# 5MS Systems Working Group

SWG#6 - Thursday, 31st January 2019

**AEMO Offices**: None (WebEx only)

WebEx: http://aemo.webex.com

ACCESS CODE: **574 614 037** PASSWORD: **v5K23663**

# Agenda (Melbourne Time)

| NO | TIME | AGENDA ITEM | RESPONSIBLE |
|---|---|---|---|
| **Preliminary Matters** | | | |
| | 10:00am - 10:05am | Welcome, introduction and apologies | Hamish McNeish (AEMO) |
| **Matters for Noting** | | | |
| | 10:05am – 10:15am | Minutes and Actions from last meeting | Hamish McNeish (AEMO) |
| | 10:15am – 10:20am | System workstream update | Hamish McNeish (AEMO) |
| **Matters for Discussion** | | | |
| | 10:20am – 10:50am | Presentation on PDR Monitor | Phil Hayes (AEMO) |
| | 10:50am – 11:10am | PDR report delivery analysis | Phil Hayes (AEMO) |
| | 11:10am – 11:30am | Bidding Technical Spec Walkthrough | Hamish McNeish (AEMO) |
| | 11:30am – 11:40am | HLIA Feedback | Hamish McNeish (AEMO) |
| **Other business** | | | |
| | 11:50am – 12:00pm | General questions | Hamish McNeish (AEMO) |
| | 12:00pm – 12:05pm | Forward meeting plan | Hamish McNeish (AEMO) |

# Items for Noting

Hamish McNeish

# Open Actions

- Meeting notes with actions have been emailed and published
- Any feedback?

| Item | Topic | Action required | Action Update | Responsible | By |
|---|---|---|---|---|---|
| **1.6** | Participant bandwidth implications | AEMO to provide assessment on bandwidth/networking impacts. | **AEMO still reviewing** | AEMO | Feb 19 |
| **3.2** | Bidding data model transition | AEMO to include in data model focus group discussion, date to be scheduled. | **Proposed for Feb-19** | AEMO | Feb 19 |
| **3.3** | Bidding data model tables | AEMO to include in data model focus group discussion, date to be scheduled. | **Proposed for Feb-19** | AEMO | Feb 19 |

# Actions to Close

| Item | Topic | Action required | Action Update | Responsible | By |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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| | | | | | |

# System Workstream

- **Current Status**
- Dispatch and settlement streams
  - Requirements gathering continues
  - Build of Development and test environments complete
  - Development and test resource confirmed
  - Development effort (environment shakeout) commenced
- Retail stream
  - Requirements gathering continues
  - Vendor negotiations continue, recommendation tabled with Exec 25-Jan
  - WebMethods Development environment build in progress
  - Development expected to start February 2019

- **IT Schedule**
  - Detailed schedule build work continues with a key focus being on Industry deliverables
  - Targeting to set a minimum 120 day baseline by end January 2019
  - Resourcing ramp up continues

# System Workstream - Metering

- Current estimated timeline

| 5 MINUTE SETTLEMENT SYSTEMS TRACKING | TIMING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Internal HLIA | Focus/Group | SWG Engagement | External HLIA | Draft Tech Spec | Final Tech Spec | User Guides | Sandbox | Preprod | Production |
| **METERING** | | | | | | | | | | |
| Transition | Aug-18 | Sep-18 | Aug-18 | Nov-18 | Apr-19 TBC | May-19 TBC | - | Nov-19 | - | - |
| Meter Data - MDFF | Aug-18 | Oct-18 | Oct-18 | Nov-18 | Apr-19 TBC | May-19 TBC | - | Nov-19 | Sep-20 | Nov-20 |
| B2M MDFF (API and FTP) | Aug-18 | Oct-18 | Sep-18 | Nov-18 | Apr-19 TBC | May-19 TBC | - | Nov-19 | Sep-20 | Nov-20 |
| Standing Data and validations | Oct-18 | Nov-18 | Nov-18 | Dec-18 | Apr-19 TBC | Jul-19 | - | Nov-19 | Sep-20 | Nov-20 |
| B2M via eHub | Aug-18 | - | Jan-19 | Jan-19 | Apr-19 TBC | Jul-19 | - | - | Nov-20 | May-21 |
| MSATS Browser (LVI) changes | Oct-18 | TBC | TBC | TBC | TBC | TBC | TBC | - | Nov-20 | May-21 |
| MSATS report changes (RM reports) | Oct-18 | TBC | TBC | TBC | TBC | TBC | TBC | - | Nov-20 | May-21 |

