



SAP *Fiori*

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About the Tutorial

SAP Fiori is a new user experience (UX) for SAP software and applications. It provides a set of applications that are used in regular business functions like work approvals, financial apps, calculation apps and various self-service apps. SAP Fiori provides 300+ role-based applications like HR, Manufacturing, Finance, etc.

SAP Fiori enables multiple device applications that allow users to start a process on their desktop/laptops and to continue that process on a smartphone or on a tablet. SAP has developed Fiori Apps based on User Interface UI5.

Audience

This tutorial is primarily meant for application developers, solution consultants, presales consultants and system administrators, who work on SAP HANA and are required to create scalable, secure and portable database-driven web-based applications.

Prerequisites

Before you start proceeding with this tutorial, we are assuming that you have a basic understanding of business processes typically addressed in solutions like SAP ERP, SAP CRM, and SAP SCM. A basic programming knowledge including HTML / JavaScript / SAPUI5 is also equally important.

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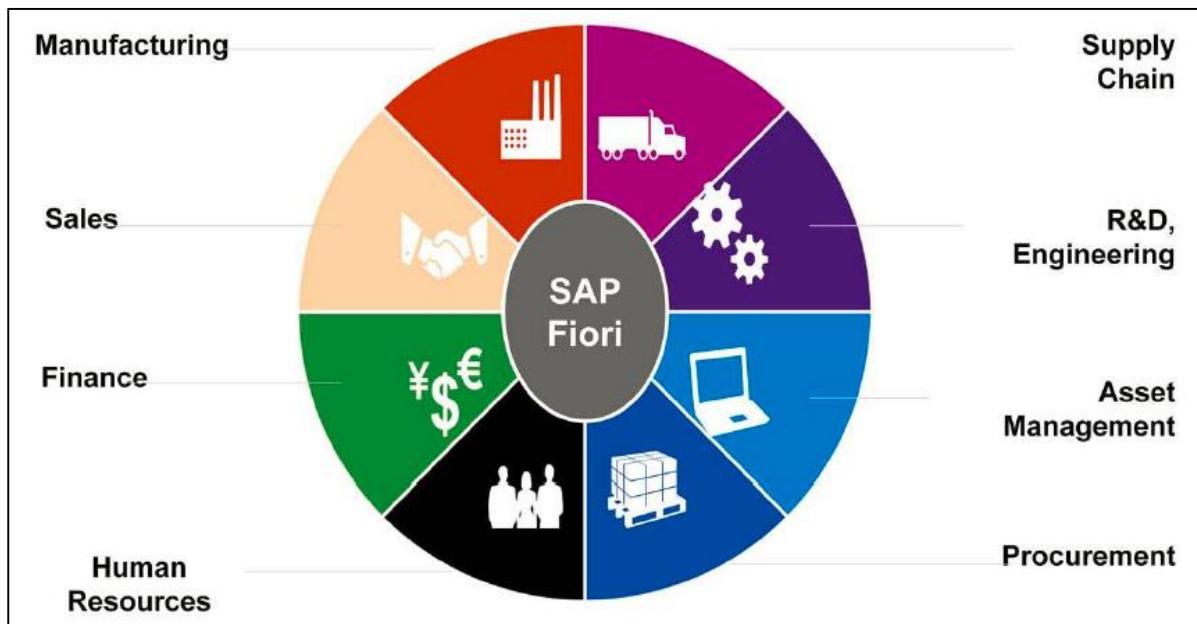
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1. SAP Fiori – Introduction

SAP Fiori is a new user experience (UX) for SAP software and applications. It provides a set of applications that are used in regular business functions like work approvals, financial apps, calculation apps and various self-service apps.

SAP Fiori provides 300+ role-based applications like HR, Manufacturing, finance, etc. When you open the SAP Fiori home page application, you will see a picture of the flowers. It is because Fiori means 'flowers' in Italian.



SAP Fiori provides all business roles in real time on compatible hand devices. It offers business roles on easy to use functions, simple with unmatched responsiveness on desktop, smartphones and Tablets.

SAP Fiori enables multiple device applications that allow users to start a process on their desktop/laptops and to continue that process on a smartphone or on a tablet. SAP has developed Fiori Apps based on User interface UI5.



When SAP Fiori is combined with the power of the SAP HANA, it provides an unmatched application response and query-execution time. SAP Fiori user experience (UX) is used to provide a personalized and role-based user experience for enterprise-wide engagement across lines of business.

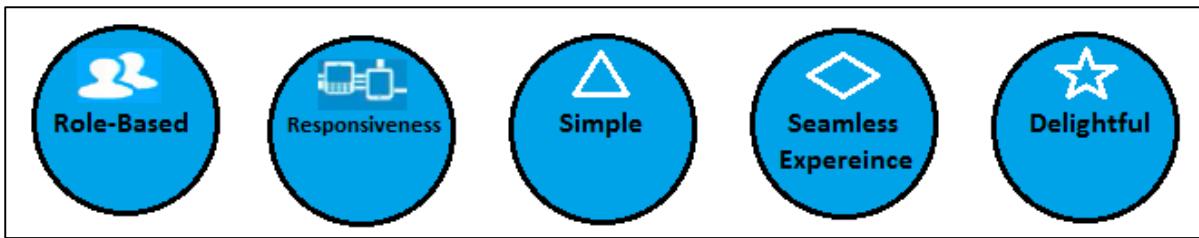
How SAP Fiori was born?

When a research was conducted, it was found that most of the SAP users use **SAP User Interface** to access the applications. These included common applications related to Manager-employee interactions such as leave request, travel request, etc. These GUI had more than 300,000 screens with various functions in it. SAP checked the most frequently used application and then decided to renew these applications. This is how SAP Fiori was born.

SAP Fiori Design Principles

There are five design principles for **SAP Fiori UI5**. These principles make SAP Fiori simple and decompose the different transactions into simple task based UI applications.

- **Role-Based** – SAP has decomposed various SAP transactions and changed them into beautiful user interactive applications that show only most relevant information to the users.
- **Responsiveness** – When SAP Fiori is combined with the power of SAP HANA, it provides an unmatched application response and query executions time.
- **Simple** – To make SAP Fiori simple to match the user demand, SAP has designed it as a **1-1-3** scenario. This means 1 user, 1 use case and 3 screens.
- **Seamless Experience** – SAP has provided all the Fiori apps based on the same language and it does not matter on the deployment and platform.
- **Delightful** – SAP Fiori was designed to work with **ECC 6.0** to make it easy for the users and to deploy on the existing SAP system.



SAP Fiori Apps

SAP Fiori apps are divided into three categories. They are distinguished on the basis of their function and infrastructure requirement.

- Transactional Apps
- Fact sheets
- Analytical Apps

Transactional Apps

The most important features of Transactional Apps are:

- The first release of SAP Fiori included 25 transactional apps.
- Transactional apps in SAP Fiori are used to perform transactional tasks like a manager-employee transactions such as leave request, travel requests, etc.
- Transactional Apps run best on SAP HANA database but can be deployed with any database with acceptable performance. These apps allow a user to run simple SAP transactions on the mobile devices as well as desktop or laptops.

Example: Leave Request, Travel Request, Purchase Order.

Fact sheets

The important features of a Fact sheet are given below.

- Fact sheets are used to drill the key information and contextual information in business operations. In SAP Fiori tiles, you can drill down to further details.
- It also allows you to navigate one-fact sheet to all its related fact sheets.
- Fact sheets also allow you to navigate to **Transactional apps** to run SAP transactions. A few Fact sheets also provide an integration option of geographical maps.
- You can call Fact sheets from Fiori Launchpad search results, from other fact sheets or from Transactional or Analytical apps.
- Fact sheets only run on SAP HANA database and also require an ABAP stack and they cannot be ported to SAP HANA Live tier-2 architecture.

Example: There is a fact sheet app with the center objects having details about vendor contract. You can drill down to further details like vendor details, contract terms, item details, etc.

Analytical Apps

Analytical apps are used to provide role-based real time information about the business operations. Analytical apps integrate the power of SAP HANA with SAP business suite. It provides real time information from large volume of data in front-end web browser.

Using Analytical apps, you can closely monitor Key Performance indicators KPIs. You can perform complex aggregations and calculations of your business operations and react immediately as per the changes in the market condition.

SAP Fiori Analytical apps run on SAP HANA database and use Virtual data models.

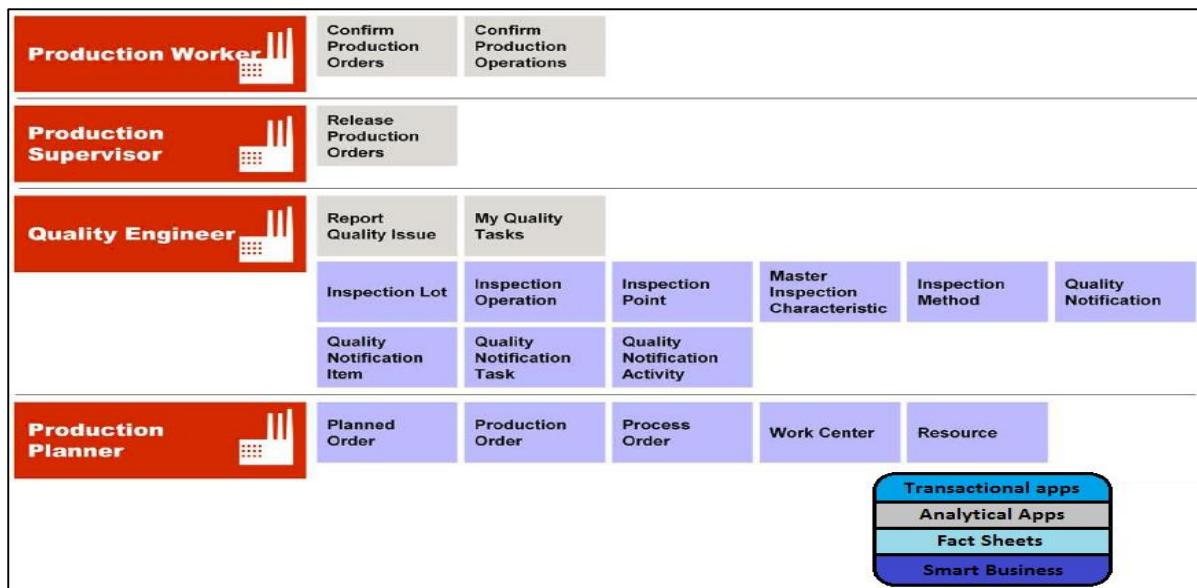
Examples

Controller	¥ \$ €	Activity Type	Statistical Key Figure	Controlling Document	Cost Center	Cost Center Group	Cost Element
		Cost Element Group	Customer Accounting Document	Profit Center	Internal Order		
G/L Accountant	¥ \$ €	Fixed Asset	G/L Account	G/L Accounting Document			Transactional
Accounts Payable Accountant	¥ \$ €	Supplier Accounting Document					Analytical
							Factsheet
							SAP Smart Business

SAP Fiori Apps for Finance

Employee		My Leave Requests	My Timesheet	My Paystubs	My Benefits
Manager		Approve Leave Requests	Approve Timesheets		

SAP Fiori Apps for Human Resource



SAP Fiori Apps for Manufacturing

SAP UX Strategy

User Experience (UX) is basically, about an overall experience that a person has while using any product, a website or an application. The application may be on either a mobile device, tablet or a desktop or laptop. User Experience should be simple to use so that the users can achieve their goals easily and interact with SAP system.

User Experience comprises of right balance of technology, business needs and desirability.

UX strategy is basically about the following three design principles:

- Technology
- Business
- Human Values

SAP UX strategy consists of three components:

- **New:** New provides a consumer grid user experience for the new applications i.e. all the applications, which are yet to be built.
- **Renew:** Renew is applied to the existing applications.
- **Enable:** Enable is to provide a customer an ability to improve user experience of any SAP software to allow them to decide which business scenario is critical for them.

Prerequisites to Learn SAP Fiori

The following are the requirements for learning **SAP Fiori**:

- ABAP program and objects
- HTML5

- JavaScript
- SAP UI5
- ERP Implementation experience
- OData and SAP NetWeaver Gateway
- SAP HANA

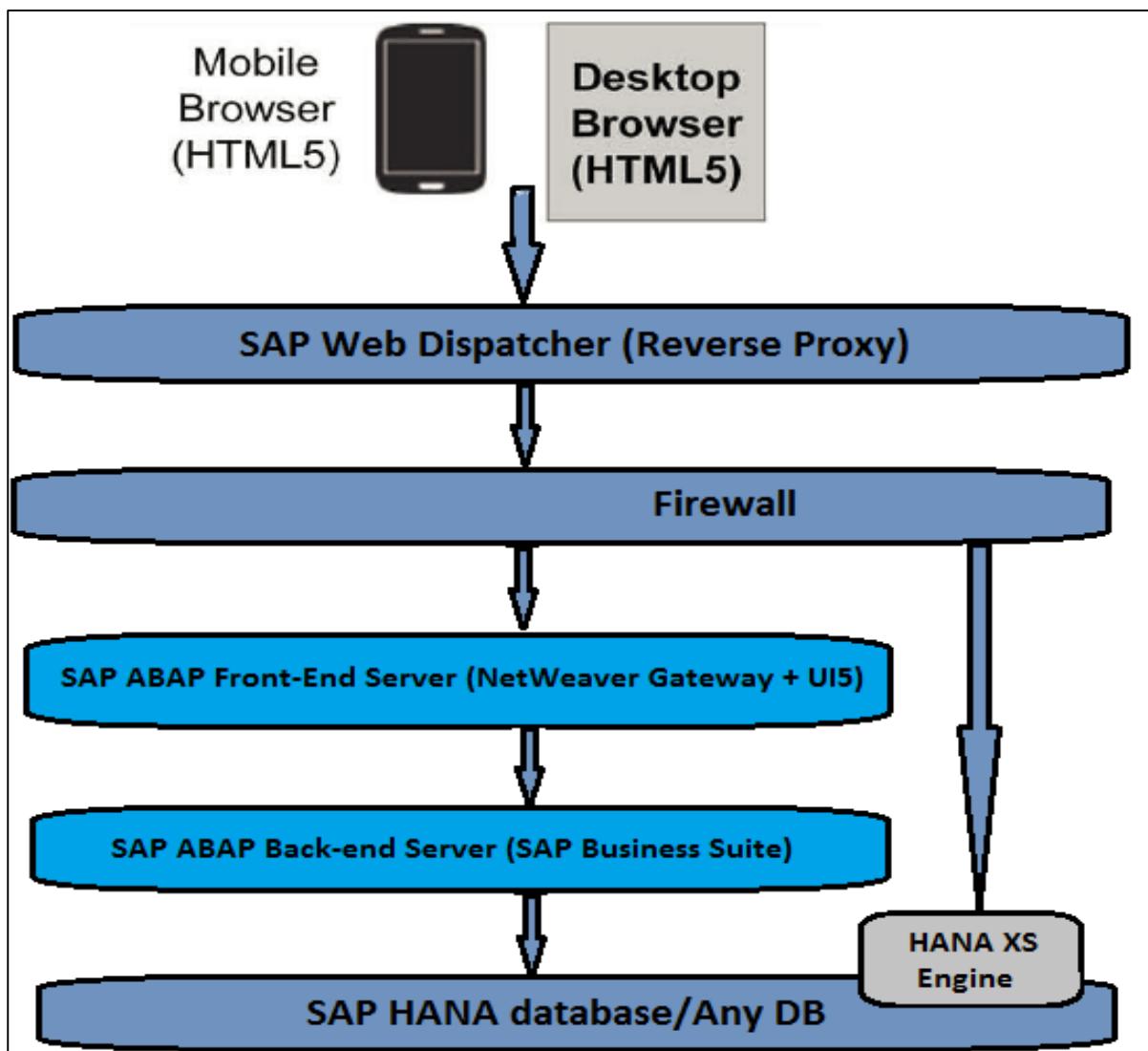
2. SAP Fiori – Architecture

The key components in high-level landscape of SAP Fiori architecture are given below.

SAP Web Dispatcher (Reverse Proxy)

SAP Web dispatcher is the first point of contact in SAP Fiori architecture for end users. This handles all web browser requests from end users via mobile devices or laptops.

It is an entry point for all HTTP/HTTPS requests and defines if a system has to accept or reject the requests and the server where request should go. It can reject or accept connection to SAP Fiori system.



Transactional apps can run on any database but Fact sheets and Analytical apps requires SAP HANA database to run.

SAP ABAP Front-End Server

SAP ABAP front-end server contains all the UI components of Fiori system and NetWeaver gateway. These UI components consist of central UI add on, SAP UI5 control library and SAP Fiori Launchpad. It also contains product specific UI. Add-ons contain UI development for respective business suite such as ERP, SCM, SD, MM, etc.

SAP NetWeaver Gateway is used to setup a connection between SAP business suite and target clients, platforms and framework. It offers development and generation tools to create **OData** services to different client development tools.

SAP ABAP Back-End Server

SAP ABAP Back-End Server is used to contain the business logic and the back-end data. Search model for fact sheets and SAP business suite is contained in ABAP back-end server.

SAP HANA database and HANA XS Engine

HANA XS engine is used to run all analytical apps in SAP Fiori. It contains Fiori app content and virtual data-model reuse content, which is provided through SAP HANA Live.

HANA XS Engine consists of two components:

- HANA Live App content for Business suite.
- Smart Business component with KPI Modeler.

HANA Live content contains VDM reuse content, which can be used for extensibility purpose.

Notes:

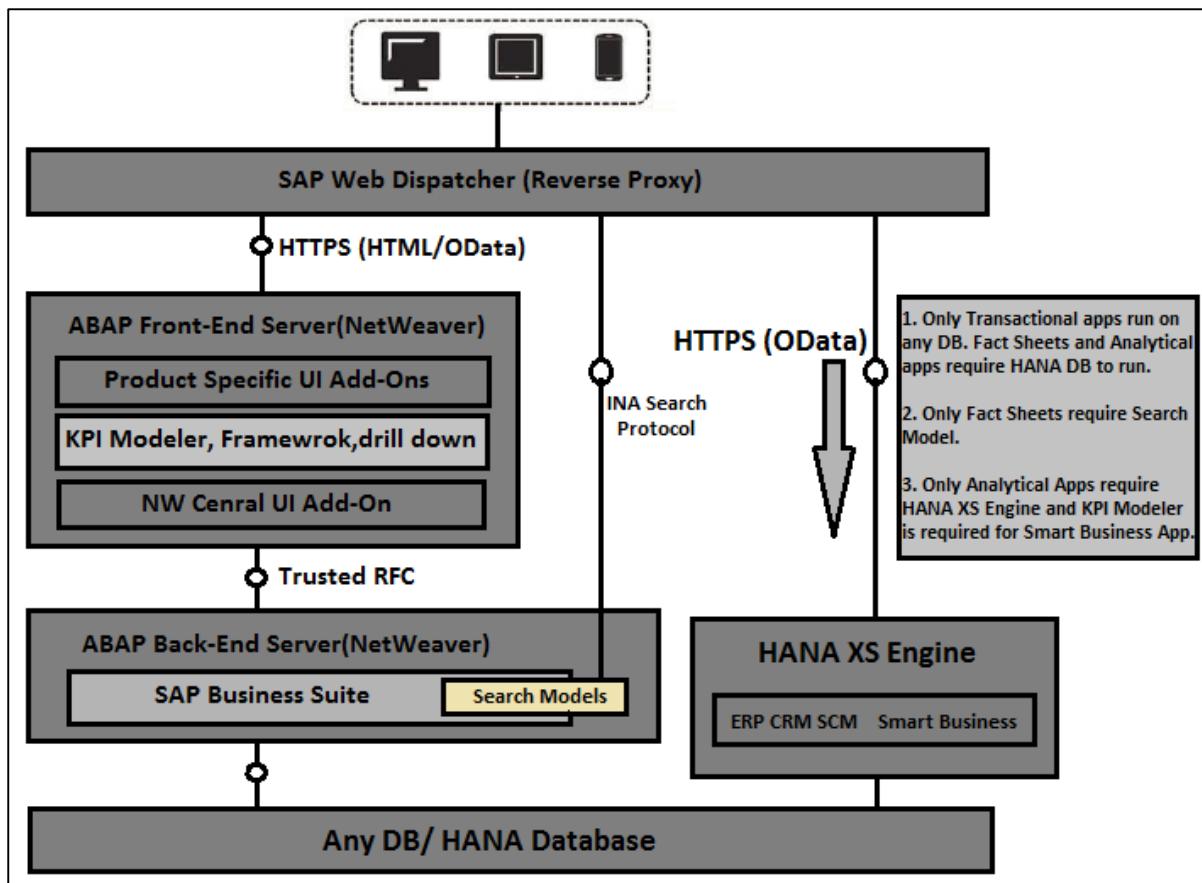
- Transactional apps in SAP Fiori does not necessarily require SAP HANA database to run and can run on any database.
- Fact **Sheets, Analytical apps and Smart Business** run only on SAP HANA database with no exceptions allowed.
- HANA is required for search model function of Fact Sheets to work.
- The data requested in Fact Sheets via search models is directly pulled from HANA database.

SAP Fiori Architecture: App Types

SAP Fiori apps are divided into three categories. They are distinguished on the basis of their function and infrastructure requirement.

As mentioned earlier, Transactional apps in SAP Fiori does not necessarily require SAP HANA database to run and can run on any database. Fact Sheets, Analytical apps and Smart Business run only on SAP HANA database with no exceptions.

The picture given below shows SAP Fiori Architecture for SAP Fiori different apps types.



Fact Sheets require Search models to perform search capability in Fiori Apps. Fact sheets are used to drill the key information and contextual information in business operations. In SAP Fiori tiles, you can drill down to further details. It also allows you to navigate from one fact sheets to all its related fact sheets.

Analytical apps and Smart Business apps data come from HANA database through HANA XS Engine.

HANA Live content contains Virtual Data Model reuse content, which can be used for extensibility purpose.

The user places request via Web browser using HTTPS. Trusted RFC is used to communicate between ABAP Front-End and Back-End server.

Hardware and Software Requirements

While installing and configuring SAP Fiori apps system, it is suggested to check the minimum hardware and software requirement to install different components as per Fiori apps requirement.

It is important to understand the concept of UI Add-Ons and NetWeaver Gateway, support packs, which are installed on ABAP Front-End server. The central UI Add-Ons are required for SAP UI5 control library and Launchpad. **NetWeaver Gateway** is used to set up the connection to back-end server by creating **OData** service.

- If you install **NW 7.4** for Front-end server, all central UI Add-Ons and Gateway components are part of that installation.

- If you install **NW 7.31 SPS04** for Front-End server, central UI Add-Ons and Gateway components have to be installed separately.

Product Version	Required SAP NW Gateway Installation	Components automatically installed with SAP NW Gateway
EHP3 FOR SAP NETWEAVER 7.0 (AS ABAP)	SAP NETWEAVER GATEWAY 2.0 SPS07 (Gateway Server Core NW 703/731) If you wish to install "Approval Requests" apps, you additionally have to install: SAP NETWEAVER GATEWAY 2.0 SPS07 > SAP IW PGW 100	GW_CORE 200 SAP IW FND 250 SAP WEB UIF 731 IW_BEP 200
SAP NETWEAVER 7.4 (AS ABAP), SAP NETWEAVER 7.4 FOR SUITE (AS ABAP)	All required components are included in the SAP NetWeaver installation (SAP_GWFND) If you wish to install "Approval Requests" apps, you additionally have to install: SAP NETWEAVER GATEWAY 2.0 SPS07 > SAP IW PGW 100	

SAP NW Installation Prerequisites

The minimum hardware requirements for SAP NetWeaver Gateway front-end server are as follows:

Requirements	Specification
Processor	Dual Core(2 logical CPUs) or higher, 2 GHz or higher
Random Access Memory (RAM)	8 GB or higher
Hard Disk Capacity	80 GB primary, or higher

HANA 1.0 database requirement is only for Fact Sheets and Analytical Apps.

HANA Live is included with suite on HANA but it is made available as separate package to be installed. SAP HANA Live uses the integrated scenario means **SAP HANA Live** shares a **SAP HANA Appliance** with the **Business suite**.

SAP HANA Live for SAP ERP

Product	SAP HANA Live for SAP ERP
Release	1.0, SPS10
Software Component	HCO_HBA_ECC
Based On	SAP HANA appliance software SPS 08 or higher
Documentation Published	April 2015

You install this software component as an add-on for SAP HANA. The SAP HANA appliance software comes pre-installed on a specific appliance hardware system delivered in conjunction with leading SAP hardware partners.

System Landscape requirement for SAP Fiori

System Landscape requirement for SAP Fiori are summarized in the table given below.

