**ERD Data Feed Replacement**

**High Level Architecture**

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**Table of contents**

[1. Introduction 5](#_Toc483388252)

[1.1 Purpose of the document 5](#_Toc483388253)

[1.2 Intended Audience 5](#_Toc483388254)

[2. Project Overview 5](#_Toc483388255)

[2.1 Scope 5](#_Toc483388256)

[2.1.1 In Scope 5](#_Toc483388257)

[2.1.2 Out of Scope 5](#_Toc483388258)

[2.2 Related documents 6](#_Toc483388259)

[2.3 Assumptions 6](#_Toc483388260)

[2.4 Dependencies 6](#_Toc483388261)

[2.5 Constraints 6](#_Toc483388262)

[ERD Data Feed Current State Overview 7](#_Toc483388263)

[2.6 Functional capabilities 7](#_Toc483388264)

[2.7 Architectural overview 7](#_Toc483388265)

[2.7.1 High-level integration overview 7](#_Toc483388266)

[2.7.2 Current Interface overview 8](#_Toc483388267)

[3. ERD Data Feed Proposed New State Overview 9](#_Toc483388268)

[3.1 High-level logical overview of new ERD Data Feed 9](#_Toc483388269)

[3.1.1 Proposed architecture highlights 10](#_Toc483388270)

[3.2 ERD Data Feed Logical System overview 11](#_Toc483388271)

[3.2.1 High Level Logical highlights 12](#_Toc483388272)

[3.3 ERD Data Feed Workflows 14](#_Toc483388273)

[3.3.1 ERD Data Feed High-Level workflow 14](#_Toc483388274)

[3.3.2 High-level Overview for the Event Monitor 15](#_Toc483388275)

[3.3.3 High-level Overview for the Scheduled Task Engine 16](#_Toc483388276)

[3.3.4 High-level Overview of the Data Importer/Data Transformation Process 17](#_Toc483388277)

[3.4 High-level Overview of the Export Service 18](#_Toc483388278)

[Appendix A – Business service classifications 19](#_Toc483388279)

[Definitions, Acronyms and Abbreviations 19](#_Toc483388280)

**Table of Figures**

[Figure 1: Overview of current HRMS and AS/400 landscape 7](#_Toc483388281)

[Figure 2: High-level overview of new ERD Data Feed 9](#_Toc483388282)

[Figure 3: High-level logical overview of the ERD Data Feed 11](#_Toc483388283)

[Figure 4: ERD Data Feed High-Level Workflow 14](#_Toc483388284)

[Figure 5: High-Level overview of the Event Monitor workflow 15](#_Toc483388285)

[Figure 6: High-Level overview of the Scheduled Task Engine 16](#_Toc483388286)

[Figure 7: High-Level overview of the Data Importer workflow 17](#_Toc483388287)

[Figure 8: High-Level overview of the Export Service 18](#_Toc483388288)

[Table 1: Definitions, Acronyms and Abbreviations 19](#_Toc483388289)

[Table 2: Service Definitions 20](#_Toc483388290)

# Introduction

## Purpose of the document

This document contains the high-level architecture for the implementation of a loosely coupled method for maintaining current data feeds into ERD database from the HRMS (PeopleSoft).

## Intended Audience

The audience for this document is everyone in Enterprise Holdings Inc. who manages, is responsible for, develops, or uses the existing ERD database; including any third parties engaged to work on behalf of Enterprise whose remit includes management and/or associated services relating to the ERD database.

# Project Overview

The intention of this project is to provide infrastructure and services to decouple the current HRMS (PeopleSoft) and the legacy ERD Database.

## Scope

### In Scope

The following items are in scope for this document:

* High-level system architecture for decoupling the current HRMS system from the ERD Database putting the extract, transform, and load (ETL) functions into a new Java Spring Boot application.
* High-level integration requirements suitable for business and development partners to allow initial high-level estimates to be produced.
* Defining changes necessary to the PeopleSoft and ERD databases.

### Out of Scope

The following sections in the requirements document have not been reviewed:

* Any changes to PeopleSoft application.
* Any changes to the AS/400 platform.
* Any modification of the aliases, table, view or materialized view names, etc. in the existing ERD

## Related documents

[LHRS High Level Architecture](https://confluence.ehi.com/display/ES/LHRS+High+Level+Architecture)

## Assumptions

The following assumptions are being made:

1. The existing AS/400 system will continue providing TempMast data feeds outside this project.
2. Until the HRMS system is replaced the TempMast feed will continue.[[1]](#footnote-1)

## Dependencies

The following dependencies have been identified:

* + PS Oracle database
  + PeopleSoft Application
  + AS/400 Application

## Constraints

Development lifecycles for other systems – e.g. HR replacement project, AS400 migration, TempMast.

