# Ovation™ SCADA Communication Server

Features

- Effective management of remote units controlling mission critical processes
- Interoperability with various remote terminal units
- Unified information through the Ovation database for efficient SCADA data management
- Optional dual redundant configuration for additional system security
- Seamless integration with new or existing Ovation systems
- Continuous monitoring of equipment and communication links
- Supports both serial and Ethernet interfaces
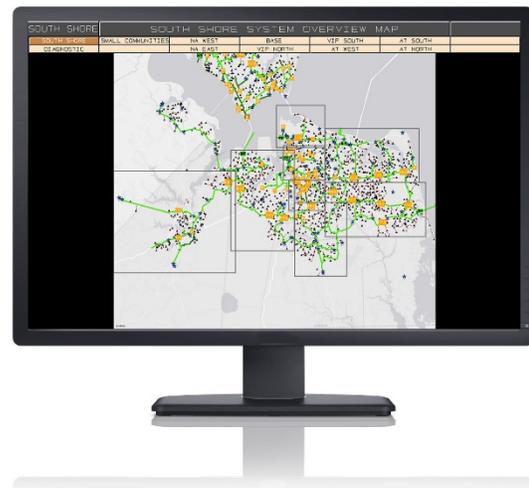
Introduction

As the world's population grows, so does the demand for more power, cleaner water and less waste. Producing these everyday necessities calls for mission-critical processes that require constant, accurate control. Quality, conservation, regulatory control and deregulation are just some of the factors forcing changes in the way these vital processes are managed.

To help customers deal with these issues, Emerson presents the Ovation™ Supervisory Control and Data Acquisition (SCADA) communication server. Important information from SCADA remote terminal units is now readily available to the control system and desktops of supervisors and managers — enabling them to make faster, more effective decisions.

Coupled with the powerful Ovation system, the Ovation SCADA communication server brings process automation of mission critical processes to a new level.

Mastering Remote Monitoring and Control

SCADA systems are typically comprised of two basic components: a remote terminal unit (RTU) and a master terminal unit (MTU). The Ovation SCADA communication server operates as the master terminal unit, providing central monitoring and control for the SCADA system.

EMERSON.

Functions of the Ovation SCADA communication server include:

- Seamlessly passes value and status information to and from the Ovation database
- Configures and monitors RTUs
- Sends control commands to the RTUs
- Receives and reports data, messages and alarms from RTUs
- Manages the status of communication links to RTUs
- Retries failed equipment
- Continually monitors failed equipment and communication links in an attempt to put the failed piece back into operation
- Implements sophisticated polling algorithms using scan groups, priorities and multiple scan rates
- Quickly changes polling algorithms
- Accepts unsolicited messages

Hardware Requirements

The Ovation SCADA communication server is based on an Ovation Windows-based platform, which can be integrated with an existing or new Ovation network. An optional keyboard and monitor make configuration and link administration quick and easy. For smaller systems, the Ovation SCADA communication server can be combined with other drop functions such as operator or engineer software. However, for most applications it is recommended to implement the server software on an independent hardware platform.

Two mounting options are available. Rack mounted systems are ideal for relay rooms or for placement in environmentally harsh locations in NEMA type cabinets. Desktop systems are perfect for control rooms, supervisor offices or employee workspaces.

Software Configuration

Three major software components make up the Ovation SCADA communication server. Each component plays a key role in ensuring constant and accurate control and monitoring of a SCADA system. And like any Ovation server, the SCADA communication server is easily configured using Ovation engineering tools.

Ovation Real-Time Data Interface

As the main interface to the Ovation database, the real-time interface moves process data between the Ovation Network and the RTUs. In addition, a separate time tagged data processor is used when the SCADA RTU/protocol provides timed tagged data.

Redundancy Interface

A redundant interface provides a failsafe redundant connection to the Ovation network.

Polling Engine

The polling engine ensures communication between the RTU device and the Ovation SCADA communication server. The polling engine interfaces through multiple drivers as required to support RTU protocols.

Communications

Ovation's open architecture also extends to the SCADA communications server. The use of standard communication protocols, media and open programming tools allows easy placement of a SCADA communication server on new and existing Ovation systems.

The server has the flexibility to operate over a variety of media such as leased lines, dial-up telephones, microwave, licensed and unlicensed radios, spread spectrum packet radio, public switched networks or satellites. Management of multiple media paths is automatic, allowing field data to be acquired from any one location, including backup communication channels and multiple sources. Communicating to primary and backup paths on different media provides additional system security.

