MOB203 – Enable Data for Mobile Consumption

Jeff Gebo / CEG

Disclaimer

This presentation outlines our general product direction and should not be relied on in making a purchase decision. This presentation is not subject to your license agreement or any other agreement with SAP. SAP has no obligation to pursue any course of business outlined in this presentation or to develop or release any functionality mentioned in this presentation. This presentation and SAP's strategy and possible future developments are subject to change and may be changed by SAP at any time for any reason without notice. This document is provided without a warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. SAP assumes no responsibility for errors or omissions in this document, except if such damages were caused by SAP intentionally or grossly negligent.

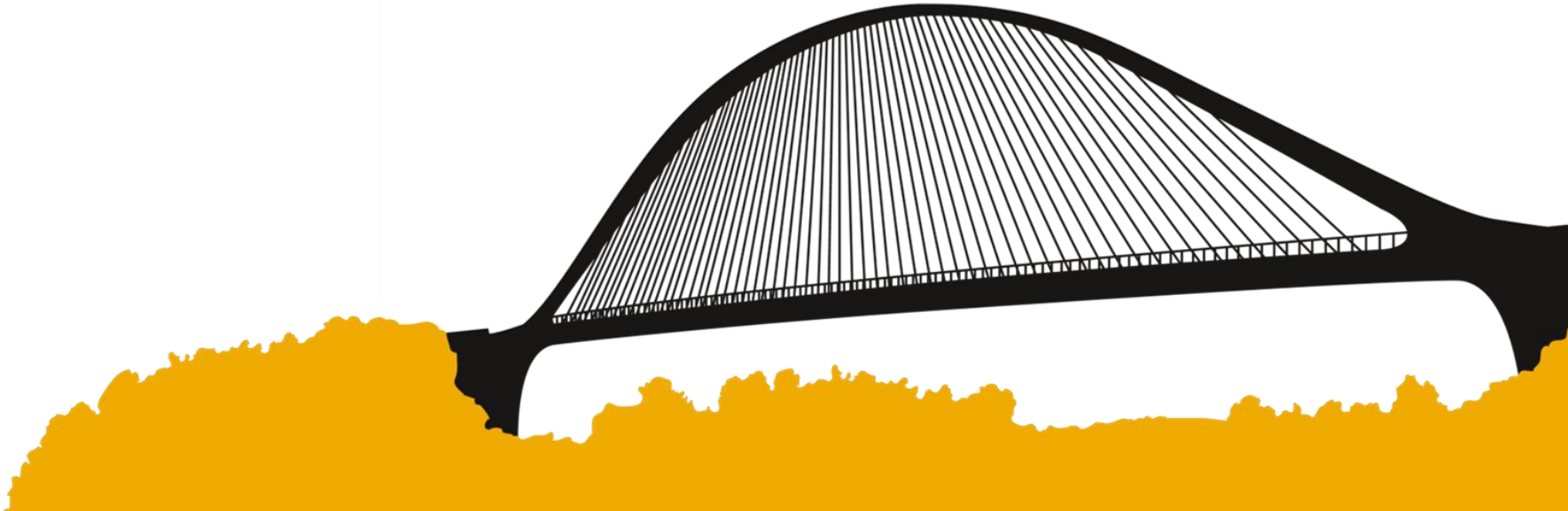
© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Agenda

Integration Gateway

Implementing Delta Query Support in Gateway OData

Push Enablement in SAP Mobile Platform 3.0



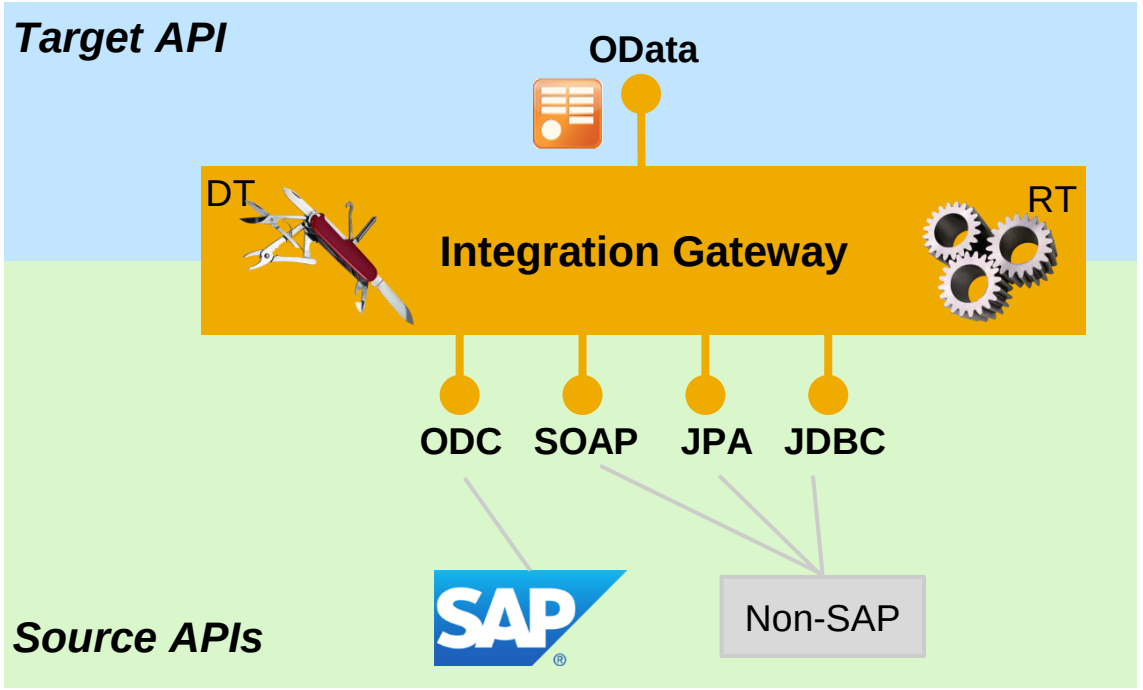
Integration Gateway

What is Integration Gateway?

Integration Gateway is a reusable technology component based on SAP Lean Java Server.

- **Seamless integration** of data from SAP and non-SAP systems.
- **Design-time tools** for modeling and defining new OData services based on different APIs and systems.
- **Runtime** environment for:
  - Running the provisioned OData services against the associated backend systems
  - Performing monitoring and other administrative tasks.

Integration Gateway can be a part of SAP products on-premise or in the cloud

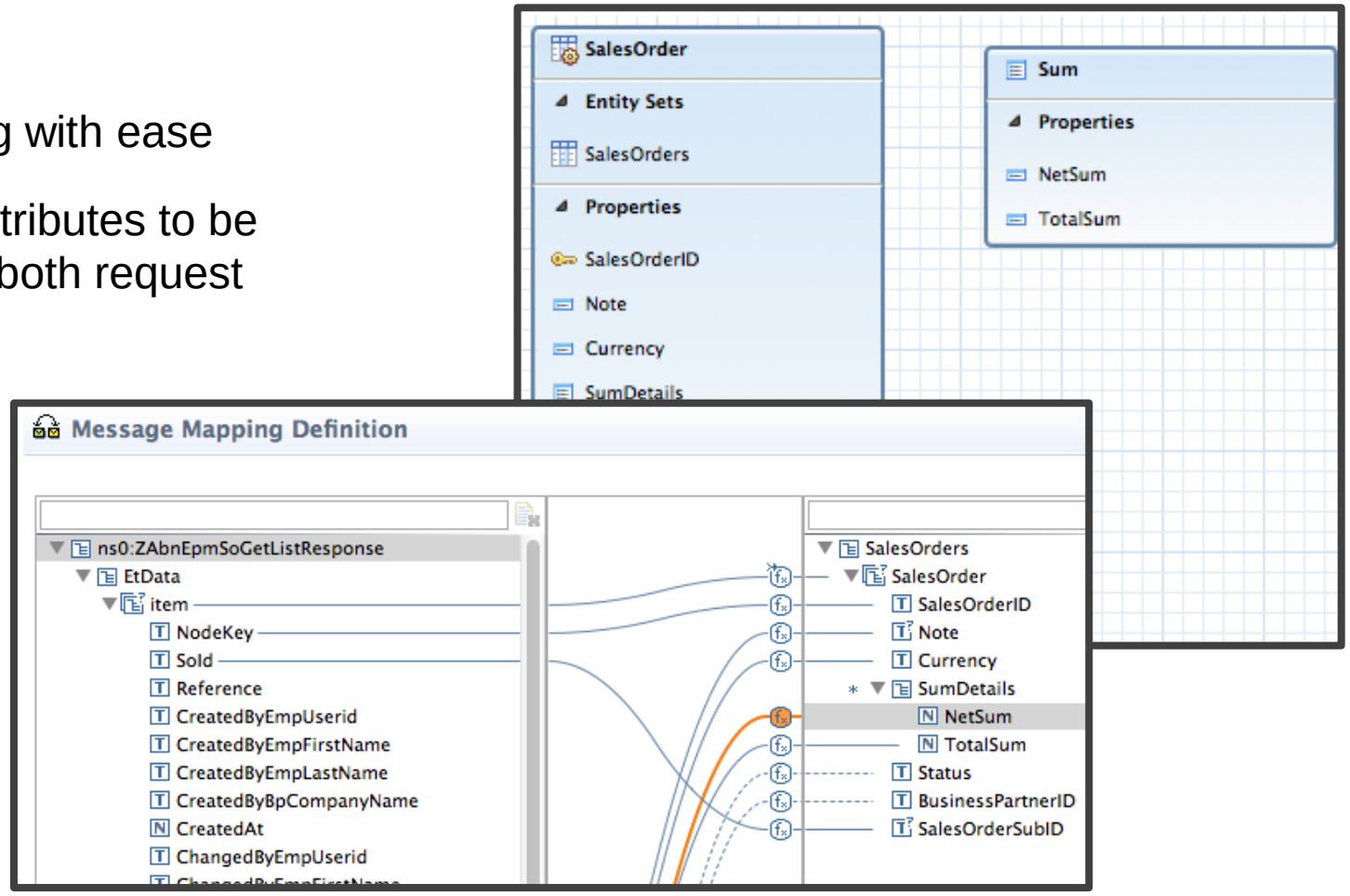


© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Integration Gateway – design-time tools

Eclipse-based OData modeling and service implementation

- Interactive UI facilitates OData modeling with ease
- OData service implementation allows attributes to be mapped between source and target for both request and response messages.
- Deployment of OData service

