

Powering Up Interoperability

How power utilities can modernize Mission Critical Communications without leaving employees and customers in the dark



Executive summary

Unfortunately, much of the technology used to facilitate internal and external communications for power utilities dates back to the 1970s and even earlier. As you can imagine, technologies have improved at an exponential rate since then. Today, many utilities that traditionally transmitted data on TDM networks have now switched to next-generation, Internet Protocol (IP) networks, which have significantly improved the reliability, flexibility and security of transmitting large amounts of data.

With the rapid advancement of technology, cybersecurity threats have become more prevalent. In 2013, the Federal Energy Regulatory Commission (FERC) approved new standards requiring power utilities still using TDM systems to develop action plans to protect their communications infrastructure.

Even though power utilities understand the need to modernize their mission critical communications systems, some continue to work around the limitations of existing communications infrastructures by developing costly processes and procedures to accommodate infrastructure shortcomings. For example, utilities that have deployed next-generation communications protocols or even proprietary solutions must immediately deal with the incompatibility of other heterogeneous systems.

This forces utilities to either a) deal with the realization that certain employees, field workers, and contractors (internally and externally) will never interconnect or b) overhaul their entire communications infrastructure to address interoperability issues. For many power utilities, a costly rip and replace is simply not feasible.

To save time, money, and resources, it is critical for power utilities of all sizes to break away from the limitations of outdated systems by choosing to invest in powerful next-generation communications networks. By doing so, utilities will have the ability to seamlessly connect internal employees and in-the-field workers and contractors using their equipment, which will create a fully interoperable communications system.

For many utilities, smoothly and incrementally migrating to an IP-based communications infrastructure has emerged as the best approach to deploying a next-generation communications network without sacrificing service quality or reliability.

The availability of technology that enables utilities to interoperate with existing legacy networks, radios, and wireless communications, while supporting a cost-effective migration to Smart Grid networks, has forever changed the market landscape. Now, power utilities can seamlessly communicate across varying systems using their existing legacy networks, all while leveraging next-generation Voice over Internet Protocol (VoIP) and unified communications applications.



Key considerations for escaping communications pitfalls

To help successfully navigate communications structure changes and opportunities, utilities should consider planning for the future now by building bridges internally and focusing on maximum interoperability.

For many utilities, smoothly and incrementally migrating to an IP-based communications infrastructure has emerged as the best approach to deploying a next-generation communications network without sacrificing service quality or reliability. By choosing to enable technology that interoperates with existing legacy systems, utilities will realize five significant advantages including flexibility, security, innovation, reliability, and cost effectiveness.

Alternatively, utilities that choose to do nothing to modernize their mission critical communications network or address interoperability issues will be tangled up in a web of communication silos that harm employee productivity, efficiency, collaboration, and in some cases, safety.

Purpose of this white paper

Today's power utility has no shortage of service continuity threats. While utilities continue to battle with regulations and fluctuations in electricity demand and capacity changes, they also face a wide range of challenges brought on by increasingly strained network communications infrastructures.

While it's been proven that a seamless communications infrastructure is the backbone of every successful power utility, many are still suffering from debilitating interoperability and survivability issues that unnecessarily leave employees, vendors and customers in the dark. In the event of power outages, natural disasters or even cybersecurity attacks, utilities must be able to communicate across all channels in a swift manner to, not only decrease the effects of such events, but also to maintain customer satisfaction and profitability.

In this white paper, we will delve into an in-depth discussion on the importance of retiring costly, disjointed communications networks and how to modernize your system with minimal impact and maximum benefit to your customer-facing and internal business activities.

Powering up interoperability

Interoperability can generally be defined as the ability of a system or product to work with other systems or products without special effort on the part of the customer (utility). The ultimate goal of interoperability is a true sense of “plug and play” in that, as utilities require new components to address mission critical communications requirements, the infrastructure would easily scale to accommodate the addition of new technologies without the need of a costly network overhaul.

According to a February 2016 study conducted by the U.S. Department of Energy, “The National Opportunity for Interoperability and its Benefits for a Reliable, Robust and Future Grid Realized through Buildings,” interoperability software can benefit all vital components of a utility’s core business operations such as human resources, information and technical systems.

