Hewlett Packard Enterprise

IT Business Analytics

Software Version: 10.10

Linux operating system

Content Extension Guide for ITBA IDE Version 10.10

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Contents

Getting Started with Content Extension

The Integrated Development Environment (IDE) allows you to develop content and DWH models, as well as develop new entities and extend existing content using the Designers. Once the entities are defined and mapped, they are run through the ETL Generator to produce the metadata and workflows. You can then package the data into Content Packs for use in the Data Warehouse.

> **Note:** The IDE only supports the usage of UTF-8 (Latin) characters.

IDE Set up

1. **Prerequisite:** When creating or extending content make sure that you have set up ITBA. For IT Business Analytics installation and administration details, see the *Administrator Guide*.

2. Install the contents of the IDE DVD. The IDE can be downloaded from HP Live Network (HPLN) (https://hpln.hp.com/) (https://hpln.hp.com/group/it-business-analytics) and contains:

   - **IDE:** Unzip the file and double-click **eclipse.exe** to run the IDE Eclipse application.

   - **IDE Content:** Contains the OOTB Content Packs.

Content Extension Process

The development of new content comprises the following steps:

1. Understand IDE. For details, see "IDE Terms" on page 9, "IDE Audience" on page 11, "IDE Main Page" on page 32, and "DWH Content Development - Content Packs and Data Modeling" on page 24.

2. Design and analyze the purposes of the extension. For details, see "Design and Analysis Phase" on page 16.

3. Data Evidence: Understanding and analyzing what data needs to be included, based on your information needs and objectives. For details, see "Design and Analysis - Discover Data Evidence" on page 19.

4. Import existing content for extension or new Content Pack directories if required. For details, see "Import Existing Content" on page 70.

5. If needed, define new Content Pack projects. For details, see "Define New Content Pack Project" on page 71.

6. Modeling: The architect creates the Target model. For details, see "Define the Target Model" on page 76 and "Diagram Editor - Architect Target Designer Tasks" on page 42.

7. Data Source Integration: The engineer maps the data from the Source to Target. For details, see "Diagram Editor - Engineer Stream Designer Tasks" on page 54, "Delete an Entity Permanently" on page 78, and "Manage Validation" on page 80.

8. ETL development and generation. For details, see "Generate Content" on page 92.

9. ETL orchestration and management. For details, see "Package and Deploy Content" on page 94.

10. Activate new content. For details, see "Activate New Content " on page 95

11. Consolidation

12. Context (universe) building and adjustments.

13. KPIs additions and modifications.

14. Advanced development. For details, see "Advanced Development" on page 98.

15. Next steps. For details, see "Next Steps" on page 127.

IDE Terms

- **IDE: Integrated Development Environment.** The Eclipse workspace where you can create or extend content using modeling tools in the relevant designers.

  > **Note:** The path to the workspace should not contain blank spaces. For example: **C:/workspaces/ide_workspace/**.

- **KPI: Key Performance Indicator.** KPIs reflect how well the organization is doing in areas that most impact financial measures valued by shareholders, such as profitability and revenues.

- **API: Application Programming Interface.** A specification intended to be used as an interface by software components to communicate with each other.

- **ETL: Extract, Transform, Load.** An end-to-end transfer of external source data through several staging layers and into the target layer of the data warehouse. The data warehouse uses the ETL process to extract, consolidate, and transform the source data into a meaningful target model that populates relevant business analytics.

- **UDM: Unified Data Model.** Provides a bridge between the user and the data sources.

- **DWH: Data Warehouse.** The data warehouse is an end-to-end solution for extracting source data and consolidating disparate source data models into a consolidated data model. The data organized to reflect this model resides in target tables that become the source for ITBA.

- **ITBA: IT Business Analytics.** An application that enables executives to continuously improve their business by measuring what happened and what is happening, analyzing that information, and planning new strategies using the gathered information.

- **File Based Integration (FBI) Extractor.**

  FBI enables you to extract data from a specific data source according to a set of instructions. It consists of a plug-able extractor framework for each data source. The extractor gathers data according to the specific instructions it receives, placing it into a relevant .txt flat file. If you want to develop your own extractor for use with extended content, see the *DCS Extractor SDK Guide*.

  The supported extractors for the OOTB Content Packs are as follows:

Content Pack	Extractor Type
PPM(Oracle)	DB

Content Pack	Extractor Type
SM(MSSQL, Oracle, DB2)	DB
ALM	REST API
CSA	REST API
AWS	SDK
AWSCW	SDK
AM	DB
SA	DB
VPV	"REST API"
AZURE	"REST API"

- **Entity.** An entity is an object of interest included in the data model.

- **Designer.** A designer in the IDE is the model you create in order to perform content extension and definition. It is a collection of certain entities that may share some relevancy in common. The IDE contains the Architect Target Designer and the Engineer Stream Designer.

- **Content Packs.** A content pack is a set of entities from a certain type. There are three types of content packs:

  - **Source.** Contains all of the artifacts needed to connect to the relevant data source and pull data from that data source.

  - **Integration.** Integrates the information from the source, using the DWH schema and loading process in order for the data to be brought to the Target tables. Takes the schema and entities of the source data and transforms it into usable data.

  - **Target.** Defines the content of the Data Warehouse as well as the look of the target tables according to the Unified Data Model (UDM).

IDE Audience

This document assumes basic data warehouse modeling knowledge, understanding of the ETL concepts, good familiarity with databases including the Vertica database.

Requirements for DWH Architects

- Understanding of Business Intelligence tools, data warehouse modeling and database design principles.
- ITBA DWH Target schema.

Requirements for DWH ETL Engineers

- Understanding ETL principles.
- Familiarity with the source schema.

Requirements for DWH Integration Engineers

- Java programming skills

Prerequisite Knowledge for Performing Content Development Tasks

- Unified Data Model (UDM).
- Target Model: The existing supported model of the DWH
- Basic architecture of the data warehouse and the advantages of the templates.
- Basic familiarity with the Integrated Development Environment (IDE).
- Vertica and data modeling.

IDE End-to-End Extension Scenario

This section provides an end to end scenario.

The following illustrates the typical flow, tasks, and procedures in the IDE process. The tasks correspond to the relevant tasks in the Designers.
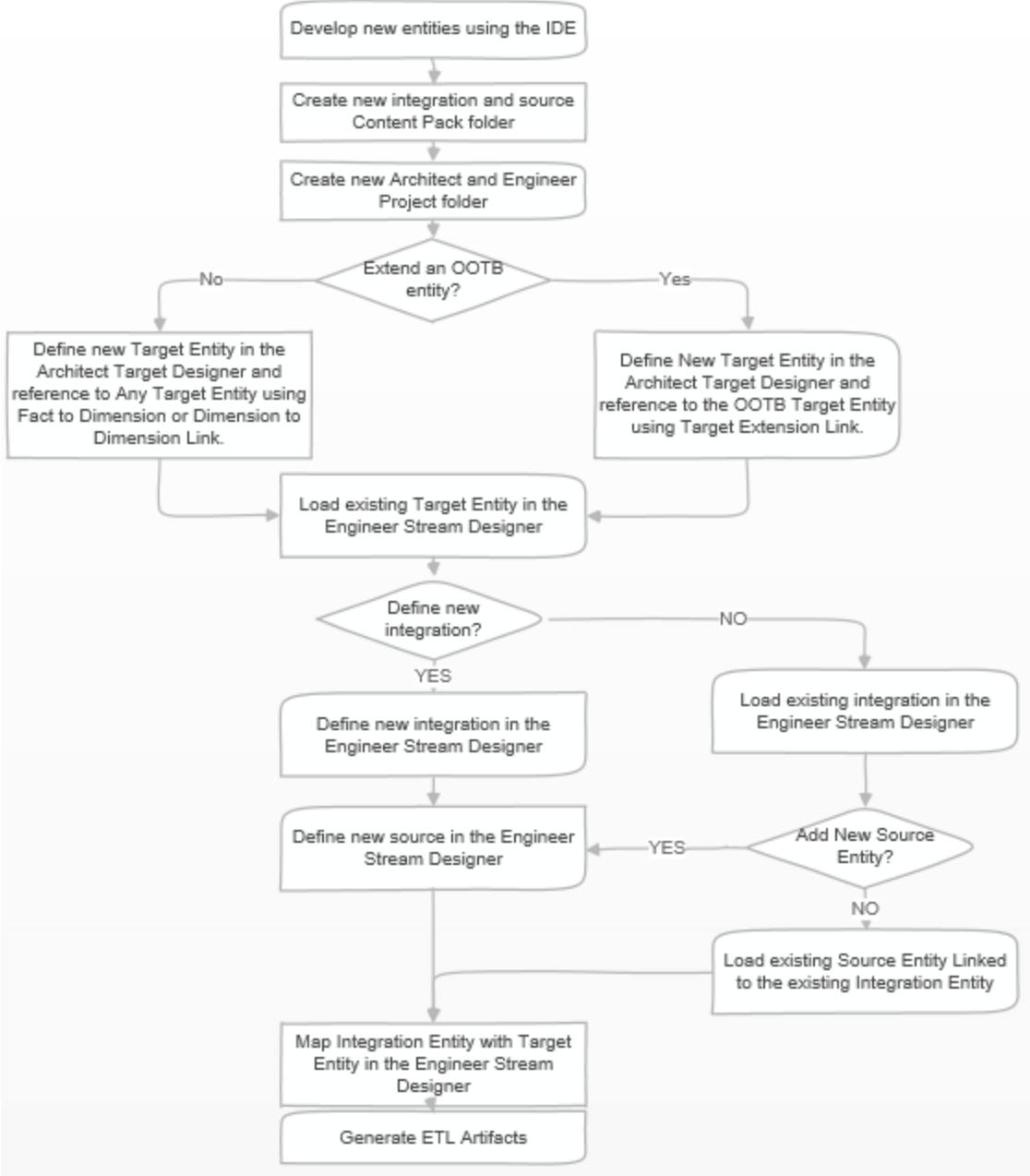
To extend the existing target entity LOCATION:

1. Create all the required project folders for the new Content Pack.

   ⊞ 📁 cp-ppmct
   ⊞ 📁 cp-ppmct-9.1-oracle
   ⊞ 📁 cp-ppmct-architect
   ⊞ 📁 cp-ppmct-engineer

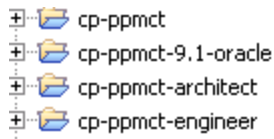2. Create the extension entity in the Architect Designer, and then link the extension entity to the OOTB entity using the Target Extension link. For details, see "Extend a Target Entity" on page 44.

   In this scenario, add two columns **CALENDAR_ID** and **CURRENCY_ID** to the OOTB entity **LOCATION**.
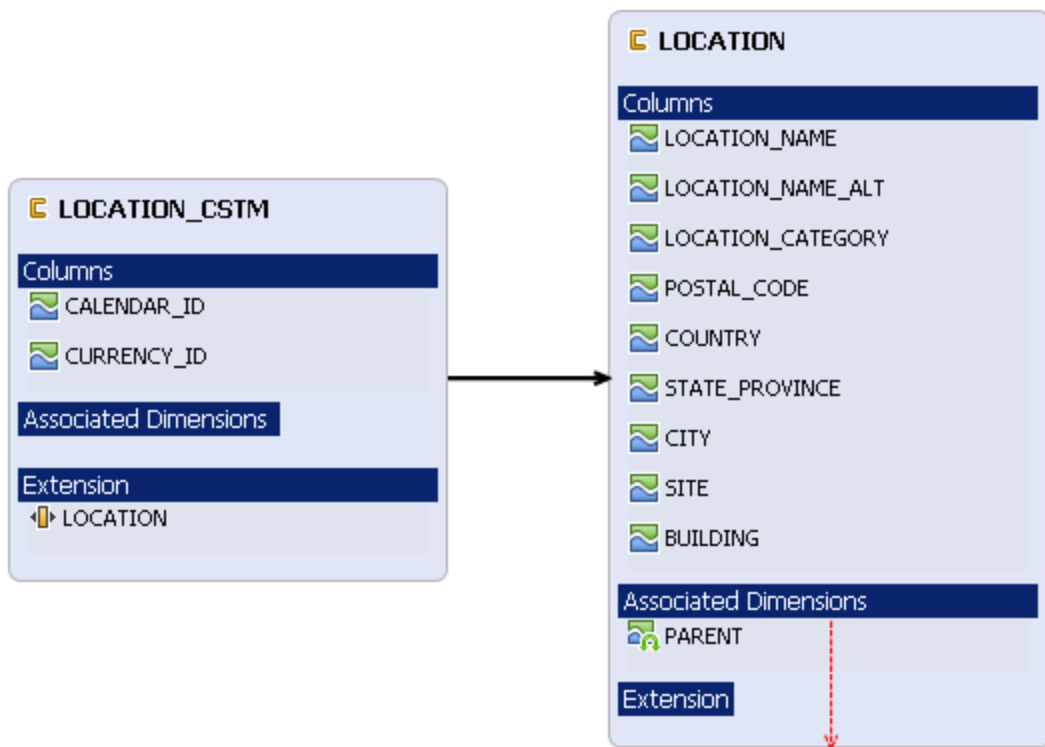
3. Create a new integration and source entity in the Engineer Designer, then map the columns from integration to target entity. For details, see "Diagram Editor - Engineer Stream Designer Tasks" on page 54.
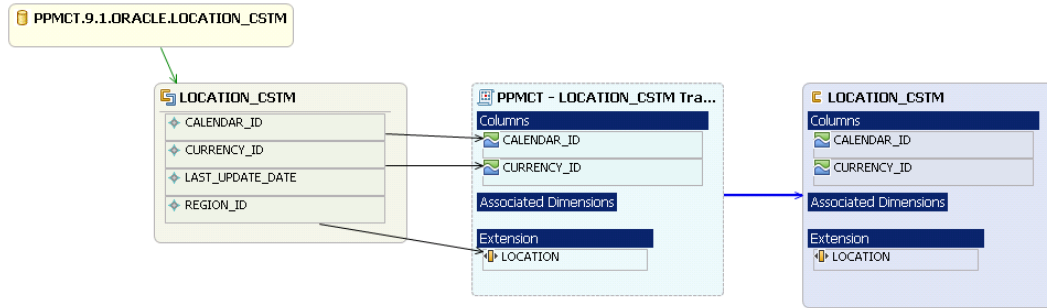
4. Generate the ETL artifacts.

5. Configure the cross-Content Pack configuration file in the **$HPBA_ HOME/ContentPacks/PPMCT/CONF/dataSourceParamsConfig.xml** file.

   For details, see "Consolidate Entities - Cross-CP Lookup" on page 121.

6. In the Context Designer, you can link the new target entity with an OOTB target entity, or you can link them in the customized views. Then the new target entity and the OOTB target entity can be used by the KPI formula.

   For details, see Semantic Layer - Context Designer in the *Content Reference Guide*.

Content Development Process

The content development process includes several stages:
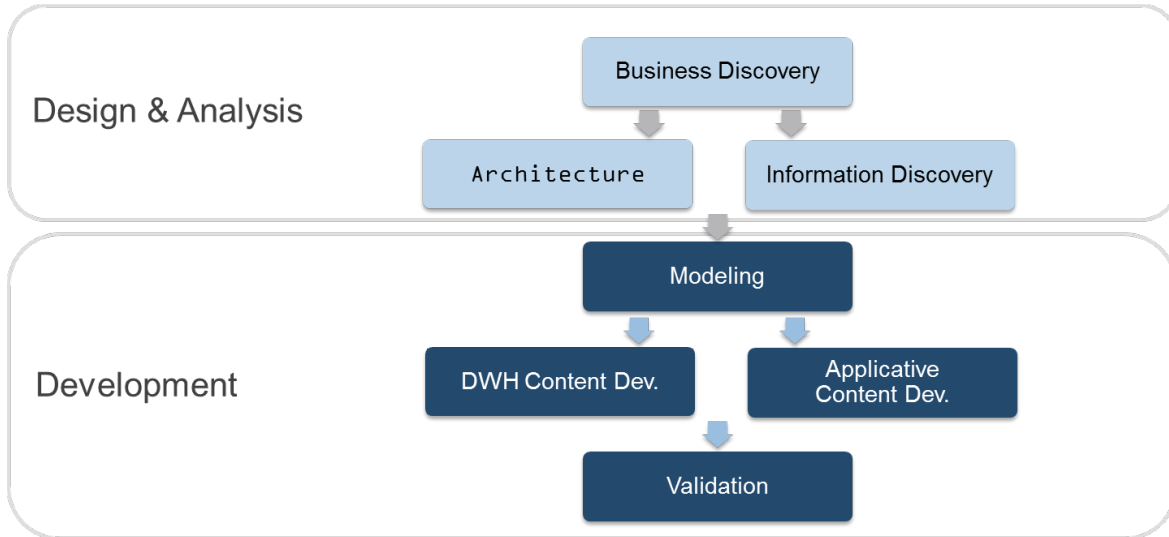
Design and Analysis Phase

The information design and analysis phase help you determine your organization's objectives and information needs and discover the data in the organization that supports the business requirements.

Learn More

 Learn More

Design and Analysis

This phase is the preparation for the actual implementation but usually consumes more time and resources as the outcome of it should be exact design of the end user solution.

This phase has the following stages:
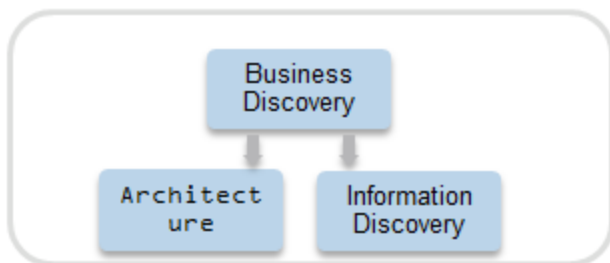
Business Discovery

A structured methodology for understanding the company's objectives and Information needs.

This methodology includes the following steps:

1. **User Analysis.**

   - Define the personas

   - Define the personas business requirements

2. **Decision Based Analysis.**

   - KPIs

   - Reports

- ○ Metrics

- ○ Dashboards

3. **Information Availability.**

- ○ Identify the Source systems that support business requirements

4. **Assign Priorities.**

The output of this stage is the design document that describes the solution from business perspective.

Information Discovery

This stage implies discovering the data in the Organization that supports the Business requirements synchronizing between the available information, means of extracting it and information required by the business. It's also known as "Data Evidence" process

Discover the data in the organization that supports the business requirements. Synchronize the available information and the means of extracting it with information required. This is the Data Evidence process. Information discovery includes the following steps.

1. **Select the Source Contact Point.**

- ○ Select a source expert to accompany the information discovery process

2. **Define the Source Extraction Method.**

- ○ Common extraction methods are DB query, API, Web Services

- ○ The new extractors can be developed based on the DCS API.

3. **Identify the Source Table.**

- ○ Identify configuration tables to populate Dimensions

- ○ Identify transactional tables to populate Facts

4. **Define the Source to Target Mapping.**

- ○ Identify Source Columns Mapping to Target Columns

- ○ Define data-processing requirements

Architecture

During this stage the Target data model is visualized using the Star-Scheme Model approach. Star Schema is a design method of dimensional modeling, in which data is organized in:

- **Facts:** An event that is counted or measured, such as a sale or logon. Table Structure contains business measurements (numeric or time based) and Dimensional Intersection Point.

- **Dimensions:** Reference information about the fact, such as period, product, or customer. Common Table Structure contains descriptive attributes.

A star schema is diagrammed by surrounding each fact with its associated dimensions. The resulting diagram resembles a star. Star schemas are optimized for querying large data sets and performing analytical queries that are used in data warehouses and Business intelligence systems.

Sample Star Schema
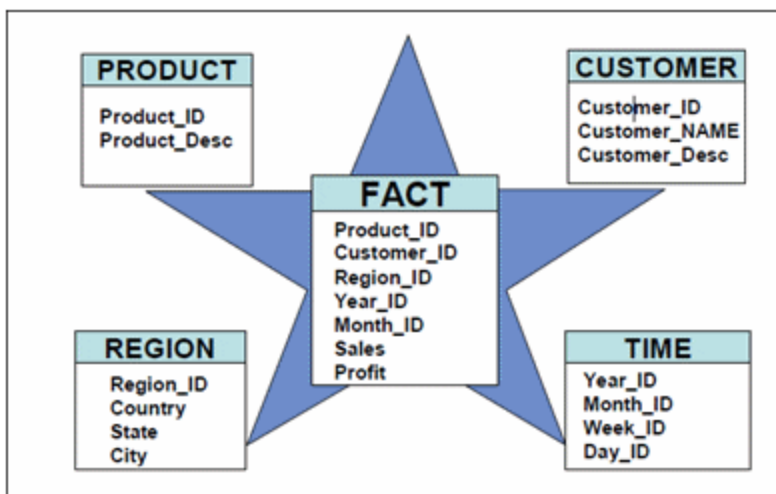
The Star-Scheme architecture creation process includes:

- Review the ITBA UDM catalog.

  - Review the ITBA UDM Catalog, by the business context defined in Business Discovery phase.

- Gap Analysis

  - Identify the OOB Target entities matches.

  - Identify the OOB Target entities to be extended.

  - Identify the New Target entities.

- Design Dimension Tables

  - Define the Attributes.

  - Mark Slowly Changing Dimension columns

> **Note:** DWH supports 2 types of Slowly Changing Dimensions:
>
> ○ **SCD1**: no history preserving an update on one or more attributes will override the old value
>
> ○ **SCD2**: history preserving an update on one or more attributes that were marked as SCD2 will be added as new record and previous record will be marked as not active.

- Design Fact tables

  ○ Define measures

  ○ Define granularity

- Define Dimensional Intersection Points

  ○ Identify Fact to Dimension Links

> **Note:** The IDE tool is used only for designing Fact and Dimension tables and their intersection points.

Design and Analysis - Discover Data Evidence

It is necessary to understand and be familiar with the new data you want to develop. When there is a new source system involved, you must first understand how the data from the source appears and operates.

Tasks

Discover data evidence

Data Evidence can be discovered as follows:

1. Understand how to extract the data.

2. Take sample files extracted from the source.

3. Examine the different fields that this source provides: It is important to recognize the fields and data that come from the source and to define the names of the fields as the source tables.

4. Define and plan in advance which extractors provide data for specific entities.

5. Understand variety, different lists of values, and end-cases.

6. Observe data behavior over time:

   a. Understand what happens with data across time – is it the same file, only different dates?

   b. Sizes of rows and volumes by types of customers.

   c. Identify how this data correlates with existing data in the Data Warehouse.

      At the end you should have a good sense of what this data looks like and how to develop extraction code for it.

7. Identify:

   a. What is the required data to be available in the Target schema to support required KPIs.

   b. What is the data that can come from the source (depending on technology).

   c. Where do they meet in the middle, so eventually we have the outcomes of the extracted data and the DWH Target model.

   d. For which columns do you want to preserve history.

After mapping between the Source and the Target, the design process is complete.

