Hewlett Packard Enterprise

IT Business Analytics

ETL Process and Architectural Overview

Business Objects Server

ITBA Dashboard Pages

The ITBA Dashboard pages displays information about the Scorecards, Perspectives, Objectives, Key Performance Indicators (KPIs), and Metrics in components with various formats.

ITBA Dashboard

Contexts and Analytic Views

Contexts and Analytic Views

The Contexts provide business-oriented views of the data and act as an interface between the data warehouse and the components that display the data. The Contexts contain a schema of the tables and joins in the data warehouse. They also contain analytic views that ensure the consistency and quality of the data.

Web Application Server

ITBA KPI Engine

The ITBA KPI engine calculates the value of a KPI using the formula specified for the KPI and provides the status and score for the KPI using the thresholds specified for the KPI.

BA KPI Engine

Consolidation Layer

You can consolidate an entity that appears in different data sources, prioritize the data sources, select the relevant entity dimensions (columns), and select when to use the consolidation. The consolidated tables store the consolidated data. The consolidated data is based on the consolidation rule (priority and columns) that are configured in the Configure Consolidation page.

Consolidation Table (CDIM, CSH, CKEY, LOOKUP)

Consolidation Layer

DW Target Database

Target Tables

The data warehouse target tables contain the data the applications use for reporting purposes. The data resides in standard fact and dimension tables.

Target Fact Tables

ACTUALCOST_FACT
BILLING_FACT
CHANGE_FACT
CHANGE_PHASE_FACT
CHANGE_REJECTION_FACT
COMPLIANCE_NODE_FACT
COMPLIANCE_POLICY_FACT
DEFECTHIST_FACT
DEFECT_REQUIREMENT_BRIDGE_FACT
DEFECT_TESTINSTANCE_BRIDGE_FACT
INCIDENT_FACT
INTERACTION_FACT
JOB_FACT
JOB_NODE_FACT
JOB_POLICY_FACT
PLANNEDCOST_FACT
PROBLEM_FACT
PROJECTISSUE_FACT
PROJECTTASK_FACT
PROJECT_FACT
RECEIPTLINE_FACT
REQUEST_FACT
REQUIREMENTHIST_FACT
REQUIREMENT_BRIDGE_FACT
SERVICE_PROVIDER_BILLING_FACT
SERVICE_PROVIDER_UTILIZATION_FACT
SLAOUTAGE_FACT
SLASTATUS_FACT
SLA_BREACHED_OLA_FACT
SLA_BREACHED_UC_FACT
SLTSTATUS_FACT
SOFTINSTALL_FACT
SOFTLCCOUNTER_FACT
TESTHIST_FACT
TESTINSTANCE_FACT
TESTRUN_FACT
WORKORDER_FACT

Target Dimension Tables

AGREEMENT_DIM
APPLICATION_DIM
ASSET_DIM
BUDGETCENTER_DIM
BUDGETLINE_DIM
BUDGET_DIM
CHANGE_DIM
CI_DIM
COMPLIANCE_NODE_DIM
COMPONENT_DIM
COMPONENT_PROPERTY_DIM
CONTRACT_DIM
COSTCATEGORY_DIM
COSTCENTER_DIM
CYCLE_DIM
DEFECT_DIM
DEFECT_PLHD_DIM
DIMFLAG_DIM
EXCHANGE_DIM
INCIDENT_DIM
INTERACTION_DIM
ITFUNCTION_DIM
JOB_DIM
LOCATION_DIM
MODEL_DIM
NODE_DIM
OCFLAG_DIM
OPTION_PROPERTY_DIM
ORG_DIM
PERSON_DIM
POLICY_DIM
PORDER_DIM
PORDLINE_DIM
PRJOBJECTIVE_DIM
PROBLEM_DIM
PROGRAM_DIM
PROJECTISSUE_DIM
PROJECTTASK_DIM
PROJECT_DIM
PROJECT_PLHD_DIM
RECEIPT_DIM
REQUEST_DETAIL_PLHD_DIM
REQUEST_DIM
REQUEST_HEADER_PLHD_DIM
REQUEST_OPTION_DIM
REQUEST_TYPE_UD_PLHD_DIM
REQUEST_USERDATA_PLHD_DIM
REQUIREMENT_DIM
REQUIREMENT_PLHD_DIM
SCHARGE_DIM
SERVICE_BLUEPRINT_DIM
SERVICE_CATALOG_DIM
SERVICE_CATEGORY_DIM
SERVICE_DIM
SERVICE_INSTANCE_DIM
SERVICE_OFFERING_DIM
SERVICE_REQUEST_DIM
SLA_DIM
SLT_DIM
SUBSCRIPTION_DIM
TESTINSTANCE_DIM
TESTINSTANCE_PLHD_DIM
TESTRUN_DIM
TESTRUN_PLHD_DIM
TESTSET_DIM
TESTSET_PLHD_DIM
TEST_DIM
TEST_PLHD_DIM
WORKORDER_DIM

Target Layer

DW Staging Database

Dimensional Transform (XFR)

The Transformation Layer contains load-ready tables in the structure of the target tables. Load-Ready New (XFRN) tables contain new records, Load-Ready Update (XFRU) tables contain records that need to be updated, and Load-Ready Delete (XFRD) tables contain records that have been flagged as deleted.

The transform processes extract data from the MSC tables, convert it into a dimension and fact format that is compatible with the target database, and load it into the load-ready target staging tables.

XFRN XFRU XFRD

Transformation Layer

Multiple Source Identity (MSI)

The Multiple Source Identity (MSI) tables contain data from the SSI tables with the addition of the enterprise key.

