

## Protecting Revenue by Preventing Loss of Billing Data: Cisco Persistent Storage Device for the Cisco Gateway GPRS Support Node

Used for billing and resolving disputes, customer data records (CDRs) are the cornerstone of the mobile operator's business. But mobile operators may lose CDRs – and consequently revenue – if either the billing and mediation agent (BMA) or its link to the Cisco® Gateway GPRS Support Node (GGSN) fails. Mobile operators can protect their profitability by storing CDRs generated by the Cisco GGSN on the Cisco Persistent Storage Device, the same services module used to store CDRs generated by the Cisco Content Services Gateway (CSG).

### Executive Summary

If the Cisco GGSN cannot connect with the BMA because either the BMA or its connection is unavailable, the Cisco GGSN has no place to store CDRs. The resulting inability to bill customers, even for brief periods, can cause revenue losses.

Operators can prevent revenue losses resulting from network or BMA server outages by storing CDRs on the Cisco Persistent Storage Device (PSD), a services module that resides with the Cisco GGSN module in the same Cisco 7600 Series Router or Cisco Catalyst® 6500 Series Switch chassis. When the BMA becomes available again, the Cisco GGSN automatically retrieves the CDRs from the Cisco PSD and restores them to the BMA. The Cisco PSD, the same proven solution used to back up CDRs generated by the Cisco CSG, the Cisco PSD provides low-cost backup for the Cisco GGSN as well.

This white paper, intended for mobile operator business managers and IT executives, explains the business risks of CDR loss, the drawbacks of traditional solutions, and how the Cisco PSD uniquely meets business requirements.

### Business Challenge

Volume tariffs for wireless data services such as General Packet Radio Service (GPRS) or Code Division Multiple Access (CDMA) average US\$2 to \$4 per megabyte. Therefore, an outage to a single Cisco GGSN can result in as much as \$80,000 in revenue loss per hour. As operators start to offer higher-margin services such as multimedia services and streaming download, the financial impact of CDR loss will increase.

Traditional approaches to CDR storage fail to meet mobile operators' business requirements. A backup BMA device is effective if the primary BMA device fails, but not if the link to the Cisco GGSN fails. And purchasing another server adds unnecessary capital expense because the operator is paying for server logic when it only needs storage.

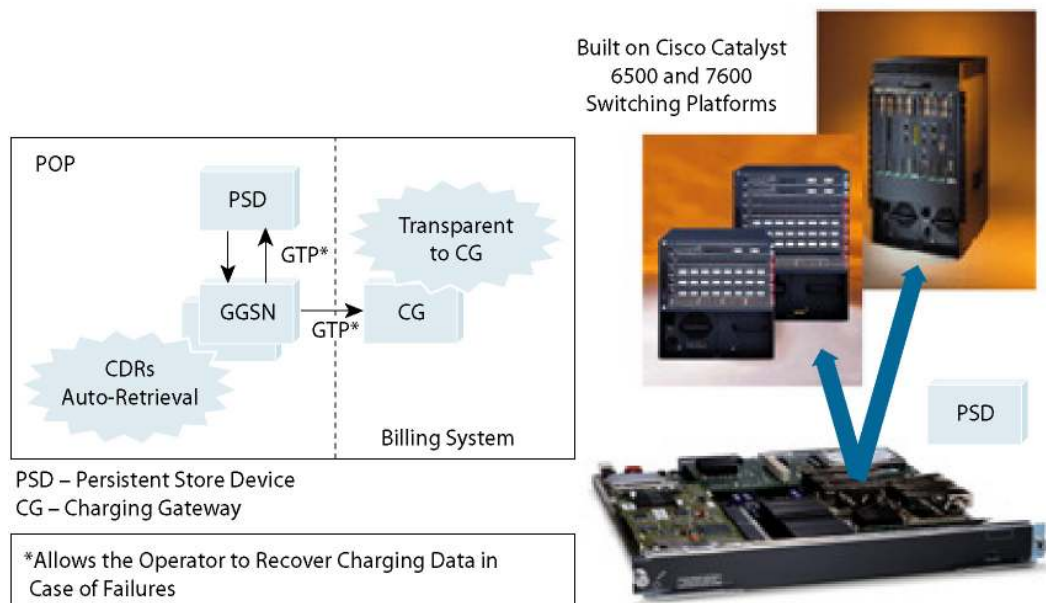
Another traditional approach is to install a standalone persistent storage device in the same rack as the Cisco GGSN. While less expensive than deploying a redundant server, this approach introduces another single point of failure: the connection between the Cisco GGSN and the

storage device. The other drawback of a standalone storage device is that it occupies rack space in the network operations center, where space is at a premium.

