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SAP Gateway

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Day 1A

SAP Gateway

Day I Agenda

- What is SAP Gateway
- SAP Gateway Overview and Architecture
- SAP Gateway Deployment Options
- What is OData? Metadata and Queries of OData
- What is REST Architecture?
- How to format different OData URI's?
- Prerequisites which needs to be checked in Gateway System
- Introducing Service Builder Tool

SAP Gateway

What is SAP Gateway?

- Any Environment, Any Device, by Any Developer

SAP Gateway lets you empower users with secure, personalized solutions that leverage and extend your existing SAP infrastructure, all with security, robustness, agility, and efficiency. SAP Gateway lets you meet the changing needs of your business at the speed of business by enabling People agility, System agility and Process agility.

New devices and experiences

Consumer innovations in the enterprise

Growing new communities of agile developers

Expansion of business data and decision makers

Simple access to complex enterprise systems

Manage and control mission critical systems AND deploy innovative solutions

Capabilities of SAP Gateway

Open - Any Device, Any Experience, Any Platform
People - Optimized for User Interaction Scenarios
Timeless - Non disruptive, any SAP Business Suite version
Developers - Simple APIs, no SAP knowledge, any tool

- Opening the doors for millions of developers to create solutions connecting to SAP
- Increase workforce productivity
- Reduces Complexity , skill set requirements and deployment barriers
- Shorten development times/cycles
- Engage all developers with their choice of development tools
- It offers connectivity to SAP applications using any programming language

Different Levels of Gateway Security

- Different Security Level in SAP Gateway?

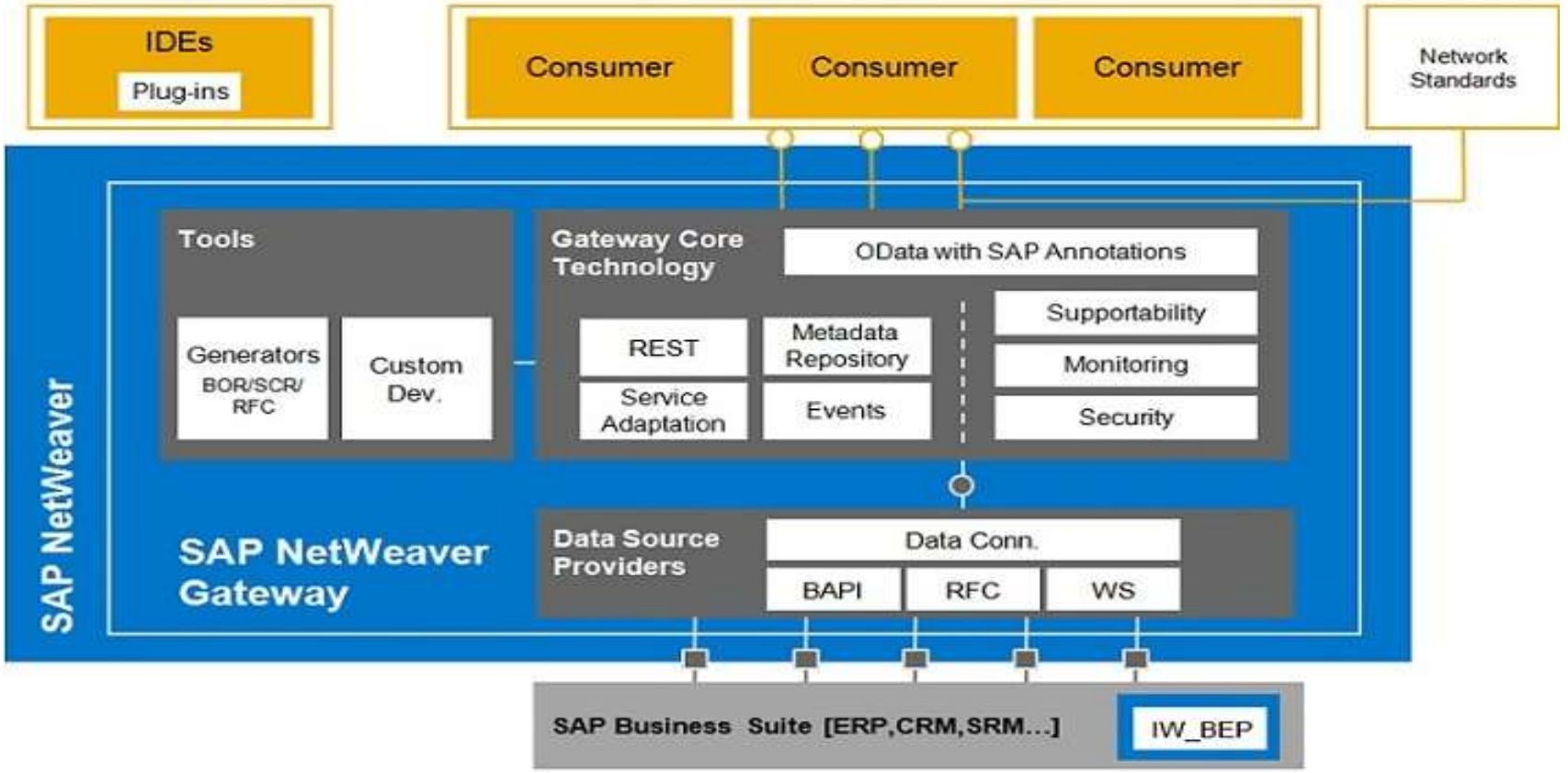
  - Browser Based SAML 2.0 Authentication

