



Cisco PGW 2200 Softswitch

The Cisco® PGW 2200 is a standards-based, multiprotocol media gateway controller (MGC) designed to support the complex interworking requirements in next-generation networks. The platform provides centralized call routing for both public switched telephone networks (PSTNs) and IP-based voice networks for service provider and enterprise customers. The Cisco PGW 2200 is a field-proven, carrier-class platform, designed to provide maximum interoperability, reliability, and scalability.

PRODUCT OVERVIEW

The Cisco PGW 2200 allows service providers to deploy and operate multiple packet-based network applications while maintaining stable interconnects with the PSTN. At the heart of the product is the Universal Call Model, which allows the Cisco PGW 2200 to support interoperability between multiple traditional time-division multiplexing (TDM) interfaces and IP signaling protocols, including Signaling System 7 (SS7/C7), Primary Rate Interface (PRI), Digital Private Network Signaling System (DPNSS), ITU QSIG, Media Gateway Control Protocol (MGCP), Session Initiation Protocol (SIP), and ITU H.323 protocols. With an extensive library of worldwide PSTN protocol variants (ISDN User Part [ISUP] and PRI), the Cisco PGW 2200 is one of the most widely deployed PSTN interconnect platforms for IP-based networks in use today, with deployments in more than 70 countries.

The Cisco PGW 2200 can be configured to operate in two modes.

In *signaling mode*, it acts as an SS7 signaling converter, providing SS7 interconnect for Cisco AS5000 Series universal gateways to offload PSTN voice and dial traffic into IP networks. SS7 links are terminated on the Cisco PGW 2200, translated into extended ITU Q.931 messages, and transported to Cisco AS5000 Series gateways over the IP network. The Cisco PGW 2200 also provides number modification, normalization, and screening to supplement Cisco IOS® Software.

In *call control mode*, the Cisco PGW 2200 acts as a MGC, providing centralized number analysis, routing and signaling interworking for PSTN- and IP-based networks. It provides call control for a wide range of Cisco IOS Software-based media gateways and Cisco MGX® 8000 Series high-density gateways, providing simultaneous protocol interworking between PSTN (SS7 or PRI), private-branch-exchange (PBX) (QSIG, DPNSS, or PRI) and IP (SIP or H323) networks, including routing between different IP networks.

APPLICATIONS

The Cisco PGW 2200 supports a variety of applications for both service providers and enterprise customers, ranging from providing transit services over cost-effective packet networks to enabling the introduction of new IP-based services such as fixed mobile convergence. Using an extensive set of protocols for both the PSTN and IP networks, the Cisco PGW 2200 supports customer objectives of both cost reduction and revenue generation.

- **National and International Transit**—Supported in signaling and call control mode.
 - Voice transit networks are evolving from TDM to IP to take advantage of the cost savings associated with routing traffic over IP backbones, and the ability to quickly introduce new services into a network. The Cisco PGW 2200 supports this application in both signaling mode, where it extends the existing capabilities on the Cisco AS5000 gateways to support SS7/C7 interconnects in markets throughout the world; and call control mode, where it provides centralized call control and routing between PSTN- or IP-based networks.
 - Least-cost routing is accomplished through the conditional routing capabilities of the Cisco PGW 2200, available in call control mode, to provide the most efficient traffic termination.