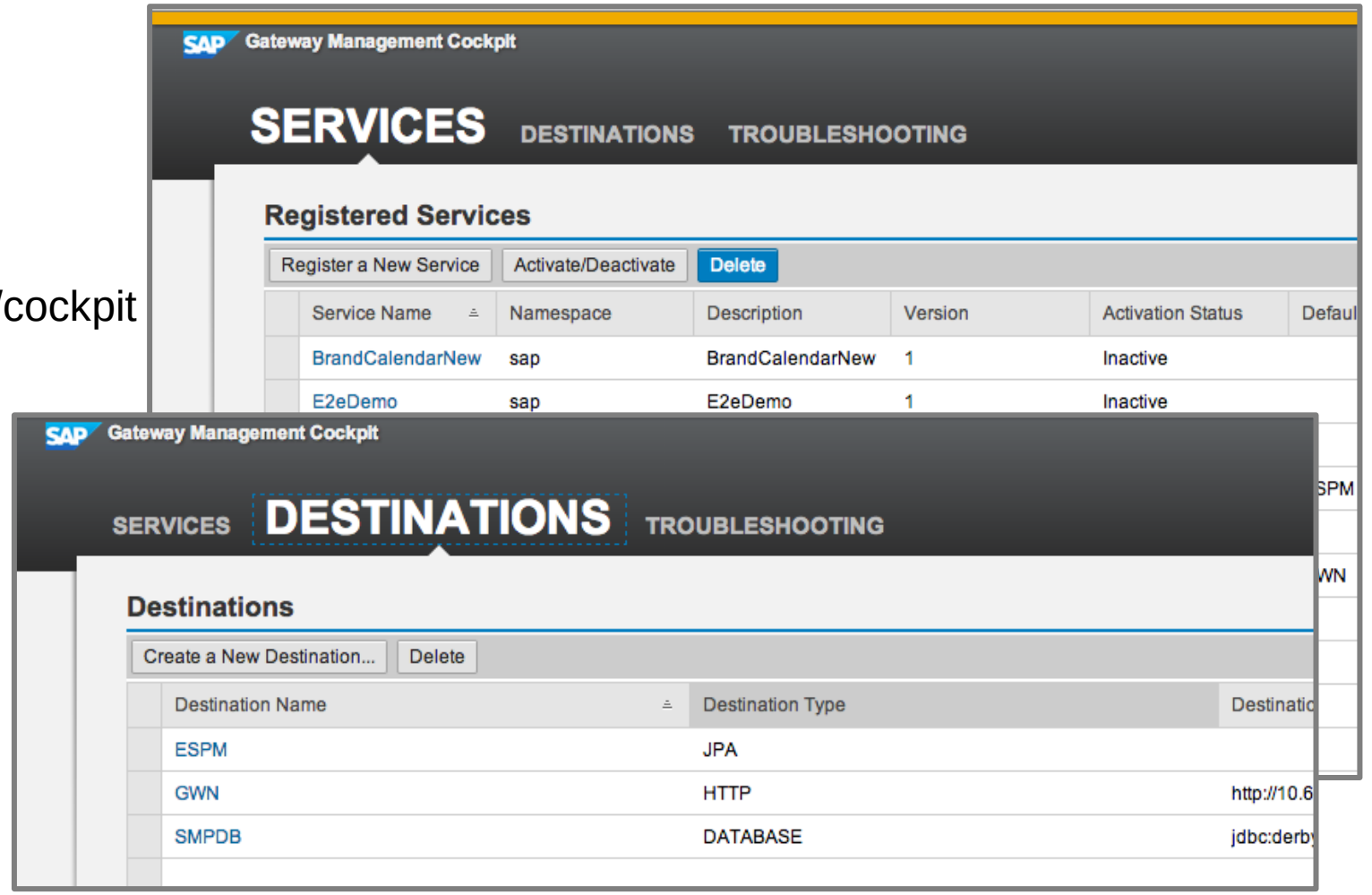


© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Integration Gateway – runtime tools

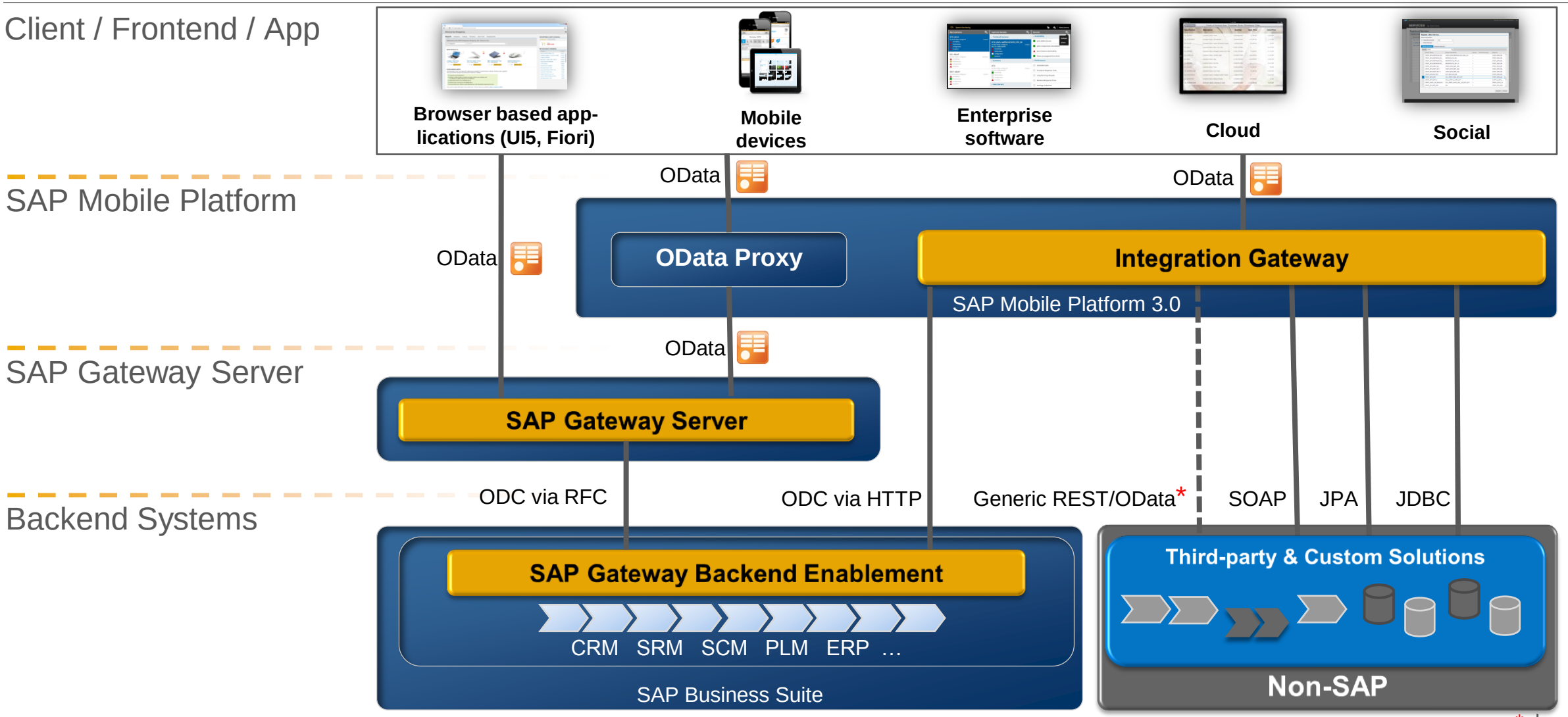
Gateway Management Cockpit enables you to:

- Accessible at https://<SMP Server>:<port>/gateway/cockpit
- Configure backend destinations
- Register, activate, and deactivate OData services
- Assign destinations to provisioned services
- Access the OData service documents and the server log files



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

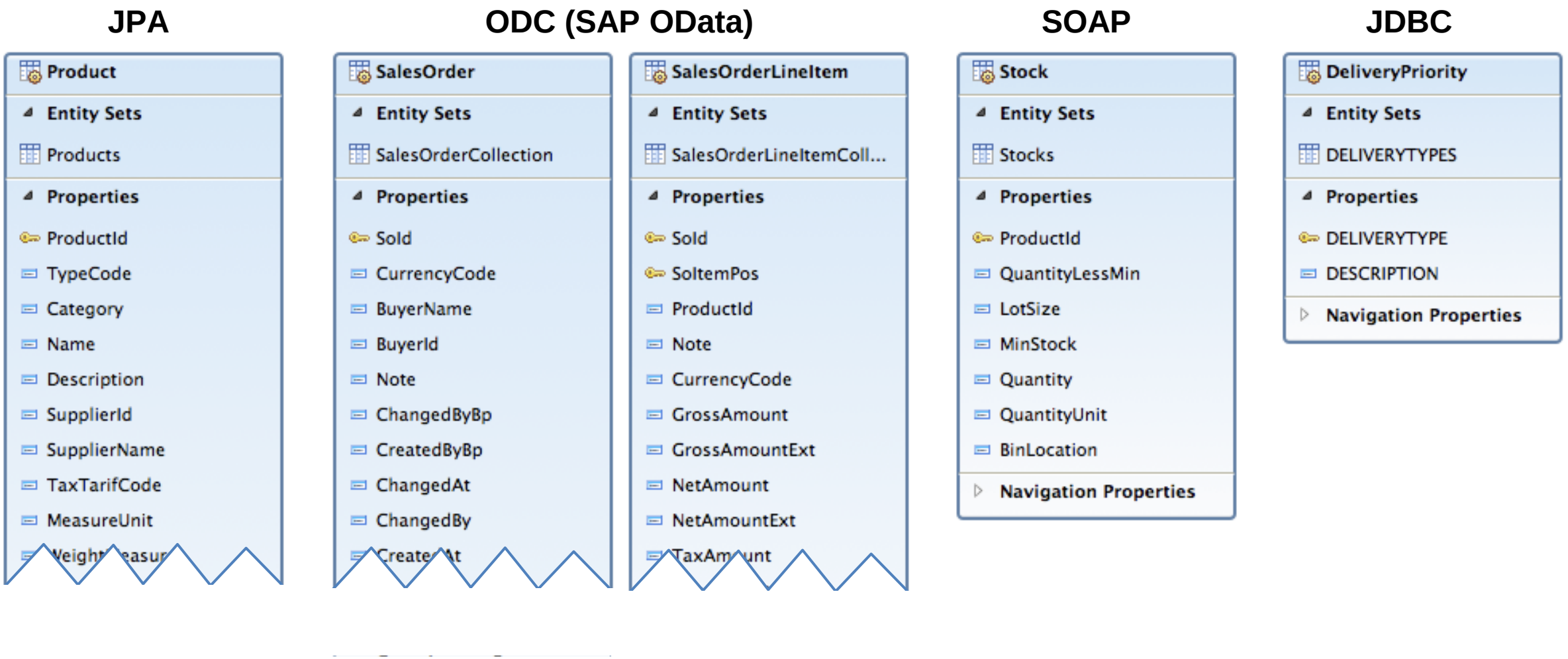
SAP Gateway and Integration Gateway (in SMP 3.0)



*planned

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Integration Gateway in Action – Hands-On Session MOB261



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

New Integration Gateway Features in SMP 3.0 SP04

Design-time Enhancements

Versioning (Target runtime)
- Show appropriate capabilities, migrate, error on wrong deployment

UI Simplifications
- SOAP - WSDL parsing and value helps.
- Support for folders
- Improvements on wizards

OData Designer simplifications
- Copy & Paste

Reference handling during refactoring

Custom Extensions via Scripts

Support for both Request and Response Mappings

JavaScript & Groovy

Support for all data-sources

Additional features for SOAP and JDBC

Admin-cockpit Enhancements

Test Connection for defined destinations

Usability improvements
- related to logout;
- session timeout consistency across all pages;
- sorting/filtering of Services
- sorting for Destinations
- consistent texts/labels/messages
- destination details page

URL Enhancements

Unification of the URLs between SMP Admin, IGW Cockpit and provisioned OData services

OData Capabilities

SOAP
- Navigation (two levels)

JDBC
- $Select
- $Expand
- Navigation
- OrderBy
- $Top
- $Skip
- Count
- InlineCount

Custom processor (scripting) allows additional capabilities.
- Actual scenarios are currently being determined & documented

