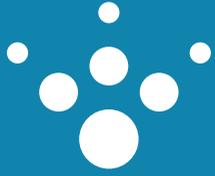


Nothing's out of reach.



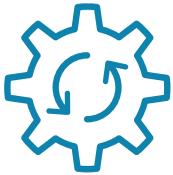
SMART CITIES START WITH SMARTER UTILITIES:

The role of smart communications

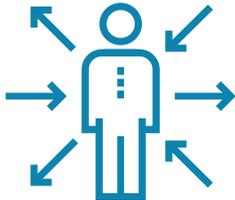
**SENSUS**
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Primary benefits of a smart utility



Optimized operation



Enhanced customer engagement



Conservation

Communities around the globe are clamoring for utilities that provide improved safety, better efficiency and a dedication to sustainability. Citizens want smart utilities. According to Randolph Wheatley, Sensus' VP of Communications Solutions Marketing, "At its foundation, a smart utility has integrated capabilities that enable it to effectively gather information about the resources it provides and the network it uses."

Ultimately, there are two primary benefits of a smart utility: optimized operation to reliably deliver services and enhanced customer engagement. These enable more intelligent resource and conservation decisions. From these two outcomes spring myriad advantages impacting both the utility and the consumer. But smart can't happen without utilities implementing a communications network that can enable all that potential.

Action requires communication

There are all kinds of devices, meters and sensors in the marketplace that proclaim to be smart—perhaps providing drive-by collection, outage determination or leak identification. And although this data collection is necessary, Wheatley explains that "a device isn't actually smart until it can provide that data to the utility so the utility can then make informed decisions to optimize operations."

It's the communication network that gives utilities the ability to glean meaningful intelligence and make relevant application for the consumer and the utility. "It's the difference between flying a plane blindly versus flying with a variety of tools such as radar and an altimeter," says Wheatley. The communication network allows the utility to see where it has been and where it is going and to keep the customers informed.

"Utilities are one of the last marketplace goods predominantly paid after use," explains Wheatley. "But consumer expectations are changing, prompting a need for better usage visibility and understanding. And this change is impossible without the right communications to gather the right information at the right time."

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Communication network features



Spectrum

Is the network private and FCC licensed, or is it shared so devices compete to deliver data?



Reliability

Can the network be counted on in an emergency, and will the system effectively support restoration efforts?



Security

Does the network provide protection from security breaches?



Bandwidth

Can the network handle ever-increasing volumes of data and support expansion and new applications?

Network options

There are four key features that dictate the efficacy of utility communication networks, each impacting the quality and quantity of data: spectrum, reliability, security and bandwidth (see the list at left). And within the current marketplace, five primary network options—mesh, LoRa, cellular, NB-IoT and FlexNet—are vying for the utility vertical. Although some parallels exist, the differences are significant—and can be costly.

Mesh

- **Spectrum:** Operates on an unlicensed, shared spectrum network crowded with noise from outside devices like baby monitors and microwaves.
- **Reliability:** It takes hours to reform post-outage; the network view is incomplete, so deployment priority decisions are challenging.
- **Security:** Consumer data can be transmitted to or received by non-secured points via the shared spectrum.
- **Bandwidth:** All applications are shared across a single channel, and investments in CapEx and OpEx are required to expand.

LoRa

- **Spectrum:** Operates on an unlicensed spectrum network built for transmitting data from sensors, but it is not built for utility-grade large data loads.
- **Reliability:** While it has a long range, it has very low transmission power. Battery life can drop rapidly based on higher data rates and channel loading.
- **Security:** Consumer data can be transmitted to or received by non-secured points via the shared spectrum.
- **Bandwidth:** An ultra-narrowband spectrum with only one channel, so traffic increases on the network lead to range decreases.



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Cellular

- **Spectrum:** Operates on a licensed, public carrier network that is shared with others and receives a wide range of data—not solely utility data—across billions of apps.
- **Reliability:** Dead zones in the network affect utility data. Consistent coverage is not guaranteed.
- **Security:** Although a cellular network is licensed, it’s not licensed specifically for utilities, which creates the potential for security breaches.
- **Bandwidth:** Upgrades are required as technology improves. With each new leap in performance, assets are stranded and costs passed to the utility.

NB-IoT

- **Spectrum:** Operates on a shared, public carrier network designed for data coming from low-power sensors.
- **Reliability:** Not designed for extensive battery life. Endpoint devices are rated for only 10 years.
- **Security:** Consumer data can be transmitted to or received by non-secured points via the shared spectrum.
- **Bandwidth:** Architected for low-power sensors and is not a utility-grade network. Service Level Agreements (SLAs) are not available to guarantee coverage.

FlexNet®

- **Spectrum:** The only FCC private-licensed spectrum network dedicated to transmitting critical utility data, interference-free.
- **Reliability:** The industry’s only private, storm-hardened network designed for 100% coverage, even during major storm events. Delivers two times the redundancy compared to the competition.
- **Security:** Provides secure, AES 256-bit encrypted data delivered over the only private, FCC-licensed spectrum specifically for utility data.
- **Bandwidth:** Scalable and upgradable, a single network can be securely used for multiple utility applications. Each application has a dedicated channel to prioritize applications and critical messages.



