Seamless Communication

Nokia Siemens Networks has what it takes to be successful in an extremely competitive market. Nokia Siemens Networks has in fact already built a corresponding infrastructure and services. With sales of €17 billion and a global workforce of approximately 60,000 (including 17,000 in research and development), the joint venture counts among its customers 7% of the world’s top 100 telecommunication companies.

The entire communications sector has been under tremendous cost pressure ever since the dot.com bubble burst. Although technological advances have helped cut costs, they have also reduced the number of people needed to operate telecommunications facilities. Thus the first order of business at the new joint venture is to further tighten control over expenditures. “We’re going to address this issue and use our leadership in innovation to create a foundation further down the road. Among other things, he and his team are working on Long Term Evolution (LTE), which operates with several antennas per base station and is expected to offer a data transfer rate of up to 170 Mbit/s in its initial version. Such high data rates will be necessary because many more pictures, songs and, above all, films will be downloaded from the Web in the future. “Users want movies to be available instantly after they click them. They don’t want to wait,” says Schulz. Nokia Siemens Networks has in fact already built a corresponding infrastructure. “At the moment, we’re up to 170 Mbit/s using two antennas. With four we get 340 Mbit/s,” says Schulz. “But this was achieved in controlled laboratory conditions; there are too many possible sources of interference to reach that level in the field.” LTE employs the orthogonal frequency division multiplexing (OFDM) procedure, which uses radio bandwidths more efficiently and can therefore transfer more data. WIMAX also uses OFDM, as does WLAN, the DVB-T and DVB-H TV standards. Schulz believes mobile devices for LTE can be developed quickly, now that manufacturers have fully developed the underlying chip technology.

And he’s team has also achieved a wire- less rate of one gigabit per second. They did so by combining OFDM with an intelligent antenna system consisting of three transmitting and five receiving antennas. The transmission bandwidth here was 100 megahertz, however, which is five times higher than what LTE was designed for. The system’s range of several hundred meters is also lower than that achieved with today’s radio cells. “For such high transfer rates, long range is currently not required,” says Schulz. That’s because Nokia Siemens Networks’ scenario involves using these high bandwidths mostly in hot spots, where mobile terminals automatically adjust data transfer rates in accordance with available bandwidth. “We’ve already got the rudiments down for such a system,” says Schulz. “At the moment, it can smoothly switch over from 14 kbit/s to five Mbit/s and also transmit videos without any interruption.”

Struggling for New Frequencies. Although LTE is far from ready for mass production, another completely new chapter in mobile communications is already beginning. This October, the World Radio Conference (WRC) will convene in Geneva, Switzerland. At the meeting, representatives of the member countries of the International Telecommunication Union (ITU) will conduct negotiations on the frequency spectrum for fourth-generation (4G) mobile radio. “This is going to be exciting, because it’s still not clear where the required frequencies might be,” says Schulz. “At the moment, they’re used differently in different countries.” Standardization probably won’t be achieved here until 2011. The first 4G cell phone prototypes could become available in 2014. These new phones are expected to be extremely expensive by today’s standards, as the goal is a data transfer rate of one gigabit per second.
Welcome to the Smart Home

The rapid increase in broadband connections is resulting in a growing number of networked homes, especially in the realm of infotainment. Siemens solutions enable new comfort and security features, while new communication standards simplify the wireless networking of individual system components.

Peter uses his cordless telephone to go on the internet, where he notes the number of a pizzeria and orders two pizzas. His wife, Sally, has already sent a cell phone postcard to Peter’s TV to tell him that she and their two children, Anne and David, will soon be arriving. When the pizza delivery man arrives, he is recognized by the home security system, which opens the door before he can ring the bell.

Technically speaking, this scenario could become reality tomorrow. However, to date, such a combination of communication, entertainment, and security systems — including the control of lights, heating, and blinds — has been implemented only in demonstration projects. “We still have individual systems that are very costly to install and require a lot of effort and expense to modify,” says Thomas Hauser, a building automation expert at Siemens Building Technologies (SBT).

To improve things, in 2007 SBT launched Synco living, a radio-based home automation system. At the heart of the system is a central unit that enables residents to control all functions in up to 12 rooms and monitor everything on a display. There are room temperature sensors that record temperature data to the central unit, whose heat regulator compares actual temperatures with predefined settings in every room and then adjusts heating system valves to bring temperatures to the desired level.

