



SAP HANA Interactive Education (SHINE) for SAP HANA 2.0 SPS02 for SAP HANA XS Advanced Model

Target Audience

- Developers
- Administrators
- Others

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Example text	Emphasized words or phrases in body text, graphic titles, and table titles
EXAMPLE TEXT	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
Example text	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
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1 Overview of SHINE for SAP HANA Extended Application Services Advanced Model (SHINE for XSA)

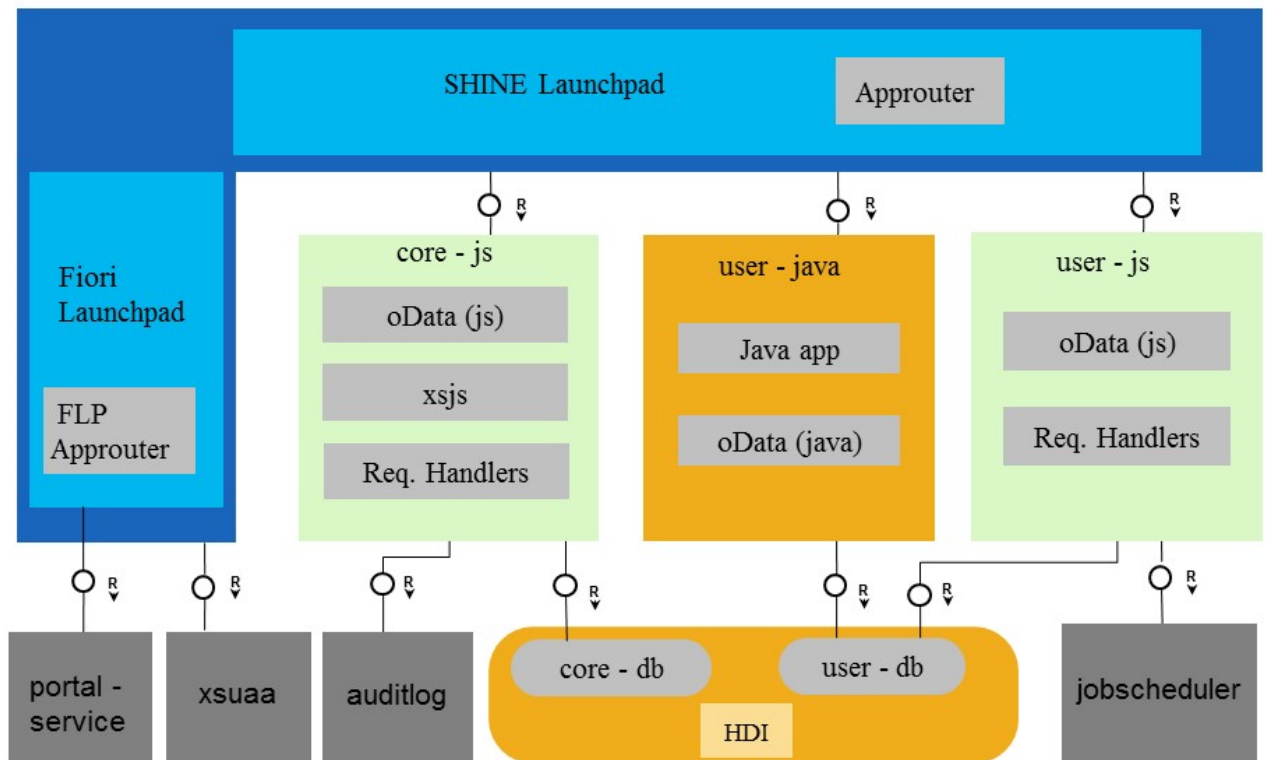
SAP HANA Interactive Education, or SHINE, is a demo application that makes it easy to learn how to build applications on SAP HANA Extended Application Services Advanced Model. This demo application is delivered as a package that contains sample data and design-time developer objects for the applications database tables, views, OData and user interface.

The application consists of the following packages:

Package	Description
core-db	This package contains the SAP HANA Deployment Infrastructure (HDI) artifacts and the database artifacts required to create the tables and other database artifacts (for example, .hdbcds, .hdbsequence, and so on) for Data Generator, Purchase Order Worklist and Sales Dashboard and Spatial Scenario.
user-db	This package contains the SAP HANA Deployment Infrastructure (HDI) artifacts and the database artifacts required to create the tables and other database artifacts (for example, .hdbcds, .hdbsequence, and so on) for User CRUD and Job Scheduling.
core-js	This package has the <i>Node.js</i> based server side implementation of Data Generator, Purchase Order Worklist and Sales Dashboard and Spatial scenario.
user-js	This package contains the <i>Node.js</i> based server side implementation for User creation, User CRUD and Job Scheduling
user-java	This package contains the <i>Java</i> -based server-side implementation for User CRUD
web	This package contains the user interface for the SHINE launchpad, Data Generator, Purchase Order Worklist Job Scheduler, Spatial scenario and User CRUD applications implemented in SAP UI5.
site-content	This package contains site configuration files required for Fiori Launchpad.
site-web	This package contains the user interface for the SHINE Fiori launchpad, Data Generator, Purchase Order Worklist, Job Scheduler, Sales dashboard, Spatial and User CRUD implemented in SAP UI5.

1.1 SHINE XSA Architecture

The architecture for SHINE for XSA is represented on the following image:



This application contains the following micro services:

- core-js
- user-js
- user-java

The XS runtime platform provides several services for managing the various container instances and their application runtime. Containers are used to manage runtime and allow isolation, resource management, and shared service injection. The XS advanced application runtime contains lightweight processes that are called over HTTP and communicate remotely with the database.

The SAP HANA Deployment Infrastructure (HDI) provides a service layer that helps to deploy database development artifacts to containers. This service layer includes a family of consistent design-time artifacts for all key HANA platform database features, which describe the target (runtime) state of SAP HANA database artifacts, for example: tables, views, or procedures. These artifacts are modeled, staged (uploaded), built, and deployed on SAP HANA.

1.2 XSA Features

This version of SHINE for XSA includes the following features:

HDI Features:

- Table
- CDS Views
- Sequence
- Calculation Views
- Associations
- Table functions
- Synonyms
- Procedures
- Cross Container Access
- Multiple containers
- Spatial features
- Local time data generation
- Constraints
- Comments for tables
- Index and Full text index
- Structured Privilege

XSA Features:

- User Authentication and Authorization (UAA)
- App Router
- oData V2 Services(Node.js)
- oData V4 Services (Java)
- Nodecds
- Authorization(roles)
- oData Exits
- Job Scheduler token based authentication
- Node.js - logging
- oData batch
- Metadata caching
- Fiori Launchpad
- Dynamic Tiles in Fiori Launchpad
- SAPUI5 as a central service.
- Audit Logging

MTA Development and Deployment Descriptor:

- Service Replacement
- Schema config
- MTA Extension Descriptor

2 Prerequisites

The XSAC_MONITORING, XSAC_SERVICES, XSAC_PORTAL_SERVICES and SAPUI5_FESV3 components should be installed before SHINE is installed on XSA.

2.1 Check for Job Scheduler, Portal Services and Audit Log Service

SHINE for XSA needs a job scheduler service broker to create a job scheduler service. The Fiori Launchpad in SHINE needs the portal services application to be installed. For this, the XSA components: XSAC_SERVICES and XSAC_PORTAL_SERVICES need to be installed in the SAP space of the system. SHINE also needs the audit log service to log messages for changes in transactional data. Use the following code sample to check if all the required components are already installed there.

```
xs marketplace
```

```
Getting services from marketplace...
```

service	plans	description
fs-storage	free	xs file service provides an env variable which denotes the root of the clients application file system.
hana	hdi-shared, sbss, schema, securestore	SAP HANA database
xsuaa	default, devuser, space	Manage application authorizations and trust to identity providers
managed-hana	hdi-shared, schema, securestore	Creates service instances at runtime of: SAP HANA database
auditlog	free	Audit log broker on the XSA Platform
portal-services	site-host, site-content, admin-cockpit	Service broker for creating and accessing portal DB
jobscheduler	default	Job Scheduler for scheduling long running, repeated tasks.

If any of them is not installed, contact your system administrator to install the necessary components on the SAP space.



In HANA Express, the Job Scheduler could be pre-installed, so in addition to checking if the job scheduler service is present, also check if the status of jobscheduler-broker is started. To do this, proceed as follows:

1. Go to SAP space by using the command `xs target -o HANAEExpress -s SAP`.
2. Run the command `xs apps | grep STOPPED` to get all stopped services.
3. Check if the status of jobscheduler-broker is stopped.
4. If it is stopped, start it with the command `xs start jobscheduler-broker`.

2.2 Check for XS Advanced Administration Tool

To create a user and to assign roles, you need the XS Advanced Administration tool. To get the URL you need access to SAP space and run the following command or get it from your system administrator.

```
xs app xsa-admin -urls
```

```
@ :~> xs app xsa-admin -urls
https://
```

2.3 Check for SAP UI5 as a Central Service

To access the sapui5 libraries, SAPUI5 as a central service is required. To get the URL you need access to the SAP space and run the following command or get it from your system administrator.

```
xs app sapui5_fesv3 -urls
```

```
root@mo-d8d327f41:/usr/repo # xs app sapui5_fesv3 -urls
https://mo-d8d327f41.mo.sap.corp:51020
```

2.4 Check for SAP WebIDE for SAP HANA

This step is optional and required only if you would like to view and execute the SHINE for XSA code in SAP WebIDE for SAP HANA.

To obtain the URLs of SAP Web IDE, run the following command in SAP space of the XS Advanced system or get it from your system administrator:

```
xs app webide -urls
```

This command returns the SAP Web IDE URL, which you can open in a supported browser (Chrome and Firefox on Windows, Chrome and Safari on Mac).

If SAP Web IDE for SAP HANA is not installed, contact your system administrator to install it and provide you with the URL. The steps to install SAP Web IDE for SAP HANA can be found in the [Web IDE for SAP HANA - Installation and Upgrade Guide](#).

2.5 Creating Users and Assigning Roles

1. Login to XS Advanced Administration with the XSA_ADMIN user and create a new user called *SHINE_USER*.
2. Choose the *User Management* tile in the XS Advanced Administration tool. See step 2.2 for more details on how to get the URL of the XS Administration tool.
3. On the *User Management* page, choose the *New* button.
4. Enter the required details and choose the *Create* button to create a new user.

5. Navigate to the *Role Collections* tab.
6. Click on the *Add* button and assign the role collections *XS_AUTHORIZATION_ADMIN* and *XS_CONTROLLER_ADMIN* and *AUDITLOG_VIEWER* to the user *SHINE_USER*



SHINE_USER

General Role Collections

Role Collections (4)

Name
XS_USER_PUBLIC
XS_AUTHORIZATION_ADMIN
XS_CONTROLLER_ADMIN
AUDITLOG_VIEWER



After the user is created, log in once with the created user and change the default password.

7. Assign the Space Developer Role to the SHINE_USER.

- a. Login to the XSA system in the CLI of the XS Advanced system with user XSA_ADMIN.

```
xs login -u XSA_ADMIN
```

- b. Set the space role for SHINE_USER.

```
xs set-space-role SHINE_USER <orgname> <spacename> SpaceDeveloper
```

```
root@86f473...:/# xs set-space-role SHINE_USER REF PROD SpaceDeveloper
Adding role 'SpaceDeveloper' to user SHINE_USER in space "PROD" of org "REF" ...
OK
```

Optional

If you want to use SAP WebIDE for SAP HANA to import SHINE for XSA code, the role collection DEVX_USER should be assigned to the SHINE_USER.

SAP Web IDE supplies the following predefined role templates: **WebIDE_Administrator**, **WebIDE_Developer**, and **xsac_hrtt_developer_template**.

You can assign these templates to existing role collections, or role collections that have been created for this purpose.

Perform these tasks in the *Application Role Builder* tool available in the XS Advanced Administration Tool. To access this tool, you need the authorization scopes defined in the XS_AUTHORIZATION_ADMIN role collection.

For more information, see [SAP HANA Administration Guide](#) -> *Building Roles for SAP HANA XS Advanced Model Applications*.

3 Deployment Options for SHINE

After you have performed the steps above, you have the following two deployment options:

1. Deploy SHINE via SAP WebIDE for SAP HANA.

This option has two further options of deployment:

- Deploy SHINE with Fiori Launchpad
- Deploy SHINE without Fiori Launchpad.