Server & Database	Platform & Add-On	Component
Front-End App Server		
NetWeaver Gateway (NW GW) Server	SAP NetWeaver 7.31 (AS ABAP) SPS04 or higher	<ul style="list-style-type: none"> SAP NW GW 2.0 including the following components & SPs: <ul style="list-style-type: none"> Gateway Server Core NW 703/731 > Components: GW_CORE 200, SAP IW FND 250, SAP WEB UIF 731 (SP06) Gateway PGW > Components: SAP IW BEP 200 (SP06). For "Approve Requests" app, also need SAP IW PGW 100 (SP03) All required core NW GW components are included in the SAP NetWeaver installation (SAP_GWFND) For "Approve Requests" app, also need SAP IW PGW 100 (SP03)
NW Central UI Add-On	SAP NetWeaver 7.31 (AS ABAP) SPS04 or higher SAP NetWeaver 7.4 (AS ABAP) SPS04 or higher	<ul style="list-style-type: none"> UI ADD-ON 1.0 FOR NW 7.03 (Minimum SPS 06) Included in NW 7.4 installation. No separate installation needed.
Respective Business Suite – UI Add-On:	SAP ERP SAP SCM SAP CRM SAP SRM SAP GRC SAP PPM (Portfolio & Project Mgmt.)	<ul style="list-style-type: none"> UI FOR EhP7 FOR SAP ERP 6.0 (For principal apps for SAP ERP 1.0, install separate product-specific add-ons.) SAP SNC USABILITY 1.0 UI FOR EhP3 FOR SAP CRM 7.0 UI FOR EhP3 FOR SAP SRM 7.0 (For principal apps for SAP SRM 1.0, install separate product-specific add-ons.) UI FOR SAP ACCESS CONTROL 10.1 UI FOR SAP PPM 6.0
Back-End Business Suite Server	SAP NetWeaver 7.4 (AS ABAP) SPS04 or higher	<ul style="list-style-type: none"> All required core NW GW components are included in the SAP NetWeaver installation. (SAP_GWFND)
Respective Business Suite – Add-On:	SAP ERP SAP SCM SAP CRM SAP SRM SAP PPM (Portfolio & Project Mgmt.) SAP GRC AC	<ul style="list-style-type: none"> EhP7 FOR SAP ERP 6.0 SP02 (For principal apps for SAP ERP 1.0, not required. Install app-specific add-ons delivered for these apps.) EhP3 FOR SAP SCM 7.0 SP02 EhP3 FOR SAP CRM 7.0 SP02 EhP3 FOR SAP SRM 7.0 SP02 (For principal apps for SAP SRM 1.0, not required. Install app-specific add-ons delivered for these apps.) SAP PPM 6.0 SP01 Access Control 10.1 SP03 (Integrated), AC 10.0 SP10 (Side by Side)
Database	HANA 1.0	SPS 6 Revision 69 or higher Smart Business, VDM for ERP,SRM,CRM,SCM,PPM,GRC

3. SAP Fiori – SAP NetWeaver Gateway

SAP **NetWeaver Gateway** is used to setup a connection between SAP business suite and target clients, platforms and framework. It offers development and generation tools to create **OData** services to different client development tools.

SAP NetWeaver gateway provides an easier way for the consumption on business logic and content for SAP Back-end system on web applications. It also reduces the complexity to access SAP data and provides easy interfaces to decrease the development time.

SAP NetWeaver Gateway: Capabilities and Key Benefits

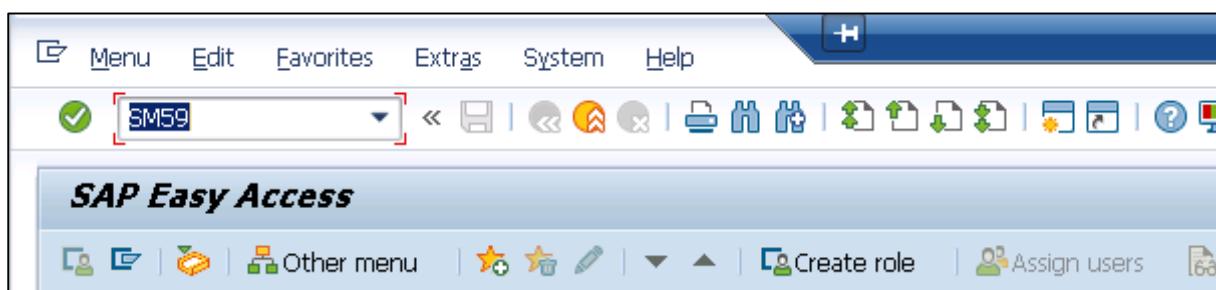
SAP NetWeaver Gateway is a technology that provides a simple way to connect devices, environments and platforms to SAP software based on market standards.

- Non-disruptive, any SAP business suite.
- Ease to develop simple APIs and does not require any tool knowledge.
- Based on REST, ATOM/OData. It allows connectivity to SAP applications using any programming language or model, without the need for SAP knowledge, by leveraging **REST** services and **OData/ATOM** protocols.
- It provides plug-ins for well-known IDEs such as Eclipse, Visual Studio 2010 and XCode.

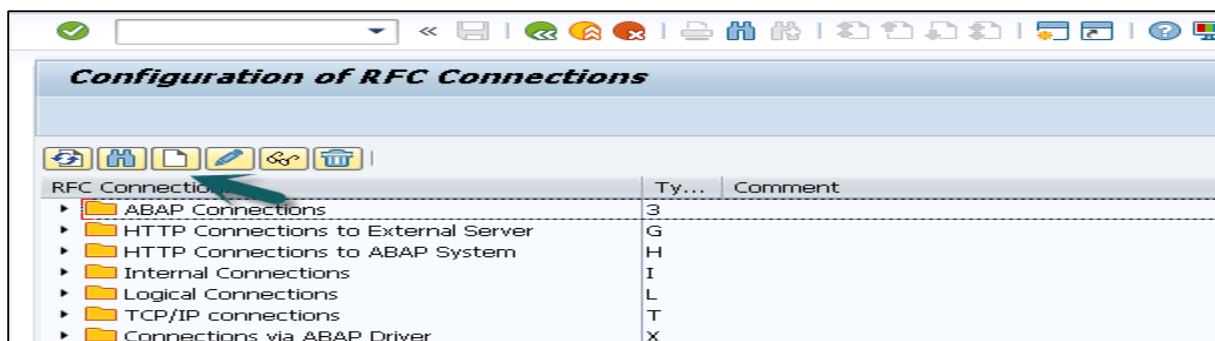
Connect SAP NetWeaver Gateway to SAP Business Suite

This involves configuring Back-end server as trusting system.

Step 1: Use T-code: **SM59**



Step 2: Click on create icon as shown below.



Step 3: Enter the details as shown below:

- RFC Destination Name
- Connection Type: 3

Step 4: Go to the **Technical Settings** tab and enter the details as explained below.

Step 5: Enter the gateway host in the **Target Host** field and Instance number in the **System Number** field.

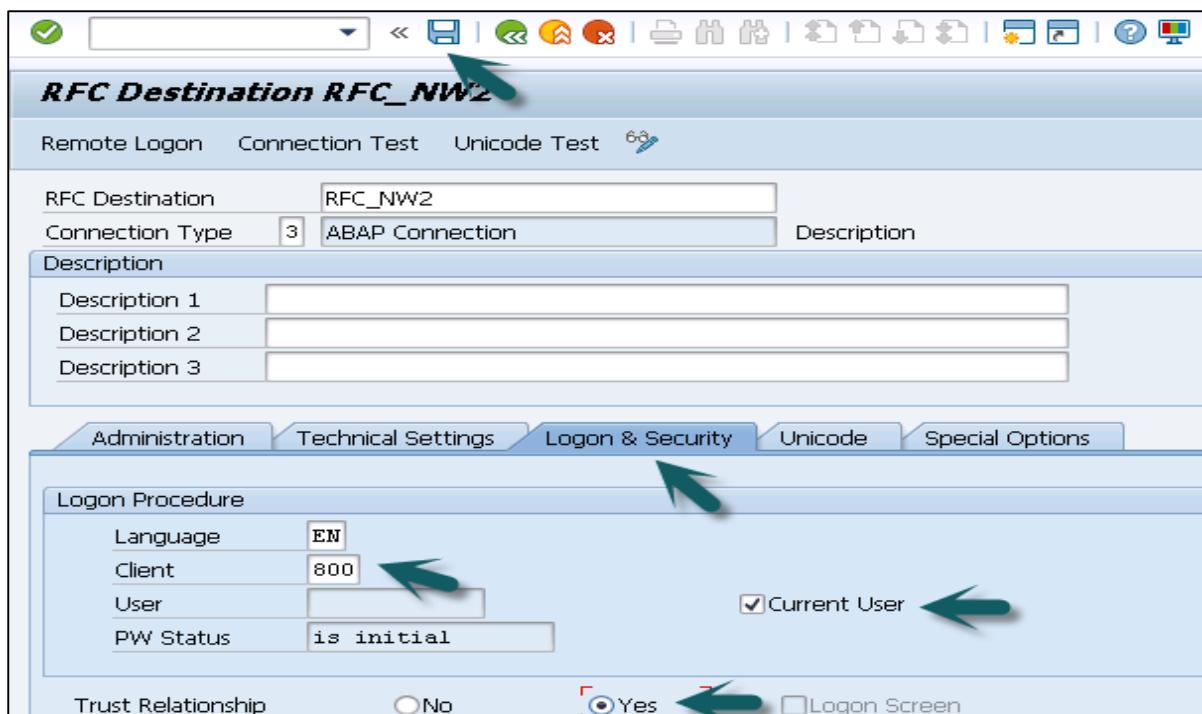
RFC Destination RFC_NW

Remote Logon	Connection Test	Unicode Test
RFC Destination	RFC_NW	
Connection Type	3 ABAP Connection	
Description	<input type="text" value="Description 1"/> <input type="text" value="Description 2"/> <input type="text" value="Description 3"/>	
<input type="button" value="Administration"/> <input type="button" value="Technical Settings"/> <input type="button" value="Logon & Security"/> <input type="button" value="Unicode"/> <input type="button" value="Special Options"/>		
Target System Settings		
Load Balancing Status Load Balancing <input type="radio"/> Yes <input checked="" type="radio"/> No		
Target Host	bods.logon2erp.com	System Number <input type="text" value="10"/>
Save to Database as Save as <input type="radio"/> Hostname <input checked="" type="radio"/> IP Address <input type="text" value="192.168.0.16"/>		

Step 6: Go to the **Logon & Security** tab and enter the details.

Step 7: Enter the client number and click on **Current user** for authentication.

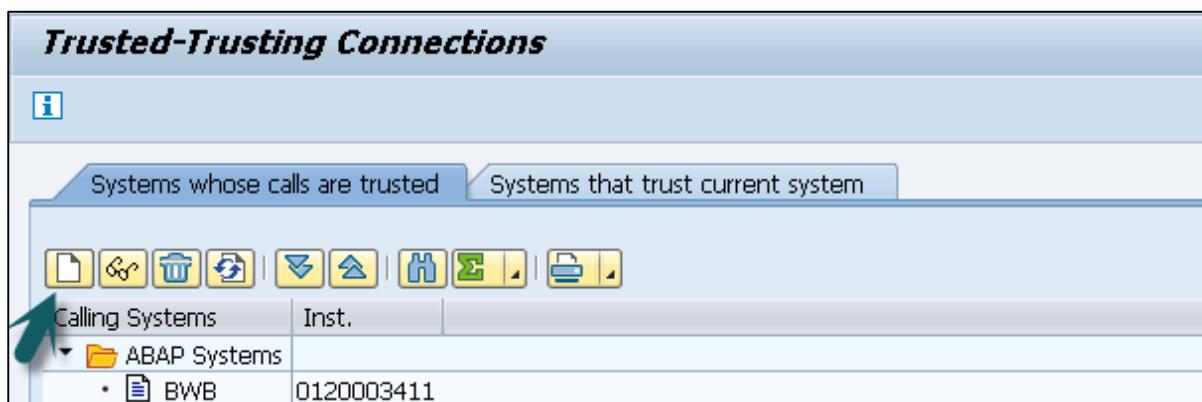
Step 8: Select **Trust Relationship** as **Yes** and click the **save** icon at the top.



Step 9: Go back to the home screen and use T-code: **SMT1**

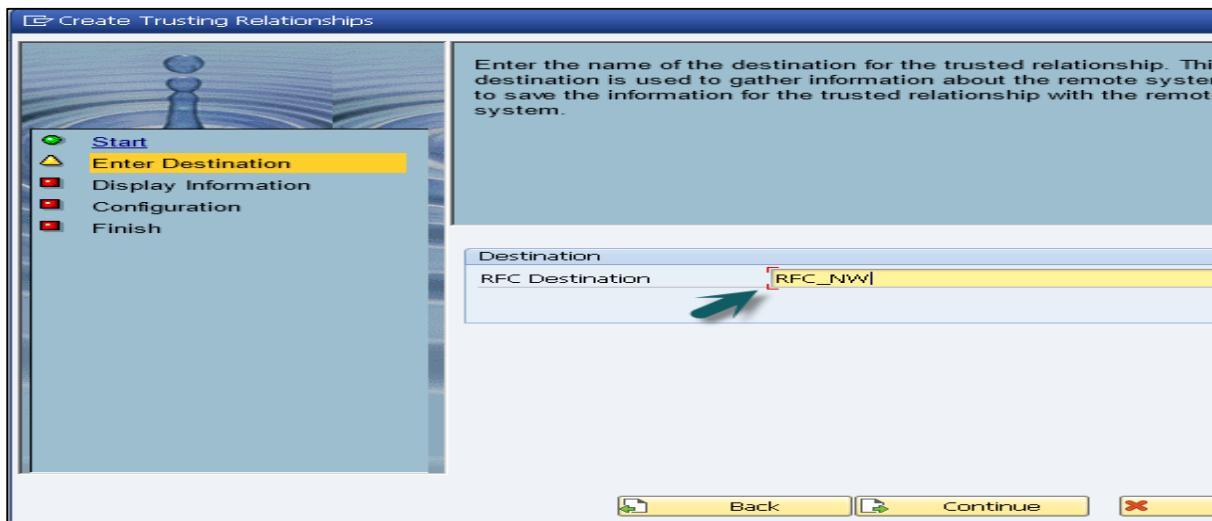


Step 10: Click the **create icon** as shown below.



The **Trusting Wizard** will open.

Step 11: Enter the details of RFC destination that you have just created and click **Continue**.



Step 12: The information of trusted system is displayed. Click the **Save** button.

Here, you have defined trust relationship between your SAP system and NetWeaver Gateway host by configuring SAP system to be trusting system and NW host to be trusted system. This enables the remote logon for users to use the user data in SAP NetWeaver gateway and SAP system.

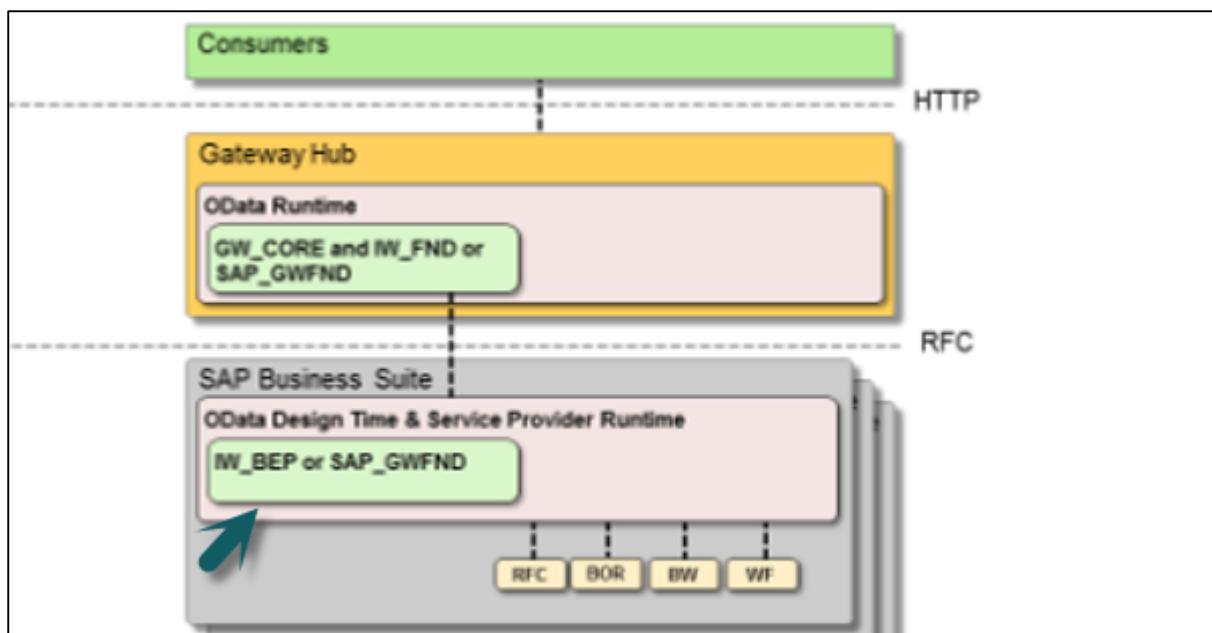
SAP NetWeaver Gateway: Deployment Options

There are two different deployment options available to deploy SAP NetWeaver gateway for SAP Fiori configuration.

Central Hub Deployment of SAP NetWeaver Gateway: Development in Back-End System

In this type of deployment option, central UI Add-On, Product specific UI Add-Ons and SAP NetWeaver gateway is contained in ABAP front-end server. The back-end server contains business logic and back-end data. Development takes place in ABAP back-end system.

The services are deployed on a back-end system and registered on the server. The Gateway service is deployed in Gateway back-end system. Either **IW_BEP** is deployed or system running on the 7.4 or higher version leverage the core component **SAP_GWFND**.



Advantages

- It allows changes to the UI without development authorization in back-end.
- It provides single point of maintenance for all UI issues.
- It provides central place for theming and branding of Fiori Apps.
- It provides single point of access to back-end system.
- As there is no direct access to back-end system, it has enhanced security.
- Direct local access to metadata (DDIC) and business data and ease of reuse of data.

Disadvantages

- It requires separate SAP NetWeaver Gateway system.

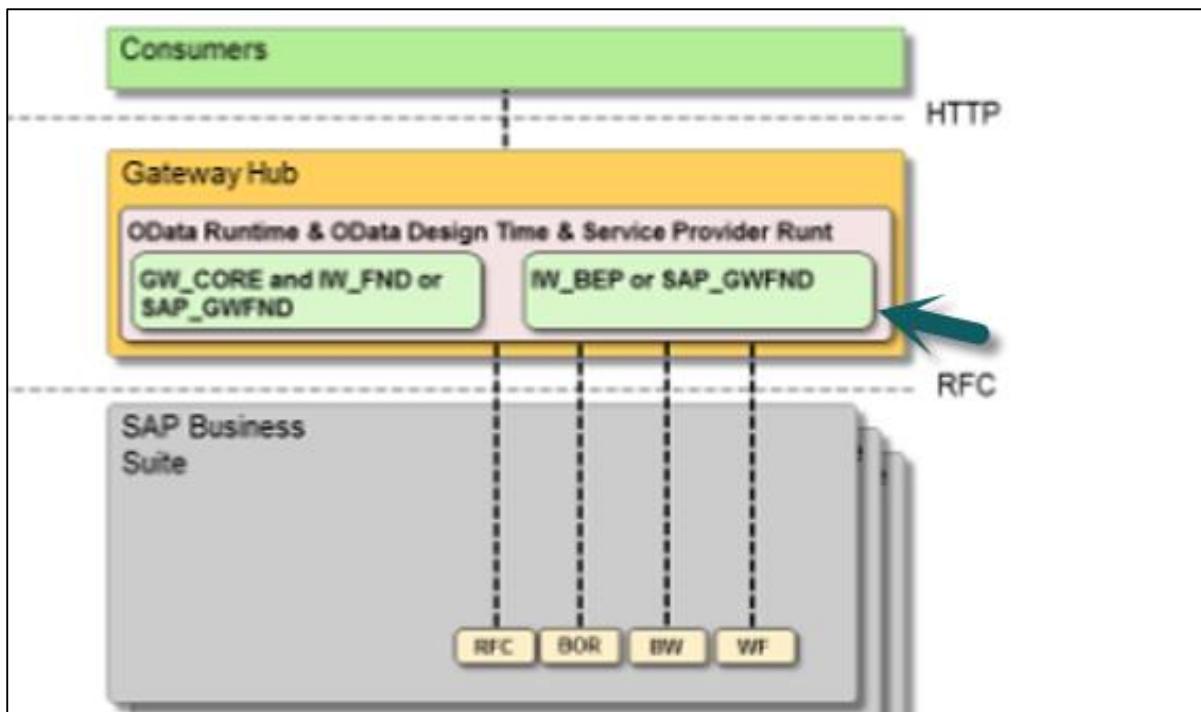
Note: SAP recommends Central Hub deployment option for production environment.

Central Hub Deployment of SAP NetWeaver Gateway

In this option, Gateway server functionalities are used on one dedicated server, the hub system. As against the first option, service deployment takes place on the hub system.

This option is used if either no development must be performed on the back-end system or in case of releases prior to 7.40. if it is not allowed to deploy the Add-On **IW_BEP** in the back-end. In this case, the developer is limited to the interfaces that are accessible via RFC in the back-end.

Development takes place in Gateway hub system and Business suite back-end systems are not touched.



IW_BEP or **SAP_GWFND** is running in Gateway hub system and nothing is touched in SAP Business suite.

Advantages

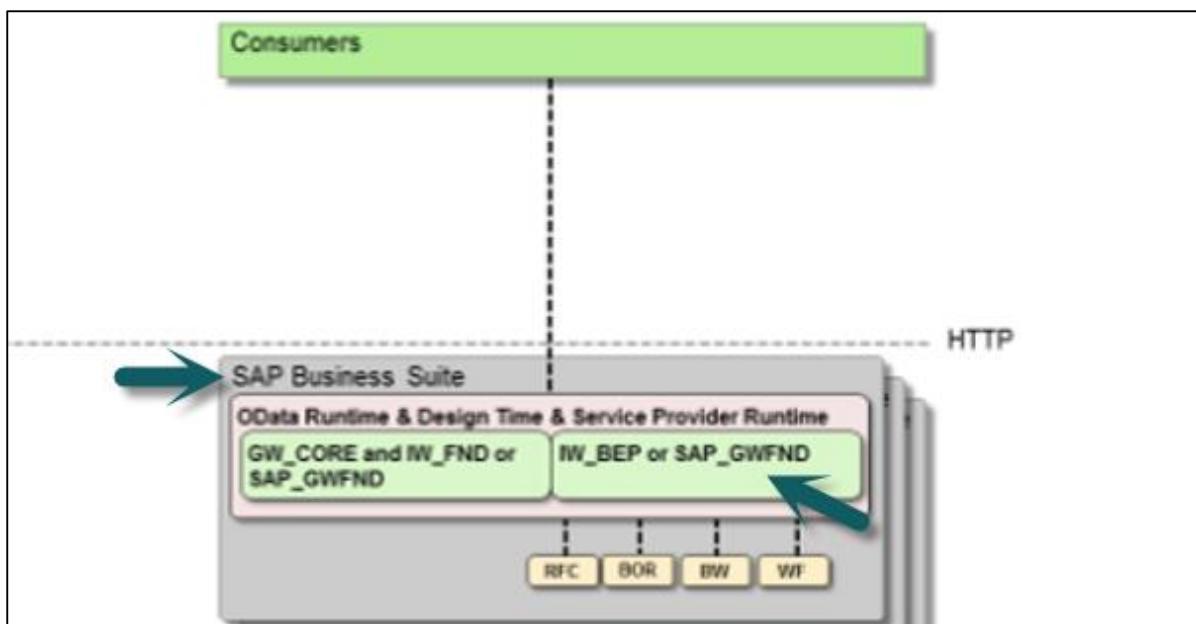
- In addition to the benefits given for the first option, this option has the advantage that it does not require the installation of Gateway Add-Ons in back-end system.

Disadvantages

- There is no direct access to **metadata (DDIC)** and business data. Therefore, reuse of data is limited.
- GENIL objects cannot be used remotely.
- In this configuration, access is limited to remote enabled interfaces like RFC modules, BAPI's etc.

Embedded Deployment

In Embedded deployment architecture, development takes place in SAP Business suite back-end system and Gateway system is also installed in the same system. Services are registered as well as published in the SAP Business Suite back-end system.



IW_BEP or SAP_GWFND is running in the same system in which SAP Business suite is installed.

Advantages

- It requires less run time as one remote call is reduced.

Disadvantages

- System should not be used as hub for additional Back-End systems.
- In case of multiple SAP Business Suite systems, Gateway has to be configured multiple times.
- This configuration is recommended only for sand box purposes.