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

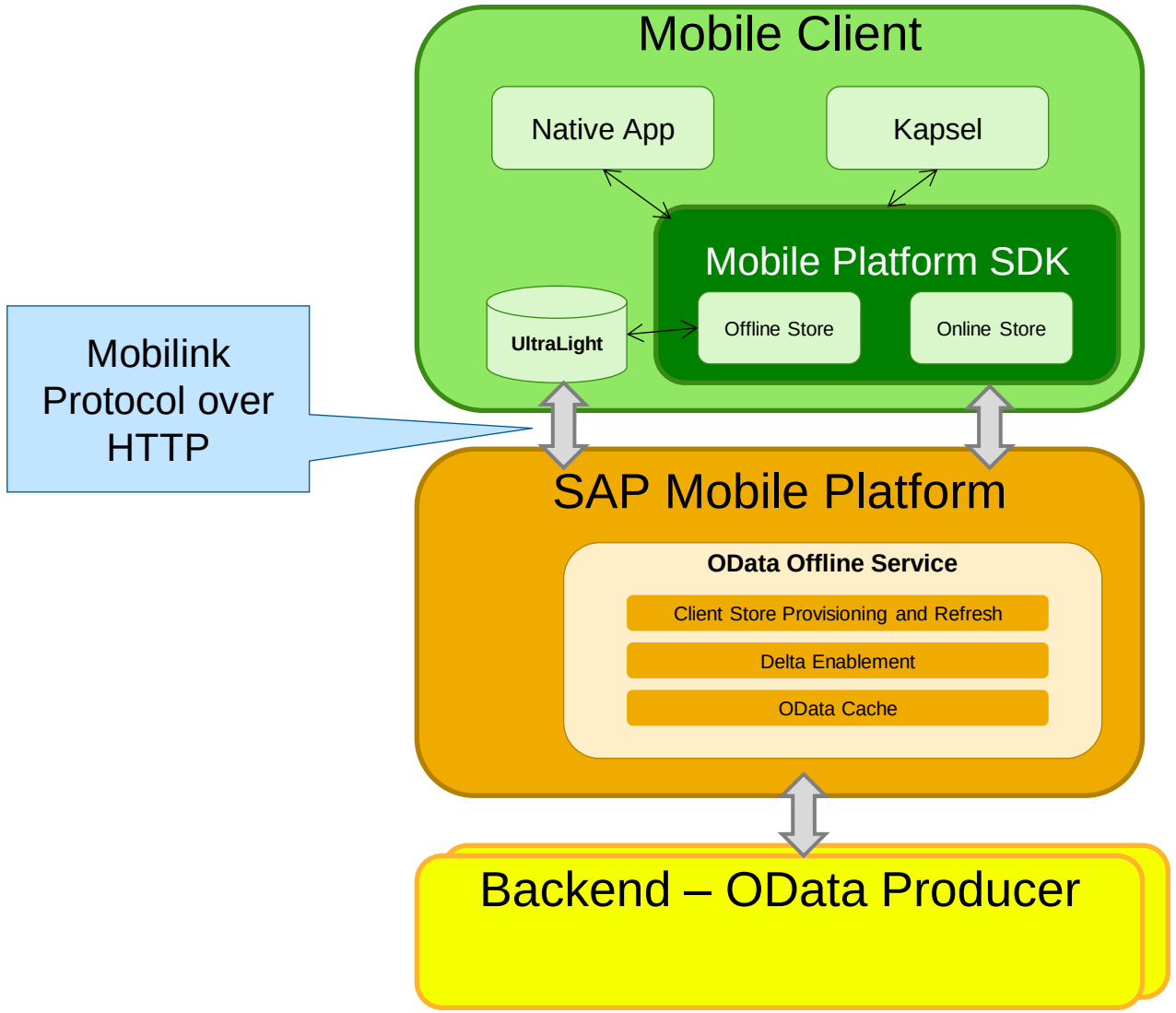
Implementing Delta Query Support in SAP Gateway OData Services

Agenda

- Offline Odata & SMP
- Delta tracking capabilities of SAP Mobile Platform
- Concept of delta querying
- Delta query support in Gateway OData services
- Implementation techniques
- Implementing delta query support with Mobile Add-On for SAP
- Example of delta query support implementation

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Offline OData and SMP 3.0 SP4



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

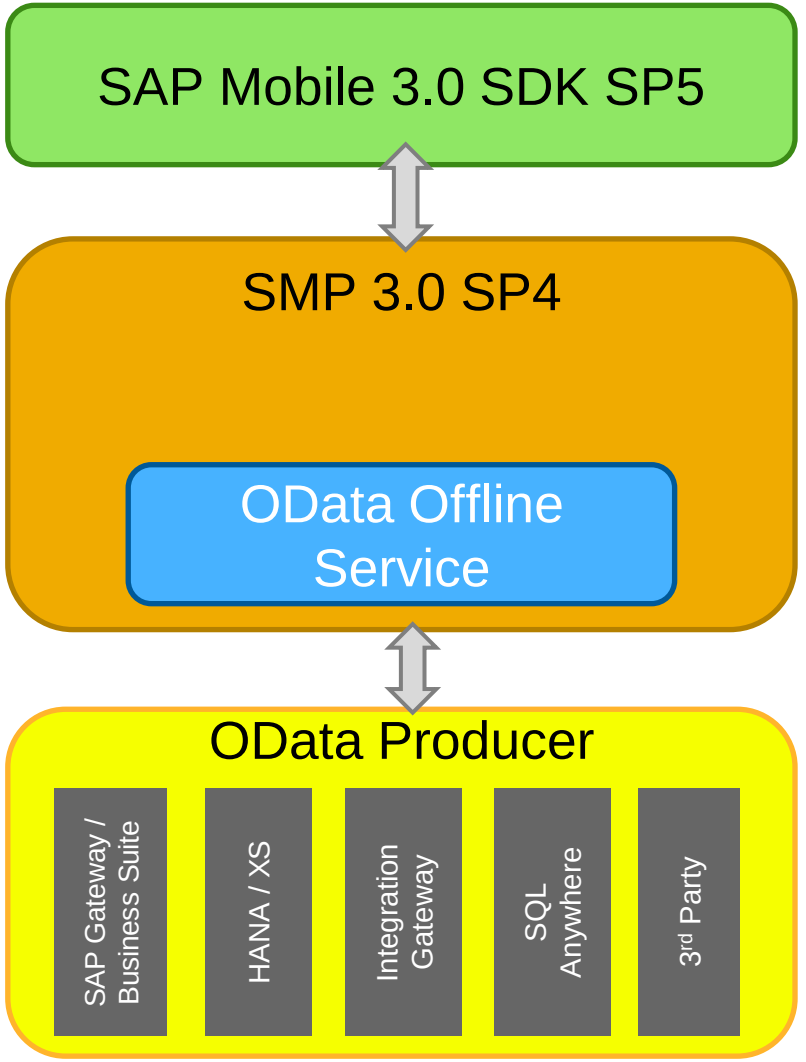
OData Offline Service

Benefits

- Always-available applications, OData everywhere, harmonized online/offline API, integration with SMP services (authentication, supportability, manageability).

Features

- Take remote OData services and run them locally on device
- UltraLite as client database (iOS, Android)
- Optimized for OData services supporting v4 Delta Query
- Middle-tier delta enablement for all other OData services
- Middle-tier caching of generic OData collections



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Initial Download Sequence

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Request for Refresh Sequence

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Delta tracking capabilities of SAP Mobile Platform

Delta tracking in SMP 3.0

- Responsibility completely delegated to backend system
  - Change Tracking by backend system
  - Change Logging in backend system

- Netweaver Gateway provides the interface and functionality via delta query support for OData services
  - Mimics delta tracking by allowing the client to fetch only new, changed and deleted records since the last time the same query was executed.

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Concept of delta querying

- Delta querying basically means “give me all entities that were created, changed or deleted since I last asked”
- Defines a pull-model protocol for clients to obtain changes in an entity set.
- Useful for projects where performance is critical and loading the full payload each time is not acceptable

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Concept of delta querying

- The backend system logs all creations, changes and deletions of delta enabled data sets in the delta log
- When the client requests a data set, the server issues a delta token with a time stamp which is returned to the client along with the requested data set
- The next time the client requests the same data set, it returns the delta token to the server
- The server compares the time stamp on the delta token to the time stamps of the records in the change log
- Only records that are new, changed or deleted since the delta token was issued are returned to the client

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Delta query support in Gateway OData services

- SAP NetWeaver Gateway, starting from version 2.0 SP07, provides delta query support for hosted OData services
- Methods GET_ENTITYSET and GET_ENTITYSET_DELTA are used to manage delta handling
- When the client requests the entity set the first time, the GET_ENTITYSET method will be called and will return the entire collection along with a delta token
  - The delta token is normally a date time stamp combined with a GUID
- When the client requests the entity set again and includes the delta token in the request, the GET_ENTITYSET_DELTA method will be called and will return the delta collection along with a fresh delta token

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

GET_ENTITYSET and GET_ENTITYSET_DELTA methods

GET_ENTITYSET method

- Returns complete entity collection, unless filters are applied
- Implementation to generate and return delta token must be added by developer

GET_ENTITYSET_DELTA method

- Called when the client provides a delta token in the request
- Returns only entities that are new, changed or deleted since the last time the method was invoked by the client
- Implementation to handle delta calculation must be added by developer

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Implementation techniques for delta detection

Two approaches to consider:

- Using ABAP based delta request log
- Using Mobile Add-On for SAP

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Using ABAP based delta request log

- Hash values are calculated and stored for each entity in the collection
- On a delta request, a hash value is calculated again for each entity and compared for changes from the prior call
- Advantage: Smaller implementation effort while providing sufficient delta functionality
- Disadvantage: Delta determination at request time and potential negative performance impact on the backend, especially for large collections

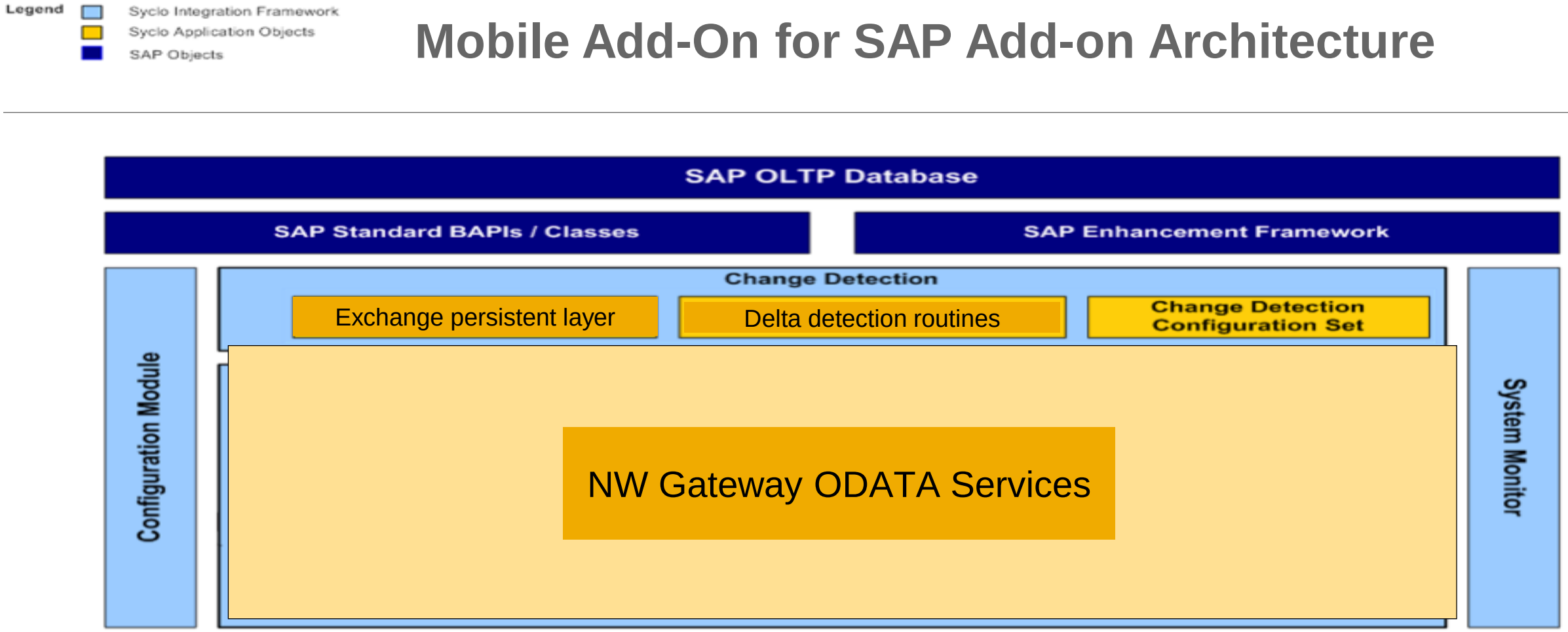
© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Using Mobile Add-On for SAP

- Exchange Framework is part of the Mobile Add-On for SAP
- Provides an advanced framework for detecting and storing changes for SAP business objects
- Exchange tables are used store information on the records that have been created, updated or deleted.
- Helper class provided by framework can be used by Gateway to access exchange tables to enable delta queries
- Advantage: Delta determination at modification time as they occur, more scalable, and more optimized performance
- Disadvantage: Requires more development

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Mobile Add-On for SAP Add-on Architecture