2. Deploy SHINE by downloading the SCA from Service market place or using it from the XSA_CONT folder of HANA.

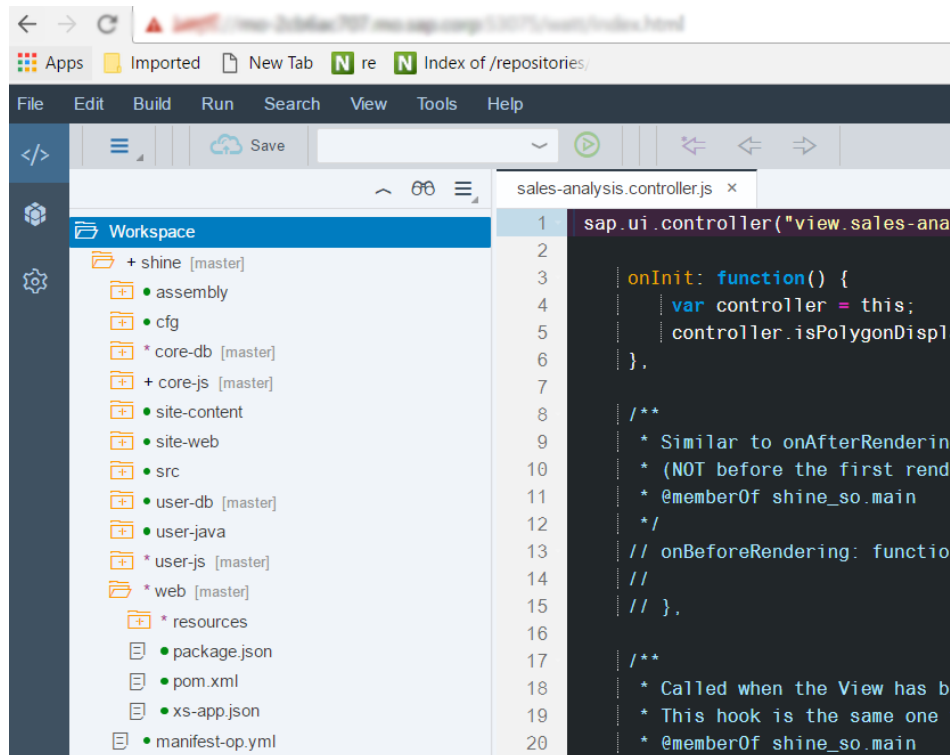
All the above deployment options are explained in detail in the subsequent chapters.

3.1 Deploying SHINE via SAP WebIDE for SAP HANA

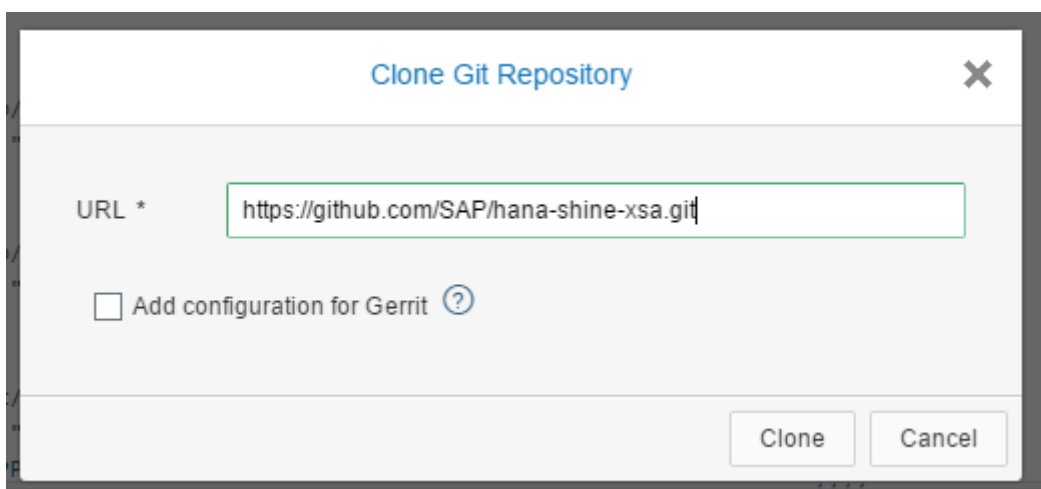
3.1.1 Import from GitHub

1. Launch SAP Web IDE for SAP HANA.

Refer to Step 2.4 for instructions how to launch the SAP Web IDE.



2. Navigate to *File -> Git -> Clone Repository*
3. Enter the URL of the SHINE repository <https://github.com/SAP/hana-shine-xsa.git>
4. Choose *Clone*.



3.1.2 Deploy SHINE for XSA Application Without FLP

Please follow the steps below to deploy and run SHINE for XSA application without the Fiori Launchpad:

1. Create xs-security.json file by using the following command in the CLI of XSA system:

```
vi xs-security.json
```

Paste the following content in the file:

```
{
  "xsappname": "shine-admin",
  "scopes": [
    {
      "name": "$XSAPPNAME.JOBSCHEDULER",
      "description": "Job Scheduler Scope",
      "grant-as-authority-to-apps": ["jobscheduler"]
    },
    {
      "name": "$XSAPPNAME.Display",
      "description": "display"
    },
    {
      "name": "$XSAPPNAME.Edit",
      "description": "edit"
    },
    {
      "name": "$XSAPPNAME.Delete",
      "description": "delete"
    },
    {
      "name": "$XSAPPNAME.DataGenerator",
      "description": "data generator"
    },
    {
      "name": "xs_authorization.read",
      "description": "Read authorization information from UAA"
    },
    {
      "name": "xs_authorization.write",
      "description": "Write authorization information to UAA"
    }
  ]
}
```



```

    }
  ],
  "role-templates": [
    {
      "name": "Admin",
      "description": "refapps administrator",
      "scope-references": [
        "$XSAPPNAME.Display",
        "$XSAPPNAME.Edit",
        "$XSAPPNAME.Delete",
        "$XSAPPNAME.DataGenerator",
        "xs_authorization.read",
        "xs_authorization.write",
        "$XSAPPNAME.JOBSCHEDULER",
        "xs_controller.read"
      ]
    }
  ]
}

```

2. Create a UAA service instance by executing the command in CLI of XSA system, from the same location where the xs-security.json was created in the previous step:

```
xs create-service xsuaa default shine-uaa -c xs-security.json
```

3. Check if the app jobscheduler-broker is started and is up and running. Please refer to step 2.1 about starting the jobscheduler-broker.

4. Create Job Scheduler Service by executing the command in CLI of XSA system:

```
xs cs jobscheduler default shine-scheduler
```

5. Create an audit log service instance by executing the following command in CLI of XSA system:

```
xs cs auditlog free shine-auditlog
```

6. Enable the space for development using the Space Enablement administration tool.

For more details on how to enable access to this tool, please refer to Chapter **Enabling Access to the SAP Web IDE Administration and Development Tools** of [SAP Web IDE for SAP HANA - Installation and Upgrade Guide](#).

6. Once done, open the Space enablement tool, whose URL can be obtained by running the following command:

```
xs app di-space-enablement-ui --urls
```

7. The Space Enablement tool allows you to enable spaces for development by deploying the builder component in each space. In this tool, you can view the status and builder version of all the spaces defined in your organization and perform the following tasks:

- In a space row, choose **Enable** to deploy the builder in the space.

- b. Choose **Redeploy** to redeploy the builder, if its version matches the DI CORE version displayed at the right of the app title bar.
 - c. Choose **Update** to update the builder to the DI CORE version. The process steps are displayed in the Log window. You can view the latest log for each space by clicking the icon in the space row in the table
8. Before building the modules, you need to assign the space to the project.
This can be done by right-clicking on the project name and choosing *Project Settings*. Choose the *Space* tab and from the drop-down menu select the appropriate space, in which the application should be deployed, and then choose *Save*.
9. Open the mta.yaml in SAP WebIDE for SAP HANA. Navigate to the **resources** section. For the resources shine-user-container and shine-container, in the parameters section update the **service name** and **config: schema** by replacing <USER_NAME> with your Web IDE user name as shown in screenshot below

```

- name: shine-container
  type: com.sap.xs.hdi-container
  properties:
    container-name: ${service-name}
  parameters:
    service-name: <USERNAME>_shine-container
    config:
      schema: <USERNAME>_SHINE_CORE_SCHEMA

- name: shine-user-container
  type: com.sap.xs.hdi-container
  properties:
    user-container-name: ${service-name}
  parameters:
    service-name: <USERNAME>_shine-user-container
    config:
      schema: <USERNAME>_SHINE_USER_SCHEMA

- name: shine-scheduler
  type: com.sap.xs.job-scheduler

```

10. In the mta.yaml replace the UAA endpoint by following the steps below:
 - a) Navigate to the resource **uaa**.
 - b) Replace the **url** property of the resource uaa to your respective UAA end point URL which will be of the format :

http(s)://<host-name>:3<instance-number>32/ uaa-security

For example, in HANA express the UAA endpoint can be <https://hxehost:3<instance-number>32/uaa-security>



In HANAExpress VM install has default instance as 90, Binary install is a user-defined number

11. Open the below folders and remove the package.json files if they are present:
 - user-db
 - core-db
12. Build all packages, one by one, in the following sequence:
 - user-db

core-db
 user-js
 core-js
 user-java
 web

13. After the successful build of all these modules, run the following modules by right-clicking on the respective module and choosing *Run*→*Run as*:

Run core-js and user-js as a Node-js application



Please note, the audit log service needs to be bound manually to the shine-core-js application. This can be done by doing a dummy run of the core-js module and after it fails execute following command in the CLI of the XSA system:

xs bs <WEBIDE_USERNAME>...<PROJECTNAME>-core-js shine-auditlog

The core-js application deployed via SAP WebIDE for SAP HANA will be of the format
<WEBIDE_USERNAME>.... <PROJECTNAME>-core-js

Rerun the core-js after executing the above command.

Run user-java as Java web Runner

Run web as Web Application.

For more information on cloning, building, deploying etc. for XSA applications, see [SAP Web IDE for SAP HANA - Installation and Upgrade Guide](#).

3.1.3 Deploy SHINE for XSA Application with FLP



Prerequisite: Steps 1 to 11 in Chapter 3.1.2 should be performed before going forward with the below steps.

Follow the below steps to deploy and run SHINE for XSA application with the Fiori Launchpad:

1. Expand the shine folder in WebIDE.
2. Open mta.yaml
3. In the resources section, navigate to the entry “controller”.
4. Replace the url property with the respective API URL of the XSA system.

It will be of the format:

http(s)://<XSA host name>:<xs controller port>

By default, the xs controller port is 3##30 where ## is the instance number.



In HANAExpress VM install has default instance as 90, Binary install is a user-defined number

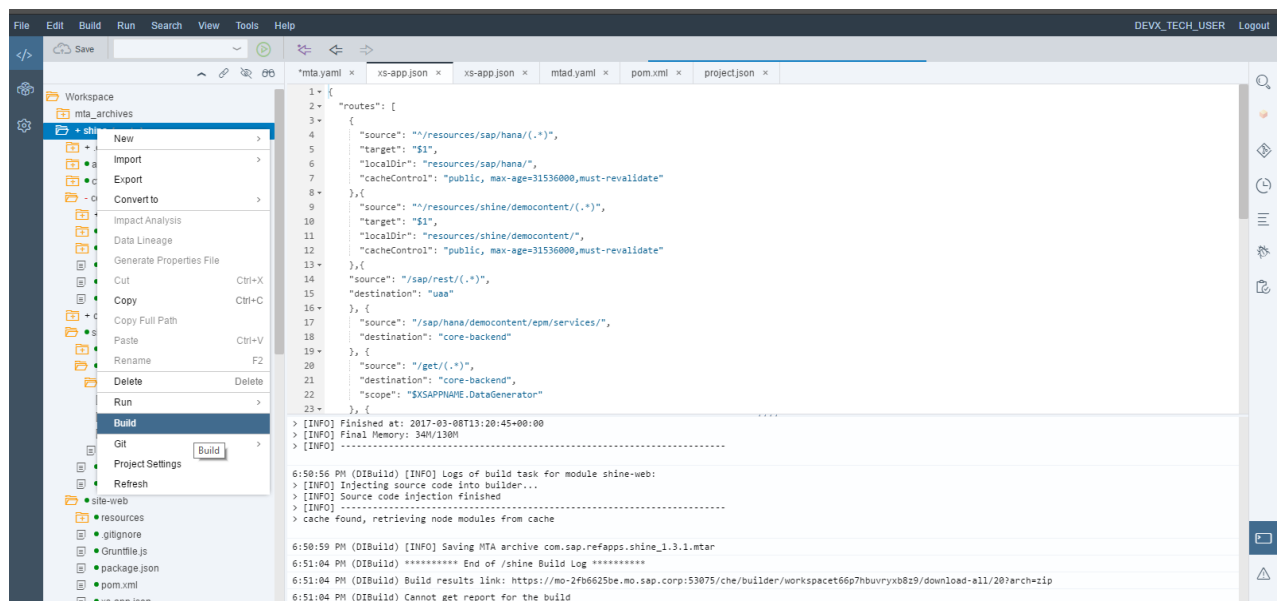
6. Navigate to the resources section, for the resource shine-user-container. In the parameters section update the **service name** and **config: schema** by replacing <USER_NAME> with your Web IDE user name as shown in screenshot below.

```
- name: shine-container
  type: com.sap.xs.hdi-container
  properties:
    container-name: ${service-name}
  parameters:
    service-name: <USERNAME>_shine-container
    config:
      schema: <USERNAME>_SHINE_CORE_SCHEMA

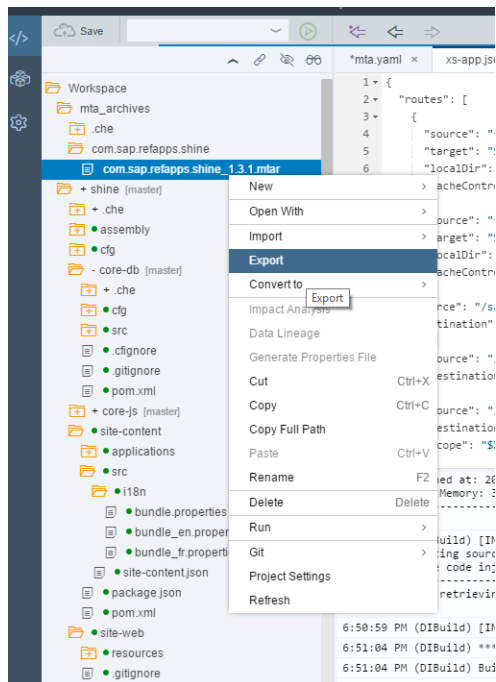
- name: shine-user-container
  type: com.sap.xs.hdi-container
  properties:
    user-container-name: ${service-name}
  parameters:
    service-name: <USERNAME>_shine-user-container
    config:
      schema: <USERNAME>_SHINE_USER_SCHEMA

- name: shine-scheduler
  type: com.sap.xs.job-scheduler
```

