

Week 2 Unit 1: **Existing Code: Is It Still Valid?**



Existing Code: Is It Still Valid?

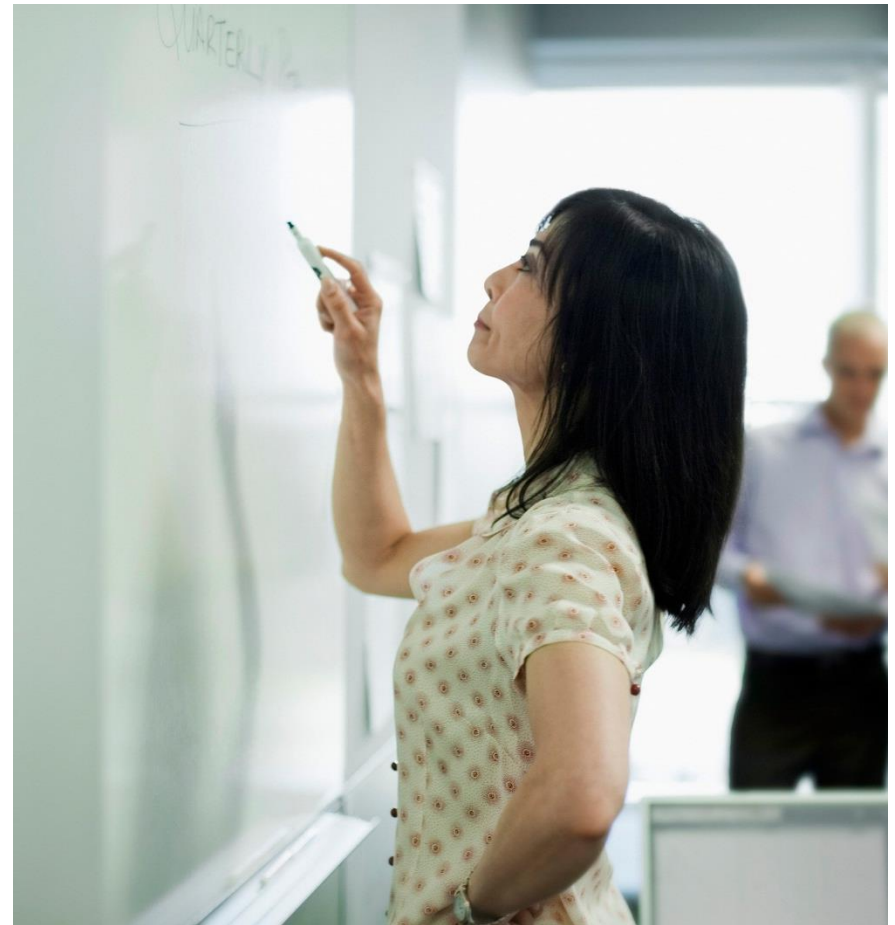
Outline



Additional
Material

Content

- Code Continuity
- Mandatory Adaptions
- ABAP Test Cockpit
- Runtime Checks



Existing Code: Is It Still Valid?

Migration to SAP HANA

1. Detect

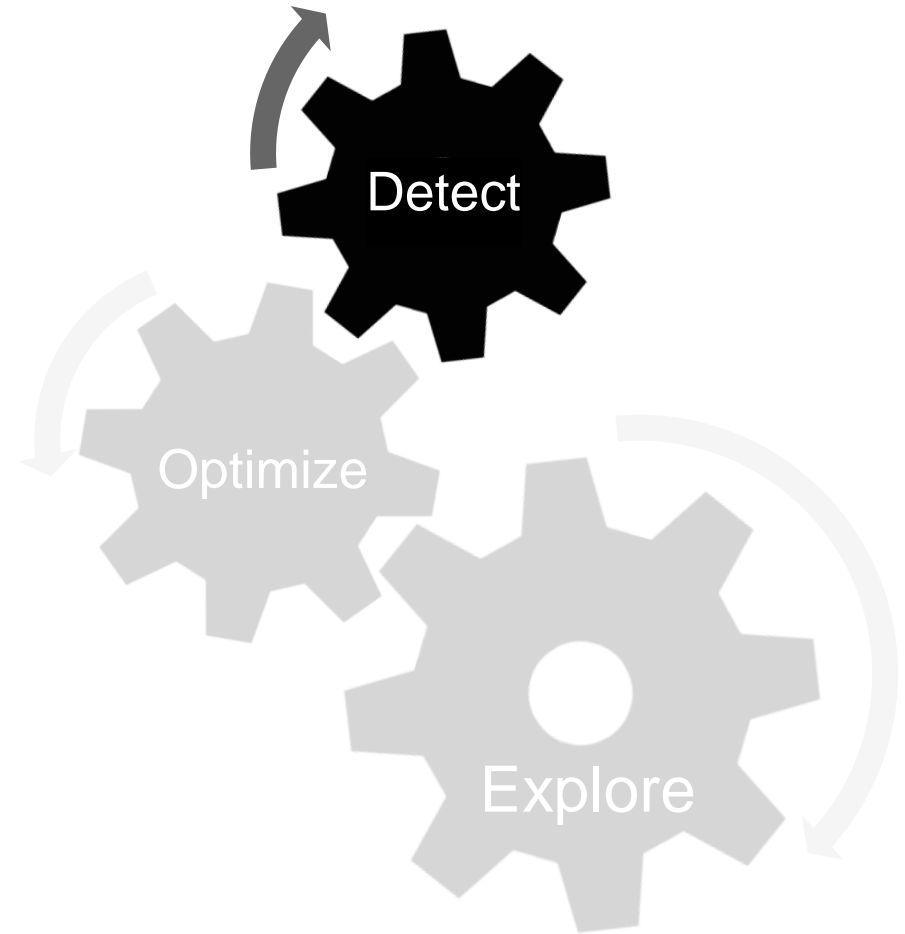
- Functional correctness
- Performance optimization potential

2. Optimize

- Database-oriented programming

3. Explore

- Use SAP HANA-specific features
- Rethink & innovate



Existing Code: Is It Still Valid?

Code Continuity

- Migration to SAP HANA is “just” a database migration
- Everything works as before, except...
 - Native SQL
 - DB-specific hints
 - Implicit DB-specific behavior

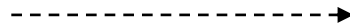


Existing Code: Is It Still Valid?

Mandatory Adaptations: Examples

Previous usage of Native SQL/hints

- Check if Native SQL uses vendor-specific statements and how they can be replaced by either Open SQL or native SAP HANA constructs.

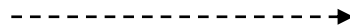


```
" Use of native SQL  
EXEC SQL.
```

```
ENDEXEC.
```

```
" Native SQL via ADBC  
lo_result =  
  NEW cl_sql_statement(  
    )->execute_query(  
    'SELECT ROWNUM, *  
      && ' FROM SNWD_BPA'  
      && ' ORDER BY COMPANY_NAME' ).
```

- Check if previously used hints are still needed in adapted form or can be removed.



```
" Database / Database Interface Hints  
SELECT * FROM snwd_so  
  INTO wa FOR ALL ENTRIES IN fae  
WHERE node_key = fae-node_key  
  &_HINTS MSSQLNT '&prefer_join 0&'.
```

Existing Code: Is It Still Valid?

Mandatory Adaptations: Examples

Relying on undocumented behavior

- Relying on implicit sorting

----->

```
" Relying on implicit sorting
SELECT * FROM my_table
      INTO TABLE lt_data WHERE id < 100.
```

- Direct access to physical pool/clusters

----->

```
" Access to physical pool / cluster
DELETE FROM my_cluster
      WHERE timestamp < '01012000'.
```

- Checking for existence of secondary indices

----->

```
" Check for secondary index
IF ( lv_index_exists = abap_true ).
    ...
ENDIF.
```

Existing Code: Is It Still Valid?

ABAP Test Cockpit

Holistic tools for quality assurance of ABAP code

- Single point of entry for all static code check tools (Code Inspector, ...)
- Verdicts are reported with priorities
- Support for quality management processes
- Available with ABAP 7.02 SP12 and above
- Fully integrated into development environment and transport tools



Existing Code: Is It Still Valid?

ABAP Test Cockpit – Usage



Additional
Material

Developers can

- Execute checks on **single objects**, **package hierarchies**, or **transport orders**
- **Suppress verdicts** using pseudo comments to avoid “false positives”
- Call the ATC from transaction SE80 and **ABAP Development Tools for SAP NetWeaver**

Features for quality managers

- **Central** execution runs with notifications
- Results of check runs can be transferred to **other systems**
- Integration with **SAP Solution Manager**

The screenshot displays the SAP ABAP Development Tools interface. On the left, a code editor shows ABAP code with line numbers 78 to 98. A context menu is open over the code, listing various actions like 'Undo', 'Save', 'Open ABAP Type Hierarchy', and 'Run As'. The 'Run As' option is selected, showing a submenu with options: '1 ABAP Application', '2 ABAP Class Run', '3 ABAP Test Cockpit', '4 ABAP Unit Test', '5 ABAP Package Check', and '6 ABAP Performance Test'. Below the code editor, a 'Statistics: Check' table is visible, showing the results of a check run.

Statistics: Check	Des...	Prio 1	Prio 2	Prio 3
Total	Total	67	255	27
Search problematic statements for result of SELECT/OPEN O	Check...	5		
Analysis of WHERE Condition for SELECT	Check...	7	36	
Search DB Operations in loops across modularization units	Check...	46		
NonLocal Nested Reading DB OP (...) found	Check...	9		
Local Nested Reading DB OP (...) found	Check...	34		
Local Nested Writing DB OP (...) found	Check...	1		
Local Nested EXEC SQL found	Check...	2		
EXIT or no statement in SELECT...ENDSELECT loop	Check...			4
Unsecure use of FOR ALL ENTRIES	Check...		4	10
Depooling/Decustering: Search SELECT for Pool/Cluster-Tabl	Check...	1		
SELECT Statements That Bypass the Table Buffer	Check...		7	
Use of ADBC Interface	Check...			13
Analysis of WHERE Condition in UPDATE and DELETE	Check...		21	
Search problematic SELECT * statements	Check...	6		
Existence check. No fields used	Check...	3		
Select-Statement can be transformed. ...% of fields used	Check...	3		

Existing Code: Is It Still Valid?

