Easily maintainable with minimal support staff

Integrated support for connection to other utility entities (internal or external) using ICCP.

Supervisory control and data acquisition

Spectrum Power TG Remote Terminal Unit Communications Server (RTUCS) subsystem supports a wide range of protocols to communicate with remote terminal units (RTUs), smart relays, substation automation systems, sophisticated IED components and other field equipment. Proven, field-tested communications using dial-up, dedicated, packet switched, fiber, radio, and TCP/IP WAN communications media ensure flexible and reliable communications when and where needed. These front end processors run in a dual redundant configuration to ensure high availability.

In the control center, the data acquisition subsystem supports the timely presentation of the data to the operators, organized by logical substations, which are not constrained to the data from a single RTU. Data quality and limit checking are performed on every value update. Where dual connections to an RTU are installed, automatic transition to an alternate line is supported.

Standard tabular displays present all the SCADA points in each substation in a user-friendly graphical user interface. Also included are summary displays showing points filtered by criteria such as off-normal, abnormal, out-of-scan, and so forth. Summary information may show a single substation or the whole system.

Benefits

Key benefits of the Spectrum Power TG include:

- Flexible, expandable base system for effective monitoring and control
- A single Spectrum Power TG system may include nodes on multiple platforms, in a combination optimized for reliability, performance, cost and ease of support
- Component-based architecture lets you expand the system to match your growth
- Continuously Current™ incremental upgrade option keeps the system in step with new technologies while minimizing the commitment of resources
- Effortlessly extensible using embedded Scriptor programming language
- Intuitive display and database-creation and maintenance tools provide low cost customization
Up to 16 customizable tag types are supported on the system. Tags may restrict or prevent controls being issued for a point or provide a warning or information. Multiple tags may be placed on a single point, enforcing all associated restrictions.

Pre-operation checks may be defined on a point-by-point basis, ensuring that the operating environment allows the safe operation of a control before allowing the control to be issued.

Special consideration is given to installation and testing: RTUs can be attached to the system in “listen only” mode, while they are still in full communication with another system. There is also a “test” mode, in which a fully-connected RTU can be exercised without disturbing the operations environment.

What this means to you:
Your communications needs can be met with the best solution for your situation. Your communication and test engineers have the tools and testing environment to perform thorough pre-cutover testing without interfering with normal operations. Operators run the system safely, securely and with confidence.

Meeting new security requirements
The Spectrum Power TG offers a security option that greatly enhances the ease of complying with NERC’s Security Urgent Action Standards (CIP 002-009).

Cyber security is enhanced by secure shell, shadow passwords, and other C2 security features. The network port usage is restricted to required ports, which disables cyber attack techniques commonly used to identify servers and other computer systems on networks. The common ports such as ping, FTP, etc., are disabled on a secure system. This allows Spectrum Power TG to remain silent when external computers or hackers try to identify possible targets for attacks. The Spectrum Power TG logging capability includes not only the logging of all interactive log-ins, but also connections with nodes outside the security perimeter, providing information regarding possible cyber attacks. All Siemens-generated passwords are identified prior to system shipment for required on-site changes.

Specific security features included in Spectrum Power TG include:
- Secure shell
- Shadow password
- User level authentication and access privileges, at both the operating system and Spectrum Power TG operator level
- Authentication of all connections with Spectrum Power TG nodes
- Encryption of all communications between nodes outside the security perimeter
- Allow only predefined nodes to connect
- Password management features (expire, minimum length, content, prevent reuse)
- Locking of accounts after multiple failed login attempts
- Generation of intrusion alarms and locking accounts on repeated login failures
- Logging of all connections and logins
- Security Training and Security Testing are also offered as options.

What this means to you:
Your Spectrum Power TG system is installed in conformance with the NERC Security Standards.

System architecture
The Spectrum Power TG system provides a real-time operating framework for the services and applications comprising the network management system. An extensible, configurable architecture allows the Spectrum Power TG to be implemented on a single computer or distributed across a large number of computers using high-speed networks. Individual system functions, such as operator console, data acquisition and communications, and power application studies, may be implemented on different nodes, each dedicated to a specific function, or consolidated on nodes performing multiple functions. Additional computers may be added to the system, increasing computing power and allowing the redistribution of functions, after system installation.

Additional functional components, such as the data historian, data exchange with other business entities, etc., may be included in the original configuration or added to the system at a later date, as the need arises. The addition of new components and/or the reconfiguration of existing components is supported in the base system architecture, and accomplished with minimal interruption of services and availability. In a standard system configuration, all real-time nodes and network connections are redundant. No single failure of a system component can impair the full functionality of the system.

What this means to you:
Your Spectrum Power TG system has a flexible, extensible configuration that evolves with your changing needs.

Hardware architecture
The Spectrum Power TG hardware architecture is designed to run in a networked environment. The computers may be of a single hardware and operating system family, or mixed. The system may consist of a one or dozens of computers.

