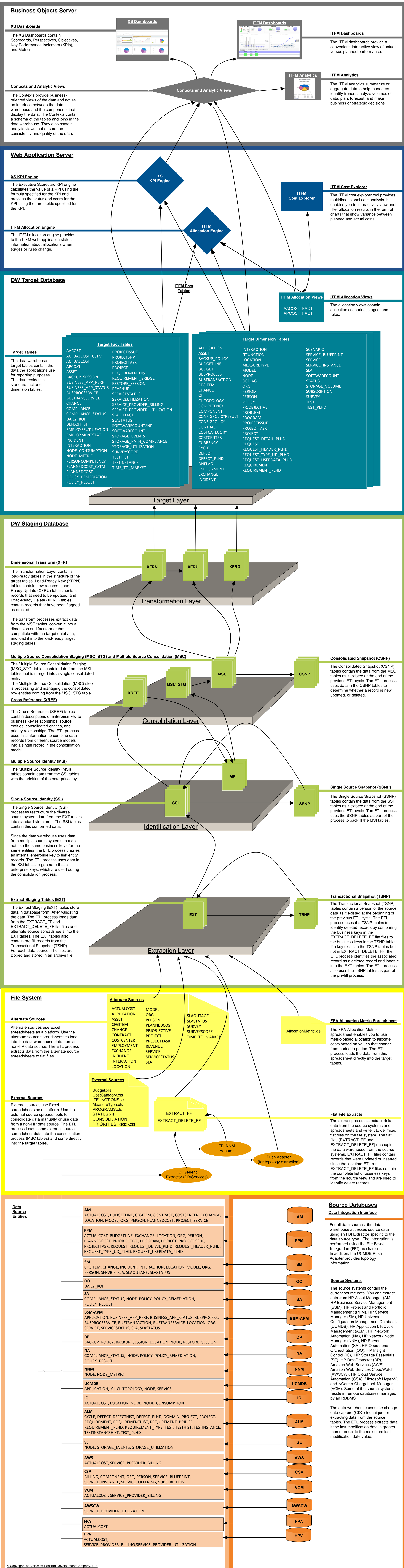


# ETL Process and Architectural Overview



## Business Objects Server

**XS Dashboards**  
The XS Dashboards contain Scorecards, Perspectives, Objectives, Key Performance Indicators (KPIs), and Metrics.

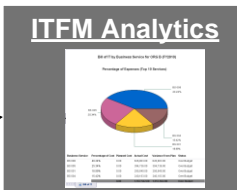


**ITFM Dashboards**  
The ITFM dashboards provide a convenient, interactive view of actual versus planned performance.

### 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.

Contexts and Analytic Views

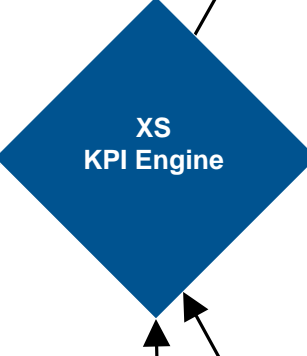


**ITFM Analytics**  
The ITFM analytics summarize or aggregate data to help managers identify trends, analyze volumes of data, plan, forecast, and make business or strategic decisions.

## Web Application Server

### XS KPI Engine

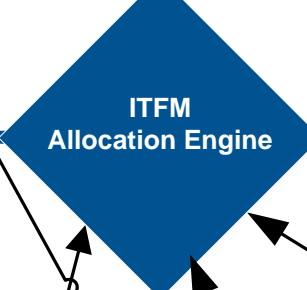
The Executive Scorecard KPI engine calculates the value of a KPI using the formula specified for the KPI and provides the status and score for the KPI using the thresholds specified for the KPI.



**ITFM Cost Explorer**  
The ITFM cost explorer tool provides multidimensional cost analysis. It enables you to interactively view and filter allocation results in the form of charts that show variance between planned and actual costs.

### ITFM Allocation Engine

The ITFM allocation engine provides to the ITFM web application status information about allocations when stages or rules change.



