

**Intel Developer Forum San Francisco Opening Keynote**

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[Video. ]

Paul Otellini: Good morning. And let me add my welcome to IDF.

As you saw in the video, there is an incredible transformation taking place in our industry. The world of computing is expanding beyond the personal computer to a much bigger space with Intel Architecture poised to be at the center of it. This transformation has broad implications on you, our developers. Over the past several years you've seen Intel developing Intel Architecture solutions that increasingly address opportunities beyond the PC. We call these a spectrum.

We're building out a spectrum of computing devices all based upon Intel Architecture from the highest-end servers to mainstream PCs to consumer electronics devices to embedded systems and all the way down to handhelds, all based on a single architecture. Inside this spectrum, what we want to deliver for consumers is the same personal computing experience across any device. For businesses, we want them to be able to have access to an affordable infrastructure for data and their devices. And for developers, we want to provide more market opportunities to leverage the same architecture, tools, know-how, to make what consumers want with Intel Architecture.

Now, building these devices is one thing; gluing them all together is another. And this is the new concept we want to discuss today, it's about building a continuum, making all these devices work together in a seamless fashion, in a familiar fashion. It's how we build an environment of familiar applications and usage models taking advantage of these very, very different compute devices. Users and developers have to have the freedom to move seamlessly back and forth through this computing continuum. I think in the process of doing this, we'll see a redefinition of the playing field between industries, between companies, breaking down barriers between industries that exist today, and expanding the boundaries of what's possible inside of computing.

While Moore's Law is very, very predictable, I think the continuum is not. The nature of the products that we enable, and are going to then make possible, are really limitless. For quite some time, what we've been focused on are things like speed, size and battery life. Those are still important. But increasingly the differentiation is around things like bandwidth, user interfaces, social networking, and even tweets. As a result, IDF is changing. The nature of IDF is that it used to be a PC event, with a very narrow focus around PCs.

Back in 1997, we had 300 attendees from the industry. Sixty percent of the attendees were PC OEMs with a handful of people here from the software community. This year we have over 4,000 attendees. Only 20 percent of the attendees are from OEMs or ODMs. Four hundred of you are from the consumer electronics industry, 400 from the

communications industry, over 600 people from software, and over 500 people here from other industries as varied as energy, financial services and healthcare.

This is a profound shift for Intel, moving from the PC focus that we've had to making all computing personal. It's good for us, I think it's good for developers – you -- and I think it's good for end-users.

How we build this continuum out is the topic of my talk today. And I want to talk about it in three distinct sections: technology; how we create the continuum; and, thirdly, the opportunity for the developers that are out here. In the context of doing this, it's important to remember the role of standards. Standards are what made the Internet explosion happen. TCP/IP was there at the start, but it was things like HTTP, HTML, and XML that really allowed developers to reach the billion PCs on the Internet today to deliver their products based upon those open standards. And what we're doing now is creating and evolving another generation of standards to enable and catalyze the growth in personal computing.

There are three essential technology ingredients here. Moore's Law, of course, the basic silicon capability that drives it all. Secondly, the platform architectures that take advantage of that silicon technology and embed new functionality into devices. And lastly, the software, the software that makes it real and that brings it to the end-user in a way that is friendly and easy to use. The combination of these three allows us to build the continuum.

Let me start with Moore's Law. The pursuit of Moore's Law at Intel is unchanged. It's the foundation for everything we do. We have been on this two-year cadence of new silicon technologies for a long, long time. Two years ago, we introduced the world's first 45-nanometer high-k metal gate silicon technology. To date, we've shipped over two hundred million microprocessors on that process. To date, our competition has shipped zero.

Well, we're going beyond that. We're not stopping at 45. The next generation is 32 nanometers. In fact, this is the first time our technologists have allowed me to show a picture of a 32-nanometer transistor -- that little thing in the small circle up there. I know it seems small -- if you're a device physicist, that's a very cool picture. Thirty-two nanometers is here now. It makes it economically feasible for us to manufacture billion-plus transistor microprocessors in very high volume.

Thirty-two nanometer at Intel uses our second generation of high-k metal gate transistors. We've already reached yields on this technology that make it very production-worthy and its moving into high-volume production. In fact, we've started production on the first microprocessor on this generation of technology, codenamed Westmere, for shipments to our customers in the fourth quarter of this year.

Now, we're not stopping at 32. We've been working on a new technology, the next generation after 32, which is 22 nanometers. And I can't show you a picture of this transistor here because my guys just won't let me.

