Agenda

Overview
Model, Develop and Transport an Application
Command Line Tool
Install, Assemble and Configure an Application
Configuration
Prerequisites
Roles & Authorizations
Evolution of HALM
Summary
Agenda

Overview

Model, Develop and Transport an Application
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Summary
An Application’s Lifecycle in SAP HANA

Your Product Structure
Define product structure incl. delivery unit and package assignment
View and analyze dependencies for DUs

Your Application
Configuration and Customization
Configuration and Customization

Your Content
Based on changes or complete entities
Using CTS+ or SAP HANA native

Your Application
Bundle object changes via automatic recording
Lock objects individually or for teams
Release changes when ready for transport

Your Product
Download from SMP
Install / update / uninstall

Labs Preview

New / Labs Preview

SAP HANA Application

Model

Develop

Transport

Install

Assemble

Configure
SAP HANA Application Lifecycle Management

Is part of XS (SAP HANA Extended Application Services)

Is easy to use

Can be configured based on your preferences

Can be launched immediately after SAP HANA installation: http://<server>:80<instance>/sap/hana/xs/lm

Requires role assignment (details later)
Content lifecycle management in SAP HANA
Managing “content” in SAP HANA

SAP HANA content defined:
• Not part of the core SAP HANA DB installation itself
• Is delivered by SAP as part of SAP HANA optimized solutions
• Is created in SAP HANA-based development projects (partner, customer)
• Sometimes called “objects” or “artifacts”

Content comprises all kinds of objects, for example:
• Schemas and table definitions defined as HANA Content
• Attribute views, analytic views and calculation views
• Procedures and privileges
• SQLScript, JavaScript and HTML
• Roles and permissions
Flow of Activities: User Interfaces

HANA Application Lifecycle Management
- Modeling (Browser)

HANA Studio
- Development, Object Activation and Change Selection
- Change Recording (View)

Web IDE
- Development, Object Activation and Change Selection
- Change Recording (Browser)

HANA Application Lifecycle Management
- Native & CTS Transport (Browser)
- Assembly (Command Line)
- Installation (Command Line)
Agenda

Overview

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Summary
Model

Product
Delivery Unit
Package
Introducing Delivery Units, Packages, and Development Artifacts

1 Product : \textit{n} Product Instances : \textit{m} Delivery Units

1 Delivery Unit : \textit{n} Packages

1 Package : \textit{n} Objects

1 Object : 1 Package

1 Package : 1 Delivery Unit

1 Delivery Unit : 1 Product Instance : 1 Product
Integration into SAP HANA Studio

- **Easy access** to product management capabilities in SAP HANA studio:

  Development perspective, repositories view > right mouse click on the workspace > choose **Product Management** or **Delivery Unit Management**
A product corresponds to an application – which could be an SAP-delivered application, a partner application, or customer application developed on a project basis.

The Product View

- Shows installed products (i.e. applications) and their metadata in the system.
- Ability to create, modify, and remove SAP HANA products (meta-data only).
- Is used to associate Delivery Units with a product instance and remove them.
What to do to create a product

• Go to PRODUCTS → Products
• Define
  • Name
  • Version
  • Description
  • Instance ★

★ = New for SPS08
Model Product
Product View

- List of Products
- Actions on products
- Delivery Units assigned to instances
- Product metadata section
- Assign and unassign delivery units

New in SPS08
Model Product
Assign Delivery Unit

What to do to assign a delivery unit to a product

• Go to PRODUCTS ➔ Products
• Select your product
• Select an Instance ★
• Assign the delivery unit
Model Product
Change Delivery Units assigned

What to do to change a DU assignment

- **Unassign**
  - Go to the Product Instance the Delivery Unit is currently assigned
  - Choose the DU and unassign it

- **Assign**
  - Go to the Product Instance to which you would like to assign the DU
  - Click assign to choose the DU
Model Delivery Unit
Delivery Unit View

The Delivery Unit view:

- Shows installed Delivery Units and their metadata
- Ability to create, modify, and remove Delivery Units (metadata only)
- Un-deploy (remove) delivery units
- Assign packages to Delivery Units and unassign them
- View Delivery Unit dependencies and object references causing dependencies
Model Delivery Unit
What and Where

What to do to create a Delivery Unit

• Go to PRODUCTS → Delivery Units

• Define
  • Name
  • Version
  • Description
  • Responsible
Model Delivery Unit
Delivery Units View

- Actions on delivery units
- Search field
- List of installed Delivery Units
- Delivery Unit metadata section
- Delivery unit dependencies
- Actions on packages
- Assigned packages
Model Delivery Unit
Assign Package to Delivery Unit

What to do to assign a package to a delivery unit

- Go to PRODUCTS → Delivery Units
- Choose your delivery unit (if not pre-selected)
- Assign the package(s) that you created (include sub-packages if needed)
- You can check for unassigned packages
Model Delivery Unit
Check for “forgotten” packages

Packages not assigned to a Delivery Unit

- Lead to issues during product assembly and installation

- Select *Check for Unassigned*, and assign them accordingly
Delete or uninstall a delivery unit

*Deleting* means that only the DU metadata will be deleted but all packages and tables remain intact.

*Uninstalling* means that all DU metadata and all objects, packages, and possible database tables will be removed.
Dependency Viewer

Graphical tool to display dependencies between delivery units:

• Graphical depiction is interactive – can be rotated and shifted around to provide different perspectives

• Useful for determining which delivery units should be transported together

• Useful for detecting unwanted dependencies, in order to clean them up
Move the mouse over a connector to view object references causing the dependency between delivery units.

Dependencies are caused by object references between objects

**Example:**

- Deliver Unit 1 contains tables
- Delivery Unit 2 contains views referencing the tables of Delivery Unit 1
- Delivery Unit 2 depends on Delivery Unit 1
Model Package: Package View

The Package view

- Shows installed packages, their hierarchy and their metadata
- Allows to create, modify, and delete packages
Package concept

**Package**

- Every SAP HANA repository object is assigned to a package
- Groups objects that logically “belong together”
- Provides a namespace
  - Each object is uniquely identified by combination of package name, object name, and object type

**Package Hierarchy**

- Establishes a parent-child relationship between packages
- Used to organize objects

**Package Privileges**

- Define access to objects in package; assign to specific user or role
- Authorizations assigned to a package are implicitly assigned to sub-packages in the hierarchy
Model Package
What & Where

What to do to create a Package

- Go to PRODUCTS → Packages
- Define
  - Name
  - Description
  - Responsible
  - Original Language
Model Package
Package View

Actions for packages
Hierarchical package view
Package metadata
Create an application

- Choose the options that you need
  - Require authentication
  - create a schema
  - developer role
  - create project
  - create index.html
  - overwrite existing objects

- Objects are created automatically, providing a fast start to the application development process.
Develop
Creating Content
What & Where

Create Content (i.e. development artifacts) in SAP HANA Developer Studio

Example from Modelling view:

- Refresh the Content folder in your development system
- Choose your package
- Create your content

Alternatively, you can create SAP HANA Content in the Web IDE
Change Recording in SAP HANA

Change recording …is the infrastructure to record changes during development

Change recording provides:
- Automatic recording and grouping of object changes
- Decoupling of activation and transport
- Predecessor calculation of changes

Change Recording…can be enabled as global system setting in your development environment
Change Recording
Concept

**Without change recording:**
- Delivery Unit transport contains *all* active objects in the packages of that particular DU
- If an object is ready to be transported, its Delivery Unit must be released
  - Some objects in the DU may not be ready for transport yet though, but they automatically get transported anyway

**With change recording:**
- **Automatic recording of object changes** to a change list when an object is activated
- **Team Development:** Allows a developer (or team) to work on a development artifact and release the “change” only when the artifact is ready to promote to the test system. For developers not contributing to this change the objects are locked
- **Release in two steps:** contributors have to approve first before a change can be released
- **Transport:** Delivery Unit transport contains only objects where their change has been released
Change Recording
What & Where

