



SERVICE OVERVIEW

CONTENT-BASED BILLING

Increasing Revenue Within the Confines of the Limited Wireless Spectrum

Unlike wireline carriers, wireless carriers have a limit to the volume of traffic they can carry, bounded by the finite wireless spectrum. Therefore, the wireless business focus is no longer on infrastructure build-outs but on customer retention and increased average revenue per customer (ARPU). A promising strategy for achieving both goals is content-based billing. Subscribers pay a fee for content and services they access, such as news, games, video broadcasts, or multimedia messaging service (MMS). The mobile operator generates new revenues, strengthens brand value, and differentiates its service to attract and retain customers.

THE CISCO CONTENT-BASED BILLING SOLUTION ENABLES BILLING BY VOLUME, CONNECTION DURATION, DOWNLOAD, OR EVENT FOR SERVICE DIFFERENTIATION AND INCREASED REVENUE POTENTIAL.

EXECUTIVE SUMMARY

For mobile operators, the need for service differentiation is urgent. Voice access has become a commodity, and dropping prices threaten profitability. Short Message Service (SMS), too, has become a saturated market. To increase ARPU, strengthen customer loyalty, and increase profits, mobile operators need to introduce innovative data services.

A prerequisite for delivering advanced services is the ability to bill for them. With content-based billing capabilities, for example, mobile operators can allow customers to pay or prepay for different types of content and services, including Websites, individual files, Multimedia Message Service (MMS), and more. According to Ovum ("Billing for Content," January 2004), mobile operators are better positioned than Internet service providers to make money from content. Reasons include the direct relationship between subscriber usage and revenues, a billing infrastructure that enables mobile operators to collect individual small payments on behalf of content providers, and a mobile phone user population that is 550 percent larger than the Internet user population.

Until now, the barrier to offering value-added content and services has been the mobile operator's inability to distinguish among different content types traveling over the Radio Access Network (RAN) and to bill accordingly. Traditional billing models based on call duration or distance do not apply to services whose worth to the customer is better measured in clicks, file size, or time-sensitivity, as in the case of live sports broadcasts.

Cisco Systems® enables operators to provide content-based billing with the Cisco® Content Services Gateway (CSG). The Cisco CSG, in use by more than 25 wireless carriers, provides the three capabilities that mobile operators need to offer content-based billing: dynamically examining content to determine its nature, controlling subscriber service access, and enforcing subscriber account balances.

The Cisco CSG is part of Cisco Mobile Exchange, an open platform that can readily interface to all of the control elements in your mobile network, including multiple RANs, back-end billing systems, and content-filtering and compression solutions. Mobile operators can install and deploy Cisco Mobile Exchange without disrupting any services.

Providing an intelligent enforcement layer within the operator's network, Cisco Mobile Exchange is enhanced and complemented by Cisco partnerships. Cisco has already demonstrated the platform's interoperability with major RAN, authentication, authorization, and accounting (AAA), content billing, content filtering, and compression solutions, relieving mobile operators of the need to dedicate resources to ensure a smooth deployment. More than 40 mobile operators worldwide have deployed Cisco Mobile Exchange. Cisco continually applies their feedback to add valuable new features, maintaining the platform's innovation and cost-effectiveness.

This white paper explains the content billing service opportunity, provides an overview of how the solution works, and summarizes service benefits to the mobile operator and its subscribers.

SERVICE OPPORTUNITY

Content billing is a significant revenue opportunity for mobile operators. The operator charges a specified fee for different types of content and services (Table 1).

Table 1. Types of Content and Services and How They Might Be Billed

Content or Service	Billing Method
User self-service <ul style="list-style-type: none"> • Balance inquiries • Account replenishment • Service activation 	Free
Local hosted multimedia <ul style="list-style-type: none"> • MP3 files 	Per byte
News <ul style="list-style-type: none"> • Stock quotes • Sports scores • Weather 	Per click
Personalization <ul style="list-style-type: none"> • Ring tones • Screen savers 	Per download
Internet games	Per game
Event broadcasts <ul style="list-style-type: none"> • Movies • Interviews • Sports videos 	Per event, with separate quote request for each event
E-mail <ul style="list-style-type: none"> • Post Office Protocol (POP) • Internet Message Access Protocol (IMAP) • Simple Message Transport Protocol (SMTP) 	Per byte (Header descriptions can be excluded for IMAP)
Streaming media <ul style="list-style-type: none"> • Real-Time Streaming Protocol (RTSP) 	Per second

By differentiating among different types of content and billing in a way that makes the most business sense, mobile operators move up the value chain transitioning from flat-rate to value-added billing. The ability to examine packet contents also meets other business needs, such as content filtering, data mining, and supporting lawful intercept requirements in certain countries.