# System Workstream - Dispatch

- Current estimated timeline

| 5 MINUTE SETTLEMENT SYSTEMS TRACKING | TIMING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Internal HLIA | Focus/Group | SWG Engagement | External HLIA | Draft Tech Spec | Final Tech Spec | User Guides | Sandbox | Preprod | Production |
| **DISPATCH** | | | | | | | | | | |
| Transition | Aug-18 | Oct-18 | Aug-18 | Nov-18 | Dec-18 | Feb-19 | Oct-19 | Nov-19 | Nov-20 | **Mar-21** |
| Bidding Web UI and APIs | Aug-18 | Nov-18 | Dec-18 | Jan-19 | Mar-19 | Jul-19 | Oct-19 | Nov-19 | Nov-20 | **Mar-21** |
| Bidding Data Model | Aug-18 | - | Sep-18 | Mar-19 | Dec-18 | Feb-19 | Oct-19 | Nov-19 | Nov-20 | **Mar-21** |
| Bidding Format | Aug-18 | - | Sep-18 | Nov-18 | Dec-18 | Feb-19 | Oct-19 | Nov-19 | Nov-20 | **Mar-21** |
| Dispatch | Aug-18 | - | Oct-18 | Nov-18 | Oct-18 | Feb-19 | - | Nov-19 | Nov-20 | **Mar-21** |
| Predispatch P30/7DAY | Aug-18 | - | Oct-18 | Nov-18 | Oct-18 | Feb-19 | - | Nov-19 | Nov-20 | **Mar-21** |
| Predispatch P5 | Nov-18 | Oct-18 | Nov-18 | TBC | TBC | TBC | - | TBC | Nov-20 | May-21 |
| Trading Price / Price Revision | Aug-18 | - | Feb-19 | Nov-18 | Mar-19 | Jul-19 | - | - | Nov-20 | May-21 |
| Administered Pricing and CPT | Aug-18 | - | Feb-19 | Dec-18 | Mar-19 | Jul-19 | - | - | Nov-20 | May-21 |
| Suspension Pricing | Sep-18 | - | Feb-19 | Dec-18 | Mar-19 | Jul-19 | - | - | Nov-20 | May-21 |
| Negative Residue Management | Sep-18 | - | Feb-19 | Dec-18 | Mar-19 | Jul-19 | - | - | Nov-20 | May-21 |
| Full Data Model | Sep-18 | Feb-19 | Mar-19 | Mar-19 | Mar-19 | Jul-19 | Oct-20 | - | Nov-20 | May-21 |

# System Workstream – Settlement and Operations

- Current estimated timeline

| 5 MINUTE SETTLEMENT SYSTEMS TRACKING | TIMING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Internal HLIA | Focus/Group | SWG Engagement | External HLIA | Draft Tech Spec | Final Tech Spec | User Guides | Sandbox | Preprod | Production |
| **SETTLEMENTS** | | | | | | | | | | |
| Estimation | Oct-18 | Nov-18 | Dec-18 | Feb-19 | Feb-20 | May-20 | - | - | Nov-20 | May-21 |
| Settlements | Oct-18 | Nov-18 | Dec-18 | Feb-19 | Nov-19 | Feb-20 | - | - | Nov-20 | May-21 |
| Reallocation | Dec-18 | Nov-18 | Dec-18 | Feb-19 | Aug-19 | Nov-19 | Feb-20 | - | Nov-20 | May-21 |
| Billing | Oct-18 | Nov-18 | Dec-18 | Feb-19 | Dec-19 | Mar-20 | - | - | Nov-20 | May-21 |
| Prudentials | Sep-18 | Nov-18 | Dec-18 | Feb-19 | Apr-20 | Jul-20 | Sep-20 | - | Nov-20 | May-21 |
| Full Data Model | Refer DISPATCH | | | | | | | | | |
| | | | | | | | | | | |
| **POWER SYSTEM OPS (TBC)** | | | | | | | | | | |
| PASA (ST/PD) | Aug-18 | - | Oct-18 | | TBC | TBC | Oct-19 | Nov-19 | Nov-20 | Mar-21 |
| RERT | Oct-18 | TBC | TBC | | TBC | TBC | TBC | - | Nov-20 | May-21 |
| Negative Residue Management | Refer DISPATCH | | | | | | | | | |

