NORTEL

White Paper

Adaptive Clients: Getting users turned on to IP Telephony

The industry is abuzz with IP Telephony, but what's in it for you and other end users in your business unit? IP Telephony can deliver (and systems from Nortel do deliver) the same feature richness, reliability and performance that you have grown dependent on in a business telephony system, and much more. What you may not realize is that IP Telephony can also deliver new desktop capabilities and unprecedented mobility options.

Here we look at how IP Telephony can transform your quality of experience and make you more productive. A converged desktop can tightly link your PC with your telephone, which itself can have a color display displaying critical information such as security alerts, directory information and conference call control panels. On-site, campus and wide area mobility can mean always-on voice and broadband data connectivity anytime, anywhere over any device. In this world, your office is wherever you are, and collaboration is transformed to real-time converged communications including voice, multimedia conferencing, application sharing, instant messaging and presence-enabled personal agents. Importantly, the user experience can be personalized to the user need and customized to the business need.

User work modes

Users can be classified by their job responsibilities — for example, executive, middle management, customer facing, administrative, marketing, IT, engineering, finance or legal. By classifying users by their work modes, you will be able to understand how user-facing technology can increase personal productivity, improve work team collaboration with higher quality outputs and shortened delivery times, strengthened customer interaction and quality of service, and streamlined knowledge sharing and learning across the organization.

Desk-bound users: These are users who spend 80 percent or more of their work time at their desks or work spaces. They can be further broadly divided into either *PC-centric knowledge workers* such as personal bankers and application developers, or *telephony-centric workers* such as contact center agents and help desk workers. While both generally have a phone and PC, the former group is most dependent on PC performance and continued application access, while the latter on continued telephony operation.

Telecommuters: These are users who spend more than 90 percent of their time working from their home offices, such as knowledge workers and call center agents, and who don't have a dedicated work space in the office. These require both a telephone and PC, both linked into the enterprise. Traditionally, this would be the realm of ISDN, but DSL and cable modem access has opened up significant new opportunities for these users.

Campus workers: These are *functional specialists* and *knowledge workers* who spend the majority of their time roaming the building or campus, and the remaining time at their desks. Functional specialists include education, healthcare, retail, warehouse, manufacturing and hospitality workers; while knowledge workers spend a high percentage of their time in conference rooms and in other collaborative environments. Traditionally, this would be the realm of pagers, wireless phones, two-way radios, laptops, stand-alone PDAs and to a lesser extent cell phones (given their cost and limited coverage in many in-building environments). These devices can be allocated to individuals as personal use devices or assigned to job functions on a time shared basis (e.g. nurses on a shift).

Road warriors: These are workers who spend most of their time outside of the traditional office, including being on the road, at customer sites, at home and in hotels. This includes those with specialized communications needs such as truckers, law enforcement officers, field service and logistics personnel and sales people. The primary need is for a single device that can meet the user's voice and application access needs. Road warriors often spend some percentage of their time as desk-bound workers, casual telecommuters and campus workers. There is a trend in certain industries, driven by the need to control real estate costs, to get away from dedicated work spaces for road warriors and establish shared office space, also referred to as hotelling.

IP Telephony and real-time converged communications can significantly enhance how workers, distributed across the virtual enterprise, communicate and collaborate. The Converged Desktop and 'Office Anywhere' broadband mobility can result in shorter decision times, faster resolution of problems and more responsive customer service. Wired and wireless Ethernet, DSL and cable modem access, and second- and third-generation public cellular services create a broadband infrastructure that provides effective equivalency between desktop and remote/mobile environments.

The new Converged Desktop

Traditionally, in a general office environment, the phone has been an instrument with an optimized set of configured feature keys, and, if next to a PC, has been totally independent of its operation. Today, the Converged Desktop creates a totally new work space. The phone itself can now provide enriched communications; can display corporate alerts and

The value of video for business

Video takes many forms. The key enabling technologies are converged IP networking, low-cost cameras and digital processing and storage on general purpose PCs. One-way video streaming is central to video surveillance, training and employee communications. In some industries (e.g. brokerage), live TV news feeds can be streamed to the desktop to keep users plugged into world and industry developments.

Many academic studies have been done to assess the value of two-way interactive video in real-time inter-human communications. R. B. Ochsman and A. Chapanis found that the value of interactive video follows a bi-modal distribution with a low-value region between high-value conflict resolution ("I want to see the whites of their eyes") and high-value personal interactions ("hi, grandma"). They also found that "The most important determinant of a team's problem solving speed was reported to be the presence of a voice component."