Development
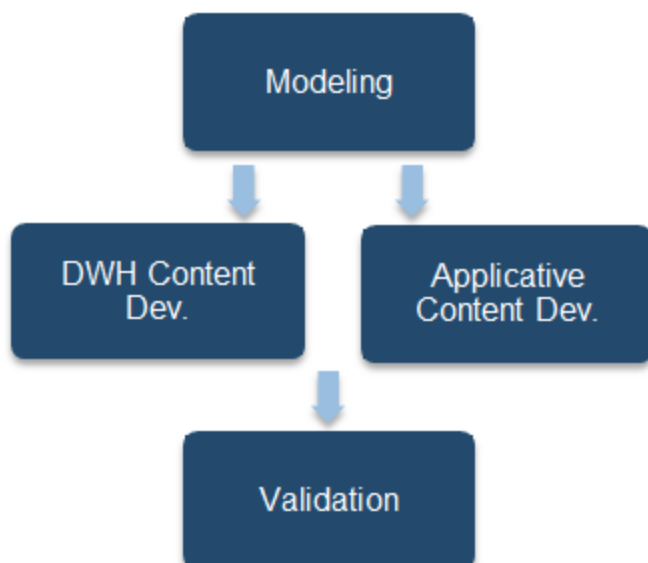
Development - Modeling

This stage is done completely in the IDE tool.

The IDE tool has the following ITBA DWH definition:

- **Target Entity** is a Fact or Dimension.

  Entity name along with column names is defined according to the Star-Schema Architecture.

- **Integration Entity** is the source table representation.

  Entity name along with column names and data types is defined according to source table design.

- **Source Entity** is the actual and accurate representation of an entity to be extracted from the source.

  It describes how and what data is extracted from the source. It is generated automatically according to integration entity design however depending on the extractor being used it may require some changes as the automatic generation is targeted for the DB extractor only.

- **Transformation Entity** is the logical representation of all the transformations that are performed by the DWH during the data processing. It's the accurate representation of the Target Entity.

- **Column Mapping** - Source to target column mapping

The modeling approach:
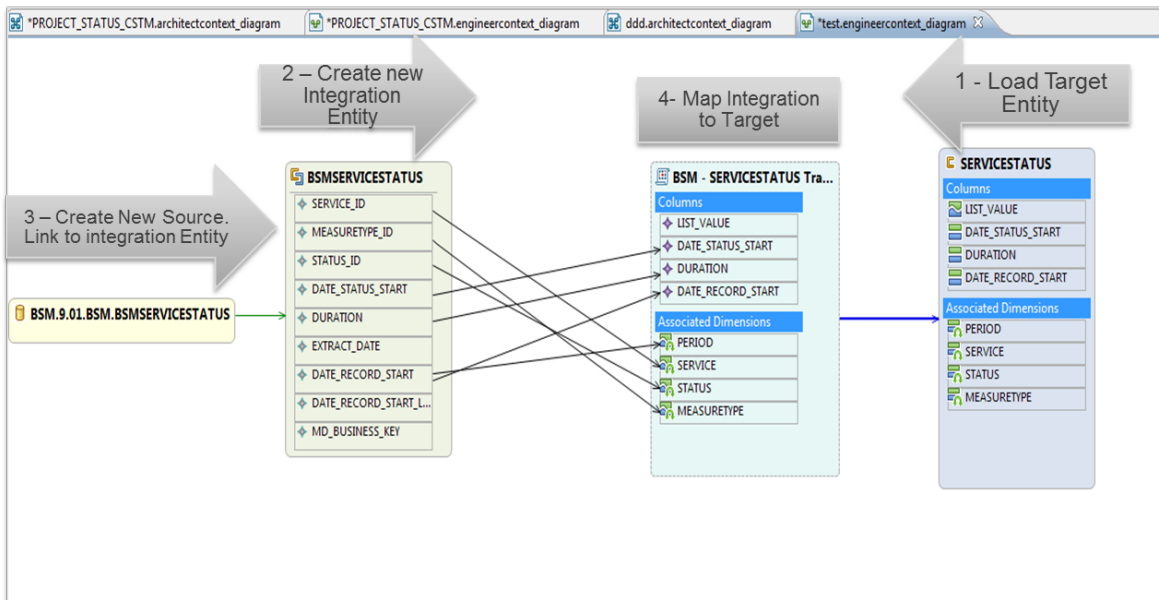
The Solution Modeling Highlights:

- Different functions are collaborating on same models simultaneously until reaching a final version.

- Actually serves as a high-level DB Studio + ETL tool. No need to touch the DB directly.

- 95% of the solution is defined by this high-level modeling.

DWH Content Development

This stage is the final stage of the content development on DataWarehouse side. The outcome of this step is the ready-to-be-distributed Product Content Pack (iCP) and the delta artifacts for the Core content pack.

The **Product Content Pack (iCP)** is the set of the artifacts that describe the data flows and data transformations for the logical entities. The iCP belongs to one source product only (e.g. AM, PPM, SM) and contains the metadata of:
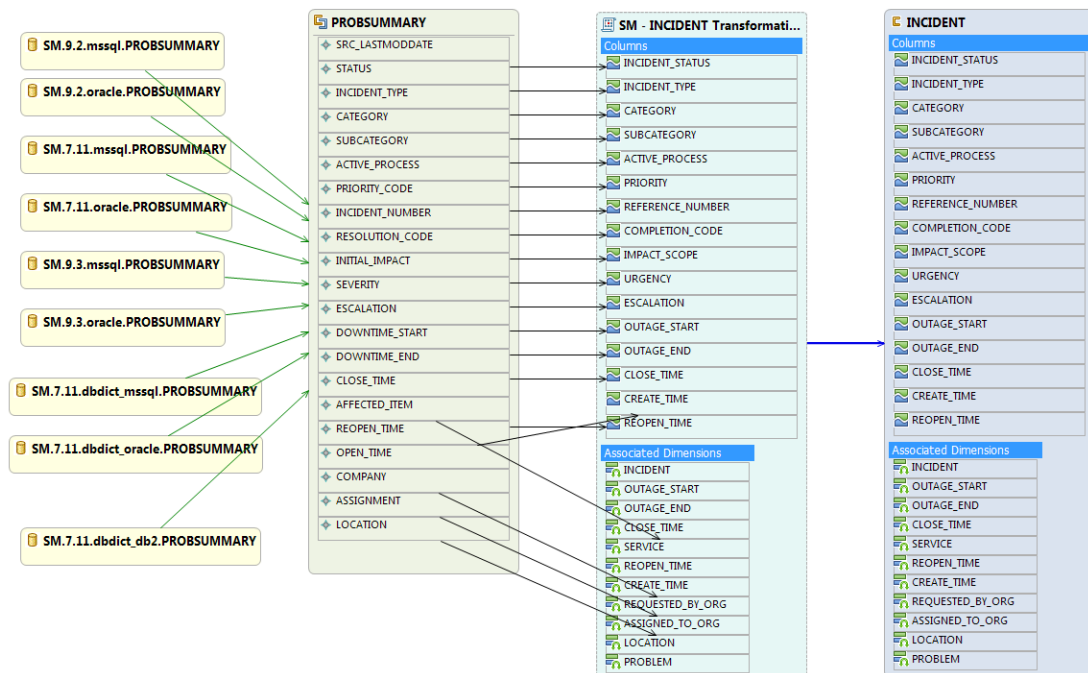
- **Source Content Packs**

  ○ The content packs that contain all source entities metadata

  ○ The separate source content pack exists for each product version and the type of extractor used

- **Integration Content Pack**

  - Contains the Integration Entities metadata

  - Unlike Source entities, the integration entity is not dependent on the product version and extractor type therefore multiple source entities are mapped to the one integration entity.

- **Column Mapping**

  - Contains the metadata of the column mappings between the Integration entity and the Target entity.

The **Core Content pack** contains the metadata for all the target entities and the intersections between them and is the basic content pack for the DataWarehouse. It is deployed automatically during ITBA Content Pack installation

DWH Content Development includes the following steps:

1. Define the target model in the Architect Designer.

2. Define the ETL in the Engineer Designer.

3. Generate ETL artifacts from IDE .

4. Customize the SSI scripts.

5. Copy the artifacts into your ITBA environment.

6. Deploy the Content Pack.

7. Run the ETL and verify the operation and correctness.

DWH Content Development - Content Packs and Data Modeling

Content packs contain all the artifacts needed to connect to the relevant data source and gather data from that data source. The mapping between the raw data from the data source and the target database in the Data Warehouse is included in the ETL.

Learn More

Content Pack contents

Content Packs include:

- The definition of the data model used for the connection.

- The type of data gathered from the data source.

- The ETL definitions.

- The definition files.

- The configuration files.

- The scripts that help build and define the Data Warehouse.

Content Pack Types

- **Target Content Pack.** Responsible for the transfer of data from consolidation to the target database. The Target CP defines the content of the Data Warehouse as well as the look of the target tables.

- **Integrated Content Pack (iCP).** The iCPs are responsible for bringing the data from the specific data sources and transforming it into the consolidation level. From there, the Target CP transfers the data to the target. The iCPs integrate the information from the source, using the DWH schema and loading process in order for the data to be brought to the target tables.

Content Pack directories

Content Packs contain the following directories:

- STREAM**.** Contains files that define the ETL stream at the entity level, and the general flow of steps of the ETL process. The files list the order of the steps as well as the link between the parent and child steps. These files are necessary if you have to add a step to the ETL process.

- **Data Model.** The Data Model in the Core Content Pack contains the xml files that define the target schema. The Data Model in the Integration Content Pack contains the xml files that define the staging and extraction schema.

- **ETL.** Contains the jobs and workflows of the ETL and defines how data goes through the processes.

- **cp_manifest.properties.** The manifest file provides additional information to the Content Pack to allow the system to perform sets of validations.

- **dw_app.properties.**

Data Model Types

Data models describe the source, extraction, consolidation, and target components for a single entity:

- **Target Entity. Fact** or **Dimension**: Entity name and column names defined according to the Star-Schema architecture.

- **Source Entity.** The actual representation of an entity extracted from the source. Generated automatically according to the integration entity design.

- **Integration Entity.** Entity name, column names, and data types defined according to source table design.

- **Column Mapping.** Integration to Target column mapping.

Logical Data Models

DWH supports the following types of logical data models:

- **Target Data Models:**

  - **Target Model – Dimension or Fact.** The target data models describe the format of the data that produces business intelligence analytics. The instantiated data models are dimension, fact, and hierarchy tables.

- **iCP Data Models:**

  ○ **Extraction Model.** ETL processes obtain the data in native format and stages it in intermediate tables that conform to the extraction data model for that entity. Extraction also validates the data to ensure that it is usable.

  ○ **Source Model.** The source entity models represent the design of DII (Data Integration Interface).

Physical Data Models

DWH logical Data Models generate multiple physical tables that support the ETL processing logic.

- **Source entity models.** The source entity models are the data produced by an external application. Used for a specific version of the product.

- **Extraction models.** ETL processes obtain the data in native format and stage it in intermediate tables that conform to the extraction data model for that entity. Extraction also validates the data to ensure that it is usable.

- **Consolidation models.** Consolidation models transform the data further by merging extracted data from diverse sources into meaningful data required by applications.

- **Target models.** The target models describe the final version of the data that adheres to the design required by applications.

Data models describe the source and extraction format so that the data warehouse can consume this data and integrate it into a common view that you can use to populate comprehensive business intelligence reports and dashboards.

Each table contains both designed columns and static columns, also known as metadata columns, so that the administrator can have the visibility of ETL processing over the entity's data.

Data Warehouse Internal Fields

The following are the internal Data Warehouse fields, in addition to those in the IDE, that are added to the model.

Field Name Prefixes	Description
MD_BATCH_ID	ETL stream ID displayed on all Physical Models.
MD_PROCESS_ID	ETL Process ID running the specific job.
MD_DURABLE_KEY	Entity's unique identifier populated with MD_QUALIFIER which should be

Field Name Prefixes	Description
	considered as the identifier to consolidate records.
	Displayed only in Consolidation Physical Models
MD_ENTERPRISE_ KEY	Entity's unique identifier in the DWH system.
	Displayed only in Target Physical Models
MD_BUSINESS_KEY	Entity's unique key as it comes from the source systems.
	Displayed only in Target and Extraction Physical Models
MD_TRANSLASTIND	Indicator whether the line is the last transaction of a specific MD_ ENTERPRISE_KEY.
	Displayed only in Target Physical Models
MD_ ACTIVESTATUSIND	Indicator whether the line is active (simulates delete operation).
	Displayed only in Target Physical Models
MD_ TRANSENDDATE	Transaction end date.
	Displayed only in Target Physical Models
MD_DELETEDDATE	Delete date (date record was marked as inactive).
	Displayed only in Target Physical Models
MD_CREATEDDATE	Date record was created.
	Displayed only in Target Physical Models
MD_LASTMODDATE	Date record was last modified and updated.
	Displayed only in Target Physical Models
MD_FLAG	Flag that indicates whether row is new, updated, or requires a delete.
	Displayed only in Extractions Physical Models
MD_PF_FLAG	Flag that indicates whether row is pre-filled or not.
	Displayed only in Extractions Physical Models
MD_CP_ID	Source instance ID

Development - Application Content

This stage implies creating the end-user artifacts based on the target data model that was developed above.

It has the following steps:

- Generate Interface

  - Create ITBA views (If Needed)

  - Serves for normalizing the data for the KPI modeling purposes and filtering the unnecessary DWH metadata fields.

- -Create Business Contexts

  - Based on ITBA Views or Target Tables

  - Similar to the Star-Scheme usually includes one fact entity which context is based on and the multiple dimension entities linked to the fact.

- Create Artifacts

  - KPIs

  - Metrics

  - Webi Reports

  - Xcelsius Reports

- Calculate and Verify

  - Run Calculation Engine

  - Check validity

- Packaging

  - Export Artifacts to create distributable Content Acceleration Pack

Development - Content Extension Best Practices

There is set of best-practices and guidelines for creating customization tracks

- Do not modify the OOTB entities

    - This includes avoiding linking the custom dimensions to the OOTB entities

    - Use the Target Extension link from the custom entity to the OOTB entity instead.

- Use the _CSTM suffix when naming the custom entities.

- Generate the ETL artifacts.

- Do not modify OOTB ITBA views, Business Contexts, BO Universes and Webi Reports

Enforcing those guidelines will guarantee that the solution will never be overridden in the future and be upgradable

Content Extension Rules

This section includes a set of best-practices and guidelines for creating customization tracks.

- Do not modify the OOTB entities:

  - Avoid modifying:

    - Any existing files in any OOTB Content Pack directories.

    - Any existing OOTB engineercontext diagram and architectcontext diagram in the IDE.

  - Avoid linking the custom dimensions to the OOTB entities.

    > **Note:** Instead of linking the custom dimensions to the OOTB entities, use the Target Extension link from the custom entity to the OOTB entity.

- Use the _CSTM suffix when naming the custom entities.

- Generate the ETL artifacts.

- Do not modify OOTB ITBA views, Business Contexts, BO Universes, CAPs, and Webi Reports.

Enforcing those guidelines will guarantee that the solution will never be overridden in the future and be upgradable.

IDE User Interface Overview

The ITBA IDE is the Eclipse based plug-in that offers the visual tools for modeling the DWH entities and creating the distributable ITBA content packs.

The IDE UI consists of three parts:

1. Package Explorer
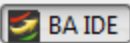2. Data Source Browser
3. Diagram Editor

IDE Main Page

The IDE main page enables you to create Designers for the purpose of extending content to entities. The following describes the IDE main page and icons.
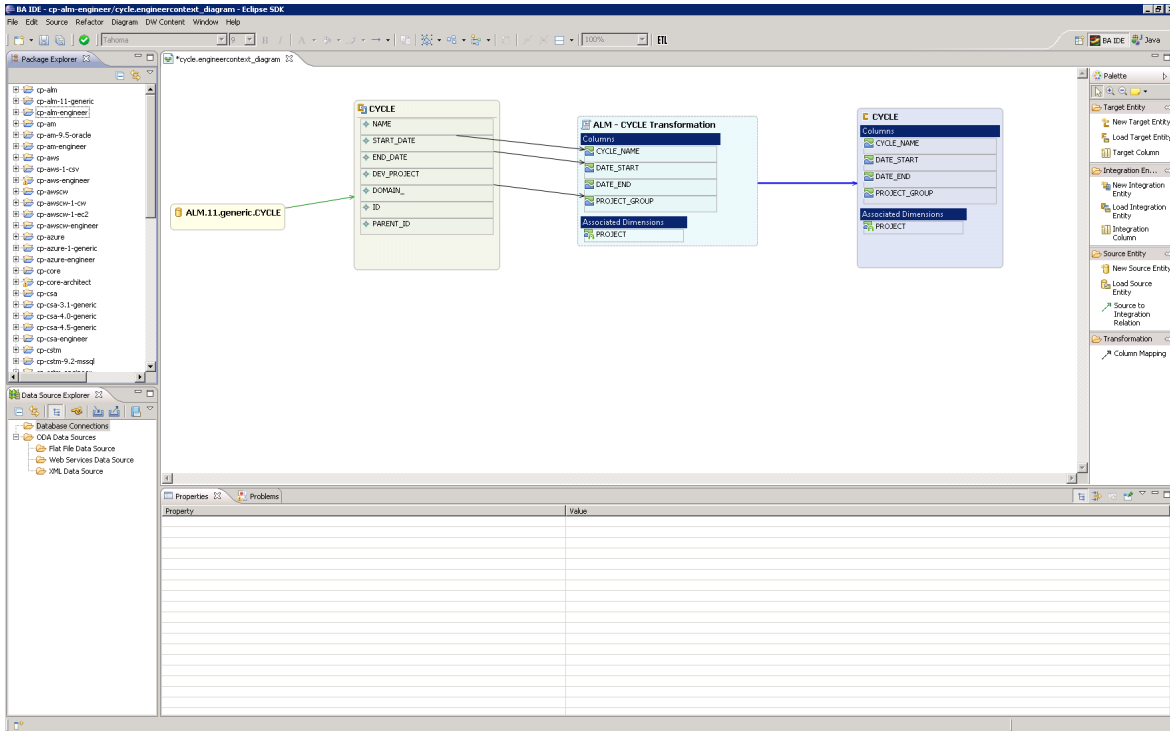
The IDE Eclipse Main Page

The IDE requires basic knowledge of Eclipse and its capabilities. The following describes the IDE layout and icons. Select **Window** > **Show View** to add to and change the view of the various tabs and areas.
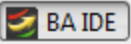
> **Note:** It is recommended to select the IDE Perspective by clicking [icon].
>
> The IDE perspective [BA IDE] contains all of the relevant buttons, areas, and functionality for working in the IDE.

IDE Workspace: Main area where all IDE functions are located.

User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Package Explorer	A list of all of the available loaded Content Packs and Designer diagrams.
Canvas	Displays model diagram.
Problems	Displays validation errors and warnings.
Properties	Displays property tabs according to the selected entity in the Designer.
Error Log	Reports system errors.
Data Source Explorer	Enables you to connect to a specific data source and browse the database.
ETL	**ETL Generation.** Appears when a designer is open in the canvas. Click to perform the ETL process and generate the artifacts and create a new Content Pack. For details, see "Generate Content" on page 92.
💾	**Save.** Click to validate and save your mappings and configurations.
🐞	**Report a Bug.** Click to gather information for a bug report packaged in a ZIP file.
✅	**Validate.** Click to manually perform validations on the Designer.
🗗	**Perspective**. Select to switch to recommended IDE perspective. 🟢 BA IDE This perspective contains all of the relevant buttons, areas, and functionality for working in the IDE.

IDE Icons

Icon	Description
🔲	Indicates a Target entity.
🔲	Indicates an Integration entity.
🛢	Indicates a Source entity.
🔲	Indicates a Target extension entity.

| Icon	Description
	Indicates a Integration entity column.
	Indicates a Fact entity column.
	Indicates a Dimension entity column.
	Indicates an association between Fact and Dimension entities.
	Indicates an association between Dimension entities.
	Indicates a column which exists both as a Fact and as a Dimension.
	Indicates a consolidation column.
	Warning that appears when you save a problematic change to a model that might cause an error at a later stage in the process. You can view the details by hovering over the icon on the model or in the Problems tab.
	Error that appears when there is a design problem with your model in a designer. For example, the length of a column is too long. You can view the details by hovering over the icon on the model or in the Problems tab. Right-click an error to check if Quick Fix has been enabled for the problem. For details, see "Manage Validation" on page 80.

Package Explorer

The Package Explorer shows and allows importing\creating the content pack directories.

All the pieces of the DWH entities modeled in the IDE – target, integration and source entities - are stored as the metadata in the core, integration and source content packs directories correspondingly as the xml files.

There is one directory for the Core CP (**cp-core**), one integration content pack directory per product (**cp-<Product_Name>**) and multiple directories for the source content packs per product per version per extractor type (**cp_<Product_Name>_<Product_Version>_<Extractor_Type>**).

There are also directories where the data flow and data model diagrams are stored (**cp_<Product_ Name>_<engineer\architect>**).
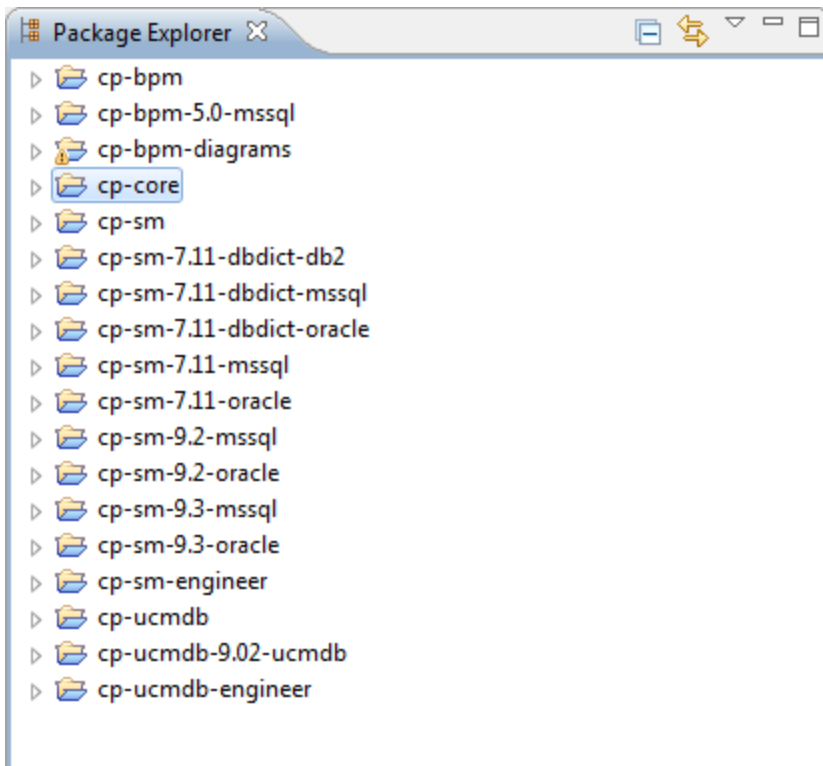
All the OOTB content packs source directories are shipped with the IDE package and can be imported into the Package Explorer for extension or reference.

Data Source Browser

The Data Source Browser allows connecting to the data sources or multiple kinds to be able to browse the source structure and data for reference purposes as well as to create the DWH entity and the entity diagram automatically based on the data source metadata.