Static Code Analysis: Demo

Code Inspector

- Overview of the available robustness checks
- Analysis example of ABAP coding with the Code Inspector

ABAP Test Cockpit

- Analysis example of ABAP coding with the ABAP Test Cockpit

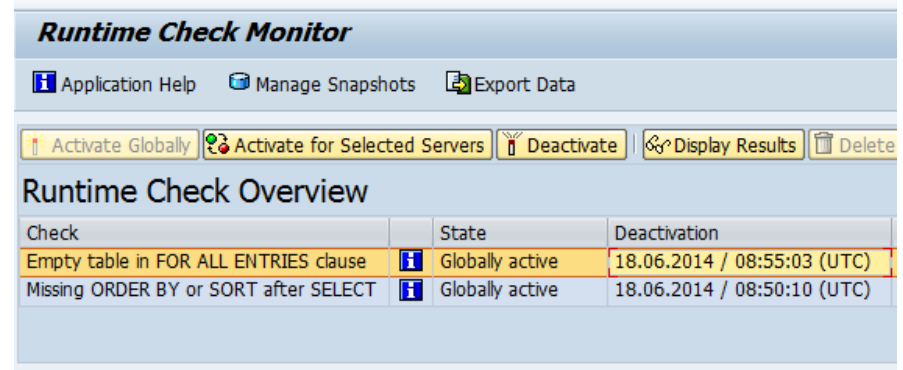


Existing Code: Is It Still Valid?

Runtime Check Monitor

Runtime Checks

- Supplement static code checks
- Executed in productive system (negligible performance overhead)
- Available for ABAP 7.4 SP2 and above
- More information:
SAP Notes 1912445 & 1931870










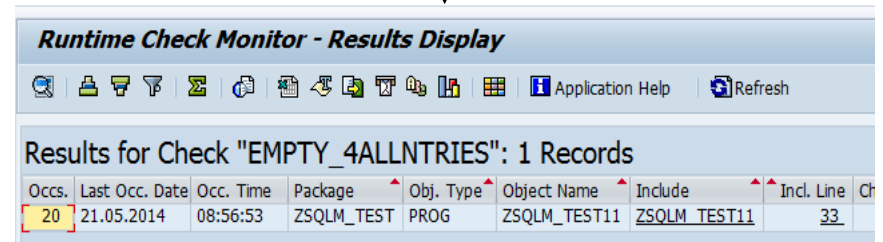



Application Help Manage Snapshots Export Data		
Activate Globally	Activate for Selected Servers	Deactivate
Display Results Delete		
Runtime Check Overview		
Check	State	Deactivation
Empty table in FOR ALL ENTRIES clause	Globally active	18.06.2014 / 08:55:03 (UTC)
Missing ORDER BY or SORT after SELECT	Globally active	18.06.2014 / 08:50:10 (UTC)




Wait 4 weeks ...

Runtime Check Monitor - Results Display



 Application Help

 Refresh

Results for Check "EMPTY_4ALLNTRIES": 1 Records

Occs.	Last Occ. Date	Occ. Time	Package	Obj. Type	Object Name	Include	Incl. Line	Ch
20	21.05.2014	08:56:53	ZSQLM_TEST	PROG	ZSQLM_TEST11	ZSQLM_TEST11	33	

```
select a from <table>
into table <itab>
for all entries in <fae_table>
where a = <fae_table>-table_line.
```

Existing Code: Is It Still Valid?

What's Next?

Week 2 Unit 2

Existing Code: What About Performance?





Thank you

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Week 2 Unit 2: **Existing Code: What About Performance?**

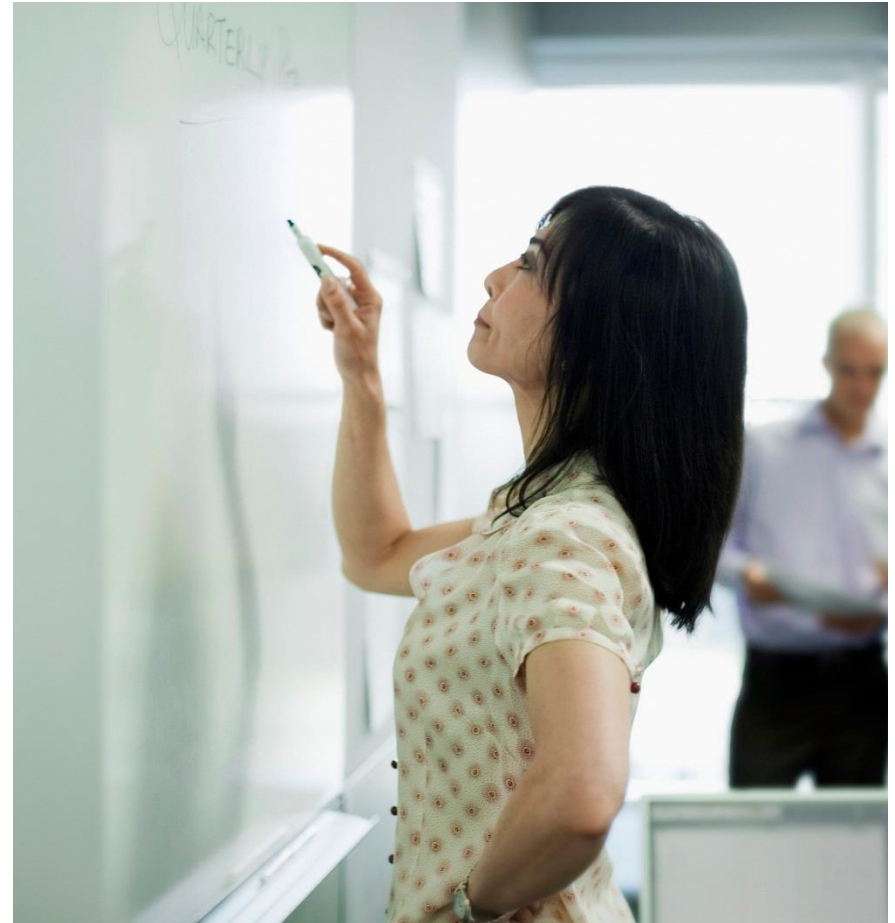


Existing Code: What About Performance?

Outline

Content

- Performance Considerations & Guidelines
- Static Code Checks for Performance Optimization Potential



Existing Code: What About Performance?

Migration to SAP HANA

1. Detect

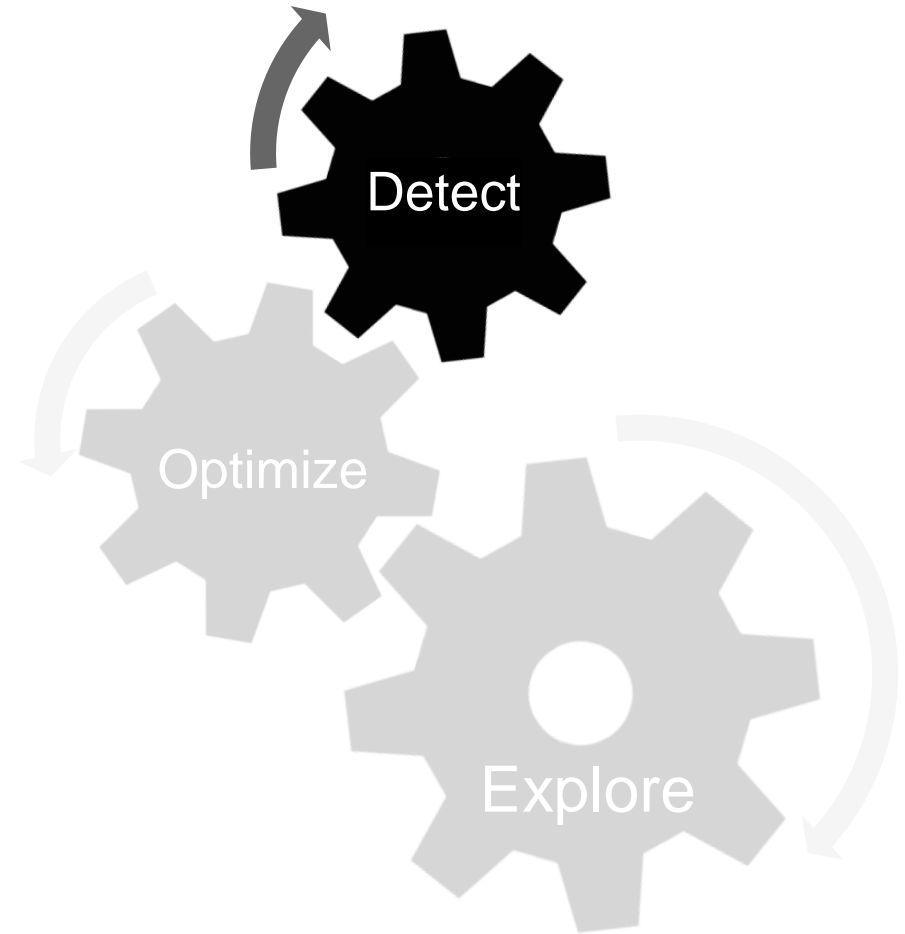
- Functional correctness
- **Performance optimization potential**

2. Optimize

- Database-oriented programming

3. Explore

- Use SAP HANA-specific features
- Rethink & innovate



Existing Code: What About Performance?

Performance Considerations

Performance!

Does SAP HANA automatically improve performance of my ABAP coding?

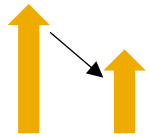
Recommendations?

- Performance guidelines
- Tool-based performance analysis

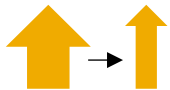


Existing Code: What About Performance?

Classical Performance Guidelines and Additions



Keep result sets small



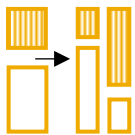
Minimize amount of transferred data



Minimize number of data transfers



Minimize search overhead



Keep unnecessary load away from DB

Even more important;
one specific aspect of
code-to-data paradigm

Less important; but still
relevant **in some cases**

Don't burden the DB
with **unnecessary**
operations

Existing Code: What About Performance?

