

EMMS Technical Specification - Data Interchange - March 2025

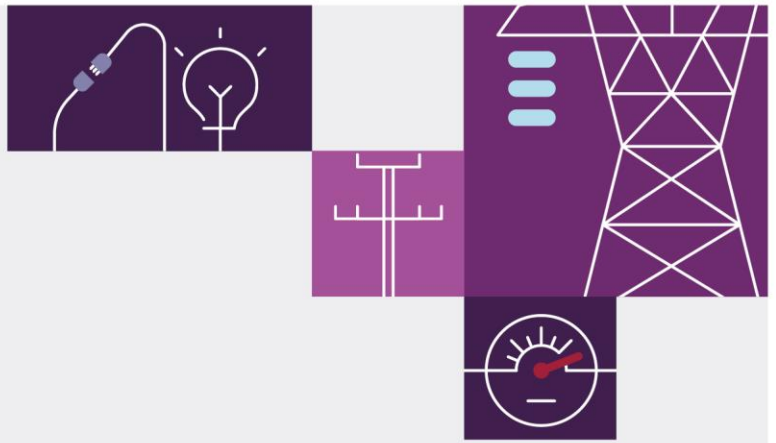
2.002.01 April 2025

Pre-production: 21 February 2025

Production: 31 March 2025

Release series: EMMSDI0325





Important notice

Purpose & audience

This document describes the technical changes required to participant's systems for the EMMS Technical Specification - Data Interchange - March 2025 (Release). The Australian Energy Market Operator (AEMO) provides this information as a service targeting business analysts and IT staff in participant organisations. It provides guidance about the changes to their market systems under the National Electricity Rules (Rules), as at the date of publication.

How to use this document

- If you have questions about the business aspects of these changes, please see Consultations on AEMO's website.
- The references listed throughout this document are primary resources and take precedence over this document.
- Unless otherwise stated, you can find resources mentioned in this guide on AEMO's website.
- **Text in this format** is a link to related information.
- **Text in this format**, indicates a reference to a document on AEMO's website.
- **Text in this format** is an action to perform in the Markets Portal.
- This document is written in plain language for easy reading. Where there is a discrepancy between the Rules and information or a term in this document, the Rules take precedence.
- Glossary Terms are capitalised and have the meanings listed against them in the Glossary.
- Rules Terms have the meaning listed against them in the **National Electricity Rules** (Rules).

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Version history

2.002.01 See Changes in this version

Documents made obsolete

The release of this document changes only the version of EMMS Technical Specification - Data Interchange - March 2025.

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1 Introduction


1.1 Purpose

This technical specification advises participants about the lifecycle upgrade to AEMO’s suite of Data Interchange applications.

1.2 Audience

AEMO provides this information as a service targeting business analysts and IT staff in Registered Participant companies.

1.3 Status

Version	Status
<u>2.01</u>	<u>Final. Only updates MSUG FAQs.</u>
2.00	Final. Ready for production release.
1.00	Ready for pre-production release.
0.01	<div></div> Initial Draft for review. The design is not ready for participants’ builds. <p>Presents the EMMS Technical Specification - Data Interchange - March 2025 evolving design.</p> <p>Please send feedback to techwriters@aemo.com.au</p> <p>Participants can commence their system builds but design changes may occur according to participant feedback</p>

1.4 Release dates

Scheduled for implementation in:

- Pre-production: 21 February 2025
- Production: 31 March 2025

1.5 Version numbers

AEMO releases new versions of this document as the technical requirements are streamlined.

Incremental version numbers such as 1.01, 2.01 and so on mean there is a minor change to the technical specification.

Major version numbers such as 1.00, 2.00 means there are substantial changes to the technical specification. Participants must carefully review the changes detailed in this Release.

1.6 Related resources

Once published, these resources take precedence over this technical specification

These guides and resources are updated according to this technical specification and published for the pre-production Release Date.

Title	Description	Status
Data Interchange Help	Data Interchange Help provides information regarding DI applications to replicate, manage, and monitor data between AEMO's Wholesale Energy Market Systems and participants' local DBMS conforming to the Electricity or Gas Data Models.	Not started

1.7 Approval to change

There is no approval or agreement to change required from participant change controllers for this Release.

