VOIP Business Services—What And How?

William J. Bushnell

Softswitches, traditional Class 4s/5s or AIN? Which platform makes sense for which applications?

Many of the new telecom service providers have focused their network investments on serving business customers; after all, in Willie Sutton's immortal words, "That's where the money is." However, many of these service providers have found it difficult to be economically viable using traditional circuit-switching equipment to offer traditional business services.

At the recent McQuillan/*BCR* Next Generation Networks (NGN) conference, several panelists in the Symposium on Next Generation Telephony proposed that CLECs could attract business customers with new voice over IP (VOIP) business services that use IP phones controlled by a softswitch. Similarly, ILECs look at softswitch-based IP telephony as a means of retaining their Centrex customers against the CLECs and the new IP PBXs. Rather than competing for customers solely on price, carriers are realizing that new services that automate tasks, simplify training or improve call management are the key to the new telecom economy.

A Compelling Vision

Today, softswitch-based VOIP networks typically support toll bypass and Internet call diversion applications, which only require a basic set of Class 4, tandem/toll services. The softswitch's open APIs have allowed third-party software developers to expand the basic set of Class 4 services with some new prepay and call routing services. (For more on the softswitch market, see *BCR*, Feb. 2001, pp. 56–60.) However, to support business customers, a softswitch must evolve into a Class 5 switch, with a robust set of sophisticated line-side features for IP phones—i.e. an IP Centrex offering.

The softswitch-based, IP Centrex architecture offers access cost savings, flexible rearrangements and remote access, and opens the door for many new VOIP business services. There are two components to the access cost savings:

- **More efficient use of bandwidth:** With traditional Centrex, the service provider provisions a loop for each Centrex line. With IP Centrex, the VOIP traffic is concentrated by the customer's LAN, and then multiplexed with the data traffic onto a single xDSL, DS1, DS3 or Gigabit Ethernet facility to the service provider's CO. This is analogous to the facility savings with integrated access devices used with xDSL or T1 facilities.

  However, with IP Centrex, an intercom call between two IP phones does not use bandwidth on the access facility; instead, the voice packets are transported across the corporate LAN from one IP phone to the other. In short, the voice packets never leave the customer's premises. In typical medium- to large-sized Centrex groups with 30 percent intercom calls, the facility bandwidth for voice traffic is reduced by almost half.
- **Self-Administered Moves:** Because IP Centrex eliminates the fixed relationship between a phone number and a loop, IP Centrex allows customers to move IP phones and corresponding telephone numbers to different locations without contacting the service provider. With DSL- or cable-modem-based high speed remote access to the corporate LAN, employees working at home or at remote locations can have an IP phone that is part of the same Centrex group as the headquarters. The remote access data facility becomes a virtual Foreign Exchange line (FX) and the remote IP phone is an Off Premises Extension (OPX).

