
Connecting to AEMO's Electricity IT Systems

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Explains the IT interfaces available for
electricity participants and how to connect to
them

Important Notice

PURPOSE

AEMO has prepared this Connecting to AEMO's Electricity IT Systems (Guide) to provide guidance on the use of the Energy Market Systems under the National Gas or Electricity Rules (Rules), as at the date of publication.

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FURTHER INFORMATION

For further information, please visit www.aemo.com.au or contact:
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FEEDBACK

To suggest corrections or improvements to this document, please contact AEMO's Support Hub.

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Introduction

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Purpose

This guide provides guidance for Registered Participants about AEMO's participant electricity market systems. It is relevant to IT decision making during participant onboarding and provides an understanding of the IT systems requiring set up. Because each participant has its own scope of business and operation, this document only outlines the facilities available. Please seek advice for your company's specific business needs.

Audience

This document is relevant to:

- Interested parties considering registration with AEMO.
- Interested parties requiring an overview of AEMO's participant IT systems.
- New registrants applying for registration with AEMO.
- New registrants and existing participants setting up interfaces to AEMO's IT systems.
- Participants requiring an understanding of the applications AEMO provides.
- Implementers and maintainers of interfaces to AEMO's systems.

For participants registering with AEMO, please read this guide before and while completing your registration application to help you understand your requirements.

How to use this guide

- This guide is written in plain language for easy reading.
- Where there is a discrepancy between the National Electricity Rules, and information or a term in this document, the National Electricity Rules takes precedence.
- Where there is a discrepancy between the Appropriate procedures, and information or a term in this document, the Appropriate procedures take precedence.
- **Text in this format** indicates there is a resource on AEMO's website, for details, see [References](#).
- **Text in this format** indicates a link to a related resource.
- Actions to complete in the web portal interface are **bold and dark grey**.
- Rules terms used throughout this guide are listed on page [30](#) and defined in the National Electricity Rules.
- Glossary terms are capitalised and have the meanings listed against them ([see page 25](#)).
- References to time are Australian Eastern Standard Time (AEST).

What's in this guide

[Introduction on the previous page](#) explains what information is available in this guide.

[Chapter 1 NEM IT Interfaces on page 4](#) explains what IT systems AEMO offers to Registered Participants.

[Chapter 2 About NEM IT Systems on page 7](#) explains the different IT interfaces available for Registered Participants to access AEMO's IT systems.

[Chapter 3 Web Portals on page 9](#) explains AEMO's secure data network connection and answers questions such as: network options, participant entitlements, and how to change your existing MarketNet connection.

[Chapter 4 Participant File Servers on page 13](#) explains how to share wholesale data with another participant ID and where to obtain market data.

[Chapter 5 API Services on page 17](#) explains Registered Participants user rights management (URM) for participants, security, and password requirements.

Chapter 6 Software Packages on page 20 explains the software AEMO makes available to participants and where to download it.

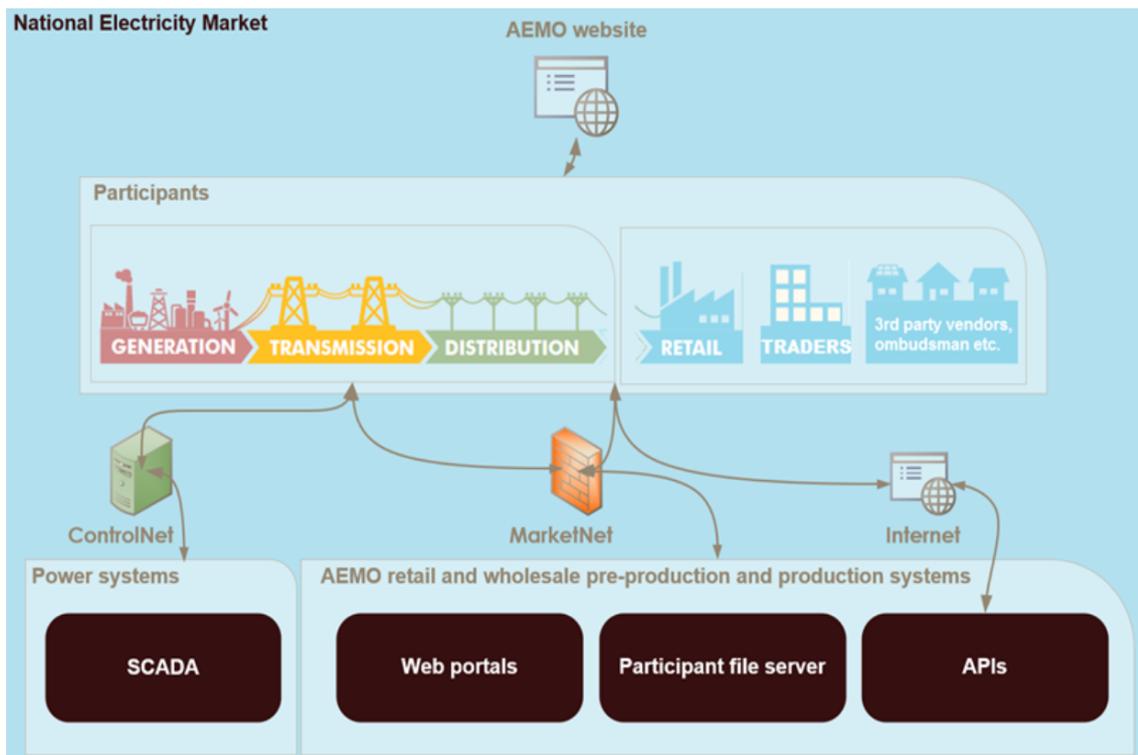
Needing Help provides information about AEMO communications, how to request assistance for IT related issues, and a list of references mentioned throughout this guide.