1.8 Market systems user group meetings

The Market Systems User Group (MSUG) is an industry user group established to discuss NEM wholesale and retail IT systems releases. Its purpose is to facilitate the continuing improvement of AEMO's IT systems by seeking feedback and collaboration from participants.

MSUG meetings are open to all interested parties, with invitations sent to all included on the distribution list. If you have a technical question for a project and want to attend the MSUG ask your company's support team to include your email address in their **AEMO Help Desk Bulletin (CRM)** distribution list.

1.9 Changes in this version

The changes in this version include:

- Updates version of pdrLoader to 7.6.1

2 Proposed Timeline

The dates for the Market System User Group Meetings (MSUG) are tentative. We will provide an invitation one week prior to the meeting.

Milestone	Date	Description
Approval required	NA	Final date for participant approval of this Release
Revised Technical Specification	December 2024	<p>AEMO releases new versions of this document as the technical requirements are streamlined. During the project this document is the source of truth</p> <p>From the production release, the technical specification becomes final and the Related resources become the source of truth.</p> <p>Technical Specification Portal</p>
Related Documents publication	21 February 2025	Release of guides and resources mentioned in Related resources
Next MSUG meeting	2 April 2025 9 April 2025 2 April 2025	<p>Market Systems User Group Meeting (MSUG) to review the technical specification and ask AEMO technical SMEs questions</p> <p>This date is tentative. The Knowledge Management Team provides the invitation prior to the meeting</p>
Pre-production available	21 February 2025	Testing period begins for participants
Industry Testing	21 February 2025 - 31 March 2025	Unstructured/bilateral participant testing in the pre-production environment
Production systems available	31 March 2025	Production systems available to participants

3 Participant Impact

For specific information on upgrade to each of the apps, see Implementation Notes.

3.1 Supported versions

Application	Current support	On 31 March 2025	3 months after Production release
pdrBatcher	7.4, 7.5	7.4, 7.5, 7.6	7.5, 7.6
pdrLoader	7.4, 7.5	7.4, 7.5, 7.6.1	7.5, 7.6.1
pdrMonitor	1.0, 1.1	1.0, 1.1, 1.2	1.1, 1.2

The support for current legacy versions of the pdr applications, v7.4.* for pdrBatcher and pdrLoader and, v1.1 for pdrMonitor ends 3 months after the new application versions are released in production.

AEMO recommends all participants using the current releases complete any upgrade to the new production releases to stay on supported software

4 Data Interchange Upgrade

The Data Interchange 2024 release is a lifecycle upgrade to AEMO's suite of Data Interchange applications. The upgrade includes:

- functional enhancements
- minor defect fixes
- security upgrades to third party libraries

Application specific details are outlined in the following section of this document.

4.1 High-level changes

Function	Description
pdrBatcher	Includes functional enhancements, minor defect fixes, and security upgrades to third party libraries for all applications.
pdrLoader	
pdrMonitor	

5 Participant Data Replication Batcher

The Participant Data Replication Batcher (pdrBatcher) upgrades from v7.5.0 to v7.6.0.

5.1 Functional enhancements

The functional enhancements to the pdrBatcher are:

- Ability to connect to various FTP, FTPS, SFTP in a single batcher instance
- File purge configuration now supports additional mask_mode logic
- Adds GUI installer for Gas Wholesale systems (MIBB and MIS)
- Batcher processing thread pause interval now accepts fractional seconds
- New data source **internal** can be defined to redirect performance and logging files to an alternate persistent store
- Performance and logging files for pdrBatcher are now prefixed with pdrBatcher to ensure uniqueness
- Restarts worker processing threads automatically, if they are detected as dead
- Adds *_CONFIGURATION_* into standard batcher thread 6 to support loader CONFIGURATION requests
- Changes to CONSUMER_CACHE state file to store full filename (including extension)
- Improvements to parsing logic for reports hosted at nemweb.com.au
- Adds capability to specify multiple translators for a single thread with a file include process mask
- Enhancements to support integration with AEMO eHub API (for example, bid submission).
- Enhancements to file process order to support PRIORITY and sort chaining definitions
- Supports send and receive inactivity timeout on batcher data sources
- Adds new file process sort capability NAME_FILTER
- Adds various new file translation functionalities:

Function	Description
JSON_TRANSFORM	Supports configurable translations of JSON based payloads
CSV_TO_JSON	Converts plain CSV to JSON
JSON_TO_NEMCSV	Converts JSON to an AEMOCSV format
XSLT	XSL transform capability for XML payloads
JSON_SPLIT	An ability to split a large JSON file into a number of smaller files based on a JSONPath expression
JSON_VARIABLE	An ability to extract a value from a JSON document on a thread translation chain

5.2 Bug fixes

The bug fixes for pdrBatcher are:

- Fixes issue with CONSUMER_CACHE mode when running with all threads with restrictive file masks that caused state file to grow without bound. Previous release only operated correctly if there was at least 1 thread without include/exclude filemask applied
- Fixes defect in web data source which caused download issues when application exceeded download rate against nemweb.com.au/nemweb.com.au
- Fixes defect file system monitor service was not being started
- Fixes defect that batcher threads observe pause interval when no file is processed
- Fixes defect in CONSUMER_CACHE mode which may cause a file to be downloaded twice

5.3 Security upgrades

The security upgrades for pdrBatcher are:

- Adds capability for configuring SSL encrypted application web services.
- Security upgrades to numerous 3rd party libraries

6 Participant Data Replication Loader

The Participant Data Replication Loader (pdrLoader) upgrades from v7.5.0 to v7.6.1.

6.1 Functional enhancements

The functional enhancements for pdrLoader are:

- File purge configuration now supports additional mask_mode logic.
- New data source **internal** can be defined to use an alternate persistent data store (for example, cloud blob storage). The default is a **local** filesystem
- Performance and logging files for pdrLoader are now prefixed with pdrLoader to ensure uniqueness
- Now automatically restarts worker processing threads if they are detected as dead
- Adds functions to DATA_FILTER row filter **matches**, **exists**, **!exists**
- New optional property to customise PDR_* configuration in memory cache timeout in seconds.
- New optional property to customise activity timeout on reconciliation in minutes
- New optional property to allow a delay to be introduced to the reconciliation process.
- Supports loading of flat CSV files without column headings, the column headings are implied by the database table
- Adds support for managing configuration of non data model files configuration
- Adds sparse data row filter
- LASTCHANGED row filter now supports operator in PDR_REPORT_RECORDS.ROW_FILTER_PARAM2. The default is value is <
- Supports file handler lookup based on filename as well as extension, for example, .gas.csv is equivalent to .gascsv
- Adds native support for Market JSON (IDX). Filename mask for this processor is *.market.json
- Enhances processing of plain JSON file to handle either nest object or array under **data** element

- Adds EXTRACTED_AT row filter for supporting load of public WEM data
- Adds generic XML file processor loading capabilities
- Adds enhancements to file process order to support PRIORITY and sort chaining definitions
- Adds new column transform DATABASE_SEQUENCE, DEFAULT_VALUE, DEFAULT_VALUE_SQL
- Populates PDR_REPORT_AUDIT.FILE_PROCESS_START column when a report starts processing
- Supports inactivity timeout on loader internal data source
- Adds functionality to gracefully handle primary key violations on concurrent threads
- Adds row filters COLUMNS_MATCH and COLUMNS_NO_NOT_MATCH

6.2 Bug fixes

The bugs fixes for pdrLoader are:

- Fixes defect with process_priority and file bump operations - ensure resumption of file load starts from where file load was previously paused
- Fixes defect for purging manifest request rows from PDR_REQUEST_LOG for mySQL
- Fixes defect for DELETE transactions
- Fixes defect with error handling with loss of database connection after file process but before audit table update
- Fixes issue with reconciliation which could result in unnecessary report re-requests
- Adds PDR_DATA_FILTER_CONFIG to support dump file

6.3 Security upgrades

The security upgrades for pdrLoader are:

- Added capability for configuring SSL encrypted application web services.
- Security upgrades to numerous 3rd party libraries

7 Participant Data Replication Monitor

The Participant Data Replication Monitor (pdrMonitor) upgrades from v1.2.0 to v1.3.0.