- Interaction with Application-Intelligent Network (AIN) or Intelligent Network Application Protocol (INAP) services, including local number portability, 800 or free-phone, and 900 or premium services, supports new revenue-generating services.
- Interworking with SIP and H.323 carriers to provide the most flexible interconnect capabilities is available in both signaling mode using the Cisco AS5000 gateways and call control mode using the Cisco PGW 2200 as a centralized routing platform.
- The Cisco PGW 2200 supports regulatory requirements, such as lawful intercept and E911, in call control mode.
- **Dial Termination**—Supported in both signaling and call control mode.
 - Dial traffic termination for wholesale or retail dial service providers is supported in both signaling and call control mode and is often done in conjunction with voice services to take advantage of the universal port capabilities on the Cisco AS5000 gateways. In call control mode the Cisco PGW 2200 supports the MGCP Network Access Server (NAS) package for terminating dial calls onto IP networks.
- **SIP and H.323 PSTN Gateway for Next-Generation Applications**—Supported in both signaling and call control mode.
 - The introduction of new services using IP-based platforms is allowing service providers to increase revenue in their existing TDM-based networks, using the Cisco PGW 2200 to provide the protocol interworking. The next-generation applications can range from next-generation messaging systems to ring-tone services.
 - The Cisco PGW 2200 provides the Media Gateway Controller Function (MGCF) in an IP Multimedia Subsystem (IMS) architecture, providing ISDN User Part (ISUP)-to-SIP interworking for Call Session Control Function (CSCF) platforms, such as the Cisco Call Session Control Platform (CSCP).
- **SIP and H323 PSTN Gateway for Local Services Platforms**—Supported in both signaling and call control mode.
 - The Cisco PGW 2200 supports the complex SS7/C7 interconnect requirements of carriers around the world, allowing customers to deploy a stable interface between the IP-based local service (Class 5) platform and the PSTN.
- **Business Voice Services**—Supported in call control mode.
 - The Cisco PGW 2200 supports multiple business voice applications, primarily by providing interworking and feature transparency for voice services across a range of IP and TDM protocols. It acts as a centralized tandem for PBX switches within a customer or multiple customer networks. In this application, it provides:
 - **Centralized Routing between TDM-Based PBX Systems**—This feature allows for efficient, centralized call routing and PSTN breakout for a network of traditional PBX switches.
 - **Centralized Interworking between TDM- and IP-Based PBXs**—This feature enables a migration strategy that caps the investment in traditional TDM-based PBX switches and introduces the IP-based Cisco CallManager PBX, with feature transparency between DPNSS-, QSIG-, and PRI-based networks and Cisco CallManager.
 - **Voice VPN**—The Cisco PGW 2200 supports multiple dial plans so that multiple customers with overlapping numbering plans can be supported on the same Cisco PGW 2200 platform (service provider-hosted PBX tandem).
 - **PSTN Breakout**—Many large multisite enterprises want to tie their traditional PBXs or IP PBX such as Cisco CallManager to a centralized PSTN breakout function with an SS7 interface for lower cost and faster call setup. The Cisco PGW 2200 provides SS7-based PSTN breakout for enterprise IP Communications networks, whether self-managed by the large enterprise or operated by the service provider as a managed business voice service.
- **Hosted IP Contact Center (IPCC)**—Supported in call control mode.
 - The Cisco PGW 2200 provides centralized call management for the Cisco IPCC. It provides SS7-enabled PSTN breakout and advanced call manipulation with the Cisco IPCC platform using an ETSI INAP interface.

KEY FEATURES AND BENEFITS

Table 1 lists the key features and benefits and Table 2 gives advanced call processing and routing features of the Cisco PGW 2200.

Table 1. Carrier-Class and Service Features of Cisco PGW 2200

Features	Benefits and Application
Scalability to Support Networks from Hundreds to Millions of Ports	<ul style="list-style-type: none"> Flexible, distributed architecture supports both small remote and large centralized POPs Support for a full range of Sun Microsystems platforms provides maximum scaling flexibility Fully distributed architecture allows for incremental growth based on business needs
Open Standards and Worldwide Interoperability and Compatibility	<ul style="list-style-type: none"> Supports SS7/C7 and PRI protocols worldwide for rapid deployment and interconnect with local service providers Universal Call Model provides seamless interoperability between PSTN, SIP, and H.323 networks to allow deployment of new revenue-generating applications Supports ETSI QSIG and DPNSS for European PBX interconnect
Carrier-Grade Reliability and Redundant Platform Components	<ul style="list-style-type: none"> Redundant critical components in node provides for no single point of failure; software fault tolerance is designed to deliver 99.999-percent availability Supports geographic distribution of active and standby MGC hosts, Cisco Signaling Link Terminals (SLTs) and Cisco IP Transfer Points (ITPs), and media gateways for maximum network reliability Supports stable call preservation during catastrophic hardware and software failure Supports Network Equipment Building Standards (NEBS) Level 3-certified hardware using industry-standard Sun Microsystems Netra platforms
Comprehensive Platform Monitoring and Call-Detail-Record (CDR) Generation	<ul style="list-style-type: none"> Offers a comprehensive and user-friendly management environment Detailed measurements and statistics used to monitor the system Offers a full suite of operational and signaling alarms Extensive CDRs include both PSTN and IP endpoint information generated for every call attempt Optional billing and measurements system (BAMS) provides standard Bellcore AMA Format (BAF) or custom-formatted CDR outputs as well as trunk-group and carrier-based measurements
SS7/C7 Support for Carrier-Class Cisco AS5000 Network Access Servers and Voice Gateways	Extends the interconnect options on the Cisco AS5000 universal gateways to include SS7/C7, protecting current investment in Cisco Systems® hardware
Lawful Intercept	Allows personnel authorized by law enforcement agency to provision the Cisco PGW 2200 to intercept a targeted call number and send the related call data to a lawful intercept mediation device using the Cisco Service Independent Intercept (SII) architecture