However, I can show you, for the first time ever, the world's first working 22-nanometer silicon technology. And it's just not able to show you, it also works. This is the smallest SRAM cell in working circuits to date. These transistors use a third-generation of the high-k metal gate technology. Each SRAM chip has 2.9 billion transistors; each array on the SRAM is 364 megabits. It's on-track for production in the second half 2011, continuing our two-year cadence. At Intel, Moore's Law is alive and well.

The second building block in the technology is the platform architecture. We introduced a cadence -- that we call tick-tock -- a number of years ago, where we bring in a new microarchitecture on an existing silicon technology, which we call a "tock." We then move to the "tick" by shrinking to the next generation of silicon technology, and then moving to the new microarchitecture, and then another shrink and so forth.

And we've done this for many, many generations in a row. This continues with this generation. I talked about 32 nanometers and the Westmere product, which has a new scalable architecture and a number of new features that we're very excited about, including one called Turbo that Sean and Dadi will discuss in their keynotes. But

beginning with this generation, graphics has also now been integrated into the microprocessor. Looking forward to the next tick on 32 nanometers is Sandy Bridge, our next generation microarchitecture that will be out on cadence late next year. And looking forward into 22 nanometers, we already have significant design work on the processors that will take advantage of the silicon technology I just showed you on that wafer.

But recently we've introduced a second architecture, not based upon the Core products, but around the Intel Atom processor. And this is a microarchitecture focused on using our best silicon technology to design the best products for Internet-connected devices. And we now have the ability to deliver these devices on a predictable cadence -- essentially generating roadmaps that you, our developers, can count on. You can see them here, with a two-year cadence, with a new core coming out about every two years on different silicon technology. The tick-tock cadence here is slightly different. What this really reflects is Intel's traditional pattern of innovation and integration. We'll use these new cores on successive generations of silicon technology to do proliferations of what we call SoCs, or system-on-chips.

SoCs are a very big investment for Intel. We think that SoCs based upon the Atom core are what allows us to be able to move into all of the new markets that we'll be discussing in a few minutes. In addition to building these devices at Intel, we've also announced that we're porting this Atom core over to TSMC. And in doing so we're rewriting the traditional rules of how Intel has operated. We're not

doing this for capacity. We're doing this to be able to reach out to new customers, to allow customers who want to embed their own intellectual property onto an Atom core SoC, or to use the wide variety of library devices, IO devices, that exist at TSMC to build semi-custom devices around Atom for themselves. New rules, new markets.

When we looked at making the shift into doing SoCs at Intel, we had to rethink our silicon technology. At one end, we couldn't stop doing what we always had done, which is the next generation technology had to improve performance, it also had to improve leakage. And in fact for our mainstream product line, we're delivering the same kind of fundamental increase in performance that we did between 65 and 45 nanometers, also being delivered between 45 and 32 nanometers. We have the choice -- at the transistor-level -- of at the same power increasing performance by 22 percent. Or, at the same performance decreasing leakage by 10x. And we're delivering that kind of technology into the new products like Westmere that we've talked about.

What we did differently with this technology -- with this generation -- is stretch the curve. That orange line stretches down into spaces that we've never done before to be able to take advantage of the scaling capability of our silicon to build devices that have ultra-low power. In fact, the 32-nanometer generation of technology has a 30x reduction in leakage over its predecessor, 45-nanometer technology. At the same time, we've got the new silicon technology for system-on-chip. We've also developed common libraries, common interconnect models, to be

able to really facilitate re-use and get SoCs out for a variety of market segments very, very rapidly.

How rapidly? Well, we already have over twelve 32-nanometer SoCs in development at Intel coming out over the next couple of years. And, in fact, if I look forward, out, say, five years or so, I can easily see the point where Intel Corporation ships more SoC devices per year than standard microprocessors. It's the kind of markets we're going into that really generate this kind of capability, as well as the low end of the PC market, which is increasingly, I think, going to benefit from SoC technology.

The third part of the technology foundation is software. Software binds this continuum together. It removes the barriers that I talked about between these devices. Software, though, is really changing. For most of my career, what we talked about was a software environment that was called client/server. That's no longer true. Today it's all about multiple clients and multiple clouds, and building devices and infrastructure that support that wide variety of clients, taking advantage of cloud infrastructure as it's built out.

Intel is very committed to our development community -- to giving you the tools to be able to develop for this new environment. There are over 14 million developers in the world today that work on Intel Architecture, and many of them work on Intel tools. In the past couple of years, we have acquired over ten companies in the software area alone to be able to flesh out the tools we need to bring you better



graphics, to bring you SoC capabilities, and to bring you some exciting things I'll talk about a little later in this speech.

