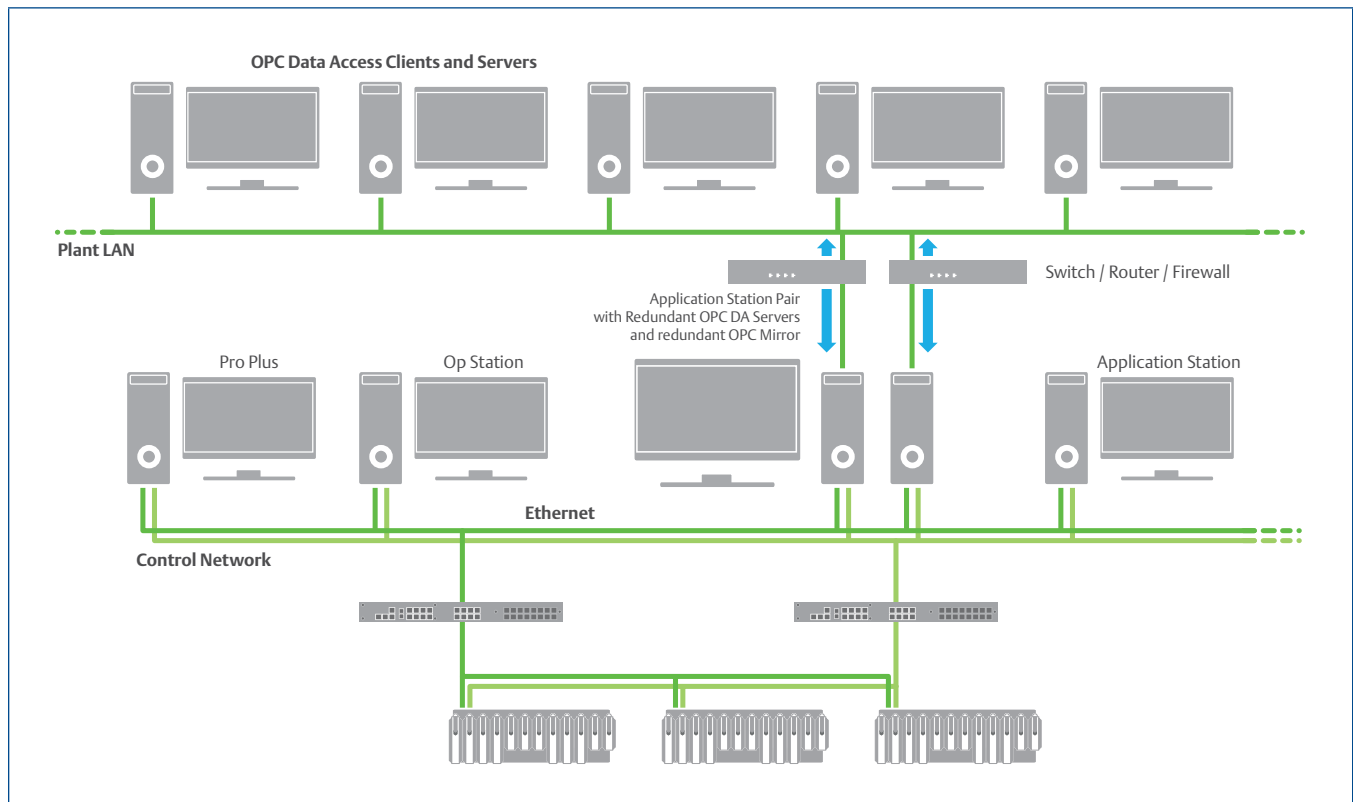


OPC Mirror Redundancy



Redundant OPC Mirror provides highly reliable OPC Server-to-server data transfer.

- Enables data transfer
- Hardware and software redundancy
- Automatic switchover
- On-line upgradable

Introduction

OPC Mirror is an OPC Data Access-compliant software application that enables two or more OPC Data Access servers to communicate with each other.