References on page 1 contains a list of resources mentioned throughout this guide.

Glossary explains the capitalised terms used throughout this guide.

Chapter 1 NEM IT Interfaces

This chapter explains the IT interfaces available for Registered Participants to access NEM participant IT



This table explains AEMO's IT interfaces, their functions, and their suitability for participants.

Table 1 AEMO's IT interfaces

Interface	Protocol	Function
AEMO's website	HTTP	Suitable as a source for publicly available market data at no cost. The public data published on AEMO's website is the same as distributed through the file interfaces, although file interfaces also contain each participant's private data. The data is in CSV format in many files along with some graphical summaries. See Electricity Data on AEMO's website.

Interface	Protocol	Function
API Gateway	API	Participants can access AEMO APIs using the e-Hub interface to communicate information with AEMO. It assists wholesale electricity and gas participants to develop their own APIs. See Chapter 5 API Services on page 17 .
Data network connection (MarketNet)	HTTPS	Most access to AEMO's market systems requires a secure private data network connection to MarketNet. If your company is a Registered Participant, it is likely that you have access to MarketNet. However, if your company does not have access to MarketNet, you must organise this first. For help, see MarketNet Connection Request .
File server	FTP	AEMO systems to participant systems interaction using batch processing, suitable for: <ul style="list-style-type: none"> • Participant systems using database technology. • Submission or receipt of high volumes of data. • Management of security and data distribution. AEMO recommends this method to replicate large amounts of data. See Chapter 4 Participant File Servers on page 13 .
File upload to web portal	HTTPS	MSATS and EMMS both allow the upload of files directly to the web portal interface.
FTP Gateway	FTP	Uses the MSATS Hokey-Pokey protocol to deliver B2B communications.
Internet	HTTPS	Some APIs allow internet access without having MarketNet access.
Web portals	HTTPS	Participants can use a web browser over MarketNet to interact with AEMO's retail and wholesale systems. The web interfaces allow direct data entry and are designed for secure, interactive use. They are suitable for light demand of data transfer. Many web applications allow the upload of files directly to the interface. Examples of functionality are: <ul style="list-style-type: none"> • User administration for participant users. • Placing bids. • Retrieving reports. • Retrieving settlement information. • Monitoring prudential exposure. AEMO recommends small operators use the web portal interface to retrieve and upload files. See Chapter 3 Web Portals on page 9 .

Interface	Protocol	Function
Web services	HTTPS	<p>AEMO provides web services client software for both retail and wholesale systems. Participants can use the approach taken in the web services software to implement their own custom web client into their gateway system.</p> <p>Web services are suitable for retrieving:</p> <ul style="list-style-type: none"> • NMI standing data and NMI details. • Constraint information. • MSATS limits status. • MSATS processing status. <p>See Web Services on page 1.</p>

Chapter 2 About NEM IT Systems

This chapter provides an overview of the participant IT systems operating in the National Electricity Market (NEM) and what is required to interface with AEMO’s market systems.

NEM IT systems

The NEM IT systems assist in determining the spot price and facilitate financial settlement of the market. The systems are designed to meet the performance and reliability requirements of the National Electricity Rules (NER), meet the expectations of market participants, provide security for sensitive information, and be cost effective.