The currently supported data source types are:

- Databases

Diagram Editor

There are two types of diagrams in the IDE:

- Architect Target Designer
- Engineer Stream Designer

The **Architect Target Designer** is used for modeling the Target data model: the target entities and the links between them.

The Designer refers to the Core CP directory – all the entities modeled in it are created as the xml files in the Core CP directory once the Designer is saved.

The entity is visualized as the table with the fields, it has the properties with entity type selections (fact and\or dimension) and the set of fields attributes based on the entity type.

The designer has the Palette with the available actions:

- Entities
  - New Target Entity – create a new target entity placeholder on the canvas
  - Load Target Entity – load the existing target entity from the Core CP directory (cp-core)
  - Target Column – add the column to the target entity
- Target Entities Relation
  - Dimension to Dimension – create the intersection point between the dimensions.
  - Fact to Dimension – create the intersection point between fact and dimension.
  - Target Extension – create the reference between the OOTB and the custom entity that is created as the extension.

Physically the link between the entities is presented as a FK column in the entity table that refers to the record in the linked dimension table.
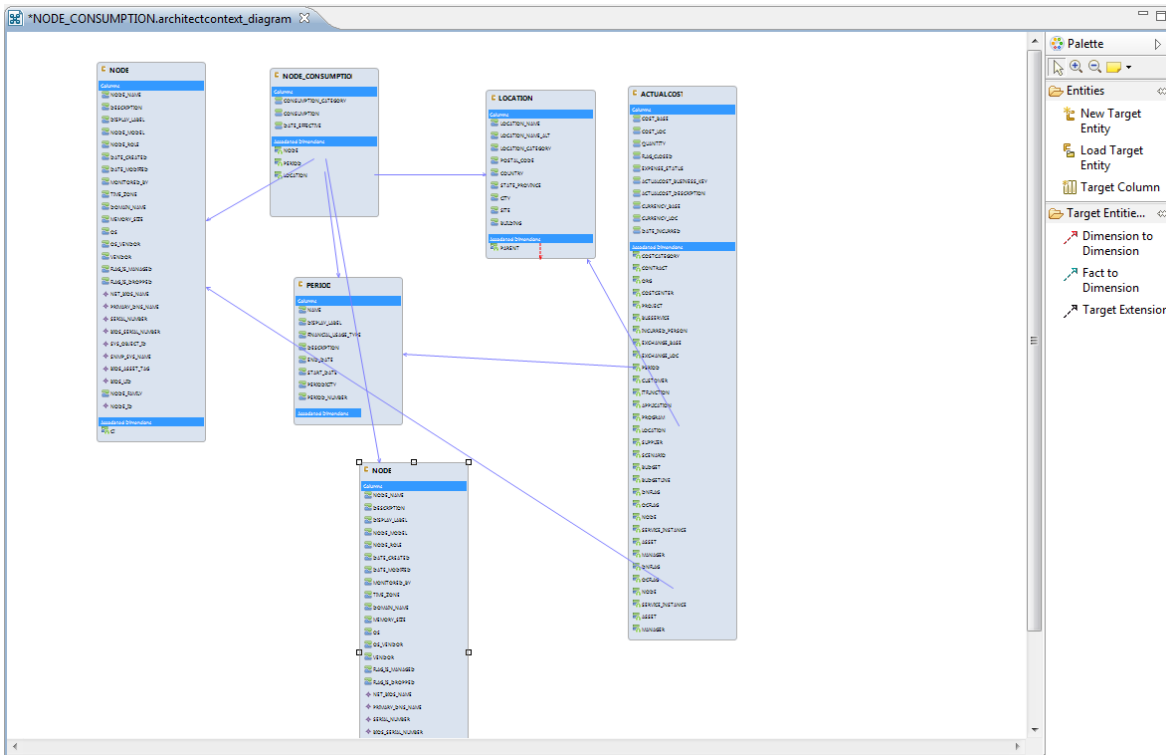
The **Engineer Scream Designer** allows creating the data path from the source to the target entity.

The Designer works with the selected Source, Integration and Core CP so that the new\existing entities are created\loaded in\from the specific source, integration or core CP directories.

The usual approach is to load the Target Entity that was previously created in the Architect Target Designer and create the new Source\Integration entities and map the fields to the Target entity.

In rare cases when the Target Entity is not supposed to be linked to any other dimension entities, it can be created directly in the Engineer Stream Designer.

The Integration Entity has the Properties where the columns data types and lengths of the fields should be set as well as the Business Key, Last Modified and nullable columns should be selected.

The Source Entity has the Properties that are based on the DB query concept and where the extraction attributes like Table\Join Condition, Where clause and the columns names\aliases and rules can be defined.

Upon the linkage of the Source Entity to the Integration entity the attributed are populated automatically:

- The Integration Entity name is populated into Table Name field

- The Integration Entity columns are populated into the Columns fields.

Physically the Source Entity is saved as the source entity xml based on which the queries\calls to the data source are built.

The Palette has the set of available actions:

- Target Entity

  ○ New Target Entity

  ○ Load Target Entity

  ○ Target Column

- Integration Entity

  ○ New Integration Entity

  ○ Load Source Entity

  ○ Integration Column

- Source Entity

  ○ New Source Entity

  ○ Load Source Entity

- ○ Source to Integration Relation (the source entity columns are not modeled by inherited from the Integration entity which the Source entity linked to)

- Transformation

  - ○ Column Mapping – create a direct mapping from the Integration Entity fields to the Target\Transformation Entity fields.
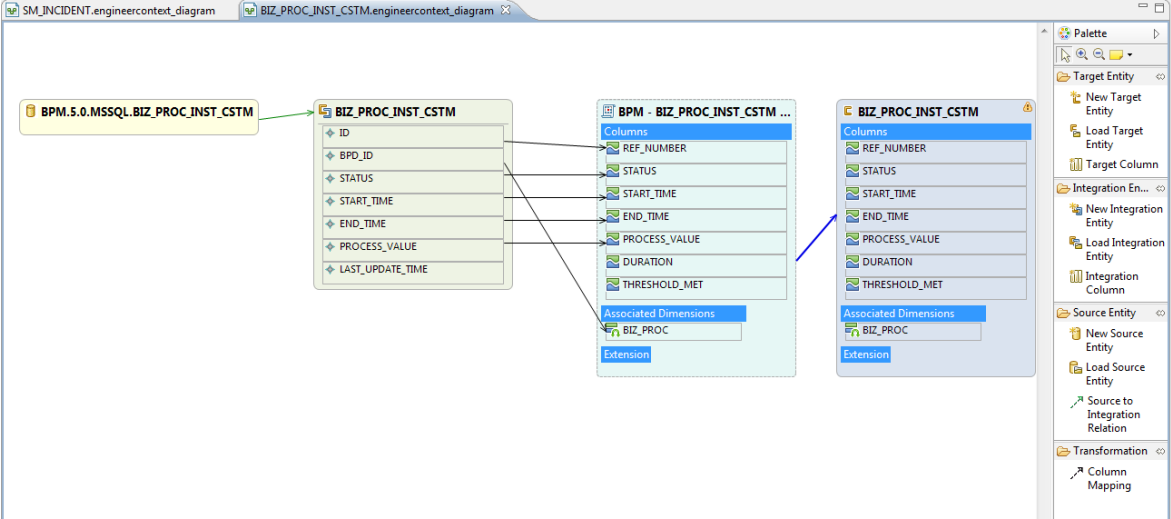
Diagram Editor - Architect Target Designer Tasks

The Architect Target Designer enables you to define a Target entity as well as link associations, or extend an existing entity. Each Target entity in the Architect Target Designer contains columns of fact, or dimension (or both) and associations to other Target entities.

Architect Target Designers can contain one or more Target entities. Usually each Architect Target Designer includes several entities that are related to the same subject (Designer). Target entities can be included in several Architect Target Designers.

The IDE supports the extension of a target entity by creating an association called Target Extension. This enables you to extend an entity by adding to the new entity columns. Adding an extension enables Fact extension and the ability to link a group of Dimensions specifically to the same group. You then use the extension entity to make all associations and links.

> **Note:** Make sure you have selected the IDE perspective before beginning to work on your designer diagram.

> **Note:** It is recommended to create a separate general project in the Package Explorer for the Architect Target Designer files.

To access:

In the IDE main page, select **File > New >Other > DWH IDE Wizards > Architect Target Designer**.

Learn More

The **Architect Target Designer** enables the following:

- Create a new entity metadata which is translated into the Target model.

- Load an existing Target entity.

- Add columns which affect entity generation.

- Add associations between entities.

- ○ Link a Fact to Dimension

- ○ Link a Dimension to a Dimension

- ○ Link an entity to an extension

Tasks

This section includes:

Create a new Architect Target Designer in the IDE

1. In the IDE main page, select **File > New > Other > DWH IDE Wizards > Architect Target Designer** and click **Next**.

2. Select the parent directory and enter the file name for the Stream Designer diagram - make sure you do not change the suffix of the file name - and click **Next**.

3. Select the relevant Target Content Pack directory and click **Finish**.

Define a new Target entity

1. In the Architect Target Designer, in the palette area, select **New Target Entity** and click on the canvas.

2. Name the entity.

3. Add relevant columns to the entity.

4. Click **Save**.

Load an existing Target entity

1. In the Architect Target Designer, in the palette area, select **Load Target Entity** and click on the canvas. The Resource Selector dialog box opens.

2. Expand the target directory and select an entity. The entity is displayed with all of the previously added columns and dimensions.

3. Add relevant columns to the entity. You can then edit and configure columns in the Properties view.

4. Click 🖫 **Save**.

Extend a Target Entity

1. In the Architect Target Designer, in the palette area, select **Load Target Entity** and click on the canvas to load the target entity that you want to extend. The Resource Selector dialog box opens.

2. Expand the target directory and select an entity. The entity is displayed with all of the previously added columns and dimensions.

3. Select **New Target Entity** and click on the canvas to add the entity which will be the target extension.

4. Name the entity. If you are extending the Person entity, for example, you can enter PERSON_ CSTM.

5. In the Properties tab of the new entity, configure the entity Type (**Fact** or **Dimension**). Must be the same entity type as the base entity.

6. In the palette area, click **Target Extension**.

7. Drag the arrow from the new extending entity to the original loaded entity.

8. This relation creates an extension to the new entity. The new entity name is displayed as an extension in the original entity. You can add relevant columns and configure the extended entity as necessary. Mapping is then done from the Integration to the Target extension.

> **Note:**
>
> ○ The extending and base targets are referred to as a single entity. Therefore, you can not add a column with the same Column ID of one in the original base entity.

○ When you add an extension, make sure that the Source and Target are from the same type.

○ Target Extensions can also be extended.

○ The name of the extension is derived from the name of the extended entity and cannot be changed.

Add a column

1. In the Architect Target Designer, in the palette area, select **Target Column**.

2. Click in the Column area of your entity and enter the Column ID in the text box.

   The column is added to the entity. You can then edit and configure columns in the Properties view.

3. Click 🖫 **Save**.

Link a Dimension to a Dimension

1. In the Architect Target Designer, in the palette area, click **Dimension to Dimension**.

2. Drag the arrow from a Dimension to the Dimension you want it linked to.

3. The New Dimension to Dimension dialog box opens. The default name is displayed and can be edited. This relation links a Dimension entity to another Dimension.

   Note: If you link to an entity from an existing association, you can connect using the arrow without naming the Associated Dimension.

   The default Associated Dimension name is the Target entity.

4. Click 🖫 **Save**.

Link a Fact to a Dimension

1. In the Architect Target Designer, in the palette area, click **Fact to Dimension**.

2. Drag the arrow from the Fact entity to the Dimension you want it linked to.

3. The New Fact to Dimension dialog box opens. The default name is displayed and can be edited.

This relation links a Fact entity to another Dimension.

> **Note:** If you link to an entity from an existing association, you can connect using the arrow without naming the associated Dimension.
>
> The default associated dimension name is the Target entity.

4. Click ⊞ **Save**.

● UI Description

Create Architect Target Designer
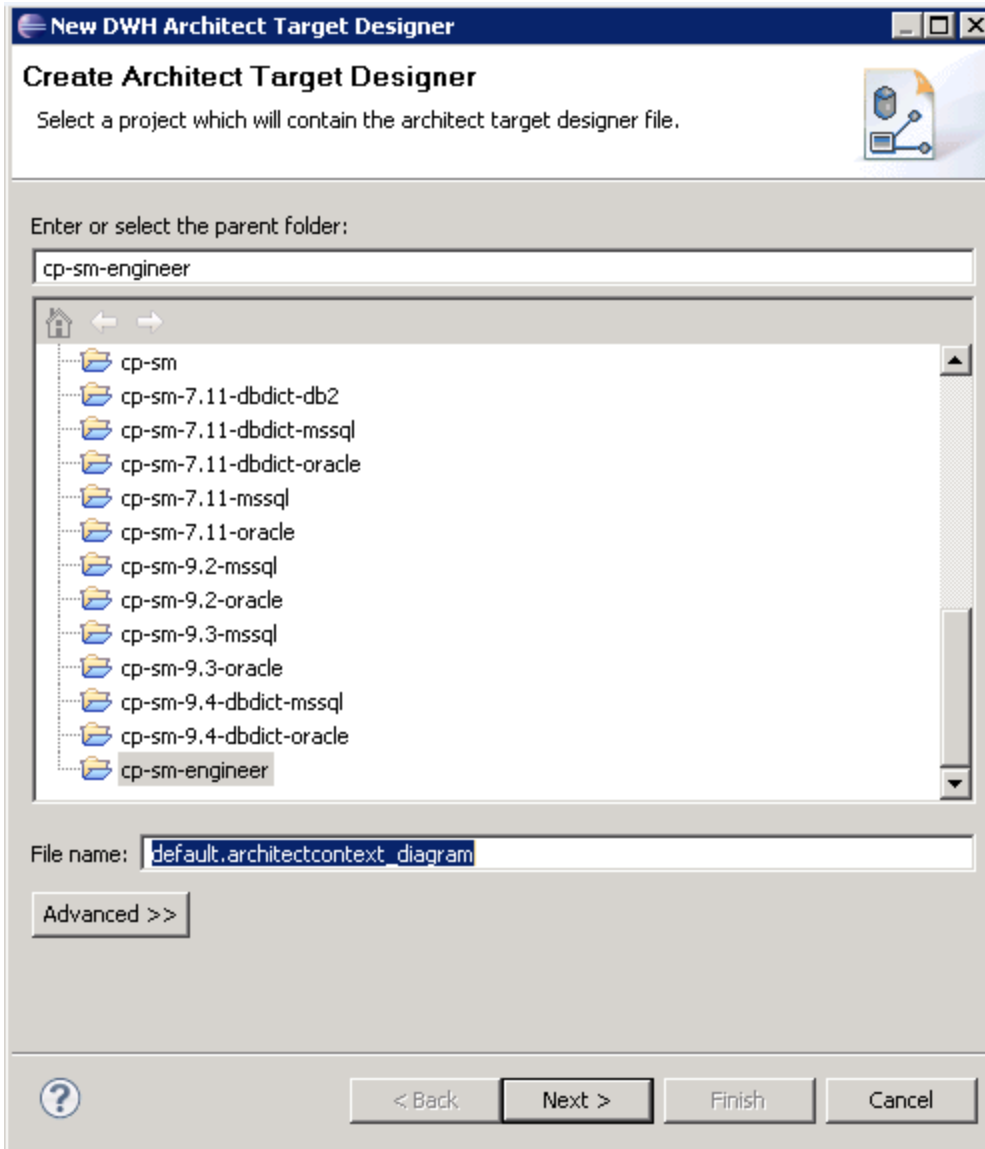
User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Enter or select the parent directory	Select the directory in which this Designer will be contained, from the directory list.

UI Element	Description
File Name	Enter a file name for your Designer diagram.

Target Content Pack
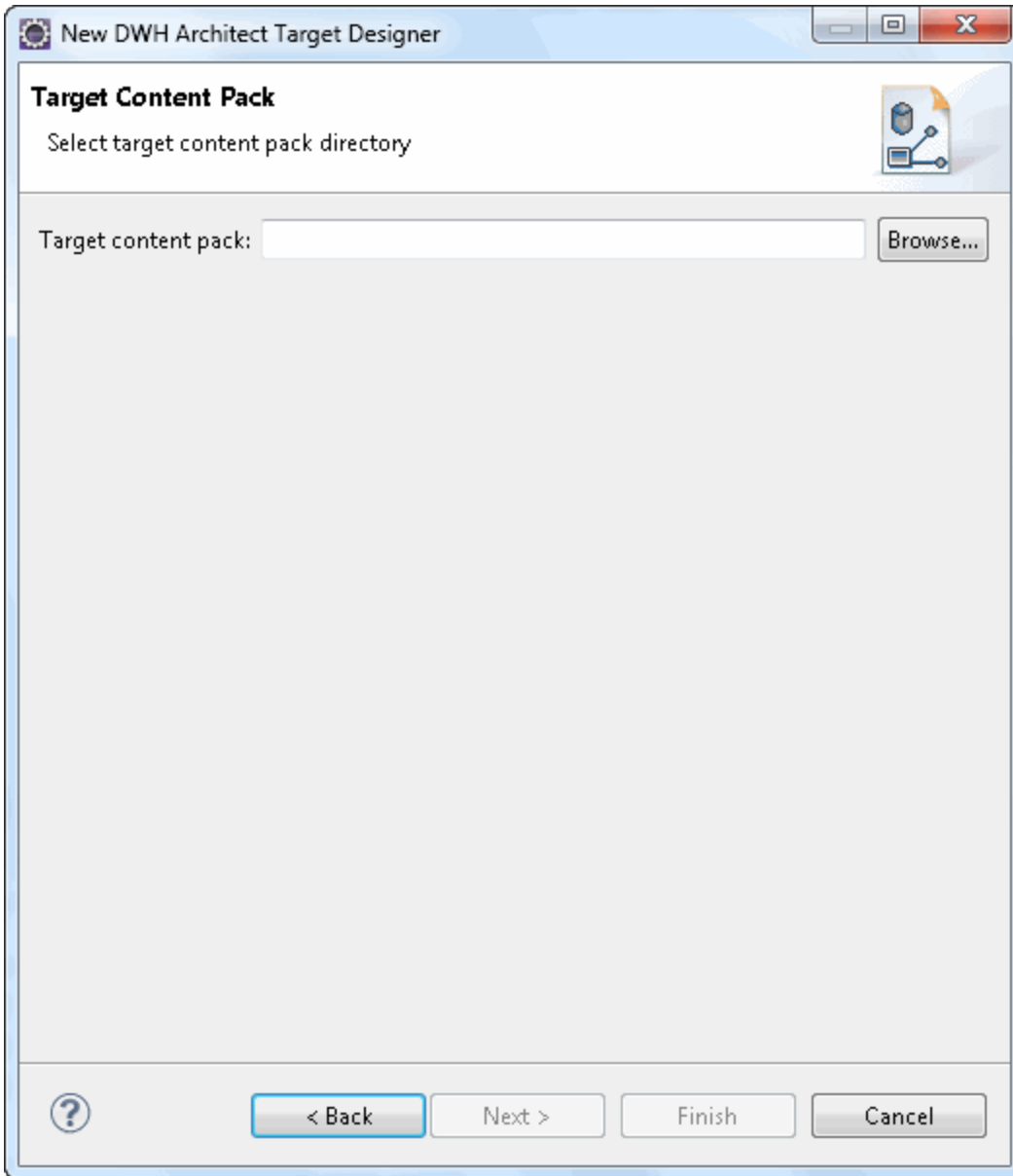
User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Target Content Pack	Select or browse for the Target Content Pack directory.

Architect Target Designer View
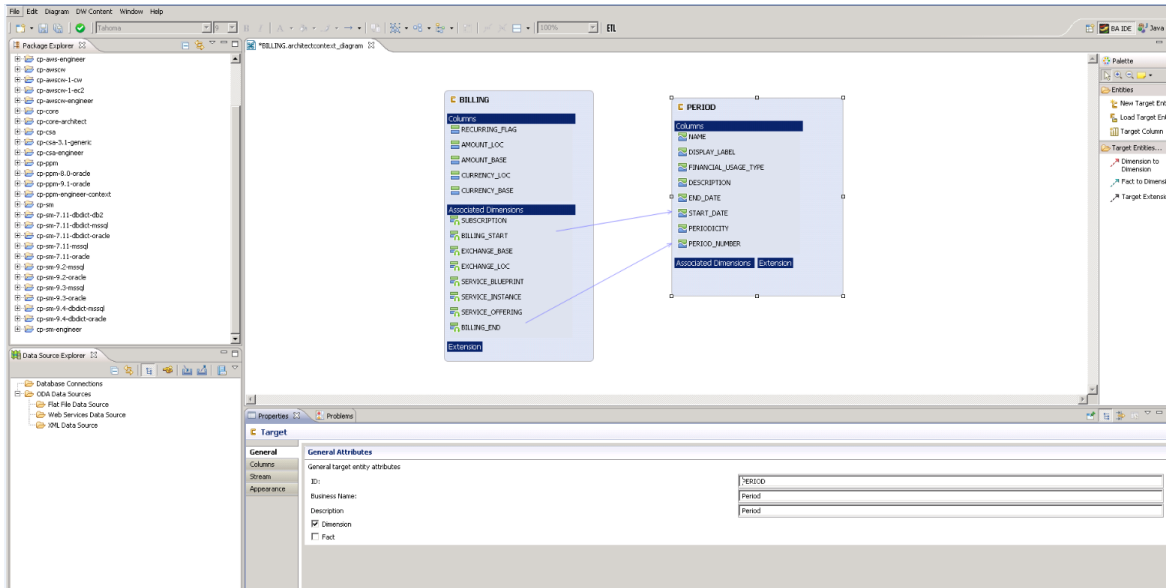
Palette Area

User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Entities	Contains the following Target entity options: • **New Target Entity.** Creates a new Target entity. Entity type can be defined in the Properties tab. To view the Properties tab, right-click on the specific entity and click **Show Properties View.** • **Load Target Entity.** Opens the Resource Selector dialog box. Select the relevant entity for your model.

UI Element	Description
	Resource Selector

	◢ CORE
	    ABC / ABC
	    ACTUALCOST / Actual Cost Lines
	    APPLICATION / Applications
	    BACKUP_POLICY / Backup Policys
	    BACKUP_SESSION / Backup Session
	    BUDGET / Budgets
	    BUDGETLINE / Budget Lines
	    BUSINESS_APP_STATUS / Business Application Status
	    BUSPROCESS / Business Process
	
	               OK Cancel
	
	• **Target Column.** Adds columns to entities. Column properties, for example column type, can be edited in the Properties tab.
	
	Each added attribute impacts the relevant entity generations.

Target Entities Relation	Click a link to create connections for building the model. • **Dimension to Dimension.** Link from one Dimension to another Dimension. A red arrow is displayed between the entities. • **Fact to Dimension.** Link from a Fact to a Dimension. This type of relation requires that the fact type was defined in the entity properties. A blue arrow is displayed between the entities. • **Target Extension.** Link from a new target entity to the base/original target entity. A black arrow is displayed between the entities.