OPC Mirror enables easy, secure and reliable data transfer among different control systems using OPC communications. For increased reliability and availability, OPC Mirror can be made redundant, using an active and a standby instance of OPC Mirror. Used in conjunction with the redundant DeltaV OPC Data Access servers, you can increase protection against single point OPC Server hardware and software failures.

The redundant OPC Mirror resides on a dedicated pair of Application Stations. When the active OPC Mirror fails, the standby OPC Mirror automatically takes over, providing data transfer without user intervention.

Benefits

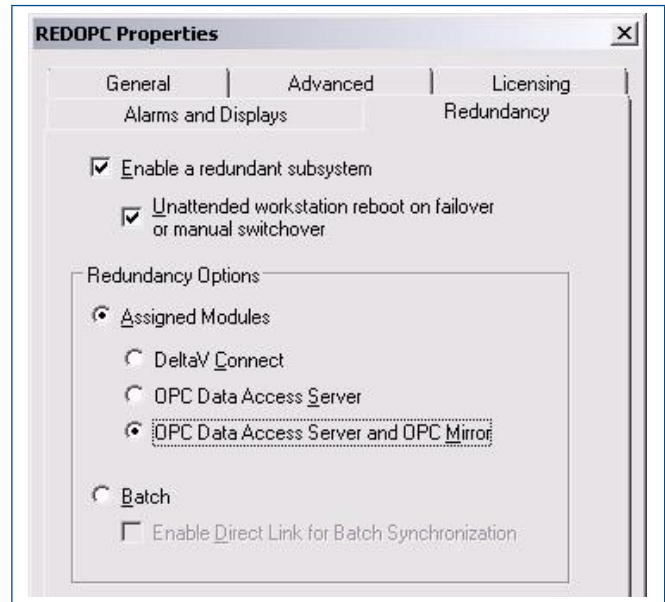
Enables data transfer. OPC Mirror redundancy consists of an active and standby OPC Mirror. If the active OPC Mirror or its associated Application Station detects a failure, the standby OPC Mirror assumes the active role, providing automatic data transfer. Your OPC communications will have increased protection against unexpected failures.

Hardware and software redundancy. The redundant OPC Mirror resides on a pair of Application Stations. One Application Station is dedicated to the active OPC Mirror and the other Application Station is dedicated to the standby OPC Mirror, providing hardware and software redundancy.

Automatic switchover. If the active OPC Mirror or its associated Application Station detects a failure, the standby OPC Mirror assumes the active role automatically, with no user intervention required. The standby OPC Mirror is in “hot standby” mode, so switchover occurs quickly. Depending on the failure condition and OPC redundancy configuration, the failed OPC Mirror and Application Station will reboot and automatically assume the standby role, restoring OPC Mirror redundancy with no user intervention.

On-line upgradable. Since the redundant OPC Mirror resides on a pair of Application Stations, OPC Mirror can be upgraded online. Just like the DeltaV controllers, you can upgrade the standby OPC Mirror and its associated Application Station while the active maintains OPC communications, then manually switch over to the upgraded Application Station.

Product Description



OPC Mirror provides real-time, read/write data transfer between two or more OPC Servers. For OPC data communications where you can’t afford interruptions, the OPC Mirror offers OPC Server-to-Server communication redundancy. You can add a standby OPC Mirror that operates in hot standby mode, replicating the operation of the active OPC Mirror. Since OPC Mirror works with the redundant DeltaV OPC Servers, you can add an active and standby OPC Mirror to the Application Station pair hosting the redundant DeltaV OPC Servers to provide DeltaV OPC communication redundancy. The active OPC Mirror connects to the active DeltaV OPC Server and the standby OPC Mirror connects to the standby DeltaV OPC Server, for a one-to-one, OPC-Mirror-to-DeltaV-OPC-Server relationship.