# Matters for Discussion

Hamish McNeish

# PDR Monitor

Phil Hayes

# Agenda

1. Overview
2. Architecture/Design
3. Configuration
4. Product Demonstration
5. Questions

# Overview

# Overview

- The current Data Interchange suite comprises 4 products
  - pdrBatcher – supporting file exchange with AEMO market systems
  - pdrLoader – supporting loading of data to a local database
  - Data Model – the electricity and gas data models, which is the industry standard information store to which market data is loaded
  - Replication Manager – configuration management and logging events
- The pdrMonitor is a replacement for the Replication Manager
- Why replace the Replication Manager ?
  - It is written in a legacy technology, last updated 11 years ago
  - The default replication type is the Database to Database protocol that was decommissioned 10 years ago
  - It only provides partial visibility of system state and health and has not been enhanced as the other products have evolved

# Key features

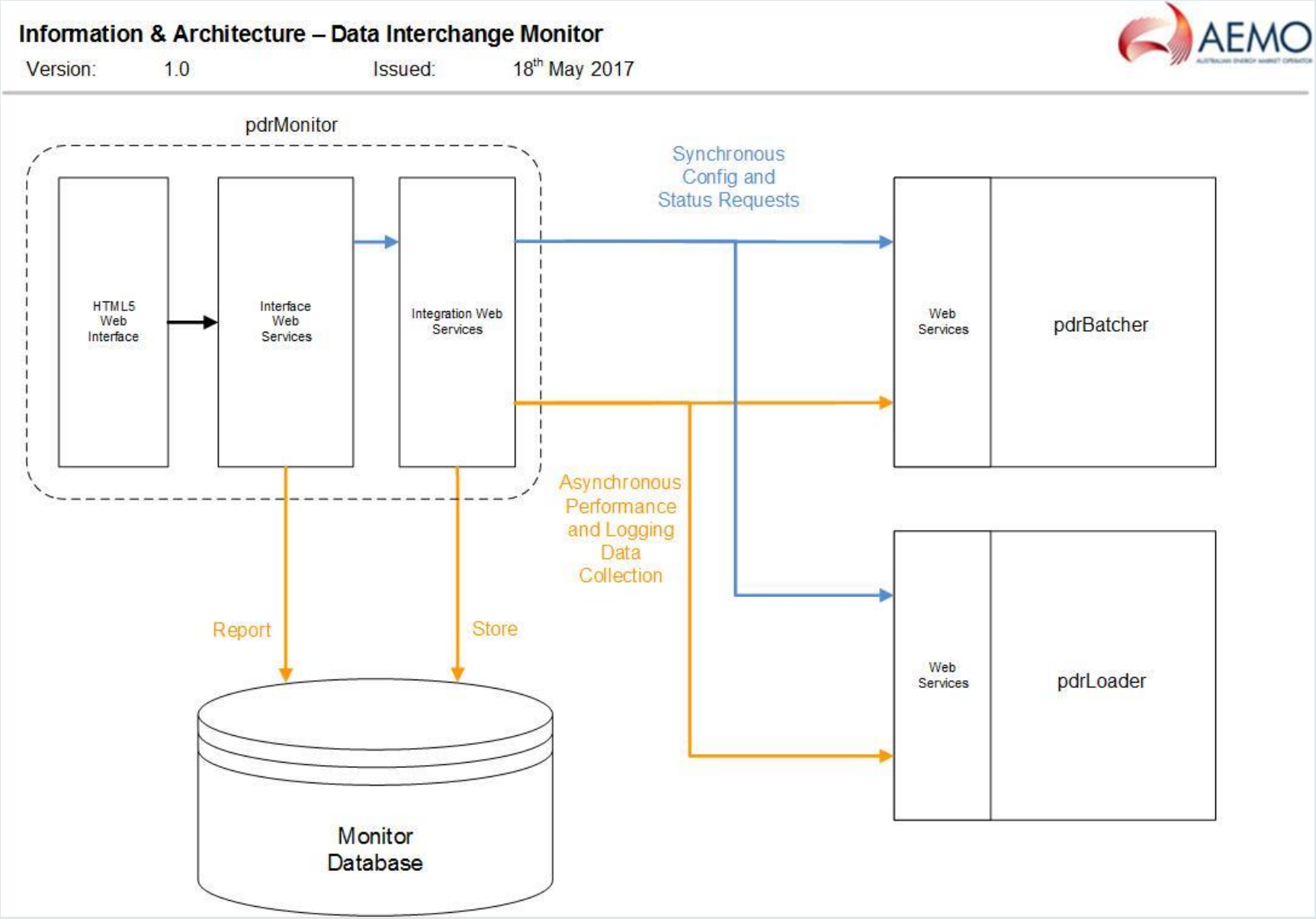
- Supports multiple Data Interchange installations
- User accounts and role based permission access
- For Data Interchange application instances:
  - Overview and runtime statistics
  - Running application configuration
  - Application event logs
  - Application workload/performance, with drill down/analytics
- For Data Interchange as an end to end process chain:
  - Overview dashboard for health “at a glance” with drill down
  - Management of Replication configuration settings
  - A suite of built in reports
  - Overview of upgrades which have been to the environment
  - A series of control actions that support various user interventions
  - End to end performance monitor
- Simple GUI based installation and configuration

