

Ovation™ Network

Features

- One second and in some cases 1/10 second updates
- Real-time data transmission without loss, degradation or delay
- Uses standard, unaltered ANSI protocols
- Fast 100 Mbps or 1 Gbps communications
- Choose or mix fiber-optic and copper media with UTP, multi-mode fiber, and single-mode fiber
- Fault tolerant with uninterrupted flow of process data
- Supports 254 dual attached nodes
- Full connectivity of third-party products such as WANs, LANs, and PLCs
- Supports geographically dispersed systems while limiting EMI/RFI interference



Reliable Communication

Ovation™ control system offers seamless, dynamic communication capabilities optimized for confident and secure control of the complicated processes involved in power generation and water treatment. Utilizing the most current and applicable technology available, Emerson provides a state-of-the-art network as the standard communication interface within the Ovation system.

The Ovation network is a robust, fault tolerant, 100 Mbps or 1 Gbps, commercially available, communications network designed for mission-critical process control applications. Implementation of the Ovation network provides the utmost in system reliability, security, and performance. The flow of process data is uninterrupted by any single component, cable, or device failure.

The Ovation network switches employ “storm control” to limit the maximum rate of traffic that any station can source onto the network. This prevents compromised workstations (i.e. infected) from causing a denial of service condition inside the DCS.

Ovation switches are configured to detect and protect the control system against the introduction of loops caused by incorrectly connected cables or mis-configured switches.

Open System Design

Ovation’s design easily integrates standard, non-proprietary hardware, enables control system expansion with improved technology, better performance, and lower risk of obsolescence. The Ovation network is our solution to an increasing demand for open system implementation capable of operating on any standard network supporting TCP/IP. Unlike other DCS highways, the high-speed Ovation network preserves design philosophy by providing real-time data transmission without loss, degradation or delay, even during plant upsets.

The Ovation network has a high bandwidth to support large, geographically dispersed systems, while being flexible enough to incorporate various media and topologies. The network is media independent, allowing the use of fiber-optic and copper (UTP) media as required.

Feature	UTP	Multi-Mode Fiber	Single-Mode Fiber
Cost	Low	Moderate	Higher
Distance 100 Mbps 1 Gbps	100 m 100 m	Up to 2 Km Up to 550 m	2 - 40 Km 550 m - 10 Km
EMI	Potentially susceptible	Immune	Immune

In contrast to other proprietary systems, the Ovation network is implemented in strict compliance with standard, unaltered ANSI protocols.

Network Standards

The Ovation network completely obsoletes the complex bridged proprietary architecture used by other process automation systems to connect control highways with plant LANs. With the use of widely available commercial hardware, custom gateways and interfaces are not required, and full connectivity to incorporate LANs, WANs, and intranets is ensured.

With Ovation's breakthrough in control system network technology, the end-user may incorporate multiple networking schemes in the information systems local- and wide-area networks (LAN and WAN) without limitations of any kind. This eliminates the need for gateways and custom interfaces that are currently used by other distributed control system vendors to interface the control system to the plant LAN.

This fully unified network seamlessly combines control and enterprise information systems while protecting process security. Effective integration of process information allows users to concentrate on corporate objectives rather than protocols, network management, and operating systems. The Ovation network software communicates on any standard physical network layer using the IEEE 802.3 standard.

Designed to incorporate standards from top to bottom in a completely open environment, Ovation allows the end-user to integrate other vendors' products. Based on open protocols, Ovation has achieved successful plant-wide automation and integration—with these

standards incorporated in future versions without exception.

Fault Tolerant Operation

The Ovation network is completely fault tolerant for any single point of failure. It has the capability to detect, report, and bypass faults. Based on ANSI standards, the Ovation network offers dependable operation incorporating fault tolerant schemes to bypass failed segments in the event of a cable break or component failure. Fault tolerance is accomplished through:

- Extensive connection and fault detection management
- Distributed fault-detection capabilities
- Enforced topology rules through connection management
- Station management layer defines standard network management and diagnostics

Network Implementation

The Ovation network is based on standard, unaltered Fast Ethernet and Gigabit Ethernet; implemented in a robust and fail-safe scheme. Contrary to competitor usage of Ethernet with custom designs that alter the standard Ethernet protocol, the Ovation network implementation maintains the original Ethernet scheme. This allows for easy and secure connection of third-party devices such as printers, WANs, and LANs, as well as Allen-Bradley PLCs, GE Mark V/VI control systems and other equipment.

Ethernet controls media access by CSMA/CD (Carrier Sense Multiple Access with Collision Detection). Ovation dedicates one switch port per end station and configures the link to be full duplex to eliminate the possibility of collisions. Maximum built-in redundancy is achieved through dual Ethernet switches and either a dual-ported Ethernet NIC card or two individual cards for each node attached to the Network.

For designs with geographically dispersed control areas, islands of switch pairs are connected together with additional pairs of switches to create an up-link hierarchical tree. The up-link interconnection provides total redundancy originating at each station that

extends throughout the entire Ovation network. Fiber-optic media may also be used to extend a network run length beyond 100 meters or to enhance EMI/RFI noise immunity.

Fast Ethernet Specifications

Speed	100/1000 Mbps (megabits/second)
Type	Ethernet switches using CSMA/CD to minimize collisions
Media	Fiber Optic, Cat5 UTP
Standard	IEEE 802.3
Node Connection	Two cables per node connected to separate Ethernet switches
Capacity	200,000 points per second
Node-to-switch or Switch-to-switch	<ul style="list-style-type: none"> ▪ Copper up to 100 meters ▪ Multi-mode fiber up to 2 km (100 Mbps) / 550m (1 Gbps) ▪ Single-mode fiber to extend even further
Nodes	Determined on a per project basis

Summary

Ovation provides a robust, reliable and secure communication path between all Ovation devices, instruments and terminals by using the most current and up-to-date network technology available.

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