  - x.509 Client Certificate authentication

  - SAP Logon tickets(SSL)

  - Basic Authentication

SAP Gateway Architecture



Deployment Options:

HUB Architecture:

Gateway server functionalities are only used on one dedicated server, the hub system. The services are deployed on the backend systems and are registered on the server. The Gateway service is thus deployed in the Gateway backend systems where either IW_BEP is deployed systems or that are running on top of 7.40 leveraging the core component SAP_GWFND.

Embedded Architecture:

In this case the services are registered as well as published in the SAP Business Suite backend system.

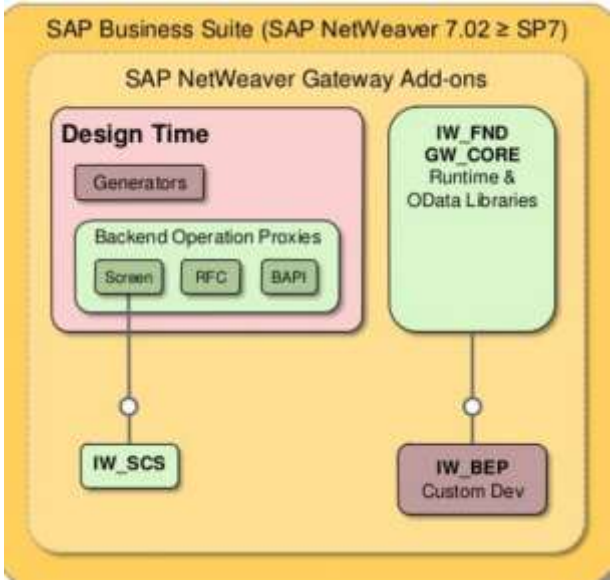
SAP Gateway Deployment Options

GWB-OVW:GWB-OVW-02

There is two main scenario for SAP GW deployment: Embedded Deployment and Central hub Deployment.

Embedded deployment

- The core software components for SAP NetWeaver Gateway
  Any optional backend components are deployed together in the SAP Business Suite backend System.
  In others words, Both Add-ons IW_BEP & IW_FND are installed to the SAP Business Suite Backend.
- This SAP GW scenario is recommended for business-case where changing SAP Business Suite is hard or not preferred.



Custom Development in Gateway/Backend System

Use case for this deployment scenario

- Development of ***intranet only*** based Gateway services – client devices connect directly to the backend system
- Test developments

Backend Requirements

- All Gateway add-ons installed on the backend system
- The backend system ***is therefore also*** the Gateway Server
- Must be based on NW 7.02 or higher
- Must be patched to SP7 or higher

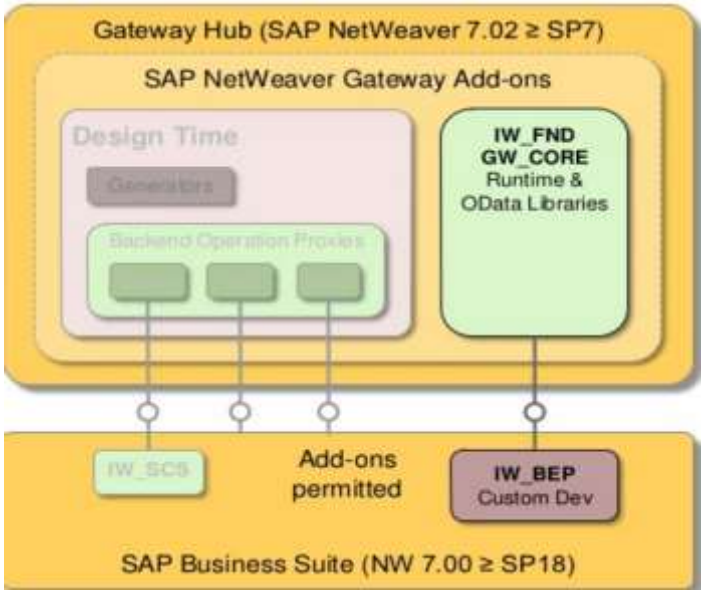
Restrictions

- The use of this deployment scenario for exposure of Gateway Services to the public internet is technically possible, ***but is not recommended***

SAP Gateway Deployment Options

Central hub deployment

- The SAP NetWeaver Gateway core software components can be deployed in a standalone system, either behind or in front of the firewall.
  In addition, you can install the optional components for central hub deployment in your standalone system.
  IW_BEP : Provides all the mandatory tools to develop and maintain GW Services
  IW_FND: Provides the conversion and formatting
- This scenario is the recommended one in term of deployment and performance.