### Cisco Persistent Storage Device Solution

The Cisco PSD is a service module that resides in the same Cisco 7600 Router or Cisco Catalyst 6500 Switch as the Cisco GGSN services module (Figure 1).

**Figure 1.** Role of the Cisco Persistent Storage Device in the Billing Environment



Because the Cisco PSD is colocated with the Cisco GGSN, it provides benefits not available from standalone storage solutions:

- Avoids revenue loss by collecting CDRs from the Cisco GGSN when the link to the BMA is unavailable
- Avoids the risk of failed connections to standalone devices in other racks
- Frees rack space for other needs
- Reduces capital expense compared to standalone storage devices

A single PSD provides 37 GB of capacity – enough to store 267 million CDRs, or a week's worth for a mobile operator with typical volume. If needed, mobile operators can install additional PSDs. One Cisco PSD can support up to three in-chassis Cisco GGSNs.

### Use Scenarios

The Cisco GPRS ordinarily sends CDRs to a BMA, constantly monitoring its availability. If the BMA becomes unavailable because of a server failure, scheduled server maintenance, or link outage, the Cisco GGSN automatically stores the generated CDRs on the Cisco Persistent Storage Device instead of the BMA. The Cisco GGSN includes CDRs that were sent but not acknowledged before the outage. When the Cisco GGSN detects that connectivity has been restored, it automatically retrieves the stored CDRs and sends them to the BMA, a feature called auto-retrieval.

The Cisco GGSN intersperses the retrieved CDRs with newly generated CDRs, giving priority to newly generated CDRs. The mobile operator can specify the rate at which the Cisco GGSN forwards records – during retrieval as well as during normal operation – to avoid overwhelming the BMA. The PSD deletes the stored CDR after the Cisco GGSN acknowledges receipt, and the Cisco GGSN keeps it in memory until the BMA acknowledges receipt.

If the BMA or link will be unavailable for an extended time, the mobile operator can also restore the CDRs from the Cisco PSD to a different server. An administrator simply logs into the Cisco mobile Service Exchange Framework (mSEF) interface and pushes the records to the specified FTP server.

### **Management**

The Cisco PSD needs to be configured only once, during installation. The network administrator logs into the Cisco PSD module from the Cisco IOS® Software on the supervisor card in the router or switch. Commands are available for administration, troubleshooting, creating data stores on the Cisco PSD, and specifying the Cisco GGSNs that can access those data stores. Typically, mobile operators configure one data store for each Cisco GGSN or redundant pair.

Administrators can also manage the Cisco PSD with the Cisco Mobile Wireless Center product suite, which complements the CiscoWorks LAN Management Solution (LMS) to provide complete management of Cisco mSEF. It addresses the element-management requirements of mobile operators and provides fault management, configuration, and troubleshooting capability as mobile operators transition their wireless service delivery networks from second-generation (2G) circuit-based traffic to 2.5G and third-generation (3G) IP-based services.

### **Relationship to Cisco mSEF**

The Cisco PSD is part of Cisco mSEF, a standards-based framework that links the access network to IP networks and the operator's value-added services. Cisco mSEF offers mobile operators a comprehensive solution for connectivity, control, and charging. It includes packet gateways, mobile services, load balancing, and network management services delivered on a range of Cisco platforms and application modules. Together, these components help mobile operators profitably deliver services over their 2G, 2.5G, or 3G mobile packet infrastructures and their 802.11 public WLAN hot spots.

