

**UTAH'S DIGITAL ECONOMY AND THE FUTURE:  
PEER-TO-PEER AND OTHER EMERGING  
TECHNOLOGIES**

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**HEARING**  
BEFORE THE  
**COMMITTEE ON THE JUDICIARY**  
**UNITED STATES SENATE**  
ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

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OCTOBER 9, 2000  
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# UTAH'S DIGITAL ECONOMY AND THE FUTURE: PEER-TO-PEER AND OTHER EMERGING TECHNOLOGIES

MONDAY, OCTOBER 9, 2000

U.S. SENATE,  
COMMITTEE ON THE JUDICIARY,  
*Provo, UT.*

The committee met, pursuant to notice, at 9 a.m., in the Terrace Room, Ernest L. Wilkinson Center, Brigham Young University, Provo, UT, Hon. Orrin G. Hatch (chairman of the committee) presiding.

## OPENING STATEMENT OF HON. ORRIN G. HATCH, A U.S. SENATOR FROM THE STATE OF UTAH

Chairman HATCH. This hearing is convened here this morning to explore the vistas of rapid technological progress that is opening to us. I think it is appropriate to have a hearing at one of the most wired campuses in one of the most wired States in the Nation, where those who will help form the future can view and participate in the discussion. Now I welcome all of you and invite those here to find the papers available in the aisles to write questions we can consider asking our panelists as they make their presentations.

We will have to go through the questions and sit through them but we won't have time for them all, but it's a good opportunity for some of you to ask the questions that are bothering you about these areas.

Let me just mention how fitting a place Utah is to have a hearing on trends in technology. According to the Utah Information Technologies Association, Utah's information technology industry, which generated over 7.7 billion dollars in revenues, ranks in the top 10 centers of I.T. activity in the United States, and ranks in the top five centers of software in the United States.

Inc. Magazine ranked Salt Lake as the second best city in the Nation in which to start and grow a business, citing our wealth of brainpower and entrepreneurship. Newsweek magazine included Utah in the top 10 information technology centers in the world. Utah has been riding high on the wave of recent technological development, and we're very pleased and proud of that.

Over the past few years, the growth of the Internet, wireless and other forms of digital communication have been rapidly modifying the way we shop, talk, work, play, create, and interact with each other. We are riding a revolution that continues to advance at an increasing rate. According to such visionaries as Intel chairman

Andy Grove, we may be on the cusp of another major change with the development of technology called peer-to-peer or distributed networking.

The most famous example of peer-to-peer networking is Napster, whose creator is here with us today. He told me he's quite nervous. I said, "Do you get nervous anymore?" Of course at 19 years of age he says, "I get nervous," but we're real proud of him and proud of the efforts he's made and proud of the things he's been able to accomplish.

To quote Mr. Grove, who is a friend, "The whole Internet could be re-architected by Napster-like technology." Fortune magazine has called the technology embodied in Napster, "The Next Big Thing," for the Internet.

Peer-to-peer means that everyone's home computer becomes like a server, so that rather than many customers browsing through the content stored on large servers, individuals search for information or entertainment on each other's computers. This technology could reduce costs for individuals who want to be their own publisher. It allows for more up-to-date information to be more quickly searchable, and could make more efficient use of computing power. It could further connect us to each other.

It could make artists like Mr. Breinholt able to publish his own music less expensively, or connect with his fans more directly. It could help researchers or students and teachers trade information more directly, ensuring that all have access to the most up-to-date information.

It also rates as a number of policy issues. Napster itself has been one of a number of Internet music companies embroiled in controversy surrounding the contours of copyright law, something I take a great interest in, among other matters.

When individuals are searching each other's home computer files, serious questions of privacy and security are raised. Many of our witnesses have their own ideas about this new technology, and each brings a unique vision of where we are heading. We have some of Utah's high technology leaders with us today, including representatives of Novell, iLumin, Campus Pipeline, and, through the Utah Information Technology Association, many others.

Additionally, we have the creator of Napster, Shawn Fanning; and Peter Breinholt, an artist who represents all the creators whose works are being transmitted across the wired and wireless world.

These various perspectives and varied perspectives should enlighten us on where the technology being created by Utahns and others is taking us, and how Washington might be able to help, or how we might be able to keep Washington's hands off of ruining the various industries as well.

I see the role of policymakers as facilitators of positive change in this area. We need policies that foster innovation and creativity, and that the users of the technology can enjoy. In the field of entertainment, for example, artists can potentially connect more directly with their audience, using new digital delivery systems like the Internet. Music fans can more easily enjoy music on wireless devices, taking all of their music with them wherever they go, with-

out having to lug huge cases of CD's with them. That's terrifying to some in the music industry, by the way.

I view the stakeholders as the people on the two ends of the wires, as well as those stringing the wires. With creative thinking, there is substantial synergy to brighten the lives of all of us in the more interconnected future.

And as we discuss connecting the globe, I am proud to have this discussion. I'm glad to be here in a community that is home to me, in Utah and at BYU, where I was challenged and inspired to think about the future.

With that, let me welcome our witnesses to the dais.

Our first witness—we're going to do this in reverse order. Let me just introduce them from the left to the right; from my left to right.

One of our witnesses today will be Shawn Fanning. Shawn Fanning is the inventor of the Napster software application and founder of the Napster Internet music community. A native of Massachusetts, Mr. Fanning developed the original Napster application and service in January 1999, while a freshman at Northeastern University.

Napster is the fastest growing application in the history of the Internet. In early October 2000 the Napster community numbered over 32 million worldwide.

Shawn continues to be active in the development and growth of the Napster technology and business. And of course as you all know, he's probably been on more front pages of magazines than almost anybody in history except perhaps John F. Kennedy.

Now Shawn, we don't think you should run for office. We think you should keep doing what you're doing, although knowing a little bit about you, I'm not sure you shouldn't run for office too.

Our next witness, or one of the next witnesses, will be Mr. Peter Breinholt. Mr. Breinholt is a singer/songwriter who uses the Internet to distribute his music, as well as connect with his fans. In addition to selling CD's on his website, he also sells MP3 downloads and offers streaming samples of his music. Since forming the group "Big Parade" in 1993, Mr. Breinholt has enjoyed growing success in Utah and the Intermountain region, playing regularly to sold-out venues throughout the west.

We will hear from Richard Nelson, who is the president and chairman of the Utah Information Technologies Association. Mr. Nelson will speak about the growing Utah I.T. economy, and what he sees as the paramount public policy issues for Congress.

We will also hear from Robert Simmons, chief financial officer for Campus Pipeline, Inc. Before helping to found Campus Pipeline, Mr. Simmons helped produce the phenomenal growth of Iomega, another leading Utah technology company; and Oracle, one of the worlds leading high-tech companies.

We will hear from Craig H. Miller, vice president and general manager of Net Management Group; Novell, Inc. Mr. Miller will offer the perspective of one of Utah's leading software companies on the topic of how we and our computers will interact with each other in the coming years.

We will hear from D. Brent Israelsen, founder, president, and chief executive officer of iLumin. Prior to his current role as president of iLumin, Israelsen served as president of JurisSoft, a divi-

sion of Lexis/Nexis. Mr. Israelsen will offer his views on an issue of increasing interest to Utahns; that is, Internet security and privacy, and that's of great interest to us, because we have to make some determinations, probably in the next Congress, where we're going to go in that area, and it's a very complex, very hard fought-over area.

Finally, we'll probably hear first from Brad Pelo, chief executive officer of NextPage. Mr. Pelo previously served as chairman of Book Craft, a leading Utah publisher of books and e-texts, and founded the Folio Corporation. Mr. Pelo's business takes the peer-to-peer technology and uses it in a business-to-business environment.

Now, our time is short and I want to leave some time for questions, so I would like each of you to try to keep your testimony under 10 minutes, and if we can do that I'd be very appreciative. I'll notify you at 10 minutes, and I hope you'll wind up if you're still going on.

On the other hand, if we're going to get some really new innovations here today, I might let you go a minute or two longer.

But let's start with Mr. Pelo. We'll go from my right to left, and we'll start with you, Brad, and I'm looking forward to this area as much as anybody.

**PANEL CONSISTING OF BRAD PELO, CHIEF EXECUTIVE OFFICER, NEXTPAGE; D. BRENT ISRAELSEN, FOUNDER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, iLUMIN; CRAIG MILLER, VICE PRESIDENT AND GENERAL MANAGER, NET MANAGEMENT GROUP, NOVELL, INC.; ROBERT SIMMONS, CHIEF FINANCIAL OFFICER, CAMPUS PIPELINE, INC.; RICHARD NELSON, PRESIDENT AND CHAIRMAN, UTAH INFORMATION TECHNOLOGIES ASSOCIATION; PETER BREINHOLT, RECORDING ARTIST AND PERFORMER; AND SHAWN FANNING, FOUNDER, NAPSTER, INC.**

#### **STATEMENT OF BRAD PELO**

Mr. PELO. Thank you. And thank you, Mr. Chairman, for the invitation to address the Judiciary Committee, and in such a fine venue as my alma mater, BYU.

Today peer-to-peer technology offers tremendous revolutionary impact to all of us. We've seen that impact through Shawn's work at Napster, and we think that rather than being threatened by the emergence of peer-to-peer technologies, we need to view it as an opportunity.

At the very time Shawn's company was being sued by a legion of attorneys, another legion of attorneys at the world's largest law firm, Baker & McKenzie, was implementing NextPage's peer-to-peer technology, allowing lawyers, rather than sharing MP3 files, to share peer-to-peer access to their legal content among their 61 offices worldwide.

NextPage is a Utah-based company headquartered at Thanksgiving Point's new corporate center. Just 15 months old, we have 160 employees, and today we'll introduce to you the idea that peer-to-peer technologies offer tremendous potential to revolutionize the way businesses conduct information.

We believe that rather than being threatening to markets, peer-to-peer technology provides an opportunity for intellectual property holders to in fact share and leverage information among their suppliers, partners, customers, and employees.

In fact, recently in a conversation with the leading analyst at the Gartner Group, John Pescatore said that he believes peer-to-peer technology has the potential to be the single most influential technology of our age, significantly changing business models and changing management methods.

Our customers at NextPage share that same vision. With peer-to-peer technologies they can unlock not just websites and e-commerce opportunities, but the tremendous intellectual assets of their businesses.

Think, for example, of the ideas locked in documents, the information in digital assets like databases. Sharing that information now with their customers, with their suppliers, and partners, allows us to leverage peer-to-peer technologies in a way far beyond what we've perhaps envisioned to this point.

NextPage's technology provides secure access in that peering environment so that copyrights are protected, that access to intellectual property is monitored and tracked, so that in any business environment we have the potential of protecting the assets that are most important to us.

Let me, if I can, just refer you to the screen, Mr. Chairman, I don't know if you can see this, but I'll describe for you the models that we've seen evolving over the last decade as the Internet has been introduced to us.

First is the model of what I call content linking. The Internet itself is a form of a distributed network, or peer-to-peer network, except that the only information that is being peered is the addresses of the computers themselves. So to access content on these systems, URL's or links are established, linking the content from one server to another by following the link. You might consider the likes of Yahoo who allow us to navigate content on the Internet by following such a link.

If you then go to another model of Content Networking, that would be the model of content aggregating, where content is actually syndicated or downloaded into a central repository, where it is then made available. This is the model typically used by enterprises, large companies around the world, to allow access to distributed information.

In the new models of peer-to-peer Content Networking, the content itself will remain on the systems that created it, and the linkages will in fact be in the form of peer-to-peer protocols, so the content itself is able to be accessed without physically going to any one location, but the systems themselves speak to each other and allow access to that content.

If we then extend this model out to the participants in an e-business relationship, the center hub here is my fictitious company where they have peer-to-peer Content Networks established, but now those links allow them to have peer-to-peer connectivity with their manufacturing partners, suppliers, customers, and professional services firms.

Up at the right of the screen, Squire & Company represents a tax advisor to my company, and in this content network, if we extend the connections now that Squire & Company has made in their peer-to-peer network, it includes the SEC, the American Institute of CPA's, the Financial Accounting Standards Board, and others.

And then finally there may be content exchanges which in fact is the model that Napster has employed, where content can also be peer-to-peer connected from independent publishers or established publishers.

NextPage, over the past 15 months, has helped professional publishers and digital rights owners around the world transact business approaching 1 billion dollars in this first 15-month period using this technology. So today we believe the frontier for peer-to-peer technologies is not about lawsuits and unfounded fears and threats; it's about the promise of unlocking the value of dynamically built and leveraged intellectual assets among market participants.

The real question is: How do we protect those assets in a world where they become freely available? Peer-to-peer technologies are nothing to be feared, and as NextPage has demonstrated in our short history, there are companies around the world trying to solve the very problem that Shawn solved by creating Napster.

It is in fact the problem of accessing content easily without having to physically surf the Net to find it. In e-business relationships where time is literally money, peer-to-peer Content Networking allows this information sharing to seamlessly take place between market suppliers and market makers, their customers, employees, and participants.

We strongly encourage this committee and the Senate to consider legislation that will further protect rightsholders but will acknowledge the anticipated market shifts that will occur as new technologies like peer-to-peer technologies are introduced to the market.

Thank you for the opportunity to testify today.

Chairman HATCH. Thank you, Mr. Pelo. We appreciate your testimony. It's extremely interesting.

[The prepared statement of Mr. Pelo follows:]

PREPARED STATEMENT OF BRAD PELO

Today peer-to-peer technology stands to revolutionize the new digital economy, impacting us all in ways that we have only recently begun to appreciate. Like most emerging technologies, what is once seen as a threat later emerges as an opportunity. While lawyers were busy filing suit against Napster's peer-to-peer offering, the world's largest law firm, Baker & McKenzie was implementing NextPage's peer-to-peer technology. Instead of swapping MP3 files, lawyers will now be able to locate relevant content from their 61 law offices spread throughout the world.

E-businesses will spend billions of dollars over the next couple of years on Internet initiatives targeted at enhancing all aspects of relationships between partners, suppliers, customers and employees. To date, e-businesses have started to streamline business transactions, however, the greater business opportunity lies in the exchange of expertise, ideas and information between companies. The majority of this expertise is buried in documents, spreadsheets, e-mail, databases, and legacy systems all over corporate intranets and the Internet. Companies are looking for software solutions that can unlock that expertise.

These companies are looking for a solution that solves these two problems:

How to give users access to the content they need without having to centralize and maintain that content, and

How to deliver critical content from outside the company—from partners, suppliers, customers, and so on—in a format that's current and accessible.

NextPage is a Utah-based company located at Thanksgiving Point's new corporate center. The company was founded in July 1999 and employs about 160 employees. NextPage is the first company to deliver a peer-to-peer content network platform for e-businesses.

This technology significantly improves productivity of companies and fundamentally changes the way corporations access information.

NextPage software creates a secure network, called a Content Network™ where users can manage, access and exchange content across distributed servers on intranets, extranets and the Internet to enhance e-business relationships. The Content Network is accessed through a Web browser and viewed as if the information existed in a single location.

The NextPage™ Content Networking Platform eliminates traditional barriers of intranets, extranets and the Internet by providing users a single point of access to information from dispersed sources and different data types, such as XML, HTML, Microsoft Office, Adobe PDF files and database repositories. Once these sources are linked together in a peer-to-peer Content Network, they become a single, virtual repository.

With the Platform, content no longer needs to be pushed around the Internet or centralized on an intranet or extranet server to be accessed. Content can be created and maintained in its original location by its original author. Users can search, navigate, categorize and personalize information in their Content Networking real time.

This NextPage application can scale to tens of thousands of concurrent users and handle multi-gigabytes of information, while still providing secure, personalized information based on an individual user's needs.