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

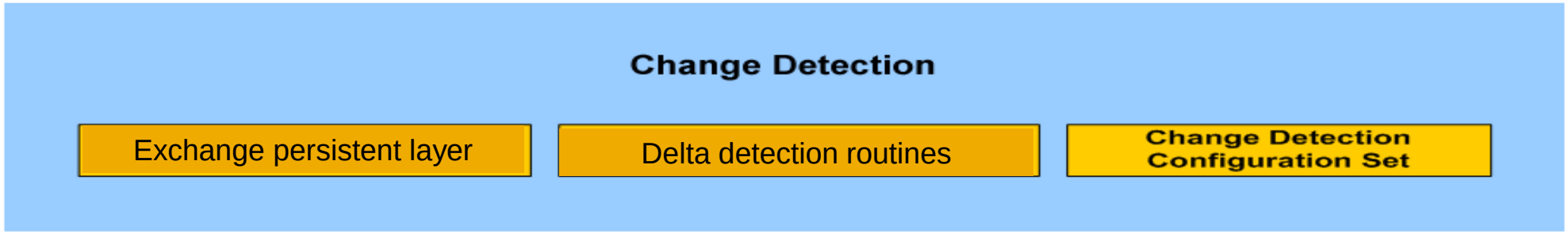
Mobile Add-On for SAP installation

- Add-On is installed in the SAP ABAP Backend
- Download from Service Marketplace
  - Software Downloads -> Installation and Download Catalog -> Browse our Download Catalog -> SAP Mobile Solutions -> Mobile Add-On for SAP
  - Unpack using sapcar –xvf <filename>.sar
- Installation
  - install in backend using Transaction SAINT in client 000
  - Requires a certain level patch level for SAP_ABA, SAP_BASIS
  - Installation time
    - ½ day to 1 day

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Change Detection Layer

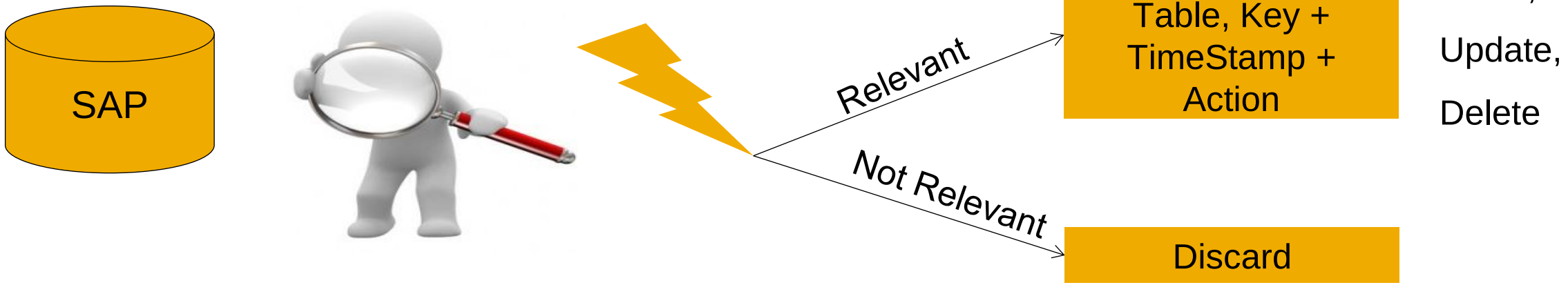
- **Detect and Track Changes to the (Relevant)Objects in the backend**
- **Consists of the following elements**
  - Change Detection Configuration Set
  - Delta Detection Routines
  - Mobile Exchange Persistent Layer



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Change Detection Layer – Delta Detection Routines

- **EFI Triggers + Business Logic to detect if a Object data was modified in the Backend**
- **EFI Trigger is provided by Enhancement Framework Implementation**
- **The Business Logic in this Layer determines whether the Change is relevant to the Mobile Application**
  - If Relevant, updates Exchange Tables (Persistent Layer)



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

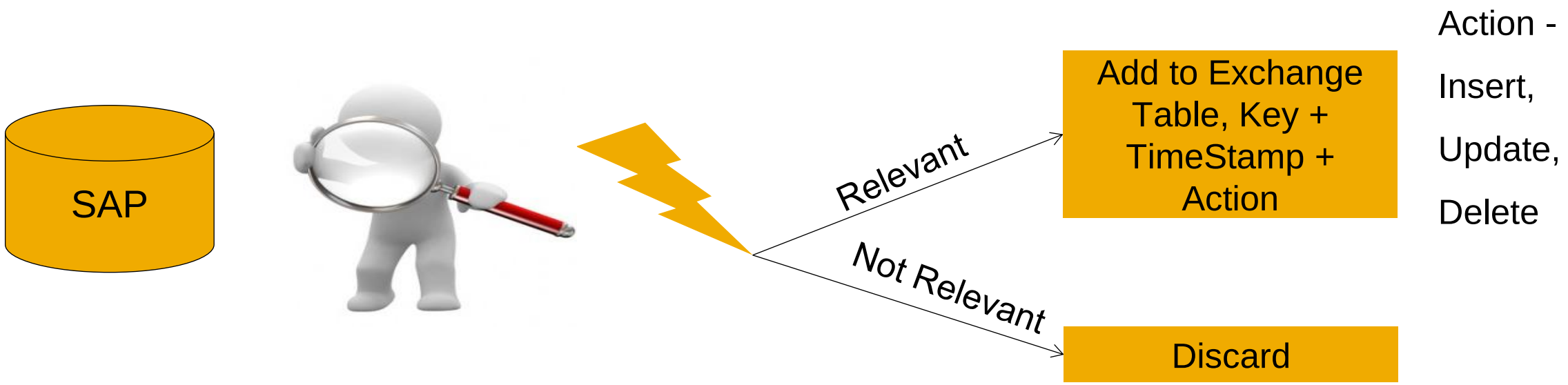
Finding correct spot for EFI Trigger

- BAdI Builder : Transaction SE18 / SE19
- Transaction SMOD / CMOD (customer exits)
- Enhancement builder tool
  - Integrated in ABAP Workbench (SE80)
  - Select development object -> Main menu -> Enhance Source Code
  - Edit -> Enhancement operations
  - Can enhance any Function module, ABAP programs , methods, etc
- Must be part of the LUW of the transaction

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Change Detection Layer – Persistent Layer

- **Contains Tables that Store changes to relevant Objects**
  - Stores Unique Key of the Object, Time of Last Modification,
- **Information stored is later used for Delta queries**



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

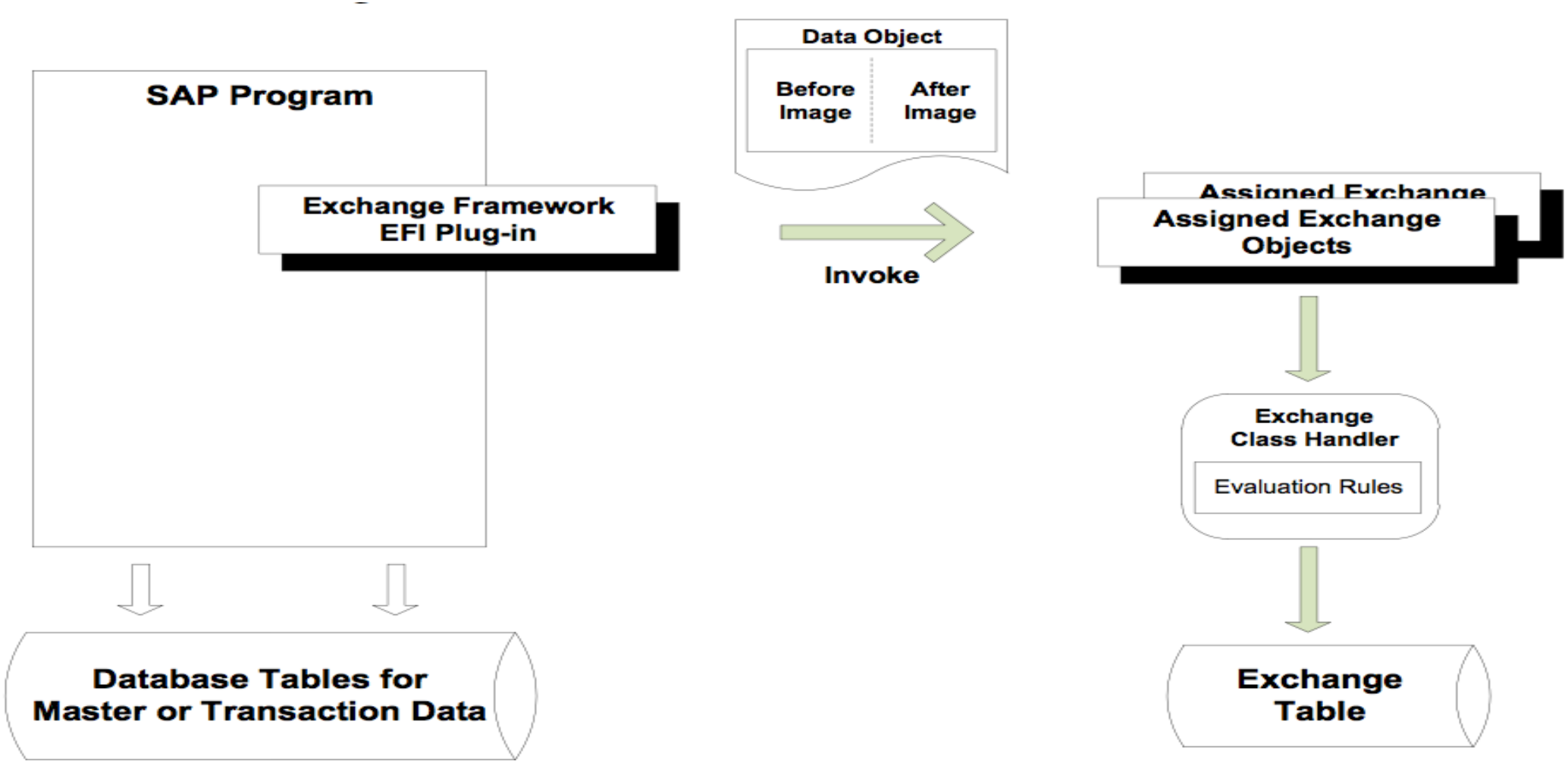
Change Detection Layer – Configuration Set

- **Configuration that defines the following (in Config panel)**
  - Define Exchange Object (an Object that needs to be Monitored) and map it to the Handler class
  - What are the relevant Fields of Object to be Monitored
  - Specify Exchange table to store Changes for the Object
  - Filter settings to further filter out at field level based on a criteria (Eg: Change is relevant only if the change in the Plant Field = “New York”)
  - EFI Assignment (Enhancement Framework Implementation) – Notify the change to a specific Exchange Object

- **Accessed via “Backend Change Detection Settings” in Config Panel**
  - Exchange Object Configuration
  - EFI Assignment

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Delta detection



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Delta query support implementation for ODATA

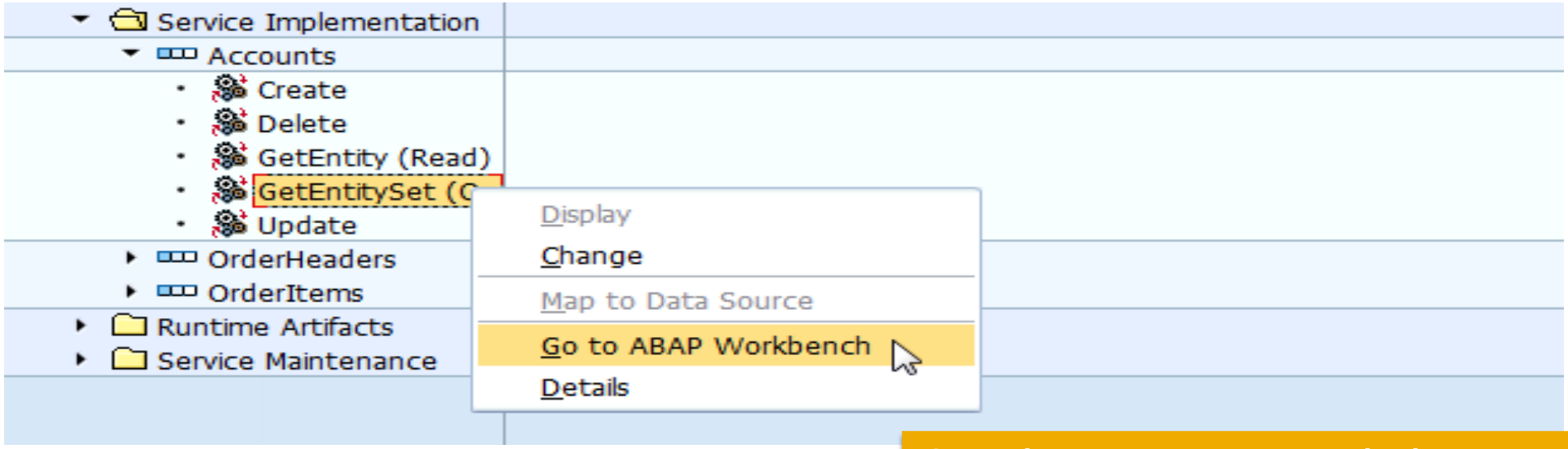
- Enhance Odata service
- Provide delta query support for entity set
- Using implementation technique with Exchange tables

