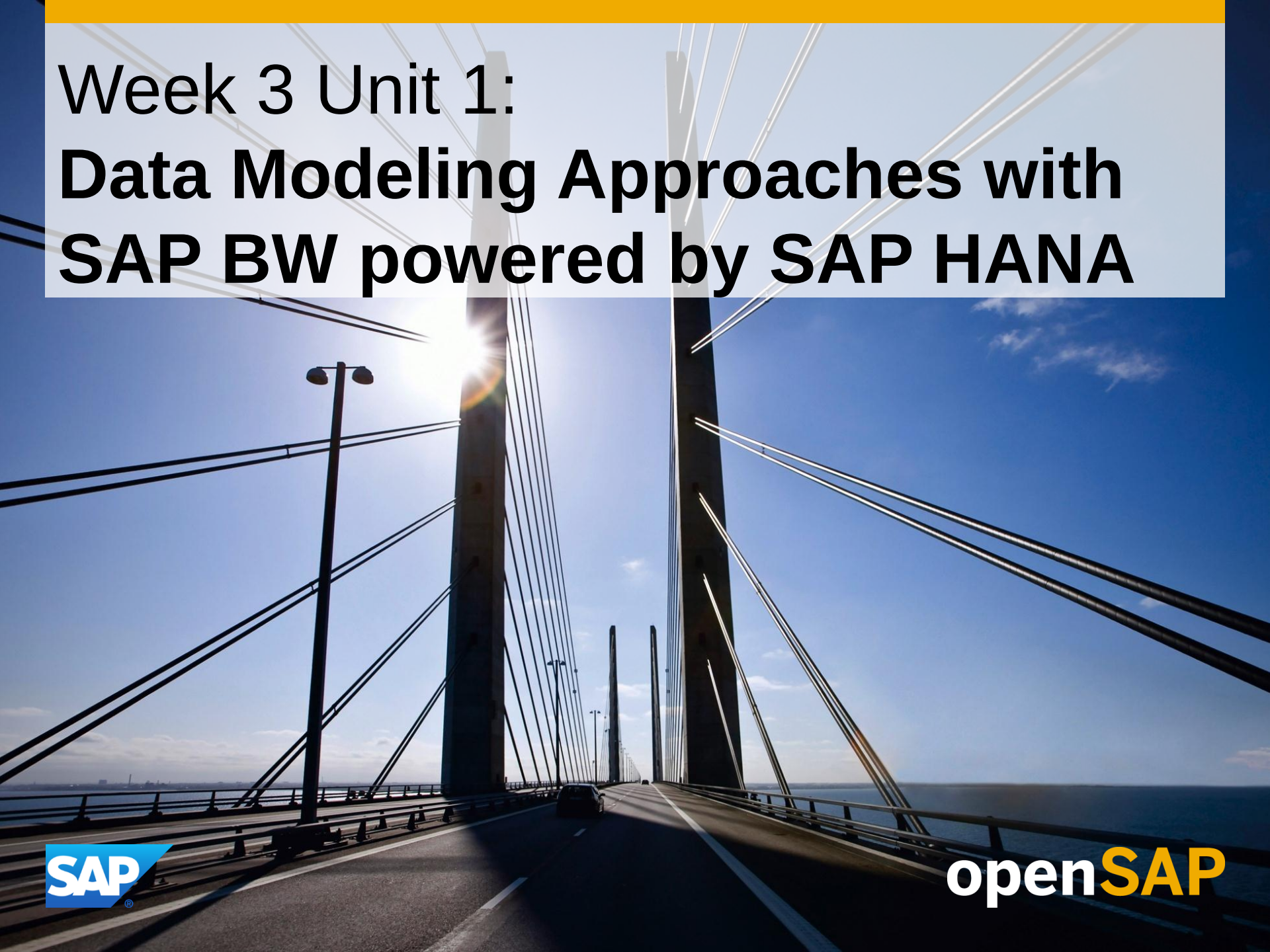

Week 3 Unit 1:
Data Modeling Approaches with SAP BW powered by SAP HANA

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Data Modeling Approaches with SAP BW powered by SAP HANA

Covered in This Unit

Content

- New approaches for data modeling in SAP BW
- Integration of SAP HANA models into SAP BW
- Exposure of SAP BW models into SAP HANA

Data Modeling Approaches with SAP BW powered by SAP HANA

Trends in SAP BW powered by SAP HANA

- Simplification
- Field-based modeling
- Big Data
- SQL exposure of SAP BW data models
- Leveraging SAP HANA modeling capabilities

Data Modeling Approaches with SAP BW powered by SAP HANA

Mixed SAP BW and SAP HANA Scenarios

Get the best of both worlds

SAP BW contribution to architecture

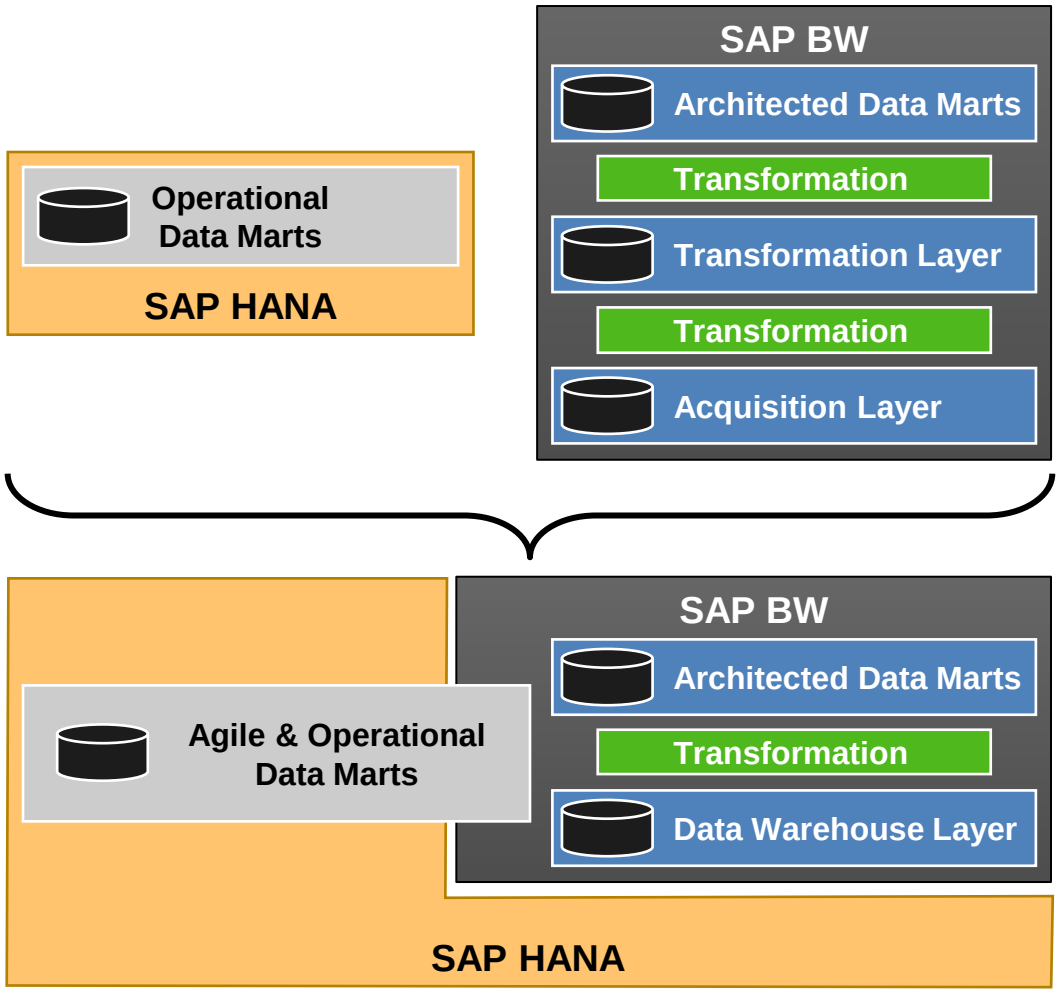
- Manage complexity & semantics
- Govern the lifecycle

SAP HANA contribution to architecture

- High performance on large data
- Maximum flexibility, agile modeling

Consider SAP BW powered by SAP HANA as common modeling environment

Combine multiple SAP HANA applications with SAP BW

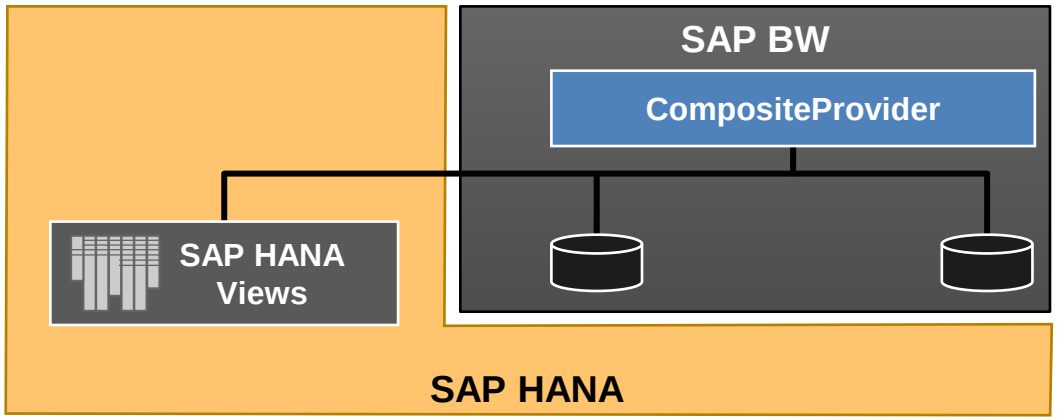


Data Modeling Approaches with SAP BW powered by SAP HANA

Use Case 1: Integration of SAP HANA Models into SAP BW (1)