Code Inspector Check Variant PERFORMANCE_DB



Additional
Material

Checks ABAP code to determine where code can most likely be optimized, for example

SELECT statements

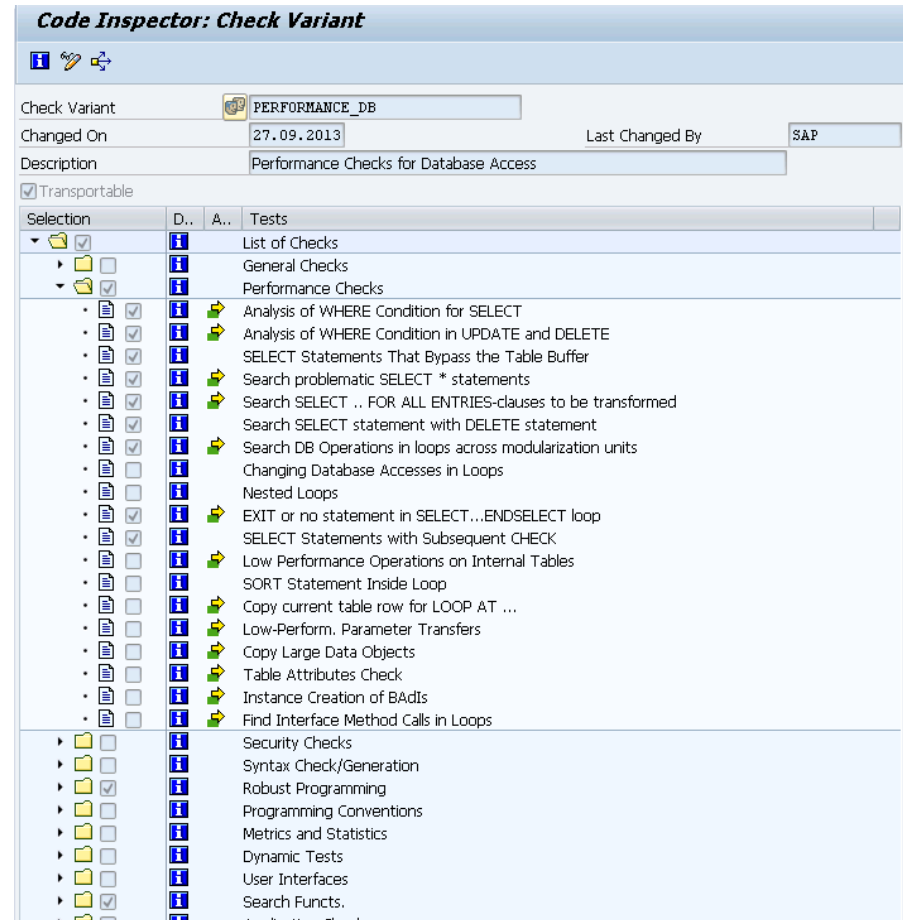
- Nested SELECT statements (across modularization units)
- EXIT in SELECT loop

Data transfer

- Problematic SELECT * statements
- Missing WHERE condition

Other performance aspects

- Statements that bypass the table buffer



Existing Code: What About Performance?

Static Code Analysis: Demo

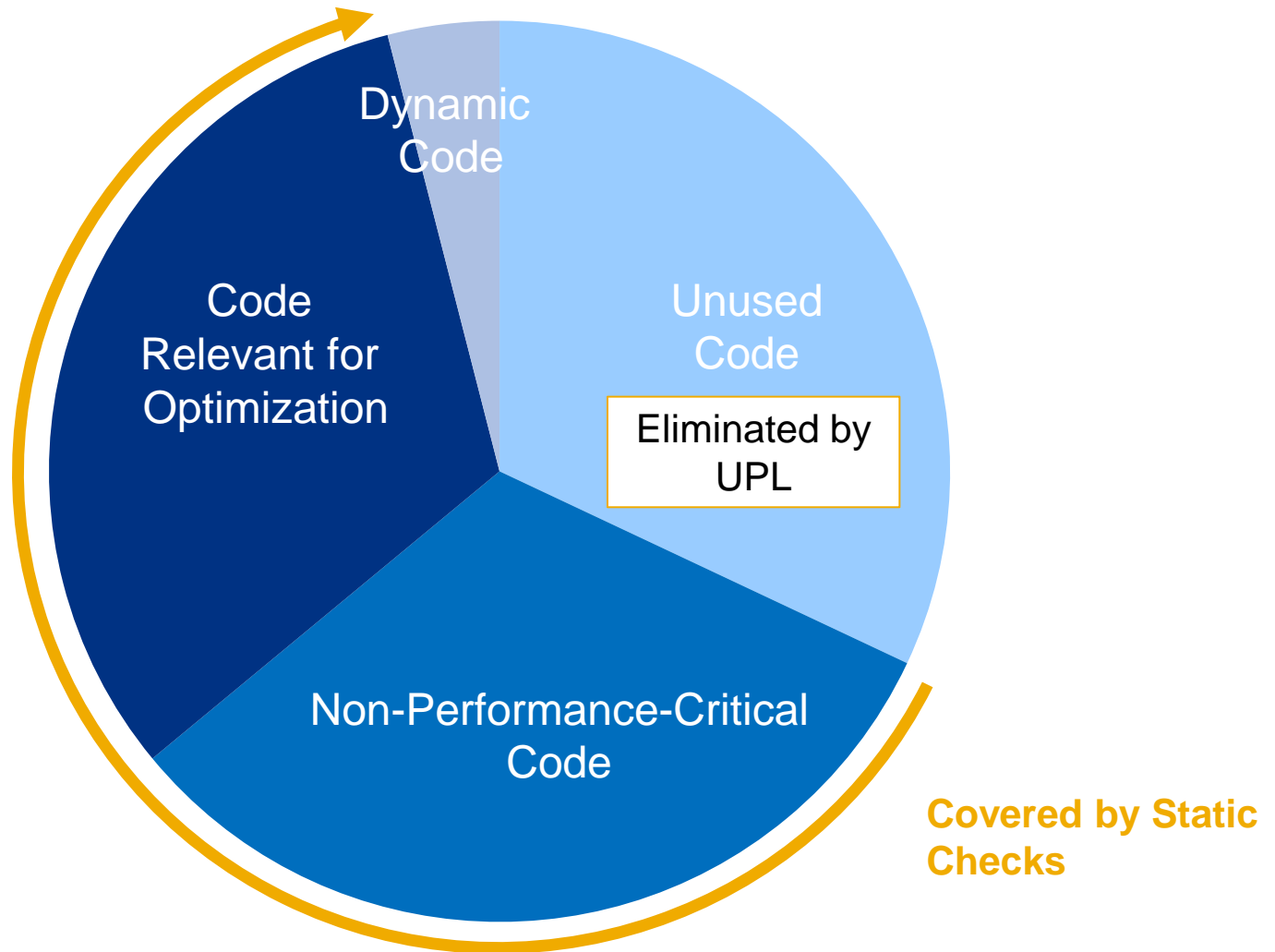
Check for Optimization Potential

- Overview of the available performance checks
- Analysis example of ABAP coding with the ABAP Test Cockpit



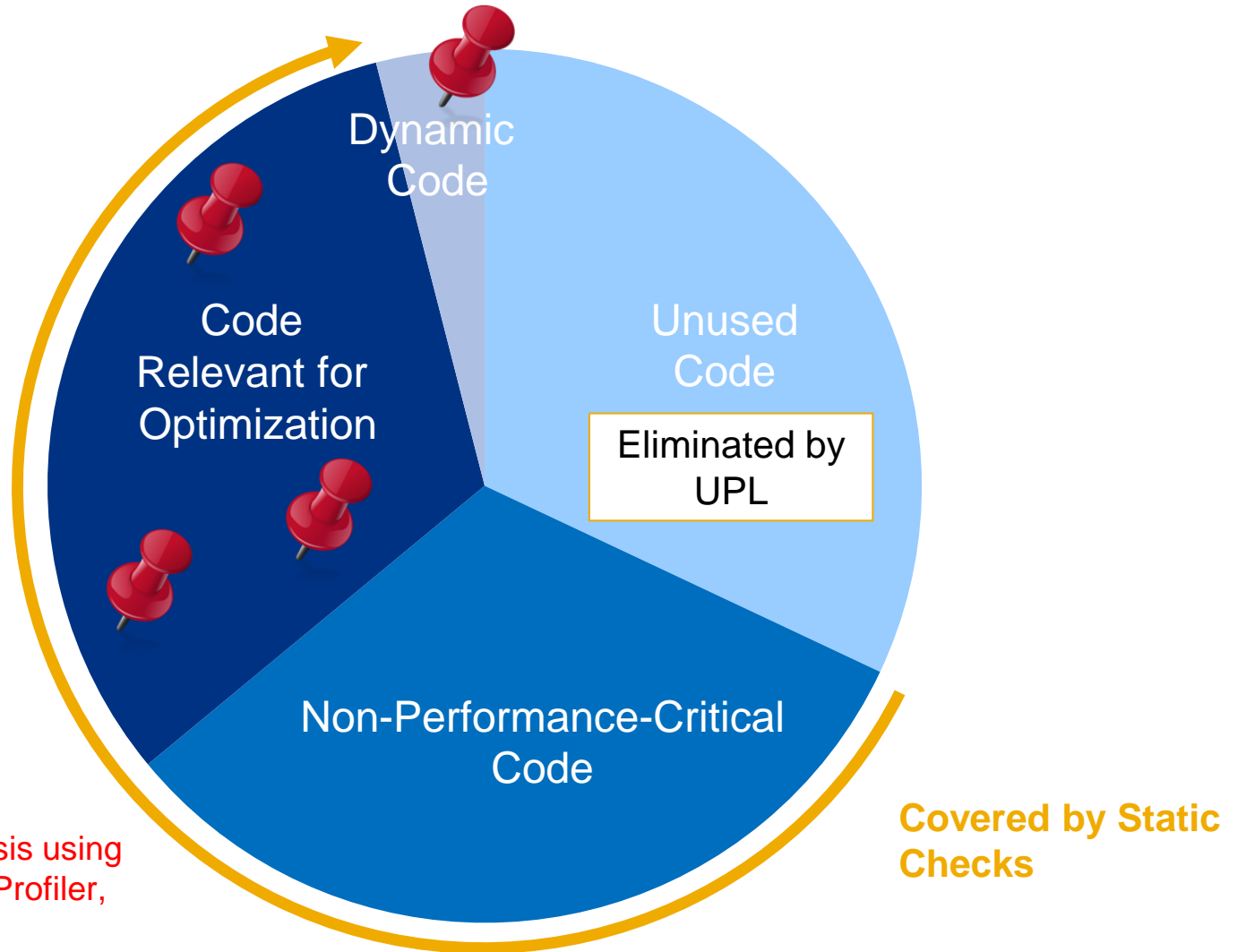
Existing Code: What About Performance?

Static Performance Check Coverage



Existing Code: What About Performance?

Static Performance Check Coverage



Runtime analysis using
SAT or ABAP Profiler,
for example

Existing Code: What About Performance?

What's Next?