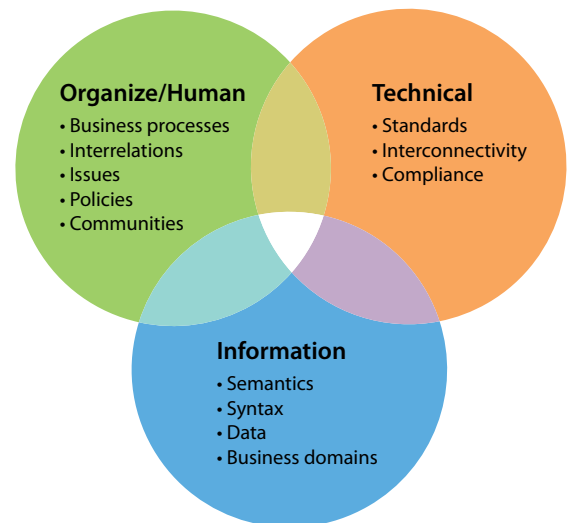
When implemented correctly, interoperability can:

- Reduce system installation and integration costs
- Lower operational costs
- Decrease capital IT and upgrade costs
- Enhance security management
- Provide more product choices
- Deliver more price points and features
- Improve operational efficiency

However, some utilities still question the value of interoperability or are uncertain on the true benefits of deploying an interoperable solution. While achieving interoperability is advantageous for both internal and customer-facing communications, lengthy install times of new applications, possible incompatibility of new devices, and the uncertainty of whether the system will scale to support future needs are just a few challenges utilities face when deciding to modernize mission critical communications infrastructures.

To proactively address these challenges, power utilities should consider systems that support a seamless, incremental transition to Smart Grid networks. Solutions that allow power utilities to use existing legacy networks while leveraging next-generation VoIP and unified communications applications provide a cost-effective way for utilities to deploy advanced communications technologies without sacrificing service quality and system reliability. Ultimately, these solutions provide utilities with the power to future-proof their networks to interoperate today and scale to meet business requirements for the future.

Interoperability benefits across Technical, Institutional, and Economic domains



Expected impact of interoperability:

- | | |
|-----------------------------|--------------------------------|
| ■ Reduces integration cost | ■ Reduces upgrade cost |
| ■ Reduces cost to operate | ■ Better security management |
| ■ Reduces capital IT cost | ■ More choices in products |
| ■ Reduces installation cost | ■ More price points & features |

All items provide compounding benefits.

Graphic credit the GridWise® Architecture Council.

By choosing to enable technology that interoperates with existing legacy systems, utilities are likely to reap five significant advantages:

Advantage #1: Flexibility

System flexibility and scalability have always been a requirement for an efficient and effective mission critical communications infrastructure. This is because as a power utility grows, their system must have the capacity to scale to accommodate more internal and external users without points of failure.

Therefore, a truly interoperable mission critical communications network allows for a more flexible architecture, where new assets can be added and removed as needed, simply by changing the configuration of infrastructure, with no real impact to the high performance or functionality of the network.

Advantage #2: Security

Enabling systems to effectively interoperate is crucial for physical, network, communications and administrative security. Physical security involves the safety and reliability of the physical components of a mission critical communications system. These include communications centers, radios and other physical hardware. Every device in the communications infrastructure needs to be secure from theft, terrorists and so on.

Network security refers to the protection of the interfaces that connect the hardware and software in any given communications system. This means the computing system used to facilitate the communications infrastructure needs protection from hackers and cyberattacks. Administrative security involves the procedural plans, programs and documentation a public utility has in place to ensure data confidentiality and integrity.

Lastly, communications security refers to the protection of radio transmissions. This type of security is extremely important to any infrastructure attempting to achieve interoperability. A truly interoperable system will enable a public utility to communicate with employees and customers expeditiously during normal business activities as well as in the event of a catastrophic event. Encryption is widely used to enhance communications security. For example, interoperable technologies like those offered by REDCOM feature an additional layer of security for VoIP traffic with the ability to encrypt calls. Utilities also benefit from secure real-time transport protocol (SRTP) and Transport Layer Security (TLS) functionality that more advanced providers like REDCOM offer to encrypt SIP call signaling and client authentication, thereby ensuring protection of confidential communications.

Advantage #3: Innovation

According to a 2007 study conducted by the Berkman Center for Internet & Society, Harvard University, "the innovation made possible by interoperability carries broad benefits for entities that come to foster it... interoperability leads to innovation that results in technology systems that work together more easily, with less hassle."

Nearly 10 years later, this conclusion continues to ring true. Innovative, interoperable standards-based telecommunication solutions such as radio, intelligent substation solutions, rugged servers and VoIP performance security and performance monitoring applications are just a few innovations made possible by interoperability.

For example, the REDCOM radio interface provides a simple and reliable bridge between both legacy and VoIP network systems

and two-way radio systems. With its innovative intelligent Radio Gateway solutions, power utilities can leverage platforms far more powerful than standard converter boxes. Instead, utilities gain access to full switching and routing capabilities along with radio features such as PTT pass-through, REDCOM's patented PTT over IP, and conferencing.