Peer-to-peer technologies can become market threatening or market making. The press and intellectual property holders have been focused on the perceived threats of peer-to-peer technologies while we at NextPage have been busily focused on its opportunities.

The potential benefits of peer-to-peer technology are unprecedented in our time. In fact, during a recent visit with John Pescatore, a leading analyst with the Gartner Group, he said he believes that of all emerging technologies peer-to-peer stands to change business models and impact management approaches more than any other.

NextPage's customers have a vision of the Internet being a system of individualized relationships where the secure connections create tremendous value. While e-commerce and Web sites are important elements of an e-business strategy, many of our customers are working to unlock the expertise, ideas and shared knowledge among suppliers, customers, partners and employees. Peer-to-peer technologies can unlock this potential.

Baker & McKenzie, one of the largest law firms in the world, is implementing NextPage technology. The NextPage Content Networking Platform will enable the nearly 2,800 Baker & McKenzie attorneys and key clients around the world to manage, access and exchange business-critical information in an integrated, seamless manner. Through NextPage technology, continuous electronic links connect separate content servers, allowing attorneys to simultaneously access intranet sites, Internet sites, and other document repositories in real time.

Linking Baker & McKenzie offices and clients throughout the world is part of that firm's strategic technology plan. NextPage technology enhances the firm's ability to interact and respond to clients in a more integrated way.

Peer-to-peer networks, created in companies like Baker & McKenzie, dramatically enhance the value customers and partners derive from their relationships and increases employee productivity, fundamentally improving a company's bottom line.

To realize the potential of peer-to-peer technology, this will require government to establish legislation that reinforces ownership in the digital domain, that penalizes intruders and that establishes the rights of business owners to the intellectual property created by its employees.

Chairman HATCH. Let's now turn to D. Brent Israelsen, founder and president and chief executive officer of iLumin.

#### **STATEMENT OF D. BRENT ISRAELSEN**

Mr. ISRAELSEN. Thank you, Mr. Chairman.

I would like to express gratitude for being able to participate today. I am a graduate of the J. Ruben Clark law school here at

Brigham Young University, and I've spent most of my career in Washington, DC, most recently returning here to Utah.

And the reason I came here was really surrounding what became iLumin Corporation. We founded iLumin Corporation in 1996. It's a privately-held, Utah-based company with offices here and in the Washington, DC area. It delivers Internet infrastructure and technology on a distributed or a peer-to-peer basis that enables enforceable online transactions to take place that really accelerate the closure of business, that last speed bump on the e-commerce highway to be able to eliminate this legal requirement of being able to close transactions that are legally binding that people can count on, that they can rely upon.

And we do this in an environment that now employs digital signature technology, and it allows us to utilize now the new e-sign legislation that went into effect on October 1 of this year, to be able to execute legally-binding transactions over the Internet.

Now if you'll look at e-commerce today, e-commerce is generally the ability to buy books, flowers, and Furbys over the Internet, sometimes credit cards, sometimes CD's and sometimes airline tickets, but it's small-dollar transactions that if you don't get your Furby you're not going to be too upset. Now, your daughter may be, but you're not going to be too upset by that fact.

The next level of e-commerce really is the level that will really allow us to achieve the huge dollar projections the analysts predict, and that's the ability to execute legally-binding transactions over the Internet, that instead of just buying books, flowers, and Furbys, allow us to now buy cars, houses, and corporations.

With the enactment of the e-sign legislation and the effective date, October 1, 2000, through iLumin's technology, called digital handshake server technology, we actually executed the first legally-binding transaction over the Internet using that e-sign legislation, when ABS Ventures, Alex Brown, invested—along with another partner, invested in a company over the Internet, and it was done beginning at 12:01 a.m. eastern time, and finished at 12:10 a.m., and the parties were in Florida, Maryland, and other locations, and all of them accessed this in the comfort of their homes via the Internet, legally executed the binding transaction and it was completed.

On October 2, the next day in San Francisco, iLumin launched its digital handshake server technology, and with that we actually closed five transactions. We actually acquired a company on line; we actually purchased an automobile on line—not just looked at it and spun it around and changed colors and ordered it, but we actually signed the bill of sale associated with that automobile and obtained financing for it.

In addition to that we signed a W-4 form on line. Imagine if we could now move all the W-4 forms on line, and the cost savings that that would bring about, not only to the government but to every business in the country.

Hewlett-Packard estimated a couple years ago that they were spending a million dollars a year for their 118,000 employees, just managing those W-4 forms, because you have to have a signed copy on file. Now you can do it completely electronically.

In addition to that, we actually executed some additional transactions involving home mortgages. Through iLumin's technology here in Utah County, we did the first full home mortgage transaction, a refinance transaction, over the Internet in June of this year, relying on Utah's law which went into effect in 1995.

With the effective date of the e-sign legislation on October 1, we closed transactions here in Utah County, and in Essex County, MA, and then Freddie Mac of the secondary market stepped forward and acquired the promissory note out of Utah County, completely electronically. They were in Virginia when they executed the transaction, and the other parties were around the country. So this capability now becomes a very, very powerful opportunity, now, to move electronic commerce to the next level.

The distributed or peer-to-peer technologies now enhance that capability so we can do what we call distributed transactions. Parties don't have to be in the same location or in the same room, and frankly, we can actually start at one location, move it to the next, and move it to the next, to finalize the transaction.

I would like to introduce very briefly what our technology is and what it does. And in introduction, what the digital handshake server does is really gives you five characteristics that we think are important in order to gain trust in electronic transactions. And those are enforceability; automation; auditability, so you have a full audit trail associated with it; security, so that you can rest assured you've got secure transactions; and privacy, where we can actually protect the privacy better than we can in a paper environment, through using digital signature technologies and the digital handshake server.

To start with, if you'll look up on the screen, the problem in the Internet today in e-commerce today has been generally that we focused on the automation side of the equation. The I.T. world operates in the data paradigm, and most of the sites up on the Internet today are databases.

If you go to E-LOAN and try and originate a loan, you're basically typing information into a database, and then when you go to close, they send you a pile of documents via Federal Express so that you can sign.

Well, if you look at the other equation in this world, and that really becomes—and there are a series of technologies that allow us to do that—the most exciting is XML because it now allows us to automate complete transactions.

The legal world, however, operates in a paper paradigm. Signed paper documents is king. That's what people are comfortable with and what they're used to. Now, if you can use digital signature technology combined with XML, we can now do a completely automated transaction that we call the automated enforceable on-line transaction market.

And with that, I'm going to go ahead and wrap up by doing just a very brief demonstration of what a digital handshake server does, and as we move forward, recommend that the Senate and the Senate Judiciary Committee continue to move forward with the electronic signature legislation, provide a structural framework for privacy, but allow the rest of the privacy capabilities to be dealt with contractual relationships and other things that will enable this to

move forward very quickly while still protecting those who can't protect themselves.

So with that I'll launch into this quick download.

[Audio-visual computer presentation followed.]

Mr. ISRAELSEN. Thank you, Mr. Chairman.

[The prepared statement of Mr. Israelson follows:]

#### PREPARED STATEMENT OF D. BRENT ISRAELSEN

##### SPEAKER INTRODUCTION

D. Brent Israelson is a 1982 graduate of the J. Reuben Clark Law School at Brigham Young University. Mr. Israelson served as Special Assistant to the Deputy Solicitor at the US Department of the Interior from August 1982 until June 1983 before becoming a law clerk to the Honorable Moody R. Tidwell, III at the United State Claims Court. From October 1984 until August 1993, Mr. Israelson practiced law in the Washington, DC Office of the International law firm of Morgan Lewis & Bockius where he focused on technology and federal government procurement issues. In August of 1993 through May of 1995, Mr. Israelson served as President of Jurisoft, a division of Lexis-Nexis. Mr. Israelson co-founded the Utah Electronic Law and Commerce Partnership ([www.uelcp.org](http://www.uelcp.org)) and served as a member of the Utah Electronic Commerce Council.

##### COMPANY OVERVIEW

Founded in 1996 by Mr. Israelson, iLumin Corporation ([www.ilumin.com](http://www.ilumin.com)) is a privately held, Utah-based company that delivers Internet infrastructure technology and services that enable enforceable online transactions that accelerate the closure of business, financial, government and consumer transactions in the New Economy.

##### INTRODUCTORY REMARKS

On July 4, 1776, fifth-six men, risking their lives for their vision of a better future, put pen to paper to sign the Declaration of Independence, decisively publishing, declaring and binding themselves to the principles of freedom enumerated therein. These were the visionary leaders who laid the foundation for the future prosperity of this great nation. More than two hundred years later, Governor Michael Leavitt of Utah, another visionary leader, signed into law on March 9, 1995 the nation's first Digital Signature Act, setting the course towards a digital future for the State of Utah. This Act, for the first time anywhere in the world, established legal parity between digitally-signed electronic documents and manually-signed paper documents.

On June 30, 2000, President Bill Clinton extended the digital economy to the federal government and across all states by signing into law the Electronic Signatures in Global and National Commerce Act (E-SIGN) using a computer terminal and a digital signature (provided by a Digital Signature Trust, a Utah company). At this historic signing, President Clinton firmly published, declared and bound the nation to a digital future with the use of his digital signature.

This event, combined with the passage in 1998 of the Government Paperwork Elimination Act (which requires full digital access to the federal government by 2003), marked a major endorsement by the federal government in support of a revolutionary movement towards a digital future.

With these actions, the federal government has laid the foundation required to fully unleash the potential of E-Commerce in the New Economy. While there are still some problems that must be addressed, we need to keep moving forward in our quest for a more efficient digital economy.

Today, we meet with you, Senator Hatch, to discuss what Utah companies, generally, and what iLumin Corporation, specifically, are doing to further the digital revolution, and what government can do to help facilitate the process.

##### E-COMMERCE OVERVIEW

Today, e-commerce can best be described as buying books, flowers and Furby's over the Internet. These are essentially credit card transactions where the merchant is willing to bear the risk of loss if the purchaser repudiates responsibility for the transaction. While this level of e-commerce has gotten us out of the starting blocks, the real growth (as projected by analysts) comes at the next level of e-commerce. Instead of just buying books, flowers and Furby's (and airline tickets and CDs), the next level of e-commerce relies upon the execution of legally-binding documents over

the Internet that will allow the purchase of cars, houses, and companies. The federal E-SIGN legislation opens the door for these types of transactions.

However, we must still address other problems in order to benefit fully from the opportunities offered by the E-SIGN legislation. The primary issue impeding rapid growth in e-commerce is the issue of trust. In a 1998 survey of technology executives, Ernst & Young concluded:

Lack of trust has emerged as the overwhelming leading barrier to the continued growth of electronic commerce. Ernst & Young/ITAA Survey of Technology Executives, Feb. 1998.

How do we cloak e-commerce with a mantle of trust sufficient to encourage broad participation in the digital economy? In order to be trustworthy, iLumin believes that an e-commerce transaction must have the following attributes: private and secure, enforceable and auditable, and automated and efficient.

*Private and secure*

In reality, there are strong parallels between the paper world and the electronic world with respect to privacy and security. The differences are those of scope and speed. We are generally comfortable transacting business in the paper world because we have grown comfortable with the risks associated with paper-based transactions. We are generally uncomfortable transacting business in the electronic world because we don't fully understand the risks and we lack clear guidelines and processes that will allow us to comfortably quantify those risks.

Paper is old technology that provides little to no privacy or security, yet, over time, we have grown to trust and rely on paper-based transactions. Information transmitted on paper can easily be intercepted through the mail, courier or even fax-based systems. Many hands and eyes have access to information on paper throughout the entire transaction process. After the transaction process is complete, paper documents are stored and can be easily accessed. Finally, even though a transaction may be paper-based, most of the data on that paper is stored electronically already.

By applying new technologies to old problems, we can improve privacy and security in the electronic world over what we currently live with in the paper world. Not unlike its role in the current paper-based transaction processes, government needs to play a similar role in determining policy and alleviating unnecessary public fears. The passage of digital legislation at both the state and federal levels is a major step forward. However, government needs to continue to work closely with business, government and private entities to establish a legal framework and basic guidelines surrounding pertinent issues such as privacy and security.

According to a March 2000 Harris poll conducted for Business Week, a company's privacy policy would encourage consumers to use the internet more, to purchase from that company, register on that company's web site, and participate in online transactions with that company.

TRUSTe.org provides additional insight into web-users perceptions regarding the disclosure of information and privacy policies. Drawing from a Harris/Westin survey, TRUSTe.org indicated that sixty-three percent of users that are now reluctant to provide personal information online say they would divulge information if Web sites disclose clearly how the information will be used. Referring to a BCG Survey, TRUSTe.org indicated that users are two to three times more willing to provide sensitive information to companies that disclose their information gathering and dissemination practices.

A public-private partnership, working to help establish clearer policies and guidelines regarding use of information and disclosure of privacy and security policies on web sites, would help alleviate current fears and help grow trust in e-commerce.

*Enforceability and auditability*

In the paper world, enforceability comes in the form of a signature on a paper document. With current technology and the recently enacted federal legislation, an electronic equivalent is now available. However, not everyone is ready to step forward and use the electronic equivalent.

The biggest issue is cultural—paper is a 4,000 year-old technology. We are comfortable holding paper in our hands and filing it in our filing cabinets. We are quickly making the cultural transition from a paper world to a digital world. Government can help speed up this transition by proactively participating in electronic transactions and accepting electronic filings or submissions of information.

Another issue impacting the move to a digital future is one of authenticating the participants in digital transaction. Under a paper paradigm, personal interaction or notaries authenticate the participants in a transaction. Under a Public Key Infra-

structure (PKI) approach, Certificate Authorities (CA) act as the digital equivalent of the notaries of the paper world. In fact, the E-Sign legislation permits digital notaries to fulfill the notary function.

Current digital signature technology, combined with the authentication function, provides greater ability to identify and authenticate individuals signing an electronic document while providing a more detailed, unalterable ability to create and keep a complete audit history of an electronic transaction.

However, to take full advantage of current technology and legislation, government needs to help clarify the scope and applicability of current legislation to avoid confusion. Government must also work with businesses, government and private entities to establish a framework and guidelines to enable cross-certification of Certificate Authorities and to define uniform Transaction Policy Statements for digital signatures applicable to government transactions.

#### *Efficiency and automation*

To achieve the full benefits of the digital economy, government must facilitate enforceable online transactions and provide digital access to government services. The passage of the Government Paperwork Elimination Act of 1998 lays the foundation for digital access to federal government services. In discussing the need for the Government Paperwork Elimination Act, Senator Abraham of Michigan noted that Americans spend over \$600B a year filling out, documenting and handling government paperwork—a huge loss of time and money and a drain on the economy—that must be brought under control. In describing the Act, Senator Abraham stated:

[It] would require Federal agencies to make versions of their forms available online and allow people to submit these forms with digital signatures instead of handwritten ones. It also sets up a process by which commercially developed digital signatures can be used in submitting forms to the government and permits the digital storage of federal documents. Senator Abraham—S. 2107, Hearing Report, Digital Signatures, July 15, 1998, 2:00 p.m.

The federal E-SIGN legislation provides the legal infrastructure required to implement the Government Paperwork Elimination Act. Now federal agencies are required, by 2003, to make their forms available electronically so they can be filled out, signed and filed with agencies electronically. While this is a good start, more is needed to spur government forward in adopting a digital future. While we are not advocating mandatory usage of digital transactions, we are advocating mandatory availability of digital transactions across all segments of the economy for those who would like to use them.

#### ILUMIN'S AUTOMATED ENFORCEABLE ONLINE TRANSACTIONS

iLumin defines an automated enforceable online transaction as one that fully incorporates the requirements of privacy and security, enforceability and auditability, and efficiency and automation. Automated enforceable online transactions bridge the opposing paradigms of data automation in the information technology world and document enforceability in the legal world. iLumin's Digital Handshake™ Server enables the execution of automated enforceable online transactions and helps infuse trust in the rapidly-expanding digital economy. ([www.iLumin.com](http://www.iLumin.com)).