Week 2 Unit 3

SQL Footprints in Your Productive System





Thank you

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Week 2 Unit 3: SQL Footprints in Your Productive System



SQL Footprints in Your Productive System

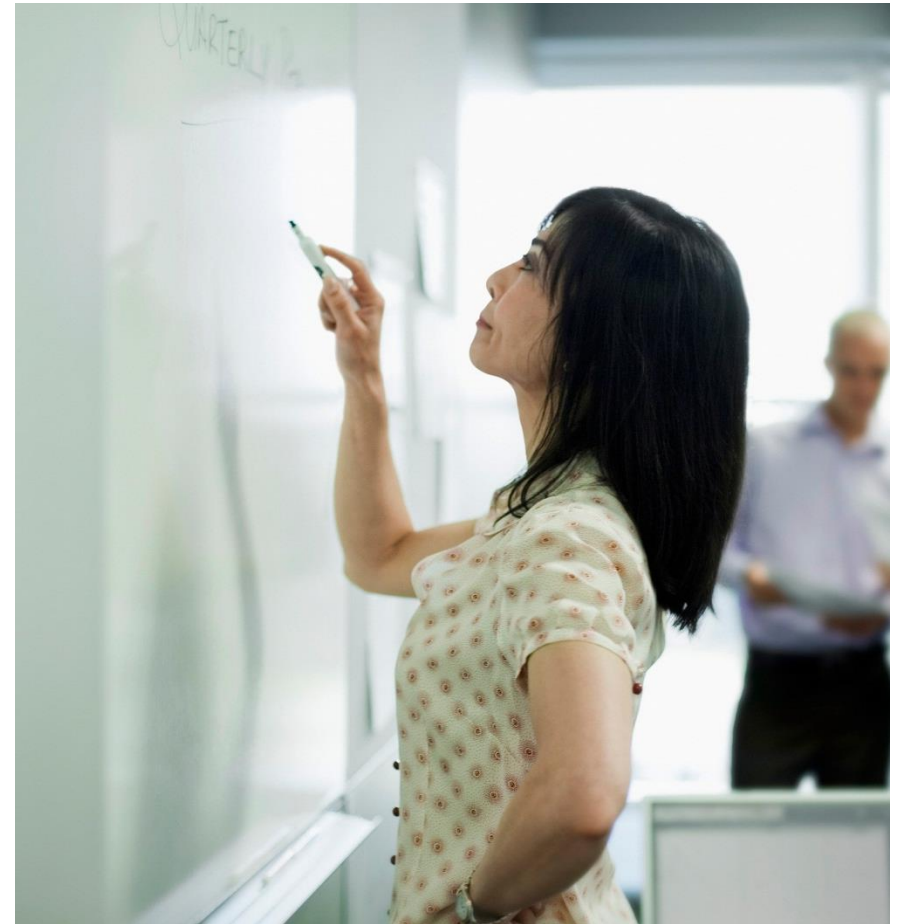
Outline



Additional
Material

Content

- Shortcomings of Static Code Checks
- SQL Monitor
- Analysis of SQL Monitor Data



SQL Footprints in Your Productive System

Migration to SAP HANA



Additional
Material

1. Detect

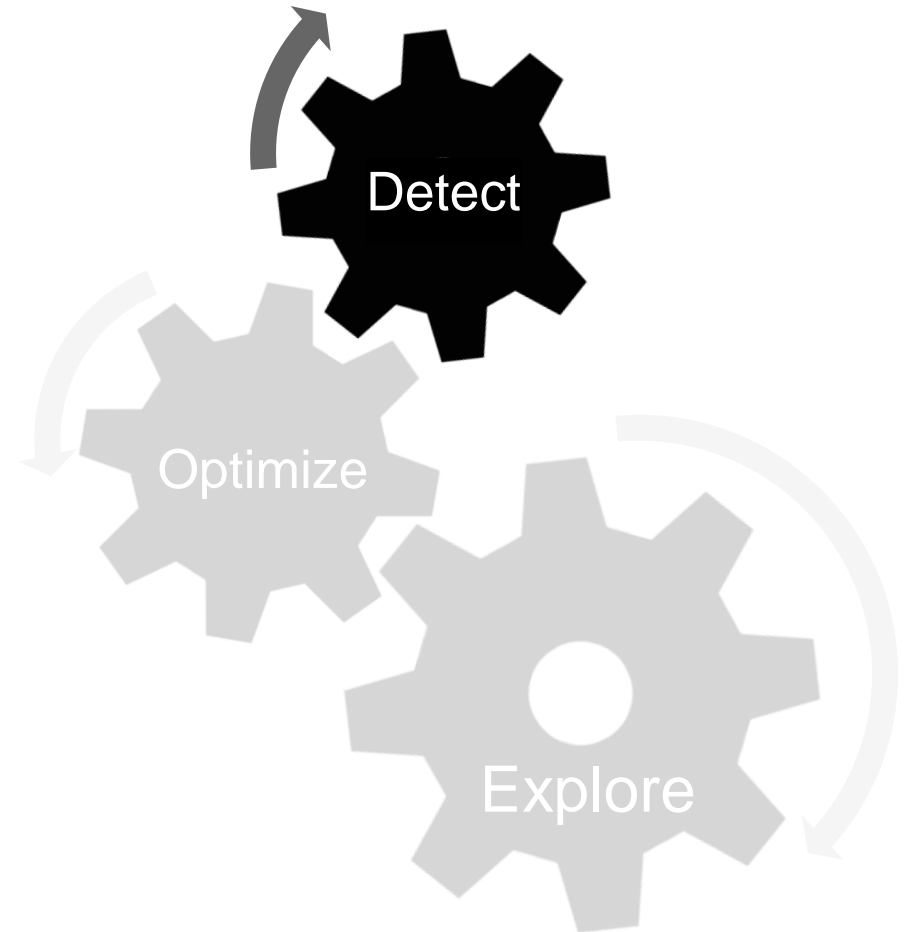
- Functional correctness
- **Performance optimization potential**

