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Substation Network Gateway

The widespread use of Intelligent Electronic Devices (IEDs), such as protection relays, meters, SCADA systems etc. within electrical networks has provided an opportunity for network managers to gain access to operational information not previously available to them.

It can provide valuable data for:

- **Post fault analysis**, speeding up supply restoration and identifying possible protection operation anomalies.
- **Performance prediction**, enabling long term assessment of plant operational life to be undertaken.
- **Asset management**, providing guidance for pre-emptive or extended maintenance activities.

Accessing this information over the corporate IP network can be a complex task because of the mix of new and older, 'legacy' products installed and the variety of protocols used.

RFL Communications plc has assembled a packaged solution to the above problem comprising 'best-of-breed' applications by industry-leading developers. The eLAN™ Substation Network Gateway (eLAN-SNG) and complementary HMI, provide a flexible combination for the acquisition, transmission and interrogation of data from IEDs, RTUs and Substation-LAN connected devices.

eLAN™ Substation Network Gateway (eLAN-SNG)/HMI, Main Features

- Translates legacy serial protocol data to industry-standard protocol formats. (DNP, IEC, UCA etc) or to proprietary, non-standard protocols.
- Communicates data to network-based client applications using Internet Protocol (IP).
- Provides transparent, concurrent communications between network-based client applications and IEDs, in native client protocol.
- Provides application-specific storage of local events, oscillographs etc., for subsequent acquisition by remote applications.
- Controlled software configuration management/upgrade from a central server location.
- Highly intuitive HMI, co-located or remote from eLAN-SNG using 'Substation Explorer™' software, a Windows Explorer™ paradigm for local or network-based browsing of substation data.



eLAN-SNG Software

Operating System (LINUX)

LINUX was chosen for its stability and reliability in mission-critical applications.

It has a small 'footprint', and is supported by an extremely active international developer group.

Protocol Translation

The Telemetry Integration Environment (TIE) software within the eLAN-SNG provides a modular data acquisition and protocol translation package. This allows data from any IED/RTU to be acquired, translated and forwarded to any network-based client application in the specified format.

There are 3 elements to TIE.

1st are the protocol data link driver(s), which reside on the Intelligent Communications Processors. These manage direct serial communications with the substation devices.

2nd is TIE Core. This provides data normalisation, routing etc.

3rd are the Host Driver(s). These translate the normalised data to the format(s) specified for the host (i.e. the Client).

Protocol Encapsulation (Tunneling)

The 'IED Anywhere™' server software package incorporated within the eLAN-SNG, enables network-based proprietary client applications to communicate transparently with the relevant IED.

Applications for legacy devices not yet within the eLAN-SNG protocol library can be written.

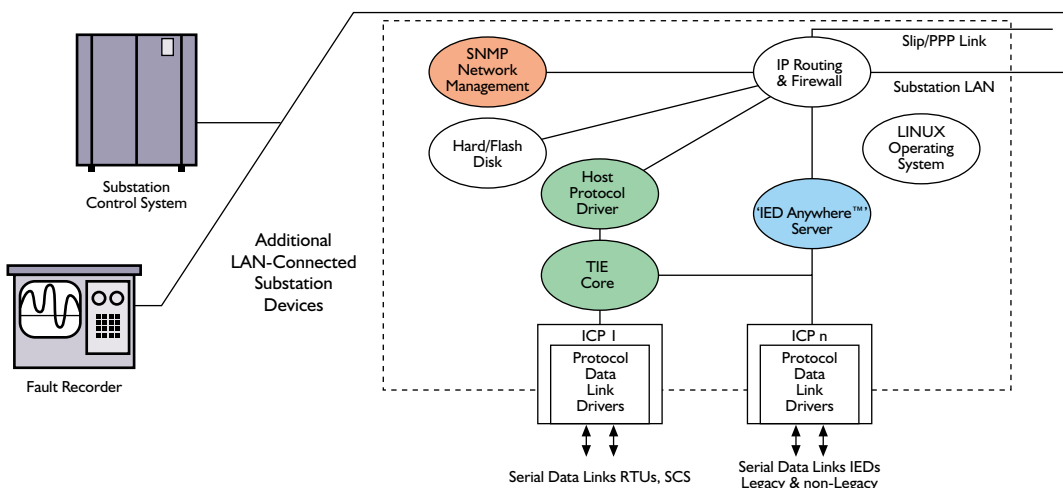
'IED Anywhere™' also has the ability to interleave client applications with an IED, enabling concurrent access by several clients.

Network Management

The eLAN-SNG provides a Simple Network Management Protocol (SNMP) Agent. This enables industry-standard network management tools, (Cisco Works™, HP Openview™ etc.) to monitor the communications status of the eLAN-SNG and devices connected to it.

Hard/Flash Disk

LINUX can operate with a hard or flash disk. This holds program and data files. Updates can be downloaded using File Transfer Protocol (FTP) from a central server site for configuration and firmware version management.





HMI Software

Operating System

The HMI runs under the Microsoft Windows NT™, or Windows 2000™ operating systems.

Protocol Encapsulation (Tunneling)

'IED Anywhere™' Client, is a Windows™ based package that runs on the same PC as the IED client application supplied by a specific vendor.

This emulates standard communications port functions expected by the application, thus enabling transparent, concurrent access to IEDs via the network environment.

Substation Explorer™

Utilising the Windows Explorer™ paradigm, Substation Explorer™ provides an intuitive user interface for browsing substation data either locally, within the substation, or remotely, across the network.

A major feature is true emulation of the Windows Explorer™ functionality, enabling composite folders of geographical or common 'data-type' information to be created by familiar, mouse-based 'drag-and-drop' methods. In addition, Special Application Folders provide advanced HMI and Internet functionality. Folders include:

Master Protocols Folder

Define a protocol (DNP-3, Modbus etc.) against a specific IED or RTU for data polling purposes.

Power Objects Folder

Configure system objects, (e.g. breakers, switches and meters) which can then be 'dragged and dropped' into single-line displays.

Single Line Folder

Configure single-line diagrams using Substation Explorer's™ 'Digital Map Board.' 'Drag-and-drop' Power Objects and live variables into the diagrams.

Trend Folder

'Drag-and Drop' key data points into Trend Folders and create live graphs, mixing digital and analog values as required.

Alarms Folder

'Drag-and-Drop' status or analog data points into the Alarms Folders, and set alarm triggers to create visual, audio and 'e-mailable' alarms.

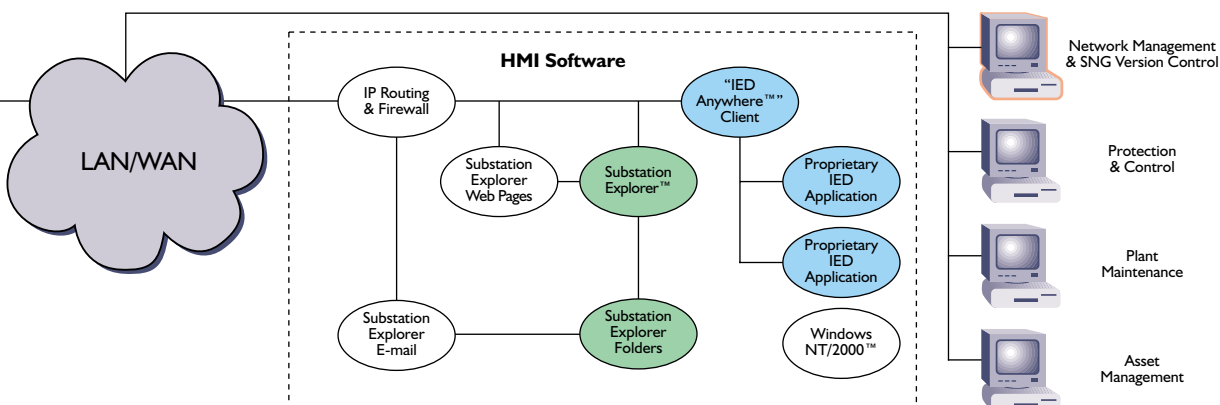
E-Mail Folder

Configure e-mail alarms by 'dragging-and dropping' alarm points into e-mail folders. Report alarms via customised e-mail texts to specified recipients.

Web Server

Make substation data available on the corporate intranet via a Web site built in minutes using Substation Explorer's™ Integrated Web Server.

Live data can be transported onto multiple web pages, complete with navigational hyperlinks.





Substation Network Gateway (eLAN-SNG), Applications.

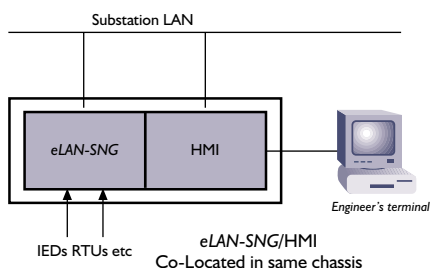


Fig 1 In its simplest configuration, the eLAN-SNG and HMI are co-located within the same Compact PCI Chassis. They communicate via the substation LAN.

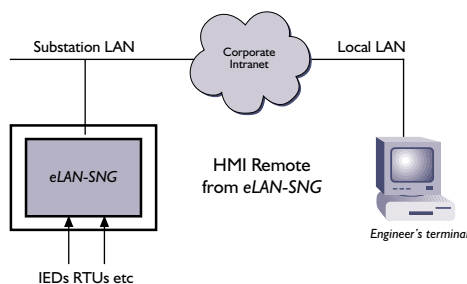


Fig 2 The HMI can be installed on a PC at a separate location. If set to run, Substation Explorer™ will notify the user of alarm conditions arising, transmit subsequent e-mails, update web pages etc.

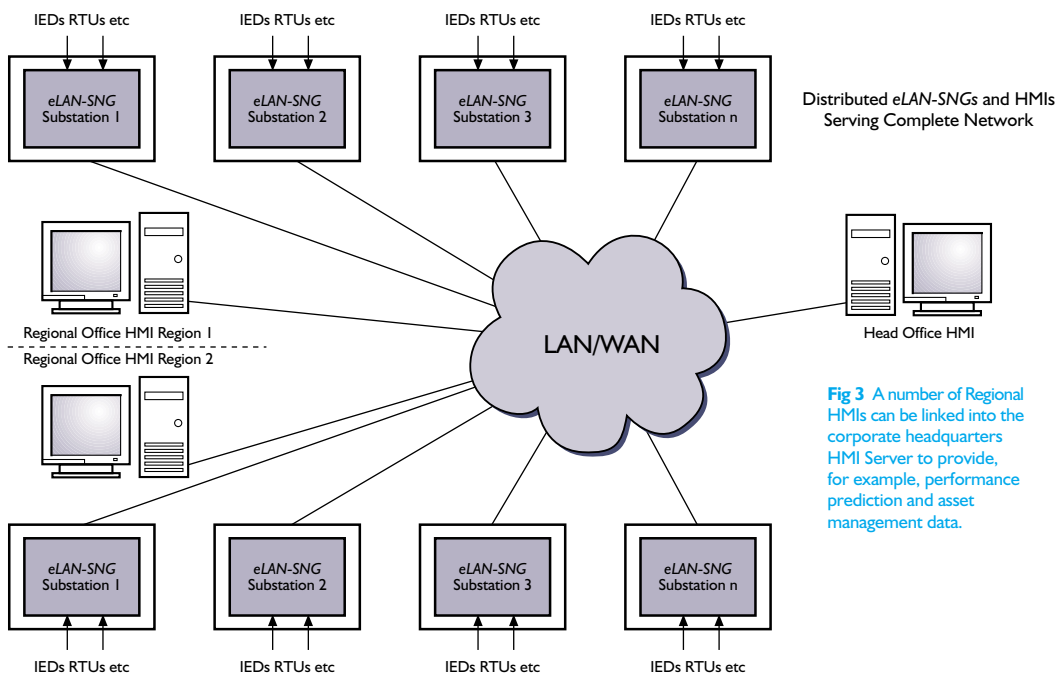


Fig 3 A number of Regional HMIs can be linked into the corporate headquarters HMI Server to provide, for example, performance prediction and asset management data.



eLAN-SNG Enclosure

Typical Specification for eLAN-SNG hardware.
 Rugged, compact PCI enclosure.
 Intel, Pentium™ processor, 266MHz.
 Up to 1Mb, level 2 cache Ram.
 Up to 384Mb Dram.
 Typically 20Gb hard disk.
 Full duplex 10/100Mbps Ethernet controller.
 Four serial ports (expandable in groups of 4 or 8).
 LINUX pre-loaded for eLAN-SNG application.
 Windows NT™ or 2000™ for HMI application.
 Power supplies available for 48Vdc, 125Vdc or 110/230Vac applications.

About RFL Communications plc.

RFL Communications plc specialises in the design and supply of communications systems for the demanding electricity generation, transmission and distribution markets, primarily utilising the products of RFL Electronics Inc. The company numbers many of the UK and Europe's major industry suppliers and utilities amongst its customer base.

From teleprotection links to turnkey communications systems, RFL Communications takes pride in its reputation for customer support through all stages of an order, from tendering through to commissioning and post-sales support.

To ensure that optimum solutions are provided at all times, RFL Communications works closely with a limited number of 'best of breed' partners. For the eLAN-SNG and complementary HMI, RFL Communications' partners include Bow Systems Inc. and Subnet Solutions Inc. Both companies have long and enviable reputations for the supply of innovative internetworking solutions linking SCADA/EMS and metering systems, LAN-based or legacy, over IP networks and the internet.

eLAN is a trademark of Bow Software Inc. IED Anywhere is a trademark of Bow Software Inc.

Substation Explorer is a trademark of Subnet Solutions Inc.

Windows NT, Windows 2000, Windows Explorer are registered trademarks of the Microsoft Corporation.

Intel Pentium is a trademark of Intel Corporation.

**For information on the eLAN-SNG, or any other RFL Communications product, contact RFL Communications plc
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Alternatively, contact may be made with the Agent/Distributor listed below.



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SUBSTATION NETWORK GATEWAY eLAN-SNG



The eLAN-SNG provides a ruggedised, cost-effective platform for the communication of data over IP networks from LAN-based, or legacy Intelligent Electronic Devices in substations.

