DeltaV™ Virtual Ethernet I/O Card

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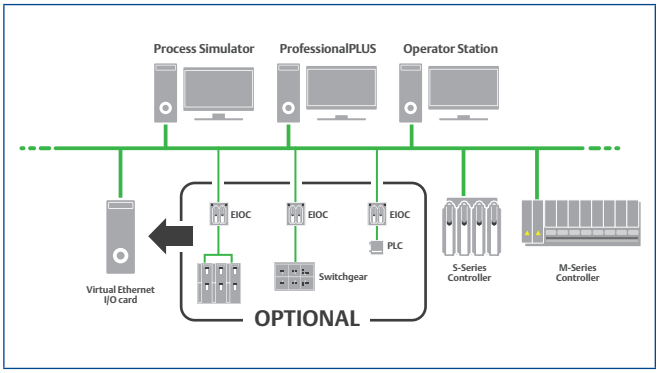
- Eliminates the need for hardware during FAT
- Supports testing of control configuration and operator graphics



DeltaV™ Virtual Ethernet I/O Cards provide the ability to simulate an EIOC in a DeltaV development/training system.

Introduction

The Virtual Ethernet I/O Card (vEIOC) provides a platform to create your configuration in a simulated environment for development, testing and training.

Benefits

Provides DeltaV™ Ethernet I/O Card Simulation from a host computer using either DeltaV Virtual Studio or VMware. The vEIOC provides the ability to simulate process signals from a host computer for control system development and checkout. This simulated data appears the same as real data in DeltaV system and requires no changes to graphics or control configurations when moving the configuration between a vEIOC and the EIOC.

Eliminates I/O hardware during FAT. The vEIOCs eliminate the need for additional hardware during FAT.

Supports testing of control configurations and operator graphics. vEIOC simulation enables testing of control applications and associated graphics. When development and testing in the vEIOC are completed, the configuration and graphics can be moved to an EIOC with no configuration changes needed.

Product Description

The EIOC is a big pipe for the integration of process data from 3rd party Ethernet Devices into DeltaV, and the vEIOC allows the same functionality but in a simulated environment for offline development, simulation, testing and training. The vEIOC is created via a tested and proven virtualized template and looks the same as real EIOC within the DeltaV system. When first connected, the vEIOC appear as decommissioned nodes in DeltaV and can be commissioned the same as real cards.

The vEIOC can simulate process signal using a process simulator or can also talk to Ethernet Devices connected directly to the host computer. The vEIOC can communicate using one of five protocols; Modbus TCP, EtherNet/IP, IEC61850 MMS, OPC UA client and EtherNet/IP Control Tag Integration.

The vEIOC for simulation provides a cost efficient and easy way to configure, test, and simulate the configurations in a DeltaV Simulate Environment. Once tested, the entire configuration can be moved to the a real EIOC without configuration changes. A simulated off-line vEIOC is supported on the DeltaV Virtual Studio or VMware platform.

Modules needed to process the data from the field devices are configured, assigned and run in the vEIOC. In this way, the vEIOC is self-contained and does not need an external controller to process the data. Values can be read from another controllers control strategy via external references. Access to DeltaV Live graphics, DeltaV Operator Interface graphics, as well as alarming and history collection is the same as any other module in the DeltaV DCS.

All supported protocols, shown below, can be configured on the vEIOC and all the rules for the EIOC apply to the vEIOC.

Modbus TCP Interface

The Modbus TCP interface will support Modbus data sources such as programmable logic controllers (PLCs), motor control centers (MCCs), analyzers and similar devices communicating Modbus TCP. The Modbus TCP interface is a Modbus client (Master) reading and writing data from/to Modbus servers (Slave devices). The Modbus server devices can be Modbus TCP devices or Modbus serial devices using a Modbus TCP gateway.

The Modbus TCP interface supports the following types of data access using the Modbus TCP protocol:

- Reading input data from Modbus Coils, Discrete Input, Holding Registers, and Input Registers.
- Writing output data to Coils and Holding registers.

EtherNet/IP Communications

The EtherNet/IP protocol allows data sources such as PLCs and Intelligent Field Devices (IFDs), such as variable-speed drives, MCCs, and analyzers; as well as other devices communicating EtherNet/IP to connect directly in to DeltaV via the vEIOC.