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Enhance Runtime Data Provider Class for Account

Using SE80 or Gateway Service Builder perform the following tasks:

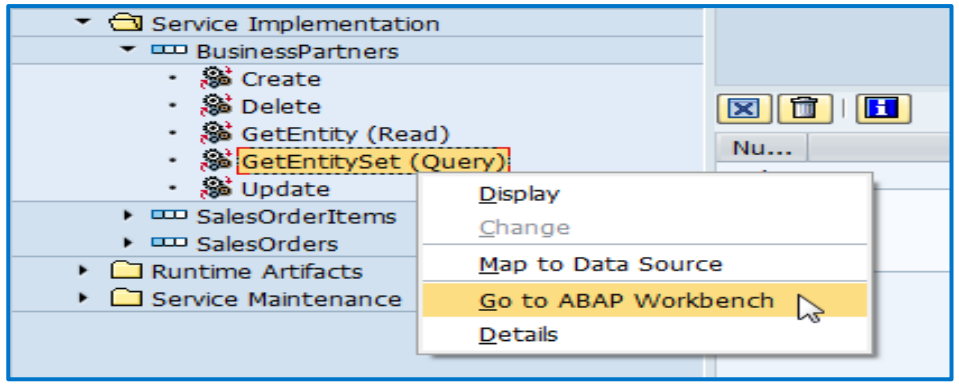
- Enhance method GET_ENTITYSET
- Redefine method GET_ENTITYSET_DELTA

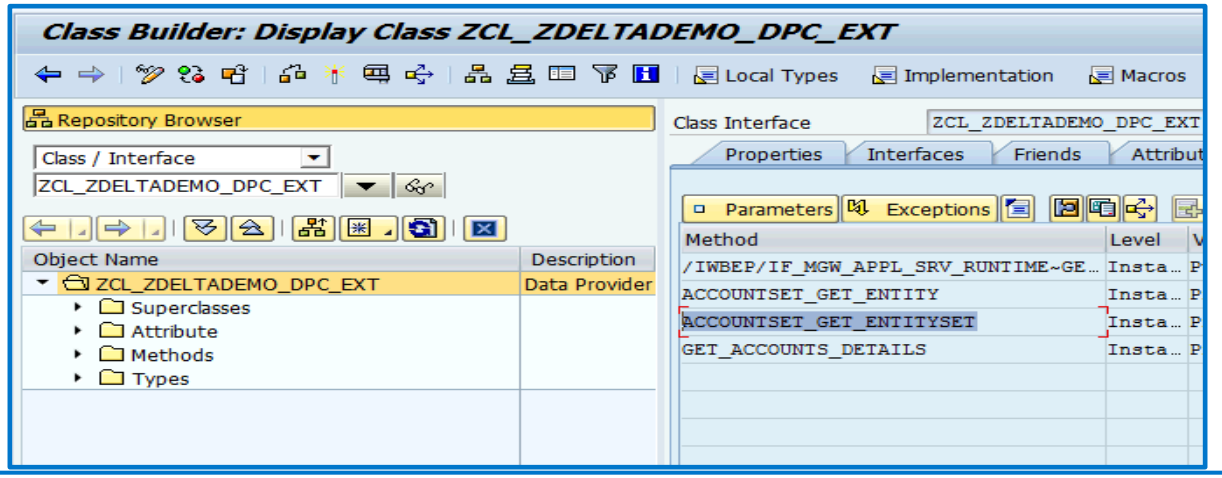


Operation	ABAP Method
Query	<Entity>_GET_ENTITYSET
Delta Query	<Entity>_GET_ENTITYSET_DELTA

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Enhancing GET_ENTITYSET method






```
method ACCOUNTSET_GET_ENTITYSET.

  < get all accounts assigned to this user >

   CALL FUNCTION 'ZDD_GET_ACCOUNTS_IDS_FOR_USER'

   CALL FUNCTION 'ZDD_GET_ACCOUNTS_DETAILS'

 endmethod.
```

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

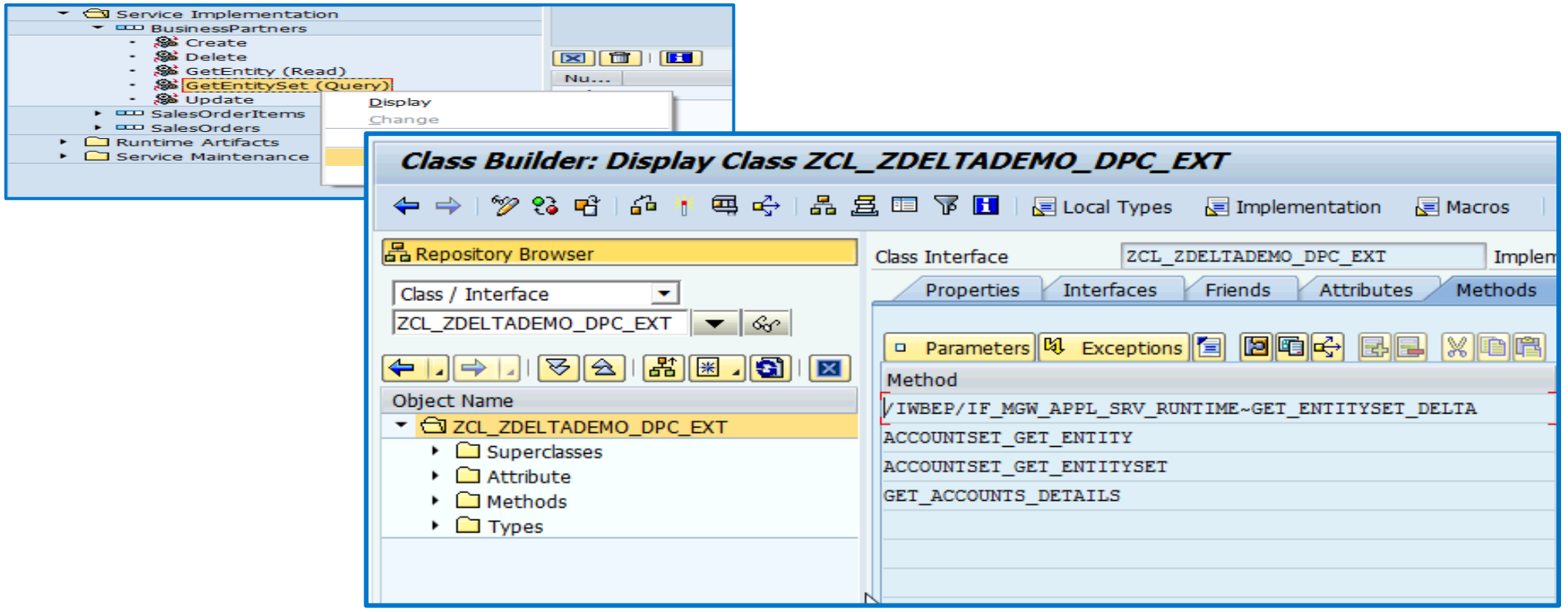
Enhancing GET_ENTITYSET method

- **Code enhancement 1:** Add delta token to the response

```
 * generate  the delta token
   /syclo/cl_core_bapi_tools=>get_system_time ( IMPORTING ev_sys_datum = lv_date
                                                         ev_sys_uzeit = lv_time ).

CONCATENATE lv_date lv_time INTO es_response_context-deltatoken.

 * add to header of response
  ls_header-name  = 'deltatoken'.
  ls_header-value = es_response_context-deltatoken.

  CALL METHOD me->/iwbep/if_mgw_conv_srv_runtime~set_header
   EXPORTING  is_header = ls_header.
```

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Redefining GET_ENTITYSET_DELTA method



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Redefining GET_ENTITYSET_DELTA method

- **Code enhancement :** Determine changed objects and merge with objects that the user is allowed to see

```
* Get delta token from the odata call
 lo_delta_context ?= io_tech_request_context.
 lv_delta_token = lo_delta_context->get_deltatoken( ).

•  Get exchange table contents for delta token ( see note 1921547 )
 CALL METHOD /smfnd/cl_core_exobj_tools=>determine_delta_objkeys EXPORTING
        iv_mobile_app                = <your mobile app>
        iv_exchobj                   = <exchange object>
        iv_time_token                = lv_delta_token
        iv_time_zone                 = 'UTC'
      IMPORTING
        eref_exch_data               = lr_ref_exch_data

  ASSIGN lr_ref_exch_data->* TO <lt_delta_tab>.


•  Inspect exchange table data.  * Get account details


* Handle deleted case ( action = 'D').  Add entries to ER_DELETED_ENTITYSET.
* Handle insert/update ( action = 'I' or 'U'). Add entries to ER_ENTITYSET
```

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Enhancing GET_ENTITYSET_DELTA method

- **Code enhancement :** Add delta token to the response

```
 * generate  the delta token
   /syclo/cl_core_bapi_tools=>get_system_time ( IMPORTING ev_sys_datum = lv_date
                                                         ev_sys_uzeit = lv_time ).

CONCATENATE lv_date lv_time INTO es_response_context-deltatoken.

 * add to header of response
  ls_header-name  = 'deltatoken'.
  ls_header-value = es_response_context-deltatoken.

  CALL METHOD me->/iwbep/if_mgw_conv_srv_runtime~set_header
   EXPORTING  is_header = ls_header.
```

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

More information

- **How to Implement Basic Delta Query Support in SAP NetWeaver Gateway**
  - http://scn.sap.com/docs/DOC-47043
- **How To Enable Delta Queries using Syclo Exchange Framework and SAP NetWeaver Gateway**
  - http://scn.sap.com/docs/DOC-49290
- **Youtube Video**
  - http://www.youtube.com/watch?v=ePAomjct208&feature=youtu.be

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Push Enablement in SAP Mobile Platform 3.0

Steps to Enable Push Notifications

Steps to sending push notifications:

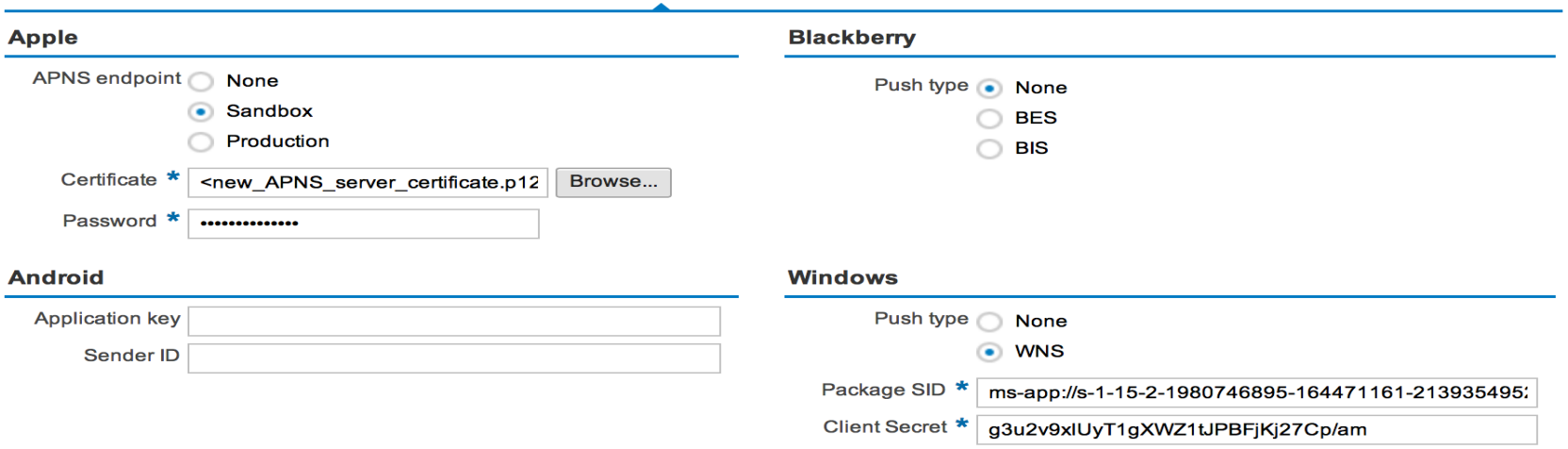
- **Configure Application Push Settings in SMP**
- **Get and Store User's notification token on their SMP registration**
- **Subscribe to OData notification**
- **Trigger the Notification from the backend**
  - Implement BADi at proper location to trigger push

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Configure Push Notification Settings on SMP

Configure push notifications for:

- iOS
- Android
- BlackBerry
- Windows 8, Windows Phone

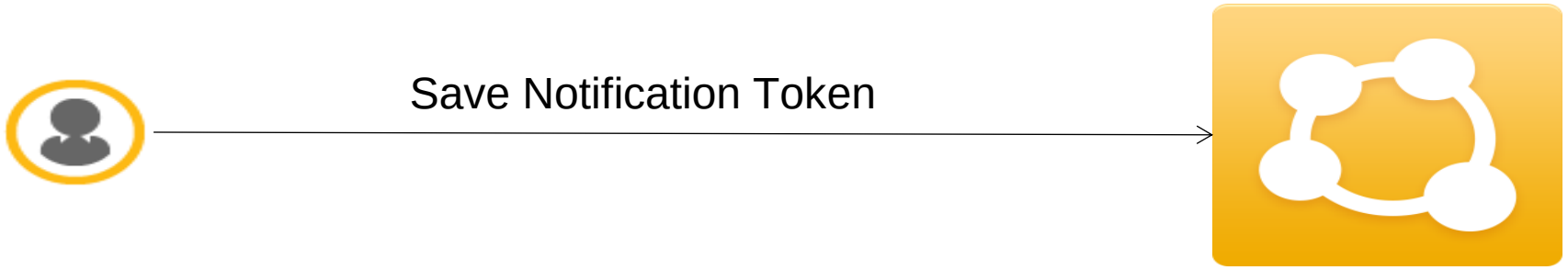


© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Store User’s Device Notification Token on SMP

The User’s Notifcation Token must be stored on the SMP server.

- REST API to store on User’s registration data
- Native SDK wrapper for REST API

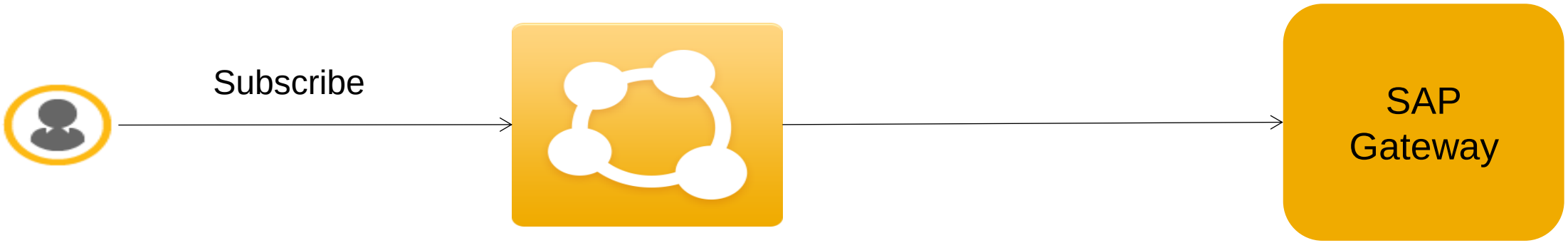


© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Subscribe to OData Notification

Tell the Gateway Server that you want to be notified.

- Option on all OData services
- Send Call-Back URL that is used by backend to inform you of the notification

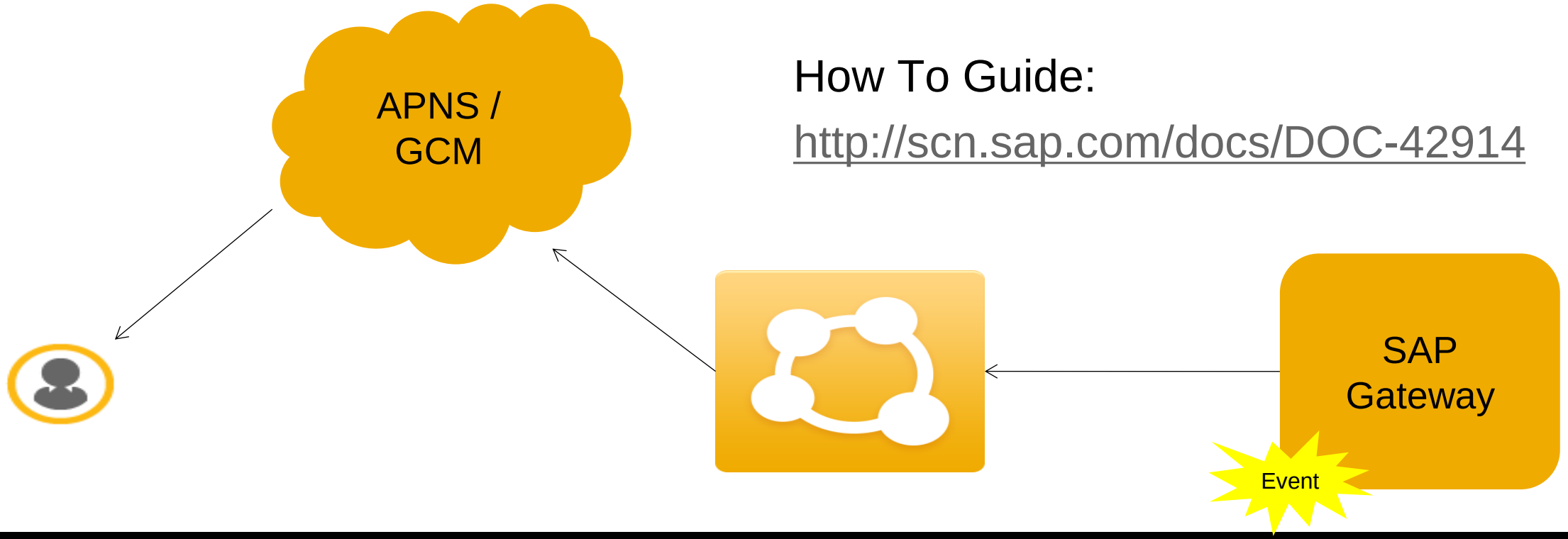


© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Trigger Notification

Trigger Notification at proper spot based on business criteria.

- When event is triggered in backend call SAP Gateway class for sending notifications
- SAP Gateway will call the call-back URL specified when user subscribed.
- SMP in turn sends the notification to the appropriate device notification service.



How To Guide:

http://scn.sap.com/docs/DOC-42914

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Enhanced Push Services – SMP SP4

Introducing new PUSH APIs:

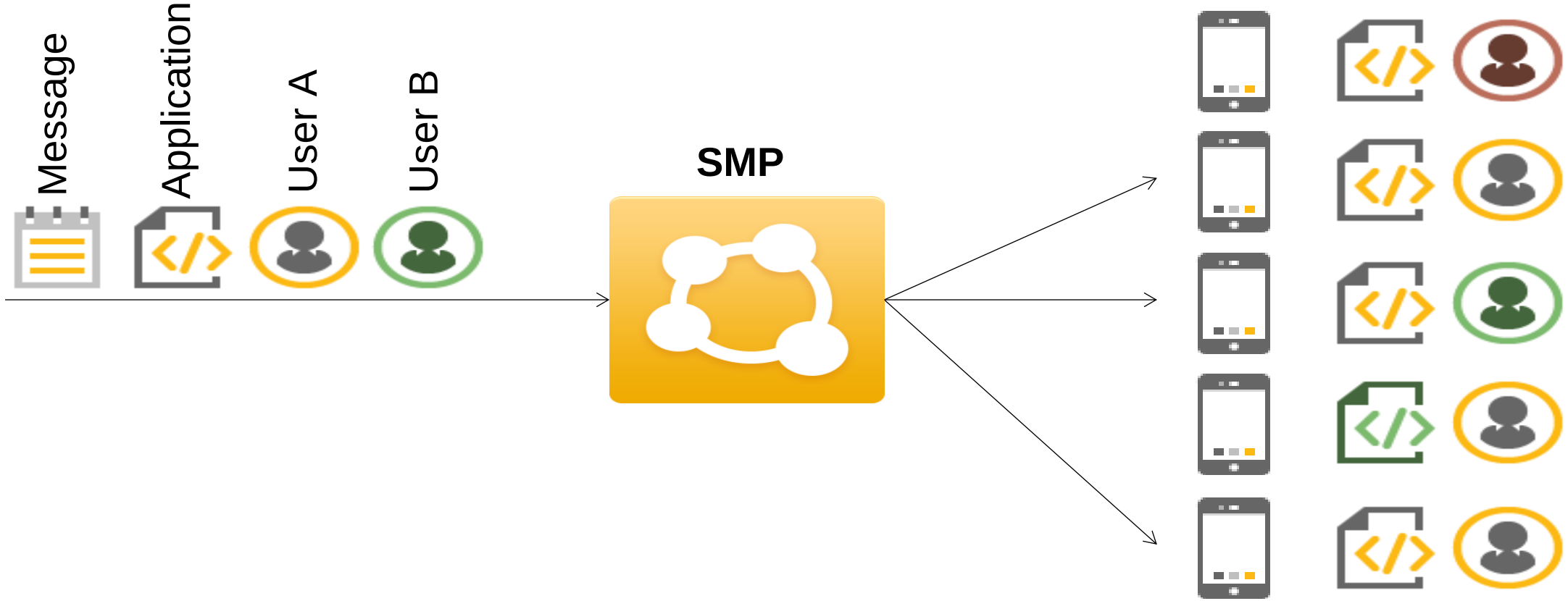
- **PUSH Notification to a device via registration ID**
- **PUSH Notification to devices registered of an application**
- **PUSH Notification to devices registered to all devices/registrations of a user**
- **PUSH Notification to a list of user of an application**
- **PUSH Notification to a list of registrations**

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Push Example:

PUSH Notification to a list of user of an application

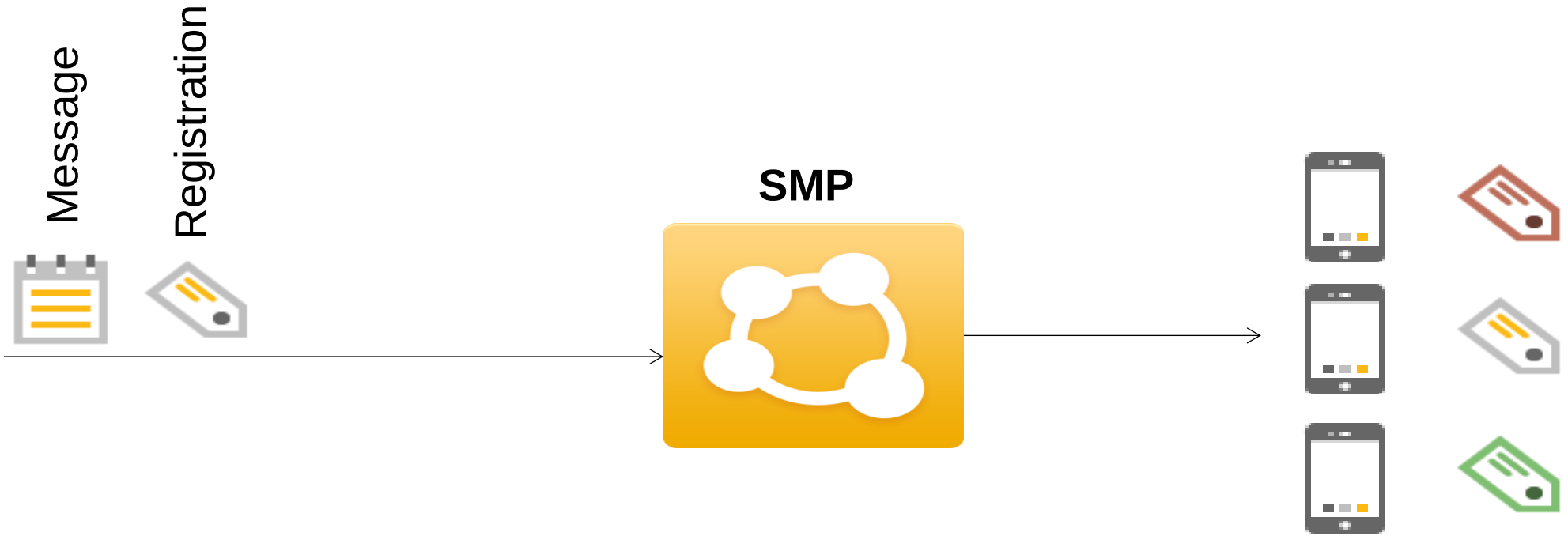
Application



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

PUSH Notification to a device via registration ID

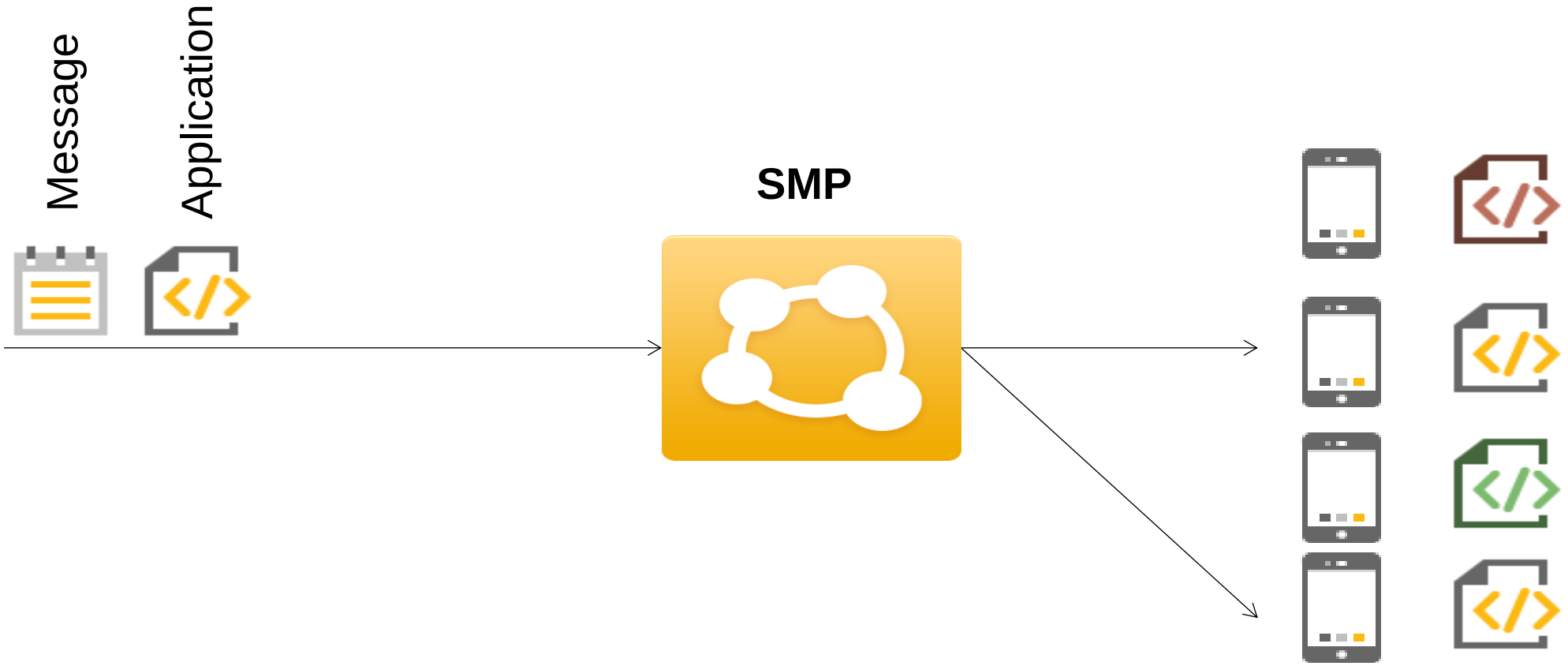
POST http(s)://server:port/restnotification/registration/{applicationRegistrationId}



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

PUSH Notification to devices registered of an application

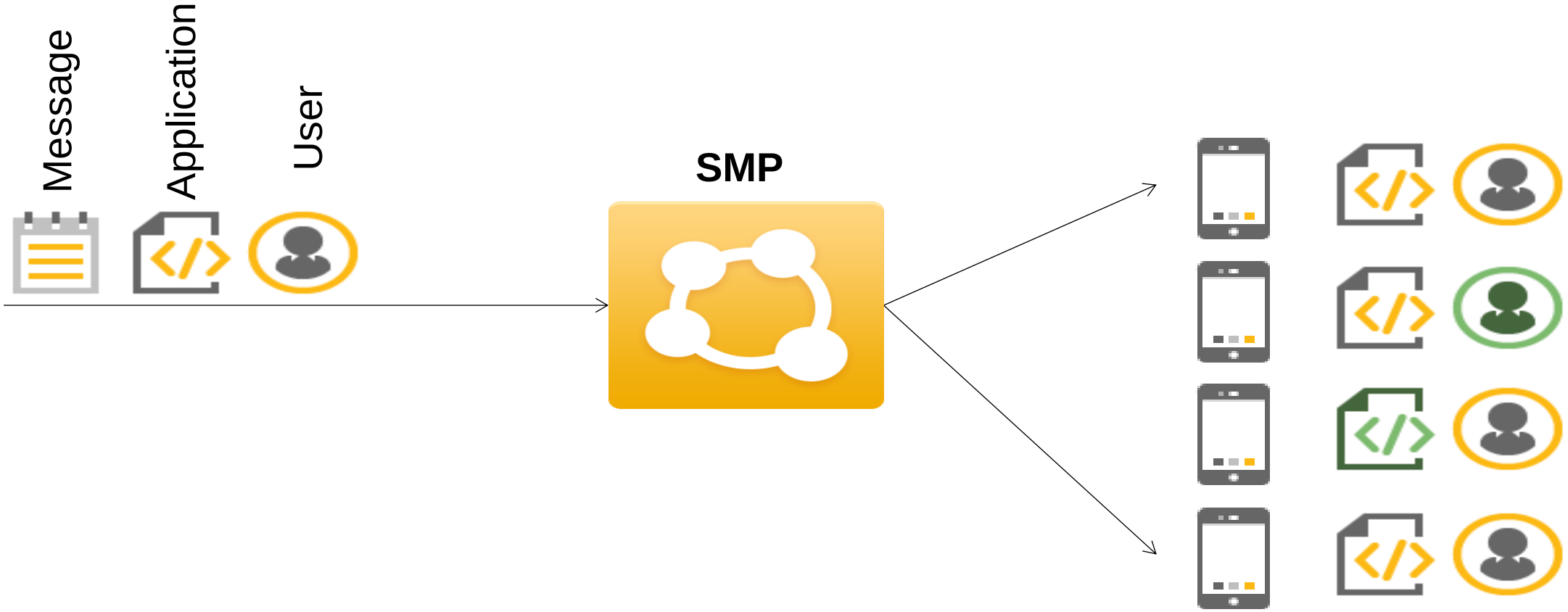
POST http(s)://server:port/restnotification/application/{applicationId}



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

PUSH Notification to devices registered to all devices/registrations of a user

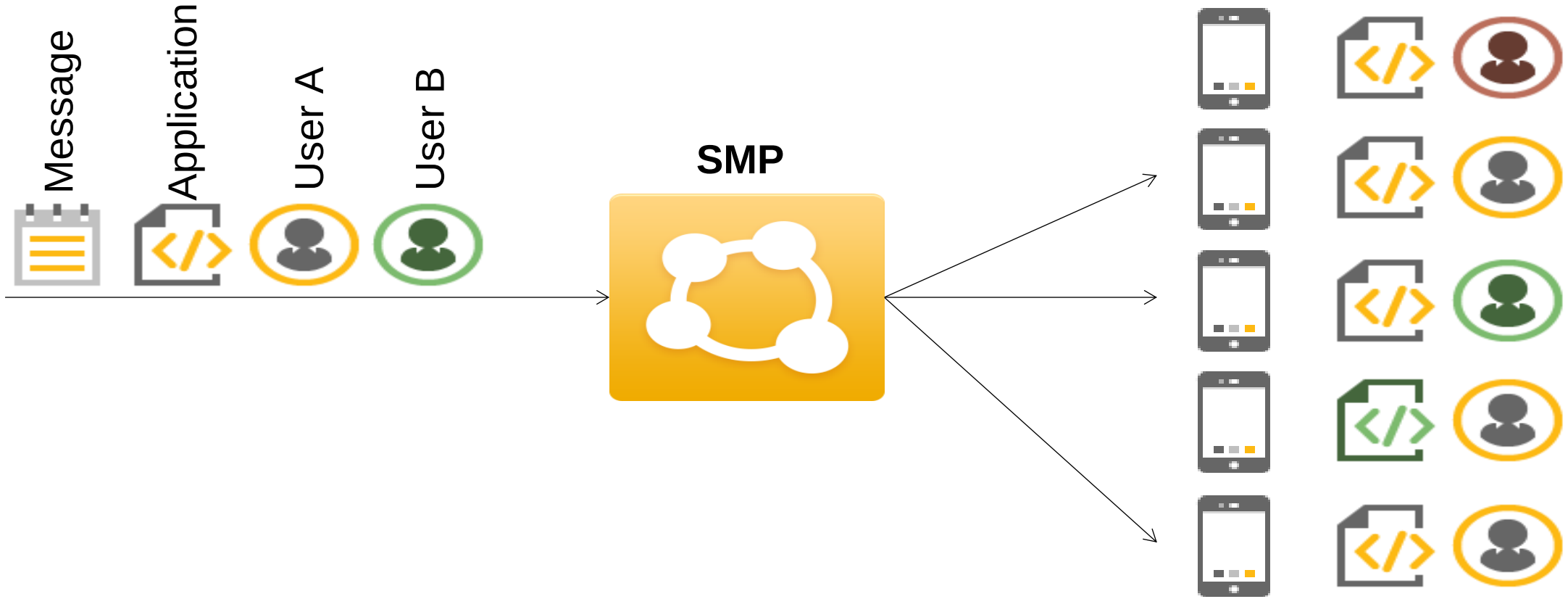
POST http(s)://server:port/restnotification/application/{applicationId}/user/{userId}