General Overview

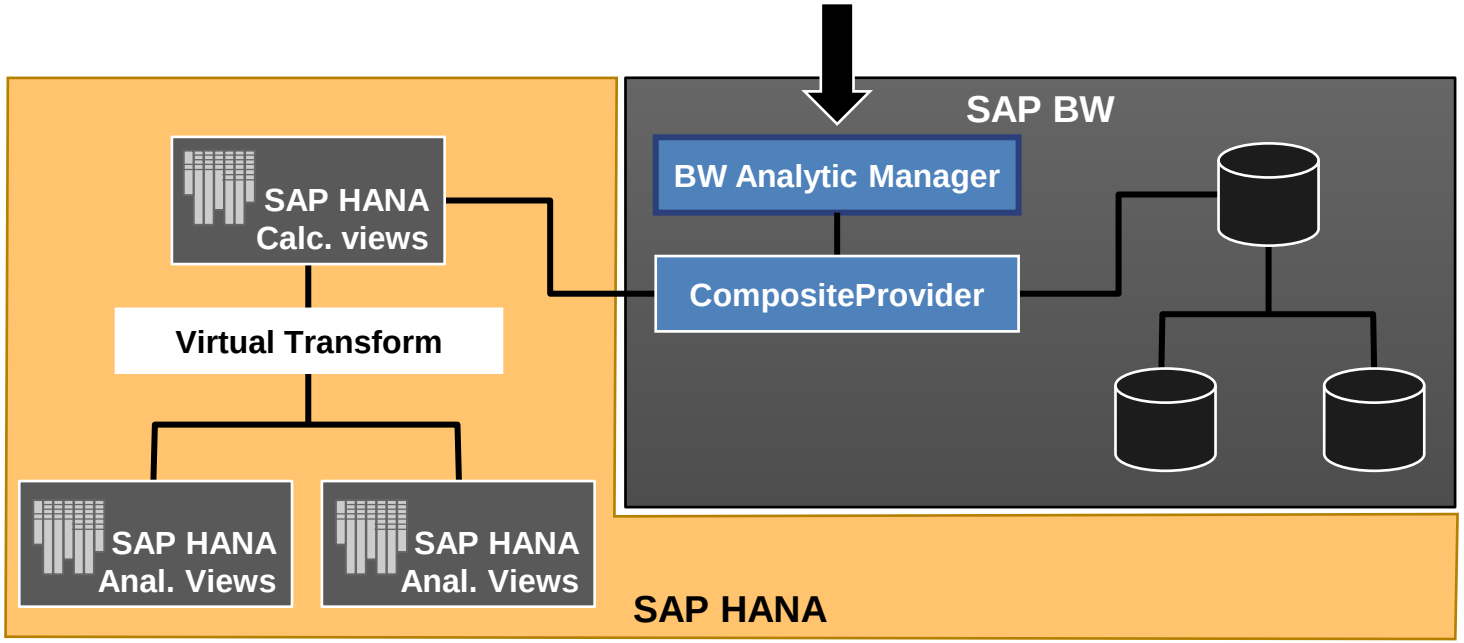
- Integrate existing SAP HANA models with the new CompositeProvider in SAP BW
- Add BW OLAP functionalities on SAP HANA modeling scenarios
- Leverage SAP HANA interfaces, libraries, and tools in combination with SAP BW



Data Modeling Approaches with SAP BW powered by SAP HANA

Use Case 1: Integration of SAP HANA Models into SAP BW (2)

Example

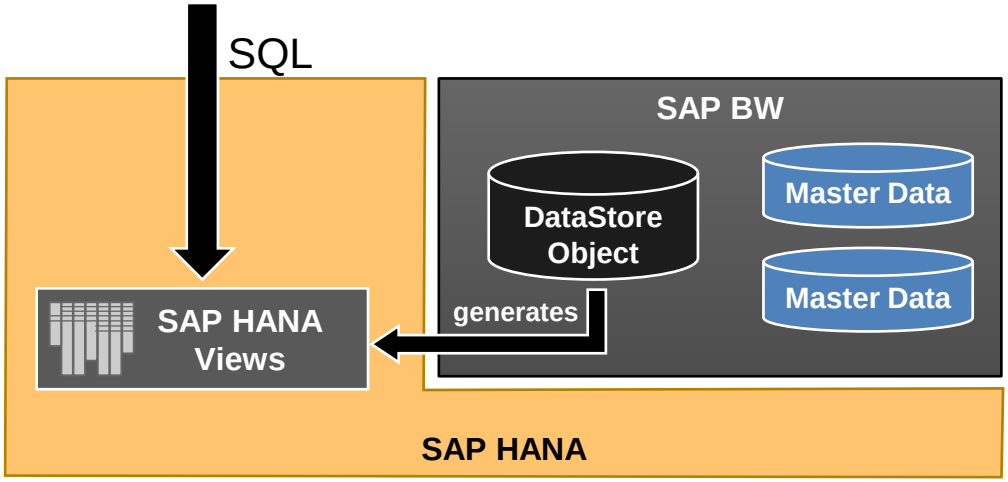


Data Modeling Approaches with SAP BW powered by SAP HANA

Use Case 2: Exposure of SAP BW Models into SAP HANA (1)

General Overview

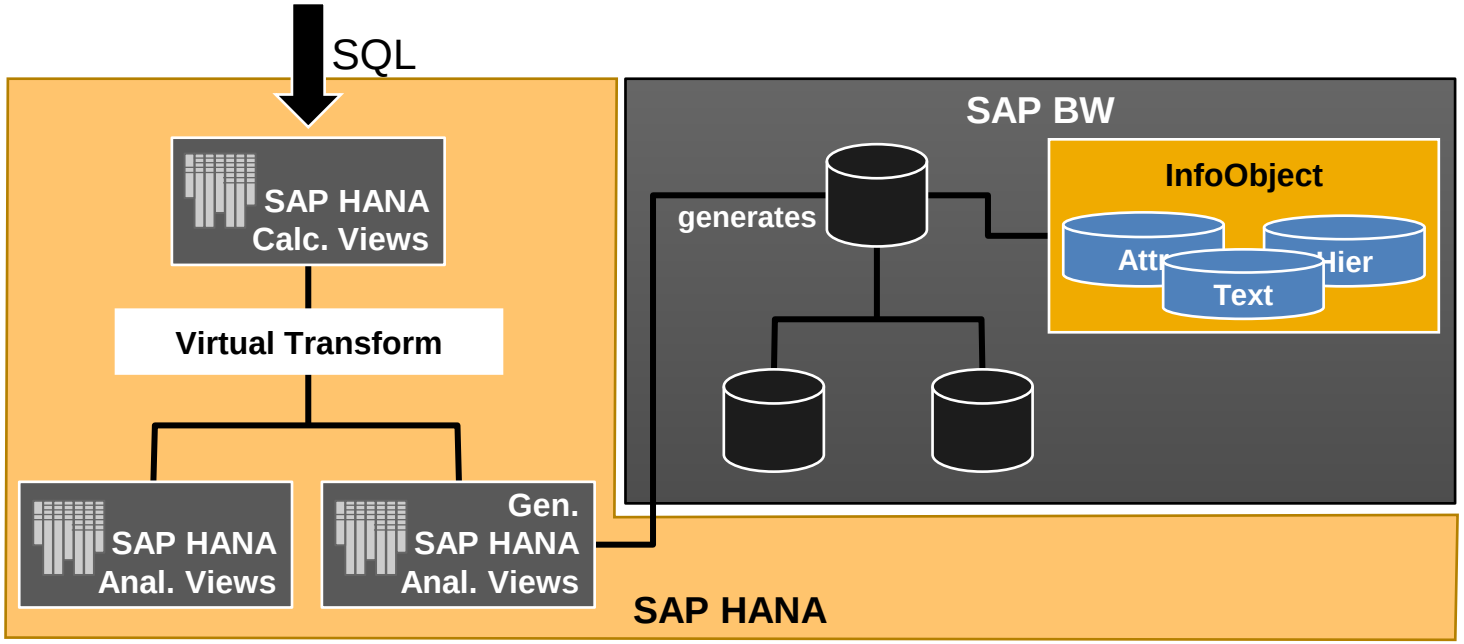
- SAP HANA model generation triggered automatically from SAP BW
- Supports automatic synchronization of authorizations and impact analysis
- Direct consumption of SAP BW data via generated SAP HANA views, for example SAP Lumira, BO Explorer, SQL
- Use SAP BW for further modeling in SAP HANA



Data Modeling Approaches with SAP BW powered by SAP HANA

Use Case 2: Exposure of SAP BW Models into SAP HANA (2)

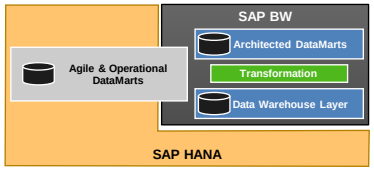
Example



Data Modeling Approaches with SAP BW powered by SAP HANA

Aspects of Data Modeling

SAP HANA Modeling



SAP BW Modeling

- SQL knowledge
- Front-end tool with SQL support
- Leverage SAP HANA modeling techniques to bring the business logic closer to the data
- Agile options for data modeling
- SAP HANA interfaces
- Run SAP HANA application close to your data warehouse

- SAP BW analysis authorizations
- SAP BW content / model lifecycle
- SAP BW-managed data lifecycle and aging
- SAP BW partitioning and derived pruning
- Integrated Business Planning
- Internal and external value representations
- Improved semantics of the BW InfoObjects
- Handling of BW hierarchies
- BW Analytic Manager features

Data Modeling Approaches with SAP BW powered by SAP HANA

What You've Learned in This Unit

Key takeaways

- Major trends in SAP HANA and SAP BW 7.4: field-based modeling and "mixed" SAP HANA scenarios
- SAP BW can expose data via views into SAP HANA, supporting efficient SQL selections
- SAP HANA data can be integrated into SAP BW modeling very easily. This helps to add OLAP functionality on top of native models
- SAP BW and SAP HANA offers a strong combination for various modeling options and is a key element in the strategic direction of SAP

