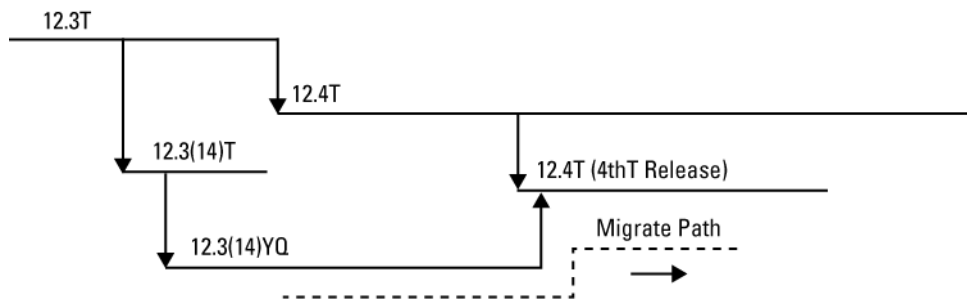


CISCO GGSN RELEASE 5.2/CISCO IOS SOFTWARE RELEASE 12.3(14)YQ

This product bulletin describes content and delivery information for Cisco® Gateway GPRS Support Node (GGSN) IOS® Software Release 12.3(14)YQ. It should be used in conjunction with the Cisco IOS® Software Release 12.3(14) product bulletin. Cisco IOS Software Release 12.3(14)YQ is supported on the Multiprocessor WAN Application Module (MWAM) card on Cisco 7600 Series, Cisco Catalyst® 6500 Series, and Cisco 7206VXR platforms. This release contains all of the features supported in Cisco GGSN IOS Software Release 12.3(11)YJ).

Figure 1 depicts the collapse of Cisco IOS Software Release 12.3(14)YQ into the mainline T train.

Figure 1. Migration Diagram



CISCO IOS SOFTWARE RELEASE 12.3(14)YQ FEATURES

Table 1 lists the features that will be delivered in Cisco IOS Software Release 12.3(14)YQ. Cisco GGSN Release 5.2 supports both 2.5-G and 3-G Universal Mobile Telecommunications Service (UMTS).

Table 1. Cisco IOS Software Release 12.3(14)YQ Features

Features	MWAM on Cisco Catalyst 6500 Series and Cisco 7600 Series	7206VXR
Support of prepaid and postpaid billing in conjunction with the Cisco Content Services Gateway (CSG) based on IETF Diameter Credit Control Application (D-CCA)	X	X*

* Only Cisco GGSN Release 5.0 features are supported as part of GGSN Release 5.2. The GTP-SR and the Diameter support are only for MWAM.

Prepaid and Postpaid Billing Support

Cisco GGSN Release 5.2, in conjunction with the Cisco CSG, provides support for enhanced billing, based on the Diameter-Credit Control Application (D-CCA) for real-time online billing support as defined by the IETF. Cisco GGSN interfaces with the Cisco CSG to provide enhanced billing in the form of content postpaid and prepaid billing.

Customers will need to deploy Cisco GGSN and Cisco CSG in order to use the Diameter-Closed Loop Charging Interface (D-CLCI) functions as part of their enhanced GGSNs. Cisco GGSN Release 5.2 retains all of the features of releases 5.0/5.1.

Backward Compatibility

The following features are supported in GGSN 5.2 in terms of backward compatibility:

GTP Session Redundancy

GTP session redundancy (GTP-SR) enhances GGSN availability and is supported using dual chassis. GTP-SR provides Packet Data Protocol (PDP) context stateful failover between two MWAM cards across two Cisco 7600 Series or two Cisco Catalyst 6500 Series chassis.

One-to-one session redundancy in Cisco GGSN Release 5.2 is based on Active-Standby redundancy. In Active-Standby redundancy mode, one node is active and handles all user traffic. The second node is standing by, ready to take over in case of failover. Cisco GGSN does not handle any user traffic in standby mode.

The following types of PDP contexts will not be redundant, and will require re-establishment of the PDP context on the standby node.