The EtherNet/IP interface will support connections for both implicit and explicit messaging to allow access to both Class 1 and Class 3 EtherNet/IP I/O adapter devices. Class 3 PCCC and UCMM with Logix tags message classes are also supported.

IEC 61850 (MMS)

The IEC 61850 MMS interface will allow data from Intelligent Electronic Devices (IEDs) such as motor protection relays, motor starters, motor control centers, switchgear, and similar MMS-based devices to be integrated into the DeltaV system. The MMS interface will be a client reading and writing data from/to the Intelligent Electronic Device which acts as the server in this interface.

OPC UA Client

The OPC UA Client protocol provides a native client implementation of a Data Access profile (real time data) compliant with OPC UA version 1.02. The OPC UA client will allow to read and write up to 30,000 real time signals coming from up to 64 OPC UA servers.

EtherNet/IP Control Tag Integration protocol

The EtherNet/IP Control Tag Integration protocol utilizes EtherNet/IP Class 3 messaging to provide integration with tag-based PLC data sources. Referencing data by tag name eliminates the need for register mapping. Read or write up to 10 signals per tag, and up to 2000 tags per EIOC for a total of 20,000 signals. The EtherNet/IP Control Tag Integration protocol supports reading string type signals and read/write of arrays up to 64 elements each (max 100 arrays per EIOC).

The EtherNet/IP Control Tag Integration protocol supports integration with ControlLogix and CompactLogix PLCs utilizing tags.

Parallel Redundant Protocol (PRP)

PRP functionality is not supported in the vEIOC, only in the EIOC. For more information, consult the product data sheet of the EIOC.

Configuration Information

Modules using the signals being read by the vEIOC must be assigned to the vEIOC. The function blocks available to the vEIOC are the same as the EIOC, that are a subset of the function blocks supported by the DeltaV system.

The Function Blocks supported are:

Advanced Functions – State Transition, Step Sequencer.

Analog Control – Analog Tracking, Calc/Logic, Filter, Input Selector, Scaler, Signal Characterizer, Signal Generator, Signal Selector, Bias/Gain, Manual Loader, PID, Rate Limit, Ramp, Enhanced Ramp, Splitter, and Limit.

Tag I/O – DI, DO, AI, AO.

IO – Alarm Detection, AI, AO, DI, DO.

Logical – All the function blocks in this category are included as well as the new DCC and EDC function blocks.

Math – All function blocks are included.

Special Items – All function blocks are included.

Timer Counter – All function blocks are included.

The usage of the following Function blocks are limited in both the vEIOC and the EIOC:

- 256 DC's
- 256 EDC's and DCC's
- 26 PID's
- 16 SEQs
- 16 STDs

Batch control, SFCs, PLMs, advanced control and energy metering function blocks are not supported in either the vEIOC or the EIOC.

Each virtual I/O card runs in a separate virtual machine on a host computer. vEIOC I/O cards for simulation are supported with DeltaV Virtual Studio and VMware workstation and ESXi virtualization environments. The number of vEIOC I/O cards on a host computer is limited to 8. See DeltaV Virtual Studio product data sheet or VMware Implementation Guidelines for system planning implementation.

Once the vEIOC I/O cards are created in the DeltaV network, you can commission the vEIOC I/O card in the same way you commission the physical EIOC cards. Once commissioned, you can provide simulated I/O using the simulated Ethernet device application and configure modules as shown in Figure 1.

