SX, you have to have LDAP and Approval settings set up. If these are already set up, the following sections are not required.

Configure HP CSA to use LDAP

1. Login to HP CSA.

2. Select **Organizations**.

3. Select HP CSA **Consumer**.

4. Select **LDAP** section.

5. Fill in your LDAP server information and click **Save**.

6. Select **Access Control** section.

7. Click **Add On**.

8. Fill in the AC Config and click **Update**.

Configure HP CSA Approval settings

1. Login to CSA.

2. Select **Catalogs**.

3. Create a new catalog.

4. Go to the **Approval Policies** section of the new catalog.

5. Fill in **Name**, select a Template (ie. Named Approver Template) and add **Approver**.

6. Save the policy.

Import Certificates

For details on configuring and importing certificates, see the relevant sections in the **INSTALL STEPS** section of this guide.

Integrating HP SX with HP SM

In this guide [`%SX_HOME%`] is used as a shortcut for the path: `/opt/hp/propel/jboss-as/standalone/deployments/sx.war/`

Setting up HP SX to work with HP SM

- **ADDING ADDITIONAL HP SM INSTANCES**
- **CONFIGURE FOR TICKETING**
- **CONFIGURE CASE EXCHANGE**

Adding additional HP SM instances

During install, the script of the edited HP SX `installer.properties` file adds one HP CSA instance to the JSON file. If additional HP CSA instances are to be integrated into Propel, the following file must be edited manually:

[`%SX_HOME%`]`/WEB-INF/classes/config/sm/instances.json`

It is possible to add any number of instances of HP SM.

Required fields: `endpoint, loginName` and `password`

Assuming *SMEurope1* was added through the `installer.properties` file during install, add any additional HP SM instances as in the *SMEurope2* example below, using your unique urls, names and passwords.

Example:

```
{
    "SMEurope1":{
        "endpoint":"http://sm1.example.com:13080/SM",
        "db":{
            "dbEndpoint":"sm1db.example.com",
            "dbPort":"1433",
            "dbName":"sm_db",
            "loginName":"sm_user",
            "password":"mypassword1"
        },
        "user": {
            "loginName": "johndoe",
            "password": ""
        }
    },
    "SMEurope2":{
        "endpoint":"http://sm2.example.com:13080/SM",
        "db":{
            "dbEndpoint":" sm2.example.com",
            "dbPort":"1433",
            "dbName":"smdb",
            "loginName":"sm",
            "password":" mypassword2"
        },
        "user": {
            "loginName": "janedoe",
```

```
            "password": ""
        }
    }
}
```

For a specific module to use the correct instance, relevant configuration files must be edited to include the appropriate HP SM instance names.

Configure for ticketing

For ticketing REST API to use the instance, the *targetInstance* field value (the name previously defined in `instances.json`) has to be named in the following JSON file:

`[%SX_HOME%]/WEB-INF/classes/config/operationMappings.json`

Example:

```
{
    "instance": {
        "backendSystemType": "SM",
        "targetInstance": "SMInstance1"
    },
...
}
```

The targetInstance value must be filled with your organization's name.
In this example, *SMInstance1* is the unique name used for identifying this HP SM instance in other configuration files.

Configure Case Exchange

To set up Case Exchange functionality, one or more entries have to be added to the file:

`[%SX_HOME%]/contentStorage/sm-case-exchange/sm/case-exchange.json`

See the Case Exchange section **CONFIGURE HP SX** for further details.

Setting up HP SM to work with HP SX

- **IMPORT UNLOAD SCRIPTS INTO HP SM**
- **APPLY GENERAL UNLOAD SCRIPTS**
- **APPLY CHANGES AND QUOTES UNLOAD SCRIPTS**
- **ADDITIONAL CONFIGURATION STEPS**
- **POSSIBLE CONFLICTS APPLYING UNLOAD SCRIPTS**
- **MANUAL CONFIGURATION - APPROVALS**
- **IMPORT CERTIFICATES**

Import Unload scripts into HP SM

To import an unload script into HP SM:

1. In your HP SM instance, go to **System Administration** > **Ongoing Maintenance** > **Unload Manager** > **Apply Unload.**

2. Select **Unload File**: e.g. {path-to-unload-file}

3. Select **Backup To**: e.g. {path-to-unload-file}.backup

4. Click **Next.**

If there is a conflict with an entry, double-click that entry to see details, and look at the section

POSSIBLE CONFLICTS APPLYING UNLOAD SCRIPTS to understand what customizations each HP SM unload pack contains. Consider checking all the changes made by the unload scripts to verify your HP SM configuration is correct.

Apply general unload scripts

Apply the following:

1. **SXBaseCustomizations.unl**
2. **SXBaseDB.unl**
3. **SXBaseExtAccess.unl**
4. **SXTicketing.unl**
5. **SXCaseExchange.unl**

Apply Changes and Quotes unload scripts

1. **SXChangesCustomizations.unl**
2. **SXChangesDB.unl**
3. **SXChangesExtAccess.unl**
4. **SXQuotesCustomizations.unl**
5. **SXQuotesDB.unl**
6. **SXQuotesExtAccess.unl**

Additional configuration steps

Manual configuration for Case Exchange

Add "Add" activity privileges to the user account HP SX will be using:

    a. Go to **Tailoring** > **Format Control** > Name: activity > **Privileges**
    b. Change "false" to "true" for operation "**Add**".

Manual configuration step for Quotes

Rebuild "Extaccess Actions" Global List

    a. Go to **System Definition** > **Tables** > **globalists.**
    b. Click **View all records in table.**
    c. Select the line **Extaccess Actions**.
    d. Right click **Rebuild Global List.**
    e. Click **Save**.

Possible conflicts applying unload scripts

Applying any of the following three unload scripts can lead to conflicts with already existing HP SM settings:

- **SXBASECUSTOMIZATIONS.UNL**
- **SXCHANGESCUSTOMIZATIONS.UNL**
- **SXQUOTESCUSTOMIZATIONS.UNL**

See sections below for the parameters that are set by each of these HP SX customization files. This will help you avoid or resolve any conflicts with previously existing HP SM settings.

SXBaseCustomizations.unl

CAUTION: This unload script initiates a number of customizations. As they might conflict with already existing HP SM settings, HP recommends you review all changes made after running the script.