The Ovation SCADA communication server interfaces with RTUs through multiple serial and Ethernet ports using routers, terminal servers, A/B switches, modems, etc. Up to 32 simultaneous channels of any type can be interfaced to the

EMERSON.

server, including backup channels. Multiple protocols are available from any one SCADA communication server. The supported protocols are:

- Modbus (Master/Slave)
- Allen-Bradley DF-1
- Allen-Bradley EIP
- DNP3 (Client/Server)
- IEC61850
- IEC60870-101
- IEC60870-104
- GE GSM
- Turbine Control Interface
- OPC UA (Client/Server)

Data Collection, Transmittal and Storage

Efficient data management is vital to the success of SCADA communications. All process variables, data values, status and diagnostic information used in SCADA communications are stored in the Ovation database and available to other Ovation drops (i.e. operator, engineer, historian, report server workstations, etc.). Process data is sent to RTUs based on control calculations or operator commands. Status changes of SCADA variables are then communicated throughout the Ovation system, allowing quick adjustments to operating conditions before a problem occurs.

Polling algorithms are used to ensure communication between the RTU device and the Ovation SCADA communication server. The server supports multiple polling algorithms based on the number and type of connected RTUs. These algorithms include periodic, on-demand, spontaneous and by-exception polls. Demand scans for faster process variable scanning rates can also be implemented to quickly display, respond or control SCADA information. Since the SCADA communication server is directly connected to the Ovation network, historical SCADA process data can be collected by the Ovation historian for online storage, off-line archiving, sorting, data analysis and generating reports.

Redundancy and Link Failures

Emergency situations require rapid recovery to ensure continual flow of vital remote data to the control system. The Ovation SCADA communication server incorporates various optional redundancy and failover schemes to keep process up and running. Dual redundancy allows one Ovation SCADA communication server to perform as the primary server, while a second server as the backup. Whenever failure of the primary server is detected, data shadowing and diagnostic monitoring are automatically initiated, thereby allowing the backup server to assume full SCADA communication responsibility.

The Ovation SCADA communication server can quickly detect and respond to failure modes, including line failures, time-outs, data retransmit, incomplete data and busy signals. Failure of communication links between the RTU and the communication server is monitored and reported to the Ovation database as an alarm. When a failure is detected after a specified number of retries, the server alarms the failure, connects to an alternative communication link (if available) and attempts to reestablish communication to the primary link. The failed channel is continuously monitored and put back into service upon recovery. An initialization scan ensures initial proper operation of the recovered link, while a confidence scan is run periodically to verify continuous smooth link operation. The number of recovery attempts from communication failures is pre-determined by the operator. If an alternative link is not available, all process variables associated with that link will be reported as "timed out" until link operation resumes.

Remote Terminal Units

The Ovation SCADA communications server supports various RTUs and PLCs at remote locations. These devices handle process I/O and application logic to monitor and control local processes. They also handle communications to one or more central monitoring facilities (master/slave configuration) and possibly to other remote locations (peer to peer). Ovation technology supports a variety

EMERSON.

of RTUs, such as those from Emerson, Motorola, Kingfisher and Control Microsystems, as well as PLCs that are capable of providing RTU services, such as Allen-Bradley and Modicon. Remote configuration and programming may be available depending on the RTU/PLC, protocol and network combination specified. Emerson will interface to existing RTUs over an existing network or work with the customer to upgrade both.

Specifications

SCADA Communication Server Specifications	
Hardware Platform	Windows
Standard Communication Protocols	Modbus (Master/Slave), Allen-Bradley DF-1, Allen-Bradley EIP, DNP3 (Client/Server), IEC61850, IEC60870-101, IEC60870-104, GE GSM, Turbine Control Interface, OPC UA (Client/Server)
Communication Media	Leased lines, dial-up telephones, microwave, licensed and unlicensed radio, spread spectrum packet radio, public switched networks, satellites, cellular, Ethernet (LAN and WLAN)
Redundancy Scheme	Primary and backup; supports dual redundant configuration
Number of Simultaneous Communication Channels	Up to 32 per server

ControlWave® Integration

Emerson's ControlWave® product line has been integrated into the Ovation SCADA platform to provide seamless supervisory control and data acquisition. Real time data is exchanged between the Ovation control system and the ControlWave RTUs through a configurable polling mechanism built into the Ovation SCADA communication server. Time-stamped historical data and alarm data is also captured for storage into the Ovation historian. The Ovation SCADA communication server acts as a gateway to the ControlWave products via Ethernet or serial communications. Configuration of the ControlWave RTUs/PLCs is performed through native tools, such as the ControlWave designer and OpenBSI utilities.

Summary

The power of the Ovation control system can now be connected to the SCADA process, maximizing plant effectiveness and increasing productivity, while reducing operating costs. Data from SCADA operations can also be shared across organization boundaries from remote terminal units to plant operators, supervisors and management. Quick, reliable control can make the difference between a rapid recovery from an emergency situation and loss of production, time and more.

EMERSON.