In business settings, Ellen Isaacs and John C. Tang found that, "compared with audio-only, the video channel of our desktop video conferencing prototype adds or improves the ability to show understanding, forecast responses, give non-verbal information, enhance verbal descriptions, manage pauses and express attitudes. These findings suggest that video may be better than the phone for handling conflict and other interaction-intense activities. On the other hand, when compared with face-to-face, it can be difficult in video interactions to notice peripheral cues, control the floor, have side conversations, point to things or manipulate real-world objects. To fully enable rich interactions, video should be integrated with other distributed tools that increase the extent and type of shared space in such a way that enables natural collaborative behaviors within those environments."

The implication of the above is that, while consumer interactive video is growing to be a hot market, the value of business video is greatest when viewed as part of a real-time converged communications environment, leveraging the power of the PC.

Reference:

R. B. Ochsman and A. Chapanis. "The effects of 10 communication modes on the behavior of teams during co-operative problem-solving." International Journal of Man-Machine Studies, 6(5):579–620, Sept. 1974.

Ellen Isaacs and John C. Tang, "What Video Can and Cannot Do for Collaboration", Published in 1994 in the Springer-Verlag journal Multimedia Systems, Volume 2, pp. 63-73.

have business content pushed to it; and can be augmented through USB-attached peripherals (e.g. keyboard and mouse). Enriched communications include corporate and departmental directories with click-to-call, conference managers that simplify chairperson controls and enhance security, push-to-talk capabilities and zone paging that speed up communications, and visual voice mail that accelerates voice mail handling. Alerts include security alerts, weather alerts, IT alerts, travel advisories and company announcements. While some vendors choose to put a browser in every phone and limit access to Web-based applications, Nortel believes that the business need is better served with information from targeted applications being securely tailored for the best user experience, in a way that doesn't require any changes to the application and minimizes the cost of the device to the end user. The converged desktop also leverages the power of the PC to deliver real-time converged communications including voice, multimedia conferencing, application sharing, instant messaging and presence-enabled personal agents.

Examples of content that can be pushed to IP phones can stretch the imagination and include general purpose information such as weather reports, airline flight info, stock quotes, headline news, stock prices and sport scores, and work-related applications such as management dashboards and vertical applications. Management dashboards can provide daily sales figures, inventory levels, manufacturing efficiency, call center status and real-time product updates. In addition, vertical applications can be provided — for example, restaurant reservations and room and maid status in hospitality; T-Bill Rate information in finance; inventory lookup and price checks in retail; time clocks in manufacturing; student attendance tracking in K-12; and class schedules in higher education.

Desktop phones: hard or soft clients?

With IP Telephony, users have a choice of using an IP phone as their telephony instrument, or to install a soft client on their PC. The former has the advantage of exhibiting the familiar look and feel of a phone, including use of a handset or hands-free operation, and the availability of a familiar numeric key pad with associated numerics identified (i.e., "2" and "A, B and C"). Using an IP set also has the advantage of not being totally dependent on the operation of the PC: if the PC is being rebooted to install a patch, the phone keeps working, even in the Converged Desktop scenario.

The big advantages of an IP Telephony soft client running on a PC (which can have a similar look and feel through a point-and-click key pad on the screen) are that it is a lower cost solution and requires less footprint on the desk, as long as the user is comfortable with using a headset. USB handsets are available, but handsfree operation is problematic. Of course, power over Ethernet can provide continuous operation for IP sets in case of power failures, but are not applicable to PCs because they draw too much power.

Nortel Converged Desktop

- **Real-time converged communications**
  - Business-grade telephony
  - Device choice in making and receiving calls
  - Instant messaging and presence
  - Desktop video
  - Conferencing
  - Application sharing
  - Personal agent with dynamic call handling
- **Quality of experience**

Figure 1. The Converged Desktop

Nortel IP Phone 2007

- **Interactive multimedia experience**
- **Flexible input options and application interaction with touch screen and USB mouse/keyboard support**
- **Enhanced productivity via Application Gateway access to pre-packaged services**
  - Express Directory
  - Visual Voice Mail
  - Broadcast Alerts
  - Zone Paging
- **Content push of audio, video or text messages, including soft keys for user activation e.g., meeting reminders, announcements, sales figures, company news**
- **Transformed business Web applications via easy-to-use "point-and-click" Design Studio**

Figure 2. An advanced-level desktop IP phone

The Converged Desktop also provides access to network-based services, such as ad-hoc and meet-me conferencing, voice mail and unified messaging (providing a single inbox for e-mail, voice mail and fax), as well as to contact center servers and related applications, and in many cases enhances the user experience in accessing these services.

