**August 23, 2005 - 8.15 a.m to 9.15 a.m.**
**Introduction and Intel Developer Forum Opening Keynote**

Female Voice: Ladies and gentlemen, please welcome president of Intel Americas Jeff McCrea.

Jeff McCrea: Morning. Welcome to our [unintelligible] Intel Developer Forum. I thought I'd start this morning with one of my favorite quotes from Alan [unintelligible]. "The best way to predict the future is to invent it." That's while we're all here, to talk about what's next, what's coming, and where the industry is going. Today you're in San Francisco, players from across the industry talk about key technologies that [are going to] shape our futures. Technologies to improve our health and quality of care. Technologies to make businesses more efficient, and to enable consumers to get the information they want whenever wherever they want it around the home. Most importantly we're here to help you help your company improve your products and [help your customers].

That's what IDF's all about. It's about how the industry [invents] the future together. So our theme for the next few days is on multi-core platforms. This morning we're going to be talking much more about how Intel, and most importantly you, our developers -- the development community -- come together in terms of where we're going, where we're driving. Paul will be up here shortly to give you a much more in-depth overview of our strategy of where we're heading, talking about higher performance, lower power, [and some unique] user value propositions -- what we call the [unintelligible] or some key technologies that will make us competitive [in the platforms going forward]. Later this morning Sean [Andotti] will be up talking about

wireless and wireless broadband, and followed by Lewis over lunch giving you some future direction on digital [health].

This week you're not only going to hear from Intel, but more importantly we're going to go together with the rest of the industry and do a lot more industry participation. In fact, the majority of our 143 sessions are either taught or co-taught by third party experts. It's not just us, but everybody. We've got over 1,500 companies here today. Over 170 will be exhibiting in our tech showcase. We've got over eight special interest groups here to talk about digital content and key standards of where the industry is going.

Finally, we think this is a unique opportunity for you to engage with our sponsors our exhibitors and all the communities around the industry in a quest to figure out where the industry's going. But of course we're also here to have a little fun, so I get to play Monty Hall. And I point you to stage right. If you'll open the curtain.

[Music plays]

So this year we're doing something completely unique; we're giving away a car. One of you will be picking one of your own in the next two days with our ultimate geek contest. [I think this is going to be] a lot of fun and a great opportunity for you.

The other thing we've done is, as you know, we've asked you guys to [unintelligible] tons of surveys. And believe it or not we've got analysts back at Intel [who are going over these in gory] detail, and

come up with what you guys most wanted us to change. So we've added a lot more interactive sessions. First we've added [chalk talks]. This is access to Intel's engineers. No PowerPoint, no scripts, no speeches. Just you, the engineers, and a chalk board to talk about specific topics. Secondly, both tomorrow and Thursday morning we've added birds of a feather breakfasts. These [unintelligible] just Intel, we've now added industry experts here as well. Again, giving you access to not only talk about specific topics -- each table will have its own topic, again enabling you to talk about what you want to talk about.

[And finally,] we're doing our first ever IDF think tank. This is tomorrow evening. Again it's a much more social atmosphere, great networking opportunity for you. And again talking about some specific things like digital health [or power] and industry standards. And here we're going to give you access to all [of our technologists, our Intel fellows, vice-presidents, and directors to come] and help you understand [what we're going toward] [and more importantly, to listen to what you think and what you have to say].

[So IDF is bringing it all together. This is a huge] opportunity for you to learn, get access to information and experts and technical training. It's also a key opportunity for us to work together and collaborate. This is the way the industry [moves forward]. This is our opportunity to [come up with] [unintelligible] [in technology and key solutions for our customers]. And finally, it's all about innovation. It goes without saying that's what Intel is all about. That's what you're all about. That's

what our industry is all about. You're the center – innovation is at the center of everything that we do.

So I thought I'd close with a quote. "When it comes to the future, there are three kinds of people: those who let it happen, those who make it happen, and those who wonder what happened." Clearly I know you all are in the second category. Let's go make it happen together. Thank you.

[Applause]

[Music plays.]

Female Voice: Ladies and gentlemen, please welcome President and Chief Executive Officer, Paul Otellini.

[Applause]

Paul Otellini: Good morning. Thank you, and let me add my welcome to IDF. We have a great week here in store. As you saw from the video, rumors of the death of technology I think were great exaggerated. Growth in our industry is clearly back. We're seeing broad-based growth in the home, in the enterprise, in a number of emerging markets.

At the heart of that growth, the heart of our industry is the PC. The PC continues to grow. It continues to be the bellwether of the industry itself. This chart shows PC growth from 1985 to 2001. It took 18 years, if you go back to the introduction of the IBM PC in '81, for the

industry to go from zero to 100 million units a year. And then in 2001 with the bursting of the dot-com bubble, we had our first down year in the past 20 years.

At IDF in 2001 I showed you this slide. It's a quote from Charles Kettering, who was the founder of Delco and ran R&D at General Motors for 30 years, including the depths of the Depression. And, what Kettering said was, “Business will come back when we get some products that people want to buy.” I said that was exactly what we needed to do as an industry – to keep investing, to keep innovating in order to make growth happen.

And so, what’s happened since then? Well, in the four years since 2001, the market is growing nicely again, and in fact, it’s projected to continue to grow. And, this year, for the first time, the industry processed 200 million units. In fact, I read the Gartner report this morning showing at 206 million units for 2005. Few technology products have ever shown this kind of sustained growth; 18 years to the first 100 million units, five years to the second 100 million units. This growth is not an accident. It’s happening because we continue to invest in this industry, to innovate, and to build products that people want to buy.

An example of that is Centrino. Centrino is Intel’s first platform effort. It’s aimed at a new usage model. The results have been very, very good. This chart shows the percentage of Intel microprocessors that are mobile as a percent of the total PC [mix that we ship.] It goes back to the late '90s, and it tracks from about 17%, to the introduction of

Centrino at 23%. Since Centrino, it's grown very, very rapidly, and we expect the growth to exit this year at almost 36% exit rate of our total shipments – a very, very fast growth curve in notebooks.

As a result of this, we've seen notebooks cross over desktop shipments in Japan a number of years ago, in Europe a couple of years ago, and most recently, for the first time, in Q2 of '05, in the U.S. retail channel; notebooks outsold desktops. What's the driver? The driver was that we gave people what they wanted; better battery life, thinner and lighter form factors, and perhaps most importantly, mobility and computing on the go as a result of Wi-Fi.

It's hard to remember that a few years ago, Wi-Fi was nowhere. This chart is San Francisco; it's an overhead map of the city. We're going to plot here the public and private hotspots in San Francisco before the release of Centrino. This is measured by a Wi-Fi logging engine around the city outside of buildings. If you fast forward to today, it looks a lot different.

It's pretty fair to say that Wi-Fi is now nearly ubiquitous. What happened here? Well, we certainly created a new industry together. But, more importantly, we created a new normal. We created something that people expect in their day-to-day lives; they expect to have the ability to now have access through Wi-Fi. And, that is really what we do as an industry year after year after year.

Now, what's behind this kind of change, this rapid adoption? I think it's a very fundamental shift in the way computing is designed and

used. If you go back to the '60s and '70s, that was the era of the mainframe. All roads led to and from a centralized resource based upon custom technology. In the '80s and '90s, it was one-size-fits-all, and the PC as a market was established.

I think now we're entering what I call the era of usage-orientated computing. The winners in this new era will be those who orient technology to do specific needs and tasks that people want done. Technology disappears behind that into the lives of individuals.

Over these three evolutions of the computer industry, Intel's evolved, as well. In the '60s and '70s, we were predominantly a memory company; we invented DRAMS, we built flash memory, we sold things that went into mainframes. In the '80s and '90s, we sold microprocessors -- principally our core business, and that was what shaped our industry and our company. Well, today you see us become platform company. We're focusing on helping define the needs, and then the products that will create the new normal the large way.

Now, to enable this reality, about nine months ago, at the beginning of this year, Intel announced the largest reorganization in the company's history. We were no longer organized around product groups, within microprocessors or chip sets or flash memories or communications. Instead we've organized ourselves on the platform basis, for mobility to the digital home to the digital enterprise, and for the emerging markets with our channel partners, and the digital [health field]. You'll hear about each of these in detail from the group general managers over the next three days. But every one of them shares a common

thing. They share a common focus on understanding what users need. And they increasingly have outward focus to developers trying to define these needs and bring them back in and apply technology against them to solve problems, to answer questions such as where user needs intersect with technology and how do we deliver against that?

One thing that is common to all these business units is Intel architecture. We've built the premise of all of them around the core competency of Intel, our microprocessor architecture, and around what we think are the ingredients for the platforms that deliver the needs in these areas. At the same time as we've done this, the new Intel reflects the fact that convergence, after many, many years of discussion, finally happened and communications and computing are converging in a very real fashion. You see technologies like Wi-Fi and WiMAX, then, central and embedded into the platforms of each of these core groups is delivering, as well as essential to the infrastructure for our handset and our infrastructure businesses.

Now, these changes have been in the works for quite some time. Four years ago at IDF, I talked about the notion of moving beyond gigahertz, the classic focus of Intel, and moving to delivering other features and capabilities that give a better computing experience for things like Wi-Fi and hyperthreading. We're been investing heavily, in recent years, to develop these core competencies. As we look forward to intersect a broader set of user needs, we need to think about delivering performance against a new metric, and that is performance per watt.

Now, performance per watt is very obvious for things that you carry around with you. You want to have higher performance and longer battery life. But increasingly, it's also essential in terms of those needs beyond mobility. It becomes necessary in the desktop and the server markets as well. I'll just give you some examples of that over the course of this morning. More importantly, left unchecked, power efficiency and heat generation would have limited the types of devices you build today and the ones that we would be able to imagine in the future.

So Intel began moving towards performance per watt and the first manifestation of this was in the notebook arena. It started with Banias in 2003, the chip that's at the heart of the Centrino platform. It's our first ever bottoms-up design CPUs focused on what the needs of the notebook market were. We followed that product with a product called Dothan, and here I'm plotting on this chart performance per watt. And it's measured in performance per watt against an integer spec benchmark. Dothan is significantly improved from Banias and later this year we'll begin shipping a product called Yonah for introduction early next year that will deliver a 2x improvement on integer performance over the original Banias product.

Thinking about this, continuing to deliver more and more performance, but also increasingly focused on the efficiency of that performance with respect to power, Yonah derivatives will also find their way into sleek and small fan-less desktops and I think, also, ultra-dense server environments.

So how are we accomplishing this increase in performance per watt? Well, as we've been talking about, we're changing our engineering focus from clock speed to multi-core processors. Multi-core enables us to be able to deliver continued performance without the power penalties that we saw in the gigahertz approach.

With a new computing era coming upon us, I think it's time to take things up to a different level. Today we're shipping two different micro-architectures. One, which is based upon NetBurst for the Pentium 4 and Xeon lines, and has been focused on performance orientation. Another, which is based upon our mobile micro-architectures -- Banias, Dothan, Yonah chips and so forth -- is focused on power performance and is optimized in that environment. Today we're announcing that moving forward, we're combining the best of these two architectures into one to create a next-generation, power-optimized architecture designed from the bottom up for performance per watt without compromising on the requirements of performance for the given tasks at hand. And it's this microarchitecture that will be the basis for three new dual-core products that we'll bring out in the second half of 2006. They are [Woodcrest] for servers, [Conroe] for desktop, and [Merom] for laptops.

In addition to the power performance benefits that this new microarchitecture delivers, we will get for the first time in a long time, a single and persistent platform for software developers. For example: all of the products that I've shown there will have a common set of features. 64-bit, virtualization – VT for virtualization, LT for security

– [LeGrande Technology] – and it will also support Intel Active Management technology for manageability features.

Now in true Intel fashion, I don't just want to tell you about these products. I'd like to show it to you. I'm happy to say that the silicon from these three products is really running very, very well. In fact, so well that this presentation today has been running on this [Merom]-based notebook. Let me show you what we've got here. You'll see the presentation there. Let me minimize that. In this chart here we have performance monitor. You can see it's got two cores, two processors running. Over here you can see it's a Windows 64-bit edition, so we've enabled the 64-bit extensions, dual-core, and perfect compatibility.

We've also got a second product called Conroe. Conroe is a desktop product, and this one, in this case, is running in a [reference] platform here. And it's running Fedora Linux 64. And there's a third product here called Woodcrest, which is a server product. It's actually in a DP – a dual processor configuration, and if you look up at the performance monitor here, what is showing is that it's essentially four cores running. So two processors, two cores each…

So . . . what I've just shown you is the first public demonstration of Intel's new technologies. What do these new products give us? Well, they give us the next level of performance per watt. In Merom, we'll deliver a 3X improvement in performance per watt over the original [Banias] chip. This is based upon again [integer spec]. On the desktop, because we're changing the microarchitecture, Conroe will deliver a 5X improvement in performance per watt over the three years from the

original Northwood product. And in servers, Woodcrest will deliver a 3X increase. It's also performance per watt, but we're not measuring [integer spec], we're measuring transactions or TPCC performance. So 3X improvement in servers based upon this technology.

Now a critical enabler for this technology, for these products, rather, is our silicon process technology. In fact, what I showed you were three distinct sixty-five nanometer dual-core microprocessors. In addition to the three I just showed you, we have another three dual-core processors today, in house, all of them working for a total of six dual-core products on 65 nanometers --two for servers, two for desktops, and two for mobile environments. All the products will be shipping and ramping over the course of 2006.

In addition to that, we also have two more single-core processors on that 65-nanometer technology also working, and these products will be able to allow us to serve the volume markets with single-core products in a very cost-effective fashion over the course of next year. So 65 nanometers as a process and the products that we're going to ramp on it are looking very healthy. In fact, we intend to ramp them very rapidly over the next year or so.

By Q3 of 2006, a year from now, we would expect our CPU shipments based upon 65 nanometers, to surpass those of '90. And the [X-curve] behind me shows how fast that rate is happening. Beyond the new technology and the effects of performance and price and cost that come off of moving to the new technology, most importantly this gives us a wonderful vehicle to ramp our dual-core technologies. And this

X-curve shows the rate at which dual-core will displace single-core in our performance segments. And you can see the crossover here is also Q3 of '06, about a year from now.

In fact, over the next 18 months, Intel plans to ship [60] million dual-core microprocessors, between now and the end of 2006. But we're not stopping at dual-core. And beyond this we have quad-core. Intel has over ten quad-core or beyond projects in development today, and you'll hear a more from Pat Gelsinger on this tomorrow morning.

I wanted to share one more thing we're planning with respect to power. We've been discussing the importance of power on the laptop, the desktop, and the server. In 2006 the low end, ultra-low voltage products notebook products, or sub-notebooks will be at five watts. Desktops will move to 65 watts, and 80 watts in servers. This is in terms of TDP.

Well, when you look at this range of power, you have to also consider, 'Where else can the power envelope take us?' And we see a possibility of a new category of devices being developed. Machines that we'll call 'hand tops' for now. This is where we combine the performance capability of the PC with the mobility that you get in a handset today. And we've got some mock-ups and prototypes here of what these devices will look like. In general -- let me pull one off to show you -- they've got about a five-inch screen, they weigh about a pound, they have an all-day battery life, they're always connected -- they'll have Wi-Fi and WiMAX built into them. They have the ability to have USB inputs, to be able, in this mode, to control the screen to see things, like

movies or whatever, but also to be able to, in this mode, act as sort of a super Blackberry or instant messenger machine, with the keyboard here. But if you want to look at longer messages, since this is capable of running a full-featured operation system like Longhorn, with all the applications, you can also run it in this mode, and be able to see attachments in the orientation that you would normally see them on the PC.

Now this isn't science fiction. We expect our customers to be able to bring products based on the existing ultra-low-voltage technology out in these kinds of form factors in the first half of 2006.

But moving forward, the next generation of products requires a lot lower level of power. So beyond the five-watt products, we're developing a new product line. It's Intel architecture based, that will take our power envelope down by a factor of ten, from five watts to half a watt. And we expect to be able to deliver these products by the end of this decade.

We think that this will create new opportunities when you start thinking about the capabilities of this kind of performance in that kind of power envelope. And it has applications not just in these ultra-small devices. The other side of it has applications in terms of the kinds of servers we can develop.

What do I mean by that? In that same time frame we'll take the technology of many [cores], that is double-digit cores, and drive up the performance by another factor of ten -- factor of ten down in power,

factor of ten up on performance where you need it. Two factors of ten, one in each direction.

What's all this good for beyond building these new products? Well, one thing that we see coming forward is that we can significantly help reduce the energy costs around the world through lowering the overall power consumption of the kind of computers that are built around our products. In fact, given the power reduction with the next generation products, the [Merom], [Conroe], [Woodcrest] generation I just showed you, and today's California electricity costs, computer users can save a billion dollars per year in electricity for every 100 million units sold. It's an average of 30-watt reduction per CPU. And that doesn't even include the cost of the cooling and the environment around the PCs. So significant increase in performance, significant increase in efficiency, and a significant decrease in energy consumption and energy bills for users going forward.

Now there's one company that knows an awful lot about the trend in performance per watt, and multi-core. In fact, they're leading the industry, in my mind, in doing some of these really innovative things in terms of these trends. I'd like to invite up now Urs Hölzle who is the vice president of engineering and operations, and a fellow at Google, to talk about the importance of power and multi-core to them. Hello Urs.

Urs Hölzle: Hello Paul. Nice seeing you.

Paul Otellini: How are you?

[Applause]

Urs Hölzle: Thank you. So Paul in fact I really am very excited about hearing about multi-core and low-power, because we actually care at Google. At Google, we have a problem, and the problem is all of you doing queries -- it's not really a problem, so don't take it the wrong way, all right -- but our traffic is going up, the Web is getting bigger, so each of your queries needs to search through a larger set of data. And then our internal standards are going up, so we would actually like to spend even more computation per query. And all of these things together really drive up our computational needs.

Now, this need is too big to be served by a single machine. And you can't search through terabytes of data on a single PC or even a large-scale server. So we parallelized the program. The solution is well-known. You take your problem, you chop it down into smaller tasks, and you run each of these tasks on a separate CPU. And the exciting part about multi-core CPUs is that each of these separate cores gives us extra throughput so we can process more data in parallel.

Now, why is this better than just having multiple CPUs? Well, the big difference is power. Now, power is something that really matters, because if you do a careful study and you look at what you spend on your hardware and what you spend on just turning on this hardware and leaving it on for the three years of its lifetime, you will see that depending on where you live and what your infrastructure is, you paid half as much as you paid for your hardware to the electricity company.

And as Paul mentioned before, the trends historically actually made this even worse, because the power was going up, the speed was going up, and performance was going up every year, but performance per power wasn't going up. And so pretty soon, if that trend would continue, you would spend more money on the electricity company than you spend on your hardware. And in this respect, multi-core CPUs have a very big promise of, for the first time, really changing the performance-per-watt picture, because you can add cores and you add much less power per extra core than you add for CPUs. It's a lot cheaper too.

So this really matters to us, because we use lots of CPUs everywhere. I'll show you one example, an application that we released just two weeks ago, Google Earth. So Google Earth is a free application for your PC. You can download it and it allows you to fly over the Earth, you know? Any place on the Earth and, in fact, on the Moon, and see what's there. So what we do there is we take hundreds of terabytes of satellite imagery and compose them together into an application. There's tons and tons and tons of data there, and so we need parallel processing to actually deal with it and allow you to fly over. So just the terrain map, for example, so the elevations for the different, you know, points on the Earth is over 14 billion data points, you know, all over the globe. And on top of that, you know, all the image data, obviously, really, really adds up. So you get many millions of square miles with very high-resolution data, typically down to one foot, and in a few places, even below that, one inch.

And so [Chika Ozama] here, who is one of the key engineers, actually, from Google Earth, is going to show us what you can do with it starting with a one-inch resolution picture of the Google campus. So Chika, take it away.

Chika Ozama: So here we are looking at the globe. We can zoom down into Googleplex and sort of see the Mountain View campus. We'll actually zoom down on [best position] data in the database. This actually is where we eat our wonderful food every day, outside the cafeteria. You can sort of see the area we actually play volleyball in every year, and the swimming pools over here. And from here, we actually can zoom over and go out to across the Pacific and go to Mount Everest. So this is actually going over the ocean and we can go zoom down into Mount Everest. I'll just show you some of that data. This is actually Mount Everest, .7 meter data, a pretty amazing view of -- [you can virtually] go there when normally you would be able to go to that area. Sort of see Mount Everest.

So from here, we can actually go over to New York and fly across the Middle East, over Spain and across the Atlantic, and go down into New York. You'll see all the buildings, three buildings here, and sort of see different geometries and different complexity of both imagery, terrain, 3D buildings, and everything. Then we can go back out and zoom over the United States and come back over to exactly where you are right now. And zoom down into San Francisco to exactly where we are now, which is Moscone West. Zoom down here and see Moscone West, which is [unintelligible] [there]. Hold on one second. There you

go. Moscone West right here, and that's where we are right now. Around the world in eighty seconds. [Thanks] [unintelligible].

[Applause.]

Paul Otellini: Alright, thank you [unintelligible]. It is great working with a company that takes advantage of these things. [I'd love to see more.]

Paul Otellini: Let me shift now and talk about a few of the market areas that Intel's addressing. You'll hear more about this over the course of the week. I'd like to start though with the enterprise.

The business of doing business has been changed by technology, and in many ways, you the people in the room have helped make that happen. But Intel sees a continuing opportunity to drive innovation by looking at the problem a little bit differently -- the problem of running businesses end-to-end. And when we did the reorganization, we created one of the teams called the Digital Enterprise Group. And the main focus of this group is to look at the end-to-end value proposition for technology inside of businesses large, medium, and small.

And when you look at the enterprise today, there's certainly Intel architecture [resident] throughout it, in the PCs, in the servers, in the network infrastructure and so forth. But increasingly you'll see from Intel that we'll build around that Intel architecture to create end-to-end value in areas such as security and manageability and virtualization. Now there's no question that IT has driven enormous gains in worker

productivity over the last decade, but I think if you look at the data, there are sources and trends of increasing concern here.

This is from Gartner, and it suggests that CIOs are now spending almost 90% of their annual budget on maintenance, about 11% on innovation. So it's harder and harder for a CIO to be able to afford to put new capabilities into their enterprise, which gives them a differentiation in the market, when they're being forced to spend 90% of their budget on just keeping the business running.

At the same time this is happening, there's increasing vulnerabilities in terms of security, and they're really skyrocketing. This chart looks at a large inflection in security [incidences] that were reported. You can see a giant jump in 1999 and then a steady increase thereafter. And the sad part of this is, is this is just the reported vulnerabilities. The real number is probably a lot higher than this.

So what are we doing about it? What can technology do to solve some of these problems and address that pie chart and put more money into the CIOs for innovation over time? Well the first of the end-to-end areas that Intel intends to address in the enterprise is bringing forth this notion of imbedded IT. We'll use the transistor budgets to imbed capabilities combined with software to be able to deal more efficiently with things like security, manageability, virtualization [in] all of our platforms. And we've been talking about these capabilities for the last few IDFs.

Today I wanted to show you through some real products that are about to come out in terms of what kinds of value they can add for CIOs and specifically we'll focus on VT or virtualization technology and IAMT or Intel's Active Management Technology. To do that, I'd like to bring up Steve Ward who's the CEO of [Lenovo] to show a real solution that takes advantage of these technologies. Hi, Steve.

Steve Ward: Hi, Paul. Thanks very much.

[Applause.]

Steve Ward: Hey, Paul, it's hard to top those demos we just saw from Google, but Lenovo is all about taking innovation and putting it together with a low-cost infrastructure to help you save money so you can invest in stuff like what we just saw. And that's why this partnership with Intel is so important to us.

Let's start by talking about AMT, which can help lower the cost of managing and owning PCs by doing a lot of down-the-wire maintenance. I've got [Mark] over here to help me do a demo. I want to show you one of our premiere products. This is the IBM Think Center, and it's completely unplugged – doesn't even have a network connection. Let me just plug it in here. What we're going to do is simulate setting up a new [employee]. While the system is completely turned off, what's different about it is it's got Intel's AMT technology –virtualization, and Lenovo's ThinkVantage technologies. It's going to allow Mark to find this PC, bring it up, and do things he couldn't have done before without going to the office. Now, what you're going to see

on the left screen is the IT console. The right screen over here is blank because this machine is still turned off.

Paul Otellini: Now, Steve, I know how long it takes to load a system. This conference is only three days. [Laughs]

Steve Ward: Actually, Paul, with the new Intel technology, with Lenovo's technology, we can move this very, very quickly. As a matter of fact, we can find the machine, load brand new images on it, and bring it up, literally, in a matter of minutes. In fact, we can completely avoid any kind of [desk] side or remote maintenance, doing everything down the wire. We can actually even remotely assign IDs and personalize the machine, not as it ships from the factory, but for the individual in the office that it's put in. Also, as we load this new image in the machine, [run] diagnostic tools like Lenovo's Rescue and Recovery. All of this will take only a few minutes of the IT department's time. So, the machine should be up and running; there it is. So, Paul, that's one thing we can do.

Let's move to this second PC. In this case, this machine has one other technology in it which is Lenovo's Antidote Delivery Manager. Now, with Lenovo's Antidote Delivery Manager and with Intel's VT, what we've done is partitioned this PC. So, we have normal Windows environment running, and we have a second partition which is basically an appliance for the network. Do you want to give it a try?

Paul Otellini: Absolutely. You know, one of the big issues with doing a keynote is you're off of email for a couple of hours. So, I notice there's an email

here from Craig. Do I want to run it? Sure, I want to run it; he's my boss. Do I trust him? Well, I probably trust him. [Laughs]

Steve Ward: It's Craig. [Laughs]

Paul Otellini: It's Craig. It's downloading; I have an hourglass. Uh-oh, the icons are starting to disappear; that's not a good sign. And, in fact, it looks like I've got a virus.

Steve Ward: Uh-oh. So, what's happened is --

Paul Otellini: I shouldn't have trusted him.

Steve Ward: [Laughs] You shouldn't have trusted him, right. [Laughs] That email actually opened a virus into the machine. Don't worry, this machine will fix itself. What Antidote will do is identify that the machine has a virus -- and it's already starting to spew out packets, infecting the rest of the network. So, not only is your productivity completely lost, but the whole rest of the network is, in fact, going down. What you can see on the monitor up here are all the packets being spewed.

A message was sent over to IT. Mark saw it; he can [vary] off the machine remotely and send patches out without even having to reboot the machine. And in a very short period of time, you'll be back up.

Now, the reason this is so important is if you look at the surveys about virus attacks, even for a company as small as 25 PCs, it takes on average 31 person-days to recover from an attack. The average

company spends a minimum of $130,000 every time there's a virus released into the environment; you can imagine how often that is. It can be millions of dollars with the larger viruses. Most analysts believe that those costs are only one-seventh the true cost to the company. I was just speaking to a CIO the other day, and he told me they were actually losing a million dollars for every major virus in terms of business productivity. And, you're back up and running.

Paul Otellini: So, my system is running. I'm not going to open that email again, though.

Steve Ward: Right. [Laughs]

Paul Otellini: Steve, that's very impressive. When will these products be available?

Steve Ward: Paul, we actually announced these products this morning. They're shipping now, and the Antidote technology you saw will ship within six months.

Paul Otellini: That's fantastic.

Steve Ward: Thanks so much.

Paul Otellini: Thanks for coming. What you just saw there was the first example of a real solution for embedded IT. And we intend to rapidly ramp these capabilities. This is a diffusion curve that I show almost every IDF and it shows the rate of which we bring new technologies into the market as a function of our platform shipments. And if you look on the right-

hand side of this, you see the technologies like IAMT and VT will ramp very, very rapidly and, in fact, we expect them to represent about half of our platform shipments by the end of '07 -- and that's for all of our products. If we look at it in the business environment, I expect it to be a much more rapid ramp than that. New technologies, focused on intersecting users needs.

Now many of us are familiar with the needs of the enterprise, I thought I'd switch now to some less familiar territory, and this is really emerging markets. Now the growth in emerging markets has been well documented. It's gone from 15% of the PC market 10 years ago, to 38% of the PC market this year, 2005. And if you look forward, out to the end of this decade, it's expected to approach 50% of all shipments. And while that's a big number, I don't think that any of us think that we're doing a good job at penetrating these markets as rapidly as possible, or as they need. In fact if you look at the entirety of all emerging markets versus the United States what you see is that we have an 80% penetration here of computers, and less than 4%. So we have a lot of work to do to figure out to how to bring computing to the rest of the world.

Now at Intel we believe that tailoring products for the needs of these markets is really the key to driving the next wave of emerging markets growth. It's the reason we formed an organization inside of the company called CPG, or channel products group. And this group is focused on defining, understanding, and then delivering to the needs of customers in those countries. And, in fact, the needs that they have are increasingly different. Now some companies treat emerging markets as

a dumping ground for older technology and assume that cost is the only driving factor out there. Well I believe, at best, that's short-sighted, and probably at worst it's insulting. These nations are called emerging for a reason. They're called that because they are the high-growth engines of the future, of the economies of tomorrow.

Now I don't think anyone believes that the markets of tomorrow are going to be satisfied with yesterday's technology -- at Intel, we certainly don't. So we had a number of early efforts at trying to define and meet the unique needs of these markets. You've seen demonstrations here before at prior IDFs of computers that are designed to meet the needs of iCafes or internet cafes. Or computers that are focused on the education market in countries like China. We've also recently announced the opening of platform design centers in cities of Cairo, Shanghai, Sao Paulo, and Bangalore. The reason we've done this is that we want design resources in market understanding the requirements of these markets. And when you do this it requires then that you start thinking differently about these markets, and about the real needs. Let me show you the process by which we do that.

[Video Plays]

Paul Otellini: Now what you saw there was a partial solution but it showed the power of technology to begin to change people's lives. And as an industry, I think that once we understand the needs we can start then defining the technology required to solve those problems. And to do that, to show you how that process happens, I'd like to bring up Bill

[Su] who runs Channel Platforms Group for us, to show you some of the things that we're working on today. Hi, Bill.

Bill Su: Good morning, Paul.

[Applause]

Paul Otellini: Good to see you again.

Bill Su: Paul, as you mentioned in your speech the emerging market has special needs. And it's not just the kind of needs that we're accustomed to in the mature market. Also [you show on the video some] of these special usage models that a market like India has. Now a key part of CPG's mission is really to understand these needs and working with local interest to develop the products that meet their needs. This is not about just shipping them a product that works well on the mature market and hope that it works there as well. It's about ethnographic research, understanding their needs, working locally just to provide that kind of product.

We have already had a number of successes in the past, as you mentioned, but today, I want to show you a new product that we're working on, which is right here, Paul. This is a community PC. As you've seen in the India video, we show a usage model where people go to kiosks to use the computer. Now, in the mature market, we think of computer usage as one-on-one -- I have my own computer, or in many cases, we have more than one computer. In this market, they use a community PC to access government information, land records,

business transactions, and maybe in the future even as a portal for like health and other services.

Does any PC work in this case? Well, there are some special challenges. Let me show you some. For example: in India, the availability of reliable power is not abundant. As a matter of fact, if you've ever been to India, power outages are very common. We're not talking about outages for seconds. We're talking about outages for hours, so one of the capabilities of this PC is to be able to withstand such outages.

Now what I'm going to show you right here is I just unplugged the PC. Now you didn't see any glitches in the PC because it's running on a battery backup. And the kind of preferred battery backup in this environment is actually a car batter because they're [plentily] available over in India. And this car battery will enable this PC to run for hours and therefore continue to be productive. So that's one mode of operation.

But that's not the only thing. Also if you've been to India, especially in the summer time, it's hot, humid, and dusty, especially in the rural areas. So a regular PC can get compromised and may not work very well and reliably. So as part of the design of this PC, there's actually a dust filter built into it that allows the PCs air intake to be dust free and also keeps out, occasionally, bugs. Real live insect bugs, as an example. So this has proven to be quite a useful tool.

Another significant feature of this PC is that because it's a community PC, there are a lot of different transactions. It could get compromised. And the operator and the users would have to be able to recover the PC instantaneously. So we've built into this product a one-button recovery process. And in so doing, just at the push of one button, it activates the recovery console, which will allow the user to recover the PC to a specific configuration as they see fit. Now, in the absence of IT and other sophisticated support, this is essential.

This is the kind of product that we're working with the local community to bring to market and meet their needs.

Paul Otellini: That's exciting. When do you think products like this will start shipping?

Bill Su: We're targeting for the beginning of next year. We're very excited to bring this product to market, Paul.

Paul Otellini: Great. I can't wait to see your quota.

Bill Su: Thank you.

Paul Otellini: Okay, Bill.

[Applause.]

Paul Otellini: What you saw there was the computing side of the solution, but the other side of it is also important, and that's connectivity. In places like

India and places in the emerging markets, connectivity has to cover a very large area with a single node. And WiMAX is a new technology that intersects that need. In fact. WiMAX is making pretty good headway around the world.

As you see in the chart behind me, there are over one hundred WiMAX trials now going on in the world. Wherever there's a white dot, there's a trial. And I think the interesting thing to note here is two thirds of those trials are happening in the emerging markets. In fact, I wanted to introduce you to some people who will tell you more about WiMAX and the emerging markets, and to do that, we're going to go live, via WiMAX, to [Uttaranchal], which is a town in the foothills of the Himalayas, it's way out there – you can see on the map behind you – and get a live video conference call via WiMAX to [Uttaranchal], which is a town in the foothills of the Himalayas. It's way out there. You see on the map behind you. And get a live video conference call via WiMAX to India. And here we have the Minister of Communications for that province. Hello, Mr. Minister [Nelo] India!

Minister: [unintelligible]

Paul Otellini: Fine.

Minister: [unintelligible] really address the needs of the people.

Paul Otellini: Very good. Intel is very excited to be working with you, Mr. Minister.

Minister: Thank you very much, [Paul].

Paul Otellini: Appreciate your time and thank you for staying up tonight to help us..

Minister: [unintelligible]

Paul Otellini: Bye-bye.

[Applause]

Paul Otellini: That looked like a real simple demo. Let me tell you, running WiMAX in that village was non-trivial. And as you know, India is about an eleven-and-a-half hour time difference. So we did the rehearsal last night and the Minister stayed up, worked on things and so forth, and we kept it running all night to be able to do the video. So it shows you the capability and it also shows you the willingness and the excitement that this kind of technology can bring to these rural villages as we bring the ability to do a lot of the services you saw in the video to people real-time.

So, I'd like to step back from the Himalayas now and return closer to home. The home is the site of the most fundamental revolution of all. The home is where life happens. Technology, I think, has its greatest challenge in the home, because in order for technology to be useful in the home, it has to not only meet the needs but it has to meet the lifestyles of the people that life inside it. And we put together a short video to give you a view of how a digital home might look in the not-so-distant future.

[Video Plays]

Paul Otellini: What you saw in that video is all technically possible today and I think it will soon be commercially available, as well. That kind of building into the lifestyle of the family is really, I think, the essence of the beginning of the digital entertainment era. It's an era we've talked about for quite some time. It's an era where digital content, the move towards digitizing of content allows that content to then be played back on any digital device. With that the concepts of watching television only on a television or listening to radio only a radio go away. Those days are gone forever.

In fact, you can now start experiencing audio, video, news, entertainment anywhere, at any time, on a myriad of digital devices. Consumers are beginning to recognize this in very large numbers. We've already seen large growth in things like digital set-top boxes; these have crossed about 50 million units, headed towards almost 70 million units by 2009. Digital televisions have had even faster growth heading toward 100 million units by '09, and digital audio players also growing similarly quickly to almost 100 million a year in that same time frame.

These are all trends of the adoption of digital in the home. A re-tooling or rethinking of the living room is about to happen. It's happening in front of us with technology at the center. From my perspective, there are two key areas where technology is driving and effecting this

change. The first is how content is distributed, and the second is how it's consumed.

If we start with the distribution, the simple view is that the Internet is simply the delivery for all of this content. What does that mean, though? It means that you start thinking about a single distribution channel that can simultaneously reach almost everyone in the world, from mainstream down to niche.

The Internet access is necessary but not sufficient. For this digital home experience to really happen, what we need to have is broadband. A few years ago when we talked about broadband adoption in this country, it was anemic, at best. But, the U.S. broadband users, which are the blue on the chart behind me, have grown very, very rapidly. You probably all know that. Most of you experience it. But, what you may not know is that the growth in the United States is dwarfed by the growth outside of the United States. Today, there are more people outside the U.S. that are on broadband than in the U.S. In fact over the next few years, that number grows to 65%. You already have countries like South Korea that have an 80% penetration of broadband in their country, and its real broadband – 5 to 10 megabits per second.

If you look at 2005, there's another interesting data point that pops out. Worldwide, there are 300 million broadband subscribers. At 300 million, per household, it's not that hard to think about a billion users now being in the broadband era.

So, where's broadband going? Well, earlier you heard about WiMAX in the emerging market context – the demonstration, the live video conference from India. I think WiMAX will also play a large role in the home. Let me show you now what's possible with WiMAX in a home environment.

Imagine, first of all, that there will be premium content available on the Internet, all in high-definition, and in this case, 7.0 Dolby Surround Sound. Here, I'm going to download a movie on my typical living room television; it's a broadband movie. This movie's going to come encrypted and protected end-to-end in a celluloid-free fashion. All this is made possible by the power of the dual-core entertainment PC that's going to run it here and the WiMAX network that will enable bringing that broadband content here into the auditorium. In this case, I'm going to click on a movie called "Fly Boys." It's a 300 megabyte file, so it's going to buffer before it starts playing. You can see the buffering happening here; it's about 80% done. Then, it's going to start playing that protected content here on the large plasma.

[Movie plays]

Paul Otellini: That's pretty cool. With technology like this, though, you're not – you don't want to necessarily be limited to the living room or to the movie that's being shown in the living room. And in fact we've talked about the notion of DMAs or Digital Media Adapters for a number of years. The ability to take that protected content and stream it around the house to other rooms and other devices. And in fact what we've got here is another HD – first HD DMA -- this happens to be from [Acer]

here – screening that same content simultaneously with the one that was up on the other screen, enabled by the power of that dual-core microprocessor. It's the first time we've ever seen HD content over a DMA.

But consumers aren't only going to be tied to the living room or the bedroom or wherever this other television happens to be. Consumers are increasingly mobile. And I think with the deployment of ubiquitous high-speed broadband, you can start enjoying now quality content on a third screen, and that screen happens to be the notebook. And here we've got a bank of 12 notebooks, six on this side, six over there, and they're all showing that same content, again, in high def, protected end-to-end. In this case it's being streamed from that PC over the Wi-Fi network here that's in the auditorium. Twelve separate HD screens playing on these notebooks simultaneously.

Now there's a fourth screen, and the fourth screen is one that many of us carry around. It's a phone. And while it may be a bit farfetched to think about watching a movie on a phone, it's certainly not farfetched to think about watching a movie trailer or a news snippet or maybe then ordering tickets for that movie that evening. I thought we'd take a look at the quality of the trailer that this enables.

[Movie trailer plays]

Paul Otellini: Let me show you how we did all this. We began by encoding and encrypting those HD movie clips and the trailer at our labs in Oregon, right? And then we securely sent that content over the Internet. We

sent it to a WiMAX base station located about a half a mile, mile from here on top of Nob Hill. And then from that WiMAX base station, we sent it over WiMAX to the auditorium here at Moscone West, and then we sent it from there to the entertainment PC located over here under the plasma, where the entertainment PC decoded the file and played it on the plasma screen. From there, it was sent, again protected, encrypted, in high-definition, over to the scene screen, which was out in the bedroom somewhere. And then using the Wi-Fi network that's here in this room, we took the content and displayed it simultaneously on twelve notebook computers -- Wi-Fi, separate HD streams -- and also on a comparable number of smart phones and PDAs -- third and fourth screens -- all showing that same content, all being able to demonstrate the ability to protect that stream for the content owners so they can make sure that they get paid for their valuable content.

Now, if you're still thinking "so what, what's cool about this or what's different about this?" it gets really exciting when you start doing a little math. I said earlier there are over 300 million broadband households in the world today. If you assume a family of four, a couple of digital devices per home, some conservative math gets you to two billion screens. With two billion broadband screens, you can start thinking about deploying content to a billion viewers in a matter of weeks versus the matter of years that it takes for the movie industry; even a successful movie, to have a billion people see a given piece of content.

Now, I think it's fair to say that the industry has talked about this kind of revolution before and it's been happening or about to happen for

many, many years. I think the difference today is that there are a number of key pieces that are finally coming together to enable this transition to happen. Processor performance is here with the enablement and the beginning of the dual-core era. We now have sufficient processing performance to be able to handle a multitude of streams independently and also keep them protected in a means that satisfies the content owners. We have hard drive capacity now able to store these things. Broadband technology now, both Wi-Fi and WiMAX and other technologies, are essentially being deployed to handle the distribution of the content. Content-protection mechanisms have now been agreed to by the consumer electronics industry, the computer industry, and most importantly, many of the key players in Hollywood, so that the content can now be distributed over the Internet. And lastly, people are now creating that content in a digital fashion.

As this happens, I think you'll see new service models be created. Two months ago at the Sun Valley conference, Intel and Morgan Freeman production company announced the formation of a new company. It's called Clickstar. And Clickstar begins with the revolutionary premise that first-run movies will be available day and date on the Internet and out in the theaters simultaneously. As this happens and as more people follow this model, I think you'll see the beginnings of this revolution start to happen and proliferate inside the home.

The other thing that has to happen, though, is that these devices to run all this content have to be increasingly consumer-friendly or consumer electronics-like, and I wanted to show you a reference design here of a

new entertainment PC. This one happens to be based upon the upcoming Yonah dual core microprocessor. I said earlier you'll see that product evolve into small [form-factor] desktops as well. This is a full entertainment PC. It has integrated Bluetooth technology, Wi-Fi, television tuner, HD audio, 1394, and it's pretty quiet. 30db quiet. I expect products to be built around this reference design or products very comparable to it over the course of 2006.

Now, you'll see that Intel has plans to deliver a specific platform, much like we did with Centrino mobile technology, optimized and designed around the digital home. And tomorrow, Don MacDonald will tell you all about that and give you a sneak peek into the details behind it.

So wrapping up, today we took you on a whirlwind tour of where Intel is going. We started out with the premise that growth is back and that technology and innovation are needed to fuel growth. Looking forward, I think you can count on Intel to do a couple of things. You can count on us to continue our relentless pursuit of Moore's law. We will create and build products and platforms that enable new levels of performance, energy efficiency, and communication capability integrated into them.

And in the end, Kettering was right. We have to all come together to build exciting products that people want. And that is what this week at IDF is all about. Together, we need to spend the week and then the subsequent years defining and designing the products that will fuel the next phase of our collective growth. Thank you.

[Applause]

[Music]

[End of recorded material]