When a monitored fault is detected, the active OPC Mirror switches over to the standby OPC Mirror, which then assumes the active role. Your OPC communications continue on the “new” active OPC Mirror. In addition, the DeltaV Event Chronicle stores a record of each OPC Mirror switchover and the reason it occurred, if known.

The redundant OPC Mirror resides on a pair of DeltaV Application Stations. One copy of OPC Mirror must be installed on each Application Station in the Application Station pair.

OPC Mirror redundancy is configured in DeltaV Explorer from the Application Station Properties dialog. OPC Mirror redundancy must be configured with DeltaV OPC Server redundancy. Then, during DeltaV workstation configuration, you identify the Application Station that will host the initial active OPC Mirror and the Application Station that will host the initial standby OPC Mirror.

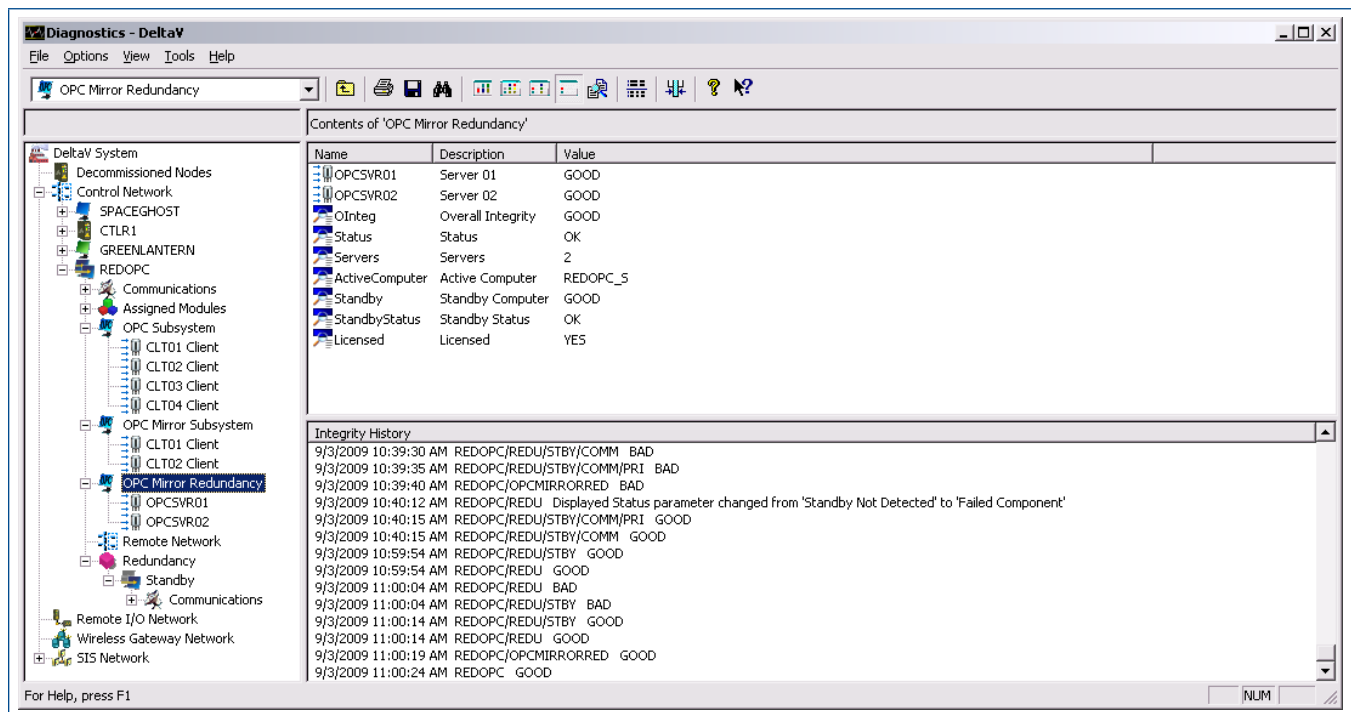
OPC Mirror redundancy also includes redundant Assigned Modules on the Application Station pair. Any control modules assigned to the Application Station pair are redundant. Landing your OPC data in control modules running in the Application Station pair enables redundant module execution, just like in redundant DeltaV controllers. When you assign control modules to execute in the Application Station pair, the redundancy subsystem allows modules running in the standby Assigned Modules subsystem to be synchronized with the modules running in the active Assigned Modules subsystem.