Building on Utah's leadership in the digital economy, iLumin used its Digital Handshake Server to complete the world's first online home refinance in Utah County on June 29, 2000.

Additional iLumin industry firsts include:

February 1999.—Utah's Third District Court, enabled by technology jointly developed by iLumin and the Administrative Office of the Utah Courts, becomes the first court in the United States to accept digitally-signed legal filings via the Internet.

March 1999.—Governor Leavitt of Utah signs the Digital State Act into law using iLumin's Online Signing Room and a digital certificate issued by UserTrust, another Utah company, becoming one of the first Governors to sign legislation electronically.

September 1999.—The Utah County Recorder, using iLumin technology, becomes the first in the United States to electronically record a legally-binding, digitally-signed deed affecting the transfer of real property.

And on October 1 and 2, 2000, using iLumin's Digital Handshake Server, the first transactions executed under the federal E-SIGN Legislation, including:

The first venture capital equity investment (completed 10 minutes after the E-SIGN legislation went into effect)

Closing of two real estate transactions (Utah and Massachusetts) and the first purchase of a promissory note under the E-SIGN legislation by Freddie Mac in the secondary mortgage market

The first automobile purchase and automobile financing was executed under the E-SIGN legislation

The first corporate acquisition conducted under the E-SIGN legislation

The execution of the first W-4 form conducted under the E-SIGN legislation

iLumin's leadership in Utah, in the nation, and in the world continues to expand the reaches of e-commerce and to push forward the boundaries of our digital future.

#### HOW ILUMIN'S DIGITAL HANDSHAKE SERVER MAKES OUR FUTURE EASIER

E-commerce technologies like iLumin's Digital Handshake Server, combined with digital signatures, will change the way we do business in the future. Imagine purchasing your next car completely online, from selection to purchase to registration, from an Internet terminal at your office. Imagine closing on your new home from the comfort of your apartment on a Friday evening and moving in on Saturday morning. Imagine applying for and closing on a business loan, obtaining a business license, and leasing your new office space, all with the click of a button, from the comfort of your new home. This can all be possible because of the Internet, the E-SIGN legislation and digital signatures, and applications such as iLumin's Digital Handshake Server.

The benefits of living in the New Economy are many. However, the primary benefits can be summarized as huge savings of time and money for all participants in the digital economy. Other benefits flowing directly from iLumin's technology include the following:

iLumin's Digital Handshake Server enables a much higher level of privacy and security for businesses, governments and consumers, provides full enforceability and auditability of online transactions, and facilitates efficiency through full automation of a digital transaction from start to finish.

iLumin's Digital Handshake Server delivers the technology necessary to accelerate the closure of business, financial, government and personal transactions and removes the hassle of doing business by humanizing technology.

iLumin's Digital Handshake Server is the first fully automated technology solution that enables people to securely and privately complete a legally-binding online transaction from start to finish while integrating with existing information technology and e-business infrastructures, thus eliminating the costly re-keying of data.

Finally, iLumin's Digital Handshake Server technology dramatically reduces the time, costs, inefficiencies and errors associated with today's labor-intensive, paper-based, transaction processes.

#### POLICY RECOMMENDATIONS

What policies should the government be pursuing to further electronic commerce? The role of the government in the digital economy is to encourage trust in the e-commerce marketplace. This should not be done through burdensome and restrictive government regulations that can stifle the growth of e-commerce, but through a combination of limited legislative frameworks to protect those who can't protect themselves, combined with prudent business practices implemental through complete and accurate disclosure statements and negotiated contractual relationships.

So far the government has done a good job in balancing the need for limited legislation with the need to allow e-commerce to develop within the confines of the private sector. Examples of key legislative enactments that provide needed guidance and protection without overreaching and unnecessarily interfering with a rapidly-changing and vibrant digital economy include the federal E-SIGN legislation, the Cyber-Squatting legislation, updates to copyright and patent legislation, and legislation protecting children on the Internet.

Additional government focus is required with respect to the following:

Expand the federal E-SIGN legislation to encompass all transactions, including all government actions and transactions, providing participation on a voluntary basis by anyone who chooses to participate in the digital economy.

Consider additional digital signature legislation that provides governments, businesses and consumers with the flexibility to implement different levels of authentication security for different types of transactions. For example, greater authentication of the parties is required for a completing a mortgage transaction online than for purchasing a fishing license online.

Establish a minimal legislative framework governing protection of privacy and security in digital transactions that sets forth basic processes and guidelines for government, businesses and consumers implementing privacy policies describing the use of personal and business information in the digital economy.

## CONCLUSION

In summary, the government should continue to provide limited legislative structure and guidelines while working with the private sector to encourage, monitor, and, where necessary, to enforce the basic laws and guidelines already set forth.

The government can further facilitate our transition to a digital future by helping build trust surrounding the privacy and security of information by:

- encouraging companies to comply with existing privacy and security laws and regulations;

- encouraging companies to develop privacy and security policies for the data they collect;

- monitoring whether companies comply with their privacy and security policies; and

- enforcing existing laws and regulations regarding fraudulent business practices against those companies that fail to comply with their privacy and security policies.

Thank you for the opportunity to testify this morning.

Chairman HATCH. Thank you.

As a lawyer you're going to put a lot of lawyers out of business if you keep this up.

I think that's just great.

We'll now turn to Craig Miller, who is the vice president and general manager of Net Management Group of Novell, and we're happy to have you here, Craig.

**STATEMENT OF CRAIG MILLER**

Mr. MILLER. Thank you, Senator. I'm Craig Miller, vice president and general manager for the Net Management Group at Novell.

My remarks this morning, I'd like to do two things: First of all, I'd like to give a quick overview of the Novell's vision of the evolution of the net; and second, I will offer some thoughts about the implications for U.S. public policy.

Before I present my thoughts about the future directions of digital markets in the Internet, however, I'd like to pause and thank Senator Hatch for the opportunity to meet here, and for his extraordinary leadership on the digital policy front. I'm not sure that many people here today understand just exactly what Senator Hatch has done for us. More than anyone else in Washington he has played a leadership role in shaping our healthy public policy environment. He's been our champion on the R&D Tax Credit, the Net Act, the Digital Millennium Copyright Act, the competition policy, the Y2K Act and H-1B visas.

He's literally laid the building blocks for our digital economy at the time when most of the other politicians have been simply content to sit back and speculate and watch the thing happen. We would not be here today without him, so I thank you, Senator.

It's important to remember that we are still at the beginning of the Internet's evolution. The big challenge we face today, and for several years to come, is how to scale the Net to create a web that knows who you are, is always on, and can handle mission critical applications.

The distinction between corporate LAN's and WAN's and Internets and Intranets is disappearing. In the future we will not have the tangle of NetWare—networks separated by firewalls that we do today, but we'll have one integrated Net.

At Novell we call this vision OneNet, which means a seamless network that links the people, the applications devices together with ease, and is instantly available no matter where you are. We

believe that the key to this integrated network is an Internet directory, or an eDirectory, that spans different operating systems and platforms.

Here we've talked a little bit about—today about two separate technologies to help people do peer-to-peer and do business over the Net. The things that make it possible for you to be able to store your document securely, to be able to know where you are, and be able to have your identity, is stored in what's called a directory, or an eDirectory.

The eDirectory will link me with my personal applications and knows who I am, even if I have different accounts, different access rights, different profiles and so on.

Today when I visit a web I go from one corporate account webserver to another. An application server that backs up the website delivers dynamic content to me, but in order to give me the content that is right for me, the site needs to know who I am.

That's where the eDirectory comes in. The eDirectory can authenticate users, handle massive amounts of information, reads faster than a database, and provides a single data repository to store those things that are important, that gives you your personal identity, like your encryption, what we saw here with the digital handshake.

All that information has got to be stored somewhere securely and safely, and that's what a directory is for. A technology called DirXML allows different directories to share information with each other across different enterprise systems.

The goal of all this is to create a new kind of web interface for the average person. This interface will consist of a simple portal that automatically connects you to your accounts and applications, and the beauty of it—of all that, is, all of a sudden I have one place to go for all my computing needs.

The screen I see will be identical to me, no matter where I am, no matter where I go, at the office, in a hotel room, or at home. I spend a lot of time on the road, as I'm sure you do, and I like to be able to have my desktop be the same desktop whether I'm at work or whether I'm in the Marriott hotel. And I wanted to have that environment up in about 3 or 4 seconds, and no matter where I am, and I want it to know who I am and be my desktop so that I can get the information I need to do my job and to connect with my family and with the people that are important to me, and also the applications that I need to access the Internet.

We're developing that software right now and making these portals available. It actually unlocks the power of the Internet for you and turns all that data into knowledge.

The portals should be available to us over wired or wireless devices. I should be able to have it, whether I'm hooked up with a laptop or whether I have my phone with me or some other PDA. I should be able to have online access all the time. The thing that will define the Internet is not the device that we're on, but it's who you are.

Finally we're going to take this new architecture and make it incredibly fast by means of accelerated caching networks. In the end, these accelerated content distribution nets will make what is a

complex and a powerful and sometimes unpredictably slow world almost seamless and magically fast.

If this is where we're headed, what does it mean for public policy? I don't pretend to have all the answers but the two big questions seem to me to be how we manage digital content, and how we manage our digital relationships.

The first question deals with how we protect and share intellectual property on the Net, and the second question is how we protect and empower people on the Net. These policy debates have already been launched and we will have a long way to go before they're resolved.

As a high-tech company that makes Net services software, Novell embraces the technology advances that drive the rapid evolution of the Net, as well as digital copyright laws that protect our intellectual property. The Digital Millennium Copyright Act that Senator Hatch authored is a tremendous base from which to build. During the course of the coming year it will be tested to see how well it comports with the questions about digital content, the Napsters and the others arise.

This is a very healthy debate, and we will not shy away from it. While we do need to find ways to let innovations like Napster flourish, we could not afford to do so at a price of undermining copyright and digital content.

We are actually developing some kind of a licensing technology that makes it so you can wrap any kind of a file, whether that be MP3 or a Word file. It makes it so that with your own personal digital key you can unlock that and give it to anybody else, so you can have secure sharing of your content across the Internet if you so desire.

We are now facing big questions about how to protect online policy and security, and fortunately Novell has strong positions in both. We are one of a handful of companies that has audited all of its U.S. websites to make sure that we adequately protect our customers' privacy, and we always have offered great security to our customers.

Congress is almost sure to take up legislation in these areas in the next year, and we would not expect one piece of legislation to solve the problem. The issue is sure to be with us for several years and will evolve along with our e-commerce, and our technology and our consumer preferences. Our goal should be to encourage best practices and establish uniform goals across all the 50 States, and avoid a one-size-fits-all approach that demands opt-in.

With Senator Hatch's leadership I feel confident that we will achieve these goals, and Novell looks forward to working with you during the coming years to make this vision a reality.

[The prepared statement of Craig Miller follows:]

PREPARED STATEMENT OF CRAIG MILLER

I am Craig Miller, Vice President and General Manager for the Net Management Group at Novell, which is the leading provider of Net services software. In my remarks this morning, I would like to do two things. First, I will give a quick overview of Novell's vision of the evolution of the Net. Second, I will offer some thoughts about the implications for US public policy.

Before I present my thoughts about the future directions of digital markets and the Internet, however, I would like to pause and thank Senator Hatch for the opportunity to meet with you today and for his extraordinary leadership on the digital

policy front. I'm not sure many people really know just how critical he has been to the evolution of the US software industry. More than anyone else in Washington, he has played a leadership role in shaping a healthy public policy environment. He has been our champion on the R&D Tax Credit, the Net Act, the Digital Millennium Copyright Act, competition policy, the Y2K Act and H-1B Visas. He has literally laid the building blocks for the digital economy, at a time when most other politicians were content simply to sit around and speculate. We would not be where we are today without him. Thank you Senator.

It is important to remember that we are still at the beginning of the Internet's evolution. The big challenge we face today and for several years to come is how to scale the Net to create a web that knows who you are, is always on and can handle mission critical applications. The distinction between corporate LANs, WANs, Intranets and the Internet is disappearing. In the future, we will not have the tangle of networks separated by firewalls that we have today, but one integrated network. At Novell, we call this vision One Net, which means a seamless network that links people, applications and devices together with ease and is instantly available wherever you are.

We believe that the key to this integrated network is an Internet directory—or eDirectory—that spans different operating systems and platforms. The eDirectory will link me with my personal applications and know who I am, even if I have different accounts, different access rights, different profiles and so on.

Today when I visit the web, I go from my corporate account to a web server, which takes me to a web page. An application server that backs up the web site delivers dynamic content to me. But in order to give me the content that is right for me, the site needs to know who I am. That's where the eDirectory comes in. The eDirectory can authenticate users, handle massive amounts of information, read faster than a database and provide a single data repository. A technology called DirXML allows different directors to share information with each other across different enterprise systems.

The goal of all this is to create a new kind of Web interface for the average person. This interface will consist of a simple portal that automatically connects you to all your accounts and applications. The beauty of it is that now, all of a sudden, I have one place that I can go to for all my computing needs. The screen I see will be identical to me no matter where I am—at the office, in a hotel room, or at home. It will automatically provide me with the applications that I need and give me access to the information and relationships that I want.

Moreover, this portal will increasingly be unlocked from the desktop. Your portal will be available to you over wired and wireless devices, over computers, cell phones and personal digital assistants. The thing that will define the Internet is not the device you use, but the services you access.

Finally, we are going to take this new architecture and make it incredibly fast by means of accelerated caching networks. In the end, these accelerated content distribution nets will make what is a complex and powerful, but sometimes unpredictably slow world, almost seamlessly and magically fast.

If this is where we're headed, what does it mean for public policy? I don't pretend to have all the answers, but the two big questions seem to be how we manage digital content and how we manage digital relationships. The first question deals with how we protect and share intellectual property on the Net; the second question with how we protect and empower people on the Net. These policy debates have already been launched, but we have a long way to go before they are resolved.

As a high tech company that makes Net services software, Novell embraces the technological advances that drive the rapid evolution of the Net, as well as the digital copyright laws that protect our intellectual property. The Digital Millennium Copyright Act that Senator Hatch authored is a tremendous base from which to build. During the course of the coming year, it will be tested to see how well it comports with the questions about digital content that Napster and others raise. This is a very healthy debate, and we should not shy away from it. While we need to find ways to let innovations like Napster flourish, we cannot afford to do so at the price of undermining copyrights and digital content.

We are also facing big questions about how to protect online privacy and security. Fortunately, Novell has a strong position in both areas. We are one of the handful of companies that has audited all of its US websites to make sure that they adequately protect our customer's privacy, and we have always offered our customers good security. Congress is almost sure to take up legislation in these areas next year, but we should not expect one piece of legislation to solve the problem. This issue is sure to be with us for several years and will evolve along with e-commerce, technology and consumer preferences. Our goal should be to encourage best practice,

establish uniform rules across all 50 US states and avoid one-size-fits-all approach that demands opt-in.

With Senator Hatch's leadership, I feel confident that we will achieve these goals. Novell looks forward to working with you during the coming years to make this vision a reality.

Chairman HATCH. Thank you, Craig. We're happy to have your testimony and we're proud of Novell and what you've been able to accomplish.

We'll now turn to Robert Simmons, who is the chief financial officer of Campus Pipeline, Inc.; so Robert, we'll turn to you.

