

Managed 4G LTE WAN: Provide Cost-Effective Wireless Broadband Service

What You Will Learn

With the arrival of the fourth-generation (4G) or Long Term Evolution (LTE) cellular wireless standard, Cisco® introduces a new category of wireless managed services that is expected to provide many exciting new business opportunities for service providers. The Cisco Managed 4G LTE Wireless WAN Service is a highly secure, simplified, and cost-effective managed broadband WAN service alternative to DSL, cable, or Frame Relay services. It is low cost, easy to deploy and manage, and competitively priced. Ideal for a variety of business applications that require high bandwidth, low latency, and high security, the service should have wide application, including as an access technology for interactive business video and telepresence, ATMs, store kiosks, telemetry sensors, and for WAN and Internet connectivity in rural and remote areas. The solution is based on the Cisco 4G LTE Wireless WAN (WWAN) Enhanced High-speed WAN Interface Card (EHWIC), available for the Cisco Integrated Services Router (ISR) G2 family.

Challenge

The availability of 4G LTE services is expected to have a dramatic impact on mobile applications and service provider competition. With uplink speeds of up to 50 Mbps and downlink speeds of up to 100 Mbps, low latency, and support for both IPv4 and IPv6 devices and applications, 4G LTE is an excellent solution for some of the latest technologies and bandwidth-demanding services.

Increased customer choice, resulting in increased competition among service providers, is a new reality. Business customers no longer want to be dependent on DSL, cable, T1 or E1 leased lines, or satellite access solutions alone. With 4G LTE, a new managed services area is emerging called “fixed wireless broadband,” where wireless devices access the Internet or WAN through a fixed wireless terminal (FWT) or cellular router. The terminal or router allows local devices (for example, desktop phones, Wi-Fi-enabled PCs, or sensors used in telemetry applications) to access a wireless WAN network service at 4G LTE speeds. Secure, easy to deploy and manage, with low latency, and highly cost effective, this type of broadband service is emerging as a competitive challenge to more traditional broadband services.

A 2010 study of the global FWT and cellular router market by ABI Research found that growing interest in mobile broadband services is based on several factors, including:

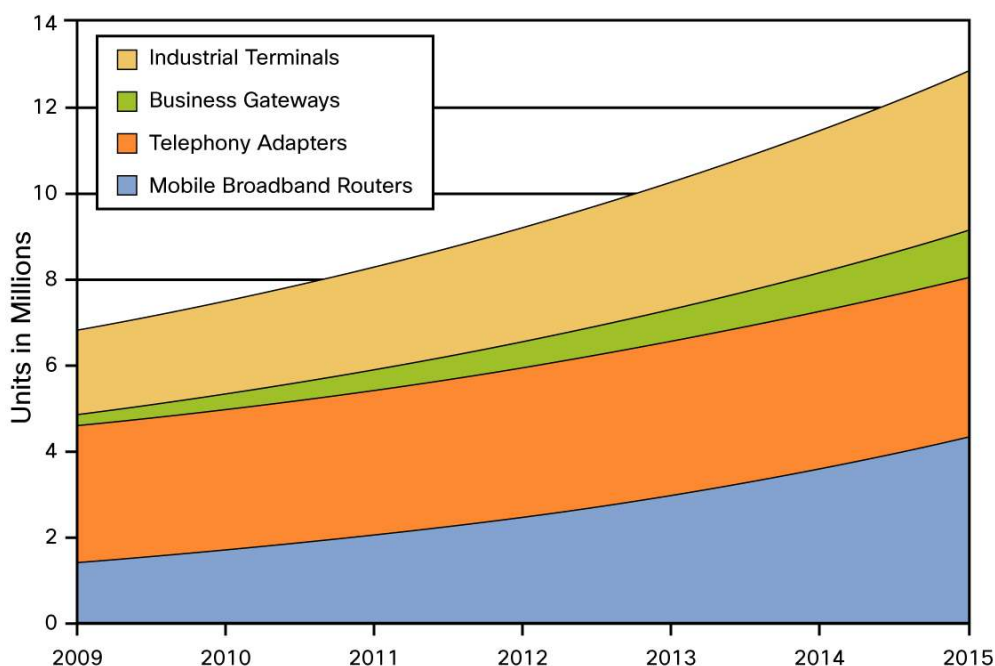
- The availability of mobile broadband speeds that are comparable to those of fixed-line access technologies
- The desire by governments in various parts of the world to increase telephony services to rural areas underserved by wireline telephony infrastructure
- Interest among mobile operators in competing against incumbent wireline carriers in the fixed home telephony services market by using their own network technology instead of wholesale access lines from an incumbent competitor
- Interest among businesses and governments in deploying telemetry and telematics applications to increase operational efficiencies and introduce new organizational capabilities

- Interest among businesses with remote branch offices in using cellular-enabled business gateways as either primary or backup WAN connections

In the FWT and cellular router market forecast shown in Figure 1, overall FWT and cellular router device shipments are expected to increase from about 6.89 million units in 2009 to approximately 12.85 million units by 2015. Business gateways correspond to the Cisco 4G LTE WWAN EHWIC and Cisco ISR G2 solution that provides the Cisco Managed 4G LTE Wireless WAN Service. Shipments of business gateways are expected to roughly double between 2009 and 2015.