7. Right click on the shine project folder and select **Build**.



7. After successful build of the project, there will be a folder called `mta_archives` created in the workspace.
8. Expand the folder and expand the folder `com.sap.refapps.shine_1.4.x.mtar` file present inside.
9. Right click on the `mtar` file present inside and select **Export**.



10. Once exported, login to the XSA system via CLI and deploy the `mtar` file using the following command:

```
xs deploy com.sap.refapps.shine_1.4.x.mtar
```



Ensure that you do not deploy the `mtar` in the same space as the application from SAP WEB IDE for SAP HANA was deployed in Chapter 3.1.2.

Deploying the `mtar` in a different space will avoid the installation failure due to the same schema names in both applications.

3.2 Deploy SHINE for XSA SCA



Do not install SHINE on your productive SAP HANA system.

SHINE for XSA Software Component Archive (SCA) can be found on SAP HANA Media as well as on the SAP Support Portal.

3.2.1 Download from HANA Media

SHINE for XSA can be found in the XSA_CONT folder of HANA media.

3.2.2 Download from SAP Support Portal

The SAP HANA Interactive Education (SHINE) for XSA SCA is available for download on the *SAP Support Portal* → *Software Download* page.

Procedure

To download the SHINE software component archive from SAP Support, perform the following steps:

1. Open your Internet browser and enter <https://support.sap.com/patches>. Click on *My Support* drop down in the category *Software Downloads*, click on *Types of Software*.
2. Under *Support Packages and Patches*, click on *Access Downloads*.
3. In the newly opened *SAP ONE Support Launchpad* window/tab, click on the *Support Packages & Patches* → *By Alphabetical Index (A-Z)* → *H* → *SAP HANA PLATFORM EDITION* → *Downloads* → *SAP HANA PLATFORM EDITION. 2.0* → *Downloads*
4. Select *SAP HANA DEMO MODEL ADV. 1*.
The *Downloads* tab appears with information about the packages available for download.
5. Select the *latest* version of *ZIP for SAP HANA DEMO MODEL ADV. 1* and choose *Add to Download Basket*.
6. Choose *Download Basket* and save the ZIP file in a convenient location, for example, on your local PC hard drive.

3.2.3 Install the Software Component Archive

Prerequisites

You have downloaded the SHINE for XSA software component archive from the SAP Support Portal or SAP HANA Media.

Please note these steps are optional and are only needed, if the schema names provided in the SHINE application need to be overridden.

- a. Download the MTA extension descriptor for SHINE for XSA `sap-xsac-shine-1.4.xx.mtaext` from <https://github.com/SAP/hana-shine-xsa> or download it from SAP Note: [2239095](#)
- b. Open the `sap-xsac-shine-1.4.xx.mtaext` file in any text editor.
- c. Update the two `<SCHEMA_NAME>` fields in the `mtaext` file with two different schema names. (e.g.: `SHINE_USER_SCHEMA`, `SHINE_CORE_SCHEMA`).
Please ensure that the two schema names are not the same.

Procedure

1. Login to the XSA system using CLI (Command-line interface) with the `SHINE_USER` user you created in the previous chapter using the `xs login -u SHINE_USER` command:

```

no-000f5d3f5a:/> xs login -u SHINE_USER

API URL: https://no-000f5d3f5a.mylap.corp:30000

USERNAME: SHINE_USER
PASSWORD>
ORG: myorg

Existing spaces:
0.      PROD
1.      SAP
SPACE> 0
SPACE: PROD
API endpoint: https://no-000f5d3f5a.mylap.corp:30000 API endpoint: 1
User:      SHINE_USER
Org:       myorg
Space:     PROD

```

2. Navigate to your corresponding XSA organization and space using the command

```
xs target -o <orgname> -s <spacename>
```

3. Deploy the SHINE for XSA application without the extension descriptor using the following command:

```
xs install XSACSHINE04_<patch.no>.zip
```

4. Deploy the SHINE for XSA application with the extension descriptor using the following command:

```
xs install XSACSHINE04_<patch.no>.zip -e sap-xsac-shine-1.4.xx.mtaext
```

3.2.4 Uninstall the Software Component Archive

Prerequisites

The software component SHINE for XSA should be installed on the system.

Procedure

To uninstall SHINE from the system, please follow the below steps:

- a) Login to the XSA system using CLI (Command-line interface) with the SHINE_USER user you created in the previous chapter using the command.

```
xs login -u SHINE_USER
```

- b) Navigate to your corresponding XSA organization and space using the command

```
xs target -o <orgname> -s <spacename>
```

- c) Uninstall the SHINE for XSA application using the command

```
xs uninstall XSAC_SHINE -delete-services
```

Note: The delete-services flag is used to delete all the services associated with the SHINE application.

3.2.5 Reinstall the Software Component Archive

To reinstall SHINE for XSA software component, proceed as follows:

5. Reinstall SHINE without the extension descriptor using the following command:

```
xs install XSACSHINE04_<patch.no>.ZIP -o
<ALLOW_SC_SAME_VERSION,[ALLOW_SC_DOWNGRADE]>
```

6. Reinstall SHINE with the extension descriptor using the following command:


```
xs install XSACSHINE04_<patch.no>.ZIP -e sap-xsac-shine-1.4.xx.mtaext  
-o <ALLOW_SC_SAME_VERSION,[ALLOW_SC_DOWNGRADE]>
```

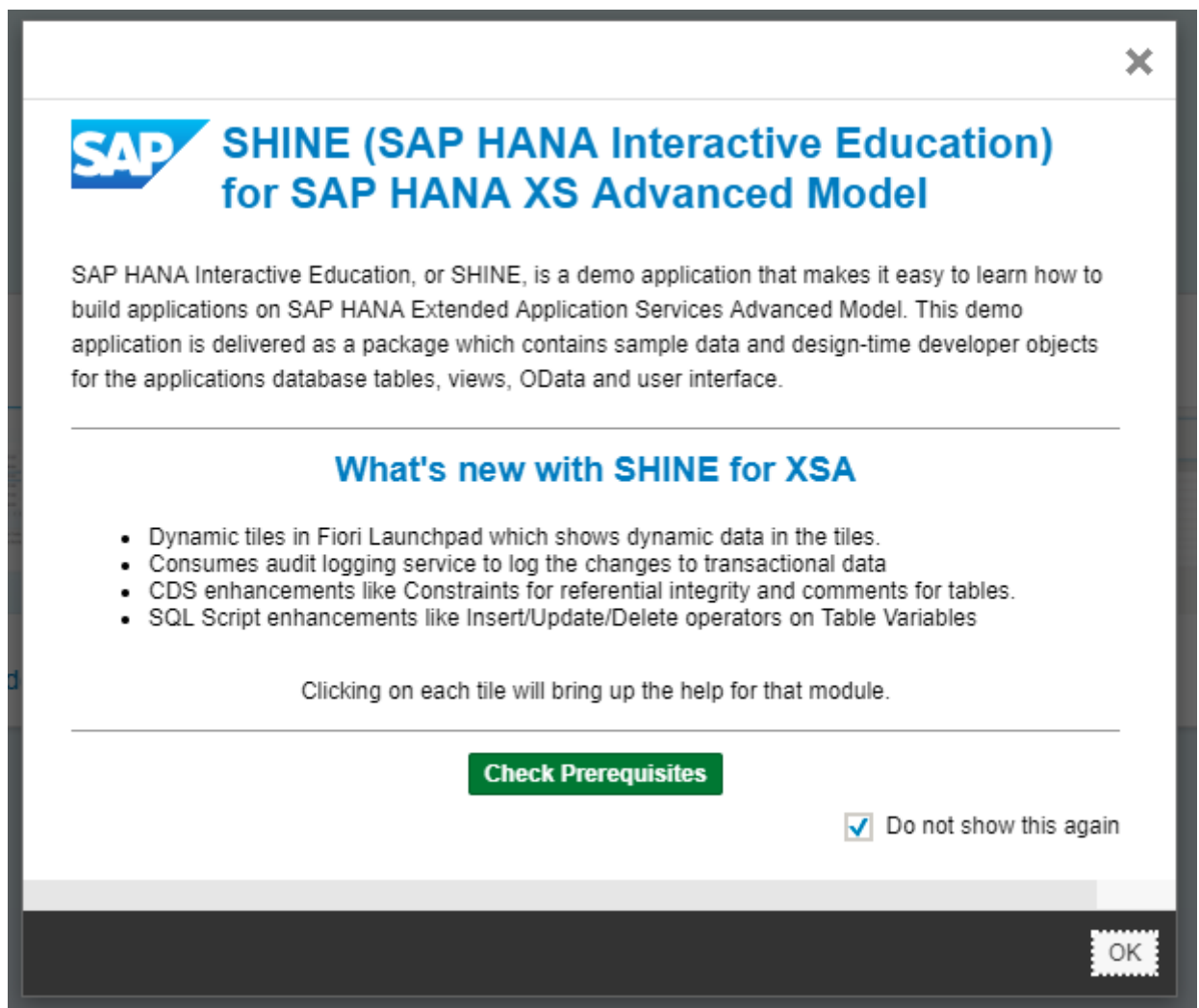
Please note that the **ALLOW_SC_SAME_VERSION** flag is used to reinstall the same version of the software component and **ALLOW_SC_DOWNGRADE** is used to downgrade a software component.

4 Launch the SHINE for XSA Application

1. Login to the XSA system from CLI to find the URL of the SHINE for XSA application.
2. Enter the `xs target -o <orgname> -s <spacename>` command to navigate to the corresponding organization and space in which SHINE for XSA is installed.
3. Enter the `xs app shine-web -urls` command to display a list of all applications running in your space.

```
@: ~> xs app shine-web -urls
https://
```

4. In a browser, use this URL to start the application and login with `SHINE_USER`.
The application opens and a popup appears providing information about the SHINE for XSA application.



5. Choose the *Check Prerequisites* button.
6. Once the *Check Prerequisites* button is clicked, in the new pop up there will be an “X” symbol for Role Collection, indicating that the role collection “SHINE_ADMIN”, necessary to access the Data Generator tile, is not available and another “X” symbol for Generate Time data button indicating that the time dimensional data, needed for charts and reports to be displayed with respect to time, is not yet generated.

✕

Checking Prerequisites

Please check the **SHINE** documentation for the complete list of prerequisites.

Role Collections

In order to launch the data generator tile, we need a role collection which has a role template shine admin. Click on the button "Create Role Collection" to create a role collection with the name SHINE_ADMIN and assign the role template shine admin to it. You will be logged out after the role collection creation.