Custom Development in Backend System

Use case for this deployment scenario

- This is the preferred deployment scenario
- Used internally by SAP
- The Gateway Hub acts only as a communication end-point
- Business functionality invoked by the Gateway Service executes directly in the backend server, ***not*** the Gateway Hub

Backend Requirements

- Must be based on NW 7.00 or higher
- Must be patched to SP18 or higher
- Installation of add-ons is permitted
- The add-on component IW_BEP is mandatory and provides:
  - ABAP classes for OData Channel development
  - Event Push capabilities

Versions

- SAP Netweaver Gateway 1.0
- SAP Netweaver Gateway 2.0

  - ✓ SP01
  - ✓ SP02
  - ✓ SP03
  - ✓ SP04
  - ✓ SP05
  - ✓ SP06
  - ✓ SP07
  - ✓ SP08
  - ✓ SP09
  - ✓ SP10
  - ✓ SP11
  - ✓ SP12(Latest)

  From SP4, SAP has newly introduced Gateway Service Builder Tool

What is Odata?

- OData is Microsoft developed extension to the Atom Publishing and Atom syndication Standards, which in turn are based on XML and HTTP(S).

- It is Standardized protocol, built over existing HTTP and REST protocols supporting CRUD(Create, Read, Update and Delete) operations.

  We can call it as ODBC Web.

- It can be used freely without the need for a license or contract.

- It uses ATOM+XML or JSON.

- REST-based architecture.

For more information, please refer below link:

http://www.odata.org/

Output Formats Supported by OData

It supports XML and Json formats

XML - Hyper Text Mark up Language

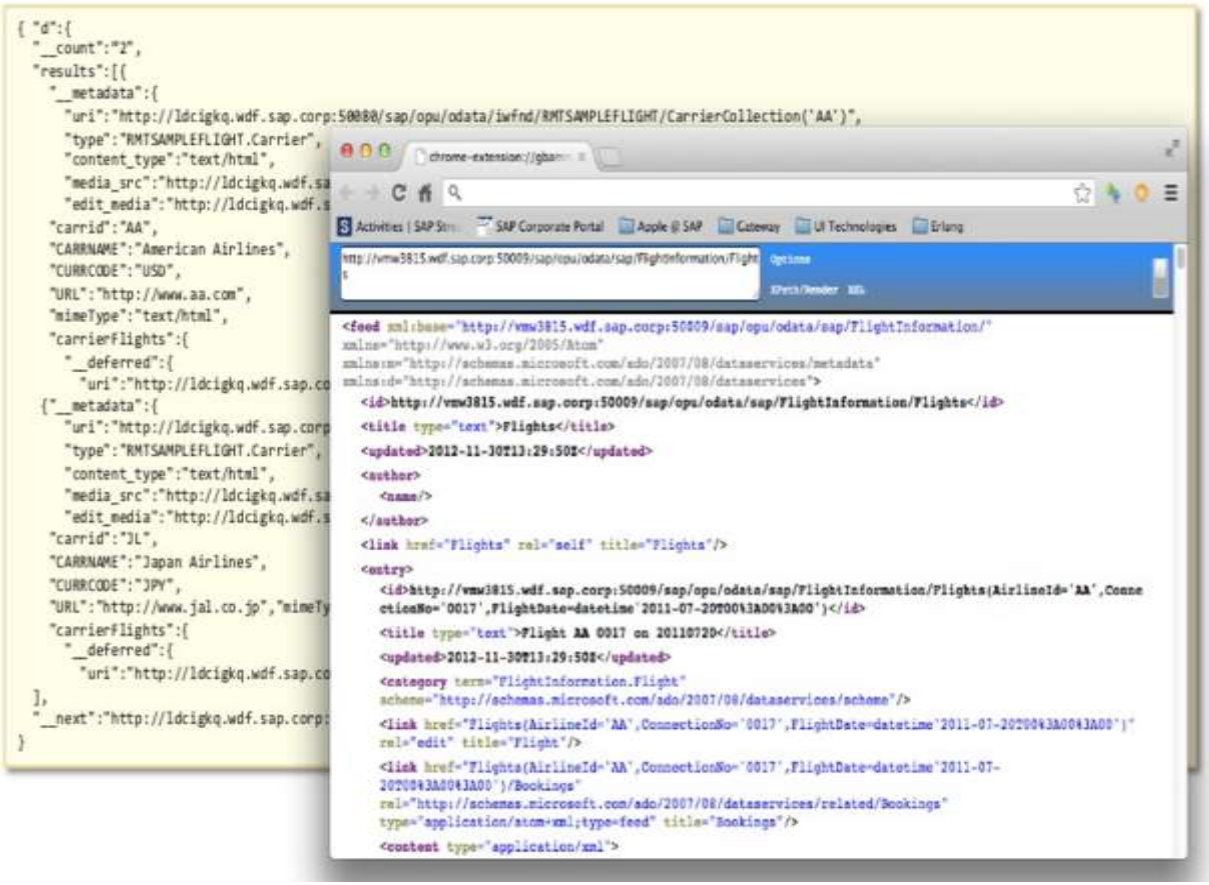
JSON - JavaScript Object Notation

Reference Links:

http://www.odata.org/documentation/odata-version-2-0/json-format/

http://www.odata.org/documentation/odata-version-2-0/atom-format/

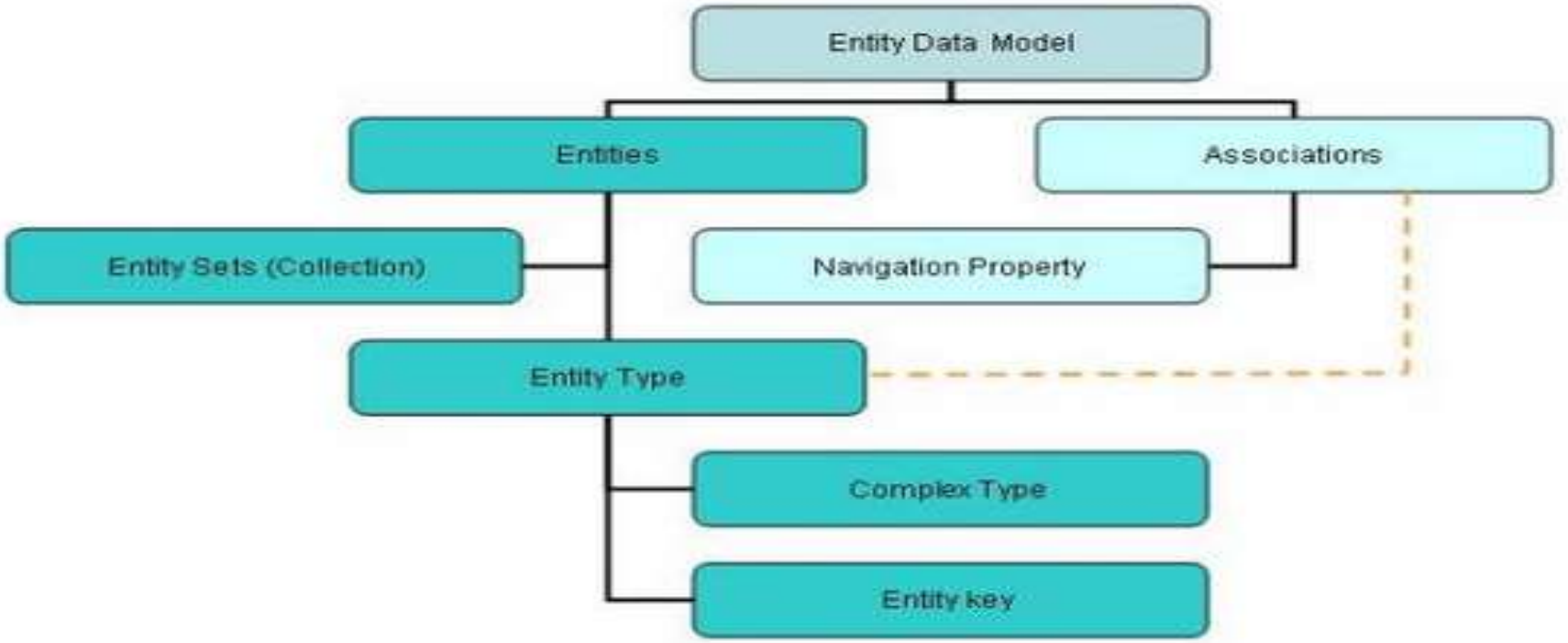
OData supports the use of either XML or JSON format messages.



Metadata of OData

The metadata of OData message can be summarized as follows.

Refer to this blog: http://www.odata.org/



REST Architecture

- REST is an architectural framework and methodology which is based on addressability, statelessness, connectedness and uniform interface.
- OData is an implementation of REST.

HTTP(S) – An Implementation of the REST constraints:

- HTTP(S) is the protocol that drives the World Wide Web
- A Server-side resource can be manipulated in four basic ways.
- These four basic REST operations have given rise the acronym CRUD.

REST Operation	HTTP Method
Create Resource	POST
Retrieve one or more Resources	GET
Update Resource	PUT
Delete Resource	DELETE