Changes in HALM ★

- Select CHANGES
- Filter results if needed (default filter is applied)
- Work with the changes

Changes in SAP HANA Developer Studio

- Open Change Manager view
Change Recording
Enable Change Recording

Setting the option *Enable Change Recording* adds the menu entry *CHANGES ★*

Released Changes for all active objects will be created when Change Recording is first enabled.
Change Recording
Changes in HALM

New in SPS08

Filters
Changes

Actions for changes

List of Changes

Details for Change

List of Contributors

Changed objects
Change Recording

- **Automatic recording of object changes** to a change list when doing the object activation

- **Team Development:** Allows a developer (or team) to work on a development artifact and release the “change” only when the artifact is ready to promote to the test system. For developers not contributing to this change the objects are locked.

- **Release in two steps:** contributors have to approve first before a change can be released.
Change Recording
Change Manager View in SAP HANA Studio

- Filter for changes
- Actions for Changes
- Changes that match your selection
- List of Contributors
- Changed Objects

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Transport
## Transport scenarios for SAP HANA content

<table>
<thead>
<tr>
<th>Use case</th>
<th>SAP HANA Source</th>
<th>SAP HANA Target</th>
<th>Transport Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native SAP HANA content</td>
<td>![Source Icon]</td>
<td>![Target Icon]</td>
<td><strong>SAP HANA Application Lifecycle Management</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• SAP HANA stand-alone transport management</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• No need for ABAP-footprint</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Lightweight and easy-to-use transport tool</td>
</tr>
<tr>
<td>Native SAP HANA content or as part of a solution (BI, Mobile, …)</td>
<td>![Source Icon]</td>
<td>![Target Icon]</td>
<td><strong>Enhanced CTS (CTS+)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Transported as any other non-ABAP content</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Integrated in existing CTS transport landscape</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Integrated in SAP process tools (ChaRM, QGM)</td>
</tr>
<tr>
<td>SAP HANA content exclusively used by ABAP (ABAP for SAP HANA)</td>
<td>![Source Icon]</td>
<td>![Target Icon]</td>
<td><strong>HANA Transport Container</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Transported with standard ABAP transports</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Integrated in existing CTS transport landscape</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Integrated in SAP process tools (ChaRM, QGM)</td>
</tr>
</tbody>
</table>
Easy access to transport management capabilities in SAP HANA studio:

Development perspective, systems view > right mouse click on the system

select Transport Management from the menu
Native SAP HANA Content
What and Where (1/2)

What to do to make a system known

• Log on to the target system
• Go to TRANSPORT → System
• Check whether the source system exists
or
• Register the source system
Native SAP HANA Content
What and Where (2/2)

What to do to transport content

- Go to TRANSPORT → Transports
- Create a route covering your needs

or

- Choose the route you need
Native SAP HANA Content
Basics for Transports

Target Group
- New SAP customers without ABAP-footprint
- SAP customers with the need for a lightweight transport management

What to use
- Content Creation: SAP HANA Studio (source system)
- Transport: SAP HANA Application Lifecycle Management (target system)

Granularity
- Full Deliver Unit / Product (without Change Recording)
- Full Released Delivery Unit / Product (with Change Recording enabled)
- Change (with Change Recording enabled)
Native SAP HANA Content
Transport Landscape

1. Request content
2. Content Provided

HND

Export

Content

HND

Export

Content

Development

HNQ

HALM

Transport Route

Import Activate

Export

Test

HNP

HALM

Transport Route

Import Activate

Content

Production

Application Landscape
Native SAP HANA Content
Configuration

Configure native SAP HANA Transport ★

- Go to SETTINGS
- Set *Enable Native HANA Transport*

This is the default setting
The menu entry TRANSPORT is only available if Native SAP HANA Transport is enabled.
The route management is an essential part transport management.