Properties tab for Target entity and specific fields

To view the Properties tab, right-click on the specific entity and click **Show Properties View.**

You first configure the Target entity properties, and then the properties for each specific column.

UI Element	Description
General tab	Displays the **Entity**, **Dimension** and **Fact** attributes for the target entity. **General Target entity attributes:** • **ID:** The ID of the entity. • **Business Name:** The complete business name. • **Description:** Enter a description of the entity. • **Dimension/Fact Checkbox:** Select one or both for the entity. If you change the selection, a dialog opens, warning that you may lose information previously entered in the Columns tab. **Note:** Make sure to select the required option connected to the relevant Fact or Dimension column properties.
Columns tab	Displays information for each column in the Target entity. Column property options are displayed according to the entity selection of Fact or Dimension in the General tab. • **ID.** The ID of the entity. • **Business name.** The complete business name. • **Description.** Enter a description of the entity. • **Data Type.** Varchar, Int 16, Int 32, Float, Localized Date Time • **Length.** Only for Varchar data type. The length of a Varchar column must be more than 0 and less than 4000. • **Null Allowed.** Select if the field can have the value NULL. • **SCD Type.** Slowly Changing Dimension type can be either 1 or 2. Only for Dimension. SCD1: For update. SCD2: For preserving history. • **Measure.** Select only for Fact. • **Calculation Formula.** The calculation of the measure. (Optional)

UI Element	Description
	• **Summary.** Select **SUM**, **MIN**, **MAX**, or **AVG**. (Optional)
Appearance tab	Displays font and appearance information.

New Associated Dimension Dialog Box

When you link to an unlinked Dimension, the following dialog box opens.
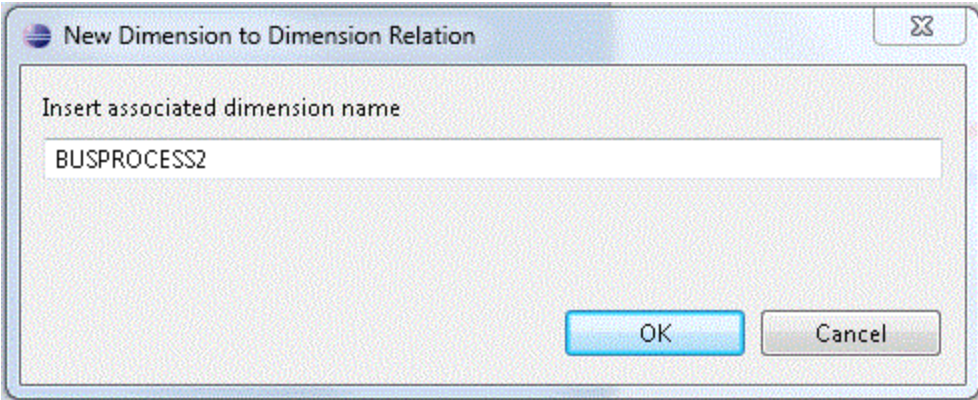
Edit an Associated Dimension name. The default is the Target entity name.

Target Extension Entity
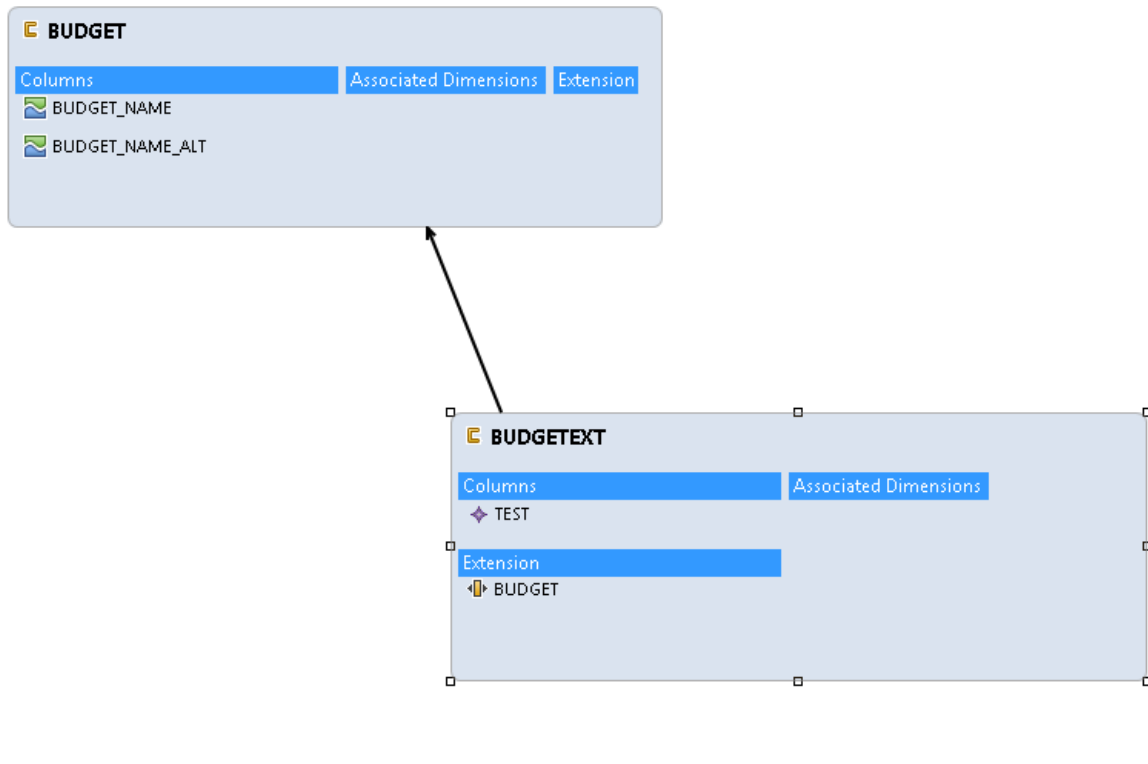
Properties tab for Associated Dimensions

To view the Properties tab, right-click on the specific entity and click **Show Properties View.**

UI Element	Description
Associations tab	Displays Dimension association information: • **ID.** The ID of the entity. • **Business Name.** The complete business name. • **Description.** Enter a description of the entity. • **Type.** Select **Dimension**, **Fact**, or **Both**. • **SCD Type.** For Dimension only. • **From Target.** The Target entity. • **To Target.** The Associated Dimension
Appearance tab	Displays font and appearance information.

Diagram Editor - Engineer Stream Designer Tasks

The Engineer Stream Designer enables you to define the integrations and how they are transformed and connected. This view defines the mapping relations for the entity from the source to the target. You can create new integrations based on graphical diagrams, using the Engineer Stream Designer in the IDE tool.

Note: Make sure you have selected the IDE perspective before beginning to work on your designer diagram.

To access:

In the IDE main page, select **File > New > Other > DWH IDE Wizards > Engineer Stream Designer**.

Learn More

The Engineer Stream Designer enables you to extend and add content from the Integration and Source Content Packs into the target model. Using a new or existing Target entity, you can add new or existing content from the Integration and Source entities. You then perform transformation and Source Integration mapping for new and pre-loaded entities. The Source, Integration and Target entities are mapped using the Transformation Mapping connector, which creates a new mapping entity. All further mapping is done to the new entity in order to complete the Target model.

Note: All Source entities must be connected to an Integration entity.

Entities in the Engineer Stream Designer are mapped as follows:

- **Source Entity:** Mapping to the correct source, meaning the version the data is extracted from.
- **Integration Entity:** Contains the mapping of all fields.
- **Target Entity:** Several consolidation entities can be consolidated into one entity.

It is recommended to map from the Source to the Target.

Source Extractors

OOTB set of existing supported extractors are:

- **Generic Extractors**

  - **DB Extractor:** Supports MSSQL, Oracle and MySQL databases.

  - **File Extractor:** Supports general CSV file.

- **Source Specific Extractor**

  Connecting to the integration:

  ETL Gen templates in the back-end generate integration templates which utilize Data Collection Service (DCS). Load the Source metadata to the IDE and then map it to the correct consolidation entity in the relevant fields. To create a custom DCS extractor, see the *DCS Extractor SDK Guide.*

Important Information

> **Note:** Creating new Target entities with Associated Dimensions can only be done in the Architect Target Designer.

Recommended

When you generate ETL artifacts with IDE, if you just put the source and integration entities in the engineer diagram, but do not map any columns with target attributes (no associated dimensions) from source to target (Left to Right), the IDE does not generate the data model correctly, and the ConsolidationReferences in the Extraction model is incomplete.

It is recommended to map at least one column to the target attributes for every integration entity.

![Tasks icon] **Tasks**
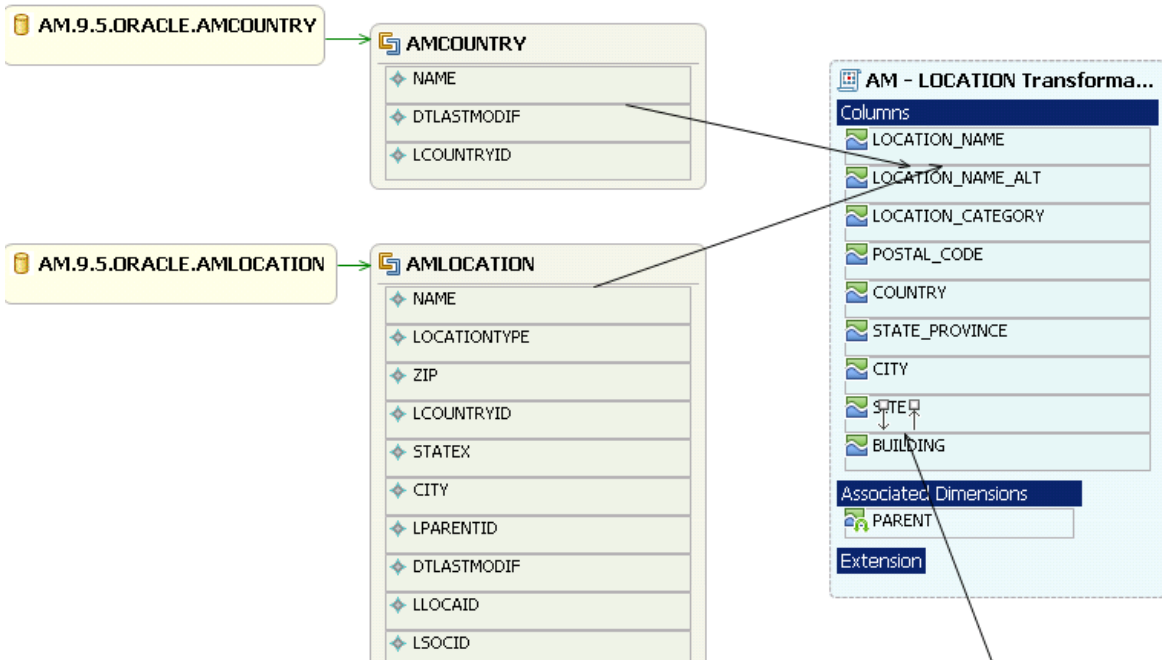
This section includes:

Create a new Engineer Stream Designer in the IDE

1. In the IDE main page, select **File > New > Other > DWH IDE Wizards > Engineer Stream Designer** and click **Next**.

2. Enter or select the parent directory and enter the file name for the Engineer Stream Designer

diagram - make sure you do not change the suffix of the file name - and click **Next**.

3. Select the Target, Integration, and Source Content Pack directories and click **Finish**.

Define a new Target entity

1. In the Engineer Stream Designer, in the palette area, select **New Target Entity** and click on the canvas.

2. Name the entity.

3. Add relevant columns to the entity.

4. Click **Save**.

Load an existing Target entity

1. In the Engineer Stream Designer, in the palette area, select **Load Target Entity** and click on the canvas. The Resource Selector dialog box opens.

2. Select an entity. The entity is displayed with all of the previously added columns and dimensions.

3. Click **Save**.

Define a new integration entity

1. In the Stream Designer, in the palette area, select **New Integration Entity** in the Integration section and click on the canvas. An integration entity is displayed.

2. Enter a name. The name can be up to 44 characters. An Integration entity is created.

3. Click **Integration Column** to add a column to the entity.

4. Perform mapping if required.

5. Click **Save**.

Load an existing integration entity

1. In the Stream Designer, in the palette area, select **Load Integration Entity** in the Integration section and click on the canvas. The Resource Selector dialog box opens.

2. Select an entity. The entity is displayed with all of the previously added mappings.

Define a new source entity

1. In the Engineer Stream Designer, in the palette area, select **New Source Entity** in the Source section and click on the canvas. A Source entity is displayed.

2. Click **Source-Integration Relation** and drag the display arrow from the Source entity to an Integration entity. All columns from the Integration entity are copied to the Source entity with default values.

3. Click 💾 **Save**.

> **Note:** The Source-Integration Relation tool only enables you to link Source entities to Integration entities of the same product (content pack). For example, a Source entity from cp-sm-9.4-dbdict-mssql can only be linked to Integration entities from cp-sm and not cp-ppm.

Load an existing source entity

1. In the Engineer Stream Designer, in the palette area, select **Load Source Entity** in the Source section and click on the canvas. The Resource Selector dialog box opens.

2. Select an entity. The entity is displayed with its mapped integration entity.

Add a column

1. In the Engineer Stream Designer, in the palette area, select **Target Column** or **Integration Column**.

2. Click in the Column area of your entity and enter the Column ID in the text box.

   The column is added to the entity.

3. Click 💾 **Save**.

> **Note:** Source data is replicated from the integration entity. If you add or delete columns from the Integration, however, it is not automatically done in the Source.
>
> To add: Once you have added the column, delete the mapping link and re-map from the Source to Integration.

To delete: Right-click the deleted column, delete the mapping link and re-map from the Source to Integration.

Alternatively, you can use the Quick Fix mechanism on the error that appears in the Problems tab. For details, see "Manage Validation" on page 80.

Map from the Integration to Target

Once you have added columns to the Integration entity you can perform SSI mapping.

1. In the Engineer Stream Designer, in the palette area, click **Column Mapping** in the Relations section to map the Integration to the Target entity.

2. Drag the arrow from the Integration column to the Target column.

3. After you have performed the first SSI mapping, a transformation SSI entity is created to which you can perform further mapping. Any integration entity from the same CP that should be mapped to this Target, must be mapped to the transformation entity.

4. Click **Save**.

Note: If an Integration column is already mapped to a Target column, you cannot perform further mapping from the same Content Pack.

Two Integration entity columns from the same Content Pack cannot be mapped to the same Target entity column.

UI Description

Engineer Stream Designer View
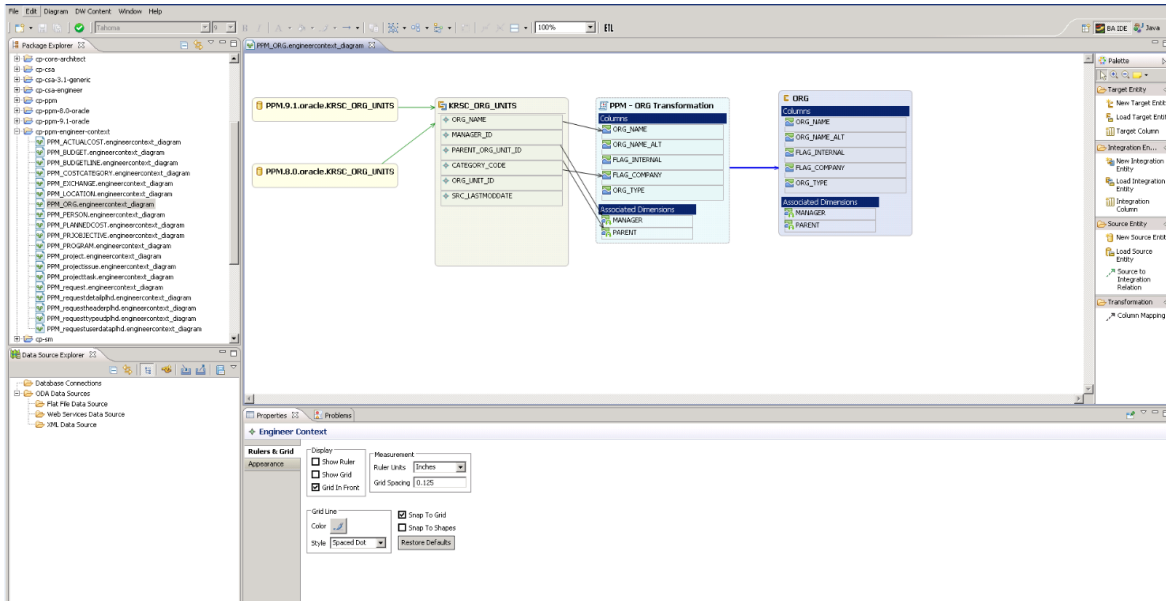
Palette Area

UI Element	Description
Target Entity	- **New Target Entity.** Select to display a new Target entity. - **Load Target Entity.** Opens the Resource Selector dialog box. Select the relevant entity for your model.

UI Element	Description
	• ▥ **Target Column.** Adds columns to entities. Column properties, for example column type, can be edited in the Properties tab.
	Each added attribute impacts the relevant entity generations.
Integration Entity	Contains the following Integration entity options:
	• ▦ **New Integration Entity.** Select to display a new Integration entity.
	• ▦ **Load Integration Entity.** Opens the Resource Selector dialog box. Select the relevant entity for your model.

UI Element	Description
• ⊞ **Integration Column.** Adds columns to entities. Column properties, for example column type, can be edited in the Properties tab. Each added attribute impacts the relevant entity generations.
Source Entity	Contains the following Source entity options: • 📄 **New Source Entity.** Select to display a new Source entity. • 📁 **Load Source Entity.** Opens the Resource Selector dialog box. Select the relevant entity for your model.

UI Element	Description
	Resource Selector ⊞ PPM.9.1.oracle ⊞ SM.7.11.dbdict_db2 ⊞ SM.7.11.dbdict_mssql ⊞ SM.7.11.dbdict_oracle ⊞ SM.7.11.mssql ⊞ SM.7.11.oracle ⊞ SM.9.2.mssql ⊞ SM.9.2.oracle ⊞ SM.9.3.mssql ⊞ SM.9.3.oracle ⊞ SM.9.4.dbdict_mssql ⊞ SM.9.4.dbdict_oracle OK Cancel • ↗ **Source to Integration Relation.** The Source must be mapped to the Integration in order to map to the Target. A green arrow is displayed between the entities.
Transformation	Click to map the displayed entities. • ↗ **Column Mapping.** Mapping between the Integration and Target columns. First time mapping is done from the Integration column to the Target column. A black arrow is displayed between the entities. First-time mapping creates a new entity for Transformation. Subsequent mappings are done to the new Transformation entity.

Properties tab for Integration

To view the Properties tab, right-click on the specific entity and click **Show Properties View.**

> **Note:** Properties data is replicated in the Integration and Source columns. If you add or delete columns from the Integration, however, it is not automatically done in the Source.
>
> To add: Once you have added the column in the properties tab, delete the mapping link and re-map from the Source to Integration.
>
> To delete: Right-click the deleted column, delete the mapping link and re-map from the Source to Integration.

UI Element	Description
General tab	Displays the **General** entity attributes.
Columns tab	Displays column information: • **ID.** The ID of the column. It is taken from the mapped integration column and is read-only. • **Business name.** The complete business name. • **Description.** Enter a description of the entity. • **Data Type.** Varchar, Int 16, Int 32, Float, Localized Date Time • **Length.** Only for Varchar data type. The length of a Varchar column must be more than 0 and less than 4000. • **Null Allowed.** Select if the field can have the value NULL. If you specify a Business Key, at least one of the columns must not **Null Allowed**. • **Business Key.** Primary key of the Integration field order. Select a number for the order of columns for placement. When no number has been assigned, you can only select 1. Subsequently you can assign any number to a column. If you change a number, all other assigned columns are automatically shifted down a spot in the order. > **Example** If you change the Business Key of a column to **1**, the one that was specified previously as **1** becomes **2**. • **Last Modified.** The last date that the source has been changed. Select the button if you want a query from a certain date and not all possible data.

Properties tab for Source

To view the Properties tab, right-click on the specific entity and click **Show Properties View.**

UI Element	Description
General tab	**General attributes:** • **ID.** The entity ID. • **Content Pack.** The Source Content Pack information. **Data Source SQL Clauses:** • **Group by.** The section in the SQL Query for the aggregation. • **Table Name/Join Condition.** Default is Integration entity name. If you change the table name, you must also change it in the columns. Enter the Join Condition for an SQL query with join. • **Where.** Where to extract for the SQL query for filtering data from the source.
Columns tab	Displays column information. The Source entity receives all of the Integration entity properties. • **ID.** The ID of the column. It is taken from the mapped integration column and is read-only. • **Type.** Select **Fixed**, **Direct**, or **Rule**. If you select Fixed, you must enter a Fixed Value. if you select Rule, you must enter the Calculation Rule. • **Not Applicable.** • **Table Name.** Based on table name entered in the General tab. Relevant only if **Direct** type is selected. • **Column Name.** The field name. Must be what appears in the Source entity. • **Fixed Value.** The fixed value of the column. Relevant only if **Fixed** type is selected. • **Calculation Rule.** The calculation rule of the column. Relevant only if **Rule** type is selected. The IDE does not support non UTF-8 characters in the **Calculation Rule** field.

For details on the Properties for Target entities, see "Properties tab for Target entity and specific fields" on page 51

For details on the Properties tab for Associated Dimensions, see "Properties tab for Associated Dimensions" on page 53.

The DW Content menu

The DW Content menu has several actions (that are also duplicated on the Toolbar):

- Report a Bug (the workspace is exported to the zip archive and can be sent to Support for investigation)

- Upgrade (applicable in case the entity was created in the previous IDE versions)

- Validate (check the opened diagrams for errors)

- ETL Gen (The generation of the ETL based on the opened diagram)

Obviously the most usable action is the ETL Gen.

By clicking this menu item\tool bar button the ETL Generator dialog is opened.
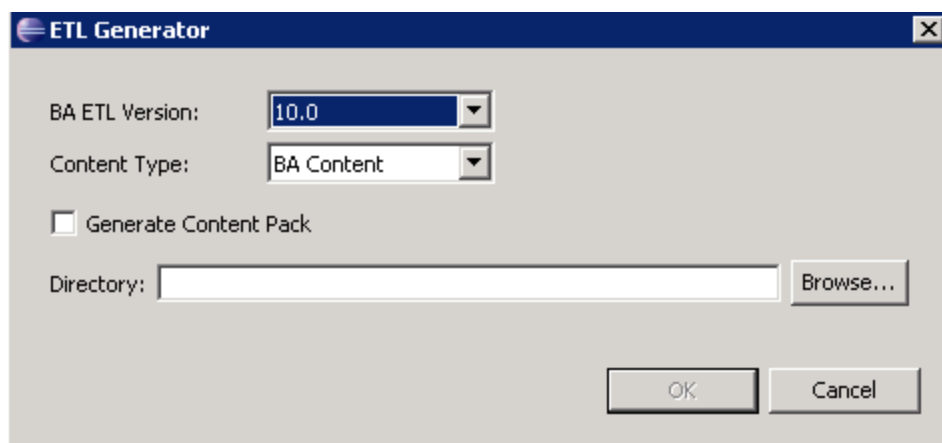
Since the ETL artifacts are different in different ITBA versions, it is important to select the correct ITBA version.