An early success story for the Cisco content-based billing solution is a European wireless carrier that deployed Cisco CSG in two countries. The carrier immediately began offering for-fee MMS and Wireless Application Protocol (WAP) services and plans to soon launch WAP 2.0 browsing, content downloads, mobile instant messaging, and e-mail. The carrier anticipates achieving return on investment for the initial services in one year. Subsequent product launches will capitalize on the exact same deployment with almost no incremental investment.

Customer Use Scenario

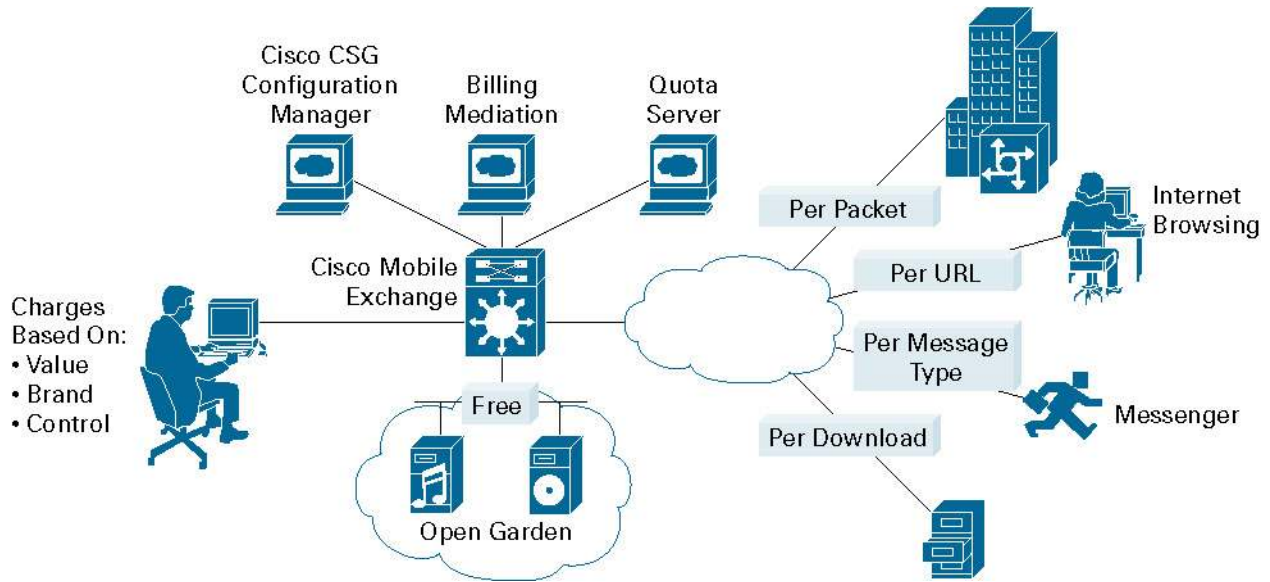
- A customer requests content, such as a screen saver.
- The prepaid billing system authorizes subscriber access if the subscriber has not exceeded a prepaid limit. If the limit has been exceeded, the subscriber is directed to a Webpage to replenish the account—with a credit card payment, for example.
- The subscriber accesses the content. If the operator chooses, the Cisco CSG can notify the user that there will be a charge for accessing the content and redirect the user to accept the Advice of Charge (AoC). The Cisco CSG records subscriber service access attempts and actual usage.
- The mobile operator can apply differentiated billing based on content type, host name, directory accessed, or even individual files.

Flexible Billing Plan Options

Carriers can introduce a variety of billing plans that make their service more attractive or more profitable. Examples include:

- Differentiated billing based on volume, duration, time of day, quality of service, and more (Figure 1)
- Per-MMS billing
- Billing according to minutes of usage for Push-to-Talk service
- Prepaid or postpaid services for 2.5G, 3G, and 3G+ networks
- Bill-back to content providers for advertisements
- Goodput billing, or not charging customers for errors or retransmitted packets

Figure 1
Flexible Billing Options



Balance Management and Prepaid Billing

With the Cisco CSG mobile operators can offer content-based billing on a prepaid or postpaid basis. For postpaid services, the Cisco CSG reports usage to the mediation system, which filters and rates usage before handing it off to the billing system. For prepaid services, the mobile operator can allocate the subscriber a specified number of transactions, number of bytes, or time duration for each service through the quota server. When subscribers use up their balance for a particular service, the connection can either be terminated or forwarded to a Website where they can add money to their accounts. Mobile operators can choose to warn subscribers of low balances before their accounts are depleted so that service is not interrupted.