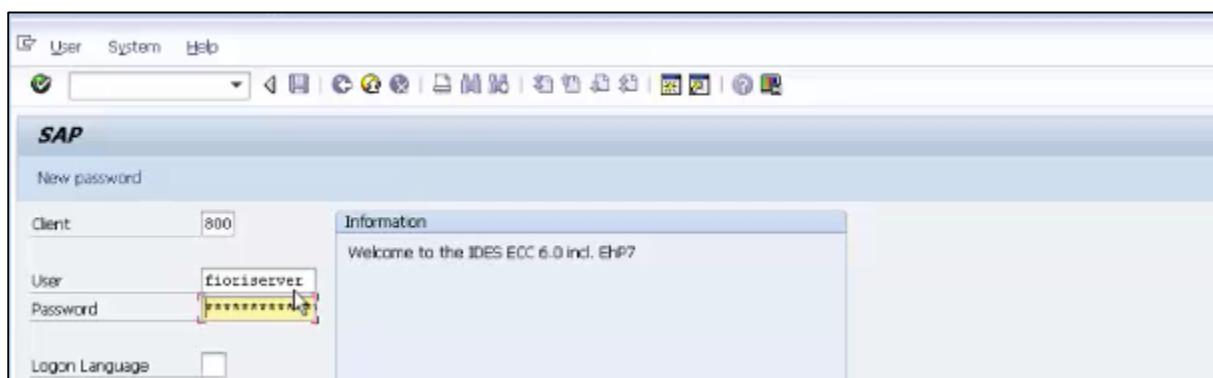
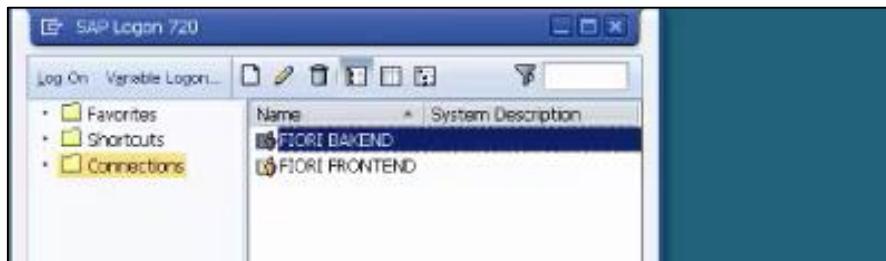
Note: You should not use a SAP Business Suite System with embedded deployment as a hub system for additional back-end system. The reason is that it might lead to a situation where the SAP NetWeaver Gateway release of the hub system is lower than the version of the SAP NetWeaver Gateway back-end components of the remote back-end system.

To avoid such situation, you can use embedded deployment option for your SAP Business Suite systems.

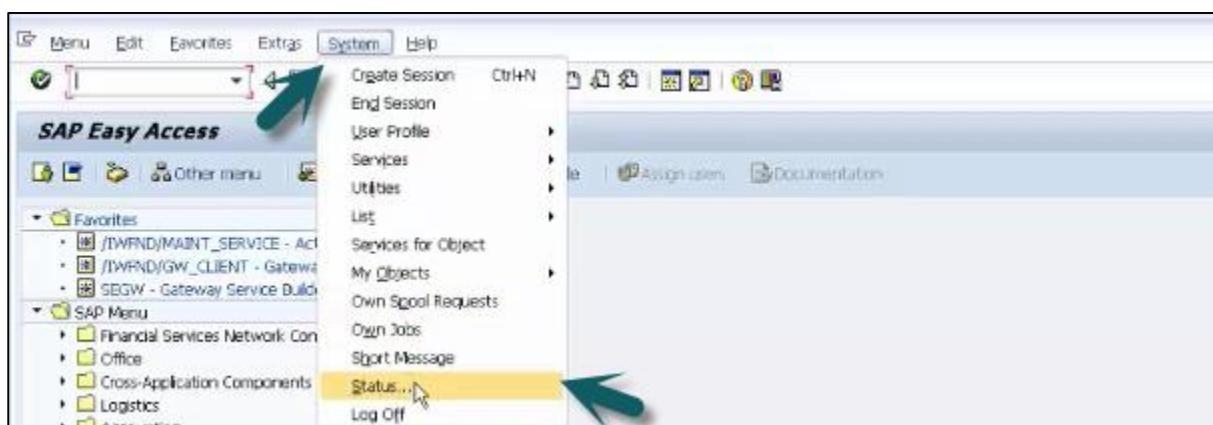
If you go for a hub-based architecture, you should use a dedicated SAP NetWeaver Gateway Hub system that should run on the latest release of SAP NetWeaver Gateway.

Check the Deployment method in SAP Fiori System

Step 1: Login to SAP Fiori back-end system using SAP GUI as shown in the image given below.

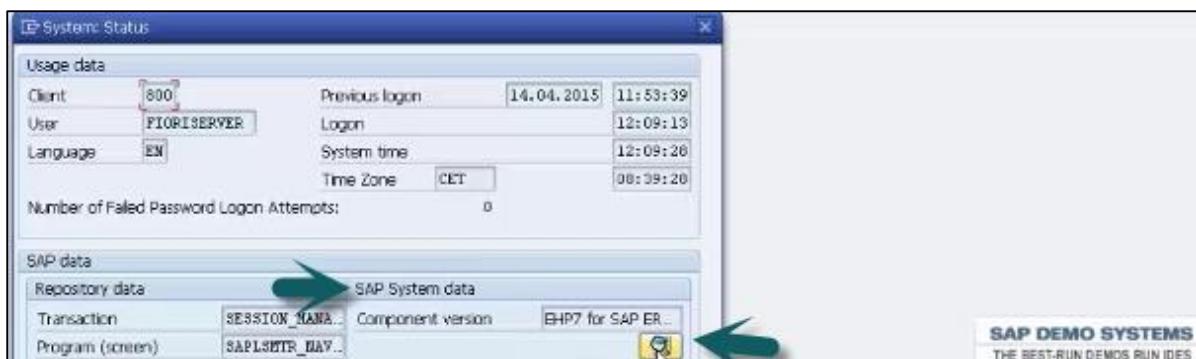


Step 2: On the **System menu**, click **Status**.



Step 3: A new window opens showing the **System Status**.

Under SAP System data, click the icon (magnifying glass) below the label Component version.



Step 4: This will show you the list of the components installed on SAP back-end system as per NetWeaver Gateway Release.



With NW 7.31, **IW_BEW** and **GW_Core** components are installed and for **NW 4.0**, **SAP_GWFND** is installed and there are no individual components.

Now in this system, you have NW system installed on back-end system and all the UI Add-Ons components are in front-end system. Therefore, it represents a Hub Architecture method of deployment.

Overview of OData (Open Data Protocol)

OData is used to define best practices that are required to build and consume RESTful APIs. It helps you to find out changes, defining functions for reusable procedures and sending batch requests etc.

Some of the important features are:

- OData provides facility for extension to fulfill any custom needs of your RESTful APIs.
- REST stands for Representational State Transfer and it is sometimes spelled as "ReST".
- It relies on a stateless, client-server, cacheable communication protocol. In virtually all cases, the HTTP protocol is used.
- REST is defined as an architecture style for designing network applications.
- OData helps you focus on your business logic while building RESTful APIs without having to worry about the approaches to define request and response headers,

status codes, HTTP methods, URL conventions, media types, payload formats and query options etc.

- OData RESTful APIs are easy to consume.

OData Service Life Cycle

The OData service life cycle includes span of an OData service. Given below are the key steps to be considered in an OData Service Life Cycle.

- Activation of OData service.
- Maintaining OData service.
- Maintaining of models and services, up to the cleanup of the metadata cache.
- RESTful applications use HTTP requests to post data to create or update, read data and delete data. REST uses HTTP for all four CRUD (Create/Read/Update/Delete) operations.
- REST is a lightweight alternative to mechanisms like RPC (Remote Procedure Calls) and Web Services.

REST Architecture Components

Given below are the components of the REST Architecture.

- Resources
- A web of resources
- Client-server
- No Connection state
- Proxy Servers

4. SAP Fiori – Installation

SAP Fiori installation involves installation of front-end, back-end components and in case of Analytical apps, installation of HANA components. These components are delivered as separate products and hence, have to be installed separately.

With the integration of SAP Fiori apps library and Maintenance planner, installation process has been simplified. It allows you to select from the list of available apps from SAP Fiori Apps library, their installation and configuration prerequisites.

A summarized step-by-step procedure is shown in the image given below.

- **Step 1** shows how to check the prerequisites for the installation according to different SAP Fiori Apps.
- **Step 2 to Step 5** determine the front-end and back end components to be installed as per different Fiori Apps.
- **Step 6 to Step 10** determine the Configuration steps to be performed for setting up the SAP Fiori environment.

Installation and Configuration Task	Transactional Apps	Fact Sheets	Analytical Apps
1. Check Prerequisites	Yes	Yes	Yes (SPS 6 Revision 69 or higher)
2. Install Required SAP NetWeaver Gateway Components (Front-End)	Yes	Yes	Yes
3. Install Central UI Add-Ons (Front-End)	Yes	Yes	Yes For SAP Smart Business apps: install KPI framework in addition
4. Install Product-Specific UI Add-Ons (Front- End)	Yes	Yes	Yes
5. Check & Install all relevant SAP Notes	Yes	Yes	Yes
6. Configure SAP NetWeaver Gateway (Front-End)	Yes	Yes	Yes
7. Configure Central UI Add-On (Front-End)	Yes	Yes	Yes
8. Configure Product-specific UI Add-Ons (Front-End)	Yes	Yes	Yes
9a. Configure Back End (Back-End) 9b. Analytical Apps (HANA Database)	Copy and adjust delivered back-end roles and assign users to them. For more information, see Installation and Configuration .	Copy and adjust delivered back-end roles and assign users to them. For more information, see Installation and Configuration .	Configure the PFCG roles in the ABAP back end system and the privileges in SAP HANA live. For more information, see SAP Smart Business 1.0 on SAP Help Portal at http://help.sap.com/ssb Administrator's Guide . Import product-specific virtual delivery models through HANA Studio
10. Configure Enterprise Search (Back-End)	Not relevant	Yes	Not relevant

Let us understand the procedure in detail.

Step 1: SAP Fiori – Prerequisites

Checking prerequisites includes checking the following:

- NetWeaver Gateway Server NW 7.31 SPS04 or higher or NW 7.4 SPS04 or higher

- NW Central UI Add-On NW 7.31 SPS04 or higher or NW 7.4 SPS04 or higher
- Business Suite UI Add-On
- Back-End Business suite Server NW 7.4 SPS04 or higher
- Database HANA 1.0

Front-End App Server	SAP NetWeaver 7.31 (AS ABAP) SPS04 or higher
NetWeaver Gateway (NW GW) Server	
NW Central UI Add-On	SAP NetWeaver 7.4 (AS ABAP) SPS04 or higher SAP NetWeaver 7.31 (AS ABAP) SPS04 or higher SAP NetWeaver 7.4 (AS ABAP) SPS04 or higher
Respective Business Suite – UI Add-On:	SAP ERP SAP SCM SAP CRM SAP SRM SAP GRC SAP PPM (Portfolio & Project Mgmt.)
Back-End Business Suite Server	SAP NetWeaver 7.4 (AS ABAP) SPS04 or higher
Respective Business Suite – Add-On:	SAP ERP SAP SCM SAP CRM SAP SRM SAP PPM (Portfolio & Project Mgmt.) SAP GRC AC
Database	HANA 1.0

On SAP Front-End server, some components have to be installed for SAP NetWeaver gateway installation. If you install **NW 7.31 SPS04** on your front-end server, the components given below have to be installed separately.

If you install **NW 7.4 SPS04** on your front-end server, these components are installed automatically.

Product Version	Required SAP NW Gateway Installation	Components automatically installed with SAP NW Gateway
EHP3 FOR SAP NETWEAVER 7.0 (AS ABAP)	SAP NETWEAVER GATEWAY 2.0 SPS07 (Gateway Server Core NW 703/731) If you wish to install "Approval Requests" apps, you additionally have to install: SAP NETWEAVER GATEWAY 2.0 SPS07 > SAP IW PGW 100	GW_CORE 200 SAP IW FND 250 SAP WEB UIF 731 IW_BEP 200
SAP NETWEAVER 7.4 (AS ABAP), SAP NETWEAVER 7.4 FOR SUITE (AS ABAP)	All required components are included in the SAP NetWeaver installation (SAP_GWFND) If you wish to install "Approval Requests" apps, you additionally have to install: SAP NETWEAVER GATEWAY 2.0 SPS07 > SAP IW PGW 100	

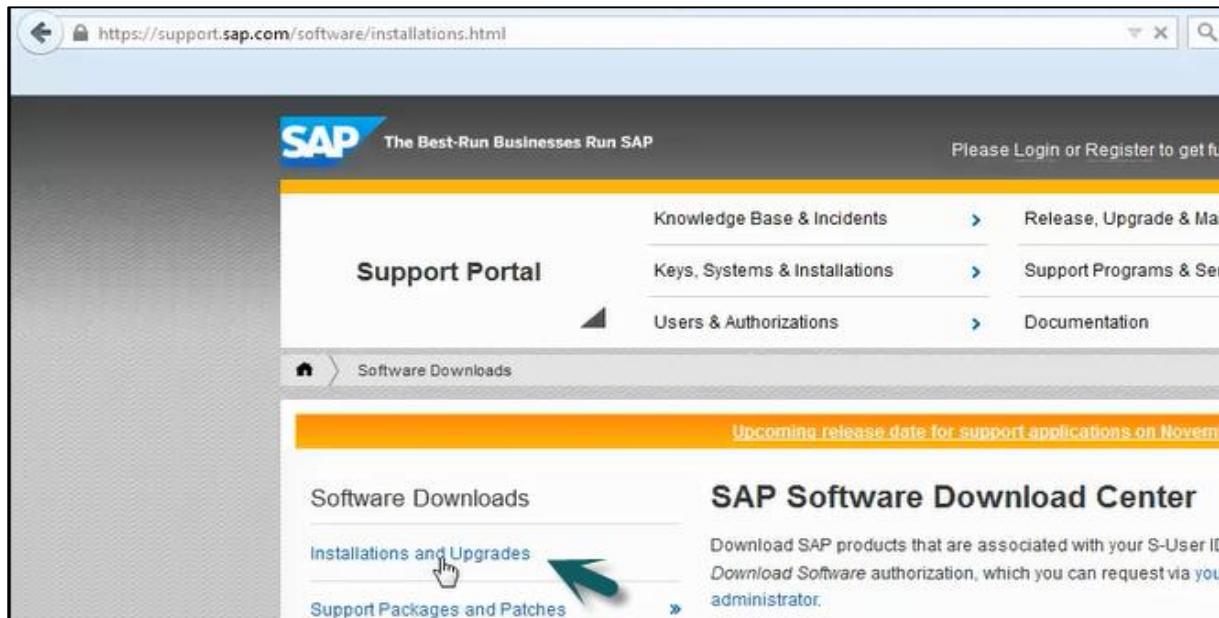
You can use Software Update Manager with Maintenance Optimizer for the installation.

Step 2: Download SAP Fiori

To download the software: <http://service.sap.com/swdc>

Follow the procedure depicted in the images below.

Click **Installation and Upgrades** as shown in the following screenshot.



Click the link A-Z index.

This screenshot shows the SAP Software Download Center page. On the left, there's a sidebar with links for Software Downloads, Installations and Upgrades, Support Packages and Patches, Databases, Address Directories & Reference Data, and SAP Business One for Partners. The main content area is titled 'Installations and Upgrades' and contains text about downloading installations or upgrades. It features a large yellow button labeled 'A-Z' with the sub-label 'Alphabetical List of my Products'. To the right of this button are two other buttons: 'My Company's Application Components' (with a hexagonal icon) and 'Browse our download catalog' (with a book icon). A teal arrow points to the 'A-Z' button.

Once the page with **A – Z index** opens, click **N -> NetWeaver Gateway -> SAP NetWeaver Gateway 2.0.**

A B C D E F G H I J K L M N O P Q R S T U V W X Y

INSTALLATIONS AND UPGRADES - N

[Installations and Upgrades - N](#) [SAP GATEWAY](#)

SAP GATEWAY

- SAP GATEWAY 2.0 
- SAP Gateway 2.0

SAP GATEWAY 2.0 (INSTALLATIONS AND UPGRADES)

- [Installation and Upgrade](#) 
- [Application Help \(SAP Library\)](#)

SAP NetWeaver Gateway 2.0
ANY DEVICE, ANY EXPERIENCE, ANY DEVELOPER
General Information

▼ SAP Software Download Center

- ▶ Support Packages and Patches
- ▼ Installations and Upgrades
 - My Company's Application Components
 - **A – Z Index**
 - Browse our Download Catalog
 - Search for Installations and Upgrades
 - Installation and Upgrade Guides
 - Ramp-Up Releases

INSTALLATIONS AND UPGRADES - N

[Installations and Upgrades - N](#) [SAP NETWEAVER GATEWAY](#) [SAP NETWEAVER GATEWAY 2.0](#)

SAP NETWEAVER GATEWAY 2.0 (INSTALLATIONS AND UPGRADES)

- [Installation and Upgrade](#)
- [Application Help \(SAP Library\)](#)

Step 3: Install SAP Fiori

The next step is to install **Central UI-Add On** and **SAP Fiori Launchpad**. Install Central UI Add-On according to your NetWeaver release.

NetWeaver Gateway Version	Central UI Add-On	Components Name
EHP3 FOR SAP NETWEAVER 7.0 (AS ABAP) (SPS 04 as minimum)	UI ADD-ON 1.0 FOR NW 7.03 (SPS 06 as minimum)	<ul style="list-style-type: none"> • SAP UI ADD-ON INFRA V1.0 • SAP UI2 SERVICES V1.0 • SAPUI5 CLIENT RT AS ABAP 1.00 • SAP IW BEP 200 • SAP UI2 FOUNDATION V1.0 • SAP UI2 IMPL. FOR NW 7.31 V1.0
SAP NETWEAVER 7.4 (AS ABAP), SAP NETWEAVER 7.4 FOR SUITE (AS ABAP) (SPS 04 and component SAP UI 7.40 SP05 for both as minimum)	All required components are included in the SAP NetWeaver 7.4 installation. Ensure that the above-mentioned required components are in place.	

The next step is to install product-specific UI Add-On according to your Business suite:

- ERP: UI for EHP7 for SAP ERP 6.0
- SRM: UI for EHP3 for SAP SRM 7.0
- SCM: SAP SNC USABILITY 1.0
- CRM: UI for EHP3 for SAP CRM 7.0
- PORTF AND PROJ MGMT: UI for SAP PORTF PROJ MGMT 6.0
- GRC: UI for SAP ACCESS CONROL 10.1 SP3

All these Add-Ons are non-modifying. It means, no changes in the back-end is required and no down time is required to install these Add-Ons.

OData part is delivered via back-end enhancement pack by the product i.e **EHP7** for SAP ERP 6.0. You do not require installation of SAP Fiori Add-On components separately.

Check Installed Components in SAP Fiori

To check installed components in SAP Fiori:

Login to **SAP Logon -> Go to Back end server -> System -> Status -> Component version.**

System: Status					
Usage data					
Client	800	Previous logon	08.04.2015	14:17:30	
User	FIORISERVER	Logon		16:55:54	
Language	EN	System time		16:55:58	
		Time Zone	CET		13:25:58
Number of Failed Password Logon Attempts:		0			
SAP data					
Repository data		SAP System data			
Transaction	SESSION_MANAGER	Component version	EHP7 for SAP ERP...		
Program (screen)	SAPLSMTR_NAV...	Installation Number	0120003411		
Screen number	100				

Installed Software				
Installed Software Component Versions				
Component	Release	SP-Level	Support Package	Short Description of Component
SAP_BASIS	740	0004	SAPKB74004	SAP Basis Component
SAP_ABA	740	0004	SAPKA74004	Cross-Application Component
SAP_GWFND	740	0010	SAPK-74010INSAPGWFND	SAP Gateway Foundation 7.40
SAP_UI	740	0011	SAPK-74011INSAPUI	User Interface Technology 7.40
PI_BASIS	740	0004	SAPK-74004INPIBASIS	Basis Plug-In
ST-PI	2008_1_710	0008	SAPKITLRE8	SAP Solution Tools Plug-In
DECSERMG	100	0001	SAPK-10001INDECSERMG	Decision Service Management

Installed Software				
Installed Product Versions				
Component	Release	SP-Level	Support Package	Short Description of Component
SRA003	600	0002	SAPK-60002INSRA003	Create Travel Expenses OData Integration
SRA004	600	0000	-	Travel Request Create OData integration
SRA006	600	0000	-	Payslip lookup OData integration component
SRA007	600	0000	-	My Benefits enrollment OData integration
SRA008	600	0000	-	Travel Expense Approval OData integration
SRA009	600	0000	-	Travel Request Approval OData integration
SRA010	600	0000	-	Staffing list OData integration component
SRA012	600	0004	SAPK-60004INSRA012	My Department Spend
SRA013	600	0006	SAPK-60006INSRA013	Create Purchase Order from Released Purch
SRA016	600	0006	SAPK-60006INSRA016	Price and Availability Check OData Integ

The above SRA components are for particular Apps. These are OData service available in back-end system.

5. SAP Fiori – Launchpad

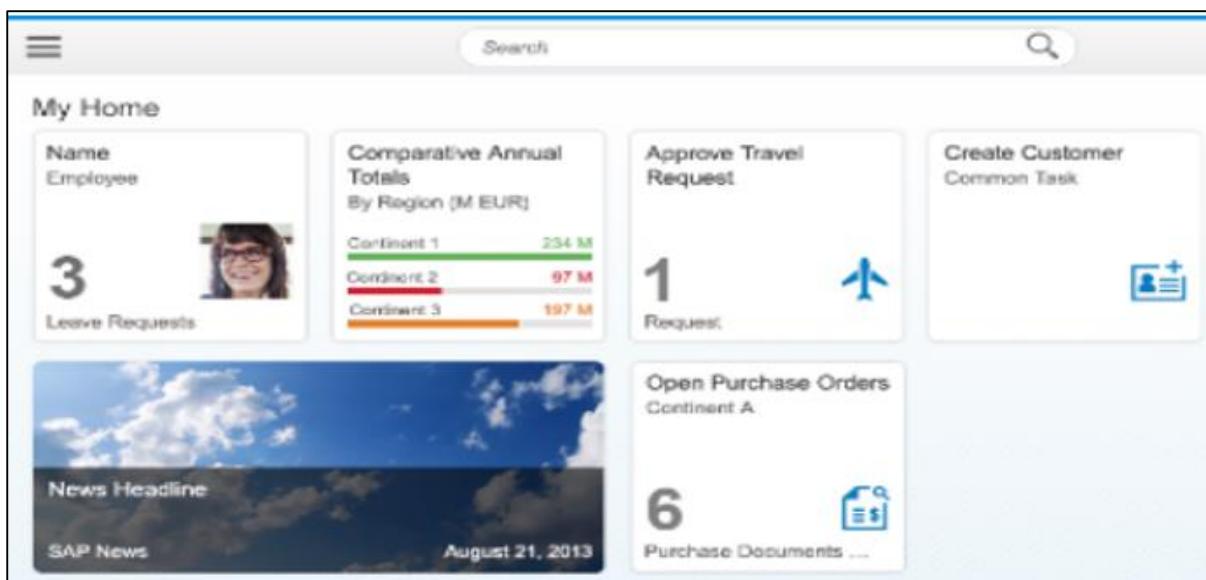
SAP Fiori Launchpad is known as the entry point to Fiori apps system on mobile and desktop devices. It contains various tiles in Fiori system. Tiles are square objects that are used to access different Fiori Apps. Access to these tiles are based on the user roles.

SAP Fiori tiles run on multiple device types and provides a single point of access for business applications such as transactional, analytical, factsheet, smart business apps.

SAP Fiori Launchpad- Key Facts

The key points about SAP Fiori Launchpad are given below.

- Web-based entry point to use SAP Business applications across platforms and devices.
- Delivered as an out-of-the-box thinking to the I HTML client.
- High productivity for end users using features like theming, search integration, customization, etc.
- Offers single entry points for end users using multiple device types.



How does SAP Fiori Launchpad Work?

When you launch the Fiori Launchpad, it only shows **fiorilaunchpad.html** as the end of the URL. This is because the **fiorilaunchpad.html** is the only HTML document, which is loaded to the browser, making it the only **SAPUI5** root application.

If you are a customer using Launch page this is different in that the launch page had an index.html for each application. This change provides a more holistic user experience by allowing page navigation & transitions.

Fiori Launchpad – Key Benefits

Given below are the key benefits that can be achieved using SAP Fiori Launchpad.

- Ability to define application usage for certain roles or personas
- One Homepage
- Personalization
- Responsiveness
- Single Sign On
- Theming
- Search
- Bookmarks
- Page/navigation transitions

SAP Fiori Launchpad – Key Values

- **Simple** – intuitive, easy and coherent user experience.
- **Role based** – simplified role based navigation and business function access.
- **Contextual** – real time, contextual and personalized access.
- **Responsive** – consumption across devices, versions and channels with a single user experience.
- **Multi-platform** – planned to be running on multiple platforms – ABAP (available today), SAP Portal, SAP HANA Cloud Portal and HANA.

Configuration of Launchpad

To see the implementation steps and requirement of any of SAP Fiori Apps, go to help.sap.com/Fiori.

To check the URL of SAP Help page, go to Google.com and enter the App name.

Google my timesheet SAP Fiori app implementation

Web Images Videos News More Search tools

About 4,290 results (0.45 seconds)

App Implementation: My Timesheet (Version 1) - SAP Fiori ...

help.sap.com/fiori_bs2013/helpdata/en/5c/.../content.htm

System Landscape Requirements. Before you start to implement the app, ensure that your system landscape has been set up to enable SAP Fiori. This also ...

App Implementation: My Timesheet (Version 2) - SAP Fiori ...

help.sap.com/fiori_bs2013/helpdata/en/1e/.../content.htm

System Landscape Requirements. Before you can start to implement the app, ensure that your system landscape has been set up to enable SAP Fiori and that ...