Figure 1 NEM IT systems overview

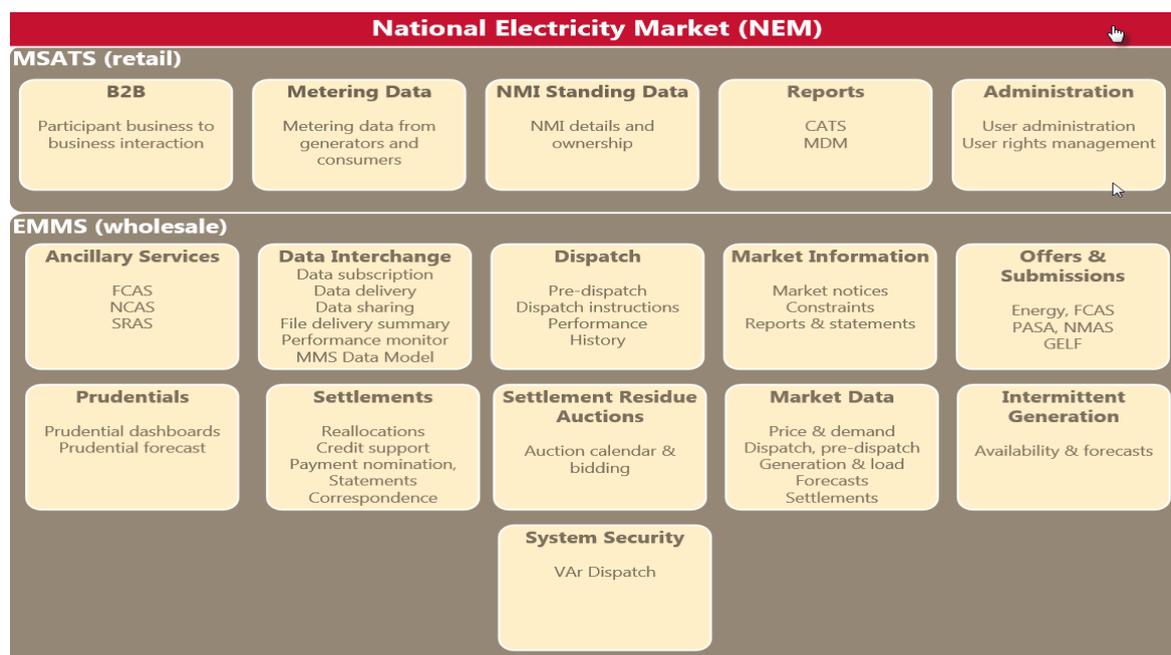


Table 2 NEM IT systems available to participants

System	Interface	Description
Electricity Market Management System (EMMS)	Web portal File upload	EMMS is the NEM wholesale system determining the cost of energy. EMMS provides such things as ancillary services, dispatch, market information, NEM reports, offers and submissions, settlements and prudentials, and trading facilities.

System	Interface	Description
	File server API	
Market Settlement and Transfer Solution (MSATS)	Web portal File upload File server API	<p>MSATS is the NEM retail system used for NEM energy settlements. IT determines energy flows from generators and retailers but does not determine the cost of energy.</p> <p>To support the operation of the NEM, participants are required to comply with the procedures set out by AEMO, which define the communication interfaces and infrastructure for electronic communications between AEMO and participants, see MSATS Procedures and B2B Procedures on AEMO's website.</p> <p>All files exchanged with MSATS and B2B conform to the Australian Standard for Energy XML (aseXML), for more details, see aseXML Standards.</p>
B2B e-Hub (MSATS)	Web portal File upload File server API	
API Portal	Web portal API	The API Portal is AEMO's communication platform supporting exchange of information between participants and AEMO.
Network Outage Scheduler (NOS)	Web portal	NOS lists the planned network outages for work on the transmission system. Specialist staff within AEMO assess the outage bookings and the forecast demands for the period and provide feedback to the TNSPs on the likelihood of each outage proceeding. TNSPs can make bookings up to two years in advance or at short notice in response to an emergency. The schedule contains all out of service work and any secondary bookings that are forecast to cause a constraint on the dispatch process. The schedule is updated every half hour starting at midnight (AEST).

For more information about individual system functionality and functionality relevant to each participant category, see **Guide to Electricity Information Systems**.

Chapter 3 Web Portals

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About the web portals

The web portals are the access point for AEMO’s retail and wholesale web-based applications, providing a secure interface for authorised users to interact. The web portals are the most cost effective option, suitable for use by small operators, in place of setting up Data Interchange (DI) or MSATS Participant Batcher software.

The web portals gives you a clear indication of the environment you are working in by providing a different background colour for the menu.

- The pre-production environment has a green menu background.

For information about Data Interchange or MSATS Participant Batcher, see **Software Packages**.



- The production environment has a blue menu background.



Why use the web portals

The web portals cut participants' cost and client side footprint by:

- Reducing the requirement for participants to maintain an IT infrastructure at their site.
- Allowing participant business user access 24 hours a day, 7 days per week for 365 days per year—wherever a connection to MarketNet is available.
- Being fully maintained and supported by AEMO.
- Being available to all participants at no additional cost.
- Providing a secure web interface with user access rights managed by participants.
- Allowing the use of multiple participant IDs using the set participant function, see [Guide to User Rights Management \(URM\)](#).
- Being easy to learn with guides available for each web application—requiring less staff training.
- Providing a consistent look and feel across each web application.

Who can use the web portals

A MarketNet connection is required to access the web portals. If your company is a registered participant, you probably already have access.

Your company's participant administrator (PA) can advise what access you have. An initial PA is set up by AEMO as part of participant onboarding, if you don't know who it is, AEMO's Support Hub can advise you.

Your company's PA also provides your company's participant users with their access rights to AEMO's IT systems.

Web portal requirements

The web portals are accessed using a web browser and require:

- The website address where the application is located on AEMO's network. See [Web-based interface URLs on the next page](#).
-

To access the Markets Portal, AEMO recommends the following web browsers:

For more information, see [Setting up your IT Systems and Security chapters in the **Guide to Electricity Information Systems**](#).