- The Login Name is set to **joe.manager**.
- On the **General** tab the **User Role** and each of the various Profiles are set (see screenshot above.)
- On the **Security** tab the **Max Logins** in the **User Session Information** section is set.
- On the **Startup** tab, in the **Execute Capabilities** section the words **SOAP API** and **RESTful API** are added.
- The password is set to **changeit.**

SXChangesCustomizations.unl

CAUTION: This unload script contains a number of customizations. As they might conflict with already existing HP SM settings, HP recommends you review all changes made after running the script.

This unload script initiates the following customizations:

- Set joe.manager as the only approver of **Subscription Approval**, using **Change Management** > **Maintenance** > **Approvals.**

- Simplify the change category **Subscription** to just 2 phases - **Approval** and **Acceptance**.

- Change catalog item **Custom desktop Provisioning**:
    o Change connector. Create a change of type **Subscription**.

    o Add user options (memory - number and model - Model 1 (model1), Model 2 (model2) Model 3 (model3) with prices $100,$200,$300.)

SXQuotesCustomizations.unl

CAUTION: This unload script contains a number of customizations. As they might conflict with already existing HP SM settings, HP recommends you review all changes made after running the script.

This unload script initiates the following customizations:

- Set joe.manager as the only approver of **Manager Approval**. **Change Management** > **Maintenance** > **Approvals**

- Customize approval process/lifecycle of **Quote**. **Request Management** > **Quotes** > **Quote Categories**
    o Click on the phase box to get to phase details.

    o Remove **Financial department approval** from the first phase (Front Line Management Approval.)

    o Remove **Manager** approval from the last phase (Customer Follow-up.)

Manual configuration – Approvals

Modify Change and Request Profiles used by your approvers

1. Login as admin.
2. Go to **System Administration > Ongoing Maintenanace > Operators**.
3. Enter the login name, click **Search.**
4. Click on the magnifying glass icon beside **Change Profile**.
5. Change to tab.
6. Check **Can Delegate Approvals**.
7. Click **OK**
8. Click on magnifying **Approvals/Groups** glass icon beside **Request Profile.**
9. Change to Alert/Approval tab.
10. Check **Delegate Approvals**.

11. Click **OK**.
12. Change to **Startup** tab
13. Change the parameter values in the first table in this way:
    1. name = MAIN MENU
    2. prompt =
    3. string1 = HOME
14. Click **OK.**

Setup approval delegation for each approver

1. Login as the Approver.
2. Click **Miscellaneous > Approval Delegation.**
3. Click **Add New Delegation**.
4. Select **Delegate Selected Approvals**.
5. Click **Next.**
6. Select module **Change Management.**
7. Click **Next.**
8. Move jane.doe to the right column.
9. Click **Next.**
10. Delegate to: johndoe. Fill in the Start and End dates.
11. Click **Finish.**
12. Repeat for the **Request Management** module.

Import Certificates

For details on setting and importing certificates, see the relevant sections in the **INSTALL STEPS** section of this guide.

Using Case Exchange

In this guide [`%SX_HOME%`] is used as a shortcut for the path: `/opt/hp/propel/jboss-as/standalone/deployments/sx.war/`

Case Exchange is a feature of HP SX that offers easy management of underlying connections between entities within different HP SM (or other application) instances, ensuring that updates propagate appropriately. In addition, it is only necessary to integrate an application once with SX, thereafter all exchange of messages/cases will be performed automatically through SX. This eliminates point-to-point integration and greatly simplifies IT management.

When configured:

Case Exchange can listen for entity changes (create/update/delete), where an entity in one HP SM instance is referring to an entity in another HP SM instance.

If a *referring* entity is changed in one HP SM instance, HP SX is notified and registers a listener for entity changes in the other (*referred*) HP SM instance.

This process is defined through these HP SX operations:

- **entityChangeOf_referringEntity**
- **entityChangeOf_referredEntity**
- **registerEntityChangeListener**
- **unregisterEntityChangeListener**
- **transferReferredEntityChanges**

Components
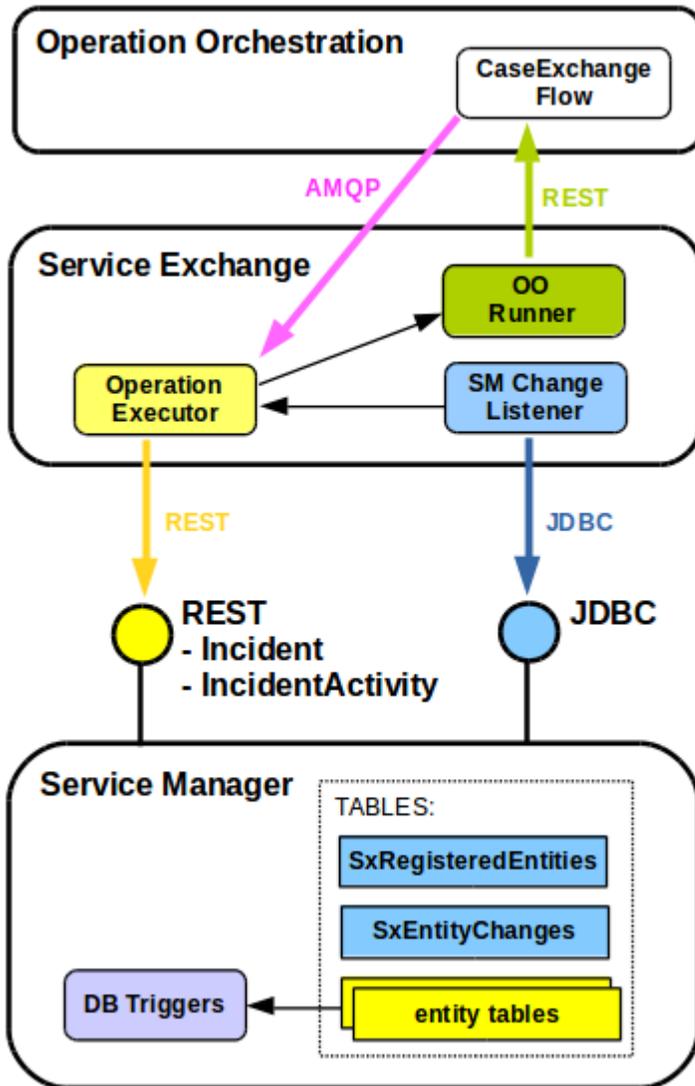
As depicted above, Case Exchange involves the following components:

- **OPERATION ORCHESTRATION**
- **HP SERVICE EXCHANGE**
- **HP SERVICE MANAGER**

Operation Orchestration

Case Exchange OO Flow
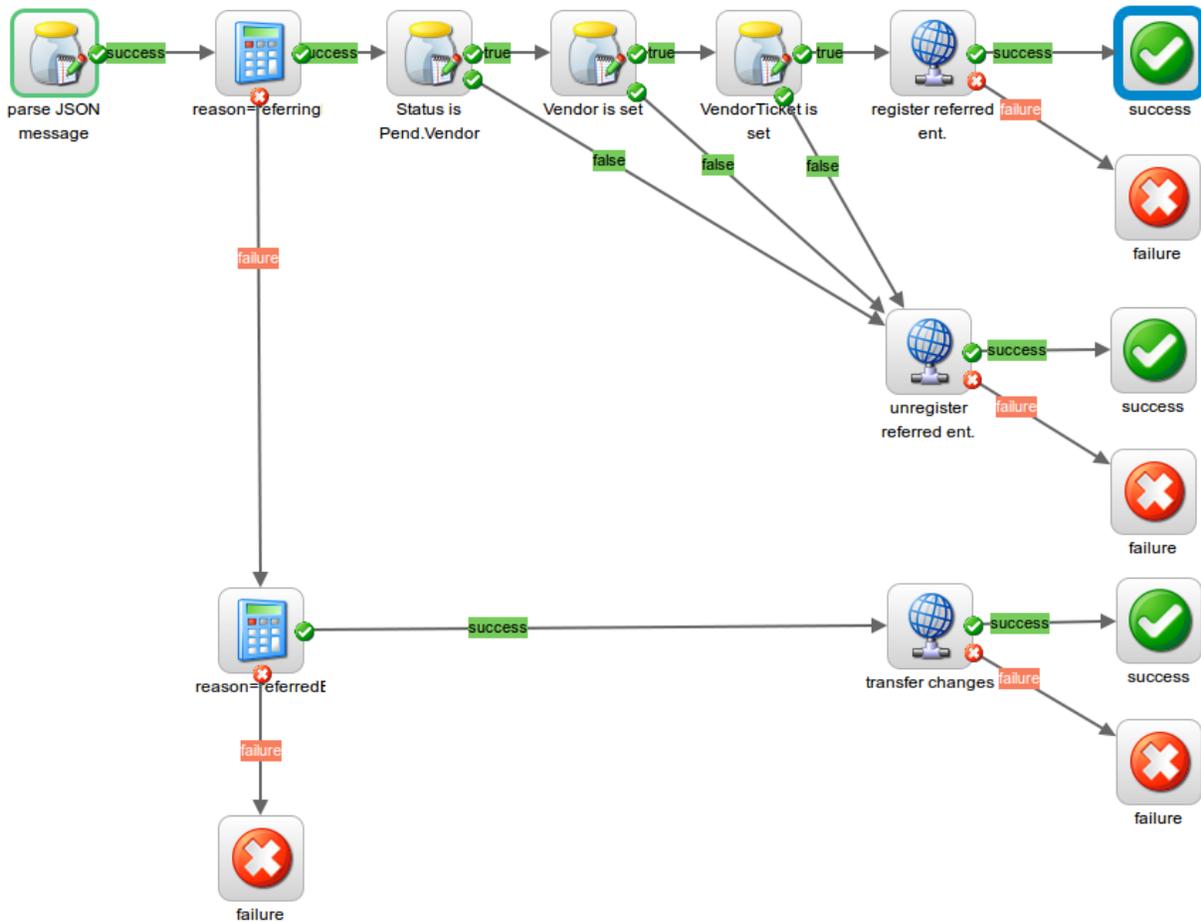
This is a custom flow in OO containing the following logic:

if change reason is **"referringEntity"**

- if Status is "**Pending Vendor**" and Vendor and VendorTicket is set, then call operation **registerEntityChangeListener**

- else call operation **unregisterEntityChangeListener**

if change reason is **"referredEntity"** then call operation **transferReferredEntityChanges**

HP Service Exchange

Operation Executor

This component executes Case Exchange related operations:

- entityChangeOf_referringEntity

- entityChangeOf_referredEntity

- registerEntityChangeListener

- unregisterEntityChangeListener

- transferReferredEntityChanges

For details, see CUSTOMIZING THE OPERATIONS.

OO Runner

This is the common component to run the flow in Operation Orchestration.

HP SM Change Listener

This component periodically checks table **SxEntityChanges** in HP SM and if a new entity change is detected it executes operation "entityChangeOf_{changeReason}".

HP Service Manager

Table SxRegisteredEntities

This is the database table containing entity registrations for HP SX. If an HP SM entity registered in this table is changed, this change will be reported to HP SX.

The content of this table is written exclusively by HP SX.

Entity registration can be defined using:

> entity type
>
> entity ID
>
> filter expression

The table has the following structure:

> **idNotUsed** (varchar 60)
>
> **entityType** (varchar 60)
>
> **entityId** (varchar 100)
>
> **entityFilterExpr** (varchar 300)
>
> **reason** (varchar 60)
>
> **subReason** (varchar 60)
>
> **sxId** (varchar 60)

Table SxEntityChanges

This is a database table containing changes of entities which were previously registered in **SxRegisteredEntities**. New entries to this table are added by **DB Triggers** and processed entries are deleted by **HP SX**.

The table has the following structure:

> **id** (varchar 60)
>
> **entityType** (varchar 60)
>
> **entityId** (varchar 100)
>
> **changeType** (varchar 30, values={create/update/delete})
>
> **status** (varchar 60)

          updatedOn (datetime)

          reason (varchar 60)

          subReason (varchar 60)

          sxId (varchar 60)

DB Triggers

If an HP SM entity which is registered in **SxRegisteredEntities** is changed (created/updated/deleted), then a database trigger creates a new entry in **SxEntityChanges.**

Implementing Case Exchange messages in HP SX

Register entity reference in SM-A

In the following examples `SMInstance-demo-sm01` and `SMInstance-demo-sm02` would be the names of your HP SM instances.