Although there are two physical Application Stations that host the redundant OPC Mirror, they are seen by the DeltaV system as a single workstation. The Application Station pair is known by the name configured for the initial active OPC Mirror node (e.g. REDOPC). The initial standby OPC Mirror node has the same name appended with _S (e.g. REDOPC_S). The Application Station pair appears in the DeltaV Explorer system tree as a single icon.

By configuring OPC Mirror redundancy, a redundancy subsystem is created on the Application Station pair. The redundancy subsystem transfers messages and data between the Application Stations, keeping the active and standby OPC Mirror synchronized. You only need to configure the OPC item mappings on the active OPC Mirror—the redundancy subsystem enables that the configuration is copied to the standby OPC Mirror.

The DeltaV Diagnostics Explorer includes an OPC Mirror and OPC Mirror redundancy subsystem. The OPC Mirror and OPC Mirror redundancy subsystems provide diagnostics information for OPC Mirror, the OPC Mirror server connections (“pipes”), and the connected OPC Servers, as shown below.

The active OPC Mirror and its connected active DeltaV OPC Server work together to provide one-for-one redundancy with the standby OPC Mirror and its connected standby OPC Server. If a problem is detected with any of the monitored components on the active OPC Mirror node, the entire Application Station will switch over to the standby OPC Mirror node, with the standby OPC Mirror and the standby DeltaV OPC Server assuming the active role.



DeltaV Diagnostics Explorer allows you to view OPC Mirror redundancy diagnostics data.

When you configure OPC Mirror redundancy, the Application Station itself is not redundant, only OPC Mirror, the DeltaV OPC Server and Assigned Modules subsystem. In addition, the Application Station pair is dedicated to redundant OPC communications. Once the Application Station pair is configured for OPC redundancy, no other subsystems on the Application Station pair may be enabled.

When you configure the Application Station pair for the first time, you identify the initial active and the initial standby OPC Mirror nodes. However, during operation, either Application Station can host the active OPC Mirror, depending on the last switchover. Since either OPC Mirror can be the active OPC Mirror, each Application Station should be sized to handle the active OPC Mirror role.

The automatic OPC Mirror switchover protects you in the event of a failure. If the active OPC Mirror fails, the standby OPC Mirror automatically becomes the active OPC Mirror. During normal operation, the standby OPC Mirror is in “hot standby” mode, so switchover from the failed active to the standby OPC Mirror occurs immediately after the redundancy subsystem has detected the failure and triggered the switchover. The hot standby mode adds more load to the DeltaV system but allows immediate availability of OPC data after switchover.

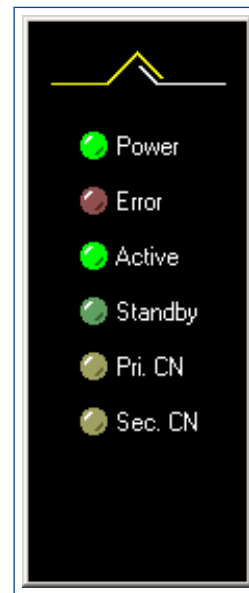
During Application Station switchover, which typically takes a few seconds (depending on the Application Station hardware and the size of the OPC configuration), the OPC data will hold the last value under the right conditions, enabling a bumpless data transfer. It is important to say that there are conditions that cannot be detected and cause a bump during a switchover. These conditions could be and are not limited to: DCOM errors, synchronous read in the middle of switchover, software bugs, etc. That is why a switchover event is generated and collected in the DeltaV Event Chronicle, providing notification to the operator that a switchover has occurred.

