



S&C's Smart Grid Solution Maximizes Data Center Reliability

S&C Featured Solution: Self-Healing Distribution System

Location: Richardson, Texas

Customer Challenge

Data center provider Digital Realty was seeking a solution to further enhance its data center performance with a medium-voltage (MV) distribution system to reduce generator and UPS run times. It also required a standardized system with a configurable design applicable to its Tier-compliant data centers, which provide N+1 redundancy.

The typical data center uses a metal-clad vacuum breaker lineup in typical MV-lineup configurations, feeding “blocks” of dedicated transformers, which serve redundant switchboards and UPS systems.

Digital Realty needed a partner with expertise in MV data center power systems to design a reliable, cost-effective, and concurrently maintainable distribution system. The company was seeking a way to deliver redundant feeders to each load center and, at the same time, automatically locate and isolate faults.

S&C Solution

S&C Electric Company was chosen for its long-standing relationships with utilities and ability to work closely with Digital Realty's technical experts to meet their facilities' design and operational requirements. S&C provided engineering services, including control and relay programming. It also provided project management services and performed point-to-point system Level 4 commissioning. In addition, S&C supplied the switching and protection products, plus the smart grid communication and control solutions needed for a self-healing distribution system.



Discrete medium-voltage Remote Supervisory Vista, used in loop-feed configuration.

“S&C's solutions allowed us to stay flexible, limit utility downtime, limit generator run time, and safely operate our medium-voltage system, all at a much lower cost compared to metal-clad breaker systems.”

*—Patrick A. Murphy, Director – Design East Region,
Utility Power North America, Digital Realty*

Working with the customer, S&C developed a flexible, standardized, open-loop design that supplied 2N utility to every transformer feeding a load center and enabled load management. Discrete MV switchgear units in a loop-feed configuration provided the most economical way to eliminate single points of failure on the system. This configuration also allowed for concurrent maintainability without reliance on back-up generators.

A premier data center builder enlisted S&C to provide a self-healing, medium-voltage distribution grid that enhances performance.

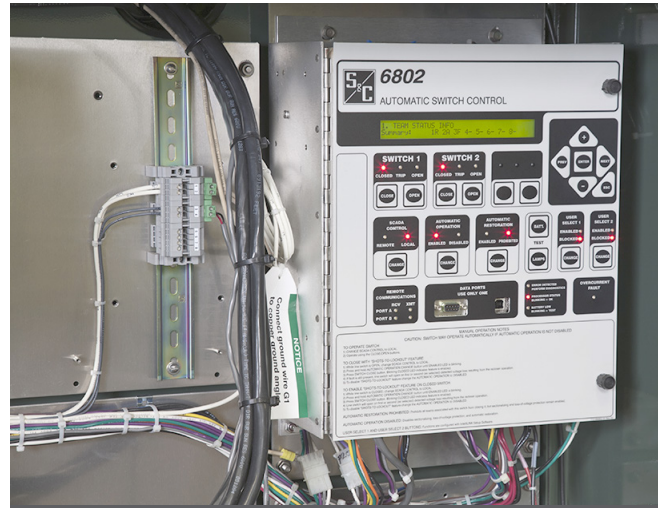


Switching and protection were provided by S&C's Remote Supervisory Vista® Underground Distribution Switchgear, which offers compact, low-maintenance, and arc-resistant construction. Protection for each incoming source is controlled by a relay coordinated with the local utility's upstream protective devices, so if a fault occurs in the loop, utility involvement is virtually eliminated.

To enable self-healing of the distribution system after a fault, S&C installed its IntelliTeam® SG Automatic Restoration System, a field-proven universal smart grid solution. Each Vista was equipped with S&C's 6802 Automatic Switch Control to support IntelliTeam SG's self-healing technology. S&C's IntelliNode™ Interface Module allows a third-party relay to communicate in IntelliTeam SG's scheme.

All controls use peer-to-peer communication over a fiber-optic network and obtain system data in real time. When an event occurs, controls evaluate the data, isolate the fault, and restore unfaulted sections in seconds. Even if one control loses communication, it could still independently isolate a fault while the other controls restore the system around the faulted section. IntelliTeam SG's "In-Field Instant Replay" automatically reconstructs field events for easy playback and analysis.

S&C also custom-engineered a SCADA/HMI (Human-Machine Interface), providing interactive one-line visuals, alarms, and integration with the Building Management System. Using SCADA/HMI to view fault locations, Digital Realty could ensure fast dispatch for repairs. After repairs or during maintenance, the system's remote switching capability maximizes safety and flexibility.



6802 Switch Control supporting IntelliTeam SG.

Results

S&C completed the project on time and within budget, even reducing the customer's medium-voltage distribution system cost by 35%-45% compared with equivalent metal-clad breaker gear. The system automatically restores itself upon loss of a single source, and it isolates faults and restores unfaulted sections without human intervention. The system also has superior arc resistance. S&C's self-healing solution delivered exactly what Digital Realty needed—a highly reliable, economical, versatile, and low-maintenance MV distribution system that enhances the provider's data center builds.