Message created if a referring entity is changed in HP SM:

```
{
 "messageHeader" : {
    "messageType" : "entityChange",
    "backendSystemType" : "SM",
    "targetInstance" : " SMInstance-demo-sm01"
  },
  "@type" :

"urn:x-hp:2014:software:cloud:data_model:sx:entityChange",
  "entityType" : "probsummary",
  "entityId" : "IM10136",
  "reason" : "referringEntity",
  "subReason" : "vendorIsSet",
  "changeType" : "update"
}
```

Message after it is enhanced by entity details by operation **entityChangeOf_referringEntity**:

```
{
  "messageHeader" : {
    "messageType" : "entityChange",
    "backendSystemType" : "SM",
    "targetInstance" : "SMInstance-demo-sm01"
  },
  "@type" :

"urn:x-hp:2014:software:cloud:data_model:sx:entityChange",
  "entityType" : "probsummary",
  "entityId" : "IM10136",
  "reason" : "referringEntity",
  "subReason" : "vendorIsSet",
  "changeType" : "update",
  "entity" : {
```

```
      "Incident" : {
        "Area" : "performance",
        "Assignee" : "Incident.Coordinator",
        "AssignmentGroup" : "Field Support (Europe)",
        "Category" : "incident",
        "Description" : [ "d13" ],
        "Impact" : "3",
        "IncidentID" : "IM10136",
        "JournalUpdates" : [ ... ],
        "OpenTime" : "2011-06-02T08:17:32+00:00",
        "OpenedBy" : "johndoe",
        "ProblemType" : "incident",
        "Service" : "Intranet / Internet (Asia)",
        "Status" : "Pending Vendor",
        "Subarea" : "system or application hangs",
        "TicketOwner" : "johndoe",
        "Title" : "TEST 1",
        "UpdatedBy" : "johndoe",
        "UpdatedTime" : "2011-06-03T15:16:46+00:00",
        "Urgency" : "3",
        "Vendor" : "SMInstance-demo-sm01",
        "VendorTicket" : "IM10135"
      },
      "Messages" : [ ],
      "ReturnCode" : "0"
    }
```

Message constructed by **CaseExchangeFlow** to register referred entity in HP SM:

```
{
 "messageHeader" : {
    "messageType" : "registerEntityChangeListener",
    "backendSystemType" : "SM",
    "targetInstance" : "SMInstance-demo-sm01"
  },
  "@type" :

"urn:x-hp:2014:software:cloud:data_model:sx:registerEntityChangeListener",
  "referringEntities" : [ {
    "targetInstance" : "SMInstance-demo-sm01",
    "entityType" : "probsummary",
    "entityId" : "IM10136"
  } ],
  "referredEntity" : {
    "targetInstance" : "SMInstance-demo-sm02",
    "entityType" : "probsummary",
    "entityId" : "IM10135"
  },
  "entityRegistration" : {
    "targetInstance" : "SMInstance-demo-sm02",
    "reason" : "referredEntity",
```

```
    "subReason" : "statusChange",
    "entityType" : "probsummary",
    "entityId" : "IM10135",
    "entityFilterExpr" : "ISUPDATE && OLDRECORD

['problem.status'] != NEWRECORD['problem.status']"
  }
}
```

Change referred entity in SM-B

Message created if a referred entity is changed in HP SM:

```
{
  "messageHeader" : {
    "messageType" : "entityChange",
    "backendSystemType" : "SM",
    "targetInstance" : "SMInstance-demo-sm02"
  },
  "@type" :

"urn:x-hp:2014:software:cloud:data_model:sx:entityChange",
  "entityType" : "probsummary",
  "entityId" : "IM10135",
  "reason" : "referredEntity",
  "subReason" : "statusChange",
  "changeType" : "update"
}
```

Message once it is enhanced by the entity details coming from operation
entityChangeOf_referredEntity:

```
{
  "messageHeader" : {
    "messageType" : "entityChange",
    "backendSystemType" : "SM",
    "targetInstance" : "SMInstance-demo-sm02"
  },
  "@type" :

"urn:x-hp:2014:software:cloud:data_model:sx:entityChange",
  "entityType" : "probsummary",
  "entityId" : "IM10135",
  "reason" : "referredEntity",
  "subReason" : "statusChange",
  "changeType" : "update",
  "referringEntities" : [ {
    "entityId" : "IM10135",
    "targetInstance" : "SMInstance-demo-sm02",
    "entityType" : "probsummary"
  }, {
    "entityId" : "IM10135",
    "targetInstance" : "SMInstance-demo-sm02",
```

```
      "entityType" : "probsummary"
  } ],
  "entity" : {
    "Incident" : {
      "Area" : "hardware",
      "AssignmentGroup" : "Hardware",
      "Category" : "incident",
      "Description" : [ "hhj" ],
      "Impact" : "3",
      "IncidentID" : "IM10135",
      "JournalUpdates" : [ ... ],
      "OpenTime" : "2011-06-02T07:46:38+00:00",
      "OpenedBy" : "johndoe",
      "ProblemType" : "incident",
      "Service" : "Intranet / Internet (South America)",
      "Status" : "Accepted",
      "Subarea" : "hardware failure",
      "TicketOwner" : "johndoe",
      "Title" : "SIMON - Referred entity",
      "UpdatedBy" : "johndoe",
      "UpdatedTime" : "2011-06-03T15:17:28+00:00",
      "Urgency" : "3"
    },
    "Messages" : [ ],
    "ReturnCode" : "0"
  }
}
```

Message constructed by **CaseExchangeFlow** to transfer changes from referred entity to referring entity:

```
{
  "messageHeader" : {
    "messageType" : "transferReferredEntityChanges",
    "backendSystemType" : "SM",
    "targetInstance" : "SMInstance-demo-sm02"
  },
  "@type" :

"urn:x-hp:2014:software:cloud:data_model:sx:transferReferredEntityChanges",
  "referredEntity" : {
    "targetInstance" : "SMInstance-demo-sm02",
    "entityType" : "probsummary",
    "entityId" : "IM10135",
    "Status" : "Accepted",
    "UpdatedTime" : "2011-06-03T15:17:28+00:00",
    "UpdatedBy" : "johndoe"
  },
  "reason" : "referredEntity",
  "subReason" : "statusChange"
}
```

Configuring Case Exchange

This requires two processes:

- **CONFIGURE HP SM**
- **CONFIGURE HP SX**

Configure HP SM

Apply unload script SXCaseExchange.unl

Find the `SXCaseExchange.unl` unload script inside the `sm-case-exchange` content pack.

To apply the `SXCaseExchange.unl` script into each of your HP SM instances, follow these steps:

1. Go to **System Administration** > **Ongoing Maintenance** > **Unload Manager** > **Apply Unload**.

2. Select **SXCaseExchange.unl**.

3. Select **Backup To**: and enter or select a backup location.

4. Click **Next**.

5. If there is a conflict with an entry, double-click that entry and manually resolve the conflict based on the description of what the unload script should do.