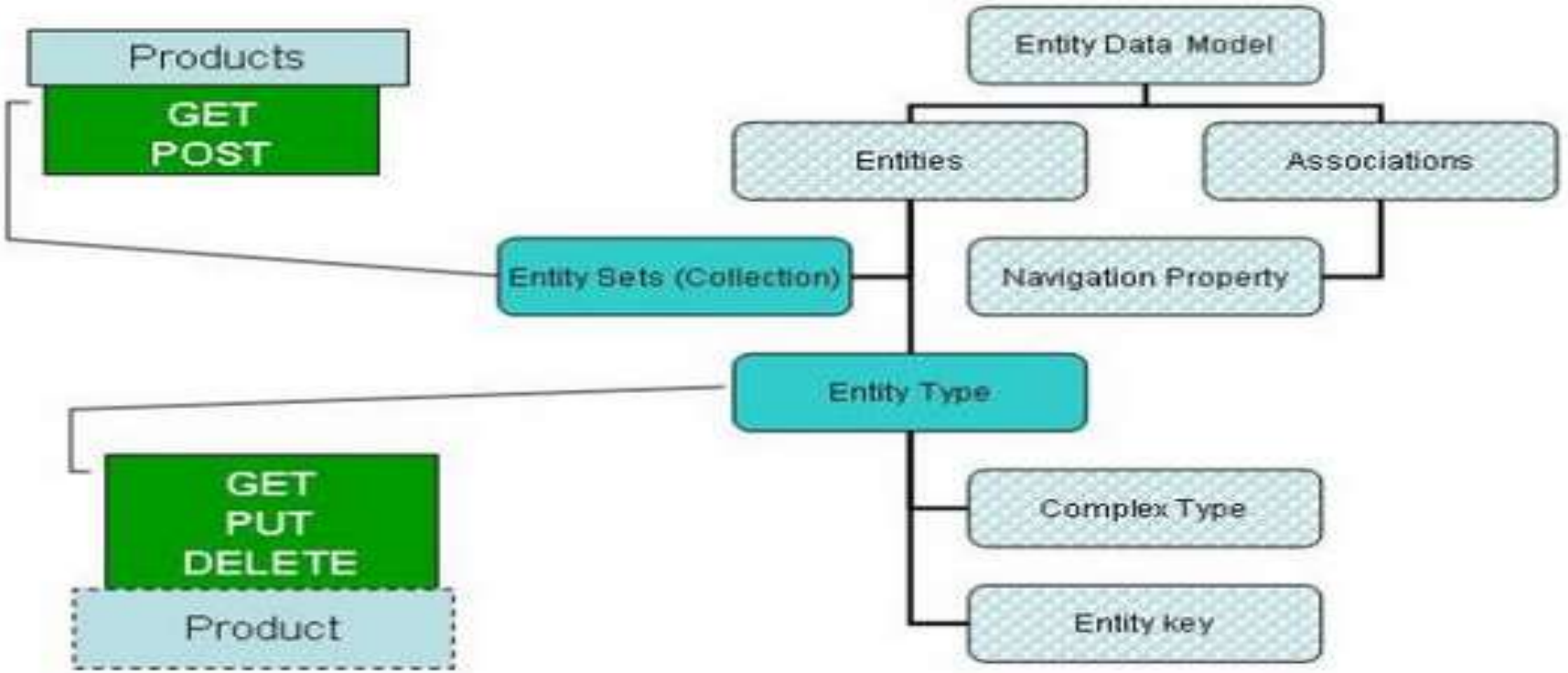
Differences

REST(Gateway Services)	SOAP (Web services)
Limited Bandwidth and Resources & more suited for light weight apps	Higher Bandwidth and Heavy Weight
Stateless Operations	Statefull Operations
Caching is Possible	Caching is not Possible
No Asynchronous Support	Asynchronous processing and invocation
Communicate only over HTTP/HTTPS	Communicate over web, email, private networks
Formats like XML and JSON supported	Only XML is supported
It's a style	It's a industry standard

Resource Action

Possibility operations

- We can do a GET and POST request on an Entity Set while GET, PUT and DELETE can be done on an Entity.



Definitions

- An **E**ntity type can be considered as data type that contains details of specific type of data.

  For example: Customer, Supplier, Sales Order, Employee etc.

- **E**ntity Key is used to uniquely identify an **E**ntity Type.

  For example: Employee number , Sales Order number

- An **E**ntity set is nothing but a collection of **E**ntity type.

- **A**ssociation is simply relation ship between two or more **E**ntity types

  For example: Products to its Manufacturer

  (An entity set Product can be associated with an entity set Manufacturer in an OData metadata)

- Navigation Property is a property set on an entity type to understand the associations of the entity type.

Queries of OData

- **$format** : This query allows us to change the format of data.
  URI: http://services.odata.org/OData/OData.svc/Suppliers?$format=json
- **$top** : This query helps to limit the data returned by the service.
  URI: http://services.odata.org/OData/OData.svc/Categories?$top=1
- **$Skip** : This can be treated as opposite to $top.
  URI: http://services.odata.org/OData/OData.svc/Products?$skip=2
- **$inlinecount** : This will return the total number of records as part of response payload.
  URI: http://services.odata.org/OData/OData.svc/Suppliers?$inlinecount=allpages
- **$orderby** : It is used to sort the records returned by service.
  URI: http://services.odata.org/OData/OData.svc/Products?$orderby=Price desc
- **$expand** : This we found as very helpful query to reduce the number of calls we need to make to access a particular set of data. Say, if you want to return all the products along with their category, use the example
  URI: http://services.odata.org/OData/OData.svc/Products?$expand=Category
- **$filter** : This can be compared to 'where' query in SQL. Lets say we want to get all the products with greater than 3
  URI: http://services.odata.org/OData/OData.svc/Products?$filter=Rating gt 3
- **$select** : As is any SQL query, this query option can be used to select specific or all fields of an Entity set or Entity. A simple example, lets say the requirement for which is for us to return the fields rating and Price of a Product with ID = 3
  URI: http://services.odata.org/OData/OData.svc/Products(3)?$select=Rating,Price

Prerequisites check in Gateway system

- Check whether SAP Gateway is activated.
- Check whether system alias is maintained.
- Check whether Service maintenance is registered and maintain successfully.
- Check, based on SP level where all SAP notes has been implemented which are recommended by SAP.
- Check whether virus scan profile is deactivated or not.
- Clear the cache when ever the services are regenerated.

