GENe Software Suite

Today’s utilities have complex requirements that need sophisticated solutions. GE Energy’s GENe provides these solutions. Using the latest advances in technology, the GENe software suite offers a cutting-edge approach to issues of security and reliability.

GENe-at-a-glance

GENe is a complete software suite that addresses the operational and control needs of any Electricity Generation, Transmission, or Distribution utility as well as those of Water and Gas Distribution systems. All GENe products are fully integrated into secure platforms based on the most advanced technologies and as such offer features that assist users to meet the utility’s security, reliability, and financial objectives.

A GENe SCADA, DMS, EMS, or GMS system alerts users to important events affecting the network. This allows them to react quickly to control the plant or network, minimize outages, protect network assets, and ensure public safety. The built-in decision support tools and automated control functions improve utility performance at all levels reducing operating costs and meeting regulatory and corporate objectives.

For Generation utilities, GENe includes forecasting tools as well as real-time control functions to manage the economic and network or plant performance needs and obligations.

For Transmission utilities, GENe includes network security analysis and optimization tools based on advanced power analysis methods.

For Distribution utilities, GENe includes Smart Grid applications to improve distribution reliability, reduce network operating costs, and maximize the investments in measurement, metering, control, and communication infrastructures.

For Water and Gas Distribution utilities, GENe includes applications to closely monitor and control utility assets and offer controlled access to system data.

For all utilities, GENe includes an advanced SCADA integration platform that fits seamlessly into your IT and control centre infrastructure using any of the standard interfaces available today such as: SOA, EAI, ICCP, DNP, IEC, ODBC, SQL, and others.

It also includes a Dispatcher Training Simulator for conducting tailored training using real network conditions, accurate network data, and real RTU responses in a “safe mode” environment.
The GENe SCADA integration platform is designed with the highest standards for reliability, security, and performance, and is used in many of the world’s largest and most secure utilities. Offering a throughput of 1 million-plus SCADA points with near zero data latency, this platform is a leader in the industry. With a wide selection of on- and off-site backup processes, any operational environment will be secure with reliability levels of 99.99%.

Benefits of a GENe control system go beyond controlling your network. It delivers improved network reliability, loss reduction, and safer operation. GENe supports your Smart Grid initiatives with improved business processes that are more closely integrated with enterprise applications.

**GENe SCADA**

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The SCADA platform supports a wide range of standard and non-standard protocols and will interface with any commercially-available RTU. Key benefits of the GENe SCADA integration platform include:

- Completely cross platform (Linux or Windows®) and can be deployed with a fully-internationalized User Interface.
- On-line database management facilities with comprehensive change order management.
- Advanced alarm facilities designed to attract users to the most important trouble conditions.
- Powerful calculation features and control command scripts allowing automated sequences to be constructed.
- Controlled and secure access to critical network information for corporate users via Web Server and remote access.
- Advanced historical data recording for calculations, reporting, or replaying network events.

![Typical substation one-line diagram.](image-url)
The GENe EMS includes the full suite of transmission network security analysis applications as well as optimization and forecasting tools. Part of this suite is the Application Sequence Controller used to co-ordinate application execution. GENe EMS applications are fully integrated with Nexant PCA Powersuite.

Separate or together with the SCADA, DMS, and/or GMS products, a GENe EMS solution will help transmission users realize the highest-level of network security, and assist them in scheduling plant or interchange transactions to meet their operational needs. The GENe EMS consists of a comprehensive set of modules that can be configured as a standard off-the-shelf offering or as a customized product to meet a specific need.

These EMS modules include:

- Load Forecasting and operations scheduling (units, equipment outages, interchange transactions, etc.). The Load Forecast application contains not only a Short-term Load Forecast (STLF) engine but also a Similar Day Tuning (SDT) application that calculates actual weights for the various weather variables influencing the load on a day type and season basis for a given load area.


