

# *Sprint's Partner Interexchange Network (PIN)— A New Approach to Scalable Voice Peering*

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## Executive Overview

As more and more organizations benefit from the affordability of voice over IP (VoIP) solutions, innovative providers are developing new ways to reduce costs. For example, VoIP peering establishes individual peering relationships to directly terminate traffic between VoIP operators for greater cost savings. In a VoIP peering arrangement, a pair of VoIP operators bilaterally exchange calls to one another using VoIP technology.

Calls bypass the PSTN (public switched telephone network), often eliminating costly tandem and access termination fees when partners agree to a settlement free arrangement. The greatest advantage of conventional VoIP peering is the complete bypass of all IXC and LEC facilities that generate most of the cost of terminating calls.

This approach, however, also poses several disadvantages. As an operator's number of direct peering relationships grows, managing multiple relationships can prove costly and cumbersome. Interconnect fees to other carriers and incremental hardware costs represent an additional, significant

**One-to-one VoIP peering provides a mechanism to keep more traffic on IP networks, avoiding the toll charges typically associated with the PSTN. By keeping voice traffic on IP networks, carriers can reduce costs, improve call quality, and offer new IP-enabled services to customers.**

expense. And these costs increase with every additional peering arrangement established.

The limited scalability of VoIP peering has caused Sprint to develop a dynamic new approach called the Partner Interexchange Network (PIN). PIN employs a SIP (Session Initiation Protocol) routing architecture that delivers low cost termination between partners at competitive rates by leveraging

Sprint's global IP backbone. PIN supports both on-net and off-net calling and charges transport fees far lower than traditional TDM (Time Division Multiplexed) voice services.

Partners benefit by accessing a larger community of potential peering partners from a single point of interconnection. This yields reduced capital and operational costs due to the smaller hardware requirement and streamlined ability to manage multiple partner arrangements.

The greatest advantage of PIN lies in its infinite ability to scale. The larger the partner community, the greater the addressable community of available terminations, delivering cost savings to partners. Additionally, PIN supports multiple verticals. From wireline carriers and wireless providers to cable companies — PIN appeals to a broad number of industry and company types.

In addition to PIN's obvious advantage over the expense of PSTN, PIN delivers far greater scalability than traditional VoIP peering, offering operators a strategic approach to staying competitive. The same can be



said with regard to how the PIN transport architecture can be used in a termination-only fashion, for operators who may not want or need to participate as an on-net community member, but find value in the scalability and cost advantages for long distance domestic termination.

### **Introduction—Challenges of Traditional Voice Solutions**

Today's rocky business climate is causing operators to look for alternatives to the way voice traffic is currently being delivered. As more and more companies migrate to voice over IP (VoIP) and away from traditional TDM (Time Division Multiplexing) and analog voice services, network operators and service providers are seeking an affordable, scalable way to securely exchange and terminate voice traffic in a native IP format — without having to access the public switched telephone network (PSTN) — and without sacrificing call quality through transcoding from TDM to IP and back.

As a well-established architecture that is relatively easy to maintain and set up, the PSTN nevertheless poses several disadvantages. Bandwidth optimization is difficult and maintenance involves costly,

monthly fees. Perhaps most importantly, the PTSN is expensive — transport, access termination, and LEC tandem fees increase the cost of delivering voice traffic, resulting in much higher pricing than many VoIP alternatives. For this reason, a new approach is needed to reduce long distance telephony delivery costs without sacrificing call quality.

**Sprint's Partner Interexchange Network (PIN) transforms the way operators engage in VoIP peering — delivering the affordability of voice peering while overcoming the scalability concerns of more conventional approaches.**

### **The Voice Over IP Peering Solution**

The most cost-effective way for carriers to exchange calls is by direct VoIP interconnection — a methodology called “VoIP peering.” “Peers,” or partners, forward calls

from one provider to another using SIP — providing a mechanism to keep more traffic on IP networks.

By keeping voice traffic on IP networks calls bypass the PSTN, eliminating access termination fees and LEC tandem fees and creating dramatic cost savings. Call quality is also maintained because no transcoding occurs between the VoIP cloud and the PSTN.