Thank you

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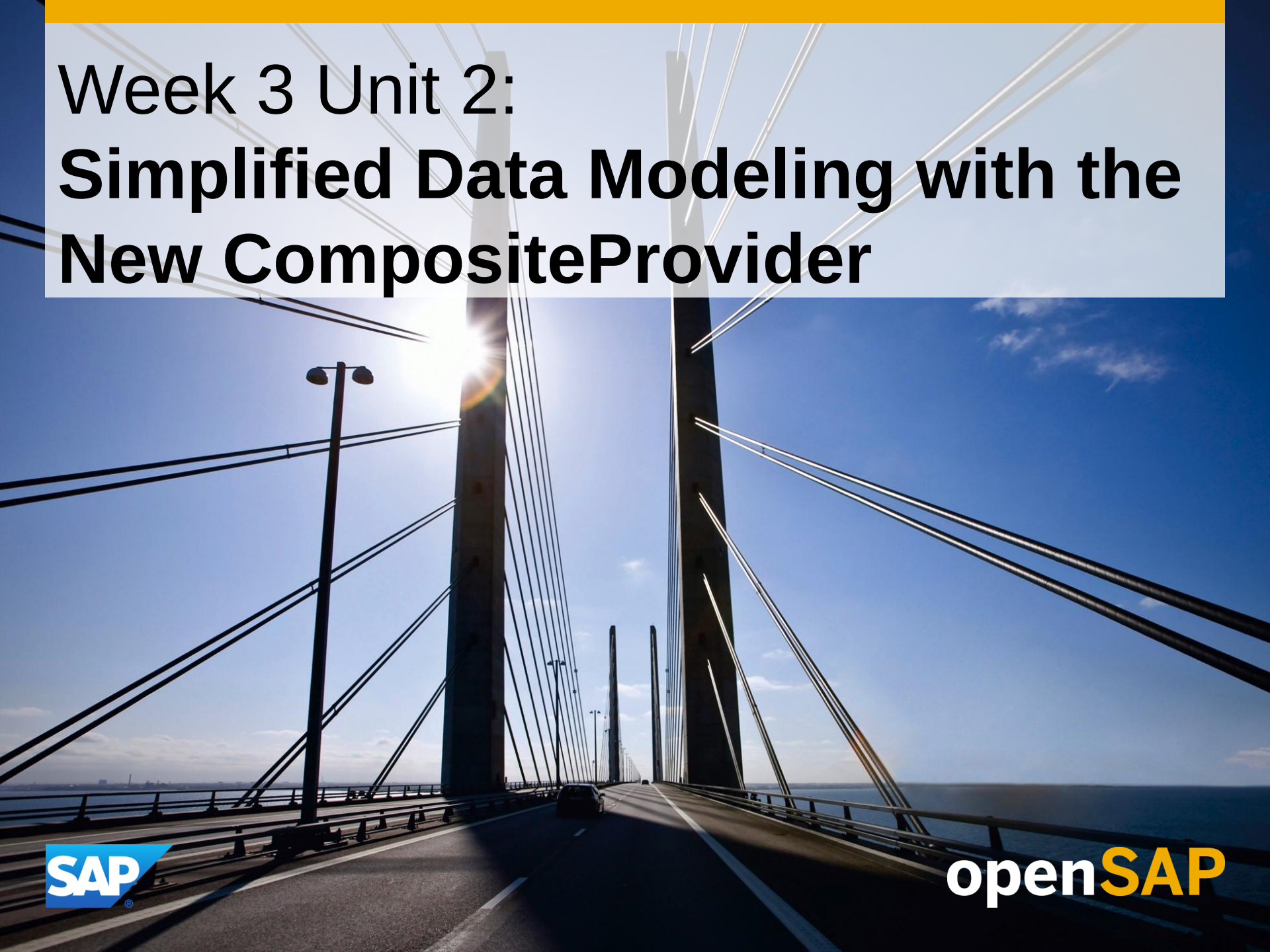

Week 3 Unit 2:
Simplified Data Modeling with the New CompositeProvider

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Simplified Data Modeling with the New CompositeProvider

Covered in This Unit

Content

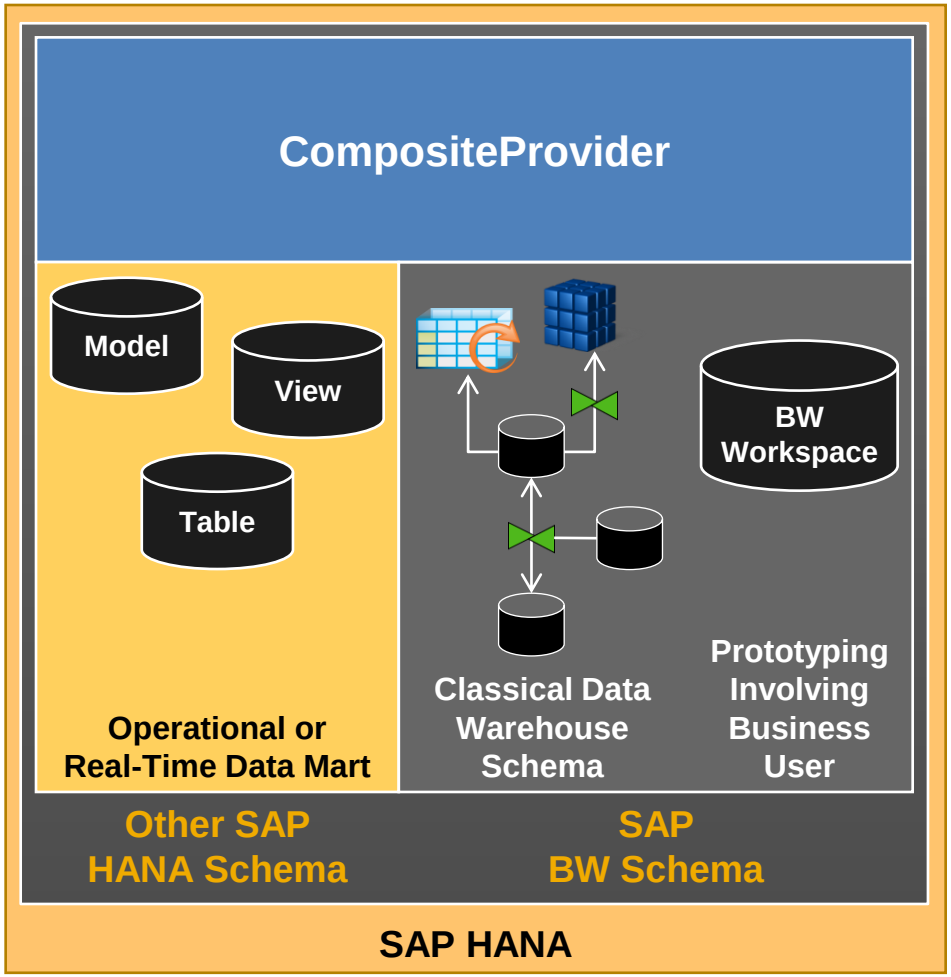
- The new CompositeProvider
- New modeling experience
- Use cases in detail
- System demonstration

Simplified Data Modeling with the New CompositeProvider

Simplified Data Modeling and Reduction of InfoProvider Types

SAP BW 7.4 powered by SAP HANA – enhancing the CompositeProvider

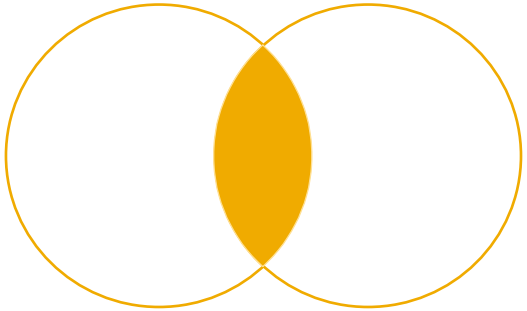
- Consolidates existing InfoProvider
- Combine the data of various applications
- Merges data from other SAP HANA-based applications on the same SAP HANA instance
- Eclipse-based modeling
- Supports union / join operations



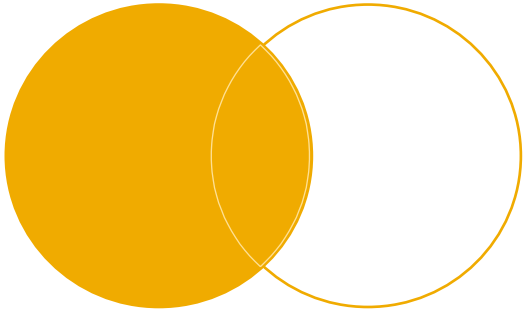
Simplified Data Modeling with the New CompositeProvider
Details

