



# 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
- Capable of fast 100 Mbps or 1 Gbps communication
- 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

The 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 from causing a denial of service condition inside the distributed control system (DCS).

Ovation switches are configured to detect and protect the control system against the introduction of loops caused by incorrectly connected cables or miss-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 Emerson's 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. 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/VIe control systems and other equipment.

Ethernet controls media access by carrier sense multiple access with collision detection (CSMA/CD). 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

## Ovation Network Specifications

Specifications			
<b>Speed</b>	100 Mbps (megabits/second) or 1 Gbps (gigabits/second)		
<b>Type</b>	Ethernet switches using CSMA/CD to minimize collisions		
<b>Media</b>	Fiber-optic, Cat5 UTP		
<b>Standard</b>	IEEE 802.3		
<b>Node Connection</b>	Two cables per node connected to separate Ethernet switches		
<b>Capacity</b>	<ul style="list-style-type: none"> <li>▪ 100 Mbps = 200,000 points per second on Ovation 3.5.x and older versions 250,000 points per second on Ovation 3.6 and later versions</li> <li>▪ 1 Gbps = 400,000 points per second on Ovation 3.6 500,000 points per second on Ovation 3.7</li> </ul>		
<b>Node-to-switch or Switch-to-switch</b>	<ul style="list-style-type: none"> <li>▪ Copper up to 100 meters</li> <li>▪ Multi-mode fiber up to 2 km (100 Mbps) / 550 m (1 Gbps)</li> <li>▪ Single-mode fiber to extend even further</li> </ul>		
<b>Nodes</b>	Determined on a per project basis		
<b>Distance</b>	<table border="0"> <tr> <td style="vertical-align: top;"> <b>100 Mbps:</b> <ul style="list-style-type: none"> <li>▪ UTP = 100 m (328 ft)</li> <li>▪ Multi-mode fiber = up to 2 Km (1.24 miles)</li> <li>▪ Single-mode fiber = 2 - 40 Km (1.24 – 24.85 miles)</li> </ul> </td> <td style="vertical-align: top;"> <b>1 Gbps:</b> <ul style="list-style-type: none"> <li>▪ UTP = 100 m (328 ft)</li> <li>▪ Multi-mode fiber = up to 550 m (1,640 ft)</li> <li>▪ Single-mode fiber = 550 m-10 Km (1,640 ft – 6.21 miles)</li> </ul> </td> </tr> </table>	<b>100 Mbps:</b> <ul style="list-style-type: none"> <li>▪ UTP = 100 m (328 ft)</li> <li>▪ Multi-mode fiber = up to 2 Km (1.24 miles)</li> <li>▪ Single-mode fiber = 2 - 40 Km (1.24 – 24.85 miles)</li> </ul>	<b>1 Gbps:</b> <ul style="list-style-type: none"> <li>▪ UTP = 100 m (328 ft)</li> <li>▪ Multi-mode fiber = up to 550 m (1,640 ft)</li> <li>▪ Single-mode fiber = 550 m-10 Km (1,640 ft – 6.21 miles)</li> </ul>
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