# Architecture / Design

# Technical Summary

- Technology
  - pdrMonitor is deployed on the participants infrastructure using a self hosted web server
  - pdrMonitor is written in JAVA, making it consistent with the technology stack that supports the other Data Interchange products
  - The user interface is HTML5 using Bootstrap and JQuery frameworks
  - The user interface is serviced by restful web services.
  - Requires a local database, which can either be shared with existing environment or run as an  independent database
- Communication protocols
  - Exposes restful web services over HTTP for consumption by the HTML5 client
  - Communicates with other Data Interchange products using HTTP calls to restful web services hosted by those products
- Security
  - pdrMonitor web services (browser consumption) are secured by a token based authentication scheme which is generated from basic authentication credentials
  - pdrBatcher and pdrLoader web services are secured using HMAC (hash-based message authentication code) and a secret key. All requests must be digitally signed including a timestamp within the HTTP header which prevent modification of request and ability to replay any request by a man in the middle

# High level architecture



# Configuration

# Configuration

- The pdrMonitor application has two primary configuration stores:
  - The application instance has an XML based configuration file
  - There is also configuration stored inside the database
- There is also a sundry XML configuration for logging
- All configuration is managed by the GUI installer and should not require manual intervention under normal circumstances.

# Configuration Database
# PDR_MONITOR_SOURCE

| Name | Data Type | Length | Comment |
|---|---|---|---|
| PDR_MONITOR_ID | Integer | | The monitor collector identifier |
| SYSTEM_ID | Varchar2 | 30 | The system identifier associated with this application |
| HOSTNAME | Varchar2 | 40 | The hostname on which this application is running |
| INSTANCE_ID | Varchar2 | 30 | The unique instance identifier for this application instance |
| APP_NAME | Varchar2 | 30 | The name of the application associated with this data source |
| APP_VERSION | Varchar2 | 30 | The version of the application associated with this data source |
| LAST_ACTIVE | Date | | The datetime at which this last source was last active |
| PORT | Integer | | The port number for web service communication |
| API_KEY | Varchar2 | 30 | The API key for web service communication security |
| IS_ACTIVE | Integer | | Identifies if this source is currently active and should be polled for updates. Valid entries are:<br>1 = Active<br>0 = Inactive |

# Product demonstration

# Implementation requirements

pdrMonitor v1.0.0

- Was released for production use on 22nd November 2018
- Requires pdrBatcher / pdrLoader v7.4.1 as pre-requisite.

pdrBatcher/pdrLoader v7.4.1

- Drop in upgrade on top of v7.4.0 release installation
- Adds some additional web services to support functionality in pdrMonitor
- Includes correction of a few minor defects and some suggested enhancements.

