Communications for the Smart Grid

Utilities are recognizing the strategic value of communications in delivering the applications to make the vision of the Smart Grid a reality. In the past, many utility applications utilized dedicated single purpose networks, but the multiple applications of the Smart Grid make leveraging a single network capable of supporting multiple applications, essential to building a successful business case.

Tropos GridCom™ 2.0 is a standards-based distribution area network architecture for the smart grid that enables utilities to build a private communications foundation for aggregating multiple applications across their service territory. It incorporates the resiliency, adaptability, security, control, and performance features required. Deploying one network for multiple smart grid applications provides substantial operational efficiencies and cost savings.

TROPOS SMART GRID CUSTOMERS EXAMPLES

- **Avista**
  Avista selected Tropos as part of Avista's Smart Circuits Project in the Spokane area for distribution automation. Tropos provides real time communications between substation controllers and DA devices. Avista will be able to quickly pinpoint faults in its distribution network, significantly improving system reliability that will reduce energy losses, lower system costs, increase reliability, and enhance the utility's ability to integrate distributed renewable generation resources.
- **Burbank Water & Power (BWP)**
  BWP is planning to use the network for AMI, Demand Response, and Distribution Automation. For BWP, the driving factor for a smart grid was to flatten demand peaks to avoid building new generating plants and the ability to better absorb the impact of PHEVs in the near future. The utility is also planning on segregating traffic and sharing the network for use by other city departments.
- **Silicon Valley Power (SVP)**
  SVP Meter Connect program includes rollout of Tropos' private wireless communications network and AMI. The utility plans to use the Tropos network to support additional smart grid applications, including Distribution Automation and mobile workers. In the future, the City plans to use the same network to provide mobile access for municipal field workers (public safety, building and fire inspectors, parks and recreation, and more), reducing operational costs versus cellular cards, and delivering greater bandwidth.

GridCom TROPOS

Why would a utility want to own a private wireless broadband network... why not just use cellular?

Owning and operating a private wireless broadband infrastructure offers utilities many advantages over public carrier wireless networks.

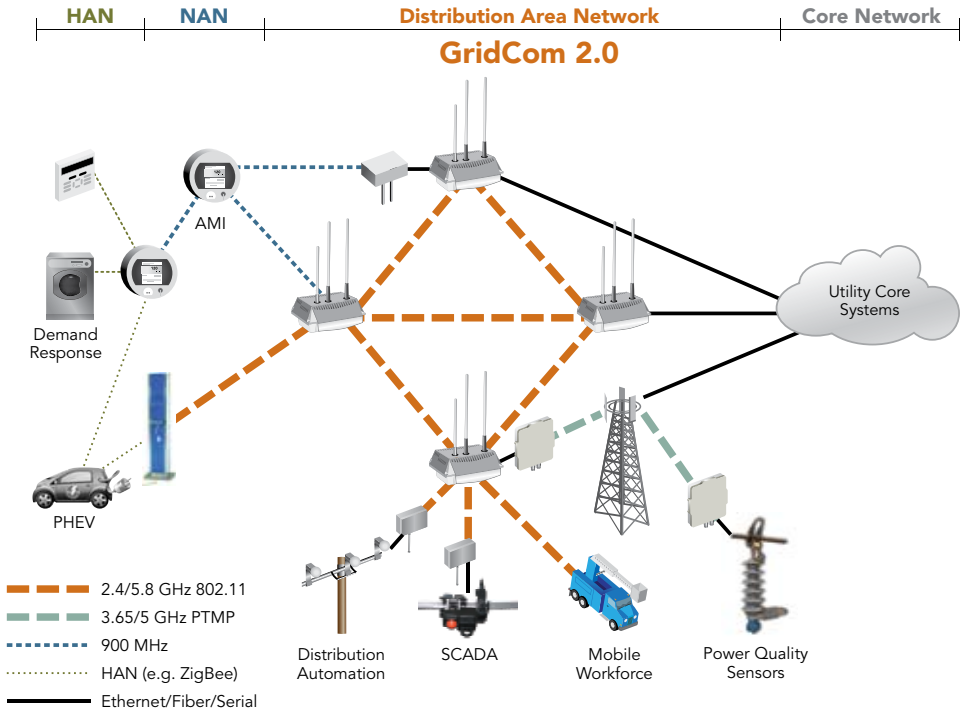
- **Availability:** Public carriers networks are shared with the consumer market and network performance can degrade dramatically in times of high usage. The utility lacks the ability to control availability.
- **Latency:** Some mission-critical applications, such as distribution automation, requires very low latency. Compared to private wireless technologies that reach latencies in the 10-100 millisecond range, public cellular technologies offer latencies in the 100-1000 millisecond range.
- **Control:** With a privately owned network, the utility designs and implements a network that meets the performance, reliability and security needs of their smart grid applications, while making any necessary cost or technology tradeoffs along the way. By contrast, public carrier networks are designed to the cellular operator's business objectives, which typically do not align with those of the utility.
- **QoS for mission-critical applications:** A utility that owns its own private network can ensure that its mission-critical applications are prioritized over other less delay-sensitive traffic. By contrast, utility data traffic on a cellular network is only one of many other traffic flows and utility applications are typically not afforded a higher priority than other traffic.
- **Higher network capacity:** Private wireless networks can provide an order of magnitude higher data capacity than existing cellular data networks. This is especially important as more data-intensive smart grid applications are adopted - these include distribution automation, mobile GIS, and video for substation monitoring.
- **Cost:** While leveraging cellular allows a utility to avoid some capital expenditure, there are significant ongoing subscription costs associated with this option. This becomes even more significant as the number of endpoints (meters, DA devices, etc.) increases. By contrast, building a private wireless network entails up-front capital expenditure as well as some ongoing operational expenditure, however, the payback period can be very short, compared with cellular data services over the life of use.

What is the Return on Investment (ROI) of this type of network?
The ROI for GridCom 2.0 depends on the overall network architecture chosen and the value created by the applications running over the network. For a single application, the breakeven can be in the 5-7 year range, however adding additional applications can reduce ROI to 1-3 years.

Is an open-standards wireless network more vulnerable to attack than a proprietary network?
Absolutely not. Open standards, especially in the area of security, result in more secure systems through the open processes of peer review and revision. GridCom 2.0 conforms to several of the toughest security standards including IEEE 802.11i, NERC CIP and FIPS 140-2, and is a layered security strategy comprised of strong authentication, access control, encryption and data confidentiality and physical security.

Why is broadband performance for a utility's network needed?
While many utilities initiated deployment of their smart grid with AMI, its just one of many applications required to fulfill the vision of the smart grid. Demand management and response, distribution automation and control, outage management, and mobile workforce applications will work together to help utilities more efficiently leverage assets in the field and make the vision a reality. Deploying and managing separate networks for each application is not cost-effective. A single, standards-based high performance network that aggregates communications for multiple applications is simpler to manage and creates a better ROI. Over the next 2-3 years, additional applications for smart grids related to distribution automation, distributed generation, PHEV load management and video security will require much higher bandwidth and low latency that only broadband can provide.

What types of applications can a GridCom 2.0 network handle?
Since the GridCom 2.0 broadband network is completely standards based, any application that runs over an enterprise IT network or the Internet can be supported. Smart Grid applications include both fixed applications such as smart metering, demand response, outage management, distribution automation and control, as well as mobile or portable applications used in the field such as mobile work order management, remote GIS applications, field asset management, and various personnel security applications. The network can be configured to provide multiple virtual networks which separate and prioritize user group or application traffic as needed.



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