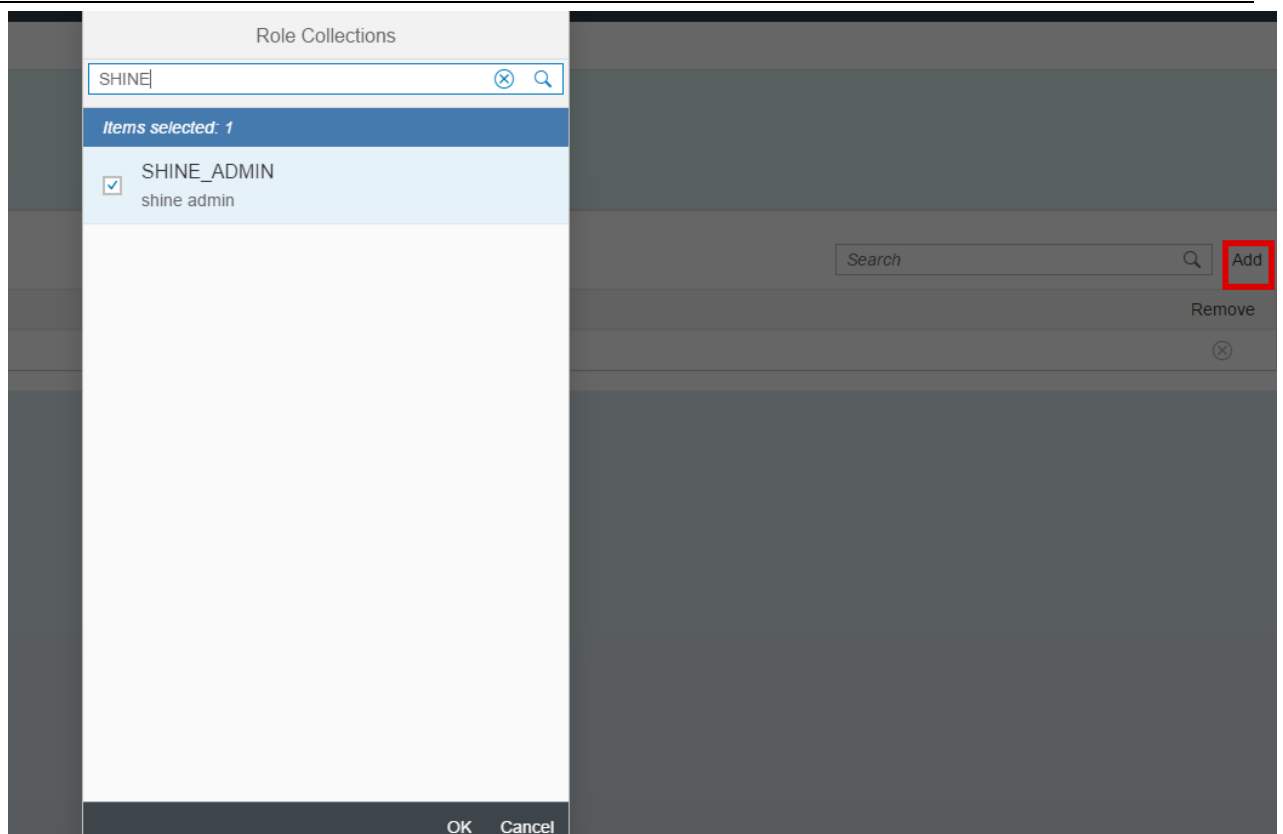
✕


Generate Time Data

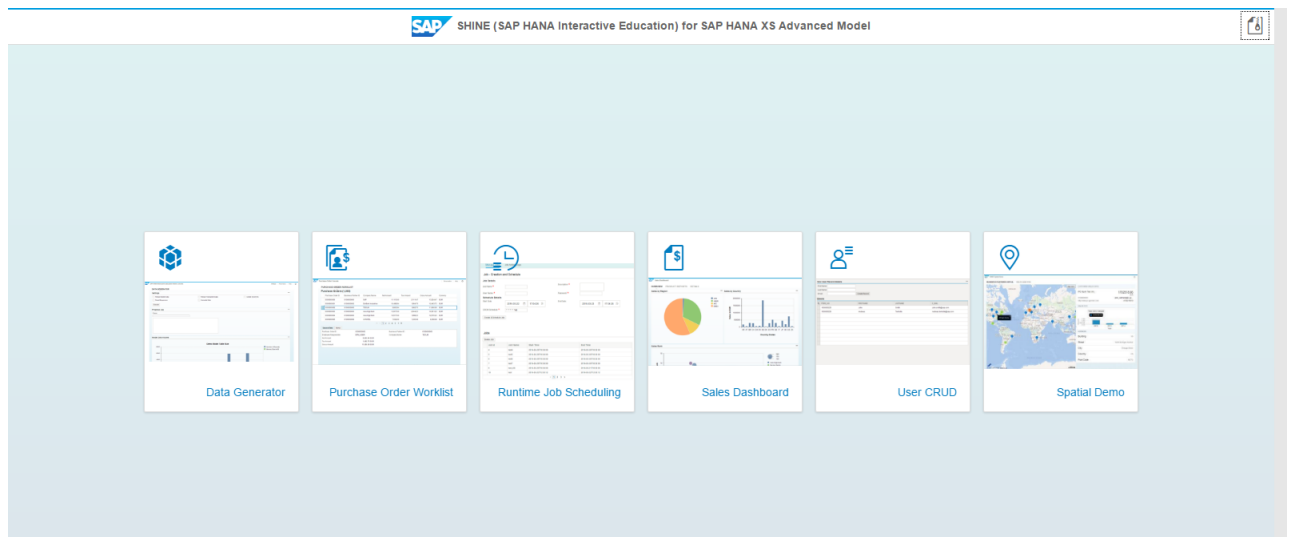
Time Dimensional Data needs to be loaded into the SHINE Time Dimension table for the models and charts to work perfectly. You can easily generate this data by clicking on **Generate Time Data** button.

✓

7. Click on the *Generate Time Data* button to generate time-dimensional data required for charts and reports.
8. Click on the *Create Role Collections* button, which creates the SHINE_ADMIN role collection. The user will be logged out of the application.
9. In a separate window, log on to the XS Advanced Administration tool and navigate to the *User Management* tile. For more information on how to open XS Advanced Administration Tool, see Step 2.2.
10. Choose the user name created in Step 2.4 (for example, SHINE_USER)
11. Navigate to the *Role Collections* tab, click on the *Add* button and search for the role collection "SHINE_ADMIN".



12. Select the SHINE_ADMIN role and click OK and then click the Save button
13. Open the SHINE application URL or log on back to the SHINE application.
14. Once the user is logged in again, note that *Check Prerequisites* will return a  (green tick) sign for both prerequisites. Click OK.
15. The SHINE Launchpad appears with 6 tiles, the *Data Generator*, the *Purchase Order Worklist*, *Job Scheduler*, *Sales Dashboard*, *User CRUD* and *Spatial Demo* applications.



16. Click on any tile to start the corresponding application.

5 Launch the Fiori Launchpad of SHINE for XSA Application

Fiori Launchpad is the entry point to Fiori apps on mobile or desktop devices. The Fiori Launchpad displays various tiles that provide access to applications.

The tiles that appear on a user's entry page depend on the user's role and hence it provides role based navigation and business function access.

The Fiori Launchpad available in SHINE provides an alternate entry point for the various microservices in SHINE.



Execute steps 1 to 13 in Chapter 4 before launching SHINE Fiori Launchpad to

- Create SHINE_ADMIN Role Collection and assign it to user
- Generate Time Data

To launch the Fiori Launchpad in SHINE, please follow the below steps:

1. Login to the XSA system from CLI to find the URL of the SHINE for XSA FLP application.
2. Enter the `xs target -o <orgname> -s <spacename>` command to navigate to the corresponding organization and space in which SHINE for XSA is installed.
3. Enter the `xs app shine-site-web -urls` command to display a list of all applications running in your space.

```
root@bmc-1:~/bin$ ./bin/fiori/4787/478900/exe> xs app shine-site-web -urls
https://bmc-1:4787/478900/exe/51043
```

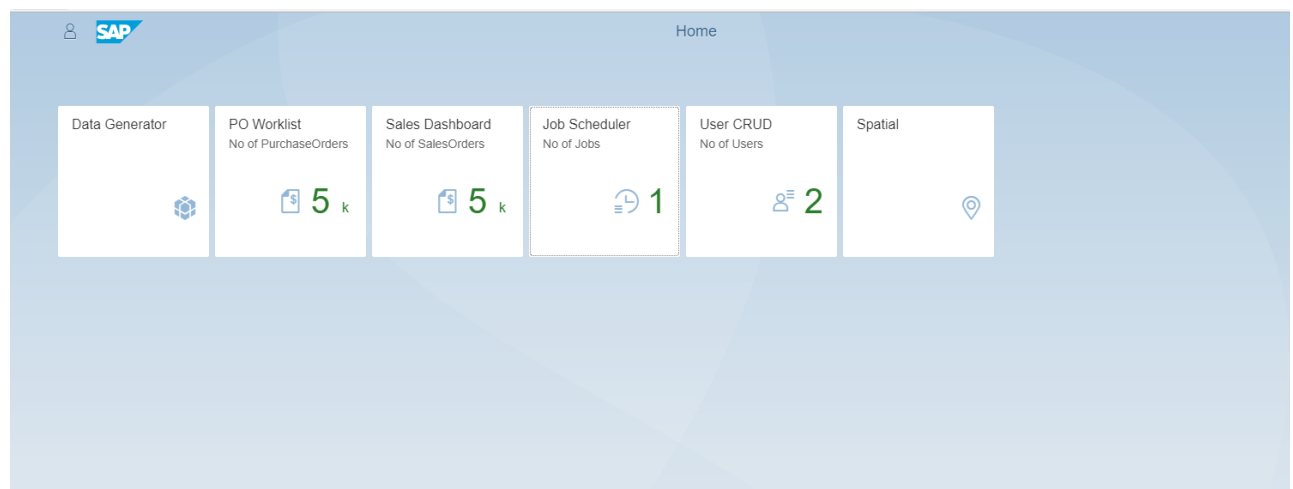
4. In a browser, use this URL to start the application and login with **SHINE_USER**.

The SHINE Fiori Launchpad application opens with 5 tiles: *Data Generator*, *PO Worklist*, *Job Scheduler*, *Sales Dashboard*, *Spatial* and *User CRUD*.

Please note that the tile *Data Generator* appears only if the logged in user is assigned the SHINE_ADMIN role collection.

The tiles like PO Worklist, Sales Dashboard, Job Scheduler and User CRUD also display additional dynamic information like the number of purchase orders, the number of sales orders, the number of jobs active and the number of users created.

For more details on how to assign the SHINE_ADMIN role collection, see Chapter 5 Step 10.



5. Click on any tile to start the corresponding application

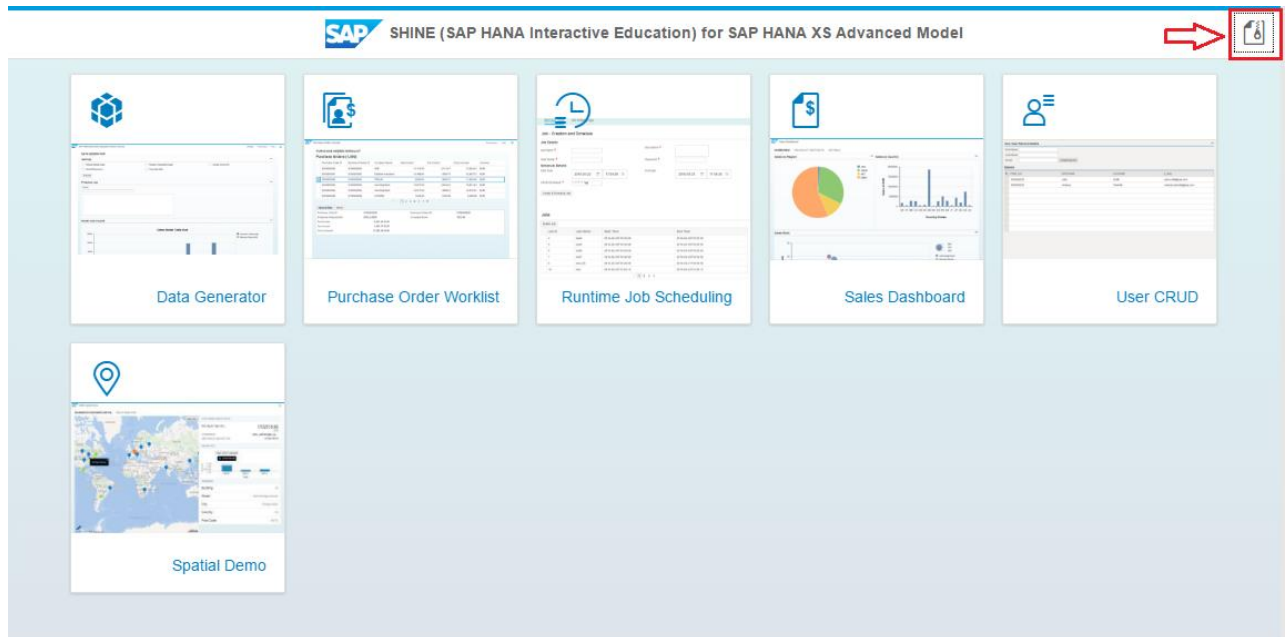
6 Downloading the Source Code of SHINE for XSA as ZIP

The source code of SHINE application can also be downloaded as a ZIP file so that the users can readily view the sample data and design-time developer objects such as database tables, views, OData and user interface.