The Content Type is **BA Content**..

Selecting the Generate Content Pack check-box allows generating the full content pack directory structure. It is applicable whenever the new content pack is selected. In case of the extension of the existing content packs, the generation of the CP directory structure is not required because only the delta artifacts are generated and merged to the existing content pack directory in the **$HPBA_ Home/ContentPacks** directory.

After specifying the settings above the location for the generated ETL artifacts should be selected.

The ETL artifacts are generated only for the Designer in context of which the ETL Generator dialog in opened.

The two directories are generated: Core – the target entity artifacts, and <Product_Name> - the source entity, integration entity and mappings artifacts. These two directories should be then copied into the **$HPBA_Home/ContentPacks** directory.

Common Extension Scenarios

There are several most common extension scenarios:

1. Extension of the existing entity in the existing content pack

2. Extraction of the new entity in the existing content pack

3. Populating the existing entity from the new source

4. Extraction of the new entity from the new source

Extension of the existing entity in the existing Content Pack

In this scenario the main goal is to add more fields of the existing entity.

The approach is the following:

1. Use the existing Integration and Source (the required product version) content packs.

2. Model the new target entity and link it to the OOTB target entities using the Target Extension link.

   > **Note:** Make sure the name of the new entity includes the suffix _CSTM.

3. Model the new Integration and Source entity

4. Generate the ETL without creating the new content pack (just the delta is generated).

   a. Only new entity artifacts are used (not the whole content pack) for both Core and Product content packs and merged with existing CP directories in the ITBA content packs directory.

Extraction of a new entity in an existing Content Pack

The purpose is to bring the new entity from the data source which already has the OOTB integration with ITBA.

The approach is similar to the previous scenario; the only difference is that instead of the Target Extension link the Fact to Dimension or Dimension to Dimension link is used for linking the new entity with the OOTB entities.

> **Note:**
>
> - Make sure the name of the new entity includes the suffix _CSTM.

Populating an existing entity from a new data source

When the customer does has source systems with which ITBA does not have an OOTB integration but does have the necessary target entities with all the necessary fields, the approach for developing the integration is as follows:

1. Create new Integration and Source content packs.

2. Use the existing Target entity

3. Create new Integration and Source entities.

   > **Note:** Make sure the name of the new entity includes the suffix _CSTM.

4. Generate the ETL with the Generate Content Pack feature in order to create the new CP.

   a. Only the Product Content Pack artifacts are used (the Core CP has the entity already) and are copied to the ITBA content packs directory as a new directory.

Extracting a new entity from a new source

There are cases when ITBA does not provide either the OOTB CPs or the suitable target entities that could fulfill the integration requirements. In this case the modeling of the all pieces is required.

1. Model the target entities and the references between them

2. Create new Source and Integration Content Packs

   > **Note:** Make sure the name of the new entity includes the suffix _CSTM.

3. Model new Integration and Source entities.

4. Generate the ETL with the Generate Content Pack feature in order to create the new CP.

   a. The product CP directory is copied to ITBA content packs directory as a new directory

   b. The Core CP directory (delta) is merged with the existing Core directory in the ITBA content packs directory.

Import Existing Content

When you extend your existing content using the IDE, you must import the relevant content packs you want to work with.

> **Note:** You must import the Target Content Pack (cp-core) in order to extend or create content in the IDE.

Tasks

Import existing content

1. Navigate to **File** > **Import** > **General** > **Existing Projects into workspace** and click **Next.**

2. Browse for the cp-core directory and click **OK**, click **Finish** to import the project.

3. Import all of the relevant content packs you need to work with.

4. Proceed to creating the Designers.

Define New Content Pack Project

The IDE comes with out of the box Content Packs which you can import to add and extend content. You can also create projects based on data from new content directories, which you must manually add and define.

> **Note:** You must import the Target Content Pack (cp-core) in order to extend or create content in the IDE.

To access:

In the IDE main page, select **File > New > Other > DWH IDE Wizards > Content Pack**.

| Tasks | UI Description |

Tasks

Create new projects from content directories

To create new projects from content directories:

1. Select **File** > **New** > **Other > DWH IDE Wizards > Content Pack**.

2. Select the type of project: **Source** or **Integration**.

3. Enter the relevant details for the project and click **Next**.

4. Select the relevant Content Pack reference for the project:

   - For new Integration CP select the Target Content Pack for the project.

   - For new Source CP select the Integration Content Pack for the project.

5. Click **Finish**.

6. Proceed with defining the Architect Target and Engineer Stream Designer projects. For details, see "Diagram Editor - Architect Target Designer Tasks" on page 42 and "Diagram Editor - Engineer Stream Designer Tasks" on page 54.

⬡ UI Description

Integration Project
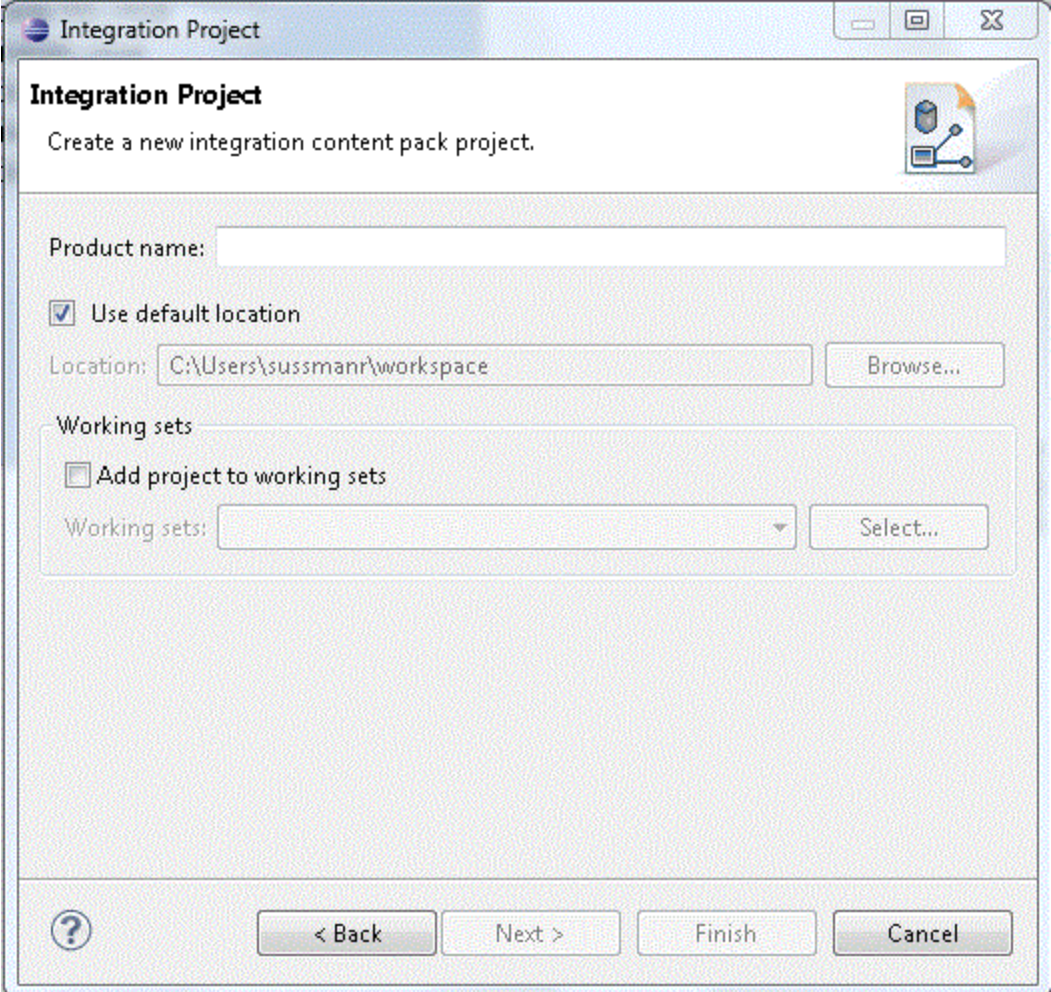
User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Product Name	Name of the source product. Make sure that after you define the product name, you can view the file under the Integration project **icp.dwmodelappintegration** file.
Use Default Location	Select to use the displayed location for your new project.

UI Element	Description
Location	Browse to the location of the content directory.
Add project to working sets	Select to add this project to the current set of projects.
Working Sets	Select new working sets.

Target Content Pack Reference
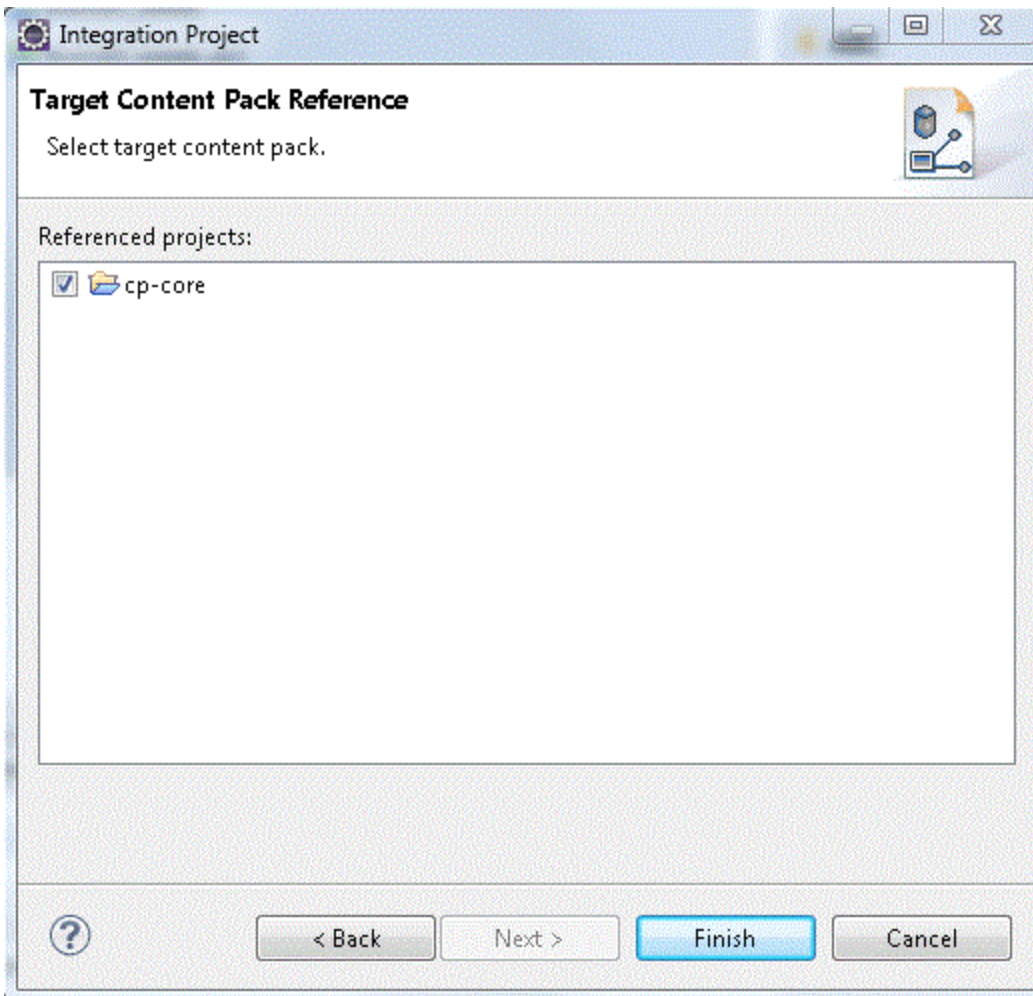
User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Referenced projects	Select the Target Content pack for the new Integration project.

Source Project

User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Product Name	Name of the source product. Make sure that after you define the product name, you can view the file under the Source project **scp.dwmodelappsource** file.
Version	Enter the data source version.
Product Type	Enter the data source type.
Use Default Location	Select to use the displayed location for your new project.

UI Element	Description
Location	Browse to the location of the content directory.
Add project to working sets	Select to add this project to the current set of projects.
Working Sets	Select new working sets.

Integration Content Pack Reference
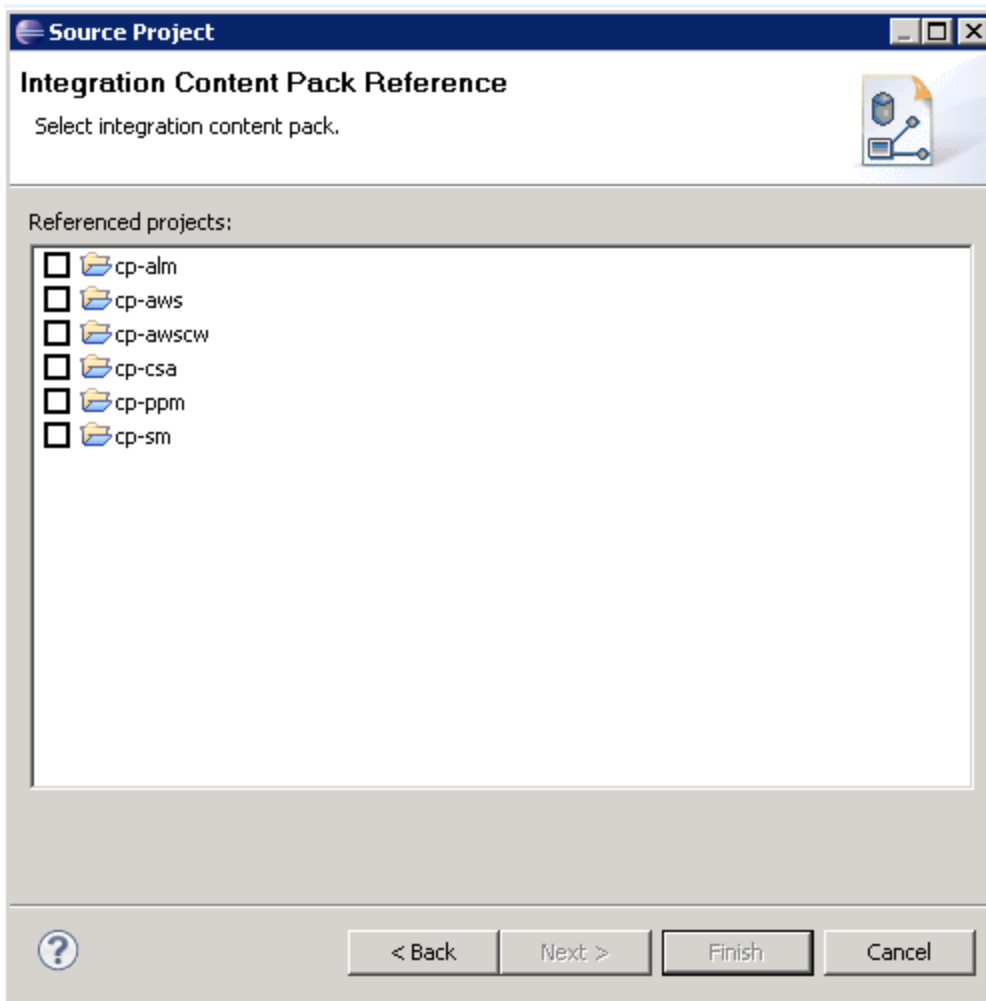
User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
Referenced projects	Select the Integration Content pack for the new Source project.

Define the Target Model

Before working with a specific designer, you should define the Target model and the related associations and mappings. The Target model describes the final version of the data that adheres to the design required by applications. Each table in the model contains both designed columns and static columns, which comprises the metadata, so that the administrator can have the visibility of ETL processing over the entity's data.

Target Model – Dimension or Fact: The target data models describe the format of the data that produces business intelligence analytics. The instantiated data models are dimension, fact, and hierarchy tables.

In the Architect Target Designer you define the target model containing the entities and links between them.

Extend the Period Entity

The Period target entity requires special mapping requirements in the IDE. The entity contains time and date related mapping and can only connect to date related sources and dimensions, for example START_TIME.

When you connect to a data source that has a Period entity, the data source consistently changes depending on configurations. Therefore you can only map to date-related entities and dimensions.
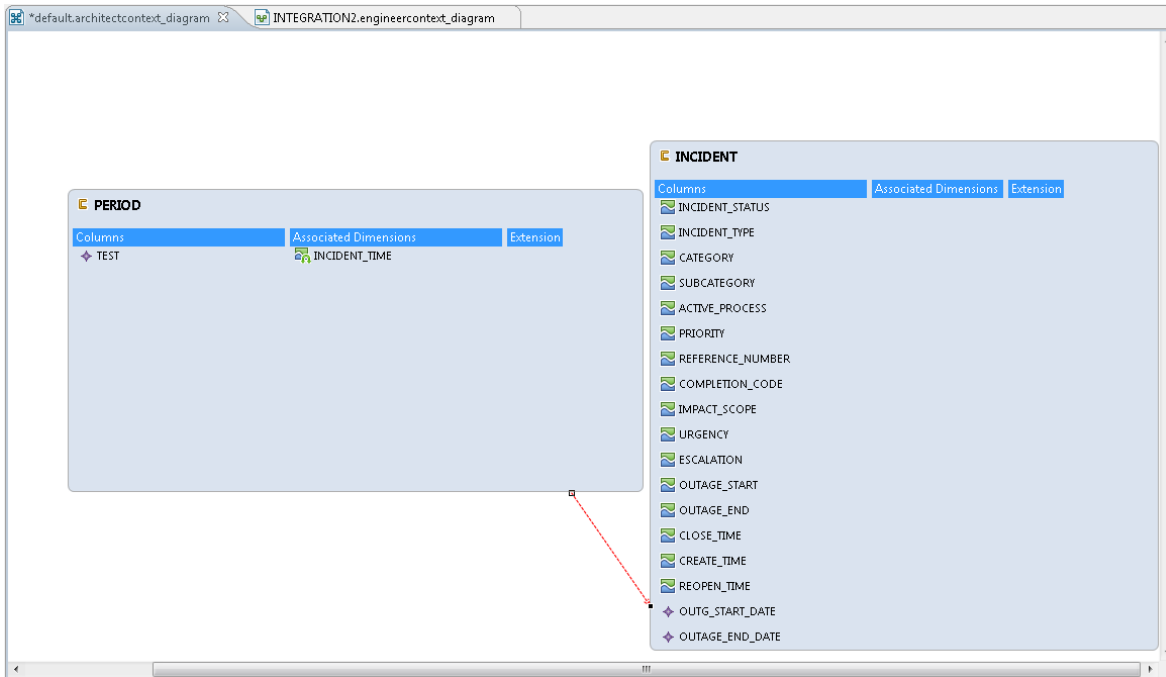
Delete an Entity Permanently

The IDE enables you to permanently delete an entity that is not needed or supported, from the file system. Make sure that no other entity contains any reference to the deleted entity.

> **Note:** When you right-click a selected entity and click **Delete From Model**, the entity is only removed from the current designer and not from the file system.

Tasks

Permanently delete an entity

To permanently delete an entity:

1. Delete the relevant entity from the canvas.

2. In the Package Explorer, expand the content pack that contains the entity you want to delete, for example **cp-sa**.

3. Delete the actual entity, for example **POLICY**, from the Package Explorer.
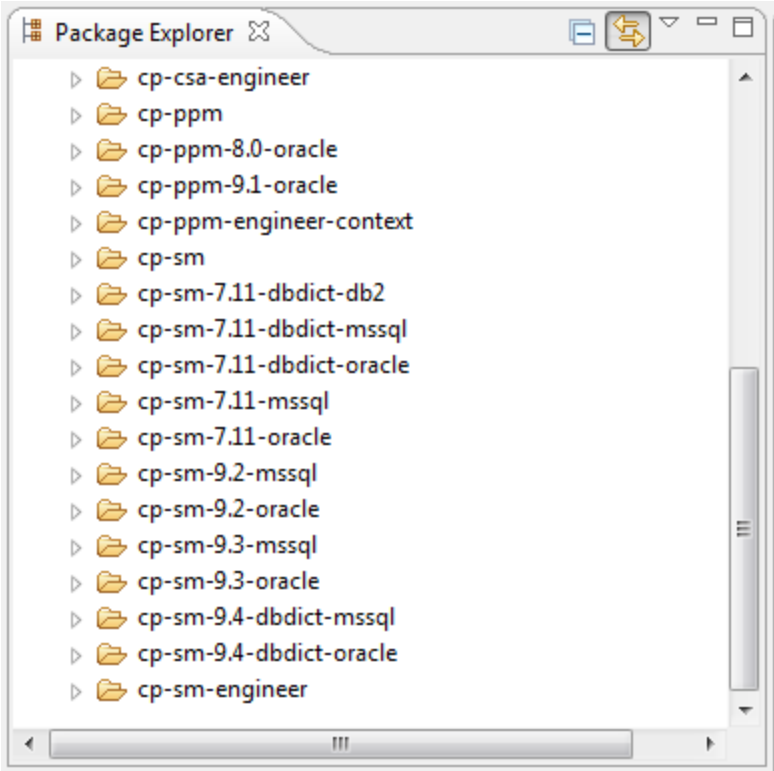
Manage Validation

The IDE performs validations on all Designers and entities created in the Designers. After you save your changes, you can view the errors and warnings that occurred during content development. You can perform a manual validation or use the Quick Fix solution to make the required fixes for validation.

> **Note:** All validations are performed only after you have saved your changes to the Designers.

To access:

Click the **Problems** tab.

Tasks Reference

Tasks

This section includes the following topics:

View the errors and warnings that occurred during content development

After you save your changes, click the **Problems** tab, below, to view the errors and warnings that occurred during content development.

Manually perform validation

Additionally, you can manually perform validations on all Designers and fix relevant errors and warnings.