### **Business Benefits**

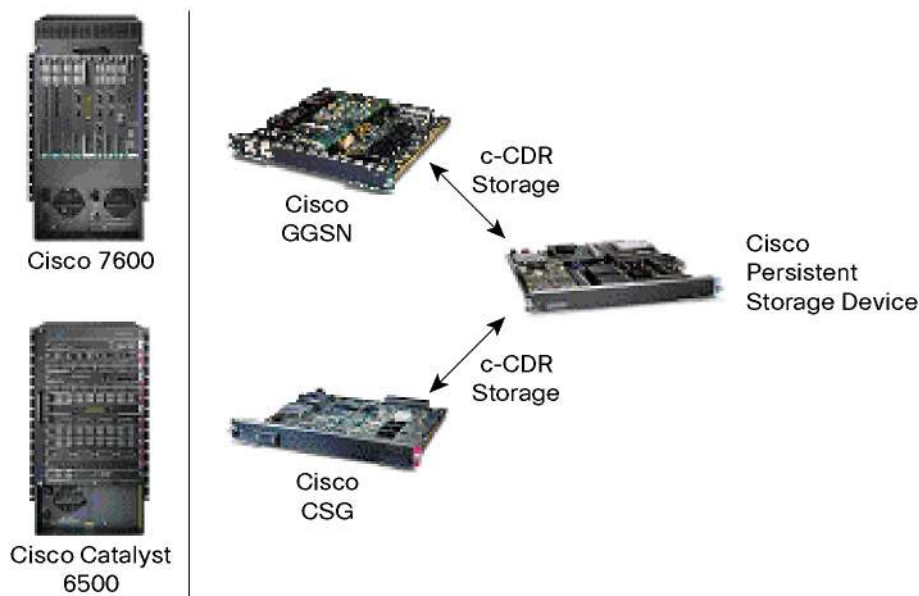
#### **Prevention of Revenue Loss**

The mobile operator retains CDRs needed for billing even in the event of a network or BMA server outage as well as server or network upgrades. The stored CDRs also help prevent revenue loss by providing an audit trail that facilitates resolution of billing disputes.

#### **Investment Extension**

The Cisco PSD works with Cisco CSGs as well as Cisco GGSNs (Figure 2). As business requirements change, mobile operators can redeploy the device from one function to the other. Therefore, a single capital expense and training investment can be applied to two solutions.

**Figure 2.** The Cisco PSD Works with Cisco CSG and as Cisco GGSN



### Flexibility

To restore stored CDRs to the BMA, network administrators can use either the autoretrieval feature or datastore transfer option of the Cisco PSD. Autoretrieval is preferred in most circumstances because it requires no human intervention, which reduces IT burden and accelerates the resumption of normal CDR-storage processes. Datastore transfer provides a useful alternative for restoring CDRs to a different BMA.

### Low Total Cost of Ownership

The Cisco PSD is more cost-effective than expensive remote billing gateways. Total cost of ownership drops further because the Cisco PSD device avoids the need for the network provisioning and configuration changes that a redundant BMA would require, and administrators can use the same management interface they use for other components of the Cisco mSEF.

### Increased Availability and Data Integrity

Because the Cisco PSD occupies a slot in Cisco 7600 Series routers and Cisco Catalyst 6500 switches, it shares their highly reliable backplane and high availability. It has a long expected life because of reliable hardware components and an idle spin-down. Checksums help ensure data integrity.

### Manageability

As part of the Cisco mSEF solution, the Cisco PSD shares the same Web-based management interface as other components of the framework that mobile operators already use or plan to deploy in the future. IT staff who already know how to use the management interface for other Cisco mSEF solutions need little or no training to use Cisco PSD for the Cisco GGSN.

### Scalability

The Cisco PSD can support even the largest volume of CDRs with no loss. Each Cisco PSD supports 264 million CDRs, typically seven days of volume. For higher-volume environments, the mobile operator can insert multiple PSDs in the same chassis.

### Conclusion

To prevent loss of revenue, mobile operators need a reliable way to back up CDRs if the Cisco GGSN cannot communicate with the BMA. Because it resides in the same Cisco 7600 Series Router chassis as the Cisco GGSN module, the Cisco PSD provides a highly reliable, low-cost solution. And as part of the Cisco mSEF, the Cisco PSD can be managed with the same interface the mobile operator already uses for its other infrastructure components. Mobile operators that already use the Cisco PSD to back up CDRs generated by the Cisco CSG can apply the same technology to the Cisco GGSN, for a low-risk solution with no incremental management requirements.

For more information on PSD, Cisco GGSN, and Cisco mSEF, visit: [www.cisco.com/go/mobile/sef](http://www.cisco.com/go/mobile/sef).



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