2. Optimize

- Database-oriented programming

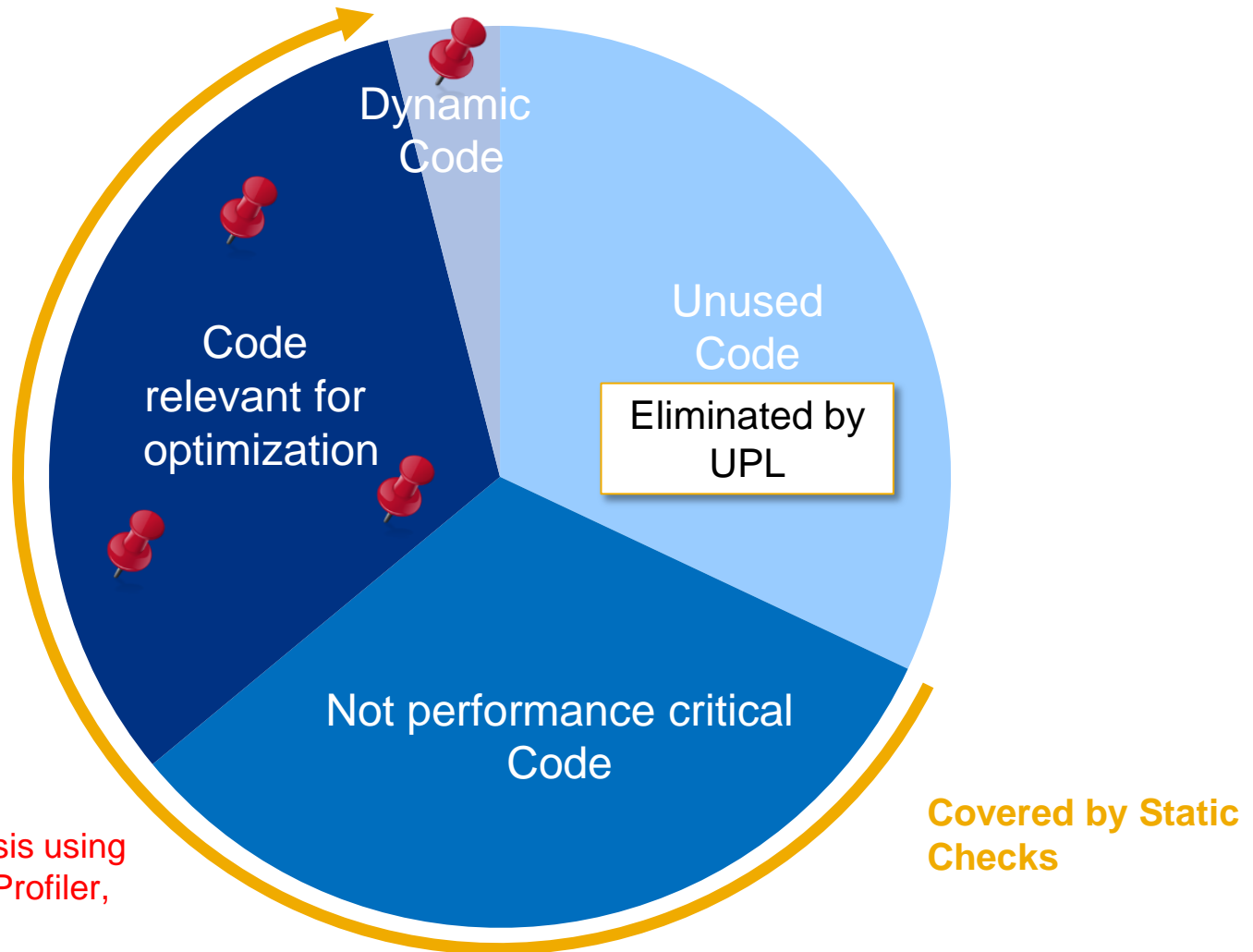
3. Explore

- Use SAP HANA-specific features
- Rethink & innovate



SQL Footprints in Your Productive System

Static Performance Checks



SQL Footprints in Your Productive System

Example of a Productive ERP System

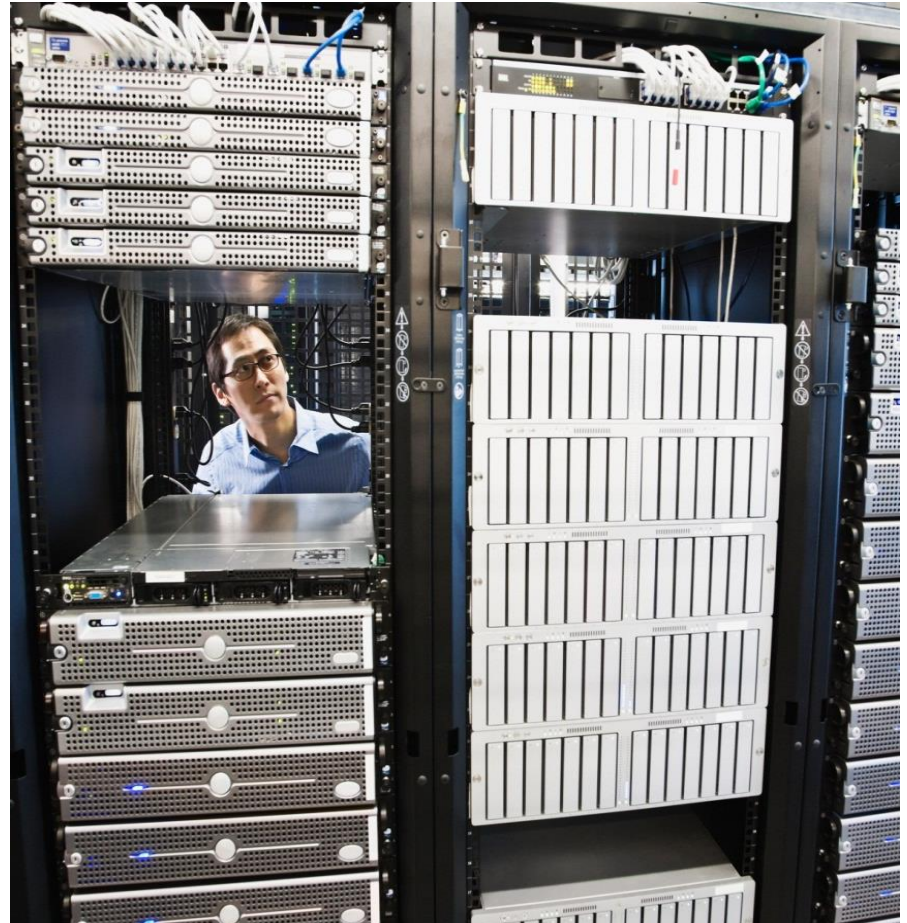
Example: A productive ERP system with 6000 concurrent users

Two weeks in this system means:

- 50k different business processes
- 130k different ABAP SQL statements (>15% in customer code)
- 13B SQL requests (~1B / day)
- 140B records (~10B / day) read/changed



→ **Where to optimize?**



SQL Footprints in Your Productive System

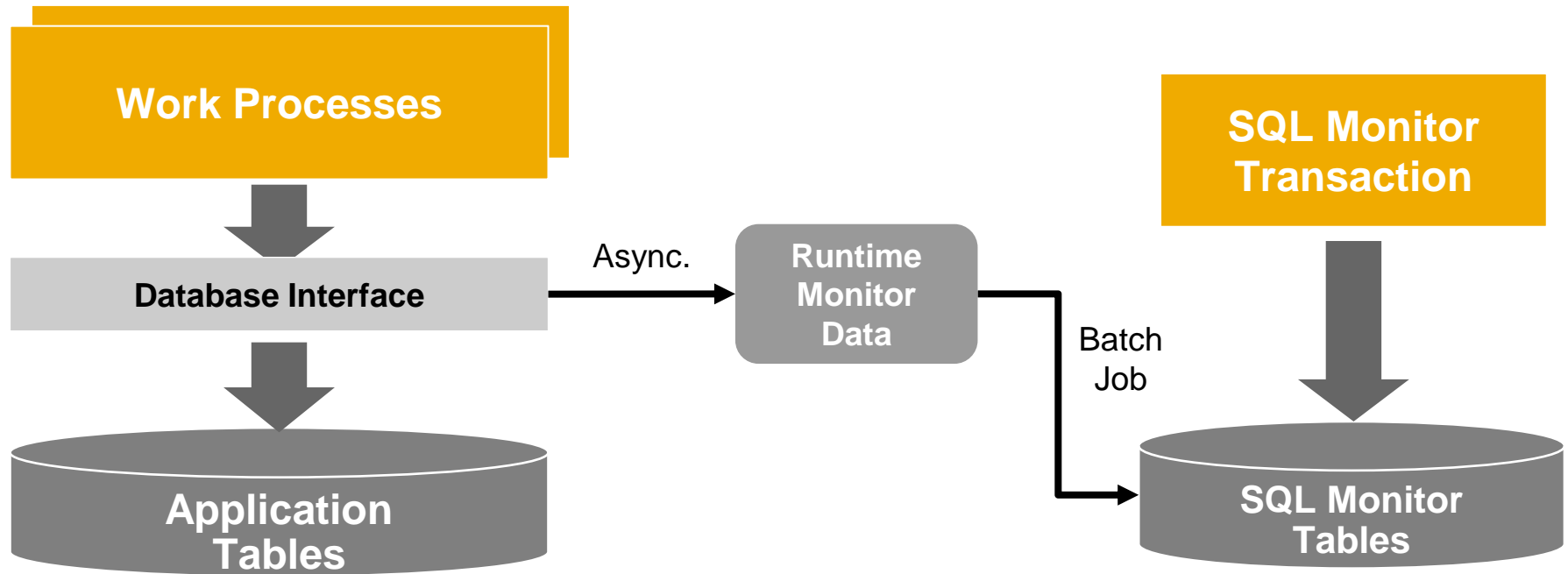
SQL Monitor

Runtime Code Analysis

- SQL profile of productive system
- Find SQL performance optimization potential
- Available with ABAP 7.02 SP12 and above
- More information:
 - SAP Note 1885926
 - SCN Blog [SQL Monitor Unleashed](#)



SQL Footprints in Your Productive System Architecture



SQL Footprints in Your Productive System

Administration of the SQL Monitor (1)



Additional
Material

Activate/deactivate SQL Monitor via transaction **SQLM**

SQL Monitor can be activated either for **all** application servers or just **selected** ones

Upon activation, an **expiration date** and an **upper limit** of records can be specified

For further information about initial setup (required authorizations, and so on), see <http://scn.sap.com/docs/DOC-47444>

The screenshot displays the 'SQL Monitor' SAP transaction interface. At the top, there is a navigation bar with icons for 'Application Help', 'Servers', 'Log', and 'Data'. Below this, the 'State' section provides a summary of the monitor's configuration and status. The 'Activation / Deactivation' section contains buttons for 'All Servers', 'Select Servers', and 'Deactivate'. The 'Data Management' section includes buttons for 'Display Data', 'Export Data', and 'Delete Data'. The 'Snapshots' section at the bottom has buttons for 'Display Snapshots' and 'Manage/Create Snapshots'.

State	
Number of Records	81.921
Last State Change	11.11.2013 / 12:36:06 (CET) by user BRESCH
Last Data Action	12.11.2013 / 08:21:55 (CET) by user BRESCH (refresh data)
Scheduled Data Refresh Job	Scheduled on Job Event SAP_RTM_COLLECT_ALL_FINISHED
Scheduled Deactivation	18.11.2013 / 11:20:14 (CET) by user BRESCH
Activation State	Active for 3 selected servers including local (3 servers a

SQL Footprints in Your Productive System

Administration of the SQL Monitor (2)



Additional
Material

Transaction **SQLM** offers simple management of SQL Monitor snapshots

Snapshots can be:

- Created based on local data
- Imported from file (from other systems, for example)
- Exported to file
- Removed

To reduce data volume, **basic filter** criteria can be applied before snapshot creation

The screenshot shows the 'SQL Monitor: Snapshot Management' dialog box. It has a title bar and a toolbar with 'Create Snapshot' and a file icon. Below the toolbar are 'Create' and 'Edit / Delete' tabs. The 'General' section contains a 'Description' field with the text 'SQLM Snapshot [#SYSTEM] [#DATE] [#TIME]' and a note that these placeholders will be replaced with actual values. The 'Data Source' section has two radio buttons: 'File Import' (selected) and 'Local System'. A 'Path' field with a folder icon is next to the 'File Import' option. The 'Further Options' section includes an 'Object Set' table with columns for 'Package', 'Object Type', and 'Object Name', each with a 'to' field and a selection icon. The 'Import Only Top Records by' section has two radio buttons: 'Total Number of DB Executions' (selected) and 'Total DB Execution Time'. Below this is a 'Maximal Number of Records' field with a dropdown arrow and the text '(Aggregated by Source Position)'.

Package		to		
Object Type		to		
Object Name		to		

SQL Footprints in Your Productive System

Analysis of SQL Monitor Data



Additional
Material

To display SQL Monitor data

- Use transaction SQLMD or
- Navigate from transaction SQLM

Specify **filter criteria**:

- Development objects
- Requests
- Database tables

Choose **aggregation** type

Select **initial sorting**

SQL Monitor: Data Display

Application Help

Data Source

☒ Local System
☐ Snapshot Description -- Select

Objects

Package [] to []
Object Type [] to []
Object Name [] to []

Requests

Request Type [] to []
Request Entry Point [] to []

Tables

Table Name [] to []

Aggregation

☒ None
☐ By Source Code Position
☐ By Request

Order by

☒ Total Number of DB Executions
☐ Total DB Execution Time
☐ Total DB Records
Maximal Number of Records [200]

Options

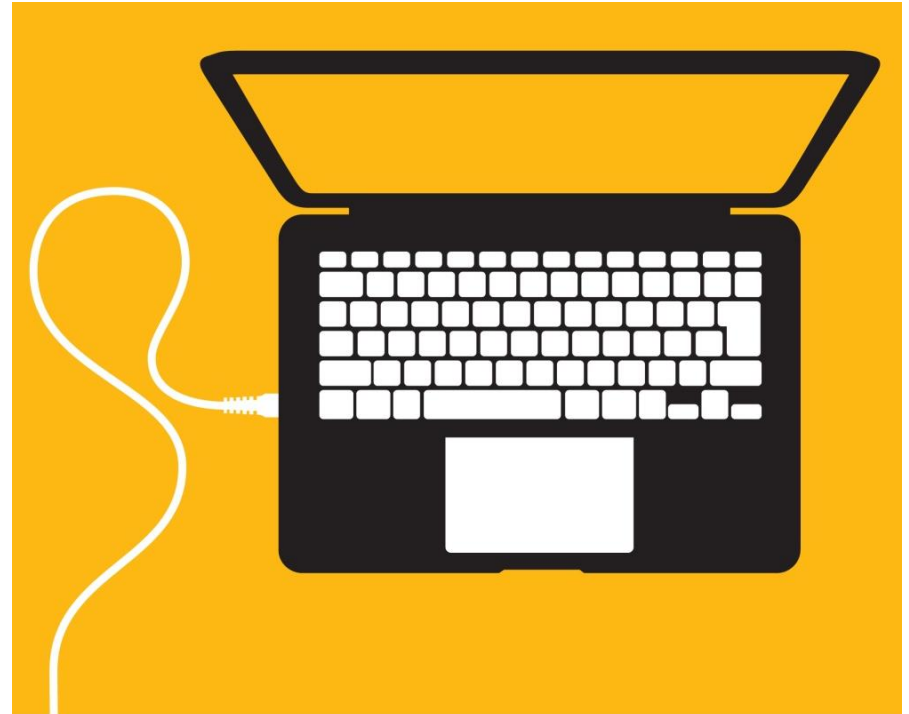
☐ Display Technical Records

SQL Footprints in Your Productive System

SQL Monitor: Demo

SQL Monitor

- Activation / deactivation
- Export / import SQL Monitor data snapshots
- Analyze SQL Monitor data





