



# DISPATCH MESSAGE AUTOMATION FOR DISPATCHABLE LOADS AND GENERATORS

## OVERVIEW

The Dispatch Message Automation (DMA) is the primary interface to the IESO Message Exchange Server. The Message Exchange Server provides participants with the live connection to the IESO's real time dispatch system. This connection is made using a TCP/IP connection to the IESO (normally being Ethernet over frame relay directly to the IESO).

The DMA ensures a reliable connection to the IESO monitoring communications and message exchanges. As messages are received from the IESO, they are immediately acknowledged (simple means for the IESO to know the message did indeed arrive at the intended destination). The message contents are then examined and DMA logic is used to determine what actions are required. Each message received from the IESO is also logged for possible use later in reconciliation applications as well as any required post analysis.

The DMA can then present this data to control systems, alarm control systems, reports, pages, faxes, etc. These interfaces are built in and around the DMA core, however are based on specific requirements of each participant. Dependant upon the extended functionality required, additional utilities and software components may be required, and/or some additional third party software may be used.

Additionally, an optional client is available in different variations dependant on the extent of the user interaction required. This client is also referred to as DMA Client and an example of the basic client is the DMA Monitor or DMAMon for short. This application provides a windows application indicating the current operation of the DMA. It displays the latest dispatch amounts for the configured resources, most recent dispatch messages and status, DMA and IESO heartbeats, and various other data.

The Dispatch Message Interface (DMI) Client provides the operator with a more interactive interface. It provides the operator the ability to dynamically control how specific resources/products are automatically responded to after a dispatch instruction is received, as well as allowing some resources to maintain the manual responses. This brings the mix of both automated and manual responses together to allow operations personnel to change strategies easily.

A graphical overview of the DMA is shown is shown on the next page.





## **DMA Core**

The DMA Core provides all the base functionality required for all dispatch messaging automation systems. The core components are comprised of:

1. IESO Supplied MX API
2. MX Connection
3. Message Processing
4. Dispatch Logic
5. External Interfaces

These are explained further in the following sections.

## **IESO Supplied API**

The IESO Supplied API that is designed to allow access to the Automated Dispatching System (ADS) utilized by the IESO. The following is a definition of the Automated Dispatching System (ADS) as per the California ISO.

The Automated Dispatching System (ADS) is a messaging system that replaces the manual, telephone based method of dispatching Imbalance Energy in the Real Time Market. ADS establishes clear and unambiguous dispatch instructions from the IESO to SCs and/or resources. It is designed to accomplish timely and transparent dispatch, logging, archival and retrieval of information

The ADS system has provided query functionality to allow users to view historical information such as dispatches and dispatch operating targets (DOT's). The new Query Tool described in this document is an improvement over the previous query functionality in ADS. Unlike the previous functionality which only allowed views of dispatch information on a batch-by-batch basis, the new Query Tool allows the user to view all historical data within a user-specified date range. The result is a more useful query functionality.

## **MX Connection**

The MX Connection is the core component of the DMA that maintains reliable communications with the IESO Exchange Server. It provides the layer of functionality which monitors the connection status of the API and connects, disconnects, and reconnects when necessary to maintain a connection. It also provides the necessary capability to send and receive messages.

## **Message Processing**

The Message Processing component of the DMA takes all incoming messages and validates and then interprets the intent. For example, one item it checks is the configured resource ID(s) to determine whether or not the message is expected and/or should be filtered out. After successful validation, it determines how the message should be treated; passed on or simply logged.

## Dispatch Logic

After messages have been processed, those which need to provide responses to the IESO, or need to pass on parameters to other components will go through the Dispatch Logic component. The Dispatch Logic determines whether or not a particular dispatch instruction should be replied to. Essentially, all dispatch instructions the IESO issues must be either accepted or rejected.

The logic varies as per customer requirements; however the logic can be as simple as to accept all instructions for the specified resource. It can be somewhat more complex and add several other conditions and checks prior to being accepted. A simple example is where an external system is used to toggle a parameter controlling the ability to accept or reject all messages. This can be used by a simple HMI for operators to indicate to reject all messages at times when operations are unable to comply with dispatch messages.

## External Interfaces

The External Interfaces component essentially ensures a manner in which to supply current operating parameters to other devices/systems. There is a significant amount of operating values that are exposed for other systems as well as several diagnostic counters/timers.

## Control System Interface

The Control System Interface is developed as a generic interface for providing control systems dispatch data and alarms. For most systems it is facilitated using OPC which is an open data communications standards for process control systems. As explained by the OPC Foundation, "*OPC is open connectivity in industrial automation and the enterprise systems that support industry. Interoperability is assured through the creation and maintenance of open standards specifications. There are currently seven standards specifications completed or in development.*"

OPC is an open standard that is supported by several software vendors for each and likely every process control system. This is why this method was chosen. Proven implementations with OPC for the DMA have been installed using third party utilities. Other products and interfaces may be designed based on the customer's requirements.

## Client Interface

The Client Interface components provide the capability to extend the status and interaction of the DMA in regards to managing dispatch instructions with the IESO to a Dispatch Messaging Interface (DMI) application.

## Alarming/Paging/Email

Alarming can be provided on configuration for arising conditions such as:

- New Energy Dispatch Amount
- Operating Reserve Activation (ORA)
- General Alarm

These alarms are facilitated through digital outputs connected to the host computer running the DMA. At the time of writing, the DMA supports I/O via the National Instruments Field Point Remote I/O.

Paging is added for the above conditions as well. It requires the addition of the paging module and access to a paging terminal via telephone dial up (using TAP protocol).

Similar to paging, email can be achieved for the above conditions. Simple text messaging (like that to cell phones) can normally be performed using email. Use of email requires the DMA have access to an SMTP server.



## Logging

The DMA makes extensive use of logging. The recent implementations use an industry standard ODBC connection to a database to provide the logging. The database commonly installed for use as the DMA data store is MSDE, which is a distributable version of Microsoft SQL server. For the most part the database format and data manipulation is performed for the purpose of the DMA and its utilities. Unless stated otherwise, data organization may change at any time.

## Time Series Reporting

Time Series Reporting is the ability to custom manage internal data and reformat it for presentation to other applications. This is customer specific and may require adaptation for application requirements. In a simple format, the data is extracted and formatted to be presented in an Excel spreadsheet.

## Dispatch Messaging Interface

The Dispatch Messaging Interface is a general name for remote modules that provide users additional interfaces to view, monitor, and in some cases control how the DMA is currently operating. These DMA Client applications can be run on computers throughout a site to give various personnel the information they need to operate or understand why operations have performed actions in response to a dispatch.

One simple form of a DMA Client is the DMA Monitor (or DMAMon) application that provides the following information:

- Recent dispatch amounts
- New dispatch indications
- Latest dispatch instructions/status
- IESO Heartbeat (as reported from the DMA)
- DMA Heartbeat
- Clearing of local alarms
- DMA/IESO Message Exchange status and diagnostics
- Configurable for representing only specific resources

Resource specific highlighting

Other forms of the DMA can provide operators the ability to control the logic of the DMA and/or even provide manual intervention for some types of dispatches.

This can be of great benefit without increasing the traffic between the site and the IESO. As the IESO only provides a single frame relay connection, congesting this connection can result in excessive disconnects and even lost dispatch instructions. DMA Clients retrieve their data from the DMA and therefore only a single connection from the DMA to the IESO is required.