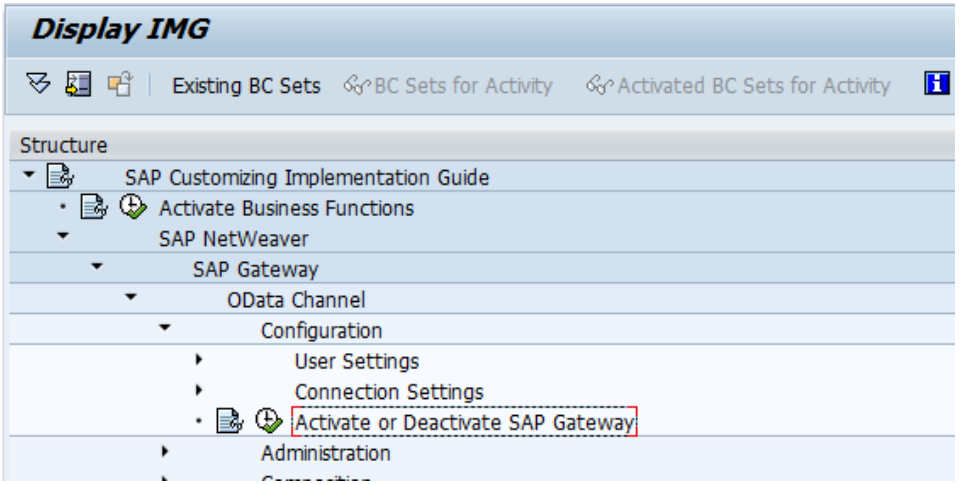
Prerequisites check in Gateway system

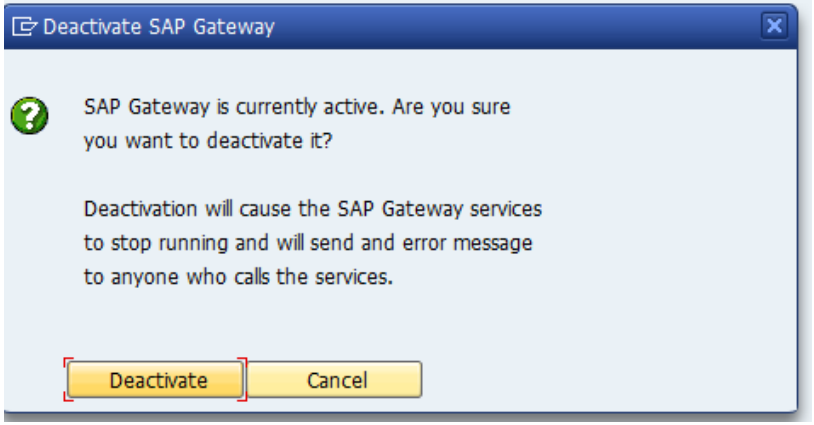
- **Check whether SAP Gateway is activated**.

Go to Transaction SPRO => Click on SAP Reference RMG

Navigate to below path:

SAP NetWeaver=>SAP Gateway=>OData Channel=>Configuration=>Activate or Deactivate SAP Gateway





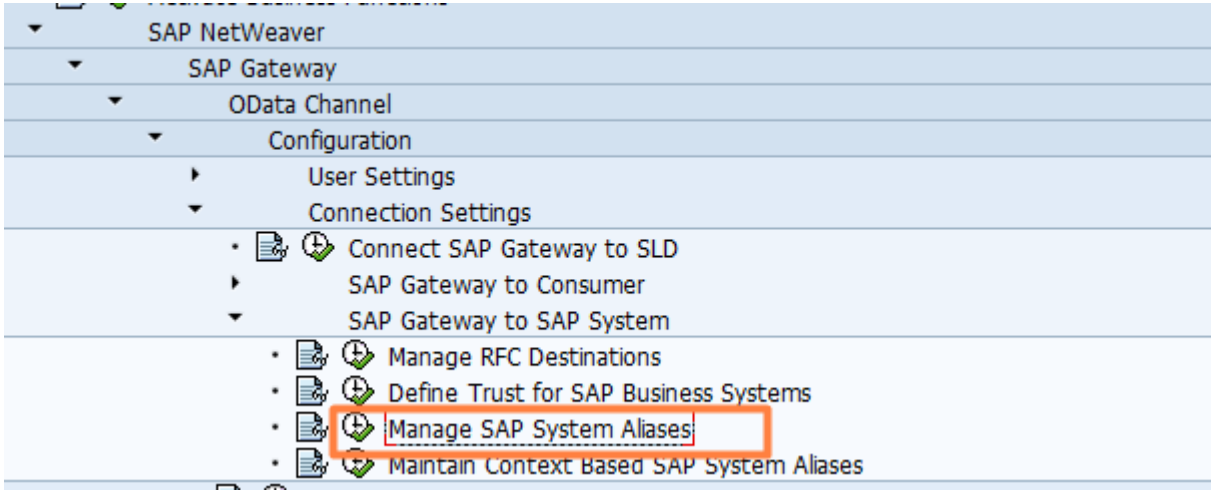
Prerequisites check in Gateway system – Contd..