# Questions

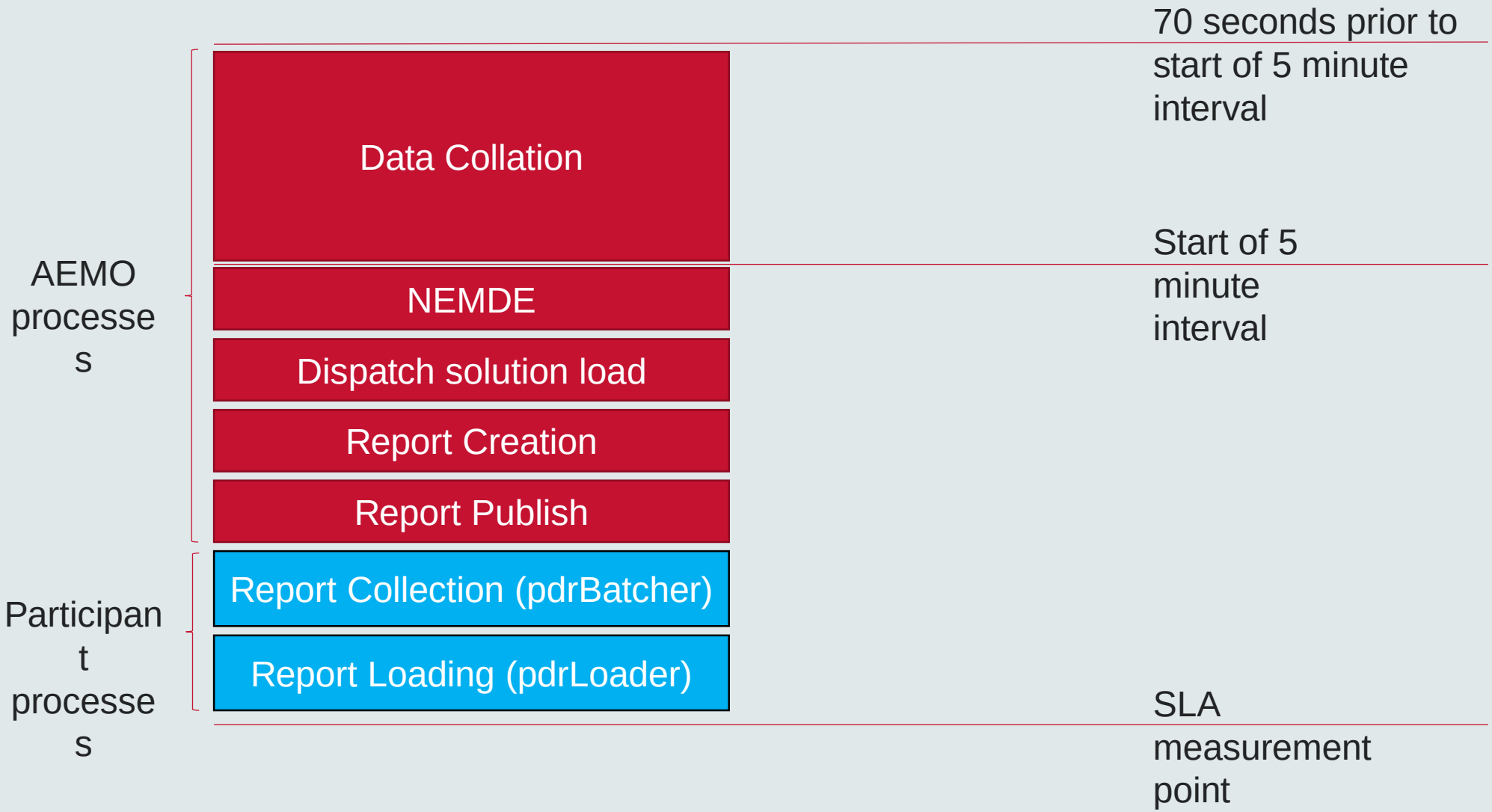
# PDR Report Delivery Analysis

Phil Hayes

# Overview

- This presentation is an update on continuing discussions within the 5MS system working group around the end to end performance of the 5 minute dispatch, including making data available to participant systems via Data Interchange.
- Participants have noted both a deterioration and greater variance in the end to end performance of the DISPATCHIS report.
- AEMO undertook to investigate and report back to the 5MS system working group with our findings.
- This presentation provides an update on how this work is progressing