VoIP peering offers a significant advantage in its direct interconnection approach. As a provider increases the number of direct peering relationships, its overall termination and transit costs can decrease dramatically.

This advantage, however, also poses a downside. Although costs decrease as the number of peering partners grows, establishing and managing multiple, one-to-one relationships can be expensive and time-consuming. In addition, a large, upfront capital outlay is required to allocate routers and port cards on the routers and to set up network facilities to support the effort. Interconnect fees to link to other carriers are an additional expense.



Also, operational costs to manage, monitor, troubleshoot, and maintain multiple interconnect arrangements can be considerable. Consider also that a certain level of redundancy is required, essentially doubling the number of interconnects needed.

For all of the reasons named above, VoIP peering solutions do not effectively scale, particularly when a network generates large volumes of traffic. Clearly, a new solution is needed to overcome the cost disadvantages of PSTN and the lack of scalability of traditional VoIP peering.

## A Transformational Approach to Voice Peering

Sprint's Partner Interexchange Network (PIN) transforms the way operators engage in VoIP peering – delivering the affordability of voice peering while overcoming

the scalability concerns of more conventional approaches.

As more and more firms embrace VoIP for its greater efficiency and lower cost per call, Sprint offers PIN (a VoIP peering exchange service) as a way for a community of on-net partners to exchange and terminate SIP (Session Initiation Protocol)-based voice calls.

PIN employs a unique, SIP route proxy network architecture, implemented across Sprint's global IP core, to deliver low cost, long distance voice terminations between on-net community partners and to the PSTN. Partners can efficiently route calls to off-net endpoints through a small number of large bandwidth SIP interconnections, reducing usage bills and operational support costs to partners.

The establishment of such a peering architecture and on-net community also provides an attractive PSTN alternative for operators interested in a SIP-based termination-only arrangement.

Starting with a termination-only participation also provides a unique migration path for operators to grow into the community by giving them initial termination to the on-net partners, and allowing them grow their interconnectivity and participation level within the community – without having to deploy more capital, establish new contractual arrangements, or deploy more interconnect facilities.

Lastly, the growth of the PIN community establishes a foundation for transformation into a next generation communications platform that has the capability

