



UpFront

The beginning of a new era

As we enter 2008, it is becoming increasingly clear that the era of “classic telecom” is behind us and that we are accelerating – faster than many expected – into a new era that will likely be the most transformational our industry has seen yet.

The end of an era typically occurs when we reach the point where products become mature and differentiation moves to a different level, which I would suggest is true today. Most carriers and enterprises have relatively high-performance networks, with some level of security and mobility, and vendor differentiation comes primarily in the form of price, color, relationships, and sales and marketing.

The start of a new era, on the other hand, is always signaled by new challenges and opportunities and a rush of technology innovation and industry change.

That “rush” is certainly true today. To highlight just a few of the major transformations under way, we’re seeing increasing acceptance and adoption of 4G wireless technologies; Provider Backbone Transport (PBT) – a technology that makes Ethernet carrier-grade – is gaining momentum as the technology of choice in metro networks; 40-Gig optical networks are being deployed and 100 Gig is on the horizon; and Unified Communications is taking over from Voice over IP, becoming the new paradigm for communications within the enterprise. At the same time, huge amounts of spectrum are being allocated around the world for a wide range of diverse technologies; entirely new classes of telcos, operators, and enterprises are surfacing; and the telecom and IT ecosystems are converging, to the point where they will soon be indistinguishable.

What most differentiates this era from others, however, is the speed and magnitude of the changes under way. Never in my career – and I would challenge, never in the history of the telecom industry – have so many technology disruptions and industry shifts of such a profound

nature happened at the same time. As a result, this next era stands to be more revolutionary than any that preceded it. As Bill Gates expressed in his keynote address at the recent Consumer Electronics Show, we are at the beginning of a new “digital decade” – one in which technology “will make our lives richer, more connected, more productive, and more fulfilling.”

At Nortel, we call this the era of Hyperconnectivity, and we’ve been talking about it for well over a year now. Hyperconnectivity is the state reached when the number of nodes and applications connected to the network far exceeds the number of people connected.

We are accelerating toward Hyperconnectivity far faster than many expected. And, it’s not just cell phones, PCs, and PDAs being connected. We’re also talking about entirely new types of devices, like Amazon’s recently announced Kindle e-book system, as well as about cars, home appliances, medical equipment, cameras, industrial machinery, and countless items with embedded RFID sensors that are being connected at an ever-increasing rate. At the same time, more and more business and consumer applications are connecting to the network as they are being enabled with communications capabilities (like click-to-call, as a simple example). Indeed, anything that would benefit from being connected to the network is being connected to it.

This unprecedented level of connectivity promises to bring about new solutions and technologies that will revolutionize the end-user experience and that will forever change the way we live, work, and play.

Without a doubt, Hyperconnectivity offers tremendous opportunities – in terms of increased revenues for carriers, increased productivity for enterprises, and a better communications experience for all – but it also presents significant challenges that will require us to fundamentally rethink the way networks and applications are built.

Most of the challenges can be addressed by focusing on the two “pillars” of Hyperconnectivity: “true” broadband and communications-enabled applications. And these are the areas where Nortel is placing much of its research and development efforts.

I describe true broadband as being a communications experience that is so seamless that users are completely unaware of the technology that makes that communication possible. They simply communicate anywhere, anytime, from whichever device is most convenient, wired or wireless. Although the industry has talked about this concept for years, it’s a promise that has yet to become reality.

To deliver it, we need to solve a number of technology challenges, including:

- scaling the access network, particularly the wireless one (to meet the huge bandwidth demands of high-capacity media-rich services, like video);
- scaling the metro and long-haul networks (again, to meet growing bandwidth demand);
- simplifying all network architectures to accommodate the very diverse set of endpoints and their different needs (e.g., in terms of authorization, authentication, security, OAM, and intelligence); and
- ensuring seamless, uninterrupted communications across all networks – wired and wireless, public and private.

It will not be enough, however, simply to provide a seamless broadband experience at the infrastructure level. We must also unify the communications experience at the applications level so that it too is seamless across devices, networks, applications, and enterprise boundaries. To do this, we need to marry the network capabilities and intelligence that exist in the telecom world with the rich world of IT applications to create a new type of application – a “communications-enabled” application. Essentially, all of the telecom functions that we understand so well – including voice, instant messaging, video, and sophisticated network capabilities such as conferencing, loca-

tion, presence, proximity, and identity – will become intrinsic to the application experience.

In our R&D labs around the world, our teams are working at the technology, product, and solutions levels to meet the challenges of true broadband and communications-enabled applications. This issue of the *Nortel Technical Journal* provides a glimpse into just a few of them, specifically:

- Our Wireless Technology Lab (page 4) is rewriting the economics of wireless access to enable our customers to accelerate to a 4G world, where technologies like WiMAX and LTE will create high-capacity “pipes in the sky” that will make it possible to do wirelessly what today can only be done on wireline networks. We are working not only to improve spectral efficiency and boost data rates, capacity, coverage, reach, and throughput, but also to dramatically lower the cost per bit of wireless communications, through innovations that include new antenna, base station, advanced scheduling, and multi-hop relay designs.
- Our new Provider Link State Bridging (PLSB) technology (page 21) builds on the capabilities we brought to the industry last year with PBT. PBT is making Ethernet simple, scalable, and carrier-class, and enabling customers to migrate away from Multiprotocol Label Switching (MPLS), which is too costly and complex a technology for metro networks. PLSB is a next step that will enable carriers to deploy much larger and simpler pure-Ethernet infrastructures than previously thought possible, and in the process will significantly drive down operating costs for carriers.
- We are reinventing the way we develop software by leveraging Service-Oriented Architectures and Web Services to communications-enable a wide range of applications and processes (page 31). Our goal is to take the sophistication and intelligence that used to be confined to the telecom network and present them to all types of IT applications in a language and syntax that those applications can

understand. Instead of expecting the “apps” to come to us, we are proactively bringing communications functions to the applications world. In doing so, we are tapping into a huge base of applications and services, as well as teaming with such partners as Microsoft and IBM. The result is a growing (and ultimately infinite) pool of rich applications and services.

- And, we are taking those communications-enabled applications to the next level by developing a library of building blocks that can be rapidly combined and orchestrated into solutions that can be easily reused, rapidly deployed, and quickly and cost-effectively customized for customers across many different industry segments (page 45).

Behind all of these efforts and many others is a strong portfolio of intellectual property and a global team of 12,000 R&D professionals. The remaining articles in this issue profile some of these talented individuals, including some of our leading standards experts (page 60), a number of top inventors honored at recent Nortel Patent Awards ceremonies (page 72), and our 2007 Nortel Technical Fellows – outstanding scientists who are well-respected in their fields and who have made significant contributions to Nortel’s technology leadership in a number of areas (page 71).

It is indeed a new world. As change accelerates across the converging telecom and IT landscapes, I am optimistic and energized by the opportunity in front of us to help shape that future and to bring forth new technologies, products, and solutions to address both the challenges and opportunities of Hyperconnectivity.



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