Build and Run an SQL Data Warehouse on SAP HANA
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Agenda

SAP HANA Platform for Data Warehousing

SAP HANA SQL DW toolset
- Model the SAP HANA SQL DW
- Develop the SAP HANA SQL DW
- Deploy the SAP HANA SQL DW
- Run the SAP HANA SQL DW

Summary
SAP HANA Platform for Data Warehousing
### SAP HANA Platform
The data management and application platform for all applications

**All Devices**

**SAP, ISV and Custom Applications**

### SAP HANA® Platform
**On premise | Cloud**

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SAP HANA Platform: How does SAP approach Data Warehousing
Two ways to run, or get the best of both

Application driven approach, SAP BW/4 HANA as premium DW application with integrated services

- SAP BW/4HANA is an application offering. All data warehousing services via one integrated repository
- Optional integration of additional tools for modelling, monitoring and managing the data warehouse

SQL driven approach, SAP HANA with loosely coupled tools and platform services, logically combined

- SQL approaches require several loosely coupled tools, usually having separate repositories
- “Best of breed” approach to build your own model
SAP HANA Platform: How does SAP approach Data Warehousing

Mixed Approach for SAP HANA Data Warehousing

SAP HANA Data Warehouse

- SAP Business Warehouse
  - SAP BW/4HANA
- SAP HANA SQL Data Warehouse

SAP HANA Platform

- SAP HANA Application Services
- SAP HANA Integration Services
- SAP HANA Processing Services
- SAP HANA Database Services

SAP BW approach

SQL approach (extendable by third-party-tools)

Mixed approach
SAP HANA SQL DW leverages concepts of HANA XS Advanced
Development Environment - All HANA DW artefacts defined by files

How to model, develop and deploy a typical SAP HANA SQL DW application?

- The answer is: Use SAP Web IDE for SAP HANA in combination with the toolset around. SAP Web IDE is the new standard IDE offering, both for on premise and cloud, serving all programming model layers offered.

- It provides Integration with Git as the de facto versioning system standard and – by running in XSA itself – can build and run your applications using the deploy service to instantiate or update the respective services/containers of your application.
SAP HANA SQL DW toolset
The SAP HANA SQL DW toolset

Design

Develop

Deploy

Run
HANA SQL Data Warehouse
Data process perspective of SAP defined SQL DW

Model, Compute & Data Store

Ingest
ETL ↑ Replication ↑ Streaming ↓ Virtual Access

Sources

Consume

Data Lake
SAP Vora

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Model the SAP HANA SQL DW
Model the objects, processes and dataflow

SAP Power Designer
SAP Enterprise Architecture Designer
SAP Enterprise Architecture Designer
Edition for SAP HANA

Create and integrate enterprise, landscape, process and data models to manage information and systems effectively

– Business process architecture
– Landscape and application architecture
– Requirements management
– Strategy architecture to document goals and projects
– Physical data modeling & data architecture
– Reverse engineering capabilities
– Lineage & Impact analysis
SAP Enterprise Architecture Designer
Specifications for SAP HANA

- Reverse-Engineering capabilities
- Impact Analysis, Model Comparison
- Generate EAD model objects in HANA HDI compatible file format
  - Table & View
  - Data Movement Model (Flowgraph)
  - Native DataStore Object (NDSO)
  - Virtual table definition
  - HANA CDS Association
- Storage of generated HANA HDI compatible files to
  - Local ZIP-File (SAP Web IDE - Import)
  - Git Repository (SAP Web IDE - Git Integration)
Demo

Modeling the Data Warehouse with SAP Enterprise Architecture Designer (EAD)
Develop the SAP HANA SQL DW
One environment to develop all artefacts

SAP Web IDE for HANA
Develop the entire DW model from your browser
Major extensions for DW functions (Flowgraphs, NDSO, DLM, Taskchains)
SAP Web IDE for SAP HANA

- SAP Web IDE for SAP HANA is the successor to SAP HANA web development workbench and the development perspectives of SAP HANA studio.

- It offers
  - Development of SAP HANA content and models
  - UI development with SAPUI5
  - Development of polyglot applications
  - Node.js, Java or XSJS business code
  - Git integration

- It is
  - Browser based
  - Installed as a SAP HANA XSA application
SAP Web IDE for SAP HANA
Calculation Views & Flowgraphs
SAP Web IDE for SAP HANA
Native DataStore Objects & Taskchains
Native DataStoreObject
– Provide a central persistence object with additional semantics to determine deltas
– Move, aggregate and delta data load containing deleted records
– Provide interoperability between HANA native Data Warehouses and BW/4HANA
– Embedded into SAP Web IDE for SAP HANA using HANA CDS as metadata description language
– Integrated with HANA SDI flowgraph
Developer and feature isolation
Export of Objects from local project workspaces. Manual activity to manage and resolve conflicts.

• In SAP HANA XS Advanced, all developers work in their *isolated workspace*.

• Each developer also works with an *isolated runtime*. HANA XS Advanced automatically creates a *runtime container* for each developer.