Route definition for transport on target system:

- Source & target system
- which Delivery Units (multi-select available)
- Select transport all objects (Full Released) or just released changes (Change)
- Select DU Transport or Product Transport

The route definition can be specified in a static way or during each transport.
Native SAP HANA Content
Transport based on Changes

- **Transport based on released changes**: only objects which are assigned to a released change are transported.

- **Object transport**: Selecting a single change from the list of changes imports only objects involved in this change into the target system—not the full delivery unit.

- **Dependency calculation**: Automatically grabbing depending changes as part of the transport too.
Transport via CTS+
Basics for Transports

Target Group
- SAP customers with ABAP-footprint and existing CTS transport landscape
- SAP HANA content is handled like any other non-ABAP content

What to use
- Content Creation: SAP HANA Studio (source system)
- Export: SAP HANA Studio (source system)
- Transport: Transport Organizer Web UI (for source system) / STMS (for target system)

Granularity
- Delivery Unit
- Change
Transport via Change and Transport System (CTS+)
Transport Landscape

Application Landscape

CTS System

Development

- HND Repository
  - Objects
  - HALM

Test

- HNQ Repository
  - Objects

Production

- HNP Repository
  - Objects

Transport Request

- HND
- HNQ
- HNP

Transport

- Attach
- Import

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Transport via CTS+
Configuration

Go to SETTINGS
Select Enable CTS Transport ★

Enter Data of your CTS System
(Additional Configuration on CTS System is required)
Transport via Change and Transport System (CTS+) Configuration

- Menu entry CTS EXPORT is only shown if CTS Transport is enabled
- (Menu entry TRANSPORT is removed)
- Transports can be done on DU or Change level
What to do to transport content

• Log on to the source system
• Go to CTS Export
• Transport Delivery Units

or

• Transport Released Changes
Transport via Change and Transport System (CTS+): Export Process in SAP HANA Studio

File → Export → Change and Transport System (CTS) or Modeler → Export

Choose System

Choose transport via Delivery Units or Released Changes

Select Attach to Transport Request

Check Transport Request Details

Click on Next and then Finish
Transport Organizer for non-ABAP is used to:

- Create Transport Requests
- Preselect requests
- Release requests
- Monitor or change content of requests
- Maintain attributes
- Monitor status
- View logs
Transport via CTS+
Import Process in TMS

Choose queue of your target system

Import the request(s) and check the result
Agenda

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Model, Develop and Transport an Application

**Command Line Tool**
Install, Assemble and Configure an Application

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Summary
SAP HANA Database Client Installation

Command Line Tool

- can be installed locally
- Can run on Server

SAP HANA Database Client installation kit detected.

SAP HANA Lifecycle Management - Client Installation 1.00.73.00.390371

Enter Installation Path [C:\Program Files\sap\hdclient]: c:\MyProgs\SP8HDBClient

Checking installation...
Preparing package 'Python Runtime'...
Preparing package 'Product Manifest'...
Preparing package 'SQLDBC'...
Preparing package 'ODBC'...
Preparing package 'REPOTOOLS'...
Preparing package 'Python DB API'...
Preparing package 'ODBC'...
Preparing package 'JDBC'...
Preparing package 'HALM Client'...
Preparing package 'Client Installer'...
Installing SAP HANA Database Client to c:\MyProgs\SP8HDBClient...
Installing package 'Python Runtime'...
Installing package 'Product Manifest'...
Installing package 'SQLDBC'...
Open the Command Line Tool

hdbalm

Commands:

- **product**
- **admin**
- **update**
- **dependencies**
- **install**
- **du**
- **Transport**
- **log**
- **help**

C:\MyPrograms\SP0HDBClient\hdbalm

Usage: hdbalm [ <arg> ] <command> [ <command arg> ]

Commands are:

- product: manage SAP HANA products
- help: Print available commands
- admin: manage administration
- update: Updates a HANA product with the given stack.xml and SAR archives
- dependencies: View and analyze delivery unit dependencies
- install: Installs a HANA product available in zip format
- du: manage delivery units
- transport: transport management
- log: log file viewer

args:

- \( -u <user>, --user=<user> \) User name
- \( -h <host>, --host=<host> \) XS Engine host
- \( -p <port>, --port=<port> \) XS Engine port
- \( -v, --verbose \) writes debug messages to stderr
- \( -c, --certs \) certificate file when using https
- \( -y, --yes \) non-interactive mode, does not ask questions
- \( -j, --json \) print result as json if successful

The parameters \(-u, -h, \) and \( -p \) take precedence over environment variables. The program will query for a password if no password is set in the environment.

Command args are command specific. Use

```
  hdbalm help <command>
```

for further details.

The following environment variables are read:

- **HDBALM USER**: user name
- **HDBALM PASSWD**: password
- **HDBALM_HOST**: host
- **HDBALM_PORT**: port

New in SPS08
Command Line Support for Delivery Units

All operations available from the delivery unit view are available through the command line.

In addition a full dependency report is available to show all relevant dependencies between delivery units.

C:\halm>halm.py help dependencies
View and analyze delivery unit dependencies.
usage: halm [args] dependencies [command args]
       [source du] [source du vendor]
       [target du] [target du vendor]
command args:
    -f, --full    show full dependency view and analysis
    -r, --references shows object references between delivery units
    -n, --nirvana shows nirvana references for a delivery unit

notes:
The references command requires source and target du name as well as the DU vendor.

The nirvana command displays object references for objects that are part of a delivery unit to objects which are not part of a delivery unit. When exported it will not be possible to import and activate these delivery units into another system. Those references therefore pose a serious problem.

With no arguments a list of delivery unit dependencies will be displayed. Each line of the output lists a delivery unit followed by a colon and a command separated list of referenced delivery units. In the following example the delivery unit HANA_XS_LM has references to SAPUI5_1 and HANA_XS_BASE:

HANA_XS_LM(sap.com): SAPUI5_1(sap.com), HANA_XS_BASE(sap.com)
hdbalm transport

- list
- start

Usage:

```
C:\MyProgs\SP8HDBClient>hdbalm help transport
Client to the HANA Application Lifecycle Management transport system.
usage: halm [ARGS] transport <transport command>
transport commands:

list
Lists available transport routes
usage:
  halm [ARGS] transport list

start
Starts a transport operation on the given transport route. The transport type is in accordance with the transport route definition. In case of transport type change all released changes that are still not imported to the target system are transported.
usage: 
  halm [ARGS] transport start [options] <route id>

Supported options are:
  -t <type>, --type=<type>  type can be "full" or "delta"
```
hdbalm product

- list
- get
- create
- delete

C:\MyProgs\SP8HDBClient>hdbalm help product
Commands to manage SAP HANA Products.
usage: halm [args] product <product command> [command args]

product commands:

- list
  Lists all products installed in the system
  usage:
  hdbalm product list

- get
  get product metadata
  usage:
  hdbalm product get <product name> <vendor name>

- create
  Create a product in the system (metadata only).
  usage:
  hdbalm product create <product name>

- delete
  Delete the product (metadata only). No delivery units are removed from the system.
  usage:
  hdbalm product delete <product name> <vendor name>

New in SPS08
hdbalm dependencies

C:\MyProgs\SP8HDBClient>hdbalm help dependencies
View and analyze delivery unit dependencies.
usage: halm [<args>] dependencies [<command args>]
          [<source du>] [<source du vendor>]
          [<target du>] [<target du vendor>]

command args:
    -f, --full                        show full dependency view and analysis
    -r, --references                  shows object references between delivery units
    -n, --nirvana                      shows nirvana references for a delivery unit

notes:
The references command requires source and target du name as well as the DU vendor.