Figure 1. Total Global FWT and Cellular Router Shipments by Application

Source: ABI Research, 2010



Business Benefits

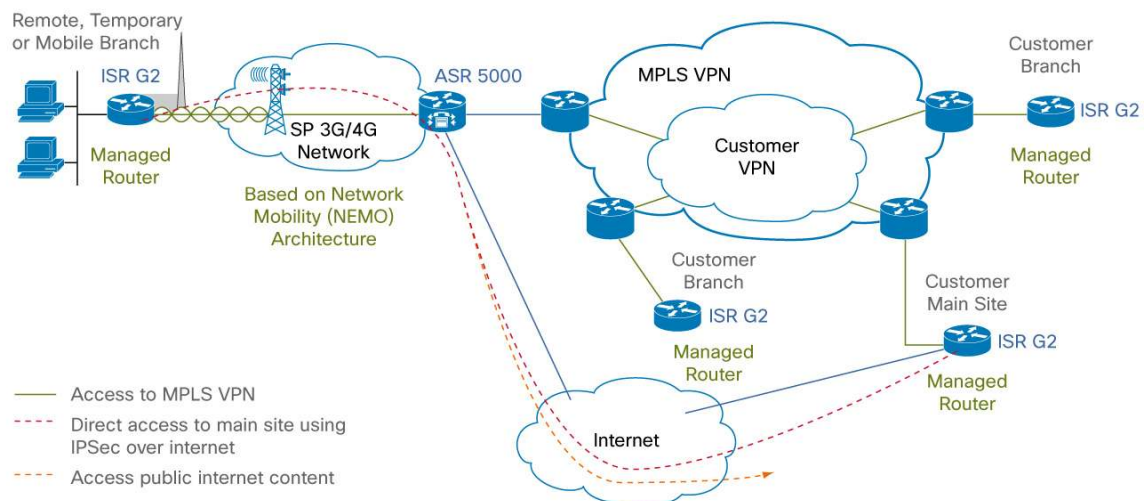
- **More flexible, cost-effective alternative to DSL, cable, T1, or satellite services** that relies on 4G LTE wireless access
- **Ideal solution for fast, easy deployment in response to dynamic business growth** for new or temporary locations and a mobile or telecommuting workforce
- **Support for businesses to extend traditional network borders to new access devices** reliably and securely with an enterprise-grade wireless WAN primary link
- **Better operational efficiency and lower cost** for interconnectivity of the newest interactive applications - anywhere, anytime, on any device

Solution

As compared to previous wireless WAN services that were usually used by businesses as backups in the event of a failure of their DSL or leased lines, Cisco Managed 4G LTE Wireless WAN Service is intended to be a competitive primary business broadband service. It allows businesses to run the most demanding broadband applications such as interactive video and telepresence on the 4G LTE WWAN link, which is 10 to 15 times faster with five times lower latency than third-generation (3G) links. The solution reduces cost, complexity, and time to deployment by securely extending wireless mobility to any location covered by a 4G LTE tower - without compromising quality of experience and timely delivery.

Figure 2 shows a branch office using Cisco Managed 4G LTE Wireless WAN Service. The dual 3G and 4G cellular access from a local cell tower is available through the branch's Cisco ISR G2 router equipped with a Cisco 4G LTE WWAN EHWIC. The card is enabled by the Cisco implementation of the Internet Engineering Task Force (IETF) standard Network Mobility (NEMO) solution.

Figure 2. Cisco Managed 4G LTE Wireless WAN Service



Now available on the Cisco ASR 5000 Multimedia Core Platform and on multiple models of Cisco ISR routers, NEMO is an extension of Mobile IP that allows an entire network to change its attachment point to the Internet. With NEMO, a mobile router takes over the role of the mobile node in Mobile IP, performing mobility functions and supporting the deployment of multiple branches or individual devices as stub networks across wide geographic areas. All of the branches act as mobile networks connected behind the branch router and establish all the connectivity by dynamic mobile IP tunnels over the WAN link. The NEMO solution helps service providers to manage LAN services and LAN devices as if they were mobile nodes.

