Deployment Best Practices for PPM Operational Reporting

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HP Project and Portfolio Management Center

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About this Document

This document provides guidelines to assist HP Project and Portfolio Management Center (PPM Center) customers in deploying the complete PPM Operational Reporting solution. It includes recommendations for deploying both the reporting schema and the BusinessObjects enterprise server. The following pages provide recommendations for customers working with small, medium, or large data sets and best practices to follow to optimize performance of the Operational Reporting solution. These recommendations are guidelines based on the tests conducted in HP's research and development labs, and are not intended as hard and fast rules for deploying the Operational Reporting solution.

Target Audience

This document is intended for use by anyone who plans to deploy the PPM Operational Reporting solution. It covers the prerequisites and recommended practices to follow to optimize the output from the hardware resources to the dataset volume of the data warehouse.

Terminology

The following table lists descriptions of the terms used in this document.

Term	Description
Reporting Schema	Oracle schema that holds the data model for the reporting data warehouse
BO Enterprise Server	BusinessObjects Enterprise server to host all of the BusinessObjects Enterprise components
Reporting DB instance	Database instance that hosts the reporting schema
ETL process	Extraction, transformation, and loading of data from the PPM Center system to the reporting schema
Incremental ETL	The regular and frequent ETL events that capture and load changed data from the PPM Center system to the reporting schema. You can run this scheduled event manually whenever you need the very latest information.

Assumptions

No single "one-size-fits-all" model is ideal for all PPM Operational Reporting deployments. The sizing recommendations for the Operational Reporting database instance are estimates that are based on the dataset volume of the business entities (resources, timesheets, financial summaries, and so on) in the PPM Center system.

The timing of the full and incremental ETL events described in this document will vary based on data volume and DB configuration, and are for reference only.

Document Updates

The following changes were made to this document since its original publication in February, 2011:

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Where guidelines were provided to improve the performance at the network layer of Oracle, the suggested value of "0" for the DIAG_ADR_ENABLED parameter was incorrect. The suggested value was changed to "OFF".

Related Documents

The following documents contain useful information for Operational Reporting administrators and users.

- *System Requirements and Compatibility Matrix*

  Before you start to deploy Operational Reporting, check the *System Requirements and Compatibility Matrix* document to make sure that your operating environment meets all of the minimum system requirements for installing SAP BusinessObjects Enterprise (in addition to PPM Center).

- *Operational Reporting Administrator's Guide*

  The *Operational Reporting Administrator's Guide* provides information about how to deploy the Operational Reporting solution for HP Project and Portfolio Management Center (PPM Center). It is written for PPM Center administrators, configurators, and DBAs.

- *Operational Reporting User's Guide*

  The *Operational Reporting User's Guide* provides details about how to use BusinessObjects' web desktop tool InfoView to generate operational reports on HP Resource Management, HP Time Management, and HP Financial Management data.

- *Data Model Guide*

  The *Data Model Guide* provides details about the internal structure of the data models for both PPM Center and Operational Reporting.

Accessing Documents

To obtain all of the HP PPM Center documentation, go to the HP Software Product Manuals Web site (h20230.www2.hp.com/selfsolve/manuals). To access this Web site, you must first set up an HP Passport account.

For more detailed information about SAP BusinessObjects Enterprise, see your SAP documentation. For information about how to access SAP documentation, see the HP knowledge document "Documentation for Customers using the Operational Reporting Solution (Business Objects) with PPM 9.1x" (support.openview.hp.com/selfsolve/document/KM1052487).

Primary Considerations for Deployment

The volume of business entities in the PPM Center system is a primary factor in calculating the hardware capacity, deployment layout, and database configuration of the Operational Reporting solution. Based on the volume of business entities, guidelines are provided to profile the customer dataset and plan database configuration.

The start and end periods that determine the range of data to be loaded during the ETL process must also be considered in Operational Reporting deployment - particularly with regard to hardware capacity and database configuration. As the date range specified for the ETL increases, the duration of the ETL process increases proportionally.