Supported Join Types

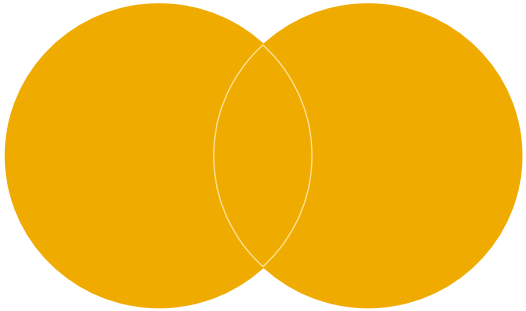
INNER JOIN



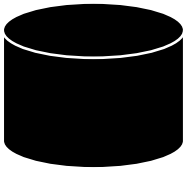
(LEFT) OUTER JOIN



UNION



Supported Objects

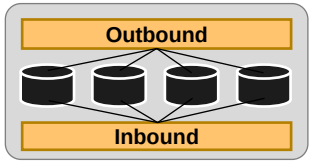


(advanced) DataStore Object

Open ODS View

Info-Cube

Composite-Provider



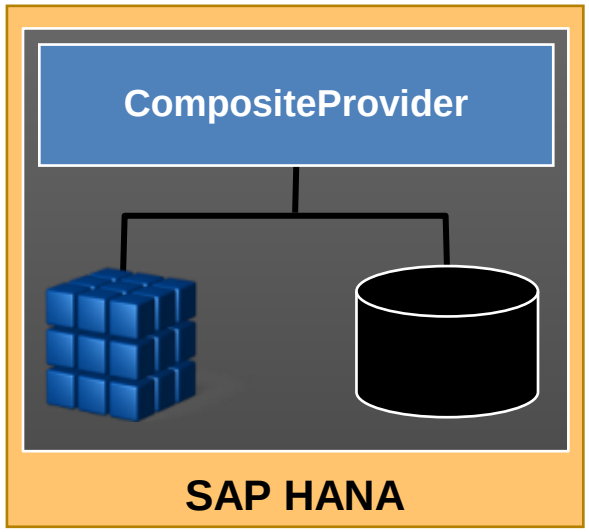
SPO

SAP HANA View

Simplified Data Modeling with the New CompositeProvider

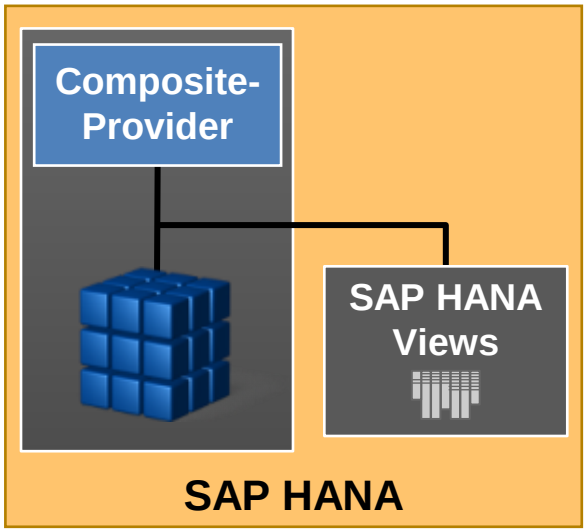
Combine Data of Various Objects

Use Case 1



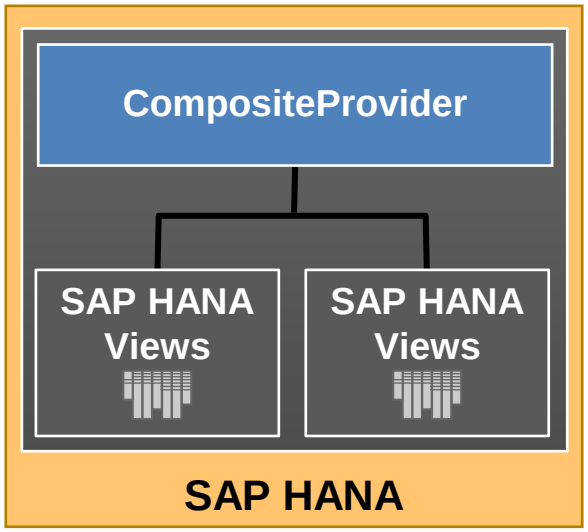
- Combine SAP BW objects
- Replacement of MultiProvider and InfoSets

Use Case 2



- Integrate existing SAP HANA models into SAP BW and join them
- Replacement of VirtualProvider and TransientProvider on SAP HANA models

Use Case 3



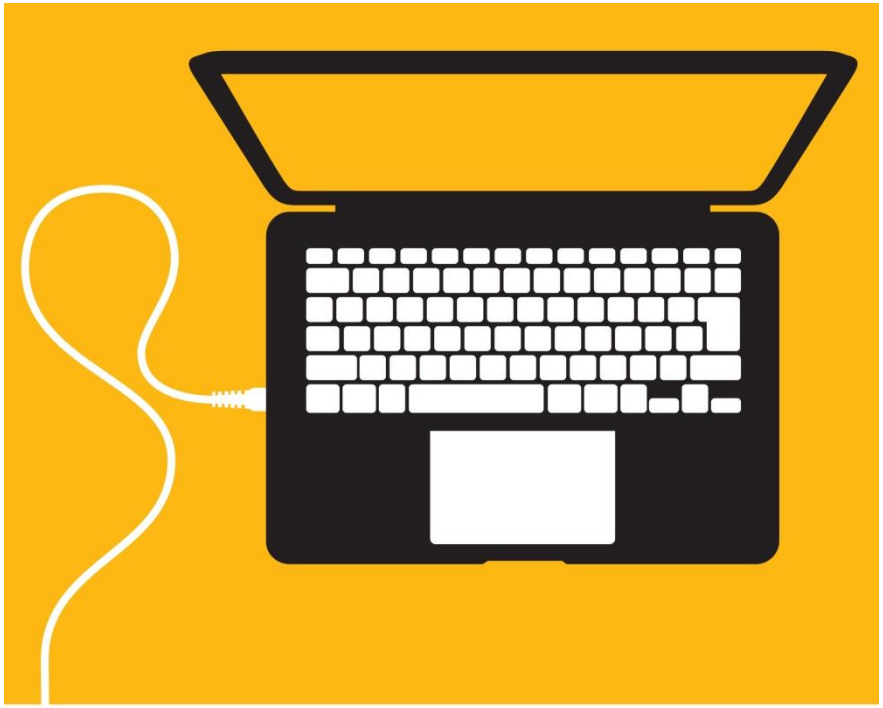
- Add BW OLAP functionality on SAP HANA models
- “Single point of truth” reporting

Simplified Data Modeling with the New CompositeProvider

System Demo

CompositeProvider

- Different use cases
- Optimized for SAP HANA
- Eclipse-based modeling



Simplified Data Modeling with the New CompositeProvider

What You've Learned in This Unit

Key takeaways

- The SAP BW 7.4 CompositeProvider is the new modeling object for flexible joins and unions
- Consolidation of existing InfoProvider (for example, VirtualProvider on SAP HANA models, InfoSets, MultiProvider)
- CompositeProvider integrates SAP HANA models into SAP BW and also allows combining SAP BW InfoProvider
- The new CompositeProvider is enabled for Eclipse-based modeling

Thank you

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Week 3 Unit 3:
SAP BW and SAP HANA Interoperability

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SAP BW and SAP HANA Interoperability

Covered in This Unit

Content

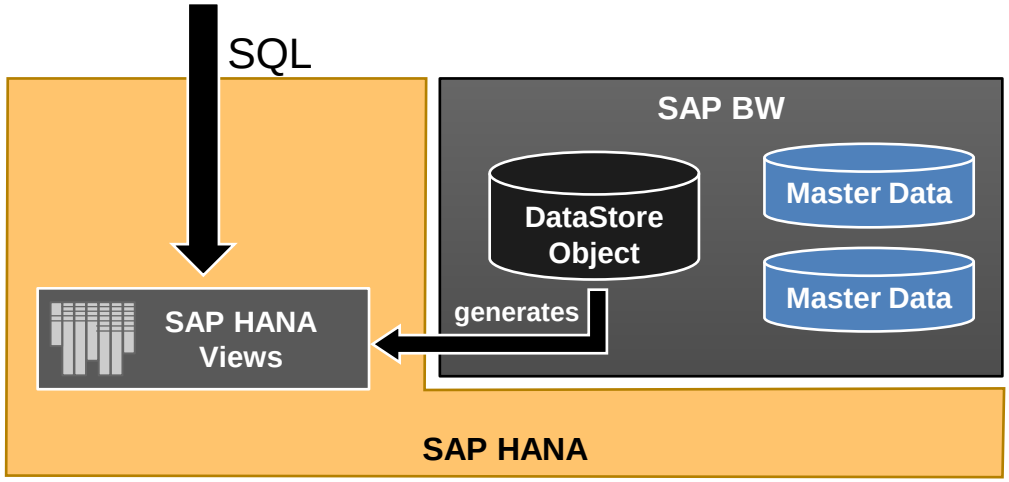
- Exposure of SAP BW models via SAP HANA views
- Supported objects and benefits
- System demo with SAP Lumira

SAP BW and SAP HANA Interoperability

Exposure of SAP BW Models into SAP HANA

Automated model generation

- SAP HANA model generation triggered automatically from SAP BW
- Supports automatic synchronization of authorizations and impact analysis
- Direct consumption of SAP BW data via generated SAP HANA views, for example SAP Lumira, BO Explorer, SQL
- Use SAP BW objects for further modeling in SAP HANA

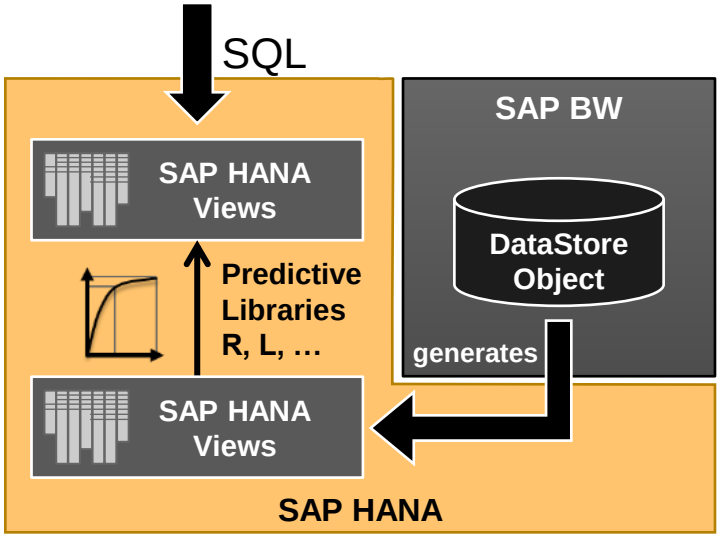


SAP BW and SAP HANA Interoperability

Details

Supported objects for generation:

DataStore Object | Info-Cube | Composite-Provider | Info-Object



Benefits

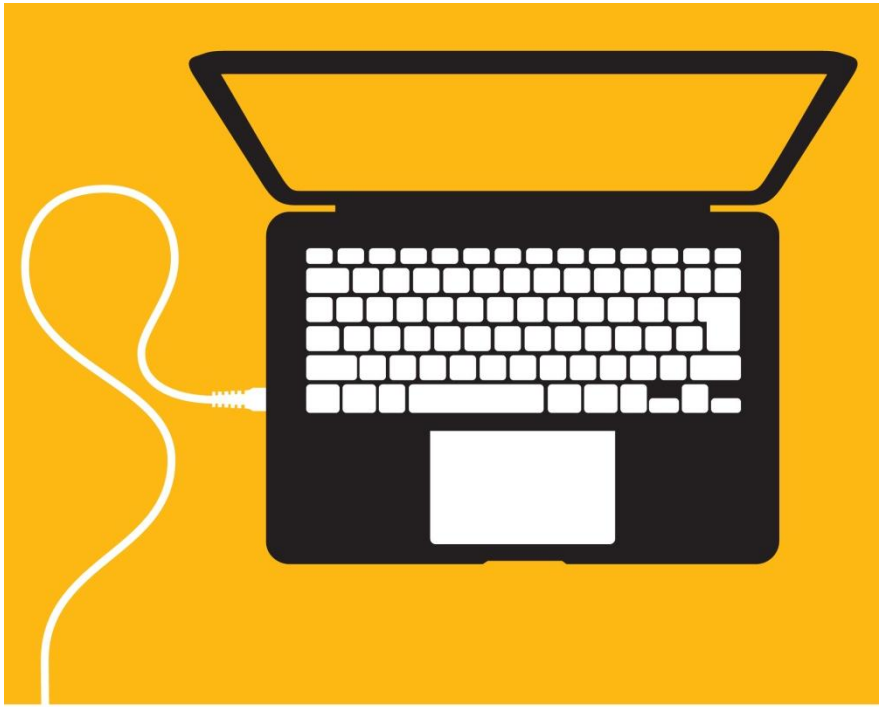
- SQL interface via SAP HANA usable for SAP BW objects and data
- Extensions of data model with agile SAP HANA modeling options
- Reuse, for example harmonized SAP BW master data in SAP HANA modeling scenarios

SAP BW and SAP HANA Interoperability

System Demo

SAP HANA model generation

- Generate an SAP HANA model for transactional data
- Generate an SAP HANA model for master data
- Consumption via SQL with SAP Lumira



SAP BW and SAP HANA Interoperability

What You've Learned in This Unit

Key takeaways

- SAP HANA modeling options are extending core SAP BW functionalities
- Support of the core InfoProviders and master data InfoObjects
- View generation allows you to work with SQL statements and SQL-based front-end tools on top of SAP BW data
- Model generation includes authorizations and all tables representing complex models like InfoObjects

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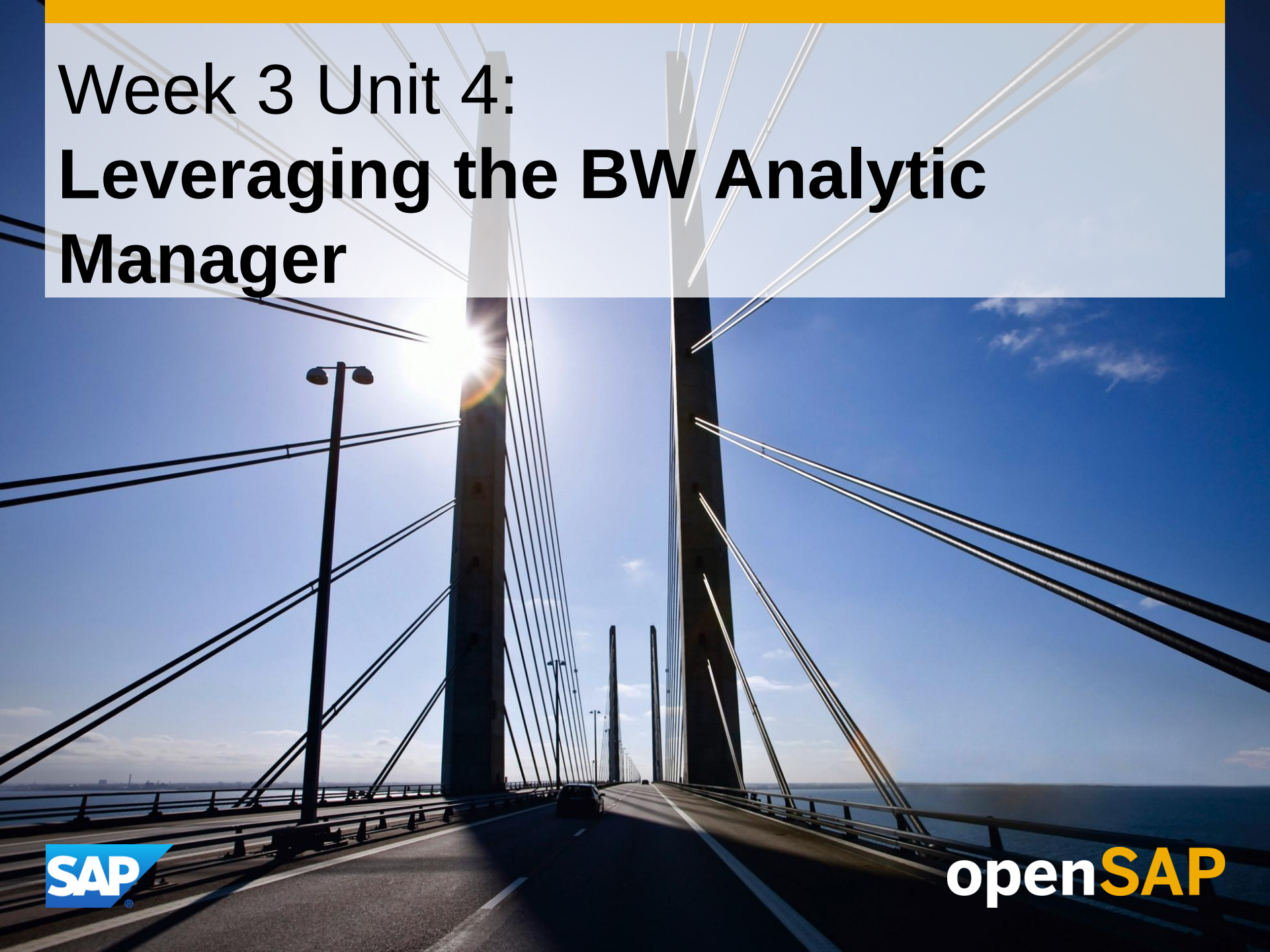
Week 3 Unit 4:
Leveraging the BW Analytic Manager



Leveraging the BW Analytic Manager

Covered in This Unit

Content

- What does the BW Analytic Manager do?
- Functions offered
- Processing example
- Understanding the difference with SAP HANA as database

Leveraging the BW Analytic Manager

The OLAP Compiler for SAP HANA

BW / BEx Query Designer

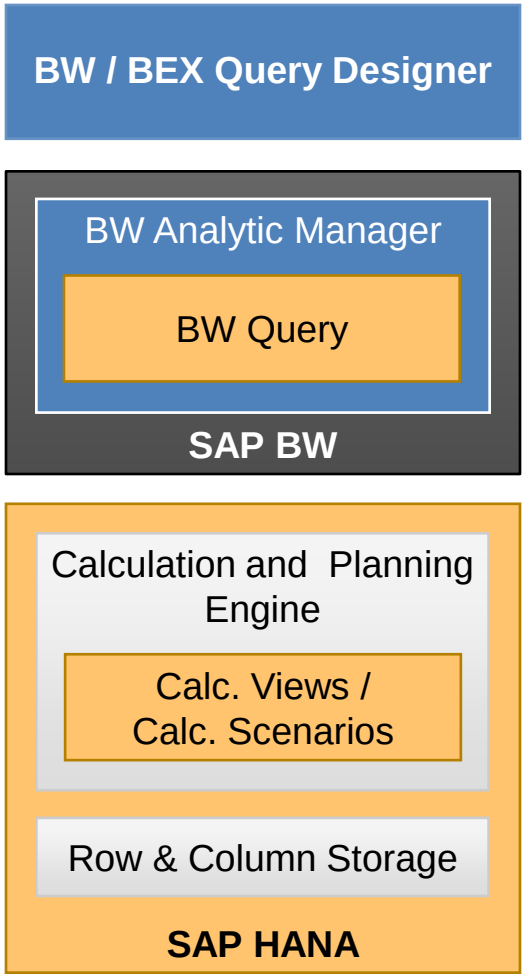
- Is the design tool for the BW Analytic Manager

BW Analytic Manager

- Has a wide variety of OLAP functions
- Generates calculation to execute on the underlying data structures directly in SAP HANA

Pushing down to SAP HANA

- Excellent query performance
- Deep granular data can now be analyzed by using relevant SAP HANA engines (code to data)



Leveraging the BW Analytic Manager

SQL and OLAP: Example of a Simple Query

Aggregated key figure | **Counter key figure** | **Normalized, calculated key figure**

Country	Product	Quantity	No. of Customers	Share per Product
DE	Pencil	10	5	67% (10/15)
	Paper	5	3	33% (5/15)
	Subtotal	15	6	100 %
US	Pencil	7	3	39% (7/18)
	Glue	11	5	61% (11/18)
	Subtotal	18	7	100 %
Grand Total		**33**	**11**	**100 %**