7.1 Functional enhancements

The functional enhancements for pdrMonitor are:

- Automatically restarts worker processing threads if they are detected as dead
- Adds JobType to batcher/loader in the following screens:
 - Transactions reporting screen
 - Performance drill down reporting screen
 - ThroughPut reporting screen
- Adds UI enhancements to tables and charts
- Adds enhancements to LHS menu
- Adds status indicator to top banner to indicate operational status
- Enhancements to logging view with message acknowledgement capability
- Adds data source summary tab for pdrBatcher
- Adds congestion analysis feature
- Adds feature that allows active status of sources to be managed automatically

7.2 Bug fixes

The bug fixes for pdrMonitor are:

- Fixes defect with missing TransactionTypeOverride attribute missing on config edit modal dialog
- Fixes defect with display of performance chart axes labels under Daylight Saving conditions
- Fixes defect where a LEGACY FILE_ID would not appear as having a SLA defined in FileId drop down list/picker

7.3 Security upgrades

The security upgrades for pdrMonitor are:

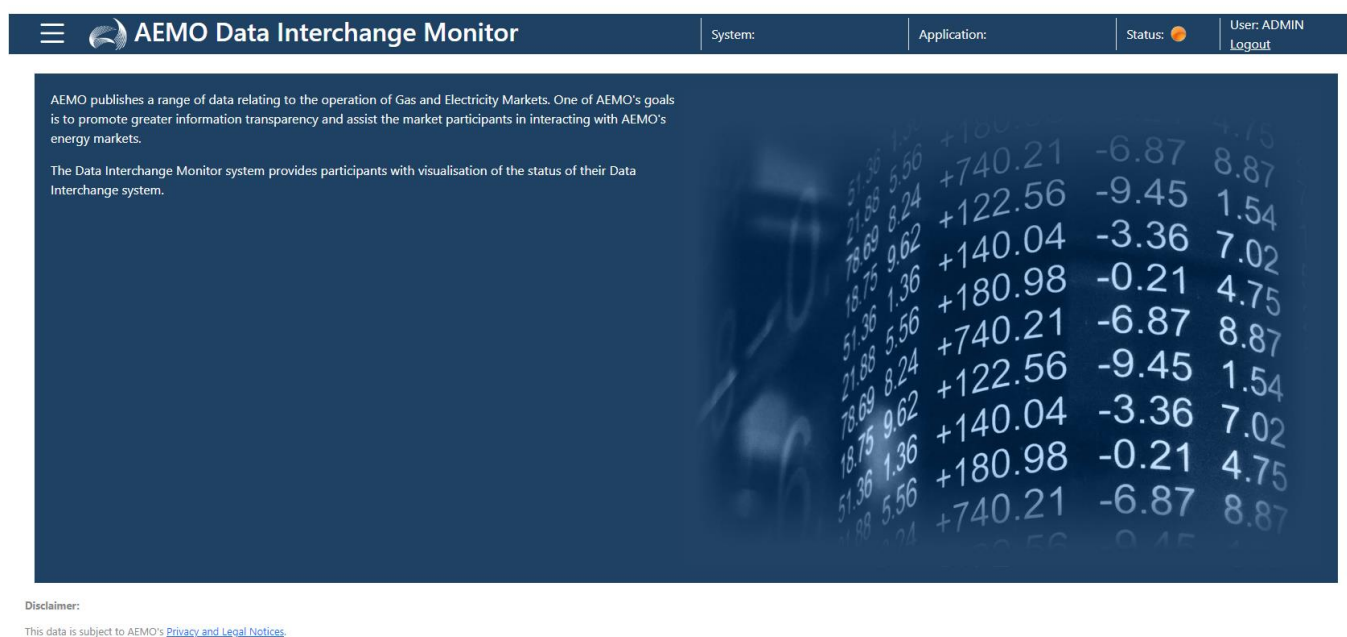
- Enables SSL encryption for connectivity to source applications
- Security upgrades to numerous 3rd party libraries

7.4 Sample screenshots

7.4.1 Home screen

The home screen is enhanced to add:

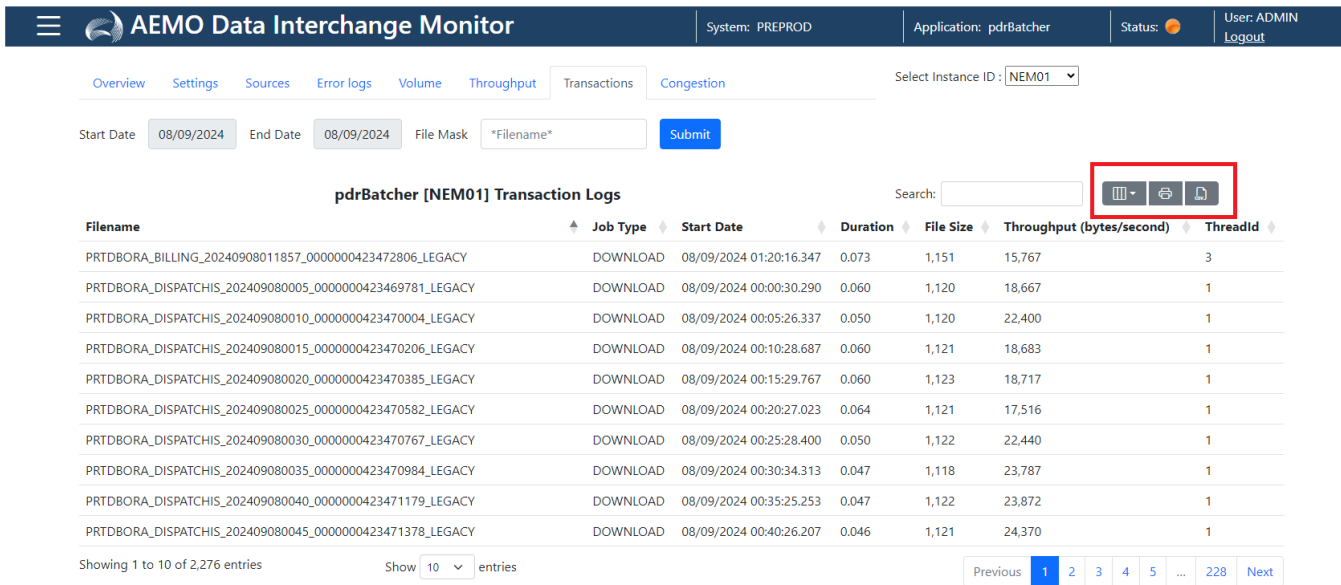
- Status indicator to show any internal issues within monitor
- Hover over menu to improve usable screen space



7.4.2 Functionality for tables

The functionality for tables are enhanced to:

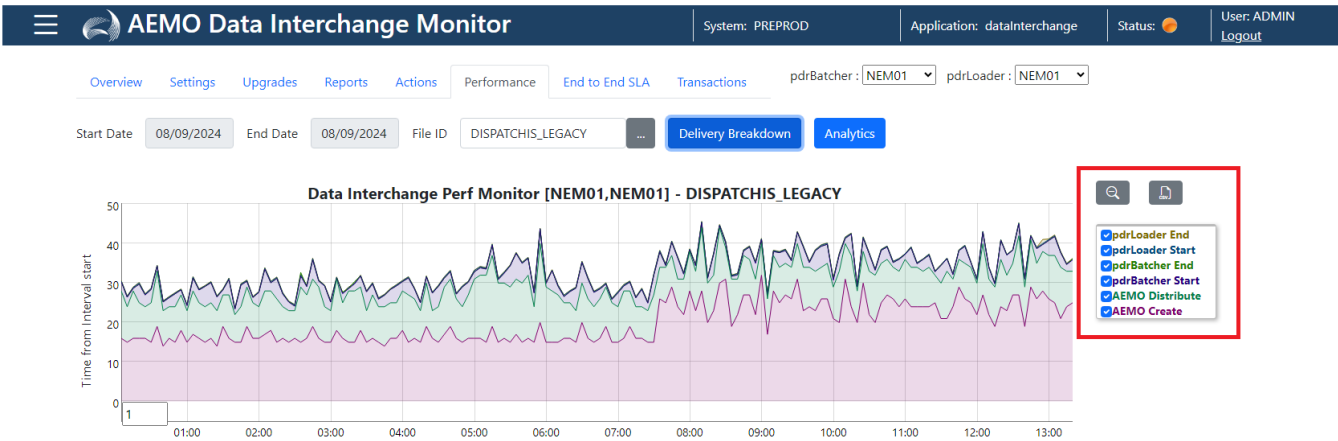
- Select columns to show or hide columns
- Print
- Export to csv



