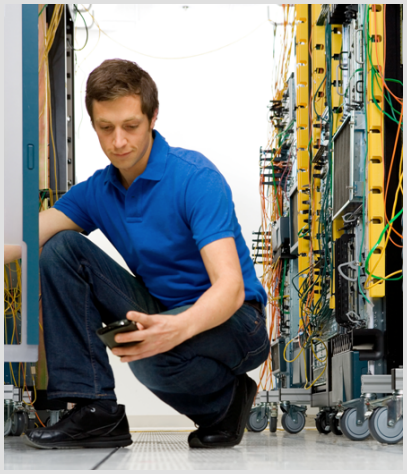
Cisco Connected Grid Network Architecture Services

Deploy greater grid capabilities while increasing efficiency, addressing regulatory compliance, and serving your customers better.



Connected Grid Service Benefits

- Increase return on assets, efficiency and utilization with careful planning and detailed custom design
- Experience a faster, more effective deployment of Cisco's innovative Connected Grid converged IP infrastructure based on Cisco leading practices
- Improve regulatory compliance by integrating security features across the network
- Enable new energy services offerings such as demand response and integration of distributed generation onto the grid

With both energy demand and costs rising, utilities must be able to anticipate changing patterns to manage supply and demand. They need to be agile and responsive enough to explore renewable forms of energy generation, such as wind and solar power, and integrate these sources into their framework. Finally, they need to make sure that their infrastructure is reliable, resilient, and secure to reduce the risk of costly outages and breakdowns.

Cisco® Connected Grid is an architecture and foundation for the smart grid that includes a holistic portfolio of technologies and services that enable utilities and other organizations in the energy industry to optimize electrical power supply and demand, improve security and reliability of power delivery, and reduce the operational cost and complexity of the energy grid.

Enabling the Connected Grid

Cisco Services are crucial components of Cisco's Connected Grid Architecture, the network communications infrastructure for the smart grid. Cisco's Connected Grid Architecture is the framework for the network that helps utilities become more efficient and provide sustainable energy generation and distribution while also providing consumers the tools they need to manage and control their energy consumption as participants in a multi-lateral grid environment.

Cisco, which has architected some of the world's largest networks, provides deep networking expertise and applies industry-leading practices to help you plan, build, and run a converged smart grid infrastructure. Cisco has developed detailed use cases and documented architecture requirements working with leaders in the utility industry.

Cisco Connected Grid Network Architecture Services

Cisco Connected Grid Network Architecture Services are a portfolio of professional services that help utilities create the Connected Grid through a series of established planning, design, implementation, and operational models. These services help utilities envision the framework and create a blueprint for improving their grid efficiency and then pave the way for innovative business models and energy services.

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The three services that make up this offering are:

- Cisco Connected Grid Network Architecture Discovery Service
- Cisco Connected Grid Network Architecture Assessment Service
- Cisco Connected Grid Network Architecture Planning and Design Service

These services are customized to the specific needs of the utility for generation, transmission and distribution. Cisco has undertaken a thorough analysis of the use cases that utilities want implemented for current and future smart grid environments. The resulting design schemes bridge the utility's business needs and the necessary technical solutions. Cisco Connected Grid Architecture Services are built on these use cases to help utilities create an intelligent, fully integrated and participative communications architecture that can play a pivotal role in the success of the smart grid going forward.

Cisco Connected Grid Network Architecture Discovery Service

The Cisco Connected Grid Network Architecture Discovery Service provides guidance in analyzing the merits of various technology options and solutions to arrive at a comprehensive grid networking strategy.

Through a multiday architecture and solution workshop, Cisco reviews the utility's business and technology requirements, especially network infrastructure and security strategies, and then documents recommendations for adopting solutions within the end to end energy delivery infrastructure.

Typically, this onsite facilitated session includes reviewing new business transformational solutions with smart grid specialists, mapping to the business objectives and priorities, and creating recommendations for the converged architecture needed to enable the Connected Grid, including one or more of the following:

- Architectural transition
- Requirements and solutions planning
- Security and NERC/CIP compliance
- Distributed Intelligence
- Network management
- Customer premise networks (business and home energy management)
- Operations center network design
- Data center design
- Field area network and advanced metering infrastructure
- Transmission and substation design
- Utility and regional network

Cisco Connected Grid Network Architecture Assessment Service

The Cisco Connected Grid Network Architecture Assessment Service is a more detailed discovery process that occurs over several weeks and requires onsite review and remote analysis. This service is right for the utility that already has a solid understanding of its equipment capabilities but needs a detailed network roadmap and seeks to achieve long-term objectives for its investments in smart grid communications devices and networks.

Through a multiweek engagement, we work with your team to assess the current state of the infrastructure, identify gaps, and propose a networking architecture and solution recommendation.

Service activities and deliverables include:

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- Analyzing and documenting your business profile, requirements, and target network success metrics relative to Cisco leading practices
- Assessing the utility's current architecture, including:
  - The high-level design for routing and switching infrastructure
  - Current LAN performance, traffic, and configurations
  - Existing network security: internal, perimeter, wireless, unified communications, data center, endpoint, and firewall security
- Developing a high-level converged network solution proposal identifying technologies and solutions to achieve business and network goals

Cisco Connected Grid Network Architecture Planning and Design Service

Once you have a network roadmap and strategy established, based on the extensive work done in the Cisco Connected Grid Network Architecture Assessment Service, you are ready to proceed with detailed design and implementation in the Cisco Connected Grid Network Architecture Planning and Design Service phase.

The planning and design service is an onsite or remote engagement that provides the guidance and leading-practice expertise to help you succeed. It creates a design document that maps the utility's business objectives and technical requirements to a proposed network architecture design and then offers an adoption schedule.