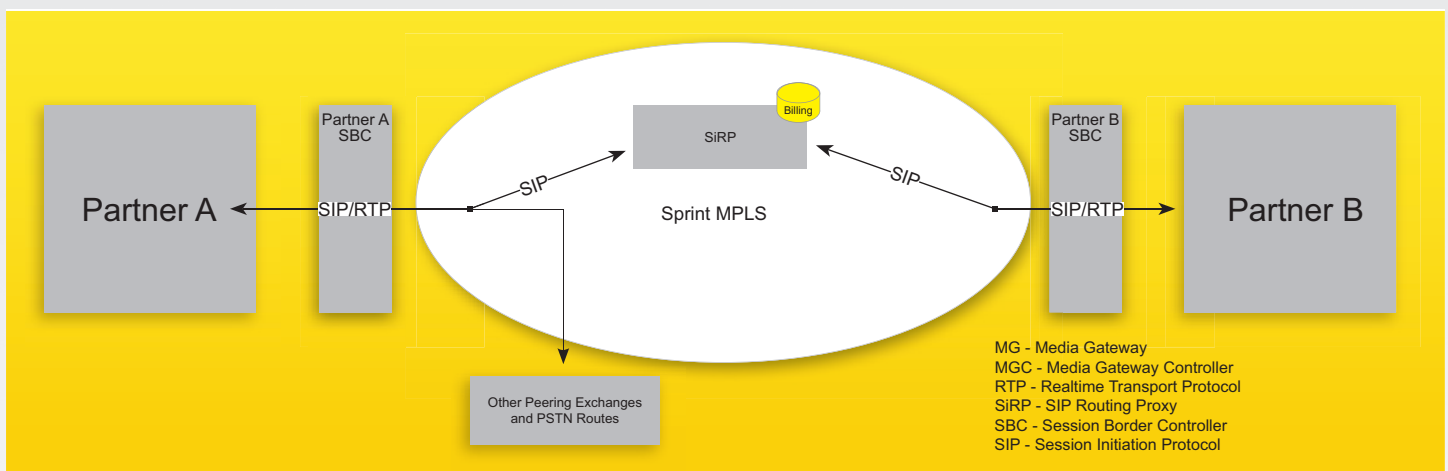


Figure 1: PIN network architecture



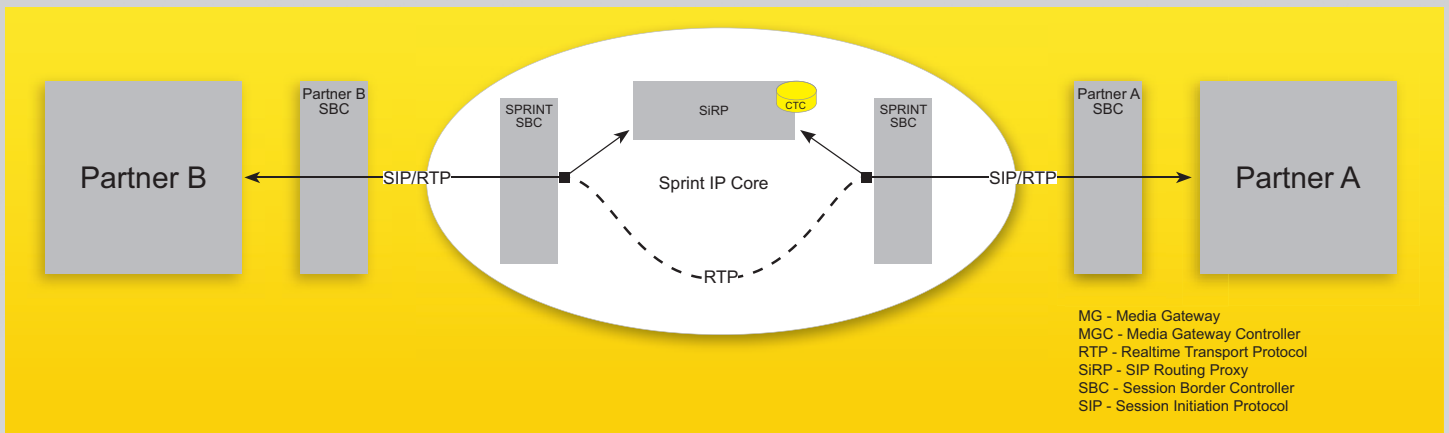


Figure 2: PIN on-net call flow

of supporting all the ways people interact via SIP beyond voice communication.

The architecture is ideally suited to support other SIP applications such as conferencing, video conferencing/calling, HD Voice, gaming and peer-to-peer applications, and beyond. PIN is expected to evolve into a premier communications backbone for the distribution and exchange of SIP applications and content to massive communities - all enabled by Sprint's considerable worldwide IP connectivity.

### PIN Network Architecture

PIN leverages Sprint's Tier 1 IP backbone to provide SIP call routing between partner networks, and SIP terminations off-net through Sprint's connectivity to other peering exchanges and least cost route vendors.

**With PIN, some voice calls can actually be delivered free of access charges, depending upon the peer group of partners and their specific agreements.**

The SIP route proxy architecture provides a switchless routing and translations architecture to eliminate legacy class 4/class 5 elements in the call flow whenever possible, supporting a lower cost for transit on PIN between border elements.

In Figure 1, Partner A can access partner B on PIN as an on-net route. This represents a peering approach that allows the partners to

peer without the time and expense of establishing multiple bilaterals. Partner A can also reach off-net endpoints through Sprint's various PSTN gateways. A single point of interconnection provides access to a multiple partner network and PSTN destinations.

In the same way, the PIN architecture also supports operators not choosing to peer within the community, but who simply use the on-net community and off-net footprint for termination only.

### Two Call Types

PIN supports two call types — on-net and off-net calling. With PIN on-net call flow, all signaling will traverse the SiRP (SIP routing proxy) network elements. SiRP is built upon Sprint's Next Generation Voice Network (VoIP) and therefore offers the same footprint and similar redundancy scheme.