Energy Market Systems runs on both Windows and Unix-like operating systems.

Browser	Platform	Current	More information
Microsoft Internet Explorer	Windows	IE11	https://www.whatismybrowser.com/guides/the-latest-version/internet-explorer
Microsoft Edge (Microsoft recommended)	Windows 10	Edge	https://www.microsoft.com/en-au/windows/microsoft-edge
Google Chrome	All platforms	Latest version	https://www.whatismybrowser.com/guides/the-latest-version/chrome

- Access to MarketNet; if your company is a registered participant, you probably already have access because it is set up during participant onboarding. For more details, see [Data network connection \(MarketNet\) in the **Guide to Electricity Information Systems**](#).
- A user ID and password provided by your company's participant administrator (PA) who controls access to AEMO's web portals. For more details, see [User Rights Management \(URM\) in the **Guide to Electricity Information Systems**](#).

Web-based interface URLs

AEMO's web portals run on Windows and Unix-like operating systems.

Table 3 lists the URLs for electricity market IT systems.

Table 3 AEMO web-based URLs

Name	URL
Web portal menu (links to all participant web portals)	https://menu.prod.marketnet.net.au/ https://menu.preprod.marketnet.net.au/
EMMS Markets Portal (wholesale)	https://portal.prod.marketnet.net.au/ https://portal.preprod.marketnet.net.au/ https://portal.5ms.staging.test.marketnet.net.au/#/menu
EMMS Markets Portal Help	https://portal.prod.marketnet.net.au/help/ https://portal.preprod.marketnet.net.au/help/
MSATS and B2B e-Hub (retail)	https://msats.prod.nemnet.net.au/ https://msats.preprod.nemnet.net.au/
NOS pre-production	https://nos.prod.nemnet.net.au/ https://nos.preprod.nemnet.net.au/nos/
Domain account password change	http://146.178.211.25 For help, see Changing your participant user password in the Guide to Electricity Information Systems .
Market Data	https://www.nemweb.com.au/
API Portal	https://dev.preprod.aemo.com.au/ https://dev.aemo.com.au/

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About file servers

AEMO's MarketNet provides access to folders for batch file transfer between AEMO and participant IDs.

Each energy market system has a file server, and each has production (live data) and pre-production (test data) folders. Each participant ID has secure read-write access to their own set of folders, plus read-only access to commonly-shared folders that contain public data.

The private folders are for secure transfer of data between the participant ID systems and AEMO (such as bidding and settlement invoices). For the IP addresses, see [File-based interface URLs on page 15](#).

Participants require the file interface for:

- Receiving dispatch data.
- Participants needing an on-going data feed of 5-minute public data, such as, traders.

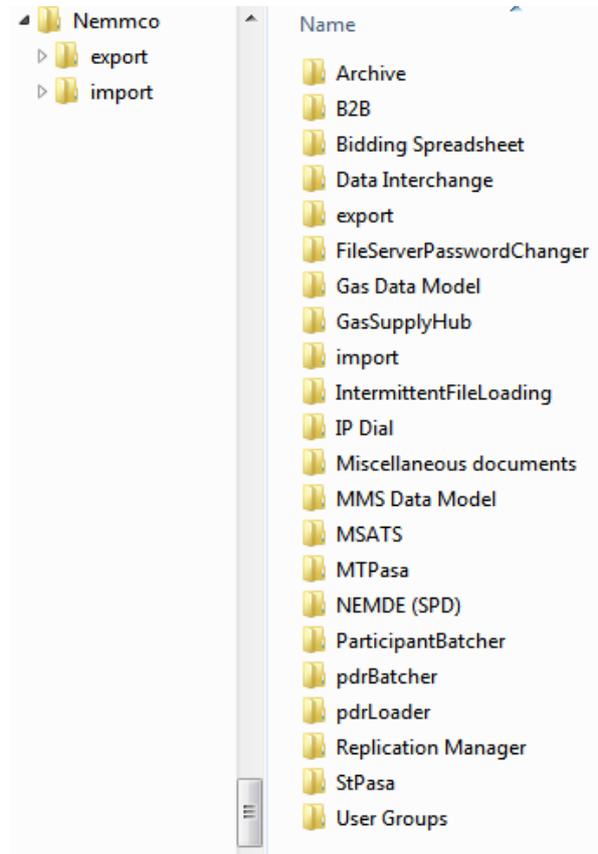
Participant file server folders (FTP Gateway)

Each participant ID set of folders has at least two subfolders, **\import** and **\export**, with naming relative to the participant ID. Further subfolders are for specific subsystems.

Simplest access method

The simplest method to access participant ID folders is to use an FTP client capable of using passive FTP to put and get files. This is only practical for small amounts of files and requires the participant ID user to know the login and password for direct access to the participant file server.