The ABAP SQL Monitor is available in two (more or less identical) variants:

- 1. Out of the box as part of SAP_BASIS (recommended when available)**

ABAP 7.02, 7.03/7.31, 7.4

- 2. As part of the ST-PI add-on (fallback for lower releases)**

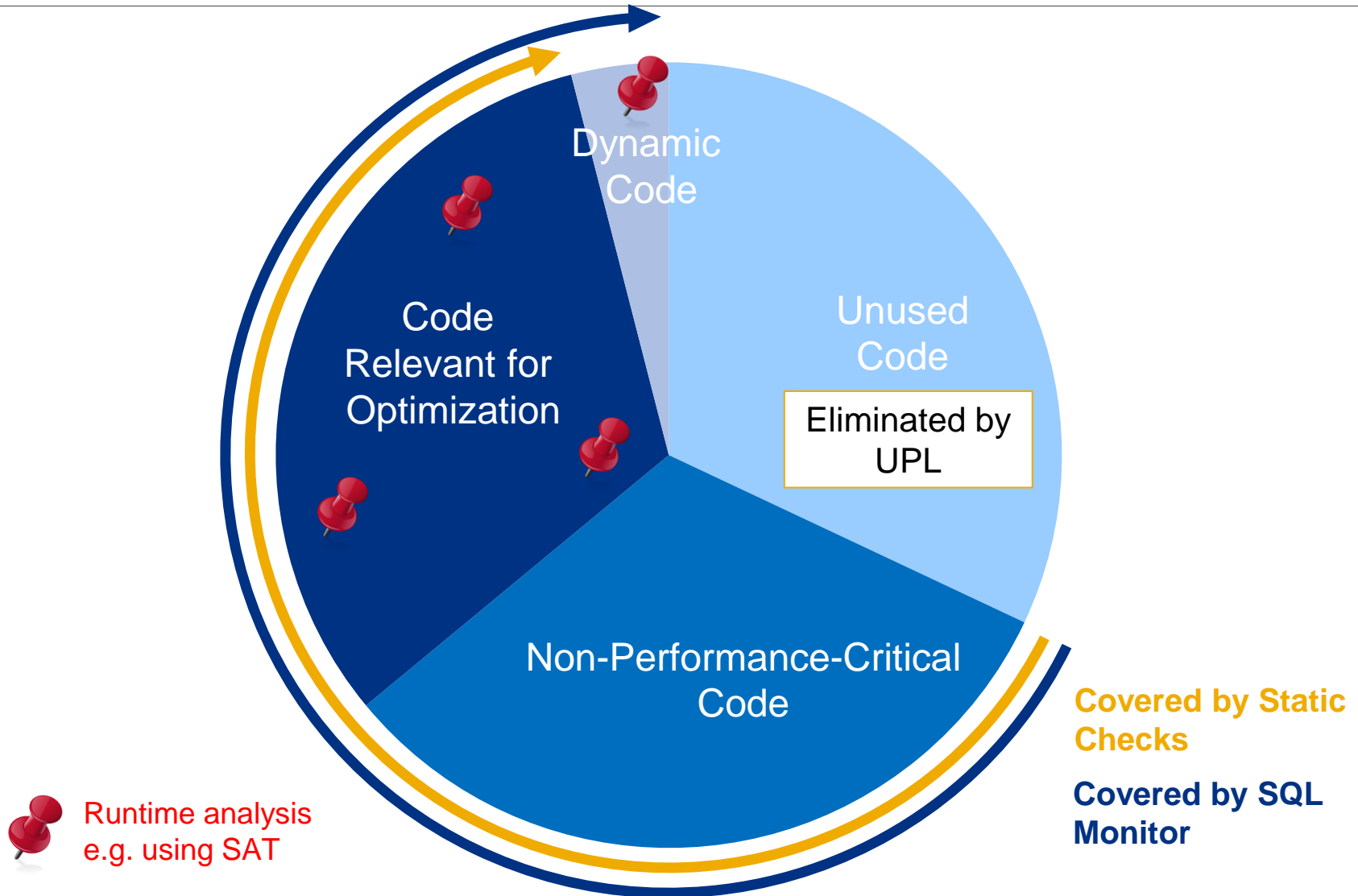
ABAP 7.00 (and above)

Note: ABAP kernel 7.21 is required for releases lower than 7.4

→ Refer to SAP Note 1885926 for all details about availability and necessary preparation steps

SQL Footprints in Your Productive System

Improved Check Coverage



SQL Footprints in Your Productive System

What's Next?

Week 2 Unit 4

Guided Performance Analysis





Thank you

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Week 2 Unit 4:

Guided Performance Analysis



Guided Performance Analysis

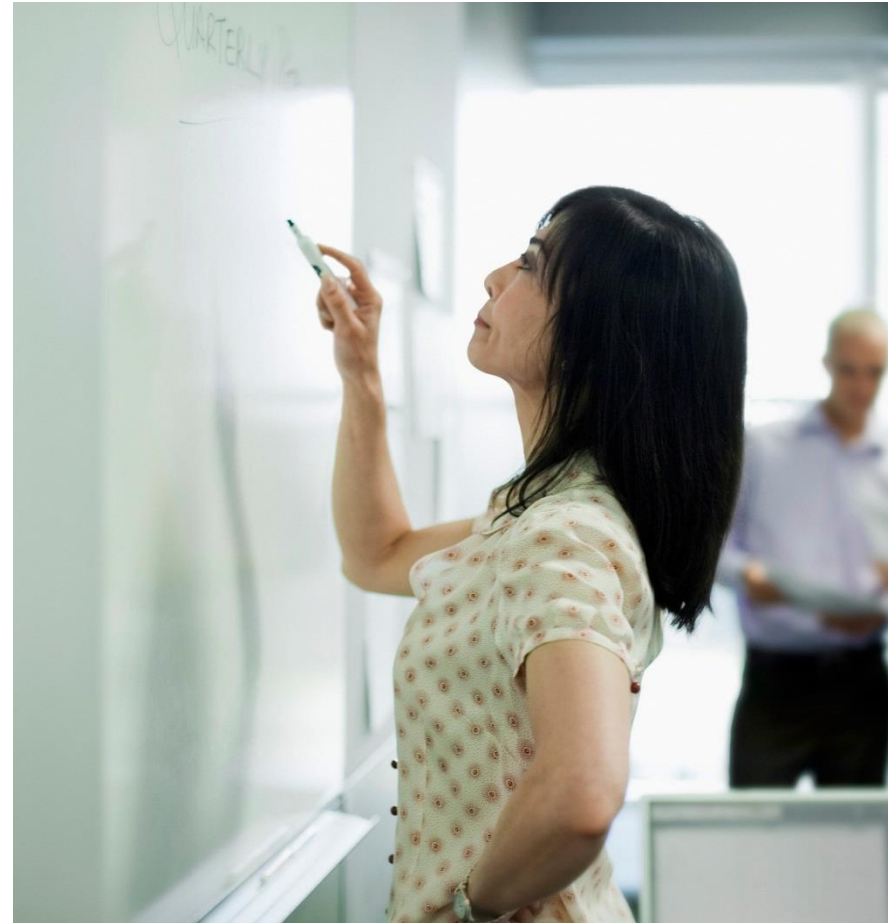
Outline



Additional
Material

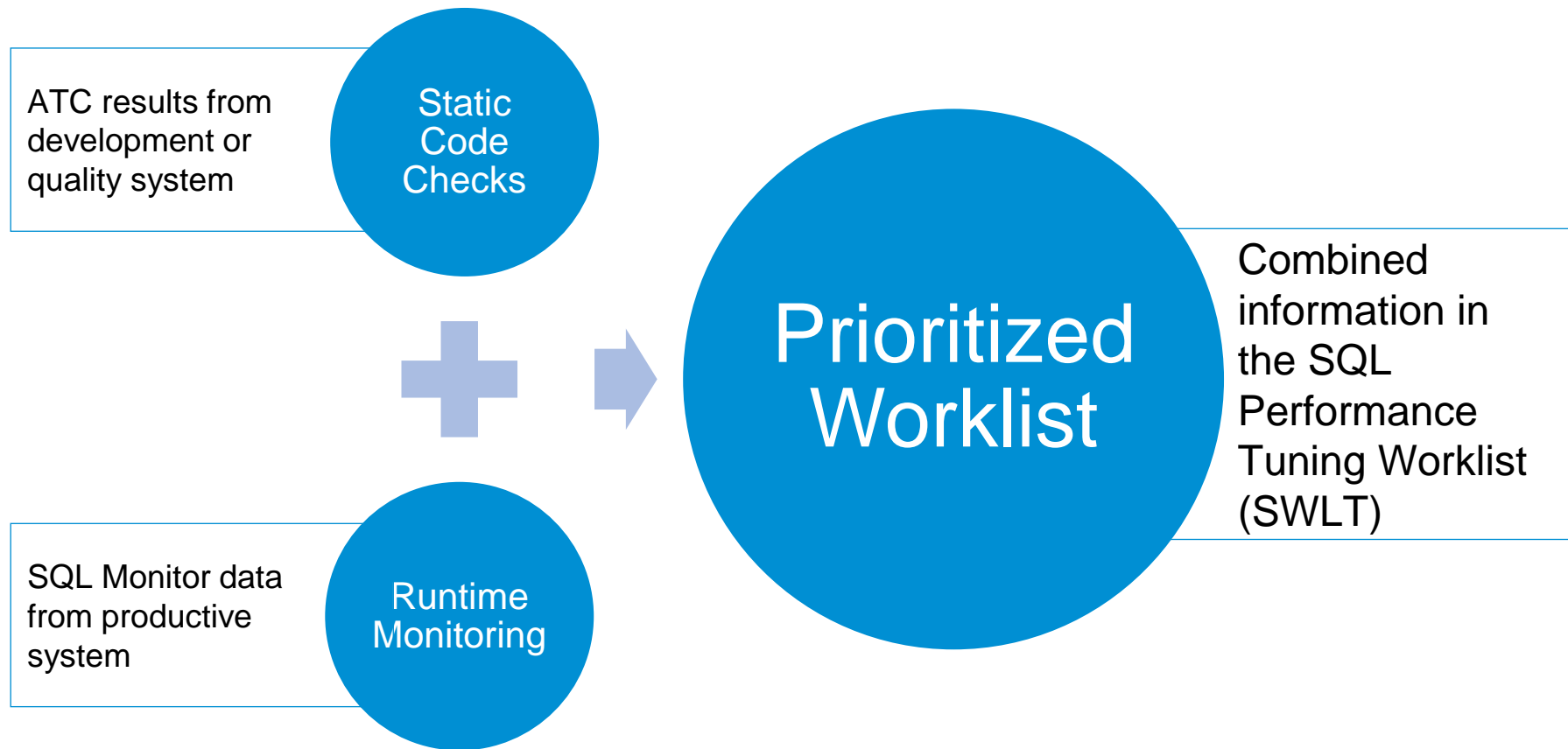
Content

- Combine Static Code Checks with SQL Monitor Runtime Data
- SQL Performance Tuning Worklist
- Performance Analysis Recommendations



