Charging for Telco & Web 2.0 Services

By Ravi Chamarthy, Hewlett-Packard and Dr. Matthew Lucas
he recent infusion of Web 2.0 innovation is poised to change the telecom industry dramatically. Everywhere you look, Internet pioneers are working to blend their services with telco assets, bringing about a range of compelling applications, devices, services and revenue possibilities.

This is a fundamental shift, compared with the first generation of web applications—which were essentially delivered “over the top” of best-effort IP connectivity, as if the telcos were a public road system.

Instead, Web 2.0 applications, and so-called mash-ups, are implemented “across the middle” of telco networks—directly controlled by network policies and supported by back-office functions to ensure that they work properly and deliver a quality user experience. Consider the following examples:

• **iPhone**—Apple’s latest is the ultimate mobile device: a phone, an amazing web browser (with zoom and orientation features) and a media player, with a range of productivity and messaging applications. But it’s useless without the mobile network.

• **Software As A Service**—IDC projects that the market for software as a service will surge past $11 billion by 2009. Today, CRM and sales force automation applications, such as salesforce.com, are leading the market. However, just about every software supplier has a SaaS strategy. Given that these are distributed, mission-critical applications, the SaaS model doesn’t work without fault-resilient connectivity and robust security.

• **Gaming**—Today’s gaming experience is unparalleled. In fact, the technology in a Playstation3 or Xbox makes a standard PC look like a calculator. The growth in the market is driven by distributed, multi-player games that integrate voice, video, and rich media. The user experience can’t be met without low-latency, low-error broadband networks.

• **Video**—Video is fast becoming telecom’s next killer app. Hollywood is excited, as IPTV and mobility together have unlimited potential for personalized, on-demand, interactive content. User-generated content via YouTube has opened up unforeseen markets. AT&T’s recent mobile push-to-video service allows users to capture, publish and archive video clips directly from the handset. And there are other applications like security, remote monitoring, training and more. But video is a bandwidth hog—it won’t work without quality network distribution.

• **Mobile applications**—These are popping up all over. On the enterprise side, custom applications for real estate, transportation, medicine, workforce management, sales and other activities are announced daily. Cisco, Microsoft and some operators are working on integrated communications technologies that are making FMC a reality. On the consumer side, navigation, friend-finder, messaging, banking, social networking and entertainment apps are gaining in momentum. None of these work well without integrated call handoff over 3/4G networks.

**Opportunity, Here at Last**

The emerging market reality is that new value is created only when telcos and Web innovators integrate their offerings. This point is perfectly illustrated by the recent announcement that Google has agreed to provide the portal, interface and application suite for Sprint’s WiMAX network.

This is the golden opportunity telcos have been waiting for. Operators of both wireless and fixed networks are brilliantly positioned to enable the Web 2.0 innovation. Their multibillion-dollar investment in fiber, spectrum, broadband and access networks will bring 10 or 100 Mbps access everywhere, all the time. Investment in IMS and rich communication functionality—such as location, presence, bandwidth policy, identity/authentication, QoS, rich messaging, profiling and other network services—is bringing powerful communications elements to bear. What’s more, the investment in standardized, open APIs and service delivery platforms is helping to expose these assets to the development community.

By opening their networks to third-party developers and allowing them to create, integrate and blend their products easily and rapidly with communications assets, the telcos no longer settle for a role as bit-pipes. Instead, they sit between the consumer and developer, and get to participate in the action. This is what AT&T and Apple did. Both are winning big as a result.

**Turning Services into Revenue**

From a revenue perspective, it couldn’t get any better for a telco. The question is: will the operator’s back office be ready to monetize their network capabilities and services? This is critical for the telcos, because the web companies won’t care. They are perfectly comfortable monetizing their applications via ads and click-throughs or, in Apple’s case, device sales. That’s their business model, and experience with content has shown that it is very difficult to reach a revenue sharing agreement.

Therefore, operators will have to carve out and charge for Web 2.0 services on a discriminatory basis. They will have to have tight control over their network assets—carefully defining and executing network access and usage policies based on the service. They will have to support complex partnering agreements and meet delivery expectations.

To see how these components work together to deliver a Web 2.0 service, consider a simple application that allows...
making a group reservation at a restaurant. Nicole is in the mood for Chinese food, so she picks up her new iPhone and uses the restaurant finder service. It shows her an area map of the nearest Chinese restaurants and lets her drill down for the individual menus, daily specials and opening hours. Her buddy list shows her that a number of her friends are in the same city. She sends an IM invitation to several of her friends who are close by. They comment back on the various restaurants and agree on one of them. She makes an online reservation for their party of four; this automatically sends calendar appointments to all the invitees, and adds the location to their GPS function for driving directions.

To deliver this functionality, the application has to integrate with the operator’s core network capabilities like presence, location, identity, customer profile and messaging. This tight integration with the customer profile and preferences enhances the user experience tremendously.