The nirvana command displays object references for objects that are part of a delivery unit to objects which are not part of a delivery unit. When exported it will not be possible to import and activate these delivery units into another system. Those reference therefore pose a serious problem.

With no arguments a list of delivery unit dependencies will be displayed.
Each line of the output lists a delivery unit followed by a colon and a common separated list of referenced delivery units. In the following example the delivery unit HANA_XS_LM has references to SAPUI5_1 and HANA_XS_BASE:

HANA_XS_LM(sap.com): SAPUI5_1(sap.com), HANA_XS_BASE(sap.com)
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Summary
Assemble
Assemble
What You Should Know

Currently only available for SAP-internal usage

Planned for Customers and partners for a future release

Planned to support you in creating a file out of your product that can be delivered to your (internal or external) customers
Install
Install an Application

Use Command Line Tool; Install one or several product instances

Checks that all pre-requisites are met for installing the product (correct SAP HANA version, other products as a pre-requisite)

Possibility to select single product instances for installation

Installs all delivery units and creates product metadata

Command line based installation
Installation Transcript

$C:\dev\test>hdbalm install SAP_HANA_EXPLORER_WEB.zip$

**SYSTEM INFORMATION**

<table>
<thead>
<tr>
<th>HOST</th>
<th>ld2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT</td>
<td>8045</td>
</tr>
<tr>
<td>USER</td>
<td>dirk</td>
</tr>
<tr>
<td>INSTANCE</td>
<td>045</td>
</tr>
</tbody>
</table>

**PRODUCT INFORMATION**

<table>
<thead>
<tr>
<th>NAME</th>
<th>SAP HANA EXPLORER WEB</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERSION</td>
<td>1.0</td>
</tr>
<tr>
<td>VENDOR</td>
<td>sap.com</td>
</tr>
</tbody>
</table>

**PRODUCT INSTANCES FOR INSTALL**

<table>
<thead>
<tr>
<th>No.</th>
<th>Instance Id</th>
<th>Product Instance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>SAP Lumira Server (EA) 1.0</td>
</tr>
</tbody>
</table>

Validating Product Descriptor.
Validation successful.

Validating Product Descriptor.
Validation successful.

SAP HANA EXPLORER WEB

<table>
<thead>
<tr>
<th></th>
<th>INSTALLED</th>
<th>TO BE INSTALLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCT VERSION</td>
<td>NOT YET INSTALLED</td>
<td>1.0</td>
</tr>
<tr>
<td>SP VERSION</td>
<td>NOT YET INSTALLED</td>
<td>Initial Shipment Stack</td>
</tr>
</tbody>
</table>

SAP Lumira Server (EA) 1.0

<table>
<thead>
<tr>
<th>INSTALLED VERSION</th>
<th>TO BE INSTALLED</th>
<th>IMPORT</th>
<th>DELIVERY UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT YET INSTALLED</td>
<td>1.0.000.0</td>
<td>YES</td>
<td>HANA_EXP_WEB</td>
</tr>
</tbody>
</table>

Do you wish to continue with the installation for the specified product?[yes/no]--->yes

Installing Delivery Units.

[...]

Updating Repository Tables.

Update successful.

Installation process is complete.
Product Installation

Install and uninstall products via Command Line tool

Functionality moved from SAP HANA Platform Lifecycle Management to HALM

→ No <SID>adm required any more
hdbalm install

**Command:**
install

**Optional parameters to**
Display product instance information
Install specified Product instance(s)

**Required parameter to**
Specify installation file location

```plaintext
Command: install
Optional parameters to
Display product instance information
Install specified Product instance(s)
Required parameter to
Specify installation file location
```
Configure

Planned for future releases

SAP HANA Application
Technical Configuration Today

**Application Configuration (general)**
- Typically found on service market place /instguides

**Application Configuration (specific)**
- Hana Live Configuration
  - Configuration is documented in installation guide
  - Manual description of SQL statements to configure application

