Connected Grid Solution Questions

Q. What is Cisco announcing?

A. Cisco is introducing its Connected Grid architecture, along with the first solutions in its Connected Grid portfolio of solutions for harsh, ruggedized environments often found in the energy and utility industries. These solutions include the Cisco® 2010 Connected Grid Router (CGR 2010) and the Cisco 2520 Connected Grid Switch (CGS 2520), which have been designed to support the communications infrastructure needs for the energy delivery infrastructure across the generation, transmission, and distribution sectors. Together, these Cisco Connected Grid solutions deliver a next-generation secure and reliable network infrastructure for connected energy applications, such as substation applications supporting electrical transmission and distribution, renewable generation, oil and gas, water, distributed generation, co-generation and trackside operations. The infrastructure also includes communications infrastructure for delivery applications such as transmission pipelines, distribution mains, and service lines for oil and gas and water. Designed for highly secure, reliable, and scalable infrastructure, the CGR 2010 and CGS 2520 are an ideal platform to support the Smart Grid and other energy delivery infrastructure needs of customers. These ruggedized products have been extensively tested and are KEMA certified to meet challenging substation compliance standards including IEEE 1613 and IEC 61850-3.

Q. Are these new products?

A. Yes. Based on proven Cisco technology, the Cisco CGR 2010 router and the Cisco CGS 2520 switches have been specifically designed for the exacting environment of the energy and utility industries.

Q. Where do these solutions fit in the smart grid infrastructure?

A. One potential application for these solutions is deployment in the power utility substation as part of a transmission and distribution automation infrastructure. Refer to the associated at-a-glance document for more information on the components of the Smart Grid.

Q. What is substation automation?

A. Substation automation is the replacement of electromechanical and analog protection and control systems, and monitoring and communications equipment in electrical substations with microprocessor relays and other digital devices (generically known as Intelligent Electronic Devices or IEDs). Substation automation involves the use of digital communication networks, both inside the substation and from substation to other substations and to utility control centers. Substation automation provides the utility with increased capabilities for advanced grid control as well as the ability to collect operational and asset data that can be analyzed to diagnose and even predict failures, thus improving reliability, power quality, and utility asset management and utilization.

Q. What differentiates the Cisco substation automation infrastructure solutions?

A. The Cisco CGR 2010 router and Cisco CGS 2520 switches both have integrated, comprehensive security features. These solutions combine the rich functionality of Cisco IOS® Software with the specific standards compliance and ruggedized features required for Smart Grid deployments. Cisco IOS Software infuses intelligence, reliability, and security into the substation automation infrastructure by combining high availability, redundancy, quality of service (QoS) traffic prioritization, and high performance with fully

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integrated security features such as intrusion prevention system (IPS), VPN, firewall, identity, and access control capability. These features provide superior protection and reliability to the substation. Most importantly, these products are part of an end-to-end, secure, and standards-based data communications infrastructure for the Smart Grid, the Cisco Connected Grid portfolio. Cisco delivers secure, end-to-end, and standards-based communications solutions for the Smart Grid, from power generation facilities to businesses and homes.

Q. What are the major challenges faced by the energy industry and utility companies that the Cisco CGR 2010 router and Cisco CGS 2520 switches were designed to address?

A. Utility and energy operators face a rapidly changing operational and business climate, with increasing regulatory compliance requirements, increased demands for network security, and ever greater need for transparency of grid operations, from power generation to load consumption.

At the same time, utility and energy operators must not only maintain, but also increase the reliability of the delivery system. Utility and power operators must plan for new operations, such as the integration of renewable energy sources to meet legal and regulatory mandates. All these challenges must be met in an extremely demanding physical environment of the energy and utility network infrastructure.

Q. How do Cisco's Connected Grid solutions address these challenges?

A. The new Cisco Connected Grid automation solutions for the utility and energy industry deliver clear and immediate benefits to operators, enabling them to:

- Build a more efficient and reliable energy delivery system by integrating end-to-end, highly secure IP-based communications into their power grid.
- Meet regulatory mandates by helping secure, monitor, and manage their critical data networks in accordance with requirements such as the North American Electric Reliability Corporation/Critical Infrastructure Protection (NERC/CIP) requirements
- Reduce operational expenses by providing better remote engineering access to resolve network issues, which reduce the need for costly onsite repairs.
- Combine Supervisory Control and Data Acquisition (SCADA) and nonoperational data onto a single IP network while maintaining higher priority for grid operation and management traffic.

Q. What does "ruggedized" mean?

A. In the context of the power utility substation, "ruggedized" means that the devices comply with specifications IEEE 1613 and IEC-61850-3, which certify that products meet stringent environmental, surge, and electromagnetic interference (EMI) requirements for utility substation environments. Ruggedized products tolerate a broad range of temperatures, surge, fast transients, radio frequency interference, and electrostatic discharges. Cisco CGR 2010 routers and Cisco CGS 2520 switches have no moving parts or fans, and meet or exceed these IEEE and IEC specifications. In addition, these platforms share common power supplies and can use either AC or DC, dual-redundant power supplies.

Q. When will these products be generally available?

A. The Cisco CGR 2010 is currently available. The product started shipping in August 2010.

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Connected Grid Architecture and Portfolio Questions

Q. What is the Cisco Connected Grid Architecture?

A. The Cisco Connected Grid architecture is the foundation for new energy infrastructure and power utility processes that will improve grid efficiency and pave the way for new, innovative business models and energy services that will enable our world to produce, distribute, and consume energy in a more efficient and sustainable way. Beginning with the power utility substation, Cisco is introducing Connected Grid architectures that help ensure grid security and reliability by using an end-to-end, integrated data infrastructure to collect, analyze, and respond rapidly to information about changing operating conditions throughout the grid.