7.4.3 Functionality for charts

The functionality for charts is enhanced to:

- Zoom charts
- Series show/hide selectors
- Export to csv



7.4.4 Functionality for monitoring log messages

Adds enhanced ability to acknowledge monitor log messages to clear indicator status in header

AEMO Data Interchange Monitor

System: Configuration

Application: logs

Status:

User: ADMIN
Logout

pdRMonitor Error Logs

Search:

<input type="checkbox"/> Ack	Event Date	Level	Message	Ack Date
<input checked="" type="checkbox"/>	08/09/2024 13:08:58	WARNING	Error validating web request: Invalid token	
<input checked="" type="checkbox"/>	08/09/2024 13:08:58	WARNING	Error validating web request: Invalid token	
<input checked="" type="checkbox"/>	08/09/2024 13:08:58	WARNING	Error validating web request: Invalid token	
<input checked="" type="checkbox"/>	08/09/2024 13:08:58	WARNING	Error validating web request: Invalid token	
<input type="checkbox"/>	07/09/2024 22:12:30	WARNING	Error validating web request: Invalid token	
<input type="checkbox"/>	07/09/2024 22:12:30	WARNING	Error validating web request: Invalid token	
<input type="checkbox"/>	07/09/2024 22:12:30	WARNING	Error validating web request: Invalid token	
<input type="checkbox"/>	07/09/2024 22:12:30	WARNING	Error validating web request: Invalid token	

Showing 1 to 8 of 8 entries

Show 10 entries

Previous 1 Next

Acknowledge selected messages

7.4.5 pdrBatcher data source summary reporting

Adds new reporting tab Sources for pdRBatcher displaying activity summery.

AEMO Data Interchange Monitor

System: PREPROD

Application: pdRBatcher

Status:

User: ADMIN
Logout

Overview

Settings

Sources

Error logs

Volume

Throughput

Transactions

Congestion

Select Instance ID : NEM01

Search:

local

remote

Name	Value
Name	remote
Protocol	ftp
Last Send Activity	
Total Files Sent	0
Total Data Sent	0.00 B
Last Receive Activity	08/09/2024 13:23:08
Total Files Received	4460
Total Data Received	334.97 MB

Showing 1 to 8 of 8 entries

7.4.6 Congestion analysis feature for pdRBatcher and pdRLoader

The congestion analysis tool provides an assessment of delays in processing a transaction due to one or more transactions being processed ahead of them.

The tool is useful to understand where delays have occurred and provide insights for tuning of processing threads.

AEMO Data Interchange Monitor

System: PREPROD

Application: pdrBatcher

Status:

User: ADMIN
[Logout](#)

OverviewSettingsSourcesError logsVolumeThroughputTransactionsCongestion

Select Instance ID : NEM01

At At Date08/09/2024SummaryFile IDEnter Filed ...Fileld BreakdownSamples10Fileld SamplesEnter Filename ...

File Detail Breakdown

pdrBatcher [NEM01] Congestion Summary

Search:

File ID	Congestion Percent	Avg Prioritisation Delay (secs)	Max Prioritisation Delay (secs)
ACTUAL_OPERATIONAL_DEMAND_HH	81.5%	0.38	1.29
AP_EVENT	93.3%	0.46	0.94
AVERAGEPRICE30	85.2%	0.16	0.38
BIDMOVE_COMPLETE	100%	0.14	0.14
BILLING	50%	0.07	0.07
BILLING_DAILY_ENERGY_SUMMARY	100%	0.34	0.34
DEMAND	67.5%	0.22	1.15
DISPATCHIS	49.4%	0.08	0.97
DISPATCHIS_FCAS	84%	0.22	1.31
DISPATCHOCD	77.8%	0.20	1.12

Showing 1 to 10 of 39 entries

Show10entries

Previous

1

2

3

4

Next

8 Product certification and inter-operability

The Data Interchange suite includes four products:

- **pdrBatcher**: Supports file exchange with AEMO wholesale market systems.
- **pdrLoader**: Supports loading of data to participants' local databases.
- **Data Model**: The industry standard information store for the electricity and gas Data Models where participants load market data.
- **pdrMonitor**: Supports configuration management and logging events (replaces the Replication Manager).

