



CHAPTER 1

Overview of the Cisco Broadband Wireless Gateway

This chapter provides an overview of the Cisco Broadband Wireless Gateway (BWG), and identifies its function within an end-to-end fixed or mobile IP network.

Overview

The Cisco BWG functions in the gateway role in WiMax networks, and is designed as part of an end-to-end IP architecture. WiMAX is a standards-based wireless technology that offers high throughput broadband connections over long distances. WiMAX can be used for a number of applications, including “last mile” broadband connections, fixed and mobile cellular service, hotspots and cellular backhaul, and high-speed enterprise connectivity for business.

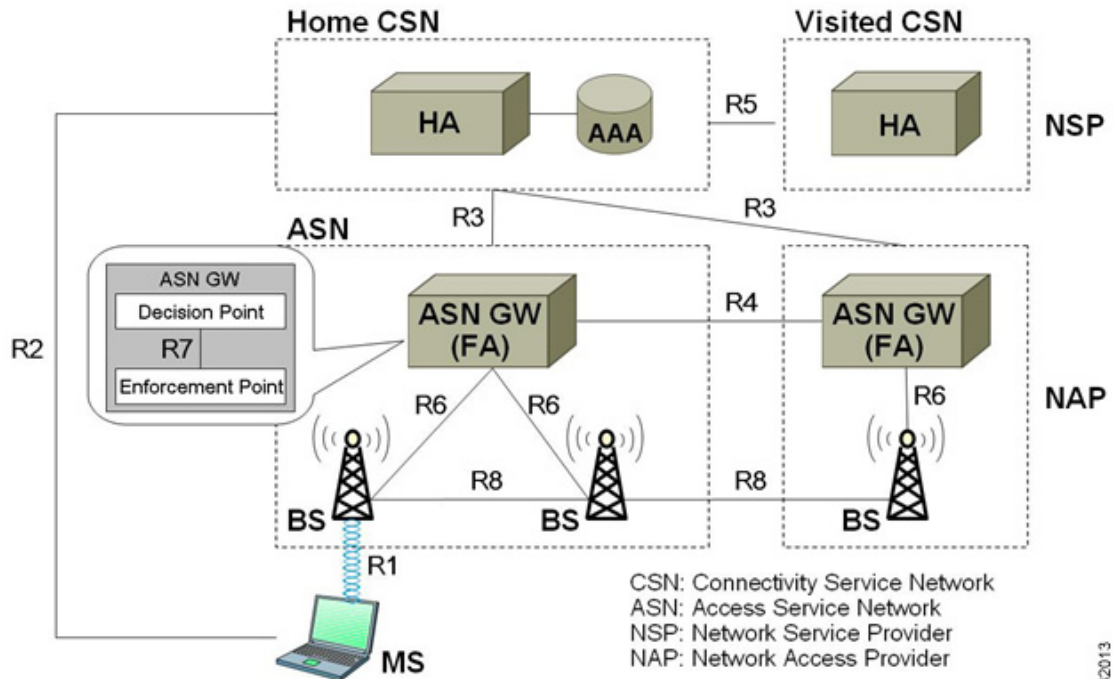
WiMAX is based on the IEEE 802.16d standard for fixed wireless, and the 802.16e standard for mobile wireless. This standard is appealing to customers because it allows mass production of chipsets that reduce CPE costs, ensure multi-vendor interoperability, and reduce investment risk for operators.

The architectural framework of a WIMAX network consists of the Access Service Network (ASN) and the Core Service Network (CSN). For new, or small deployments addressing the fixed/nomadic markets, only an independent ASN is possible in this release. Release 1.0 and above only addresses the standalone Access Service Network.

[Figure 1-1](#) illustrates the WiMAX Network Reference Model.