Reverse Billing

In some cases, the mobile operator might prefer to reverse-bill certain content transfers to the content provider. Content providers already compensate mobile operators for hosting the site, but a Webpage that is accessed frequently might be more costly for the mobile operator to host. With detailed information on how often and for how long a Website is accessed, or how many times an advertising banner is accessed, mobile operators can back-bill appropriate access costs to the content provider or advertiser.

Data Mining

Mobile operators can use the Cisco CSG to gather information for data mining, specifically, to identify the most popular sites and the content providers that offer the most popular content. With this information, mobile operators can adjust their content-based billing prices to reflect value.

SOLUTION DESCRIPTION

At the heart of the content-based billing service is the Cisco CSG, a high-speed processing module that provides content billing and user awareness to the Cisco Catalyst® 6500 Series Switch and Cisco 7600 Series Router platforms. The Cisco CSG is an integral part of Cisco Mobile Exchange, a standards-based framework that links the RAN to IP networks and their value-added services. It includes network devices, mobile services, load balancing, and network management services delivered on a range of Cisco platforms and application modules.

The Cisco CSG provides the following functions:

- Generating billing records
- Enforcing quotas for prepaid billing customers
- Differentiating services according to the rate plan
- Supporting roaming, allowing different rating plans
- Enabling subscribers to replenish their account balances (“top-up” services)
- Providing AoC to subscribers before they accept a service
- Allowing pricing overrides, a capability also called tariff switch—for example, when a user’s session spans two different times of day charged at different rates
- Content filtering
- Supporting lawful intercept
- Ensuring high availability