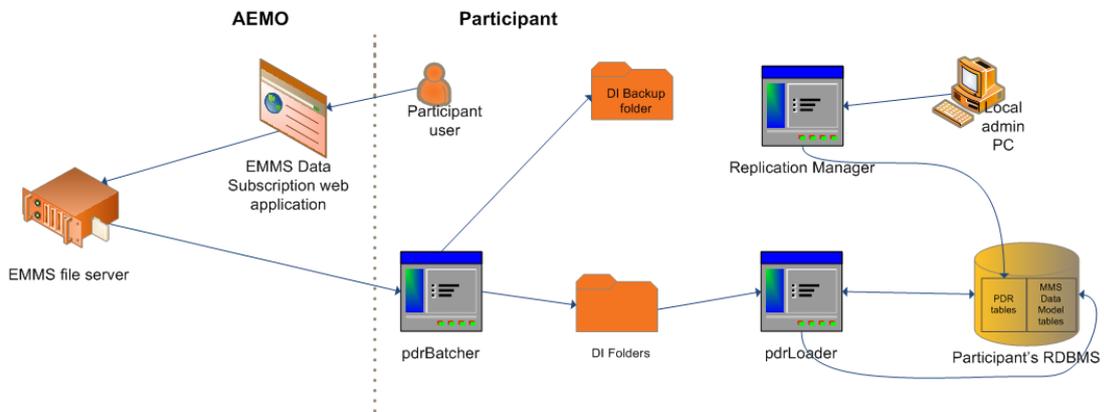
For small operators AEMO recommends using the web portal interfaces to retrieve and upload files. See [Chapter 3 Web Portals on page 9](#).



Recommended method for large amounts of data

The recommended method for accessing the secure folders and replicating large amounts of data between AEMO's systems and a participant's DBMS conforming to the Electricity or Gas Data Models is to use a batcher program such as Data Interchange (DI). See [Figure 2](#)

Figure 2 Standard DI setup



File-based interface URLs

Table 4 File-based interface addresses

EMMS (wholesale)	Production: ftp://146.178.211.63 Pre-production: ftp://146.178.211.25 5MS Staging: ftp://146.178.211.26
MSATS (retail)	Production: ftp://146.178.211.205 Pre-production: ftp://146.178.211.225 5MS Staging: ftp://146.178.211.226

Setting up Data Interchange requires planning and good IT skills, including: networking, database management, batch file management, and disaster recovery. For more details, see Guide to Data Interchange.

Table 5 describes specific mappings, with <participant ID> being your company's Participant ID.

Table 5 Specific mapping addresses

Private participant data	<production or pre-production URL>/<participant ID>
Market data	<production or pre-production URL>/MarketData
Data to initially populate an RDBMS conforming to the Data Model	<production or pre-production URL>/MarketData/Baseline
MSATS data	<production or pre-production URL>/<participant ID>

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The e-Hub is AEMO’s communication platform supporting exchange of information between participants and AEMO. The e-Hub is accessible over MarketNet and internet and includes:

- An **API Web Portal** for registration and as a resource for downloading Swagger files, see Figure 1 AEMO’s e-Hub and Participant API Gateway.
- An **API Gateway**, see Figure 2 API Gateway.

For more information, see **Guide to e-Hub APIs**.

