ABAP Platform 7.4/7.5 – Overview

Technology Core Platform Product Management, SAP SE
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Agenda

ABAP Platform Overview
ABAP Platform 7.4/7.5 Product Highlights
ABAP Platform Summary
ABAP PLATFORM OVERVIEW
A short introduction
ABAP platform
Innovations driven by SAP HANA and SAP S/4HANA

SAP Business Suite EHP x
SAP NetWeaver 7.x
SAP NW AS for ABAP 7.x
Any DB
SAP HANA

SAP Business Suite EHP 7
SAP NetWeaver 7.4
SAP NW AS for ABAP 7.4
Any DB incl. SAP HANA
SAP S/4HANA
SAP Fiori UX Cloud

≤ 2014
ABAP platform
ABAP platform 7.5 – Role in SAP S/4HANA

SAP Business Suite codeline

- SAP Business Suite EHP 8
- SAP NetWeaver 7.5
- SAP S/4HANA Finance 3.0

SAP S/4HANA codeline

- SAP S/4HANA on-premise edition 1511
- SAP S/4HANA cloud edition

SAP NW AS for ABAP 7.5 / 7.6x package in the Cloud
[General availability: Q4 2015 | Unicode systems only]

Any DB incl. SAP HANA

Only SAP HANA

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ABAP platform
ABAP platform 7.51 – Role in SAP S/4HANA

SAP NW AS for ABAP 7.51

Any DB incl. SAP HANA

SAP NW AS for ABAP 7.51 Innovation Package

SAP S/4HANA on-premise edition 1611

SAP S/4HANA cloud edition

SAP S/4HANA specific SAP_ABA component

SAP S/4HANA codeline

SAP NW AS for ABAP 7.51 / 7.6x package in the Cloud

[General availability: Q4 2016 | Unicode systems only]
ABAP platform 7.4/7.5x

- New ABAP language features for more simple and concise code
- ABAP application development further optimized for SAP HANA
- Increased coverage of SQL standard
- Efficient ABAP programming model for SAP Fiori apps
- Advanced quality assurance tools and support for SAP S/4HANA conversion
- Increased developer efficiency in Eclipse®
- Real-time event-driven programming and Industrial IoT support
- Increased developer efficiency in Eclipse®
Product highlights
Modern ABAP Language
Declarative and functional ABAP modernization

- Write simplified ABAP using new language features
- Extensively expression-oriented syntax
- Advanced table operations
- JSON support in sXML-Library
- Inline code documentation with ABAP Doc
Modern ABAP Language
More simple and concise ABAP code

**ABAP < 7.40**

```
DATA: it1 TYPE tt1,
     wa1 LIKE LINE OF it1.

wa1-a = 7. wa1-b = 9.
INSERT wa1 INTO TABLE it1.
wa1-a = 3. wa1-b = 5.
INSERT wa1 INTO TABLE it1.

FIELD-SYMBOLS <wa1> LIKE LINE OF it1.
DATA wa2 LIKE LINE OF it2.
LOOP AT it1 ASSIGNING <wa1>.
   wa2 = t1_to_t2( <wa1> ).
   INSERT wa2 INTO TABLE it2.
ENDLOOP.

DATA: ref TYPE REF TO class1,
     tmp TYPE string.
READ TABLE it1 WITH KEY a = 3 ASSIGNING <wa1>.
CREATE OBJECT ref.
   tmp = <wa1>-b.
   ref->do_something( tmp ).
```

**ABAP ≥ 7.40**

```
INLINE DECLARATION
DATA(it1) = VALUE tt1( ( a = 7 b = 9 )
     ( a = 3 b = 5 ) ).

TABLE COMPREHENSION
it2 = VALUE #( FOR <wa1> IN it1
     ( t1_to_t2( <wa1> ) ) ).

CONSTRUCTOR
NEW class1( )->do_something( CONV #( it1[ a = 3 ]-b ) ).
```

- **Inline declaration with inferred type**
- **Constructor expression**
- **Table comprehension**
- **Object creation**
- **Value conversion to inferred type**
- **Table selection**
Modern ABAP Language
What’s new with ABAP 7.5

01 | New built-in ABAP data type int8

02 | Further expression enablement

03 | Advanced table operations like CORRESPONDING() operator, grouping and filtering

04 | Type inspection for object reference variables using IS INSTANCE OF and CASE TYPE OF

05 | Easy raising of T100 messages via class-based exception

06 | Test seams and injections for ABAP unit testing
Database-centric optimizations
ABAP managed code pushdown

- Transparent optimizations
  - Fast Data Access
  - For all entries

- Reuse components
  - ALV with integrated data access
  - Enhanced search help

- Advanced SQL programming
  - Open SQL enhancements
  - Advanced view building with Core Data Services (CDS)

- Exploit SAP HANA native features
  - ABAP managed database procedures (AMDP)
  - CDS table functions

Effort for code pushdown

Utilization of SAP HANA capabilities

MORE

LESS

LOW

HIGH
Database-centric optimizations
Enhancement of Open SQL

Broader coverage of SQL standard for higher expressiveness in Open SQL statements

