Cisco Systems

SERVICE-DRIVEN METRO NETWORKS

CISCO SYSTEMS METRO ETHERNET PORTFOLIO BROCHURE

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THE SHIFT TOWARD SERVICE-DRIVEN METRO NETWORKS

Enterprise, commercial, and residential customers are increasingly seeking customizable services from their service providers. They not only expect higher-bandwidth connectivity services to support demanding applications, but also want the bandwidth delivered at greater levels of granularity. Service providers can no longer treat data, voice, and video traffic in the same way. Terminal traffic, for example, should be latency-optimized, while voice or video traffic should experience minimal loss and no packet reordering. The new service model is becoming one of "mass customization" rather than "mass production." Providers that can customize services for individual customers are more likely to realize the maximum revenue with these customers—because all their requirements are acknowledged and fulfilled.

To deliver the tailored services that customers demand, service providers are changing their assumptions about how to design and deploy networks. In the past, service providers focused on building a network infrastructure, then on delivering the services that the infrastructure could support. This transport-driven approach to networks is being replaced by a business-driven approach where services are increasingly driving the network infrastructure. This is especially true with Metro Ethernet networks.

To generate new revenue, providers are expanding their service offerings with connectivity services such as Layer 2 and Layer 3 VPNs, as well as value-added services such as storage, videoconferencing, and hosted IP telephony—all enabled by Metro Ethernet networks. To maximize their return on investment, providers need to deploy multiple services over a common Metro Ethernet infrastructure, and implement different capabilities at different layers (Layer 1, 2, and 3) where they can be delivered in a scalable and cost-effective fashion.

THE ETHERNET ADVANTAGE

Many service providers are turning to Ethernet technology for MANs and WANs to support new service offerings. Enterprise customers are asking providers to standardize on Ethernet as the user-to-network interface (UNI) everywhere on their networks to reduce expenses. Ethernet is familiar to enterprise customers and their IT staffs, it can scale to deliver bandwidth up to 10 Gbps to support demanding applications, and its bandwidth can be tailored to deliver performance that meets the needs of specific business applications.

Ethernet also gives the service provider tremendous flexibility. Today's intelligent Ethernet equipment delivers advanced network security and rich quality-of-service (QoS) capabilities, enabling providers to offer a customized mix of services and data rates, both for point-to-point and multipoint connections.

Ethernet can help service providers reduce operating expenses, make more efficient capital expenditures, and introduce profitable, high-margin services. The cost of introducing new Ethernet services is relatively low, because the technology is easily integrated into the service provider's existing transport infrastructure (running Ethernet over SONET/SDH, for example). In addition, Ethernet services can provide a high-bandwidth complement to a provider's existing portfolio of Frame Relay and ATM services.

By offering Ethernet-based services that can support more advanced applications, service providers can differentiate their offerings from competitors, improve their profit margins, and improve their revenue potential over the long term.

BUILDING A SERVICE-DRIVEN METRO NETWORK

Working with service providers worldwide, Cisco Systems® has formulated a service-driven approach to building a metro network that meets customers' service requirements—today and in the future. The approach consists of five major steps:

1. Service Definition: First and foremost, specify the various metro Ethernet services and their capabilities.
2. SLA Definition: Specify the attributes and performance that each service delivers.
3. Architecture: Determine the objects within a network, their roles and relationships, as well as the network topology.
4. Technology Deployment: Evaluate and choose specific technologies to support metro network services and architectures.
5. Solution Deployment: Select specific solutions and products for the different roles within the network.

*EMS Ethernet Multipoint Service; ERMS Ethernet Relay Multipoint Service; EWS Ethernet Wire Service; EPL Ethernet Private Line; EPR Ethernet Private Ring; ERS Ethernet Relay Service; L3VPN Layer 3 Virtual Private Network

A comprehensive, service-driven network employs multiple technology and product options to achieve the flexibility and scalability that is required. Many providers will opt for a hybrid of Layer 1, Layer 2, and Layer 3 technologies and products, rather than a single-layer solution. This hybrid approach can also be beneficial from a network management perspective if a single vendor can supply the underlying infrastructure.

Regardless of the underlying transport and access architectures, technologies, and products, Ethernet is the customer's interface to the service provider's network. What matters most are the customer's services and projected scale—not the supporting technology.

THE CISCO METRO ETHERNET PORTFOLIO

OFFERING COMPLETE SOLUTIONS FOR METRO NETWORKS

The comprehensive Cisco® Metro Ethernet Portfolio encompasses a variety of technologies and product options, offering service providers an end-to-end approach to deploying profitable Metro Ethernet services. The portfolio includes:

IP/MPLS and Ethernet

- **Cisco 12000 Series Routers:** These intelligent routing solutions scale from 2.5 Gbps/slot to 40 Gbps/slot capacities, enabling carrier-class IP/MPLS core and edge networks.
- **Cisco 10700 Series Routers:** The only metro edge access routers designed to optimize optical transport with Dynamic Packet Transport (DPT), Cisco's market leading Resilient Packet Ring (RPR) technology, to integrate full IP routing and services and to deliver intelligent Ethernet subscriber interfaces for simple, scalable, and reliable networks.
- **Cisco 7600 Series Routers:** The only edge routers that deliver robust, high-performance IP/MPLS features for a range of service provider edge and MAN/WAN applications.
- **Cisco Catalyst® 6500 Series Switches:** The premier line of intelligent multilayer modular switches, delivering secure, converged services from metro access to the WAN and MAN edge for service provider Metro Ethernet network deployments.
- **Cisco Catalyst 4500 Series Switches:** Modular switches with integrated resiliency, per-subscriber traffic management, security, performance, and QoS; designed specifically for both aggregation of business services and subscriber access in MANs.
- **Cisco Catalyst 3750 Metro Series Switches:** This line of premier, customer-located switches bring greater intelligence for Metro Ethernet access, enabling the delivery of more differentiated Metro Ethernet services.
- **Cisco Catalyst 3550 Series Switches:** Available in a range of Fast Ethernet, Gigabit Ethernet, DC power, and fiber configurations, this line provides an ideal solution for customer-located metro access in enterprise and small- and midsize-business markets.
- **Cisco Catalyst 2950 Series Switches:** This affordable line of fixed-configuration Fast Ethernet and Gigabit Ethernet switches is well-suited for customer-located metro access in residential markets.
- **Cisco Catalyst 2950 Long Reach Ethernet (LRE) Series:** This line of fixed-configuration switches enables service providers to extend intelligent Ethernet services over existing phone and legacy wiring, at distances of up to 5000 feet.

SONET/SDH and Ethernet

- **Cisco ONS 15600 Multiservice Switching Platform (MSSP):** Providing unparalleled flexibility in designing next-generation metro networks, this platform integrates metro core and edge networks for high-capacity aggregation, service provisioning, and network management in the core.
- **Cisco ONS 15454 SONET/SDH Multiservice Provisioning Platform (MSPP):** Offering next-generation optical transport, this platform combines traditional SONET/SDH optical transport (OC-3 to OC-192 and STM-1 to STM-64) with multiservice interfaces (including the ML-Series interface card with Fast Ethernet and Gigabit Ethernet services support).
- **Cisco ONS 15300 SONET/SDH MSPP:** This portfolio of compact access and aggregation optical platforms delivers OC-3 to OC-48 and STM-1 to STM-16, Ethernet/Gigabit Ethernet, and DS1/DS3 and E1/E3 services.

DWDM/CWDM

- **Cisco ONS 15454 Multiservice Transport Platform (MSTP):** This platform integrates intelligent dense wavelength division multiplexing (DWDM) onto the multiservice platform.
- **Cisco ONS 15500 Series:** Encompassing the ONS 15530 DWDM Multiservice Aggregation Platform, ONS 15540 ESPx Extended Services Platform, and ONS 15501 EDFA Optical Solutions Amplifier, this series is designed for carrying mission-critical storage and data applications over a highly available, scalable metro optical DWDM network.
- **Cisco ONS 15216 FlexLayer Platform:** The most cost-effective uni- and bidirectional DWDM solution for video on demand (VoD) and point-to-point fiber relief in the industry, when used with the Cisco ONS 15454.
- **Cisco Course Wavelength Division Multiplexing (CWDM) Gigabit Interface Converter (GBIC)/Small Form-Factor Pluggable (SFP) Solution:** The scalable and easy-to-deploy approach for Gigabit Ethernet and Fibre Channel services in metro networks.

WHY CISCO SYSTEMS?

THE CHOICE OF SERVICE PROVIDERS AROUND THE WORLD

As a leader in metro networking solutions, Cisco offers service providers several important advantages:

- **A service-rich solution:** The Cisco solution enables service providers to build a broad portfolio of Metro Ethernet services. Advanced QoS capabilities allow service providers to differentiate their offerings through SLAs. Additional bundled offerings can be delivered over Metro Ethernet, taking advantage of Cisco's extensive CPE offerings and partner programs.
- **Architectural flexibility:** In the diverse metro market, Cisco solutions can be implemented using Ethernet, optical, and IP/MPLS technologies. When combined with capabilities such as Frame Relay and ATM interworking, these technologies give service providers the ability to extend their service footprints.
- **Proven carrier-class solutions:** Cisco Metro Ethernet solutions have been deployed by service providers in different regions for delivering business and residential services. Validated through large-scale deployment, Cisco's carrier-class Metro Ethernet solutions address providers' requirements for reliability, scalability, and manageability.
- **Service provider market leadership:** Cisco has an extensive product portfolio to deliver end-to-end solutions to its customers. Cisco offers unsurpassed deployment experience, with more than 200 MPLS customers, 1,000 optical customers, and numerous IP and Ethernet switching customers. Cisco will invest billions of dollars during the next five years to continue bringing innovation to the service provider market.
- **Market leadership in enterprise networking:** More enterprises have built their IP infrastructures with Cisco equipment than with any other vendor's. Service providers that work with Cisco can quickly and smoothly connect with their customers, gaining the benefit of accelerated demand for services that increase overall network utilization, reduce cost per user, and generate a faster ROI.
- **Standards leadership:** For more than a decade, Cisco has been a major force in the development of innovative Ethernet, Layer 2, and IP/MPLS features. Cisco continues to lead support for Metro Ethernet standardization in the IEEE, ITU, IETF, and MEF, as well as in the MPLS and Frame Relay Alliance, Ethernet in the First Mile Alliance (EFMA), and the ATM Forum.
- **Comprehensive support programs:** Cisco helps service providers transition to a multiservice packet network with support services addressing device-, network-, and application-level challenges. Service providers who choose Cisco gain access to the industry's largest pool of networking experts, who collaborate in the planning, design, and implementation stages of a project, as well as with ongoing operational support and network optimization.

FOR MORE INFORMATION

For more information about Service-Driven Metro Networks and the Cisco Metro Ethernet Portfolio, please visit http://www.cisco.com/go/metroe or contact your local account representative.

For more information

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