

CUSTOMER SUCCESS STORY

CUSTOMER: BOWLING GREEN MUNICIPAL UTILITIES (BGMU)
INDUSTRY: UTILITIES
REGION: SOUTHERN KENTUCKY
PRODUCT: RAPTOR® iMX350

THE CHALLENGE

Bowling Green Municipal Utilities Electric division is a municipal electric power provider. While using Layer 2 (L2) networks, there were some redundancy issues with two Control Centers and connected substations using Radio Link. These issues impacted their SCADA traffic communication and overall network security.

iS5 Communications recommendation was to design a network that has a smaller broadcast domain, thus segmenting the large L2 network into a L3 network. The specific challenge was that the network design has a sizeable L2 broadcast domain, and broadcast storms can consume all the bandwidth, making the network unusable.

THE SOLUTION

iS5Com recommended segmenting the L2 network and implementing a L3 network to interconnect the different domains. A L3 network is not subject to a broadcast storm, so this results in smaller broadcast domains.

From iS5Com's perspective, the best way to design and implement this type of network is to use a routing protocol. However, migrating from L2 network to L3 using dynamic routing is complicated and requires several cut-overs to complete the whole migration. The hub of the network, i.e. the two Control Centers, also migrated to use dynamic routing between substations. Migrating a few substations at a time and leaving the Control Center on L2, would break the dynamic routing, leaving it dysfunctional. After the migration of the Control Center and substations to a L3 domain using dynamic routing, the network performed more efficiently and effectively.

The overall requirement needs an industrial-rated networking device with a wide operational temperature range (-40°C to +85°C) that is capable of passing SCADA, Video Surveillance, Network Timing and other Substation Management traffic from the Substation to the Control Centers in a secure way.

To implement the network design, iS5 Communications' RAPTOR iMX350, an Intelligent Cyber Secure Platform running the iBiome® OS, was installed at each Substation location and Control Center for redundant and secure intercommunication of the SCADA Services. The RAPTOR iMX350 has been specifically designed to protect and secure critical infrastructures in the harsh environments found in utility and substation applications. It meets or exceeds the standards set out in IEC 61850-3 and IEEE 1613 for utility communication equipment in substation environments. The iBiome is an all-encompassing operating system that supports switching and routing on a single platform. The iMX350 has been designed for future scalability. Its modular system of field-replaceable modules, hot-swappable power supplies, and its ability to run third-party software applications makes it a very flexible platform for today and the future.

The RAPTOR commissioning process developed essential time-saving benefits through the use of configuration tools using console and web GUI. This allowed the customer to configure the devices while minimizing errors during the setup. Additionally, the customer network performed more efficiently prior to their previous set up through better network design and usage of appropriate networking protocols.

BENEFITS

- High visibility to all substation data that feeds into the energy management system of BGMU.
- High accessibility to RTUs, IEDs, Power meters, Surveillance cameras, and other substation equipment through the RAPTOR.
- High reliability of the utility grade hardened RAPTOR platform provides long term performance in substation environments where temperature extremes can be common in harsh environments. Redundant power supplies from power disruptions, and the modular format makes for hot swappable line modules.
- Convenient RAPTOR WEB GUI Management interface and option of command line configuration facilitates large network rollouts locally and remotely. Future configuration changes, when necessary, can be done remotely and on a large scale.
- Secure remote access to the RAPTOR device configuration is facilitated through HTTPS and SSH. TACACs+ and RADIUS provide remote access architecture with centralized user access management.
- Time Synchronization options, SNTP and PTP-Transparent mode 2 Step clocking helps disseminate accurate system timing in several power system functions such as synchro phaser measurements, protective line measurements, analog measurements, and time stamping in the SCADA System.

TESTIMONIAL



Brent Norris , Electric Substation and Metering Supervisor
Gerald D. Johns, PE, Substation Engineer, Electric Substation and Metering Department
Bowling Green Municipal Utilities:

"Bowling Green Municipal Utilities chose the iS5Com RAPTOR series when upgrading our substations Ethernet network and converting our Layer 2 network to Layer2/ Layer3. We chose iS5Com because of its focus on operational technology, hardened equipment suitable for the electrical substation environments and known dependability. As a result, we received excellent products as well as great service. Our iS5Com network consultant, Hafiz Ahmed, spent countless hours developing our network scheme. He also spent two weeks onsite with us, configuring the equipment and working tirelessly to ensure a successful implementation. His availability for support after commissioning has been nothing short of terrific. We are delighted with our new network and the flexibility it provides us. Most of all, we are grateful for the excellent service and support."



ABOUT BGMU'S ELECTRIC DIVISION

Bowling Green Municipal Utilities (BGMU) Electric division has been providing service to its customers since 1942. Today, BGMU has 500 Megawatts of system transformer capacity, and serves almost 50,000 customers. Power is purchased from the Tennessee Valley Authority (TVA) and distributed through more than 362 miles of electrical lines that run underground and on poles throughout the city.

BGMU strives to be a reliable source of power and has held the Reliable Public Power Provider (RP3)[®] designation from the American Public Power Association since the program's inception in 2005. The (RP3)[®] designation, which lasts three years, recognizes public power utilities that demonstrate proficiency in four key disciplines: reliability, safety, workforce development and system improvement. BGMU is one of 220 public power utilities nationwide that hold the (RP3)[®] designation and is one of only four Kentucky (RP3)[®] designees. Additionally, BGMU is one of 76 public power utilities at the highest (diamond) level.



ABOUT iS5 COMMUNICATIONS INC.

iS5 Communications Inc. ("iS5Com") is a global provider of integrated services and solutions, and manufacturer of intelligent Industrial Ethernet products. Our products are designed to meet the stringent demand requirements of utility sub-stations, roadside transportation, rail, and industrial applications. iS5Com's services and products are key enablers of advanced technology implementation such as the Smart Grid, Intelligent Transportation Systems, Intelligent Oil Field, and Internet of Things. All products have the ability to transmit data efficiently without the loss of any packets under harsh environments and EMI conditions.

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