SAP Fiori principal apps 1.0 for SAP ERP

Select language: en - English

App Implementation: My Timesheet (Version 1)

Installation Information

SAP Fiori Apps

- Approve Leave Requests (Version 1)
- Approve Purchase Contracts
- Approve Purchase Orders
- Approve Requisitions
- Approve Timesheets (Version 1)
- Approve Travel Expenses
- Approve Travel Requests

System Landscape Requirements

Before you start to implement the app, ensure that your system landscape has been set up to enable SAP Fiori. This also implies that the front-end and back-end components for your app are already available in this system landscape:

SAP Fiori System Landscape Options	Setup of SAP Fiori System Landscape with ABAP Environment Based on SAP enhancement package 7 of SAP ERP 6.0 also possible: • Setup of SAP Fiori System Landscape with SAP HANA Database • Setup of SAP Fiori System Landscape with SAP HANA XS
------------------------------------	---

This is the front-end component for **My Timesheet** apps in Launchpad for activating SAP Fiori UI5 application:

Component	Technical Name
UI5 Application	HCM_TS_CRE

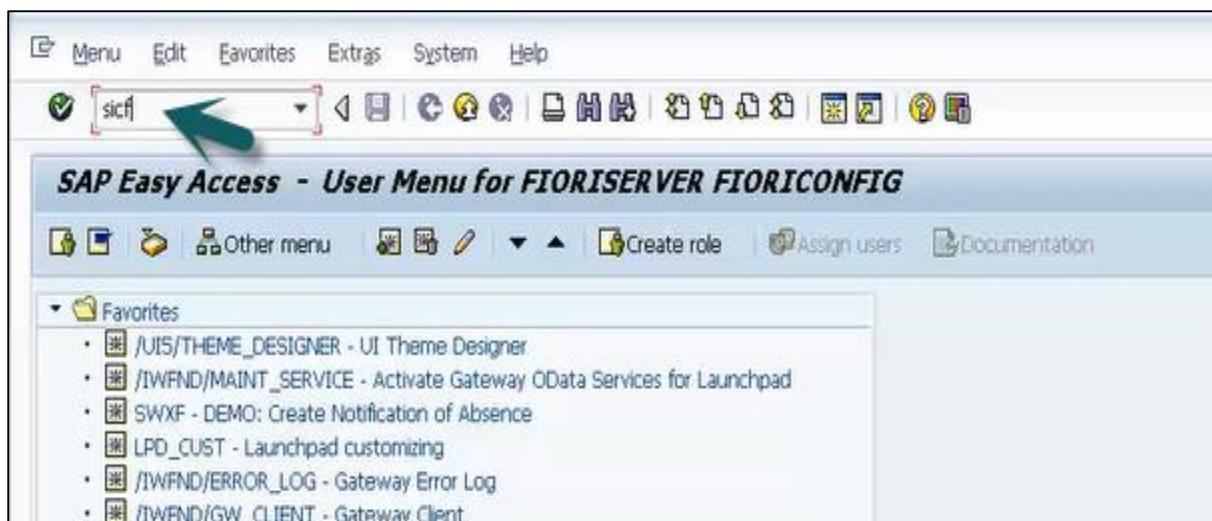
How to check Fiori Apps URL and SAP UI5 Component

Login to the front-end server using SAP logon and run the T-code: **SICF**

Log On Variable Logon...

Favorites Shortcuts Connections

Name	System Description
FIORI BACKEND	
FIORI FRONT END	



A new window will open. Click **Execute** and go to the path mentioned below:

Default_host -> **SAP** -> **bc** -> **ui5_ui5** -> **sap** -> search for **hcm_ts_cre** and double click.

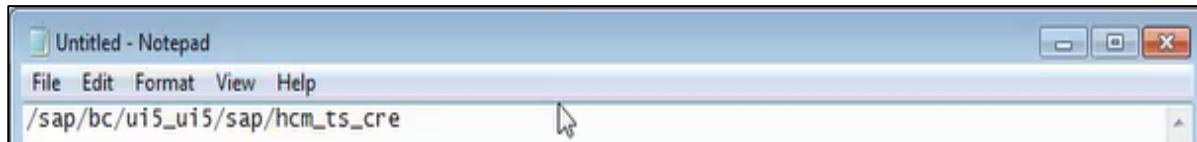
The first screenshot shows the 'Maintain Services' screen. It has a toolbar with 'Execute (F8)', a search bar with 'Hierarchy', and fields for 'Hierarchy Type' (set to 'SERVICE'), 'Virtual Host', and 'Service Path'. A teal arrow points to the 'Hierarchy Type' field.

The second screenshot shows the 'Maintain service' screen. It has a toolbar with 'Create Host/Service' and various icons. The main area has sections for 'Filter Details' (Virtual Host, ServiceName, Description, Lang., Apply, Reset, Fine-Tune) and a table for 'Virtuelle Hosts / Services'. The table shows entries for 'default_host' (VIRTUAL DEFAULT HOST), 'sap' (RESERVED SERVICES AVAILABLE GLOBALLY), 'bc' (BASIS TREE (BASIS FUNCTIONS)), and 'A_NEW_INTAL1' (Application Platform). A teal arrow points to the 'bc' entry. Below the table, there's a list of nodes under 'bc': '11111' and 'abap'. A teal arrow points to the 'hcm_ts_cre' node in the list at the bottom.

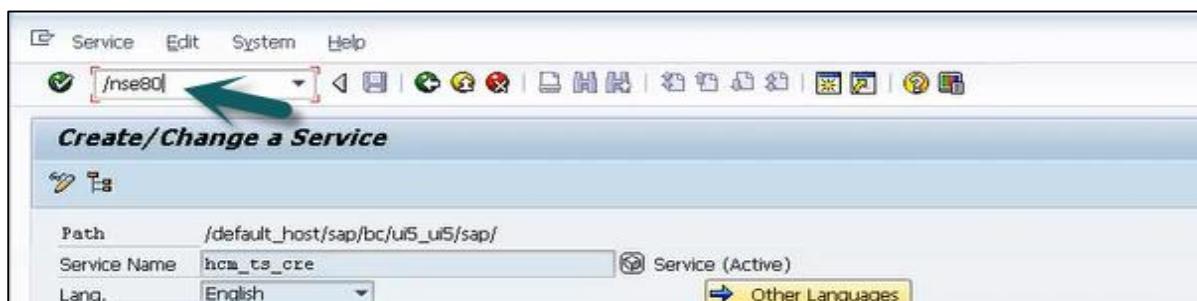
Virtuelle Hosts / Services	Documentation	Referenz Service
default_host	VIRTUAL DEFAULT HOST	
sap	SAP NAMESPACE; SAP IS OBLIGED NOT T...	
bc	RESERVED SERVICES AVAILABLE GLOBALLY	
A_NEW_INTAL1	PUBLIC SERVICES	
11111	Application Platform	/default_host/sap/A_FRISCH
abap	BASIS TREE (BASIS FUNCTIONS)	

hcm_ts_mon	SAPUI5 application specific ICF node
hcm_ts_apv	SAPUI5 application specific ICF node
hcm_ts_cre	My Timesheet

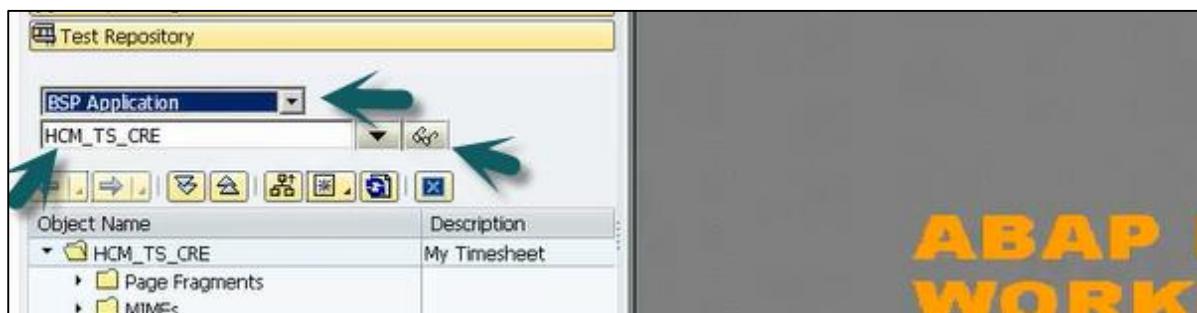
You can see the URL path for **My Time Sheet** application. Copy this path to the notepad and remove default-host and add service name in the end.



Now run the T-code: **SE80**



A new window will open. Enter the name of **BSP** application and **UI5** Application name and click on display button as below:



Go to **componenet.js** and make note of the component name.

```

1 /*
2  * Copyright (C) 2009-2014 SAP SE or an SAP affiliate company. All rights reserved
3  */
4 jQuery.sap.declare("hcm.emp.mytimesheet.Component");jQuery.sap.require("hcm.emp.mytimesheet.Configuration")
5 .ComponentBase.createMetadata('FS','name:"My Timesheet","version":"1.4.4","library":"hcm.emp.mytimesheet"
6 properties","icon":"sap-icon://Fiori2/F0397","favicon":"","resources/sap/ca/ui/themes/base/img/favicon/My_Ti
7 82":"/resources/sap/ca/ui/themes/base/img/launchicon/My_Timesheet/114_iPhone-Retina_Web_Clip.png","homeSc
8 /ca/ui/themes/base/img/launchicon/My_Timesheet/144_iPad_Retina_Web_Clip.png",viewPath:"hcm.emp.mytimeshee
9 31"))),createContent:function(){var v=(component:this);return sap.ui.view({viewName:"hcm.emp.mytimeshee
10

```

```

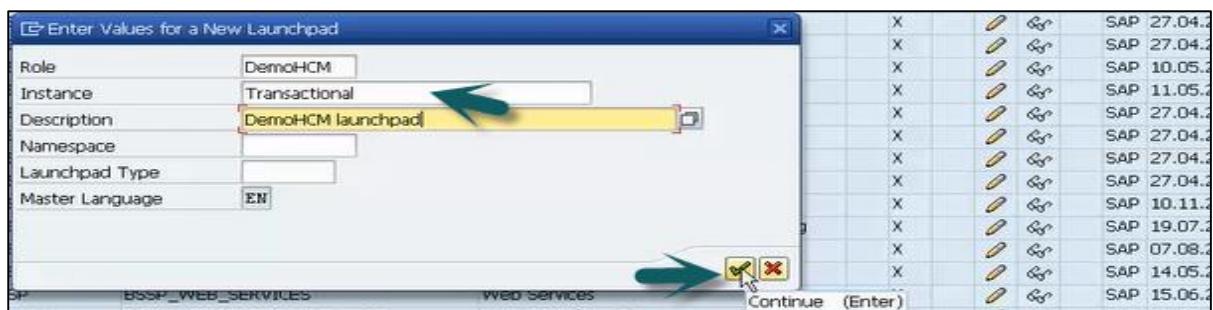
File Edit Format View Help
/sap/bc/ui5_ui5/sap/hcm_ts_cre
SAPUI5.Component=hcm.emp.mytimesheet

```

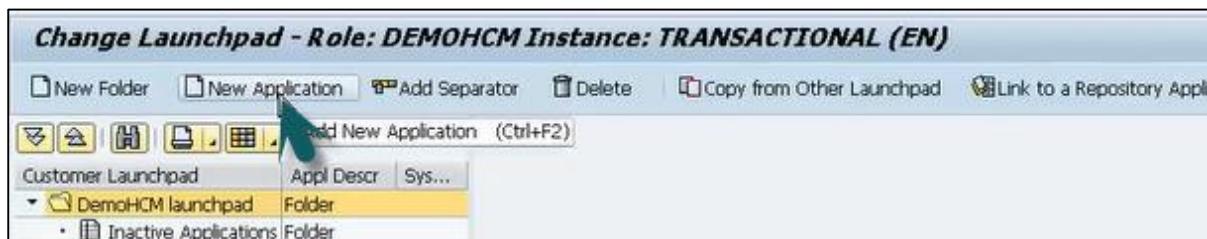
Now, to configure the Launchpad, use **T-code: LPD_CUST** and go to **New Launchpad**.

Role	Instance	Description	Re...	Em...	FP...	Ch...	Dis...	Del...	User...
/BOPU/DEMO	GENERAL	FBI / PBI Demo				<input type="button" value="Edit"/>	<input type="button" value="Delete"/>		SAP
BSSP	BSSP_CO_OM_CCA	Cost Center Reporting	X			<input type="button" value="Edit"/>	<input type="button" value="Delete"/>		SAP
BSSP	BSSP_CO_OM_OPA	Internal Order Reporting	X			<input type="button" value="Edit"/>	<input type="button" value="Delete"/>		SAP
BSSP	BSSP_CO_PC	Product Cost Reporting	X			<input type="button" value="Edit"/>	<input type="button" value="Delete"/>		SAP

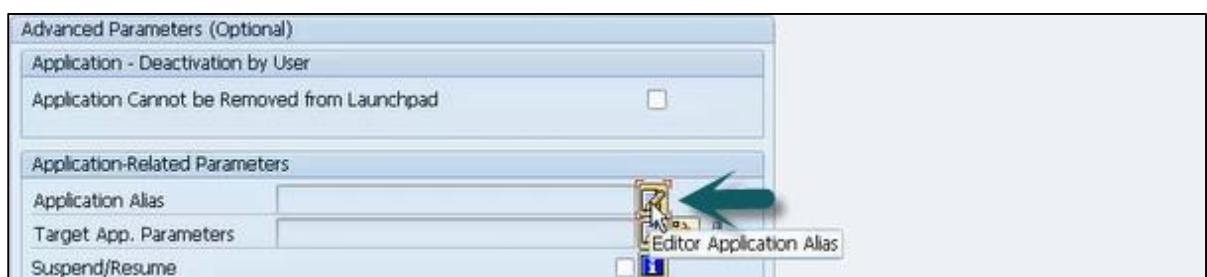
Enter the details for the labels **Role**, **Instance**, **Description** and click on **Continue and Yes**.



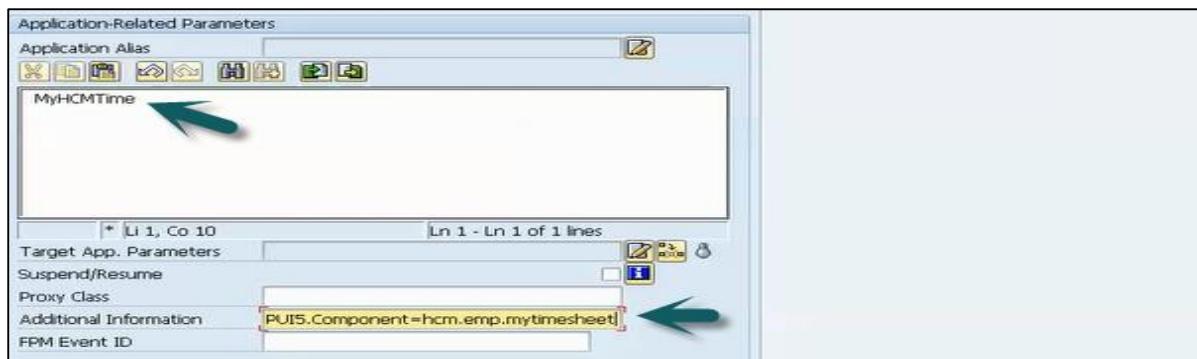
A new window will open. Click on the new Application.



Enter the details; Link Text, Application Type, URL and click **Show Advanced Parameters**.



Enter the details, Application Alias and SAP UI5 component name and click the **save** button on the top.

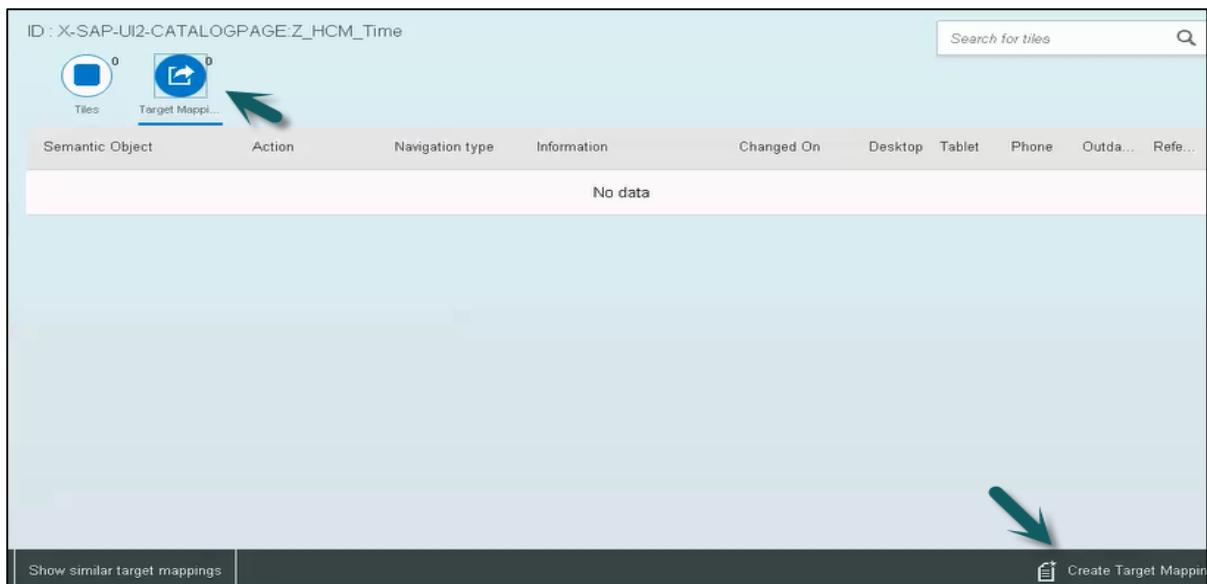


You can create a tile for this by going to the Launchpad designer and to select, **create target mapping**.

Click the **Plus** sign and enter the name for the tile and click **save**.

The first part of the image shows the App Catalog for Transportation Spec with entries like ashwani0, ashwani1, and ashwani11. A teal arrow points to the 'ashwani0' entry. The second part shows a 'Create Target Mapping' dialog box with 'Standard' selected. The 'Title:' field contains 'Z_HCM_Time' with a teal arrow pointing to it. The 'ID:' field also contains 'Z_HCM_Time'. At the bottom are 'Save' and 'Cancel' buttons.

The next step is to create the target mapping. Go to Target mapping and click **Create target mapping**.



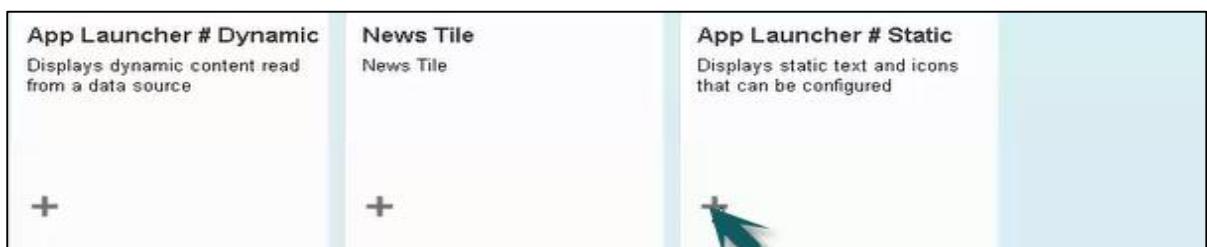
A new window will open. Enter the details as shown in the image below.

The dialog box is titled 'Intent' and contains fields for 'Semantic Object' (TimeEntry) and 'Action' (createTimeEntry). The 'Target' section includes 'Source of Navigation Target' (set to 'Other SAP Fiori ...'), 'Launchpad Role' (DEMOHCM), 'Launchpad Instance' (TRANSACTIONAL), 'Application Alias' (MyTime), and 'Application ID'. The 'General' section has an 'Information' field and 'Device Types' checkboxes for Desktop and Tablet. A large teal arrow points from the 'Action' button in the Catalog Page to the 'Action' field in this dialog. Another teal arrow points from the 'Create Target Mappin' button to the 'Save' button in the dialog.

Creating Catalogs and Tiles in Launchpad

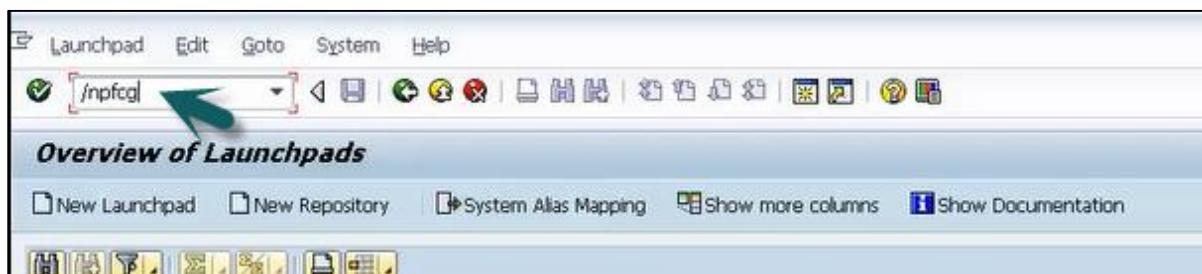
We have learnt how target mapping is done. The next step is to create a tile.

Go to the tile tab and click the '+' sign and select the type of tile to be created and enter the details.



As selected a static tile, to enter the details and click on the save icon.

To assign the role to this, go to the front-end system and use the transaction **PFCG**.



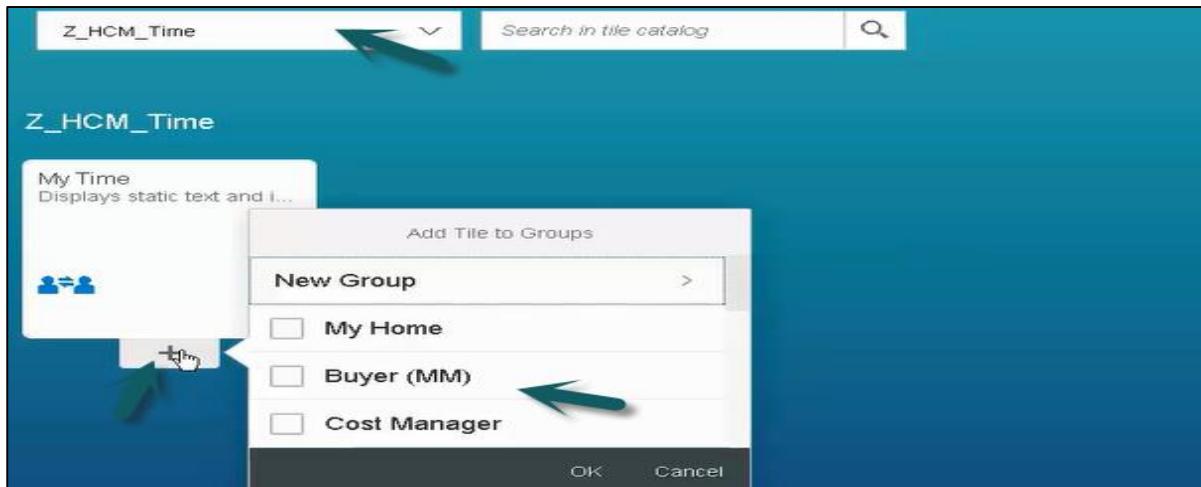
Enter the Role name. Click single role and save. Next, click the Menu tab.



Go to the User tab, enter the user details that you want to use, to access the Launchpad and save.

To Add the Catalog to a group in Launchpad, login to Launchpad and select the Tile Catalog.

Select the catalog you have created and click on '+' sign to add to a group.



If you have selected **My Home** as group name, go to back to Launchpad home page and it will show **My Time** tile there.



This is how we can configure a Launchpad and create a new catalog and tiles in Launchpad designer.

6. SAP Fiori – OData Services

OData is used to define best practices that are required to build and consume RESTful APIs. It helps you to find out changes, defining functions for reusable procedures and sending batch requests etc.

Some of the important features are:

- OData provides facility for extension to fulfill any custom needs of your RESTful APIs.
- REST stands for Representational State Transfer and it is sometimes spelled as "ReST".
- It relies on a stateless, client-server, cacheable communication protocol. In virtually all cases, the HTTP protocol is used.
- REST is defined as an architecture style for designing network applications.
- OData helps you focus on your business logic while building RESTful APIs without having to worry about the approaches to define request and response headers, status codes, HTTP methods, URL conventions, media types, payload formats and query options etc.
- OData RESTful APIs are easy to consume.

OData Service Life Cycle

The OData service life cycle includes span of an OData service. Given below are the key steps to be considered in an OData Service Life Cycle.

- Activation of OData service.
- Maintaining OData service.
- Maintaining of models and services, up to the cleanup of the metadata cache.
- RESTful applications use HTTP requests to post data to create or update, read data and delete data. REST uses HTTP for all four CRUD (Create/Read/Update/Delete) operations.
- REST is a lightweight alternative to mechanisms like RPC (Remote Procedure Calls) and Web Services.

REST

REST is defined as an option for web services and Remote Procedure calls. It is used for designing network applications.

REST services like a web services and supports below features:

- Work with firewalls
- Language-independent
- Standards-based
- Not Platform dependent

REST Architecture

Given below are the components of the REST Architecture.

Resources

In REST, both the state and the functionality are presented as resources. Resources are the key element of a RESTful design, as opposed to "methods" or "services" used in RPC and SOAP Web Services.

RPC calls like "**getProductName**" and "**getProductPrice**" are not used in REST. You view the product data as a resource and this resource should contain all the required information.

Web of Resources

It means that a single resource should not contain detailed data and it contains links to additional web pages.

Client-Server

In REST client-server model, one component server can be other component client.

No Connection State

Each request should contain details about the connection to each client and should not reply on the previous connections to the same client.