6. Click **Next**.

The unload script contains the following customizations:

> Add new REST endpoint SX/SXCE_Incident
>
> Add new REST endpoint SX/SXCE_IncidentActivity
>
> Add triggers for the following tables:
>> – probsummary
>> – activity

Configure Activity privileges

Add **Add** activity privileges:

1. Open the HP SM client.

2. Go to **Tailoring** > **Format Control** > *<Name: activity>* > **Privileges**.

3. Change **false** to **true** for operation **Add**.

4. Click **Save**.

Configure HP SX

Configure case-exchange.json

1. Download the content pack `sm-case-exchange.zip` from `sx/contentManagement`.
2. Open the `sm` folder in the **sm-case-exchange** content pack.
3. Open the `case-exchange.json` file, and using the format used in the `case-exchange.json.example` file, replace *SMInstance1* with the name of your HP SM (SM-A) instance containing *referring* entities.

IMPORTANT: Make sure that your HP SM instances have the same names as those entered in your HP SX `instances.json` file.

For example:

```
{
    " SMInstance1" : {
        "registeredEntities" : [ {
                "reason" : "referringEntity",
                "subReason" : "vendorIsSet",
                "entityType" : "probsummary",
                "entityFilterExpr" : "(RECORD['vendor'] != null &&
RECORD['reference.no'] != null) || (ISUPDATE && OLDRECORD['vendor'] !=
null && OLDRECORD['reference.no'] != null)"
            } ]  }
}
```

Where *SMInstance1* is the name assigned in your `instances.json` file.

5. Add any additional HP SM instances (which contain *referring* entities) to the `case-exchange.json` file, using a comma to separate each instance. Use the example format in the `case-exchange.json.example` file.

6. Save and close the `case-exchange.json` file.

7. Upload the updated `sm-case-exchange.zip` back to HP SX through the Content Management UI, for details see **UPLOADING CONTENT PACKS**.

8. When the upload is finished HP SX will automatically register all entity change listeners defined in `case-exchange.json`.

Contents of case-exchange.json

The content of the `case-exchange.json` configuration file above defines that HP SX is interested in entity changes occurring in HP SM instance *SMInstance1:*

- where the changed (create/update/delete) entities are of type "probSummary" (Incidents)
- where the changed (create/update/delete) entities have (or had before update) set fields "vendor" (Vendor) and "reference.no" (Vendor Ticket) fields
- and if such a change occurs then this change will be reported to HP SX with reason/subreason set to "referringEntity"/"vendorIsSet"

The filter expression in **"entityFilterExpr"** has a JavaScript format and the following variables can be used in them:

- **ISCREATE** - Boolean variable, set to TRUE, if the change operation was a creation of a new entity.
- **ISUPDATE** - Boolean variable, set to TRUE, if the change operation was an update of an existing entity.
- **ISDELETE** - Boolean variable, set to TRUE, if the change operation was a delete of an existing entity.
- **RECORD** - Map, containing the created/updated/deleted entity's fields. To access these fields use syntax RECORD['fieldName'].
- **OLDRECORD** - Map, if the operation is **update**, then it contains the entity's fields before the change.

- **NEWRECORD** - Map, if the operation is **update**, then it contains the entity's fields after the change.

Customizing Case Exchange

The reference Case Exchange implementation in the **sm-case-exchange** content pack demonstrates a working example, where **Incidents** (probsummary in SM) references **Incidents** in other (or even in the same) SM instance. If the **referred** Incident's status is changed then a new **Activity** line is added to the **referring** Incident.

This is just one example from the wide range of use cases you can manage using the Case Exchange feature. To write your own Case Exchange implementation you can either modify the existing reference implementation, in the **sm-case-exchange** content pack, or create your own content pack with your own implementation.

Customizing the Operations

HP SX Case Exchange reference functionality implements the following operations:

1. Operations of type "entityChangeOf_*<changeReason>*"

   where *<changeReason>* is your specified changeReason.

   Generally, if SX is notified of an entity change of reason *<changeReason>* then the operation with name "**entityChangeOf_*<changeReason>***" is called.

   The purpose of these "entityChangeOf_" operations is to load entity details from HP SM before the **CaseExchangeFlow** is invoked.

   In our case we have two operations:

   OPERATION "entityChangeOf_referringEntity".

   - This operation is implemented using FTL templates inside the content pack.
   - It is invoked if a referring entity in HP SM is changed. This operation queries HP SM through REST to load the changed entity's details.

   OPERATION "entityChangeOf_referredEntity"

   - This operation is implemented purely using FTL templates inside the content pack.
   - Invoked if a referred entity in HP SM is changed. This operation queries HP SM through REST to load the changed entity's details.

2. **OPERATION "registerEntityChangeListener"**

   - This operation is an **internal operation** implemented in HP SX.
   - It registers a new entity change listener in HP SM.
   - It is invoked from CaseExchangeFlow OO Flow if a referring entity in HP SM is changed and the referring fields are filled out.

3. **OPERATION "unregisterReferredEntityListener"**

- • This operation is an **internal operation** implemented in HP SX.
- • It removes a registration entry from **SxRegisteredEntities** table in HP SM.
- • It is invoked from CaseExchangeFlow OO Flow if a referring entity in HP SM is changed and the referring fields are cleared.

4. **OPERATION** "transferReferredEntityChanges"

- • This operation is an **internal operation** implemented in Service Exchange, but additionally it has parts implemented in FTL templates (in the content pack.)
- • The FTL template part of the operation adds a new **Activity** entry on the referring entity.
- • It is invoked from **CaseExchangeFlow** OO Flow if a referred entity in HP SM is changed.

Operation "registerEntityChangeListener"

An example message showing the message format (the highlighted parts need to be edited to your unique values):

```
{
 "messageHeader" : {
    "messageType" : "registerEntityChangeListener",
    "backendSystemType" : "SM",
    "targetInstance" : "SM-B"
  },
  "@type" : "urn:x-
hp:2014:software:cloud:data_model:sx:registerEntityChangeListener",
  "entityRegistration" : {
    "targetInstance" : "SM-B",
    "reason" : "referredEntity",
    "subReason" : "statusChange",
    "entityType" : "probsummary",
    "entityId" : "IM10135",
    "entityFilterExpr" : "ISUPDATE && OLDRECORD['problem.status'] !=
NEWRECORD['problem.status']"
  }
}
```

or

```
{
 "messageHeader" : {
    "messageType" : "registerEntityChangeListener",
    "backendSystemType" : "SM",
    "targetInstance" : "SM-A"
  },
  "@type" : "urn:x-
hp:2014:software:cloud:data_model:sx:registerEntityChangeListener",
  "entityRegistration" : {
    "targetInstance" : "SM-B",
    "reason" : "referredEntity",
    "subReason" : "statusChange",
    "entityType" : "probsummary",
    "entityId" : "IM10135",
```

```
    "entityFilterExpr" : "ISUPDATE && OLDRECORD['problem.status'] !=
NEWRECORD['problem.status']"
  },
  "referringEntities" : [ {
    "targetInstance" : "SM-A",
    "entityType" : "probsummary",
    "entityId" : "IM10136"
  } ],
  "referredEntity" : {
    "targetInstance" : "SM-B",
    "entityType" : "probsummary",
    "entityId" : "IM10135"
  }
}
```