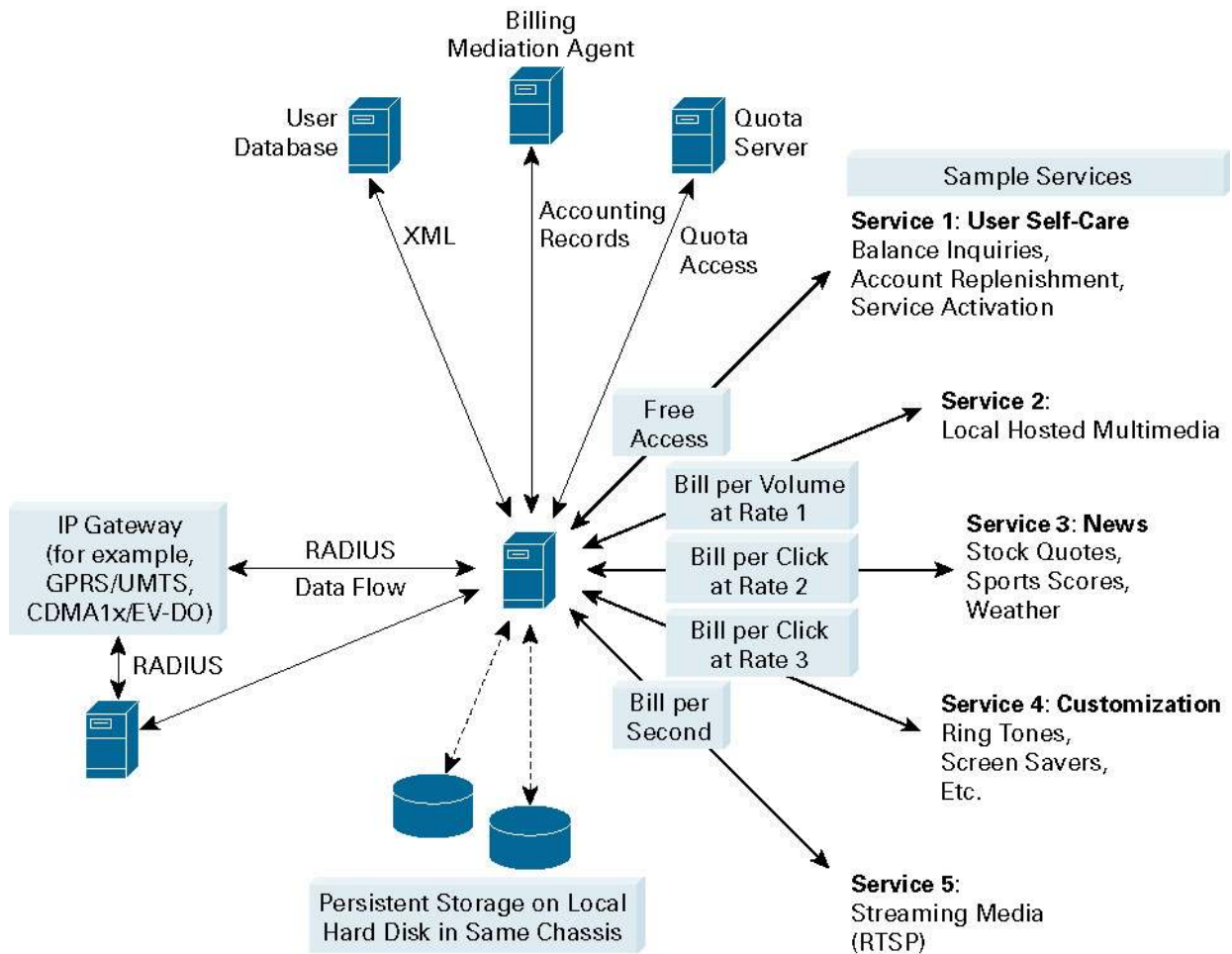
Interacting with the Billing System

The Cisco CSG supports differentiated billing based not only on the destination IP address, but also on the host name, directory accessed, or even individual files. This is a unique advantage compared to other vendors’ solutions that support domain names only.

The Cisco CSG interfaces with most leading billing, mediation, and quota servers. It interacts with the following components of the mobile operator’s billing system (Figure 2):

- *Billing mediation agent* that logs transaction records
- *Quota server* that manages subscribers’ use of the system based on their profile, service authorization, and quota allocation
- *Top-up server* that subscribers use to replenish their accounts when they have depleted their account quotas
- *(Optional) RADIUS server or XML database* used to store subscriber profiles
- *Cisco Persistent Storage Device* used for extended storage of call detail records (CDRs) in the event of a billing system failure

Figure 2
Relationship Between the Cisco CSG and Billing Systems



SERVICE BENEFITS

To the Subscriber

When mobile operators offer content-based billing services, subscribers enjoy an improved experience because they can:

- *Access more and better content*—Operators can charge for the true value of content, making it possible to provide more content types to enrich the user experience
- *Avoid billing surprises* by accepting an AoC when they request an event
- *Eliminate double charges* when they request a service a second time if it's not delivered satisfactorily the first time

To the Mobile Operator

By offering content-based billing, mobile operators can:

- *Increase revenue potential* through more granular billing
- *Realize revenue sooner* by offering prepaid services
- *Differentiate the brand* to strengthen customer loyalty
- *Move up the value chain* by offering services in addition to simple access

WHY CISCO

Mobile operators that use the Cisco CSG acquire three advantages: flexibility, scalability, and the confidence that comes from working with an industry leader.

Flexibility

The Cisco CSG manages numerous protocols and content and service types, and a variety of billing methods, such as click, transaction, volume, or duration. The Cisco CSG provides the flexibility to apply different pricing models and to modify them as conditions change. The result is that operators are better able to respond to changing customer behavior.

Scalability

Each Cisco CSG can manage up to 300,000 subscribers, process several thousand connections per second, and manage multiple gigabits per second of bandwidth. By adding Cisco CSGs as needed within the Cisco Mobile Exchange framework, mobile operators can support millions of users.

Market Leadership

The Cisco CSG is currently used by over 25 mobile operators around the world. As part of the Cisco Mobile Exchange framework, the Cisco CSG complements an integrated set of solutions that mobile operators around the world are using to maximize the profitability of their 2G, 2.5G, and 3G mobile packet infrastructures; 802.11 public WLAN hotspots; and dial-up networks. Mobile operators gain the confidence that comes from using a mature platform, such as the Cisco Catalyst 6500 Series Switch and Cisco 7600 Series Router platforms, as well as from Cisco expertise with IP in general and the service provider market in particular. Choosing a tested solution from a financially stable company minimizes the risk of introducing a new service.

Comprehensive Programs

Through Cisco Advanced Services, mobile operators gain access to certified experts' in-depth technical knowledge, specialized tools and methodologies, industry-leading research labs, and a network of certified partners to help ensure the delivery of high-quality mobile wireless services. Cisco consultants and engineers help minimize the risk to business assets by working with the mobile operator to plan, design, implement, operate, and optimize mobile wireless networking solutions. Contact your Cisco representative to find out more about how Cisco Advanced Services experts can help improve staff productivity and help reduce the total cost of ownership for your network.



CONCLUSION

With content-based billing, mobile operators can provide more value than they could with access alone, increasing the revenue potential of the finite wireless spectrum. Profitability increases because the mobile operator provides a higher value service, boosts subscriber growth, and monetizes content for higher margins.

For more information on content-based billing and the Cisco CSG, visit: <http://www.cisco.com/go/mobile>.

For more information on the Cisco CSG, visit: <http://www.cisco.com/en/US/products/hw/wireless/index.html>.

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