We also think we have support in terms of first-class support for developers out there. We have the third largest ISV program in the world. I'll give you one factoid from that: in the last couple of years we've trained 2,500 faculty around the world and 136,000 students on multi-core technology and how to program in that environment. The beauty of the architecture is its consistency. You all know how to use the tools. The developer community, 14 million worldwide, understands them. Reuse, time-to-market is really where the money is nowadays.

Those are the fundamental technology foundations. How do we actually build this continuum? Let me go through the products one by one. I couldn't get through IDF without talking about the PC market. What's going on? Sean talked about the market being resilient. I think it's more than resilient. I think it's amazing.

What this chart shows is three successive forecasts by Gartner\* for PC shipments and units in the year 2009 and 2010; 2008 actuals are on the left there. And you can see in three successive forecasts they've gone from being down 10 to 15 percent to being down a few percent. And all forecasts show a significant growth into 2010.

I think it's actually better than this. My own bet is that we are likely to see units in the PC market flat to slightly up this year over 2008. Now,

think about that. This is in an environment where we have the worst recession in 70 years, where the automotive industry has essentially collapsed. Consumer electronics industries are hurting. The handset industry, which has never seen a down year, will be down at least 5 percent in units this year. And the PC is flat to up.

It shows that we have built something which is indispensable, something that people need in their day-to-day lives. This is no longer a discretionary purchase. This is something that is fundamental to what all of us do day in and day out. And looking forward, I can get a lot more excited than Sean was in terms of the best is still yet to come. I think that the market is poised for a resurgence. And we'll see how 2010 plays out.

Let me talk a little bit about the various market segments. I'll start with our core microarchitecture processors. We've recently introduced a new branding scheme, i3, i5, and i7 that we intend to be persistent for the Core products for a long, long time. And they represent, very simply, good, better and best versions of our products. We introduced the first vision of an Intel Core i7 processor a while back, last year. Most recently we've introduced new versions of the Core i7 processor and the first versions of the Intel Core i5 processor. And early next year we'll introduce the first Intel Core i3 processors.

The ones we've introduced so far have been based upon Nehalem. Upcoming ones are based upon Westmere. One of the things we've done is work very closely with Microsoft\* around the Win 7 launch

and optimizing our collective products for this. Let me say off the top that I am very excited about Windows 7 and its ability to ignite some growth in the marketplace. I think it's a first-class job that they've done on this operating system, and I can't wait, personally, to install it on my machine.

But one of the things that we've done with Microsoft is focus on faster boot-up, better performance in terms of optimizing the threading and the solid state drives and those kinds of things in our drivers. And also, most importantly for notebook users, [focused on] much better platform power management, being able to move the machine into deep sleep states, C6 sleep state, much more often and more rapidly to be able to [help] preserve that battery life.

How does this play out in the two classes of computers that we have? Well, first of all, let me talk about the enterprise. In many ways, I think that with Win 7 what we'll see -- and Core i5 and i7 -- we'll see momentum continue to build on what's already happened around Intel vPro technology in the last couple of years.

The new platforms offer up to three times the performance versus the install base of machines, which are typically Pentium 4-class machines. Manageability around the environment is up to 50 percent reduction in operating costs. And one of the things I'm very excited about with these new machines, and Win 7, is the ability to run legacy [Windows] XP applications under Intel's virtualization technology and the Win XP mode under Win 7.

But I think most important to an IT manager right now is being able to offer their users security without compromise. Today running the full security environment, things like hard disk encryption, requires quite a bit of taxing load on the machine, and very often the users just turn the darn things off. We want to be able to allow security to be done in a very transparent fashion. To show you this, let me bring out Adam who's going to take us through some of the newest vPro features.

Adam: Morning, Paul. All right, what I've got here for you today is a quick demonstration to illustrate what you talked about here with the IT managers trying to juggle the security without compromise of performance on this. So what I have for the audience here on their left side is about a three-year-old PC. It's featuring what was a top-end processor, a Pentium 4. It's running an oldie, but goodie, Windows XP. And it's loaded up with some of the applications that we're all familiar with. By 9 a.m. I seem to always have all my mail open, all the Powerpoints, and all these other things going.

Now, it's a bit of a bake-off, my competitive nature. I like to go ahead and throw together a little bit of a race here. And what I have for the audience is, for the first time on stage, our Arrandale dual-core processor. This is from the Westmere line on 32 nanometers. And there are some great new features here that will help with some of those performance hits.