1. To activate, click ⊙ in the toolbar, or select **DW Content** > **Validate**.

2. During the validation process, a Progress Information dialog box appears specifying the current validated designer and its progress.
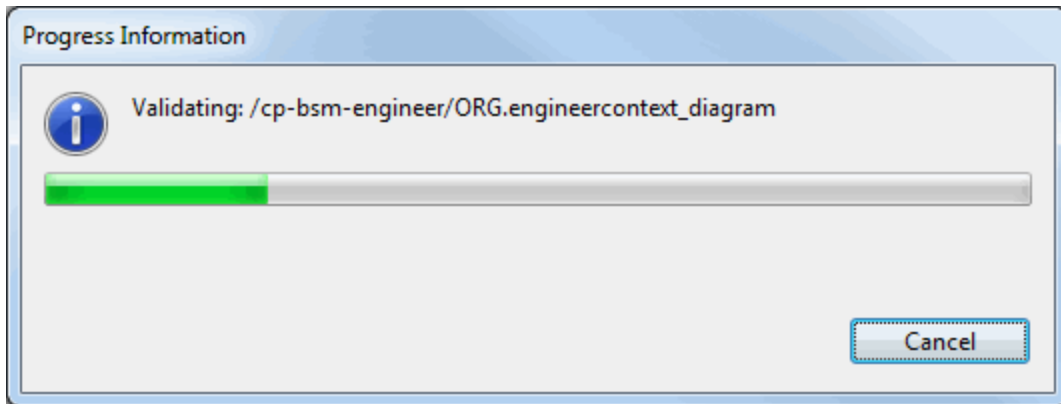
In case of an unreadable designer, an error dialog appears, listing the problem designer diagrams.
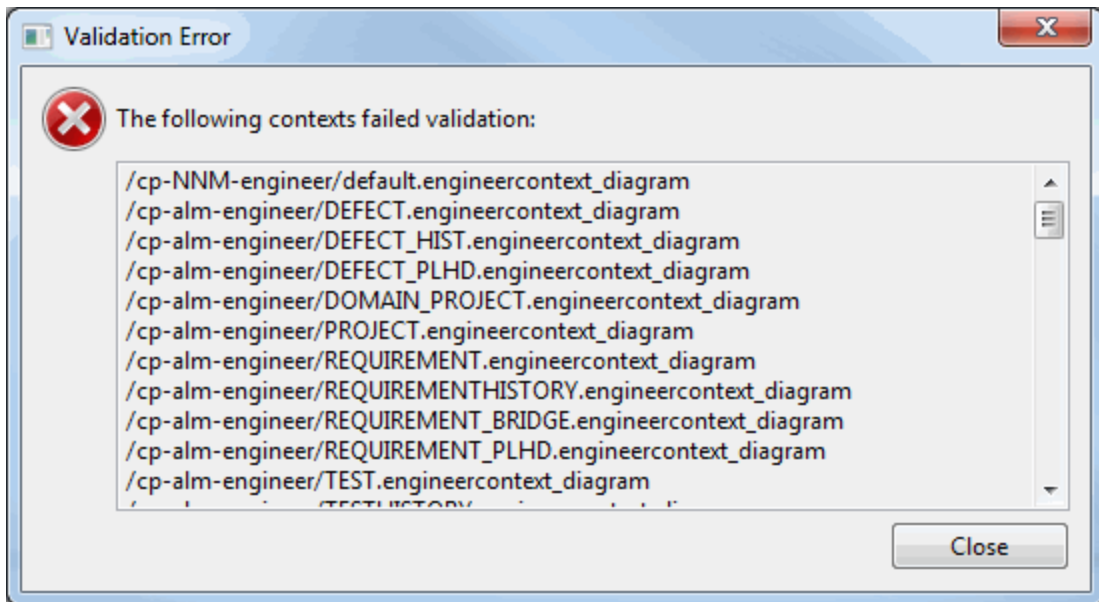
3. Click **Cancel** to cancel the validation process.

   All validations are performed only after you have saved your changes to the Designers.

Quick Fix

The validation process also includes a Quick Fix validation which provides recommendations for solutions for validation problems displayed in the Problems tab.

To use the Quick Fix option:

1. In the **Problems** tab, under the **Warnings** or **Errors** list, right-click a warning or error and select **Quick Fix** to open the Quick Fix dialog box.
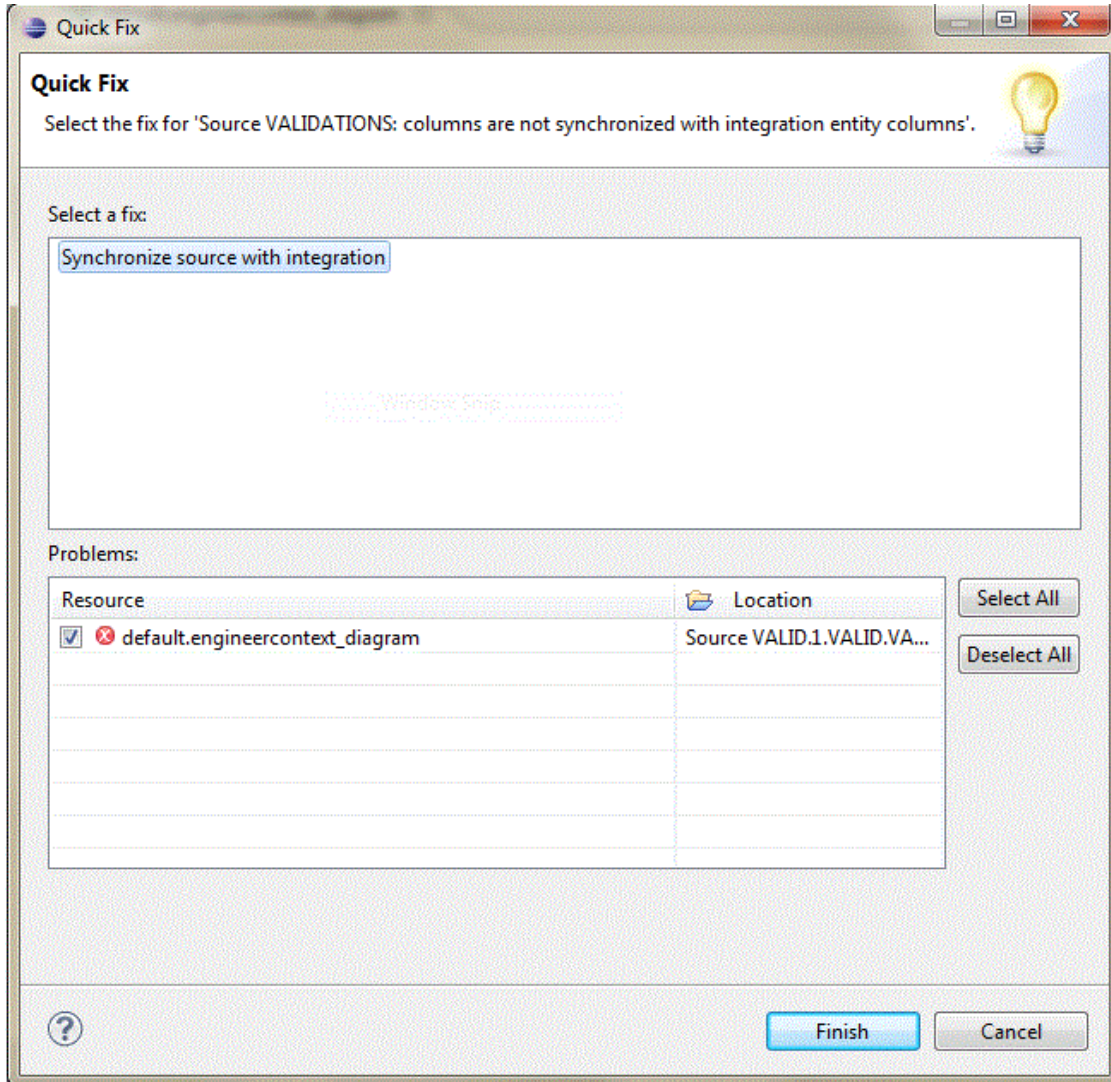
2. Select the fix for the specific warning and click **Finish**.

3. Click 🖫 **Save** and the error is removed.

Reference

Validation Table

Make sure all entities have been configured properly according to the following validations. An error or warning appears in the Problems tab once you have made the problematic change, and saved it. Note the validations that have the Quick Fix option available.

Error Text	Validation	Source	Integration	Target	Quick Fix
Target <Target ID> column <Column ID> - id length is greater than allowed Integration <Integration ID> column <Column ID>:- id length is greater than allowed	Length of column names (including system suffix)	Up to 60 characters	Up to 60 characters	Up to 60 characters	
Target <Target ID>: id length is greater than 50 characters Integration <Integration ID> id length is greater than 44 characters	Length of entity names (including system suffix)	Up to 60 characters	Up to 44 characters	Up to 50 characters	
Sample errors: Target <Target ID>: 'Business Name' field contains backslash (\) character Integration <Integration ID> 'Description' field contains backslash (\) character Source <Source ID>: 'Group By' field contains backslash (\) character	Backslash (\ ) is not permitted in any field text.	✓	✓	✓	✓
Target <Target ID> column <Column ID> id attribute violates DW Platform reserved prefixes: starts with non alphabetic character	Entity names and column names must start with alphabetic characters.	✓	✓	✓	✓

Error Text	Validation	Source	Integration	Target	Quick Fix
Integration <Integration ID> column <Column ID>: id attribute violates DW Platform reserved prefixes: starts with non alphabetic character					
Target entity is invalid. File containing the metadata was deleted Integration entity is invalid. File containing the metadata was deleted Source entity is invalid. File containing the metadata was deleted	Make sure an entity deleted from the file system is also deleted from the designer diagram.	✓	✓	✓	
Target <Target ID> column <Column ID> DataType is not defined	Make sure Data Type is defined for all Target columns.			✓	
Target <Target ID>: no column is defined as SCD for dimension entity	Make sure when a Target entity is defined as a **Dimension** that **SCD Type** is defined for at least one column.			✓	✓
Target <Target ID>: no column is defined as measure for fact entity	Make sure when a Target entity is defined as a **Fact** that **Measure** is selected for at least one column.			✓	✓
Target <Target ID>: not defined as FACT or DIMENSION	Make sure a Target entity is defined as a Fact, or Dimension, or both. The entity type cannot be left unselected.			✓	

Error Text	Validation	Source	Integration	Target	Quick Fix
Target <Target ID>: no column is defined as SCD for dimension entity Target <Target ID>: no column is defined as measure for fact entity	Make sure that when a Target entity is defined as a Dimension and a Fact, that at least one column in the entity is defined accordingly for each type. **Note:** If the Target entity contains only associated Dimensions, this validation is not performed.			✓	✓
Target <Target ID>: Invalid target extension. Target type doesn't match	Make sure that the data type in the extended entity equals the type of the base entity.			✓	
Target <Target ID> column <Column ID> - id is not unique in target extension	Make sure column or Associated Dimension ID is unique in the Target extension			✓	
Target <Target ID>: Target extension contains loop	Make sure Target extension does not contain a loop, meaning the extension of a base entity can not also have the base entity as an extension. That would place the			✓	

Error Text	Validation	Source	Integration	Target	Quick Fix
	entities in a loop with each other.				
Target <Target ID> column <Column ID> id attribute violates DW Platform reserved prefixes: starts with non alphabetic character	Integration names and in the columns first character must be a letter: [a-z][A-Z].	✓	✓	✓	✓
Target <Target ID>: id attribute violates DB character constraints (a-z A-Z 0-9 $ # _) Target <Target ID> Associated Dimension <Associated Dimension ID> id attribute violates DB character constraints (a-z A-Z 0-9 $ # _) Target <Target ID> column <Column ID> id attribute violates DB character constraints (a-z A-Z 0-9 $ # _) Integration <Integration ID> id attribute violates DB character constraints (a-z A-Z 0-9 $ # _) Integration <Integration ID> column <Column ID>: id attribute violates DB character constraints (a-z A-Z 0-9 $ # _) Source <Source ID> <Column ID>: 'Column Name' field violates DB character constraints (a-z A-Z 0-9 $ # _)	Integration names and in the columns next characters should be a letter, a digit, or '_' , '$', or '#'.	✓	✓	✓	✓
Target <Target ID>: id attribute violates DW Platform reserved prefixes: MD_ or DI_ Target <Target ID> Associated Dimension <Associated Dimension ID> id attribute violates DW Platform reserved prefixes: MD_ or DI_"	Integration names and in the columns must not start with one of the DW Platform reserved prefixes: MD_ or DI_.	✓	✓	✓	✓

Error Text	Validation	Source	Integration	Target	Quick Fix
Target <Target ID> column <Column ID> id attribute violates DW Platform reserved prefixes: MD_ or DI_ Integration <Integration ID>id attribute violates DW Platform reserved prefixes: MD_ or DI_ Integration <Integration ID> column <Column ID>: id attribute violates DW Platform reserved prefixes: MD_ or DI_					
Integration <Integration ID> no business key is defined Integration <Integration ID> Business key sequence is not defined properly (Doesn't start at 1 or numbers are not sequential)	Make sure that the Business Key is specified. In case of more than one Business Key, they must be in order (1, 2, 3) without spaces in the numbering.		✓		
Integration <Integration ID> Business key sequence must contain at least one column which is not Nullable	Make sure Null Allowed is not selected for at least one of the Business Keys.		✓		✓
Target <Target ID> : No id is defined for column Target <Target ID> column <Column ID> - id is not unique Integration <Integration ID> column <Column ID>:- id is not unique	Make sure that the column has an ID and it is unique.		✓	✓	
Source <Source ID> <Column ID>: no value at table name field Source <Source ID> <Column ID>: no value at db column name field	If a Source column has Type set as Direct, then make sure Table Name and Column Name are not empty.	✓			

Error Text	Validation	Source	Integration	Target	Quick Fix
Source <Source ID> <Column ID>: no value at fixed value field	If a Source column has Type set as Fixed, then make sure Fixed Value is not empty.	✓			
Source <Source ID> <Column ID>: no value at calculation rule field	If a Source column has Type set as Rule, then make sure Calculation Rule is not empty.	✓			
Source <Source ID> <Column ID>: 'Column Name' field contains backslash (\) character Source <Source ID> <Column ID>: 'Column Name' field violates DB character constraints (a-z A-Z 0-9 $ # _)	If a Source column has Type set as Direct, then make sure Column Name does not contain special characters. This validation runs only if the Product Type in the source Content Pack is the database type of either MSSQL, Oracle or MySQL.	✓			✓
Source <Source ID> doesn't include join condition	Make sure that the Source entity has a Join Condition and Table Name specified.	✓			
Source <Source ID> contained in <cp Name> is not referencing to any integration entity	Make sure that a Source entity is mapped to an Integration entity.	✓	✓		
Source <Source ID>: columns are not synchronized with integration entity columns	Make sure that the Source and Integration	✓	✓		

Error Text	Validation	Source	Integration	Target	Quick Fix
	entities are synchronized.				
Integration <Integration ID> column <Column ID>: is not mapped to target column and data type is undefined Integration <Integration ID> column <Column ID>: contains invalid mapping	Make sure all mapped Integration columns are mapped accordingly to the Target or have been assigned a data type.		✓		
Target <Target ID> column <Column ID> is defined as VARCHAR but has no length Integration <Integration ID> column <Column ID>: is defined as VARCHAR but has no length	Make sure that the length of a Varchar column is more than 0.		✓	✓	
Target <Target ID> column <Column ID> is defined as VARCHAR but length is greater than allowed (4000) Integration <Integration ID> column <Column ID>: is defined as VARCHAR but length is greater than allowed (4000)	Make sure that the length of a Varchar column is less than or equal to 4000.	✓	✓	✓	✓
No id is defined for target entity No id is defined for integration entity	Make sure each entity has an ID defined.	✓	✓	✓	
Target <Target ID> column <Column ID> the id is a DB reserved word Integration <Integration ID> column <Column ID>: the id is a DB reserved word	Make sure the defined column name does not contain a reserved word. For details, see MSDN Microsoft SQL Server	✓	✓	✓	

Error Text	Validation	Source	Integration	Target	Quick Fix
	reserved keywords list.				

Generate Content

The IDE can generate the relevant schemas and ETLs that are required for the integration.

The ETL Generator generates the required artifacts based on the modeling in the previous steps. The artifacts contain ETL SQL scripts as well as the data models and stream configuration XML files that are imported into the Data Warehouse metadata repository. Once the metadata has been loaded, the schema generation mechanism performs the schema changes in the target and the staging databases.

To access:

When a designer is open, the ETL button is displayed in the top right toolbar in the IDE workspace. If it is not displayed, navigate to **Window** > **Customize Perspective** and make sure **BA IDE** is selected.

Click **ETL** to begin the ETL Generator.

Learn More

Content Pack Creation Tool

The Content Pack Creation Tool enables you to create a new Content Pack structure using existing source content packs. This allows you to use the IDE to extend content as well as develop entirely new Content Packs for use in the Data Warehouse and ITBA.

The ETL Generator action is relevant to the selected designer. The ETL button is only displayed when a designer is open.

Tasks

Create a new entity and a new Content Pack with the ETL Generator

To create a new entity and a new Content Pack with the ETL Generator:

1. Click ETL in the toolbar on the top right of the IDE workspace to begin the ETL Generator. The ETL Generator dialog box opens.
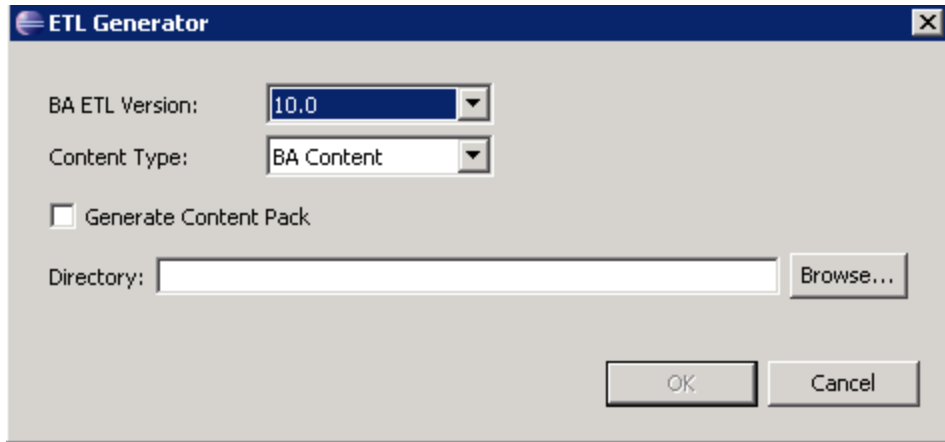
2. In the dialog box:

   ○ In **BA ETL Version**, select **10.10**.

   ○ In **Content Type:** select **BA Content**.

   ○ Select the **Generate Content Pack** check box if you are creating a new Content Pack (not existing content). This creates a new content pack structure along with the generated ETL files. This capability is only available when generating the ETL files in the Designer.

   > **Note:** The Generate Content Pack check box is not available when generating the ETL files from the Architect Target Designer.
   >
   > When you generate the ETL files from the Engineer Stream Designer, the **Generate Content Pack** check box is disabled if there are no source entities in the Engineer Stream Designer.

   ○ In **Directory**, browse to the directory where you want the generated Content Pack to be placed.

3. Click **OK**. The process may take some time.

4. Proceed to package and deploy your content.

Package and Deploy Content
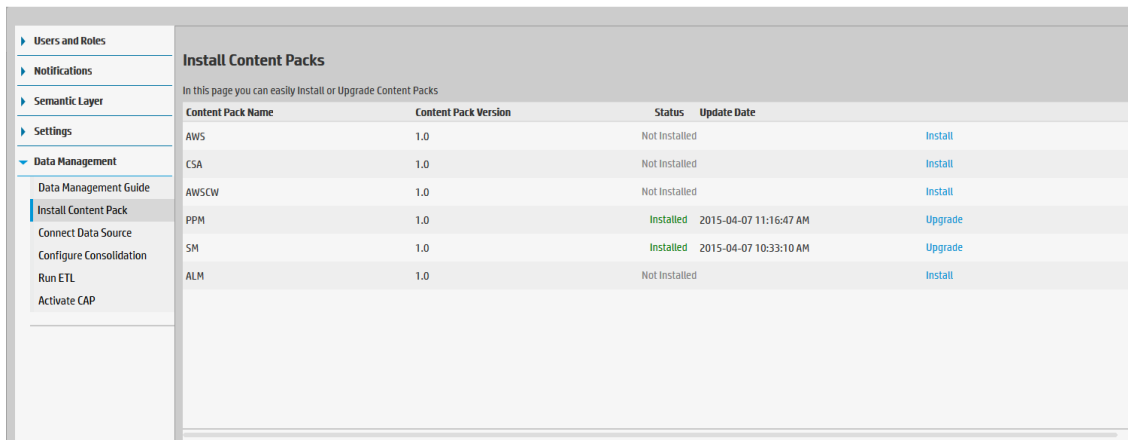
After you have run the ETL Generator and saved the Content Pack, you must package your new or extended content solution.

Tasks

Package and deploy content

Copy the generated files to the Content Packs directory on the DWH server.

- **For Content Packs with added or extended entities:** Go to UI to install the Content pack.

- **For new Integrated Content Packs:** Make sure your new CP is packaged in the correct directory structure by selecting the **Generate Content Pack** checkbox in the ETL Generator, and then copying it to the ContentPacks directory in your DWH installation.

Activate New Content

After you package and deploy new Content Packs, you activate the content in the ITBA Connect Data Source UI. Content that is created from databases (MSSQL ,ORACLE and MYSQL) according to your specific Content Pack source.

To access:

In the ITBA application, select **ADMIN > Data Management > Connect Data Source.** Click **Add Data Source** and select the relevant Content Pack you have created.

| Tasks | UI Description |

Tasks

Activate a new Content Pack

1. In the ITBA application, select **Admin > Data Management > Connect Data Source**.

2. Click the **Add data source** to open the Data source wizard. The Add Data Source page opens.

3. Select the CP you created and click **Next**.

   The relevant data source page opens.

4. Enter and select the configuration parameters.

5. Complete the wizard.

   The data source instance is activated.

For details on all ITBA Connect Data Source capabilities, see Connect the Data Source in the *Administrator Guide*.

UI Description

CP Activation Page Options

Activation parameters are based on the Data Source Type of your Content Pack.

MSSQL Database Source CP

UI Element	Description
Instance name	Enter a name for the data source instance you are activating.
\<CP name\> Version	1
Time Zone	Select the time zone for the data source.
Data Source Type	Select **MSSQL**.
Username	Enter your username used to log on to the database.
Password	Enter your password used to log on to the database.
Hostname/IP Address	Enter the SQL server database hostname or IP address.
Port	Enter the server port number.
Database Name	Enter the database name used by the CP.
Initial Load Period (months)	Select the number of months from which you want the initial data loaded.

MySQL Database Source CP

UI Element	Description
Instance name	Enter a name for the data source instance you are activating.
\<CP name\> Version	1
Time Zone	Select the time zone for the data source.
Data Source Type	Select **MySQL**.
Username	Enter your username used to log on to the database.
Password	Enter your password used to log on to the database.

UI Element	Description
Hostname/IP Address	Enter the MySQL server hostname or IP address.
Port	Port for database connections.
Initial Database Name Load Period (months)	Select the number of months from which you want the initial data loaded.

Oracle Database Source CP

> **Note:** The Oracle database can have both Server ID (SID) and Service Name properties, but the user should specify only one. If you define the SID, then the SID is used, and if you define Service Name, then Service Name is used. If you define both in the UI, only SID is used.

UI Element	Description
Instance name	Enter a name for the data source instance you are activating.
<CP name> Version	1
Time Zone	Select the time zone for the data source.
Data Source Type	Select **Oracle**.
Username	Enter your username used to log on to the database.
Password	Enter your password used to log on to the database.
Hostname/IP Address	Enter the Oracle server hostname or IP address.
SID	Enter the unique name of the database.
Service Name	Enter the alias used when connecting.
Initial Load Period (months)	Select the number of months from which you want the initial data loaded.

Advanced Development

Following the ETL Generator process, you can optionally access the following features and processes for advanced content development.

Data Source Explorer

Following the ETL Generator process, you can optionally access the following features and processes for advanced content development.