# ERD Data Feed Current State Overview

## Functional capabilities

The existing platform moves data from the PeopleSoft database to an external, to PeopleSoft, database called ERD. This allows known clients to connect via SQL and pull data based on views created for them. There are also daily feeds from PeopleSoft to ERD all of which are shown below.

## Architectural overview

### High-level integration overview

Existing high level integrations are in place between PS database and the ERD database are shown below in Figure 1.



Figure : Overview of current HRMS and AS/400 landscape

### Current Interface overview

* Interface methods
  + PeopleSoft to ERD
    - Database materialized views over a DB Link
  + Feed Interval
    - Employee/TempMast changes updated every 5 minutes
    - All other feeds are daily
* Live interfaces cover the following types of data:
  + Employee HR data including PII, EID
  + TempMast
    - Contingent employee
    - Multiple ID non-person accounts

# ERD Data Feed Proposed New State Overview

## High-level logical overview of new ERD Data Feed

Below is the high-level overview of the replacement system.



Figure : High-level overview of new ERD Data Feed

### Proposed architecture highlights

The proposed system consists of a new Java Spring SQL monitor that watch the PeopleSoft ERD table for changes. The HRMS system (PeopleSoft) database will update a new trigger table with insert, update, and delete event that will be monitored by the external Java application. When events are detected records will be inserted into the existing ERD database base.

The system consists of a new monitor and a task scheduler;

#### Monitor

* PS ERD Table changes

As changes happen in the trigger table the application will read the data from the trigger to determine what type of work to perform. If it detects an event that needs to be transferred to the ERD database, it will notify the Data Importer which will pull data directly from the PeopleSoft (PS) Database, ERD table, for the event.

The Data Importer (DI) will wrap the data with metadata about the source of the event and pass the payload to the Data Export Engine (DPE). Data will be inserted into the ERD database from a defined exporter.

#### Scheduled Task Engine

There are six (6) daily exports from the PeopleSoft database that are required for the ERD system to function. These tasks will be entered as event tasks into the Data Importer (DI) and will flow out the system by an exporter to the ERD database.

#### Data Importer (DI)

The Data Importer receives tasks from the ERD Event Monitor and the Scheduled Task Engine and makes SQL requests to the PeopleSoft database getting either employee/TempMast or table data depending on the type of tasks (events).

##### **Translator**

The translator layer maps external data elements to the internal data mapping used by the LHRS.

#### Data Processing Engine (DPE)

This engine analyses the event metadata and routes the export request to the correct exporter.

#### ERD Export Service

This service connects to the Oracle database and preforms CRUD operations based on the data from the importer.

## ERD Data Feed Logical System overview

Below is the proposed systems high-level logical overview



Figure : High-level logical overview of the ERD Data Feed

### High Level Logical highlights

The system is comprised of four logical components;

* + ERD Event Monitor
  + Scheduled Task Engine
  + Data Agent
  + Data Transformation
  + Processor
  + ERD Data Exporter

Since the end goal of this framework design is to facilitate the replacement of the current HRMS system, PeopleSoft, with a new cloud version with minimum rework a Black Box System approach has been used. The design of the system focuses on using interface contracts to enforce the standalone nature desired. This allows for each component to be modified/replaced without impacting the rest of the framework.

#### Event Monitor

In the initial phase, the monitor uses SQL queries to look at existing trigger table looking for events. A new Trigger table will be created to capture the changes in the PS ERD table which will be monitored by the event monitor. Each event will be sent to the data importer.

In the case where there are issues with the data the monitor, after a configurable number of times an event is skipped, will generate an email notice to support and the event is marked as processed.

Each event monitor will update the trigger table associated with the monitor when either the event has been sent to the client or when an error will prevent an event from ever being processed without outside intervention.

#### Scheduled Task Engine

This engine will use individual external start times to grab data[[2]](#footnote-2) from PeopleSoft to keep the ERD current. Below is a list of the tables that are accessed by the data import engine when the scheduled task event is added to its work queue.

* PS\_ZHRV\_ORG\_CHART
* PS\_JOBCODE
* PS\_POSITION\_DATA
* PS\_JOB\_HIST
* PS\_EMCNTCT

#### Data Importer

In the initial phase the data importer will be SQL in nature. The importer takes a notice message from the **Event Monitor** and will retrieve the data from the PeopleSoft DB per the export channel and other information contained in the notice metadata.