Cachable

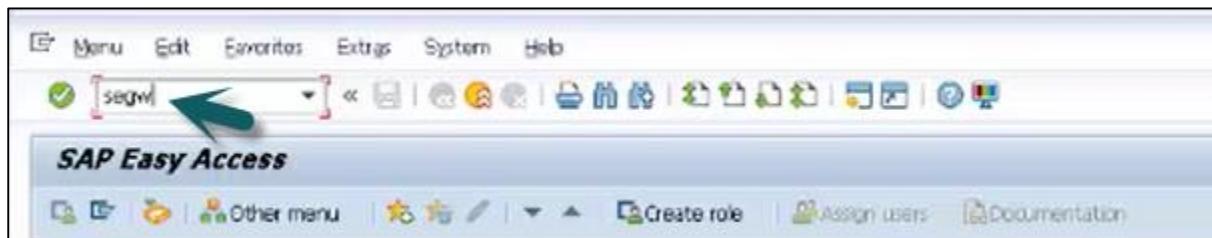
The protocol must allow the server to explicitly specify which resources may be cached, and for how long.

Proxy Servers

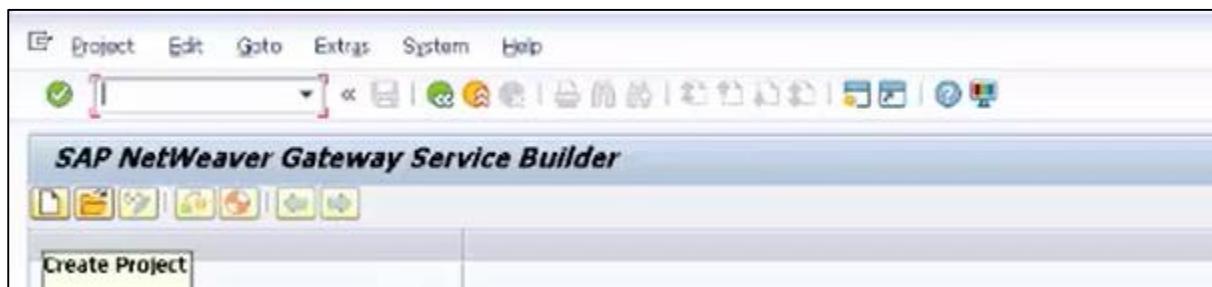
To improve performance and scalability, Proxy servers can be used. Any standard HTTP proxy can be used.

OData Service using SAP NetWeaver Gateway Service Builder

Use the **T-Code: SEGW**



A new window will open. Click **Create Project**.

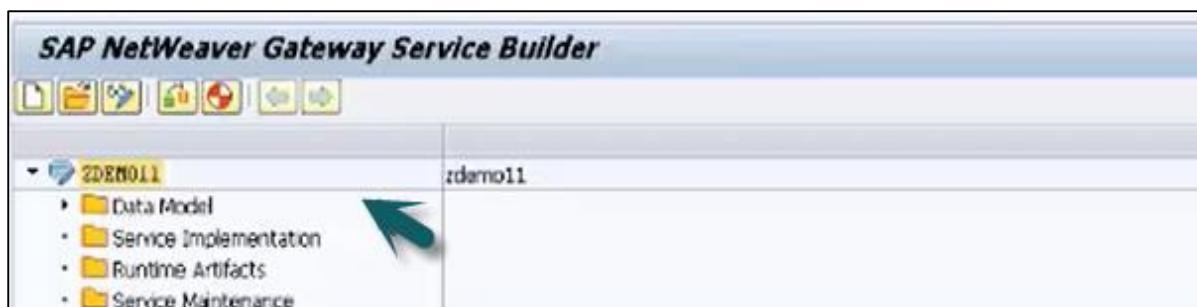


Now, follow the steps given below:

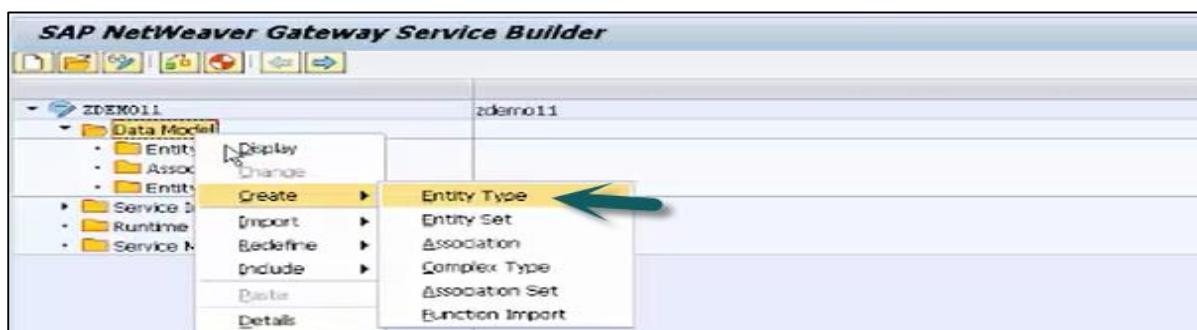
- Enter the Project name as shown in the image below. It should be unique and should not contain any special characters.
- Enter the description of the project as it is a mandatory field.
- Enter the different attributes such as Project Type, Generation Strategy.
- Select Package or click the local object, if you want to create this locally.



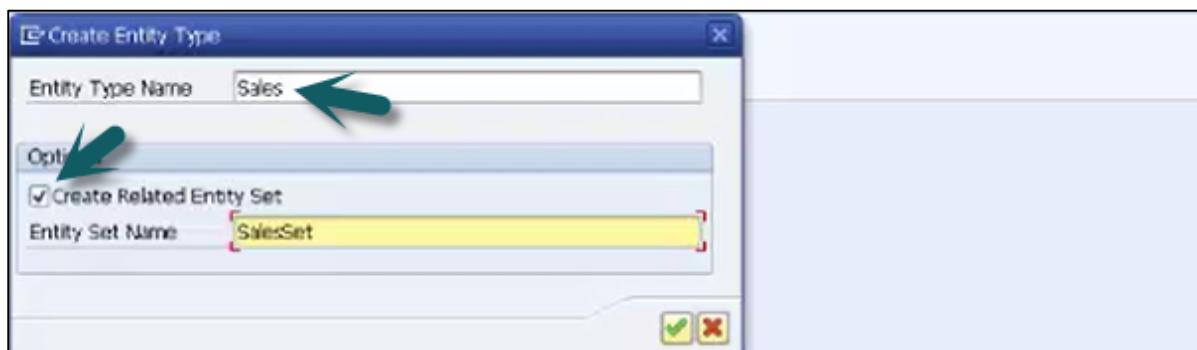
Once you click the local object, Service builder will create a new project with empty folder structure. All these are automatically created with a new project and click the save icon.



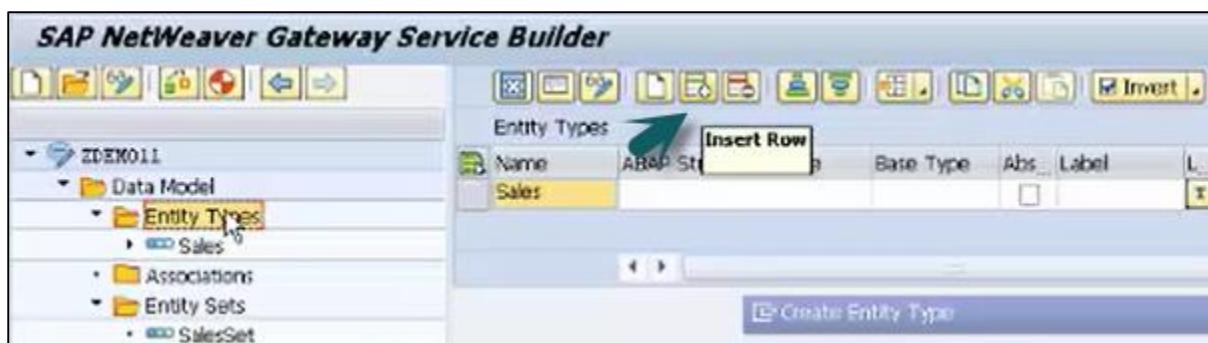
Now, to create an Entity type in data model. Expand the Data model -> right click -> Create -> Entity Type.

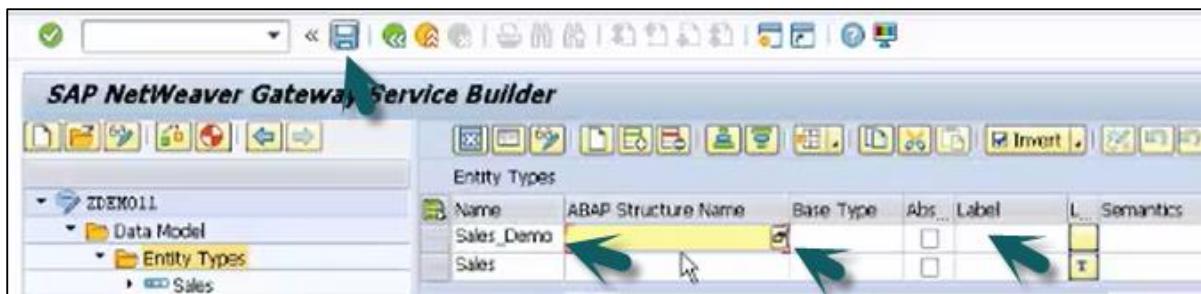


Enter the Entity type name and to create an entity set automatically, click on related entity set check box option.



Click the option **Insert row** to add another entity type in data model and add the details as given below. Click Save.

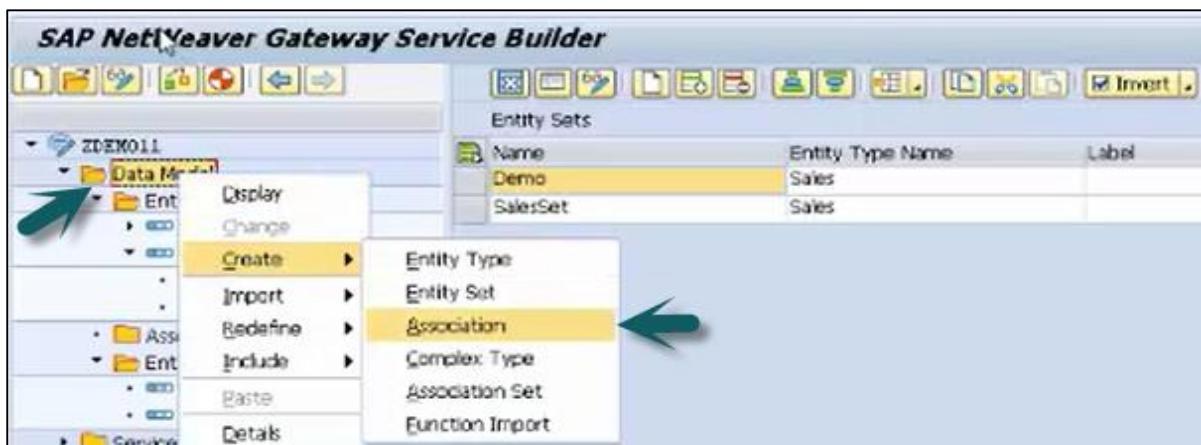




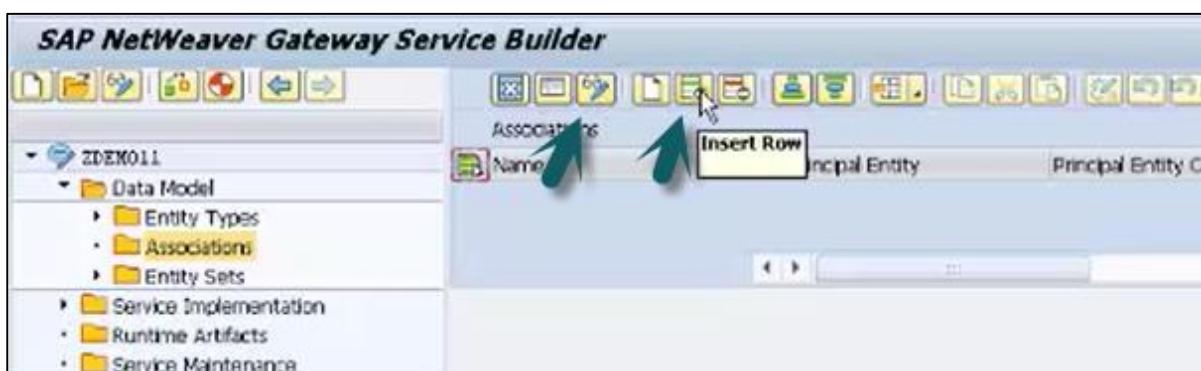
In a similar way, you can create an entity set by right-clicking the data model and enter the details or by using the **Insert Row** option in Entity Type.

The next step is to define association and relationship between different entities. It can be created in two ways, by using a wizard or by using mask edit view.

- Right click **data model -> Create -> Association** or
- Right click **Association folder -> Create**



Double click **Association folder -> Edit Mode -> Insert Row**



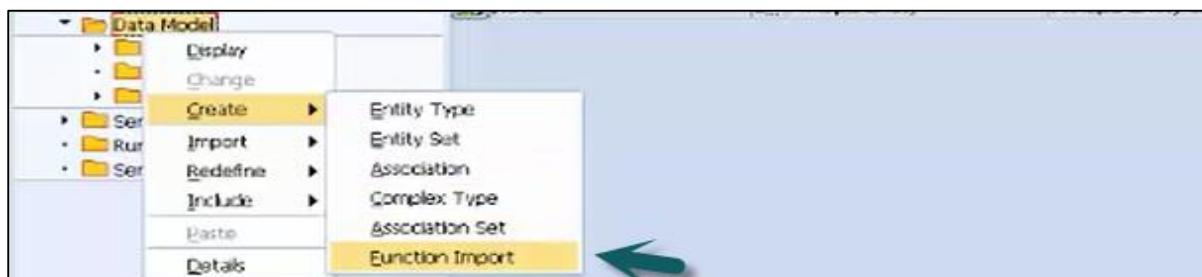
Enter the details of the given labels:

- Name for the association
- External Association Editor
- Principal entity and cardinality
- Dependent Entity and Cardinality

Name	E.. Principal Entity	Principal Entity Cardinality	Dependent Entity	Dependent Entity Cardinality Label	L...

Click the **Association set**. Right click **data model -> Create -> Association Set**.

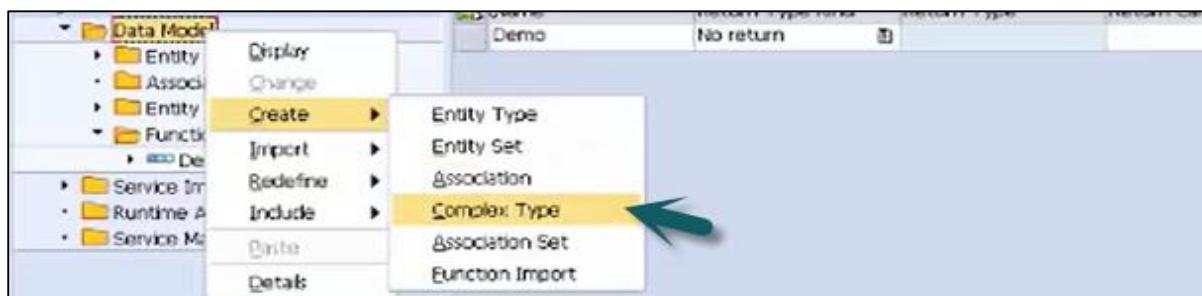
To create **Function Import** in Service Builder, right click **Data Model -> Create -> Function Import**.



Enter the name of **Function Import** and you can select from other options and click the **save** icon.

Function Imports						
Name	Return Type Kind	Return Type	Return Cardinality	Return Entity Set	HTTP Method Type	Action for Entity Type Label
Demo	No return				Not specified	

To define complex type, go to **Data Model -> right Click -> Complex type**.



Enter the details as per the requirement and Save.

Complex Types			
Name	ABAP Structure Type Name	Base Type Name	Abr... Label
Demo			

This is how you can create Data model, Entity set, type, Association and Complex types.

How to Import Data Model

There are four options available to import Data Model from a file:

- Data model from File
- DDIC structure
- RFC/BOR Interface
- Search Help

To import data model, follow the steps given below:

Run T-code: SEGW

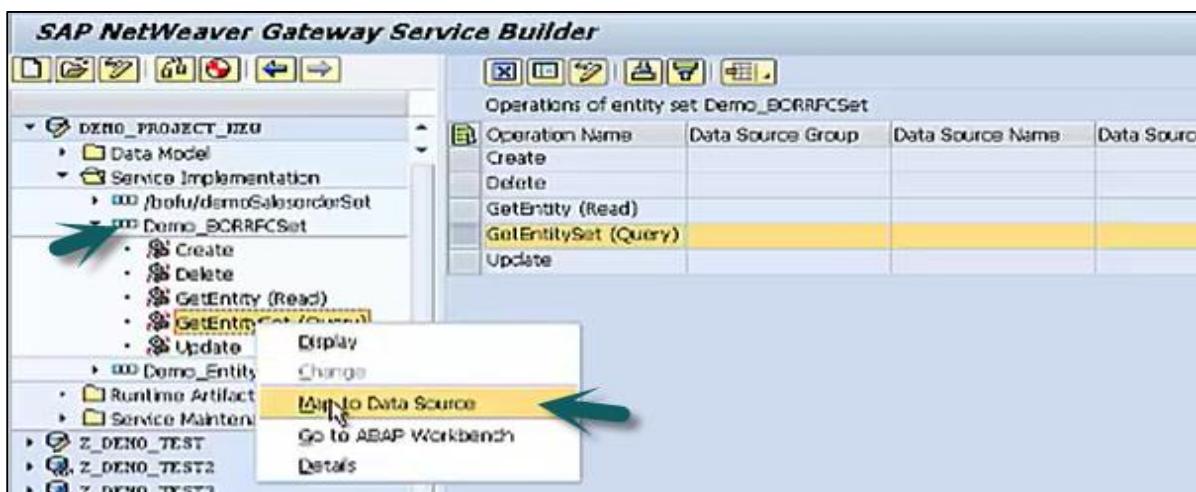
Right-click **Project Name** -> **Import** -> **Select the import method**



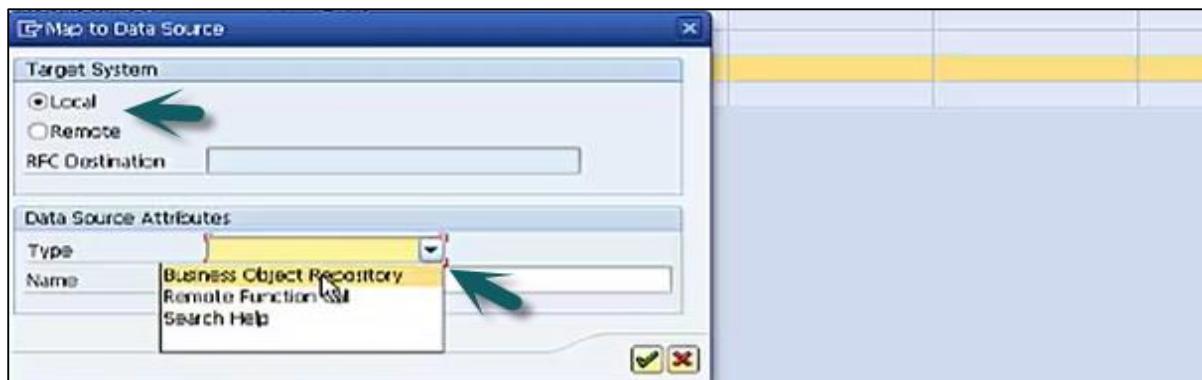
Enter the path and import Entity types, Entity sets, associations and complex types.

Mapping to Data Source

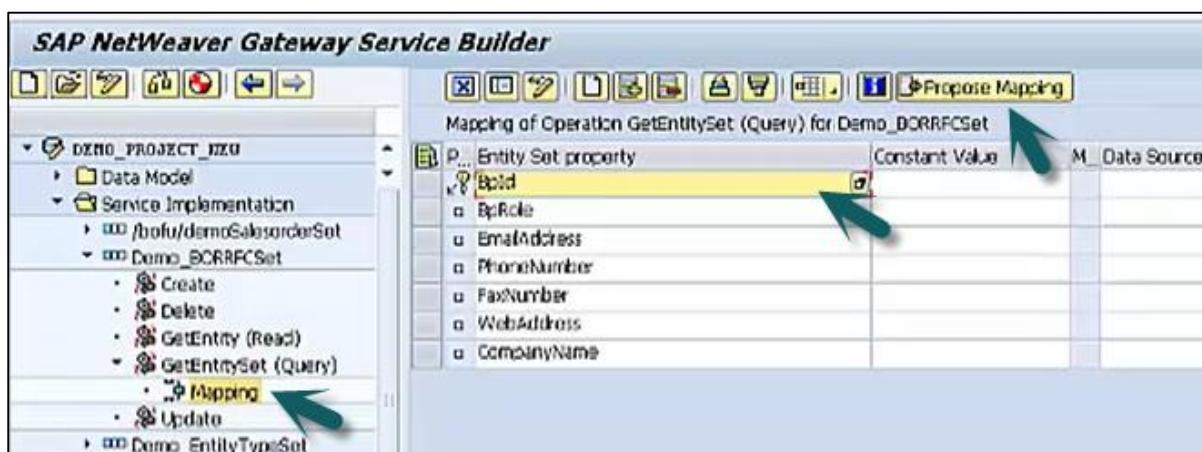
Go to **Data Model** -> **Service Implementation** -> select **Entity Set for Mapping**



Enter the local or remote system data source, type and Name and save.



This will enable mapping node under query operation. You can do mapping for single objects or can also use the option of **Propose mapping** option.



Service Maintenance and Registration

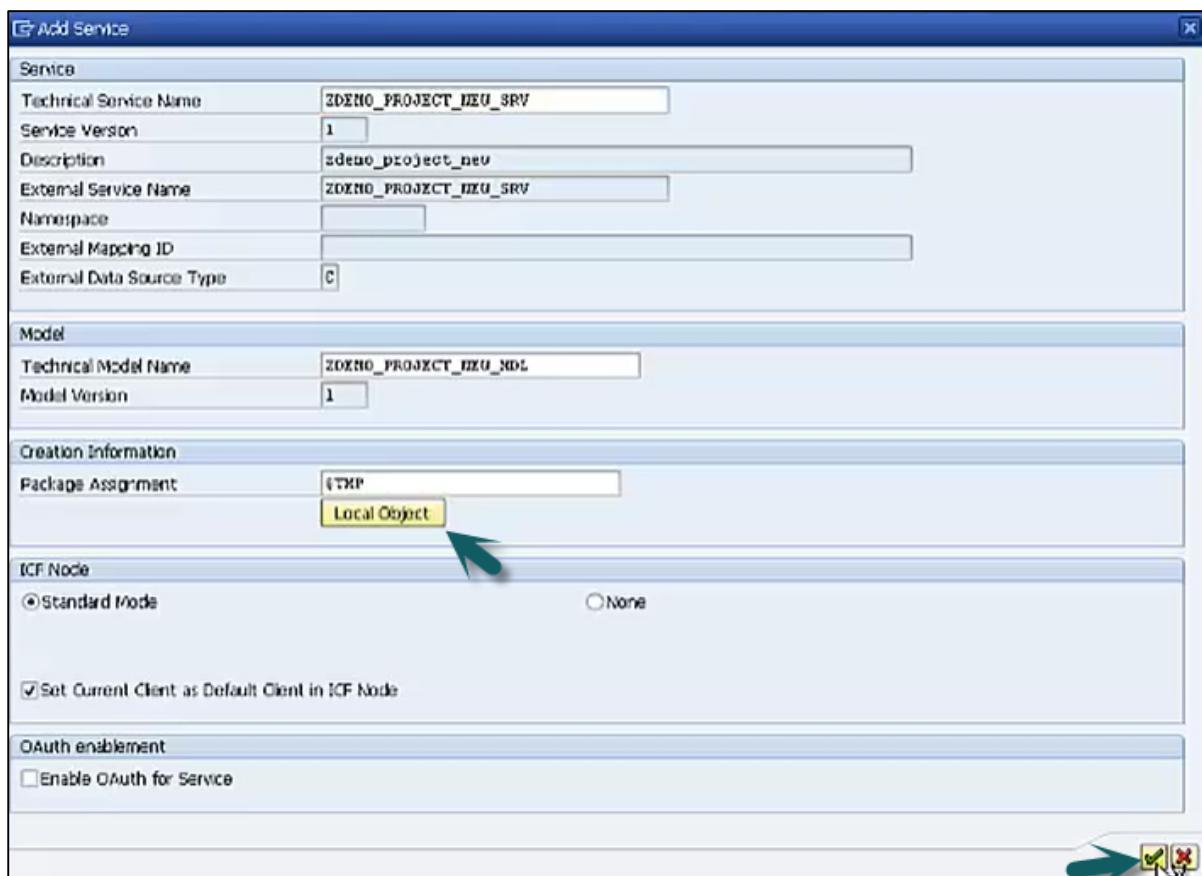
Go to **Data Model**. Double-click **Service Maintenance**.



Select the system you want to register and click the **Register** option at the top.



Select the **project -> Local Object** and then save by clicking the tick mark.