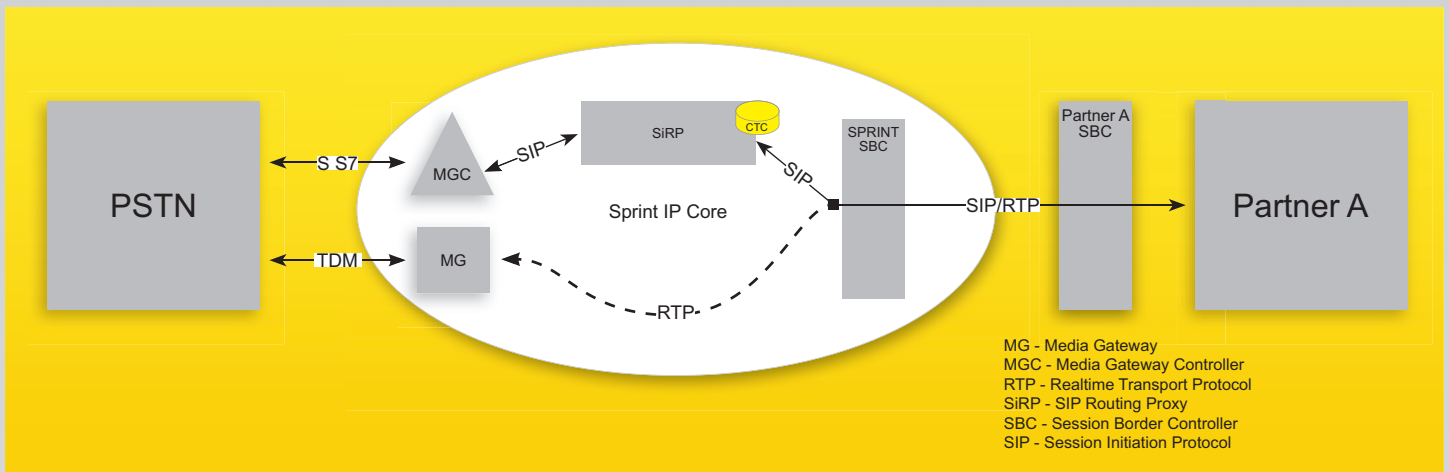


Figure 3: PIN off-net call flow

However, no additional voice switching elements are required to support on-net PIN calling. Sprint charges PIN partners a discount-eligible transport fee and partners have the flexibility of negotiating their own CABS (carrier access billing system) settlement arrangements. See Figure 2.

With the PIN off-net call flow, calls flow across the SiRP architecture to the determined PSTN gateway for off-net PIN termination. Calls to the PSTN are outbound only, so no origination occurs from the PSTN. See Figure 3.

Sprint charges PIN partners a discount-eligible transport fee and passes terminating access charges through to the originating partner.

### Cost Savings

Like traditional VoIP peering, PIN is cost-effective because it eliminates the long distance telephony costs associated with LEC/tandem and traditional PSTN. Although a low cost transport fee might be incurred to facilitate the exchange, these fees are far less than fees paid to LECs.

Also, as the number of partners in the exchange grows, more calls can be terminated through PIN, increasing the cost savings that partners can realize. With PIN, some voice calls can actually be delivered free of access charges, depending upon the peer group of partners and their specific agreements.

For example, wireless and cable operators would use PIN on-net to reduce or eliminate access termination and transport costs. These firms can often seek a

settlement-free, on-net environment that is free of CABS access revenue collection.

Alternatively, carriers that are net-receivers of access settlements (CABS) leverage PIN, which provides them the flexibility to preserve valuable CABS revenue while still reducing long distance transport costs.

PIN off-net provides all partners a cost-effective addition to their least cost routing engines (LCR) to reduce access costs. PIN also reduces capital costs involved in purchasing additional network facilities and equipment. Operational costs are also much lower.