- Point-to-Point Protocol (PPP) PDP type.
- PPP regeneration/Layer 2 Tunneling Protocol (L2TP) access.
- IP Multimedia Subsystem (IMS) support (no support for the Go interface).
- Network-initiated PDP.
- GTP-SR for a single-chassis solution. This will be supported with supervisor engine failover when stateful switchover/nonstop forwarding (SSO/NSF) is supported.
- Command-line interface (CLI) redundancy for GTP-SR. Here, it is necessary to manually (or with a network management system [NMS]) make sure there is near-identical configuration on the active and standby nodes.
- In-Service Software Upgrade (ISSU).
- MIBs. Dynamic counters and statistics will not be synced; they will appear reset when a switchover happens.
- Protection of the call detail records (CDRs) in the memory of the active GGSN prior to switchover. User-data-related charging information for PDP is not planned to be synced; the unsent CDRs that are in the active GGSN's memory before the switchover will be lost. Configuring nodes to close and send the closed CDRs to Charging Gateway Function (CGF) will minimize this loss.

3GPP Standards/Change Request Compliance

Cisco GGSN Release 5.2 is fully compliant with the Third-Generation Partnership Project (3GPP) releases 98, 99, and 4, and also with Release 5 in terms of charging change requests.

Charging Enhancements

- Local/tertiary charging gateway support—This supports a third charging gateway in addition to the two (primary and secondary) charging gateways that Cisco GGSN already supports. The third charging gateway can be deployed locally so that if the access to the primary and secondary charging gateways (which are remote) fails, the GGSN can act as backup and send the CDRs to the local (third) charging gateway until one or both of the remote charging gateways become operational. Then, the GGSN switches back to the primary or secondary gateway.
- Time-based triggers—Cisco GGSN Release 5.2 supports time-based triggers for generation of GGSN-CDRs [G-CDRs], in addition to the volume-based triggers that are already supported by Cisco GGSN. These can be enabled per GGSN, access point name (APN), or PDP context.
- Enabling charging per APN—Cisco GGSN Release 5.2 allows enabling and disabling the generation of CDRs per APN.

RADIUS Support

- Configurable RADIUS attribute for backward compatibility—Cisco GGSN Release 5.2 allows configuration of the RADIUS attributes for the Mobile Station International ISDN Number (MSISDN) and the account session ID for a user to be able to support backward compatibility with Wireless Application Protocol (WAP).

APN-Based Features

- Mapping multiple APNs to a single virtual routing/forwarding (VRF) instance—Cisco GGSN Release 5.2 supports more than one APN per VRF instance.
- Enabling charging per APN—Cisco GGSN Release 5.2 allows the generation of CDRs per APN to be enabled or disabled. This feature is part of the charging enhancements.
- Rate limiting for users per APN—This feature allows a controlled distribution of bandwidth per APN. Some APNs may be recognized as those used for bandwidth-intensive applications, such as MP3 file hosts, or other locations where image files or large file sizes are involved. Cisco GGSN Release 5.1 is configurable on a per-APN basis to restrict the transfer rate per subscriber to an operator-defined limit that reduces the chance of a node being congested, thereby increasing its availability. This is also part of the Call Admission Control (CAC) and per-PDP policing feature suite.

Security Enhancements

Support of multiple trusted public LAN mobile network (PLMN) IDs—Access to certain partner roaming mobile stations is allowed; by default, other roamers will be blocked on an APN basis. This allows the operators to provision access based on partner agreements. Cisco GGSN Release 5.2 allows more than one trusted PLMN ID. This allows operators to form multiple alliances when they do not want the mobile stations from their partners to be blocked because they do not belong to the home PLMN that the GGSN belongs to. This feature allows the operator to configure multiple trusted mobile country codes and mobile network codes (MCC/MNCs).

Operation and Maintenance Features

- Maintenance mode—Cisco GGSN Release 5.2 allows APN configuration when there are active PDP contexts. It allows operators to change the APN configuration in real time, without tearing down any active PDP contexts on that APN.
- Preventing generation of CDRs for active PDP contexts—Deactivation of G-CDR generation for an active PDP context. With this feature, customers should be able to stop generation of G-CDRs when a PDP context is active, without tearing down the PDP context to be able to do this. This is related to the above maintenance mode feature for allowing APN configuration for active PDP contexts.