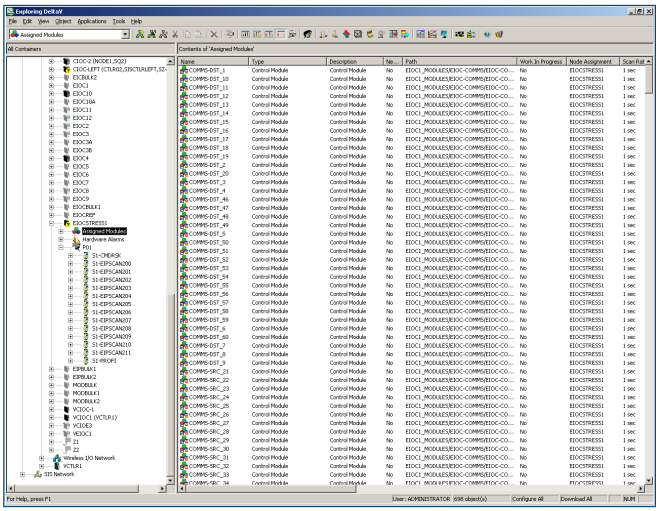


Figure 1. *DeltaV vEIOC Example.*

Note: *vEIOC resides in the I/O network in the DeltaV Explorer.*

Creating vEIOCs

vEIOC I/O cards are easy to create and implement using DeltaV virtual machine templates as shown in Figure 3. These templates allow you to easily add virtual I/O cards from a single Configuration dialog. Simply select to create the DeltaV vEIOC. Then, on the EIOC creation dialogue, select the network connections from a drop down menu. Press OK. Within a few minutes you have a vEIOC ready to commission and configure.

DeltaV Virtual Studio

DeltaV Virtual Studio is an integrated DeltaV application environment designed for easy implementation and management of virtual DeltaV control systems. DeltaV Virtual Studio is used to create, modify, start, stop, and move DeltaV virtual machines. vEIOC I/O cards for simulation are easily created and assigned to host computers using DeltaV Virtual Studio in development and training systems. Figure 2 shows the DeltaV Virtual Studio application.

Licensing

DeltaV vEIOC I/O Cards are licensed per card for a specific DeltaV system ID. There can be up to 8 vEIOC I/O cards on a host server. The licenses are sold in quantities of 1 as described below. A separate license for the protocol is necessary. The vEIOC and the EIOC can have only one protocol per card. The licenses are tied to a specific system ID and will not operate on multiple DeltaV systems. No device license is required in the vEIOC, it allows the maximum amount of Ethernet Devices supported in each protocol.

Subscription Based Licensing

Starting with DeltaV v15.LTS, Virtual EIOC and associated licenses will be available for purchase in subscription-only licensing for new systems.

The subscription-based licensing will let you to avail flexible term lengths allowing you to purchase only what is needed and enabling you to reduce the upfront capital investment for a simulation environment.

Please see the Ordering Information section below for details.

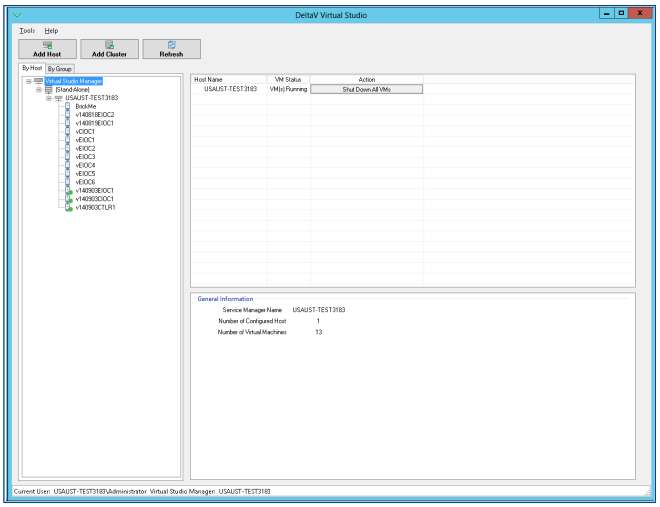


Figure 2. *DeltaV Virtual Studio Application.*

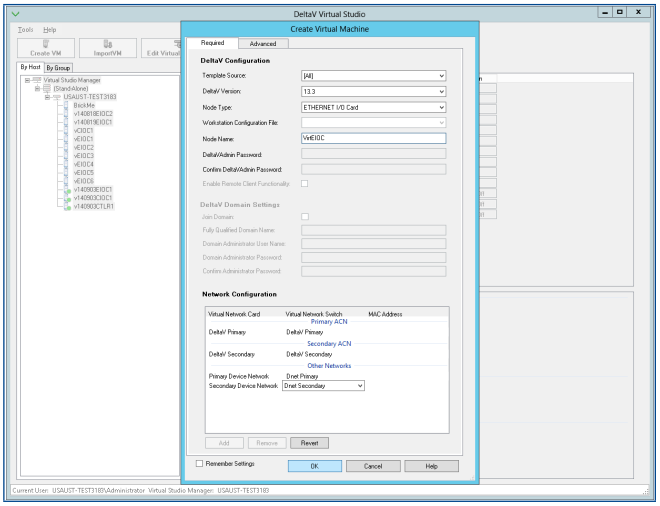


Figure 3. *Creating a vEIOC I/O Card.*

Product Specifications

Virtual Ethernet I/O Card (vEIOC) Specifications	
Number of vEIOCs per system*	8
Number of signals per vEIOC	Depends of the protocol
Number of modules per vEIOC	Up to 2000 monitoring modules
Number of DC, EDC and DCC function block	256 each
Number of PID function blocks	26
Number of SEQ and STD function blocks	16 each
Redundancy	Not Available. Redundancy is not available for vEIOCs.

