



Skype: Leading the VOIP Revolution

Case Study

*Research Assistant **Bojan Angelov** prepared this case under the supervision of **Professor Bharat Rao** at Polytechnic University in New York. This document was prepared as a basis for class discussion, and does not reflect the effective or ineffective handling of an administrative situation. The authors would like to acknowledge the valuable contributions and suggestions of executive program participants in the MOT and TIM Programs at Polytechnic University.*

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“I knew it was over when I downloaded Skype. When the inventors of KaZaA are distributing for free a little program that you can use to talk to anybody else, and the quality is fantastic, and it’s free – it’s over. The world will change now inevitably.”

-- Michael Powel, Chairman, FCC, Fortune Magazine, February 16, 2004.

Introduction

It was March 10th 1876 when Alexander Graham Bell made the first telephone call to his assistant Thomas Watson¹, his exact words being:

“Mr. Watson - come here - I want to see you.”

Today, we take basic telephony for granted, and it is priced like water or electricity. In the midst of the war for market share in a nearly mature telephony market, a tiny company located in Luxemburg began the process of revolutionizing the traditional view of what Alexander Graham Bell began two centuries ago. The name of the company was Skype, and by 2004 the industry was abuzz with what could potentially disrupt its collective long-held business model. Skype had successfully fused peer-to-peer computing (P2P) and voice-over-Internet-protocol (VoIP) to create a new standard for telecommunications.

One year earlier, on August 29th 2003, Niklas Zennström and Janus Friis had released the Beta/test version of Skype, touted as “the free Internet telephone that just works.”²

Industry Background

Over the past decade, the telecommunications industry had witnessed rapid changes in the way people and organizations communicate. Many of these changes sprang from the explosive growth of the Internet and from IP based applications. The Internet became a ubiquitous means of communication, and the total amount of packet-based network traffic had quickly surpassed traditional voice network traffic. In the wake of these technology advancements, it became clear to entrepreneurs that voice traffic and services would be one of the next major applications to take full advantage of IP. This expectation was based on the impact of a new set of technologies generally referred to as Voice over IP (VoIP) and IP telephony. VoIP had the potential of creating many unique

¹ America’s Story from America’s library, “Jump back in time – Reconstruction (1866-1877),” The library of Congress presents – America’s Library, <http://www.americaslibrary.gov/cgi-bin/page.cgi/jb/recon/telephone_1>, accessed 9/27/04.

² Skype Company, “Company,” Skype Company Web site, <<http://www.skype.com/company>>, accessed 9/27/04.

capabilities for carriers and customers who depended on IP or other packet-based networks.

The origins of VoIP and its development were closely related to the history of both the Internet and telecom markets, which were influenced not only by technological advancements, but also by changes in government regulations (see *Exhibit 1* for important historical events in the telecommunications industry). Despite the fact that Vocaltec³ introduced the first commercial Internet phone software as far back as 1995, substantial interest in the business applications of this technology had taken several years to surface. Revenues for VoIP services had been less than 1 percent of the worldwide voice market⁴, but the growth forecasts, on the other hand, were more optimistic. According to The Yankee Group⁵, the number of U.S. VoIP subscribers would grow from 1 million in 2004 to 17.5 million households by the end of 2008. In addition, ABI Research's director of broadband research, Vamsi Sistla⁶, characterized VoIP as not being a "garage application" anymore, but the thin end of a wedge that would eventually include such features as videoconferencing and ubiquitous information sharing. In another report by Yankee Group⁷, analysts predicted a sharp shift in the US local VoIP market. Alternative VoIP providers such as Vonage would see their market share drop from around 41 percent of the U.S. residential market share, to 19 percent by year-end 2005. On the other hand, cable MSOs, RBOCs, and IXCs⁸ were expected to take the lead and capitalize on the market's momentum (see *Exhibit 2* for the offerings of several major VoIP providers).

IP Telephony Explained

VoIP was developed as an Internet Protocol (IP) based application in order to provide convenient communication between people using a variety of device types. Gartner Research Group formulated three definitions concerning the new trends in the voice industry utilizing IP networks⁹. VoIP referred to the delivery of voice communications over an IP network, specifically the traffic management mechanism but not necessarily the layered applications or services. IP telephony was described as the basic voice communication services delivered using IP network, and enabling asynchronous and real-time voice communications. In the user environment, examples of IP telephony would include dial tone, voice messaging, call management, caller ID and other functions considered common or traditional telephony features. Examples in the

³ Jennifer Williston and Rose Cordero, "Voice over Internet Protocol," UNC School of Law, 2004, <<http://www.unc.edu/courses/2004spring/law/357c/001/projects/jennwill/VOIP/facts.html>>, accessed 9/27/04.

⁴ Jay E Pultz and Eric Paulak, *Voice over IP Services are Here*, Gartner Inc., September 23, 2004.

⁵ "Yankee Says VOIP to grow 100x," Light Reading, August 30, 2004, <http://www.lightreading.com/document.asp?doc_id=58449>, accessed 9/24/04.

⁶ David Halperin, *Voice over IP has left the Garage, says ABI Research*, ABI Research, September 13, 2004.

⁷ Craig Matsumoto, "Report: VOIP Growth Won't Benefit All," Light Reading, August 30, 2004, <http://www.lightreading.com/document.asp?doc_id=58466&site=lightreading>, accessed 9/24/04.

⁸ MSO - Multi-Service Operator; IXC - Interchange Carrier; RBOC - Regional Bell Operating Company.

⁹ Voice over IP services are here.

carrier domain would include feature management and billing/performance measurement. The third category referred to the integrated voice applications (advanced communication applications) that would be delivered to users over an IP network, that would be impossible, or prohibitively expensive, to be implemented in a traditional telecommunications environment (TDM¹⁰ environment). Examples of these applications would include presence-awareness phone features, find-me-follow-me services integrated with collaboration tools such as calendar/scheduling programs, screen-pop provisioning beyond the call center environment, and similar applications.

Skype: Leading the VoIP Revolution

“The idea of charging for calls belongs to the last century. Skype software gives people new power to affordably stay in touch with their friends and family by taking advantage of their technologies and connectivity investments.”¹¹

--Niklas Zennström, CEO & Co-founder of Skype.

Niklas Zennström and Janus Friis (see ***Exhibit 3***) founded Skype Group, a Global Internet Telephony Company with headquarters in Luxemburg and offices in London, Tallinn, Stockholm, and Copenhagen. They had a rather revolutionary idea and decided to change the telecommunications world by offering consumers free, unlimited, superior quality of worldwide calling via next generation peer-to-peer (P2P) software¹². On August 29th 2004, the corporation marked its first anniversary with impressive growth numbers. The VoIP software was downloaded more than 20 million times, and during its first year of introduction, Skype had more than 9 million registered users.

Skype entered the market in time when the VoIP was gaining in momentum (see ***Exhibit 4*** for a company timeline). The founders of Skype had also created KaZaA¹³, the popular file-sharing Internet software that had established itself mainly as a vehicle for downloading music¹⁴. Many of Skype’s architectural features were designed similar to those offered by KaZaA. A P2P design allowed Skype an extremely low cost of maintainance and easy registration of new users. Despite doubts expressed by the big telcos, the scalability offered by employing P2P architecture had been referred to as a key feature in Skype’s competitive position in the VOIP market¹⁵.

Zennström and Friis had a specific approach in recruiting programmers and company staff. They looked to the well-trained Estonian computer workforce for programming talent, and attracted candidates by running popular ads such as the one in

¹⁰ TDM – Time Division Multiplex

¹¹ Skype Company.

