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Program

GUESTS OF HONOR

JOHN T. CHAMBERS
President and Chief Executive Officer
Cisco Systems, Inc.

&

RONALD D. SUGAR
Chairman, Chief Executive Officer and President
Northrop Grumman Corporation

PRESIDING OFFICER

BARBARA HACKMAN FRANKLIN
Chairman of the Club

QUESTIONERS

GAIL D. FOSLER
Executive Vice President
The Conference Board

ROBERT D. HORMATS
Vice Chairman
Goldman Sachs (International)

Introduction

Barbara Hackman Franklin - Presiding Officer: This evening we are very fortunate to have

with us as guests of honor two Chief Executives. The leaders of two important companies, both

headquartered in California, in two of America's key industries, defense, and global networking

for the Internet. These companies focus on widely different markets but those markets are

intertwined, illustrating how the information revolution has brought the power of new

technologies to the commercial, military and government markets. Each of these companies,

Cisco and Northrop Grumman, is at the forefront of innovation, of technology, and most

importantly the innovation in technology that is transforming the way we live, work,

communicate, protect our homeland, and defend ourselves. So with that bit of background,

we're going to get right to our speakers and the first one is going to be Ron Sugar. Dr. Ronald

D. Sugar is Chairman, CEO and President of Northrop Grumman, one of the worlds largest

defense companies. It's a leader in the application of high technology to miliary transformation,

and he himself is recognized as a leader in the defense industry globally. Ron has electrical

engineering degrees, bachelors, masters, doctorate from UCLA. He started his career as an

engineer, and at TRW he rose to become head of two of it's largest operations, TRW Aerospace

and Information Systems, and he was the CFO along the way. He then became President and

COO of Litton, which was acquired by Northrop, and the rest, as they say, is history. And how

TRW is part of the Northrop family so things have come in full circle in Ron's career. Over the

past 12 years Northrop Grumman has undergone a strategic transformation. Once highly specialized in military aircraft such as the B2 Bomber, the company today is the nations largest military ship builder and the leader in systems integration, advanced aircraft, raiders, electronic warfare, space systems, missile defense, homeland security and government information technology. Headquartered in Los Angeles, Northrop has $30 billion in annual revenues, employees 125 thousand people in 50 states and 25 countries. Ron is a member of the National Academy of Engineering, a Fellow of the American Institute of Aeronautics and Astronautics, and a Fellow of the Royal Aeronautic Society. It is a great pleasure to welcome him to our gathering and to this podium. Please warmly welcome Dr. Ronald Sugar.

Dr. Ronald D. Sugar: Thank you very much Barbara. Even though I'm an engineer, I'm going to try not to bore you tonight. I also want to thank the Economic Club for allowing me to go before John Chambers, not after John Chambers. That was my luck of the draw. Well look, we're going to talk tonight about technology and we're going to talk about how computers and networks and all those kind of good things have changed the world and are going to change the world going forward, so what I'd like to do to get started is to ask you if you could indulge me for a minute in a slightly politically incorrect story, but I know this group is pretty sophisticated so...A professor of foreign languages was explaining to her class that in French nouns, unlike English counterparts, are grammatically designated as either masculine or feminine. For example, in French house is feminine, la mesou, and pencil in French is masculine, le crayon. But if you know how to speak French you know that I don't from the way I'm talking. So what she asked is to have her students basically break into two groups by gender, men and women,

and then she asked them if they would please give four reasons for why they thought the gender of computers should either be masculine or feminine, because computer was the key word. Well first the men's groups went and they said that they decided unanimously that computers should be of the feminine gender, la computer, because 1) no one but their creator understands their internal logic, 2) the native language they use to communicate with other computers is incomprehensible to everyone else, 3) even the smallest mistakes are stored in long term memory for later retrieval, and 4) as soon as you make a commitment to one you find yourself spending a lot more money on accessories for it (laughter). Then the women's group was asked to step forward and explain what they thought, and they felt that computers should definitely be designated as masculine le computer, because 1) in order to get their attention you first have to turn them on, 2) they have lots of data but their still basically clueless, 3) their supposed to help you solve problems but half the time they are the problem, and 4) as soon as you commit to one you realize that if you'd waited just a little longer you could have gotten a much better model (laughter). So with that setting for technology computers, let me now abruptly shift gears and take you to the front lines of the global war on terror, how about that for a segue. It's a good segue, huh? And talk about how computers, and more particularly, computer networks are transforming national security. For the soldier in combat there are three fundamental questions that he must be able to answer at all times. Where am I, where are my buddies, and where is the enemy? With that information he can usually make the right decisions to carry out his mission. Not long ago, determining where am I meant using a map and a compass, and trusting ones map reading and navigational skills. Picture a Second Lieutenant in a fog or a storm leading a patrol through a dense swamp at midnight, and trying to determine his exact location using a 20-year

old map. Today with the advent of global positioning, satellite communication and robust computer networks, you now have a digital battlefield. A command system at a capability, which is now called Blue Force Tracking. This capability is new, and equipped military units have a GPS receiver to constantly track their own positions. Satellite uplinks eliminate line of sight communication breaks where there might be a mountain between you and the people you're communicating with, and a tactical Internet that's superimposed upon the battlefield connects everyone to a common network, even allowing text messaging to go back and forth. On a ruggedized handheld device, that very same Second Lieutenant can know within 10 meters where he is. He sees little blue icons on his device, and he knows where all of his other friendly forces are. He sees red icons and he knows where the enemy may be lurking. That same information is available to the squad leader, to the brigade commander, and even if necessary to top decision makers in the Pentagon in realtime. They can change their view in terms of the display, they can add content, they can see a larger picture, they can zoom in on a smaller picture, in other words, each leader at every level gets the information they need to do their job effectively. Where am I, where are my buddies, where is the enemy? Questions answered. As my friends as Cisco might say, that's the power of the network. Northrop Grumman makes the Blue Force Tracking System for the United States Army. And I share this anecdote with you as a way to introduce to you the main points of my remarks tonight. I'll call them spin off, spin on, and twin spin. First I'll touch on spin off, that old concept that the government funds military technology and research and development, and over time that creates innovations which will be spun off to benefit commercial industry. Second, a more recent dynamic which we can call spin on, where information revolution, which has been going on all around us for many years, has

sparked innovations which, in the commercial world, then become spun back on to our military

forces and to the government. These innovations have fundamentally changed how modern

warfare is now being conducted and how it will be conducted in the future. And finally, what I

believe is the future path that we're on here, is twin spin, where innovations will now travel

much more rapidly and readily back and forth between both commercial and government worlds

to the benefit of both. These three concepts serve to explain, for example, the remarkable

transformation of my own company, Northrop Grumman, which has become during the post cold

war era, one of the major defense contractors in the world. They also serve to illustrate the

special relationship between such seemingly different companies as Northrop Grumman and

Cisco. It's a relationship well known to John and I, but perhaps not as readily apparent to

outsiders, and I'll say more about that in a few minutes. And most significantly is the dynamic of

twin spin, and that is more than just good business or good government, it is the imperative for

our future success in the war on terror, and to have a truly effective system of homeland security.

So, first in talking about spin offs, let's start with a leading example, the space race. We all

remember the space race. Some remember the space race as an ideological battle, as an

opportunity to prove that free and democratic peoples could accomplish a great task more

quickly and efficiently than a closed and authoritarian regime. Others celebrate the scientific

journey and say that that was reward enough. We seemingly conquered impossible technical

hurdles to accomplish President Kennedy's vision of placing a man on the moon and returning

him safely to Earth. In the process, we added dramatically to our core knowledge of the Earth

and its sciences, and in fact of our entire universe. Equally impressive to those achievements

were the many lasting ways American lives were touched by the technologies that were

developed in the space race. For example, digital signal processing techniques, which were

originally developed to computer enhance pictures of the Moon on the Apollo mission are now

the core technologies for computer aided tomography, CAT Scans, and for magnetic residence

imagine, MRIs, both now widely used in hospitals worldwide. Kidney dialysis machines were

the result of a NASA developed chemical process that could remove toxic waste from used

dialysis fluid. And portable self-contained power tools were originally developed to help Apollo

astronauts drill for Moon samples. They didn't have any kind of plug they could plug into. But

back on Earth this technology was developed and led to the development of commercial cordless

power tools and appliances we all take for granted today. From athletic shoes to firefighter

equipment, from ski boots to joy stick controllers, from smoke detectors to water purification

systems, and don't forget the powder orange drink Tang. Anybody remember Tang? This is a

good audience. When I talk to younger people they have no idea what I'm talking about. The list

goes on and on. Since 1976, in fact, over 1,400 documented NASA technologies have benefitted

the United States, its industry, improved the quality of life, and created jobs and better prosperity

for Americans. With NASA poised to launch a new era of space exploration with missions now

to the Moon and Mars, as articulated by the President, we may be on the cusp of another influx

of technologies that will have broad impacts on society. Spin-off technologies, however, were

not limited to simply NASA and civilian space programs. Military requirements have also

pushed the state of the art and resulted in new commercially viable technologies and products.

Advance composite materials, semiconductors, radars, infrared sensors, and even structured

software development, all originated or received very significant boosts critical to the

development from military spending. And perhaps the most significant spin off of the era of

defense spending was the Defense Advanced Research Projects Agencies Arpanet, which later morphs into what we now call the Internet. And once the internet's development left the confines of government laboratories and research universities funded by military expenditure and reached the wide-open spaces of the commercial world, it flourished. In fact, it flourished to the point that the internet would later spin back on, that it spin back to the defense industry and trigger what is now the current transformation in military thought on how future wars are going to be fought. Following the end of the cold war, the military and it's industrial base contracted, and it contracted dramatically during the 1990s. At the same time, the information technology sector boomed with new ideas and new products. Of the information revolutions many far-reaching impacts, the most significant impact was that IT became the essential component of our military's new transformation. I think every American would agree that those who we send in harms way deserve every possible advantage we can give them. And aside from the sheer bravery, skill and decency of our highly trained fighting forces, our nation's greatest strength is its technological know how. As illustrated by the Blue Force Tracking example I just mentioned a few minutes ago, the miniaturization of key technologies, the advent of ever more powerful software computer processors, and the advances in communications technologies have made a dramatic difference. These spin on innovations have enabled our military to conduct battlefield operations with unprecedented efficiency. Space, air, ground and sea based platforms are now being linked into a robust network that give our fighting forces an overwhelming advantage in conventional warfare. These breakthroughs were in fact spawned by the commercial sector, because the pace of commercial progress surpassed that of defense sector in the last decade or so. Incorporating these and future breakthroughs in the military systems, and even more profoundly

into military doctrine and training is essential if we're to maintain our advantage on the

battlefield. While the military, and in fact all of government was recalibrating it's plans and

assumptions initiated by the information revolution, by own company, Northrop Grumman was

as well. At the end of the cold war, Northrop Grumman was a $5 billion military airplane

company, with the majority of our revenues tied to one program, the B2 Bomber. We were going

to originally build 132 B2 Bombers, and the program was stopped after 21. But we saw an

opportunity in the changes sure to come from the new geopolitical picture, and the influx of

breakthrough technologies largely coming from the commercial sector. We recognized that

America's future security needs would depend upon capabilities such as information dominance,

precision strike with smart weapons, persistent global surveillance, and ultimately defense

against ballistic missiles. We then launched a decade long expansion of our company, largely

through mergers and acquisitions, and some internal research and development investment, to

strategically align the company with what we thought the future needs of war fighting would be.

We anticipated the broad impact of technology advances and what they would have on our

industry and our government customer, and went ahead and bet our company on these believes.

Executed a business strategy to bring in the right capabilities at the right price. And I'd like to

take personal credit for it but I can't. It really goes to my predecessor, and while I participated in

the final stages of this with him, I will give Kent Kresa full credit for all of this. Today we are, as

Barbara mentioned, a $30 billion company with an exceptional portfolio of businesses that really

do align us with the future. Today I would tell you that we're not primarily a military aircraft

maker. We at one time had 70 or 80 percent of our revenues in that area. Today it's about 10

percent, but today well over a third of our business is in information technology. The

information revolution changed the rules of the game. Had we been unable to find a way to

bring the best commercial technologies into our business and incorporate them as solutions for

our government customers, we would have been out of the game. This brings me to where we

may be headed in the future. The notion that we are moving beyond spin off, spin on, to

something new, something we call twin spin. Everyone here understands all too well the

profound impact the atrocities of 9/11 had on our country. The subsequent years have seen a

variety of actions taken as a result of the new war on terror, and I would suggest to you that one

of the most important steps we can take is to encourage the rapid two way flow of innovation

between commercial and government. What's possible when we take the leading technologies

regardless of their point of origin and apply them to things such as homeland security? Let me

give you an example. Consider a system, which we formulated recently called VISTA. Imagine

an urban landscape with a proliferation of low cost sensors that are distributed around the city

that can detect the presence of explosives as well as radiological, or chemical, or even biological

weapons or contaminants. In the case of a chemical weapons release in the middle of an urban

area, special standoff infrared sensors would identify the poisonous vapor, the networks

computer brain would then be able to use wind and temperature data to predict the path of the

plume, and we would have a reverse 911 systems where instead of you calling in with an

emergency this would call you, and call with a direct telephone warning to every apartment,

home and office that is within the cloud's path. Traffic lights would be automatically routed to

change car's direction to move them away from the threat and the danger zone. First responders

and emergency personnel would receive a detailed picture of the impacted area with the

information that they would need to make immediate decisions well before they would even

arrive on the scene. The technologies to do this exist today, and the benefits could not only apply to terrorist attacks, but also to other day-to-day operations, or in response to natural disasters. We have now reached a point where the information revolution in which technology and intelligent networks can create a web of even greater safety and security for our citizens. While the concept I described to you, VISTA, is still a concept, there are many other activities we have underway helping to meet these vital homeland security needs. Let me give you a couple of examples. We're currently building a highly secured data network for the United States Department of Homeland Security in order to be able to securely network together the 22 or more agencies, which are part of this organization. One of the challenges of homeland security is the ability to communicate rapidly and accurately when there's any kind of a crisis, and probably one of the first orders of business for the Department of Homeland Security is to be able to do that for themselves internally. This is something, which is now underway. We're also deploying a biohazard detection system in post offices around the country to be able to determine anthrax and other biotoxins, and ensure that the United States mail is safe. And we're testing infrared countermeasures, which we developed under military conditions for planes such as the C17 and "head of state" aircraft to be able to protect commercial aircraft one day from attacks such as shoulder held missiles. And in the spirit of twin spin, we see applications of new secure networks and software to improve the protection of things such as our very important financial data exchanges, not only in this country but worldwide, and protect them from cyber terrorists. The ability to recognize threats, to identify and respond to cyber attacks, and to assure the integrity of existing data are critical discerns of ours. I believe the unique capabilities that we, and others in the defense world, have in this area will certainly migrate to the commercial arena,

and the sooner the better. So, let me conclude my odyssey from spin off, to spin on, to twin spin by emphasizing that I see much progress being made. The Department of Defense and it's unique industrial base of which we're a part will continue to innovate to meet future national security needs. But by far, more of those necessary innovations will certainly come from the commercial world. So therefore, partnerships between government contractors and traditionally commercial companies will continue to serve as an important bridge for these innovations. That's why close relationships between companies such as Northrop Grumman and Cisco are so important for both business and for national security as well. Northrop Grumman stays highly informed on technical advances at Cisco and at other commercial companies to insure that we find the right solutions for a specific military need, and the government in turn gets a competitive price, a commercially competitive price for much of the products, particularly the Cisco products that we pull through, and Cisco, as an example, gains a good advanced look at the future needs and requirements of the United States Government, which happens to be the largest single consumer of IT products and services on the planet. For all of us, advancing national, in fact global security is a shared goal, and that translates into more stable financial markets, more opportunities for economic growth, and increasing consumer confidence in the future. Well, thank you again for this opportunity to be with you tonight, and after John gets a chance to make his remarks I look forward to entertaining your questions.

Barbara Hackman Franklin: Thank you Ron. That was just most illuminating in many respects. Thank you. John T. Chambers is President and Chief Executive Officer of Cisco Systems, the worldwide leader in networking for the Internet. Since January of 1995 when he

assumed his current role, John has grown the company from $1.2 billion in annual revenues to

it's current $22 billion in annual revenue. It's headquartered in San Jose, California. John has an

MBA from Indiana University and bachelors and law degrees from West Virginia University.

His career, though, has been at the heart of the information age. Prior to joining Cisco in 1991 as

Senior Vice President for Worldwide Sales and Operations, John spent eight years at Wang

Laboratories, and six years with IBM. He's well known for his visionary strategy, his ability to

drive an entrepreneurial culture, and his straight talking style. He has twice been awarded the

Best Investor Relations by a CEO Award by Barron's and IR Magazine, and last year, was

named Most Influential CEO in Telecommunications by Institutional Investor. He's passionate

about education. I've heard him on this subject, and one of the things he's deeply committed to

is the Cisco Networking Academy program which prepares students for high technology jobs.

Globally the program has more than 10,000 academies and 450,000 students. It held it's first

ever classes in Afghanistan 18 months ago, and has graduated more than 100 Afghan students,

including 43 women. John has served two presidents, most currently as Vice Chairman of

President George Bush's National Infrastructure Advisory Council, served on the Bush

Transition Team, and on President Clinton's Advisory Committee for Trade Policy and

Negotiations. I'm very pleased to welcome, and give a warm welcome please to John Chambers.

John T. Chambers: Thank you. It's truly an honor to be here this evening to share with you

some views on global competitiveness. Ron and I share a very similar view of how this evolves,

whether it's from the military, government, business or job perspective. I'm going to talk about

this not as an expert in any of those categories as such, but purely from the perspective of a high

tech CEO with a strong internet background. And because of that background we get to talk to almost every government around the world, almost all…large business, and the majority of small businesses, and consumers. And we're able to see trends, or at least what people view of trends in terms of how the market will change in its global competitiveness. And it is the key thing on almost every CEO's mind around the world, how are they positioned within their industry, how is this market going to change, but also it has changed dramatically, especially in the last three or four years from government leaders perspective. And their view about how they will use IT technology, network technology as Ron said, not just from a security perspective, but literally to make them more competitive on a global basis. When you think about global competitiveness, from my perspective, and again I'm going to approach it from a technology perspective, I think about four key elements. The first is, and perhaps most important, is the ability to identify market transitions, and those transitions be they economic, be they changes in industry or other factors, to be able to say how do you use innovation and how do you use productivity to gain a competitive advantage. That's true whether you're a country in Europe, North America, it's true whether you are a company regardless of industry. And it is becoming more and more true of government in every aspect, as Ron I think articulated extremely well. The second part is infrastructure. All of us understand from our involvement in the industrial revolution that if you didn't build up the highways, the railroads, the harbors and the airports to really support the industrial revolution that puts your country and your businesses at a disadvantage and dramatically limited the amount of jobs that you would create and what those jobs were paid from a salary perspective. The same thing is true in this new cyber and physical world, which were meld together. You basically are going to be measured by how effective is your

communications of data voice video across broadband. And I have some sobering numbers for

you in that area. We used to lead as a country and at the present time we're falling behind. The

third element is education, and I'm not going to talk about it in ways that many of us have been

involved with because that is not, even though as Barbara is a tremendous passion for me, I'm

going to talk about it from a high tech CEO trying to get the best talent in the world to work for

my company, and how important it is in terms of a competitive education system to determine

where do I locate my jobs, and also where am I able to attract the best and brightest to work in

terms of their education for their children. And finally I'm going to talk about supportive

government and how important it is. It is something that I think many of us in business, and

especially in a high tech would view a short time ago is our definition of government help is

please do not. And I think more and more of us are realizing that these goals that I just

articulated without business and the citizens and government working together are unobtainable,

or put a different way, the countries who get those combinations working right will lead in this

next three to four decades in a very unique fashion. I'm going to then bring it back to practical

examples and talk about it across key industries, key market transitions example, and then kind

of summarize, if you will. And then Ron and I would very much enjoy questions that you may

want to ask. First from an innovation point of view, I'm going to talk about innovation both as it

relates to high technologies, source of innovation, and also why it's going to change

competitiveness from the business perspective. If you look at it from a technology perspective

the most basic change in innovation that is occurring is you're going to have data voice video,

wired or wireless, to almost every electronic device in any format you want. And as you've

already figured out, I do not keyboard into a system anywhere worth the speed that I can clearly

articulate it from a voice perspective. I'm a voice person. And so the quicker I can communicate

in the mode that I'm most comfortable with, the more effective I will be. So that transition is a

given. There'll be one connection to your car, obviously a mobile connection. It will do data

voice video, and it will shock you with the number of devices that in your car will communicate,

some of which you'll be aware of, some of which you'll have no idea that it's occurring. But

I'm talking anywhere, anytime, in whatever mode you're most comfortable with. The second

major change is going to be, and this is a little bit into technology so bare with me, Ron you'll

follow me very tightly on it, that is the virtualization of resources within devices. That's a

mouthful. What it basically says is that PC that's sitting on your desk or that you're taking with

you as you travel, the telephone or the PDA device, you will have no idea where that data is

stored, where it's processed and where the applications are, nor should you care. It basically

says that the devices will no longer be dependent upon having a given functionality, which over

a network of wired vs. wireless you won't have any idea if the access information you just asked

for was on your PC or on your telephone. You won't have any idea if it's stored in the server

over here across the hallway, or if it goes to your local branch office, or if it goes to your

corporate data centers, or goes over the world-wide web. This transparency of resources changes

forever how devices will be designed and how this virtualization will occur, and while that is

exciting to some of us in the room it is also very challenging in terms of how quickly this

transition will occur. The third area is pervasive security. It won't just be for the military or for

government. It will be in every way imaginable. Security will no longer be embedded only into

a product. It must be collaborative across a set of products, and it must be literally adaptive to a

set of threats unanticipated. Not just for the military to protect the men and women in our

services as Ron articulated extremely well, and Northrop Grumman and Cisco together work

toward, but literally how does this change in ways we're just beginning to understand. And it has

to be like the human body. There are literally thousands of attacks on your body each day by

viruses and other issues, and it's the exception of when you take some aspirin and when you go

see a doctor. The network has to be the same way. In fact, if an infection can spread throughout

the network either with your knowledge or lack of knowledge, change your financial statements,

corrupt the data, or bring it all down in ten seconds, how much time do you have for human

intervention? Zero. It must be able to identify the threats that we know today, what viruses they

are, it must be able to deal with distributive knowledge… service attacks, and it must be smart

enough to say, here's a pattern that I haven't seen before. I'm going to confine this for a short

period of time—one to two seconds, and determine if it's another kind of attack or security

violation. And so as you think about what this means for the IT industry and for where the

industry is going to evolve, it will change forever how applications are designed, where the

processors reside, where the storages occurs, and it gets kind of exciting and challenging at the

same time. Source of innovation - innovation at most companies mean we do it ourselves, and

yet in the high tech industry those companies that are going to lead in the future will be able to

innovate by doing it themselves. That will be primarily where you get your growth, but it will be

also based upon acquisitions. Now remember in high tech 90 percent of acquisitions fail. 90

percent. And there was the philosophy when I was at IBM or Wang Laboratories that we could

come late to a market and become the number one or two players just because we were good.

That just doesn't happen in our industry. If you're not one of the first five to move you almost

never become the one or two player. And so it says if you aren't there you better learn how to

acquire and realize that most acquisitions fail. We've done 95 acquisitions and our success rate has been approximately 70 percent. Most important is measured by what we told our board of directors we would do. But it's also important to realize that there was 30 percent failure. And you better understand when you acquire an industry, if you're in the banking industry and you acquire a different geography what are you acquiring? You are acquiring customers and geographic presence. In my industry all you're acquiring is people, paying $500 thousand-$1.5 million for the average employee I acquire, which means by definition, if you lose 40-80 percent of your acquired engineers and management team within two years after the acquisition is done, which is usually what happens, you failed miserably. Our attrition voluntary rate is four percent. But the third area, and it's even more difficult to use than acquisitions for innovation, is business partnerships. Most business partnerships are nice marketing arrangements to resale products. And realize business partnerships are really hard. We share a common view. Government is going to be, and it has changed, I can't explain what changed, but in the last five to seven years government has moved back like it was 20 or 30 years ago developing a lot of the products in directions that are going to very quickly role out on the commercial environment. And it is so a leading edge utilization, not just a technology, but concepts. Now you can imagine the first time Ron's team and my team got together. Ron was talking about projects 10 years out and at Cisco long term planning is two years. And yet to learn how to operate as two companies as one to solve a common set of goals, and to balance that, it something that's very difficult to do. But when you think about those companies or countries that are going to win in the future, they will create the combination of your own internal innovation, and the R&D implementation by government spending to encourage that. They will create an environment that learns how to

acquire, and understand what you're acquiring and protecting that. And they will create an

environment that is even harder than acquisitions, business partnerships, to really work together

in terms of a direction. When you think about the most basic element of all, and this was a

emotional evangelical discussion ten years ago and even as recently as five years ago, which is,

you will use networked information technology to implement your strategies regardless of what

business you're in. And that was something that we'd have a lot of theoretical discussions. The

CROs would go yes, the CEOs said I'm not so sure. But when you talk to the top CEOs around

the world, whether it's in the business council or world economic forum, or where we had a

session just two weeks ago for 37 of the top CEOs and CROs who could spend two to three days

talking together about where is this industry going to go. That is something that is a given at a

GE or Tata from India or BT from the UK. And so you are seeing people change from being

theoretical to people saying here's what my strategy is. Here's how I'm going to use technology

to implement my strategy. The second area of market transitions is how do you use productivity.

When we began to talk seven years ago formally to people that I respect and very good friends

such as Laura Tyson, the prior economic advisor to President Clinton, or people like Mr.

Greenspan, or other economists from around the world, and we said productivity doesn't need to

run at one and two percent like it had for three decades. We think two to three percent should be

a given for a country, and well run countries should execute at three to five percent. Well run

companies at five to ten percent. Now that was 1997, and even my good friends would kind of

look at me like...I doubt it. And yet productivity, when you grow it at one percent a years your

standard of living only doubles every 72 years, once in our lifetime. You grow at three percent, it

doubles every generation, every 24 years. Our children have twice the standard of living that

we did. If you grow at five percent, which I think is doable, you double every 14 years. Cisco

grows it's productivity at ten percent per year. When I serve 50 of the top 100 CEOs in the world

that I have the best relationships with on a number of topics I ask one basic questions which

shocked me the answer. I said "how many of you plan, and are going to hold yourself

accountable for growing your productivity of your company more than five percent?", and then I

asked for between four and five, one to two, etc. That answer five years ago I don't think would

have been above two percent. 75 percent said they are building plans and programs to grow

productivity at more than five percent a year. And if you think about global competition and the

price per employee, no matter how you measure that, you have to, in this country, to be

competitive as you go forward. Second key area, is the one to one correlation between GDP

growth, productivity growth, and IT investment. One-to-one correlation, with a slight lag time…

doesn't get any closer than that. It's true on a global basis. Now your answer to that is all right

John, what you're saying is we just spend money on IT and we'll get the benefits. And that's

honestly what we thought five or six years ago. What we found more important than your

expenditures on IT is, do you change the underlying process. In other words, if it's truly an

interaction type of process, if you don't change the way we learn or you don't change the way

that information flows through the healthcare system, no matter how much money you throw at it

you're going to be disappointing the productivity. So in a customer support system, those

companies that change the process at the same time they put in the systems had three to five

times the productivity that those just threw the systems at it. So it's a realization that, as you

invest in IT, if you don't change the process that goes with it, you will get about a third to a fifth

of the productivity you would have otherwise. The other major change in productivity is a basic

concept, but it's something that when we shared with these 37 CEOs and CROs, almost without exception, from Jeff Immelt through all the other players, they said you've got it. It is productivities almost in three generations as it relates to networked or IT in general. First generation was production. Whether it's the production line and tracking information through that, or whether it's a supply train. That occurred during the 80s. During the 90s, we and others really hit huge productivity increases. Cisco went from 2001 as an example, $450 thousand per employee to today almost $700 thousand per employee. We already had achieved twice the productivity of any of our competitors, large system competitors, during the 90s. So one of the reasons we are the most profitable company in our industry. And yet you begin to look at what can occur going forward. Almost all of our productivity is what I would call on transactions. Transactions are whether you order something over the Internet, or you look at the weather, or you do a search on Google, or you basically say what are the known problems with an issue, or when my Federal Express package will arrive. And that is very high productivity. Your employee changes their benefits online. But the next generation of productivity it interactions at the same time.?? So it's like the difference in the financial industry between "a stock broker and a financial advisor". Very few of us call up our stockbroker anymore and say please buy this stock for me. We do it ourselves. What the financial advisor has to do is a set of inter activities that occur some as one to one, or one to a group of people, where they have estate planning together with your financial investment portfolio together, working toward a common set of goals including your insurance. In my industry, the ability to move from communication being primarily from engineer to engineer, to my manufacturing team, four or five engineering teams, my supply partners, and the future generation of my supply partners engineers, working together

on a common approach to how I'm going to bring a product to market from my idea to revenue,
in half the time that I used to do it. ……transactions and yeah, we've done very well. But almost
all of our productivity in the future will be interactions. And as you think about it's going to be
pervasive across many industries. I talked about the example Cisco. Let's talk about a retail
organization, be it a Wal-Mart or Home Depot. You will see them automate their checkout
individuals. What they do as a transaction that actually slows you down as you go outside the
store. They'll automate that to new technology such as radio frequency ID. They'll automatically
know what you're buying. You'll be able to see it come up in picture form, not in some receipt
that you can't even figure out what it was after the fact. You basically will eliminate that job,
and where they will move their resources is to interaction with their customer, to get a bigger
share of your wallet when you're in the store, to make it pleasant shopping experience, and the
benefit that goes with that. That is retail of the future. Two major applications. Identifying your
customer and getting a bigger share of the wallet and a more pleasurable shopping experience,
and number two, in store management. Because if you haven't already got your supply chain
automated, you're out of business. The Wal Marts of the world, etc. force that to occur. So if you
think about the progression in the future it will move from a production type of IT
implementation, to a transaction where most of us get our productivity today, to interaction as
you move forward. The next area is broadband. If you believe, as I do, and I think more and
more people are coming to the conclusion of, your broadband is your infrastructure for the
future. Let me just share some data with you. The US used to be number one. Several years ago
we're number four in the world. Today we're number 13. You look at South Korea, you look at
Japan, you look at China, and you look at France. Dramatically

different attitudes. An example in France, just three and a half years ago they had one percent of their population connected to broadband. They made a national initiative that when you talk with the Prime Minister, or the Senate, or half their Senate members, which I had the opportunity to do for about two hours along with the Department of Interior at an evening of entertainment, which is really a give and take type session with the political analysts involved. They understand how important this is their future. And they are now over ten percent of their population with high bandwidth connection. Blew right past the US. Japan, you look at what they've done. They have three times the penetration rate the US does in terms of their citizens. They do it at one-thirtieth the cost, and their speed is 15 times what it is in the US. Now if you think about our competitiveness as we go forward in terms of market transitions and infrastructure, then you come to the next challenge we have. And all of these challenges are manageable. I'm very much an optimist on this country. But we have to learn to deal with the issues that are in front of us. I'm a believer that only the paranoid survive, and making Andy Grove look relaxed (laughter). And that is what serves I think both companies, but also countries in the future. Education. I'm not going to approach it in ways that many of us have talked about. I'm going to talk about it purely from a hire of the best-educated workforce in the world. My goals is really three to five world class engineers who are really creative, with 50 other engineers will produce 5,000. So getting the best and the brightest is very key. Now lets share some data when I think about where do my jobs go and where do I recruit in the future. In the past we were able to attract the best and the brightest to this country after they got educated, or bringing them to great universities and then keep them in this country. Sixty percent of the workforce in Silicon Valley is first or second generation from outside this country. Sixty percent of the engineers. Now if

you look at how we're going forward, education in the most recent studies have been done, and

I'm talking about K through 12 type of system. We've all seen the data. We are somewhere

around 24th in math, I'm sorry 24th in science and 18th in math on a global basis. So plus or

minus a couple points, we're 20th. Now if you think about what is about to occur from a global

competitive point of view. We are a country of several hundred million. We're competing

against countries like China and India that have a billion people. They not only encourage math

and science focus much earlier age, they take the top 10 percent of their resources, and they will

guarantee that 25 percent of them will go into math and science and computer sciences. Locate

here, my university here will train the people, and the skills sets, when you really look at the

math, are dramatically higher than what we're able to do. So you take a country that has three to

five times our volumes, that very shortly will be producing not just five times the engineers like

India and China are today that this country is, but perhaps 10 times or more. And you begin to

play out that global war for talent. And, our country not being user friendly to ask people to

come in, not as much ownership, creation, not just for the executives. Take away the executives.

Pay them any way you want. But ownership for the employees being key. And you begin to

realize the challenge that occurs. A fully burdened engineer for us in China or India, all factors

included, is $48 thousand. In the US, regardless of whether you're in Boston, or Texas, or

Raleigh, or San Jose, it's $252 thousand. You have a five-to-one cost, and you have all of a

sudden a resource pool that is starting to change. So as we think about this, this is something

that has to be a national initiative. Not by government, but by we as normal citizens saying

we've got to get this fixed. Because we do have a large number of factors that give us

advantages on leads. But that lead will melt over time in terms of position. And if you think

about this combination of supportive government saying how do we create the environment for all of the above, think about one example. When I go in to talk about a facility in China, they basically will guarantee me 25 percent of the students will graduate with the skill sets that I need and they're selecting from the top 10 percent of their country, they literally say how much land do you need and how quickly do you have to have it built, they will give me a much lower cost infrastructure in terms of positioning, and government will do whatever it takes to get the business. And that's how they treat a company from outside their country. Inside your country you get even better service. So we've got to think about the challenges in front of us and realize this is a market transition that is based on infrastructure and education, and we as a country must move more rapidly than we've been able to in the past, and we must make an "only the paranoid survive" point of view in terms of our country's direction. If you look about it, and you begin to think about examples within this, I've lived in Boston and saw what happened to the textile industry. It occurred before I got there. I lived in Pittsburgh during the still industry downturn. Lived in Indianapolis and saw the impact of the automotive industry slowdown. Those were industries that you can argue maybe we should have done a better job of keeping the jobs here in the direction. But a large part of those jobs are gone. In the technology industry the speed of change is very rapid. Changes that used to take place over several decades will occur in less than five years. Let me give you a mathematical example. Cisco, when we entered this industry in 1995 we had a market cap of $10 billion, and let's just use market cap in terms of financial community's expectation of our future. Our top 12 competitors had a market cap of $70 billion. During the bubble they had a market cap of $950 billion, we had a market cap of $500 million. During the downturn in the March of 2001 time period when all of us got hit hard their market

cap was $170, ours was $130, and today ours is $111 and theirs is $51, as of yesterday. By the way, eight of my top 12 competitors aren't around. We had to get eight more to fit in that category. That's how rapidly industries such as high tech will change, and realize that my own view is if I look at who my competitors will be a decade from now, assuming we make that transition, and time will tell if we will or not, it will be largely from Asia. So it's how do we position our country, our businesses and our directions in a way that allows our children to have twice the productivity or twice the standard of living we did, or realize that can very quickly change. I'll close with three examples. One is the network academies that Barbara eluded to. In the network academies what we found were in 162 countries worldwide, the majority of students over 200 thousand both attending and graduates, etc. have come in the US, but we also currently have 454 thousand of these 162 countries. We get to see what these academies are able to do as far as preparing the workforce where they can get a job, and therefore we attract a lot of the best and brightest. Barbara used the example of Afghanistan. And absolutely the women's scores and the men's scores were identical. But what was interesting is there's no difference in students around the world, much like we'd all like to think it should be. Not on gender or not on countries. But it does tie very specifically to the education base that you have in place. Second, when you think about Jordan, and let me use that as an example of a country, one that may surprise you. First, it's led by a states person who I think is world class, King Abdullah, Queen Ranya, great combination.?? In his environment he has no national resources. The only natural resources he has is people and an education system, education of both genders by the way. If you can imagine a friendly place to be and imagine Iraq on one side, Syria on the other, Saudi Arabia on the other and your friendly border is Palestine. And yet we as leaders in business are

under pressure on short term, and let me explain what short term pressure is like, and yet do you

know what percentage of his budget he spends on education? 49 percent. We were part of

companies working together with government and NGOs to help play a role in that change. We

literally led the idea at the world economic forum where the key sponsoring company combined

with six other companies. We combined with 17 Jordanian companies and 11 NGOs, and with

the leadership of King Abdullah we began to address not just the education system, but the

venture capital and the job creations that go with it. And this along with other factors he's done,

he's in an environment that couldn't be more hostile and his GDP is growing at seven percent.

The ability to make a difference. And to go after the most basic elements you say? "Well can this

really change the world?" I think it can. It's not just a Silicon Valley mentality. Because if you

think about the Middle East, all of us understand the issues of terrorism and all of us understand

the issues and the controversy that we have to solve around the Palestinian area. But you have 60

percent of your population below 18 years of age with no economic future and no education.

There will be terrorism forever if you don't address that issue. And so the ability to educate both

sides, genders, etc. and create an economic future is key and then create the jobs for it. By the

way, when you go into a K through 12 school in Jordan, not only is it wired to their 16

universities, the first and second graders learn math in arabic off of network computer games.

Now that is really neat; I can understand where they're going. We don't do that in the US. And

you are able to see the difference in global competition based upon infrastructure, based on

market transitions, based on an education system and a supportive government. So these are the

type of issues that we see again and again in front of us. So when I look at the four major

elements that are going to occur in terms of global competitiveness, the first one is how you do

market transitions based on innovation productivity. The second has to do with how you do your

infrastructure, broadband. The third one has to do with how do you create an environment that

really encourages the direction of education. And then fourth is how supportive government

comes together. So Barbara, I thank you for the opportunity to share views tonight, and once

again it's an honor to be here. Thank you.

Barbara Hackman Franklin: Thank you, John, for challenging us in many ways. Appreciate

that. OK, we'll turn to our question period, and on my right is Gail Fosler who is Executive Vice

President and Chief Economist at the Conference Board. And on the other side is Bob Hormats

who is Vice Chairman of Goldman Sachs International. I'm going to start the question with Gail.

Gail Fosler: Thank you Barbara. This presentation makes me want to run out and get a

Blackberry with GPS capability and laser firing applications. So I have do admit I don't own a

cell phone and it may mean that I'm incapable of asking an appropriate question, but anyway, let

me try. I think it's almost impossible not to come into contact with the IT world and be

extraordinarily almost overwhelmed by the power that it brings to us, and yet I'm struck by the

fact that it also, it's capability is becoming increasingly ubiquitous, and it no longer really

represents a competitive advantage because most firms have the same services, the same formats,

the same platforms, in fact they're even scaling these platforms by out sourcing and the like. Is it

not possible that information technology has reached the point of diminishing returns, and if not

diminishing returns, that the pace of innovation that you describe actually exceeds the pace at

which human beings can effectively adapt it?

John Chambers: Ron that's an easy one. Do you want to go first? (Laughter) I think the candid answer is no, and let me share with you the way I would approach it because you're stimulating in the thought process and go back and forth. Technology has always been able to keep ahead of our ability to properly program it and to use it effectively. And where our kids might be able to keyboard information remarkably quickly on their communication devices, most of us in this room prefer voice or video data voice combined type of approach. Secondly, the ability, even if the technology was there to say how do you practically apply it, to change in process, be it in heath care, be it in government defense or other areas, has really not been there. The productivity increase has really occurred when you begin to integrate this technology through a network. In 1995 is when the first elbow occurred. Another elbow about 1998 to achieve those goals. And so I think a real determining factor here will be that the best is still in front of us, but the easy stuff on transactions, the ability to enter something and get it shipped to us, the ability to do an update in terms of how do your sales forecasts look today, have there been any changes, etc., have been done. The real productivity, especially in this country, will be around interactions. And that means you've got to get groups working together that traditionally have not worked well together, and it isn't controlled by two individuals, it's controlled by multiple ones. So I think it really comes down to how well we do process in change, and with the information in the format we're comfortable with, I think the best productivity is actually in front of us or in front of our peers. I don't know Ron, how you would approach that.

Ronald Sugar: Let me just add something to that. When we worked on the Blue Force

Tracking System we worked with senior military officers, generals, colonels, of a slightly earlier

generation, and they were highly skeptical about whether or not the tremendous amount of

technology these kids would be having at their handheld laptops to do the Blue Force Tracking

where am I, where are my buddies we puzzled. It turns out they totally mis-estimated the fact

that the generation of kids coming into the service today who are all 18 years old are totally

facile in computer/man interface. And it turned out this was a very significant competitive

advantage, which was unrecognized by the senior leadership originally.

John Chambers: Ron why don't you stay there and I'll just stand behind you and we'll take

turns answering questions.

Robert Hormats: First of all, thanks to both of you for a very, very interesting set of

presentations which really demonstrate a great deal of vision about where technology is taking us

and the challenges ahead. I'd like to raise a question about one particular area and that's

healthcare, which is an enormous challenge for our society today as both of you know. And there

are two aspects to my question. One is the general notion of what role networking can play in the

interaction among the various parts of the healthcare system, which are, as you know, very

fragmented today. There is no common platform, it's very hard for hospitals to get the medical

records of individuals, it's very hard to have one common standard because each doctor in a way,

or each hospital, writes it's own kinds of prescriptions and it's very hard to figure out whether

one doctors prescribing a medicine which does not interact well with the prescription that

another doctor is prescribing. So this interactivity is a major problem, and a lot of people die from it from these kinds of mistakes. The second point relates to the issue of terrorism, and the interoperability of various systems, and I think this is yet another issue that Ron talked about. I think that on both counts technology has an opportunity to play a major role and I'd be very interested if both of you could talk about this for a moment. It's own biggest challenge, I think, from an economic point of view and from a social point of view, and yet technology is just beginning to play a role. My expectation is, and I believe yours as well, that it can play a much more proactive, much more dynamic role in the future. I'd be interested in both your comments on this topic.

Ronald Sugar: OK, I'll talk about healthcare. You can talk about terrorism (laughter). We actually were talking about his just before we came down today. As a company we're actually moving into this area. Not into commercial healthcare IT, but into government healthcare IT, dealing with veterans and all the various agencies. If you think about the enormous dysfunction of the information gap in our healthcare system it just blows you away. I can hardly stand to go to a doctor or hospital and realize the enormous waste. If we ran our banks this way we'd be bankrupt. If we ran our wars this way we would be defeated. So we have some of the same set of opportunities. There are some barriers. There are barriers in terms of not having common standards, there's barriers in terms of basically balkanization, there's barriers because of frankly legal and concerns, real and imagined, over privacy which prevent the ability to freely allow information to go. But all the technology exists for tech privacy and security in this area. So I think this is a very rich field. We just recently made an acquisition of a company, which actually

does this because we wanted to add that to our capabilities and our growth going forward. Let me turn it over to John at this point on healthcare.

John Chambers: On the healthcare side, if you look at this country it's $1.8 trillion. My view is with the proper process change and technology change you could take between 20 and 30 percent of that cost out and dramatically improve the quality of healthcare. You could, the six leading cause of death is drug interaction. With a common e-medical record, and by the way, both my parents are doctors, you have to write illegibly to be able to be a doctor. So it's little wonder why there's a problem with pharmacists filling the wrong drugs. Doctors only know 10 to 12, maybe at most 15 drug interactions. And you usually don't tell them, especially if it's an emergency situation, what drugs you're on. So by having a common, e-medical record, which other countries around the world are further ahead on, you are able to build your base. But the productivity numbers are dramatic on that. It isn't a question of throwing money at the problem. By the way, we spend very little. It's $1,154 per healthcare professional. In your industry it's $15 thousand per professional. But if you don't change the underlying processes Ron eluded to, you're not going to get the pay back. So I think as a country we need to approach this on a national basis, identify the tough issues, not the least of which is the people who pay for the service, government and insurance, the cost of the service is delivered by others, the hospitals and the doctors. And so we have to begin to address the overall issue. Wireless data voice video integration gives you the capability to address, it goes back to the question from before. If you don't change the process you don't get the productivity. Terrorism?

Ron Sugar: I'm against it (laughter).

John Chambers: Our military used to be designed upon fighting a given geography against a very identifiable enemy, and you know about when they were going to attack and do what. Today you don't know who, when or where. It's all about how. And so you have to build your security systems and your military systems anticipating how and realize again, you have to change all the basic process of the military to be able to address it.

Gail Fosler: When you think about it, this country has spent billions and billions of dollars building a very, very effective global command and control communications system. And because of the asymmetric advantage that we've had, the terrorists have come back and taken advantage of what we've created, including commercial Internet, to create their own worldwide command and control system. So the only way to counter that is with methods to basically selectively intercept, better intelligence analysis, figure out who's talking to whom and coordinate things together, and do that in a way which doesn't necessary violate the rules of privacy or law, but still is able to get to the nexus of what the threat communications are.

John Chambers: I understand one of the most basic elements in war is you take out your other opposition's infrastructure. The infrastructure of the future is your data centers and your information that flows across it. So that's what both defense and office will be based on.

Robert Hormats: Well actually staying a little bit on this topic, I was struck in your remarks

Ron, you talked about the essential components, the information components in the battlefield as telling the soldier where am I, where are my buddies, and where is the enemy. That seems to me to be the fundamental strategic information that every business needs. Can you share with us what some of the learnings are that you've taken away from your work on the battlefield to improve your own business organization, and likewise John, maybe there are also some lessons in terms of Cisco's performance.

Ronald Sugar: That's a very good question. We spend a lot of time dealing with what we call network centric warfare, and we think about the fact that to be an effective provider of solutions we've got to be a network centric company. And I would like to say that our shoemaker's children and great shoes. They don't always have the best shoes and we have to work harder at that. One of the things that's very important currently as we look forward is, while we used to have an Army, a Navy, and Air Force and Marine Corps that would fight separately as a stovepipe organization, in the battlefield today they have to fight jointly. They have to come together because they're co-occupying the same space, both information space and battle space. And the war in Iraq most recently was a wonderful example of how the Army, Navy, Air Force and Marines actually did come together to fight jointly. In a corporation the analogy is that you have multiple divisions, each one of which does something different. To be a very capable company to be able to harness the power of all the elements of your company you have to be able to operate and do business jointly, or we call it collaboratively, or another way to say it is horizontally integrated. So these are lessons learned analogies that are coming back into our business environment, which we're trying to take to our market place.

John Chambers: I think the analogies are very similar. The military and the defense groups are actually leading in terms of how corporations will look at the future and I don't know when it happened Ron, but as I said it was five to seven years ago it began to take off. If you watch what occurs in the military you should be able to know what any foot soldier or war fighter plane is able to see, and to be able to direct and coordinate your information from anywhere in the world, virtual command centers, in evolution, etc. We've been able as a company to close our books, not in 24 hours, but in one hour anytime we wanted, for quite a while, but it was the ability to compare it to prior data and to watch the trends that became more useful. It was the understanding that I thought it was mathematically impossible to grow for nine quarters in a row between 50 and 75 percent increase in orders, and in 45 days for that to turn negative -45. So it's the ability to anticipate a 9/11 type of event. Peaks much higher than any of us appreciated, valleys much slower and your ability to adjust to it, and build an information system that allows you to learn from both what you've done well in the past, but also to realize you can't predict the same variables. You've just got to predict how, and then you've got to be able to respond to it.

Ronald Sugar: Let me just add one thing. John is gracious to allow companies like mine to come up and spend time with him, and we were just blown away by the quality of information that he has that he runs his business with. He really does have the state of the art, the ability to instantly know where he is and where he can close his books. I think most of us in the rest of industry would love to be in that position.

John Chambers: But I want to remind everybody, including myself and my team, it's not a

crystal ball for the future. It is a point in time.

Robert Hormats: I'd like to go back to the question of education that both of you touched upon,

and I know it's a passion with both of you gentlemen. Here's an issue that I think many of us are

concerned about, particularly living in New York, but throughout the country, and that is, each of

your companies depends on a very highly specialized, very highly trained workforce, and yet this

country is not training engineers and scientists at the rate required to meet the kinds of

requirements that your companies and many others have. And in part it's a public policy issue

which is really, primarily in this country, local as opposed to federal, although the federal

government has to play a role, and in part it's the responsibility of individual corporations, local

businesses, to put pressure on their school districts to improve their performance. I wonder,

given your need for talent and given the fact that both of you are very concerned about this, what

kinds of recommendations you have or what kinds of things your companies are doing or

recommend other companies might do to strengthen dramatically the output of talent in this

country, because this talent deficit is growing very dramatically both in terms of the problems

with our own school system, and the inability to get people from abroad. It's hard to get H1B

Visas, it's hard to get green cards. How do you think we as a country ought to cope with this and

what can the business community do to create a greater sense of urgency and commitment to

deal with this problem?

Ronald Sugar: It's very serious problem. And in many ways we feel like we're spitting into

the wind. As one corporation, we have directed a major portion of our corporate philanthropy on just education. And originally we thought about doing that at the college level because, kind of in our own interest, if we put it in colleges we'll get those graduates. We've also realized over time you really have to drop down into the education system. Most kids who fall off the track to do science and math, fall off at an earlier age. I think the other thing we have to recognize is that in this country diversity is a very, very important thing to consider. We spent a lot of energy trying to figure out how to reach out to a more diverse set of new employees. 54 percent of our college hires this year were women or minority, and that is not enough to really fuel the needs of our corporation. The scary thing is that the pipeline is very weak, and kids who might have a natural bent towards science and technology, even from homes where their parents might have been technological or medical or what have you, find that there are many other attractive ways to spend their education and time and being an engineer is probably not the most glamorous of professions. I myself gave up my pocket protector a number of years ago so I could set more of a role model for other kids (laughter). It's a very serious issue. I don't know what to say. It is absolutely frightening when you look at the number of scientists and engineers being turned out in China, in India, and other countries which are not even as large a population. It's something we as a nation have to deal with. I don't have an answer but it's something that's going to be significant from a national security standpoint, never mind a competitiveness standpoint.

John Chambers: Yeah, I'm pretty radical on this view. I think the first thing is to realize this isn't only about the healthily, paranoid survive. This is about survival itself, and we are losing the battle rapidly. I think the roles that business can play, much like Ron does, we give back to

our education system and you can do that. But I think business can be the bully—saying you don't

understand, our employees will not come to a poor public education system. They just will not come

to a location of that type. Most of my employees unfortunately put their kids in private schools. If

they couldn't afford to do that I wouldn't be able to attract them to some of the geographies where

we are. Secondly, I think you can be very active on getting key issues passed. The high tech industry

largely carried the California bond initiative lowering the approval on bonds from 60 to 55 percent.

That might not sound like a lot, but it got two thirds more approved, and remember in voters only a

third of them have their kids in public schools in California. So you can make a difference. But this

is one that, much like my opening comments I think eluded to. It's not one that a government can

make a difference in or a business. We have to create an environment through the business press,

through other areas that we as a country say we've got to change, because for political leadership to

take this on, the Democrats and Republicans, it will have to be combined, and to take on a lot of

spacial interest groups on this, and it requires a change in process, there has to be an overwhelming

determination by the American people to fix the issue. And a willingness to say we'll change. Our

country is not showing that. So even if our political leadership wanted to do it or our business

leadership wanted to do it, the country doesn't have the stomach yet to do it. I think we've got to put

a person on the moon. For those of us who were in school when we decided to do that as a country,

in junior high my workload went from a half an hour a night to three and a half hours in one year.

But by the way, my scores went up dramatically as well. So I think we as a country have to decide

are we going to step up to this, or are we going to follow the examples of other western countries,

Europe in particular, etc. that doesn't deal with the way the world changes and

then suddenly finds itself in a very tough competitive environment, and now they're playing

catch up. And the interesting thing is, those countries that fell behind are playing catch up faster

than the US is.

Barbara Hackman Franklin: On that note, I think that's going to be the last word. You leave

us with this kind of challenge about our competitiveness and our security, and we just thank you

both very much for a really stimulating session, for your vision, for stretching our minds about

what's coming in the future, and for just making us far more aware of what we ought to be aware

of right now. So thank you very much, both of you.