**Configuration Process**
- Administrator reads documentation
- Administrator performs tasks

SCENARIO → SERVICE
1 → N

SERVICE → PROCESS
1 → N

Tasks
Technical Configuration (planned)

- **Lifecycle Experts**
  - (Cloud Infrastructure Experts)
  - → Defining scenarios
  - → Documenting scenarios

- **Application Developer**
  - → Understanding scenarios and their content contribution requirements
  - → Providing content for configuration automation

- **Administrators or Orchestration Tools**
  - → Executing configuration services
  - → Orchestrating end2end and/or cloud processes

**SCENARIO** → **SERVICE** → **PROCESS**

- **Steps**
- **Tasks**
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Set vendor

**Vendor must be set** before you start creating SAP HANA Content

You can change the vendor later on
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System requirements

- **For SAP HANA Application Lifecycle Management**
  - Part of each SAP HANA shipment as of SAP HANA appliance SP06

- **For Transporting SAP HANA content with enhanced CTS (CTS+)**
  - **CTS+ Domain Controller**: SAP Solution Manager 7.1 SP05 and higher support package levels or SAP NetWeaver 7.31 with SL Toolset 1.0 SP07 and higher support package levels or SAP NetWeaver 7.4 with SL Toolset 1.0 SP07 and higher support package levels
  - **SAP HANA systems**: SAP HANA Appliance SP05 and higher support package levels

- **For Transporting SAP HANA content with HANA Transport Container**
  - SAP NetWeaver 7.40 SP0 and higher support package levels
  - SAP NetWeaver 7.31 SP5 and higher support package levels
Agenda

Overview
Model, Develop and Transport an Application
Command Line Tool
Install, Assemble and Configure an Application
Configuration
Prerequisites

**Roles & Authorizations**

Evolution of HALM
Summary
The following roles exist for the SAP HANA Application Lifecycle Management:

- Administrator
- Developer
- DevelopmentExpert
- Display
- Execute Transport
- Transport

Additional roles for SAP HANA Repository are required.
Agenda

Overview
Model, Develop and Transport an Application
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Roles & Authorizations
Evolution of HALM
Summary
## Availability of features in SAP HANA

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**CLT:** Command Line Tool  
**HALM:** SAP HANA Application Lifecycle Management
Agenda

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Roles & Authorizations
Evolution of HALM

Summary
Key Takeaways for SAP HANA Application Lifecycle Management

**What do we provide?**
HALM as tool to manage the Lifecycle of SAP HANA XS Applications

**When?**
Available since SAP HANA 1.0 SPS06

**For whom?**
- Easy to use, lightweight application with native SAP HANA transport for customers with none or little ABAP footprint, or who simply prefer its streamlined approach
- Comprehensive transport handling with CTS+ for customers who prefer to integrate SAP HANA transports into existing promote-to-production processes
Further information

SAP Public Web

http://www.saphana.com/docs/DOC-4268 > What’s new in SAP HANA 1.0 SPS07 for Extended Application Services (XS) and Content Lifecycle Management

http://scn.sap.com/docs/DOC-46119 > SAP HANA Lifecycle Management
http://scn.sap.com/docs/DOC-49327 > Overview of SAP HANA Content Transport Management
http://scn.sap.com/docs/DOC-8576#HANA > How to Configure SAP HANA for CTS+
http://www.saphana.com/community/about-hana/features#administration/application-lifecycle-management > HALM@ saphana.com

SAP Notes

1920406 - Release Note SAP HANA Application Lifecycle Management SP7
1998966 – Release Note for SAP HANA Application Lifecycle Management SP8

SAP Internal

https://wiki.wdf.sap.corp/wiki/display/SDT/HANA+Application+Lifecycle+Management
Further information

SAP Public Web

SAP HANA Master Guide:

SAP HDB Client Installation Guide:

SAP HANA Studio Installation Guide:

SAP HANA Developer Guide:

SAP HANA Server Installation guide:

SAP HANA LCM Tools Reference Guide
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Thank you

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