In this scenario, a particular user session with the service requires multiple sub-sessions and events triggered with various systems in the operator’s network. The service provider should have maximum flexibility to charge for these kinds of applications. For example, a service level charge scheme could ignore all network usage, making it free when the service is provided by the network service provider. When the service is provided by a third-party provider, however, the network service provider needs to measure the individual events and correlate them to the specific application to enable settlements with the partner.

**Doing It All, in Real Time**

Differing scenarios require a flexible charging and policy execution platform. Legacy BSS systems could handle the processing load of relatively simple voice services, but Web 2.0 applications will require complex, real-time interactions with multiple network-level services. The charging platform must be able to handle multiple charging models—bearer, event and session charging—and multiple payment methods, and enforce additional credit controls and policies to minimize revenue leakage for the service provider. A single convergent platform will be required to collapse the network and service access silos, and give the customer control over service selection and pricing. Once implemented, service providers will be able to offer high-value, high-margin Web 2.0 data services to their customers that increase loyalty and reduce churn.

The Web 2.0 charging solution must be able to handle the services of today as well as those of future IMS environments. Solving the problems of real-time charging for Web 2.0 services requires a standards-based charging platform that enables integration of various systems seamlessly, including legacy systems. It must support standard charging models out of the box and allow for easy customizing. Apart from the functional requirements, it must support high performance, availability and manageability requirements. Figure 1 depicts a Web 2.0 charging solution that resolves these issues.

**Priority Requirements**

A key component of the charging platform is support for real-time charging interfaces to network elements and the ability to integrate with rating, balance management and subscriber information. The charging manager must be able to communicate with the core network services that carriers will provide to Web 2.0 service developers. These network services—location, presence, bandwidth policy, identity/authentication,
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Evolving industry-standard charging protocols, such as Diameter Credit Control Application (RFC 4006) and 3GPP TS 32.200 charging specification Ro, must be supported out of the box to reduce integration costs. The charging platform must support legacy charging protocols GTP and RADIUS, and provide an extensible framework to plug in proprietary charging protocols, thus allowing the service provider a smooth transition plan from legacy to modern networks.

In addition, the platform must support multiple protocols inbound and outbound, allowing it to route events to the appropriate prepaid or postpaid bill-rules—supporting multiple concurrent services—in order to bring new services to market quickly and cost effectively.

The charging rules must enable real-time correlation, aggregation and enrichment of usage records, as well as real-time duplicate charging event detection (convergent session charging). In addition to charging logic, the charging rules must also support per-user and per-service promotions. The charging manager must also authorize user service access requests. This requires the charging manager to interact with various systems such as real-time rating engines, balance management systems, and policy servers to apply credit control policies. For functions such as pre-rating, credit reservation and monitoring, the charging solution must manage consumer activity according to credit thresholds and control access to content or services.

The solution must maintain a per-service quota, which increases charging flexibility and allows for faster reauthorization by reducing the load on the balance manager. It must also interface with advice of charge (AoC) and top-up systems.

And It Has To Be Bulletproof
The charging platform has to be more than robust—it can’t fail. It must support operational requirements like availability, performance, scalability, security and manageability. Availability criteria include 99.999 percent uptime, fast failure detection, transparent failover and active-active redundancy. Performance criteria include low latency for real-time response and high throughput, proactive congestion detection and rerouting of requests, and policy-based event routing at peak capacities. The system must scale linearly with the addition of hardware resources.

The load balancer plays a critical role in identifying additional resources on the cluster and effectively distributing the load. These characteristics will improve the performance that are necessary in order to meet the performance levels demanded by users of always-on Web 2.0 services. To support online charging effectively, the system must monitor itself and apply exception policies in case of failure or errors. This reduces maintenance intervention in case of failures.

There are additional characteristics of the charging manager that are key to rapidly rolling out new Web 2.0 services cost-effectively. For example, charging and policy logic must be user-configurable via an easy-to-use interface. To keep current and future operational costs in line, the charging solution should be a purpose-built, commercial off-the-shelf (COTS) product for handling IP data and future IMS services that offers an end-to-end solution built with reusable

QoS, messaging, profiling—are difficult to duplicate but integral to delivering compelling new services.

Creative service promotions, policy enforcement and flexible charging for Web 2.0 services will allow service providers to tap new revenue sources and increase customer loyalty. The session data shown in Figure 1 are an important component that distinguish a real-time charging system from legacy BSS. To support the new data services, the charging manager must enable customizable charging components. And lastly, the charging solution must be built to integrate with and automate the charging tasks of a service delivery platform (SDP), which will be at the heart of a carrier back office enabled to support Web 2.0 services.

Opening up the carrier network via an interface to the SDP is what will allow service providers to bring Web 2.0 services from “over the top” to “in the middle,” and allow the carrier’s core network functionalities to participate in these new services. It is up to the charging platform to pull the pieces together.

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