The optimal sizing of the BusinessObjects Enterprise server is determined based on the number of users who may potentially access the reporting interface concurrently (through InfoView).

Guidelines for Profiling PPM Center Datasets

For the purposes of server resources planning, a customer dataset profile is categorized as large, medium, or small. The following table lists the business entities and volumes in the HP Resource Management, HP Time Management, and HP Financial Management product modules categorized into three general dataset sizes for forecasting the deployment and the configuration of the Operational Reporting solution. To more accurately plan the deployment, consider the number of entities to be measured within the date range specified for the ETL.

Business Entity	Small	Medium	Large	Comments
Resources	< 5,000	> 5,000 < 10,000	> 10,000	
Resource Pools	< 300	> 300 < 1,000	> 1,000	
Staffing Profiles	< 3,000	> 3,000 < 6,000	> 6,000	
Resource Distribution Entries	< 18,000	> 18,000 < 35,000	> 35,000	Consider the number of rows in the RSC_RP_DISTRIBUTION_ENTRIES table.
Resource Assignments	< 20,000	> 20,000 < 40,000	> 40,000	Consider the number of rows in the RSC_RESOURCE_ASSIGNMENTS table.
Staffing Profile Allocations	< 3 million	> 3 million < 8 million	> 8 million	Consider the number of rows in the RSC_STAFF_PROF_ALLOCATIONS table.
Position Forecast	< 3 million	> 3 million < 8 million	> 8 million	Consider the number of rows in the RSC_POSITION_FORECAST table.
Positions	< 15,000	> 15,000 < 40,000	> 40,000	
Calendars	< 20	> 20 < 35	> 35	
Time Actual Effort	< 10 million	> 10 million < 30 million	> 30 million	
Time Sheets	< 150,000	> 150,000 < 400,000	> 400,000	
Time Sheet Lines	< 1.5 million	> 1.5 million < 4 million	> 4 million	
Financial Summary	< 5,000	> 5,000 < 10,000	> 10,000	
Financial Line Cells	< 150,000	> 150,000 < 300,000	> 300,000	

Deployment Best Practices

In deploying the Operational Reporting solution, the reporting database deployment, database configuration, ETL process, and database network configuration must all be considered. The following sections address these factors.

Reporting Database Deployment

HP recommends the following for deploying the Operational Reporting database:

- Regardless of the size of the datasets, keep the Operational Reporting database instance separate from the PPM Center database instance.

- To avoid space issues, allocate enough additional disk capacity for the reporting solution.

- Recommended Oracle versions and patches are as follows:

Oracle Version	Required Patches
11.1.0.7.3	#7013768
	#9352179
11.2.0.1	None

- Check to make sure that statistics on the Operational Reporting schema are gathered automatically.

ETL Process

For scheduling and running ETL, HP recommends the following:

- Schedule ETL jobs to start while system usage is off peak.

- Monitor the rate at which the volume of PPM Center data changes (CDC changes) occur and calibrate the incremental ETL scheduling intervals. If a customer anticipates that a large volume of data will change, HP recommends that the customer schedule more frequent ETL runs than they would schedule otherwise.

Database Configuration

The following sections address the database configuration required, regardless of the dataset size, and the dataset configuration for the Operational Reporting system.

Required Tablespaces

The following table lists the tablespaces required for the Operational Reporting database schema.

Tablespace	Configuration
DATA	LOGGING
	BLOCKSIZE 32K
	DEFAULT COMPRESS
	ONLINE
	PERMANENT
	EXTENT MANAGEMENT LOCAL AUTOALLOCATE
	SEGMENT SPACE MANAGEMENT AUTO
INDEX	LOGGING
	BLOCKSIZE 32K
	DEFAULT COMPRESS
	ONLINE
	PERMANENT
	EXTENT MANAGEMENT LOCAL AUTOALLOCATE
	SEGMENT SPACE MANAGEMENT AUTO
NOLOGGIN_DATA	NOLOGGING
	DEFAULT COMPRESS
	ONLINE
	PERMANENT
	EXTENT MANAGEMENT LOCAL AUTOALLOCATE
	BLOCKSIZE 32K
	SEGMENT SPACE MANAGEMENT AUTO
NOLOGGIN_INDEX	NOLOGGING
	DEFAULT COMPRESS
	ONLINE
	PERMANENT
	EXTENT MANAGEMENT LOCAL AUTOALLOCATE
	BLOCKSIZE 32K
	SEGMENT SPACE MANAGEMENT AUTO
TEMP	DEFAULT CONFIGURATION
UNDO	DEFAULT CONFIGURATION