¹² Ibid.

¹³ Rakesh Kumar, Keith W. Ross and Jian Ling, “Understanding KaZaA,” Polytechnic University, 2004.

¹⁴ CNet, “Most Downloads,” Download.com Web Site, <<http://www.download.com>>, accessed January 25, 2004.

¹⁵ Skype Company.

Tallinn's Eesti Paevaleht newspaper¹⁶: “*Supermodels not needed! We want your brain!*” In addition, there was a tremendous interest among investors after observing Skype's early success. Tim Draper, managing director of VC (venture capitalist) firm Draper Fisher Juvertson likened the startup to one of his biggest successes, Hotmail:

*“I like the idea of being able to reach millions and millions through viral technology of any kind. I think Niklas is an extraordinary guy. He has been through so much with his first deal and taken on an extraordinarily powerful industry, and he's going to do it again. This is going to be the next great company.”*¹⁷

Overview of P2P: The Key Enabling Technology

The founders of Skype were bullish on the possibilities of peer-to-peer (P2P) technology and believed it could put them on the global map. The P2P medium provided an unprecedented number of ways to obtain information, acquire services, and vastly improve collaboration. Using a specially designed P2P network, Skype was able to provide its users high voice quality while adding new users and expanding the network at almost no cost.

Peer-to-peer was formally defined as the action of mutually exchanging information and services directly between the producer and the consumer to achieve purposeful results¹⁸. A more precise understanding for the technology was provided by the P2P Research Group, IETF/IRTF¹⁹:

“Peer-to-Peer (P2P) is a way of structuring distributed applications such that the individual nodes have symmetric roles. Rather than being divided into clients and servers each with distinct roles, in P2P applications a node may act as both a client and a server.”

P2P could be viewed as a decentralized paradigm of networking with distributed usage of resources, such as bandwidth, memory, processing and computing power. No particular clients and servers were present as in the traditional way of networking, but all nodes could act both as clients and servers at the same time (see **Exhibit 5** for comparison between P2P and the traditional client/server networking along with the paradigm shift of the computing system models). P2P systems could be designed using various topologies, starting from centralized P2P systems like Napster, decentralized systems like Gnutella,

¹⁶ Daniel Roth, “Skype: Catch Us If you Can”, Fortune, January 26, 2004.

¹⁷ Daniel Roth.

¹⁸ Dana Moore and John Hebler, *Peer-to-Peer: Building Secure, Scalable and Manageable Networks* (Osborne: McGraw-Hill, 2002), p. 4.

¹⁹ IETF/IRTF, Excerpt from the Chapter of P2P Research Group, <<http://www.irtf.org/charters/p2prg.html>>, accessed 6/24/03.

hybrid like Fast Track/KaZaA, and structured P2P systems like Chord²⁰ (see *Exhibit 6*). Several interesting applications based on P2P technology had been launched with varying degrees of success (see *Table 1*):

Application Type	Examples
P2P file swapping (sharing)	Napster, FreeNet, Gnutella, KaZaA, eDonkey, Morpheus, Grokster, EZPeer, Kuro
P2P communication	NetNews (NNTP), Instant Messaging (IM), Skype
P2P lookup services and applications	IRIS, Chord/CFS, Tapestry/OceanStore, Pastry/PAST, CAN, HP2P
P2P overlay networking	BGP, RON, PDF, Detour, LRR
P2P multimedia streaming	CoopNet, Zigzag, Narada, P2Cast, Streamlla
Proxies and Content Distribution Networks	Squid, Akamai, DigitIsland
Overlay Testbed	PlanetLab, NetBed/EmuLab
Distributed data processing and science content sharing	Quarknet, SDSS, Neptune, SETI, Folding, Fightaids
P2P gaming	Ongoing projects

Table 1: P2P Application Types and Examples²¹

How does Skype work?

The founders of Skype had introduced a P2P based VOIP software that would provide audio quality equivalent to conventional phone lines. This P2P technology could take various forms that differed in their functionality and feature offerings, such as instant messaging and communication tools, file sharing utilities, and distributed computing. In the case of Skype, all these features were integrated in an attempt to provide impeccable quality of the voice service, along with various possibilities of value-added packages at the lowest cost possible. According to Skype, a true P2P system would have all network nodes joined together dynamically to participate in traffic routing, processing and

²⁰ Chun-Hsin Wu, "Differentiated Admission for Peer-to-Peer Systems," Academia Sinica – Taiwan, April 20, 2004.

²¹ Source: Chun-Hsin Wu, "Differentiated Admission for Peer-to-Peer Systems," Academia Sinica – Taiwan, April 20, 2004; Ivyes Poppe, "The Peer 2 Peer Internet," PowerPoint Presentation, May 13, 2004. Network & Interop, Las Vegas, NV.

bandwidth intensive tasks that would otherwise be handled by central servers²². Skype thus successfully leveraged all available resources in the network and had no infrastructure implementation and maintenance costs.

In order to deliver “state-of-the-art” IP-based telephony, Skype employed several techniques²³:

- Firewall and NAT (Network Address Translation) traversal – a technique that enabled Skype to bypass firewalls and communicate with NAT’ed nodes using the non-firewall clients and clients on publicly routable IP addresses. No end-user configuration of gateways and firewalls is required, thus avoiding one of the major issues with the existing VoIP service providers.
- Global decentralized user directory – in order to deliver high quality telephony with the lowest possible cost, a third generation of P2P technology (3G P2P), or Global Index (GI) was necessary development and represented yet another paradigm shift in the notion of scalable networks. The GI technology represented multi-tiered network where all super nodes communicate in such a way that every node in the network has full knowledge of all available users and resources with minimal latency.
- Intelligent routing – Skype used the most effective paths possible to intelligently route encrypted calls. It kept multiple connection paths open and dynamically chose the one that is best suited at the time. This increased the call quality throughput by reducing the latency.
- Security – Skype employed special encryption technology (256 bit AES) to protect all calls and instant messages for unrivaled privacy.
- Super-simple UI – Skype designed very simple to use interface, requiring no special technical skill-set, to enable massive adoption among various consumer segments.

Skype initially offered only PC-to-PC calling, combining the features of both IM (Instant Messaging) and VoIP. The SkypeOut service, enabling connectivity to the POTS²⁴ (traditional telephony network), was added later on. The hardware requirements to use Skype were 400-MHz CPU, 128 MB of RAM and 10 MB of hard drive space, microphone, sound card, and speakers/headphones. In addition, a broadband Internet connection was required to ensure superior quality (see *Exhibit 7* for Skype UI details).

²² Skype Company, “Skype Explained.”

²³ Skype Company.

²⁴ POTS – Plain Old Telephone Network

Business Description

The telephony market represented a true challenge for the founders of Skype. It was still being continually impacted by technological progress and Skype did not have time to wait for the “politically correct” moment.

“What I learned when working with Tele2 is that sometimes when you come in with a business plan, it’s like, ‘Why are you wasting your time writing that? Just go and do it...there is multibillion dollars in potential for Skype. We’re not here to try to make some small business.’”²⁵

-- Niklas Zennström.

According to Yves Poppe, director of IP Strategy for Teleglobe, the telecom industry was just coming out of a recession, and there was an industry wide famine for renewed revenue growth²⁶. There was a growing consensus that the next multibillion-dollar opportunities lay in network convergence, multifunctional end-devices, always on, always P2P-reachable, mobile and secure end-to-end infrastructure and applications. Skype’s business model contradicted the traditional telephone company paradigm. It was based on the notion of free telephony for its customers while providing high quality voice services. The revenue plans were not built on pricing for the basic service, but rather on its premium features and unique product offering.