A failed active OPC Mirror and associated Application Station will remain failed by default, waiting for the cause of the failure to be investigated. While the failed OPC Mirror is in the failed state, switchovers are disabled and the active OPC Mirror is in simplex mode. However, you can configure the Application Station pair to automatically reboot the failed Application Station to allow the failed OPC Mirror to assume the standby role without user interaction. A standby OPC Mirror that assumes the active role will remain the active OPC Mirror until the next switchover.

Some of the events that can cause a switchover are:

- OPC Mirror failure
- Connected OPC Server failure
- DeltaV software processes failure
- Application Station hardware failure
- Communications failure between the active and standby OPC Mirror
- Communications failure between connected OPC Servers
- Manual switchover from Diagnostics

From the DeltaV Diagnostics Explorer, you can see the status of the active and standby OPC Mirror. Indication of the active and standby OPC Mirror status is also available from a redundancy faceplate graphic display located in the system tray on the Application Station pair.



Mirror to the standby OPC Mirror. During switchover, the failed OPC Mirror will hold last value until the standby OPC Mirror assumes the active role. The system can be upgraded without losing OPC communications, but as mentioned before there are undetected conditions that can cause a bump in the communications during a switchover and need to be considered when performing an online upgrade. You can then upgrade the standby OPC Mirror node at your convenience.

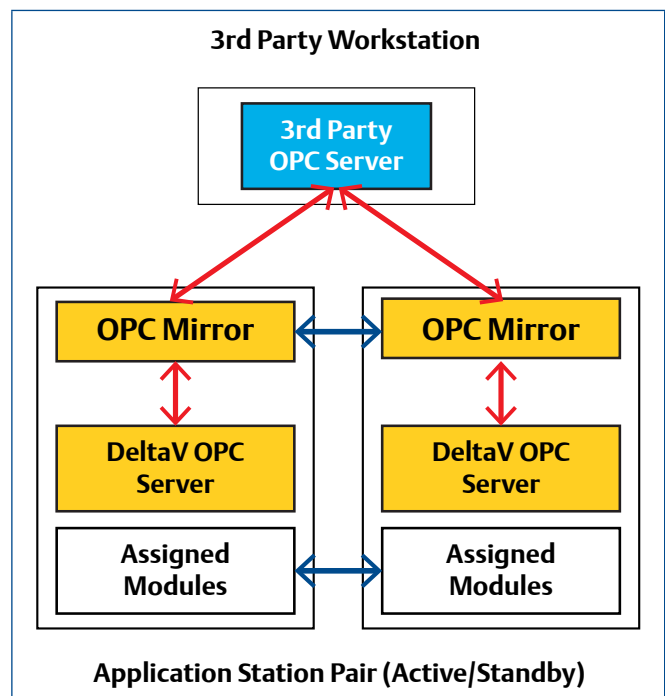
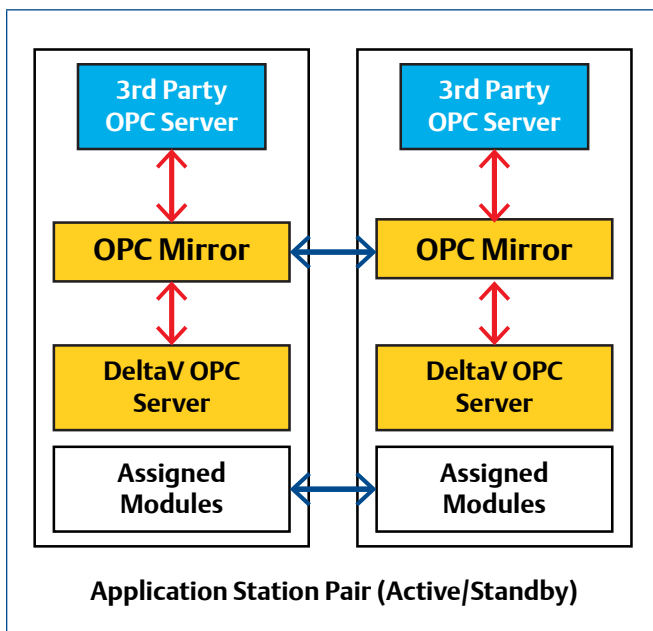
The active OPC Mirror and the active DeltaV OPC Server reside on the same Application Station. The standby OPC Mirror and the standby DeltaV OPC Server reside on a second Application Station. A third-party OPC server may be installed on the same Application Station as the active OPC Mirror and active DeltaV OPC Server. In this architecture, the third-party OPC server should also be installed on the Application Station that hosts the standby OPC Mirror and the standby OPC Server. Doing this will prevent data loss when the failed active OPC Mirror switches over to the standby OPC Mirror, when the failed active OPC Mirror, including the third-party OPC server, is shut down.

