



Cisco Resource Policy Management System

Wholesalers face a challenge when delivering service level agreements (SLAs) on a common network, especially when providing a range of services for different customers. The Cisco Resource Policy Management System (RPMS) is a software tool that provides policy management of platform resources whether the service is data or voice. With Cisco RPMS, wholesalers are able to offer a variety of services to a variety of customers on a single set of gateways. Cisco RPMS offers not only effective resource management but the capability to build and deliver flexible service models that fit customers' unique requirements. Cisco RPMS can grow to support a wholesaler's changing needs, scaling as the network expands and delivering the Cisco Any Service, Any Port (ASAP) services that customers demand, including:

- Wholesale dial
- Access to virtual private network (VPN) services
- Prepaid and postpaid calling cards
- Global long-distance voice-over-IP (VoIP) services¹

The industry's first example of second-generation policy management tools, Cisco RPMS brings to voice solutions the level of control previously enjoyed by data network providers.

Cisco RPMS allows service providers to:

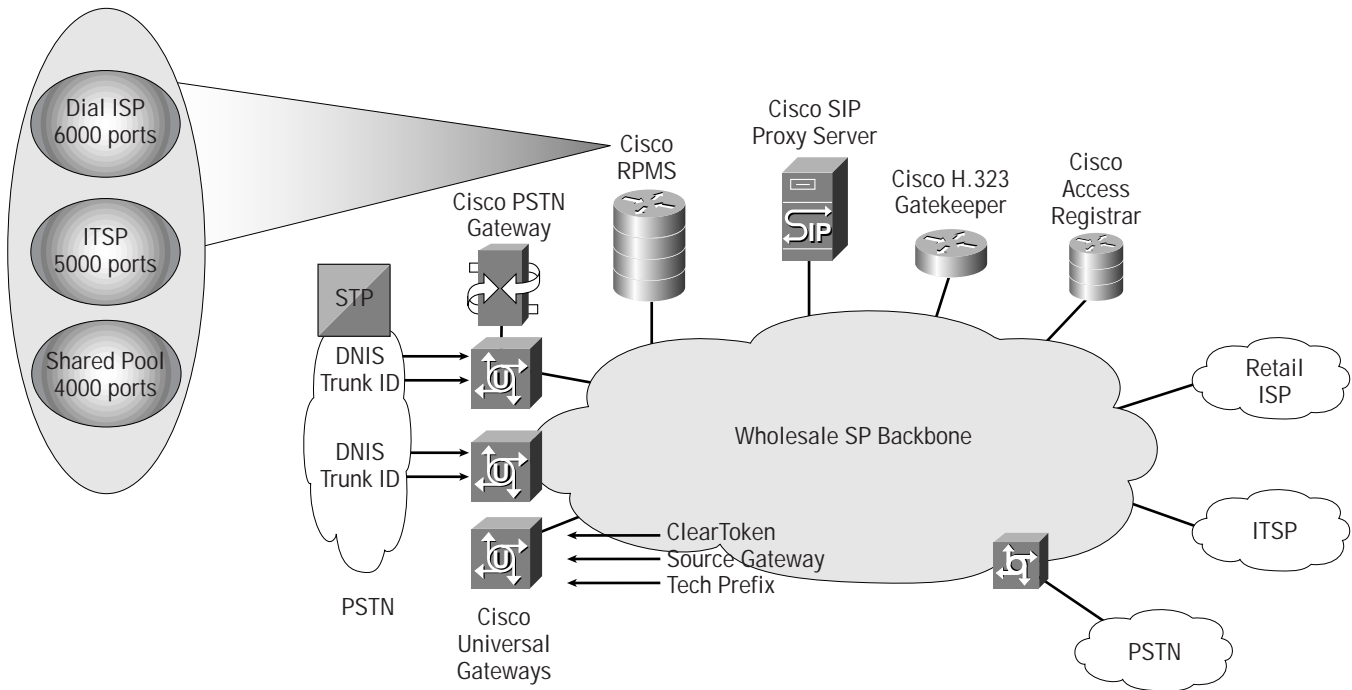
- Manage customers' use of shared pools of gateway resources capable of processing voice or data calls on a per-call basis
- Establish a policy to accept or reject a call before answering based on:
 - Incoming Dialed Number Information Service (DNIS) for calls originating from the Public Switched Telephone Network (PSTN)
 - Volume of calls or CPU utilization meeting defined thresholds
 - IP address or Inter-Zone ClearToken (IZCT) for IP-originated calls²
- Guarantee their customers' subscribed ports and allow oversubscription from a shared overflow pool
- Model virtual points of presence (POPs) by grouping trunks and enforcing usage limits per virtual POP or trunk
- Manage heterogeneous network access servers conforming to the Internet Engineering Task Force (IETF) Remote Authentication Dial-In User Service (RADIUS) RFC standards
- Send busy signals to the PSTN if call volume exceeds defined thresholds
- Generate start/stop Call Detail Records (CDRs) with a rich set of information about accepted and rejected calls
- Distribute call processing and policy management across multiple servers to build resiliency and scalability

Cisco RPMS manages ports across gateway stacks. Cisco AS5000 Universal Gateways Cisco IOS[®] Port Management can be used independently of Cisco RPMS for port management within one gateway.