*vEIOC I/O Cards must run in DeltaV host computers, not traditional DeltaV workstations. See DeltaV Virtualization Hardware product data sheet for available host computer information.

Ordering Information

Description	Perpetual Model Number	Subscription Model Number
Offline Simulation Only		
DeltaV Simulate Virtual Ethernet I/O Card (EIOC) Base License, 1 Card	VX1014S001	VX1014SwS001_YyFYzz
DeltaV Simulate Virtual Ethernet I/O Card (EIOC) Scale-up, 1 Cards	VX1014UPS001	VX1014SwUPS001_YyFYzz
EtherNet/IP Control Tag Integration for DeltaV Simulate Virtual Ethernet connected I/O (EIOC)	VX1012	VX1012SwS001_YyFYzz
OPC-UA client for DeltaV Simulate Virtual Ethernet connected I/O (EIOC)	VX1013	VX1013SwS001_YyFYzz
MODBUS TCP/IP Interface for DeltaV Simulate Virtual Ethernet connected I/O (EIOC)	VX1015	VX1015SwS001_YyFYzz
Ethernet/IP Interface for DeltaV Simulate Virtual Ethernet connected I/O (EIOC)	VX1016	VX1016SwS001_YyFYzz
IEC 61850 MMS Interface for DeltaV Simulate Virtual Ethernet connected I/O (EIOC)	VX1017	VX1017SwS001_YyFYzz

DeltaV Simulate Virtual EIOC licensing starting DeltaV v15.LTS can only be purchased as a one-year, three-year, or five-year subscription which includes software licenses, updates, and support.

These subscription model numbers are for initial subscriptions only; model numbers for renewals are listed separately in the price book.

**w represents the length of the subscription term in years (1, 3, or 5).
** y represents the specific year of the subscription term (1, 2, 3, 4, or 5).
**zz represents a two-digit indicator of the year of purchase (e.g. 23).

For existing customers with perpetual DeltaV Virtual EIOC licenses who wish to expand and/or upgrade their DeltaV Simulate system, please contact your local sales office.

Prerequisites

- For Modbus TCP, EtherNet/IP and IEC61850 protocols in the vEIOC, DeltaV 13.3.1 or higher is required.
- For OPC UA client, EtherNet/IP Control Tag Integration protocols in the vEIOC, DeltaV 14.3 or higher is required.

Related Products

- **DeltaV Virtual Studio** is an integrated DeltaV application environment designed for easy implementation and management of virtual DeltaV control systems for both off-line and on-line production systems. Virtual machine templates are provided for automatic generation and configuration of DeltaV workstations and controller hardware. For more information, see product data sheet for DeltaV Virtual Studio.
- **DeltaV Simulate** lets you use all DeltaV software for training and development without purchasing duplicate system hardware. This means you can use exactly the same software provided with your actual DeltaV system at a fraction of the cost. With the simulate suite you can also explore features of the DeltaV system that you have not yet purchased. For more information, see the product data sheet for DeltaV Simulate.
- **Ethernet I/O Card (EIOC)** provides a platform to monitor and control of Ethernet Devices via control modules assigned to and executed in the EIOC. Ethernet Devices like PLCs, Motor Control Centers, drives, switchgear and others can be controlled directly by the EIOC, independent of a controller.

Related Hardware Products

- **DeltaV Virtualization Hardware.** Rigorously tested and supported computer and peripheral devices for use with DeltaV Virtual Studio. Hardware includes host servers, storage area network (SAN), thin clients, network switches, and related hardware required for DeltaV Virtualization. For more information, see product data sheet for DeltaV Virtualization Hardware.

Related 3rd Party Products

- **VMware Workstation and ESXi Hypervisor.** DeltaV vEIOC I/O Cards are available and supported for VMware environments. Refer to Emerson Alliance Partner webpage for the latest implementation guidelines and limitations.

Contact Us
www.emerson.com/contactus