The marshalling of the connection between the third-party OPC server and the active OPC Mirror is handled automatically by the OPC Mirror software. The active and standby OPC Mirror are monitoring the OPC communications, but only the active OPC Mirror is transferring data. With a second third-party OPC Server on the second Application Station, failure of the active OPC Mirror and switchover to the standby OPC Mirror does not impact communications to the third-party OPC server, providing bumpless transfer of OPC data under the right conditions. During switchover, OPC Mirror holds the last good value but as mentioned before, there can also be a bump in the switchover of OPC mirror due multiple undetected causes such as: DCOM errors, synchronous read in the middle of switchover, software bugs, etc. Once the standby OPC Mirror becomes active, real-time OPC communications will resume.

Under the right conditions, you can upgrade the Application Station pair online without losing OPC data communications between the OPC Servers connected through the redundant OPC Mirror. Simply upgrade the standby OPC Mirror node, and then perform a manual switchover. OPC data transfer will switch from the active OPC.

A third-party OPC server may also be installed on a third-party workstation. In this architecture, the active OPC Mirror and standby OPC Mirror will be configured to connect to the remote third-party OPC Server.

The marshalling of the connection between the third-party OPC server and the active OPC Mirror is handled automatically by the OPC Mirror software. The active and standby OPC Mirror are monitoring the OPC communications, but only the active OPC Mirror is transferring data. Failure of the active OPC Mirror and switchover to the standby OPC Mirror does not impact communications to the third-party OPC server. During switchover, OPC Mirror will hold the last good value but a bump can occur during switchover for reasons mentioned earlier. Once the standby OPC Mirror becomes active, real-time OPC communications will resume. In this architecture, the third-party workstation and third-party OPC server are a single point of failure; therefore, failure of the third-party OPC workstation or server will cause a loss in data communications.



The redundant OPC Mirror is well integrated with the redundant DeltaV OPC Servers and the DeltaV redundancy subsystem. The redundant OPC Mirror is aware of the status of the DeltaV OPC Servers and will switch over if a problem is detected in the DeltaV OPC Server, communications to the DeltaV OPC Server, or in the Application Station itself. The redundant OPC Mirror may also be configured to monitor the status of its connected third-party OPC servers and act based on the status of the third-party OPC servers. The redundant OPC Mirror Server Monitor feature allows you to configure the redundant OPC Mirror to monitor the status of the connected third-party OPC servers and switch over if communications are lost between the active OPC Mirror and the third-party OPC server.