- **Check whether system alias is maintained**

Go to Transaction SPRO => Click on SAP Reference RMG

Navigate to below path:

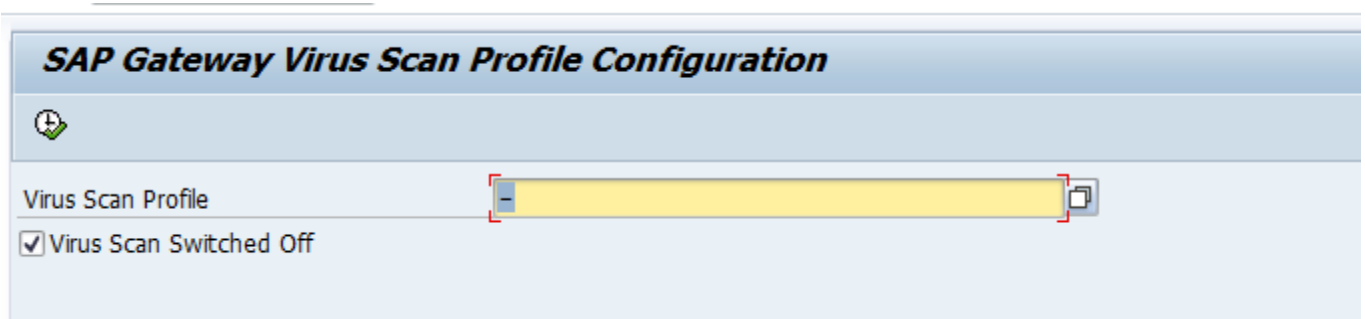
SAP NetWeaver=>SAP Gateway=>OData Channel=>Configuration=>Connection Settings=>
SAP Gateway to SAP System=>Manage SAP System Aliases



Prerequisites check in Gateway system – Contd..

- **Check whether virus scan profile is deactivated or not.**

Transaction: /IWFND/VIRUS_SCAN



- **Clean up the cache when ever the services are regenerated**.

Transactions:

/IWFND/CACHE_CLEANUP - Frontend Gateway System
/IWFND/CACHE_CLEANUP - Backend System

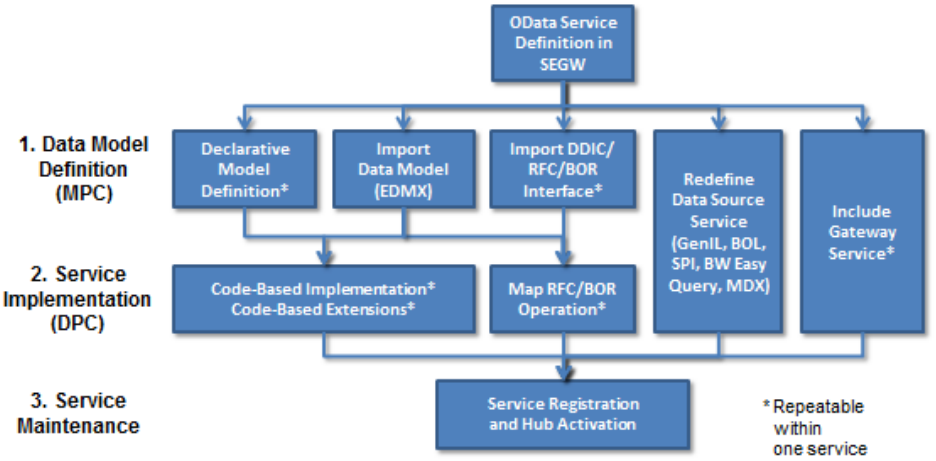
Gateway Service Builder Tool

- Gateway Service Builder (transaction "SEGW") is available as of Release 2.0 Support Package 4/5 and it greatly accelerates the OData service development process. In many cases you don't even need to write a single line of ABAP code - unless of course you prefer to do so. It is no longer mandatory that you have deep ABAP OO skills.