VCS (venture capitalists) provided Skype with \$18.8 million to fund the company’s transition to the next phase. Focusing on a global product and service strategy and providing technology that worked without any infrastructure while delivering overwhelming scalability, is what made Skype attractive target for numerous investors. Among the key investors were Draper Fisher Jurvetson, ePlanet, Index Ventures, Bessemer Venture Partners and Mangrove Capital Partners²⁷.

Market life-cycle and demand projections

The market for the product Skype had to offer was large. Telephony was still a very profitable business and Skype had the quality attributes to overcome the typical VoIP drawbacks in order to compete on the open market. The service demand was driven by the consumer need for low-cost, integrated, highly personalized and simple to use telephony product. Skype provided a feasible alternative to the traditional telecommunications paradigm, by setting the market standards for the next generation of IP telephony²⁸. The demand consistency over the years was confirmed with the latest Yankee Group report²⁹, emphasizing substantial market growth in the next 3 years. At the same time, the noticeable

²⁵ Daniel Roth.

²⁶ Yves Poppe, “The Peer 2 Peer Internet,” PowerPoint Presentation, May 13, 2004. Network & Interop, Las Vegas, NV.

²⁷ Skype Company.

²⁸ Daniel Roth.

²⁹ Light Reading, “Yankee Says VOIP to grow 100x.”

involvement of many cable MSOs and traditional telephone carriers made a clear indication of a shift in the VoIP market's life-cycle. The introduction period was well gone, and IP telephony was growing fast. The people started to recognize the product category, the awareness among the businesses was elevated, and the technology providers clearly labeled VoIP as highly profitable segment of their offerings.

Product differentiation, market positioning, promotion and distribution channels

According to a study by Research and Markets³⁰, the VoIP industry could be segmented into three main categories. The first category was represented by the technology providers, offering solutions for wholesale carriers and enterprises, supplying endpoints (IP-phones and softphones), communication servers, application servers, switches, routers, signaling points and gateways. This segment included companies such as 3Com, Cisco, Lucent, Siemens, Nortel Networks, and many others. The service providers like Net2Phone, 8x8, Dialpad, Iscom, Vonage, TalkingNets, Skype, ICQ and others, formed the second segment. The offerings of this segment included PC-to-PC, PC-to-Phone, hosted flat-free, calling cards and number portability services for both enterprises and consumer customers. Wholesale Carriers represented the third segment. The companies in this segment, such as iBasis, ITXC, Genuity and others, offered network services to service providers.

"We have a very different offering, a software application that uses the Internet as a carrier for the voice. The impact is that you can not charge for phone calls the same way, just as you can't charge for an e-mail or visiting a web page."³¹

--Niklas Zennström.

Skype's tried to differentiate its offering immediately. The free software that could be downloaded from Skype's website www.skype.com, along with the superb voice quality of the service, made Skype clearly different from the rest of the IP telephony providers. In addition, the KaZaA legacy of its founders played pivotal role in the early days of product adoption. A solid market positioning for Skype required interoperability with the popular industry standards such as Microsoft's Windows OS and Linux OS. In addition, understanding the ever-increasing proliferation of Wi-Fi enabled devices, Skype developed a Pocket PC version of its software.

It was very important for Niklas Zennström to establish Skype as a second alternative on the telephony market. He tried to emphasize Skype's correspondence with the analogy of the introduction of the e-mail and the fax technology³²:

"The fax did not kill the postal service, and the email did not kill the fax. This new technology is just adding on to communication."

³⁰ Research and Markets, *Voice over IP Market Trends, 2002-2006*, 2003.

³¹ IDG News Service, "Skype's Net calling service reaches beyond the PC," IT World.com, August 27, 2004, <<http://www.itworld.com/Net/3303/040727skype/pfindex.html>>, accessed 9/24/04.

³² Daniel Roth.

The same way the e-mail did not replace the traditional fax service, Skype (or IP telephony in that context) would not replace the traditional PSTN (Public Switched Telephone Network). This did not mean that Skype wasn't going to try to come as close as possible to the PSTN. Introducing the SkypeOut service, the company attempted to integrate its VoIP offering with the old PSTN by extending its services and allowing connection to users not having Skype. Being a global company, Skype offered its product for distribution in fifteen languages allowing immediate penetration to over 165 countries. In addition, Skype partnered with Plantronics and Siemens AG, This strategic partnership had a long-term task of enabling seamless transition from the traditional services to their VoIP product (see *Exhibit 8* for product offering by Skype's partners). Plantronics was a proven headset manufacturer, particularly popular with the Internet customer base, while Siemens AG produced high quality telephone equipment and computer hardware. Targeting the market niche, Skype's position in the IP telephony was based on innovation and personalization of the services.

*"Voice is just the beginning. Once you are in the IP environment you bring in video and data, it's all about who can create the best application ... it's about interactive media."*³³

--John Arnold, VoIP program leader for Frost & Sullivan Inc.

The advertising and promotion strategy of Skype was simple and effective. It used strong "word-of-mouth" networks to build critical mass of users. It was a perfect example of viral promotion. Once a user had the software, he/she wanted their friends to have it as well. Consequently, in just one week of availability, 60,000 people downloaded the free Skype software.

*"Just as in the 'real world', the least costly customer is the one who was referred by a satisfied customer. When the referral is so easy that customers do not even realize they have made the referral, it is called viral."*³⁴

--Roiweb.com.

The most essential advantages of the P2P business model for Skype reflected the immense scalability options, easy and effective marketing, and less expansive retailing and distribution. The fact that there was no special infrastructure to support the promotion, customer recruiting process, and the distribution channels, gave Skype a strong competitive advantage over the rest of the VoIP service providers.

Market segmentation and targeting

Skype was developed to be globally present on the telephony market. The company designed its offering to appeal to the mass customer base, and according to David P.Reed³⁵,

³³ IDG News Service.

³⁴ Rapport Online Inc., "Managing Cost per Customer Acquisition Online Explained," Roi-Web Web Site, <http://www.roi-web.com/cost_per_customer_acquisition.asp>, accessed 6/26/04.

its business model could be classified as Group Forming Networks (GFNs). GFNs had an important network capability that directly supported affiliations among subsets of its customers. The number of groups that could be formed in these networks could grow exponentially according to the formula 2^N , where N was the number of group members. The reason behind this phenomenon was the true nature of P2P software. It created a network through which all users joined together dynamically to help each other route traffic and store information. The power of the network grew proportionally with the number of users.

Considering the fact that Skype had no premium (fee-based) services to offer at its inception, there was no well-defined market segmentation at that time. Initially, the users were generally seen as part of a niche demographic defined by both willingness to embrace disruptive technologies and an interest in being part of an identifiable community. In addition, the PC and broadband Internet connection requirements clearly targeted customers who were spending substantial amount of time on their PCs, both home and at work. Generally, these people were used to the popular IMs (Instant Messaging), had the necessary resources, and were willing to experience a new approach in IP-telephony.

“The majority of our users just want to make free phone calls to their Skype friends and family. Their core contacts use the service and SkypeOut is just a value-added offering for calling other people (outside the Skype network).”³⁶

--Niklas Zennström.