The power of the planning and design service is its deep analysis of the utility's business profile, grid requirements, metrics, and current architecture.

Benefits Summary

Ultimately, the Cisco Connected Grid Network Architecture Planning and Design Service:

- Maps business objectives and technical requirements to a proposed high-level architecture and network design
- Creates an adoption schedule that includes pilot testing and the necessary steps to introduce new hardware and protocols into the network with associated recommended timelines to help ensure stability and functionality
- Translates your high-level design into a detailed design by developing low-level configuration templates, logical and physical topology diagrams, and checklists
- Provides consultative support and knowledge transfer sessions while you and/or your Cisco partner are implementing the architecture
- Validates security and network performance relative to design specifications, assists with site turn up, and provides a report

Designs that Cross Operational and Functional Boundaries

Cisco's design services map how a utility's grid functions from one end to the other across operational and functional boundaries. This effort results in an architecture and design that address the utility's overall business needs rather than just the needs of a particular domain or function and effectively tie the smart grid together in a truly transparent and uniform manner.

An integrated design takes into consideration the various places in the network as well as the network overlays to create a single, converged architectural framework. Brief descriptions of each area follow.

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Places in the Network

- **Data center**: A secure and efficient operation center environment contains the applications associated with data collection, analysis, and control. Cisco Services help utilities set up fully virtualized operational environments, enabling scalability, efficiency, and cost effectiveness as well as manageability and security.
- **Operations center:** As the central point for analysis of operational data in the smart grid, optimal IP network designs are critical for reliability and performance. Applications residing in the control centers perform a variety of functions ranging from grid monitoring and control to generation scheduling and market operations. Getting the right data from smart grid intelligent devices to the appropriate applications quickly and accurately—and providing a response in real-time—is the function of the Operation Center.
- **Field-area network**: This part of the network requires a communications infrastructure that has the ability to accommodate the needs of diverse applications, ranging from fault location, isolation, and restoration (FLIR); grid optimization; and demand response to the management of distributed energy sources. These services help design an architecture that is scalable and able to meet the needs of distribution automation and distributed energy resources (DER) use cases in the future, address high-availability requirements for security and FLIR use cases, and build security transparently into the fabric of the distribution network.
- **Customer premise network**: The designs required for this part of the network address the communications needs within the utility's consumer, commercial, and industrial environments and determines how the utility's business requirements can be effectively achieved in a secure manner. Cisco architecture and design services can provide the flexible frameworks necessary to address multiple premises network scenarios and integrate them into a single, high-level communications architecture.
- **Transmission and substation network**: Cisco services for this network create designs for differentiated levels of service for the various types of traffic traversing substations. They are secure and compliant with regulations governing these networks. The objective is to reduce operation costs for the utilities, provide greater visibility, and increase reliability in these environments.
- **Utility and regional network**: Cisco design services for the wide-area network connect all the network places together in a secure and fully differentiated manner mapped to the requirements of the various applications flowing across it. This service helps improve the manageability of the network.

Overlays

- **Distributed intelligence**: Cisco design services work closely with the utility to identify those areas where the intelligence that is embedded in the communications fabric can be used to improve scalability, security, and manageability of the smart grid environment. Cisco Services for Distributed Intelligence create an environment where centralized and distributed processing work closely together to improve functioning of the entire grid.
- **Security**: Cisco design services provide the utility with a unified framework for security, meaning security that is based on helping survivability of use cases cutting across the utility environment rather than protecting one domain against another. These services also provide the utility with a complete security lifecycle, including deployment, operations, and incident response.
- **Network management**: Cisco design services build out a framework for network management of the communications infrastructure enabling smart grid. These services include element and device management strategies as well as an overall view for gaining situational awareness, assessing and making management decisions based on the information available, and applying controls. The architecture creates a view for tying network management into energy management in the smart grid, as well as offering configuration management and secure, live updates for uninterrupted operations.

Utility transmission and distribution grids already contain the equipment that makes the grid work for yesterday's configurations. But, by responding to future concerns about the environment and addressing demands for more

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control of their energy consumption by consumers, utilities must plan now for a future with a more pervasive communication infrastructure: the Connected Grid. Cisco Connected Grid Architecture Services create a solid foundation that helps utilities prioritize and address the operational aspects of grid management:

- **Network operations**: integration, deployment, and manageability
- **Information technology**: uptime, utilization, capital expenditures, operational expenses, and total cost of ownership
- **Applications**: application availability, performance, and security for strategic applications
- **Server operations:** server and storage availability and efficiency and total cost of ownership
- **Security operations:** physical, network and application security

Sustaining and Optimizing Your Cisco Connected Grid Infrastructure

Following the deployment of your Cisco Connected Grid solution, Cisco offers the Cisco Network Optimization Service to help you:

- Improve network performance and prepare the infrastructure for future changes
- Make the network more resilient, stable, and predictable
- Increase your team's self-sufficiency through sharing of knowledge and leading practices

Cisco and Smart Grid Ecosystem Partner Expertise

Engineers from Cisco and Cisco smart grid ecosystem partners are among the energy industry's elite in providing integrated, collaborative, adaptive smart grid solutions. Cisco and partners work together closely to deliver services to support your grid solution requirements. Cisco engineers typically hold one or more Cisco or industry certifications and have planned, deployed, secured, operated, and optimized the performance of many of the largest and most successful energy networks in the world. Cisco smart grid ecosystem partners are recognized for their prominence and expertise in the energy industry.

Availability

Cisco Connected Grid Network Architecture Services are available globally. Service delivery details might vary by region.

Further Information

For more information about Connected Grid Services, visit www.cisco.com/go/services/connectedgrid

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