The IDE provides a Data Tool Platform plug-in which enables you to connect to a specific data source and browse the database.The Data Source Explorer enables connection to the data sources through the SQL, Oracle and MySQL drivers. You can then browse the database tables, make queries, and view the data source information.

To access:

- To create a new data source connection profile, in the IDE main page, select **Window > Show View > Other > Data Management > Data Source Explorer,** right click **Database Connections** and right-click **New**.

Tasks **UI Description**

Tasks

This section includes:

Create a new database connection in the Data Source Explorer

1. Navigate to **Window** > **Show View** > **Other** > **Data Management** > **Data Source Explorer**. The Data Source EXPLORER tab is displayed.

2. Right-click **Database Connections** and then right-click **New.**

3. Select **Oracle**, **SQL Server**, or **MySQL** and click **Next**.

4. Enter the **Database**, **Host**, **Port number**, **Username** and **Password**.

5. Click **Test Connection** to check for errors with the connection to the database.

6. Click **Finish** to enable the connection to the database.

You can change the driver definitions or create another driver.

Modify driver definitions

Note: IDE provides out-of-the-box drivers for MSSQL, Oracle, and MySQL.

1. Navigate to **Window** > **Preferences** > **Data Management** > **Connectivity** > **Driver Definitions**.

2. Select the driver you want to change, or click **Add** to add an additional driver.

   For details on the Data Tool Platform, see the Eclipse DTP tutorials.

⬤ UI Description

Data Source Explorer

Note: IDE provides out-of-the-box drivers for MSSQL, Oracle, and MySQL.
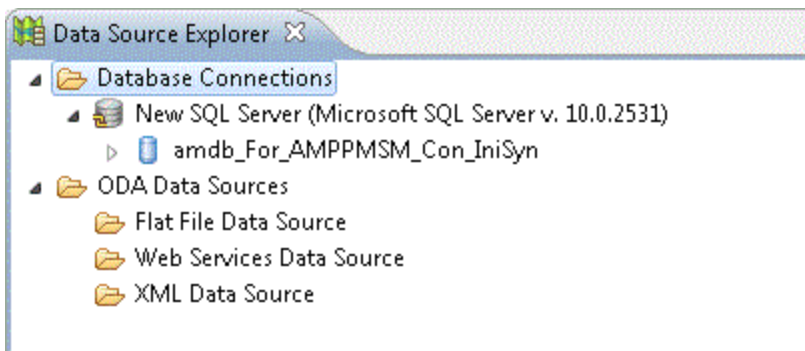
- Right-click **Database Connections** and select **New** to create a new database connection. For details, see "Data Source Connection Profile" on the next page

Data Source Connection Profile
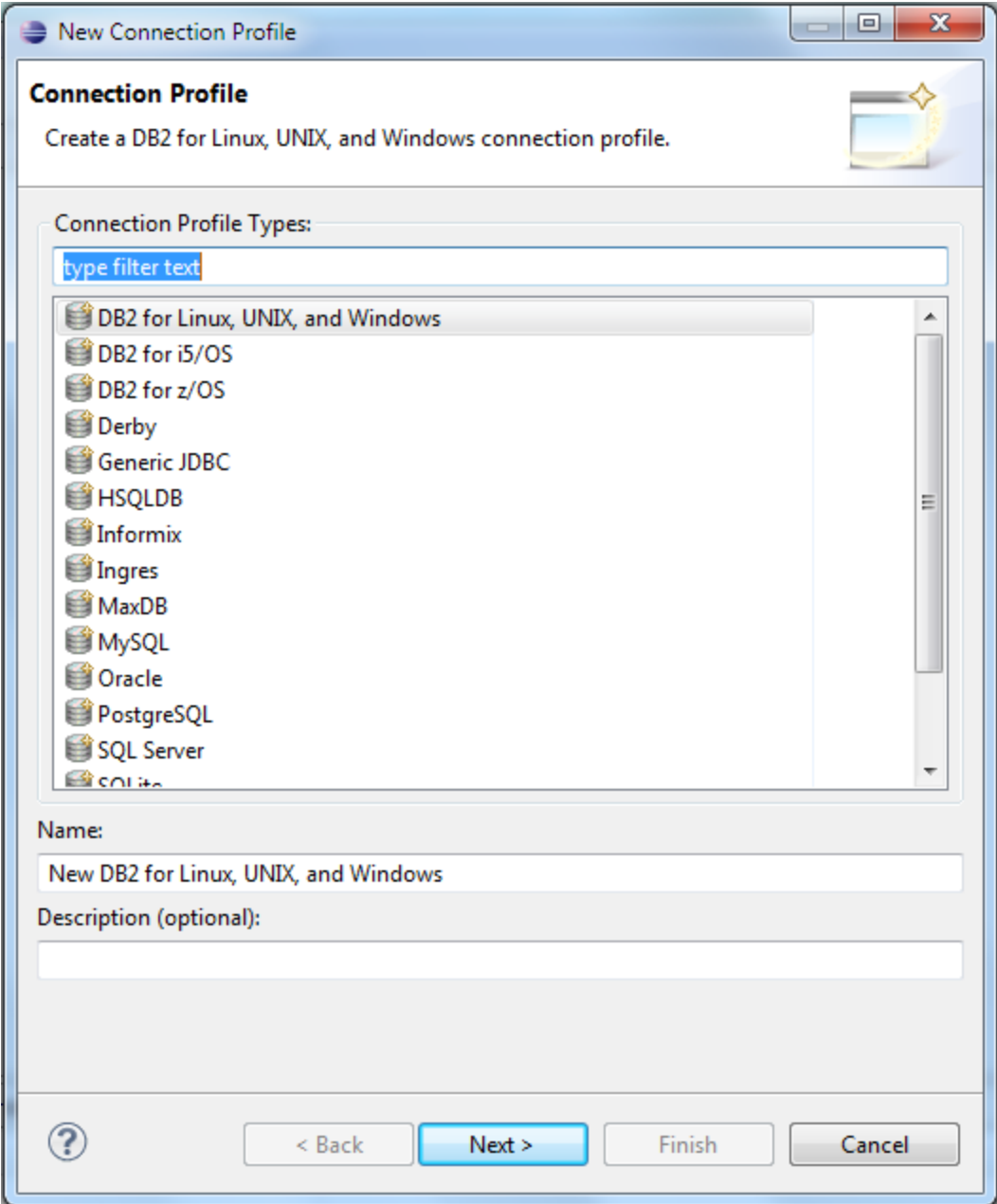
User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

UI Element	Description
<Driver List>	Select **SQL**, **Oracle**, or **MySQL Server**.

Specify a Driver and Connection Details

- **MSSQL Server**

UI Element	Description
Database	Enter the specific database name.
Host	Enter the host server.
Port number	Enter the database port.
User name	Enter the database user name.
Password	Enter the database password.
	New Driver Definition. Click to configure new driver definitions. For details, see the Eclipse DTP tutorials.
	Edit Driver Definition. Click to edit the current driver definitions. If you receive an error for the driver, check that the correct path is displayed in the driver files of the JAR list.

- **Oracle Server**
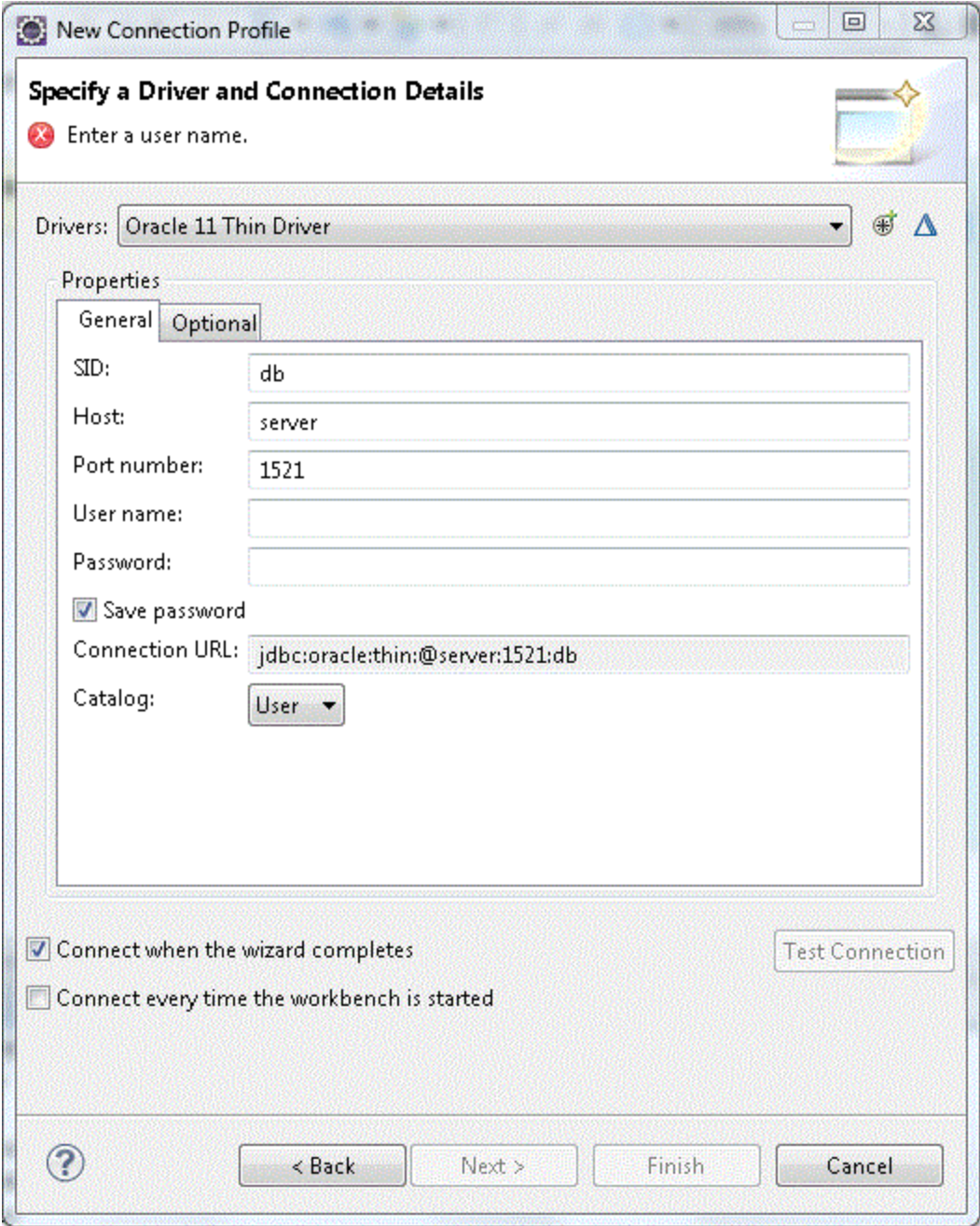
UI Element	Description
SID	Enter the Server ID, the unique name of the database.

UI Element	Description
Host	Enter the host server.
Port number	Enter the database port.
User name	Enter the database username.
Password	Enter the database password.
	New Driver Definition. Click to configure new driver definitions. For details, see the Eclipse DTP tutorials.
	Edit Driver Definition. Click to edit the current driver definitions. If you receive an error for the driver, check that the correct path is displayed in the driver files of the JAR list.

- **MySQL Server**

User interface elements are described below (when relevant, unlabeled elements are shown in angle brackets):

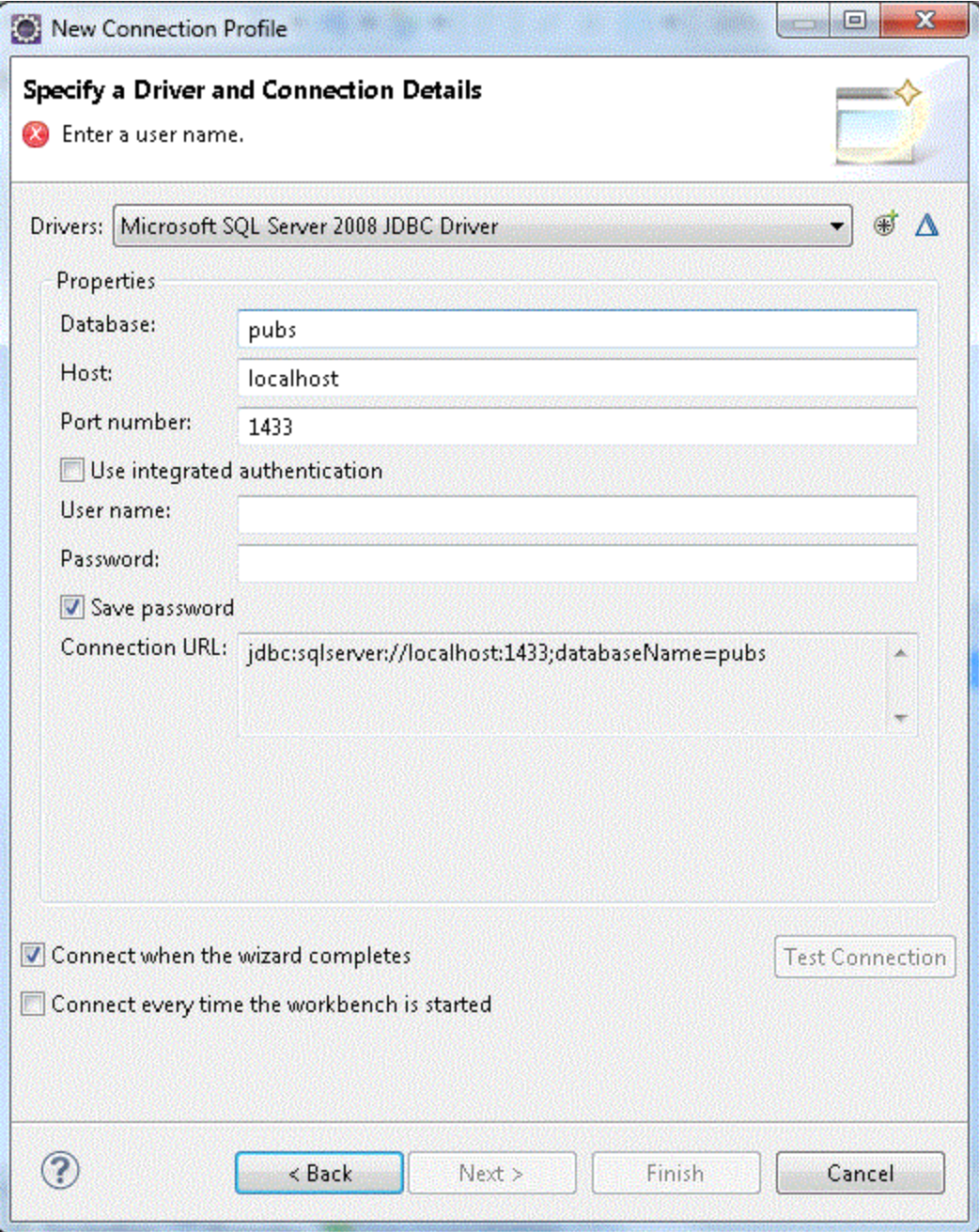| UI Element	Description
Database	Enter the specific database name.
URL	Enter the database URL.
User name	Enter the database username.
Password	Enter the database password.
	New Driver Definition. Click to configure new driver definitions. For details, see the Eclipse DTP tutorials.
	Edit Driver Definition. Click to edit the current driver definitions. If you receive an error for the driver, check that the correct path is displayed in the driver files of the JAR list.

Generate Entities Automatically

You can generate entities from the source database tables or views. This enables you to automatically create Source, Integration or Target entities. Using the Data Source Explorer, you can connect to the source database and navigate to the source table or view. The entities are created based on the specific source metadata. MSSQL, Oracle, and MySQL source databases are supported. You can then load the entity to a new designer located in an existing project. The entity is then displayed in the new Engineer Stream Designer.

Tasks   **UI Description**

Tasks

This section includes:

Automatically generate entities from database tables or views

> **Note:** You can generate Source, Integration or Target entities using the Entity Generator wizard.

1. Navigate to **Window** > **Show View** > **Other** > **Data Management** > **Data Source Explorer**. The Data Source EXPLORER tab is displayed.

2. Select either an SQL, Oracle, or MySQL Database and connect to the database.

3. Navigate to **Tables** or **Views** and right-click the relevant table or view from which you want to generate the entity and select **Generate DWH Entity**.
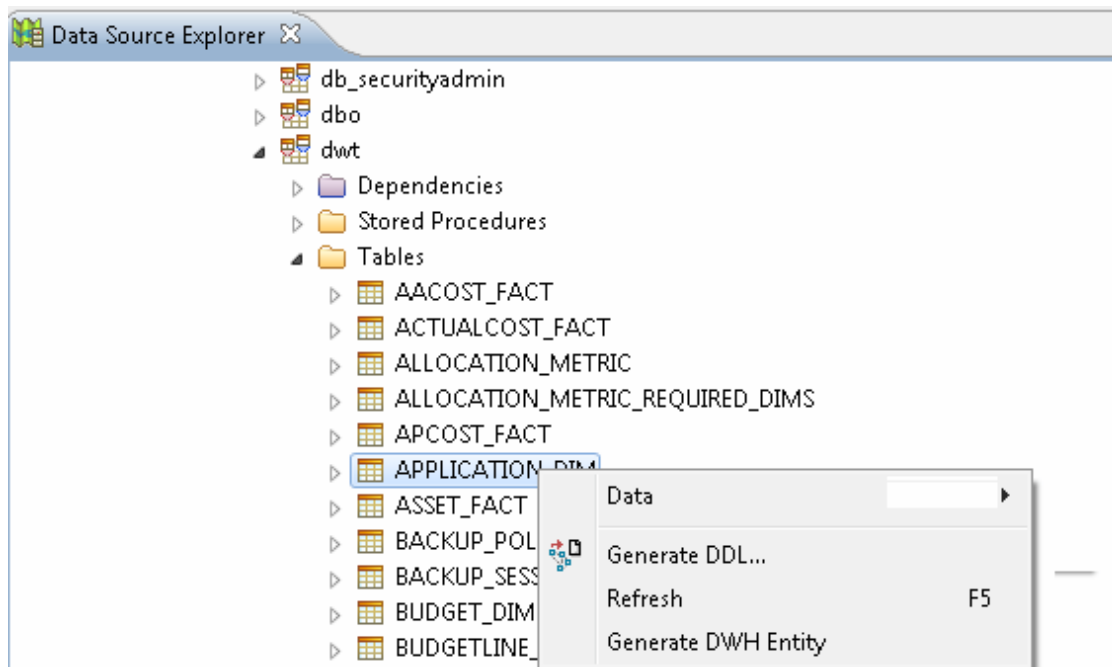
4. In the Scenario page:

   a. Select the type of content pack: **Source Content Pack**, **Integration Content Pack**, or **Target**.

   b. If you have selected **Source Content Pack**, **Integration Content Pack**, select the relevant content pack.
   When you select the Source Content Pack, the Integration Content Pack is automatically displayed.

      If you have selected **Target**, select whether the entity is defined as a **Fact** or **Dimension**.

   > **Note:** When you generate an entity from an Oracle database, make sure that if you use reserved words, they are placed in quotation marks, for example, "NUMBER".
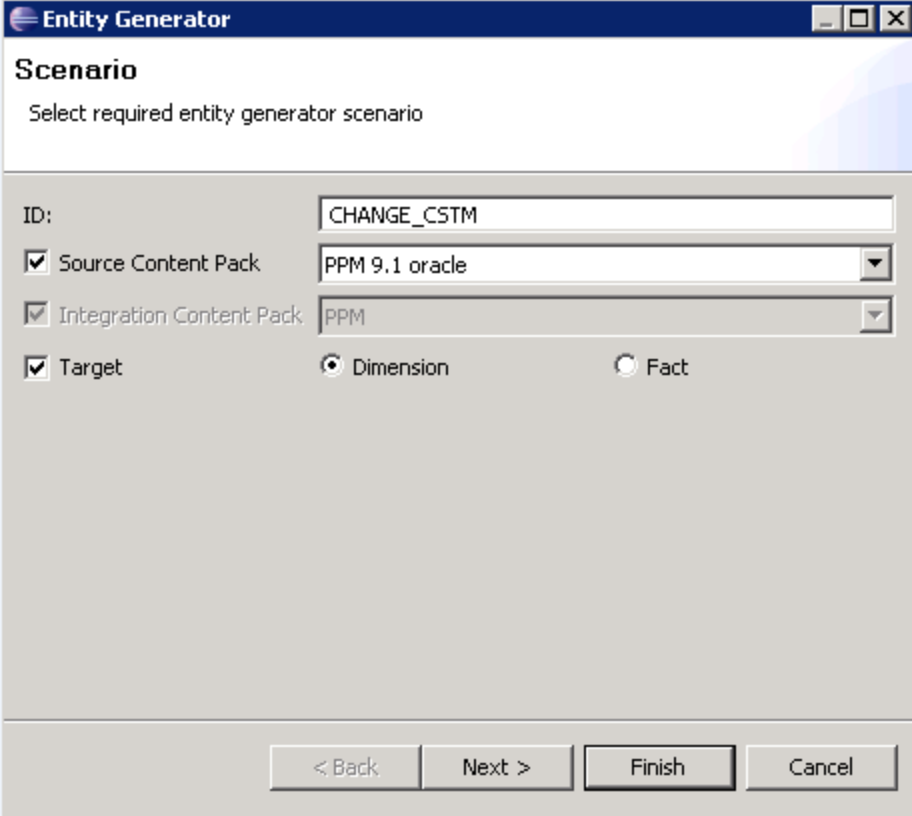
5. Click **Next**.

6. In the Load to Designer page, select to either load the entity to a **New Designer**, or **No Designer** .

7. If you selected **New Designer**, select from the drop down list, the project where you want the specific Designer to be located.

8. Click **Finish** to complete the wizard and create the entity. The new entity is now displayed in the IDE Package Explorer, and if relevant, loaded in the assigned designer canvas.

● UI Description

Entity Generator Wizard

Scenario page

Note: If you select to generate Integration and Target entities, **SSI Column Mapping** is automatically performed and displayed in the relevant designer .

UI Element	Description
ID	Enter entity name. The current table or view name is the default.
Source Content Pack	Select the checkbox and the Source content pack for the specific entity. This generates a Source entity and automatically selects the relevant Integration content pack.

UI Element	Description
	Notes: • If there is only one Source content pack in the workspace it is entered automatically and cannot be changed. • This checkbox is disabled if there is no Source content pack in the workspace.
Integration Content Pack	Select the checkbox and the Integration content pack for the specific entity. The Integration content pack is automatically populated when the Source CP is selected. **Notes:** • If there is only one Integration content pack in the workspace it is entered automatically and cannot be changed. • If only **Integration Content Pack** is selected, the **Next** button is disabled, and the entity cannot be loaded to a designer. • This checkbox is disabled if there is no Integration content pack in the workspace.
Target	Select the checkbox and whether the Target entity is defined as a **Dimension** or **Fact**. The entity is placed in the core-cp. If only **Target** is selected, the entity is loaded to the Architect Target Designer.