Reaching the critical mass of users, Skype would be able to segment its market more directly, aiming at particular groups that need special services, and businesses that would be ready to adopt IP telephony as provided by the Skype.

Competitive landscape

By entering the IP telephony market, Skype got the attention of both the alternative VoIP providers, such as Vonage, Net2Phone, 8x8, DialPad, FreeWorld Dialup and others, and the traditional voice carriers such as AT&T, Verizon, Qwest etc. Despite the clear service differentiation of Skype, the “fight” on both market fronts was inevitable.

“They’re basically kicking the nail of the smallest toe of a giant. And they’ve done that with, what? One press release.”³⁷

--Morten Lund, an early investor in Skype and the CEO of Bullguard.com.

The competitive landscape in the IP-telephony market had two major segments. The first segment was formed by the alternative VoIP service providers, and was further

³⁵ David P. Reed, “That Sneaky Exponential-Beyond Metcalfe’s Law to the Power of Community Building,” Reed.com Web Site, 1999, <<http://www.reed.com/Papers/GFN/reedslaw.html>>, accessed 7/1/04.

³⁶ IDG News Service.

³⁷ Daniel Roth.

partitioned between the companies providing telephony as a primary service and companies that used the telephony as a secondary, value added feature to their offerings. The second segment represented the traditional voice carriers and MSOs.

The battle with the alternative VoIP providers was considered an easy one by the founders of Skype. In this segment, companies like Vonage³⁸ (41 percent US market share in 2004) that had well-established pricing model, suffered from very high infrastructure costs, thus clearly giving Skype an upper hand in the market. To add a new user, Vonage had to spend almost \$400 (compared to no cost for Skype). In addition, the pricing model, as opposed to the free basic service, was major disadvantage in obtaining a critical mass of users. On the other hand, Vonage used telephone adapters and provided regular PSTN connection, while Skype was based on the PC platform and its users were not available outside Skype's network.

The second representative of the first segment, the popular IM providers (Yahoo, AOL, ICQ, MSN, Netscape and others), had an immense shortcoming in the poor quality of the voice service. Their infrastructure and technology was not designed to support high-quality voice communications since telephony was their secondary service. As with the alternative VoIP providers using telephony as a primary service, the IM providers' centralized infrastructure represented additional drawback considering their customer expansion.

An important player on the VoIP market was the SIPphone. Considering the popularity of the Session Initiation Protocol (SIP) and its standardized deployment, the SIPphone was a stand-alone appliance easy to use and configure. Thus, it represented direct competition to Skype. A major disadvantage was the limited interoperability with non-SIP devices and the traditional PSTN. In the corporate domain, Avaya was the global leader in communication systems, applications and services. Avaya's market share was substantial and based on the reliability, security, customer relationship, and the effectiveness of their offering³⁹.

Even though Skype declared itself as a second phone alternative to the traditional PSTN it was more than mere competition for the traditional telephony providers.

*"In the big picture this is very threatening (to traditional telecom providers) because it works. They've demonstrated that they can make end-to-end phone calls and cut the phone companies out of the equation."*⁴⁰

--Jon Arnold, VoIP program leader for Frost & Sullivan Inc.

As expected, the big Telcos, who represented the second major segment of the competition were not speechless.

³⁸ Vonage Holdings Corporation, "Vonage," Vonage Holdings Web Site, <<http://www.vonage.com>>, accessed 9/24/04.

³⁹ Avaya Company, "Avaya," Avaya Company Web Site, <<http://avaya.com>>, accessed 10/01/04.

⁴⁰ IDG News Service.

“What Skype is doing is like a toy. They will realize they can’t scale it, they don’t have a brand like the AT&T brand, and they don’t have the local footprint, which we have. It’s going to be very hard to compete with someone like AT&T.”⁴¹

--Hossein Eslambolchi, AT&T’s CTO and president of AT&T labs.

Offering the AT&T Call Vantage plan⁴², the big voice carrier entered the IP telephony battle. So did Verizon with its VoiceWing⁴³, Qwest, Cox, Cablevision, and Time Warner Cable⁴⁴. The competition became fierce and, differentiation with low-cost service was the main tool for attaining competitive advantage. In addition, the traditional telephony carriers were still considering the PSTN as a major business opportunity (their main form of revenue), thus relentlessly trying to keep it “live” as long as possible.

Revenue Models

The long-term goal of Skype was to provide fee-based services on the top of its basic plan⁴⁵.

“We’re making money right now by selling value-added services like SkypeOut, which brings in revenue. We don’t need to make as much money per user as the traditional phone companies because our marginal costs are so low. We’re also working on new paid-for features to offer users. But let me stress that Skype to Skype calls and all the features that you see today – except for SkypeOut – will remain free.”⁴⁶

--Niklas Zennström.

The premium services offered to specific customer groups were designed as major form of revenue for the company. Constantly adding value for their users, Skype was planning to build high customer loyalty at the same time while it was building the critical mass needed to support the company’s growth. SkypePlus, the premium service offered by Skype, was supposed to include Voicemail, mapping of DID (Direct-Inbound-Dialing), ad banner, and other value added services. Considering the large customer base, Skype planned to include special third-party advertisements and e-commerce features to increase the revenue possibilities⁴⁷.

⁴¹ Daniel Roth.

⁴² AT&T Company, “CallVantage,” AT&T Company Web Site, <<http://www.usa.att.com/calvantage/plans/index.jsp>>, accessed 9/25/04.

⁴³ Verizon Company, “VoiceWing,” Verizon Company Web Site, <<http://www22.verizon.com/ForYourHome/VOIP/VOIPHome.aspx>>, accessed 9/25/04.

⁴⁴ Voice over Internet Protocol.

⁴⁵ Skype Company.

⁴⁶ J.D. Lasica, “The Engadget Interview: Niklas Zennström,” Engadget, November, 2004, <<http://www.engadget.com/entry/2635319328796286/>>, accessed November 28, 2004.

⁴⁷ IDG News Service.

According to Skype, SkypeOut and possibly SkypeIn were developed to complete the service offering and add value to the existing customers, it was very clear that SkypeOut, a connection to the regular PSTN, could serve as a viable revenue generator⁴⁸. It provided low-cost international calls and as such it became very popular among the users (see *Exhibit 9* for international rates of the SkypeOut service).

Another form of revenue for Skype surfaced from its partnership with Plantronics and Siemens AG. Skype opened an online “Skype Store” offering desktop and wireless Plantronics headset that is compatible with the Skype software. It also offered the Siemens Internet telephone, the Gigaset M34 USB PC Adapter as part of their product palette (see *Exhibit 8* for product description and pricing).

A possible revenue model for Skype could leverage the licensing of Skype API to third-party developers and carriers⁴⁹. This model could substantially increase Skype’s presence in the telephony market and promote the company into a key player on the market.

"We are opening up the platform so others can develop for it. If you're making CRM or PIM software or a cordless phone, you can use the API and get the Skype functionality in your software or on your phone."⁵⁰

--Niklas Zennström.

Building corporate trust

According to a report by Gartner Research, Skype’s Internet phone service was characterized as not ideal for businesses⁵¹. Considering the large corporate market for IP telephony, Skype had to build its reputation and brand itself as a reliable partner for the business customers. It should have focused on its superb voice quality and its impenetrable encryption technique. Vonage and Avaya represented Skype’s major competition in this segment. They were well-established brands and enjoyed high customer trust in the business market.