Database Parameters

HP recommends that you use Oracle's automatic memory management (AMM) feature. To do this, set the value for either the `memory_max_target` parameter or the `memory_target` parameter, and let Oracle manage the memory (SGA and the PGA) dynamically.

Database Parameter	Recommended Value
db block_size	32k
db_file_multiblock_read_count	128
db_writer_processes	4
ddl_lock_timeout	60
open_links	20
open_links_per_instance	4
optimizer_mode	All Rows
parallel_degree_policy	'AUTO'
parallel_adaptive_multi_user	TRUE
parallel_automatic_tuning	TRUE
parallel_degree_limit	Auto
parallel_execution_message_size	40960
query_rewrite_enabled	TRUE
query_rewrite_integrity	Trusted
result_cache_max_size	67108864
session_cached_cursors	500
session_max_open_files	50
shared_servers	1
star_transformation_enabled	TRUE
nls_length_semantics	CHAR
dml_locks	6704
log_buffer	268427264
undo_retention	900
parallel_max_servers	cpu_count * parallel_threads_pre_cpu x (2 if pga_aggregate_target > 0; otherwise 1) x 5
parallel_min_servers	2

Dataset Configuration

This section addresses the configuration required for different dataset profiles. The recommended database configuration parameter settings are based on the customer dataset profile and reporting usage.

Small Profile Dataset

Tablespaces

The following table provides the recommended sizes for the required tablespaces for a small dataset.

Tablespace	Recommended Size (in GB)
Data	6 - 10
Index	6 - 10
NOLOGGIN_DATA	2 - 4
NOLOGGIN_INDEX	2 - 4
Temp	15 - 20
Undo	20 - 25

Redo Logs

For a small profile dataset (up to 2 x 800 MB), HP recommends that you distribute redo logs files to minimize input/output contention.

Database Parameters

The following table lists the Oracle database parameter values to set for efficient performance during ETL processes and report execution.

Database Parameter	Recommended Value
log_buffer	134217728
open_cursors	300
parallel_max_servers	cpu_count * parallel_threads_pre_cpu x (2 if pga_aggregate_target > 0; otherwise 1) x 5
parallel_servers_target	4 * cpu_count * parallel_threads_pre_cpu * active_instance_count
parallel_threads_per_cpu	2
processes	500
transactions	853
memory_max_target	6 to 7 GB

Hardware Recommendations

System Resource	Value
CPU	4 CPU (3.0 GHz) User current generation processors
RAM	8 GB
Disk Space	Calculate the cumulative size of the tablespaces. (See Tablespaces.)

Medium Profile Dataset

Tablespaces

Tablespace	Recommended Size (in GB)
Data	10 - 15
Index	10 - 15
NOLOGGIN_DATA	4 - 6
NOLOGGIN_INDEX	4 - 6
Temp	25 - 30
Undo	35 - 40

Redo Logs

For a medium profile dataset (at least 4 x 800 MB), HP recommends that you distribute redo logs files to minimize input/output contention.

Instance Parameters

The following table lists the Oracle database parameter values to set for efficient performance during ETL processes and report execution.

