NetLink Technologies, Inc.
White Paper

Telecommunications and Data Convergence for the Technically Challenged

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In the beginning…

Historically, and continuing today, many businesses have seen Telecommunications and Data Processing/Communications (IT) as separate and distinct business functions. Organizational charts reflected this perception by most often creating, staffing, and funding completely separate departments to manage the company's respective voice and data responsibilities.

The degree of separation/segregation existed at virtually all organizational levels. Not only at the operational level – technicians and operators; but with Directors and tactical level management; even at the Executive level – the company's strategic thinkers— these two disciplines were considered separate and unique entities.

An obvious impact of this model was that voice and data existed in separated, and sometimes isolated, silos; with separate planning processes, budgetary, and management goals and objectives. It was not uncommon to witness two departments having little or no understanding, insight, sympathy for problems; or notion of strategic direction, of the other. They knew little to nothing of what the other might be doing.

But before we direct too much criticism at this model, it is important to remember that, in this time frame (the 1980's and before), there was little to suggest that any other model should be considered. IT Departments were focused on Main Frames, Service Bureaus, Time sharing, and Programming Languages like COBOL and FORTRAN. The Telecommunications world was dominated by PBXs and Key Systems, WATS and Foreign Exchange Services, Cross-Bar Switches and Touch Tone. In fact, the ability to carry data across a telephone line was in its infancy… what reasons were there to consider IT and Telecommunications as functions that should be combined?

The times, they are 'a-changing'…

In 1986, the Marketing Department of one of the Midwest's Bell Operating Companies, owned fewer than 5 PCs; they ran one application, Lotus 1-2-3; there was no Local Area Network, no e-mail; and only a very few individuals had any comfort with their operation.

Within the next two years there was to be revolutionary change … the explosive adoption of the Personal Computer and Local Area Networking. For the first time, word processing, spreadsheet, and desktop publishing applications became accepted as business essentials; putting the end-user in control and eliminating the need for secretarial pools, and other centralized support-groups, and manual processes. Almost overnight, computing shifted from main frames, back room functions, programmers and raised floor computer rooms, to being controlled by the user… a position they would never relinquish.

Independently, but essentially during the same time frame, the first commercial voice mail system was sold and implemented, launching the concept of Voice Messaging, and ushering in

the ability to better control communications; improving individual productivity; enhancing the level of customer service; and further empowering the end-user.

These two technological events, as much, if not more than any others, directly lead to a corresponding shift in traditional organizational thinking, and the destruction of the 'silo' mindset.

Now computing and communications technologies were being viewed as methods of improving business operations; as contributors to revenues and profits (rather than simply cost-centers requiring control). Now they were to achieve a new status — 'strategic business asset'—a status that demanded executive level involvement and management.

But the real kick in the seat…

The movement of information (in the form of electrical signals) along a wire, enabling the sharing of hard and soft assets within the office; enhancing the ability of colleagues to collaborate; and the general empowerment of the end-user, all contributed to the revolutionary rise in strategic importance of Voice and Data services. More specifically it was the rules and standards (the IP Protocol), approach to communications that gave **convergence** the momentum that continues today.

Through convergence, we were given the ability to transmit/receive all forms of communications (data, video, and voice); all integrated into a single packet and transported across **any IP** network (including the internet). Convergence gave us the tool for improving productivity, empowering users, and eliminating the obstacles of dissimilar devices/networks, time zones, and geography.

Most familiar of converged applications was **IP Telephony or VoIP**, which allowed packetized voice conversations to pass over traditional data networks. Just like the applications of the 80's (file sharing, print sharing, email) convergence offered impressive benefits – ranging from reduced spending on long distance calling, to improved customer care, to infrastructure optimization, to lower Total Cost of Ownership, and improved Return on Investment – immediately gaining the attention of executive management.

But unlike the decade of the 80's, and although businesses appeared ready for VoIP, it actually took several years for the marketplace to reach the conclusion that IP Voice technology was ready for them.

Once it was clear that converged voice systems could deliver the performance and features that we had come to expect from traditional TDM PBX and Key Systems, IP Telephony adoption really took off. In fact, at this writing, it is estimated that fully 80%[1] of all telephone shipments made during 2008 will be IPT as opposed to traditional TDM Technologies.

[1] Info Tech Primary Research, *InfoTrack for Converged Communications*.

So what is Converged voice (VoIP) …?

VoIP is not Voice over the Internet. It is a process of digitizing and sending voice telephone signals over **ANY data network supporting the IP Protocol**. The internet is just one example of this type of data network.