1. Cisco ASAP voice features in Cisco RPMS require a planned Cisco IOS Software release containing "pre-authentication for voice calls." Please consult your Cisco representative for availability.

2. When voice support becomes available.

Figure 1
RPMS in a Wholesale Network



Services

Cisco RPMS enables wholesale service providers to offer an assortment of services to multiple retail customers on a single network without dedicating ports, addressing service providers' needs to generate new, higher margin sources of revenue while controlling costs (Figure 1). Cisco RPMS supports the delivery of many services, including:

Global Long-Distance VoIP Services³

Service providers can deliver services that terminate voice calls originating from the IP network. Cisco RPMS tracks these calls using the DNIS, IP address, or an IZCT identifying the originating network. Cisco RPMS for voice supports both H.323 and Session Initiation Protocol (SIP) call-signaling protocols. With Cisco RPMS, a call enters the wholesale network only if the caller is authorized and resources are available to process the call.

Prepaid and Postpaid Calling-Card Services³

Service providers resell ports to retail providers of calling-card services whose voice calls originate from or terminate to the PSTN. Wholesalers can enjoy the higher-margin revenue from VoIP long distance without incurring expensive marketing costs. Cisco RPMS tracks voice calls originating from the PSTN using the DNIS used by the subscriber to get to the prepaid interactive voice response (IVR) system. Cisco RPMS preauthenticates the caller before the call is answered per customer SLA so that no network resources are expended answering a call and playing a voice response for rejected calls.

Wholesale Dial Service

Cisco RPMS is ideal for combining retail and wholesale dial services using Cisco AS5000 Universal Gateways or the Cisco AS5300 and Cisco AS5800 Access Servers. Call management and call discrimination occur before answering the call, conserving network resources. Wholesalers can share ports among multiple customers, which maximizes the use of their networks. Cisco RPMS monitors and enforces SLAs to prevent a disproportionate use of network resources by a customer. Cisco RPMS differentiates dial customers using configurable customer profiles based on the DNIS and call type determined at the time of an incoming call.

3. Cisco ASAP voice features in Cisco RPMS require a planned Cisco IOS Software release containing "pre-authentication for voice calls." Please consult your Cisco representative for availability.

Access VPN Service

Service providers can deliver VPN access services to enterprise customers using the Virtual Private Dialup Network (VPDN) feature. When management by VPDN is configured, a VPDN group contains the information to set up or reject a VPDN session. VPDN setup can be based on the DNIS received during call setup or the domain name after the call is answered. Cisco RPMS can scale to meet customer needs by balancing the load across home gateways. Because Cisco RPMS guarantees that customers receive their required ports, wholesalers can ensure that higher revenue VPN customers have access to the network.

Table 1

Features and Benefits of Cisco RPMS

Feature	Benefit
DNIS groups	Cisco RPMS includes an easy way to manage services using multiple DNIS entries. This scenario is especially useful with distributed dial services or universal toll-free dial services.
Trunk groups	Service providers can provide port guarantees per regions to their customers even when the same DNIS is used in different regions.
DNIS wildcards	A wildcard character (*) can be used in place of any number of digits in a DNIS to provision retail customers easily.
PAP/CHAP selection	Service providers can support a customer's choice of either Password Authentication Protocol (PAP) or Challenge Handshake Authentication Protocol (CHAP) for user authentication.
Call session and overflow limits	Predefined service levels can be supplemented with the ability for users to exceed service levels when necessary but be charged premium rates.
Shared overflow pools	Shared overflow pools with defined ratios of voice/dial calls can be created for one or more customers.
Variety of call types supported	Cisco RPMS provides the tools to manage the full complement of service types delivered to the gateway by the PSTN.
Call discrimination	Service providers can disallow calls that infringe on published rates because of the service type. (For example, ISDN data calls can be rejected for a number specifically rated for modem calls.)
Resource services	Modem resources can be dynamically configured on a per-call basis, depending on the customer profile and service-level agreement.
Server-based session counting	Using Cisco RPMS, service providers can centrally administer group-based service policies.
VPDN session and overflow limits	When managing sessions after a call is answered, sessions may be limited with predefined service levels for VPDN groups enabled by the customer domain name.
VPDN tunnel limits	This feature allows service providers to manage the number of sessions in a tunnel to prevent network congestion because each tunnel spanning the wide area network may use media with varied bandwidths.
VPDN tunnel load balancing	Service providers can take advantage of multiple VPDN paths for better bandwidth utilization and higher service quality.
Flexible accounting	Accounting information can be parsed from flat files or sent on to authentication, authorization, and accounting (AAA) servers to integrate easily with existing billing and reporting systems.
Synchronized call counting	Cisco IOS Software delivers call accounting records for calls immediately to Cisco RPMS for synchronous call counting. Calls are recorded and counted against customers' quotas instantaneously.
Call Detail Record generation at call start	Cisco RPMS offers the choice to generate call detail records (CDRs) at the beginning of a call to ensure accounting of calls that might not complete. Start/stop CDRs include rich information elements to allow tiered billing.
Reporting monitoring	Administrators have instant access to dial service activity across POPs for troubleshooting and monitoring.
MGCP support for dial	Cisco RPMS operates in a Media Gateway Control Protocol (MGCP) dial network using the Cisco gateway MGCP network access server package
Flexible configuration	Service providers can configure Cisco IOS Software port management only for chassis-based management or add Cisco RPMS for centralized management, depending on their specific network architecture requirements.