Office Anywhere

Mobility used to mean a cell phone and possibly one or more mobile data devices, such as a PDA or pager. If you traveled with your laptop, you were always on the search for connectivity back to the head office; for example, via an Ethernet jack at the hotel or at home, or even a modem jack. When you were mobile, you lost most of the functionality you had back at the office.

The emergence of ubiquitous broadband wireless connectivity has changed all that, enabling the realization of the Office Anywhere. This allows mobile workers to collaborate effectively across an increasingly distributed environment. Real-time converged communications allow you to take your office wherever you are and deliver a consistent, reliable, secure communications experience. Being connected 24 hours a day may be good for business but does not meet the needs of individuals, balancing their personal and professional lives: the Nortel Office Anywhere solution provides users with control over their connectivity environment.

Factors to consider in choosing a mobile device

- Handsfree, wired or wireless headset
- Push to talk capabilities
- Data or voice-centric capabilities
- Screen size and availability of data applications
- Battery life expectations
- Availability of soft clients for collaboration
- Form factor and ruggedization options for hostile environments

Nortel WLAN Handset 2212

- **Familiar Nortel IP client feature set**
- **High-quality voice**
- **Integrated VPN Client**
- **Back-lit display**
- **4 hours talk time/70 hours stand-by**
- **Open Application Interface (OAI) support**
- **Robust design and resistance to liquids**
- **Vertical market applications**

Figure 3. A Voice over Wireless LAN Handset

There are three general classes of mobile users, although the boundaries among these classes are not rigid. Which class best describes your users will point you towards the optimal mobility solution. User can be *nomadic* in the sense that they go from place to place and want connectivity when they get there. Users can be *locally mobile* either within the locale of their work place (e.g. leveraging wireless LANs or WLANs), and *mobile anywhere*, leveraging WLAN hot spots and public broadband wireless services.

In all cases, users can choose which single mobile device they use for real-time communications and data access, using software IP Telephony/multimedia clients to attain a consistent user experience in accessing information, communicating and collaborating, no matter where they are. The level of standalone functionality is device-dependent, with data synchronization provided when connected. The form factor of the mobile device can fit the job. Voice quality and adequate application bandwidth is delivered even when roaming, as are security, privacy and confidentiality. Let's look at these three types of mobile users.

Nomadic users are very well served by laptops, which can be plugged into a docking station or use an Ethernet plug or a WLAN connection. Equipped with a multimedia client and tightly coupled with the desktop phone, the Nortel Converged Desktop delivers an unprecedented richness in multimedia capabilities, while delivering a consistent and rich telephony experience. Security is provided through VPN technology whether connected via an on-site WLAN or over the Internet via DSL, a cable modem, a hotel Ethernet plug or a home or hot spot WLAN connection. When nomadic users don't have broadband connectivity, access to data applications (e.g. order status and inventory information) can be provided via voice portals using advanced speech technologies.

Locally mobile or campus mobile workers, whether functional specialists or knowledge workers, require mobile devices that provide WLAN voice and data roaming across the building. These generally take the form of Wi-Fi phone handsets with small displays and possibly with push-to-talk functionality, and VoIP-enabled PDAs, possibly equipped with built-in or peripheral devices, such

as barcode readers, RFID scanners and printers. Having a multimedia client can provide collaborative capabilities including presence and instant messaging, control over call routing and access to corporate directories.

Battery life and recharge times, and talking and standby times are particularly critical for heavy usage environments, such as hospitals. Given that battery life for WLAN connectivity and color displays is still a constraint for some applications, sub-optimal dual-device solutions may be required. This could consist of, for example, a WLAN handset and a tablet PC on a cart in healthcare, or a WLAN handset and a specialized non-networked handheld data capture device in retail. That said, with dramatic improvements in battery life expected over the next 18 months, the preferred mobile device for campus mobility will be a converged WLAN device with a multimedia client. The latter will provide a subset of converged real-time communications functionality (e.g. no video support), while maintaining a consistent user experience.

Mobile anywhere workers with broad off-site mobility needs are looking for comprehensive capabilities in a single device. While mobility has become an essential competitive capability, escalating costs for public mobile services (increased minutes, more users, roaming charges and data services) is a major enterprise concern. As a result, attempts are being made to control cellular costs, through better deals with carriers, auditing usage and plan optimization, and imposing limits on how many mobile devices can be used by users (e.g. pager or cell phone, but not both). Mobile anywhere workers are looking for a single device that meets their communications needs. One benchmark device is the voice-enabled BlackBerry, supporting secure e-mail and real-time converged communications including instant messaging, personal agents and presence. Increased choice is emerging with similar functionality on other platforms such as Pocket PC.