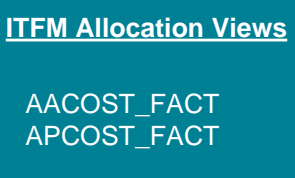
## DW Target Database

### 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		Target Dimension Tables	
AACOST	PROJECTISSUE	APPLICATION	INTERACTION
ACTUALCOST_CSTM	PROJECTSNP	ASSET	ITFUNCTION
ACTUALCOST	PROJECTTASK	BACKUP_POLICY	LOCATION
APCOST	PROJECT	BUDGETLINE	MEASURETYPE
ASSET	REQUIREMENTHIST	BUDGET	MODEL
BACKUP_SESSION	REQUIREMENT_BRIDGE	BUSPROCESS	NODE
BUSINESS_APP_PERF	RESTORE_SESSION	BUSTRANSACTION	OCFLAG
BUSINESS_APP_STATUS	REVENUE	CFGITEM	ORG
BUSPROCSERVICE	SERVICESTATUS	CHANGE	PERIOD
BUSTRANSSERVICE	SERVICEUTILIZATION	CI	PERSON
CHANGE	SERVICE_PROVIDER_BILLING	CI_TOPOLOGY	POLICY
COMPLIANCE	SERVICE_PROVIDER_UTILIZATION	COMPETENCY	PROBJECTIVE
COMPLIANCE_STATUS	SLAOUTAGE	COMPONENT	PROBLEM
DAILY_ROI	SLASTATUS	CONFIGPOLICYRESULT	PROGRAM
DEFECTHIST	SOFTWARECOUNTSNP	CONFIGPOLICY	PROJECTISSUE
EMPLOYEEUTILIZATION	SOFTWARECOUNT	CONTRACT	PROJECTTASK
EMPLOYMENTSTAT	SOFTWAREEVENTS	COSTCATEGORY	REQUEST_DETAIL_PLHD
INCIDENT	STORAGE_EVENTS	COSTCENTER	REQUEST
INTERACTION	STORAGE_PATH_COMPLIANCE	CURRENCY	REQUEST_HEADER_PLHD
INTERACTION	STORAGE_UTILIZATION	CYCLE	REQUEST_TYPE_UD_PLHD
NODE_CONSUMPTION	SURVEYSCORE	DEFECT	REQUEST_USERDATA_PLHD
NODE_METRIC	TESTHIST	DEFECT_PLHD	REQUIREMENT
PERSON_COMPETENCY	TESTINSTANCE	DNFLAG	REQUIREMENT_PLHD
PLANNEDCOST_CSTM	TIME_TO_MARKET	EMPLOYMENT	
PLANNEDCOST		EXCHANGE	
POLICY_REMEDIATION		INCIDENT	
POLICY_RESULT			