Figure 1 AEMO’s e-Hub and Participant API Gateway

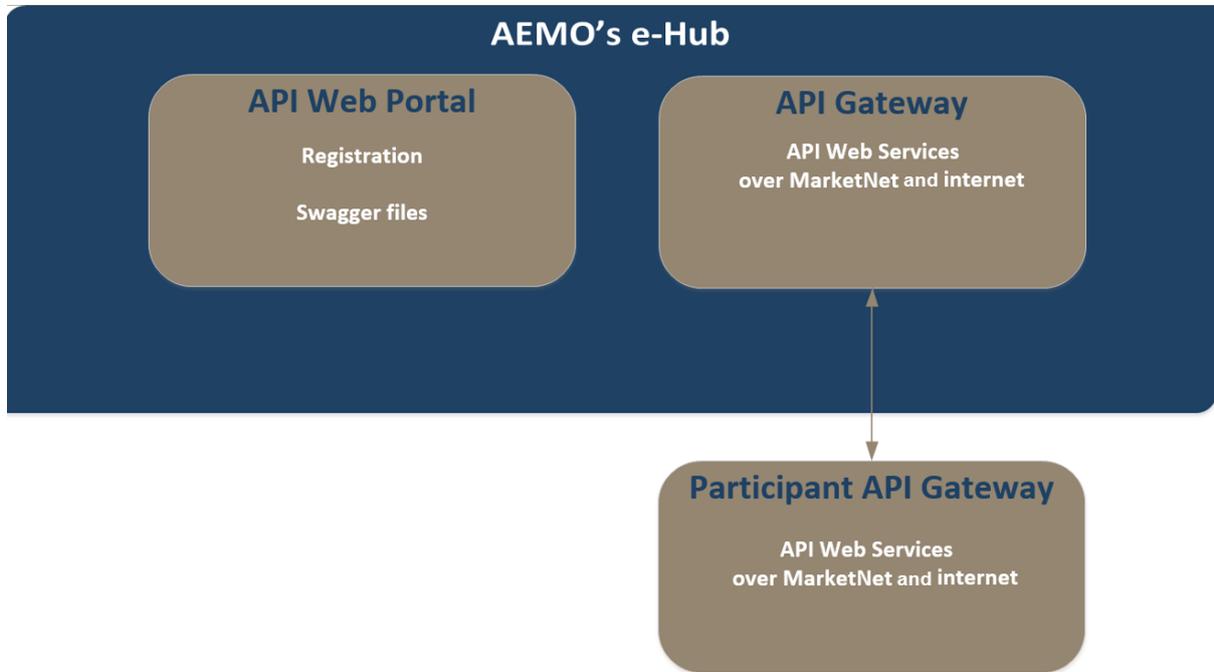
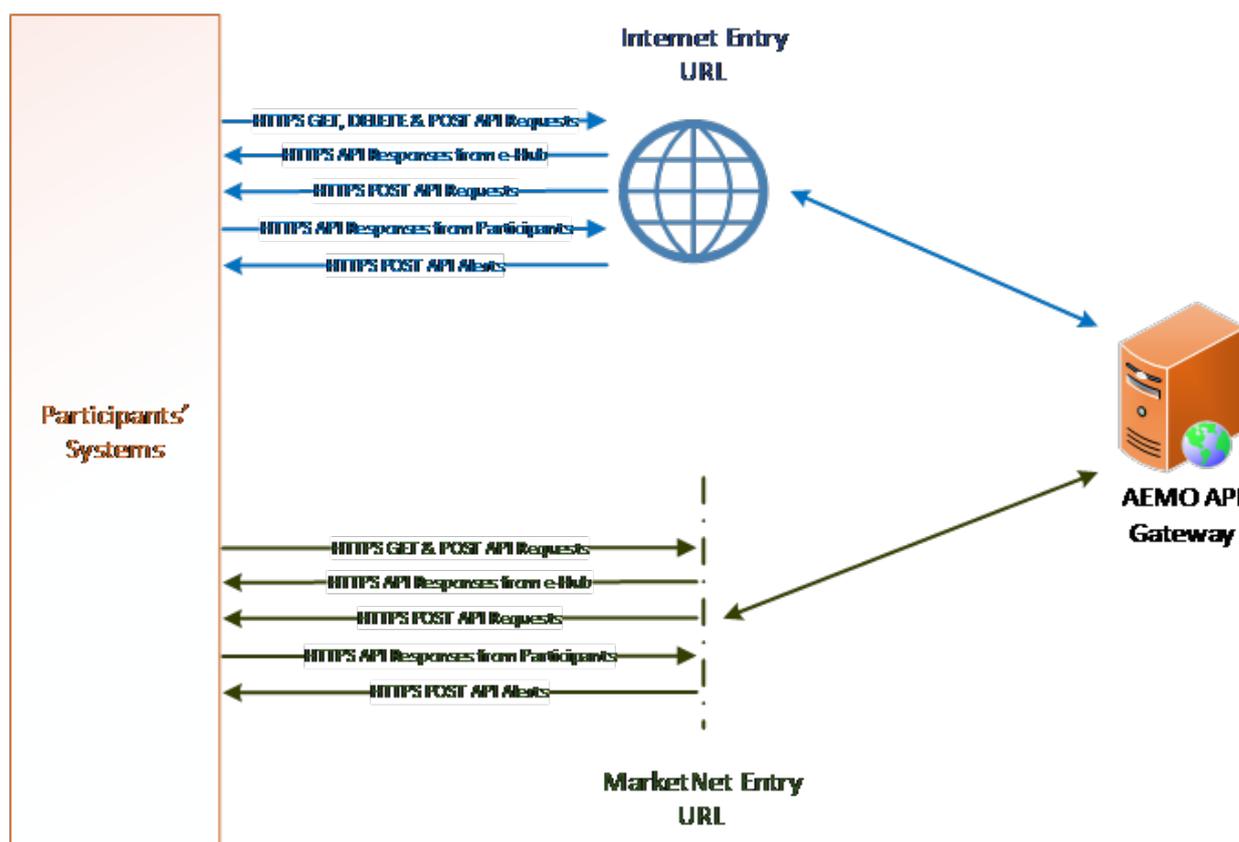


Figure 2 API Gateway



Network connectivity requirements

This section describes the connectivity requirements between AEMO IP addresses, the public IP addresses that AEMO will whitelist and the IP addresses of the API gateway(s).

Participants can use this information to provide the relevant IP address, URLs and ports to AEMO for whitelisting.