For one, we have gone ahead and put on the McAfee\* whole disk encryption on both of these systems. The good news is the Arrandale dual-core system features a new advanced encryption offload. [It] offloads AES to the CPU. So we're no longer needing to do that in software. So throughout the day your operating system, your applications, and your personal files are opening thousands of files all day long, decrypting, encrypting -- over and over and over.

So I put together a quick example of that. This is a WinZip application which also features encryption and compression. The encryption is also offloaded by our Westmere processor. So I'm going to go ahead and fire up the zipping. And if you look up on the keynote screen here, you'll see that the Westmere system is well on its way to getting this thing done quicker than I can even get this thing started under this background workload. We'll get this thing going in a second here.

But you see what happens on this system. It becomes lethargic with these background tasks, whole-disk encryption, and everything combined together -- this multitasking. Working with Win 7 on the schedulers, we're able to take advantage of the dual core as well as the two virtual hyper-threading cores that come on this system. So you see we're going to be able to get this thing done. And additionally, take a look at the responsiveness on this. Because it's being offloaded by the CPU, there's no problem with that.

Another thing that we have as we move over from desktops to laptops in small, medium and large businesses is an increased chance of theft. So last year we introduced the anti-theft technology, Intel's Anti-Theft technology. And what we can do with that, I'm going to go ahead and fire off what's known as, what I call anyways, a poison pill -- using my Intel Win 7 MID.

And what happens here is the poison pill goes up to the Internet and has killed this system, basically has rendered it into a brick state. The chipset and the motherboard is basically unusable until we bring it back to an IT manager to get this reinstated. Now, let me go ahead and fire that on so we can see what's happened here. Give it a second to get through that. We can get a camera shot on this. Great.

So what's happened here with Anti-Theft 2.0, working with vendors like PTP and WinMagic, we're able to not only disable the platform, but now that hard disk is also rendered useless. Even if I gave you the password, Paul, you're not going to be able to unlock that -- again, without taking it back to our IT staff. So that's great news. And also for a support with the new KVM features and stuff, we can also bring this back online remotely without even making a deskside visit.

Paul Otellini: Fabulous.

Adam: So performance, security, and manageability without any compromise to any of those.

Paul Otellini: That's words to an IT manager's heart.

Adam: Exactly. Thanks, Paul.

Paul Otellini: Thank you, Adam.

[Applause]

Paul Otellini: Let me shift to consumer space. It's pretty clear that consumers are spending more and more time with digital media, in particular video. Sixty-two percent of all the video on the Internet that's watched is user-generated content, and the majority of it is under two minutes long. And increasingly what you're seeing people do is not just shoot and upload, but also take the time to edit it out and create something which is compelling for their friends and their family.

One of the things that Intel and Microsoft have done with this generation of consumer devices, consumer PCs, is focus on a way to optimize how all of these devices can work together. And to show you how that plays out, let me bring out Art to walk us through the world of consumer. Hey, Art.

Art: Hi, Paul, good morning. So what I brought along with me is several new and next-generation devices all running various different flavors of Windows 7. And the first one I want to show you is this cool new device from UMID\* with an Intel Atom processor. And not only does it give me access to the full Internet, it's got an integrated camera here.

And it allows me to capture my adventures here in San Francisco.  
And this keynote's a big part of that adventure.

Do you mind if I just take a quick video of you on stage?

Paul Otellini: Sure. Hi, Art.

Art: So, wave to the camera. We've got the Transamerica Building in the background. And, you know, I was running Windows 7. It's running in the Windows 7 Home Basic version. I'll turn this around so you can see the familiar user interface and the application I used to capture the video. And since it's running Windows 7, it makes it very easy to add this onto my home network or home group and share my media across it. We'll use that later on in the demo here.

Okay, so moving on. You know, as I'm traveling, I almost always take a camera or an MID with me to capture pictures and video. But I'm a bit of a photography buff, so I usually want something with a bigger screen size and a little bit more processing power. So I went to something like this Arrandale laptop so I can edit the pictures and videos. But you might want to just look at the pictures and—

Paul Otellini: You're saying I'm lazy?

Art: —and go on the Internet. No, just something that might match your needs a little bit better. The netbook is running Windows 7 Starter, and on the Arrandale we're running Windows 7 Home Premium. So I



wanted to show you a common task that I like to do so you understand a little better why I might choose the Arrandale system.

So if we kick that off -- and I'll explain what we're doing here. So, on both systems we're using Windows 7 photo gallery to stitch together a panoramic scene. I'm using four pictures in this case. And you can see that the netbook is fully capable of doing this task. But, with the Arrandale laptop -- with the extra processing power and features like turbo -- you're able to do that three to four or more times faster. And that just scales when you do more pictures and video.