The message tells HP SX to:

- Register an entity change listener in SM-B with the following parameters:
    - reason=referredEntity
    - subReason=statusChange
    - entityType=probsummary
    - entityId=IM10135
    - entityFilterExpr="ISUPDATE && OLDRECORD['problem.status'] != NEWRECORD['problem.status']"

- (If referringEntities and referredEntity are set then) also save an entity mapping from (SM-A/probsummary/IM10136) to (SM-B/probsummary/IM10135) into the SX internal database.

Operation "unregisterEntityChangeListener"

An example message showing the message format (the highlighted parts need to be edited to your unique values):

```
{
  "messageHeader" : {
    "messageType" : "unregisterEntityChangeListener",
    "backendSystemType" : "SM",
    "targetInstance" : "SM-A"
  },
  "@type" : "urn:x-
hp:2014:software:cloud:data_model:sx:unregisterEntityChangeListener",
  "entityRegistration" : {
    "targetInstance" : "SM-A",
    "reason" : "customReason",
    "entityType" : "probsummary",
    "entityId" : "IM10111"
  }
}
```

This message tells HP SX to:

- Unregister entity change listener SM-A/probsummary/customReason/IM10111 from SM-A
- (If property entityId is missing then) unregister all entity change listeners SM-A/probsummary/customReason from SM-A

Operation "unregisterReferredEntityListener"

An example message showing the message format (the highlighted parts need to be edited to your unique values):

```
{
  "messageHeader" : {
    "messageType" : "unregisterReferredEntityListener",
    "backendSystemType" : "SM",
    "targetInstance" : "SM-A"
  },
  "@type" : "urn:x-
hp:2014:software:cloud:data_model:sx:unregisterReferredEntityListener",
  "referringEntities" : [ {
    "targetInstance" : "SM-A",
    "entityType" : "probsummary",
    "entityId" : "IM10136"
  } ],
  "entityRegistration" : {
    "reason" : "referredEntity"
  }
}
```

The message tells HP SX to

- Find existing entity mappings in the HP SX internal database from entity SM-A/probsummary/IM10136, and for each mapping found, to unregister the entity change listener from SM of its referred entity.

Operation "transferReferredEntityChanges"

An example message showing the message format (the highlighted parts need to be edited to your unique values):

```
{
  "messageHeader" : {
    "messageType" : "transferReferredEntityChanges",
    "backendSystemType" : "SM",
    "targetInstance" : "SM-B"
  },
  "@type" : "urn:x-
hp:2014:software:cloud:data_model:sx:transferReferredEntityChanges",
  "referredEntity" : {
    "targetInstance" : "SM-B",
    "entityType" : "probsummary",
    "entityId" : "IM10135",
    "Status" : "Accepted",
```

```
    "UpdatedTime" : "2011-06-03T15:17:28+00:00",
    "UpdatedBy" : "johndoe"
  },
  "reason" : "referredEntity",
  "subReason" : "statusChange"
}
```

The message tells HP SX to

- Find all entity mappings in the HP SX internal database where the referred entity is (SM-B/probsummary/IM10135), and for each mapping found, to invoke operation **transferReferredEntityChanges**.

Customizing the OO Flow

See the example diagram **CASE EXCHANGE OO FLOW**.

The **CaseExchangeFlow** from the reference functionality implements the following logic:

- if the change reason is "**referringEntity**"
    - if Status is **Pending Vendor** and Vendor and VendorTicket is set then call operation **registerEntityChangeListener**
    - else call operation **unregisterReferredEntityListener**
- if the change reason is "**referredEntity**" then call operation **transferReferredEntityChanges**

By modifying this OO Flow you can make changes, for example:

- Which fields contain the reference to another entity (Vendor, VendorTicket.)
- In the case of a referred entity change, which fields are forwarded to the **transferReferredEntityChanges** message (Status, UpdateTime, UpdatedBy.)
- Calls to other custom operations.

Manually configuring HP SX-required files

 In this guide `[%SX_HOME%]` is used as a shortcut for the path: `/opt/hp/propel/jboss-as/standalone/deployments/sx.war/`

Configuring for OO server

To set an internal connection to a specific OO server add/edit the **OO** entry in the JSON file:

`[%SX_HOME%] /WEB-INF/classes/config/infrastructure.json`

Required fields: *endpoint, loginName* and *password*

Example:

```
{
    "OO": {
        "endpoint": "http://oo.example.com:8080/oo/rest",
        "loginName": "oouser",
        "password": "oopassword"
    }

)
```

NOTE: Change the endpoint, loginName and password to your unique values.

To enable the OO server to send email messages, change values in the JSON file:

`[%SX_HOME%] /WEB-INF/classes/config/oo/properties.json`

Example:

```
{
  "smtpServer": "smtp3.example.com",
   "smtpPort": "25",
   "mailFrom": "noreply@example.com",
   "emailBcc": "joe.doe@example.com"

        }
```

Configuring for RabbitMQ

To set an internal connection to a specific RabbitMQ add/edit the **JMS_BROKER** entry in the JSON file:

`[%SX_HOME%] /WEB-INF/classes/config/infrastructure.json`

Required field: *endpoint*

Example:

```
{
    "JMS_BROKER": {
          "endpoint": "oo.example.com"

  }

}
```

NOTE: Change the endpoint to your organization's endpoint.

Configuring for the HP Propel Portal

To enable communication with the HP Propel Portal, entry **SERVICE_CATALOG** has to be added/edited in the JSON file:

`[%SX_HOME%] /WEB-INF/classes/config/infrastructure.json`

Example:

```
{
    "SERVICE_CATALOG": {
        "requestCallbackEndpoint":
"https://<CATALOG_HOSTNAME>:8444/consumption/api/service/state/request",
        "subscriptionCallbackEndpoint":
"https://<CATALOG_HOSTNAME>:8444/consumption/api/service/state/subscription",
        "internalCallbackEndpoint": "https://<SX_HOSTNAME>:8444/sx/api/catalog"
    }
}
```

NOTE: Change the endpoints to those for your organization.