To download the source code of the SHINE application, click on the icon in the *Launchpad* as highlighted in the image below.



In addition to the DB artifacts and services required for the SHINE application, there are also a lot of standalone samples present in the code.



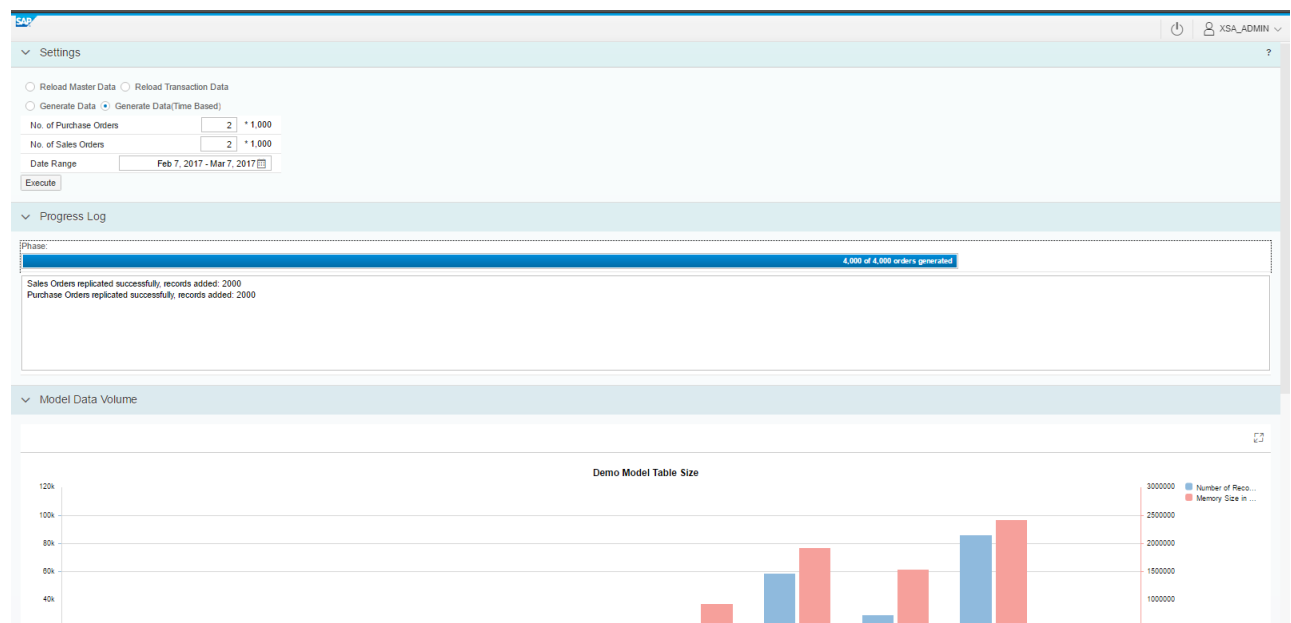
7 Scenarios

This version of SHINE contains the features *Data Generator*, *Purchase Order Worklist*, *Job Scheduler*, *User CRUD* and *Sales Dashboard*. The scenarios are described in the following sections.

7.1 Data Generator

This application can be used to perform the following operations with respect to data:

- The application master data can be reset or reloaded by using the Reload Master Data module (which includes data reloading for Business Partners, Addresses, Products tables, and so on).
- The applications transactional data can be reset or reloaded using the module Reload Transactional Data (which includes data reloading for Sales Orders and Purchase Orders tables).
- New transactional data for Sales Orders and Purchase Orders can be generated using the Generate Data module.
- Time based Purchase and Sales orders can be generated for a specific time interval using the Generate Time Data module.

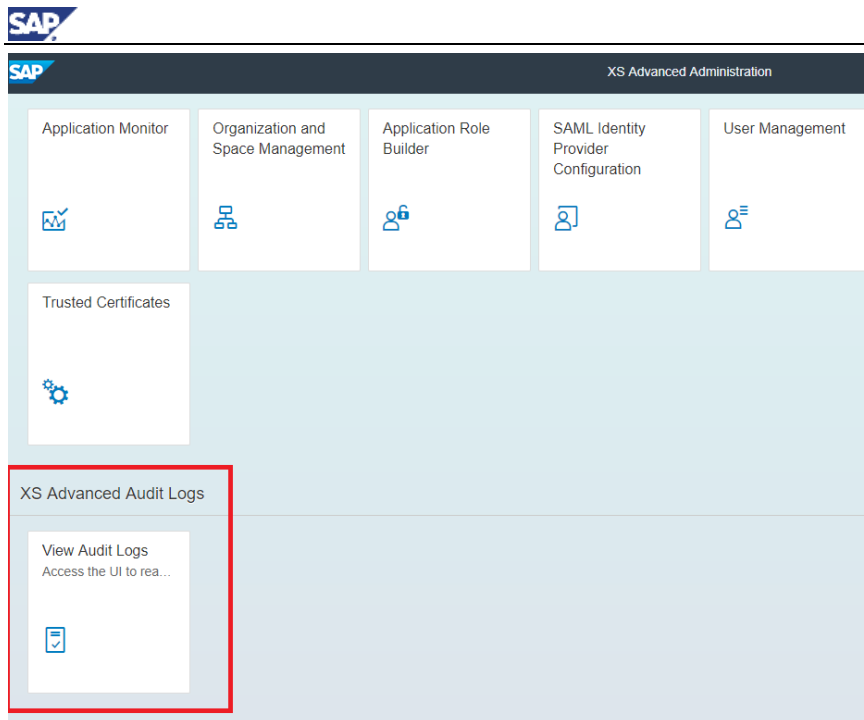


Also in Data generator, is the SHINE audit log service which logs the changes done to the transactional data which happens when data generator is used with options *Generate Data* and *Generate Time-Based Data*.

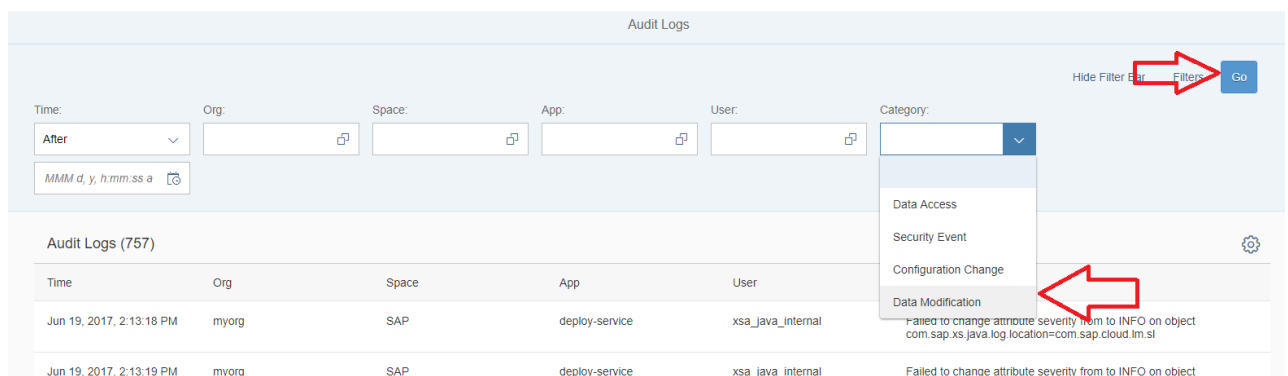
The logged messages can be viewed via the xsa admin application.

After generating transactional data by any of the two options mentioned above, to view the logged messages, please perform the following steps:

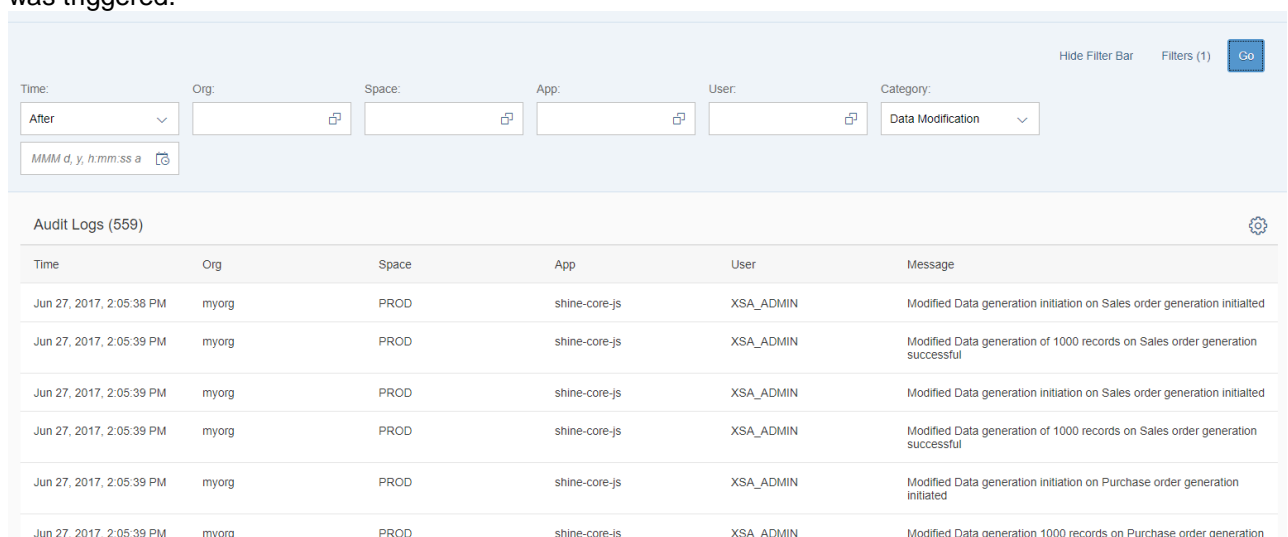
1. Login to XS Advanced Administration with SHINE_USER.
2. In the home page of XSA Admin application, under the **XS Advanced Audit Logs** section, click on the tile **View Audit logs**.



3. Filter out the messages by selecting Data modification under the **Categories** drop down and Click on the **Go** button.



4. The messages logged from the SHINE application due to generation of transactional appear with details like the time of generation, the user who generated it, the org, space and the app from which the request was triggered.



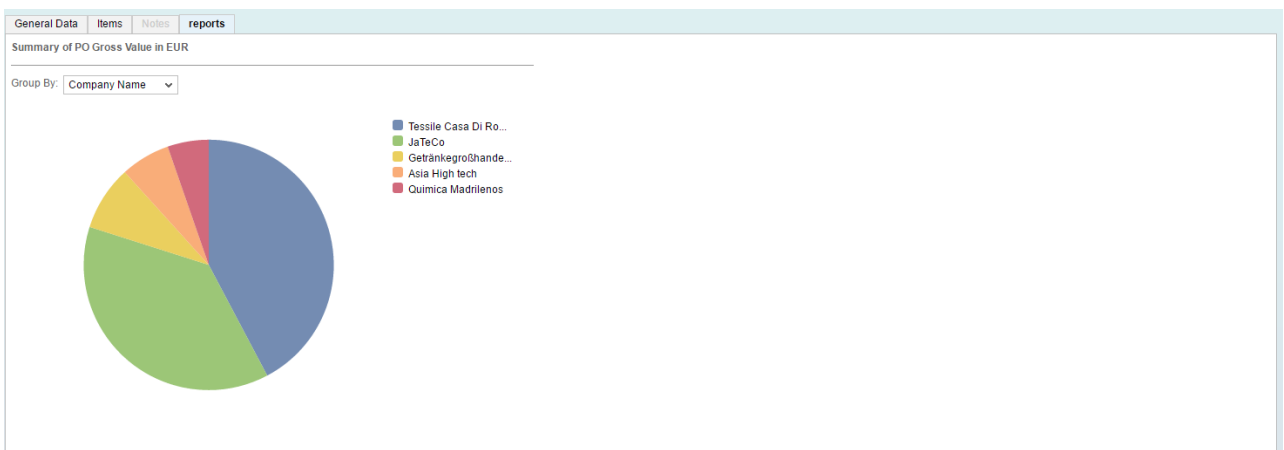
7.2 Purchase Order Worklist

This application illustrates a comprehensive Purchase Order Worklist that acts as an interface for a Purchase Department Head to manage the purchase orders created by his or her department. The following tasks can be performed:

- View the list of purchase orders and choose a particular order to see the General Data and Purchase Order items related to it, displayed in separate tabs.
- Perform actions such as *New*, *Delete*, *Accept*, or *Reject* for a selected purchase order.
- Perform actions such as *Export to Excel* which downloads all purchase-order data into an Excel spreadsheet.
- Perform operations such as searching for purchase orders based on various attributes, including *Company Name*, *Product ID*, and so on.
- Click on the *Reports* tab to see the summary of purchase order gross value grouped by different attributes like Company Name, City etc.

