Centrix™ Advanced Feeder Automation

An Indra company

The Centrix solution from Advanced Control Systems™ (ACS™) enables you to build self-healing feeders that significantly reduce the scope and duration of sustained outages for your customers, through a unique model-driven application that requires no GIS and no operator intervention. Feeder faults are automatically detected and isolated, while customers upstream and downstream of the fault are restored in under a minute. Centrix is the first solution that combines the simple, rapid deployment typical of a distributed solution with the power and reliability of a dynamic, model-driven approach. Centrix is a true advanced distribution automation platform–flexible, scalable, easy to configure, and cost-effective to implement.

Using proven technology from ACS's years of experience in delivering state-of-the art Distribution Management Systems, Centrix leverages your existing infrastructure to:

- Reduce outage durations from hours to seconds through automatic isolation and service restoration, including a "return to normal" function with no violations or further service interruptions
- Dramatically improve permanent outage statistics–SAIDI, CAIDI and SAIFI–transforming the majority of the service interruptions to momentary outages
- Reduce losses and improve power factor with Volt/VAR control

Scalable and easily deployed feeder automation that delivers:

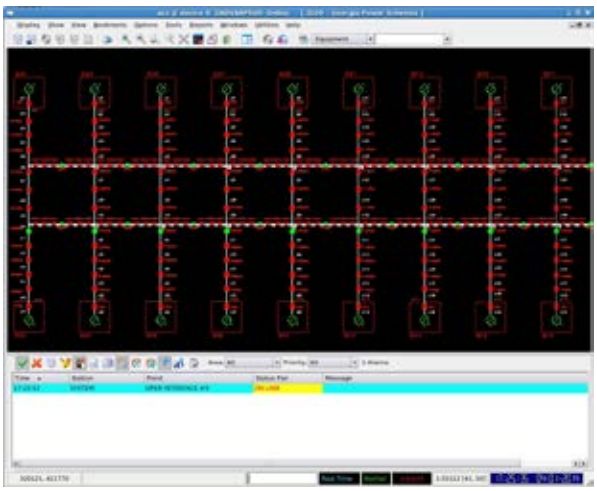
- Self-healing feeders for reduced outage times and increased customer satisfaction
- Faster fault location and improved operational efficiency
- Feeder optimization with Integrated Volt/VAR Control (IVVC)
- Simple integration with any existing SCADA, DMS or OMS

Centrix Advanced Feeder Automation

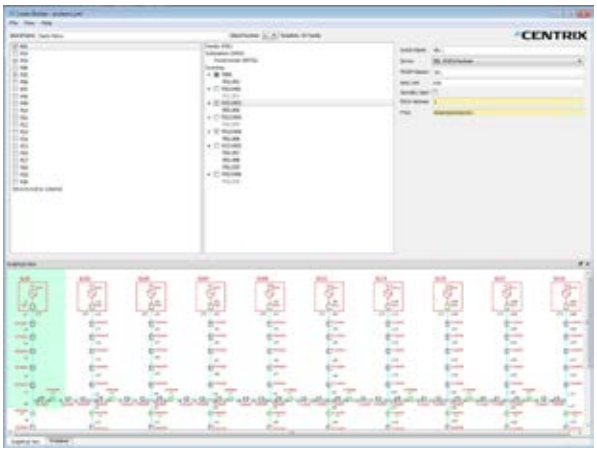
Centrix uses a new, advanced approach to Distribution Automation at the feeder level. This innovative approach makes Centrix a powerful Smart Grid automation foundation to support many companion applications. ACS has taken the functionality and capability of our model-driven advanced DMS applications and developed a stand-alone system that is easier to configure and deploy. The cost of a Centrix installation is consistently lower than that of a peer-to-peer distributed solution, without the need for additional and often expensive vendor-specific hardware.

Because Centrix is model-driven, it supports additional optimization applications—including Loss Minimization and Interactive Volt/VAR Control—without the complexity normally associated with creating a full distribution network model. Centrix models are easy to build, using global feeder templates, with available customer-specific configurations.

Best of all, Centrix is a field-proven solution for self-healing feeder automation, based on our advanced Fault Location Isolation and Service Restoration (FLISR) application. ACS first delivered FDIR in 1998, and it has been successful worldwide in reducing feeder outage restoration time from over one hour to less than 20 seconds. Utilities have now deployed ACS FLISR on thousands of feeders worldwide.



Centrix utilizes pre-configured templates for rapid configuration and deployment



Centrix Builder simplifies parameter definitions for model-driven automation

Scalable, feature-rich automation

Centrix is configured to autonomously isolate faults and restore service to un-faulted sections without operator intervention. It quickly isolates faults and restores power both upstream and downstream, analyzing switching options and choosing the one that maximizes the restored load without violations. The system adapts immediately to changes in the network topology, even if the network is in an abnormal state. This means that optimum restoration solutions are always within reach. Moreover, Centrix easily accommodates the switches and protection schemes you already have in place. Other features include:

- Disables automation following a loss of communications, but only to the affected device or feeder
- Six definable device-level flags for disabling automation on active islands
- Restoration on loss-of voltage
- Two-way SCADA/DMS interface via DNP3 – no expensive or custom interfaces necessary
- Sequence-of-events logging
- Secure remote access
- Response to multiple faults (schemes are independent of each other and can operate simultaneously)
- Return-to-Normal function
- Available control center HMI