Guided Performance Analysis

Combination of Code Check Results

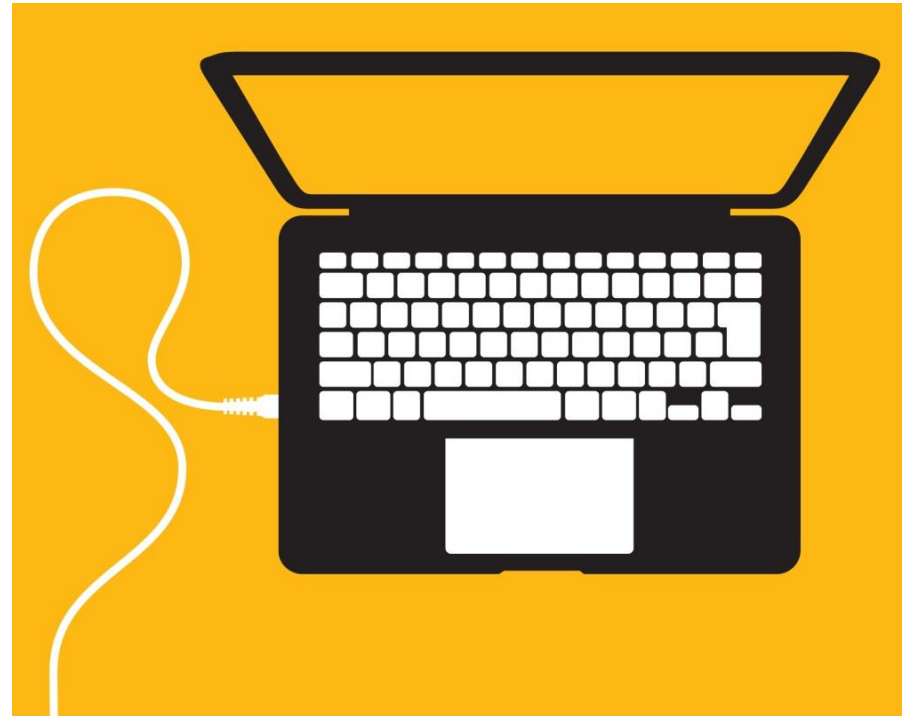


Guided Performance Analysis

SQL Performance Tuning Worklist: Demo

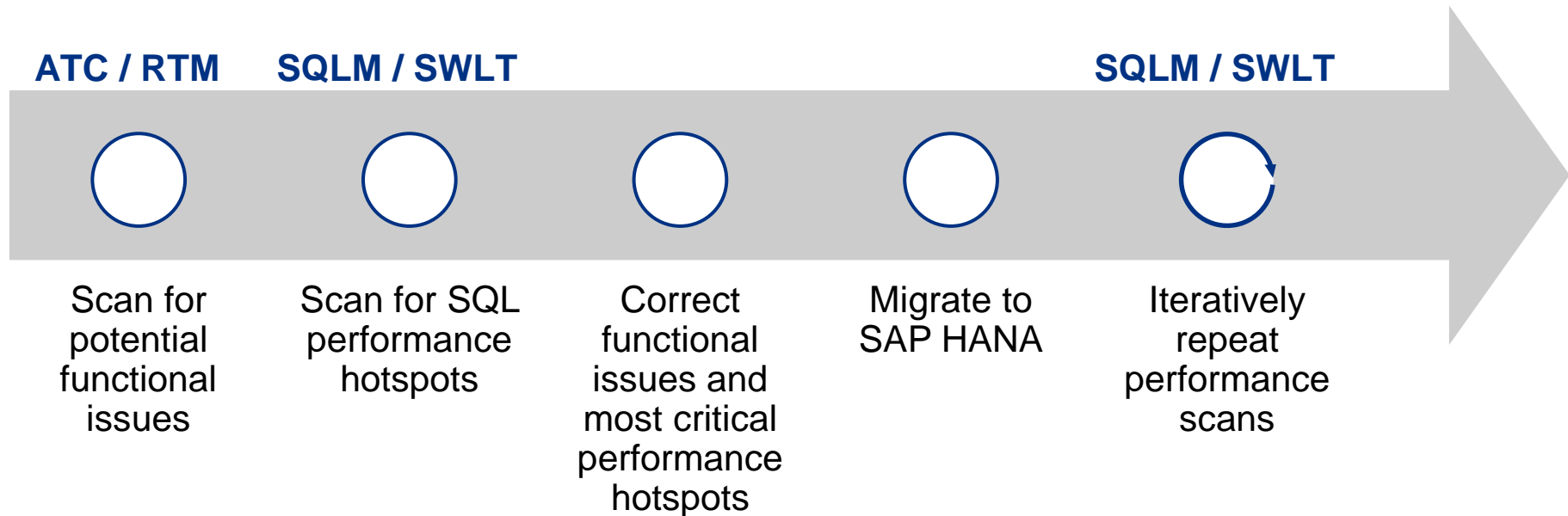
SQL Performance Tuning Worklist

- Activation / deactivation
- Export / import SQL Monitor data snapshots
- Analyze SQL Monitor data



Guided Performance Analysis

Recommended Procedure



Guided Performance Analysis

What's Next?

Week 2 Unit 5

Quick Wins: Optimized ALV and Other Improvements





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Week 2 Unit 5: Quick Wins: Optimized ALV and Other Improvements

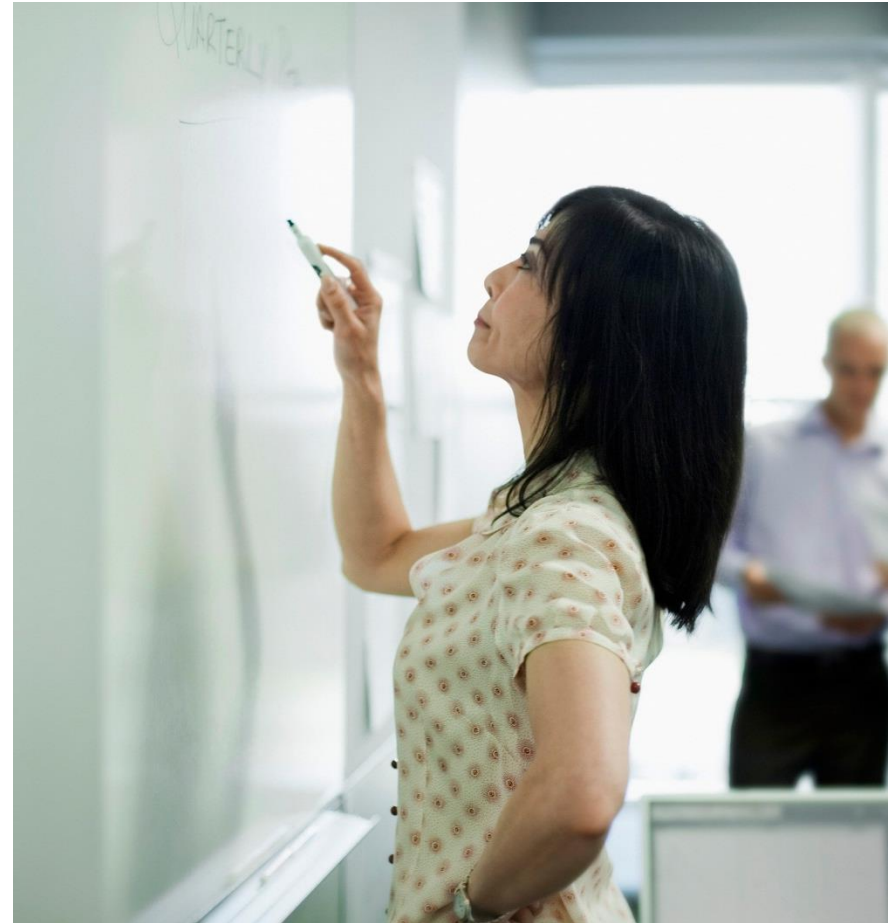


Quick Wins: Optimized ALV and Other Improvements

Outline

Content

- Transparent Optimizations
- ABAP List Viewer with Integrated Data Access
- Fault-Tolerant Search Help and Type-Ahead