• All developed objects are stored in separate project workspaces. Manual activity required to manage and resolve the conflicts.
Developer and feature isolation

**GIT to manage and resolve conflicts from parallel project workspace objects.**

- In SAP HANA XS Advanced, all developers work in their *isolated workspace*.
- Each developer also works with an *isolated runtime*. HANA XS Advanced automatically creates a *runtime container* for each developer.
- All developed objects are stored in a shared repository: GIT, which keeps a full version history, and uses *branching* to support *isolated feature development*. 

![Diagram showing the integration of developers, runtime containers, and a shared Git repository](image-url)
Versioning, branching and development with GIT
Working in parallel on different repository versions

User story 1

User story 2

Master

Time
Clone, Edit and Build the Data Warehouse Artefacts using SAP Web IDE for SAP HANA
Dear GitHub users, GitHub Enterprise upgrade to 2.10 is planned on 12th Aug Saturday from 4:30 to 8:30 UTC, we request you to please test your code beforehand at our test instance https://github04.iaas.mo.sap.corp.

[GitHub Interface]

Repository: DWF-TechEd2017

- DWF20_TECHED
  - JavaScript
  - Updated 23 hours ago

Top languages:
- JavaScript

People:
- 5 people
Deploy the SAP HANA SQL DW
Transport Models, Objects and Option for Integration testing

HALM
XSA integrates with HANA Application Lifecycle Manager (HALM for XSA) to manage change and transport of content

SAP Application Lifecycle Manager
SAP HANA Product Installer

Open Source deployment
Bring your own tools: Jenkins, XL release, etc.
Deployment option: Continuous Testing, Integration, Deployment

Continuous Testing | Integration | Deployment

Continuous Integration (CI) Server

Assemble & Deploy

Daily Builds

SIT/UAT

Prod

Deploy

Deploy

Deploy

Regression

Test++

Production

SAP Web IDE for SAP HANA
Agile Software Development in a typical Data Warehousing Scenario

Versioning, branching and development with GIT
Working in parallel on different repository versions

Deployment example
Continuous...

Continuous Testing | Integration | Deployment

WebIDE

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Run the SAP HANA SQL DW
Integrated Data Warehouse Processes

Design  Develop  Deploy  Run

Data Warehousing Foundation
Data Warehousing Scheduler
Data Lifecycle Manager
Data Warehousing Monitor
Data Distribution Optimizer
TaskChain Editor:
- provide a framework to define task chains as a sequence of single tasks
- Flexible start conditions
- Parallelization and Dependency Handling
- Provide capability to model dependencies for flowgraphs, NDSO related tasks
- Enhanced capabilities for project local database procedures (planned for DWF 2.0 SP02) and DLM related tasks (planned for DWF 2.0 SP02)
SAP HANA Data Warehousing Foundation
Data Lifecycle Manager (DLM)

TBs - 10s of TBs

10s of TBs - PBs

Data Access via DLM
generated Union & Pruning View

DLM managed data movement. Based on aging rules

In-Memory (Hot Store)
Extension Node (Warm Store)
Dynamic Tiering (Warm Store)

Data Lake (Cold Store)

SAP Vora *
SPARK Controller
HADOOP
SAP IQ

* restricted availability with DWF >= 2.0 SP02
Data Lifecycle Manager (DLM)
- Offer data warehouse developers functionality to model data movement strategies from HANA column store tables to Hadoop, Vora, SAP IQ, Dynamic Tiering or HANA Extension
- Enable access to warm and cold data by generating pruning views (calculation views)
- Enable data movement by generating HANA database procedures
- Execution and Monitoring of DLM Profiles (Data Movement) embedded into HANA Data Warehousing Scheduler via generated “DLM task chains”
Data Warehouse Monitor (DWM):

- Fiori-Style Application for (Production) System environment w/o access to SAP Web IDE for SAP HANA
- Schedule and Monitor Task chain execution
- Enhanced capabilities for database procedures (planned for DWF 2.0 SP02) and DLM related tasks (planned for DWF 2.0 SP02)
SAP Data Warehousing Foundation – Data Distribution Optimizer (DDO)
SAP UI5 Style Application

Data Distribution Optimizer (DDO):
- Create, adjust and simulate different reorganization plans to achieve an optimal data distribution in an interactive fashion. Repeat the steps until a sufficient reorganization plan has been created.
- Join Path Analysis to identify associated database tables in the system.
- Create and adjust table groups from proposal.
- Execute & Schedule SAP HANA redistribution runs.
Leverage the Data Warehousing Monitor to execute a monitor the Task Chain
Summary
SAP HANA SQL DW
Why should you choose SAP HANA SQL DW

Strengths
• Complete web approach with HANA XS Advanced platform. Still 100% open SQL approach.
• Strong and open repository versioning with Git
• Freedom to custom built data models and data management processes. Example: adopt Data Vault model.
• Leverage 3rd party tools and in-house standards, skills & knowledge
• DevOps enabler: Continuous Testing | Integration | Deployment

Use Case
• Considerable share of non-SAP source systems and interfacing
• Specific data model requirements, for example for auditability
• 3rd party DW replacement
• DevOps requirements
• Public cloud deployment (SQL DW not fully available yet)
Thank you.

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