Check the **Service Registration** status.

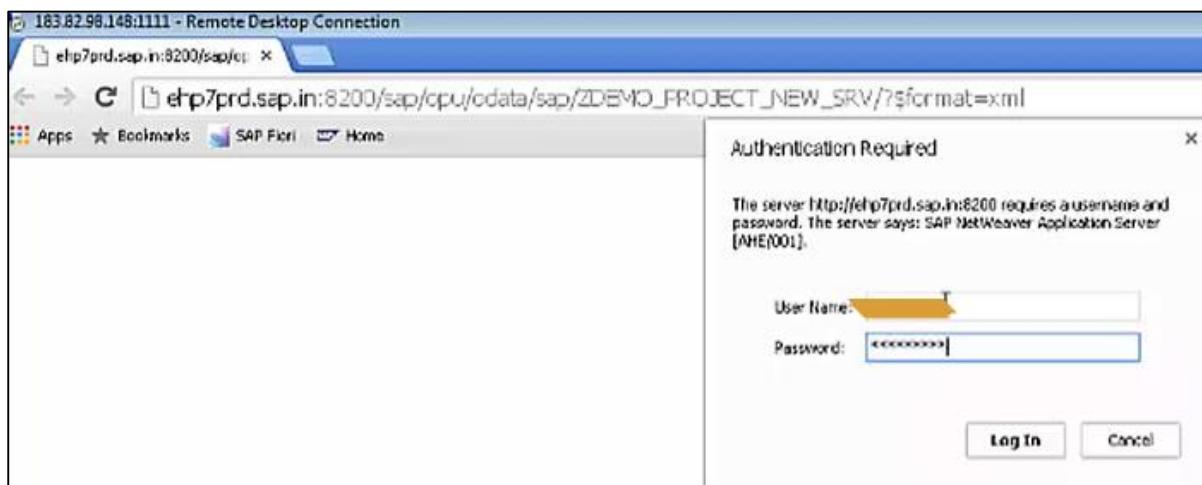


To maintain the service, click the **Maintain** button. Another window will open.

Click **Call browser** and select to use this service as URL. Click **OK**.



A browser will open; enter the user name and password to see if service is exposed as OData service.



7. SAP Fiori – Transactional Apps

The most important features of Transactional Apps are:

- The first release of SAP Fiori included 25 transactional apps.
- Transactional apps in SAP Fiori are used to perform transactional tasks like a manager-employee transactions such as leave request, travel requests, etc.
- Transactional Apps run best on SAP HANA database but can be deployed with any database with acceptable performance. These apps allow a user to run simple SAP transactions on the mobile devices as well as desktop or laptops.

Example: Leave Request, Travel Request, Purchase Order.

Configuration

Before starting the configuration for SAP Fiori Transactional Apps, complete infrastructure of SAP Fiori Apps must be installed.

Once it is installed, the next step is to configure front-end and back-end servers.

Step 1: Configuration of SAP Web Dispatcher

Prerequisites:

- You have implemented SAP Web Dispatcher and enabled it for multiple systems.
- You have enabled Single Sign-On (SSO)

Procedure:

- Configure SAP Web Dispatcher to use HTTPS requests
- Configure Web Dispatcher ports
- Configure SAP Web Dispatcher for SAP NetWeaver Gateway
- Configure SAP Web Dispatcher for Front-end server
- Define routing rules to required target system.

Step 2: Configuration of front-end server.

Step 3: Configuration of back-end server.

#	Server	Tasks	
1	SAP Web Dispatcher	Configure SAP Web Dispatcher	This is required for Fact Sheets
2	Back-end Server (Factsheets)	<ul style="list-style-type: none"> Configuring Enterprise Search Activate Search & Factsheet in the SAP Business Suite Foundation 	
3	Front-end Server	<ul style="list-style-type: none"> Configuring SAP NetWeaver Gateway <ul style="list-style-type: none"> Connect SAP NetWeaver Gateway to SAP Business Suite Create system alias for applications Activate Odata services Specify language settings Configuration of central UI add-on <ul style="list-style-type: none"> Setup of SAP Fiori Launchpad Configuration of product-specific UI add-on <ul style="list-style-type: none"> Activate ICF services Setup of catalogs, groups, and roles in the SAP Fiori Launchpad 	
4	Back-end server (transactional apps and fact sheets)	<ul style="list-style-type: none"> Roles, users, and authorizations on the back-end server <ul style="list-style-type: none"> Copying and adjusting roles Assigning users to roles 	

Transactional Apps run on any DB and does not require specifically HANA database to run like Fact Sheets and Analytical Apps.

Configuration Tips

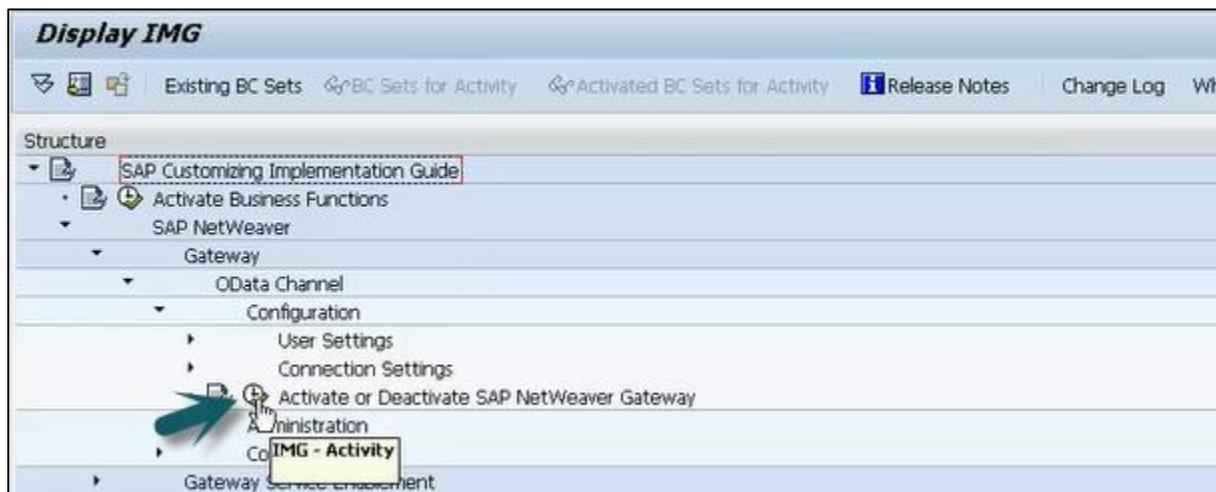
- All the SAP required notes are applied.
- Back-end system functions are up and running.
- To connect SAP NW Gateway to SAP Business suite, configure back end system as the 'trusting' system.
- Configure Gateway server as trusted system by creating a type 3 RFC destination on Gateway to back end.

More details are already provided under NetWeaver Gateway Configuration.

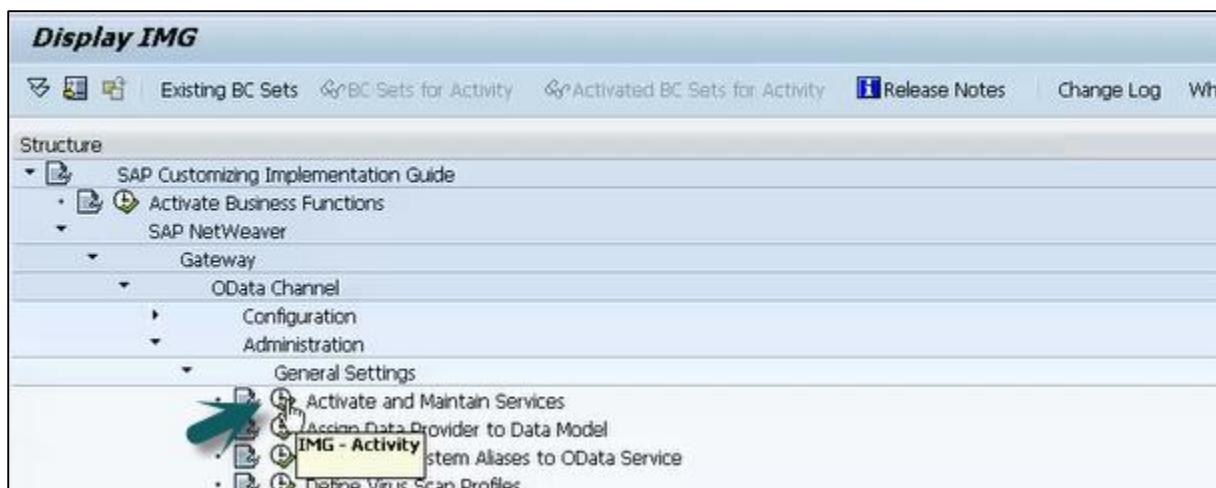
Create two system alias for the back-end system – One for the back-end system and another for the back-end flow.

Activate OData Services

T-Code: SPRO -> SAP Reference IMG



Activate and Maintain OData Service



Activate the services for Launchpad designer. Select the services for Launchpad designer and click the **ICF node -> Activate**.

Ensure that system alias should be local while activating these services.

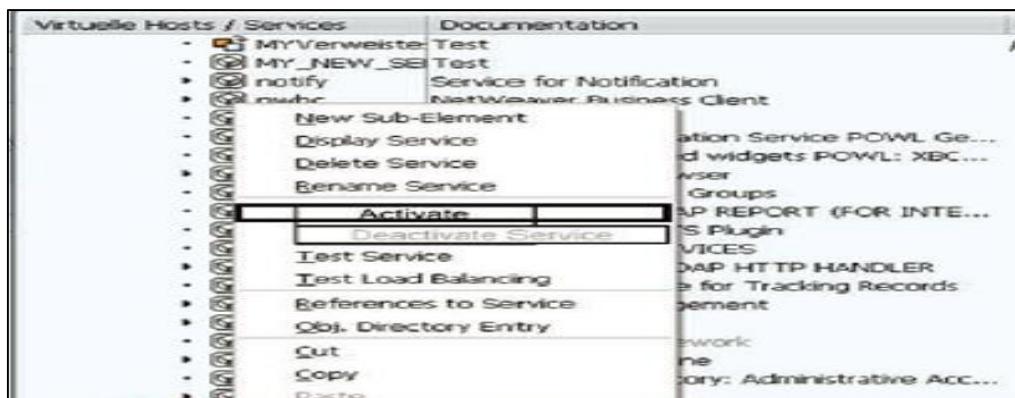
The screenshot shows the SAP Fiori interface for maintaining services. At the top, there's a toolbar with various icons and buttons like 'Add Service', 'Delete Service', 'Service Details', etc. Below the toolbar, the 'Service Catalog' section lists services categorized by type (e.g., BEP, ZTEST_SO_SRV) and provides details like service description and external service name. A yellow arrow points to the 'ZTEST_SO_SRV' entry. Below the catalog, there's a menu bar with 'Activate', 'Deactivate', 'Delete', and 'Configure (SICF)'. A green arrow points to the 'Activate' button. To the right, there's a 'System Aliases' section with a table showing SAP System Alias and Local System Alias. A blue arrow points to the 'LOCAL' alias entry.

Activate ICF Services

Use T-code: SICF -> Execute -> Default Host -> Follow

These ICF services must be activated:

- /sap/public/bc/ui5_ui5
- /sap/public/bc/ui2
- /sap/bc/ui2/start_up
- /sap/bc/ui5_ui5/ui2/launchpage
- /sap/bc/ui5_ui5/ui2/tilechips



Once OData and ICF services are activated, the next step is to configure SAP Fiori Launchpad. It includes:

- Setting up Navigation for applications
- Creating Catalogs and Tiles
- Assigning Catalogs to roles

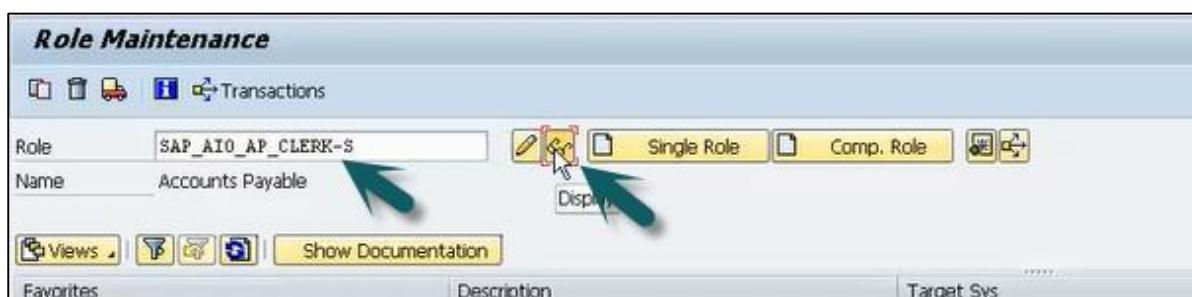
- Providing user access to launch page

Configure Back-End server

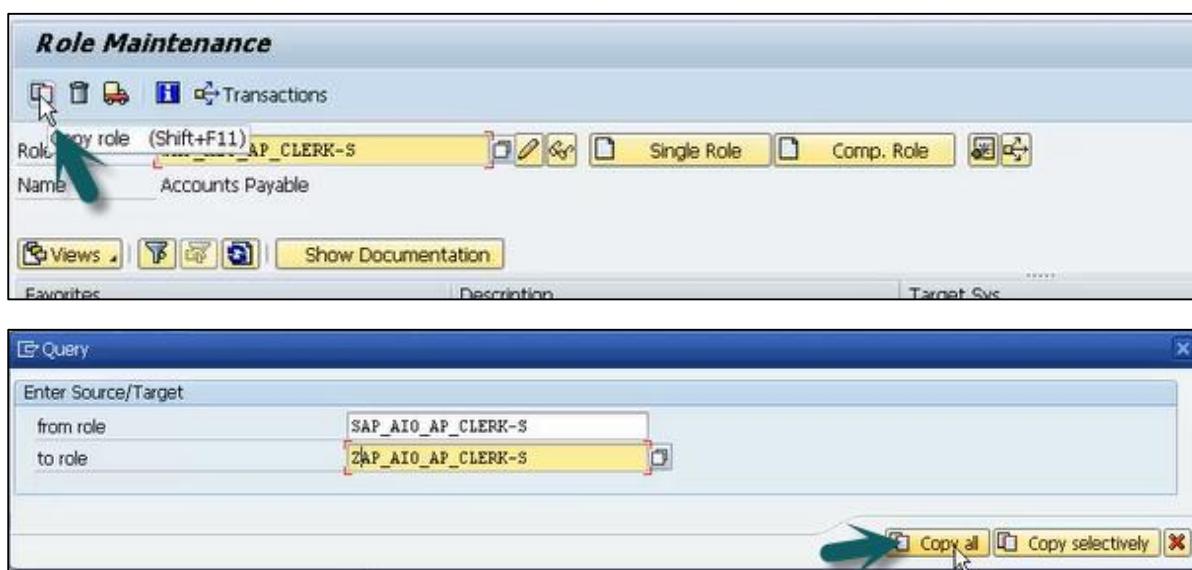
Use the T-code: **PFCG**



Search for the roles as above.



You can check Menu, authorizations and users to check further details. Go back to main service and click on copy role and then Save. .



8. SAP Fiori – Fact sheets

The important features of a Fact sheet are given below.

- Fact sheets are used to drill the key information and contextual information in business operations. In SAP Fiori tiles, you can drill down to further details.
- It also allows you to navigate one-fact sheet to all its related fact sheets.
- Fact sheets also allow you to navigate to **Transactional apps** to run SAP transactions. A few Fact sheets also provide an integration option of geographical maps.
- You can call Fact sheets from Fiori Launchpad search results, from other fact sheets or from Transactional or Analytical apps.
- Fact sheets only run on SAP HANA database and also require an ABAP stack and they cannot be ported to SAP HANA Live tier-2 architecture.

Example: There is a fact sheet app with the center objects having details about vendor contract. You can drill down to further details like vendor details, contract terms, item details, etc. **Configuration of Enterprise Search**

Activate UI Services

T-Code: **SICF** and activate the seven services given below.

Under the path **/default_host/sap/bc/webdynpro/sap**

- ESH_eng_Modeling
- Esh_eng_wizard
- Esh_search_results_ui
- Wdhc_help_center
- Under the path /default_host/sap/es/
- Cockpit
- Saplink
- Search

Connect Embedded Search and SAP HANA

Use the **T-Code: SE38**

In the program field, Enter **ESH ADM SET TREX DESTINATION**



The next step is to search RFC connection created earlier and assign the role: **SAP_ESH_LOCAL_ADMIN**

Create Connector

After setting up the above role, next is to run **T-Code: ESH_COCKPIT** and click **Create**.

Select the model you want to use with embedded search and click the create connector button.

The image consists of two screenshots. The top screenshot shows the 'Search Object Connectors' screen with a message: 'Here you can monitor and administrate search object connectors.' Below this is a toolbar with buttons for 'Status' (set to 'All (0)'), 'Refresh', 'Create' (highlighted with a red box and a green arrow pointing to it), 'Delete', 'Actions', 'System Settings', and 'Edit'. The bottom screenshot shows the 'Create Search Object Connector' screen. It has a header 'Select a Software Component' and a dropdown menu 'Software Component: NWECM_SEAR1' (highlighted with a red box and a green arrow pointing to it). Below this is a section 'Connector Templates' with a note: 'Select connector templates for which you want to create connectors. This function is intended for creating new connectors only. Connectors have already been created cannot be processed here.' At the bottom is a table with a single row: 'Template: NWECM_T_NODE' and 'Description: Enterprise Content Management Node Template'. The 'Create Connector' button at the top of this screen is also highlighted with a red box and a green arrow pointing to it.

Indexing of Connector

In Admin Cockpit, select the connector you want to index and click on activate. Select the search and analysis model and click on start so that the indexing starts immediately. Click OK.

Connector Name	Connected To	Action
▶ Search Connector	FIE004	Activate Deactivate Update Reset Prepare Indexing Schedule Indexing Continue Indexing Consistency Check Suspend All Indexing Processes Resume All Indexing Processes
▼ Search Software Component	FIE004	
▶ Tables	FIE004	
▶ Views	FIE004	
▶ Sending Cost Centers	FIE004	
▶ Service	FIE004	
▶ Service Entry Sheet	FIE004	

Activate Search and Fact Sheets in SAP Business Suite

SAP Fiori Search and Factsheets- HANA Search for SAP Business suite **BSESH_HANA_SEARCH**.

Enable Factsheets: HANA navigation for SAP Business suite **BSCBN_HANA_NAV**.

9. SAP Fiori – Analytical Apps

Analytical apps are used to provide role-based real time information about the business operations. Analytical apps integrate the power of SAP HANA with SAP business suite. It provides real time information from large volume of data in front-end web browser.

Using Analytical apps, you can closely monitor Key Performance indicators KPIs. You can perform complex aggregations and calculations of your business operations and react immediately as per the changes in the market condition.

SAP Fiori Analytical apps run on SAP HANA database and use Virtual data models.

There are two types of Analytical Apps:

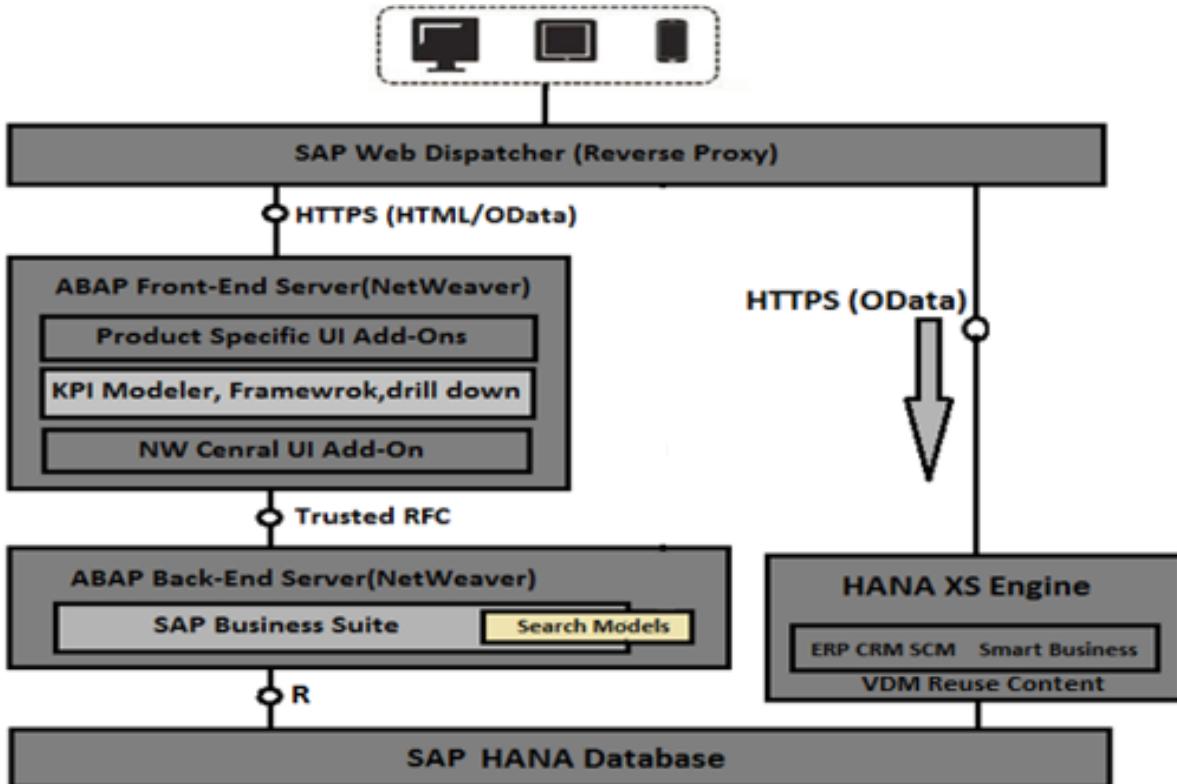
- SMART Business
- Virtual Data Models

SMART Business

SAP Fiori smart business apps are used to monitor your most important KPI's in the real time and to make changes as per market conditions immediately.

Note: There are around 84 Analytical apps under this umbrella and out of these, you have 69 apps are smart business apps and rest 15 are Analytical Apps.

Architecture of Analytical and SMART Business Apps



Analytical apps can run only on SAP HANA database, unlike transactional apps that can run on any database. SAP Fiori leverages XS engine by using virtual data models and within XS engine, there are 2 components:

- HANA Live Apps content for respective business suite
- SMART business content

SAP HANA Live provides exceptional capability analytics for all business suite by enabling industry standard access to SAP data through data models.

The **data models** are used for analytical purpose using **views** in HANA database. The views form a virtual data model that a customer and partner can reuse.

Virtual Data Models

Virtual Data Models provide a way to process massive quality of data in HANA database. A UI rich client can consume these views without the use of any additional software. There are three types of view:

- **Private View:** Private views are SAP views and you cannot modify these views.
- **Reuse View:** Reuse views are heart of SAP HANA model and they expose the data in structural way and they are designed to be reused by other views.
- **Query View:** Query views are top views in hierarchy and designed for direct consumption by Analytical apps and cannot be altered.

KPI Modeler

It is a tool used to model KPI and report tiles for monitoring the business data using Fiori Launchpad.

You can define KPIs and reports to which you can apply different calculations and it enables you to make adjustment according to changing market conditions.

You can configure **drill-down views**.

10. SAP Fiori – Theme Designer

The UI theme designer is a browser-based tool that allows you to develop your themes by modifying one of the theme templates provided by SAP.

Example: You can change the color scheme, or add your company's logo. The tool provides a live preview of the theme while you are designing.

Apply your corporate branding and look to applications built with SAP UI technologies. The UI theme designer is a browser-based tool for cross-theming scenarios. Use it to build your corporate identity themes easily by modifying one of the theme templates provided by SAP. For example, you can change the color scheme, or add your company's logo. The tool is targeted at different user groups, including developers, visual designers, and administrators.

Supported Platform

- SAP NetWeaver as ABAP (via UI Add-On 1.0 SP4)
- SAP NetWeaver Portal (7.30 SP10 and higher version)
- SAP HANA Cloud (Planned)
- SAP NetWeaver Portal (7.02 Planned)

Key Features and Benefits

The key features and benefits are as given below.

- **Browser-based, graphical WYSIWYG editor:** Change the values of theming parameters and immediately see how it affects the visualization of the selected preview page.
- **Build-in preview pages:** Select built-in preview pages to see what your custom theme will look like when it is applied to an application.
- **Application previews:** Example: Purchase Order Approval, SAP Fiori Launchpad
- **Control previews.**

Different levels of theming

- Quick theming (basic cross-technology theme settings).
- Expert theming (technology-specific theme settings).
- Manual LESS or CSS editing.
- Color palette for reuse: Specify a set of parameters with the main color values defining your corporate branding

- Cross-technology theming: Create one consistent theme that applies to various SAP UI clients and technologies.
- SAPUI5 standard libraries (including SAP Fiori applications and SAP Fiori Launchpad)
- Unified Rendering technologies (such as Web Dynpro ABAP and Floorplan Manager)
- SAP NetWeaver Business Client

SAP UI Client	UI parts can be themed
Web Dynpro ABAP	<p>You can theme applications that do not use the following UI elements:</p> <p>HTMLIsland HTMLContainer Chart FlashIsland SilverlightIsland BusinessGraphics</p> <p>You can only consume themes created with the UI theme designer for Web Dynpro ABAP applications as of SAP NetWeaver 7.0 EHP2.</p>
Floorplan Manager for Web Dynpro ABAP (FPM)	You can theme applications that do not use HTMLIslands or Chart UIBBs.
SAPUI5	You can theme SAP standard libraries. Custom SAPUI5 libraries cannot be themed.
SAP NetWeaver Business Client (NWBC)	<ul style="list-style-type: none"> • NWBC for Desktop (4.0 or higher): You can theme NWBC shell and overview pages (index page, new tab page, service map). • NWBC for HTML (3.6): You can theme the service map. The shell cannot be themed.