Figure 1-1 WiMAX Network Reference Model

WiMAX Forum NWG - Mobile WiMAX NRM (Network Reference Model)



Access Service Networks

An Access Service Network is a set of network functions that provide radio access to a WiMAX subscriber. The ASN typically provides functions such as network discovery and selection, connectivity service between the MSS and Core Services network (CSN), Radio Resource Management, Multicast and Broadcast Control, Intra-ASN mobility, Paging and Location Management.

The Wimax architecture consists of both mobile and fixed subscribers, as well as the ASN and CSN. The interface between the ASN and those subscribers is based on the IEEE 802.16 (“d” for fixed and “e” for mobile subscribers). An ASN is comprised of base stations (in one, or more base station clusters), and BWG(s). An ASN may be shared by more than one Connectivity Service Networks (CSN).

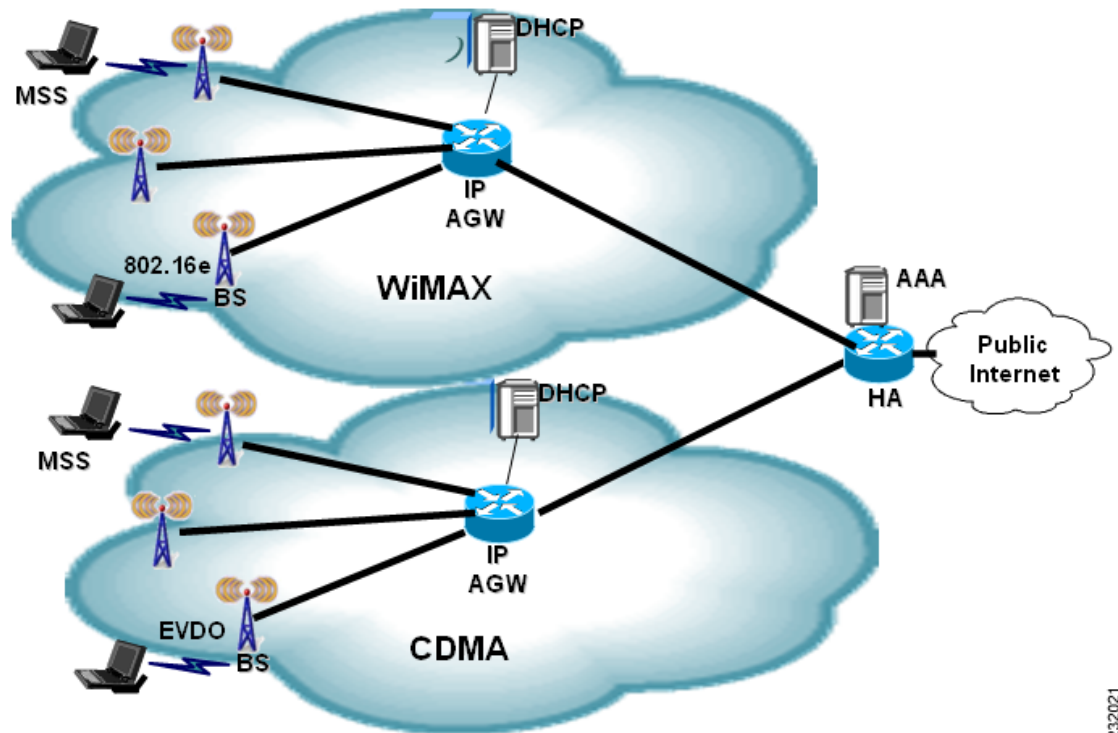
A Network Access Provider (NAP) is a business entity that provides WiMAX radio access infrastructure to one or more WiMAX Network Service Providers (NSPs). A NAP implements this infrastructure using one or more ASNs.

A Connectivity Service Network (CSN) is defined as a set of network functions that provide IP connectivity services to the WiMAX subscriber(s). CSN may comprise network elements such as routers, Home Agent, AAA proxy/servers, user databases, Policy servers, Content Service Gateways, Service Selection gateways, Interworking gateway devices.