#### **STATEMENT OF ROBERT SIMMONS**

Mr. SIMMONS. Good morning, Mr. Chairman. I'm Robert Simmons, executive vice president and chief financial officer of Campus Pipeline. I appreciate the opportunity to appear before you today, and hope that I can provide some insight into what campus Pipeline is doing to reshape how the Internet is used in higher education, and how we are impacting Utah's technology environment.

Founded in 1998 Campus Pipeline has attracted an outstanding team of employees, bringing more than 180 professional-level jobs to our downtown Salt Lake City headquartered company.

We've also raised more than \$87 million in venture financing, drawing welcomed attention from the investment community and the press. Our impact on Utah's technology scene has definitely been felt. And our impact on higher education is growing stronger.

Today's college students grew up with the Internet. However, many, if not most of our country's approximately 3,800 colleges and universities do not have a comprehensive web strategy. As a result, when students arrive on campus they are often met by a disparate collection of off-line and on-line resources and services.

The Campus Pipeline web platform helps schools house all academic and administrative services under one online roof. We help pull students out of line by putting them on line. Our secure technology serves the entire campus, giving students, faculty, and staff 24 by 7 campus access from any Internet connection.

By web enabling critical campus services such as course registration, grade posting, and tuition payment, and adding academic tools such as course message boards, online office hours, and distance learning, schools are helping their constituents save time and accomplish their goals.

We've taken an innovative approach in making our software available to every school. In addition to a typical software license, we offer a grant model through which corporate sponsors such as Hewlett-Packard, ETS, and TIAA-CREF help underwrite the costs of the software. By enlisting the aid of corporate sponsors, we help bridge the digital divide between institutions of higher education.

The most satisfying validation comes from our schools. Pepperdine University tells us that Campus Pipeline has enormously improved their business processes. The University of Idaho, ranked as one of the most wired universities, told us that it would have been difficult to maintain their technology leadership without us, and Illinois Eastern Community College believes Campus Pipeline is raising the technology expectations of their students.

Since launching our sales effort in 1999, more than 600 campuses have licensed our software, 65 of which are running on it as

I speak. Our next step will be to extend platform access to the individuals and groups naturally associated with an institution, such as prospective students, friends, family, and alumni, enabling institutions to establish and reinforce school communications and affinity.

Our ultimate vision is to connect the hundreds of schools, using the Campus Pipeline platform, into a network of institutions. This collaborative network will enable the formation of idea exchanges around specific research disciplines or interests, and facilitate the exchange of intellectual information.

To quickly illustrate how the network will function as a knowledge exchange, imagine a university professor beginning a research project. Through the Campus Pipeline platform he accesses information and directs efforts of his research assistants. As the project progresses, the research team is able to use the network to collaborate with colleagues at other institutions, as well as access resources anywhere on the broader network.

The network will also connect non-academic parties, such as government agencies, corporate sponsors, and affiliated professional associations.

Finally the network will be a tool to aggregate demand among member institutions and leverage the purchasing power of the respective schools. As wireless and broadband technologies promulgate, we feel the network will be a catalyst for non-boundary educational opportunities.

As we progress toward our goal, we foresee government playing a role in three specific areas. First, we acknowledge the important position that government holds in protecting the privacy of the individual. However, users should have the ability to disclose the information they see fit, giving commercial entities the ability to customize their products to meet personal preference.

Second, as the Internet increasingly becomes a form of exchange, government has a responsibility in defining intellectual property ownership issues.

Finally, government must play a role in addressing the critical shortage of engineering talent, needed to further technology development.

We applaud the chairman's efforts to increase the annual quota of H1-B visas as a short-term solution to the problem. We would encourage the legislature to ensure that the INS has adequate resources to process these additional visas in a timely manner. In the long term we believe the solution is to focus more resources within our State and local educational institutions to the training of students interested in electrical engineering and computer science.

Thank you again for the opportunity to speak to you today. I am very encouraged by the progress that Utah has made in nurturing a technology culture. We are seeing success but we still have a long way to go.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Simmons follows:]

## PREPARED STATEMENT OF ROBERT J. SIMMONS

## INTRODUCTION

Good Morning, Mr. Chairman. I'm Robert Simmons, executive vice president and chief financial officer of Campus Pipeline. Headquartered in Salt Lake City, Campus Pipeline is the leading provider of Web platforms that create official campus intranets for higher education.

I appreciate the opportunity to appear before you today. I hope that I can provide some insight into what Campus Pipeline is doing to reshape how the internet is used in higher education and the impact that we have had on Utah's technology environment.

## CAMPUS PIPELINE

Founded in 1998 Campus Pipeline has created almost 180 professional level jobs in downtown Salt Lake City. Our core product, which began shipping December of 1999, is setting the standards for integrated Web networks in higher education.

Today's college students grew up with the Internet. However, many if not most colleges and universities do not have a comprehensive Web strategy. As a result, when students arrive on campus they are often met by a disparate collection of off-line resources and services which results in the long lines we all knew from our own college experience.

The Campus Pipeline Web platform enables schools to integrate their systems and administrative services behind a single, secure Web based interface which gives students, faculty and staff 24/7 access from any Internet connection. By Web enabling critical service such as registering for class, checking grades, and career center along with academic enhancements such as course specific chat, message boards and distance learning, schools are able to more efficiently deploy scarce resources and enhance the learning environment.

At Pepperdine University, Administrator Candace Jones stated, "Campus Pipeline has spurred enormous improvements in our business process."

To make our software available to every school that wants it, even those that cannot afford to buy it, we have developed an innovative grant model through which corporate sponsors help underwrite the cost of our product. By enlisting the aid of corporate sponsor, we are leveling the technological playing field in higher education.

Jerry Wallace, vice president of finance and administration at the University of Idaho stated, "Our technology leadership would have been costly to maintain without Campus Pipeline."

Terry Bruce, Chief Executive Officer at Illinois Eastern Community College added, "Campus Pipeline offers community colleges a way to offer student services, information and technology that moves beyond what they expect. When our students move on to four-year colleges, they will have high standards for the online services and technology available."

Since launching our sales effort in 1999 over 600 campuses have licensed our software, 65 of which are currently live and using the product across their respective systems.

Our next step will be to extend platform access to the individuals and groups associated with a specific institution such as prospective students, friends and family, and alumni. Thus enabling institutions to establish and reinforce school-centric communication and affinity.

Our ultimate vision is to connect the hundreds of schools using the Campus Pipeline platform into the CP Network. This collaborative network will enable the formation of idea exchanges around specific research disciplines or interests, the exchange of intellectual information, and aggregate buying power among its members.

To quickly illustrate how the network will function as a knowledge exchange imagine a professor at Campus Pipeline school beginning a research project.

Through the local platform he accesses information and directs the efforts of his research assistants.

As the project progresses, the research team is able to use the network to collaborate with colleagues at other institutions as well as access resources anywhere on the network.

Interested parties will be able to track the resources and perhaps provide input.

The network will also connect non-academic interested parties such as government agencies and corporate sponsors.

Finally, the network will be a tool to aggregate demand among member institutions and leverage the purchasing power of the respective schools.

Clearly there will be tremendous benefits to both institutions as well as individuals in having access to such a network.

#### ROLE OF GOVERNMENT

As we progress towards our goal we see government playing a role in three specific areas.

First, we acknowledge the important role that government fills in protecting the privacy of the individual. However, the user should have the ability to disclose as much or as little information as they see fit which will enable commercial entities the ability to customize or enhance their products and services for each individual.

Second, as the Internet increasingly becomes a forum of exchange, government has a role in defining and refining intellectual property ownership issues.

Finally, government must play a role in addressing the critical shortage of engineering talent. We applaud the Chairman's efforts to increase the annual quota of H1-B visas as a short-term solution to the problem. We would encourage the legislature to ensure that the INS has adequate resources to process the additional visas in a timely manner.

In the long term, we believe the solution is to allocate more resources within our state and local educational institutions to the training of students interested in electrical engineering and computer science.

#### CONCLUSION

Thank you again for the opportunity to speak to you today. I am exited about the progress the state of Utah has made in nurturing a technology culture. We are seeing success but we still have a long way to go.

I will be glad to answer any questions.

Chairman HATCH. Well, thank you, Mr. Simmons. That was very interesting.

Let me turn now to Richard Nelson, who is president and chairman of Utah Information Technologies Association.

We are happy to have you with us, Mr. Nelson.

#### STATEMENT OF RICHARD NELSON

Mr. NELSON. Thank you very much.

Mr. Chairman, it is a privilege to address you and provide testimony here today. With the subject today of Utah's digital economy, I'd like to title my remarks this morning "Utah's Dynamic I.T. Industry." I've provided you a handout that I'd like to refer to. The press also has access to that.

I would like to give you a profile of our dynamic industry. Utah has 2,500 information technology companies and an estimated 1,000 viable Internet enterprises. As the growth engine of the State, you've already mentioned we have last year \$7.7 billion in revenues, 43,000 very high-paying jobs. I'd like you to refer to the back side of the material that was provided, you can see that the average salary at the bottom of an I.T. position, according to our extensive survey last year was \$45,228.

That compares with an average wage—non-agricultural wage in the state of Utah, \$26,484, or 71 percent above the average. And you can see the prior year, that this has increased from 66 percent above the average to now 71 percent above the average. You can see how significant it is for the State of Utah with these 3,500 I.T. and Internet enterprises.

The I.T. leadership within the State is extremely optimistic. In our survey last year of the industry, the I.T. leaders projected over the next 3 years that they would increase their new employees by 53 percent above where they were at that time, or an additional 23,000 employees. That's obviously very, very significant, and again

another reason why I say that the I.T. industry in the State of Utah with the concentration we have here, Senator Hatch, is truly the growth engine of this State.

As I try to describe the industry, and we'll do this this morning, I used five or six adjectives. It's dynamic, a lot of energy, speed, vibrant, and very, very young.

Now to the issue that faces all of our industry here in the State and throughout the country that you have provided such incredible leadership on, and the recent passage of the H1-B visa bill in the Senate.

A skilled work force is our number one issue. Recently we surveyed our membership, and I'd like to share some of those findings with you, as you can see at the top of this page, and you can see that this documented significant local shortages. The survey results show the following:

Two hundred forty technology members were surveyed. We received a response rate of 23.3 percent, which is an outstanding response. First question: Are you having difficulty meeting your need for qualified engineers, computer science, and technical people? Ninety-four percent that were surveyed said yes.

Question Number Two. If yes, what was the percentage of short-fall on hiring? An average of 42 percent of technical positions are not filled due to skilled work force shortage.

Question Number Three. Given an adequate supply of qualified applicants, how many engineers, computer science, technical staff would you hire in the year 2000? Now this survey was taken in August, so it was a 5-month projection going forward. Surveyed companies responded that they would hire 1,264 people by year end, an average of 23 new employees per the 56 companies that responded to this survey.

Company survey reported that they employ 8,168 people in the State of Utah, or an average of 146 employees. That gives you some perspective on how significant this increase is. New hires would increase by year end, total employees, by 15 percent.

You mention in your opening remarks that Utah's success and recognition as a high-tech community have been well documented. I'd like to refer to two or three of those cited statistics.

In June of 2000, Salt Lake City was ranked the number one computer-savvy city in the Nation, with San Francisco being number two, according to Scarborough Research of New York City.

Salt Lake City, according to Newsweek magazine, is one of the top 10 new tech centers in the world, according to Newsweek, as I mentioned; and number three, and last comment, the Salt Lake City/Provo area was named the number two largest metropolitan area for startups and growing of business, again according to the Wall Street Journal.

Senator Hatch, I appreciate being here today and sharing this profile of our extremely dynamic industry, and I want to personally thank you on behalf of our industry, our 2,500 I.T. companies and Internet enterprises, for your extremely effective leadership role in the Senate for the significant legislation you've passed this year. Five of the six major pieces of legislation. We appreciate that a great deal. Thank you.

[The handout referred to above follows:]



## Utah's Dynamic IT Industry!

Utah's Information Technology (IT) successes are well documented in the national media, including:

- Salt Lake City is ranked the number one computer-savvy city in the nation.  
-*Scarborough Research of New York City, June 2000*
- The Salt Lake City/Provo area was named the number two largest metropolitan areas for starting up and growing a company, by Congnetics, Inc.  
-*The Wall Street Journal, December 7, 1999*
- Salt Lake City is one of the top 10 "Hot New Tech Cities" in the world.  
-*Newsweek magazine, November 2, 1998*

### IT Industry Overview

#### **2,500 IT companies**

- \$7.7 Billion in Revenues (up 8.5% from prior year)
- 43,000 very high paying jobs
  - 4.2% of Utah's total (non-agriculture)
- IT leaders are extremely optimistic!
  - Projecting 22,750 new employees (over next three years)
    - This is a 53% increase
- Young, small entrepreneurial enterprises
  - 34% less than 5 years old (up from 23% in 1998)
  - 72% employing 25 people or less
- Utah IT Compensation Survey available
  - Wirthlin Worldwide 2000 Report results
  - Provides current Utah IT composite salary data by 35 job categories.

#### **e-Business**

- Up to 1,000 (estimated) viable Internet enterprises

For more information on the UITA Agenda, events, or the IT Compensation Survey, contact:

**Utah Information Technologies Association**  
[uita@uita.org](mailto:uita@uita.org)/801-568-3500/[www.uita.org](http://www.uita.org)

## Utah Skilled Workforce Survey

Conducted By:  
Utah Information Technologies Association  
Richard R. Nelson, President and CEO  
Released: September 11, 2000

### Who Participated?

- UITA surveyed 240 "technology" members.
- Received 56 responses. This is a 23.3% response rate!

### Question #1

#### Are You Having Difficulty Meeting Your Need for Qualified Engineers/Computer Science(CS)/ and Technical People?

- 94% of the companies surveyed replied "yes"
- 6% replied "no"

### Question #2

#### If Yes, What Was the Percent of Shortfall on Hiring vs. The Number of Current Open Positions?

- An average of 42% of technical positions are not filled due to the skilled workforce shortage.
- 26% of the companies surveyed have 50% of their open positions unfilled.

### Question #3

#### Given an Adequate Supply of Qualified Applicants, How Many Engineers/CS/Technical Staff Would You Hire in 2000? How Many Utah Employees Do You Have?

- Surveyed companies responded they will hire 1,264 people by year-end!
  - An average of 23 new hires per company.
- Companies surveyed report they employ 8,168 people in the State of Utah.
  - An average of 146 total Utah employees per respondent.
- New hires would increase total employees by 15%!

### Question #4

#### What Is Your Average Starting Salary for Engineers/CS at the Bachelor Degree Level?

- The overall average is \$52K
- The average range is from \$45 – \$60K
- High of \$75K

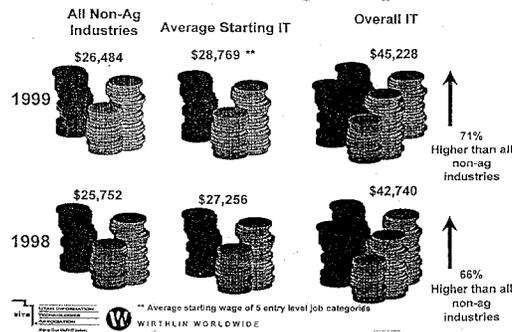
### Question #5

#### Over the Next Two Years, What Are Your Anticipated Needs for Engineers/CS/Technical Staff?

- Respondent companies plan on hiring 2600 employees.
  - An average of 46 new hires per respondent

Survey Conducted: August 2000

### Average Utah Vendor Wage Comparison



Chairman HATCH. Well, thank you, Mr. Nelson.

It's great for all of you BYU students to know, and our university students throughout the State to know that if we work hard here and in our various universities to prepare, there appear to be plenty of high-paying, high-tech jobs right here in Utah for you. We can assimilate all of you, and I'll tell you, I want to keep it that way, so your testimony is very important.