Feature	Benefit
RADIUS interface	Cisco RPMS uses the RADIUS protocol for support of pre-authentication with other network access servers conforming to the RADIUS RFC standards.
Scalable architecture	Cisco RPMS distributed architecture offers the flexibility to scale as service providers' networks grow.
Multuser HTML administrative interface	The graphical user interface (GUI) simplifies training requirements for administrators and allows remote operators in multiple locations to view or configure system and service parameters.
Cisco RPMS CLI	The Cisco RPMS can be easily integrated with existing billing and provisioning systems using the Cisco RPMS command-line interface (CLI).
Call rejection	A call is rejected if call volume or CPU utilization exceeds defined thresholds. A busy signal is sent to the PSTN if a call is rejected.
Configurable call threshold settings	Administrators, customers, or sales departments can be alerted when problems occur, new capacity is required, or customers need to purchase more services.
Fault tolerance	RPMS employs a hot-standby server for stateful failover. If the primary Cisco RPMS fails, the gateway automatically switches to the secondary server, maintaining state with no dropped calls.
SNMP manageability	Cisco RPMS supports Simple Network Management Protocol Version 2 (SNMPv2) for network management and monitoring.

Table 2

ASAP Voice Features and Benefits of Cisco RPMS

Feature	Benefit
H.323/SIP protocols	Cisco RPMS supports both H.323 and SIP signaling protocols. Because the Cisco SIP Proxy Server communicates directly with the Cisco RPMS for precall setup SLA enforcement, Cisco RPMS can reject unauthorized calls before the call enters the wholesaler's network.
IP address groups	IP address groups are useful for tracking voice calls originating from IP to identify a wholesale customer and apply appropriate policy to the calls.
Inter-Zone ClearToken	Cisco RPMS can associate voice calls with a customer profile using ClearTokens that identify the originating IP network.

System Architecture

Configuration

Cisco RPMS is a client server solution employed for managing shared resources for customers across multiple gateway stacks. Cisco RPMS acts as a server process to gateway clients, granting or restricting resource allocations based on configurable limits and current known session limits. Its distributed architecture allows call processing and policy enforcement components to reside on separate servers, enabling Cisco RPMS to scale to accommodate service providers' growth. Cisco RPMS includes an HTML browser application that offers flexibility in customer configuration, reports, accounting, scalability, and robustness while supporting multiple POPs in a wide geographic area with cost-effective management tools. Deployment of multiple servers will meet the advanced requirements for managing high-capacity data networks and diverse geographic locations.

The Cisco AS5000 Gateways Cisco IOS Port Management function is within the Cisco IOS Software that is part of the gateway platforms. This function provides port management for single gateway management and serves as the client for Cisco RPMS solutions.

Fault Tolerance and Resiliency

Cisco RPMS tolerates system and client failures. Fault tolerance is enabled through information redundancy, multiple services, and nonreliance on a single component for resource management.

Specifically, the Cisco RPMS system handles fault tolerance using a hot standby server. Cisco RPMS servers are deployed in pairs. The primary Cisco RPMS passes all messages received to the hot standby server. If the primary Cisco RPMS fails, the gateway automatically switches to the secondary server. State is preserved, so no calls are dropped. The Cisco RPMS database can replicate on a secondary server. Cisco RPMS is designed so that the failure of the database causes no service disruption.

The preferred deployment of the system is to have more than one server known to the gateway clients in the same manner that exists in today's gateway environment where a list of external servers is contained in the gateway "database." If an external server cannot be reached, then the list is iterated until a server is located.

System Requirements

Cisco RPMS has the following minimum system requirements:

Cisco RPMS Hardware

Sun Ultra 60 with:

- Dual 450 MHz processor
- 1 GB of RAM
- 800 MB of disk space

Cisco RPMS Software

- Solaris Version 2.6 and above
- Oracle Version 7.3.4, 8.0.5, or 8.1.6, or 8.1.7 Enterprise edition

Cisco RPMS Client Browser

- Netscape Version 4.04 or later
- Microsoft Internet Explorer Version 4.01 or later

Gateways

- Cisco AS5000 Universal Gateways and Cisco AS5300 and Cisco AS5800 Access Servers
- Other vendor network access servers conforming to IETF RADIUS RFC standards

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