The specific implementation technologies used in a Spectrum Power TG system depend on the functions and resources that must be supported and customer preferences. System nodes running Microsoft Windows™ use 32-bit/64-bit based personal workstations or server class computers. Linux nodes are offered on 32-bit/64-bit based personal workstations or server class computers. The optional external historical archive is implemented with Microsoft SQL Server or Oracle™ as the relational database engine.
Software architecture

All Spectrum Power TG system software is based on core libraries, which provide integrated support for distributed processing and inter-process communications. Because the interfaces are identical across operating system platforms, data and communications can be exchanged between processes running on different operating systems.

The Spectrum Power TG system database is defined and maintained in a relational model on the source database server. This information is copied to the application server nodes where it is transformed into a database designed to facilitate real-time access and processing. The real-time database also implements a data context model, in which multiple copies of the same data structures may be maintained. This provides support for data snapshots, studies, and other functions, which may need to modify data but should not impact the operation of the system.

Spectrum Power TG Scriptor is the primary scripting and rapid application development utility. Scriptor is a programming language very similar to the widely-used Microsoft® Visual Basic®, but with built-in awareness of the Spectrum Power TG real-time database structures. The Script Interactive development environment supports the development of scripts and menus with user interfaces. The ScriptCalc environment is a special runtime script engine which runs as an integral component of the Spectrum Power TG system. It performs calculations using database quantities and can issue scada control and other Power TG system function requests.

What this means to you:

You get the ease and flexibility of a relational database for data maintenance, but the speed required for real-time data access on the production system. The majority of your system-specific needs can be implemented in a user-friendly programming environment that incorporates real-time database structures. Where optimization is desired, standard libraries supporting FORTRAN and C programming languages and providing full database and SCADA integration are delivered with the system.

Operator interface

The operator interface enables operators to have one or many display windows open, with each window displaying continuously updated information. Each window can be individually positioned and/or resized. Display window arrangements can be stored and recalled. Zooming, panning, detailing, and decluttering can be built into any display. Menus, dialog boxes, and active icons are used to navigate through the system and issue controls. Support for projection monitors is included with the base system.

WebOIS (Operator Interface Subsystem) is an optional secondary interface providing view only access to the system displays using a standard web browser.

A Spectrum Power TG login, separate from the operating system login, is required before the operator has access to the system displays. Security and data access controls are implemented using area of responsibility (AOR) and area of viewability (AOV) rights assigned to the operator, as well as Console Mode assigned to the individual consoles.

On delivery, a Spectrum Power TG system provides a comprehensive set of tabular displays to complement the baseline SCADA functions. The system builds these displays automatically as the RTU and Station point data are input into the database.

A full-graphics display editor environment provides the capability to develop sophisticated, multi-layer, interactive, project-specific displays. Custom symbols and behaviors can be developed by the display developers to reflect their specific operating environment and practices.

What this means to you:

The operator interface can be tailored to meet the operational procedures of your system operators. You can set the security requirements for data access and controls on a per-user and per-console basis. You can deliver current system information in a safe, secure manner to corporate users and senior staff using the WebOIS option. Automatically generated tabular displays mean that you can begin RTU testing as soon as the points are in the database.
Operator support functions

The Spectrum Power TG operator support utilities and functions are designed to facilitate use of the system and enhance the effectiveness of the basic operator interface. The Spectrum Power TG operator support functions include:

- A flexible and convenient graphical trending application
- Ability to attach comments to major entities and events
- A utility to remind users of important events
- Extensive reporting tools
- Management of external display and recording devices (projection monitors, mapboards and chart recorders)
- An online help function.

Alarms and events

An event is defined as an expected system change that should be recorded. The system maintains a chronological list of events.

An alarm is defined as an unexpected system change that requires immediate operator attention. The Spectrum Power TG system implements 16 alarm priorities with distinct audible and visual signals to notify the users of the related system change. A text description of the change is displayed in the Alarm Summary list as well as the chronological list of alarms and events.

The Spectrum Power TG system uses a variety of simple sorting and filtering measures that together provide extremely effective and flexible alarm management. The ability to sort and filter alarms is paramount to insuring that operators can respond promptly and accurately to changing conditions. All alarm summary displays include alarm filters that the operator can quickly configure to show only alarms of interest.

Alarms can be assigned up to 16 priority levels, alarming can be inhibited or enabled discretely by device or measurement point and the user can set a variety of alarm suppression functions. These include:

- Master/slave alarming
- Time-related alarms
- Normal and disturbance mode
- RTU test mode.

Since the system captures many alarms and events every day, search and sorting tools are provided to assist the user in the isolation of events of interest in the alarms and events list.

What this means to you:

Alarms are assigned to the responsible operators, ensuring that critical alarms have high visibility. When reviewing a significant event, your ability to analyze the system conditions is facilitated by the ability to isolate the related alarms and events and save them to a report file.

For more information, please contact your Siemens representative.