Synco living is based on KNX, an open global standard for building system technology. The key aspect here, says Hauser, is that “depending on the needs of the resident, the heating system can be easily combined with electrical and security applications.” Some people, for example, don’t need a home security system right away, while adjustable heating systems are a fast-growing trend. Hauser also says that installation costs for Synco living are extremely low, thanks to battery-powered components and wireless connections. Additional KNX-based products from other manufacturers can also be integrated into the system.

In the realm of infotainment, the PC-inter-net world is merging with devices like MP3 players, digital cameras, cell phones, game consoles, and TVs. Fujitsu Siemens Computers (FSC) believes networked homes will require powerful data storage units that can handle photos and videos, as well as Web and television content, whereby users will access such content via WLAN and the internet. FSC already offers an expandable home server with a 500-gigabyte hard disk.

The top priority for us at the moment is television,” says Björn Fedrm, head of FSC’s Digital Home Unit. Fedrm emphasizes the importance of systems for recording television broadcasts onto hard disks, thus enabling users to view programs at any time. Then there’s ‘ Follow Me TV’, which allows users to continue watching one program on a laptop that’s connected via WLAN and the Universal Plug-and-Play (UPnP) standard protocol, if they want to go into the garden, for example.

Telecommunication companies are now also offering TV programming via internet (IPTV), although channel surfing requires special solutions that interlace smoothly with the network infrastructure and set-top boxes. “We’ve had an IPTV platform on the market since 2000. Today, four European and more than 80 U.S. providers use it to broadcast via broadband,” says Udo Biro, IPTV product manager at Nokia Siemens Networks.

Depending on the provider, several hundred thousand viewers can thus watch more than one hundred stations in high definition, download videos, or record programs, which they can watch anytime they want. “In the future, we’ll also see the convergence of IPTV solutions and mobile radio networks,” says Biro. This will make it possible for someone to take a picture with their cell phone, for example, and then send it to a Web portal, from which a friend can download the photo to his or her television.

Finding your Favorite Shows. Lydia Aldephon, who is responsible for innovative busi-ness models at Nokia Siemens Networks (NSN), believes the television of the future will offer a large number of personalized services. NSN already has a TV service package known as Iron that works with new types of hybrid set-top boxes that receive TV broadcasts via conventional satellite, cable, or DVB-T channels and are also equipped with a DSL connection for in-teractive functions.

“We developed an intelligent software client for Iron that creates dynamic user profiles,” says Aldephon. Such profiles allow the sys-tem to register and assess user preferences, which enables the set-top box to make viewing suggestions on the basis of an electronic program guide (EPG). Iron also automatically records programs that fit a given user profile. The solution is being tested in Finland with Connect TV Group Oy until the end of 2007 and, as Aldephon reports, “Iron could be come commercially available in 2008.”

The merging of telecommunications with the Internet continues as well. CAT-iq (Cordless Ad-vanced Technology — internet and quality) — the successor of DECT (Digital Enhanced Cordless Telecommunications) — sends out radio signals worldwide in the unlicensed frequency spectrum and cannot be affected by WLAN or Bluetooth systems. “Internet telephony with CAT-iq is so clear that it sounds like the person you’re talking to is right next to you,” says Erich Kamperschroer, chairman of the DECT Forum and head of Innovation and Technology Manage-ment at Siemens Home and Office Commu-nication Devices (SHC). What’s more, radio telephones in CAT-iq-devices last longer than those in WLAN phones and the system’s range of 50 meters in the home is also much greater.

One big advantage: CAT-iq makes it possible for cordless phones to directly access the Internet and future Inter-net-based networks. “For the first time, applica-tions such as the direct dialing of numbers looked up in Internet telephone books will be come possible,” says Kampserschroer. The tech-nology could also open up Internet radio to a mass market. According to Kampserschroer, CAT-iq is the only radio technology that distrib-utes radio signals at a continual high quality. CAT-iq can also be used to supplement LAN and WLAN as a home data distribution system.

Better Telecommunications. Telecommuni-cation companies usually offer a standard CAT-iq links mobile phones to the Internet, opening up many new application possibilities on the road to the networked home.