- The Network Operations Scheduling (NOS) application provides the capability to execute a sequence of analysis and optimization applications such as contingency analysis and the two power flows on a set of time steps within a short-term horizon.
The GENe DMS product is the key component required to implement your Smart Grid distribution automation initiatives.

**GENe DMS**

The GENe DMS product provides utilities with a comprehensive suite of Smart Grid tools for efficient, reliable, and cost-effective management of distribution networks.

- Unbalanced three-phase Load Flow to add a high-level of visibility to the network state, including measurement corrections.
- Power Analysis tools to identify opportunities for network improvements, including Fault Level Calculations, Loss Calculations, and Network Optimization.
- Intelligent Switching Management tools and processes.

Like all GENe products, these modules are integrated into a common platform and work in a fully-synchronized manner. The DMS Model Management tools are a highlighted feature, supporting full and incremental model updates from commercial GIS products, ensuring that the DMS network model is always current and producing the best possible recommendations.

**GENe GMS**

The GENe GMS is used to monitor and control generation resources, either in an interconnected power system or a generation plant. It provides the flexibility to define network-wide control areas or one control area that only involves the generators within a plant. In addition to large power plant control, the GMS functions are suited to centralized power dispatch operations when integrated with other EMS security tools. This offers a complete solution such as Security-constrained Dispatch.

As utilities invest in Smart Grid solutions, including a broadly dispersed communication, AMR, and AMI infrastructure, the GENe DMS features make full use of this investment to improve customer reliability and reduce operation costs. Along with the built-in and comprehensive Outage Management System (OMS), the GENe DMS includes one of the most comprehensive suites of modules available on the market today, including:

- Unbalanced three-phase Load Flow to add a high-level of visibility to the network state, including measurement corrections.
- Power Analysis tools to identify opportunities for network improvements, including Fault Level Calculations, Loss Calculations, and Network Optimization.

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*Detailed Distribution Network Display*
The Generation Management tools include those for Automatic Generation Control (AGC) Control and Performance Monitoring, Economic Dispatch, Production Costing, Reserve Monitoring, and AVC. The GENe GMS specializes in capacity and economic optimization and control. It also contains advanced scheduling features for all operations planning.

The Security-constrained Dispatch (SCD) application can be executed in an unconstrained mode to produce results consistent with the conventional ED. The SCD program is capable of minimizing costs while respecting line transfer limits and reserve requirements.

The AGC application controls generating units within each operating area in real-time. Its load-frequency control function derives its dispatch information from the Economic Dispatch (ED/SCD) application.

The ED/SCD application determines the real-time economic loading of generating units necessary to achieve the minimum production cost.

The Production Cost Monitor (PCM) application calculates and monitors the real-time costs of both generation and operating constraints so as to be able to compare actual costs to the optimum production costs calculated by ED.

The Reserve Monitor (RM) application calculates and monitors MW reserves within each operating area. It also imports the results of the NAS Reactive Reserve Monitor, if available, in order to co-ordinate the display of both the real and reactive reserves in the network.

The Automatic Voltage Control (AVC) application controls the voltage of a bus section upon request by a dispatcher and includes validation, monitoring, and execution. The control can be carried out on individual generators or on the set of generators in collective mode so as to reach the target voltage/MVARs while minimizing current circulation.

The Operations Planning tools assist users in scheduling future system operations. The tools within Operations Planning are:

- The Interchange Transaction Scheduling (ITS) application provides the capability of entering and monitoring various types of interchange transactions between Interchange Areas.

- Hydro and Thermal Unit Commitment (UC) and Hydro-thermal Co-ordination (HTC) applications schedule the commitment of hydro generating units and thermal generating units respectively in order to meet the hourly demand in the most efficient manner (minimum generation costs, minimum number of start-ups, etc.). GENe GMS includes a comprehensive model for complex cascading hydro generation schemes and river basins.

Contact us to find out how you can benefit from the innovative GENe software suite.