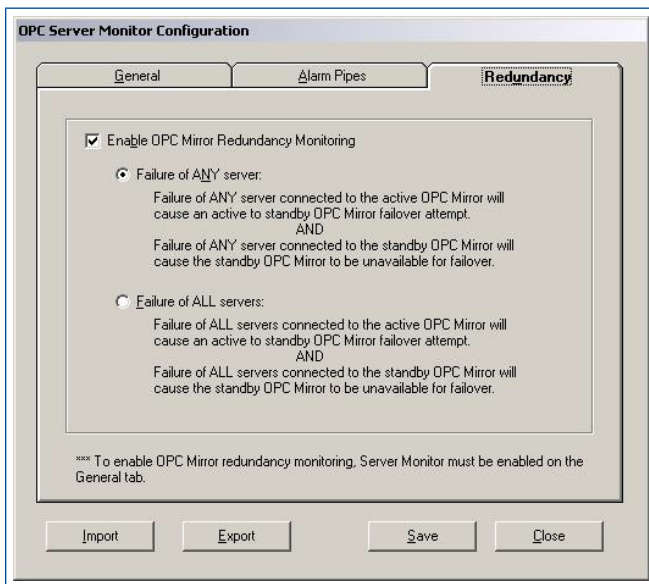
From the OPC Mirror Configuration client, you can enable server monitoring. Once enabled, you configure the desired switchover behavior. The options are to switch over if any OPC server connected to the active OPC Mirror fails or to switch over if all OPC servers connected to the active OPC Mirror fail. The redundant OPC Mirror Server Monitor feature enables status of third-party OPC servers to influence the operation of the OPC Mirror redundancy, increasing your OPC communication reliability and availability.

In the example architecture noted above, where a simplex third-party OPC server is located on a third-party workstation, failure of the network connection between the active OPC Mirror and the third-party OPC server would typically result in a loss of OPC data communications.

With the OPC Mirror Server Monitor, the loss of data communications due to the failed network connection would be detected by the Server Monitor and the active OPC Mirror would switch over to the standby OPC Mirror.

Redundant OPC Mirror is supported only on the DeltaV Application Station. Simplex OPC Mirror may be used with redundant DeltaV OPC Servers. The simplex OPC Mirror may be installed on another DeltaV workstation or a third-party workstation. The simplex OPC Mirror does not provide the Server Monitor feature included in the redundant OPC Mirror.

A redundant OPC Mirror may be licensed for up to 50 OPC server connections. Each DeltaV system will support up to 20 redundant OPC Mirror instances (residing on 20 Application Station pairs). For more information on the Application Station, refer to the Application Station product data sheet.



Ordering Information

Description	Model Number
Redundancy License for OPC Mirror	VE2212RED

Related Products

- **OPC Mirror.** Transfers thousands of values back and forth between your DeltaV system and other OPC-compliant systems.
- **Application Station Software Suite.** Integrate your DeltaV system with third party systems and applications on a DeltaV workstation. Includes a scalable DeltaV Continuous Historian and DeltaV OPC Data Access server.
- **Backup and Recovery.** Provides data backup and disaster recovery for DeltaV system and associated process control data.
- **OPC UA.** The different OPC UA servers and clients in the DeltaV system allows data reads and writes to and from third party application in an easy, reliable and secure way.

Prerequisites

- One Application Station Software Suite license with the appropriate DeltaV OPC Server scale up, VE2201Sxxxx (where xxxxx is the number of OPC data values required, from 00250 to 30000).
- One OPC Mirror license, VE2212Sxxx (where xxx is the number of OPC server connections required, from 002 to 050).
- Redundancy License for OPC Data Access Servers, VE2224RED
- One copy of OPC Mirror installed on each Application Station in the Application Station pair.
- Two Dell computers (workstation or server class, as required).
- It is recommended that the Dell computers used for the Application Station pair be the same model.
- The Application Station pair used for OPC Mirror redundancy must be dedicated to OPC communications; you cannot enable any other subsystem on the Application Station pair and you should not install or run non-OPC based applications on the Application Station pair.
- If you're using OPC Mirror with non-DeltaV OPC servers, then you should follow the instructions provided by the third-OPC server supplier when configuring the third-party OPC server.
- DeltaV v10.3 or later.

Emerson
North America, Latin America:
 ☎ +1 800 833 8314 or
 ☎ +1 512 832 3774

Asia Pacific:
 ☎ +65 6777 8211

Europe, Middle East:
 ☎ +41 41 768 6111

🌐 www.emerson.com/deltav

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