With conventional VoIP peering, relationship building amongst multiple partners can prove to be expensive and extremely time-



## ***PIN in Action***

*A digital cable and high-speed Internet provider wanted to expand their peering strategy for residential telephone service. PIN was a logical fit for the company to interconnect with other tier 1 and tier 2 cable operators, which were on their “wish list” but did not justify costly peering arrangements to each network based on current traffic models.*

*The short-term benefit of off-net termination was the catalyst in sealing the agreement to use PIN. According to the network operator, Sprint PIN delivered a compelling value proposition through a private VoIP ecosystem that was independent of traditional LEC access arrangements, and costly CABS settlement agreements. The low cost of entry paved the way for peering relationships with partners that would have otherwise proven cost-prohibitive.*

*A nationwide leader in delivering next-generation, converged VoIP services to consumers was looking for avenues to lower their long distance terminations costs, and access a SIP based on-net community of other carriers to preserve end-to-end call quality.*

*The service provider did not own their own telephone numbers, and as such was not ready to participate as an on-net partner in their own right. However, they still found value in a Termination-Only participation in the PIN service that provided the ability to terminate to the on-net PIN community, and leverage the off-net footprint.*

*While not visible to the on-net community, they can still take advantage of the same scale and economics that full-blown on-net PIN partners have. As their base of customers grows, along with their own CLEC capabilities, they now have an existing interconnection into PIN that will allow them to become on-net, and generate revenue by advertising their footprint to the greater PIN community when the time is right – with minimal additional investment.*

## ***How Peering Works Across PIN***

*Carrier A wants to terminate their minutes to 30 other partners, which would require 60 individual interconnects for redundancy purposes. Hardware is required to support each of these interconnects, and costs would need to be allocated for management, maintenance, service assurance, and troubleshooting of each interconnect.*

*With PIN, Carrier A can exchange with the 30 other partners using only two interconnects. And partners are not limited to terminations to their target 30 on-net partners—off-net calling offers a comprehensive PSTN footprint.*



consuming — both during setup and for ongoing management. Conversely, PIN offers the least expensive way to route traffic to interconnecting networks. Partners benefit from a single point of interconnection to access multiple partner network destinations rather than having to engage in multiple peering arrangements with many partners.

*As telephony networks increasingly embrace IP delivery, PIN offers a radically new yet sustainable approach to voice peering.*

### **Unlimited Scalability**

PIN offers several, additional, unique advantages over traditional VoIP peering. One of the most significant advantages is PIN's unlimited ability to scale.

Competing VoIP exchange providers are limited when trying to accommodate the large traffic volumes, broad geographic global footprint, and access to the broad

VoIP operator community that PIN partners require.

The PIN service model is unique in that it supports a multi vertical community and leverages Sprint's worldwide, world-class, IP network. From traditional wireline carriers and wireless providers to cable companies — PIN appeals to a broad number of industries and company types. PIN leverages Sprint's wholly owned, global, Tier 1 network, which allows for complete control over network management and performance, and provides a broad global footprint. Sprint's demonstrated industry leadership in voice and IP and worldwide IP presence stand behind the PIN infrastructure to ensure greater IT scale and dependability

### **Conclusion**

As telephony networks increasingly embrace IP delivery, PIN offers a radically new yet sustainable approach to voice peering, while offering a next generation alternative to PSTN terminations by leveraging large on-net SIP-based calling communities. With a more affordable cost structure and a unique architecture, PIN provides dramatic improvements over today's circuit-switched PSTN models.

Additionally, PIN delivers greater scalability than traditional voice peering approaches and can

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support multiple operators and industries across a broad geographic IP footprint. PIN's ability to reduce both capital and operating expenses provides the Sprint partner community with a strategic approach toward staying competitive in an evolving voice termination landscape.

### **About Sprint Nextel**

Sprint Nextel offers a comprehensive range of wireless and wireline communications services bringing the freedom of mobility to consumers, businesses and government users.

Sprint Nextel is widely recognized for developing, engineering and deploying innovative technologies,



*including two wireless networks serving almost 49 million customers at the end of the second quarter of 2009; industry-leading mobile data services; instant national and international push-to-talk capabilities; and a global Tier 1 Internet backbone. The company's customer-focused strategy has led to improved first call resolution and customer care satisfaction scores.*

*For more information, visit  
[www.PowerYourIdeas.com/PIN](http://www.PowerYourIdeas.com/PIN).*

