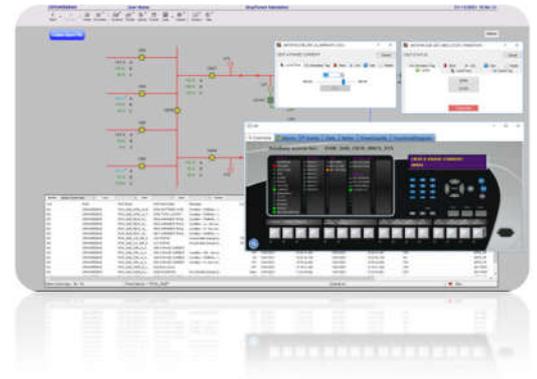




PowerLink Connect

Migrating to PowerLink Connect: Benefits and Migration Planning Guide for PowerLink Advantage Customers



Introduction

This document is for GE PowerLink Advantage Customers. It is intended to provide customers with an overview of the key differences, advantages and benefits provided by the new PowerLink Connect.

PowerLink Connect is a substantial improvement over PowerLink Advantage in terms of functionality, ease of use, performance and reliability. This is in part due to major advancements in the underlying CIMPLICITY software platform, and in part to major new facilities provided by the new PowerLink Connect.

Upgrading from PowerLink Advantage to PowerLink Connect requires migration of your database, screens and other configuration details to the latest supported standards. Automated migration tools are offered as a service, making this process as fast and cost-effective as possible. Importantly, this migration process preserves the integrity of your existing PowerLink Advantage database.

PowerLink Connect Overview

PowerLink Connect is an intelligent solution designed for organizations in need of safe, efficient and reliable power delivery. PowerLink Connect enables real-time electrical infrastructure data collection and display with standards-based communication and secure operator supervisory control.

PowerLink Connect enables centralized monitoring and management for distributed electrical infrastructure. PowerLink Connect connects and communicates with all equipment and smart power devices in your facility and brings together display, control and reporting functions under one easy-to-use interface, providing a dynamic window into your electrical network.

PowerLink Connect is an open, standards-based solution that's intuitive to configure and easy to own. It's scalable from smaller point count systems (5,000-10,000) to larger, complex electrical networks (100,000+ points). With intuitive operations and simplified maintenance, PowerLink Connect enables you to ensure optimal operational and electrical performance.

Key PowerLink Connect Features:

- Real-time, dynamic data collection and display
- Remote and secure operator supervisory control
- High availability architecture
- Scalable – add more device monitoring points as needed
- Manufacturer agnostic (non-GE) equipment integration (supports a range of IED's)
- Alarm & event management
- Historical data storage, trending and reporting
- Mobile / Web-enabled operations

Key PowerLink Connect Benefits:

- ↑ Reliable, secure and auditable operations
- ↑ Enhanced operational decision making & safety
- ↑ Increased productivity & accountability
- ↑ Improved operations efficiency
- ↑ Extended equipment life
- ↓ Lower total cost of ownership
- ↓ Reduced configuration & training time
- ↓ Reduced downtime & equipment maintenance

PowerLink Connect vs PowerLink Advantage: Key Differences

PowerLink Advantage has been a robust and versatile energy distribution and substation management solution for many years. It is utilized around the globe and has served customers tirelessly and reliably. However, technology doesn't stand still and GE Grid Solutions has been working hard to improve upon PowerLink's capabilities as well as the underlying technology reliability and performance.

PowerLink Connect surpasses PowerLink Advantage in a range of categories. It offers substantial improvements in functionality, ease of use, performance, data management, equipment control, security and more. Let's examine some of the fundamental ways that PowerLink Connect has improved upon PowerLink Advantage:

Menu Navigation / Ease of Use

Intuitive menu provides familiar navigation functions such as "Home", "Forward", "Back" and "Favorites". Highly configurable, PowerLink Connect Menu is easy to use and flexible. Integrated security links screen access to user authentication (only screens operators are authorized to access are visible).

Tab Displays

PowerLink Connect provides powerful, centralized equipment monitoring and control interfaces known as Tab Displays. These are one-stop containers for all relevant information and controls for substation equipment. They are consistent and familiar, making HMI substation operations more intuitive and easier to learn. Tab Displays are totally customizable to your operational standards and requirements.

Operator Dialogs

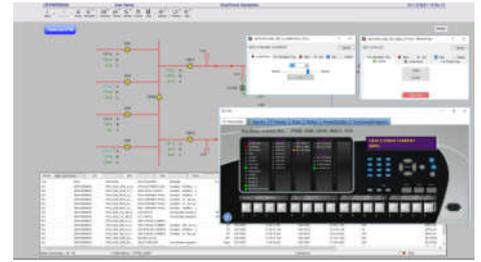
All SCADA operations such as issuing a control, placing a control tag, attaching an equipment note, disabling an alarm, etc., are achieved using Operator Dialogs. This provides consistent and intuitive operations. Each type of field device has an Operator Dialog specific to its operational needs. PowerLink Connect dialogs require no programming and are easily configured to meet all operational requirements.

Secure Control

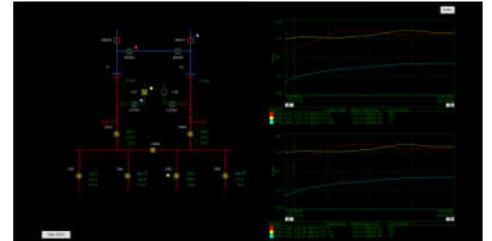
PowerLink Connect provides enhanced security options and configurable user and group role-based security. Security configuration allows access and operational permissions to be set for individual users and for user groups. Furthermore, PowerLink Connect has an operator access and change log to audit operations and aid in security reporting.

Dynamic Configuration

PowerLink Connect provides the powerful ability to make maintenance changes on a running server without requiring a restart of the server. Standard operations such as adding new points, creating new objects, adding and modifying alarms, adding and modifying scripts can all be performed dynamically while the server is running. Screen changes can also easily be modified while the system is running. A deployment mechanism is provided to enable easily updating the screens on remote viewers without impact to the system or the operator. The ability to perform these modifications on a running system for maintenance purposes contributes significantly to maintaining the high availability of PowerLink Connect.



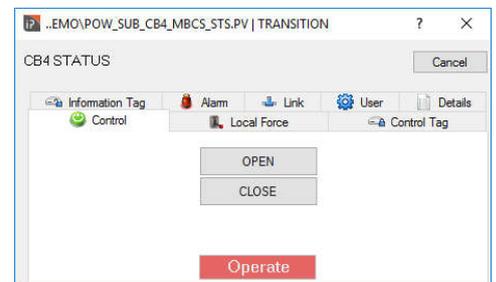
Full SCADA functionality with real-time data acquisition & control



One-line screens for monitoring status, control and tagging



Tab Displays provide centralized, consistent control interfaces for all types of substation equipment and IEDs



Operator Dialogs enable controls such as disabling alarms and opening or closing circuit breakers

Equipment Attributes

Attributes provide easy to understand, high-visibility indicators for equipment conditions. They are informative graphical cues that can be designed and configured to meet your operational preferences. Attributes can indicate the presence of control tags, information tags, off scan, local force applications or disabled alarms.

Control Interlocking

PowerLink Connect provides powerful logic-based control interlocking to prevent equipment operations when specific conditions are not met. Interlocking can be used to prevent harm to personnel on site when working on equipment by preventing operations that might make equipment go live during maintenance. It also protects electrical hardware by ensuring it is not subject to undesirable electrical loads. Interlocking includes graphical logic diagrams to illustrate why operations are blocked and what steps are not aligned to enable operation.

Alarm Management

Central to the role of the operator is quickly identifying and addressing exception conditions within the system. PowerLink Connect provides a multitude of alarm notification and management functionality to increase operator awareness, decrease response time and improve system reliability.

- Visual and audible notification
- Historical logging
- Millisecond resolution time stamping
- Group, area and priority categories
- Advanced filtering and sorting

Events List

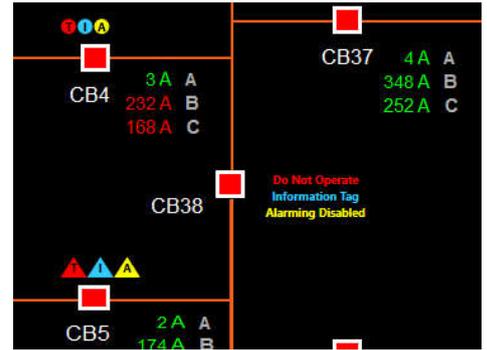
The Event List is a comprehensive and permanent record of management activity including:

- A permanent, searchable, chronological record of operator actions and activity
- Advanced filtering
- Quick filtering on location and device
- Display historical events from any period
- High resolution sequence of events with millisecond accuracy to determine the exact sequence that critical changes have occurred
- Operators can record comments about events
- Operators can enter messages into events
- Auditing of operator actions for security and accountability

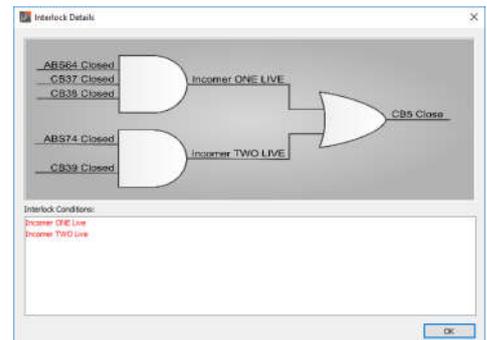
Open and Connected Communications

PowerLink Connect enables you to leverage your existing investments as well as future proofing the new devices you may choose tomorrow. PowerLink Connect is built on an open, layered SCADA architecture. With support for hundreds of drivers off-the-shelf, including, DNP 3.0, IEC 61850 and many others; and full OPC client and server support, PowerLink Connect is a truly open, vendor-independent solution that's flexible and interoperable – translating into real value.

- Proven communications software for hundreds of brands of RTUs, IEDs, PLCs and other I/O devices
- Industry standard communications protocol compatibility for DNP 3.0, IEC 870-5-101, 870-5-104, ICCP, IEC 61850
- Full OPC server and client support
- Multiple simultaneous serial and/or Ethernet communications channels
- VisiconX SQL wizard



Attributes provide clear indicators of equipment conditions



Intuitive Interlocking logic control diagrams

Alarms List increases operator awareness, decreases response time and improves system reliability

Standard Lists and Reports

- Alarms
- Events
- Sequence of Events
- Off-Normal
- Dynamic database display
- Control tag
- Information tag
- Local Force
- Off-Scan
- Disabled alarms
- Operator notes

Migration Process

Migration of your existing PowerLink Advantage databases to the new class/object based PowerLink Connect database structures is provided as a service: We provide you with the converted database and other configuration files, produced from a copy of your current Powerlink Advantage system delivered to us. Migration is done using proven software migration tools, that deliver a level of accuracy and confidence that is unachievable by any process requiring manual data manipulation. Automated conversion provides:

Upgrading to the new PowerLink Connect database structures is automated using proven software conversion tools, delivering a level of accuracy and confidence that is unachievable by any process requiring manual data manipulation.

- A new database with your chosen structured point naming. PowerLink Connect supports point names up to 132 characters long, with up to five part names. An example of a naming structure with four names parts would be Location_Device_Type_ID , i.e. SUB5_CB3_AI_AMP5A
- Classes for common point types such as Analog Input or Digital Output. The Class/Object database structures within the new PowerLink Connect system facilitate the fast production of well-structured and consistent systems. The classes delivered by automated conversion will facilitate your ability to extend your system in the future in a consistent and reliable way.
- Conversion of existing DNP3 driver configuration definition
- Conversion of existing Interlock definitions
- Conversion Reports:
 - 1) Log showing mapping of each old point name to each new point names, and all old and new attributes and their values.
 - 2) List of points where conversion encountered an error. For example an invalid alarm limit, such as a limit outside engineering range, or a HI limit lower than a LOW limit.
 - 3) Lists of points not converted.
 - 4) A summary of the total number of each type of point converted and number of points not converted

Automated database conversion using software tools delivers a very high level of confidence in the updated system, minimizing the cost of the upgrade process.

Automated migration service does not convert existing screens. However PowerLink Connect provides tools to quickly and easily produce a powerful HMI environment, including for example:

- A single navigation menu for the entire system.
- Tabular lists for alarms, events, data summaries and more
- Tab displays for complex devices

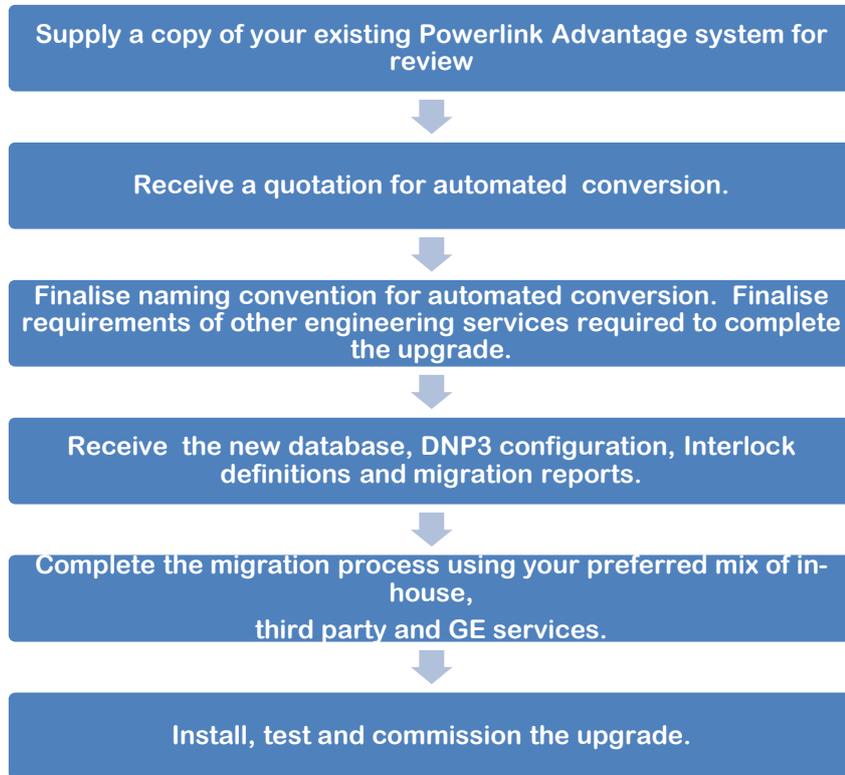
Some important HMI facilities require negligible configuration in the new PowerLink Connect environment. An example is the many dialogs needed for safe and secure operator control. These require no individual programming or configuration. Other configuration components not covered by automated migration are:

- Scripts
- Security database containing user logons

Please enquire about services available to complete your migration process.

Automated conversion service is typically offered for a fixed price. Pricing can be finalized after we review your existing Powerlink Advantage system.

Migration Process Overview



Migration FAQ

- 1) What is required to get a fixed price quote for automated conversion?
 - We will need to review a copy of your current Powerlink Advantage system assess its suitability for conversion. This can be provided either as current CIMPLICITY project and PLA project export, or even better a VMWare of the complete system. Please contact us for exactly how to provide one of these options.
- 2) What is required from us to undertake automated conversion?
 - A copy of your current project
 - Agreement on your preferred naming convention for the new system
- 3) What will be delivered to us from the automated conversion process?
 - Your database, converted to be compatible with current PowerLink Connect
 - New DNP 3.0 configuration files, generated from your existing DNP 3.0 configuration as supplied to us, compatible with our DNP3.0 driver for PowerLink Connect.
 - Interlock definition files, generated from your existing interlock definitions as supplied to us, compatible with Interlock definitions for PowerLink Connect.
 - Conversion process reports
- 4) What happens if the automated conversion process finds errors
You will be provided with reports produced by the conversion tools that details conversion errors. Common error types are:

- Systemic, repeated errors in the original Powerlink Advantage system. For example the A-phase current HI alarm will be zero in all cases.
 - Inconsistent point names in the original system.
 - Simulated points needed in Powerlink Advantage that are not required in PowerLink Connect.
- Error correction is typically a straight forward process that we can provide as a service if required.

5) What is not provided by the automated conversion process?

- Screen updates
- Scripts
- Security database containing user logons

6) Can we purchase a complete, turn-key migration?

Yes. GE or our qualified partners can provide a complete migration service. Please contact us to discuss your requirements.

7) What version of PowerLink Connect configuration will be provided?

Unless otherwise agreed, we will supply the current release version of PowerLink Connect. At the time of printing this is version 10.0, running on Proficy Cimplicity 10.0, supported on the current releases of Microsoft operating systems.

Contact Us to Plan Your Migration

Please contact us to discuss your upgrade requirements and tailor your migration.

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System Requirements

Requirement	Specification
Supported Operating Systems	Note: Machines can be 32-bit or 64-bit Microsoft® Windows® Server 2019 Microsoft® Windows® Server 2016 Microsoft® Windows® 10
Computer & Processor	CPU: Intel® Core 2 Duo 3.0 GHz (minimum) Installation: DVD drive
Memory	RAM: 4 GB (minimum)
Hard Disk	HDD: 40 GB (minimum)
Display	SVGA or better color graphics monitor, 24-bit graphics card capable of 800x600 resolution (minimum)
Connectivity	Ethernet adapter One parallel port or free direct-connect USB port. (for license keys) Some touch screens, pointing devices, and I/O drivers require a serial port Additional ports for I/O hardware.

Note: Actual system requirements also depend on what features are included beyond the base system (e.g. whether or not data logging is enabled, application size). Therefore, it is strongly recommended that you test your particular system for performance needs to determine what hardware is appropriate above the base system recommendations.

PowerLink Connect At-a-Glance

Solution	Description Key Features	Outcomes Key Benefits
Real-Time Equipment Monitoring	<ul style="list-style-type: none"> Real-time, dynamic data collection and display (one-line / 3D graphics) Unlimited device connections & communication Supports: meters / PLC / generators / PDU / trip units & more Monitors: RMS current & voltage / KW & KWh / events / alarms & more Widescreen, multi-monitor support, mobile device and Web-enabled operator interfaces Secure, supervisory control of devices & operations Prioritized alarms, precision sequence of events, centralized monitoring of operations Vendor agnostic equipment support; works with anything Redundant system architecture ensures reliable operations Wide range of supported device communication protocols, including: BacNet, Modbus, IEC 61850, DNP3 	<ul style="list-style-type: none"> Secure oversight of facility operations & energy usage High availability, reliable services Scalability to add equipment as required without additional costs, & freedom to choose your preferred supplier Flexibility to monitor & control operations from anywhere Proven solution backed by industry-leading support and consulting services for dependable peace-of-mind Easy-to-use, familiar and intuitive operator interfaces enhance efficiency and improve day-to-day operations Active, ongoing system development ensures future-proof operations and real return on investment (ROI)
Mobile Device & Web-Based Operations	<ul style="list-style-type: none"> Realtime operational intelligence (RtOI) accessible anytime, anywhere Secure operator login access from any location via any Web-enabled mobile device 	<ul style="list-style-type: none"> Place key information in the right hands at the right time Enhance decision making and improve operations Access operational data from anywhere and with any device, enable greater freedom and flexibility for operations
Big Data Energy Analysis & Trending*	<ul style="list-style-type: none"> High performance, 'Big Data' archiving and reporting solution Collection, archival and storage of large volumes of data from multiple sources into workable database structures Collation and formatting of disparate data structures into a single framework - turns big data volumes into meaningful, actionable information 	<ul style="list-style-type: none"> Delivers meaningful context for vast amounts of raw data from across your operations Aggregates islands of information for true process visibility and feeds higher-level operations management systems with accurate, real-time information Enterprise performance & scalability
Intelligent Process Automation	<ul style="list-style-type: none"> Automated control of devices and services Open/close breakers Intelligent load management Automated shutdown or startup processes Specialist GE consulting and development services to customize automations processes 	<ul style="list-style-type: none"> High availability services with near-zero downtime Streamlined operations in complex environments Millisecond response to 'off-normal' situations with prescribed automatic procedures Optimal operations efficiency, sustainable competitive advantage, improved return on investment and advanced cost savings

For more information, visit: www.catapultsoftware.com

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