"By offering organizations a cost-effective migration to IP telephony, Avaya has been successful in enabling its customers to obtain greater productivity and efficiency in an increasingly global and competitive marketplace. Avaya's success in enabling IP communications for customers of all industries and sizes continues to drive Avaya's

⁴⁸ Ibid.

⁴⁹ Jorge Solaris, Gloria Lowhar, Minfeng Lin and Abelardo Arias, “The Skype’s the Limit,” Case Study (New York: Polytechnic University, Department of Management, 2004).

⁵⁰ Sylvia Carr, “Skype lures developers with software giveaway – Put VoIP in your products,” Sillicon.com, November, 2004, <<http://networks.silicon.com/telecoms/0,39024659,39125741,00.htm>>, accessed November 28, 2004.

⁵¹ Ruud, Katja, *Skype’s Internet Phone Service Isn’t Ideal for Businesses*, Gartner Research, August 2, 2004.

*market leadership, as measured in our latest market share research for third quarter 2004.*⁵²

-- Jeremy Duke, president and CEO, Synergy Research Group.

Branding

The founders “roots” in KaZaA implicitly influenced Skype’s branding process⁵³. Similar to KaZaA, the adoption rate for Skype had been growing exponentially among Internet users. In addition, Skype was eager to promote itself as a reliable product with outstanding QoS. The process of establishment as a serious contender for the IP telephony market was completed with the impressive privacy features and encryption techniques. The creators of Skype envisioned a world where people would tell their friends “Skype me” instead of “call me”, and they thought this possibility was around the corner⁵⁴.

Strategic Partnerships

Planning for its future growth, Skype signed strategic partnerships with the hardware companies Plantronics and Siemens Mobile, the software company Global IP Sound, and the Internet service provider PChome Online. In order to enable their SkypeOut and SkypeIn services, which provided users with connection to the PSTN and vice-versa, they signed contracts with the phone carriers Colt Telecom Group, iBasis, Level 3 Communications and Teleglobe. In the long run, these partnerships were supposed to provide a phone equivalent on the market, and therefore, made Skype universally competitive in the Telecommunications industry.

VoIP regulation and legislative issues

The expansion of VoIP among the end users inevitably led toward initiatives for appropriate regulation of its services. Recently, Vonage was embroiled in a fight with the NY District Court to avoid telecom regulations by the states. Considering the complexity of this issue, it was highly important that Skype closely followed and participated in the process of shaping future legislations⁵⁵. The complexity could be expected to increase when Skype directly challenged the big carriers and operators. Therefore, it was important to wisely select the timing of its strategic choices and operational initiatives.

⁵² “Avaya Leads Global IP Telephony Market For Fourth Consecutive Quarter,” TMCnet.com, December, 2004, < <http://www.tmcnet.com/usubmit/2004/Dec/1098920.htm> >, accessed December 1, 2004.

⁵³ Skype Company.

⁵⁴ Ibid.

⁵⁵ Elaine Campbell, Barbara Blauth, Eugene Radomyslsky, Ali Shafiee and Derek Telford, “Skype,” Case Study (New York: Polytechnic University, Department of Management, 2004).

Innovation policies and future growth

In the short period of existence, Skype built itself a reputation of being a highly innovative company and brand. One of the reasons for this image was the fact that the technology behind Skype enabled it to exist and thrive practically cost free. Therefore, the company could focus a lot of energy and creativity was focused in improving the performance of the main product and its features.

“By having telephony as a Net application, we can develop new features faster... it takes a long time for traditional telephone companies to develop new switches.”⁵⁶

-- Niklas Zennström.

As one of its future services, Vonage was planning to offer video telephony, and Skype had to respond swiftly⁵⁷. Considering the creative potential behind the Skype engineering staff, innovative was a common attribute attached to this company.

As the founders of Skype considered the future, they had to grapple with several important questions:

1. How should they position their service vis-à-vis other competing VOIP services?
2. What should be their strategy in dealing with the big telco's?
3. Would partnering be an effective strategy? What were the different areas in which they could set up partnerships and which players should they target?
4. What new product and service improvements could they add so that Skype would generate significant revenues? Should such products and services be developed in-house, through collaborations, or outsourced?
5. What were the strengths and weaknesses of linking the Skype brand to Kazaa? What would be a good brand position for Skype with respect to the competition?
6. What were the key financial, regulatory and market challenges going forward?

⁵⁶ IDG News Service.

⁵⁷ IDG News Service.

Exhibit 1: Important facts and dates in the telecommunications and computer industry

1876, Alexander Graham Bell made the first telephone call;

1934, US Congress established the Federal Communications Committee (FCC);

1950, Edmund Berkeley created Simon, the first personal computer (PC);

1969, the first node of Arpanet was attached at the University of California Los Angeles (UCLA);

1972, Bolt Beranek and Ray Tomlinson invented the email. After a year, three quarters of ARPANET traffic was email;

1974, In a paper on Transmission Control Protocol, Vint Cerf and Bob Kahn mentioned the term Internet for the first time;

1982, Scott Fahlman kick-started the smiley-culture by suggesting using the :-) and :- (smileys to convey emotions in emails;

1983, The University of Wisconsin created Domain Name System (DNS);

1984, The Modified Final Judgment caused AT&T monopoly to break up into regional companies;

1988, The first Internet worm was unleashed by Robert Morris;

1990, Tim Berners proposed the formation of the world-wide-web (www);

1992, Internet society was chartered and WWW was released by CERN;

1994, “The Great Internet Explosion”, Pizza Hut offered pizza ordering on its Web page;

1994, Jerry and David's Guide to the World Wide Web was renamed to Yahoo!;

1995, Jeff Bezos launched Amazon.com;

1995, Hotmail was founded;

1995, eBay was launched to enable Internet users to trade with each other;

1995, Vocaltec introduced the first commercial Internet phone software;

1996, The US Congress passed the Telecommunications Act;

1996, The popular instant messaging software ICQ was released;

1996, Net2Phone was founded;

1998, Google was released;

1999, Shawn Fanning released the first version of Napster;

1999, RIAA filed the first suit against Napster;

1999, Dialpad Communications, a VoIP service provider was founded;

2000, Preliminary injunction to shut down Napster; partnership with the German media Bertelsmann AG;

2000, Nullsoft released Gnutella;

2001, Niklas Zennström and Janus Friis released KaZaA;

2001, US regulators approve the merger of AOL and Time Warner;

2001, Napster was ordered to shut down and stay offline until it could be free of illegal music;

2001, Vonage was founded;

2002, Sharman Networks bought KaZaA and immediately got sued by the RIAA and MPAA;

2003, KaZaA became the most downloaded software on download.com;

2003, Niklas Zennström and Janus Friis released the test version of Skype;

2004, P2P software ruled legal in the USA;

2004, One million simultaneous users on Skype.