Leveraging the BW Analytic Manager

SQL and OLAP: Data to Calculate the Query Result

SELECT Country, Product, Customer, SUM (Quantity), 1 FROM …

This is what can be retrieved by SQL and thus the starting point for further calculations

- 11 customer, 3 products resulting in 16 rows
- Imagine you have
  - 1000s of products
  - 1000s of customers
  - or even millions of customers
- Combinations let this result explode

Country	Material	Customer	Quantity	No. of Customers
DE	Pencil	Customer A	2	1
		Customer B	3	1
		Customer C	1	1
		Customer D	2	1
		Customer E	2	1
	Paper	Customer B	1	1
		Customer C	1	1
		Customer F	3	1
US	Pencil	Customer G	1	1
		Customer H	3	1
		Customer E	3	1
	Glue	Customer G	3	1
		Customer J	3	1
		Customer K	1	1
		Customer L	2	1
		Customer D	2	1

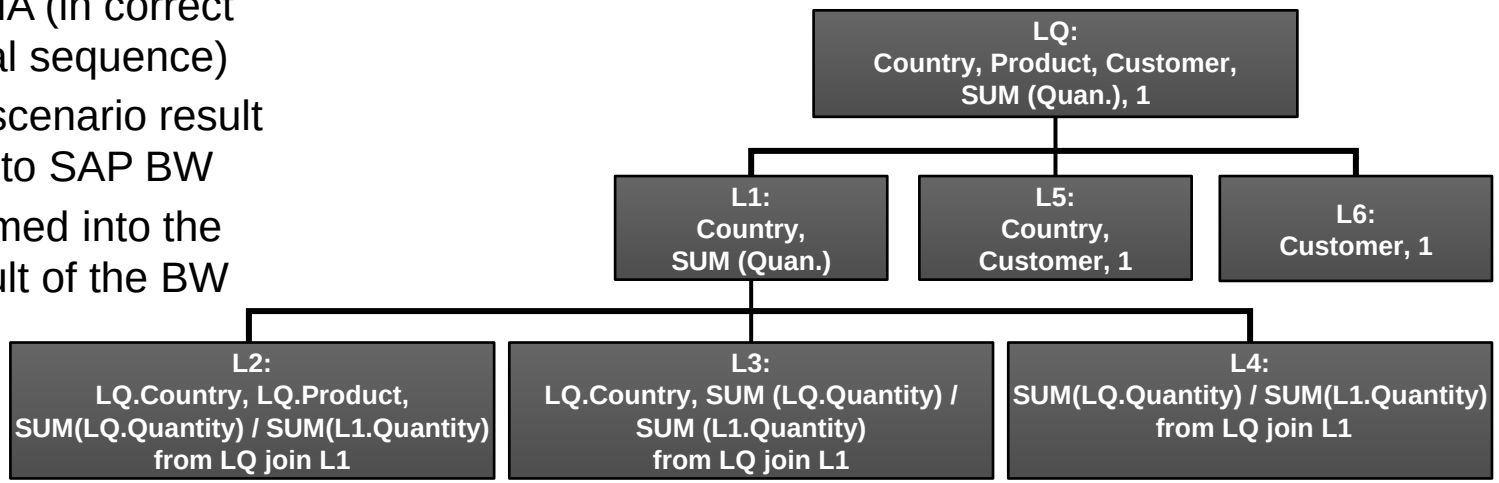
Leveraging the BW Analytic Manager

SQL and OLAP: Assemble Query Result

Orchestration role of the BW Analytic Manager

1. Translate BW Query into an OLAP calculation graph
2. Translate the graph into an SAP HANA calculation scenario
3. Calculation scenario is optimized and processed by SAP HANA (in correct mathematical sequence)
4. Calculation scenario result is sent back to SAP BW
5. It is transformed into the (cellset) result of the BW Query

Country	Product	Quantity	No. of Customers	Share per Product
…	…	LQ: Country, Product, SUM (Quan.)	LQ: Country, Customer, SUM(1)	L2
	Subtotal	L1	L5: Country, Customer, SUM(1)	L3
Grand Total		L1: SUM(Quan)	L6: SUM(1)	L4



Leveraging the BW Analytic Manager

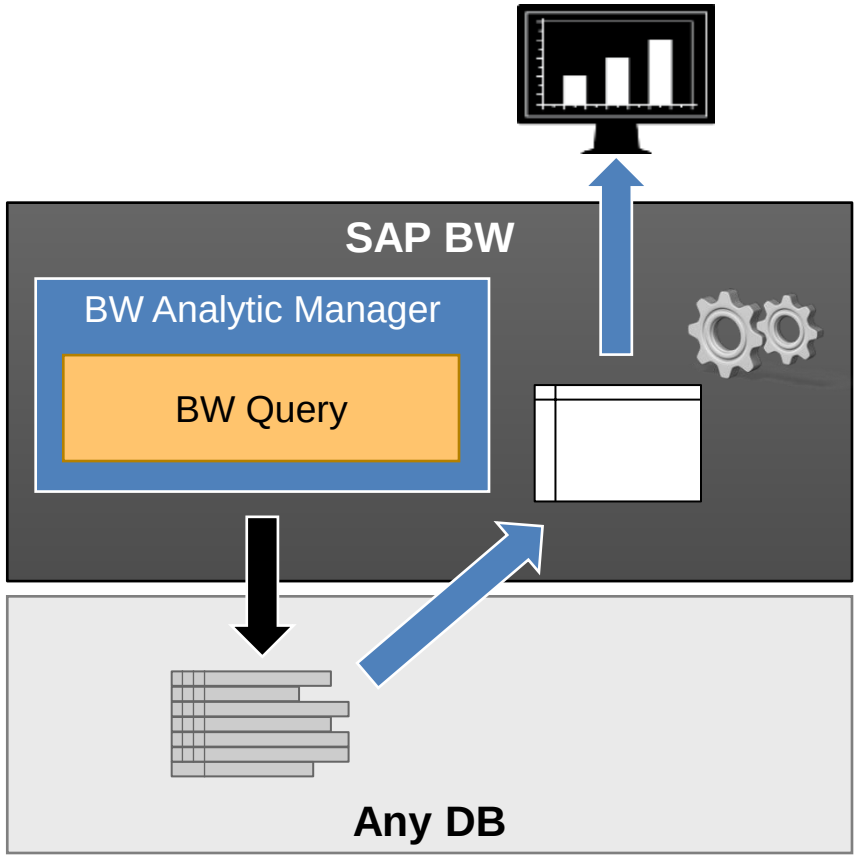
Example ‘Exception Aggregation’ (1)

Processing with SAP BW on Any DB

BEx Query Designer defines exception aggregation on reference characteristic

Generates reference characteristics in group by clause and executes SQL

Transfers the result set from DB into application server-based internal table (inside Analytical Manager) and executes exception aggregation



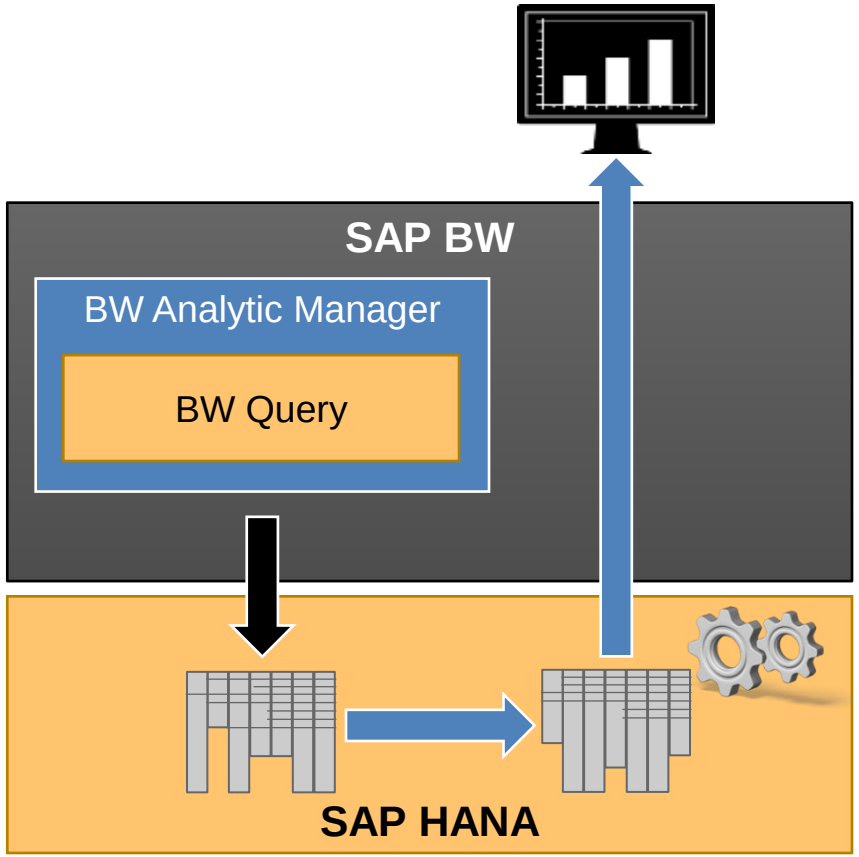
Leveraging the BW Analytic Manager

Example ‘Exception Aggregation’ (2)

Processing with SAP BW on SAP HANA

BEx Query Designer defines exception aggregation on reference characteristic

Generates calculation scenario in SAP HANA and executes exception aggregation in SAP HANA



Leveraging the BW Analytic Manager

Push-Down List (examples)