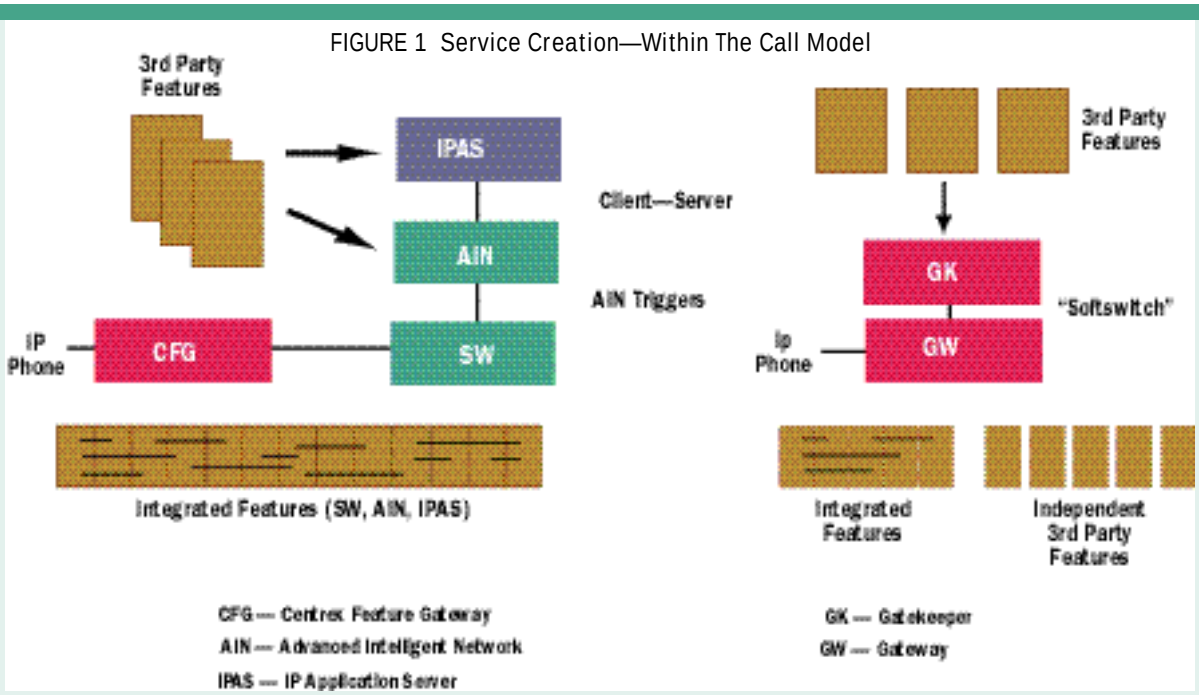
  This capability also allows remote employees to share a common voice mail system. Calls from the remote location to the headquarters are transported over the remote access facility and do not incur local toll charges. InterLATA toll calls from the remote locations are aggregated and billed with the interLATA toll calls from the main corporate location.

In addition to the access facility savings, softswitches typically support open APIs that allow third parties to develop new applications. With third-party feature development, the service providers are no longer dependent on the traditional circuit-switch vendor's long—and expensive—software development process.

In fact, most softswitch vendors plan to start with a basic set of 10 to 20 "high-runner" business services (e.g., call hold, call transfer, call waiting, call forward, caller ID, 4-digit intercom dialing), and then look to third-party suppliers to fill out the portfolio of services. By developing a basic set of services, the softswitch vendors can reduce

William (Bill) J. Bushnell Ph.D. is director, network convergence consulting at Lucent Technologies. He can be reached at wbushnell@lucent.com

FIGURE 1 Service Creation—Within The Call Model



software development costs and time to market. From the service provider's perspective, open APIs hold the promise of enabling a rich set of third-party applications.

Reality Bites

But as the old adage goes, "If it sounds too good to be true, it probably is." There are a number of aspects of this vision that may not hold up as the details unfold.

n **Feature Interaction:** While open APIs and third-party service creation are definitely attractive, the real benefit of the call-processing features on a PBX or Centrex is that the features interwork in a seamless fashion. Will that capability extend into the world of softswitches?

Assume one independent team developed a caller ID feature and a second team developed call waiting, and then both were loaded onto a softswitch. Will the switch provide caller ID on call waiting calls? Probably not, unless the two development teams collaborated in the design.

As sophisticated business features, such as multiple call appearances, shared directory numbers and attendant features, are added to a softswitch, the feature interworking problem grows rapidly. Furthermore, a Class 5 softswitch must also support government-mandated features like 911 and the enhanced wiretap provisions specified in CALEA. Granted not all features need to interwork; in fact, features that are invoked before or after the call—e.g., "click-to-dial" directory services, unified messaging services and provisioning services—may be prime candidates for third-party development.

n **Minimal Feature Set:** By now, you've probably heard the claim that PBX and Centrex end users typically use fewer than 20 features. So why develop an extensive service set?

In fact, the premise is wrong; it flies in the face of experience of PBX vendors and Centrex service providers. While each end user in an enterprise uses a small set of features, the whole enterprise uses a large number of features. Secretaries use multiple call appearances. Customer service representatives (CSRs) use several hunting features. Cafeteria phones use several call blocking features. Voice mail systems require multiple call forwarding services and transfer features. The telecom administrator requires accounting, traffic monitoring and rearrangement features.

A typical RFP from a large enterprise contains an exhaustive set of services, and the PBX vendors and Centrex service providers must indicate which features they support or plan to in the future. In general, the suppliers want to be able say that they're "compliant" on all the specified features, because they've learned, all things being equal (price/performance, etc.), the enterprise telecom manager is likely to select the vendor with the more robust list of services. Since that decision is a multiyear commitment, the expanded list of services is an insurance policy against service requests that may come up through the line organizations in the future.