Advantage #4: Reliability

For power utilities, interoperability means seamless, end-to-end connectivity of hardware and software from customer energy usage all the way through data transmission and mission critical telecom infrastructure that allow utilities to communicate effectively with employees, customers and other key stakeholders.

When interoperability works properly, new devices and assets can be added to a communications system and efficiency of results are obtained. Because interoperability directly affects how devices and assets communicate, system reliability and adequacy can be greatly compromised if interoperability is not achieved. With a reliable, interoperable mission critical communications infrastructure, power utilities are more likely to eliminate communication gaps and meet end-user customer demands consistently and effectively.

According to a report from the GridWise® Architecture Council, "potential savings in the electric power industry due to interoperability falls in the range of 1% to 3%. In the U.S. power system alone, this could amount to as much as \$10 billion in savings."

Advantage #5: Cost-Effectiveness

Volatile energy prices, a debilitating strain on communications networks, rapidly growing concern for the environment, and lower power quality are creating evolving challenges for public utilities. Interoperability is the answer to improving communications across all internal and external channels. Even though the cost-effectiveness of interoperability in the power utility industry is difficult to quantify, studies show that interoperable systems lead to financial benefit. According to a report from the GridWise® Architecture Council, "potential savings in the electric power industry due to interoperability falls in the range of 1% to 3%. In the U.S. power system alone, this could amount to as much as \$10 billion in savings."



Planning today for tomorrow

Many power utilities have begun to consider migrating to, or have already deployed, next-generation networks to support their mission critical communications' goals. When deciding to tackle communications infrastructure issues, power utilities of all sizes face a perplexing choice: fully upgrade existing equipment and software or adopt a new unified interoperable communications platform.

Upgrades take the "rip and replace" approach and typically entail a large capital investment and multi-year rollout schedule. And while the new equipment devices and software will interoperate with each other, they will not work with legacy equipment, leaving utilities to grapple with technology barriers and several points of communication failure.

Alternatively, an interoperable communications solution uses innovative software and an underlying IP network to deliver the framework of interoperability between both new and old infrastructure components. With a unified interoperable mission critical communications solution, power utilities can deploy a future-proofed mission critical communications network without the worry of failed communications during their system modernization efforts.

As bandwidth demands continue to strain existing communications networks, a variety of converging factors such

as evolving regulations and standards, opportunities to develop new service offerings and implement advanced, more reliable business and operational processes suggest that now is the time to modernize mission critical communications networks and fill gaps in both customer-facing and internal communications.

To help navigate communications network changes and opportunities, power utilities should consider the following actions:

- 1. Plan now for the future.** Careful planning for upgrades to utility communications networks should take an integrated approach that thoroughly analyzes all relevant corporate and technology resources, requirements and goals.
- 2. Build bridges internally.** Optimal planning endeavors include representatives from a variety of departments. Incorporate network growth in any operational discussions and planning. Continue to bring operational and information technology groups together to gain synergistic insights.
- 3. Focus on maximum interoperability.** Carefully vet vendors and choose solutions designed to support industry-standard protocols and enable interoperability with a variety of devices and platforms including third-party call control platforms, session border controllers and gateways.

Now is the time to modernize your mission critical communications infrastructure

Developing a forward-looking strategy for building your communications infrastructure of tomorrow requires careful analysis and consideration. Effective planning for the future depends on a comprehensive assessment of current and emerging technologies and business applications. Having a strategic plan is particularly important for addressing interoperability issues and ensuring unified, efficient modernization efforts.

A solution-focused vendor partner with proven excellence in communications network applications can bring essential capabilities to the table during every phase of network modernization. The selection criteria outlined in this paper provides valuable benchmarks for selecting a vendor, such as REDCOM, with the right credentials to help utilities meet the challenge of building truly useful, unified communications networks that support the smart grid.

For example, the extensive SIP trunking capabilities found in REDCOM platforms allow power utilities to scale telecom systems faster and more cost-effectively than with traditional phone lines. SIP trunks are used to connect two sites together and to connect them to the Internet. With proper network assessment planning and implementation, SIP trunks can deliver high quality and reliable service with substantial cost savings that directly impact the bottom line of utilities.

Public utilities also benefit from interoperable technologies such as those offered by REDCOM, which features a simple and reliable

means of bridging communications between both legacy and VoIP networks. The most robust solutions include full switching and routing capabilities along with radio features such as PTT pass-through. At the very least, a telecom vendor should support interoperability between disparate radio networks; HF, VHF and UHF radio nets; VoIP; SIP, T1, E1, E&M and LSRD trunking; and fixed-line/PBX subscribers.