Q. In addition to the substation automation architecture, what other Connected Grid architectures is Cisco planning?

A. Cisco is developing architectures for the utility data center, the wide area network, the field area network, and premise area networks.

Q. What is the Cisco Connected Grid portfolio?

A. The Cisco Connected Grid portfolio is a family of products designed to deliver secure, end-to-end, standards-based communications solutions for energy and utility applications, from generation facilities to businesses and homes.

Q. Are services part of Cisco Connected Grid?

A. Yes. Cisco works with its partners to deliver services that accelerate technology absorption, simplify management and maintenance, and provide world-class customer support. The Smart Grid services provided by Cisco and its partners are based on industry best practices and proven methodologies to help utilities:

- Plan, build, and run resilient, converged networks that support Smart Grid solutions
- Maintain high levels of reliability, performance, and manageability
- Achieve and maintain compliance with regulatory requirements
- Create and maintain an energy-efficient, secure data center for control operations
- Protect against both the cyber threats and the physical security threats to utility data and utility physical assets
- Improve efficiency and lower greenhouse gas emissions

Q. Can you tell us about the Cisco Connected Grid solution roadmap?

A. Cisco does not speak publically about new products until they are available. We will have detailed information about the specific products and services forthcoming, as well as some longer-term roadmap elements when the various business units announce those products and capabilities.

General Smart Grid Questions

Q. Won't you compete with GE and other vendors such as Silver Spring in this market?

A. Cisco will partner with a variety of developers, integrators, and suppliers to develop best-in-class solutions for customers.

Q. How is Cisco approaching working with possible partners and competitors?

A. This is a new, adjacent space for Cisco, but our model will be similar to our model for working in other markets. We are going to build a new ecosystem of partners and also use some of our existing partners. These partners have a common vision for IP communications as the fundamental enabler for Smart Grid.

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Ultimately, however, building the Smart Grid has to be an industry effort in which we all work together with government to make this vision a reality.

Q. Will you become a utility Internet service provider of sorts?

A. No. Cisco expertise is in creating networking technology solutions that will enable an end-to-end communications fabric for the grid.

Q. What standards bodies are involved in developing standards for the Smart Grid? Does Cisco have a presence in any standards bodies?

A. Cisco is involved in a number of standards bodies. Many of the standards that apply to the smart grid revolve around security or other particular technology areas.

A few examples: North American Electric Reliability Corporation/Critical Infrastructure Protection (NERC/CIP). To see what this group is involved in, visit: http://www.nerc.com/page.php?cid=1.

Cisco has active participation in this group, and our products adhere to the guidelines that have been published by the group. Cisco is a leading advocate of this group.

National Institute of Standards and Technology (NIST) is active in new standards development. Cisco is a primary participant in these new standards. For more information about NIST, visit: http://www.nist.gov/index.html.

Q. What products does Cisco currently offer? What is your product roadmap?

A. Cisco solutions will provide network communications for grid infrastructure and establish a complete generation-to-home communications fabric based on IP standards. Our vision is to build intelligence, resiliency, and two-way communications into the currently static electricity distribution system as well as other energy infrastructure.

Currently we offer:

- Connected Grid solutions, including the Cisco CGR 2010 router and the Cisco CGS 2520 switches
- Business energy management tools, including Cisco EnergyWise and Cisco Network Building Mediator
- Data center solutions enabling data collection and analysis

A full portfolio of plan, build, and run services is offered by Cisco and our partners.

Q. What would you offer in the home that is not already out there?

A. We cannot comment on the specifics, but we already have an extensive footprint in the home. We are planning solutions that can be integrated into existing solutions or current infrastructure, such as routers, or that will operate with our Scientific Atlanta cable modem.

Ultimately, we want to provide consumers with greater choice and control over their energy consumption.

Q. What do you mean by an "end-to-end" communications infrastructure? What part of the grid will be communications based?

A. We believe that the IP infrastructure will form the basis of the Smart Grid from power generation facilities to the home. Communications technology will be embedded at various places along the grid: substation, WAN, operations center, field area network, premise networks, and data center.

Q. How will a Smart Grid work with your current energy management products such as Cisco EnergyWise?

A. Cisco EnergyWise technology, available on Cisco Catalyst® switches, offers a business energy management (BEM) solution that proactively measures, reports, and reduces the energy consumption of IP devices across

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the organization, including phones, laptops, access points, building control systems, and more. It provides better visibility into energy savings across the organization as well as in branch offices and data centers.

Combined with the Smart Grid capabilities, EnergyWise is designed to enable organizations to not only optimize their power utilization, but also correlate business energy policies with business-use needs and special power-rate offers and off-peak pricing. It is also designed to enable the utilities to enforce controls on peak-load conditions and perform load-shifting to optimize power generation and reduce costs.

Q. How will your Smart Grid solutions tie in with building management?

A. Cisco Network Building Mediator solutions and Cisco EnergyWise solutions help connect building management systems into the overall business energy management solutions and take advantage of optimized energy use for cost and carbon savings.

Q. What about security: Is a Smart Grid really secure?

A. Over the past 25 years, we have witnessed a transition of primary infrastructures to IP, such as financial, communications, defense, and industry.

The benefit of an IP-based Smart Grid is that it can be secured both from cyber attacks and physical attacks using the latest security technologies.

Best practices developed from securing other critical infrastructures will be applied to the Smart Grid to segment business functions and provide the authentication, authorization, integrity, confidentiality, and threat prevention necessary to realize a secure smart grid.

For More Information

Cisco 2000 Series Connected Grid Router (CGR 2010): http://www.cisco.com/go/cgr2000.

Cisco 2500 Series Connected Grid Switch (CGS 2520): http://www.cisco.com/go/cgs2500.

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