Exhibit 2: Major U.S. VoIP service providers

Major VoIP Providers in the USA	
Cable Companies	
<u>Company</u>	<u>Offer</u>
Time Warner Cable	Digital Phone Service as low as \$39.99 a month plus tax
Cox Communications	Digital Telephone with variable monthly plans starting from \$15.00 for 250 min. of usage
Cablevision Systems	Optimum Voice for \$34.95 a month all inclusive
Telecommunication Companies – Voice Carriers (Telcos)	
AT&T	CallVantage for \$29.99 a month
Verizon	VoiceWing for \$34.95 a month
Qwest	OneFlex Hosted VoIP for \$39.99 a month
Pure Play VoIP Providers	
Net2Phone	VoiceLine Broadband Phone Unlimited from \$29.99 a month
Vonage	Unlimited Phone Service from \$24.99
BroadVoice	Unlimited Plans starting from \$19.95 a month
Broadvox Direct	Residential Unlimited from \$29.95 a month
Lingo	Home Unlimited for \$19.95 a month
Packet8	Unlimited Broadband Phone for \$19.95
IM (Instant Messaging) VoIP Providers and SIP Solutions	
Yahoo Messenger	Free voice communication among yahoo messenger users, PC-to-PC
Free World Dialup	Free pulver.Communicator for voice communication compatible with SIP phones
AIM	AIM Voice Conferencing starting at \$20.00 for 120 Call Units
ICQ	Free PC-to-PC and fee-based PC-to-Phone voice service
MSN Messenger	Free PC-to-PC voice communication
SIP Phone	Free SIP-to-SIP communication and low rate SIP-to-PSTN service offers

Exhibit 3: The founders of Skype



Niklas Zennström
CEO & Co-founder
Skype AG



Janus Friis
Co-founder
Skype AG

Niklas Zennström, a Swedish citizen of 38 has a dual degree in business and MSc Engineering Physics, computer science from Uppsala University in Sweden. He spent his final year at University of Michigan, Ann Arbor.

He started his professional career at Tele2, when there were only 23 employees. Now the company is the leading consumer oriented pan-European telecom operator present in 23 countries.

Niklas served in various business development roles including launching and being responsible for European Internet Service Provider business get2net and as CEO of the everyday.com portal.

Niklas later co-founded and served as CEO of KaZaA, the world's most downloaded Internet software to date with more than 370 millions downloads.

After that Niklas founded and served as CEO at Joltid, a software company developing and marketing peer-to-peer (p2p) solutions and p2p traffic optimization technologies to companies.

Niklas also co-founded Altnet, the world's first secure p2p network promoting commercial content to millions of consumers and integrating the full value chain of promotion, distribution, and payment of digital content, including being the world's largest issuer of DRM licenses.

Niklas' newest venture is Skype, the Global Internet Telephony company founded in 2003 based on peer-to-peer principles. When Niklas is not creating new cutting edge disruptive businesses, he enjoys sailing, skiing, outdoor activities and travelling. Niklas is happily married.

Janus Friis, a Danish citizen, 28 years old, is co-founder of Skype, the Global Internet Telephony company, founded with Niklas Zennström in 2003 based on peer-to-peer (p2p) principles.

Prior to Skype, Janus co-founded KaZaA, the world's most downloaded Internet software to date with more than 370 millions downloads.

Janus is also co-founder of Altnet, the worlds first secure p2p wholesale network promoting commercial content to millions of consumers and integrating the full value chain of promotion, distribution, and payment of digital content, including being the world's largest issuer of DRM licenses.

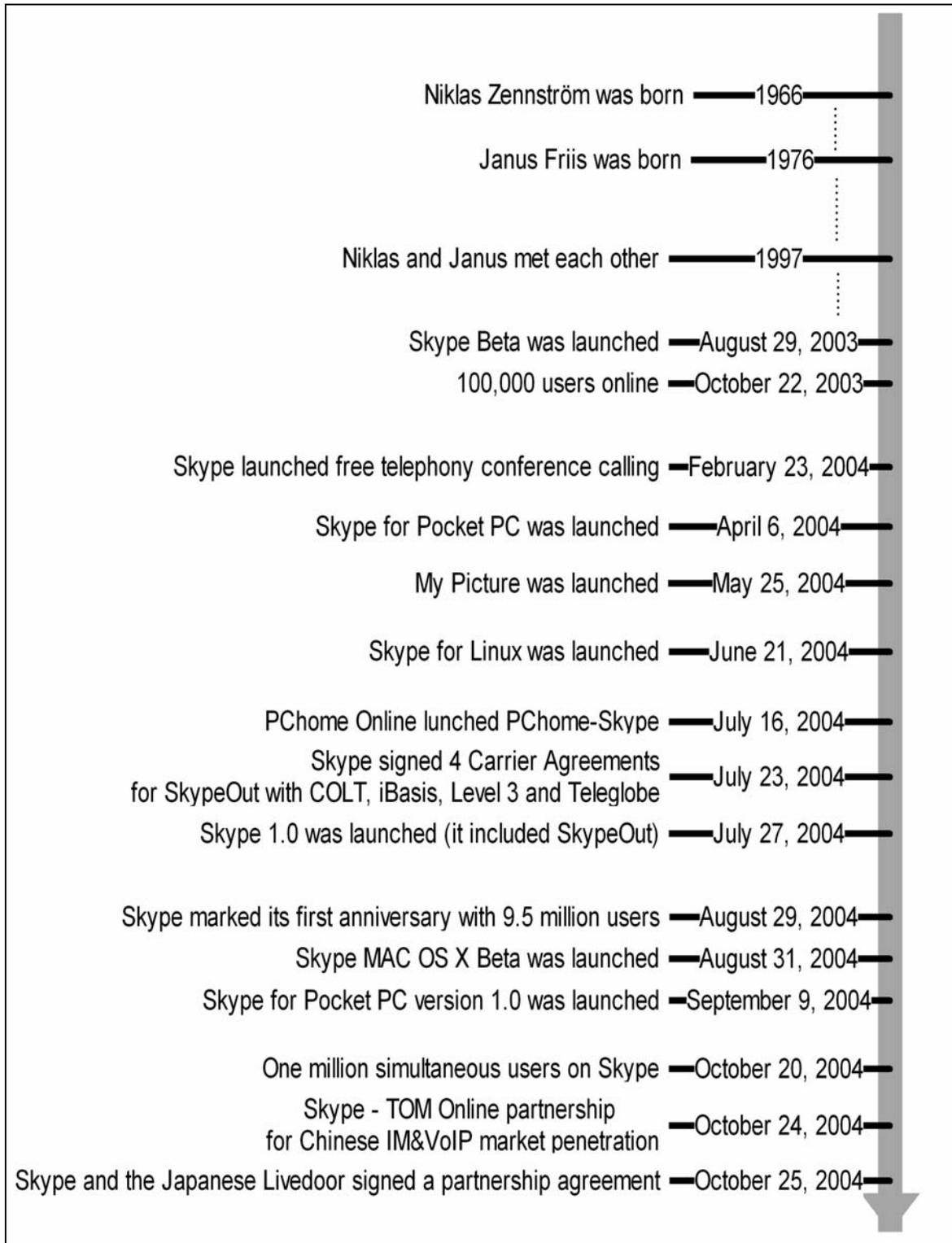
Janus is also a co-founder of Bullguard.com, a security software suite.

Before discovering his entrepreneurial streak, Janus began his career at the help desk of CyberCity, one of Denmark's first ISPs, worked for get2net, another Danish ISP and helped Niklas launch the portal everyday.com.

When Janus is not devising new concepts for state-of-the-art disruptive technology he enjoys skydiving, pool, martial arts and winter sea-bathing.