Table 1 Participant systems to AEMO

Source (provide to AEMO)	Destination	Protocol and Port
Public IP address(s) that will access AEMO's network	apis.preprod.aemo.com.au – 202.44.77.88	TCP, 9319
	apis.prod.aemo.com.au – 202.44.77.87	TCP, 9319

Table 2 AEMO to Participant systems

Source	Destination (provide to AEMO)	Protocol and Port (participants specify the port from the range below)
202.44.78.204	Participant to provide URL	TCP, 9318-9330
202.44.76.204	Example: https://<url>:93xx/destinationURI	
	Note: This must translate to a publicly routable IP address.	

API e-Hub addresses

HTTP header attributes are case sensitive.

API details, including Swagger files, are available via AEMO's API Portal. For more information about e-Hub APIs, see [Guide to AEMO's e-Hub APIs](#).

The following AEMO API Gateways are available:

Table 6 API Gateway Addresses

Environment	Internet Address	MarketNet Address
5MS Staging	https://apis.5msstaging.aemo.com.au:9319	https://apis.5msstaging.marketnet.net.au:9319
5MS Staging API portal	https://dev.preprod.aemo.com.au You need to register and sign in to access the 5MS APIs in this portal.	Unavailable until further notice
Pre-production	https://apis.preprod.aemo.com.au:9319	https://apis.preprod.marketnet.net.au:9319
Pre-production API portal	https://dev.preprod.aemo.com.au You need to register and sign in to access the 5MS APIs in this portal.	Unavailable until further notice
Production	https://apis.prod.aemo.com.au:9319	https://apis.prod.marketnet.net.au:9319
Production API portal	https://dev.aemo.com.au	Unavailable until further notice

Chapter 6 Software Packages

AEMO provides sample software packages to assist with data validation and replicating data between AEMO's systems and participants' systems. Software versions are updated for each new release. Participants using AEMO's software are responsible for ensuring they are using the current version. Change notices and technical specifications advise participants of software changes for each release. **Table 7** describes the sample software packages provided by AEMO.

MSATS retail system software

Table 7 Retail software packages provided by AEMO

You can find software packages and documentation on [AEMO's website](#) > Electricity > IT systems > NEM

B2B Validation Module

An application participants can embed in their B2B systems allowing validation of an .XML file before it is deployed to the MSATS B2B Hub.

See **Guide to Validation Module Software**.

MSATS Participant Batcher

A simple batch interface to MSATS and B2B removing the detail of the file handshaking and leaving participants to deal with the raw .ZIP files only. It transfers files using FTP from and to the MSATS hub and does the entire message acknowledgement and file manipulations as required by the MSATS batch file interface.

See **Guide to Participant Batcher Software**.

API Services

An additional option to AEMO's web portals, and batch or file interfaces for system-to-system interaction with AEMO's systems. It provides supported and secure API services to participants' systems using the secure MarketNet connection. See **Guide to Web Services**.

EMMS wholesale system software

Table 8 Wholesale software packages provided by AEMO

Data Interchange	Data Interchange is a set of cooperating applications used to replicate, manage, and monitor data between AEMO and a participant's database conforming to the Electricity Data Model. See Concise Guide to Data Interchange .
API Services	An additional option to AEMO's web portals, and batch or file interfaces for system-to-system interaction with AEMO's systems. It provides supported and secure web services to participants' systems using the secure MarketNet connection. See Guide to AEMO's e-Hub APIs

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AEMO's Support Hub

Contacting AEMO's Support Hub

IT assistance is requested through one of the following methods:

- Phone: 1300 AEMO 00 (1300 236 600)

For non-urgent issues, normal coverage is 8:00 AM to 6:00 PM on weekdays, Australian Eastern Standard Time (AEST).

- Email: supporthub@aemo.com.au

AEMO recommends participants call AEMO's Support Hub for all urgent issues, whether or not you have logged a call in the Customer Portal.

Information to provide

Please provide the following information when requesting IT assistance from AEMO:

- Your name
- Organisation name
- Participant ID
- System or application name
- Environment: production or pre-production
- Problem description
- Screenshots

For AEMO software-related issues please also provide:

- Version of software
- Properties or log files
- Replication Manager support dump and instance name (if Data Interchange problem)

Feedback

Your feedback is important and helps us improve our services and products. To suggest improvements, please contact AEMO's Support Hub.

References

The resources listed in this section contain related information that may assist you.

aseXML Standards, links to guidelines, schemas, change process, sample files, and white papers.

You can find resources on AEMO's website.

Baseline data, data files in a format suitable for loading to participant's DBM conforming to the data model. The data is in the same folder as the participant ID's file server folders, AEMO updates the \MarketData\Baseline folder daily with current baseline data.

B2B Validation Module Software and Guide, a validation application participants can embed in their B2B systems to validate an .XML file before it is deployed to the B2B e-Hub.

Electricity Data, publicly available market data at no cost. The public data published on AEMO's website is the same as distributed through the participant file server with the exception of participants' private data. The data is in CSV format in many files along with some graphical summaries.

Guide to Data Interchange, assists participants to understand AEMO's Data Interchange software components. It describes how to set up a standard Data Interchange environment to replicate data between AEMO's energy market systems and participants' local DBMS conforming to the MMS Data Model.