With traditional voice technologies (PBX and Key Systems), voice conversations are transmitted over circuits and inside wiring that are separate from those carrying data[2]. On a converged network, all types of traffic – voice, data, and video – are broken up into discrete packets of information and carried to their destination in a common stream, on a common network infrastructure (Packet Switching).

VoIP allows voice traffic to travel over the same Local Area Network (LAN) cabling and facilities that are used for the transport of traditional data. If traffic is expected to be carried beyond the confines of the LAN, it is necessary for the LAN to be connected to another IP Network by means of an IP compatible facility (or to dissimilar networks like the PSTN, with a gateway). From the perspective of physical transport, VoIP is just another form of data to be managed.

But there are some important distinctions between voice and data traffic, the most important of which is found in the nature of voice communication itself, and the user's expectations of quality.

Voice conversation occurs in real time. The packets containing voice information require priority handling by the network. In the PSTN, and the exclusivity of the Circuit switching technology utilized, there is nothing but voice traffic. But in a packet switched network, everything appears as homogenous data. That means in order to insure the quality that we as users demand, that the resources of the network must be 100% committed to the transport of voice packets immediately, and on demand. If not, the sound quality of the voice traffic could be significantly degraded. We simply will not tolerate a performance level less than what we have grown accustomed.

In contrast, however, data transport is extremely tolerant of variations in network performance levels. When packets containing an email are dropped, the missing information is simply resent; when an end-user encounters an additional 500 ms of delay in loading a web page, it's a non event.

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[2] Throughout its history, The Public Switched Telephone Network (PSTN) has used a switching methodology referred to as Circuit switching…it is a Circuit Switched Network. Circuit switching creates a dedicated communications link between end-points by mechanically or electronically "piggy-backing" dedicated connections from one switching point (Exchange) to the next, until the two points are connected.

The end result is the creation of a dedicated connection, or circuit from end to end. Once established, it remains unshared, private, and of the highest quality, until the connection is terminated, generally by the party establishing the connection request. But one of its biggest advantages is that it permits the connection of a wide variety of locations rather than a single location.

The PSTN cannot support VoIP… so VoIP is not a circuit switching technology, and therefore cannot utilize the generally available Telephone network we all take for granted today.

The reality is that we have significantly different performance expectations (and thresholds for tolerance) for data compared to voice traffic. In general, data networks operate under what is often referred to as "best efforts" standards that don't set any end-user expectations. On the other hand, we expect voice communications to be a pristine experience. When it comes to delivering the expected level of voice reliability, availability and quality, "best efforts" are clearly not enough.

Where does that leave us…?

The growing value and of communications technology has given the IT Department, or more realistically in the smaller business, the "technology go to guy", an opportunity to contribute to the overall performance of the business organization. Increasingly, converged applications are being seen by management as mission-critical to the survivability of the business.

We've seen how communications has evolved and expanded its role from pure infrastructure (cost-center) to becoming a strategic enabler for financial performance and competitive differentiation. Forward looking organizations, techno-leaders, often can duplicate this shift by broadening their traditional operational role by becoming the experts on using communications technology and applications to advance the success of the business.

But given this increased visibility; the growing importance of technology, where exactly does converged communications fit in the organizations scheme of things? Is IP Telephony a voice technology or is it a data technology? Or is it both?

For telecom groups, the end-user expectations of VoIP are nothing out of the ordinary; they're the same as they've always been… quick, dependable, high quality voice communications. For most data networking teams, however, working with advance applications require some significant changes in both their traditional methods and their points of view.

Voice must become a priority – whether in network planning, negotiating end-user performance commitments or developing new methods and procedures for non-disruptive network upgrades.

IP Telephony also requires data teams to expand their traditional focus beyond infrastructure to include high-visibility business communications applications such as unified communications, contact center, CRM, and desktop multi-media conferencing. The esoteric "secret society" that was once the IT Department has largely disappeared.

So where does that leave us? When all the similarities and differences, varying disciplines and competencies are all taken into account… is IP telephony an asset that belongs with the data group or the telecom group? It arguably belongs to both.

[i]NetLink Technologies is a Microsoft Certified Solutions Provider – Partner, specializing in the design; installation; support and maintenance of Windows Networking solutions for the Small to Midsized Business client. In addition, they are both an Avaya Small Business Partner, as well as a Cisco Select Business Partner, with concentrations in the voice, voice over IP, and data communications needs of the Small Business Client.

NetLink Technologies also, through contractual arrangement, represents the services of more than 50 Carrier service products and services, including: AT&T, Verizon, Covad, Qwest, Sprint, and others.

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