It is possible to use string `${hpIPAddress}` instead of a specific IP address of SX, but it is still required to add the server port manually.

Configuring for IdM

To use Identity Manager, the entry **AUTHENTICATION** has to be added/edited in the JSON file:

`[%SX_HOME%] /WEB-INF/classes/config/infrastructure.json`

Example:

```
{
    "AUTHENTICATION": {
        "secretKey": "<YourSecretKey>"
    }
}
```

Required field: *secretKey*

Endpoint and other information has to be set in the properties file:

`[%SX_HOME%] /WEB-INF/sx.properties`

Concerned lines contain the prefix **security**.

Configuring for PostgreSQL

To use your PostgreSQL installation, change properties with the prefix **db** in the properties file:

`[%SX_HOME%] /WEB-INF/sx.properties`

Preset values:

`username`**=SX**

`password`**=SX**

`dbname`**=SX**

Troubleshooting

In this guide [`%SX_HOME%`] is used as a shortcut for the path: `/opt/hp/propel/jboss-as/standalone/deployments/sx.war/`

General recommended steps

1. When a problem happens, go to the relevant **log files** (see the **LOG FILES** section), and look for any sign of an error.

2. If no error is found, look into the **OO Flows** input parameters (see the **OO FLOWS** section.) For example, look for wrongly set notification email addresses etc.

3. Use the **SX Debug UI** (see the **SX DEBUG UI** section.) If the functionality you tried to perform through the HP Propel Portal is available in the Debug UI, try to run it there. If it is successful, it is an important point to note in any defect report logged to HP Support. If it still does not work, check the UI error messages and see the log files for any changes in the error printouts when compared to the HP Propel Portal execution.

Where to find help

OO Flows

If a problem occurs and you suspect the OO Flows did not execute properly:

1. Navigate to OO.

    The URL of the OO used for HP SX will look like this:
    http://oo_server_hostname:8080/oo/#/runtimeWorkspace/runs

2. Check that:

    a. There is an entry in the **Run Management** section that corresponds to your request. View it.

    b. The Flow was executed properly. It is legal to go through **failure** transitions, but the Flow should not end in an **error** state.

    c. If the flow ends in an **error** state, look for details in the **Flow Input** parameters.

    *   When viewing the Flow, click on its header (where the Flow name is displayed, and a little *down-expand* arrow.)

    *   Now you can see all the input parameters for the flow. Watch for any suspicious, incorrect values and be prepared to write them down for when needed later in trying to solve your issue with support.

Log files

SX

Log files are located in the log directory of the JBoss server, where HP SX is deployed. Typically:

`jboss-as/standalone/log`.

Below is a listing of HP SX log files:

Log file	Description
sx.log	All the HP SX debug and error messages. Search here first for **error messages**.
server.log *(for JBoss server)*	Look here during HP SX deployment when something happens during boot time**.** After booting up, all the HP SX related information is logged to the other HP SX log files.
notification.log	Contains all callbacks **SENT TO Catalog (HP Propel Portal)** Look here for possible explanations when having difficulty connecting to Catalog.
sx-messages.log	Contains all messages **RECEIVED FROM Catalog (HP Propel Portal)** Look here for possible explanations when having difficulty receiving from Catalog.
csa-messages.log *sm-messages.log*	Contains all callbacks sent to HP CSA and HP SM servers**.** Search here when experiencing problems connecting to these two server types.
case-exchange.log	Contains all Case Exchange module initialization messages, including database initialization, runtime message, and processing information regarding the Case Exchange feature. Could be helpful when Case Exchange seems not to be working for you.

OO

The OO Flows should be viewed in the OO UI, see **OO FLOWS**.

HP Propel MPP

Log file	Description
aggregation.log	All the aggregation related errors and information messages are logged here. Look into this file when you have a problem aggregating data from external servers.
ccue.log *consumption.log* *hpcloud-idm-service.log* *mpp.log*	See the HP Propel MPP Documentation for detailed descriptions of these log file contents.
server.log	Look here only when something happens during the HP Propel MPP deployment. After deployment all application related information is logged to other log files.

SX Debug UI

NOTE: See the SETTING USER ROLES section for information about the role settings that allow access to the SX Debug UI.

This Debug UI is useful when assessing possible causes of problems. By default the UI can be found at the following address:

http: *sx_machine_hostname:8081/sx/*

It contains the following functionality:

- Create Order Wizard

  Use to run a standard Item order in either HP SM or HP CSA instances (that are configured in SX.) Because ordering an Item via the HP SX Debug UI fetches the Offerings list directly from the remote HP SM and HP CSA instances, it is particularly useful, for example, when you have problems aggregating the offerings from HP SM and HP CSA instances. Select the desired instance first. Then select a Requestor (user) for whom you want to order the item, and then the Item required. Finally you can specify all the Parameters related to the Item being ordered.

- Bundle Order

  Similar to the Create Order Wizard, but creates a prepared bundle containing a number of items to be ordered.

- Clear HP SM orders

  Use to clear all HP SM orders for a given user (Requestor), and given HP SM Instance.

- Tickets

  Use Tickets to find the cause of problems with HP Propel MPP Support Tickets and if they are HP SX related. You can browse (sort, search), view and create Tickets here.

- Notifications

  Find both existing and completed HP SX Request and Subscription statuses here. You can also view detailed Subscription parameters when applicable.

- Content Management

  Here you can manage Content Packs for SX, by uploading, downloading or deleting content packs. See USING THE CONTENT MANAGEMENT UI for details.

HP SM item types supported by HP SX

In general, only two Service Manager item types are supported by the current version of HP SX: Changes and Quotes. See the following sections for detailed description of their functionality.

How to discern supported items in HP SM

View the item in HP SM, in the **Service Catalog > Administration > Manage Catalog** section see the **Connector Details** tab. To function correctly with HP SX an item should have the following attributes:

Change:

- **Interface Type**: *Open a Change*
- **Create Subscription**: *Checked*

Quote:

- **Interface Type**: *Open New Request*
- **Create Subscription**: *NOT checked*

Quotes order processing in HP SM

The expected process advancement of a Quote Offering order in HP SM is:

1. When you start the Offering Item order, an **Interaction** is created in SM.

   Find the Interactions in HP SM under **Service Desk > Interaction Queue > Search**.