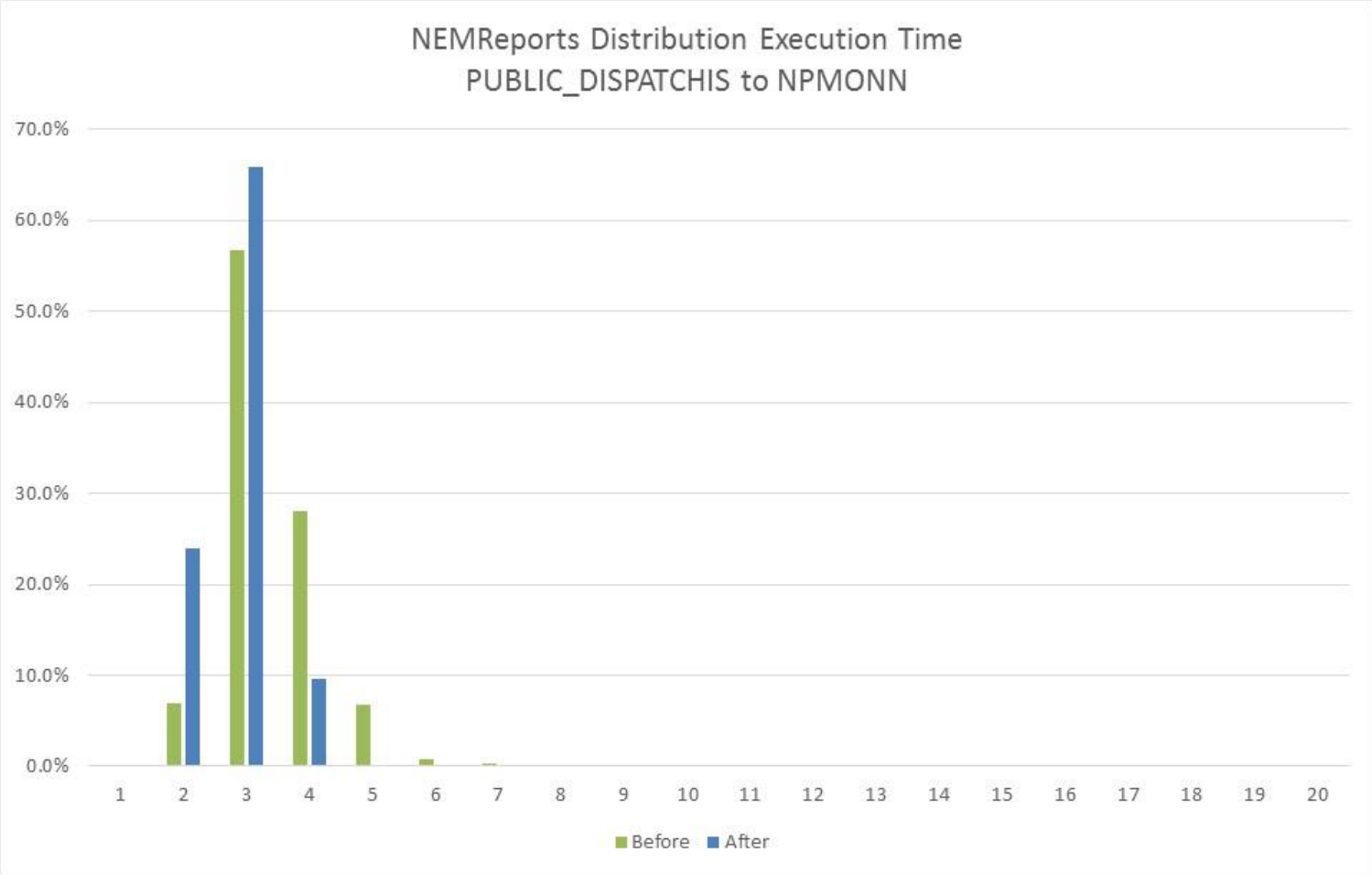
# 5 Minute Dispatch cycle process steps



# Investigation outcomes

- AEMO has performed some investigation into the delivery performance of DISPATCHIS and identified some configuration changes in the report publishing application suite which will improve delivery performance.
- This change was implemented into the AEMO PreProduction environment in early December 2018 with the following results which show both improved and more consistent delivery performance

# Investigation outcomes




- AEMO has progressed this change to production as of January 22, and the early indications are that it has marginally improved performance in production, however more time is needed to establish a new performance baseline