It's also important to note that the H1-B bill that was just mentioned, we had a heck of a time getting through the Senate. We had to go through three cloture votes, motion to proceed on some of the amendments, and then finally on the bill. They had a substitute that became the H1-B bill, because there were those who didn't want it to pass, but yet in the end it passed 94 to 3 in the U.S. Senate, and then went through the House very fast.

But I would like to note that we will be able to use the fees from the increased visas to fund more high-tech education for our own students and workers. Those fees are estimated to be about \$450 million over 3 years. But if the visa cost goes to a thousand dollars from the current price per visa, which the high-tech industry is willing to bear in the interests of getting more people, you're talking about, you know, a billion dollars, and educational help and aid to our own students in this country. So it's a very important bill, and I appreciate you mentioning it, Mr. Nelson.

Let's turn to Peter Breinholt, a man I deeply respect, as I do all these folks here today.

Peter is a recording artist, and of course, performer. I think most of you know Peter, and I'd like to turn the time over to you at this time.

Now I think, if it's not too noisy, I think we can go ahead. I was going to break for about 10 minutes, but I think why don't we go ahead. If it gets too noisy we'll break and then finish.

#### STATEMENT OF PETER BREINHOLT

Mr. BREINHOLT. Well, I would like to first of all thank you, Mr. Chairman, for inviting me to come and talk about my perspectives. I'm getting asked a lot these days—

Chairman HATCH. I want to learn how to sell my CD's, so I'm going to learn from you.

Mr. BREINHOLT. Well, hopefully we can do that.

Just sort of by way of introduction, I'm an independent performer and songwriter, and so I'm not with a label. I've had to figure out sort of my own way to do what the label does.

Chairman HATCH. Did you all get that? He's not with a formal recording company. The only way he's going to have an opportunity, with his high skills and intellectual abilities and artistic and musical abilities, is to be able to figure out a way to get his music out there by himself. And this is a new wave that's coming, and Napster of course provides, and may very well provide one of the best ways of artists and creators to get their matters going who would never get a chance with some of the recording industry.

Mr. BREINHOLT. We started locally. Let me start by doing the demo here, just sort of to introduce this.

This is something we've jumped on. This is a website we designed—

Chairman HATCH. I can't quite see that.

Mr. BREINHOLT [continuing]. It helps sort of to welcome people that have heard our music for the first time who are trying to find out more; and it also, you know, invites people who already know who we are to come and find out more. And so what we've done: This is the main page where most of our hits are.

[Website being shown on overhead projector.]

Mr. BREINHOLT. And we have an announcements board, we have samples for people who don't know who the heck I am to hear my songs right here, we announce upcoming shows.

But we also up here we've got an albums page, and if you go there you can actually go and sample every one of the songs. I've got three CD's and you can hear, this is the first one. You can sample it just like going into Blockbuster music and sitting at the listening station. You can decide if you like it, and then if you like it you can go over here and you can buy the MP3.

We also have bios and photos, and I've got sheet music on here. We have live recordings so people can find out what we sound like live, and reviews, and also the store. So if you do want to buy something you can go down and you can—there's all the CD's, some T-shirts, some hats and so forth.

So this has helped us, and so far I've had one for a long time but this—since we've done it in this format our sales have gone up, and it's definitely paying for itself, and it's helping us broaden my audience. And so for that reason alone, I'm excited by the high-tech, especially for an independent guy like me.

I've got a number of friends that are allowing the labels to do that for them, and when it comes to radio play, when it comes to VH1, or, you know, a lot of the articles, it seems like the labels are sort of dominating in those areas, but this allows people like me to do all those things on the web.

Now locally I have—because I haven't—I've been able to record the CD's and pay for them myself and write my own press releases and pretty much do everything a label would do, for myself—the one thing I haven't been able to do very well is get radio time or TV time, and I'm interested in making my music as available to as many people as possible.

And locally what I've been able to rely on is word of mouth. We found if I do a lot of shows around town, people will go and buy the CD's, and then they'll listen to it in their car, and then their friends will hear it and then they'll go and buy it. So locally that's what's driven my career over the last 7 years, are students listening to my CD's in their car.

Peer-to-peer to me seems like it might be a high-tech bigger version of that, to enable people to hear my music that wouldn't ordinarily. Now granted, there are all the copyright issues that I think we've all talked about, and that's a concern, of course, but I want to talk mostly about what I see as opportunities, and maybe I've wondered how do I get to the point where somebody logs on and they weed through the hundreds of thousands of artists that are on the web right now and find me?

And I don't have the answer to that yet, except that maybe the time will come where we'll be able to say, you know, to our computer, "I want—I like the Beatles and I like Nancy Griffith and I

like folk music. Help me find more music like it,” and with peer-to-peer and some of the search things, it could bring up new music and then play it for you. And that would be a benefit for someone like me.

There’s also been talk—I have been reading articles about going to sort of a cable format where you pay, you know, a monthly rate and then you get access to everything that’s on Napster, for example, which would also be of interest to me.

I’m optimistic and I don’t see the Internet and I don’t see peer-to-peer as a threat, even though there’s some issues that I do worry about. I found that oftentimes when I give some of my music away or when I do a free concert, instead of it hurting the next concert or hurting my CD sales, it actually—because more people are out there listening to it, it actually is a boost. So there’s an opportunity, I think, for me to take advantage of, and hopefully be able to do it in a way that also helps me maintain control over what’s intellectual property and copyright. So I’m optimistic about that, and we’re just going to see where we go from now.

I also want to thank you for the chance for letting me represent independent artists and not just musicians but anyone who has any sort of intellectual property, writers, film makers, and so forth. Thank you.

[The prepared statement of Mr. Breinholt follows:]

PREPARED STATEMENT OF PETER BREINHOLT

So what do I think about Napster? I’m getting that question a lot these days. First, like most artists. I worry about the copyright issue. In five years is everybody going to be swapping my songs with each other instead of buying them? Am I going to have any reason to make another CD? Is anybody going to want to publish if they can’t re-coup their costs? Is it unreasonable for me to want to have some input as to how my songs are sent out to the world?

But that’s just half of my answer. And not the half I want to talk about here. The other half is about the opportunities that Peer to Peer technology might be able to offer a guy like me in the future.

So far, my music has been a sort of cottage industry. I paid for the CDs to be made, found people to distribute them, designed the covers, booked the concert halls, took out ads in the paper. It’s a lot of work, but I like doing it. Not only that, but I think I understand my audience, and I get to be protective of them. I like being able to decide ticket prices for shows, who is going to open for us, what the next CD will sound like, or how aggressively I’m willing to advertise.

As a result of doing it on my own, I get about \$7 for every CD that sells in a store. And about \$10 per CD sold at concerts. In contrast, I’ve got a friend who is also a performer/songwriter who opted to sign with a local label. He recorded a CD that cost about \$18,000 to make, which the label paid for. Now, when one of his CDs sells at a store or at a concert, he makes about \$1. The rest of that \$7–10 which I make on my CD sales goes to his label. On top of that, he has to pay back the \$18,000 it cost to make the CD out of his \$1-per-CD cut. In other words, he won’t make a dime until he has sold 18,000 CDs. And then, he still won’t own the CD, the label will. They maintain the copyright. It’s kind of like paying off your mortgage, but then having the bank still own your house.

Around the time of the release of his CD, this same friend asked me to open for him at a concert up at Kingsbury Hall in Salt Lake. My first CD had just come out and I was trying to build an audience, so I took him up on it. I ended up selling about 70 CDs at the show. He sold about 50. I saw him a week later Christmas shopping and I could tell he was depressed about the show. It wasn’t that I had sold more CDs. It was that he knew I had made \$700 in sales that night he had made about \$50. And all of that \$50 went to his label to pay off his recording costs. (My cut also went to pay off my own CD costs at that time, but because it was a much bigger cut, the CD paid for itself within a few months.) Hardly the kind of scenario I would describe as “win/win” for both the artist and the label.

So I've stayed independent. That's not to say I'm anti-label. I'm not by any means. There's a lot a label could do to make my music available to more people. And if a fair deal came along, I might do it. I've just never seen a deal that would be fair to both parties.

My trick then, in the meantime, is to make my music available to as many people as I can on my own. I can book the concert halls and do shows on my own, run the ads, write the press releases, but I can't seem to get radio play or TV time, which is where most people are introduced to new music. And no matter how well I'm distributed, if no one has heard my music, the CDs will gather dust on the store shelves. The labels have an unofficial monopoly on what gets on the air these days.

Locally, however, I've found that if I do concerts, and occasionally free ones, people hear the music and buy the CDs. And that's where word of mouth here in Utah steps up. It's been students playing my CDs in their cars for their friends that have driven my sales since I started in 1993.

But that translates slowly out of state. Inside Utah, I've outsold Paul Simon. But outside, only former BYU students and people with a Utah connection know who I am. And maybe that's where the Internet can play a role. Peer to Peer technology is sort of like a high-tech version of those students playing my CDs in their cars for their friends. Sort of. It has the potential to do what word of mouth did for me here in Utah, which is the same thing radio generally does for signed artists: It introduces new music to people. It's still unclear how a person looking for new music on the web is going to be able to weed through the hundreds of thousands of signed and unsigned artists to find me, and then take the time to listen. But perhaps the time will come where music listeners will be able to say to their computers, in essence, "This is the kind of music I like. Here are the artists I like. Help me find more." And then their computers will narrow down the field and then play new music pulled from the Peer to Peer format for them as they work at their offices. Kind of like their own radio station. Who knows? It could be something entirely different, but my point is that the Internet might be able to play a new role in exposing new music.

During the 80's, the record industry cracked down on bootleggers at concerts. The philosophy was: If you let people record your shows then they won't buy your albums or go to your shows anymore. The Grateful Dead did the opposite. They welcomed bootleggers at their shows. They went as far as to set aside "bootleg sections" for people to set up their gear in front of the main soundboard. They argued that that was what their music was for . . . to be heard. And as we know now, their sales didn't go down. They went up, including concert attendance. Why? It meant that more Grateful Dead tapes were floating around the world, and that more people were listening to them, and more people were discovering them. All of this without much radio play. I don't want to imply, however, that because it has helped some artists, that it's now okay for people to pirate music. That's got to be the artist's choice. They may not want that kind of help. But speaking from a business strategy standpoint, I think that having a lot of copies of your music floating around works. You give something to your audience, and it always seems to come back somehow. And that is how Peer to Peer, if done in a way that grants the artist a right to "opt in" or "opt out," has tremendous potential for unsigned artists.

Lastly, once people find new music these days they can be directed to a website. An artist's site might be able to turn a curious passer by into a fan. Once people find an artists' site, the artist can potentially provide the same kind of information that the radio, VH-1, music magazines, stores, books, movies, newspapers, mailing lists, and fan clubs all provide for signed artists. Personally, it's been nice lately to be able to say to the person who comes up after a show looking for more information to "check out the site" and not worry about them not being able to find what they need.

Chairman HATCH. Thank you. I don't think it will be long before we have major paintings being sold by individuals as independent artists almost anywhere in the independent art field.

I will never forget, I was asked to speak to a national convention of ASCAP, one of the major performing rights organization, along with BMI in this country, and I had just received my first royalty check of \$60, so I mentioned to the audience, I was sitting by Marilyn Bergman, who is the Academy award winning songwriter. She and her husband Alan wrote "The Way We Were," "You Don't Bring Me Flowers Anymore," etc.—about 40 of Barbra Streisand's songs—and I was sitting next to her, and when I said in my re-

marks that I had received my first check, royalty check, for \$60, which is pretty thrilling to me, the whole audience stood and applauded. And Marilyn Bergman turned to me and she said, "Orrin", when I said that, she said, "the reason they did that," she said, "as great as most all of them are, hardly any of them will ever receive a royalty check."

And that's how tough this business is. It's this peer-to-peer technology approach that basically has formulated opportunities for people like never before.

And we're moving more and more into peer-to-peer technology; and when you look at Gnutella, which doesn't even need a server, it's a slow system, but nevertheless someday somebody is going to break through on that.

Napster was the reason I think we've been able to even move in that direction. So let's turn to Shawn Fanning, who at 18 years of age developed this application and this process, and deserves an awful lot of credit. We're very proud of him, and he's been with us back in Washington and agreed to come to Utah especially today just to chat with us a little bit about what his perspectives are.

And if some of you young students would like to come up and sit on the floor up here, for those of you who are standing, we would be glad to have you come up here and surround this place, and we'll turn the time over to Shawn Fanning at this point.

#### STATEMENT OF SHAWN FANNING

Mr. FANNING. Good morning, Senator Hatch.

Chairman HATCH. You can come up and fill in, up here.

Mr. FANNING. What's up, BYU?

[Applause.]

Mr. FANNING. First I want to thank you for inviting me to visit Utah for the first time and to appear before the Senate Judiciary Committee, also for the first time.

I would also like to introduce Hank Berry, our CEO, who you mentioned earlier, sitting behind me today.

I am very happy to have this opportunity to discuss Napster and peer-to-peer file sharing. First I'd like to give a bit of the background behind Napster, how things were created.

In the fall of 1998 I was a freshman at Northeastern University studying computer science. Looking for a challenge beyond entry-level courses, I decided to start writing a Windows application on my own. One of my college roommates loved listening to MP3's and used Internet sites such as MP3.lycos.com and scour.net to find them. He often complained about finding links to sites that were dead ends, and indexes that were out of date. I started thinking about ways to solve the reliability problems my roommate was experiencing.

A traditional search engine sends out crawlers to roam the Internet, periodically updating itself every hour or more to remove sites that are down or unavailable. The index has become outdated as sites go up or down, a significant problem when looking for MP3's, because most of the files are housed on people's home computers.

I began designing and programming a realtime system for locating MP3 files of other users on the Internet. My idea was a service that allowed users to choose the files they wanted to share with

other users, and then list those files on a computer that all that users could access. The list would then be updated each time a person logged on or off the service.

The Napster application I designed combined this realtime system for finding MP3's with chatrooms and instant messaging. The chatrooms and instant messaging are important to creating a community experience, providing a means for people to learn from each other and develop ongoing relationships. I also added a hot list function that enables people to see others' musical preferences by viewing the files that they have chosen to share.

During the winter I made the decision to leave school and work on the project fulltime. Initially I focused purely on proving the concept. I thought that after I made it work, someone else would take it from there.

There were many unknowns. I didn't know if users had access to sufficient bandwidth to support the network. Other people were skeptical about whether users would be willing to share their files at all.

After developing the software prototype I started sending it to friends who sent it to other friends. The enthusiastic responses I received convinced me to try and build out the system.

I released an early beta version of the Napster software during the summer, and it spread quickly by word of mouth. It hasn't stopped growing since. Today the Napster community numbers over 32 million people. There are consistently 800,000 people using the system simultaneously.

While I think it was initially adopted mostly by college students, a significant portion of our users are now over 30. Music people are sharing and discussing ranges from rock to classical, opera, country, gospel, jazz, you name it. People tell us that they use the Napster service to sample new music before deciding what to buy, and to find new artists. They say that they use it to access music they already own on CD, cassette, vinyl, sometimes eight track.

We hear regularly from parents who said they use Napster to screen the music their children are listening to, and as a shared activity that helps them communicate with teenagers.

I am a big music fan myself, and Napster's benefit to artists is important to me. Many community members have told us that using Napster has led them to buy more CD's. Napster's implemented a range of features; most notably are new artists and featured music programs, which help users find out about new and emerging artists and make it possible for artists, to reach a broad audience.

When Napster is able to implement a business model, there will be other benefits for artists as well, including payments to rightsholders.

I believe that peer-to-peer technology on which Napster is based has the potential to be adopted for many different uses. First, there is the ability to share other kinds of files in addition to music, and indeed, Napster has been contacted by entities such as the Human Genome Project, that are interested in sharing information among specific communities of interest.