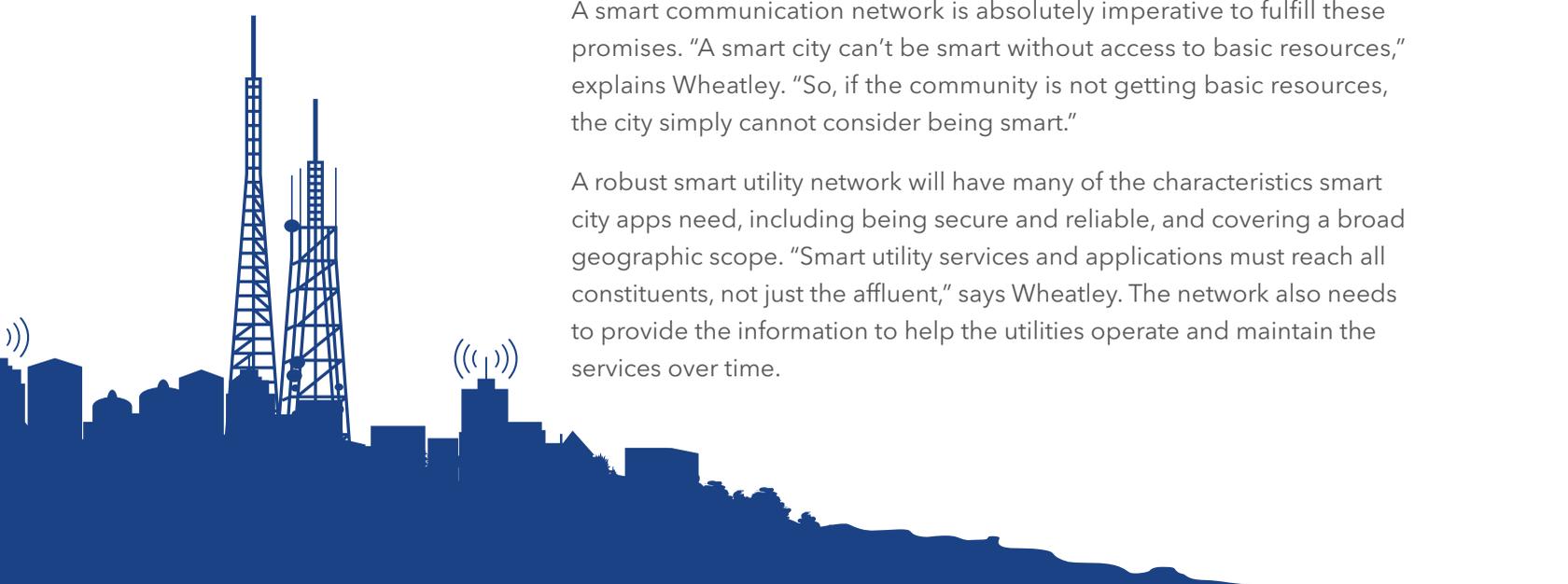
All four features—spectrum, reliability, security and bandwidth—must be considered when looking for the right communication network. But reliability and resiliency are foundational elements for any utility. “For utilities to operate and deliver resources with reliability, the network itself needs to be reliable,” asserts Wheatley. After all, regardless of data capabilities, the resources must ultimately be delivered to the community—in normal times and during storms and crises.

Of course, given the rapid pace of technological advancements, expandability is key. “Today’s available applications are just a fraction of what is coming down the road,” says Wheatley. “The network must be expandable to ever-new apps and devices.” Moreover, as customer demands change and grow, the network has to adequately expand to handle the latest applications without compromising current services.

Communications and the smart city

Urban areas are attracting residents with the promise of being a “smart city”—providing digital connectedness, automation, safety and conveniences. A smart communication network is absolutely imperative to fulfill these promises. “A smart city can’t be smart without access to basic resources,” explains Wheatley. “So, if the community is not getting basic resources, the city simply cannot consider being smart.”

A robust smart utility network will have many of the characteristics smart city apps need, including being secure and reliable, and covering a broad geographic scope. “Smart utility services and applications must reach all constituents, not just the affluent,” says Wheatley. The network also needs to provide the information to help the utilities operate and maintain the services over time.



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Building the case for smart communication

According to Wheatley, utilities typically have a core set of desired applications in mind when determining if an investment in a smart communication network makes sense. As previously noted, whatever network is investigated must be capable of expanding beyond the current business use case—even to applications not yet in existence. The most common aspects currently used to establish a business case are the following:

- Data capture for billing efficiency and accuracy
- Theft and loss reduction
- Management asset optimization to identify infrastructure weaknesses in advance of crisis
- Customer service enhancement, response improvement and user conservation

What’s trending?

The digital age is here to stay. Utilities, municipalities and citizens alike must recognize that the Internet of Things (IoT) is rapidly evolving, creating unheard-of connectivity among and between machines, devices, animals and humans. With IoT come new breeds of utility applications that require a network to be well-suited for existing and future applications.

“Utilities are pushing for greater automation and better visibility of their networks. This requires connectivity to a broader range of smart devices covering a larger geographic area and capturing data more frequently,” says Wheatley, “so it’s imperative for utilities to keep the long game in sight when choosing the right communication network. In fact, if a network cannot enable broad—and rapidly expanding—applications, it should not even be considered as a smart utility solution.”



About Sensus

Sensus, a Xylem brand, helps a wide range of public service providers—from utilities to cities to industrial complexes and campuses—do more with their infrastructure to improve quality of life in their communities. We enable our customers to reach farther through the application of technology and data-driven insights that deliver efficiency and responsiveness. We partner with them to anticipate and respond to evolving business needs with innovation in sensing and communications technologies, data analytics and services. Learn more at sensus.com and follow us on Facebook, LinkedIn and Twitter through @sensusglobal.

Sensus by the numbers