Load to Designer page

UI Element	Description
No Designer	Select the checkbox and the generated entity is not displayed in a designer canvas.
New Designer	Select the checkbox for the generated entity to be displayed in a designer canvas. Select an existing project from the drop down list where the designer will be located. **Note:** If a Target entity was generated then the entity is loaded into an Architect Target Designer only. For Source and Integration entities, they are loaded into an Engineer Stream Designer.

Complete Entity Generation with SSI mapping displayed in Stream Designer
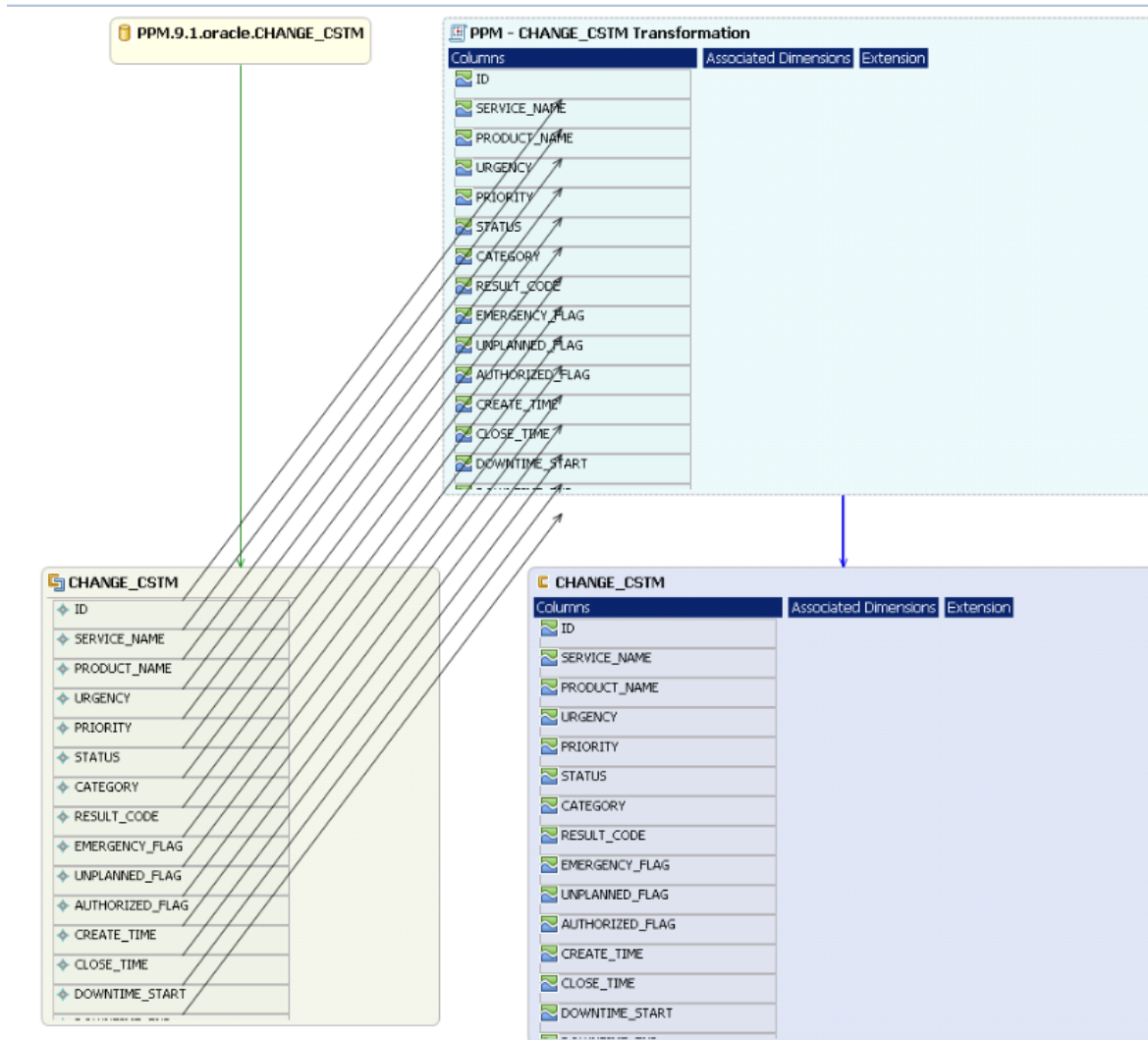
IDE Data Types

The follows shows Database Data Types and the conventions used for them in the IDE entity columns.

Database Data Type	IDE Data Type
BIGINT	Int32
INTEGER(INT), SMALLINT, NUMERIC, NUMBER	Int16
FLOAT, DOUBLE_PRECISION	Float
CHARACTER, NVARCHAR, VARCHAR, VARCHAR(2), CHARACTER_VARYING, CHARACTER_VARYING	VarChar (size)
CHARACTER_LARGE_OBJECT, CLOB, TEXT	VarChar (4000)

Database Data Type	IDE Data Type
DATE, TIMESTAMP, TIME, DATETIME,	Integration: Date Time Target: Localized Date Time
RAW16	No IDE Data Type. User must select a data type or delete the column.
IMAGE	No IDE Data Type. User must select a data type or delete the column.
BLOB	No IDE Data Type. User must select a data type or delete the column.

Data Source Extraction Customization

Integration with data sources is performed using the Data Collection Service (DCS). In order to generate the query executed for the data source, the Content Flow Manager tells the DCS framework which source entity to extract. The DCS then extracts the correlating metadata definitions, and uses them in order to formulate a query.

Tasks

This section includes:

Customize the Source Model

You can customize the generated query by modifying the source entity xml file. This updates the source metadata in the Data Warehouse and matches it to the customized source.

1. Modify the XML and load it into the Data Warehouse metadata repositoryby logging on DWH and using the user interface.

2. Change the SQL query from the DCS log and run the query on the source database make sure the query is correct and can run without errors.

3. Identify all of the changes.

There are various types of customizations to the source models supported by the DWH. This document emphasizes cases where the data source that you extract information from is based on RDBMS, and entities which are already modeled in the DWH have had field names or table names changed in the data source's structure.

The Data Source's source model metadata xml files are located under:

$HPBA_
HOME/ContentPacks/<CPname>/INBUILT/DATAMODEL/DATAINTEGRATION/SOURCE/<produ
ct_version>/<DB_type>/<entity_name>.xml

Example

$HPBA_
HOME/ContentPacks/SM/INBUILT/DATAMODEL/DATAINTEGRATION/SOURCE/9.2/oracle/
SM_INCIDENTSM1_SRC.xml

Make changes in a field name

Open the entity xml source model file and update the source field names in the
datasourcecolumnname property in the **ColumnMapping** tag:

Example

<ns1:ColumnMapping extractioncolumnidentifier="<identifier>" notapplicable="N" >

<ns1:DataSourceMapping datasourcetablenameoraliasname=" <name>"
datasourcecolumnname=" source field name" datasourcecolumntype="XXXXX"/>

</ns1:ColumnMapping>

Make changes in a table name

1. Open the entity xml source model file and update the **DataSourceJoin** and **DataSourceWhere**
   tags with the changes.

Examples

<ns1:DataSourceJoin>table name</ns1:DataSourceJoin>

<ns1:DataSourceWhere>field name=1</ns1:DataSourceWhere>

<ns1:DataSourceJoin>table1 A LEFT JOIN table2 B ON A.AAAAA =
B.BBBBB</ns1:DataSourceJoin>

<ns1:DataSourceWhere>A.AAAAAAAA IS NOT NULL</ns1:DataSourceWhere>

2. Change the **datasourcetablenameoraliasname** property in the **ColumnMapping** tag to the new
   value.

Example

<ns1:ColumnMapping extractioncolumnidentifier="XXXX" notapplicable="N" >

```
<ns1:DataSourceMapping datasourcetablenameoraliasname=" A" datasourcecolumnname="
XXXX" datasourcecolumntype="XXXXX"/>

</ns1:ColumnMapping>
```

Update the data warehouse metadata

1. Go to **Admin > Data Management >Install Content Pack**, and upgrade the changes.

2. Start the ETL again using the DW ABC Streams Management UI. For details, see Content Flow
   Management in the *Administrator Guide*.

Customize the Extraction Model and the EXT ETL Scripts

The IDE generates ETL scripts that, by default, support deleting cases. You can change the default if you do not need to delete cases.

1. Modify the flag **isDelete = 'Y'** in the extraction model to **isDelete = 'N'**, then DCS does not extract the delete flat file any more.

   The extraction model is located under:

   **$HPBA_
   Home
   /ContentPacks/<CPname>/INBUILT/DATAMODEL/DATAINTEGRATION/EXTRACTION/**

2. Remove the relevant SQL clause from the EXT ETL scripts.

   Relevant SQL causes are all the SQL clauses with a table name that has the post-fix **DEL_SRC**.

   The EXT ETL script is located under:

   **$HPBA_Home/ContentPacks/<CPname>/INBUILT/ETL/ENTITY_NAME/%NTEGRATION_
   ENTITY**

Customize the SSI Layer

The Single Source Identity (SSI) processes restructure the diverse source system data from the EXT tables into standard structures. The SSI tables contain this conformed data. Since the Data Warehouse uses data from multiple source systems that do not use the same business keys for the same entities, the ETL process creates an internal enterprise key to link entity records. The ETL process uses data in the SSI tables to generate these enterprise keys, which are used during the consolidation process.

For details, see *ETL Process and Architectural Overview* in PDF format.

> **Tip:** When customizing the SSI layer:
>
> 1. Do not modify the SSI table creation clause.
>
> 2. Do not remove the commit keyword from the end of the script.

> **Tip:** When customizing your ETL script, you can only modify the SSI layer script.

1. To customize the SSI layer, go to **$HPBA_HOME/ContentPacks/<Product_Name>/ETL/<Product_Name>_<Entity_Name>_SSI_DF.sql**.

2. Modify the script and save.

Example:

```
--SSI step
--Create SSI table
DROP TABLE IF EXISTS ${dws}.AM_LOCATION_${MD_CP_ID}_SSI CASCADE;
CREATE TABLE ${dws}.AM_LOCATION_${MD_CP_ID}_SSI(
    BUILDING  VARCHAR(140)  NULL,
    CITY  VARCHAR(80)  NULL,
    COUNTRY  VARCHAR(80)  NULL,
    LOCATION_CATEGORY  VARCHAR(60)  NULL,
    LOCATION_NAME  VARCHAR(140)  NULL,
    LOCATION_NAME_ALT  VARCHAR(200)  NULL,
    PARENT_BUSINESS_KEY  VARCHAR(1000)  NULL,
    PARENT_ENTERPRISE_KEY  INT  NULL,
    POSTAL_CODE  VARCHAR(40)  NULL,
    SITE  VARCHAR(140)  NULL,
    STATE_PROVINCE  VARCHAR(80)  NULL,
    MD_BATCH_ID  INT  NOT NULL ,
    MD_PROCESS_ID  INT  NOT NULL ,
    MD_CP_ID  INT  NOT NULL ,
    MD_FLAG  VARCHAR(10)  NOT NULL ,
    MD_BUSINESS_KEY VARCHAR(1000) NOT NULL
) ORDER BY MD_BUSINESS_KEY SEGMENTED BY HASH(MD_BUSINESS_KEY) ALL NODES;

--Put ext data into SSI table
--If mutiple source join or merge, please add the join condition to below SQL,
--and please map the md_business_key of target entity to some columns of source entities,
--and please map the md_flag of target entity to one of source entities
INSERT INTO ${dws}.AM_LOCATION_${MD_CP_ID}_SSI(
    BUILDING  ,
    CITY  ,
    COUNTRY  ,
    LOCATION_CATEGORY  ,
    LOCATION_NAME  ,
    LOCATION_NAME_ALT  ,
    PARENT_BUSINESS_KEY  ,
    PARENT_ENTERPRISE_KEY ,
    POSTAL_CODE  ,
    SITE ,
    STATE_PROVINCE  ,
    MD_BATCH_ID ,
    MD_PROCESS_ID  ,
    MD_CP_ID  ,
    MD_FLAG ,
    MD_BUSINESS_KEY
)
SELECT
    NULL AS BUILDING  ,
    AMLOCATION.CITY AS CITY  ,
    AMCOUNTRY.NAME AS  COUNTRY  ,
    AMLOCATION.LOCATIONTYPE AS LOCATION_CATEGORY  ,
    AMLOCATION.NAME AS  LOCATION_NAME  ,
    NULL AS LOCATION_NAME_ALT  ,
    DECODE(AMLOCATION.LPARENTID,0,NULL,AMLOCATION.MD_CP_ID || ':' || AMLOCATION.LPARENTID) AS PARENT_BUSINESS_KEY
    NULL PARENT_ENTERPRISE_KEY ,
    AMLOCATION.ZIP AS POSTAL_CODE  ,
    AMCOMPANY.NAME AS SITE  ,
    AMLOCATION.STATEX AS  STATE_PROVINCE  ,
    ${MD_BATCH_ID} AS MD_BATCH_ID ,
    ${MD_PROCESS_ID} AS MD_PROCESS_ID  ,
    AMLOCATION.MD_CP_ID  ,
    AMLOCATION.MD_FLAG ,
    AMLOCATION.MD_CP_ID || ':' || AMLOCATION.MD_BUSINESS_KEY     MD_BUSINESS_KEY
FROM ${dws}.AM_AMLOCATION_LOCATION_${MD_CP_ID}_EXT  AS AMLOCATION
LEFT JOIN ${dws}.AM_AMCOUNTRY_LOCATION_${MD_CP_ID}_EXT  AS AMCOUNTRY  ON (AMLOCATION.LCOUNTRYID = AMCOUNTRY.LCOUNTRYID )
LEFT JOIN ${dws}.AM_AMCOMPANY_LOCATION_${MD_CP_ID}_EXT  AS AMCOMPANY  ON (AMLOCATION.LSOCID = AMCOMPANY.LCPYID )
WHERE AMCOUNTRY.MD_PF_FLAG = 'D' OR AMLOCATION.MD_PF_FLAG = 'D' ;
COMMIT;
```

Table creation

Commit key word

Consolidate Entities - Cross-CP Lookup

A Content Pack (CP) includes several entities. Some entities have relationships with other entities in the same Content Pack. In such cases, the ETL process looks up for the relational entities in the same Content Pack.

In some cases, you may need to develop several Content packs for the same entities. For example, the AWS and AWSCW integrations are performed using two different Content Packs including similar entities.

To set up the priority order:

1. Go to **$ITBA_HOME$\ContentPacks\$DATASOURCE_ NAME$\CONF\dataSourceParamsConfig.xml**.

   Note: The configuration file is optional. Without the configuration file, the ETL process follows the regular look up way, meaning that one entity looks up the other entity in the same Content Pack with the same instance and the instance ID is replaced automatically by the ETL service.

2. Modify the file, and save it.

   The entity uses first the value in the first instance, for example PPM_1, if there is no such value, it uses the value in the second instance, for example PPM_2, or if there is no such value, it uses the default value. You can have more than two <ParamValue Value=... Instance Name=.../> lines.

   The format must be as follows:

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
    <Entities DataSourceName="PPMCT">
        <Entity EntityName="LOCATION_CSTM">
            <Parameter DefaultValue="" Name="MD_CP_ID_FOR_LOOKUP">
                <ParamValue Value="1" InstanceName="PPM_CSTM"/>
            </Parameter>
        </Entity>
    </Entities>
```

   where:

   - **DataSourceName** is the name of the Content Pack that is installed.

   - **EntityName** is the entity for which you must do a cross_CP lookup.

   - **Parameter DefaultValue** is the default value if you did not configure the parameter value.

- **Parameter Name** is the name of the parameter that you use in the SSI layer.

- **ParamValue** is the value for the parameter that is used for the SSI layer customization.

- **InstanceName** is the data source instance used for the cross -CP lookup.

Note: Multiple instance cross-CP lookup is supported.

This configuration file is optional. Without the configuration file, the ETL process follows the regular lookup way.

Customize Views

To customize a view:

1. Go to $**HPBA_HOME\DW_Content\CORE\INBUILT\SCRIPTS\APPLICATION**.

2. Duplicate the relevant OOTB view and make the changes or create your own script.

> **Tip:** Do not modify an OOTB view script.

Example of a customized script:

```
CREATE  OR REPLACE VIEW ${application.schema}.CHANGE_FACT_V
AS
SELECT     ${target.schema}.CHANGE_FACT_V.MD_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.SERVICE_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.CREATE_TIME_PERIOD_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.CLOSE_TIME_PERIOD_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.OUTAGE_START_PERIOD_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.OUTAGE_END_PERIOD_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.CURRENCY_BASE,
           ${target.schema}.CHANGE_FACT_V.CURRENCY_LOC,
           ${target.schema}.CHANGE_FACT_V.COST_BASE,
           ${target.schema}.CHANGE_FACT_V.COST_LOC,
           ${target.schema}.CHANGE_FACT_V.EXCHANGE_BASE_DURABLE_KEY,
           ${target.schema}.CHANGE_FACT_V.EXCHANGE_LOC_DURABLE_KEY,
           ${target.schema}.CHANGE_DIM_V.URGENCY,
           ${target.schema}.CHANGE_DIM_V.PRIORITY,
           ${target.schema}.CHANGE_DIM_V.APPROVAL_STATUS,
           ${target.schema}.CHANGE_DIM_V.CHANGE_CATEGORY,
           ${target.schema}.CHANGE_DIM_V.COMPLETION_CODE,
           ${target.schema}.CHANGE_DIM_V.REFERENCE_NUMBER,
           ${target.schema}.CHANGE_DIM_V.EMERGENCY_CHANGE,
           ${target.schema}.CHANGE_DIM_V.UNPLANNED_CHANGE,
           ${target.schema}.CHANGE_DIM_V.CREATE_TIME_PERIOD_LOC,
           ${target.schema}.CHANGE_DIM_V.CLOSE_TIME_PERIOD_LOC,
           ${target.schema}.CHANGE_DIM_V.OUTAGE_START_PERIOD_LOC,
           ${target.schema}.CHANGE_DIM_V.OUTAGE_END_PERIOD_LOC,
           ${target.schema}.CHANGE_DIM_V.CHANGE_SUBCATEGORY,
           ${target.schema}.CHANGE_DIM_V.UPDATE_TIME_PERIOD_LOC,
           ${target.schema}.CHANGE_DIM_V.ACTIVE_PROCESS
FROM       ${target.schema}.CHANGE_DIM_V LEFT OUTER JOIN
                ${target.schema}.CHANGE_FACT_V ON ${target.schema}.CHANGE_DIM_V.MD_DURABLE_KEY = ${target.schema}.CHANGE_FACT_V.CHANGE_DURABLE_KEY
WHERE      (${target.schema}.CHANGE_FACT_V.MD_ACTIVESTATUSIND = 'Y') AND (${target.schema}.CHANGE_FACT_V.MD_TRANSLASTIND = 'Y')
           AND (${target.schema}.CHANGE_DIM_V.MD_ACTIVESTATUSIND = 'Y') AND (${target.schema}.CHANGE_DIM_V.MD_TRANSLASTIND = 'Y');
```

3. Save the customized script.

4. Open the ITBA application, click **ADMIN > Data Management > Install Content Pack**, upgrade the Core Content Pack. The customization views will be created .

Customize the PREFILL case

The IDE generates ETL scripts that support, by default, prefill cases. You can modify the default if you do not need it. The prefill dataflow is needed to support multi-source join cases.

Remove the relevant SQL clause from the EXT ETL scripts. The relevant SQL clause includes the -- **Prefill tsnp into ext for the mutiple source join logic** annotation.

Customize a Stream Priority

In general, all the streams should be running in parallel. You can assign a higher priority to one of the streams, by adding **originaldwid="PRIOR_EXECUTION"** to the stream configuration file. The stream with the addition is executed first. Then when the stream completes its run, the other streams are executed.

More than one stream can have priority. Streams with priority run in parallel. When they complete, the streams without priority start running in parallel.

> **Example:**
>
> **<ns1:JobStream xmlns:ns1="http://schemas.hp.com/bto/dwh/v1/dw_etl_stream" dwid="PPM_EXCHANGE" businessname="PPM" originaldwid="PRIOR_EXECUTION">**

Customize the Maximum Execution Time of a Stream

You can customize the maximum execution time of a stream.

By default, the maximum execution time of a stream is 900 seconds (15 minutes) and is specified in a stream file as **maxexectime="900"**.

If a step takes longer than 15 minutes to execute, the ETL fails. You can modify the maximum execution time manually by changing the default value of **maxexectime** in the stream configuration

Next Steps

Following the IDE content development and extension process, you have created additional Content Packs for use in the Data Warehouse. This provides data to ITBA. Using the tools of ITBA, you can customize and modify your data, in order to access and display it according to specific formulas and parameters. The process includes:

- **Create a custom FBI Extractor:** Enables you to develop and modify an extractor for use with new content. For details, see the *DCS Extractor SDK Guide*.

- **Manage the Data Sources:** Enables you to manage the integration of extended or new data into the data warehouse through the activation of data sources.

  To access: In ITBA, select **ADMIN> Data Management > Connect Data Source.** For details, see Connect the Data Source in the *Administrator Guide*.

- **Manage the ETL:** Enables you to perform the essential tasks related to ETL and stream functionality. It displays the state of active streams, and enables you to schedule and control stream activity. It also allows you to view the historical data and the archived stream definitions. All ETL management and functionality is accessed and performed through the Content Flow Management men in the ADMIN tab.

  To access: In ITBA   select **ADMIN** > **Data Management > Run ETL**. For details, see Run ETL - Content Flow ManagementRun ETL - Content Flow Management in the *Administrator Guide*.

- **Create your Context in the Context Designer:** Enables you to create and manage Contexts (universes). The universes can be based on your target schema tables or on .CSV files that can be uploaded to the target schema using the Context Designer.

  To access: In ITBA, select **ADMIN** >**Semantic Layer > Semantic Layer**. The Context Management page opens. For details, see Semantic Layer - Context Designerin the *Content Reference Guide*.

- **Create KPIs in the Studio:** Enables you to create and manage all of the displayed KPI elements (based on your content), as well as their interactions with each other: wiring, drill downs, and other features.

  To access: In ITBA, select **Studio**. For details, see Create the Dashboard Contents in the Studio in the *Business Analyst Guide*.

- **Create Executive Pages in the ITBA Dashboard:** Enables you to set up pages that include components that are of interest to specific users or groups of users. For each page, the administrator defines the layout of components on the page, and the interaction of the page

components with one another.

To access: In ITBA, select **Studio**. For details, see Dashboard Display in the *Business Analyst Guide*.

- **Create CAPs:** Enables you to create Content Acceleration Packs that include Scorecards, KPIs, Dashboard pages that display the Scorecards and KPI components, Contexts (universes), and .CSV files.

  To access: In ITBA, select **ADMIN > Data Management > Activate CAP**. For details, see Create Content Acceleration Packs in the *Guide to Content Acceleration Packs*.

Release Notes

What's New in this Version

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IDE 10.10 is compatible with ITBA 10.10

Send Documentation Feedback

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on Content Extension Guide for ITBA IDE Version 10.10 (IT Business Analytics 10.10)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to SW-Doc@hpe.com.

We appreciate your feedback!