In Service Builder we need to do follow below three steps to build an OData service:

- Define or import the data model
- Implement or generate the runtime logic for the service operations
- Activate and run the service

The picture shows the various options that are covered in SEGW:



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  (An entity set Product can be associated with an entity set Manufacturer in an OData metadata)

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SEGW

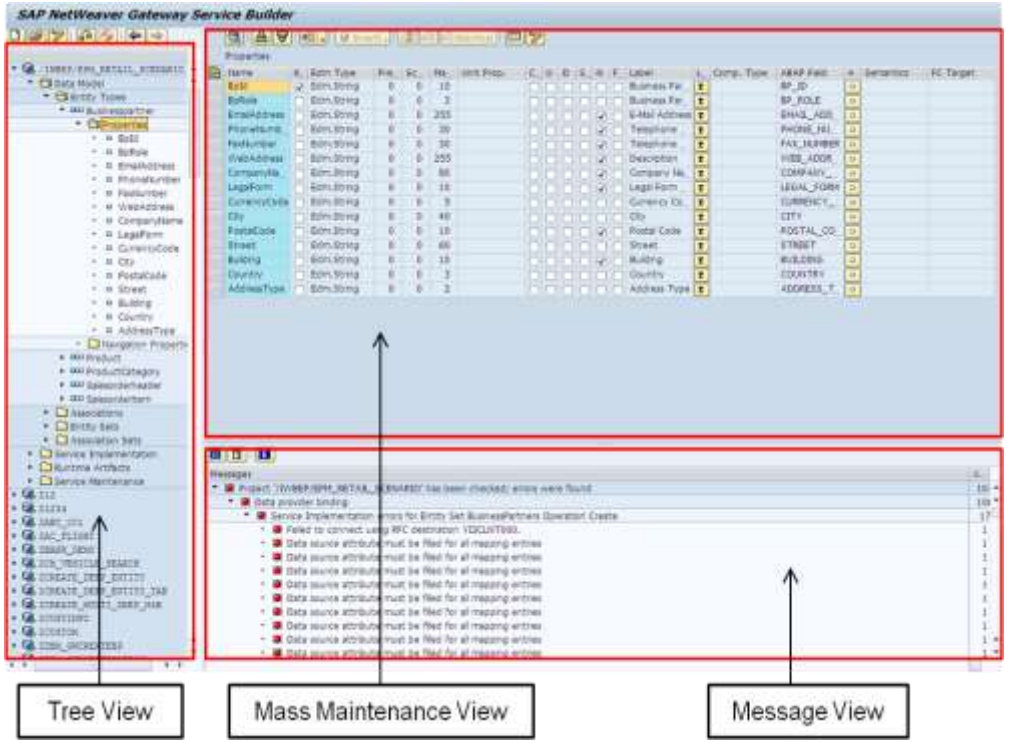
Transaction Code : SEGW

❖ Design time environment which provides developers an easy-to-use set of tools for creating services

❖ Need to understand below terms in SEGW transaction

- Entity Type
- Entity Set
- Association
- Navigation
- MPC(Model Provider Class)
- DPC(Data Provider Class)

By now we should be familiar of all above terms in Gateway Service Builder.



Service Operations

Service Operations:

- **G**etEntity
  we can refer to as work area in ABAP

- **G**etEntitySet
  we can refer to as internal table in ABAP

- **C**reate
  We can create only single record at once.

- **U**pdate
  We can single only record at once.

- **D**elete
  We can delete only single record at once.

How to format OData URI's

More examples:

- Get me the three of the best rated products
  URI: http://services.odata.org/OData/OData.svc/Products?$top=3&$orderby=Rating desc

- Now get me the next three best rated products.
  URI: http://services.odata.org/OData/OData.svc/Products?$top=3&$skip=3&$orderby=Rating desc

- Get me the count of Products with the Price greater than or equal to 20?
  URI: http://services.odata.org/OData/OData.svc/Products?$inlinecount=allpages&$filter=Price ge 20

Important Transactions

- SPRO
- SEGW
- /IWFND/MAINT_SERVICE
- /IWFND/GW_CLIENT
- /IWFND/ERROR_LOG
- IWFND/CACHE_CLEANUP
- /IWBEP/CACHE_CLEANUP
- /IWFND/VIRUS_SCAN
- /IWFND/TRACES
- /IWFND/SERVICE_TEST
- /IWFND/EXPLORER
- /IWFND/IWF_ACTIVATE
- /IWFND/SERVICE_TEST
- /IWFND/VIEW_LOG

Questions and Answers

- Is JSON supported?

Yes, JSON is supported for all the service operations, but it does not supports for metadata.

- Components which needs to be installed in Embedded Architecture?

If it is SAP Net weaver 7.0,7.01,7.02,7.03 below components should be installed

IW_BEP, GW_CORE, IW_FND.

If it is SAP Net weaver 7.40 or higher, SAP provides default SAP_GWFND.

You can deactivate caching from

SPRO -->Gateway -->OData Channel -->Administration -->Cache Setting -> Metadata . Also you will find some more options for Cache here

- How to activate/deactivate virus scan profiles?

/IWFND/VIRUS_SCAN

- Maintain System alias

SPRO->SAP Netweaver ->Gateway Service Enablement->Connection settings to SAP Netweaver Gateway->SAP Netweaver Gateway Settings.

SPRO->SAP Netweaver ->OData Channel->Connection settings->SAP Netweaver Gateway to SAP system->Manage system alias.