Pipeline
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www.pipelinepub.com V3i7 December 2006

Above and Beyond IP:
The Changing Role of OSS in the Application Age

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Imagine yourself in a restaurant where the wait staff and the kitchen staff speak entirely different languages and cannot communicate with each other clearly.

You order the linguine with white clam sauce and some garlic bread from your waiter. The waiter brings you some clams ... then a salad ... then a piece of lasagna ... then a handful of garlic ... then a white sauce that the clams are supposed to be in. Then, two hours later, another salad arrives... then the linguine ... finally, the bread that the garlic was supposed to be on ....

This would be an adventurous dining experience. You never know what might come to the table next and when it might arrive. Still, the restaurant is not going to make the Michelin guide any time soon.

A similar experience awaits the subscribers of IPTV, Triple Play and other advanced services if service providers fail to properly orchestrate connectivity in the applications and content it delivers. Like a bewildered restaurant patron whose order is confused and delayed, telecom subscribers will quickly switch loyalties and find a new service provider if the service experience does not meet their expectations. These subscribers now expect on-demand control, high responsiveness, and an appropriate quality-of-service for the applications they access.

Overcoming the challenge of orchestrating connectivity and content calls for rethinking how services are fulfilled and managed, and a fresh look at the systems and processes that support these functions.

Content Counts ... More Than Ever

Once upon a time, a service was simply connectivity – a T1, E1, DSL line, OC3, or some other physical or virtual pipe.

However, with rising competition and intense price pressures, connectivity has become commoditized, and service providers seeking to maximize margins are moving into application-based services, such as IPTV, VoIP, gaming, hosted applications, Software-as-a-Service and others. With this shift, a “service” now comprises both traditional connectivity, as well as one or more applications, and delivering and managing these new services means coordinating the various – and often complex – components that constitute each.

In our restaurant analogy, the wait staff is the network connectivity, bringing requests from dining room to kitchen and food (content) from kitchen to dining room. The kitchen staff represents the content delivery resources – IPTV servers, etc. If there is no clear coordination and orchestration between the wait staff and the kitchen staff, then patrons will make requests that may or may not be communicated in a clear and timely fashion to the kitchen. As a result,

the wrong meal may be delivered, or the components of the meal may not be delivered in a sequence or timely manner that meets the patron's expectations.
In the world of application-based services, if connectivity is not coordinated with the application and content, service providers run the same risk, potentially relegating content delivery to a "best effort" approach, for example, or requiring massive over-provisioning to achieve required service levels.

For facilities-based service providers, the result is a less than optimal utilization of the carrier's most important strategic asset – the network. The fundamental operational challenge is for service providers to use this resource most efficiently and effectively, to meet or exceed subscriber expectations and thus enhance the subscriber experience. In the emerging application age, ensuring the quality of services – and indeed the service experience – does not necessarily mean delivering 5-nines reliability for each instance of each offering. Rather it means adapting one network to deliver and manage a variety of services with diverse and often changing requirements.

OSS Transformation

To fully take advantage of the network and the potential market uptake for new, "sticky" services, providers need to revisit – and possibly transform – how services are defined, designed, activated and monitored.

This transformation should mirror the evolution of the network itself, as the telecom network moves up the stack with the advent of ubiquitous IP networking. IP simplifies how application content is carried by lower layer transport technologies and how application components can communicate with one another (client to server, etc.). Service delivery and management need to leverage such advances in network itself.

To make the most of the new capabilities of the network and application infrastructure, OSS needs to be oriented around four important new requirements:

- **A new template for service creation.** Service templates, representing an abstract service definition, must encompass service elements at both the connectivity layer and the application layer. For example, a "gold tier" IPTV service is going to involve some predefined bundle of channels as well as the connectivity and QoS required to deliver that service in a way that meets the subscriber's expectations.

- **Orchestration between connectivity and applications, especially in self-service environments.** To ensure that applications and connectivity are delivered in a synchronized fashion, the configuration of the two must be orchestrated in a seamless, automated way. On initial service instantiation, the basic service template can guide how an application is configured and the connectivity is configured accordingly. Changes, especially those driven by an end-user subscriber, then must be undertaken with an eye on how both service elements are affected. For example, a subscriber may decide to upgrade their IPTV service to HDTV through a web portal or directly through the set-top box interface. The fulfillment system must be able to change the configuration of the server while automatically ramping up the allocated bandwidth to handle the increased traffic.

- **Separately optimized management of both connectivity and applications.** The design and activation of the connectivity portion of a service presents distinctly different challenges from the configuration of the application. Connectivity configuration involves interfacing into a very complex multi-vendor environment to lay in a service construct end-to-end. Application configuration may seem simpler, but service and feature conflicts need to be managed and transaction volumes are much higher volume, especially in a self-service context. Hence, application configuration must be optimized for volume. These separate capabilities call for a system of modular components that are designed to handle the distinct performance requirements, yet that can be orchestrated across both the connectivity and application layers, as noted above.

- **Discovery and abstraction of network resources and capabilities.** Most importantly for any service creation environment is the understanding of the actual network and resources available for service delivery and consumption by subscribers. This is most often accomplished by using a discovery engine as a mechanism to build a picture of the network "as is." This approach enables service design and assign to be based on an accurate view of network resources, minimizing provisioning fallout and boosting automation and flow-through. Beyond the fulfillment process, the abstraction of network resources in this method permits other OSS/BSS processes to have a more precise view of actual network resources. For example, a view of the network "as is" can boost service assurance efforts, enabling operations personnel to understand the actual resources in the network affected by a service outage and, ultimately, gain a better view into how customers are affected.

The end result of this transformation is an OSS that looks less like a traditional operations support system and more like a PC's operating system.

Losing an "S" … the New Telecom OS

Like a PC's OS, the new OSS generally must take the form of an integrated platform, as opposed to the traditional OSS, whose functional processes were typically siloed based on layer or segment of the network.

This need for a common platform is driven in part by the increasingly converged nature of the services offered by carriers, but also by the requirements imposed by the layering of applications on the connectivity. In essence, a platform enables the generalization and abstraction of a set of network capabilities, some of which may exist only at certain layers, such as QoS mechanisms. But it does this in a way that these capabilities can become usable to support a service template or construct that is not tied to any one layer.

An OSS in this architecture actually begins to resemble an OS platform. Just like an OS has southbound interfaces to printers, network adapters, output devices, etc., the telecom OS platform has southbound interfaces that support the multivendor network environment, as well as the application servers.

A PC OS exposes the capabilities of the PC's hardware to upper level applications in a simplified way, allowing those applications to make use of the system capabilities without having to interface directly into the devices. This simplifies and accelerates the execution of processes and also simplifies the creation of PC applications that take advantage of the system capabilities.

Similarly, the evolved OSS platform exposes the network and application server's capabilities to upper layer operational systems and processes, accelerating the execution of functions such as fulfillment and assurance. As a result, it becomes simpler and faster to build new processes and service definitions that reside on the platform. Where this becomes most valuable is in the effort to automate processes that involve multiple layers of the network or multiple applications, such as in a Triple Play service delivering multiple applications over a common connection.

In the end, a platform approach provides a foundation for orchestration among the increasingly complex components of a next-generation service. Achieving that seamless orchestration is the key to capturing and keeping subscribers and reducing churn. In fact, like a restaurant with good communication between the kitchen and the wait staff, this approach can go a long way toward ensuring a positive customer experience.