AEMO assumes the participants' systems are compliant with the minimum supported configuration of the following software and systems.

8.1 Software Releases

Product	New version	Supported versions
pdrBatcher	7.6	≥ 7.5
pdrLoader	7.6.1	≥ 7.5
pdrMonitor	1.3	≥ 1.2

8.2 Product Interoperability

pdrMonitor version	pdrBatcher version	pdrLoader version
1.1	$\geq 7.4.1$	$\geq 7.4.2$
1.2	≥ 7.5	≥ 7.5
1.3	≥ 7.5	≥ 7.5

pdrMonitor v1.2 does not support encrypted connections. The v7.6 applications only work with pdrMonitor v1.2 when configured as unencrypted which is insecure and not recommended.

8.3 Software Certifications

Software	Description	Supported versions
Java	Java Runtime Environment	OpenJDK 21
Oracle	Oracle relational database	21C, 19C
SQL	Microsoft SQL Server	2022, 2019

9 FAQs

9.1 Will AEMO test the PDR applications both old and new versions of Java?

Moving forward, the idea is to test these updates internally on the latest supported versions which is OpenJDK21. You can run application on any version JRE11 and above.

Please make sure to do your own validation in a non-production environment first.

9.2 Which Windows Server version will the new data interchange support?

AEMO does not certify against any particular operating system. The JRE sits above the operating environment and different participants use different systems and AEMO cannot take on all the different possibilities.

9.3 Is there going to be another release ahead of IDX, or is this the final build?

Yes, there will be another IDX release. The message exchange and identity patterns are still under discussion in AEMO. The approach is to implement functionality that is compatible with the final target state build for IDX.

9.4 Are the translators in Batcher to support workloads like loading into data lake solutions like data bricks or fabric?

You can use the translators for a variety of purposes including loading data into data lake solutions, but their use is entirely up to the participant. AEMO provides most data from the participant file server in the AEMO csv format for efficient data replication and loading into relational tables. If you want to convert to JSON or another format, the translation facilities are available to support this, and participants can configure them based on their use case.

9.5 Do participants need to upgrade to the new version of Data Interchange applications and what is the impact if they do not upgrade?

AEMO recommends upgrading to the latest version of Data Interchange. However, there is no immediate impact if you do not upgrade. Older versions may continue to function, but if an issue arises, support for the older versions is limited. Participants may have to upgrade to a supported version to resolve certain problems. Additionally, some new functionalities are only available in the latest versions.

9.6 If participants are on pdrBatcher (7.4.2), will they need two incremental upgrades, from 7.4.2 → 7.5.0 → 7.6.0?

For the pdrBatcher, a direct upgrade to 7.6 is possible if you are running a vanilla configuration. You can install v7.6 alongside 7.4.2 and choose when to cut over. However, for the pdrLoader, incremental upgrades are required due to database changes in the PDR management tables affecting both structure and data. AEMO does not recommend skipping versions in the pdrLoader as these database upgrades must be applied sequentially.

9.7 What is the impact of not updating on time?

PDR apps are different from data model tables. If you don't upgrade PDR apps, the data is still received, and there is no impact. You can analyse your system and upgrade in your own time. However, the support for these applications is for versions N & N-1. If there is a support issue and your version is N-2, upgrading to a supported version is required.

9.8 Is there a link for pdrBatcher and pdrLoader documentation?

All PDR application documentation is available on the [Data Interchange Help](#).

9.9 What does it mean by custom APIs?

We consider them internal APIs. The custom APIs mentioned are for the APIs that PDR monitor uses. The PDR monitor supports these internal APIs, ensuring that the data interchange and monitoring functionalities are maintained.

9.10 How does the process work for polling the BLOB storage for the loader?

The process involves the loader checking the BLOB storage at regular intervals to see if there are any new files to process. Once it detects new files, it picks them up and processes them accordingly. This ensures that the data is continuously updated and available for further analysis.