How to Call Theme Designer in SAP Fiori?

Login to SAP Fiori Front-end server.

You can use T-Code: **Theme Designer** or use shortcut as shown below and login.



Once you login, you will see all the default templates provided by SAP for Theme Designer. Select the default theme and click **Open**.

The screenshot shows the SAP UI Theme Designer interface. At the top, there is a toolbar with buttons for Open, Duplicate, Rename, Rebuild, and Delete. Below the toolbar is a table listing themes:

Theme ID	Title
sap_bluecrystal	SAP Blue Crystal
sap_chrome	SAP Chrome
sap_corbu Click to Select	SAP Corbu
sap_goldreflection	SAP Gold Reflection
sap_hcb	SAP High Contrast Black
sap_standard	SAP Streamline
sap_tradeshow	SAP Tradeshow

Below the theme list is a section titled 'Add Target Content'. It includes fields for 'Link to Application:' and 'Name of Application:', both with placeholder text. There is also a 'Test Suites' section with links to SAPUI5 Control Previews, SAPUI5 Application Previews, and UR Control Previews.

Enter the Fiori Launchpad link and Name of the application and click **ADD**.

Add Target Content

Application

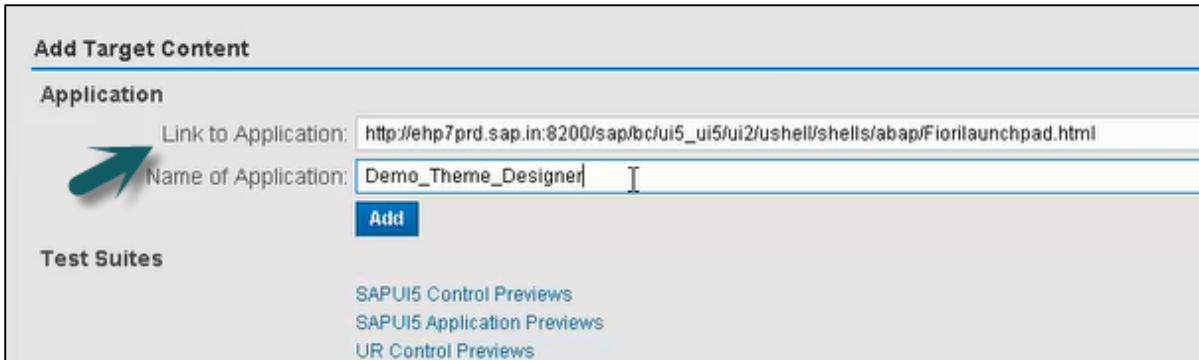
Link to Application: <http://ehp7prd.sap.in:8200/sap/bc/ui5/ui2/ushell/shells/abap/Fiorilaunchpad.html>

Name of Application: Demo_Theme_Designer 

Add

Test Suites

SAPUI5 Control Previews
SAPUI5 Application Previews
UR Control Previews



Custom Blue Crystal

ORIGINAL PREVIEW

Target Pages

Applications

- Demo_Theme_Designer
- SAPUI5 Control Previews
- SAPUI5 Application Previews
- UR Control Previews

PREVIEW

My Home

My Spend

Cannot load tile

Cannot load tile

My Time

Displays static text and i...

Cannot load tile

Cannot load tile

Quick

Color

- Background Color: #2f2f2f
- Background Gradient Color: #178299
- Base Color: #808080
- Brand Color: #009de0
- Highlight Color: #007cc0

Font

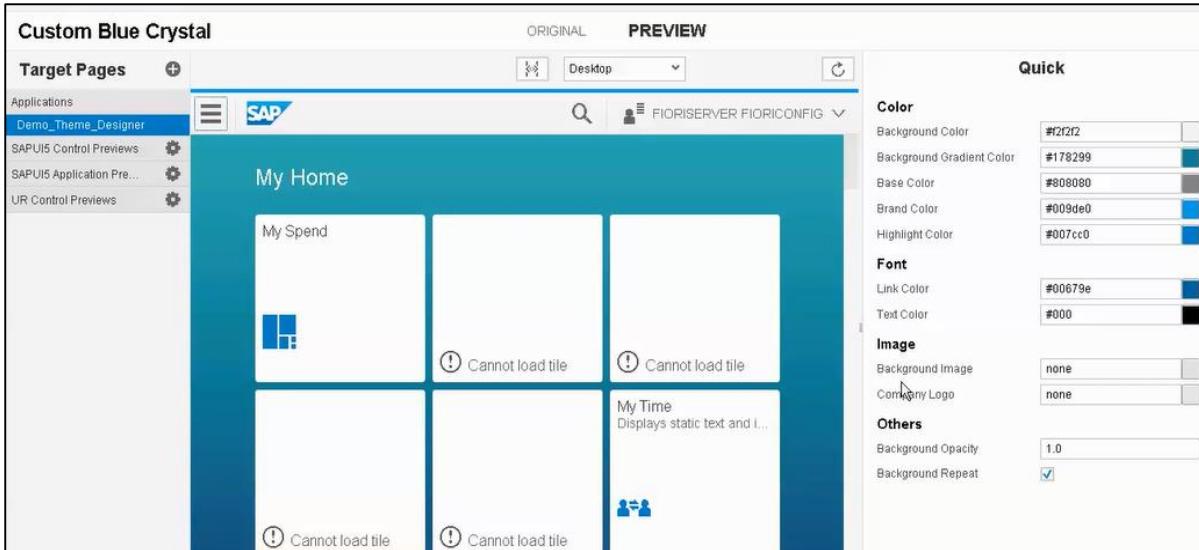
- Link Color: #00679e
- Text Color: #000

Image

- Background Image: none
- Company Logo: none

Others

- Background Opacity: 1.0
- Background Repeat: checked



From right side, you can select Color, font, Image and other properties. You can edit colors as shown in the snapshot given below.

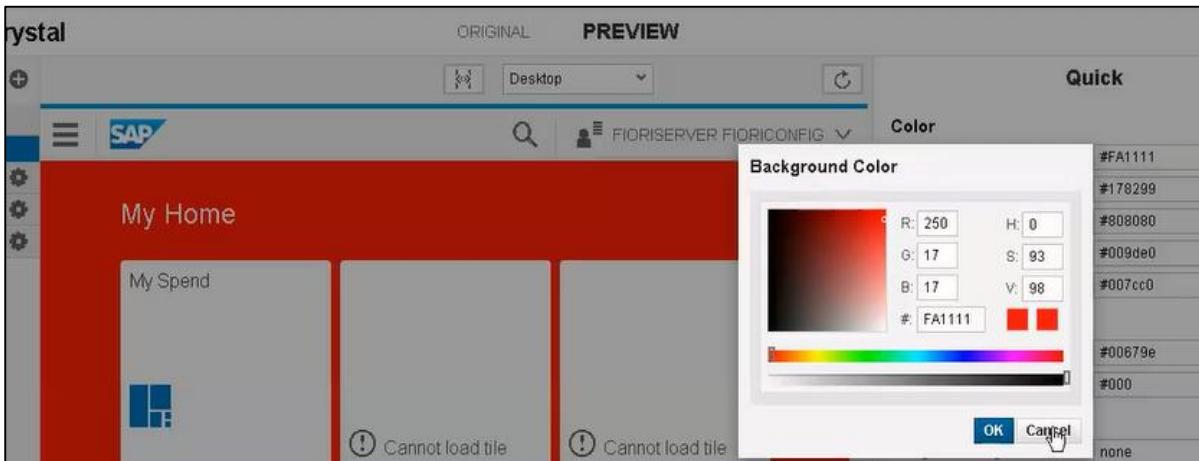
Crystal

ORIGINAL PREVIEW

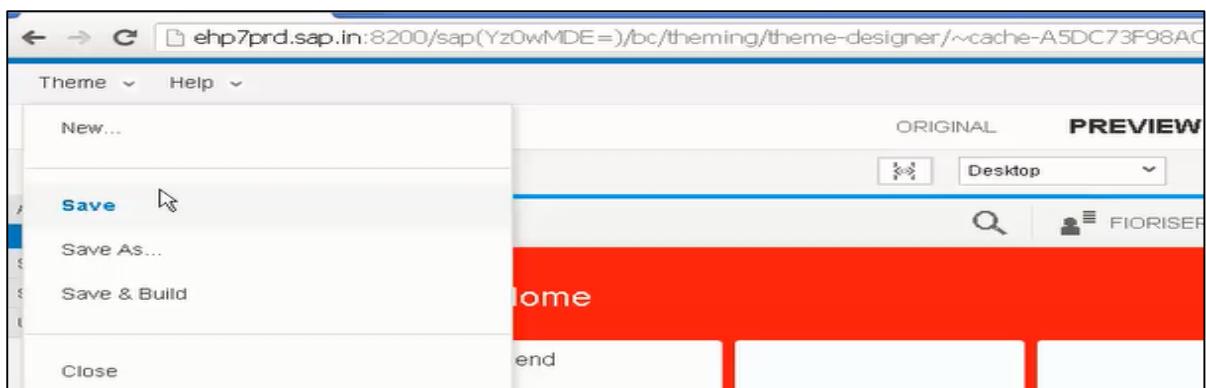
Color

Background Color

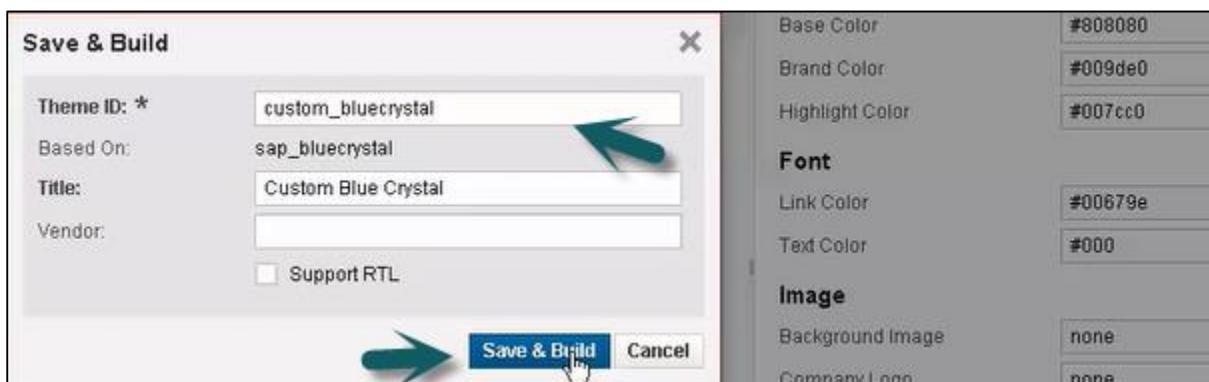
R: 250	H: 0
G: 17	S: 93
B: 17	V: 98
#: FA1111	Color Swatches



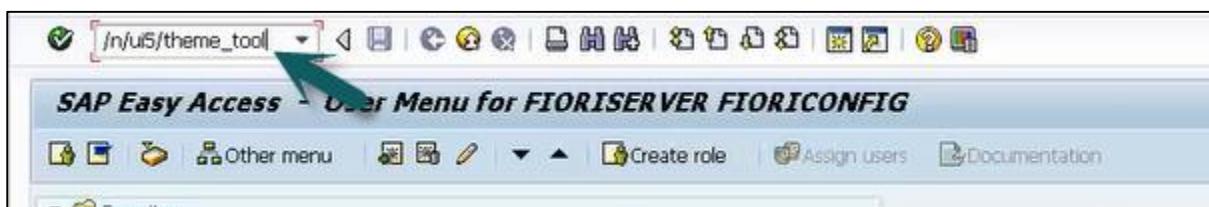
To save the Theme click the save icon as shown below. You also have an option to save and build option.



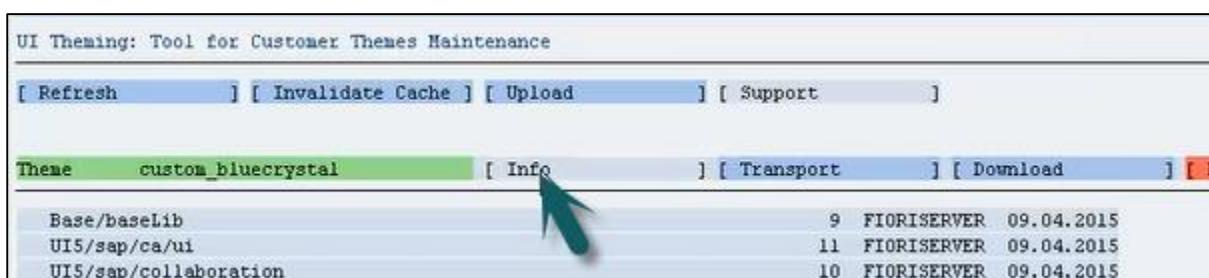
Once you select **Save and Build**, it will start saving and once it is completed, you will get a confirmation Save and Build completed.



To get the link of this Custom Theme, use **T-code:theme_tool**.



Select the Theme that you have created and click the Info tab.



Use Ctrl+Y to copy the URL from the screen and make a note of this.



11. SAP Fiori – Security

Securing SAP Fiori system ensures that the information and processes support your business needs, are secured without any unauthorized access to critical information.

You must ensure that the user errors, negligence, or attempted manipulation of your system must not result in loss of information or processing time.

All these security policies should apply to all components in a Fiori system.

Managing users in SAP Fiori:

- To manage SAP Fiori transactional apps, you should have below users:
- Users in SAP NetWeaver Gateway and ABAP front-end server
- User in the ABAP back-end server

Authentication Methods

While launching SAP Fiori app, the request is sent from the client to the ABAP front-end server by the SAP Fiori Launchpad via Web Dispatcher. ABAP front-end server authenticates the user when this request is sent. To authenticate the user, the ABAP front-end server uses the authentication and single sign-on (SSO) mechanisms provided by SAP NetWeaver. The mechanism mentioned below can be used for authentication:

1. SPNEGO/KERBEROS

SPNEGO is used when a client application wants to authenticate to a remote server, but neither end is sure what authentication protocols the other supports. The pseudo-mechanism uses a protocol to determine what common GSSAPI mechanisms are available, selects one and then dispatches all further security operations to it. This can help organizations deploy new security mechanisms in a phased manner.

2. SAP Logon Tickets

SAP Logon Tickets represent user credentials in SAP systems. When enabled, users can access multiple SAP applications and services through SAPgui and web browsers without further username and password inputs from the user. SAP Logon Tickets can also be a vehicle for enabling single sign-on across SAP boundaries; in some cases, logon tickets can be used to authenticate into third party applications such as Microsoft-based web applications.

3. X.509 Certificates

An X.509 certificate contains information about the identity to which a certificate is issued and the identity that issued it. Many of the certificates that people refer to as Secure Sockets Layer (SSL) certificates are in fact **X.509** certificates.

Authentication in the Back-End Systems

Once initial authentication is done on the ABAP front-end server, a security session is established between the client and the ABAP front-end server.

This allows SAP Fiori apps and Launchpad to send OData requests to the ABAP back-end server. These requests are communicated securely by using trusted RFC.

Secure Network Communication SNC

Secure Network Communications (SNC) integrates **SAPNetWeaver** Single Sign-On or an external security product with SAP systems. With SNC, you strengthen security by using additional security functions provided by a security product that are not directly available with SAP systems.

SNC protects the data communication paths between the various client and server components of the SAP system that use the SAP protocols RFC or DIAG. There are well-known cryptographic algorithms that have been implemented by the various security products, and with SNC, you can apply these algorithms to your data for increased protection.

Important Features:

- SNC secures the data communication paths between the various SAP system client and server components. There are well-known cryptographic algorithms that have been implemented by security products supported and with SNC, you can apply these algorithms to your data for increased protection.
- With SNC, you receive application-level, end-to-end security. All communication that takes place between two SNC-protected components is secured.
- Additional security features like Smart cards can be used that SAP does not directly provide.
- You can change the security product at any time without affecting the SAP business applications.

Levels of Protection

You can apply three levels of security protection. They are:

- Authentication only
- Integrity protection
- Privacy protection

Authentication only

When using authentication only, the system verifies the identity of the communication partners. This is the minimum protection level offered by SNC.

Integrity Protection

When using integrity protection, the system detects any changes or manipulation of the data, which may have occurred between the two ends of a communication.

Privacy Protection

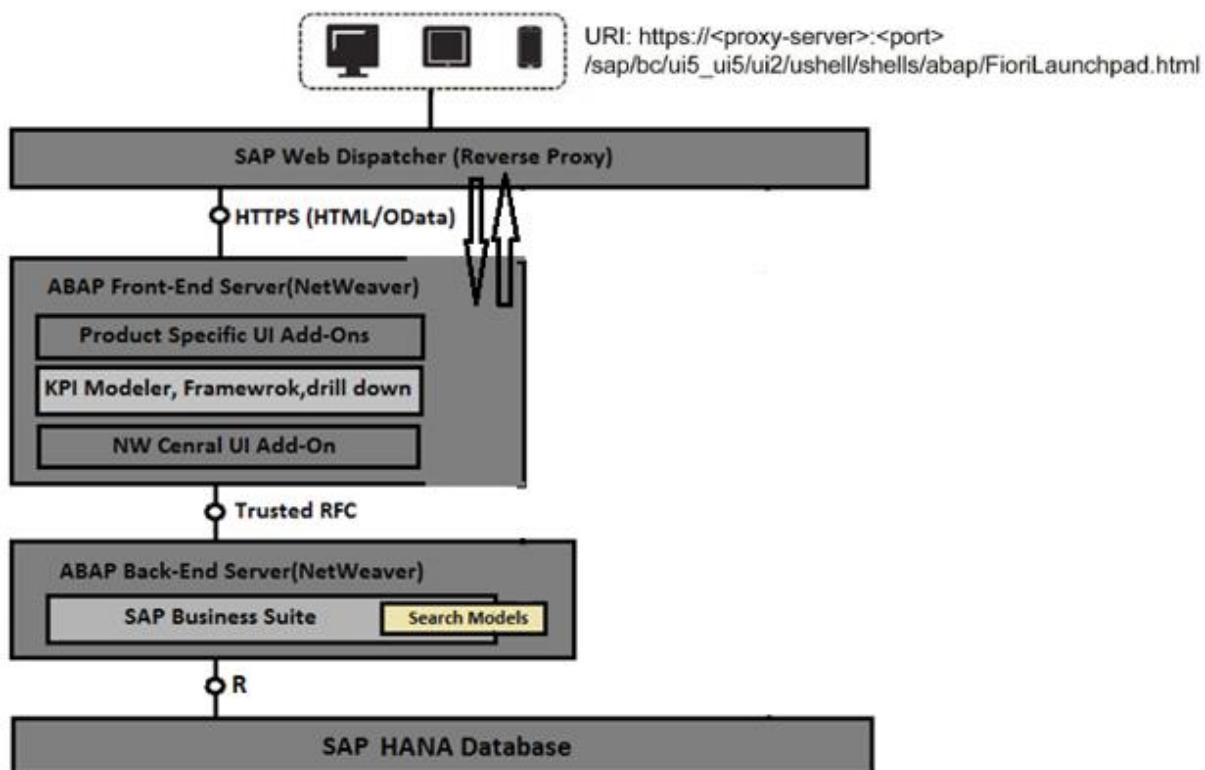
When using privacy protection, the system encrypts the messages being transferred to make eavesdropping useless. Privacy protection also includes integrity protection of the data. This is the maximum level of protection provided by SNC.

12. SAP Fiori – Data Flow

SAP Fiori Data Flow covers the data flow process in Fiori system landscape when a request is made via Launchpad by a user. This includes run time data flow in front-end server and back-end server.

Front-end server - Web server and OData Proxy.

Back End server - OData provider.



- SAP Fiori uses **HTTP/HTTPS** protocol. It is a request-response runtime architecture.
- UI Objects and Launchpad data are stored in front-end server. When Launchpad is called, the app reads Launchpad definition via OData service call.
- **/UI2/PAGE_BUILDER_PERS** is one of the OData service for Launchpad.

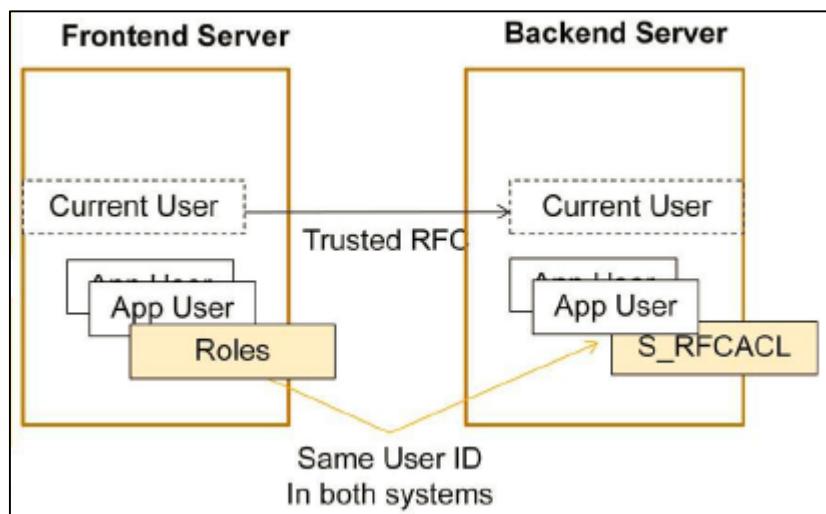
Front-end Server in Fiori Data Flow

- SAP Fiori Front-end server acts as Web server (HTTPS).
- It contains all registered OData services and acts as an end point for OData service.
- It also contains UI and Launchpad objects.

- All Front-end users are defined in Front-end server and they are assigned with correct roles.
- To communicate with Back End system, it uses an alias for back end system and interacts with back end server using trusted RFC connection.
- Fiori app calls OData service to get some data. Gateway system in front-end server knows the system alias for services and helps in getting data from back end system.

Back-end server in Fiori Data flow

- Back End server contains SAP Business suite 7 for key applications like ERP, CRM, SRM, SCM, etc.
- It contains application data and used for customization of applications.
- This system contains 2 OData classes:
- Model Provider
- Data Provider
- To access Back end system, application users created on Front-end server should have an authorization **S_RFCACL**. This authorization should be assigned to the users in Business suite.



The connection between front-end server to back-end server must be trusted RFC connection. It means same ID is authenticated to back-end system without entering the password. As mentioned earlier, the user Id should have **S_RFCACL** authorization for trusted logon.

A User should have UI roles assigned in Front-end server and back-end roles in back-end server.

How to Check Data Flow in SAP Fiori?

Go to Launchpad, right click on **grey area** -> **Inspect Element**.



If you click the **Network** tab, you will not see anything. Now refresh the Launchpad browser link and see the call to different services.

Name	Status	Type	Initiator
messagebundle-preload_en.js	200	xhr	abap.js:2
sap-launch-icons.ttf	200	font	core-min-0.js
library-parameters.json	200	xhr	abap.js:2
SAP-Icons.ttf	200	font	core-min-0.js
FeedbackLegalTexts('1')	200	xhr	abap.js:2
applauncher.chip.xml	200	xhr	abap.js:2

OData service URL link, open in new tab.

Other	5.2...	26...
Fiorilau...	24...	12...
Fiorilau...	24...	16...
Fiorilau...	24...	15...
Fiorilau...	24...	16...
Fiorilau...	24...	15...
abap.js:2	1.5...	88...
abap.js:2	7.0...	1.2...

[http://ehp7prd.sap.in:8200/sap/opu/odata/UI2/PAGE_BUILDER_PERS/PageSets\('962FUI2%2FFiori2LaunchpadHome'\)\\$expand=Pages/PageChipInstances/Chip/ChipBags/ChipProperties,Pages/PageChipInstances/RemoteCat](http://ehp7prd.sap.in:8200/sap/opu/odata/UI2/PAGE_BUILDER_PERS/PageSets('962FUI2%2FFiori2LaunchpadHome')$expand=Pages/PageChipInstances/Chip/ChipBags/ChipProperties,Pages/PageChipInstances/RemoteCat)

You can search for My App in OData service details:

```
<content type="application/xml">
  <m:properties>
    <d:id>
      X-SAP-UI2-PAGE:X-SAP-UI2-CATALOGPAGE:Z_HCM_Time:00012TR8XGIV5173461CQ2JLR
    </d:id>
    <d:title>My Time</d:title>
    <d:description/>
  </m:properties>
  <d:configuration>
    {"tileConfiguration": {"display_icon_url": "sap-icon://Fiori2/F0009", "display_info_text": "\\", "display_title_text": "My Time"}, "display_subtitle_text": "Displays static text and icons that can be configured.", "navigation_use_semantic_object": true, "navigation_target_url": "#TimeEntry-createTimeEntry", "navigation_semantic_object": "TimeEntry", "navigation_semantic_action": "createTimeEntry", "navigation_s
  </d:configuration>
</content>
```

13. SAP Fiori – Workflow

Work flow ensures that right work is brought in the right sequence at the right time to the right people. There are various SAP applications like **ERP**, **SCM**, **HCM**, etc. Therefore, when a document is created, changed or deleted, the application creates an event.