Peer-to-peer also has tremendous opportunity for sharing resources or computing power, lowering information and transaction

costs. Peer-to-peer could be used to create an aggregate pool of resources to solve a range of complex storage processing and bandwidth problems.

Think of how much faster and more efficient the Internet would be, if, instead of always connecting you to a central server every time you click onto a website, your computer could find the source that has the information nearest to you. If the kid down the hall had it on their machine, why travel halfway around the world to retrieve it?

A number of companies from Intel on down to small startups are looking at ways to develop peer-to-peer technology, and I believe that many of them will succeed.

This will result not only in a better use of computing resources, but also the development of a myriad of communities and super-communities fulfilling the promise of the Internet that its founders envisioned.

I'm going to give a quick demonstration of the software.

[Computer presentation commenced.]

Mr. FANNING. So this is the main screen, which we basically use as a way to communicate with our users about, you know, featured artists. We give them news updates, and we just recently set up a mailing list so that people can subscribe to the mailing list, and we'll tell them, you know, as new events come up, and tell them about new artists and things of that nature.

This is the chat section, which the text here is actually an introduction, the message of the day, and you have the opportunity to join chatrooms with other users who are also participating in the community.

This is the library section, which has one of Peter's songs in it right now.

So this is where you access your personal music. It allows you to create play lists, to play the music that you transferred from other users.

Probably the most popular section, the search section. This is basically the way in which you seek information on the network. What this does is it contacts our central server, searches the index, and allows you to do substring searching to locate files that other users are sharing on the network.

We also have the hot list section, which is a way to browse other users' files directly, so if you meet someone on the network that you're interested in communicating with, maybe that have similar tastes or similar library, so you can keep track of when they're on line or off line, and view the files that they're sharing.

This is the transfer section, which basically keeps track of the current transfers, both incoming and outgoing transfers.

This is the discover section, which is basically our new artist program. We are always featuring artists here that are interested in getting promotion, much like Peter, and users can come here and learn about artists that are interested in promotion. We select, you know, featured artists, as I said, but we also have a new artists section which basically allows you to browse by genre different artists that have classified their music and placed it into the directory.

And then there's the help section which is just help.

So here's an example. We've done a search for some of Peter's stuff, and as you can see, it lists the user name of the person that's sharing it on the network, and so I'll pick a song and transfer it.

So what this is doing is it's contacting the central server to—  
[Laughter.]

Mr. FANNING. OK. I'll try a different site. There we go.

So it has actually contacted the central server and received information about the location of the other user, and now it is connected to that user directly and it's transferring the file. And so once that file is finished it would end up in this library section, and I will just use this file as an example and you can just come play it.

[Music playing.]

Chairman HATCH. How come we didn't get to hear the rest of it? That's great.

Mr. FANNING. OK. Thanks for the opportunity to speak to you today, Senator, and to BYU. I appreciate it.

Chairman HATCH. Well, thank you, Shawn.

[Applause.]

[The prepared statement of Mr. Fanning follows:]

#### PREPARED STATEMENT OF SHAWN FANNING

Good morning, Senator Hatch. Thank you for inviting me for my first visit to Utah and my first appearance before a Congressional committee. Napster has broadened my own horizons in many ways that I never expected, and these are two examples. I also want to introduce Hank Barry, Napster's CEO, who is here with me today.

I am very happy to have this opportunity to tell you about Napster's origins, describe how the technology works and discuss the future potential of peer-to-peer file sharing and distributed computing.

#### NAPSTER'S BEGINNINGS IN A NORTHEASTERN DORM ROOM

You may have heard or read that I started working on Napster in my dorm room at Northeastern University; while that's true, the story is a little more complicated than that.

I grew up in Massachusetts and during my high school years lived in Harwich. In 1996, between my sophomore and junior years in high school, my uncle, John Fanning, gave me a computer and access to the Internet. That was my first real experience with computers. I was a good student and focused a lot of attention on school, but my real love at that time was sports: I played baseball, basketball and tennis. The computer and the Internet fascinated me totally, and before long I gave up sports so I could spend more of my spare time at the computer learning about programming.

I started my freshman year at Northeastern University in the fall of 1998 intending to major in computer science. Looking for a challenge beyond the entry-level courses. I decided to start writing a Windows-based program on my own. I spent a lot of time in Internet Relay Chat (IRC) rooms getting advice and information from the experienced developers and programmers who hang out there. IRC is a network of people organized into communities, through real time channels, on various topics including programming and Internet security. "Napster" was my nickname, and I used it for my e-mail address and as my user name in IRC rooms.

One of my college roommates loved listening to MP3s and used Internet sites such as MP3.lycos.com to find them. He often complained about the unreliability of those sites, finding links to sites that were often dead ends, and indexes that were out of date because they were updated infrequently. I started thinking about ways to solve the reliability problems my roommate was experiencing.

I began designing and programming a real-time system for locating MP3 files of other users on the Internet. I designed the Napster software to find MP3s because they are the most compressed format (in consideration of bandwidth) and they were very popular at the time. The system I had in mind was unlike traditional search engines at that time.

A traditional search engine sends out "robots" to roam the Internet periodically, updating itself every hour or more to remove sites that are down or unavailable.

The database created is entirely driven by what the central computer finds by “crawling” the Internet. The indexes become outdated as sites go up or down, a significant problem when looking for MP3s because most of the files were housed on people’s home computers.

My idea was to have users list the files they were willing to share on a computer that they all could access. That list would then be updated each time a person logged on to and off of that computer. The index computer would at all times have an up-to-date list of the files people were willing to share, and the list would be voluntarily made by the users as they logged on and off the system. A user searching the index would see all the files shared by users on the network and available to others on the network at that moment.

In contrast to traditional search engines, the system I envisioned would be affirmatively powered by the users, who would select what information they wanted to list on the index. Then, when the user exited the application, their portion of the list (their files) would automatically drop from the index. The index was only one part of participating in the community. I also wanted users to be able to chat with each other and share information about their favorite music, so I added these functions to the application.

I very quickly became totally absorbed in this project. It was more compelling than my classes and more meaningful than socializing at school. I wrote a small design for this real-time search engine, and then began the implementation. I first wrote the server software. I next worked on writing the client application, i.e., the user interface. I ordered a Windows programming book over Amazon.com to learn what I needed and wrote the client software.

The Napster application I designed combined a real time system for finding MP3s with chat rooms and instant messaging (functionality similar to IRC). The chat rooms and instant messaging are integral to creating the community experience; I imagined that they would be used similarly to how people use IRC—as a means for people to learn from each other and develop ongoing relationships. I also added a “hotlist” function that enables people to see other’s musical preferences by viewing the files they have chosen to share. This synergy of technologies created a platform for a community of users interested in music with different channels organized by genres of music (again, similar to IRC), and with genuine opportunity for participation, interaction and individual involvement by the members sharing files together.

During the winter, I made the decision to leave school—I found I couldn’t concentrate on developing the program and deal with my classes and life on campus. I was driven to figure out if I could make the program actually work. Initially, I didn’t intend to even build it out; I was focused purely on establishing a “proof of concept.” I figured that if I could make it work, others could too, and someone else would take it from there. There were many unknowns. The design required a networking infrastructure of servers and bandwidth in order to maintain large numbers of user connections. I didn’t know if enough users had access to sufficient bandwidth. Other people were skeptical about whether users would be willing to share their files.

After developing the software prototype, I started sending it to friends, who sent it to other friends. A few early adopters provided feedback and helped track down bugs in the software. The consistently supportive and enthusiastic responses I got convinced me to try to build out the system. My uncle and I incorporated the company in May 1999 and he raised some money from angel investors. I released an early beta version of the Napster software during the summer and it spread quickly by word of mouth. In September 1999, Napster, Inc. obtained office space and I moved to California. Download.com featured Napster in its Download Spotlight in early fall 1999, and the user community grew significantly.

It hasn’t stopped growing since. Today the Napster community numbers over thirty-two million; for the past four months, it has been growing at the rate of one million new users each week. There are consistently over 800,000 people using the system simultaneously, limited only by our network resources. Napster users are in all corners of the world, and while I think it was initially adopted mostly by college students, a significant portion of our users are now over 30 (we received email just last Friday from one 91 year-old man).

An underlying assumption of the technology and the service is that people determine entirely for themselves how they are going to use the system and participate in the community—Napster provides the tools, but has no ability to impose limitations or exercise control. The music people are sharing and discussing ranges from the rock music you might expect to classical, opera, country, gospel, jazz, you name it. I receive thousands of emails personally and the company receives hundreds of thousands. People tell us that they use Napster to sample new music before deciding what to buy, find new artists, and house music in their computers that they al-

ready own on CD, cassette, vinyl and sometimes 8-track. We hear regularly from mothers who say they use Napster to screen the music their children are listening to and parents who say that Napster is a shared activity that helps them communicate with their teenagers.

I am an avid music fan myself and it is important to me that Napster benefit artists. Many users have told us that using Napster has led them to buy more CDs. Napster has implemented a range of features, most notably our New Artist and Featured Music programs, that help users find out about new and emerging artists and help artists promote their music throughout the Napster community, making it possible for them to reach a broad audience. When Napster is able to implement a business model, there will be other benefits for artists as well, including payments to rightsholders.

#### HOW NAPSTER WORKS

Napster is a throwback to the original structure of the Internet. Rather than build large servers that house information, Napster relies on communication between the personal computers of the members of the Napster community. The information is distributed all across the Internet, allowing for a depth and scale of information that is virtually limitless.

Napster does not post, host, or serve MP3 files. The Napster software allows users to connect with each other, so that they may share MP3 files stored on their individual hard drives. The number of song files available at any given time depends on the number of song files that active users choose to share from their hard drives. Users need not share any or all of their files—they, and only they, can choose which ones to make available to others. MP3 files do not pass through a centralized server. The transfer is directly from computer to computer, known as “peer-to-peer.”

Unlike traditional web-based search engines, the Napster system cannot index files based on their content and organize them in a meaningful way for the users. MP3 and Windows Media Audio (WMA) files are not currently designed for such content-based indexing. Instead, such files can only be located and organized based on the file names assigned by the users, specific information in the MPEG header, bandwidth or ping time of the source (such as T1, cable DSL, 35 milliseconds) or by manually opening each file, listening to the file and then categorizing the file based on a personal judgment about what the file contains. Napster provides a directory through which users may find files, by file name, residing on the computers of other Napster users. The Napster service also provides location information allowing a computer to connect to the other user and transfer the file from its location.

Other Napster functions include chat rooms, instant messaging, hotlists, and message boards. We are constantly working to refine the functionality of the client and improve the user experience.

#### THE UNLIMITED POTENTIAL OF PEER-TO-PEER TECHNOLOGY

I believe that the peer-to-peer technology on which Napster is based has the potential to be adopted for many different uses. People generally speak about the ability to share other kinds of files in addition to music, and indeed, Napster has been contacted by entities such as the Human Genome Project that are interested in sharing information among specific communities of interest. But peer-to-peer, or distributed computing, also has tremendous opportunity for sharing resources or computing power, lowering information and transaction costs. Peer-to-peer could be used to create a pool of resources in aggregate to solve a range of complex storage, processing and bandwidth problems.

Peer-to-peer also has the potential to change today’s understanding of the relationship between source and site. Think how much faster and more efficient the Internet could be if instead of always connecting you to a central server every time you click on to a website, your computer would find the source that housed that information nearest to you—if it’s already on the computer of the kid down the hall, why travel halfway around the world to retrieve it? A number of companies, from Intel on down to small start-ups, are looking at ways to develop peer-to-peer technology, and I believe that many of them will succeed. The result will be not just a better use of computing resources, but also the development of a myriad of communities and super-communities fulfilling the promise of the Internet that its founders envisioned.

Chairman HATCH. Well, Shawn, we’re proud to have you here, and, you know, you’re only 19, but I think we can use you as a professor here. I think we could—

[Laughter.]

Chairman HATCH. Let me just say this. Mr. Fanning, there are at least two inconsistent stories making the rounds about the origins of the name "Napster." Could you set the record straight today about where the name Napster comes from. And by the way, I notice you like to wear baseball caps. Could I interest you in a BYU cap?

[Applause.]

Mr. FANNING. Mr. Hatch, could I interest you in a Napster shirt?

[Applause.]

Chairman HATCH. You look pretty good in that cap. You look like you might be able to make the BYU football team; you never know.

Shawn, would you outline or could you outline what is meant by the term "peer-to-peer" as applied to the software that you're so famous for.

Mr. FANNING. Well, the idea of peer-to-peer is, instead of contacting a central server when interested—when you're trying to obtain information, instead you look to work stations which, you know, nowadays have sufficient bandwidth and sufficient storage to act as servers—and leverage those resources so you create peer-to-peer networks, are networks in which work stations contribute to the network as servers, not just as clients.

Chairman HATCH. That's great. Well, let me ask each of you: What do each of you believe that Fortune magazine has called "Peer-to-Peer, the Next Big Thing for the Internet," and why it's being talked about as revolutionizing the Internet as we know it today, and what this technology means for Utah's high-technology industry.

And why don't we start with you, Mr. Pelo, and just come across the table.

Mr. PELO. Well, clearly NextPage has demonstrated that peer-to-peer is a very significant new thing. We are doing millions of dollars in business already, as a company allowing people to set up peer-to-peer connections between these work stations and servers that Shawn referred to.

In our case, we are addressing e-businesses in the same way that someone might be looking for an MP3 file. Imagine that you're looking for a spec sheet or hazardous materials data sheet or a guideline for an audit practice. That information is just as difficult to find today as MP3 files are for music lovers.

And using peer-to-peer technologies, then, I can access that content from my lawyer's system or my accountant's system or my other partner's, or maybe it's a department down the hall in my company. And companies are willing to pay a lot of money for that technology.

Just 2 weeks ago we signed our first license to a major national company for over a million dollars, so this is a technology that businesses are recognizing so long as it can also protect the content that they're providing access to. So we're absolutely a believer, and believe it will be as revolutionary as the Internet itself, and certainly applications even like e-mail have been to us.

Chairman HATCH. Mr. Israelsen.

Mr. ISRAELSEN. We think that the peer-to-peer technology, or what we used to call distributed computing technology, really has a significant place in the future. Having been at Lexis/Nexis, Lexis/

Nexis was the prototypical major server with 70 major mainframe servers sitting in Dayton, OH, where everyone that wanted access to that data came into that server forum, pulled the data down, and used that effectively.

In the legal world it became very, very useful, in fact, imperative, that you did a search across a database like Lexis/Nexis, to identify court cases from anywhere around the country, or to gather information on a property recording.

In the peer-to-peer world, and particularly if you use the digital handshake concept and others like it, you can now go ahead and electronically file a document into the court, Utah courts were the first ones to start this in 1999. And then if you want to do a search across, all filings across all courts, rather than having to go to a centralized database, now you can do a search across an index that now looks at all of the courts and identifies where that document is filed and where it's located, and takes you there to pick it up, instead of having to store that centrally.

Same concept comes with land records, the ability to do a search across the entire country to find out what property records that I might own, and instead of having to go county by county and running that search, or to a central database, you can come, run a search, and it will point you to the 10 different locations where that information is located.

Instead of having to have the cost of storing all of that centrally, you can now go and pull out data and document instantaneously. And with the digital signature capability, you know it's authentic, you know that it is legally binding, and you know you can rely on it.

Chairman HATCH. That is very interesting. As an attorney that's mind boggling.

Mr. Simmons.

Mr. SIMMONS. We're certainly interested in kind of the revolution that Shawn has potentially started here in looking at applications in higher education.

Certainly there is an opportunity to revolutionize the way that research is done. For instance, you know, anyone working on cancer research in the world could potentially, you know, share information and collaborate in a way that's never before been possible, so certainly Campus Pipeline is interested in kind of the P-to-P revolution going on right now as well.