Feature	Release
Aggregation	SAP BW7.0 + BWA
Cell-based calculations (FEMS)	SAP BW7.0 + BWA
Hierarchy-processing (part 1)	SAP BW7.0 + BWA
Top/Bottom N for Pre-Queries	SAP BW7.3 + BWA
MultiProvider-UNION	SAP BW7.3 + BWA
Exception aggregation COUNT	SAP BW7.3 + BWA
Exception aggregation for key figures w/o currency/unit	SAP BW7.3 + BWA
Exception aggregation for key figures w/ currency conversion	SAP BW7.3 + BWA
Exception aggregation for key figures w/ unit conversion without reference InfoObject	SAP BW7.3 + BWA
Time-dependent currency conversion	SAP BW7.3 (SP10) on SAP HANA
“Current member” calculation	SAP BW7.4 (SP05)
CompositeProvider (for example, JOIN between fact data)	SAP BW7.4 (SP05) on SAP HANA
Stock coverage key figures	SAP BW7.4 (SP06)
Unit conversion with reference InfoObjects (see SAP Note 2001947 to switch off)	SAP BW7.4 (SP08) on SAP HANA
Parts of handling of inventory key figures (see SAP Note 2001947 to switch on)	SAP BW7.4 (SP08) on SAP HANA
Leverage SAP HANA hierarchy processing	planned with SAP BW 7.4 (SP09) on SAP HANA

Leveraging the BW Analytic Manager

What You've Learned in This Unit

Key takeaways

- BW Analytic Manager offers a strong and unique set of OLAP functionalities
- Key functionalities are complex and not easily reproducible by manual SQL statements
- Nearly all existing OLAP features are push-down and optimized towards SAP HANA to accelerate reporting

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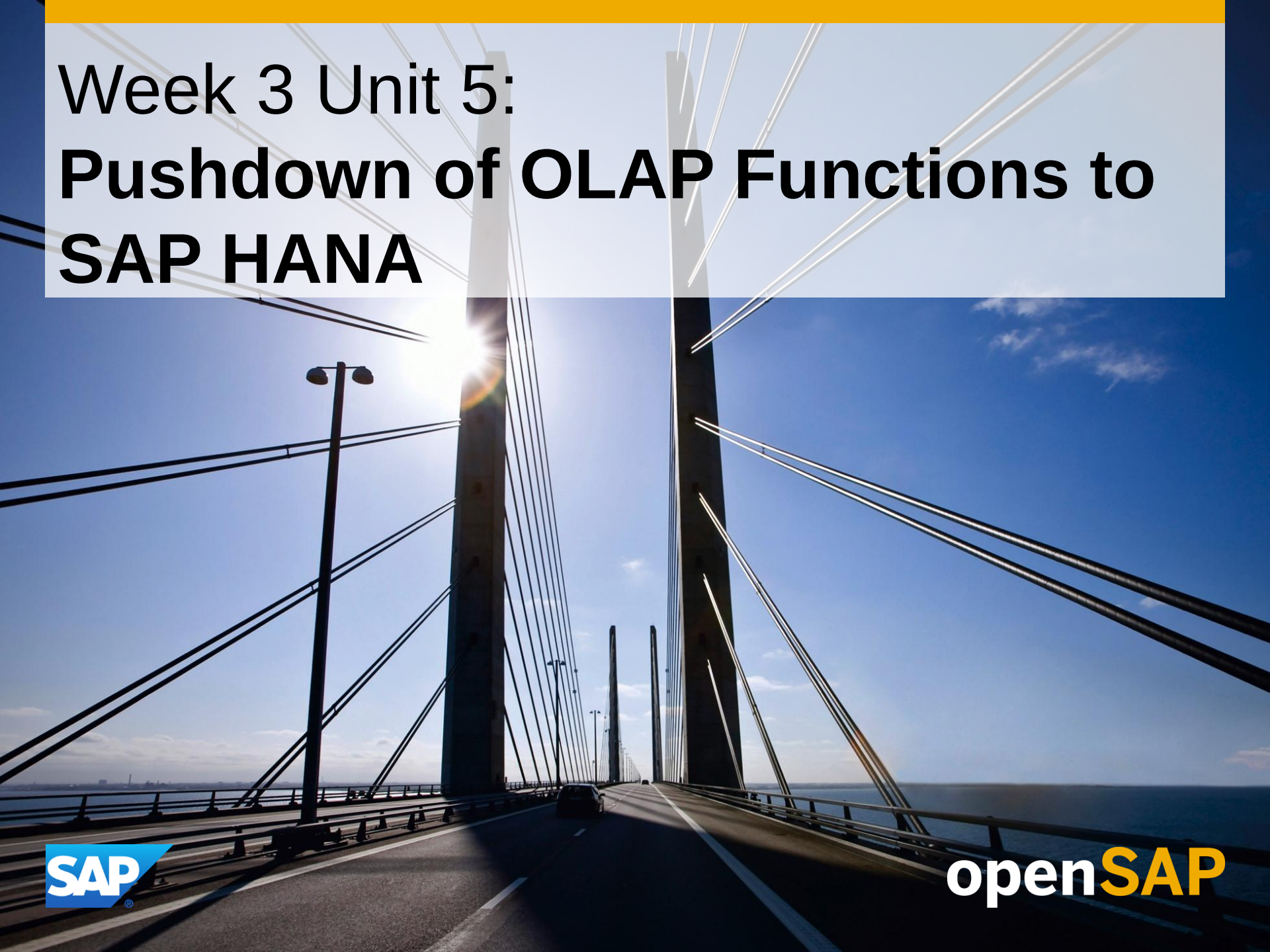
Week 3 Unit 5:
Pushdown of OLAP Functions to SAP HANA



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Pushdown of OLAP Functions to SAP HANA

Covered in This Unit

Content

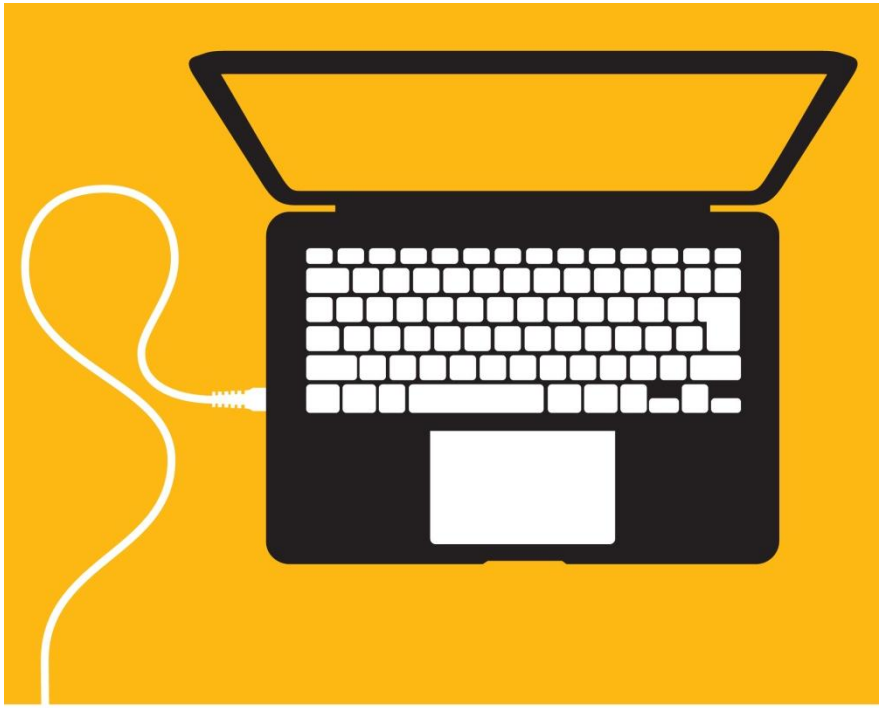
- Reporting on top of BW BEx Queries with SAP Design Studio

Pushdown of OLAP Functions to SAP HANA

System Demo

BW Analytic Manager

- See various OLAP features in reporting
- Experience the performance of SAP HANA
- Use SAP Design Studio for reporting



Pushdown of OLAP Functions to SAP HANA

What You've Learned in This Unit

Key takeaways

- The BW Analytic Manager offers a huge variety of predefined analytic functions such as currency/unit conversion or exceptional aggregations
- SAP HANA optimizes many features like exceptional aggregation
- BEx Query designer is the modeling tool to get access to all OLAP functions
- Different front ends can be used to consume BEx Queries