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

PUSH Notification to a list of user of an application

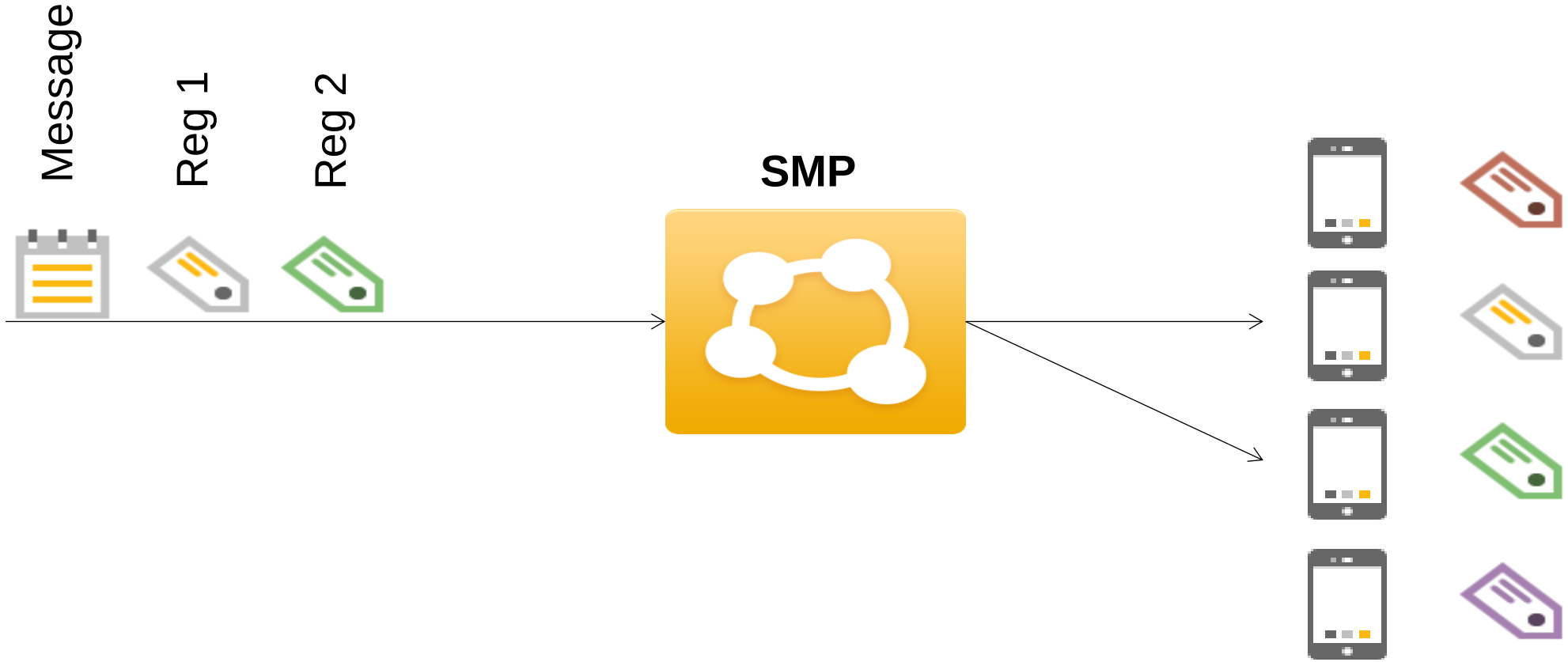
POST http(s)://server:port/restnotification/application/{applicationId}/user



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

PUSH Notification to a list of registrations

POST http(s)://server:port/restnotification/registration



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

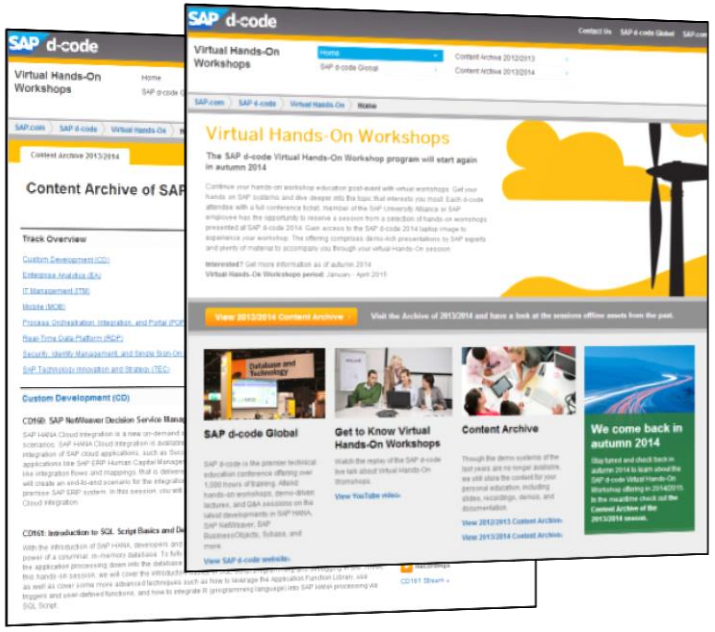
SAP d-code Virtual Hands-on Workshops and SAP d-code Online

Continue your SAP d-code education after the event!

SAP d-code Virtual Hands-on Workshops

- Access hands-on workshops post-event
- Starting January 2015
- Complementary with your SAP d-code registration

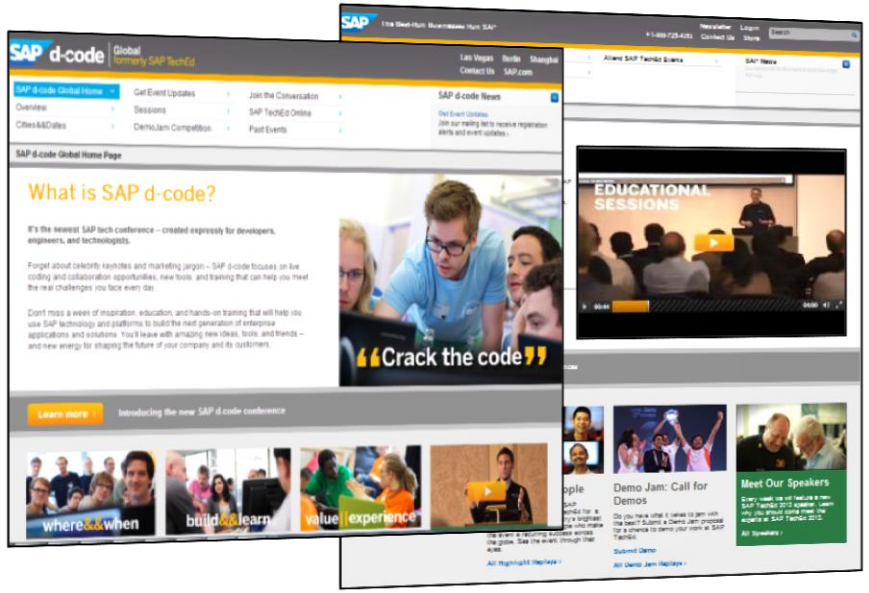
http://sapdcodehandson.sap.com



SAP d-code Online

- Access replays of keynotes, Demo Jam, SAP d-code live interviews, select lecture sessions, and more!
- Hands-on replays

http://sapdcode.com/online



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

Further Information

SAP Public Web

scn.sap.com
www.sap.com

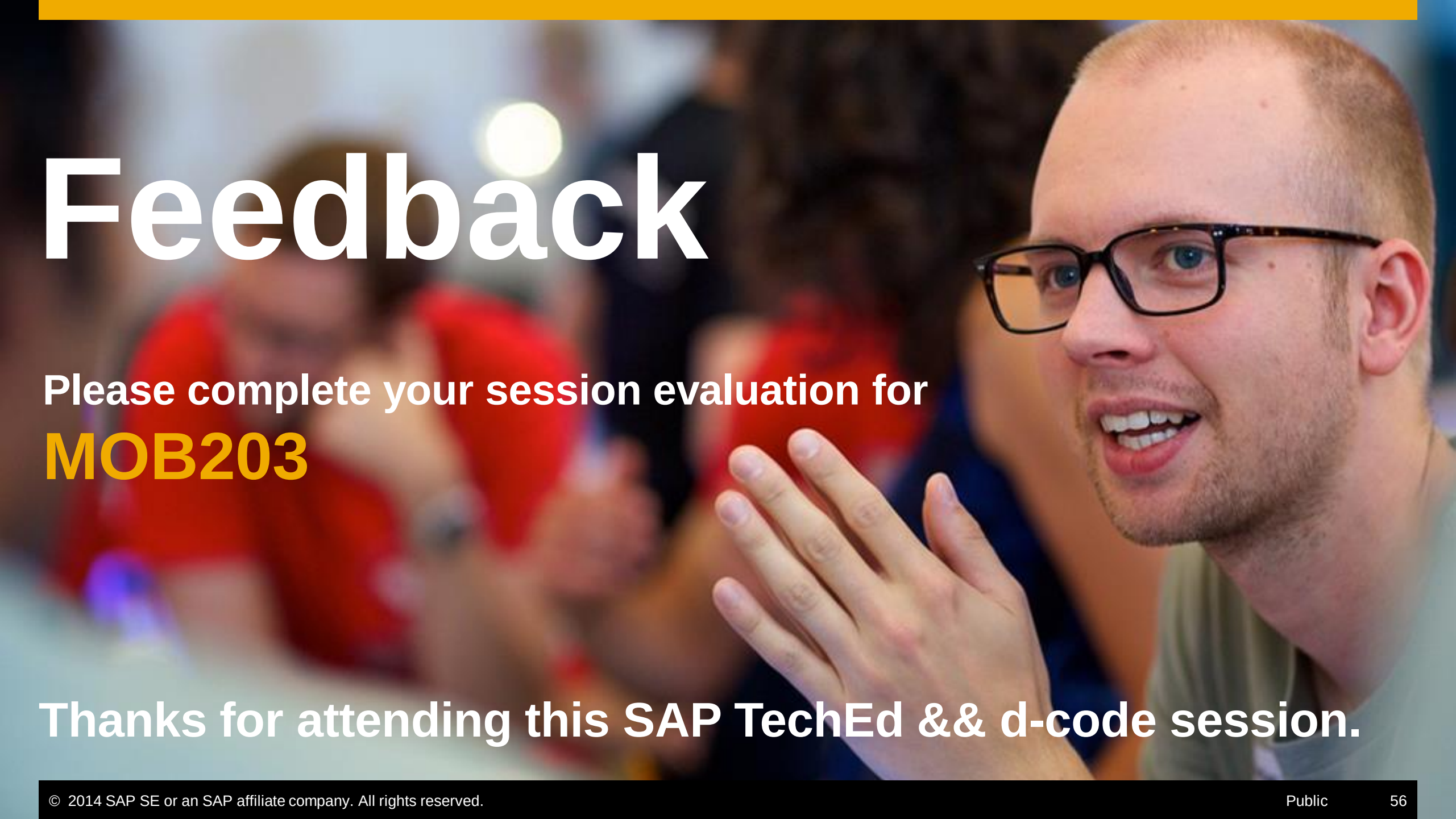
SAP Education and Certification Opportunities

www.sap.com/education

Watch SAP d-code Online

www.sapcode.com/online

© 2014 SAP SE or an SAP affiliate company. All rights reserved.



© 2014 SAP SE or an SAP affiliate company. All rights reserved.

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. Please see http://global12.sap.com/corporate-en/legal/copyright/index.epx for additional trademark information and notices.

Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors.

National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP SE or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP SE or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

In particular, SAP SE or its affiliated companies have no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation, and SAP SE's or its affiliated companies' strategy and possible future developments, products, and/or platform directions and functionality are all subject to change and may be changed by SAP SE or its affiliated companies at any time for any reason without notice. The information in this document is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.

© 2014 SAP SE or an SAP affiliate company. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP SE or an SAP affiliate company.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. Please see http://global12.sap.com/corporate-en/legal/copyright/index.epx for additional trademark information and notices.

Some software products marketed by SAP SE and its distributors contain proprietary software components of other software vendors.

National product specifications may vary.

These materials are provided by SAP SE or an SAP affiliate company for informational purposes only, without representation or warranty of any kind, and SAP SE or its affiliated companies shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP SE or SAP affiliate company products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

In particular, SAP SE or its affiliated companies have no obligation to pursue any course of business outlined in this document or any related presentation, or to develop or release any functionality mentioned therein. This document, or any related presentation, and SAP SE's or its affiliated companies' strategy and possible future developments, products, and/or platform directions and functionality are all subject to change and may be changed by SAP SE or its affiliated companies at any time for any reason without notice. The information in this document is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of their dates, and they should not be relied upon in making purchasing decisions.