>> Beyond the Internet

Infranet Initiative

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Infranets: Fulfilling IP's Promise

No one could deny that the telecommunications industry is in a state of transition worldwide. Traditional wireline voice service, long the revenue bastion of providers, faces competition from both wireless technology and from voice over IP and the Internet. Competition, a result of deregulation and privatization, has eroded revenues and profits from many of the legacy business services. This isn't a positive trend, so it's clear that something has to change it.

Through the 1990s, it was widely believed that the answer to carrier profit challenges would come from the growth of the Internet. To be sure, the importance of the Internet in establishing a model for mass-market non-voice services cannot be overstated. It has touched every market, every culture, and nearly every aspect of modern industrial society. But while the Internet has earned profits for many classes of companies, it's failed to produce them for the service providers themselves. The "universal network" is almost universally unprofitable.

But why? IP infrastructure has proven itself to be the ideal vehicle for mass-market communications, with the ability to support multiple service types at low capital and operations costs. Standards-writers have developed the means to transfer every single profitable legacy service to IP, and an examination of the economics of the "New IP" model for these services shows universal improvement in return on investment versus legacy equipment. The problem isn't IP the technology, it's IP as a business. Scott Kriens of Juniper said during an investor conference call that the Internet was a "failed business experiment", and he is absolutely right.

The telecommunications market needs a successful IP business model, not to replace the Internet but to supplement it, to capture higher-value applications in a way that rebuilds profit for the providers. It seems clear that the model will not emerge from the current business of the Internet or the current standards process. Technology evolution is not necessarily profit evolution. A new approach to the challenge…the opportunity…of public IP services is needed, and one has now emerged.

The Infranet Initiative

The Infranet Initiative is such an approach. "Infranets" are a joint development of a cadre of vendors and service providers representing all of the major world markets, called the Infranet Initiative Council (IIC). The IIC is not attempting to compete with the current standards bodies; it proposes to leverage the work of those bodies to frame IP infrastructure and services drawing on the best concepts of the Internet as a technical thought leader and the PSTN as a proven business model.

The thesis of the Infranet Initiative is that the problem with the current IP service/profit model is that it retains one of the negative factors of the PSTN, which is the notion that a "service" is simply an exposed behavior of the network. For example, basic IP networks are open and permissive, and so the Internet is open and permissive. Even when new services are conceptualized, they're created by subsetting Internet-like behavior with VPNs. There is no mechanism or architecture to add value by adding things like application processes, despite the fact that application services are a priority with most service providers.

To correct this problem, the IIC proposes to create a different kind of network model, based not on protocol-specific "layers" as the OSI model is, but on business-related "strata". The foundation of the model is a "Control Stratum" and "Data Stratum" that represent the protocol-linked, traditional, connection and transport behavior of the network. Unlike the old OSI vision, these network strata are defined in a protocol-specific way, so Infranets are inclusive of many protocols. The top stratum, which is called the "Signaling Stratum" is analogous to the application layer of the OSI model, and is based on the set of web services standards that Microsoft once described as the "application layer of the Internet" in a presentation.

The selection of web services as an element in a new IP architecture is critical because web services is explicitly a tool for integrating computing intelligence into networks. It is impossible to conceive of an "advanced service" or service that is more than a subset of network behavior and is **not** based in large part on integrated computer intelligence. That makes the integration of computing intelligence with network services a top priority.

Web services also adds an important security dimension to IP services. There are specific processes in web services ("Trust" and "Federation") to manage the authentication of users and their association with services. The edge of an Infranet is a "trust barrier" where users are admitted based on their validated identity and right to claim service access. This separates the management of a network as a **community** from the management of a network as a **connection/transport resource,** and this division of functionality has major impacts on the nature of services in an Infranet.

Instead of creating a VPN for each customer or each service type, an Infranet creates "partitions" within the Data Stratum to divide traffic according to QoS and security requirements. Multiple services and customers may share the same partition if their requirements are the same, and the Signaling Stratum and trust barrier insure that only traffic authorized for a given service is admitted to the partition where that service is supported. This approach is considerably more scalable than the old VPN-per-customer model.

Application services, including content services, can be created by simply admitting a server resource as a network member, or it as a provider of web services whose applications are published in a service registry and made available to network users. This means that Infranets can accommodate both the legacy model of distributed computing and the new service-oriented architecture of web services.

Infranets can also supply legacy services including voice, ATM, and frame relay. Service interworking facilities are a part of the IIC Framework, and trust barrier and authentication functions needed for the creation and management of advanced services can be provided by these interworking facilities on behalf of their legacy users. A frame relay user, for example, could be joined with an IP service offering web services applications, providing a profitable evolution to carriers who offer frame relay or frame relay access to VPNs.

The Infranet Initiative is also offering a solution to the problem of carrier interconnection in advanced services, a key element of any credible worldwide deployment of such services. The Infranet Inter-Carrier Interface (IICI) connects not only the traditional lower layers of the network, but also the Signaling Stratum. Services can then be extended across the IICI to span multiple providers, and the IICI will define both accounting procedures for settlement and interconnection of the underlying network partitions to insure QoS and security. In addition, the trust barrier concept applied between the user and the network is also applied at the IICI, making it possible to control user identity and service access reliably in a multi-carrier service.

At the highest level, the Infranet Initiative controls the risk that networks would fall back into a low-margin "utility" model. This would be a disaster given that most countries have taken or are taking steps to privatize their previous national administration telecommunications monopolies. The Internet is the ultimate example of a utility model of networking because the primary value of the Internet is created not by the network but by what is on the network—the e-commerce and content servers. By providing a mechanism for integrating application and content features into the network, Infranets make the carrier a player in the higher-margin services and not just a conduit for their fulfillment.

Infranets and the Revenue Evolution of Carriers

Voice services will never go away, and legacy data services consumed by enterprises today will live into the next decade. What will change is the profits these services can hope to earn. The era of voice-driven infrastructure is ending, and there is no way to turn the clock of progress back. The market has to face a new non-voice era, and build both infrastructure and business/service models that will be survivable there.

For decades, the "service" of all networks has been connection bandwidth. With the unit cost per bit of fiber transport approaching zero, it is clear that selling bits can never be a stable business model no matter what purpose those bits serve. Creating IP services to replace frame or ATM services will not relieve the downward pressure on cost of bandwidth, nor the downward trend in revenue opportunities. Connection and transport, in any protocol, reduces to the sale of bits, and bits are commodities.

The alternative to selling connection bandwidth is to sell something higher on the food chain. What differentiates the Infranet Initiative is its explicit recognition that "value-added networking" must add value at the application level and that doing that means creating an explicit marriage between the network and the application, so the network doesn't become simply a commoditized conduit.

The IIC is also a differentiator. Standards processes driven largely by technology will deal with business challenges only by accident. The membership of the IIC, drawn from both the vendor and carrier communities, have already demonstrated a determination to develop an architecture for the network of the future that empowers not only those who use that network but those who are expected to build and sustain it.

The Infranet Initiative is a bold and completely unique idea, a merger between the standards for computing and networking, between technology and business processes. Without it, or something very much like it, carrier projections of profit increases from application and content services are empty promises.