Gain the Edge

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Introduction

"Like the edge of the sea, the future of telecommunications is constantly changing. Like the future, the sea reveals only glimpses of what lies beneath. To see beneath, to see that future, we must first gain the edge."

- Osman A. Duman, Senior Vice President and Chief Marketing Officer, Ulticom, Inc.

The future of telecommunications, like the edge of the sea, shifts constantly with the tides.

Service providers today are seeking to cap investment in traditional network service delivery and signaling technologies (IN, SS7, INAP, GSM MAP and CAMEL to mention a few) while incrementally evolving to tomorrow's all-IP network.

But what is that future all-IP network? What will it look like? How will it work? How do we incrementally evolve? And, can we preserve our investment?

Unfortunately, like the sea, much of the detail is hidden, and the architecture of that future all-IP world is only shown in vague outline.

To see what is beneath, we must first gain the edge; that is where the future of telecommunications begins.

Edge-Oriented Network Transition Strategy

To get from "here" to "there," service providers must preserve their significant investment in current networks and at the same time engage a powerful mechanism to evolve service offerings and take advantage of emerging technologies.

Investment in today's core networks is waning. For many reasons, including risk and cost, future services will not be deployed in the network core; they will be deployed at the network's edge. An edge-oriented transitional network strategy builds on existing network capabilities by adding new value at the boundaries of the network without change or impact to the core network. An Edge STP (Signal Transfer Point) is the key to this strategy, providing a transition point and mapping new services, protocols, and technologies into the core network by using proven, network-compatible functionality.

By placing Edge STP router-gateways at the edge of current networks, service providers create opportunities for new capabilities and new technologies by incrementally extending existing networks and business models. Existing services can be optimized for greater performance, and problems associated with change can be mitigated before they effect the core network. Providers can create all-IP islands with remarkable cost and performance benefits or eventually even replace their core SS7 network with an IP-based signaling network – one surrounded by islands of SS7 where cost or operational considerations dictate.

The Edge STP

The Edge STP concept is based upon proven signaling and management techniques and uses best-of-breed capabilities from both traditional and evolving networks. With an Edge STP, providers can enable new services and connectivity at the edge of existing networks. They can also create solutions that leverage the strengths of the current networks and business models while engaging new technologies and business models as they become viable.

Definition: Edge STP

The Wikipedia defines an Edge STP as a turnkey IP-SS7 hybrid network element based upon proven STP capabilities and concepts derived from the world of routers, gateways, and firewalls. An Edge STP enables incremental extension of today's telecom networks by providing new capabilities at the edge of the network where advanced services and new networks plug in to today's networks.

What it does: An Edge STP can make advanced routing decisions as packets cross between networks or network segments based upon information not available in a traditional STP. It can differentiate services, optimize traffic flow, enable new hybrid services, control access, hide information, and more. Most important, Edge STPs can reduce costs and limit risk as the networks evolve.

How it works: Edge STPs provide signaling packet routing between SS7 sub-networks, packet conversion between IP (IETF Sigtran) and SS7 as needed, selective packet filtering, content-based packet steering, dynamic load distribution, congestion and overload management, packet screening, and more.

How it provides security: Intrinsic to its role, an Edge STP must provide security for the networks that it joins. Address translation, much like the Internet NAT function, is provided. Traffic screening and blocking of undesirable network elements is also provided.

1) Service Optimization

An Edge STP provides support for deployment of network services using modern server farm technologies. Using Edge STPs, a telecom equipment provider or a service provider can create cloned, distributed instances of new or even existing services, in an IP-based server farm environment.

In this model, an Edge STP can act as an intelligent front-end that provides a presence in an SS7 network while hiding the details of the application deployment – a useful security consideration. The Edge STP can also provide important – and lower cost – application functionality like:

- dynamic load distribution
- congestion and overload management
- dynamic software and hardware upgrades
- transaction steering for optimized application performance.

An Edge STP can even impart carrier-grade high availability characteristics to an application that has not been engineered to meet this level of performance.

2) Network Optimization

An Edge STP also provides router-like strategies for network optimization. Consider the evolution of short message services (SMS). SMS technology has become a double-edged sword for mobile network providers. On the one hand, the revenue for this service is beyond the wildest dreams of the service innovators. Unfortunately, the traffic volumes for this service (with related hassles) are likewise beyond their imaginings – and new uses for SMS are surfacing every day.

This success creates a challenge – how do we support ever-increasing volumes without adversely impacting other services? Content-based message routing in an Edge STP can detect various kinds of network traffic (SMS, roaming, IN services, ISUP, etc.) and steer it via IP networks without impacting existing network performance.

3) Transport Optimization

Much like an IP router, an Edge STP creates the possibility for IP-based subnetworks in a telecom service provider's signaling space. Using Sigtran protocols (M2PA, SUA, and M3UA), service providers can extend or combine SS7 network segments transparent to existing equipment, optimizing where performance or cost considerations demand it.

As one might expect, IP transport can be significantly less expensive than SS7 transport. This enables service providers to extend the hybrid network model back into the SS7 core networks, creating IP-based, core signaling networks that have islands of SS7 located at their edges. This creates the possibility that the edge of the network becomes a two-way transition zone, allowing services to migrate in both directions as economics dictate.

Why Make My Changes at the Edge?

You might be thinking: "An Edge STP seems to be just a more cost effective STP with some extra routing and security functionality. Some of those capabilities might be available from my existing vendor and could be added on to my existing STP. Why not just extend and reconfigure the equipment I already have? Why should I make my changes at the edge of my network, and not in the core? "

These are valid questions to be sure. In making your decision, you should consider both direct and indirect costs and impacts. In particular, you should pay attention to the following cost issues related to network performance and operational management of the network:

a) Upgrading deployed equipment, reconfiguring core network behaviors, and deploying new generics is both costly and error prone. If an option to deploy the same functionality at the edge of a network exists without requiring changes in the core, it is advisable to avoid major software upgrades and re-engineering of a vital core signaling network that is working well.

b) If you choose to deploy the additional functionality in the core, then you must take into account the performance impacts of the additional functionality and deeper signaling payload inspection. These impacts likely translate to decreasing transaction/call performance rates and could effectively place a tax on the entire core network operation, reducing its overall effectiveness.

Conclusion

The Edge STP takes its inspiration from the best-of-breed capabilities of both traditional telecom networks and the ever-evolving Internet to create a scalable and flexible network element that is purpose built and can enable almost unlimited growth at the edge of telecommunications networks. There is no need to abandon costly investments before their time has come. There is no need to introduce costly change into a network core that is working reliably.

Because of cost, reliability, and operations issues, new services and network interfaces should no longer be deployed in the network core; they will be deployed at the network's edge where change can be introduced dynamically, cost effectively and safely, without impacting the core network.

What is your network transition strategy? To see the future, you must first gain the edge.

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About the Author

Steven C. Davis has over 30 years experience in IP and Telecom networking and signaling. He currently participates in the Scope Alliance and was a founding member of the JAIN Community and the Parlay Group In the past, he has served as President of the Parlay Group and also served on the board of directors for the Softswitch Consortium. Steve is currently Product Line Manager for the Ulticom® *n*Signia® product line of edge-oriented network elements.