9.11 Could you comment on the mentioning of sparse data for the pdrLoader new release?

The new release of the pdrLoader includes a feature for handling sparse data. This feature ensures that the system can efficiently manage and process data even when it is sparse, improving overall performance and reliability. The implementation optimises data storage and retrieval processes to handle sparse datasets effectively.

9.12 Can pdrMonitor manage multiple versions of pdrLoader/Batcher?

Yes, it can. The new version of pdrMonitor still supports older versions and unencrypted connections to application instances.

9.13 Is the congestion monitor designed to address the issue of next day bid files creating lag spikes until they are imported properly?

Yes, the congestion monitor addresses this issue. It identifies and manages congestion by monitoring data transfer spikes and ensuring that bid files are imported efficiently. This tool aims to minimise lag and improve overall data processing performance.

9.14 Can you add a label or rename the Widget?

The naming convention for a Widget is attained from Data Interchange Monitor->Configurations->Connections under Service Label. The option to have a label added or renamed is not currently available, however AEMO considers this as a feature request.

9.15 Any plans to add LDAP integration for pdrMonitor user logins?

AEMO has an implementation of LDAP logins, where it isn't single sign-on but uses the same password. The default installation of pdrMonitor uses a local user data store but can be changed to use LDAP with configurations.

10 Implementation

10.1 Transition

The support for current legacy versions of the pdr applications, v7.4.* for pdrBatcher and pdrLoader and, v1.1 for pdrMonitor ends 3 months after the new application versions are released in production.

AEMO recommends all participants using the current releases complete any upgrade to the new production releases to stay on supported software.

10.2 Upgrading

You can upgrade your Data Interchange applications once you receive the scripts. Applying the scripts sets up the new Data Model structure on your local database. You receive the same data until the new versions of fields, files, and reports are released into pre-production or production and you update your subscriptions.

For help, see:

- [Upgrading your DI environments](#)
- [Updating your subscriptions:](#)

10.3 Implications

To maintain systems in-line with AEMO's market systems, participants need to:

- Review and assess the impact on their market systems with respect to the changes implemented as part of this Release.
- Change their systems prior to the implementation of this Release.
- Schedule staff and resources to upgrade their market systems for the production implementation of this Release.

10.4 Risks

Not upgrading to the supported versions

11 Terms

11.1 Rules Terms

You can find the following terms defined in the [National Electricity Rules \(NER\)](#) and the [Settlements Residue Auction Rules](#).

Term
AEMO
AEMO Markets Portal
AEMO Website
Market Participants
NEM
Registered Participant

11.2 Glossary

You can find a full list of AEMO glossary terms in [Industry Terminology](#) on AEMO's website.

Abbreviation/Term	Explanation
AEST	Australian Eastern Standard Time
B2B	Business-to-business
B2M	Business-to-market
EMMS	Electricity Market Management System; software, hardware, network and related processes to implement the wholesale energy market
DI	Data Interchange
FCAS	Frequency Control Ancillary Services
FTP	File transfer protocol
MSATS	Market Settlement and Transfer Solution for retail electricity
NER	National Electricity Rules
MW	Megawatt
Release	EMMS Technical Specification - Data Interchange - March 2025
Release Dates	Pre-production: 21 February 2025 Production: 31 March 2025
TBC	To be confirmed

12 References

Guide to Information Systems: Provides guidance for *Registered Participants* and interested parties about AEMO's participant electricity market systems.

12.1 Data interchange and data model resources

12.1.1 About

Information about setting up a Data Interchange environment: Data Interchange Help > [About Data Interchange](#).

12.1.2 Help

- [Data interchange online help](#)

12.1.3 Software

You can find Data Interchange software in the following locations:

- Data Interchange Help > [Software Releases](#).
- Releases directory on the participant file share: FTP to 146.178.211.25 > Data Interchange, pdrBatcher, pdrLoader, or pdrMonitor.

12.1.4 Reports

- Data Interchange Help > [Data Model Reports](#).

12.1.5 Releases

- Data Interchange Help > [Release Documents](#).

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A1. Version history

13.1 V1.00

Changes in this version:

- Adds the FAQs based on participant queries in the MSUG.