Code pushdown support thru new language features and reduction of existing limitations
Various SQL functions and expressions
Enhanced JOIN support, increased number of sub-queries

Flexible consumption of CDS views and roles

New syntax required for new features
Database-centric optimizations

Open SQL – Release 7.5 feature overview

- New and enhanced SQL functions and expressions like CONCAT, REPLACE, LPAD and COALESCE
- Support of UNION and UNION ALL
- Enhanced JOIN support, incl. dynamic ON condition
- Support of field completion by placing FROM before the field list
- Flexible consumption of CDS modelling entities and declarative authorizations
- Access to global temporary tables
Database-centric optimizations
Core Data Services (CDS) in a nutshell

Next generation data definition and access for database centric applications
- Uses and extends SQL for higher productivity
- Improved programming model for all types of applications
- Integrates with platform lifecycle management
Database-centric optimizations
Advanced data building with ABAP CDS

1. **Semantically rich data models**
   - Domain specific languages (DDL, QL, DML, DCL)
   - Declarative, close to conceptual thinking

2. **Compatible with any DB**
   - Fully integrated in the ABAP infrastructure
   - Generated and managed SQL views
   - Native integration in SAP HANA

3. **Rich set of built-in functions**
   - Generic expressions, string, arithmetic, date, time, aggregate and special conversion functions

4. **Domain-specific annotations**
   - Enabler for domain-specific consumption e.g. for UI, Analytics, OData, BW,…

5. **Associations**
   - Simple definition of view relationships
   - Path expressions to navigate along relations

6. **Extensible**
   - On model level thru extensions
   - On meta-model level thru annotations
Database-centric optimizations
Example of a ABAP CDS view definition

---

CDS view entity name

SQL view name

Name list

Select list

Join

Annotations

Built-in functions

WHERE clause

Group by clause

Aggregation

---

ABAP DDL Source

---
Database-centric optimizations
CDS – Release 7.5 feature overview

01
New and enhanced SQL functions and expressions like CONCAT, REPLACE, LPAD, enhanced COALESCE, …

02
Enhanced JOIN support, incl. dynamic ON condition and usage of associations in CDS view extensions

03
Flexible consumption of CDS modelling entities and declarative authorizations

04
CDS table functions for supporting SAP HANA breakout scenarios
SAP HANA offers procedures in SQLScript for processing application logic directly in the database

- Expression of complex logic (incl. if/else, …)
- Local variables
- Parameterized requests
- Multiple result sets

AMDP are developed with ABAP tools in Eclipse and fully managed by the ABAP infrastructure

Easy access to SAP HANA specialized engines and function libraries

Seamless integration in CDS via CDS table functions
ABAP development of SAP HANA optimized SAP Fiori apps
SAP S/4HANA applications – Product qualities

Efficient development of state of the art web-based applications

- SAP Fiori user experience on all devices drives the model
- Continuous work, device switch and collaboration
- Combination of transactions, search and analytics in a process
- Optimized for SAP HANA
- Common cloud qualities (e.g. extensibility)
ABAP development of SAP HANA optimized SAP Fiori apps
Efficient programming model* for all types of apps

Freestyle or templates based UI development
SAP Fiori Elements and SAPUI5

Decouple UI logic from backend semantics
OData services via SAP Gateway

Effective and efficient application development
Modern ABAP language and development toolset

Transactional, search, query push down, error and event handling services

One common data modelling technology for all scenarios
Core Data Services

Exploit SAP HANA features and performance
AMDP & CDS Table Functions

SAP Fiori

Gateway

AS ABAP

SAP HANA

* Introduced with ABAP 7.50
ABAP Channels
Say goodbye to polling. Collaboration. Industrial IoT.

**ABAP Push Channel – No more polling**
Bi-directional communication via WebSockets in ABAP
User interface is automatically updated when data changes

**ABAP Messaging Channel – Collaborate**
Publish / subscribe infrastructure to exchange messages between sessions
Data changes are published to subscribed clients immediately

**Direct communication with sensors/machines**
Support native TCP/IP protocols
AS ABAP 7.40
- Communication with ABAP server through WebSockets
- ABAP server only as a stateless ABAP Push Channel server
- ABAP Messaging Channels: one-to-many communication

AS ABAP 7.50
- Communication between ABAP server and devices through TCP Sockets
- ABAP server as ABAP Push Channel server or client, stateful and stateless
- ABAP Messaging Channels: point-to-point communication

AS ABAP 7.51
- Unlimited amount of data thru ABAP Channels (large messages, configurable)
- Improve browser handling for WebSockets: multiplexing, keep-alive
- Create ABAP Push Channel in ABAP Development Tools in Eclipse
ABAP Development Tools in Eclipse

Overview

Superior toolset for all ABAP-based developments

High developer productivity
- Flexible UI with powerful code editor incl. refactoring support
- New SQL development tools for CDS and AMDP, incl. ABAP SQL console
- Troubleshooting tools like debugger, tracing, dump analysis
- Quality tools for static code checks and unit testing
- New code documentation capabilities with ABAP Doc