Table 2. Advanced Call Processing and Routing Features of Cisco PGW 2200

Feature	Benefits and Applications
Preanalysis	Trigger results or number modification based on incoming parameters in the SS7 initial address message (IAM), setup, and SIP INVITE messages, including nature of address (NOA), numbering plan indicator (NPI), carrier prefix code (CPC), transit network selection (TNS), and transmission medium requirements (TMR)
Calling-Party Number Analysis, (A-Number Analysis)	Trigger results or number modification based on the A-number

Feature	Benefits and Applications
Called-Party Number Analysis (B-Number Analysis)	<ul style="list-style-type: none"> • Trigger results or number modification based on B-number • Modifies B-number type (NOA/NPI) • Requests for more digits to analyze; B-number call screening by table analysis; and trigger to perform A-number call screening • Offers Intelligent Network triggers (AIN/INAP) • Provides Euro-ported number-handling result to start ported number actions on a donor switch • Provides Euro-route number handling for ported number handling on a recipient switch
Cause Analysis	Supports routing to flexible cause analysis from any point in analysis for appropriate treatment, including rerouting, route advance, release with appropriate cause value, return to analysis, and route to IN trigger
A- or B-Number Screening with Onboard Database	Blacklist and Whitelist screening of A, B, and redirecting numbers
Number Normalization	Modifies numbers to support carrier dialing plans; facilitates international transit and long-distance services
Overload Control	Dynamically alters behavior based on the configurable congestion levels to process the maximum number of calls while under overload conditions
Automatic Congestion Control (ACC)	Offers an ISUP mechanism designed to maximize the throughput of completed calls during a period of overload on a platform in the SS7/C7 network
Flexible Call Routing Capabilities	<ul style="list-style-type: none"> • Offers multiple dial plans and global dial plans • Provides routing on redirecting number • Offers weighted trunk groups, load sharing across trunk groups, and preferred trunk groups
Policy-Based Routing	Provides flexible conditional routing based on multiple parameters, including time of day, day of week, holiday, percentage-based, and codec-based
E.164 and North American Numbering Plan (NANP) Support	<ul style="list-style-type: none"> • Offers compatibility for interconnections to PSTN worldwide • Offers flexibility to deploy at international, national, bilateral, or internal interconnects • Supports over-decadics and overlap signaling
Call Admission Control	<ul style="list-style-type: none"> • Support for system resource check (SRC), Service Assurance Agent, and MGCP Resource Reservation Protocol (RSVP) • Offers configurable call limiting to limit the number of simultaneous calls across a link based on trunk group or dial-plan analysis

SUMMARY

The Cisco PGW 2200 is designed to address the needs of service providers and enterprise customers that need to deploy either transit applications or support complex interworking between IP networks or IP applications and the PSTN. With its vast library of SS7/C7 protocol variants, advanced routing capabilities, and standards-based IP interfaces (SIP, H.323, and SIGTRAN), the Cisco PGW 2200 helps customers incorporate next-generation applications into their networks while maintaining stable, reliable interconnects with the PSTN around the world.

PRODUCT SPECIFICATIONS

Table 3 gives specifications of the Cisco PGW 2200.

Table 3. Cisco PGW 2200 Technical Specifications

Feature	Specification
SS7/C7 Protocol Support	<ul style="list-style-type: none"> • ANSI ISUP (T1.113) • ETSI ISUP (V1, V2, and V3) • ITU ISUP (Q761–Q764) • International ISUP (Q767) • ITU TUP (Q721) • NUP/IUP (BTNR) • More than 70 Country Variants
MGCP Protocol Support	<ul style="list-style-type: none"> • Support for IETF RFC 2705, including support for NAS, ATM, announcement, and RSVP packages • Support for ITU H.248 in upcoming Cisco PGW 2200 release
H.323 Protocol Support	<ul style="list-style-type: none"> • Support for ITU H.323 V2 and V4
SIP Protocol Support	<ul style="list-style-type: none"> • Support for RFC 2543 and 3261 • Support for ITU Q.1912 for ISUP/C7-to-SIP interworking • SIP for Telephones (SIP-T) support
PRI Variants Support	<ul style="list-style-type: none"> • Support for the following variants: <ul style="list-style-type: none"> – AT&T 41459 (AT&T ISDN PRI) – North American National ISDN-2: (Bellcore GR-1268) – ETSI PRI (ETS 300 102)—ETSI QSIG (ETS 300 172) – Multiple national variants • NFAS support, including D-Channel backup
DPNSS Protocol Support	<ul style="list-style-type: none"> • BTNR 188
Q.SIG Protocol Support	<ul style="list-style-type: none"> • ETS 300 172
AIN/IN Interface	<ul style="list-style-type: none"> • INAP CS-1 support (ITU-T Q.1214) • AIN 0.1 support (ANSI T1.667) • Support for the following services: <ul style="list-style-type: none"> – Local number portability – 800, 900, free-phone, and premium calls – Prepaid calling
SIGTRAN Interface	<ul style="list-style-type: none"> • M3UA (RFC 3332) for interface to ITP signaling gateway • Stream Control Transmission Protocol (SCTP) (RFC 2960) • DASS User Adaptation (DUA) (RFC 4129) for DPNSS backhaul with Cisco IOS Software access gateways • ISDN User Adaptation Layer (IUA) (RFC 3057) for Extended Q931 backhaul with Cisco AS5000 universal gateways • SCCP User Adaptation (SUA) (RFC 3868) for interface to SCP through ITP signaling gateway