Policy Enforcement/IMS Enabling Features

- UMTS CAC—UMTS CAC is used by the GGSN admission decisions based on the network resource availability and the policy set by the Policy Decision Function (PDF) in case of IMS subsystem implementation. It can also downgrade a service if the policy parameters from the PDF do not match those from the serving GPRS support node (SGSN). CAC is based on the parameters configured in the APN, such as maximum activated PDP, maximum bitrate, or guaranteed bitrate, as well as the bandwidth allocated to a particular traffic class the PDP belongs to.
- Per-PDP policing—Cisco GGSN Release 5.2 supports per-PDP policing to limit downlink traffic at the Gi interface. If the bandwidth is exceeded on a PDP context, packets may be dropped or assigned a higher drop precedence value.
- Rate limiting for PDPs per APN—Cisco GGSN Release 5.2 allows operators to configure rate (bandwidth) thresholds per APN.

L2TP Extension on Gi Interface for PPP PDP Type

GTP is used between the SGSN and GGSN to tunnel various data protocols through the GPRS backbone. The PPP PDP type traffic from the mobile station is processed at the GGSN, where the PPP sessions are terminated. The GGSN then transports the traffic over L2TP and routes it over the Gi interface to its destination. This feature requires the mobile station to support PPP PDP type.

PPP PDP Type Terminated in GGSN

The mobile station can send IP traffic encapsulated as PPP sessions all the way to the GGSN. There, the PPP sessions are terminated, and the IP packets are routed over the Gi interface to their destinations. This feature requires the mobile station to support PPP PDP type.

QoS Mapping per standards for GTPv0

In addition to new full quality of service (QoS) support for UMTS, Cisco GGSN Release 5.2 supports GTPv0 mapping of GPRS QoS classes to IP QoS classes (wireless to wired). New QoS mapping based on delay class (compliant with UMTS) is supported, and resulting QoS classes are mapped to Differentiated Services (DiffServ) classes.

Duplicate IP Address Protection (also known as PLMN Address Protection)

This feature allows the GGSN to be configured with a specific address range (the PLMN IP addressing plan, for example). The GGSN will reject the PDP creation if the mobile station address belongs to the specified range.

Dynamic Echo Timer

In previous releases, the retransmission scheme used for GTP Echo messages was the T3-Timer and N3-Request. According to the standard, however, if a path failure is detected (no Echo Response after N3 Echo Request, for example) on the Echo Request message, all PDP context related to this path will be deleted. This feature allows the GGSN to use a dynamic timer for the Echo Request message. To avoid having to delete a large number of PDP contexts because of network congestion between GGSNs, the dynamic echo timer takes into account the Round Trip Time (RTT) between GSNs.

PPP Regeneration (L2TP on the Gi Interface)

This feature allows the GGSN to regenerate a PPP session and forward the PPP frames within L2TP tunnels on the Gi interface. Targeted for corporate users, the GGSN can be smoothly integrated into a virtual private dialup network (VPDN) L2TP infrastructure.

Virtual APN Support

The virtual APN concept allows provisioning of one APN per type of access (one for corporate and one for ISP, for example). The selection of the “real” network is made using a structured user name entered by the user. As an example, for corporate access, the user will enter “login@domain” as the user name, where “domain” indicates the corporate APN (cisco.com, for example). Upon PDP context activation, the GGSN will select the target corporate APN using this user name and not the APN.

Enhanced Security Feature Support

- Source IP spoofing protection (also called antispoofing)—This feature allows the operator to prevent source IP address spoofing and protects the network from malicious attacks by unauthorized users.
- PLMN network protection from mobile stations—This feature allows the operator to protect its PLMN by disallowing mobile station traffic to the destination IP address range that falls within or coincides with the PLMN’s IP address range.
- Steer mobile station to mobile station traffic—This feature allows steering of mobile station to mobile station traffic to a specific external network element instead of allowing the traffic to loop through the GGSN. This is used for firewall filtering and external billing.

Route Aggregation

In Cisco GGSN Release 1.4, a static route for the mobile station was created in the GGSN after each PDP context activation. Each route has an impact on the capacity of the GGSN. In Cisco GGSN Release 5.2, to scale and support more PDP contexts, an aggregate route can be used to handle user data packets for multiple PDP contexts (instead of a host route for each PDP context). Using this feature, mobile station host routes with the same prefix will be aggregated into one route.