ITFM Fact Tables

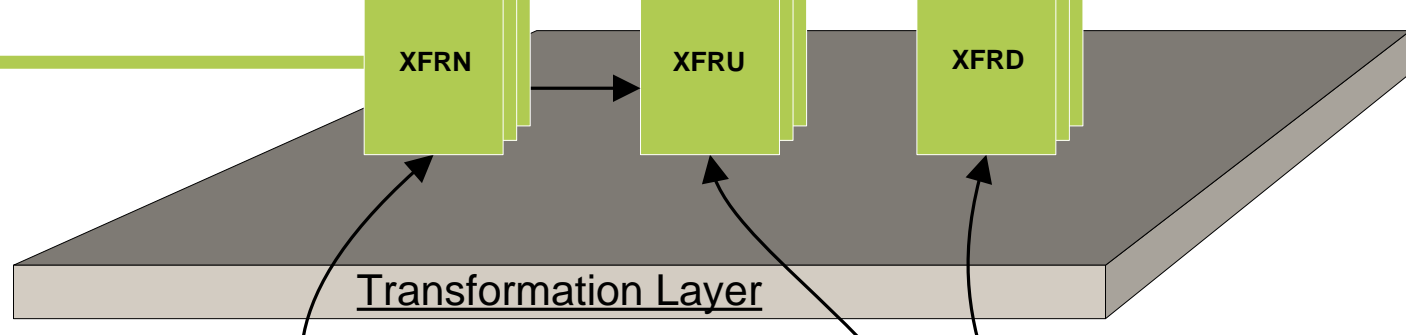


**ITFM Allocation Views**  
The allocation views contain allocation scenarios, stages, and rules.

## DW Staging Database

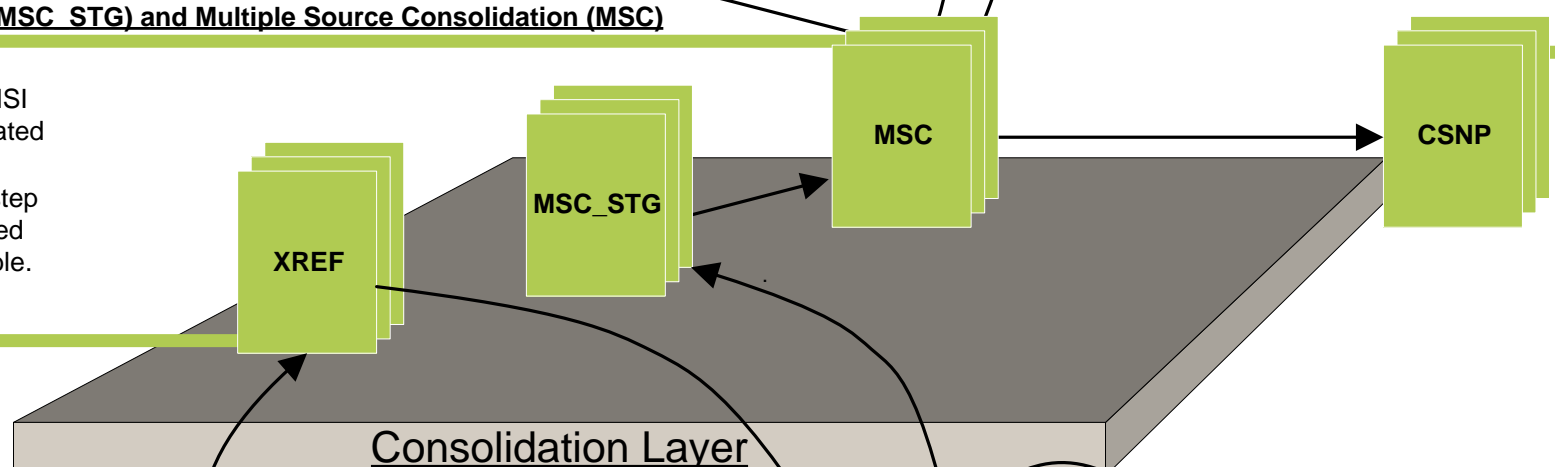
### Dimensional Transform (XFR)

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.



### Multiple Source Consolidation Staging (MSC\_STG) and Multiple Source Consolidation (MSC)

The Multiple Source Consolidation Staging (MSC\_STG) tables contain data from the MSI tables that is merged into a single consolidated entity. The Multiple Source Consolidation (MSC) step is processing and managing the consolidated row entities coming from the MSC\_STG table.



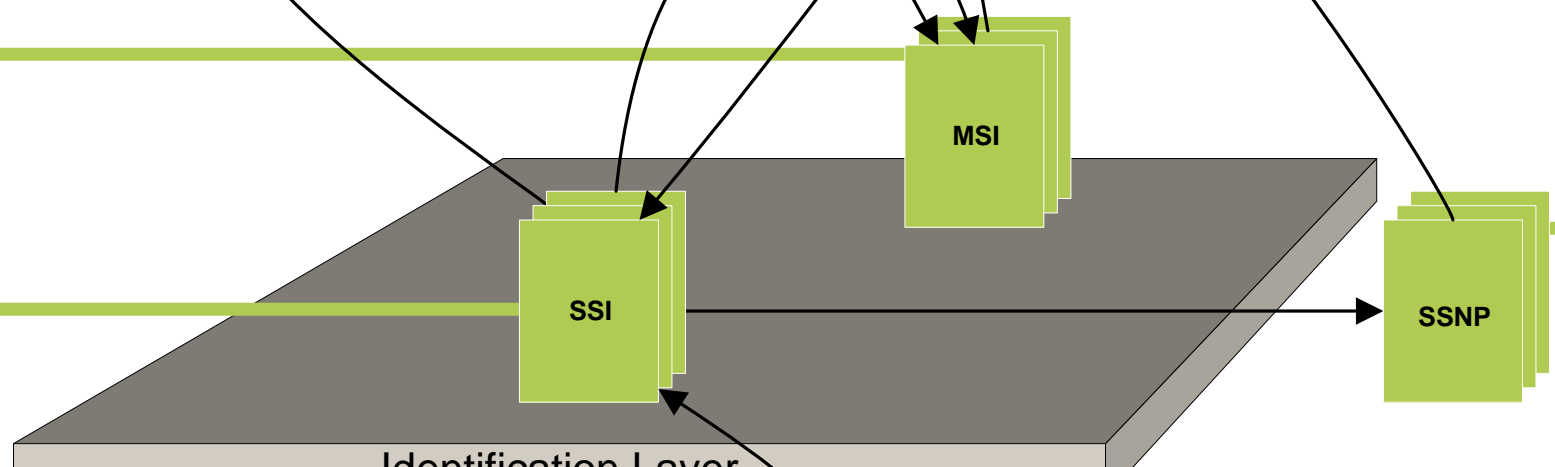
**Consolidated Snapshot (CSNP)**  
The Consolidated Snapshot (CSNP) tables contain the data from the MSC tables as it existed at the end of the previous ETL cycle. The ETL process uses data in the CSNP tables to determine whether a record is new, updated, or deleted.