Parameter	Optimal Value
log_buffer	268427264
open_cursors	900
parallel_max_servers	cpu_count * parallel_threads_pre_cpu * (2 if pga_aggregate_target > 0; otherwise 1) x 5
parallel_servers_target	4 * cpu_count * parallel_threads_pre_cpu * active_instance_count
parallel_threads_per_cpu	4
processes	800
transactions	1500
max_memory_target	9 – 10 GB

Hardware Recommendations

System Resource	Value
CPU	8 CPU (3.0 GHz) User current generation processors
RAM	12 GB
Disk Space	Calculate the cumulative size of the tablespaces. See Tablespaces.

Large Profile Dataset

Tablespaces

Tablespace	Recommended Size (in GB)
Data	15 - 20
Index	15 - 20
NOLOGGIN_DATA	6 - 8
NOLOGGIN_INDEX	6 - 8
Temp	40 - 45
Undo	50 - 60

Redo Logs

For a large dataset (at least 6 x 800 MB), HP recommends that you distribute redo logs files to minimize input/output contention.

Database Parameters

The following table lists the Oracle database parameters to set for efficient performance of the reporting solution, both from the ETL and the reports execution perspectives.

Parameter	Optimal Value
log_buffer	268427264
open_cursors	1500
parallel_max_servers	cpu_count * parallel_threads_per_cpu * (2 if pga_aggregate_target > 0; otherwise 1) x 5
parallel_servers_target	4 * cpu_count * parallel_threads_per_cpu * active_instance_count
parallel_threads_per_cpu	4
processes	1000
transactions	2000
memory_max_target	16 – 18 GB

Hardware Recommendations

System Resource	Value
CPU	12 CPU (3.0 GHz) User current generation processors
RAM	24 GB RAM
Disk Space	Calculate the cumulative size of the tablespaces. (See [Tablespaces](#).)

Oracle DB Network Configuration

To improve the performance at the network layer of Oracle, use the following settings:

- **Listener.ora**: Adjusting the value of session data unit (SDU) parameter to 32768 in the `listener.ora` file has resulted in improved performance during the ETL process.
- **tnsnames.ora**
  - `XXXXXXX =`
  - `  (DESCRIPTION =`
  - `    (SDU=32768)`
  - `    (ADDRESS = (PROTOCOL = TCP)(HOST = XXXXXXX.XXXXXXX.XXXXXXX)(PORT = 1521)`
  - `           (RECV_BUF_SIZE=131072)(SEND_BUF_SIZE=131072))`
  - `    (CONNECT_DATA =`
  - `      (SERVER = DEDICATED)`
  - `      (SERVICE_NAME = XXXXXXX)`
  - `    )`
  - `  )`
- **protocol.ora**
  - `TCP.DELAY = yes`
- **sqlnet.ora**
  - `AUTOMATIC_IPC= on`
    - `DIAG_ADR_ENABLED = OFF`

Observations

- Deploying the Operational Reporting solution should not affect PPM Center system.

- The PPM Center database instance may experience increased load on system resources for a short period of time during the `setup_all` script run or during an incremental ETL while data from PPM Center source tables are copied over to the Operational Reporting database schema over DBLINK. You can mitigate any impact on the PPM Center database instance by scheduling incremental ETL jobs during off-peak hours.

- During both the initial ETL and subsequent incremental ETL jobs, the Resource Capacity and Demand Fact data are aggregated. The aggregation may take significantly longer than other steps involved in Resource Management ETL jobs, especially if the RPT_FCT_RM_RESOURCE_CAPACITY and RPT_FCT_RM_RESOURCE_DEMAND fact tables contain millions of records.

  The size of the RPT_FCT_RM_RESOURCE_CAPACITY and RPT_FCT_RM_RESOURCE_DEMAND fact tables is influenced primarily by the start and end dates you specify for the ETL job, as well as the number of resources configured in PPM Center. As the date range specified increases, the volume of data in these two fact tables increases. Consequently, it is important that you specify a date range that is small enough to meet minimum business requirements.

- After the ETL is done and all the data are migrated to the reporting schema, the reporting data volume can be roughly 50 percent larger than the PPM Center database. However, it is important to note that the size varies depending on the size of the customer dataset and the specified ETL date range.