Chairman HATCH. Well, thank you.

Craig. Novell.

Mr. MILLER. You know, Novell's success started early in the late 1980's. Even now we have over 90 million people, almost 3 times what Napster has, as far as clients, that run their companies and their businesses on NetWare, and that basic premise started back on just doing simple file sharing, same kind of thing that Shawn's reinvented using Napster.

The biggest part of that is being able to know and locate who you are and what files are available, and that's some of the software that we helped provide to the network, is being able to discover who you are.

And so whether you take it as far as finding MP3 files on the Net or finding other people, it's all about understanding, you know, the location of where things are.

As you notice, he had to go to a server to be able to find that base—that first search, and being able to know and identify where those things are on the network is really important. That's some of the software that we provided, and we are taking a look obviously at exploiting that technology, and the need for everybody to want to be able to publish. So that's what we do and that's the software that we build.

Chairman HATCH. Thank you.

Mr. Nelson.

Mr. NELSON. I appreciate the four technology companies from the State of Utah making those remarks. Each represent world-class technology; in fact, three of the four are trustees of the Utah Information Technologies Association. I am very, very appreciative of their support of building the industry, and I think their testimony represents my comment.

Chairman HATCH. Thank you.

Mr. Breinholt.

Mr. BREINHOLT. For me, peer-to-peer sort of helps me overcome two of the biggest obstacles, and that is distribution, and finding new audiences. And it just sort of enables people who opt out of going with labels to do those things, and I told Shawn I was going to mention this but I've got several friends who are with labels right now, and they've decided to go that way, and the labels step in and do a lot of things for them that I've chosen to do myself.

As a result, when one of my CD's at Media Play, sell, for example, I make between 7 and 9 dollars, and if it is at a live show it's \$10, and my friends—this one friend in particular who is with the label—when he sells at a store he makes a dollar, and that's at live shows as well; and then out of that he has to pay off the cost of recording the album, which his last album is about \$18,000, so technically he has to sell 18,000 albums before he even sees anything.

And we did a show together where he asked me to open—this was right as I was getting started—and I sold about 70 CD's—this is up at Kingsbury Hall—and he sold about 50, and when I talked to him after he was a little bit depressed about it. But it wasn't because his opener had outsold him; it was because he knew I was going to take home about \$700, which would go to pay off this brand new CD I had released, and he was going to walk home with about \$50, which was going to try and pay off his CD.

So I've opted out. And this comes along, and this sort of helps me overcome those two obstacles of distributing, and also of getting it out there and having people hear it.

Chairman HATCH. A lot of people don't realize it costs between \$17,000 and \$36,000 to do a CD. If you would do it yourself with your own arranger and you find a studio and so forth, it's a very, very expensive process. You have to find some way of getting that back.

Shawn, I know you have chatted about this and you can answer that question too, but I know you did not come here today to speak about the litigation, so I'll avoid the temptation to ask your opinion

on how the case is going and where you see the Napster will be 6 months from now.

However, Utah is a State which prides itself on respecting the law, property rights, and free enterprise. Similarly, BYU and other Utah universities are known for their comparatively unsullied student bodies. So how do you explain Napster's popularity here in Utah and around the country, given the criticisms and the controversy that has arisen?

More to the point: Do you envision a time where Utahns can log onto Napster, or Utah businesses can enter into ventures with your company, confident that creators will be compensated for the distribution of their commercial works, like Peter, here?

Mr. FANNING. OK. Well, in terms of the compensation issue, absolutely. We've been in talks with the labels, and we've been working very hard to try and build out a system and collaborate, to create a system in which, you know, payments can be made to rightsholders.

In terms of the technology itself and how it will evolve and where I see things going—why I believe the software itself is so popular, is because, you know, the system itself is basically built around people interacting with each other in a community.

The ability to go onto the service and to locate something you haven't heard in a long time, or to have someone on the service that has similar tastes recommend something to you is incredibly powerful. It is more powerful than any recommendation engine you can build with, you know, complicated logic. It's, you know, the power of someone recommending something to you with similar tastes. So I think that's a big part of why people like to use the technology.

Moving forward, I really believe that, you know, there is a commonality of interest between the artists, between Napster, and the record companies. So I really feel that once there is collaboration and not litigation, that we can come to a peaceful conclusion and everything will work out.

Chairman HATCH. I tend to agree with you. I think collaboration without litigation might work, but we're not there yet.

Let me move on to this.

Congress recently passed a bill that I authored, or that I introduced, that sets aside the hundreds of millions of dollars in funds generated from the fees on high-tech worker visas to be used for high-tech training and education programs for Americans. How important is it that we continue to invest in our young people, assure them of the best high-tech educational opportunities available, and how important a growing population of well-trained, high-tech professionals is to your business and Utah's future, and how are we doing it, attracting?

You've indicated, Mr. Nelson, some of the answers to this, but let me just pick one or two of you, and turn to you, Brad, and maybe you, Mr. Simmons, and have you just answer that question.

I mean we had to fight like mad to get that bill through, but finally we passed it overwhelmingly. The President threatened to veto it and there's no way he's going to sustain a veto on that bill, I'll tell you that.

Mr. PELO. Well, that legislation is very important to us and to many other high-tech companies, because there is an extreme shortage of high-tech talent. And when we talk about qualified high-tech talent, unlike our industrial era, where maybe the dexterity of my fingers allowed me to produce 10 percent more parts than the next person, in the high-tech world where intellectual property and our methodologies are our true value, the person in one cubicle can be actually outperforming the guy in the next cubicle by a thousandfold.

And so when we hire, we are looking for the smartest and the very brightest. And finding people that are very well educated, that are very skilled at what they do in the technology sector is very, very difficult and highly competitive. Fortunately in Utah we have good educational institutions, a good lifestyle, and we attract a good employee base here.

When I talk to my friends at Silicon Valley about how difficult it is to hire technology talent into their businesses, it's significantly more difficult than it is here. But we feel the pain here. I think over the last 6 months, we've had at least a dozen open engineering heads that we've not been able to fill, because we have not been able to find qualified individuals here locally.

Chairman HATCH. OK. Mr. Simmons.

Mr. SIMMONS. Yes. We've been working this issue on a local level, Mr. Chairman, and we very much applaud your efforts at the national level.

We have been frustrated over the past year with the extreme shortage of qualified labor in this particular market, and find it amazing that that's so; where, you know, the University of Utah as one example, has hundreds of students that are turned away every year that want to go into computer science or electrical engineering fields, simply because there's not the resources made available to accommodate, you know, more students, more chairs, more graduates.

So we very much have applauded the work that Governor Leavitt has done in announcing a new program, where over the next 5 years they intend to double, in the State system, the number of CS and EE grads in the Utah State system. And I think that's exactly the right direction at the local level, and are thrilled at what you're doing at the national level to encourage that as well.

Chairman HATCH. Thank you. Now, I would like one of you to take a crack at this question.

Congress recently enacted a bill that I authored that protected famous names and trademarks from those who try to use them in bad faith, either to fool online consumers or to extort money from the rightful owners.

Would any of you like to comment on either experiences you have had dealing with cybersquatters or how you believe these protections will help Utah businesses or consumers in the online environment? Who would like to take a crack at that?

Mr. BREINHOLT. The only experience that I had—and it wasn't a good one—was that someone didn't take our domain name is PeterBreinholt.com—they didn't take that and do anything with it, but they did guess what they call spamming, where they took my name and made it so that whoever put it in the search engine, it

would come up first before even my website, and I think they did that because they knew there was an audience there. And it took it to a site that was—it didn't say much about me but then if you kept going it was a porno site.

Chairman HATCH. Listen, he's not alone on that. Somebody did that to me.

Mr. BREINHOLT. So I don't know. That's been my experience with it, and so I think it's terrific.

Chairman HATCH. You think that's a pretty important bill. I appreciate you saying that.

One issue that has concerned many Utahns and many Americans is the protection of their privacy as they work and play and shop on line.

I have been part of the debate in Washington trying to give Internet users as much freedom and protection as possible without unduly burdening the workings of the Internet. Now, could any of you comment on ways that businesses and policymakers can work together to protect Internet users appropriately?

Mr. Israelsen. Yes, you seem to be the logical one here.

Mr. ISRAELSEN. We look at privacy as the 800-pound gorilla in the e-commerce environment. Back in 1996 we set up the Utah Electronic Law and Commerce Partnership in Utah, to be able to start addressing these types of issues.

And realizing that the e-commerce environment is coming, how do we pro-actively look at it so that we can be prepared, instead of having to react as we go forward?

As you sit down and look at the issues that are percolating in the Internet from the Napster side, you really see legal issues associated with who is taking the property, who is using property. Are there proper protections involved in that? What about names of people who actually share information? How do we protect those effectively? How do we go ahead in a legal filing into a court which mandates that you put certain information in, such as Social Security number and financial information, particularly a divorce proceeding?

How do you protect that information from being broadly disseminated, yet at the same time provide the information that's necessary for society to move forward with?

We think that there has to be three things involved. One, technology that allows us to be able to have an infrastructure to provide protection of privacy. If you look at inputting a document over the Internet—a Word or a PDF document—you display it, it displays all or nothing. You don't have a choice to filter out key pieces of information like you do in a database. So a court filing which is a document, how guidelines in which those can operate under, and then government can step forward and be a monitoring function to help enforce a breach of that.

Those are the three areas that I think provide a middle ground, where government doesn't become too intrusive into the process, but yet everyone, as part of the process, has the ability to protect their own privacy, opt in or opt out of disclosure of that kind of information, and yet the technology protects information that's mandated to be submitted by the Federal Government, by State governments, by local governments, or even in business relations.

And I think if we took that kind of a moderate approach, I think the industry could solve most of the other problems, either through the marketplace of people deciding I'm not going to do business with this particular group or this particular site because they don't protect my privacy, or by contractual relationships and alliances. For example, as Napster works out something with the music industry where they find a common ground in which they can work, the infrastructure for protecting that information and protecting those transactions now can be put in place and then governed by contractual relationships.

Chairman HATCH. Well, thank you. Let me move to something that a lot of people are concerned about.

The chief scientist of Sun Microsystems, Bill Joy, who has been in my office recently, wrote an article for Wired magazine, which caused me to start questioning where technology is taking us. Bill Joy, the creator of Java, is by no means a Luddite, so when he wrote this article for Wired, an article which echoed many of the concerns raised by Ray Kurzweil in his best seller, "The Age of Spiritual Machines," I took notice and I asked to meet with him.

Now Joy asserts that the rapid advancement of computational technologies, nanotechnology, and biotech were combined to unleash the dangerous powers which will require us to collectively question who we are as a species. Kurzweil writes that the technology revolution will overtake biological evolution, and human beings may cease to exist. An interesting idea.

This sounds a little far fetched, but I take heed to their advice we should think through the consequences of our decisions in this area.

Are any of you familiar with Joy's views, and do any of you think we as a society need to take collective responsibility for the technologies we develop?

And let me just ask: What advice would you give to these students listening in today to prepare for careers in the digital future, and what do you project with respect to how education will change with emerging technologies?

Those are a lot of questions but I just throw them out, and anybody can answer who would like.

Shawn, if you feel like answering any of these, go ahead. Or any of the rest of you.

Yes, Robert.

Mr. SIMMONS. Mr. Chairman, one of the things that I think we should focus our collective energies around is again bridging the digital divide that we continue to find.

I think the sort of intellectual property and technological evolution that's spoken of by Mr. Joy and Mr. Kurzweil and others can only be accomplished as we make this sort of technology more broadly available than it currently is today.

One of the things that Campus Pipeline has attempted to do was, you know, kind of make our world-class technology available to all public and private universities, colleges across the board, regardless of their ability to acquire the technology. So we've had to come up with a creative model whereby that same technology that someone like Harvard would be able to afford to develop themselves,

could be used by the least well endowed community college in the poorest State in the country.

And I think that increasingly, we, as technology leaders, need to find a way to look at creative ways to approach our business models, and approach the way that we monetize our intellectual property assets that we have, in order to help make this technology available to all.

Chairman HATCH. Anybody else care to make any comments about that?

Go ahead, Mr. Nelson.

Mr. NELSON. The advice to students about—

Chairman HATCH. Sure.

Mr. NELSON [continuing]. Digital economy. The statement I would have is the new economy is here now and it's a wide open field. And it's extremely important, if you haven't retooled or focused on this, to retool yourself or to focus on this, because this is really where the jobs of the future are. They're extremely high paying. It's really the opportunity of a lifetime, and they're very, very fortunate to be their age at this point.

Chairman HATCH. Boy, I agree with that.

Let me ask some of the students questions that we've accumulated here.

The first one is: The advantage of P-to-P for distributed data storage is clear. Where do you see the future of P-to-P for distributed processing?

Anybody care to take a crack at that? Brad Pelo.

Mr. PELO. I mentioned a recent conversation with an analyst at the Gartner Group, for those who are unfamiliar, is one of the largest institutions consulting and providing analysis of the technology field to Global 2000 companies.

And this analyst specifically had just completed a paper on distributed computing or peer-to-peer computing versus peer-to-peer information sharing, and his perspective is that peer-to-peer computing, or sharing the processing power of distributed computers does not yet hold great promise; may in the future, but he believes that peer-to-peer information sharing, which is what most of us have addressed today, is in fact where peer-to-peer technologies will be headed.

And I think the reason for that analysis is that on the computing basis, I'm not sure we yet know yet how to use the distributed computing that could be available to us. What specific problems we might solve and how prevalent those applications might become, versus the exponentially growing need for information because the digital information itself is exponentially growing, so how do you manage that; and that's really where peer-to-peer technologies will apply.

Chairman HATCH. Thank you.

Yes, Craig. Mr. Miller of Novell.

Mr. MILLER. I disagree a little bit with what's been said. There are technologies being developed right now by a consortium of companies—Intel, Compaq, IBM, Hewlett-Packard, Novell, and others—regarding a technology called InfiniBand, and what it basically does is it cracks the bandwidth problem that we've had with computers.

Right now you put really fast CPU's in a lot of people's machines, and the real problem is being able to get out to the Internet, your IO, as people call it, or your storage, and the InfiniBand technologies that are being developed right now are destined to crack that.

And so I believe that over the next 3 to 5 years, as this technology comes on line, you're going to be able to see the increase of this distributed computing where it changes everyone's lives, as simple as that is, because the fat pipe technology being able to have a huge amount of bandwidth between computers is going to solve that problem, and people will take advantage of it, I guarantee you.

Chairman HATCH. You are good to help us to understand these problems better.

I have a direct question to you, Shawn.

What impact do you think peer-to-peer technology will have on government organization, and how can government take advantage of this technology to improve services to citizens and businesses?

That's kind of a tough question.

Mr. FANNING. I think in terms of impact on government, there has been some discussion related to some of the fully-distributed technologies such as Gnutella and FreeNet, which have no central server, which can't be shut down, and which, you know, allow you to transmit information on a peer-to-peer basis.

So there are some issues related to, you know, controlling information, you know, confidential information being shipped across those types of networks. So I've heard of concerns in that the respect. But that's it. I mean that's all I've really heard related to government issues of peer-to-peer.

Chairman HATCH. Great. Here's another question.

Today we've heard numerous Utah business leaders present their different technologies as possible solutions in the Internet's future. Two major questions remain: Who will monitor the Internet and how? What place does the government have in controlling content and information, theft that will increase as peer-to-peer and other internal or Internet technologies integrate themselves with the business and services industry?

Any of you care to take a crack at that? Brad. Mr. Pelo.

Mr. PELO. I think, first of all, the premise of a free society is that government's role is to protect the rights of its people, and one of those rights we want protected are property rights.