MSI

Single Source Identity (SSI)

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.

SSI XREF

Identification Layer

Cross Reference (XREF)

The Cross Reference (XREF) tables contain descriptions of enterprise key to business key relationships, source entities, consolidated entities, and priority relationships. The ETL process uses this information to combine data records from different source models into a single record in the consolidation model.

Extract Staging Tables (EXT)

The Extract Staging (EXT) tables store data in database form. After validating the data, The ETL process loads data from the EXTRACT_FF and EXTRACT_DELETE_FF flat files and alternate source spreadsheets into the EXT tables. The EXT tables also contain pre-fill records from the Transactional Snapshot (TSNP). For each data source, The files are zipped and stored in an archive file.

EXT TSNP

Extraction Layer

Transactional Snapshot (TSNP)

The Transactional Snapshot (TSNP) tables contain a version of the source data as it existed at the beginning of the previous ETL cycle. The ETL process uses the TSNP tables to identify deleted records by comparing the business keys in the EXTRACT_DELETE_FF flat files to the business keys in the TSNP tables. If a key exists in the TSNP tables but not in EXTRACT_DELETE_FF, the ETL process identifies the associated record as a deleted record and loads it into the EXT tables. The ETL process also uses the TSNP tables as part of the pre-fill process.

File System

EXTRACT_FF
EXTRACT_DELETE_FF

Flat File Extracts

The extract processes extract delta data from the source systems and spreadsheets and write it to delimited flat files on the file system. The flat files (EXTRACT_FF and EXTRACT_DELETE_FF) decouple the data warehouse from the source systems. EXTRACT_FF files contain records that were updated or inserted since the last time ETL ran. EXTRACT_DELETE_FF files contain the complete list of business keys from the source view and are used to identify delete records.

Data Collection Services (DCS) Extractor Framework (DB/Services)

Data Source Entities

PPM
ACTUALCOST, BUDGETLINE, EXCHANGE, ORG, PLANNEDCOST, PROGRAM, PROJECTISSUE, REQUEST, REQUEST_HEADER_PLHD, REQUEST_USERDATA_PLHD, BUDGET, COSTCATEGORY, LOCATION, PERSON, PRJOBJECTIVE, PROJECT, PROJECTTASK, REQUEST_DETAIL_PLHD, REQUEST_TYPE_UD_PLHD

SM
AGREEMENT, CHANGE, CHANGE_REJECTION, EXCHANGE, INTERACTION, MODEL, ORG, PROBLEM, SERVICE, SLA_BREACHED_OLA, SLAOUTAGE, SLT, APPLICATION, CHANGE_PHASE, CI, INCIDENT, LOCATION, NODE, PERSON, REQUEST, SLA, SLA_BREACHED_UC, SLASTATUS, SLTSTATUS

ALM
CYCLE, DEFECTHIST, DEFECT_REQUIREMENT_BRIDGE, PROJECT, REQUIREMENT, REQUIREMENTHIST, TEST, TESTINSTANCE, TEST_PLHD, TESTRUN, PLHD, TESTSET_PLHD, DEFECT, DEFECT_PLHD, DEFECT_TESTINSTANCE_BRIDGE, PROJECT_PLHD, REQUIREMENT_BRIDGE, REQUIREMENT_PLHD, TESTHIST, TESTINSTANCE_PLHD, TESTRUN, TESTSET

AWS
SERVICE_PROVIDER_BILLING

CSA
BILLING, COMPONENT_PROPERTY, OPTION_PROPERTY, PERSON, SERVICE_BLUEPRINT, SERVICE_CATEGORY, SERVICE_OFFERING, SUBSCRIPTION, COMPONENT, EXCHANGE, ORG, REQUEST_OPTION, SERVICE_CATALOG, SERVICE_INSTANCE, SERVICE_REQUEST

AWSCW
NODE, SERVICE_PROVIDER_UTILIZATION

SA
COMPLIANCE_NODE, COMPLIANCE_POLICY, JOB, JOB_NODE, JOB_POLICY, NODE, POLICY

AM
ACTUALCOST, BUDGET, BUDGETLINE, CONTRACT, COSTCENTER, LOCATION, NODE, PERSON, PORDER, PROJECT, RECEIPTLINE, SOFTLCCOUNTER, ASSET, BUDGETCENTER, CI, COSTCATEGORY, EXCHANGE, MODEL, ORG, PLANNEDCOST, PORDLINE, RECEIPT, SOFTINSTALL, WORKORDER

AZURE
NODE, SERVICE_PROVIDER_BILLING, SERVICE_PROVIDER_UTILIZATION

CO
NODE, SERVICE_PROVIDER_BILLING, SERVICE_PROVIDER_UTILIZATION

Source Databases

PPM SM ALM AWS CSA AWSCW SA AM Azure CO

Data Integration Interface

For all data sources, the data warehouse accesses source data using a Data Collection Services (DCS) Extractor specific to the data source type. The integration is performed using the DCS mechanism.

Source Systems

The source systems contain the current source data. You can extract data from Project and Portfolio Management (PPM), Service Manager (SM), Application LifeCycle Management (ALM), Amazon Web Services (AWS), Amazon Web Services CloudWatch (AWSCW), Cloud Service Automation (CSA), Server Automation (SA), Asset Manager (AM), Microsoft Azure (AZURE), and Cloud Optimizer (CO). Some of the source systems reside in remote databases managed by an RDBMS.

The data warehouse uses the change data capture (CDC) technique for extracting data from the source tables. The ETL process extracts data if the last modification date is greater than or equal to the maximum last modification date value.

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