#### Data Transformation

The data transformation layer is a sub layer of the Data Importer and converts the incoming data from an HRMS system into the internal data model.

#### Processor

As jobs leave the Data Importer they are evaluated by the processor which routes the request to the correct exporter.

#### ERD Data Exporter

The data export layer consists of a processor that consumes the meta data provided by the event monitor to route the message to the correct exporter. In this phase the exporters are for;

* ERD Events
  + Insert into the PS ERD table
  + Update existing record in the PS ERD table
  + Delete an existing record in the PS ERD table
* Scheduled Events (daily feeds)
  + PS\_ZHRV\_ORG\_CHART
  + PS\_JOBCODE
  + PS\_POSITION\_DATA
  + PS\_JOB\_HIST
  + PS\_EMCNTCT

The exporters will be using SQL connections to the ERD database and call the correct methods listed above based on the event metadata and event source.

## ERD Data Feed Workflows

This section describes the high-level workflow for the ERD Data Flow.

### ERD Data Feed High-Level workflow



Figure : ERD Data Feed High-Level Workflow

### High-level Overview for the Event Monitor



Figure : High-Level overview of the Event Monitor workflow

### High-level Overview for the Scheduled Task Engine



Figure : High-Level overview of the Scheduled Task Engine

### High-level Overview of the Data Importer/Data Transformation Process



Figure : High-Level overview of the Data Importer workflow

## High-level Overview of the Export Service



Figure : High-Level overview of the Export Service

# 

# Appendix A – Business service classifications

## Definitions, Acronyms and Abbreviations

The following abbreviations and acronyms have been used in this document.

Table : Definitions, Acronyms and Abbreviations

|  |  |
| --- | --- |
| **Term** | **Meaning** |
| **PS** | People Soft |
| **ERD** | Employee Reference Data |
| **SQL** | **Structured Query Language**: language used to access data held in a database |
| **TBD** | **To Be Determined** |
| **REST** | **Representational State Transfer**: Interface standard that allows for interchanging data between systems via web services. |
| **JSON** | **JavaScript Object Notation**: a lightweight data-interchange format easily read by humans and processed by computers |
| **ACL** | **Access Control List**: a list that tells a computer system which access rights a user or client has to a particular data object such as allowed access to PII data elements |
| **RESTful** | Interfaces that implement a REST like service |
| **DB** | **Database**: a system used to store large record sets allowing for standard methods to manage CRUD operations. |
| **CRUD** | **Create Retrieve Update Delete**: a basic set of operations done on data sets |
| **ETL** | Method to Extract, Translate, Load data from one system to another |
|  |  |
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Table : Service Definitions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Aspect** | **Mission Critical** | **Business Critical** | **Business Operational** | **Administrative Services** |
| **Service Hours** | Operational hours | 7 x 24 | 7 x 24 | 5 x 24 | 5 x 8 |
| Maintenance window | 4 hours / month | 8 hours / month | 48 hours / week | 60 hours / week |
| **Service Availability** | Availability | 99.99% | 99.9% | 99% | 99% |
| Backups | No impact to availability | No impact to availability | May impact availability | May impact availability |
| Availability measurement | Required | Required | Required | Required |
| **Reliability** | Unplanned outage | 1 / year | 4 / year | 8 / year | N/A |
| **Customer Support** | Maximum priority of helpdesk call | 0 | 0 | 1 | 2 |
| **Service performance** | Metrics defined in SLA | Required | Required | Required | Not required |
| Backups | No impact to service performance | May impact service performance | May impact service performance | May impact service performance |
| Restore metrics defined in SLA | Required | Required | Required | Not required |
| **Change Management** |  | Required | Required | Required | Not required |
| **IT Service Continuity** | DR Solution | Required with full operational capability | Required with full operational capability | Not required | Not required |
| Availability in DR mode | 99.99 | 99.5% | N/A | N/A |
| Data loss | None | Some, defined in SLA | N/A | N/A |
| Service recovery time | 2 hours | 72 hours | N/A | N/A |
| **Security** | Compliance | Required | Required | Required | Required |
| **Service Reviews** | Frequency | Monthly | Monthly | Six monthly | Not required |

1. This will be evaluated during the HRMS replacement project [↑](#footnote-ref-1)
2. These are not person events [↑](#footnote-ref-2)