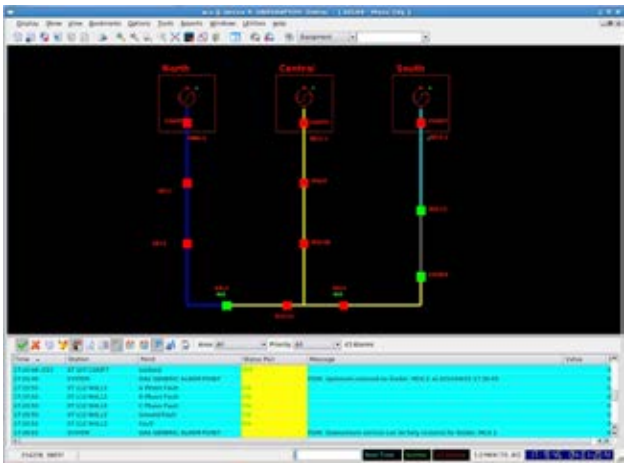
Optional optimization applications may also be implemented on the Centrix platform, making it a true Smart Grid solution with improved return-on-investment. These applications include:

- Loss minimization: reduce feeder losses while improving voltage control through coordinated control of capacitor banks
- Integrated Volt/VAR control: provide optimal control of feeder load and/or losses through coordinated control of capacitors and LTCs

Pre-defined topologies for quick and easy deployment

Centrix has the ability to model and automate very complex network topologies. It greatly simplifies this process by using pre-defined automation "island" topologies, allowing you to de-activate non-existing switches and configure existing switches as needed. The network model is then populated with a form-driven application, which defines all of the variables, load limits/current limits, voltage levels, device types, etc.

Centrix does not require a three-phase distribution load flow model; it determines the load transfer capability and requirements based on measured data. The Topology Processor enables the system to handle multiple fault conditions or abnormal network configurations with ease.



Automatically built displays show feeder topology and device status in real-time

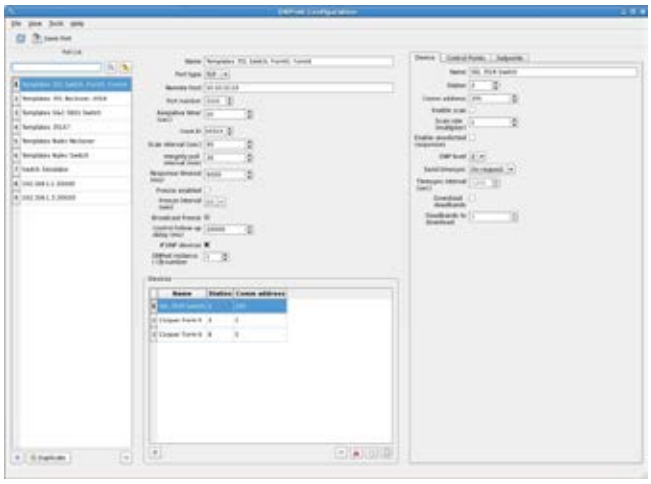
An interoperable solution: utilize existing infrastructure

Centrix integrates easily with existing sectionalizing switches or automatic reclosers for localized FLISR on distribution feeders. ACS creates interface profiles for each controller or device in order to seamlessly interface to legacy equipment–meaning in many cases no additional feeder automation equipment is needed. In some cases, you can retrofit lower cost switch units with a motor and automate existing switches using the ACS NTX-20 Intelligent Controller and D060 Analog Input Module. This remotely automates the switching device, and provides the required three-phase measurements, such as fault flag, fault direction and three phase P & Q, to perform the self-healing function. This allows you to decrease your cost by using more economical devices and leveraging existing installed devices. Centrix can be configured to operate with an array of controllers and IEDs, including popular models from SEL, S&C, Nulec, Cooper, ABB and more.

Centrix also operates without interfering with the existing protection schemes. When a fault is detected, Centrix waits until the recloser or relay issues a "lock out flag" and the switch opens before commencing with isolation and restoration actions.

Broad application potential with unlimited expansion

The Centrix network model is expandable without limitation. Most self-healing feeder products (particularly distributed solutions) are limited in their complexity and expansion capabilities. The largest operating network model in service with the FDIR application that drives Centrix includes over 1,000 feeders.



Integrated DNP communications configuration includes pre-built profiles for your IEDs

Centrix Advanced Feeder Automation

Adapts to network changes

Unique to this approach of an easily-configurable solution is the ability to adapt to different network topologies, including abnormal network conditions. Unlike rules-based decentralized solutions, Centrix adapts to the actual network state that is calculated in real-time by a topology processor application. Centrix does not require a predefined system topology in order to operate. As a result, changes to the network topology due to switching or protective device operation do not inhibit Centrix from determining an optimum solution. All switching solutions are derived from the current topology. Since all switching devices, including manual switches, are modeled, the "operation" of these switches at the control center interface can be reflected in the new feeder topology calculation. It is also not necessary to alter the program logic for expansion, since it will adapt to any configuration.

Safety features

Centrix supports many failsafe modes for safety reasons. The system supports the option of disarming itself if certain parameters are detected to be in an abnormal condition. Typical failsafe functions supported by Centrix include: remote SCADA control from the control center or substation operator; hot line tag; and local/remote operation of the switches. Centrix will also automatically disable the FLISR function upon a loss of communications, but only for the affected device or feeder–meaning restoration functions are still available for areas of the automation island where communications are normal. The system also provides up to six selectable flags per device that will disable automation on active islands.

Optimizes asset utilization and operating efficiency

Centrix provides an optimum solution that makes the most effective use of existing equipment as well as its own infrastructure. Centrix supports other applications, adapts to abnormal network situations, and provides optimum control of conflicting devices such as capacitor control and voltage regulation, helping to further justify the investment in a feeder automation platform.

Included with Centrix

The base Centrix solution includes:

- Single host workstation
- Centrix base system license
- FLISR and/or IVVC license for up to 5 feeders
- DNP interface to existing SCADA/DMS
- Up to three IED device profiles per application
- On-site installation and training support
- Additional feeder licenses and device profiles may be added incrementally as required
- Available options include redundancy and serial communications

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