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The wireless World in the next Millennium

The world stands on the threshold of a new era of computing and telecommunications as Internet-based networks compete with traditional circuit-switched public networks to be the infrastructure of choice for new enhanced services. The next generation of communications networks will provide the foundation to support the explosive growth of "eBusiness" and usher in a new breed of applications for e-commerce, voice-over-IP, distance learning and e-tainment, among others yet to be realised.

Compaq is uniquely positioned to be a driving force for the convergence of communications and computing technologies. Consider some of these numbers:

LARRY SCHWARTZ

- All of the world's top 35 telecom companies use Compaq systems
- Compaq platforms handle 80% of the toll-free calls and 75% of the emergency calls that originate in the United States – more than 200 million calls a day.
- We are the market share leaders for underlying platforms for Service Control Points (SCP) with 29% of market.
- We are the world leaders in SCPs deployed for off-switch services, with 425 SCPs deployed globally.

While Compaq is involved in all aspects of computing and communications, in the fastest-growing telecommunications segment – Wireless – Compaq's presence significantly exceeds every other telecommunications equipment supplier, according to a 1998 study by Venture Development Corporation. Today, there are well over 30 million subscribers depending on Compaq's Wireless Intelligent Networking systems for wireless services and this number is expected to double over the next year.

The Four Phases of Wireless Growth

Before looking into the future, it is useful to understand the four major phases that the Wireless segment has already experienced.

The first phase was "Dream Land". In an environment of regulated monopoly/dupoly, an operator's strategy was simple. Publicise your name, offer wireless dial tone and charge premium prices. High-end users like lawyers, real-estate agents and doctors were willing to pay the high

price for "go anywhere" wireless voice service.

The next phase was "Home Expansion". As the number of high-end users reached saturation, the need for expanding the served available market became apparent. To extend the served market from business into high-end residential, pricing packages were created (e.g. security packages for a fixed fee per month and a specified number of minutes of use.) This allowed the market to continue to grow. The third phase can be called "Big Time Choice". With B and C- Band licenses came new small PCS operators offering expanded choice for users. The incumbent suppliers competed on area of coverage while the new entrants competed on quality of digital voice. Bundled services, such as private dialing plans, voice mail and calling number became the new competitive playing field as operators began to compete for existing as well as new subscribers. Again, the overall market penetration grew.

The fourth major phase of wireless competition began with the introduction of One-Rate service (pioneered by AWS). This effectively allowed wireless operators to compete for local and long distance business with Wireline operators and long distance carriers. With no additional charges for roaming or long distance, the market penetration continues to climb to new levels.

Wireless Futures

As this millennium fades and a new one begins, one major marketplace phenomenon and three wireless industry innovations can be expected to come together to drive the wireless industry to an entirely new stage.

The first of the three wireless industry innovations is the two-week battery pack that enables people to have their wireless phones turned on all the time.

The second is high-speed data access that makes communication to the Internet practical.

The third of the innovations is prepaid service, which essentially turns a cellular phone into a roaming debit machine. The marketplace phenomenon that will synergise with these innovations is, of course, the Internet. The Internet is creating unprecedented access to information and e-Commerce. People can see, buy or trade virtually anything from Shares on E-Trade to Furbys on E-Bay. As the content power of the Internet and the anywhere/anytime access power of digital cellular come together, we are entering the fifth phase in the expansion of the wireless segment. This is the stage where the wireless/wireline walls come tumbling down and competition for subscribers will increase dramatically. This stage, which is just beginning, will be the stage of premium services. The best in class service providers will prevail and applications - some of them almost science fiction-like – will drive the marketplace. For example:

- A 12-year-old who just placed a bid on E-Bay for a Furby gets outbid. A short message is automatically sent to his or her pager letting them know and asking do they want to raise their bid?
- Somebody's stock trade limit has been reached. Her on-line broker calls on the cellular phone and asks whether to proceed with the trade. The reply comes by simply pressing a yes/no button on the dial pad to confirm the transaction.
- A prepaid wireless cell phone can be used to buy a coke at the store. The vendor enters the cell phone number and the amount, and the buyer enters their Personal Identification Number – or PIN – to accept the charge. The phone actually becomes the point of sale. A similar example is that a phone can be used to automatically transfer funds from a bank account to the grocery store, much as the debit/credit card terminal works today.

This not a futuristic wish list. At Helsinki Airport it is already possible to buy a drink from a vending machine using a GSM cell phone. I get information about stock trade limits on my cell phone today. And in several European countries 9 to 12

year-olds carry kiddy phones with pre-set numbers that enable them to reach Mum, Dad or Grandma in case of difficulties.

Accelerating Growth Through Partnership

It is Compaq's intent to accelerate the introduction of the multitude of wireless data and voice services being enabled by the Internet and mobile data technology. For instance, Compaq – also a leading computer supplier to financial institutions worldwide – is actively working with several wireless operators and financial clearinghouses. The intention is to accelerate the growth of the wireless e-Commerce market, by enabling electronic fund transfers to be made through a wireless telephone. The cellular phone is effectively becoming a mobile ATM machine. By punching a few buttons or by merely speaking into a cell phone, consumers will be able to access bank accounts or make a purchase. Compaq is also actively partnering with telephone equipment manufacturers to combine their Radio Frequency expertise with Compaq's experience in programability and content access. This will enable mobile access to a wide variety of internet-enabled services ranging from information services to mobile banking. Dan Hesse, President of AT&T Wireless, said recently that it was his goal to make the Wireless home office as ubiquitous as the wireline dial tone. Compaq today is actively engaged in "wireless enabling" its extensive portfolio of laptops, PDA's and next generation information appliances. The goal is to ensure that Compaq's customers are at the forefront of the wireless e-Commerce market of the future. Imagine using a laptop or Palm Pilot without a phone hookup to access e-mails, the company server and the Internet. 9.4

Larry Schwartz, Group Vice President, Compaq Telecommunications Division, is responsible for Compaq's worldwide telecommunications activities including wireless, wireline and IP-telephony applications. He was named to this position in July 1999. Prior to this, Schwartz served as Vice President and General Manager, Compaq Telecom Network Solutions, responsible for all IN and wireless applications.

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