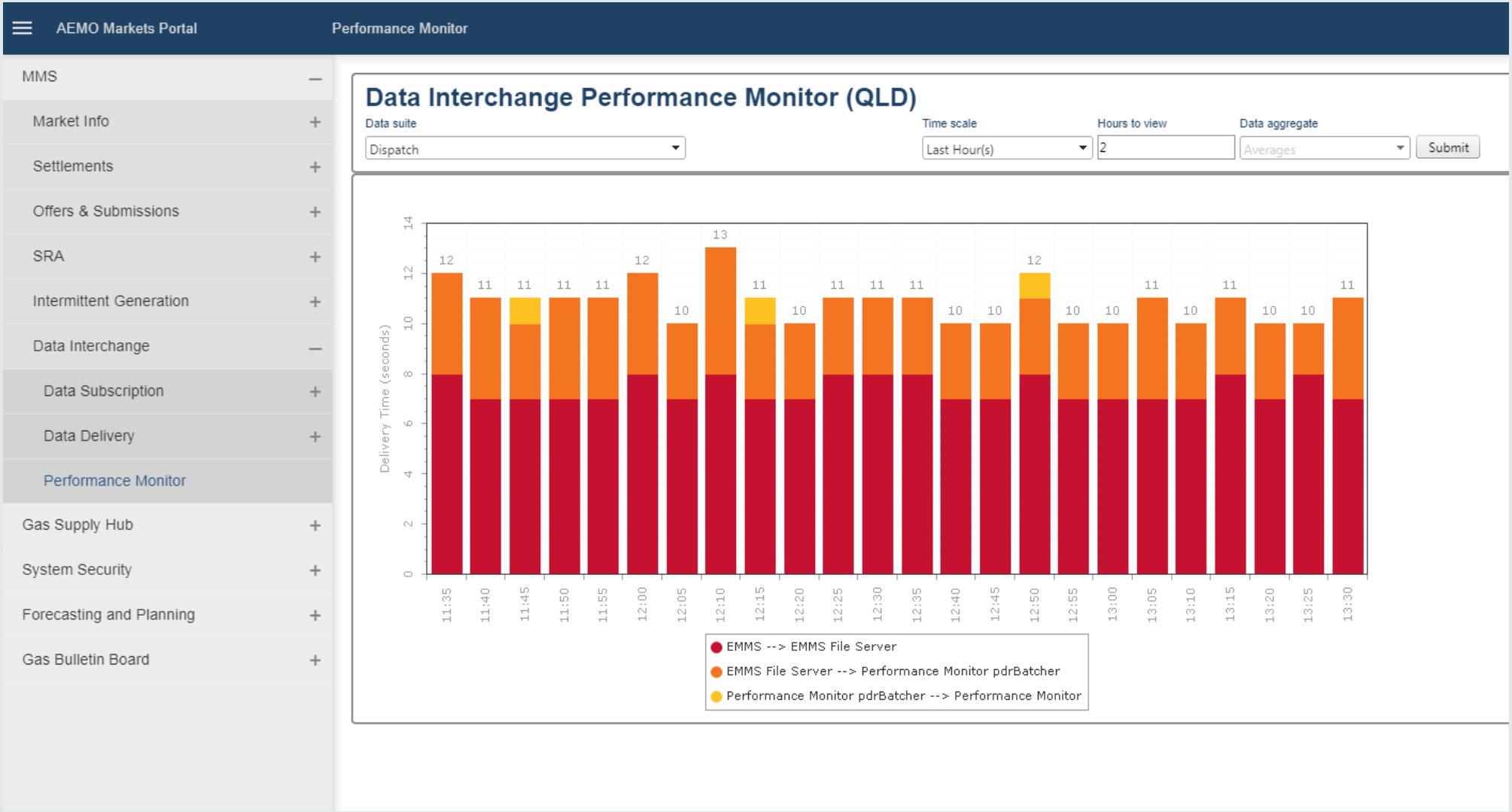
# January 2019 EMMS release impact

- AEMO has recently implemented the January 2019 EMMS software release into production which includes functional changes to DISPATCHIS
- As is normal practice, the implementation of the release has moved all participant subscriptions from DISPATCHIS to DISPATCHIS_LEGACY to preserve continuity to participant systems though the AEMO implementation
- The participants attending the Market Systems User Group have almost universally indicated that they have not implemented the release due to a change freeze in their respective organisations over the holiday period.
- This has materially changed the normal balance of report subscriptions in the AEMO systems, so it is difficult to generate a set of performance statistics that are generally applicable across the market

# Further steps

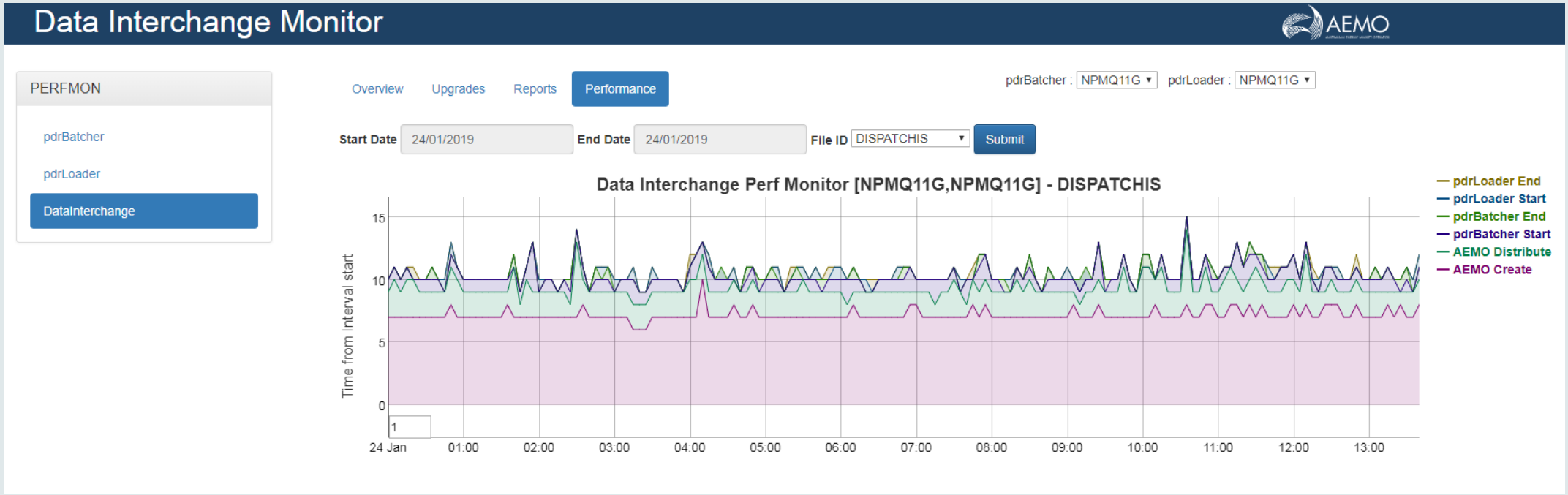
- AEMO has further identified an improvement opportunity in the report publishing application suite which will also help to deliver a more consistent report delivery outcome. The work to deliver this application update is running at an elevated priority within the AEMO application development and support team.
- The AEMO EMMS FTP server is currently in the process of a hardware refreshed, the hardware ending its expected service life. This initiative is part of our normal server management lifecycle work and we are in the process of transitioning PreProduction to new infrastructure. It is expected that the introduction of the new infrastructure will position AEMO to service the continued growth in participant data services. This change will be announced through normal change management channels.