In contrast, a softswitch-based IP Centrex offer with a small list of features represents a double risk to the telecom manager: First, whether the new technology will be stable; second, whether the additional services will be developed in time.

n **Alternate Platforms:** Traditional Centrex switch vendors, like Nortel and Lucent, have announced IP Centrex service based on a Centrex Feature Gateway that either sits in front of or is

None of the competing platforms can do it all

TABLE 1 IP Centrex Services Architecture

	CFG	+ SW	+ AIN	+ IPAS	Softswitch
Automatic Moves			Yes		Yes
Simplified Administration		Yes		Yes	
Access Facility Savings	Some			More	
Legacy Features			Yes		Eventually
3rd Party Service Creation		Some	More		
Interworking Legacy and 3rd Party Features		Yes		Unclear	
Supports Multimedia Services		No		Yes	

integrated into a Class 5 switch. This arrangement provides most of the access facility savings and automatic customer rearrangement benefits cited previously in this article, but it also allows the IP phones to access all *existing* Centrex features. Many of the same service provisioning and record-keeping systems can be used to support the IP Centrex service.

Existing Class 5 switches do not provide an open API for third-party feature development. However, there are alternative platforms that can provide the same benefits as an open API.

Since IP phones have a TCP/IP interface, they can communicate directly to servers on the enterprise LAN or the public Internet for services like "click to dial" or unified messaging. Another approach is to implement new services using the Advanced Intelligent Network (AIN).

AIN network elements like Service Control Points (SCPs) and Service Nodes now support TCP/IP interfaces to Web servers. A subscriber with a Web browser can activate and use many of the same services envisioned for the softswitch. These include follow-me, click to dial, remote access to call forwarding, call screening, call logging, SMDR, etc. With an AIN implementation, these new services are available to end users with analog phones, ISDN phones or IP phones, and one server can support customers across an entire metropolitan area.

n **Killer Applications:** Ironically, while the application/services focus for IP Centrex has been on "new" services for end users, most of the services were proposed many years ago. It is not clear whether or how implementing the services on a softswitch platform will increase their marketability.

However, as Richard Kuehn pointed out in a recent *BCR* article, one of the main objections to Centrex versus PBXs is the lack of control by the enterprise (see *BCR*, Oct. 2000, p.98). With Centrex, all line additions, line deletions, moves and feature changes must be done by the Centrex service provider. All too often, this is an expensive, lengthy and error-prone process.

With IP Centrex there are fundamental technical advantages that can be exploited to provide the enterprise with more control. For example, there is no fixed assignment of telephone numbers to lines, and no dedicated physical terminations at the switch in the central office. Consequently, a service provider could assign a block of numbers to an enterprise, and the enterprise could activate or deactivate IP phones at will.

Of course, the telecom manager would have to be alerted to possible congestion problems on the VOIP facility from enterprise to the central office. However this is identical to the situation today with trunks from a PBX to the serving central office. With this flexible "line" provisioning arrangement, the entire rate structure can be revamped from a fixed- rate monthly arrangement to a usage-based arrangement.

Conclusion

IP Centrex provides many advantages over traditional Centrex, most of which are based on the elimination of dedicated loops for each Centrex set. This enables automatic customer station rearrangement, and savings in OPXs and access facilities.

However, IP Centrex needs a rich set of features to be accepted by most businesses, and it is unclear how to deliver interoperable business services by putting together a collection of features built independently by various third-party software developers. Fortunately, several competing platforms can be used to implement new services, even though none of the platforms is well suited to support *all* new services.

Clearly, there needs to be more cross-platform discussion within the industry on these options. The first thing we need is to understand which platforms are best at offering which services (i.e. by staging a platform "bakeoff.") For example, for large service providers with an embedded base of Centrex customers, it may be more effective to implement "click to dial" features using an AIN platform with Web access than via a server that can only support IP phones. In contrast, since multimedia conferencing bridging services only pertain to IP phones, the best platform for the service is a softswitch.

Ultimately, however, the real value of IP Centrex may lie in its ability to provide end users with more control□