PURCHASE ORDER WORKLIST

Filter By											
Super Search <input type="text"/>											
New	Edit	Delete	Actions	Export to Excel	Export as Zip						
Purchase Order...	Order Item	Business Partne...	Product ID	Company Name	Gross Amount	Currency	PO Lifecycle	PO Approval	PO Confirmation	PO Ordering	
300000000	10	100000000	HT-1000	SAP	13224.47	EUR	New	Initial	Initial	Initial	
300000000	100	100000000	HT-1000	SAP	13224.47	EUR	New	Initial	Initial	Initial	
300000000	20	100000000	HT-1091	SAP	13224.47	EUR	New	Initial	Initial	Initial	
300000000	30	100000000	HT-6100	SAP	13224.47	EUR	New	Initial	Initial	Initial	
300000000	40	100000000	HT-1000	SAP	13224.47	EUR	New	Initial	Initial	Initial	
300000000	50	100000000	HT-1091	SAP	13224.47	EUR	New	Initial	Initial	Initial	



7.3 Job Scheduler

This application defines recurring tasks that run in background and can be used to do the following operations by using XSA Job Scheduler Service:

- Create a job and schedule it
- Created jobs can also be deleted via this user interface

The jobscheduler uses tokens to authenticate and trigger jobs defined within SHINE application.



Job - Creation and Schedule

Job Details

Job Name *

Description *

Schedule Details

Start Date

2017-03-07



15:29:08



End Date

2017-03-08



15:29:08



CRON Schedule *

***** */40

Create & Schedule Job

Jobs

Delete Schedule

Job Id	Job Name
2	jobtest

The triggered jobs can be viewed on the *Job Trigger Logs* tab.



Delete

Refresh

Trigger Id	Job Name	Time Stamp
700000037	demo	Thu Apr 14 2016 12:42:10 GMT+0530 (India Standar...
700000038	demo	Thu Apr 14 2016 12:42:10 GMT+0530 (India Standar...

7.4 User CRUD

This application illustrates how to manage users in the system. There are two implementations of the User CRUD service, namely, one in Node.js and the other in Java. Both the service implementations perform CRUD operations on the same database container, the user-db. The end-user can select either the Node.js or the Java version of the service, by clicking on the switch button on the top of the application page.

This application can be used for the following operations:

- Create a new user
- Update an existing user
- View all existing users
- Delete an existing user

New User Record Details

First Name

Last Name

Email

Users

UserId	FirstName	LastName	Email
No data			

In order to create a new user, the *First Name*, *Last Name* and *Email* should be provided in the top left-hand side. After filling in the details, the user needs to choose the *Create Record* button. *First Name*, *Last Name* and *Email* are mandatory parameters and the end user has to provide those details.

New User Record Details

First Name

Last Name

Email

Users

UserId	FirstName	LastName	Email
No data			

Once the user has been successfully created, the details of all the users are displayed in the table below.

Users

UserId	FirstName	LastName	Email
1000000243	y	this	y.this@sap.com
1000000245	john3234	doe2	john.doe3@sap.com
1000000247	person	ofinterest	poi@sap.com
1000000249	a	test	a.test@sap.com
1000000252	vivek	srini	vivek.srini@sap.com
1000000253	hello	myworld	h.my.w@sap.com
1000000255	test1	test2	test1.test2@sap.com
1000000256	test3	test4	test3.4@sap.com
1000000257	hello12343	world123456	h.w123456@sap.com
1000000258	John	Doe	john.doe@sap.com

To modify an existing user, you can directly modify the text element in the table (example, the First Name, Last Name or Email). Once you have modified the values, you can trigger an update by pressing the Enter key or by clicking anywhere else on the UI.

1000000253	hello	myworld	h.my.w@sap.com
1000000255	test1	test2	test1.test2@sap.com
1000000256	test3	test4	test3.4@sap.com
1000000257	hello12343	world123456	h.w123456@sap.com
1000000258	John	Doever	john.doe@sap.com

The Sales Dashboard application shows the analytical view of the sales orders created by the company ITELO (such as Sales by Region, Sales by Country, Compare Product Category Sales Year on Year and so on). Based on the analytical inputs, the Sales Manager can make decisions or take the necessary actions for the company.

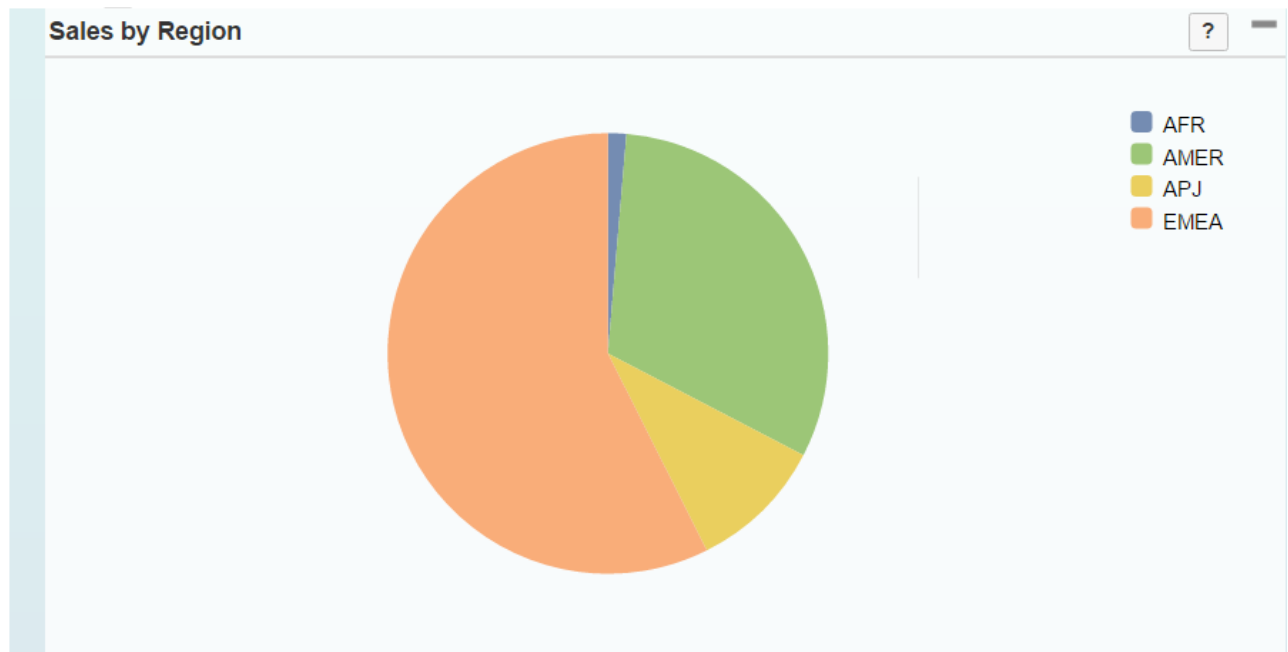


This Sales Dashboard provides a comprehensive dashboard concept that contains several charts based on the OData model constructed in the demo content. You can see sales-specific charts based on Region/Country/Discount per region and charts that provide sales information categorized by product.

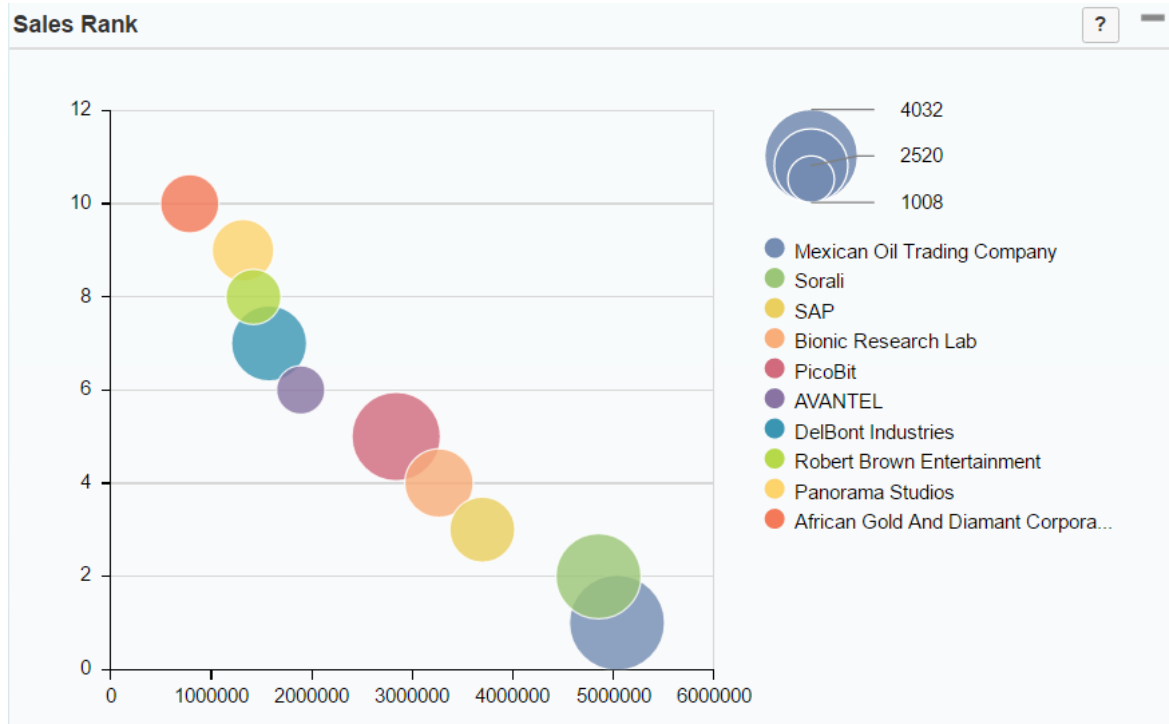
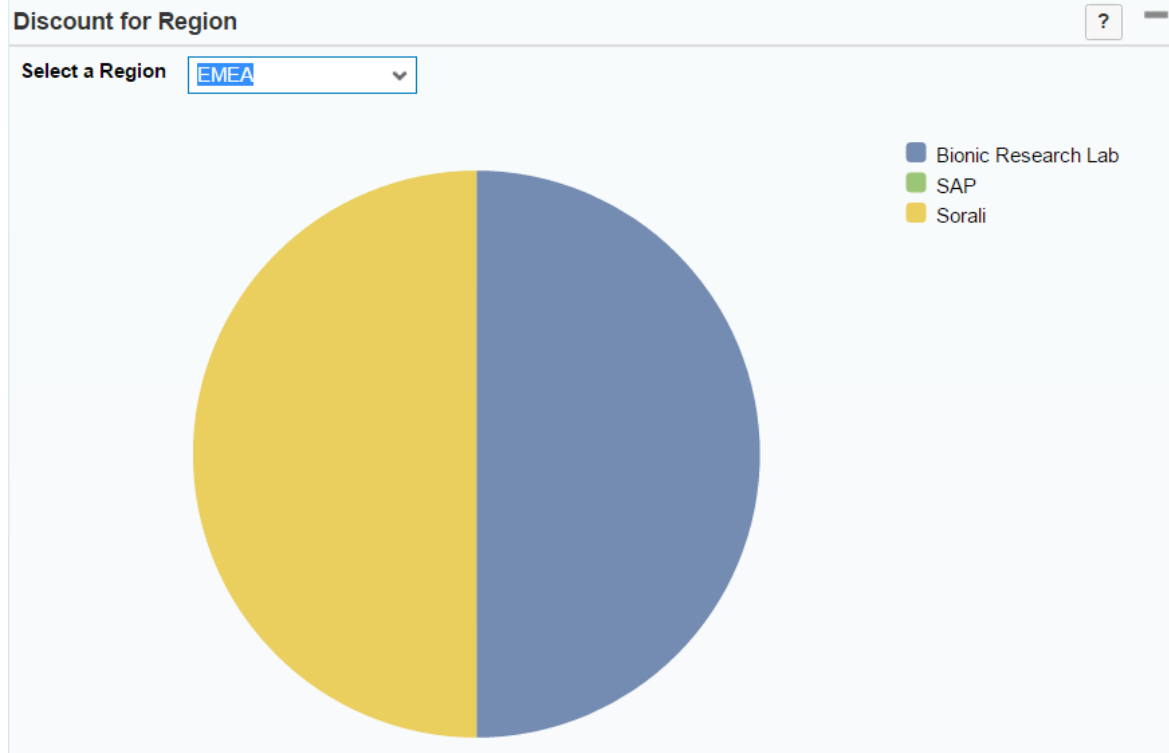
This application can be used to:

Overview Tab:

- Find the total sales for all regions and by country.