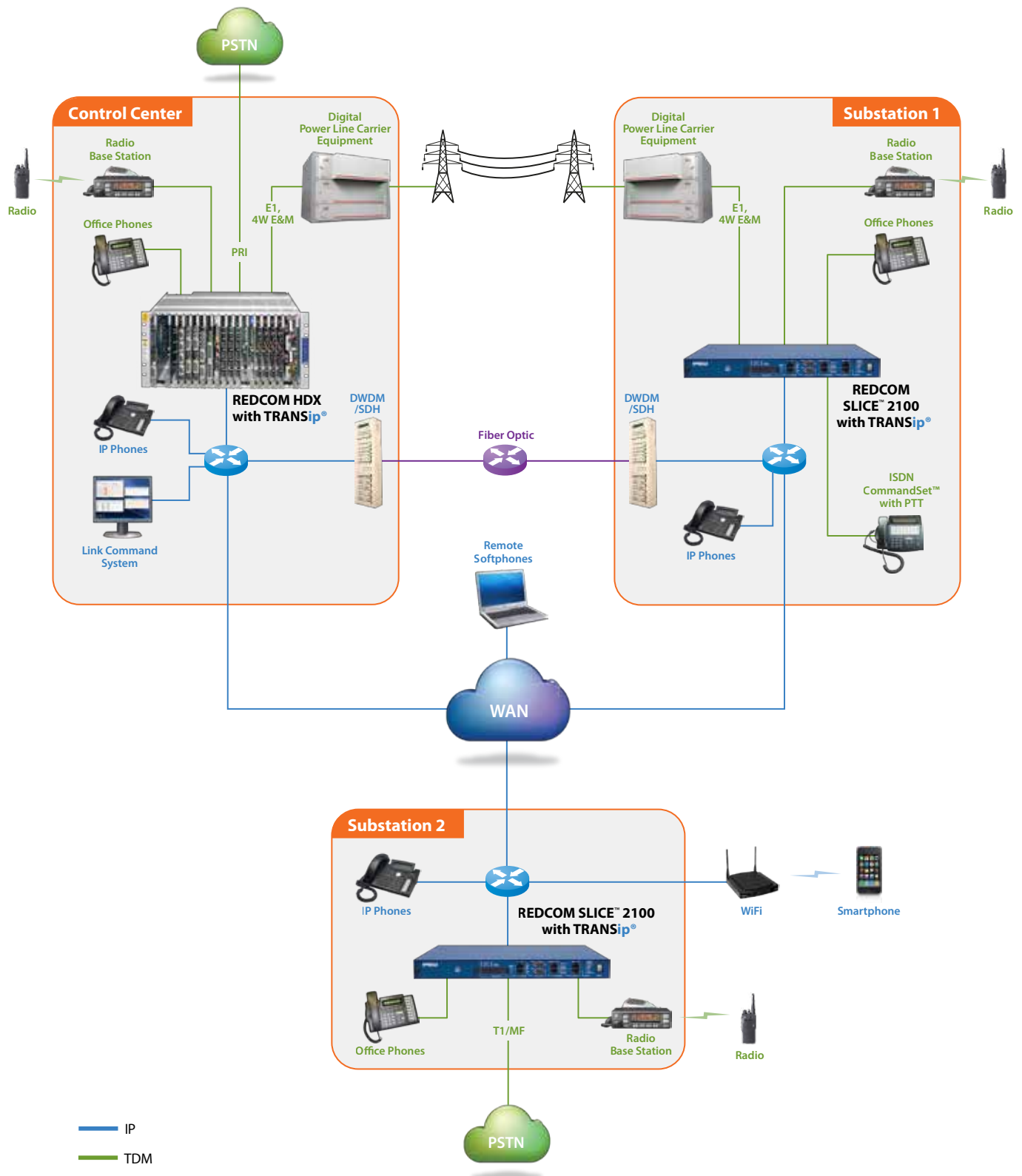
Standardization is just one way that interoperability delivers financial benefits. Standardized technology like that offered by REDCOM allows utilities to interoperate with existing legacy networks, radios, and wireless communications while supporting a seamless, incremental transition to Smart Grid systems. Because of this functionality, utilities can continue using legacy networks while leveraging the benefits of next-generation VoIP and unified communications systems, all without the worry of implementing a costly "rip and replace" solution.

At REDCOM, we believe people should have access to the necessary tools to communicate with each other whenever, wherever in a fast, precise, and reliable manner. That's why for nearly 40 years, we have worked tirelessly to design and develop innovative, interoperable unified communications products that public utilities can trust to keep the lines of communication open.

For more information on how we can modernize your mission critical communications network, visit us at www.redcom.com or email us at sales@redcom.com.



Interoperable communications for power utilities



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