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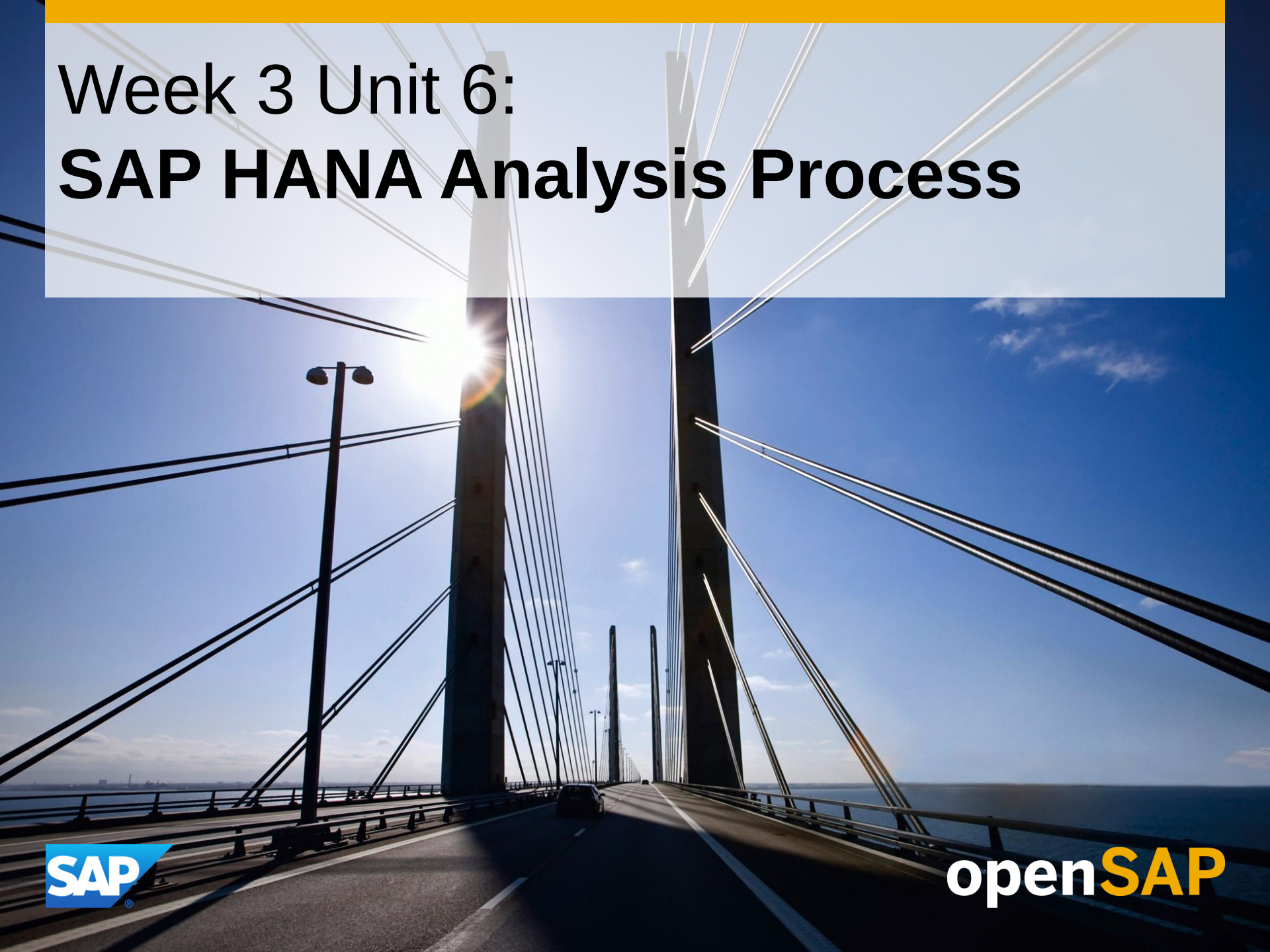
Week 3 Unit 6:
SAP HANA Analysis Process



SAP

openSAP

SAP HANA Analysis Process

Covered in This Unit

Content

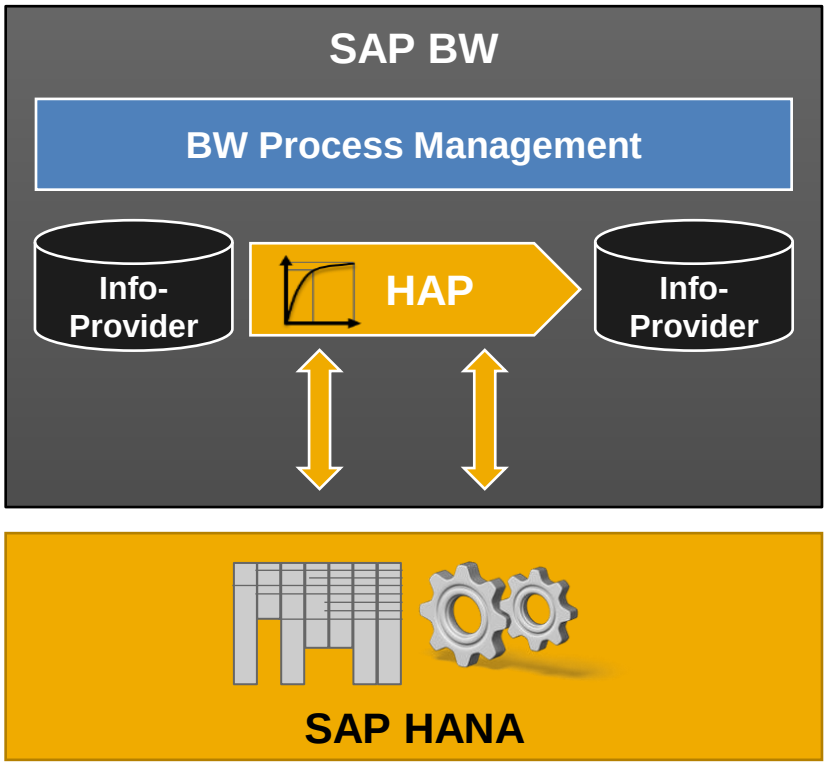
- SAP HANA analysis process (HAP)
- Components
- System demo

SAP HANA Analysis Process

Overview

Enhanced analysis capabilities

- Execute SAP HANA native functions directly on BW InfoProvider data (for example, clustering, association algorithms, regression analysis, anomaly detection, weighted score, exponential smoothing,…)
- Complex and data-intensive processes are processed directly in SAP HANA
- Fully integrated in SAP BW process management (staging, process chain management,…)



SAP HANA Analysis Process

Details

Each HAP consists of three parts:

Source

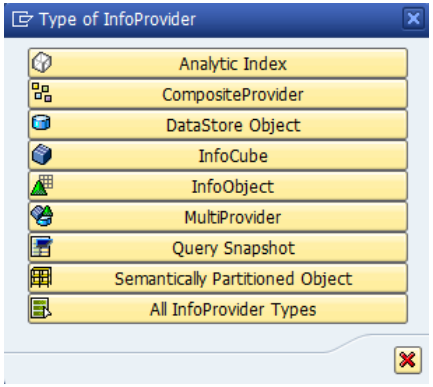
- Most BW InfoProviders
- Database tables

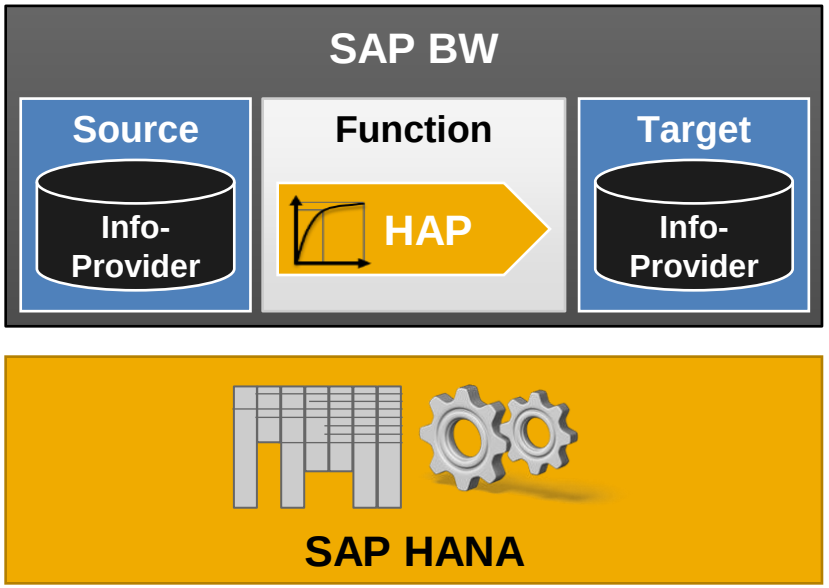
Function (procedures/algorithms)

- AFL functions (PAL, …)
- L-script, R-script, SQL Script procedures

Target

- Analytic index
- DataStore object
- Database table
- “Stacked HAPs”



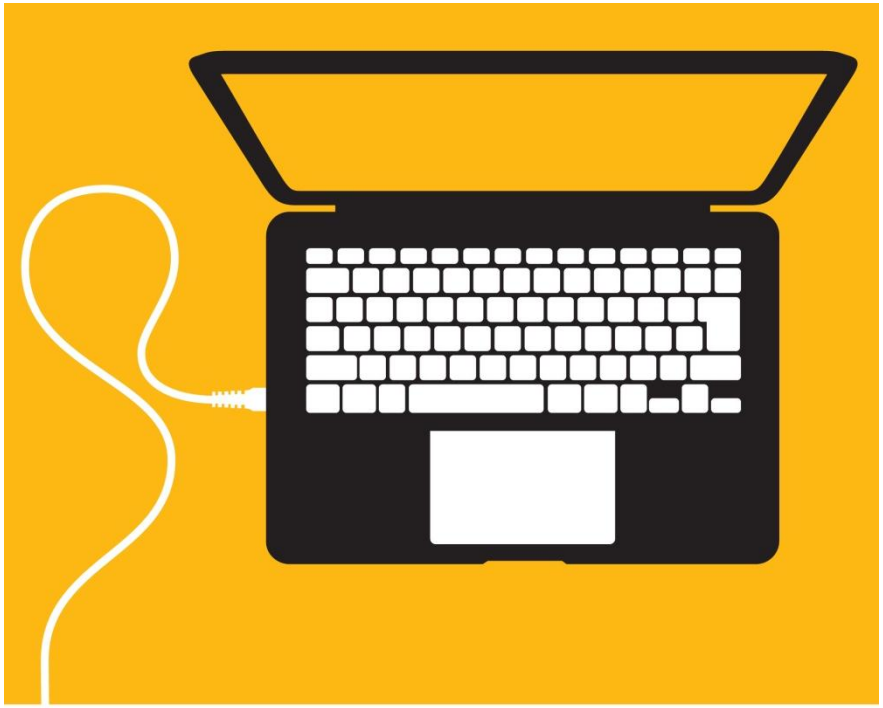


SAP HANA Analysis Process

System Demo

HAP in SAP BW

- Clustering optimized with SAP HANA analysis process



SAP HANA Analysis Process

What You've Learned in This Unit

Key takeaways

- SAP HANA Analysis processes offer a great opportunity to use functions such as predictive analytics or data mining based on SAP BW data
- HAP supports different functions, scripts, specialized libraries (PAL, AFL, R)
- Data processing and calculation executed directly in SAP HANA

Thank you

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