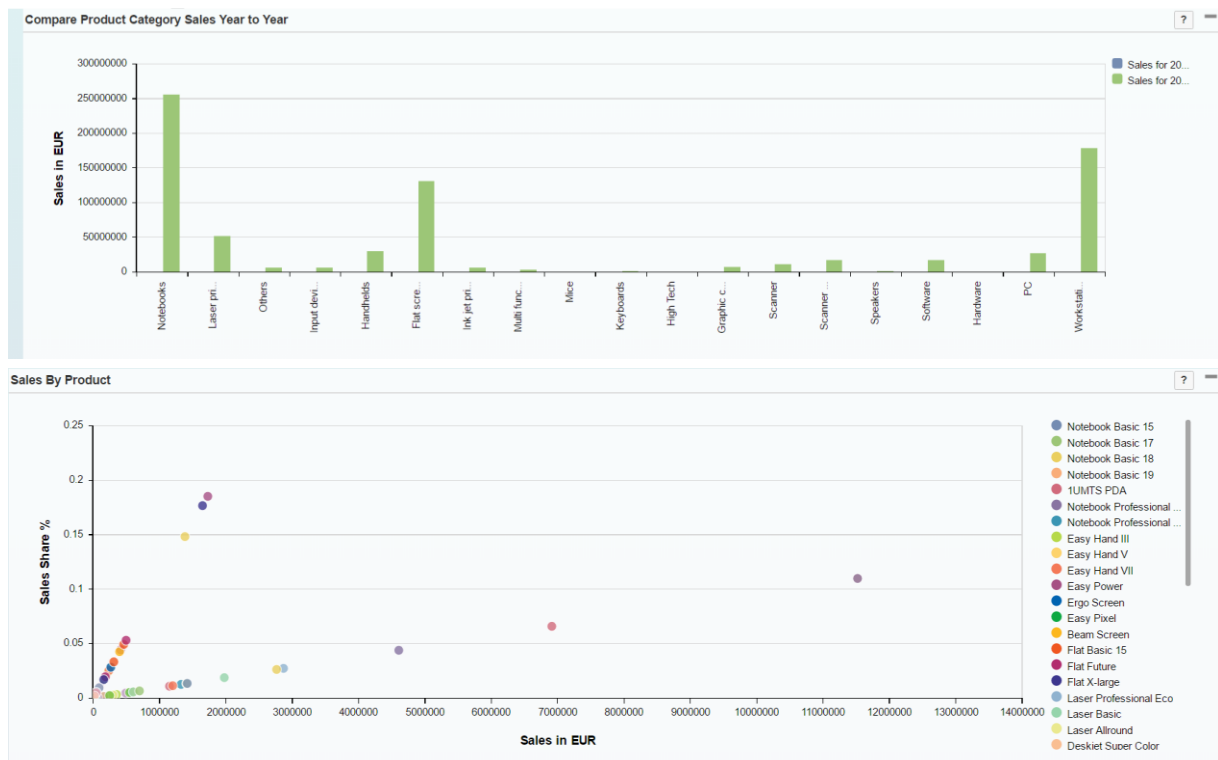


- Find the discount for the companies across a region based on the amount of sales, sales ranking, amount of orders, and order rankings



Product Reports Tab:

- The charts *Compare Product Category Sales Year to Year* and *Sales by Products* are displayed



Details Tab:

- View the list of sales orders and choose a particular order to see the *General Data* and *Sales Order* items related to it, displayed in separate tabs
- Perform operations such as searching for sales orders based on various attributes, including *Company Name*, *Product ID*, and so on
- Create a new sales order
- Delete an existing sales order

OVERVIEW PRODUCT REPORTS DETAILS

Sales Orders (11,029)

New	Refresh	Delete	Send Email					?
Sales Order ID	Partner ID	Company	City	Gross Amount	Tax Amount	Currency		
500011028	100000038	Bionic Research...	Bühl	11379.97	1816.97	EUR		
500011027	100000037	PicoBit	New York City	411.50	65.70	EUR		
500011026	100000042	Siwusha	Shanghai	521.22	83.22	EUR		
500011025	100000036	African Gold An...	Johannesburg	114.24	18.24	EUR		
500011024	100000044	Sorali	Karlsruhe	113032.74	18047.24	EUR		
500011023	100000043	Danish Fish Tra...	Kopenhagen	6543.80	1044.80	EUR		
500011022	100000038	Bionic Research...	Bühl	871.55	139.15	EUR		
500011021	100000036	African Gold An...	Johannesburg	178.14	28.44	EUR		
500011020	100000041	South American ...	Cordoba	803.25	128.25	EUR		
500011019	100000042	Siwusha	Shanghai	530.62	84.72	EUR		

⏪ < 1 2 3 4 5 > ⏩

Sales Order Items

Sales Order...	Product	Product Name	Quantity	Quantity Unit	Net Amount	Tax Amount	Currency
30	HT-1106	Smart Firewall	1.000	EA	34.00	6.46	EUR
10	HT-1104	Smart Games	3.000	EA	165.00	31.35	EUR
20	HT-1105	Smart Internet ...	3.000	EA	87.00	16.53	EUR
40	HT-1107	Smart Money	2.000	EA	59.80	11.36	EUR

7.6 Spatial



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Spatial data is data that describes the position, shape, and orientation of objects in a defined space. Spatial data is represented as 2-dimensional (2D) geometries in the form of points, line strings, and polygons.

Two common operations performed on spatial data are calculating the distance between geometries, and determining the union or intersection of multiple objects. These calculations are performed using predicates such as intersects, contains, and crosses. The spatial data documentation assumes you already have some familiarity with spatial reference systems and with the spatial data you intend to work with. The software provides storage and data management features for spatial data, allowing you to store information such as geographic locations, routing information, and shape data. These pieces of information are stored as points and various forms of polygons and lines in columns defined with a corresponding spatial data type (such as `ST_Point` and `ST_Polygon`). You use methods and constructors to access and manipulate the spatial data. The software also provides a set of SQL spatial functions designed for compatibility with other products.

Spatial data support allows you to associate spatial information with your data. For example, a table representing companies could store the location of the company as a point, or it could store the delivery area for the company as a polygon. This could be represented in SQL as:

```
SELECT * FROM Locations WHERE DeliveryArea.ST_Contains( new ST_POINT(1,1) ) = 1
```

7.6.1 Spatial Demo

Obtain Your Authorization Key from Nokia

Use Nokia HERE maps as a showcase for this demo scenario. Nokia HERE maps APIs require some authorization that you can obtain after you register from their Web site. You need to obtain the *App_Id* and *App_Code* for an Evaluation Key to perform the tasks in this scenario successfully.

1. Use the following URL to obtain the *Evaluation Key*.
<http://developer.here.com/get-started>
2. Look for "Free Trial" or select a specific plan suiting your requirements.
3. Follow the instructions on the Web page.
4. Make a note of the *App_Id* and *App_Code* for later use.

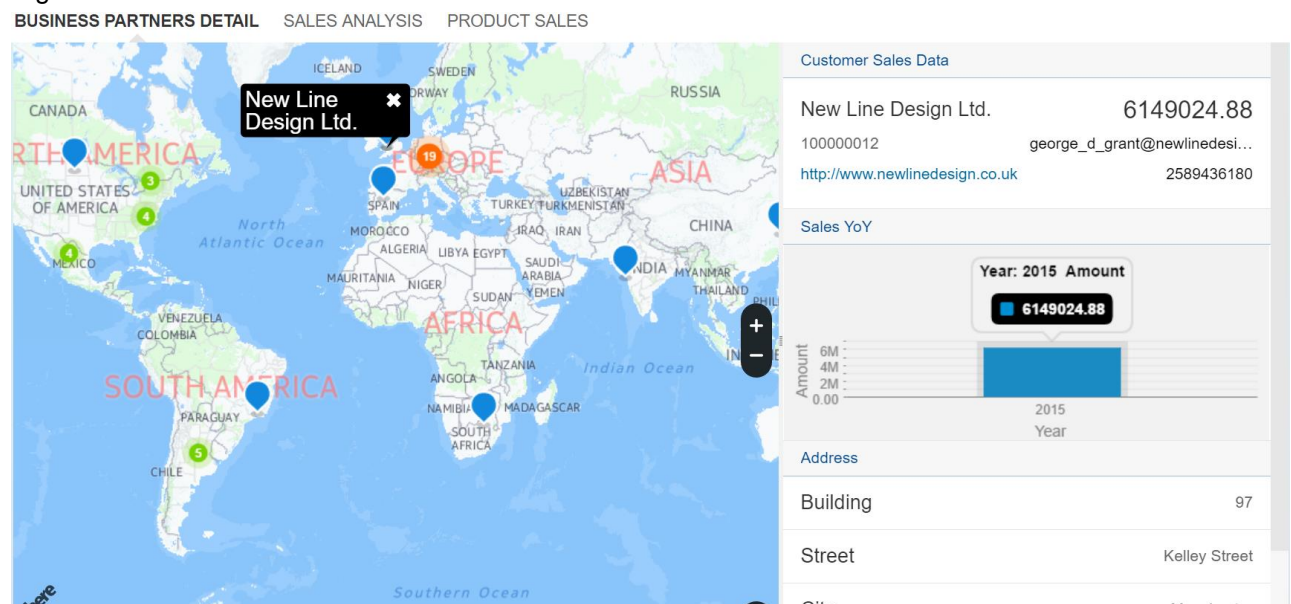
7.6.2 Spatial Query Used

The spatial query uses Business Partner data from the "MD.BusinessPartner" table in SHINE master data. The addresses are stored in the "MD.Addresses" table.

The Addresses table has been modified to include latitude and longitude information for each address.

Using the geographical (Geo) information, all the business partners are plotted on the world map.

Additionally, the address data is used with the clustering feature to provide an overview of partners in a region.



Sales Analysis Scenario

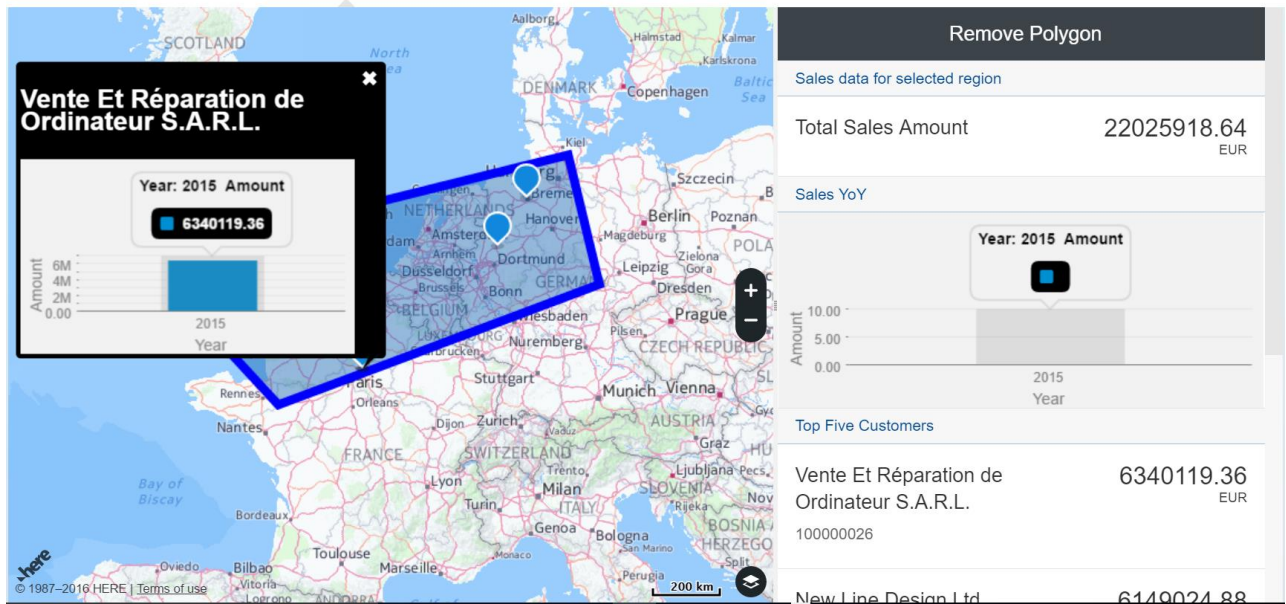
Use the Geo information to perform simple analysis over a particular region.