### 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.

### Multiple Source Identity (MSI)

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



**Single Source Snapshot (SSNP)**  
The Single Source Snapshot (SSNP) tables contain the data from the SSI tables as it existed at the end of the previous ETL cycle. The ETL process uses the SSNP tables as part of the process to backfill the MSI tables.

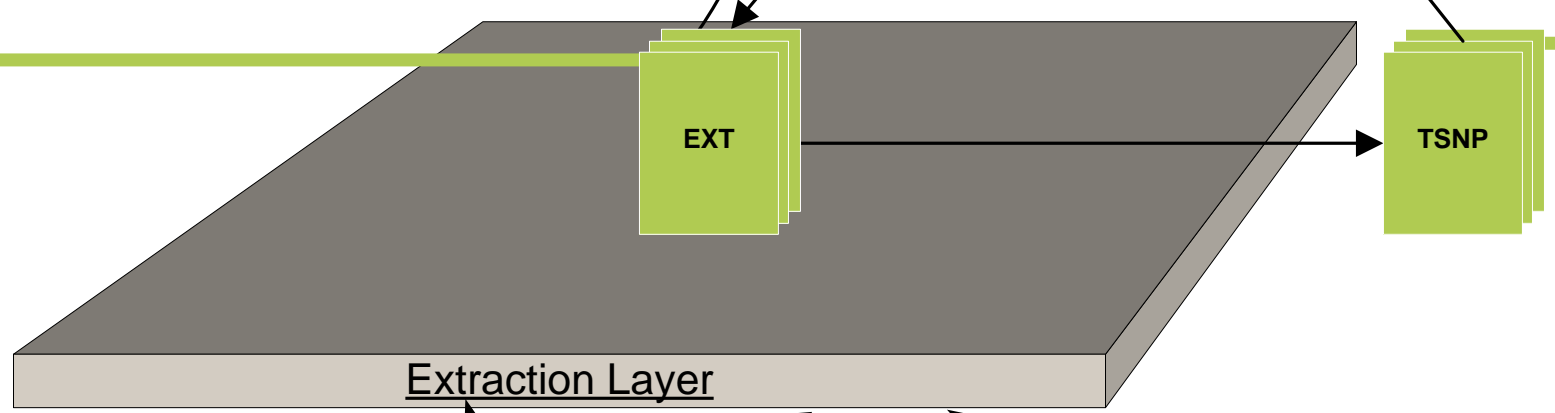
### Single Source Identity (SSI)

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.

### 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\_DELETE\_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).



**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

Alternate Sources		SLAOUTAGE
ACTUALCOST	MODEL	SLAOUTAGE
APPLICATION	ORG	SLASTATUS
ASSET	PERSON	SURVEY
CFGITEM	PLANNEDCOST	SURVEYSCORE
CHANGE	PROBJECTIVE	TIME_TO_MARKET
CONTRACT	PROJECT	
COSTCENTER	PROJECTTASK	
EMPLOYMENT	REVENUE	
EXCHANGE	SERVICE	
INCIDENT	SERVICESTATUS	
INTERACTION	SLA	
LOCATION		

### Alternate Sources

Alternate sources use Excel spreadsheets as a platform. Use the alternate source spreadsheets to load into the data warehouse. The ETL process extracts data from the alternate source spreadsheets to flat files.

**FPA Allocation Metric Spreadsheet**  
The FPA Allocation Metric spreadsheet enables you to use metric-based allocation to allocate costs based on values that change from period to period. The ETL process loads the data from this spreadsheet directly into the target tables.

External Sources	
Budget.xls	
CostCategory.xls	
ITFUNCTIONS.xls	
MeasureType.xls	
PROGRAMS.xls	
STATUS.xls	
CONSOLIDATION_PRIORITIES_<icp>.xls	

### External Sources

External sources use Excel spreadsheets as a platform. Use the external source spreadsheets to consolidate data manually or use data from a non-HP data source. The ETL process loads some external source spreadsheet data into the consolidation process (MSC tables) and some directly into the target tables.