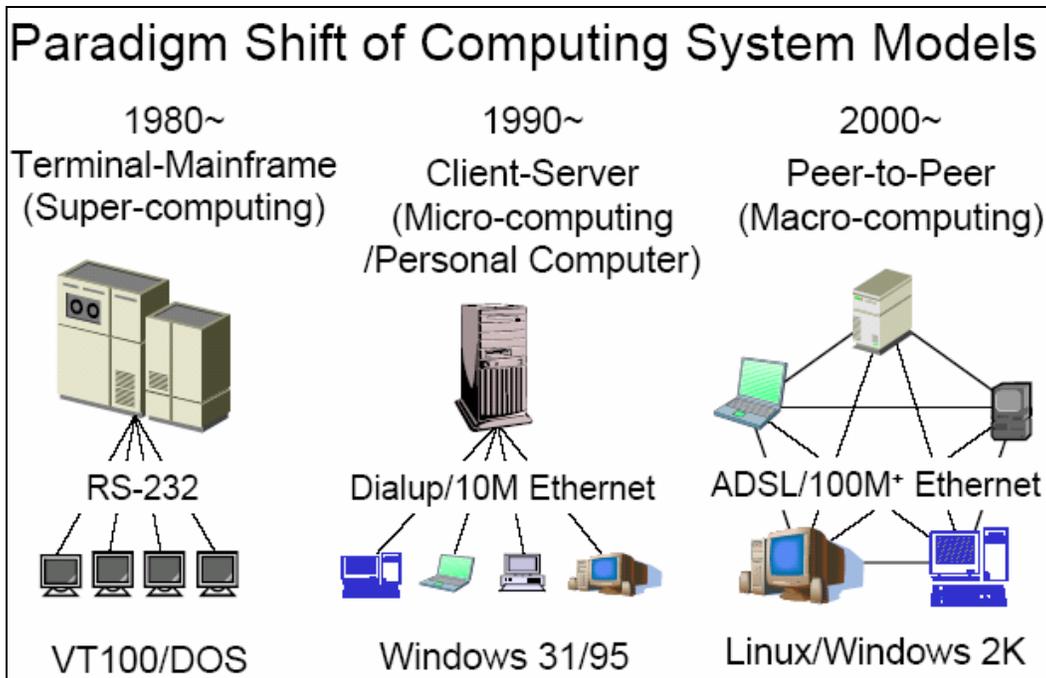
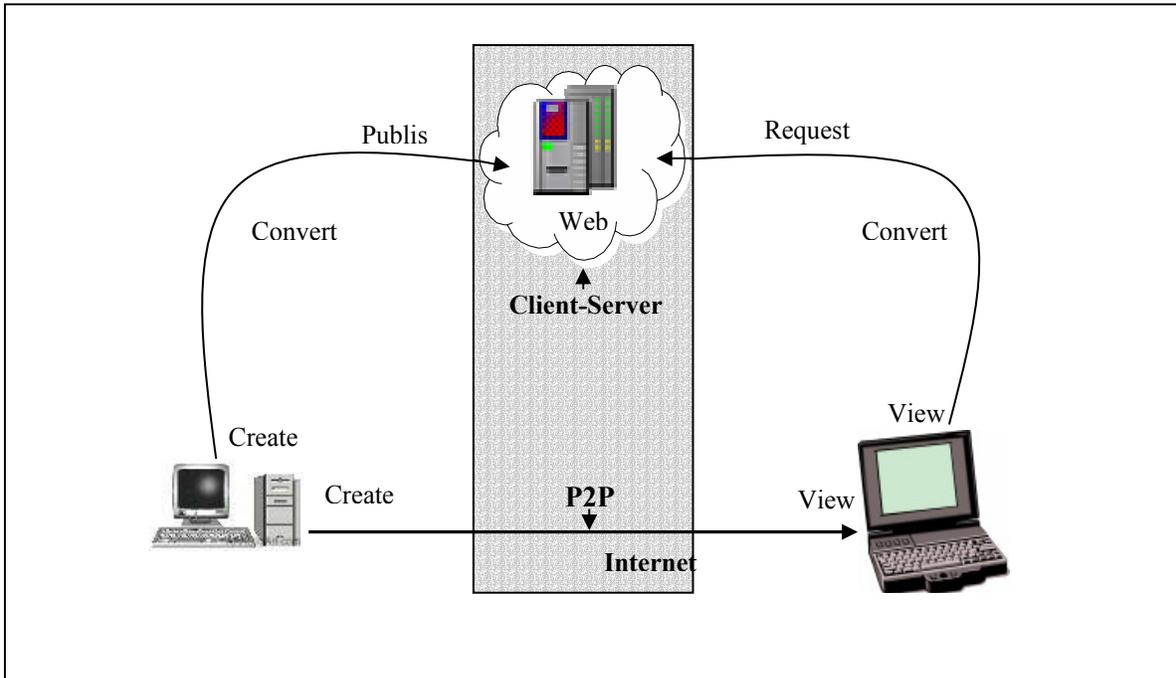
Source: Skype Company, "Company," Skype Company Web site, <<http://www.skype.com/company>>, accessed 9/27/04.

Exhibit 4: Skype Timeline



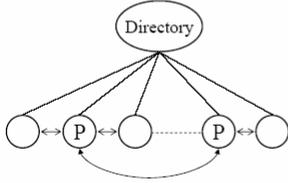
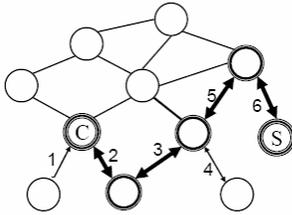
Source: Skype Company, "Company," Skype Company Web site, <<http://www.skype.com/company>>, accessed 10/27/04.

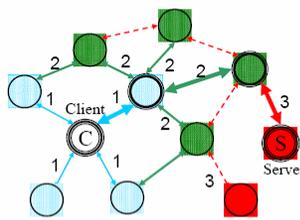
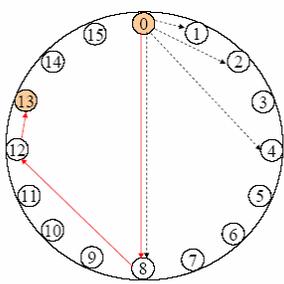
Exhibit 5: Contrasting a Web Site Exchange with P2P transfer



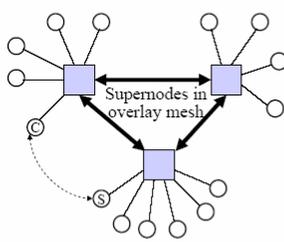
Source: Dana More and John Hebler, PEER-TO-PEER - Building Secure, Scalable, and Manageable Networks, 2002; Chun-Hsin Wu, "Differentiated Admission for P2P Systems," 2004.