2. An interaction starts in **Open - Idle** status.

3. It then moves to **Open - Linked** state, which means a **Quote was created** for the Item and it has been **linked** with the Interaction.

   Find Quote details in HP SM under **Request Management > Quotes > Search Quotes**.

4. The Quote starts in **Initial** state and its **Approval Status** is set to **Manager Approval**.

5. After an **Approval**, the Quotes status changes to **Ordering**.

6. Now all **Line Items** defined for this Quote (if any) need to be solved.

7. When all Line Items are solved, the Quote moves to the **Customer Follow-up** state.

8. When the Item is received by the Requester, he acknowledges receipt and the Quote moves to the **Closed** state.

Changes order processing in HP SM

The Changes ordering functionality is similar to that for Quotes (see above), minus a few steps. See the process description in the following table:

	Change	**Interaction**	**Subscription**
Order by requester		Status: **Open - Idle** Approval Status: **Approved**	
After 30 - 60 seconds	Phase: **Subscription Approval** Status: **Initial** Approval Status: **Pending**	Status: Open - **Linked** Approval Status: **Approved**	Status: **Requested**
Approve by manager	Phase: **Subscription Acceptance** Status: **Initial** Approval Status: **Approved**		
Approve by requester	Phase: **Subscription Acceptance** Status: **Closed** Approval Status: **Approved**	Status: **Closed** Approval Status: **Approved**	Status: **Active**

Common issues

Examples of possible error situations and how to deal with them:

- **CREATING A TICKET FAILS**
- **NO MAIL/NOTIFICATIONS RECEIVED: WHERE TO LOOK**
- **NO NOTIFICATIONS: HP SM CHANGE/QUOTE CONFIGURATION ISSUES**
- **SLOW DELIVERY OF JMS MESSAGES**
- **UNABLE TO CREATE REQUESTS IN HP SM UNDER AN LDAP USER**
- **REMOVING ALL HP SM FULFILLMENT ENTITIES FOR A SPECIFIC USER**
- **HP CSA HALTS CREATING SUBSCRIPTIONS**

Creating a ticket fails

Description:

You receive an error like: *"... is not a valid Contact Name in the contacts file (see.view.engine.post.display)."*

Solution:

There is a problem with the permissions of the user trying to create a ticket. You need to find the HP SM instance being used for ticketing, then add this user to its Contacts.

To do so:

1. Look at your HP SX configuration file `installer.properties`
2. Find which HP SM instance HP SX is connecting to for Ticketing.
3. Log into that HP SM server.
4. Go to **System Administration > Base System Configuration > Contacts**.
5. Fill in the form.
6. Click **Add**.

No mail/notifications received: where to look

Description:

The system HP Propel MPP seems to work and orders are created, but no notification (approval, confirmation ...) emails are received by the appropriate respondents.

Resolution:

1. Find and look at the appropriate **OO Flow**, see **OO FLOWS** for details.
2. View the OO Flow's **input parameters**. There should be one containing the **email address**, to which the notification mail is sent.
3. Check that this email address is correct and suits your needs.
4. Check the **email (SMTP) server settings** in the `installer.properties` file.

No notifications: HP SM Change/Quote configuration issues

Symptom description:

An item is ordered, the OO Flow is executed (the correct email settings are present), but no message (notification) is received.

For some items an exception will show up in the log files, for example the following message which appears when you try to order a Change item with no Subscription creation set:

```
The failing instruction (FTL stack trace):
----------
==> ${doc["soap:Envelope/soap:Body/sm:Ret...  [in template "sm-
r2f/sx/templates/retrieveChangeOrQuoteResponse.ftl" at line 20, column 32]
```

Solution:

This problem can be caused by the fact that your HP SM instance is configured for Quotes (or Changes) and you tried to order a Change (Quote.) Log into HP SM and check that the item you tried to order is properly configured as either a Quote or Change offering. See the section **HP SM ITEM TYPES SUPPORTED BY HP SX** for the proper item settings.

Slow delivery of JMS messages

Description:

When there are many messages pending HP SX can slow down significantly.

Resolution:

Look at the RabbitMQ UI on the machine where HP SX is running. Try the following address:

http://<sx_machine_hostname:15672/#/queues> username/password: *<guest/guest>*

If the number of messages pending is the problem, in the following spring files:

- Increase the **max-concurrency** attribute as required.
- Increase the number of concurrent listeners fetching messages.

...META-INF/server/CSAAdapterServerContext.xml

...META-INF/server/SMAdapterServerContext.xml

...META-INF/server/SXImplServerContext.xml

Unable to create requests in HP SM under an LDAP user

Symptom description:

Unable to log into HP Propel MPP as an LDAP user, or a request creation action ends with an error, or succeeds but no Request/Notification/Subscription is created.

Solution:

In order to be able to create requests in HP SM under an LDAP user, you need to create a contact in HP SM for this user like this:

1. Go to **System Administration** > **Base System Configuration** > **Contacts**.

2. Fill in the form (e.g. **Contact name**: *<YOUR_NAME>*, **Full Name**: *<Full Name>,* **emai**l: *<email_address@server.com>,* **Manager**: *<YOUR_MANAGER>*)

3. Click Add.

Removing all HP SM fulfillment entities for a specific user

Symptom description: Sometimes it can happen that the SX Debug UI does not work properly or cannot be accessed, and you want to remove all HP SM fulfillment entities for a specific user. If this happens (for example because you ordered something that cannot be fulfilled since it is not a change request), we recommend you clean entities manually.

Solution:

Perform the following in HP SM for a proper clean up:

1. Close **interactions:**

    - View **Interactions** in HP SM (**Service Desk > Interaction Queue**.)
    - Sort by **Status**.
    - Close all items with Status!="Closed" and Contact=="USER_NAME" (uppercase!)
    - Fill **Closure Code** and **Solution**.
    - Click **Close Interaction**.

2. Delete active subscriptions:

    - View Subscriptions in HP SM (**Configuration Management > Resources > Subscriptions**.)
    - Search and delete, or mass delete all items.

3. Delete open cart items:

    - Search open cart items for given user in the HP SM Client tool.
    - Search and delete, or mass delete all items.

HP CSA halts creating subscriptions

Symptom description:

When subscriptions seem to be blocked (pending) for more than a couple of minutes check the HP CSA and HP SX server time settings. If they differ by more than a couple of minutes and the requests were created in the time just before the end of the day (before midnight), then HP CSA waits to create the subscriptions exactly for the length of time that is the time difference between the two servers.

Solution:

Synchronize the time on your HP SX and HP CSA server machines.