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.

FBI Generic Extractor (DB/Services)  
FBI NNM Adapter  
Push Adapter (for topology extraction)

## Data Source Entities

<b>AM</b> ACTUALCOST, BUDGETLINE, CFGITEM, CONTRACT, COSTCENTER, EXCHANGE, LOCATION, MODEL, ORG, PERSON, PLANNEDCOST, PROJECT, SERVICE	AM
<b>PPM</b> ACTUALCOST, BUDGETLINE, EXCHANGE, LOCATION, ORG, PERSON, PLANNEDCOST, PROBJECTIVE, PROGRAM, PROJECT, PROJECTISSUE, PROJECTTASK, REQUEST, REQUEST_DETAIL_PLHD, REQUEST_HEADER_PLHD, REQUEST_TYPE_UD_PLHD, REQUEST_USERDATA_PLHD	PPM
<b>SM</b> CFGITEM, CHANGE, INCIDENT, INTERACTION, LOCATION, MODEL, ORG, PERSON, SERVICE, SLA, SLAOUTAGE, SLASTATUS	SM
<b>OO</b> DAILY_ROI	OO
<b>SA</b> COMPLIANCE_STATUS, NODE, POLICY, POLICY_REMEDIATION, POLICY_RESULT	SA
<b>BSM-APM</b> APPLICATION, BUSINESS_APP_PERF, BUSINESS_APP_STATUS, BUSPROCESS, BUSPROCSERVICE, BUSTRANSACTION, BUSTRANSSERVICE, LOCATION, ORG, SERVICE, SERVICESTATUS, SLA, SLASTATUS	BSM-APM
<b>DP</b> BACKUP_POLICY, BACKUP_SESSION, LOCATION, NODE, RESTORE_SESSION	DP
<b>NA</b> COMPLIANCE_STATUS, NODE, POLICY, POLICY_REMEDIATION, POLICY_RESULT	NA
<b>NNM</b> NODE, NODE_METRIC	NNM
<b>UCMDB</b> APPLICATION, CI, CI_TOPOLOGY, NODE, SERVICE	UCMDB
<b>IC</b> ACTUALCOST, LOCATION, NODE, NODE_CONSUMPTION	IC
<b>ALM</b> CYCLE, DEFECT, DEFECTHIST, DEFECT_PLHD, DOMAIN_PROJECT, PROJECT, REQUIREMENT, REQUIREMENTHIST, REQUIREMENT_BRIDGE, REQUIREMENT_PLHD, REQUIREMENT_TYPE, TEST, TESTHIST, TESTINSTANCE, TESTINSTANCEHIST, TEST_PLHD	ALM
<b>SE</b> NODE, STORAGE_EVENTS, STORAGE_UTILIZATION	SE
<b>AWS</b> ACTUALCOST, SERVICE_PROVIDER_BILLING	AWS
<b>CSA</b> BILLING_COMPONENT, OEG, PERSON, SERVICE_BLUEPRINT, SERVICE_INSTANCE, SERVICE_OFFERING, SUBSCRIPTION	CSA
<b>VCM</b> ACTUALCOST, SERVICE_PROVIDER_BILLING	VCM
<b>AWSCW</b> SERVICE_PROVIDER_UTILIZATION	AWSCW
<b>FPA</b> ACTUALCOST	FPA
<b>HPV</b> ACTUALCOST, SERVICE_PROVIDER_BILLING, SERVICE_PROVIDER_UTILIZATION	HPV

## Source Databases

### Data Integration Interface

For all data sources, the data warehouse accesses source data using an FBI Extractor specific to the data source type. The integration is performed using the File Based Integration (FBI) mechanism. In addition, the UCMDB Push Adapter provides topology information.

### Source Systems

The source systems contain the current source data. You can extract data from HP Asset Manager (AM), HP Business Service Management (BSM), HP Project and Portfolio Management (PPM), HP Service Manager (SM), HP Universal Configuration Management Database (UCMDB), HP Application Lifecycle Management (ALM), HP Network Automation (NA), HP Network Node Management (NNM), HP Server Automation (SA), HP Operations Orchestration (OO), HP Insight Control (IC), HP Storage Essentials (SE), HP DataProtector (DP), Amazon Web Services (AWS), Amazon Web Services CloudWatch (AWSCW), HP Service Cloud Automation (CSA), Microsoft Hyper-V, and vCenter Chargeback Manager (VCM). 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.