Guide to B2B e-Hub Self-Accreditation, assists intending B2B e-Hub Participants to understand the B2B e-Hub (e-Hub) self-accreditation process.

Guide to MSATS and B2B Terms, defines the terms in the electricity retail market.

Guide to User Rights Management, assists Participant Administrators to manage their Participant User's access to AEMO's systems. It also explains how to set up single user IDs for use with the Set Participant function in AEMO's web portals.

Guide to Electricity Information Systems, comprehensive guide providing an overview of AEMO's market systems used by participants. It is relevant to IT decision making during participant onboarding and provides an understanding of the IT systems requiring set up.

Historical data, older files are moved to the Reports Archive and kept for 13 months. The data is in CSV format and conforms to the Data Model. To obtain historical data, see <http://www.nemweb.com.au/Reports/ARCHIVE/>.

MarketNet Connection Request, use this form to apply for a new MarketNet connection, or to make a change to an existing MarketNet connection. The form provides for all types of changes to existing network connections, including bandwidth changes, participant IP changes, and adding another connection.

MSATS guides, information and assistance for using MSATS. Electricity > Retail and Metering > Market Settlement and Transfer Solutions.

Guide to MSATS Participant Batch Software, sample software and guide for using the MSATS file interface.

Registration, information about participant categories and registering in energy markets. See <https://www.aemo.com.au/energy-systems/registration>.

Systems Access Policy, the Rules requires AEMO and Registered Participants to comply with the Systems Access Policy and Procedure for access to AEMO's systems.

Glossary

AEMC

Australian Energy Market Commission

AEMO

Australian Energy Market Operator

AEMO Communication

An email from AEMO to a distribution list of Registered Participant contacts broadcasting NEM-related information.

AES

Advanced Encryption Standard

AEST

Australian Eastern Standard Time

API

Application Programming Interface; a set of clearly defined methods of communication between various software components.

API Gateway

Used to push or pull messages from the B2B e-Hub queue using RESTful APIs.

API Protocol

A B2B e-Hub delivery method.

BB

Bulletin Board

CSV

Comma Separated Values; a file format for data using commas as delimiters.

DUID

Intermittent Generation Unit ID

DWGM

Declared Wholesale Gas Market (Victoria)

EMMS

Wholesale Electricity Market Management System; software, hardware, network and related processes to implement the wholesale energy market.

FTP

File transfer protocol

FTP Gateway

Uses the MSATS Hokey-Pokey protocol to deliver B2B communications.

FTP Protocol

A B2B e-Hub and EMMS delivery method.

GBB

Gas Bulletin Board

GSH

Gas Supply Hub

HTTPS

Hypertext Transfer Protocol Secure, adds the security capabilities of SSL to standard HTTP communications.

Implementation date

Usually one business day before the effective registration date of a registration change. Upon special request, AEMO may agree to implementation two business days before the effective registration date, given sufficient notice time to comply with the Rules and Change Management Procedures.

IPWAN

Internet protocol wide area network

LAN

Local area network

MarketNet

AEMO's private network available to participants having a participant ID

MCL

Maximum Credit Limit

MSATS

Retail Market Settlement and Transfer Solution

MSUG

Market Systems User Group

MTPASA

Medium-term Projected Assessment of System Adequacy; 2 years worth of data.

MW

Megawatt

MyTerm**NEL**

National Electricity Law

NEM

National Electricity Market

NER

National Electricity Rules

NGERAC

National Gas Emergency Response Advisory Committee

NGR

National Gas Rules

NMI

[electricity] National Metering Identifier

PA

participant administrator

Participant file server

The publishing point from AEMO systems to participant systems. Each participant is allocated an account and access to private and public areas. Participants are responsible for interfacing with the participant file server.

Participant ID

Registered participant identifier; A company can have more than one Participant ID.

Participant User

An end-user, using AEMO's participant energy market systems to view and retrieve information on behalf of a participant ID. The participant users access rights are created and maintained by the participant ID's Participant Administrator.

Participant user ID

The user ID you used to login to the system.

PCO

Participant current outstandings

Pending

One of the status points of a Change Request.

Pending Validation

One of the status points of a Change Request.

Physical Inventory

A physical count of Unmetered Devices.

PM

Prudential Margin

POE

Probability of exceedence

POP

Point of presence (in network)

Pre-production

AEMO's test system available to participants

Production

AEMO's live system

Registrable capacities

Registered participant categories, such as customer, generator, network service provider, trader, reallocator, special participants, market participant, and intending participants.

RRP

Region reference price

RSF

Regional scaling factor

Rules

National Electricity or Gas Rules (NER or NGR)

SCADA

Supervisory Control and Data Acquisition

SGA

Small Generation Aggregator

SSL

Secure Socket Layer, a protocol for encrypting information over the internet.

STTM

Gas short term trading market

T & Cs

Terms and conditions

TI

Trading Interval

URM

User Rights Management; see the Guide to URM on AEMO's website

VPN

Virtual Private Network

ZIP

The file compression format used for exchanging data with AEMO.

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