The branch shown in the preceding figure has broadband access to the Internet and to other branches and the company's main office through a Cisco ASR 5000 Series enhanced multimedia core platform. The Cisco ASR 5000 Series integrates 4G LTE and Multiprotocol Label Switching (MPLS) services. Both the business's wireline and wireless networks are anchored on the Cisco ASR 5000 platform, which maintains the services and IP addresses for both 3G and 4G services. Should either the wireline or wireless network go down, the system provides failover to the network that is still up and running without service interruption or changes to policy or IP addresses.

For managed service providers, the Cisco Managed 4G LTE Wireless WAN Service greatly reduces the complexity, cost, and scalability challenges of service enablement and ongoing management. In the past, mobile IP solutions for offices with multiple devices required customer premises equipment (CPE)-based General Routing Encapsulation (GRE) tunnels or IP Security (IPsec) GRE tunnels for bidirectional access. That architecture limited scalability and increased complexity and cost.

Cisco Managed 4G LTE Wireless WAN Service provides native routing and any-to-any 4G LTE service without GRE tunnels. In addition to the service's reduced complexity, easy scalability, and lower cost, it provides these operational benefits:

- **Security:** Supports IPsec or Group Encrypted Transport (GET) VPNs, which provide encryption without the use of tunnels for business applications with high security requirements; traffic from the public Internet is segregated for increased security.
- **Customer address control:** Allows businesses to main full control over the allocation of their LAN and WAN addresses on the wireless routers within their private VPNs.
- **Enhanced customer experience:** Provides an enhanced customer experience due to the simplified operational requirements and the service's ability to integrate LAN, WAN, WLAN, and Internet access for a true borderless network experience.
- **Service for diverse uses:** The service can be used as primary WAN connectivity for stationary branches, temporary sites, and mobile networks such as those on planes, trains, and mobile command centers. The service is suitable for applications requiring high data bandwidth, low latency, and high security as well as more conventional business applications, such as bank ATMs, gas station kiosks, and telemetry sites.

Cisco 4G LTE WWAN EHWIC

The Cisco 4G LTE WWAN EHWIC is tightly integrated with the services available on the Cisco ISR G2 1900, 2900, and 3900 Series, which deliver secure data, voice, video, and mobility services. For remote management capabilities, Cisco 4G LTE WWAN EHWICs support the Simple Network Management Protocol (SNMP) 4G cellular and interface MIBs, allowing access to the standard interface counters. The interface MIB also provides traps for interface up and down events. Additionally, all Cisco ISR G2 routers have built-in instrumentation - including NetFlow, Network-Based Application Recognition (NBAR), WAN Application Acceleration Services (WAAS), and quality of service (QoS) - that are supported on the Cisco 4G WWAN EHWIC. This helps service providers to deliver an optimal end-user experience for any application, anywhere, and to optimize bandwidth utilization to branch offices.

All security features of the Cisco ISR G2 routers are supported on the Cisco 4G WWAN EHWIC, including Site-to-Site IPsec Tunnel, Dynamic Multipoint VPN (DMVPN), Group Encrypted Transport VPN, firewall, Intrusion Prevention System (IPS), and Web content protection and filtering.

The Cisco 4G WWAN EHWIC feature summary includes:

- Downlink 100 Mbps and uplink 50 Mbps
- Dual-stack IPv6 and IPv4
- Cisco Network Mobility Versions 4 and 6 (NEMOV4 and NEMOV6)
- Short Message Service (SMS) over IPv6
- Client-based mobility with Mobile IP Version 6 (MIPv6)
- Network-based mobility with Proxy Mobile IP Version 6 (PMIPv6)

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- Voice over IP (VoIP) over IP Multimedia Subsystem (IMS)
 - Global Positioning System (GPS) and Assisted GPS (A-GPS)
 - A 2 x 2 multiple input, multiple output (MIMO) antenna
 - Evolved high-rate packet data (eHRPD) for smooth handoff between LTE and EVDO
 - Inter-remote access Trojan (RAT) for smooth handoff between LTE and HSPA and non-Third-Generation Partnership Project (3GPP) networks, and 4G SNMP MIB (enhancement of 3G MIB)

Why Cisco?

Cost-effective 3G and 4G LTE WAN access is a requirement for a growing number of offices and standalone network devices, from kiosks to digital signage. The Cisco managed 4G LTE Wireless WAN Service brings 3G and 4G LTE performance to business locations of all sizes and types with their myriad of access devices, transforming the Cisco ISR G2 platform into a highly secure, simplified, and cost-effective managed broadband WAN service alternative to DSL, cable, or Frame Relay services. This managed service solution available from Cisco is an exciting, competitive option for businesses seeking to take competitive advantage of the newest features and cost efficiencies available in wireless networking.

For More Information

For information about managed services for service providers, see <http://www.cisco.com/go/managedservices>.

For information on the Cisco 4G LTE Wireless WAN Enhanced High-speed WAN Interface Card, visit <http://www.cisco.com/go/4g>.



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