Quick Wins: Optimized ALV and Other Improvements

Reminder: Transparent Optimizations

ABAP development guidelines

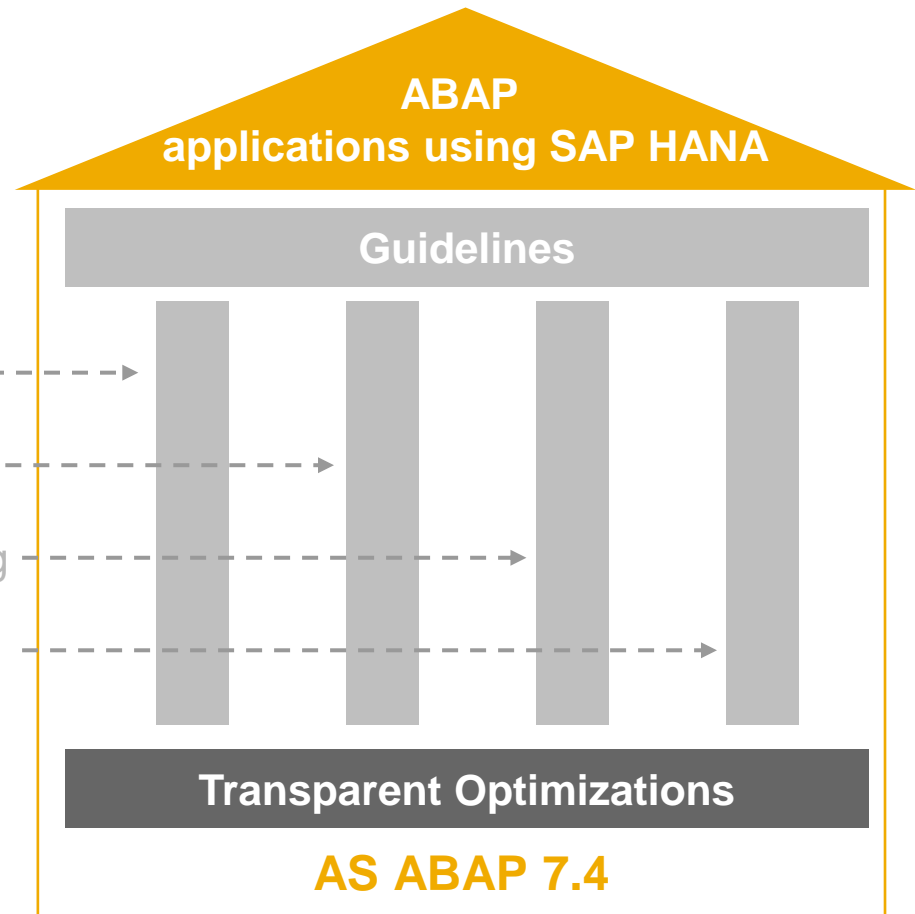
Improved tools for performance analysis - - - - ->

Extensions to ABAP and Open SQL - - - - ->

Features for SAP HANA-oriented programming - - - - ->

Re-use components optimized for SAP HANA - - - - ->

Transparent optimizations



Quick Wins: Optimized ALV and Other Improvements

ABAP List Viewer with Integrated Data Access: Demo

ABAP List Viewer with Integrated Data Access

- Performance gains
- Leveraging SAP HANA capabilities



Quick Wins: Optimized ALV and Other Improvements

ABAP List Viewer with Integrated Data Access

Optimizations

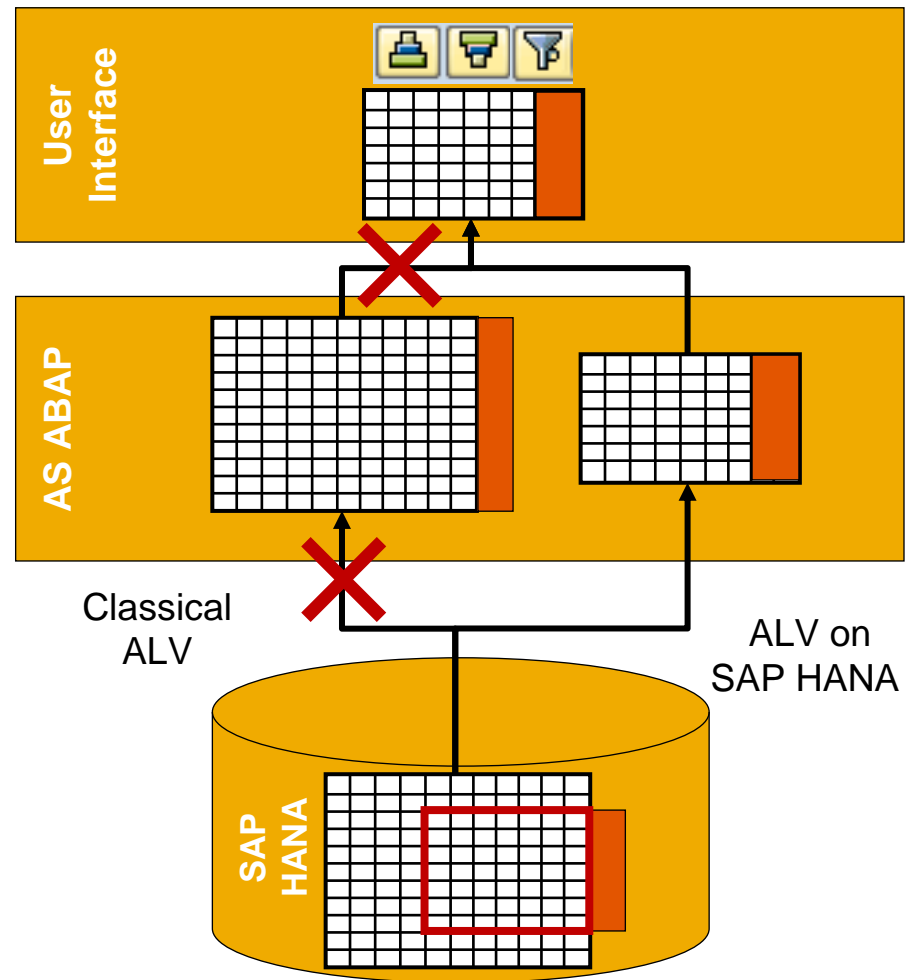
- Result set minimized
- Application of code-to-data paradigm

Experience:

- Performance improvement
- Reduced memory footprint
- No truncation of selected data

More Information:

- <http://scn.sap.com/docs/DOC-47994>
- ABAP Demo Programs in Package SALV_IDA_TEST



Quick Wins: Optimized ALV and Other Improvements

Fault-Tolerant Search Help: Demo

SAP HANA text search for search help

- Search help & type-ahead
 - DynPro
 - FPM WebDynPro



Quick Wins: Optimized ALV and Other Improvements

Search Help & Type-Ahead

Search help enhancements

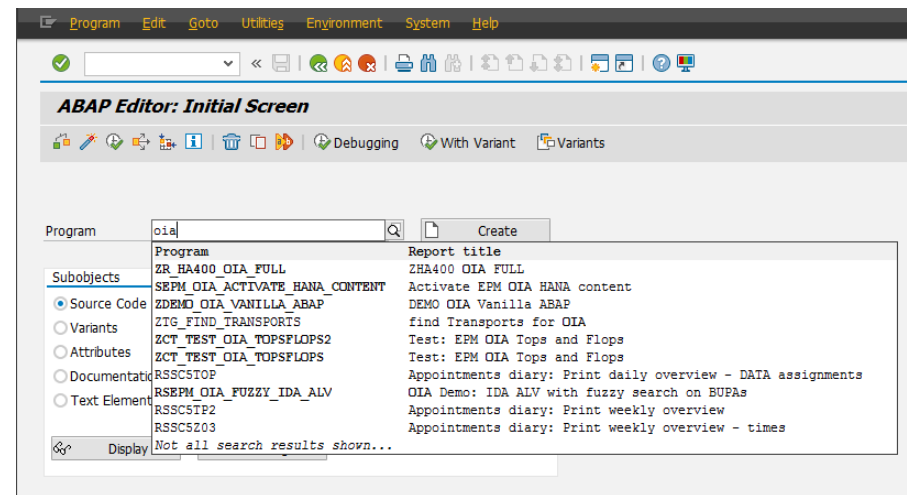
- Fault-tolerant search using SAP HANA
- Type-ahead functionality

Technical Prerequisites:

- SAP GUI version 7.30 PL6 or higher
- SAP NetWeaver Application Server ABAP 7.4 SP03 or higher

More Information in SCN:

- [Type Ahead in DynPro](#)
- [FPM, ALV & Type Ahead](#)



Quick Wins: Optimized ALV and Other Improvements - Search Help with Fuzzy Search (1)



Additional Material

Word suggestion based on the F4 value help data on any database

In addition: Cross-column full text search based on powerful SAP HANA Fuzzy Search

- Fault-tolerance depending on specified accuracy value
- F4 Value Help and SAP HANA search results merged in result list

Easy enabling via Search Help options

- Further enhancements may be required

Dictionary: Display Search Help

Elementary Help: H_I001 Active

Short Description: Company Codes

Attributes | Definition

Data Collection

Selection Method: I001

Text Table:

Dialog Behavior

Dialog Type: Display values immediately

Hot Key:

Enhanced Options

☒ Proposal Search for Input Fields

☒ Full Text Fuzzy Search (Database-Specific)

Accuracy Value for Error-Tolerant Full Text Search: 0,8

Search Help Exit:

Parameter

Search help parameter	IMP	EXP	LPoS	SPos	SDis	Data element	M...	Defa
BUKRS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	1	<input type="checkbox"/>	BUKRS	<input checked="" type="checkbox"/>	
BUTXT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	2	<input type="checkbox"/>	BUTXT	<input checked="" type="checkbox"/>	
ORT01	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	3	<input type="checkbox"/>	ORT01	<input checked="" type="checkbox"/>	

Type-ahead search settings

Quick Wins: Optimized ALV and Other Improvements - Search Help with Fuzzy Search (2)



Additional
Material

Vendor Line Item Display

Input fields with type-ahead-enabled search help

Field appearance changing as soon as edited

Search dialog with full result list and additional search options

Input help displayed in a dropdown box as the user enters the search terms

Clickable entry

Vendor Line Item Display

Vendor selection

Vendor account to

Company code to

Selection using search help

Search help ID

Search string

Search help

Line item selection

Status

Vendor Line Item Display

Vendor selection

Vendor account to

Company code

Selection using search help

Search help ID

Search string

Search help

Line item selection

Status

☐ Open items

☐ Open at key date

06.02.2014

Search Dialog: Company Code

Search Request:

Max. Results: Find Results (F5)

CoCd	Company Name	City	Crcy
FR01	IDES France	Paris	EUR
FR03	RF-FX France - Test	France	EUR
1999	Test Mandate - RE-FX FR	France	EUR
2001	APA Mandate - RE-FX FR	France	EUR
F100	Bankhaus Frankfurt	Frankfurt	EUR
1009	IDES AG	Frankfurt	EUR
1100	IDES AG	Frankfurt	EUR
1000	IDES AG	Frankfurt	EUR
1005	IDES AG	Frankfurt	EUR
1011	FIATA-ILS currency	Frankfurt	ILS

Not all search results shown...

06.02.2014

06.02.2014

Quick Wins: Optimized ALV and Other Improvements

What's Next?

Week 3 Unit 1

Recent Open SQL Enhancements - Part 1





Thank you

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