With the emergence of an all-IP end-to-end mobile network, there is a need for an all IP Broadband Access Gateway. The IP Access Gateway is radio agnostic and handles mobility and security. It also pushes IP service delivery to the radio network. In short, the BWG allows intelligence to be shared between the Base Station (BS) and the IP network. All radio independent control is part of the BWG, while all radio dependent control is part of the BS.

Figure 1-2 illustrates elements of a WiMAX network.

Figure 1-2 Elements of a Wimax Network



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Cisco's BWG

The Cisco BWG provides access gateway functions between the 802.16e wireless domain and the IP network. It is the first hop IP router from the user's perspective and provides NAS and Accounting client capabilities for interaction with AAA servers.

The BWG supports Access Network authentication and security functions.

The BWG provides local mobility anchor capability, so that users can move between base-stations. The BWG also caches authentication and security identification to accommodate fast roaming of users across base-stations or between BWGs.

The BWG is the key to the IP mobility scheme. It provides the termination of the mobility function across base-stations and the foreign agent function. The BWG maps the radio bearer to the IP network. It works with the CSN and the policy servers to control policy on behalf of the user. Additionally, it acts as an IP gateway for the IP host function that is located on the base station. The BWG brings together IP functions performed for the access network including end-to-end Quality of Service, Mobility and Security.

Cisco IOS Release 12.4(24)YG3 is optimized for the Cisco BWG feature on the SAMI card on the Cisco 6500 Catalyst Switch platform and 7600 Series router.

Cisco BWG Release 2.0 and above is supported on the following platforms:

- Cisco Catalyst 6500 Series Switch platform with a SAMI blade installed—Please refer to the following URLs for installation and configuration information:

Switch Chassis Installation

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Chassis_Installation/Cat6500/6500_ins.html

Switch Chassis Module Installation

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Module_Installation/Mod_Install_Note/78_15767.html

Release Notes

http://www.cisco.com/en/US/products/hw/switches/ps708/prod_release_notes_list.html

- Cisco 7600 Series Router platform with a SAMI blade installed—Please refer to the following URL for installation and configuration information:

http://www.cisco.com/en/US/products/hw/routers/ps368/prod_installation_guides_list.html

- The Supervisor module (Sup720-3BXL, SUP IOS Release 12.2(33)) on the 7600 supports IOS-SLB functionality, and is enhanced to support BWG selection capability.
- A maximum of 8 blades can be supported per chassis.
- The BWG can coexist with CSG2 and the HA on co-located blades.

The Supervisor 720 is supported, both in single and redundant mode. For the Supervisor 720, the 3B and 3BXL versions are supported, with the latter recommended and tested.

The Supervisor 32 is also supported in BWG 2.3.

Table 1-1 Memory Requirements for the Cisco SAMI on the 6500 Catalyst Switch and 7600 Internet Router

Platform	Software Feature Set	Supervisor Module	Flash	RAM
Cisco 6500 Catalyst Switch	BWG Software Feature Set	Sup720-3BXL, SUP IOS Release 12.2(33)	256 MB	512MB
Cisco 7600 Internet Router	BWG Software Feature Set	Sup720-3BXL, RSP720-3C-GE, and RSP720-3CXL-GE SUP, IOS Release 12.2(33)	256 MB	512MB

SUP Backward Compatibility

The BWG 2.3 on the Cisco 7600 hardware platform requires SUP software version SRE. However, BWG 2.3 will work with limited features with older SUP software version SRD.

In order to make BWG 2.3 work with SUP-SRD, configure the following hidden CLI at the global configuration mode:

Command	Purpose
Step 1 router(config)# wimax agw sup-backward-compatible	Specifies that the BWG will work with the SRD Supervisor image.

With SUP-SRD, BWG 2.3 will primarily be used for Cisco-R6, PMIP, and other BWG1.x features.

**Note**

If you use the SUP-SRD image, the following features in BWG Release 2.3 are not supported:

- L2-L2 Bridging Support
- SLB Stickiness Support
- NWG R6 in SLB-mode.
- MS Idle Mode Management in SLB-mode.