SAP Business workflow is used to capture these events and handle work items as per templates. Workflow engines delivers the work items to responsible person's inbox.

SAP Business Workflow T-Codes

Some important Business Workflow T-Codes are given below.

PFTC	Workflow Task
SWDM	Business Workflow Explorer
SWDD	Workflow Builder
SWO1	Business Object Builder
SWETPYV	Display and maintain event type linkage
SBWP	Business Workplace
SWI1	Selection report for work items
SWEL	Display Event Trace
PPOMW	Maintain organizational plan
PFTC_INS / _CHG / _DIS / _COP	Create / Change / Display /Copy Tasks
PFAC_INS / _CHG / _DIS	Create / Change / Display Rules
PFCG_INS / _CHG / _DIS	Create / Change / Display Roles

How to add custom Workflow scenarios?

To add custom workflow scenarios in Fiori, follow the steps given below in front-end and back-end system.

Step 1: Get Workflow definitions.

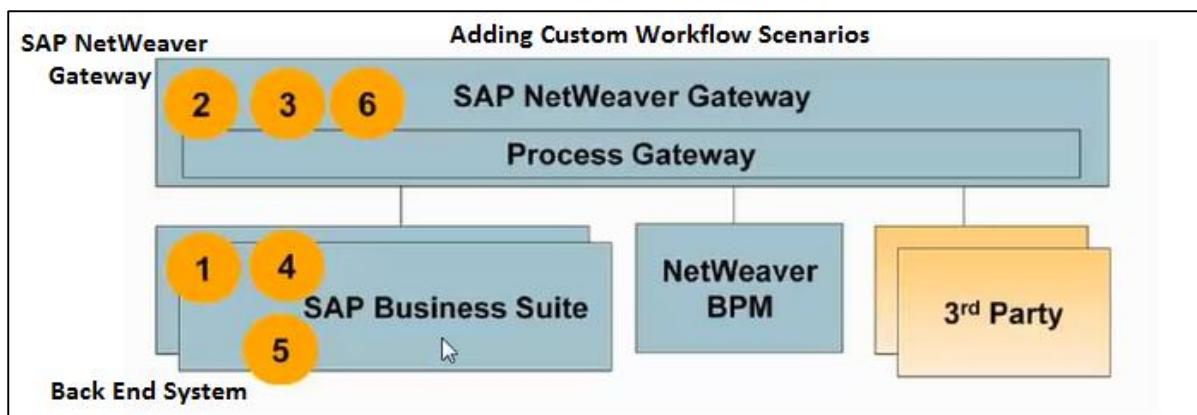
Step 2: Define the scenarios for workflow.

Step 3: Add a tile to Fiori Launchpad.

Step 4: Decision options definition.

Step 5: BADI implementation for decision update.

Step 6: Display Application data.



How to configure Work Flow in Fiori?

Step 1: Login to back-end System.

T-Code: SWI2_FREQ



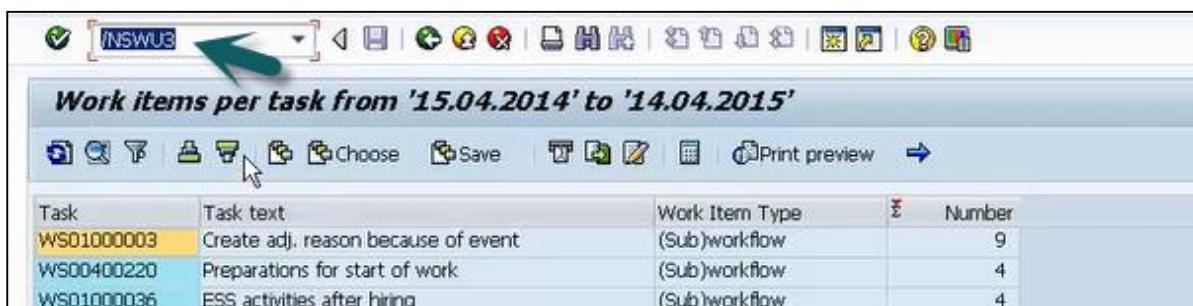
Step 2: Enter Monitoring period and work item type and click **Execute**.

The screenshot shows the "Access to Work Item Analysis (SWI2)" dialog box. The "Monitoring period" section includes radio buttons for "Today", "Last 7 days", "Last 30 days", "Last 365 days", "Time", and "Interval". The "Last 365 days" option is selected. The "Work item type" section includes checkboxes for "Dialog", "(Sub-)Workflow", and "Background". The "(Sub-)Workflow" checkbox is checked. A green arrow points to the "Monitoring period" section, and another green arrow points to the "Work item type" section.

Step 3: It will show all existing templates in the system.

Work items per task from '15.04.2014' to '14.04.2015'				
Task	Task text	Work Item Type	Σ	Number
WS01000003	Create adj. reason because of event	(Sub)workflow	9	
WS00400220	Preparations for start of work	(Sub)workflow	4	
WS01000036	ESS activities after hiring	(Sub)workflow	4	
WS98000284	sales order creation	(Sub)workflow	4	
WS01000009	Check if the employee is locked	(Sub)workflow	3	
WS53800008	Purchase Order Information	(Sub)workflow	3	
WS30100051	Workflow system verification	(Sub)workflow	2	
WS51000005	Postprocess PPO Order from MDS	(Sub)workflow	1	
WS51900008	Create Object	(Sub)workflow	1	
WS51900010	Status Change (as of BF E-Recruiting 2)	(Sub)workflow	1	

Step 4: Now use Run T-code: /nswu3



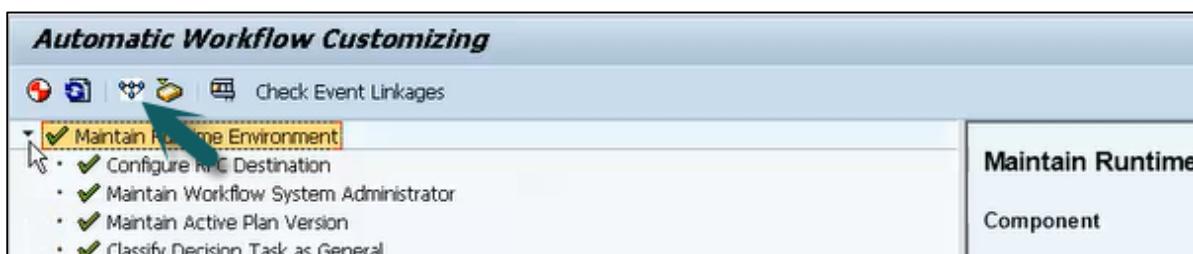
Work items per task from '15.04.2014' to '14.04.2015'				
Task	Task text	Work Item Type	Σ	Number
WS01000003	Create adj. reason because of event	(Sub)workflow	9	
WS00400220	Preparations for start of work	(Sub)workflow	4	
WS01000036	ESS activities after hiring	(Sub)workflow	4	

Step 5: Expand **Maintain run time environment** to check if all the nodes are green.

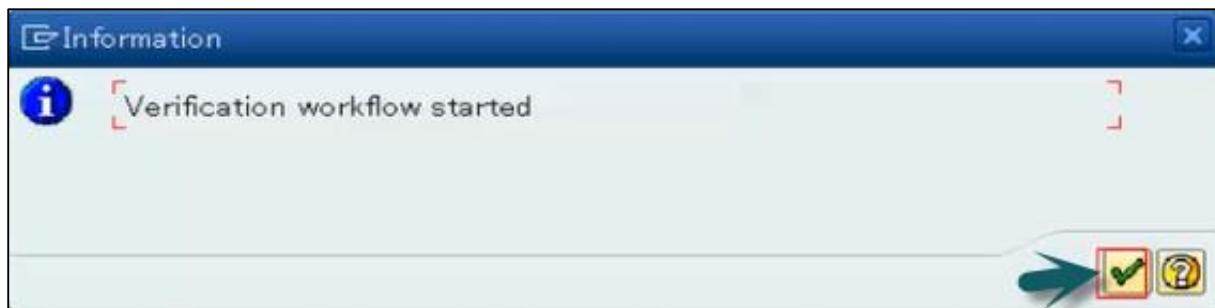


Automatic Workflow Customizing				
 Check Event Linkages				
 Maintain Runtime Environment <ul style="list-style-type: none"> ✓ Configure RFC Destination ✓ Maintain Workflow System Administrator ✓ Maintain Active Plan Version ✓ Classify Decision Task as General ✓ Document Generation/Form Integration ✓ Maintain Time Units ✓ Schedule Background Job for Workflow Deadline Monitoring ✓ Schedule Background Job for Work Items with Errors ✓ Schedule Background Job for Condition Evaluation ✓ Schedule Background Job for Event Queue 				Maintain Runtime Component SAP_BASIS: SAP Business Execution Automatic/Manual Function
 Check Event Linkages				

Step 6: Click the **start verification workflow** option at the top.



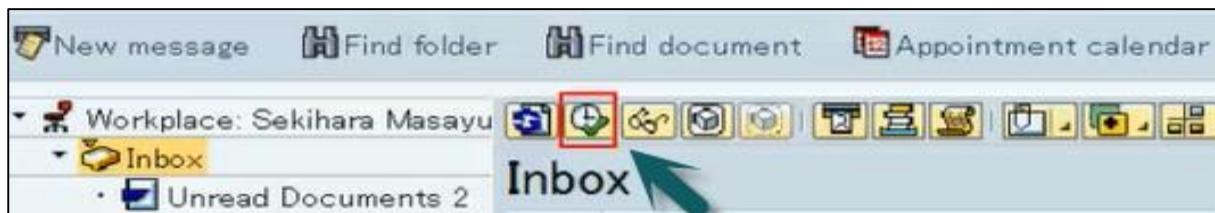
Automatic Workflow Customizing				
 Check Event Linkages				
 Maintain Runtime Environment <ul style="list-style-type: none"> ✓ Configure RFC Destination ✓ Maintain Workflow System Administrator ✓ Maintain Active Plan Version ✓ Classify Decision Task as General 				Maintain Runtime Component



Step 6: Click the **SAP Business Workflow** button.



Step 7: Click the **Execute** button. A new window will open.



Step 8: Select **Execute background** step from the new window. Select document folder to get complete email notification of workflow.

14. SAP Fiori – Extension

SAP Fiori Apps can be extended by changing one or multiple content layers and it depends on the requirement of extension and Application type.

SAP Fiori steps for Extensibility of Transactional Apps

Steps related to ABAP Back End BAdi Enhancement

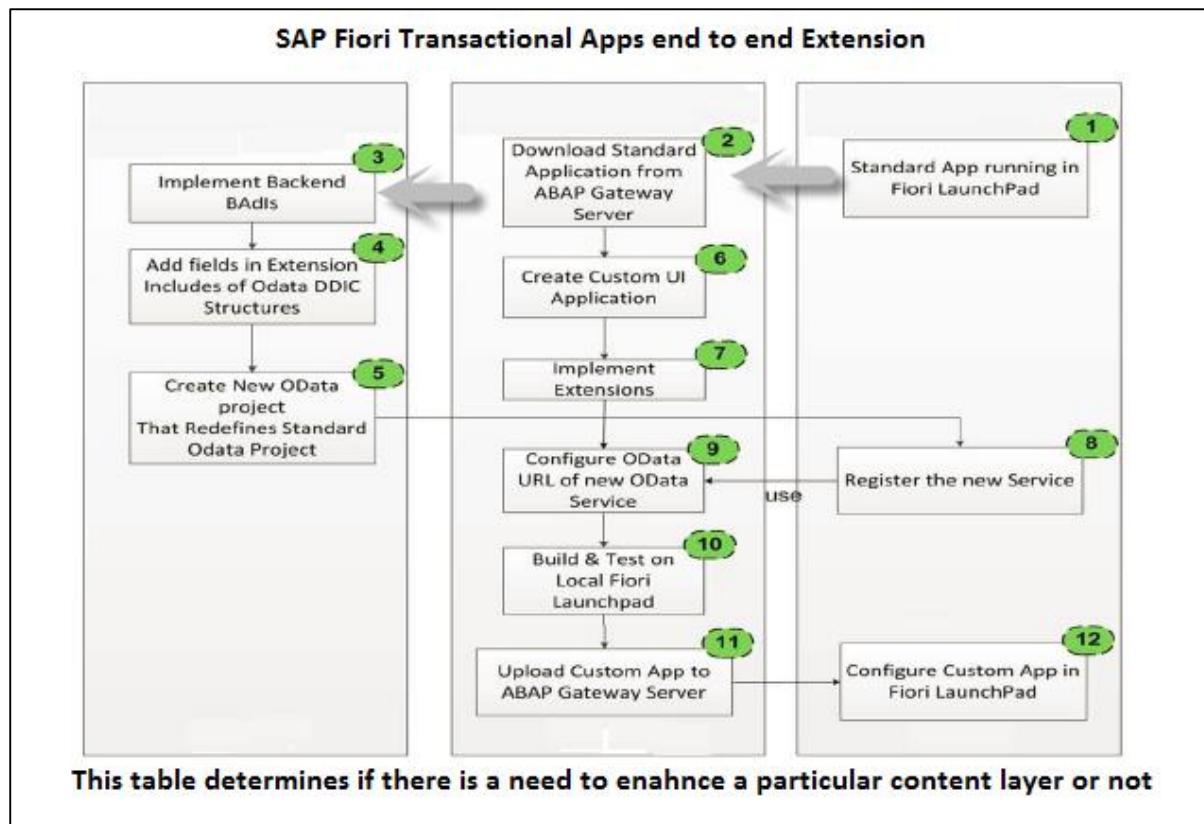
- Implement Back-end BAdis
- Add fields in extension includes of OData DDIC structure
- Create new OData project that redefines standard OData project

Steps related to UI Development

- Download standard App from ABAP Gateway
- Create Custom UI Application
- Implement Extensions
- Configure OData URL of new OData service
- Build and Test on local Fiori Launchpad
- Upload Custom app to ABAP Gateway Server

Steps related to ABAP Gateway Server

- Standard App running in Fiori Launchpad
- Register the new service
- Configure custom app in Fiori Launchpad
- All these steps are linked to each other and below table defines if there is a need to extend a particular layer.



To extend a SAP Fiori Application, the skills and tools required are given below.

Content Layer	ABAP	Business Suite	SAP NetWeaver Gateway	HANA Native Development	SAP UI5	OData Protocol HTML5, Java script	SAP Fiori specific UI development
Business Suite	✗	✗					
Gateway	✗		✗				
HANA				✗			
UI					✗	✗	✗
Search Model	✗	✗					

15. SAP Fiori – UI5 Concepts

SAP UI5 is a Java script based framework that is used to design multi-platform business applications. It supports various data models and views do desktop and mobile applications. SAP UI5 compiles on open Ajax and can be combined with java script libraries.

SAP UI5 was initially named phoenix that was later changed to **SAP UI5** in 2011.

Key UI Technologies

- Web Dynpro ABAP and Floorplan manager tool can be used for creating new applications.
- SAP UI5 and UI5 application development tools to change adapt or develop new applications.
- SAP Dynpro is used to include Screen Personas for GUI optimization

Characteristics of SAP UI5

The characteristics of SAP UI5 are as follows:

- Well Designed models, easy to consume.
- Performance optimized with compliant of SAP standards
- Support Ajax open source
- Includes JavaScript library
- Extensible UI component model
- Based on open standards like Ajax, JavaScript, CSS, and HTML 5.

Key Components – Client and Server SAP UI5:

Client

- JavaScript library, Image files
- Core JavaScript files
- Test suite HTML and JavaScript files

Server

- Application development tools
- Theming Generator
- Resource handler in Java
- Control Development tools

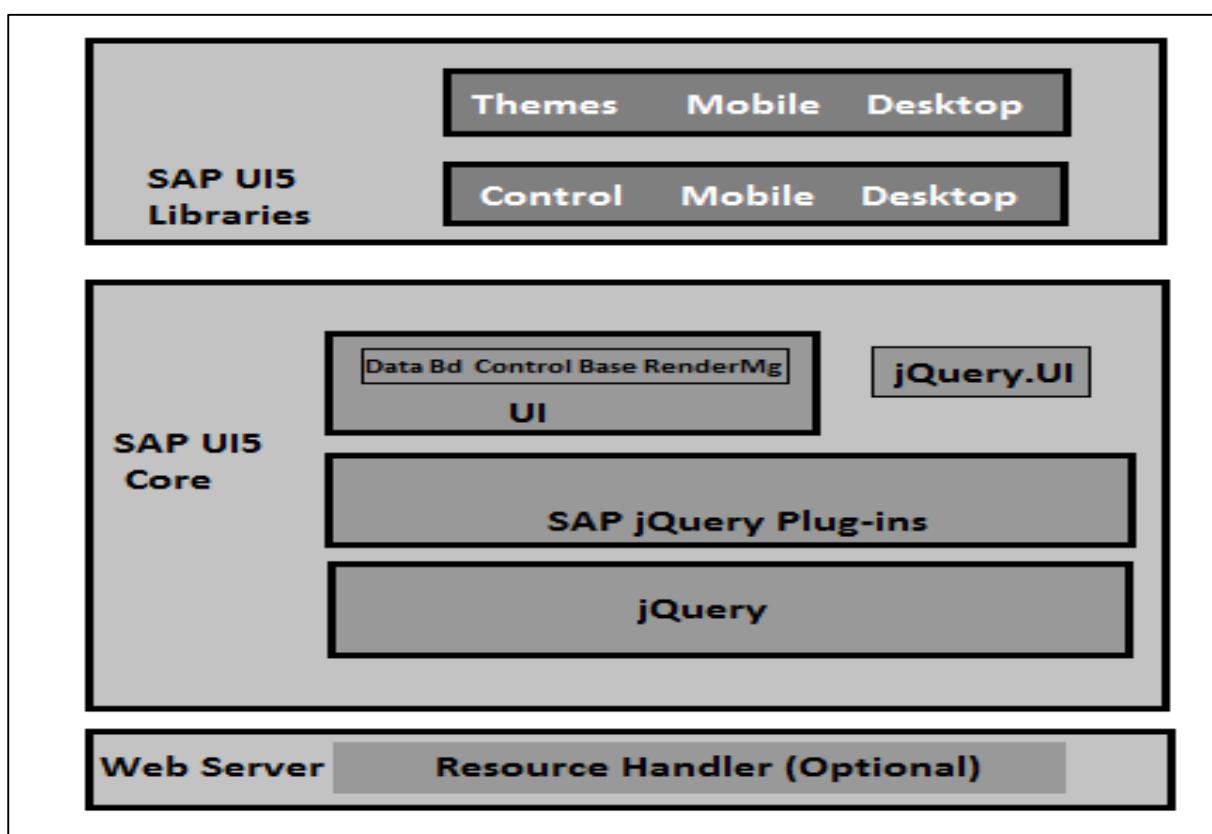
UI5 Browser Support

SAP UI5 supports all the key web browsers and latest versions like IE, Mozilla Firefox, Google Chrome and Safari.



SAP UI5 Architecture

SAP UI5 Architecture consists of core JavaScript framework including jQuery. It consists of Extension libraries Controls and Themes. It has Optional Server components.



UI5 Control Libraries

Common **SAP UI5** control libraries are given below.

- **Sap.ui.commons** : This includes controls like text fields, buttons, fonts, etc.
- **Sap.ui.table**: This includes the table controls like rows, columns, etc.
- **Sap.ui.ux3**: This includes properties for UX3 patterns.
- **Sap.m**: This includes controls for mobile devices like hand phones, tablets, etc.

SAP UI5 and Extensibility

- SAP UI5 support extensibility for application developer and allows to add JavaScript, HTML, UI5 based pages.
- It allows to write new UI libraries and new controls.
- Write plug-ins for UI5 core.
- Create controls from existing UI5 controls.
- Includes other JavaScript libraries

Model-View-Controller Concept

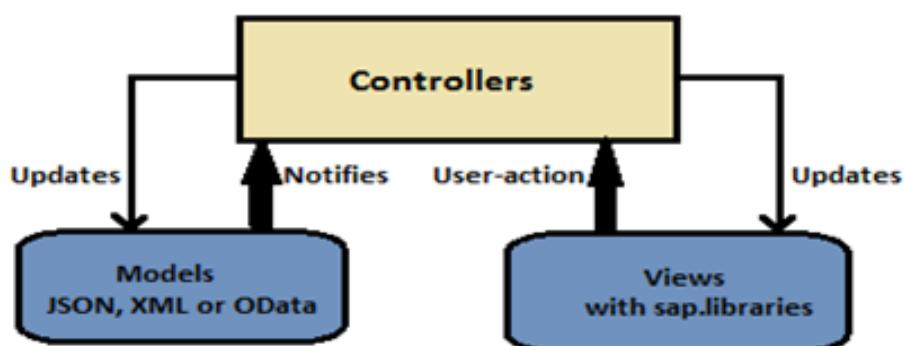
MVC consists of three concepts. Views can be defined using different languages like Java Scripts, HTML. Controller is used to bound the Views and Models are used with Views.

Views: It can be defined using XML with HTM, mixed or standalone

- **XML**: (sap.ui.core.mvc.xmlview)
- **Java Script**: (sap.ui.core.mvc.JSView)
- **JSON**: (sap.ui.core.mvc.JSONView)
- **HTML**: (sap.ui.core.mvc.HTMLView)

Controller: Controllers are bound to a view. It can also be used with multiple views

Model: Data binding can be used on the views.



Comparison of Different type of Views

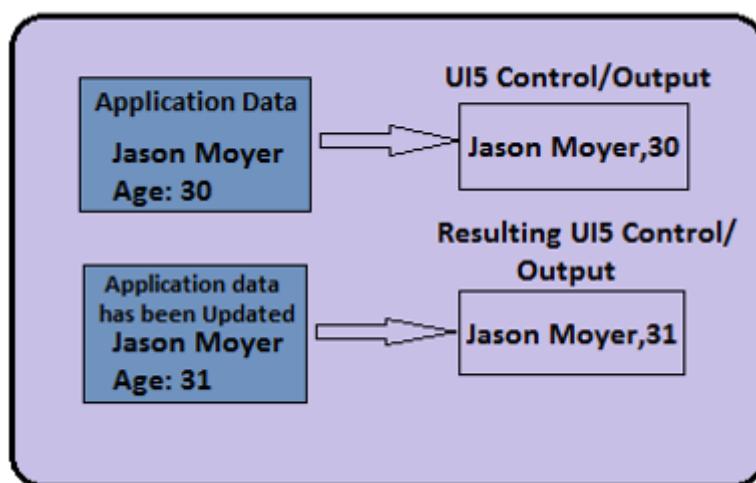
A comparison of different types of Views is given in the table.

Supported Features	JS View	XML View	JSON View	HTML View
Controls from Standard and Custom Libraries	Yes	Yes	Yes	Yes
Self-contained registration of custom library locations	Yes	No	No	No
Properties of types string, int.boolean, float	Yes	Yes	Yes	Yes
Properties of other types (object)	Yes	No	No	No
Aggregation 1:1, 1:n, Association 1:1, 1:n	Yes	Yes	Yes	Yes
Single Event Listener Registration (maybe limited to some scope, e.g. controller/window)	Yes	Yes	Yes	Yes
Multiple Eventlisteners and/or without scope	Yes	No	No	No
Simple Data Binding (Path, default or named model, template approach)	Yes	Yes	Yes	Yes
Customized Data Binding (formatter, data type, factory approach)	Yes	No	No	No
Embedded HTML (without use of HTML control)	No	Yes	No	No
Dynamic control creation (e.g. based on model data, but outside the data binding features)	Yes	No	No	No
Code completion (Eclipse)	Yes	Yes, with limitations	No	No
Templating (Eclipse)	Yes	No	No	No
Validation	No	Yes	No	No

SAP UI5 Data Binding

Data binding is used UI5 controls to a data source to hold the application data. It allows to change the controls automatically whenever there is a change in application data.

When you use two-way data binding, application data is updated whenever the value of a bound control changes.



Data Binding supports binding of simple controls like text button, list type controls, etc.

Data Binding Model Types

SAP UI5 supports three types of model implementation:

- **JSON Model:** It supports data in JavaScript Object Notation format. It supports two-way data binding.
- **XML Model:** It supports XML data. It supports two-way data binding.
- **OData Model:** It creates OData requests and handles responses accordingly. It only supports OData compliant data. It supports experimental two-way data binding.

16. SAP UI5 – Design Patterns

Design Pattern is a new term in **SAP UI5** development when we talk about SAP development or SAP Fiori system. SAP is working hard to find new design patterns that support development in SAP system using **UI5 SDK**.

SAP has released different types of design patterns:

Master-Detail

This is first step in application binding and is supported by **SplitApp** control of SAP UI5. This design pattern supports list of content and allows lead selection and detailed view.

Master-Master Detail

This design pattern displays the detail of a transaction in the detail section.

Example: You are placing an order online and you want to see a confirmation page that displays what you are buying and display detail of transaction with detailed view.

Full Screen

This design pattern is mostly recommended for displaying charts, pictorial data and various types of graphs.

Multi-Flow

This design pattern is recommended when you are using a complex application flow and there is a need to make use of all design patterns to build a working application.