In the days of the framers of the Constitution, that might have been a plot of land or cattle or horses that they owned. Today, particularly in American business—and I believe this is truer globally than we want to believe—that the assets or the properties of these businesses are becoming more and more digital in nature, to the point where perhaps the future might hold digital assets as the only real assets of business. And in such an environment, government has to play a significant role in protecting those property rights.

As far as the role of overseeing the Internet and being sort of the watch dog, I think there were equal concerns among the framers about government's role in our own privacy as citizens, and that's

why we walk a very fine line of protecting digital rights without getting encumbering on digital privacy.

Chairman HATCH. Well, thank you.

Shawn, again there are implications to disguise files as MP3 files which can be Trojan horses, etc. How will these be stopped, or any peer-to-peer dangers of this sort?

Mr. FANNING. Well, with the Napster system, the software actually validates the files that users attempt to share, so it detects a valid MPEG header and determines that there's actually audio data.

You know, there's been software written that has been designed to fool the system, to basically wrap other types of files within MPEG headers, allowing you to share stuff on Napster that's not actually a valid MP3, but fortunately those files being used in the normal use of an MPEG file, the system will attempt to decode them, not execute them, so over the Napster service there's very little risk of obtaining a virus from a file you transfer.

In terms of other types of networks that allow you to share other, you know, binary data and other types of information, there's definitely that risk; but that risk exists in, you know, standard systems as well, in the sense that you're still going to a site and transferring a file that you're executing, not knowing, you know, the contents of that file. So the trust in that system is based more on the source of the information.

So there's some trust loss in the sense that suddenly you're dealing with peers who aren't necessarily controlling the information they're sharing, haven't created it, but I think those can be dealt with—there are some approaches related to doing things like hashing of information to verify that the contents are consistent with the creator of the content. And so there are some approaches to deal with those issues.

Chairman HATCH. I hope somebody videotaped that with your BYU hat on. I think that's pretty good.

Well, we have some more questions but I'm going to have to wrap this up. Let me say the reason why the music issue, among others, intrigues me so much is because this is a nascent technology which holds such promise for Utah's entrepreneurs. The whole Napster situation, the whole creativity here in Utah.

Insofar as Utah's consumers are concerned, they desire access to downloadable music, art, research, video, and other content in a manner which is not unnecessarily restrictive or unduly burdensome. Now, I want to ensure that the marketplace provides them with the opportunity to access the content of their own choosing over the Internet and to do so legally.

Insofar as creators are concerned, I want to ensure that Utah's artists and creators are protected through an approach to copyright that empowers them to generate maximum revenue for their creative works.

Peter is the perfect illustration, Peter Breinholt. This is a great way for him to be able to get his talent out there, and I'm concerned about him and others. And insofar as Utah's entrepreneurs are concerned, I want to be sure that this revolutionary technology is not killed in the cradle.

Shawn, as an aside, I hope there is an effort undertaken to ensure that your site is eventually able to compensate artists. Unless that's so, I think you're going to have a lot of difficulty, but I know that you're working on it. I know that Hank Berry, who is sitting here in the front row, the head man at Napster, has that uppermost in his mind. But in order for that to happen, Napster has to be in business.

I question, as a matter of public policy, whether it is in the public's interest and the creative community's interest to have this site shut down before a trial on the merits is concluded. If that happens, this technology will move underground, and the opportunity to embrace this technology in a form which ensures compensation to artists will have passed, so I'm concerned about it.

I would note the Copyright Act already provides a paradigm for compensating creators in the digital environment. A few years ago, music and electronics industry experts believed that CD's would be replaced by a newer, more compact and convenient form of digital music service, the digital audio tape player. DAT, as it was called, would allow consumers to make digital copies of their favorite music onto small digital tapes. Now this is where the recording industry thought the market was going at the time. They just didn't foresee the power and consumer appeal of the Internet, MP3 compression, and peer-to-peer technology. So DAT never became a hit with consumers. It was overtaken by the Internet.

So why bring it up? Well, prior to the deployment of DAT machines, the creative community and the recording industry came to Congress and expressed concerns about piracy and how these machines could be used to facilitate large scale piracy of—how these machines could be utilized to facilitate large scale piracy of musical works.

Does that sound familiar? I worked with the creative community and leaders in the consumer electronics field to develop a legal framework which is part of current law, that placed a royalty on the sale of all DAT machines, and the funds generated from that royalty were to be divided among songwriters, musicians, recording artists, publishers, and the labels.

In fact we negotiated a fairly complex formula which spells out how much each artist would be compensated. It seems to me as though this formula contained in section 1006 of the Copyright Act, could serve as a basis for settling this current dispute.

The record labels agreed to this formula in 1994. Maybe we ought to try to see if we can get everyone to rally around this concept so that we can resolve this matter.

Napster could charge a royalty for the downloading of its software, or charge for premium services, and that, through the use of digital rights management software and application of a formula based on current law, we could keep this extremely popular service going for the benefit of consumers. And we could ensure that all of those involved in the creative process surrounding musical works—the studio musicians, the studio artists, the publishers and writers—not just the record labels, would share in the success.

Look, if we don't solve this problem, there are going to be thousands of Napster-like companies out there, many of them offshore who will not abide by copyright laws in any way, shape, or form.

So I challenge the industry to come up with the ways of doing this. The last thing on earth I want is to have government coming in and telling you what to do, but that's what's going to happen if we don't get these problems solved. And when you have 32 million people on a program, there's got to be some way for, in this case, the music industry, to exploit that process and to make it work, rather than just stop it.

So I think this hearing has been very helpful to me today. I want to thank each of you for taking time out of your busy lives to come here and talk to all of us.

I want to thank Brigham Young University for allowing us to have these wonderful facilities to hold this, and I want to thank all of you, the witnesses and the students, for appearing at this important hearing.

Technology is a part of tomorrow's future in Utah, and it's a part of tomorrow's Utah. The young people who have attended today, and the Judiciary Committee, of course I think we can say we've learned quite a bit about what we can do, both here and in Washington, to ensure that Utah continues to play a leading role in the global economy of the 21st century.

This has been a good hearing. I'm very grateful to all of you. Let me thank everyone who has participated today, and let me thank the BYU community, including the students, for being such good hosts for this interesting hearing.

I hope you've all learned something here today. If you didn't, you weren't listening. And I think we've learned at least three significant things: First, we learned that the software industry embodied most famously in Napster can help lead revolutionary change in all relationships in the wired world, where we can all share knowledge with each other to work and play and communicate.

Second, we learned that the information technology is the engine driving Utah's economy, and it's a source of very good, high-paying jobs for our young people, like BYU students and Utah's work force. Generally keeping Utah in the forefront of the technology revolution discussed today will be the key to our own State's continued success, because this is the future.

I commend all of you to read Bill Joy's article in Wired. I think it's well worth your time; it's very provocative. In fact, I recommend Kurzweil's book, even though I don't agree with some of his conclusions. I've got to say I'm not sure he's wrong. And we're going to have to make sure that we are on the top of some of these things.

Now third, we found today that next time we invite Shawn Fanning, Peter Breinholt, and our other witnesses, I think we better consider the Field House or the Marriott Center so we can do it right. How's that?

I want to thank you all for being here. This has been a good hearing. We're grateful to all of you. Thank you very much.

[Whereupon, at 10:55 a.m., the committee adjourned.]

**A P P E N D I X**

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ADDITIONAL SUBMISSION FOR THE RECORD

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**High-Tech and Intellectual Property  
Accomplishments of  
Senator Orrin G. Hatch  
During the 106th Congress**

*The 106th Congress (1999-2000) was an exceptionally productive time during which several legislative measures important to the knowledge-based industries became law. Below is a summary of some of the intellectual property and high-tech accomplishments of Senator Orrin G. Hatch during the 106th Congress. Senator Hatch is Chairman of the Senate Committee on the Judiciary and a Member of the Senate Committee on Finance.*

**HATCH LEGISLATION ENACTED INTO LAW:****S. 2045 THE AMERICAN COMPETITIVENESS IN THE 21ST CENTURY ACT**

Senator Hatch authored and introduced this legislation to insure America's continued leadership in the new information economy. There is currently a serious shortage of high-tech workers in the United States. This bill provides both long and short-term solutions to the shortage. First, the bill takes long-term steps by investing in the American workforce through a stream of funding for high-tech job training and K-12 education initiatives. It also provides grants for after-school technology education and helps educational and research communities by exempting them from the cap on high-skilled professionals. Second, in the short-term the bill addresses immediate skilled worker needs by authorizing an increase in temporary visas for high-skilled professionals. **This legislation passed Senate and the House on October 3, 2000, and currently awaits the President's signature.**

**S. 1798 THE AMERICAN INVENTORS PROTECTION ACT OF 1999**

Senator Hatch authored and introduced this legislation, which contains the most significant reforms to our nation's patent code in half a century and represents one of the most important high-tech reform measures to come before the Senate. The bill provides protections for inventors against fraud by invention promotion firms; it is expected to save inventors \$30 million a year by reducing patent fees for only the second time in history; it establishes a guarantee of a minimum 17-year term of patent protection for diligent patent applicants; it protects American businesses who use innovative business methods under trade secret protection from being put out of business by later inventors; it provides patent owners a viable alternative to costly patent litigation; it improves the operations and efficiency of Patent and Trademark Office and provides inventors a greater say in the management of the PTO; and it makes a number of other miscellaneous but important changes to patent law. The bill was reported by the Committee on a vote of 18-0 this year. **As a part of the omnibus budget package, it became law on November 29, 1999, culminating four years of work in the Senate led by Senator Hatch.**

**S. 680 EXTENSION OF THE RESEARCH & DEVELOPMENT TAX CREDIT**

Senator Hatch authored and introduced legislation to make the Research and Development tax credit permanent. **This legislation passed the Senate July 30, 1999, and while the permanent R&D tax credit did not get signed into law, a modified version to extend the credit for five years was included in H.R. 1180 and signed into law.**

**S. 247 SATELLITE HOME VIEWERS IMPROVEMENTS ACT OF 1999**

Senator Hatch authored and introduced this bill to reform the Satellite Home Viewer Act to remove some of the barriers to effective entry by satellite technology carriers in the video marketplace. This legislation: (1) permits satellite carriers to deliver local network stations to their subscribers; (2) lowers the copyright rates paid by satellite subscribers; (3) reduces consumer confusion surrounding eligibility for non-local network stations; (4) removes the anti-competitive restrictions in the current law; and (5) authorizing a national PBS satellite feed. The bill, which has been crafted over the course of three congresses, was passed by the House and Senate this year, and a joint House-Senate conference committee, which Senator Hatch chaired, reported a reconciled version of the two bills in November 1999. **The bill was included in the omnibus appropriations bill and was signed into law November 29, 1999.**

**S. 1255/ S. 1461 THE ANTICYBERSQUATTING CONSUMER PROTECTION ACT**

This important e-commerce measure, authored by Senator Hatch, amends the Lanham Act to protect consumers and promote electronic commerce by creating a new federal cause of action to fight cybersquatting – the practice of registering famous marks as Internet domain names. Cybersquatters seek to sell these domain names at a huge profit to the legitimate trademark owners or, alternatively, to reap where they have not sown by confusing consumers about their relationships to famous brand names. The Senate approved a bill originally introduced by Senator Abraham (S. 1255), with the Judiciary Committee amendment substituting the text of Senator Hatch's bill, the Domain Name Piracy Prevention Act (S. 1461). **The text of the Hatch bill was included in the Conference Report on the Satellite Home Viewers Amendments Act, with additional amendments sought by Senator Hatch to protect individuals from the practice of unfair cybersquatting, and it was signed into law on November 29, 1999.**

**S. 1257 THE DIGITAL THEFT DETERRENCE AND COPYRIGHT DAMAGES IMPROVEMENT ACT OF 1999**

This high-tech industry priority, authored by Senator Hatch, provides strengthened protections for copyright owners and added deterrence against infringement by raising the Copyright Act's limits on statutory damages by 50 percent. The legislation also directs the Sentencing Commission to stiffen criminal penalties early next year and make it more costly to infringe the valuable property rights of the high-tech and entertainment industries. **This bill was signed into law in December 1999.**

#### **THE YEAR 2000 FAIRNESS AND RESPONSIBILITY ACT**

Senator Hatch was a leader in advocating legislative reform to address the so-called "Y2K" computer-glitch problem. Many experts predicted that the Y2K problem would generate up to one trillion dollars in litigation costs and threaten the solvency of America's high-tech industry. Because of the importance of this industry, our continued economic growth and national defense were placed in jeopardy. The bill created incentives for parties to settle lawsuits arising out of Y2K suits. The bill also contained major litigation reform provisions, such as class action reform. The Judiciary Committee held an extensive hearing on the bill in March 1999. The bill was voted out of Committee late that month. **Many major provisions of the Hatch bill were incorporated into S. 96, the McCain Y2K Act, which ultimately passed the Senate and the House and was signed into law.**

#### **S. 1258 PATENT FEE INTEGRITY AND INNOVATION PROTECTION ACT OF 1999**

This bill, authored and introduced by Senator Hatch, helps the Patent Trademark Office (PTO) to better serve American innovators and trademark owners. This legislation allows the PTO to generate the fee revenue it needs to operate as a self-funded agency and to retain those fees for use in its patent and trademark operations, without being subject to fee diversions or new surcharges to subsidize unrelated federal programs. **The bill was signed into law in August 1999.**

#### **S. 1260 COPYRIGHT ACT TECHNICAL CORRECTIONS**

This bill, authored and introduced by Senator Hatch, served as a follow-up to the Digital Millennium Copyright Act and the Copyright Term Extension Act, which were enacted at the end of the 105th Congress. This bill improves these bills to make them more user-friendly for copyright owners and those who make use of their works in accordance with the provisions of the Copyright Act. **The bill was signed into law in August 1999.**

#### **S. 1259 THE TRADEMARK AMENDMENTS ACT OF 1999**

This bill, authored and introduced by Senator Hatch, provides stronger and more efficient protection for trademark owners and consumers by making it possible to prevent trademark dilution before it occurs, by clarifying the remedies available under the federal trademark dilution statute when it does occur, by providing recourse against the federal government for its infringement of others' trademarks, and by creating greater certainty and uniformity in the area of trade dress protection. **The bill was signed into law in August 1999.**

**OVERSIGHT ACTIVITIES****ONLINE MUSIC AND COPYRIGHT PROTECTION**

Senator Hatch presided over a hearing on online music featuring Lars Ulrich of Metallica, recording artist, Hank Barry, the CEO of Napster, Roger McGuinn of The Byrds, recording artist, Michael Robertson of MP3.com, and other industry leaders and experts from the online music business. The hearing explored issues of copyright protection and the rights of listeners to use music they have purchased in new ways technology makes possible, and also explored developments in the industry toward delivering music on the Internet in new devices such as mp3 players and wireless devices. As the Napster and MP3.com litigation develops, Congress may need to clarify the rights of the artists and the audience so that both can benefit from developing technology.

**HIGH-SPEED/BROADBAND INTERNET**

Senator Hatch presided over a full Judiciary Committee hearing examining competition in high-speed Internet services and new Internet broadband technologies. With passage of the Telecommunications Act of 1996 and the advent of new and improved advances in communications technologies, the Committee examined the state of competition to ensure a proper balance of incentives for investment in new broadband technologies and to provide for general "oversight" of the 1996 Act.

**ONLINE PRIVACY**

Senator Hatch presided over a Judiciary Committee hearing examining the issue of privacy on the Internet. As e-commerce, distance learning, and telemedicine become viable opportunities to bring business, education, and medicine into the home, serious questions have been raised regarding the protection of an individual's privacy. Senator Hatch has encouraged industry self-regulation to ensure enhanced confidence in the Internet.