Feature	Specification
Advice of Charge	<ul style="list-style-type: none"> • Support for AOC messages over ISUP trunks as per AOC99 • Support for AOC supplementary service as charge determination point for AOC-S, AOC-D, and AOC-E over PRI links as per ETSI 300 182
Other Interfaces	<ul style="list-style-type: none"> • Generic Transparency Descriptor (GTD) for ISUP transparency over SIP and H.323 networks • Extended Q.931/NI2 (used between Cisco PGW-Signaling and Cisco AS5000: Q931 parameters extended to support SS7 features and coordination of Carrier Identification Code (CIC) selection information with media gateway) • Simple Network Management Protocol Version 2C (SNMPv2C)
SS7 Link Termination Platforms	<ul style="list-style-type: none"> • Cisco Signaling Link Terminal (SLT)—For details, refer to the Cisco SLT datasheet at: http://www.cisco.com/en/US/products/hw/vcallcon/ps2152/products_data_sheet09186a0080091b58.html <ul style="list-style-type: none"> – Cisco 2611XM (2 port) and 2651XM (4 port) • Integrated SLT <ul style="list-style-type: none"> – Cisco AS5350, AS5350XM, AS5400HPX, and AS5400XM • IP Transfer Point (ITP)—For details, refer to the ITP datasheet at: http://www.cisco.com/en/US/products/sw/wirelssw/ps1862/products_data_sheet09186a00800925b1.html <ul style="list-style-type: none"> – Cisco 2651XM, 7200, and 7500
Supported Media Gateways	<ul style="list-style-type: none"> • Trunking gateways <ul style="list-style-type: none"> – Cisco AS5300 – Cisco AS5350 and AS5350XM – Cisco AS5400, AS5400HPX, and AS5400XM – Cisco AS5850 – Cisco MGX 8800 (MGCP only) with Voice Interworking Services Module (VISM) and Voice Switch Services Module (VXSM) • Access gateways (MGCP only) <ul style="list-style-type: none"> – Cisco 1700, 2600, 2700, 2800, 3700, and 3800 <p>Note: Contact your local Cisco account representative for configuration details or requirements.</p>
Point Code Scalability per Cisco PGW 2200 Node	<ul style="list-style-type: none"> • Up to 192 SS7 links • Up to 1536 destination point codes • Up to 6 origination point codes (OPC) • Up to 8 capability point codes per OPC
Operational Features	<ul style="list-style-type: none"> • Command-line interface/Man-machine language (CLI/MML) and GUI interface for provisioning • Cisco IOS Software-style MML commands • Dynamic reconfiguration of dial plans • Dynamic management of measurement thresholds • Onboard diagnostic tools, including alarm viewer, measurement viewer, translation verification viewer, call trace viewer, and others • Open interface to existing SNMP • Alarm, configuration, and security management using Transaction Language One (TL-1)-compliant MML, SNMP, ASCII text files, local GUI, or element management system (EMS)

ORDERING INFORMATION

The Cisco PGW 2200 includes the MGC application software, which runs on Sun computing platforms, SS7 signaling gateways for terminating SS7 links, and optional provisioning, management, and CDR conversion platforms. For additional details and access to the Cisco PGW 2200 Order Guide, refer to the product overview information at <http://www.cisco.com/en/US/products/hw/vcallcon/ps2027/index.html>.

Information about the supported hardware platforms for the MGC application software is available at:

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_installation_and_configuration_guide_chapter09186a008007dfa2.html

To place an order, visit the [Cisco Ordering Home Page](#).

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FOR MORE INFORMATION

For more information about the Cisco PGW 2200 and Cisco carrier voice solutions, visit <http://www.cisco.com> or contact your local Cisco account representative.



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