Exhibit 6: Various P2P Topologies

<p style="text-align: center;">Example of Centralized P2P Systems: Napster</p>  <ul style="list-style-type: none"> • Announced in January 1999 by Shawn Fanning for sharing MP3 files and pulled plug in July 2001 • Centralized server for search, direct file transfer among peer nodes • Proprietary client-server protocol and client-client protocol • Relying on the user to choose a 'best' source • Disruptive, proof of concepts 	<p style="text-align: center;">Example of Decentralized P2P Systems: Freenet</p>  <ul style="list-style-type: none"> • Ian Clarke, Scotland, 2000 • Distributed depth-first search, Exhaustive search • File hash key, lexicographically closest match • <i>Store-and-forward</i> file transfer • Anonymity • Open source
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<p style="text-align: center;">Example of Decentralized P2P Systems: Gnutella</p>  <p style="text-align: center;">Servent (=Server + Client)</p> <ul style="list-style-type: none"> • Open source • 3/14/2000: Released by NullSoft/AOL, almost immediately withdrawn, and became open source • Message flooding: <i>serverless, decentralized</i> search by message broadcast, direct file transfer using HTTP • Limited-scope query 	<p style="text-align: center;">Example of Structured P2P Systems: Chord</p>  <ul style="list-style-type: none"> • Frans Kaashoek, et. al., MIT, 2001 • IRIS: Infrastructure for Resilient Internet Systems, 2003 • Distributed Hashing Table • Scalable lookup service • Hyper-cubic structure
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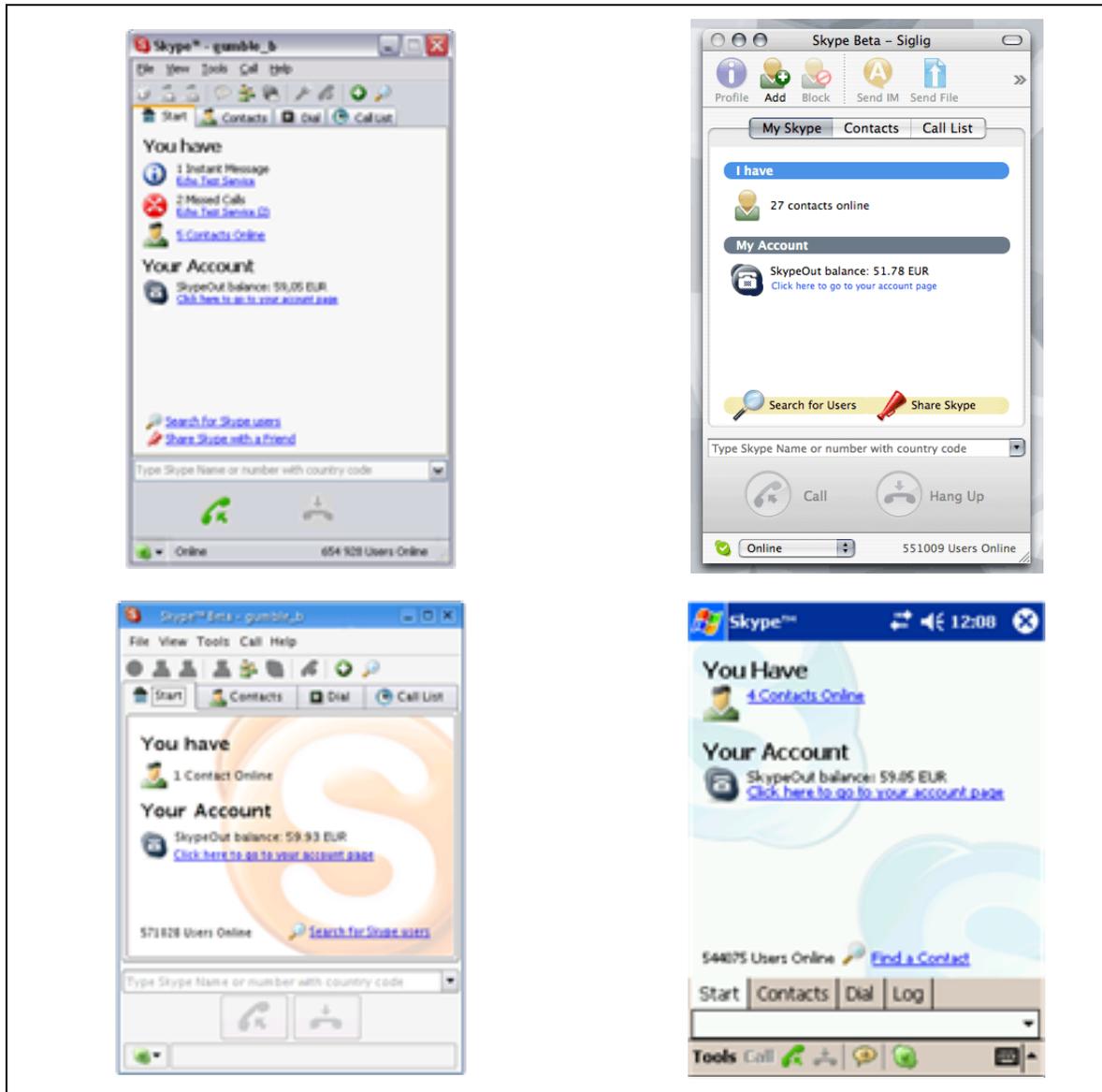
**Example of Hybrid P2P Systems:
FastTrack / KaZaA**



- Proprietary software developed by FastTrack in Amsterdam and licensed to many companies
- Summer 2001, Sharman networks, founded in Vanuatu, acquires FastTrack
- Hierarchical supernodes (Ultra-peers)
- Dedicated authentication server and supernode list server
- From user's perspective, it's like Google.
- Encrypted files and control data transported using HTTP
- Parallel download
- Automatically switch to new server

Source: Chun-Hsin Wu, "Differentiated Admission for P2P Systems," 2004.

Exhibit 7: Skype User Interface for Windows, Mac OS, Linux and Pocket PC



Source: Skype Company, "Company," Skype Company Web site, <<http://www.skype.com/company>>, accessed 10/27/04.

Exhibit 8: Product offering by Skype's partners



The **Gigaset M34 USB** is a small, easy-to-use USB adapter for computers. It offers you an incredible array of options. Calls on the Internet reduce your costs. Messenger services are equally possible. Thanks to the Internet alert function, you can see which of your friends are online and when. To enable the Internet telephone function, the Gigaset M34 USB comes with the respective software from Skype. Just connect the Gigaset M34 USB to your computer. It will pass the telephone signals from the Internet on to your Gigaset S440/445 or Gigaset C340/345. So you can make calls with your Gigaset S44 or Gigaset C34 handset instead of a headset and enjoy perfect quality of service.

Price: **99.00 EUR**



The Cyberphone K

Fully integrated with Skype technology and is available exclusively for Skype users. By doing this, your Cyberphone K will work hand in hand with your Skype program, bringing you a complete Internet telephony solution and better call management. This stylish USB handset incorporates a fully functional keypad that makes calling your Skype friends and colleagues even easier.

Price: **USD \$59.99 each Inc Del.**



Plantronics Headsets

Enhance your Skype audio experience with a headset from Plantronics. Choose from a range of PC soundcard or USB models with noise canceling microphones that deliver the audio quality you need whenever you Skype.

Source: Skype Company, "Company," Skype Company Web site, <<http://www.skype.com/company>>, accessed 10/27/04.

Exhibit 9: SkypeOut international rates

SkypeOut Global Rate: 1.7 Euro Cent per minute (approx. 2US cents). <u>Unified SkypeOut Global Rate for the following 22 countries:</u>		
Argentina (Buenos Aires, Cordoba)	France	Portugal
Australia	Germany	Russia (Moscow, St. Petersburg)
Austria	Ireland	Spain
Belgium	Italy	Sweden
Canada	Mexico (Mexico City, Monterrey)	United Kingdom
Canada (mobiles)	Netherlands	United States (except Alaska and Hawaii)
Chile	New Zealand	United States (mobiles)
Denmark	Norway	
Unless it is specifically mentioned, the SkypeOut Global Rate is only for calling regular landline telephones. Calls to mobile phones are more expensive.		

Other destinations	
Different destinations have different rates (not the previous global SkypeOut rate). The following is a list of sample rates to some popular destinations.	
Destination	Rate (in US \$)
Brazil	0.059
Bulgaria	0.099
Central Africa	0.213
China	0.029
Colombia	0.103
Dominican Republic	0.095
Estonia	0.031
Greece	0.036
India	0.202
Israel	0.035
Japan	0.025

Source: Skype Company, "Company," Skype Company Web site, <<http://www.skype.com/company>>, accessed 10/27/04.