Open & Extensible
- One IDE for different development aspects
- SDK for partner and customer extensions
- Eclipse Marketplace & Community

Central update site

https://tools.hana.ondemand.com
ABAP Development Tools in Eclipse
Release 7.5 features overview

Source-based editor for dictionary structure

New AMDP debugger

Native BOPF business objects editor in Eclipse

Form-based editor for data elements

Source-based editor for Simple Transformations

Further developer productivity enhancements
• Like new Web Dynpro ABAP tools, offline ABAP Doc, Quick Fixes and enhanced CDS editing support

Find more information here: http://scn.sap.com/community/abap/eclipse/blog/2015/10/22/out-now-adt-version-251-for-the-brand-new-as-abap-750
Advanced quality assurance tools
Why to use ABAP Test Cockpit?

Central infrastructure for functional, performance, security code checks

Extensible checks infrastructure

Uniform quality criteria for your whole system landscape

New quality assurance processes minimize errors in productive systems

Smooth migration of ABAP code to SAP HANA and S/4HANA
Advanced quality assurance tools
Remote code analysis with central ATC as of release 7.51

One **ATC central check system in your landscape** for all static code checks

**ATC central check system** accessing and checking multiple systems with latest ATC checks via RFC call

**Remote stubs** returning custom code metadata to be implemented in all systems to be checked (SAP Note 2270689)

Basis for smooth SAP HANA migration and SAP S/4HANA conversion
Advanced quality assurance tools

SQL Monitor

Runtime analysis tools for productive systems

- Collects runtime information of all executed SQL statements (transaction SQLM)
- Provides the transparent SQL profile
- Monitored data are linked to the related process
- Various aggregation and drill-down options
- SQL Trace integration

For more detailed investigations
SAP S/4HANA system conversion
Custom code related process

Preparation phase

- System requirements
- Custom code evaluation
  - Remove obsolete code based on Usage Procedure Log (UPL)
- SAP HANA checks
  - Check SAP HANA related changes like ORDER BY
  - Adaptation of necessary changes
- Data conversion
- Software Update Manager (SUM)

Realization phase

- Custom code preparation
  - Check SAP S/4HANA related changes like data model changes
  - Adapt modifications in SPDD/SPAU
- Application specific follow-up activities
  - Database migration
  - Software update
  - Data conversion
- Functional adaptation
  - Adapt custom code to SAP HANA and SAP S/4HANA related changes
- Performance tuning
  - Tune performance of critical database queries
SAP S/4HANA system conversion
Migration of custom ABAP code – Tool support

<table>
<thead>
<tr>
<th>Task</th>
<th>Analysis System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Download Simplification Database from SMP and upload to analysis system</td>
<td>Simplification DB</td>
</tr>
<tr>
<td>2. Run Custom Code Extractor and transfer metadata to analysis system</td>
<td>Changed/deprecated functionality &amp; Changed/deprecated business processes</td>
</tr>
<tr>
<td>3. Optional: Get usage data to restrict effort for productively used custom code</td>
<td>Custom code metadata</td>
</tr>
<tr>
<td>4. Work on customer specific hits</td>
<td>Used SAP objects &amp; Extended SAP objects</td>
</tr>
</tbody>
</table>

- **Customer ERP DEV or Q System**
  - Custom Code Extractor
  - Customer ERP Productive System
  - Collect Usage Data

- **Customer ERP Productive System**
  - Collect Usage Data

- **Result of Analysis**
  - Affected custom code
  - Affected extensions
  - Affected modifications

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ABAP PLATFORM OUTLOOK & SUMMARY
ABAP platform
Outlook – Contributions to SAP S/4HANA

ABAP Platform Cloud

ABAP programming model for SAP HANA optimized SAP Fiori apps

Custom ABAP code adaptations for SAP HANA and SAP S/4HANA

SAP S/4HANA codeline

SAP S/4HANA on premise edition 1611

SAP S/4HANA cloud edition

SAP S/4HANA specific SAP_ABA component

ABAP Platform / ABAP Platform Cloud

Only SAP HANA

FOCUS OF THE ABAP PLATFORM DEVELOPMENT

This is the current state of planning and may be changed by SAP at any time.
ABAP platform
Key takeaways

The ABAP platform provides the basis for thousands of critical productive ERP systems.

The ABAP platform is the foundation underlying SAP S/4HANA.

The ABAP programming model changes rapidly in order to support and unleash the power of SAP HANA, Cloud scenarios and SAP Fiori.

ABAP developers have to get familiar with the new techniques and tools in order to deliver highly desirable and scalable applications.
Further Information

SAP Public Web
ABAP 7.51 Landing Page
ABAP 7.5 Landing Page
Getting Started with ABAP Programming Model for SAP Fiori Apps
Expressions in ABAP Programming Guidelines
SAP Community ABAP Development
Developer on sap.com
Trial Versions und Downloads
www.sap.com

Product road maps available on sap.com/roadmaps
> SAP NetWeaver Application Server for ABAP
Thank you

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