Cisco Express Forwarding Switching

This feature adds Cisco Express Forwarding-enhanced Layer 3 switching to the GGSN. The Cisco Express Forwarding switching feature switches the packet out in the receive handler, avoiding the delay incurred as a result of enqueueing and dequeuing. Cisco Express Forwarding avoids the potential overhead of continuous cache churn by using a Forwarding Information Base (FIB) for the destination switching decision that mirrors the entire contents of the IP routing table (there is a one-to-one correspondence between FIB table entries and routing table prefixes, so there is no need to maintain a route cache).

VRF-Based VPN Switching

VRF allows traffic to be switched to a destination VPN, giving the GGSN true VPN support with redundant interfaces. This feature supports routing protocols per APN. Each VRF is a virtual router in the GGSN and can map to an APN, providing flexibility to connect to a corporate network and still satisfy the destination networks that are unique to each corporate. Benefits of using VRF also include:

- Security (traffic separation and isolation)
- Reliability and scalability (multiple interfaces can be supported in one VRF)
- Flexibility (can use policy and address space independently)

Charging for Roamers

This feature enables operators to charge the roamers based on the matching of MNC/MCC ID and the IMSI/MSISDN address.

GTP SLB Support for GTPv0 and GTPv1

The GTP Server Load Balancing (SLB) feature allows PDP context creation to be distributed between multiple GGSNs. The load-balancing mechanism actually uses the load of each GGSN to perform the load balancing.

GTP SLB for MWAM-Based GGSNs

For MWAM GGSNs on Cisco 7600 Series and Cisco Catalyst 6500 Series platforms, GTP SLB will be supported on the Supervisor Engine 2. GTP SLB is supported in Cisco IOS Software Release 12.2(14)ZA.

The most current release notes for Cisco IOS Software Release 12.2(14)ZA are available at:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/ol_3827.htm

Release notes for Cisco IOS Software Release 12.3(14)YQ on the MWAM are available at:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123reInt/cat6000/index.htm>

SUPPORT

Cisco IOS Software Release 12.3(14)YQ follows the standard Cisco support policy available at:

<http://www.cisco.com/warp/public/437/27.html>

PRODUCT NUMBERS

Product numbers for MWAM-based Cisco IOS Software Release 12.3(14)YQ are the same as those for Cisco GGSN Release 5.2 (Table 2).

Table 2. MWAM Cisco IOS Software Release 12.3(14)YQ Feature Sets, Images, and Descriptions

Product Code	Software Description	Image	Flash	DRAM
SC-SVC-GG50B	Cisco MWAM Series IOS GGSN 5.0 Base	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50B=	Cisco MWAM Series IOS GGSN 5.0 Base; spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50P	Cisco MWAM Series IOS GGSN 5.0 Premium	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50P=	Cisco MWAM Series IOS GGSN 5.0 Premium spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50UP=	Cisco MWAM Series IOS GGSN 5.0 upgrade from Base to Premium; spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50UBB=	Cisco MWAM Series IOS GGSN upgrade from 4.0 to 5.0 Base; spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50UBP=	Cisco MWAM Series IOS GGSN upgrade from 4.0 to 5.0 Premium; spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50BIM	Cisco MWAM Series IOS GGSN 5.0 Base (single IM)	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50BIM=	Cisco MWAM Series IOS GGSN 5.0 Base (single IM); spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50PIM	Cisco MWAM Series IOS GGSN 5.0 Premium (single IM)	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50PIM=	Cisco MWAM Series IOS GGSN 5.0 Premium (single IM); spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50UPIM=	Cisco MWAM Series IOS GGSN 5.0 upgrade from Base to Premium (single IM); spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50UBBIM=	Cisco MWAM Series IOS GGSN upgrade from 4.0 to 5.0 Base (Single IM); spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
SC-SVC-GG50UBPIM=	Cisco MWAM Series IOS GGSN upgrade from 4.0 to 5.0 Premium (single IM); spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
WS-SVC-MWG50-BDL	Cisco MWAM Series GGSN 5.0 Premium 2-unit bundle	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB
WS-SVC-MWG50-BDL=	Cisco MWAM Series GGSN 5.0 Premium 2-unit bundle; spare	c6svc-mwam-g8is-b1.123-8.XU.bin	48 MB	512 MB

DOWNLOAD INFORMATION

Customers can download Cisco IOS Software Release 12.3(14)YQ from the Cisco.com software image library at:

<http://www.cisco.com/kobayashi/sw-center/sw-ios.shtml>

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