In this scenario you can use the boundaries provided by the Nokia map that you select or you can mark the points that you want to see and create a polygon on that map. Using these boundaries, you can calculate the business partners that lie within this area with a select statement, for example:

```
select STREET, NEW ST_Point(LATITUDE, LONGITUDE).ST_Within( NEW
ST_Polygon('Polygon((0.0 0.0,90.0 0.0, 90.0 90.0, 0.0 90.0, 0.0 0.0))') ) AS
IS_INSIDE from "MD.Addresses"
```

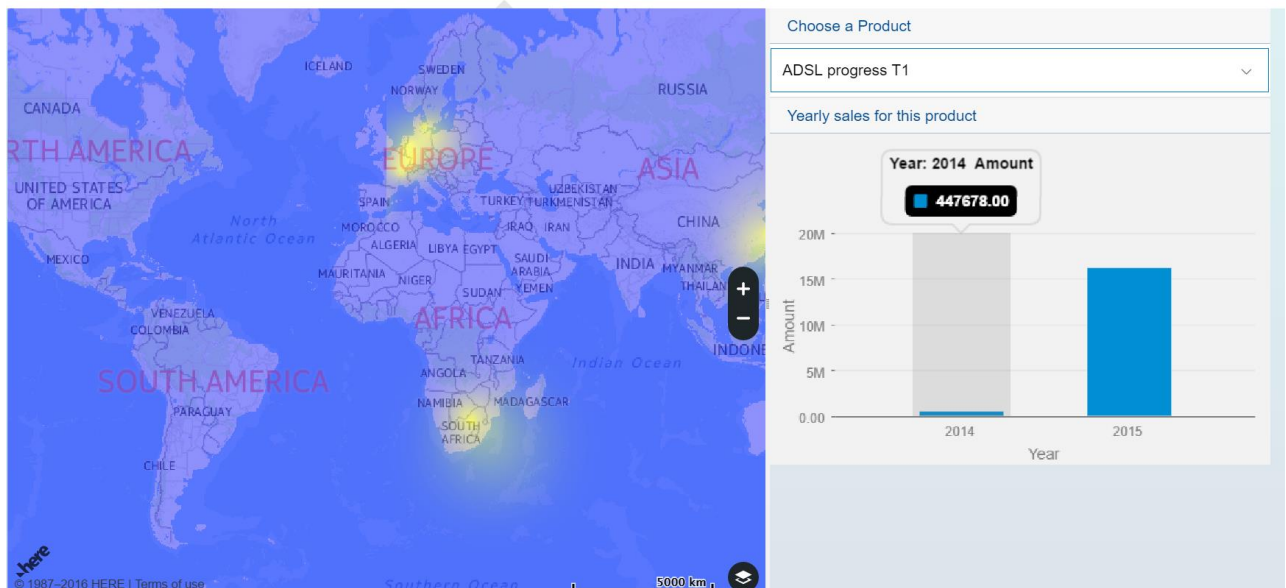
Subsequently, use the `REGION_SALES_BP` analytical model to find the sales data for this region.

Additionally, you can query the top five customers in this region. The results appear as shown in the following screen shot.



HeatMap Scenario

In this scenario, you plot the sales of the products around the world with the weight of their quantities sold. This allows you to plot a heatmap and see the areas where a particular product is sold more. The analysis is done through the `PRODUCT_SALES` analytic view, which links `Addresses`, `Sales Order Header` and `Sales Order Items` table with the `Products` table. By doing this, you can map the location for a Sales Order Item and the quantity sold. The following image provides an example of this.



8 FAQ

1. SHINE installation fails with the message:
SHINE version is already installed or cannot be downgraded.

Reinstall SHINE with the **ALLOW_SAME_ORIGIN** or **ALLOW_SC_DOWNGRADE** flag respectively.

```
xs install XSACSHINE01_<version.no>.ZIP -e sap-xsac-shine-1.4.xx.mtaext -o
ALLOW_SC_SAME_VERSION

xs install XSACSHINE01_<version.no>.ZIP -e sap-xsac-shine-1.4.xx.mtaext -o
ALLOW_SC_DOWNGRADE
```

2. If the SHINE installation fails with the message:
String is too Short (0 chars), minimum 1

Install the latest version of XSAC_PORTAL_SERVICES and reinstall SHINE.

```
3/9/17 8:03:18.331 AM [APP/1-0] SYS #2.0#2017 03 09 08:03:18:331#00:00#INFO/toggles.js#####PLAIN#Send request for toggles to: https://mo-2fb6625be.mo.sap.corp:51011/v1/toggles#
3/9/17 8:03:18.407 AM [APP/1-0] SYS #2.0#2017 03 09 08:03:18:406#00:00#INFO/server.js#####PLAIN#toggles: {}#
3/9/17 8:03:18.423 AM [APP/1-0] SYS #2.0#2017 03 09 08:03:18:423#00:00#INFO/server.js#####PLAIN#
3/9/17 8:03:18.423 AM [APP/1-0] SYS Starting server ...
3/9/17 8:03:18.423 AM [APP/1-0] SYS =====
3/9/17 8:03:18.423 AM [APP/1-0] SYS #
3/9/17 8:03:18.424 AM [APP/1-0] SYS #2.0#2017 03 09 08:03:18:424#00:00#INFO/server.js#####PLAIN#Support independent app toggle: undefined#
3/9/17 8:03:18.446 AM [APP/1-0] SYS #2.0#2017 03 09 08:03:18:446#00:00#INFO/approuter.js#####PLAIN#Application router version 2.6.1#
3/9/17 8:03:18.456 AM [APP/1-0] ERR /usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/utils/
JsonValidator.js:30
3/9/17 8:03:18.457 AM [APP/1-0] ERR throw new VError('%s: %s',
3/9/17 8:03:18.457 AM [APP/1-0] ERR at Object.load (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
3/9/17 8:03:18.457 AM [APP/1-0] ERR VError: environment-destinations/4/url: String is too short (0 chars), minimum 1
3/9/17 8:03:18.457 AM [APP/1-0] ERR at JsonValidator.validate (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
3/9/17 8:03:18.457 AM [APP/1-0] ERR at Object.validateEnvDestinations (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
3/9/17 8:03:18.457 AM [APP/1-0] ERR at loadDestinations (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
3/9/17 8:03:18.457 AM [APP/1-0] ERR at Object.load (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
3/9/17 8:03:18.457 AM [APP/1-0] ERR at Object.module.exports.load (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
3/9/17 8:03:18.457 AM [APP/1-0] ERR at bootstrap (/usr/sap/hana/shared/XSA/xs/app_working/mo-2fb6625be.mo.sap.corp/executionroot/ee342e8c-608a-4e10-884a-6d6c7d6dcb94/app/node_modules/@sap/approuter/lib/
```

3. If the SHINE installation message fails with the message,
Error resolving merged descriptor properties and parameters: No configuration entries were found matching the filter specified in resource "sapui5-provider"

Install SAPUI5_FESV3 version 1.44.8 and reinstall SHINE.

```
validating and merging descriptors...
Detecting deployed MTA...
Deployed MTA detected
Collecting system parameters...
Deployed MTA version: 1.3.0
New MTA version: 1.3.0
Resolving properties and parameters in merged descriptor...
Error resolving merged descriptor properties and parameters: No configuration entries were found matching the filter specified in resource "sapui5-provider"
----- deploy service END -----
Error resolving merged descriptor properties and parameters: No configuration entries were found matching the filter specified in resource "sapui5-provider"
Error resolving merged descriptor properties and parameters: No configuration entries were found matching the filter specified in resource "sapui5-provider"
Installation of the component XSAC SHINE (sap.com) 1.3.0 failed during deployment.
Deployment of the MTA XSAC SHINE 1.3.0 failed. Check SAP release information note [No release note provided] and analyze the issue. In case you need help, contact SAP support using the SAP component [No SAP component provided]
Installation of archive file(s) 'XSACSHINE03_0.ZIP' failed.
To see installation logs execute 'xs display-installation-logs 15737 -scv'.
com.sap.lm.sl.alm.core.monitor.ProcessException: Error resolving merged descriptor properties and parameters: No configuration entries were found matching the filter specified in resource "sapui5-provider"
Installation of the component XSAC SHINE (sap.com) 1.3.0 failed during deployment.
Deployment of the MTA XSAC SHINE 1.3.0 failed. Check SAP release information note [No release note provided] and analyze the issue. In case you need help, contact SAP support using the SAP component [No SAP component provided]
xsadm@mo-h4e59c772:/home/1302582/shine/assembly/target: █
```

4. While deploying SHINE using SAP WebIDE for SAP HANA, if the build of any module fails with the error message that looks like:

No compatible version found: @sap/jobs-client@1.1.1

Then open the package.json of the module which failed and change the version of the library shown in the error message to one of the correct versions also mentioned in the error message.

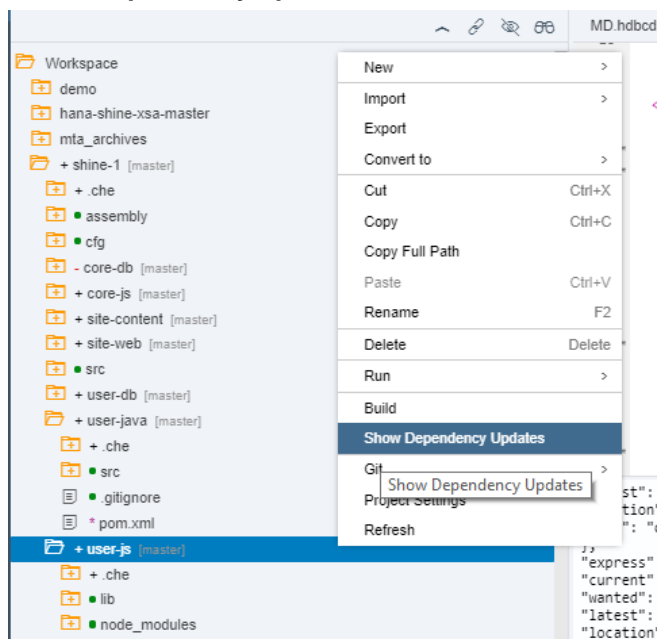
```
2:38:10 PM (DIBuild)
npm ERR! notarget No compatible version found: @sap/jobs-client@1.1.1
npm ERR! notarget Valid install targets:
npm ERR! notarget 1.1.0 Valid Version
npm ERR! notarget
npm ERR! notarget This is most likely not a problem with npm itself.
npm ERR! notarget In most cases you or one of your dependencies are requesting
npm ERR! notarget a package version that doesn't exist.
npm ERR! notarget
npm ERR! notarget It was specified as a dependency of 'user-js'
npm ERR! notarget
```

For example, in the above case the version of library @sap/jobs-client must be changed from 1.1.1 to 1.1.0.

```
npm ERR! notarget No compatible version found: express@4.14.1
npm ERR! notarget Valid install targets:
npm ERR! notarget 4.15.2, 4.14.0, 4.12.3
npm ERR! notarget
npm ERR! notarget This is most likely not a problem with npm itself.
npm ERR! notarget In most cases you or one of your dependencies are requesting
npm ERR! notarget a package version that doesn't exist.
npm ERR! notarget
npm ERR! notarget It was specified as a dependency of 'shine-core-js-backend'
npm ERR! notarget
```

In this case, the version of express should be changed from 4.14.1 to either 4.15.2 or 4.14.0 or 4.12.3.

You can also check the compatible versions of the libraries by right-clicking on the module and selecting **"Show dependency updates"**



For a nodejs module the dependencies will be shown like below:

```
5:18:44 PM (DIBuild) [INFO] Injecting source code into builder...
[INFO] Source code injection finished
[INFO] -----
cache found, retrieving node modules from cache
```

```
5:18:46 PM (DIBuild) "async": {
  "current": "1.4.0",
  "wanted": "1.4.0",
  "latest": "2.4.0",
  "location": "node_modules/async",
  "type": "dependencies"
},
"body-parser": {
  "current": "1.13.2",
  "wanted": "1.13.2",
  "latest": "1.17.1",
  "location": "node_modules/body-parser",
  "type": "dependencies"
},
"express": {
  "current": "4.14.0",
  "wanted": "4.14.0",
  "latest": "4.15.2",
```

For a java module the dependencies will be displayed as follows:

```
[INFO]
[INFO] --- versions-maven-plugin:2.4:display-dependency-updates (default-cli) @ sap-xsac-shine-user-java ---
[INFO] The following dependencies in Dependencies have newer versions:
[INFO] com.sap.gateway.v4.rt:com.sap.gateway.v4.rt.api ..... 1.2.1 -> 1.2.2
[INFO] com.sap.gateway.v4.rt:com.sap.gateway.v4.rt.cds ..... 1.2.1 -> 1.2.2
[INFO] com.sap.gateway.v4.rt:com.sap.gateway.v4.rt.core ..... 1.2.1 -> 1.2.2
[INFO] com.sap.gateway.v4.rt:com.sap.gateway.v4.rt.core.web ...
[INFO] 1.2.1 -> 1.2.2
[INFO] com.sap.gateway.v4.rt:com.sap.gateway.v4.rt.jdbc ..... 1.2.1 -> 1.2.2
[INFO] com.sap.gateway.v4.rt:com.sap.gateway.v4.rt.xsa ..... 1.2.1 -> 1.2.2
[INFO] javax.servlet:javax.servlet-api ..... 3.0.1 -> 4.0.0-b07
[INFO] org.slf4j:slf4j-simple ..... 1.7.7 -> 1.8.0-alpha2
[INFO]
```

More Information

[SAP HANA Developer Guide \(for SAP HANA XS Advanced Model\)](#)

[SAP HANA Application Lifecycle Management Guide](#)

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