# Performance Monitor within Markets Portal



# PDR Monitor Dashboard

# PDR Monitor Performance Report



# Tips for tuning for optimum performance

- Always ensure report subscriptions are kept up to date. Generally there is a lower number of subscribers to the LATEST report version compared to LEGACY and therefore it is not uncommon for LATEST to be more performant.
- Remove subscriptions to LEGACY report versions where the LATEST report version is subscribed. This removes unnecessary downloads.
- Consider whether subscriptions to non-data model reports are in fact necessary. If you are not explicitly using them with your own application and have not configured a custom pdrLoader configuration to load them into your local database, consider unsubscribing from these reports.
- Start with the standard pdrBatcher configuration and make customisations only where required.
  - The standard configuration is generalised and not necessarily tailored to your specific business requirements. The optimal configuration will depend on the nature of your business and the capacity of your MarketNet link
  - Consider file masks carefully. A mask such as *_DISPATCHIS_* will match both a DISPATCHIS and DISPATCHIS_FCAS report which may not be the intention.
  - A single include filemask on a batcher thread is sent as part of the ‘ls’ command to the AEMO fileserver and is therefore very efficient. Multiple file masks on a single batcher thread require the entire directory listing to be retrieved and parsed by the application.
  - Increasing the number of batcher threads does not always result in improved performance. This can result in increased background traffic associated with retrieving directory listing on polling cycles, FTP connection pool thread contention and potentially slower overall downloads if all threads are downloading concurrently.
  - More recent versions of pdrBatcher introduced new features such as the ability the bandwidth throttle batcher threads. This is useful to ensure that download of say a NEXT_DAY report does not saturate your MarketNet link and adversely impact the concurrent download of high priority content such as DISPATCHIS. This is part of the standard configuration.

# Tips for tuning for optimum performance

- pdrLoader versions < v7.4.1 use a polling cycle on the Reports directory to pick up incoming reports. The default value for this can be changed to 1 second to reduce latency between the batcher hand off to the loader. The performance impact of this on the local application server would be expected to be negligible.
- pdrLoader v7.4.1 introduces OS directory notification services in addition to a polling cycle to detect when new reports are presented for loading. This then moves pdrLoader to more of an event driven architecture which removes the latency of a polling cycle altogether. The polling cycle is retained as a “catch all” in the event that the OS does not correctly raise a file change event to the application layer.

# Questions

# Bidding Tech Spec Walkthrough

Hamish McNeish

# High-Level Impact Assessment Document (HLIA) - Feedback

Hamish McNeish

# General Questions

Hamish McNeish

# Forward Meeting Plan

Hamish McNeish

# Upcoming Meetings

- Systems Working Group
  - Mon, 18 February 2019
  - Mon, 18 March 2019
- Focus groups:
  - Dispatch – 15-Feb-19
  - Metering, Settlement – *to be scheduled*
- Other AEMO IT Meetings
  - MSATS MSUG – 13 Feb 2019 (Post Release) - *tentative*
- 5MS Meetings and Forum Dates: http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement