



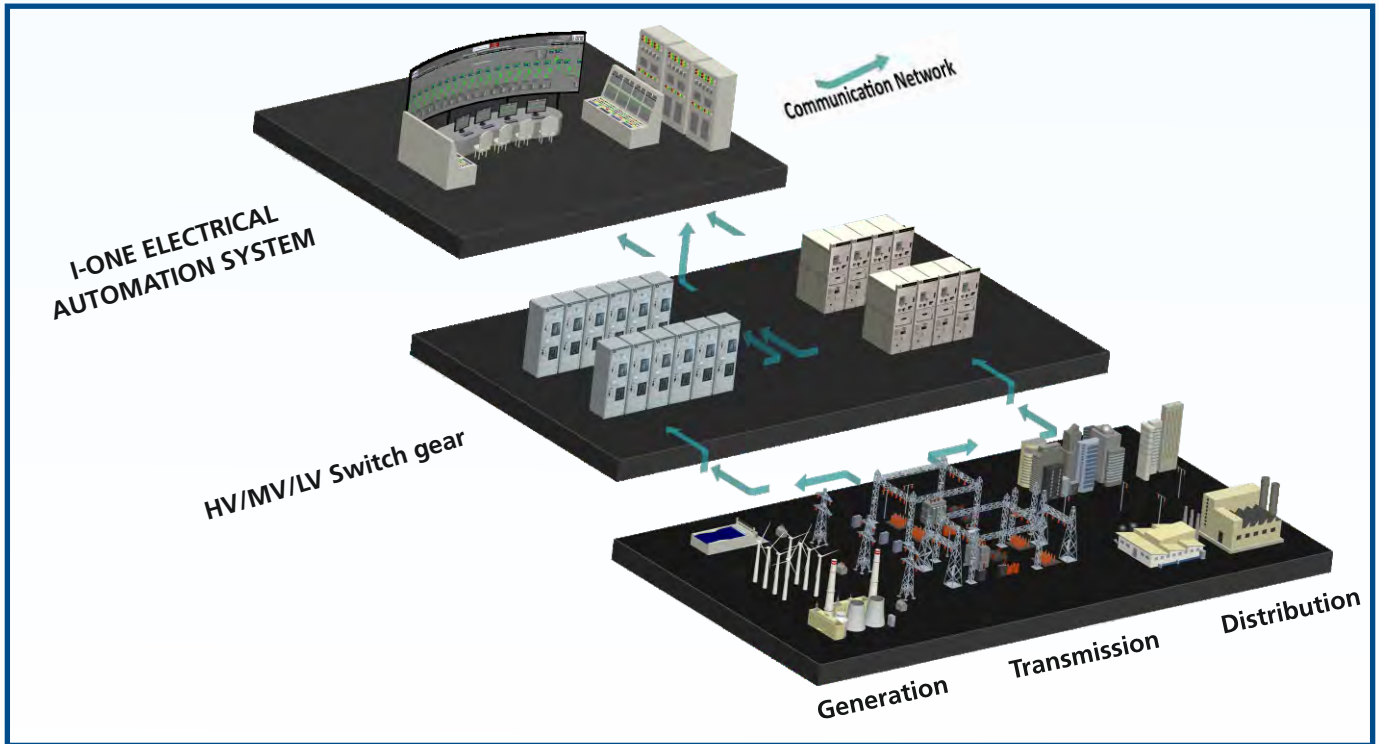
L&T Electrical & Automation (E&A) offers a wide range of advance solution through its state-of-the art product and systems. Backed by world class in-house capabilities in technology development & customer support, E&A's product and systems are geared to offer complete customer satisfaction.

With several years of industrial experience, we, as in E&A's '*Relays & Integration Solutions (R&IS)*' provide a one stop solution for all Substation Automation needs. With growing track records of contributing towards successful, intelligent Low & Medium Voltage solutions, we can offer most up-to-date Data Concentrator / CCU / SCADA / PLC based integrated substation automation solutions over a wide range of communication protocols.

“one stop solution”



I-ONE ELECTRICAL AUTOMATION SYSTEM



I-ONE Electrical Automation System is also known as Integrated Power Management System (IPMS) / Power Management System (PMS), typically includes Integrated Protection Control & Monitoring System (IPCMS), Generator Management & Load Sharing System (GMLS), Load Shedding System (LSS), Electrical Asset Management System (EAMS), Fault Management System (FMS). Depending upon the project requirement any combination of the above modules can be chosen. I-ONE integrates IED's with the centralised control system. I-ONE

solutions are typically used in industry segments such as **Oil, Gas, Steel, Cement, Electrical & Water utilities and Data Centers**. Based on the information received from remote stations, automated or operator-driven supervisory commands can be pushed to remote station control devices, which are often referred to as field devices. Field devices control local operations such as opening and closing of contactors and circuit breakers, collecting data from sensor systems, and monitoring the local environment for alarm condition.



VERSATILE COMMUNICATION GATEWAY FOR ELECTRICAL FACILITIES



Overview

iLT-G series products are specialized communication units for electrical facilities that require data conversion between different protocols.

Data from multiple devices (meters, protection relays, and other IEDs) may be acquired using field protocols (IEC60870-5-101/102/103/104, IEC61850 (MMS & GOOSE), DNP3.0, DLMS, Modbus, etc.), processed and transferred to a Control Center using IEC60870-5-104/101, IEC61850, DNP3.0, and Modbus RTU/TCP protocols.

The basic configuration (iLT-G3) includes four (4) RS232/RS422/RS485 serial ports and two (2) Ethernet 10/100BaseTX port (RJ45).

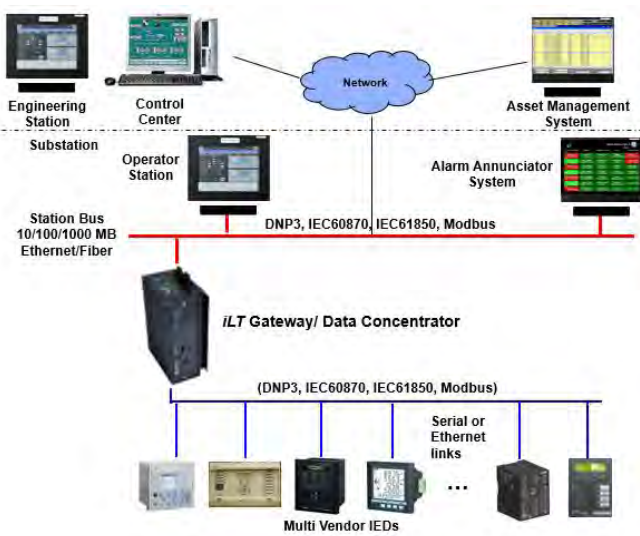
Highlights

- From data concentration to protocol conversion, iLT gateway can act in any kind of control or automation system, especially in generation plants or high voltage sub-stations, using any kind of communication protocol and media.
- Availability of a wide range of protocols including IEC60870-5-101/102/103/104, IEC61850, Modbus RTU/TCP, DNP3.0, DLMS, Procome and Profibus DP.
- Multiple communication media options, from serial ports to ethernet or fiber optic with ST/SC connectors, or SFP modules.

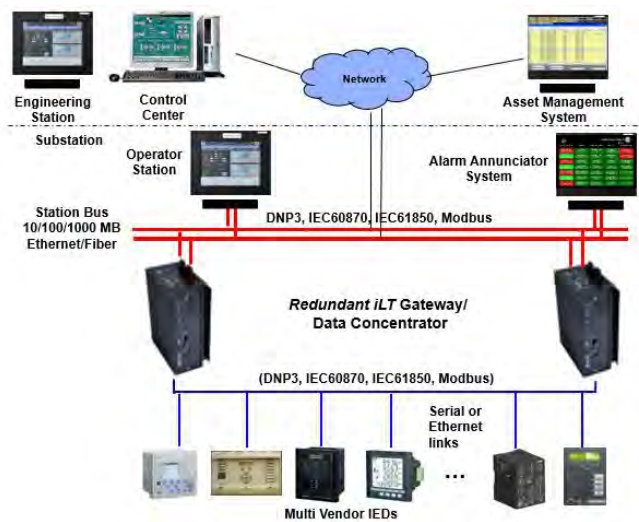
Features

- Multiple simultaneous control centers, with one or more communication protocols.
- IEC61850-3 EMC compliant.
- iLT-G models come with a full range of protocols including IEC60870-5-101, IEC60870-5-104, IEC61850 MMS client/server, IEC61850 GOOSE publisher/subscriber, Modbus RTU/TCP, DNP3.0 (serial and TCP), among others, in order to ensure the communication with new and legacy IEDs and SCADA master stations.
- Meter connection with DLMS, IEC62056-21 and IEC60870-5-102 protocols.
- Protection relay connection with IEC60870-5-103, Procome, Profibus and IEC61850 (MMS and GOOSE) protocols.
- IEC61131-3 PLC automation programming.
- Real time processing with 1ms accuracy.
- Real time clock with 1.5ppm time drift.

ARCHITECTURE

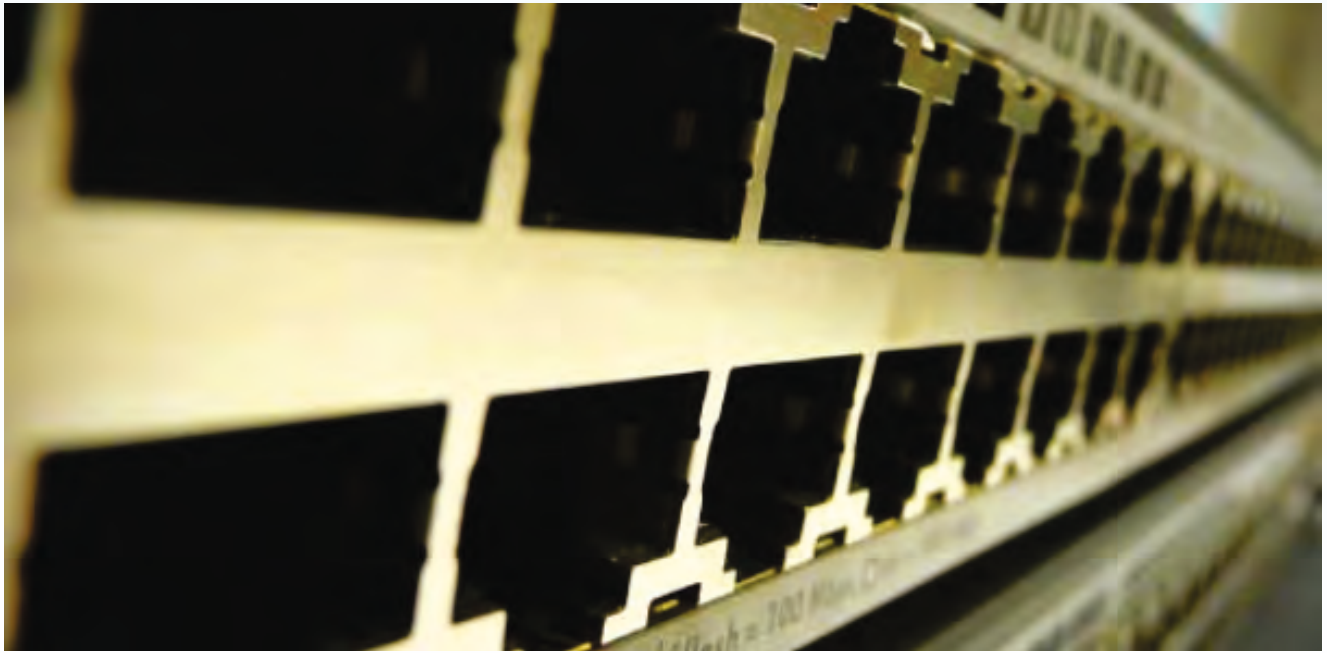


Standalone Gateway Typical Architecture



Redundant Gateway Typical Architecture

E&A's MANAGED ETHERNET SWITCHES



LT 2X Series

LT 1X Series

- LT 20GF
- LT 20G



- LT 22GF



- LT 26G
- LT 24G



- LT 28G



- LT 10G

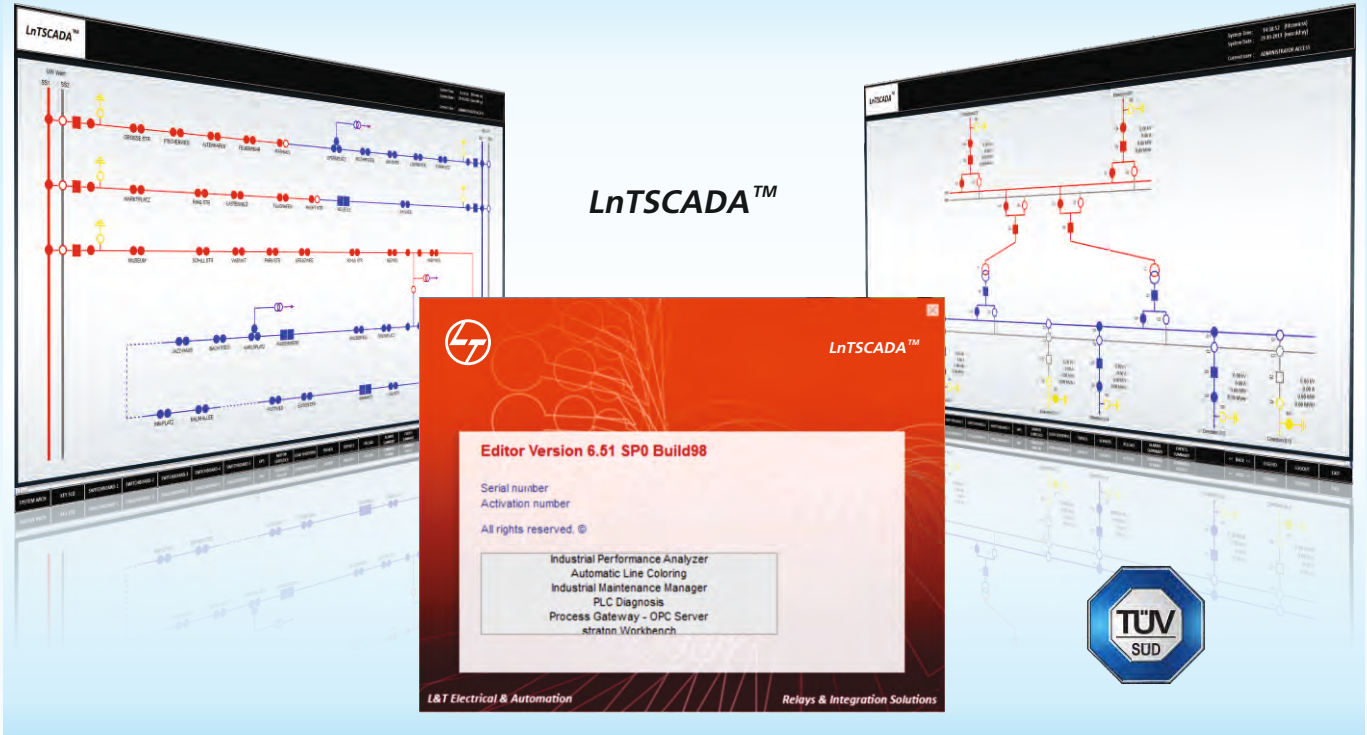


FEATURES

- Rack/Din Rail mount design with field changeable line modules
- Hot-swappable power supply modules
- Slots for fast Ethernet and gigabit line modules & High Capacity uplinks (4 x 10G Copper or Fiber)
- Mixed power, single input 120-370VDC or 85-264VAC with additional 10 - 48VDC backup
- IEC 61850 & IEEE 1613 Compliant
- Fortified for IEC61850 & IEEE1613
- IEEE 1588 PTP v2 – Precision Timing Protocol time synchronization (TBD)
- IEC62439 Redundancy using HSR and PRP modules (TBD)
- i-Ring, RSTP, MSTP
- RIP, OSPF, VRRP, PIM-SM and PIM-DM, MPLS
- Multimode or Singlemode SFP (LC Based)



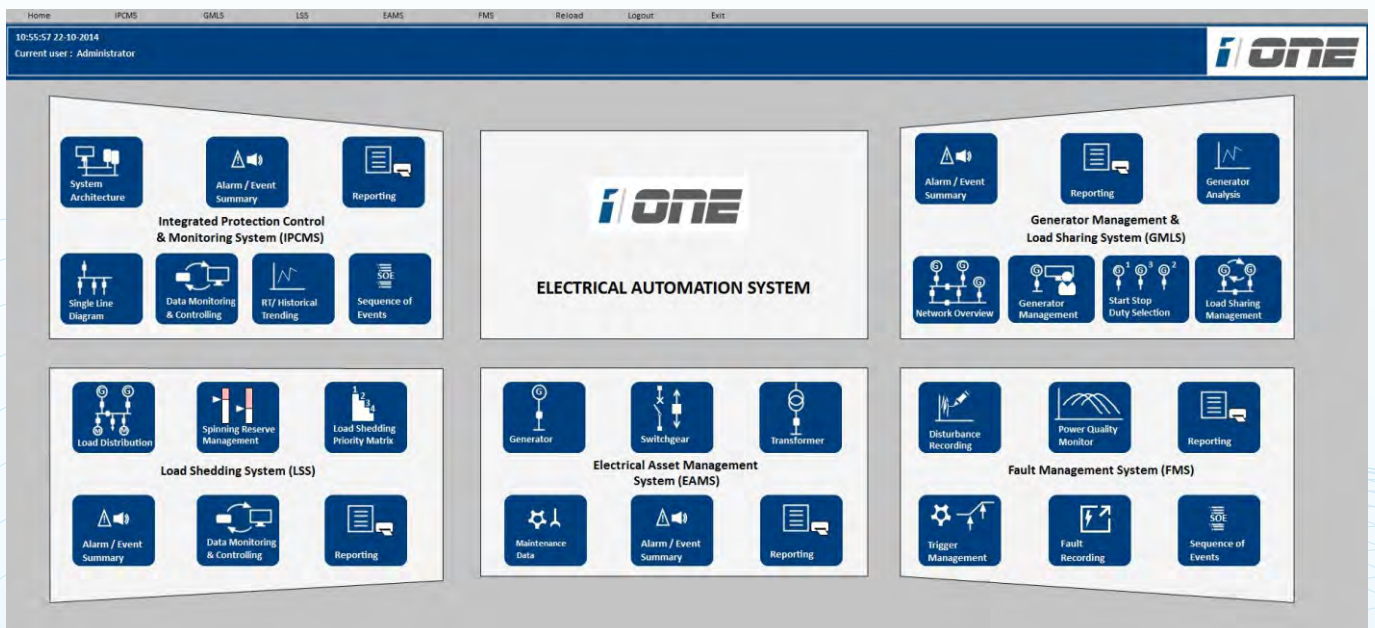
I-ONE ELECTRICAL AUTOMATION SYSTEM - SCADA SYSTEM



I-ONE system use LnTSCADA platform for remote monitoring and controlling. It allows users to monitor an entire plant or individual pieces of equipments and processes by collecting real-time data from various devices throughout a network. It is very important for organizations to monitor these network activities, as doing so informs them of the problems with their mission-critical processes. By monitoring these processes, organizations can quickly respond when there are problems within their network.

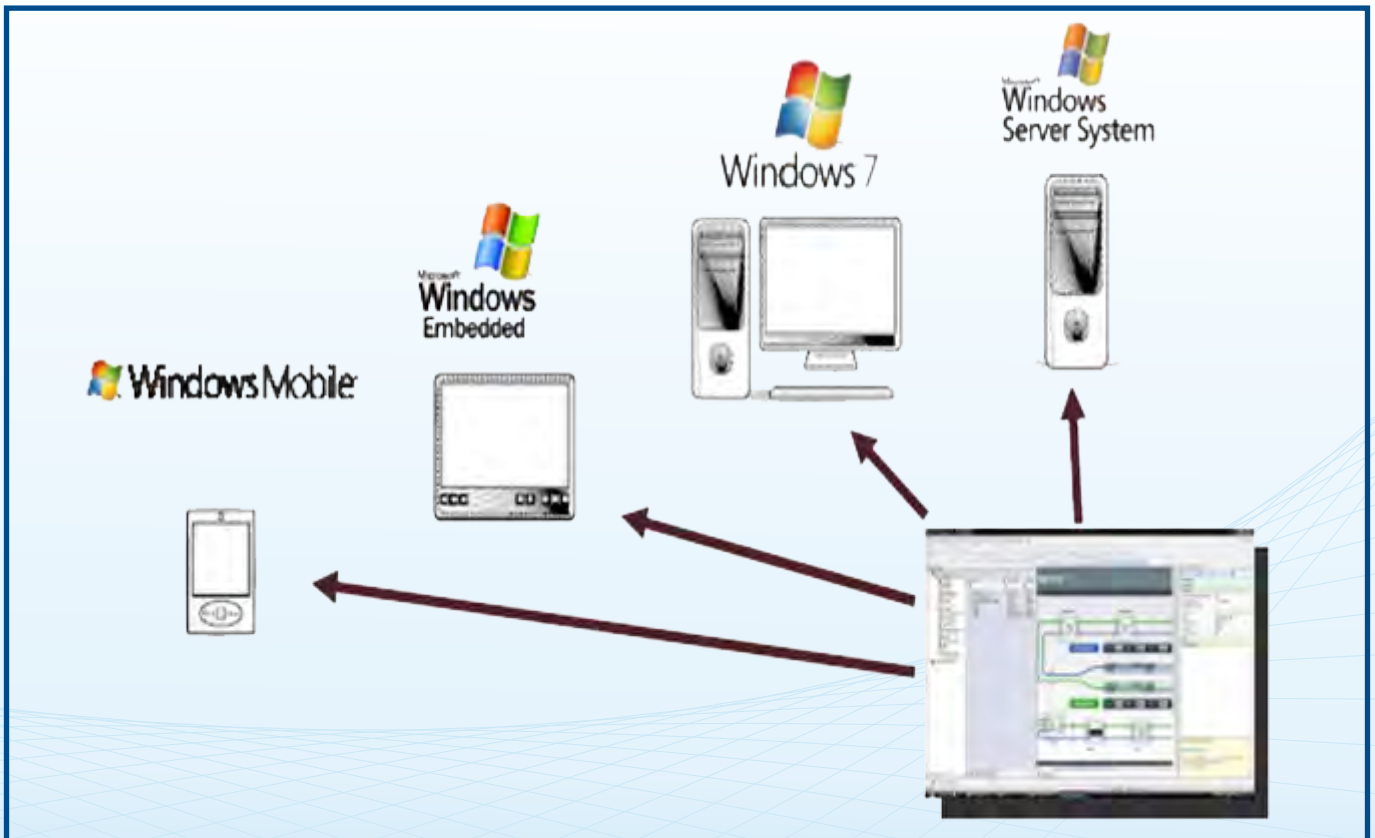
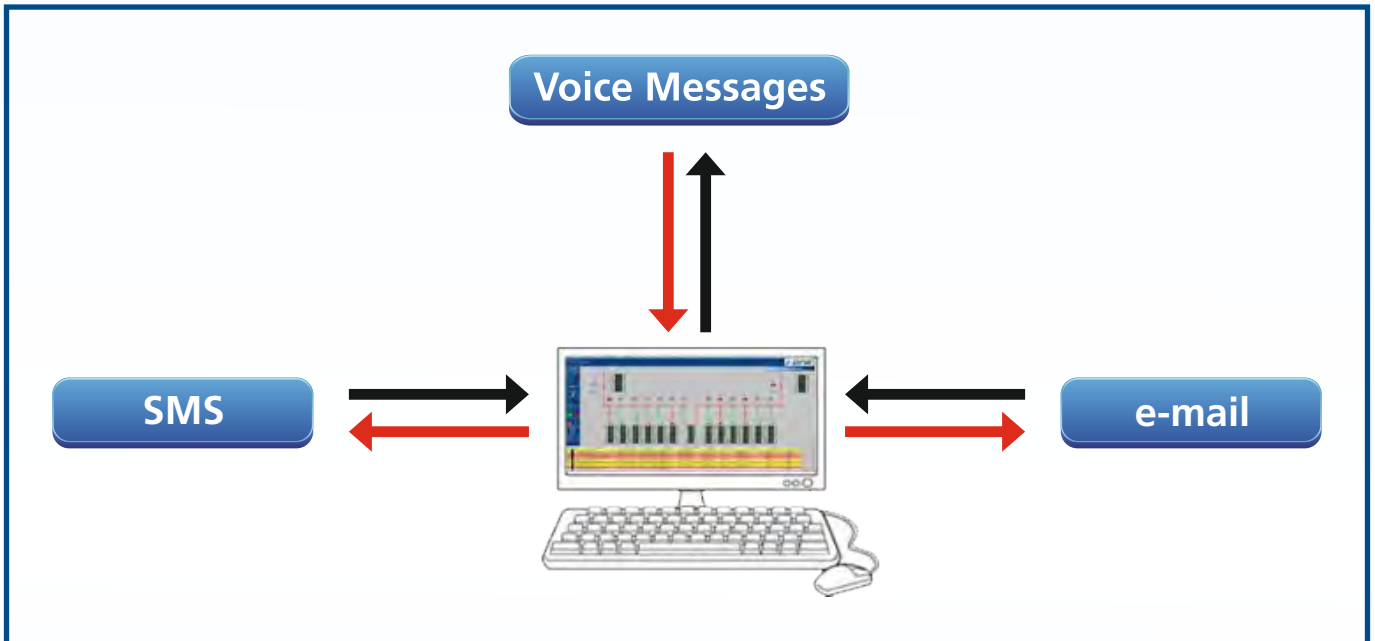
LnTSCADA™ is reliable, flexible and high performance monitoring and control solution designed to collect, record, store, analyze and present data collected from devices such as numerical relay, multi function meter, UPS, VFD, battery bank, DG, GTG etc. by using available standard modules (IPCMS, GMLS, LSS, EAMS, FMS). LnTSCADA™ comes with IEC 61850 driver & supports 1000+ additional equipment drivers.

It also comes with soft PLC module ,which supports IEC 61131 programming language. Easy-to-use configuration tools and powerful features enable faster development and deployment of any size of application.



KEY FEATURES

- Alarm Administration
- Chronological Event List
- Native communication drivers
- Diagnosis Viewer
- Extended Trend
- Historian
- Language Switch in Runtime
- Logic Workbench - IEC 61131-3 Compliant
- Network Management
- PLC Diagnosis
- Graphical symbols as per IEC 60617
- WebServer
- Secure command processing
- Targeted & Individual notification
- ActiveX, VBA developer wizards

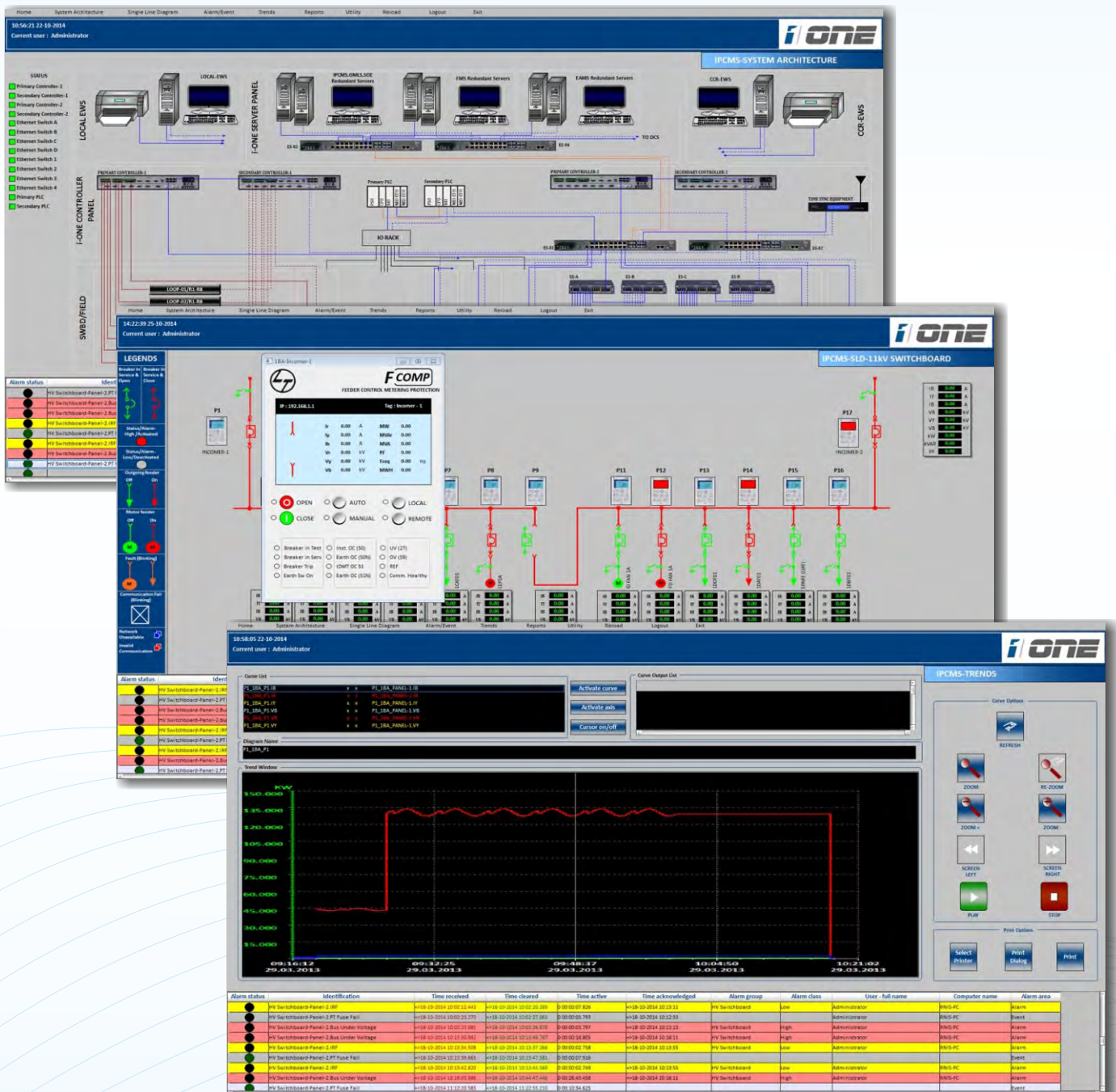


INTEGRATED PROTECTION CONTROL & MONITORING SYSTEM (IPCMS)

IPCMS- Integrated Protection Control & Monitoring System also known as EMCS ,SCMS,ENMS,ELICS. It integrates IEDs , situated at various location such as LV ,MV, HV Switchboard, UPS, APFC ,HVAC system etc ,with the centralised control system.

KEY FEATURES

- Data acquisition, monitoring & control
- Alarms & Events Management
- Distribution Network Control
- Real Time Monitoring
- Offline Simulation & Online Debugging
- Dynamic Trend Element
- Energy Reporting
- Online Analysis Tool

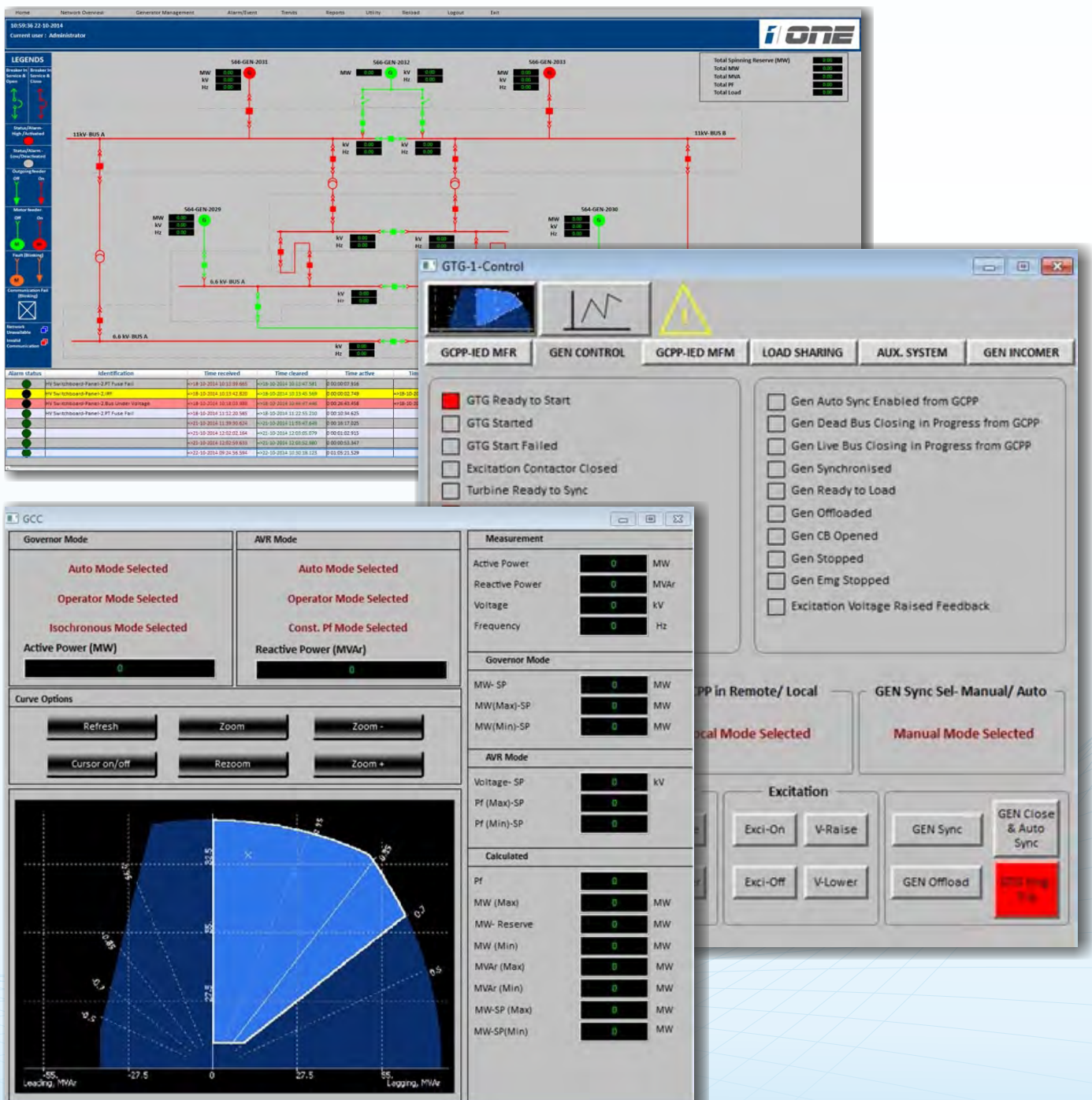


GENERATOR MANAGEMENT & LOAD SHARING SYSTEM (GMLS)

GMLS- Provides generator control & monitoring ,parallel operation management, load management, load sharing control and synchronisation.

KEY FEATURES

- Generator control & measurement
- Start & Stop Duty selection
- Spinning reserve management
- Active and Reactive load sharing
- Generator and group synchronisation
- Frequency and power control
- Alarm/SOE
- Report



LOAD SHEDDING SYSTEM (LSS)

I-One LSS module provides facility to switch off/ trip the non critical load ,during loss of generation or fault in power plant , in order to establish balance in the power network.

KEY FEATURES

- Power based fast load shedding
- Gradual load shedding
- Frequency based load shedding
- Load shedding priority matrix
- Spinning reserve calculation
- Alarm/SOE
- Report

The screenshot displays the I-One LSS software interface. At the top, there is a navigation menu with options like Home, Network Overview, Generator Management, Alarm/Event, Trends, Reports, Utility, Reload, Logout, and Exit. The current user is Administrator, and the time is 12:59:33 25-10-2014.

The main window is titled "LOAD SHEDDING PRIORITY TABLE". It contains a table with columns for Load Tag No., Switchboard Tag No., Description, Loadshedding Block Priority, Current, Set, Feeder Status, and Feeder Status. The table lists various loads such as MCKRIF, SOLID WASTE INCINERATOR PACKAGE, SANITARY TREATMENT PACKAGE, GARBAGE HANDLING UNIT-PS1, SUBSTATION 2- HVAC PS1, SUBSTATION 3- HVAC PS1, SUBSTATION 3- HVAC PS2, SSC 3- HVAC PS1, SSC 4- HVAC PS2, SSC 5- HVAC PS1, MAIN LIGHTING DB, MAIN LIGHTING DB, AUX POWER DB, AUX POWER DB, MAIN SECURITY GUARD HOUSE, and SECONDARY GATE HOUSE-1.

Below the table, there is an "Alarm status" section with columns for Identification, Time received, Time cleared, Time active, Time acknowledged, Alarm group, Alarm class, User- full name, Computer name, and Alarm area. It lists several alarms related to HV Switchboard-Panel-2, such as "Bus Under Voltage" and "Communication Failure".

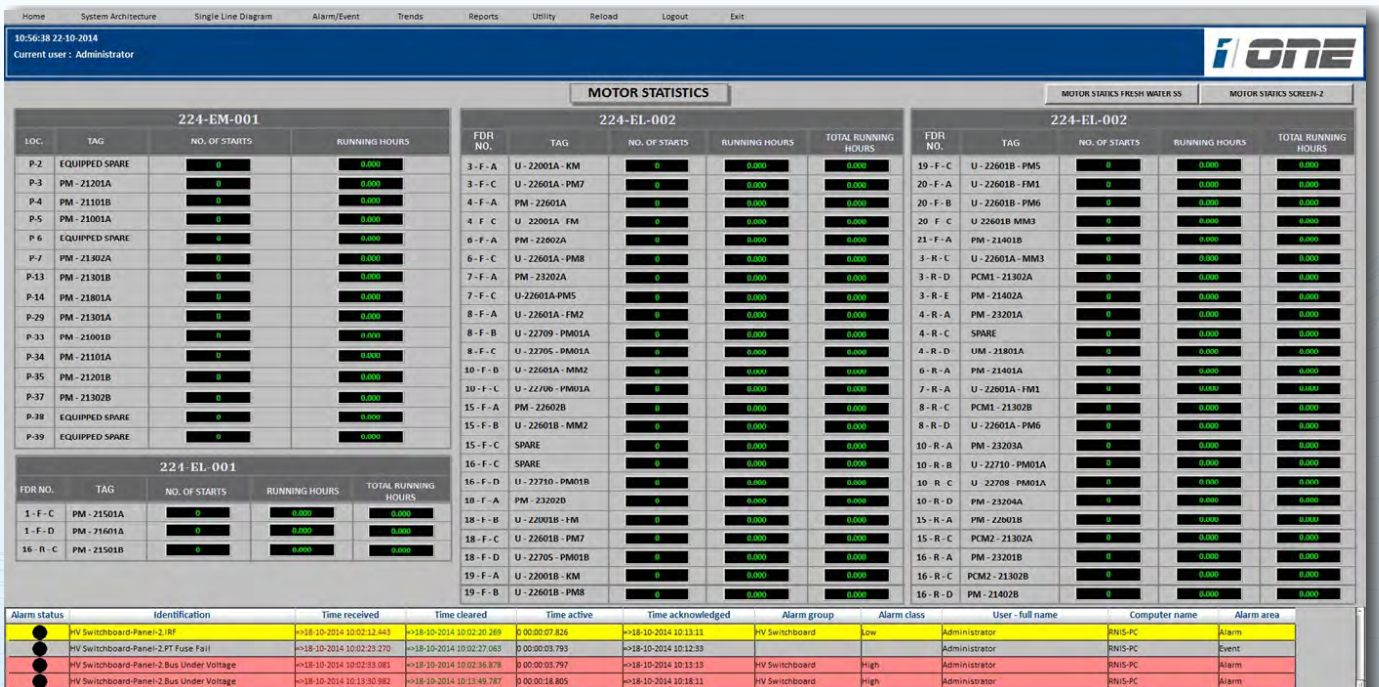
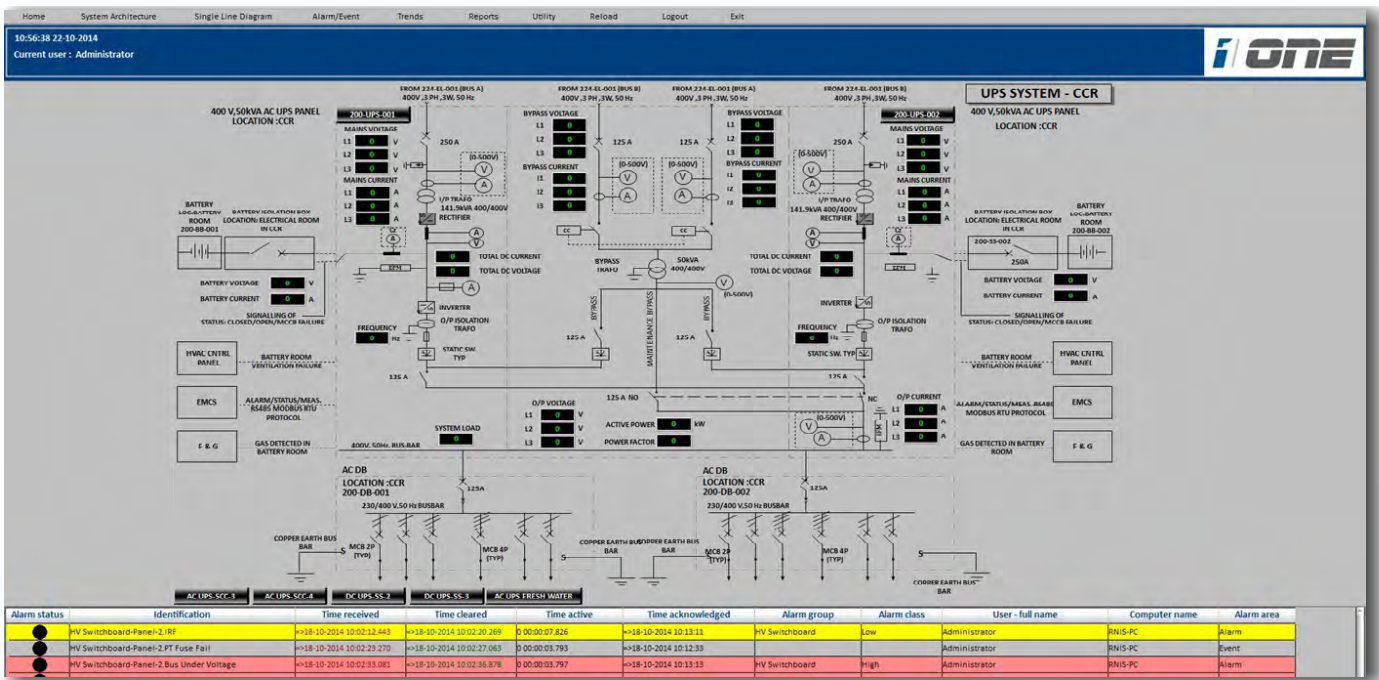
The "Spinning Reserve Calculation" window is open, showing a bar chart for six different units: GTG-3, GTG-2, GTG-3, DG-3, DG-2, and DG-3. Each unit has a bar representing its current status and a numerical value below it. The values are: GTG-3 (11.00), GTG-2 (8.00), GTG-3 (8.00), DG-3 (3.00), DG-2 (4.00), and DG-3 (1.00). Below the chart, there are fields for "Rated MW", "Running MW", and "Spinning Reserve MW" for each unit, and summary fields for "Total Running MW" (11.00) and "Total Spinning Reserve MW" (12.00).

ELECTRICAL ASSET MANAGEMENT SYSTEM (EAMS)

Electrical equipment is designed to provide efficient and reliable operation when properly maintained. I-One EAMS modules provide a reliable platform for the maintenance data calculation by reading critical data, machine health data from the equipment like.. Generator, Transformer, Switch gear, motor etc.

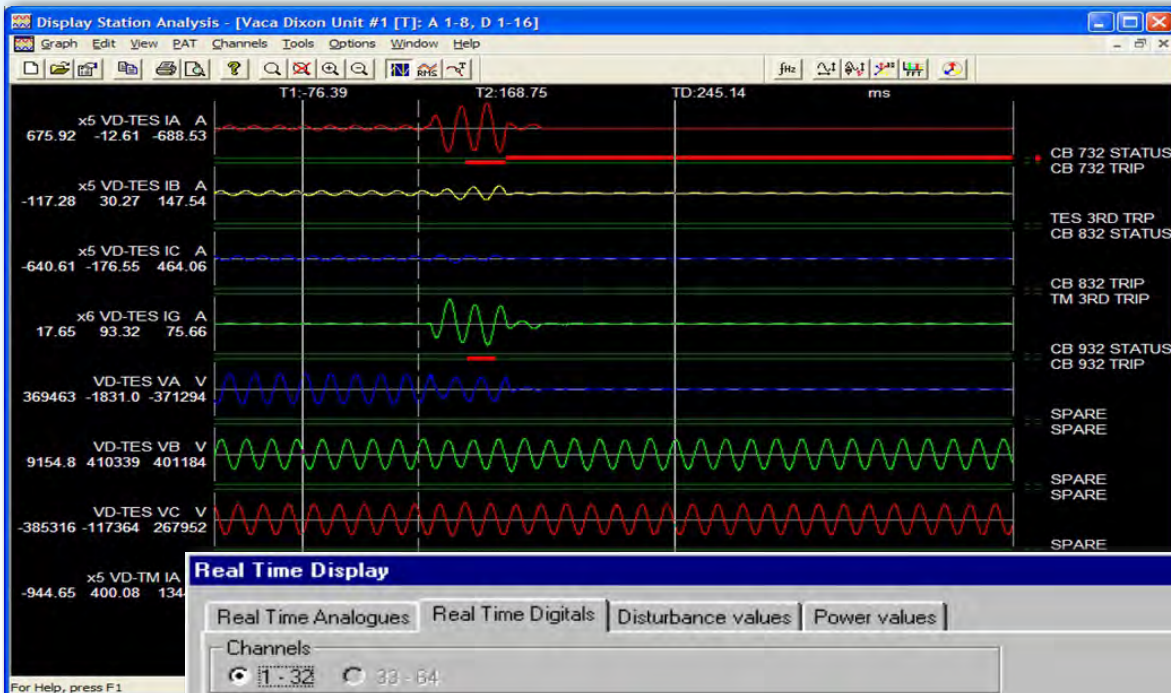
KEY FEATURES

- Online monitoring of critical parameters associated with Equipment
- Equipment/Machinery performance monitoring
- Maintenance data
- Equipment statistics
- Integrated Alarm and Reporting
- Trending of critical parameters



FAULT MANAGEMENT SYSTEM (FMS)

I-one FMS module provides capability to capture and analyze short transient events, longer-term disturbances and trend input quantities such as RMS, frequency, harmonics, power and power factor etc..



Real Time Display

Real Time Analogues | Real Time Digitals | Disturbance values | Power values

Channels: 1-32 33-64

Digitals:

| | | | |
|---|--------------------------------------|---------------------------------------|--|
| <input type="checkbox"/> Carrier Rcv | <input type="checkbox"/> Carrier Xmt | <input type="checkbox"/> Zone 1 Relay | <input type="checkbox"/> Zone 2 relay op |
| <input type="checkbox"/> Bus tie Position | <input type="checkbox"/> Digital 6 | <input type="checkbox"/> Line 966 | <input type="checkbox"/> Xformer 1 temp |
| <input type="checkbox"/> Digital 9 | <input type="checkbox"/> Digital 10 | <input type="checkbox"/> Digital 11 | <input type="checkbox"/> Digital 12 |
| <input type="checkbox"/> Digital 13 | <input type="checkbox"/> Digital 14 | <input type="checkbox"/> Digital 15 | <input type="checkbox"/> Digital 16 |

Help

Trigger Settings

Analogue | Digital | Phase Group | Frequency

| Channel Name | Nominal | FSD | Units | Over | Under | ROC | Cycles | THD |
|--------------|---------|-----------|-------|------|-------|------|--------|-----|
| 1: Ia | 800.000 | 11780.000 | A | 100 | 75 | 50.0 | 8 | 50 |
| 2: Ib | 800.000 | 11780.000 | A | 100 | 75 | 50.0 | 8 | 50 |
| 3: Ic | 800.000 | 11780.000 | A | 100 | 75 | 50.0 | 8 | 50 |
| 4: Vry | 33.000 | 63.640 | kV | 110 | 95 | 50.0 | 8 | 50 |
| 5: Vyb | 33.000 | 63.640 | kV | 110 | 95 | 50.0 | 8 | 50 |
| 6: Vbr | 33.000 | 63.640 | kV | 110 | 95 | 50.0 | 8 | 50 |
| 7: Idc | 2.000 | 20.000 | A | 100 | 75 | 50.0 | 8 | 50 |
| 8: Vdc | 125.000 | 300.000 | V | 125 | 75 | 50.0 | 8 | 50 |

Over trigger: on/OFF 110 % 36.30 kV 0%

Under trigger: on/OFF 95 % 31.35 kV 0%

Rate of change trigger: on/OFF 50.0 % 8 Cycles

THD Trigger: on/OFF 50 %

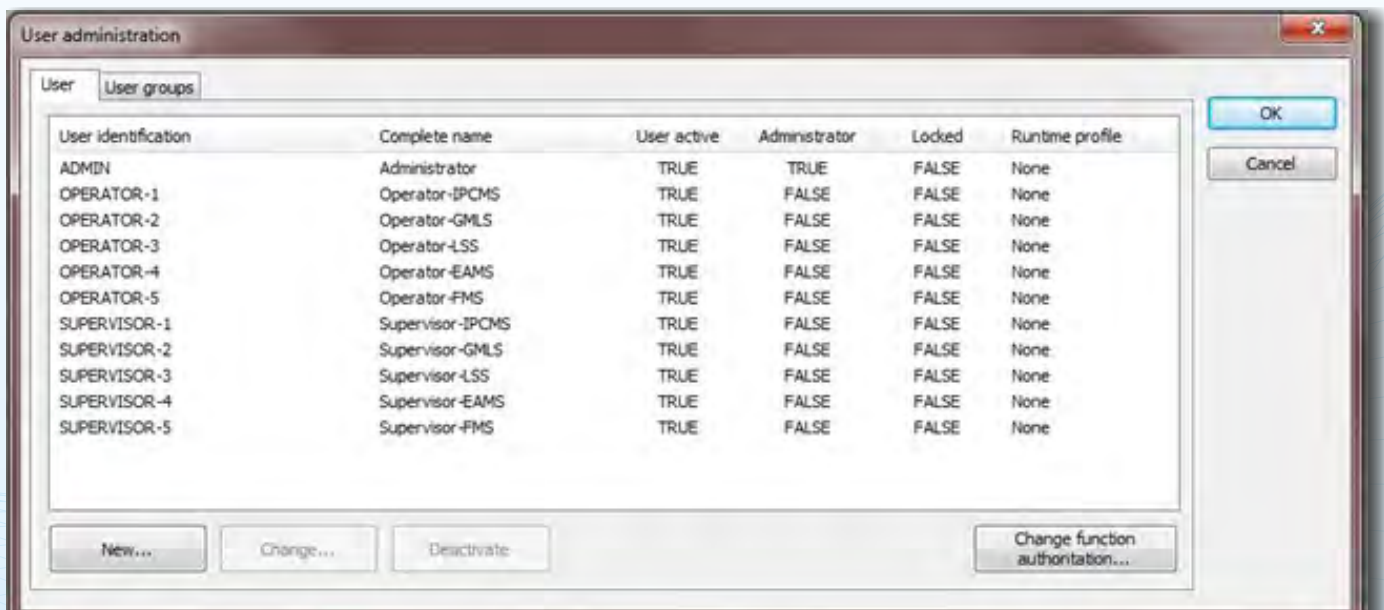
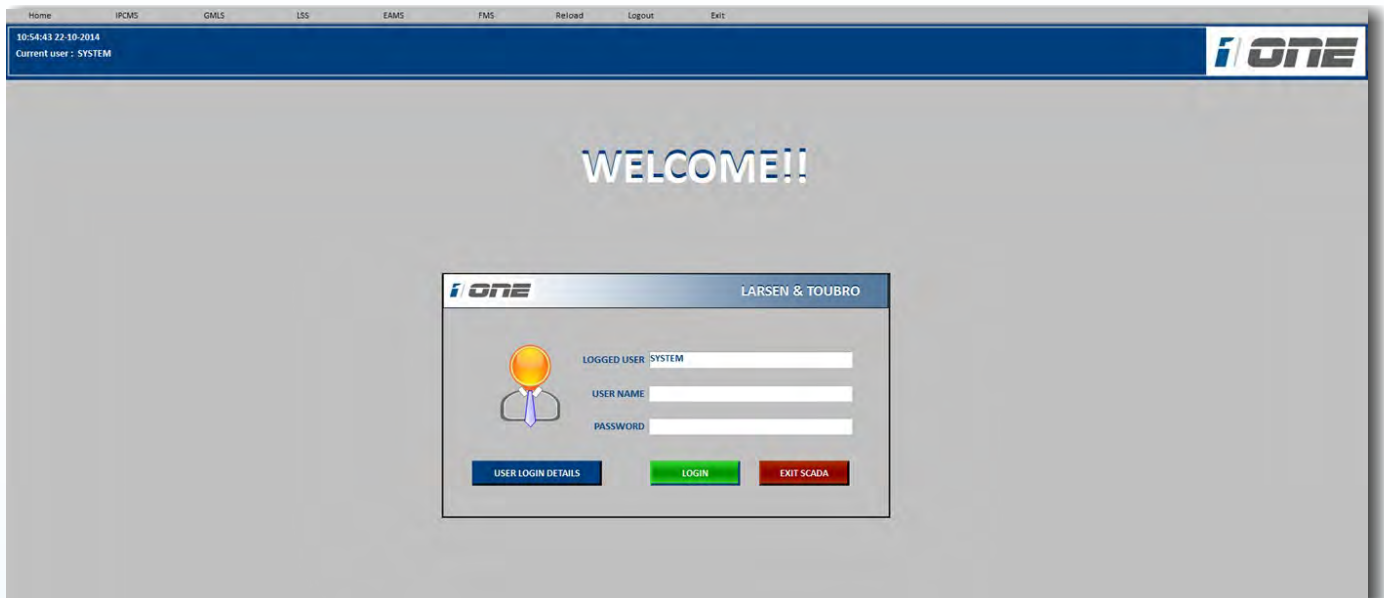
Time (ms): 0 to 30. Current: 33.40 kV, 101 % of nominal

OK Cancel Apply Help

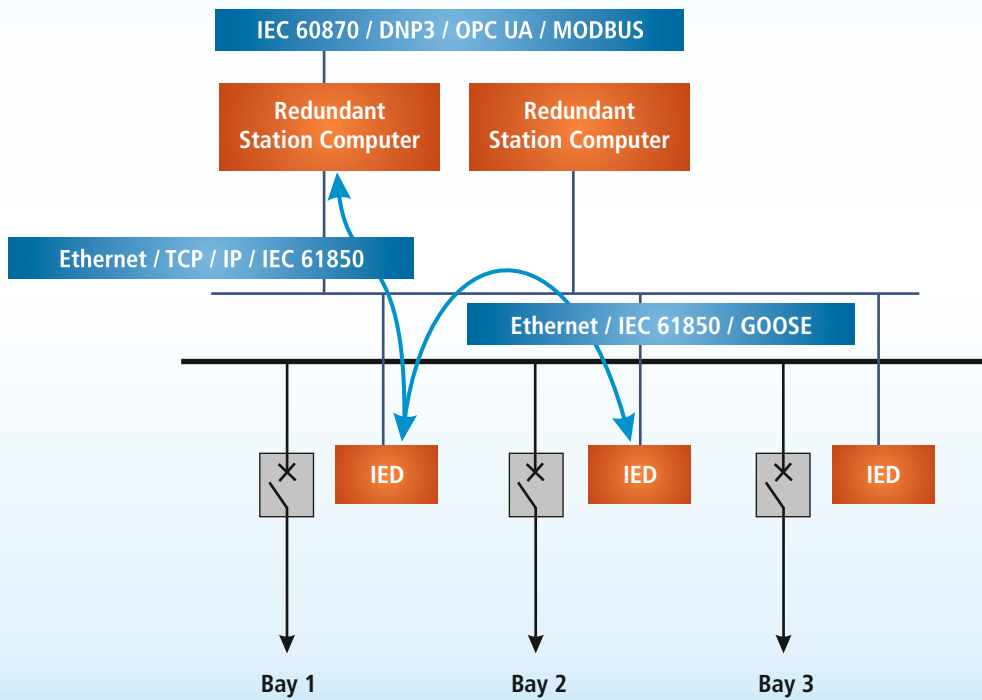
LnTSCADA SECURITY FEATURES

LnTSCADA offers a comprehensive security package, which is impressive due to the consistency of the numerous features included:

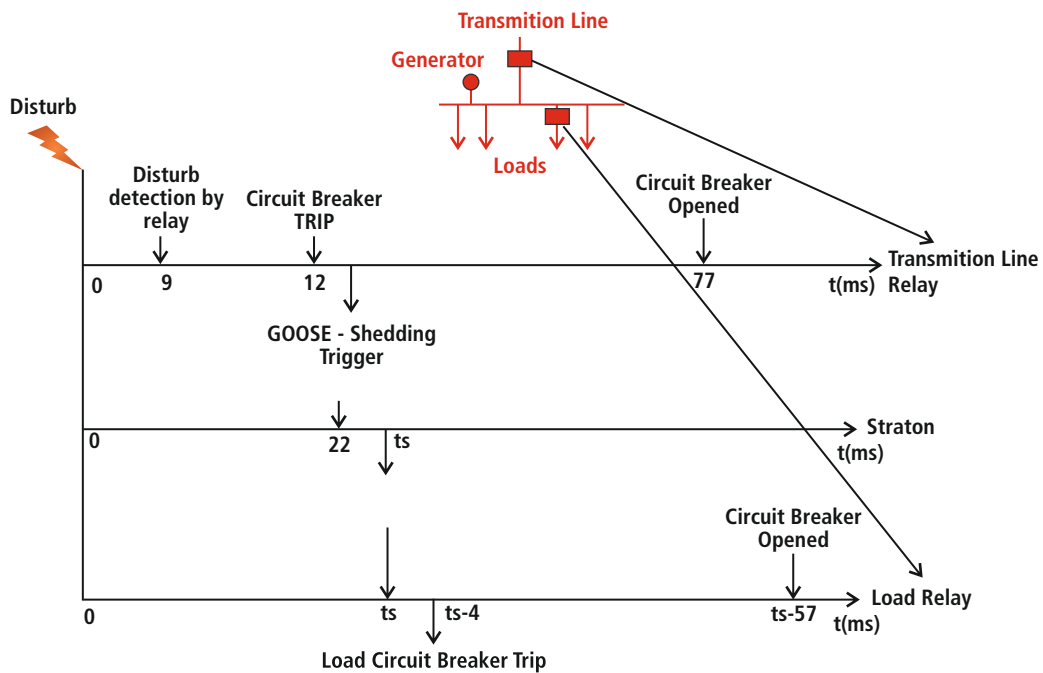
- File signature: LnTSCADA recognizes manipulated program files.
- Strong encryption: 128 bit communication encryption between server, standby server and clients in the network and in the communication with web clients.
- Authentication: Only authenticated clients gain access to a LnTSCADA server.
- http-tunneling for web server.
- OPC-UA: Client and server supported certificates and user authentication.
- Status processing
- User Administration: full support for Active Directory
- Password protection in Runtime and Editor
- Change history and backup in the Editor
- Diagnosis Server diagnoses errors in the network and in control communication
- Password protection in zenon Runtime and Editor and much more...



E&A's implementation of Electrical Automation System/ Power Management system includes integration of SCADA logic and soft PLC/ Hard PLC with embedded controllers to manage power consumption , optimize system performance, monitor network energy ,load sharing and load shedding during overload conditions.

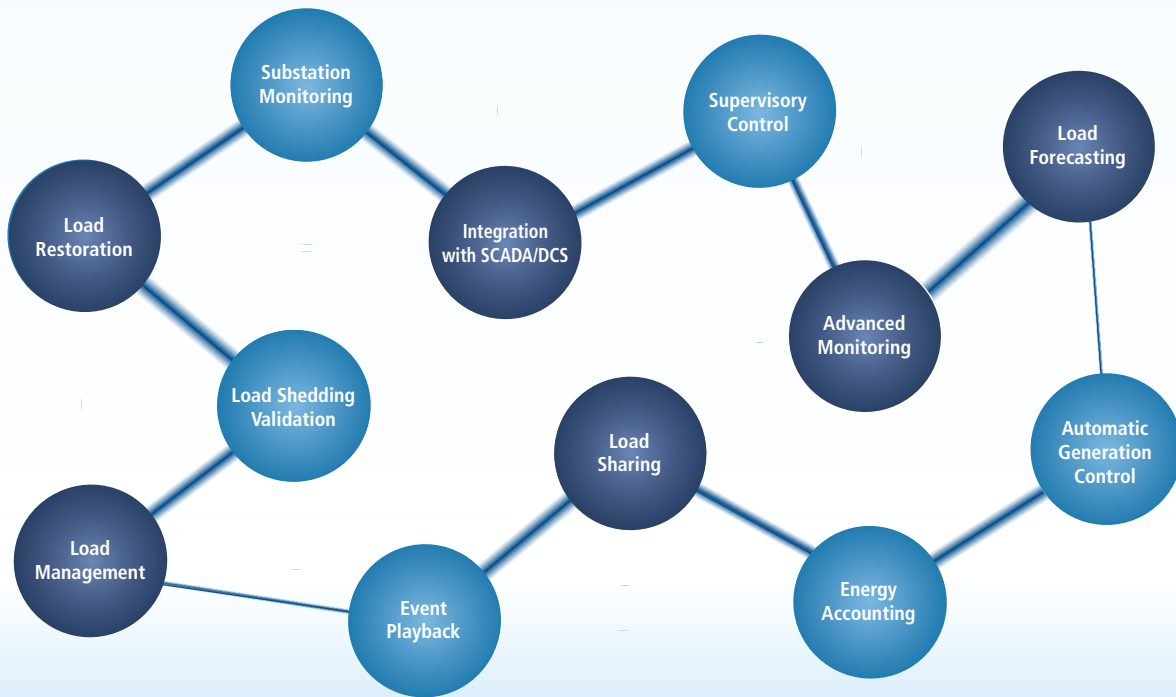


IEC 61850 GOOSE LOAD SHEDDING



I-One uses windows platform for load shedding applications. The following can be done in 12msec using I-One Solutions

- Receive a GOOSE message from the source device
- Calculate the logic
- Send the GOOSE message to the load shedding devices switching the loads



KEY FEATURES

- Ability to communicate to all major manufacturers' hardware and hence has no concern while choosing the PLC / Controller hardware or Operating systems to be used.
- No Separate Communication Driver installation and setup is fast and secure using Graphical installation tools.
- Open and Reliable connectivity to numerous Open Protocols- IEC 61850, Modbus, Profinet, Profibus, IEC 60870, EtherCAT... to name a few!
- Decentralised Architecture ensuring continuous system operation
- Soft PLC is compatible with all windows based operating systems from Windows CE or XPE to XP and Vista, including non-volatile data storage.
- Allows online modifications/changes in the PLC Program without affecting the Process.
- Solution facilitates using HMI & PLC in one system
- Redundant Operation guarantees maximum availability enabling a clear overview and saving cost.
- Complete fail-safe system ensuring high reliability & availability - operates in the background upon failure of windows.
- Real time- deterministic solution offering high data resolution.

With its excellent connectivity, high flexibility and simple handling, our solution guarantees secure and fast engineering; and its independence from hardware and operating systems liberates you from any proprietary 'shackles'.

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