Knowledge workers with on- and off-site requirements are best served by dual-mode devices supporting both public wireless and WLAN capabilities. This provides the advantage of higher-speed data connectivity when on-site. It also allows the enterprise to decrease the cost associated with using public wireless services to make and receive calls when roaming the premises (given that up to 50 percent of calls are received or originated on-site). Seamless roaming will allow users to move freely between the WLAN and public cellular environments without session interruption.

Nortel solutions for the end user

While IT has the overall responsibility for establishing and evolving the enterprise IP Telephony and real-time converged communications infrastructure, it is the end user who will ultimately reap the benefits of productivity enhancements through collaborative tools. Therefore, business units and their users within the enterprise are key stakeholders in the evolution of the business to leverage the benefits of IP Telephony, mobility and multimedia collaboration. A myriad of opportunities exist that can enhance your productivity whether you are in the office or workspace, roaming the site (e.g. warehouse, store and hospital) or campus, or on the road or working from home.

Nortel Multimedia Communication Server 5100 Wireless Client for BlackBerry

- **Business-grade telephony**
- **Click to call**
- **Personal Agent**
- **Secure instant messaging**
- **Extended use of presence**

Figure 4. A BlackBerry with a multimedia client

Nortel Dual Mode Mobile Client 3100

- **Consistent user experience for SIP and cellular voice services**
- **PocketPC devices with Windows Mobile OS**
- **Dual physical radio interface (Wi-Fi and cellular)**
- **Dual protocol stacks (SIP and cellular)**
- **Automatic mode selection or manual override**
- **Optional VPN Client**

Figure 5. Dual-mode (WLAN and cellular) client for mobile device

Nortel places Adaptive Clients and Engaged Applications at the top of its Architecture for the Converged Enterprise (ACE), because the business value comes from serving end users and providing access to applications. Adaptive Clients are the user's entry point into the emerging always-on virtual enterprise.

Nortel has an extensive set of Adaptive Clients within its real-time converged communications and mobility portfolio. Adaptive Clients supported by Nortel include a range of fully-featured IP phones, some with 5.7" bitmapped, pixel-based displays and USB interfaces; voice over WLAN handsets, some with push to talk capabilities; PC and Pocket PC soft clients; and BlackBerry multimedia clients.

How does IT evaluate Adaptive Clients?

- IT needs to meet user needs: so IT is looking at IP Telephony systems with a rich feature set to meet a broad range of users.
- IT needs to provide telephony-grade reliability for IP telephones: so they want standard power over Ethernet support.
- IT needs to secure the IP Telephony environment: so they are requiring security endpoint and communications security features and compatibility with enterprise policies. This could include PDA and laptop support for VPNs, personal firewalls and anti-virus client software.
- IT needs to ensure IP Telephony fits into their networking architecture: so they may be looking for 10/100/1000 Mbps support.
- IT needs to manage IP telephony systems: so they are looking for centralized network and service management features (including end-to-end proactive voice quality management).
- IT needs to support IP Telephony: so they may standardize on specific operating systems (e.g. Pocket PC, Symbian, BlackBerry OS) and on specific client manufacturers and even models.

The Nortel Communication Server 1000 (CS 1000) and Multimedia Communication Server 5100 (MCS 5100) provide a rich set of business telephony and real-time converged communications services. In fact, the MCS 5100 received the VoIP Applications award from Miercom, a network product test center, in the "Most Effective Multimedia for Advanced Applications Packages" category at VoiceCon 2005 (San Diego), while the Nortel IP Phone 1100 Series won Best in Show at the Fall 2005 IT Exposition and Conference in Los Angeles. In addition, *Business Communications Review* awarded the Nortel MCS 5100 the Best Multimedia Application in a test comparing the application package offerings of seven leading IP Telephony vendors. As quoted by BCR, "And it's not just that Nortel delivers every media you can think of — IM, multi-party chat, scheduled and ad hoc audio conferencing, Web push and co-browse, white boarding, and now even point-to-point and multiparty videoconferencing. These are deployed in a clean, well-organized and very usable application package. Besides clean and affordable desktop video, the latest release also adds expanded presence capabilities, improved call logs, click to call, and special features for "manager/assistant" work relationships." The results were published in the September 2004 issue of *Business Communications Review*.

Nortel is a recognized leader in delivering communications capabilities that enhance the human experience, ignite and power global commerce, and secure and protect the world's most critical information. Serving both service provider and enterprise customers, Nortel delivers innovative technology solutions encompassing end-to-end broadband, Voice over IP, multimedia services and applications, and wireless broadband designed to help people solve the world's greatest challenges. Nortel does business in more than 150 countries. For more information, visit Nortel on the Web at **www.nortel.com**.

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