Now when I get home, I will want to use a desktop with a little extra performance and a bigger screen size. In this case I'm using Windows 7 Ultimate. Since it's on my home network, I can pull videos and pictures from across the network. In this case, we're going to be using Windows Movie Maker -- very easy to use that and create movies. We're going to pull together the pictures that we had on the UMID device. We'll pull that into our frames here.

And then from the Arrandale we'll pull that panoramic picture and some other pictures we have on that. And just with a couple clicks of our auto movie feature, we'll have transitions and a title ready to go. And then just a couple more clicks of the auto publish button -- we'll get that going -- name it and kick that off. And in about 20 seconds we'll have a movie we're ready to share.

Paul Otellini: So it's got to use a lot of MIPS. You always bring out a surprise. I bet this is our next generation Westmere desktop product.

Art: I actually didn't bring Westmere, but I never want to disappoint you. So this is actually our next next generation silicon, Sandy Bridge. So it's fantastic that Sandy Bridge is already up and running Windows 7 and able to do a task like this. We've had it for about a month now.

Paul Otellini: Yeah, I saw the first silicon in Folsom just about a month ago, and here we are running compute-intensive applications.

Art: Yeah, it's great. So continuing on, one of my favorite features in Windows 7 is this play-to feature. It allows you to push content to other things on your home network. I can push that movie out to my netbook or notebook. In this case we want to stream it to our next generation set-top box. This is Sodaville [based], and it will go to our big screen here in a second. And you see the video that we just shot here on stage -- and I've got a panoramic picture. So the Sodaville's all about bringing Internet to our TV experience and sharing our home videos and things on our home network.

Paul Otellini: All seamless, all IA.

Art: Right. And I could very easily have pulled that over to the MID and watch that while I'm on a plane or something like that. But other handhelds can do that. I really wanted to show you some things that

only Intel Architecture handhelds can do, so I have several examples of that.

Right here I have Netflix\* using the “watch instantly” feature that they have. So you can stream any of 17,000 movies and videos that they have on their network. And it looks beautiful on this screen. It acts just like you have it on your laptop or desktop when you use it right now.

Next, you're able to do things like video conferencing with this with the integrated camera. So you can see Adam's working hard back there. This is using Windows Live Messenger, but we could have used Skype\* -- not just the audio part but the video portion of Skype.

Paul Otellini: These are things you don't think you could have done on other devices?

Art: You have to have Intel Architecture to be able to do this. And then the last one, you can use thousands of online games that are already out there -- and this is ready to play the many games that are already out there. I can hit play if I want to, and it starts playing there.

So just to recap, I've showed Windows 7 running across several of our next generation devices. And as I flowed back and forth between this, I didn't have to learn some new interface. It was very easy. And it's really about matching the right solution to the right need.

Paul Otellini: Thanks very much, Art.

Art: Thank you.

Paul Otellini: Now sort of a taste of what we're talking about in terms of being able to have a very seamless movement through all these devices, common user interfaces, common-use models, but yet the content is the same, the format's the same, and the experience is just scaled to the device that you're looking at.

Increasingly we are focused on Internet-connected devices -- the small things that you carry around with you or that you plug into consumer electronics devices around the world. To do this, as I said a few minutes ago, we talked about creating the Intel Atom architecture. And this was designed with a purpose. It was designed to really allow us to move IA down into spaces that we hadn't been in before. All this improves power, performance, and most of all cost -- being able to take the budget for these kinds of devices -- to build a materials budget down to levels that are very affordable in the consumer space.

But it's not just the silicon. What we're learning as we go through this is that the software environment in each of these is equally complex, and today they're equally unique. And the idea is how can we make them less unique and more leveraged from a developer's standpoint? And to do this, we are working around Atom and its software environment. The key value proposition around Atom is port-of-choice.

Of course Microsoft is with us in many segments, most notably in netbooks. For those customers that want a mobile optimized version of Linux that's optimized for Intel Architecture, we have Moblin\* -- Moblin focused on Atom. And most recently, with the acquisition of Wind River\*, you'll now see us deliver to the market leading real-time operating systems optimized for Intel Architecture based upon the VxWorks product from Wind River.

The goal that we have for developers is very simple -- to write once and run on all devices. To do this though, we have to deliver the seamless experience. And if I gave you a vision of that, it would be what could happen with the netbooks?

The netbook market has really been, I think, quite astounding. It's been a growth-driver for Intel and a growth-driver for the industry. And in many ways it's filled the gap in that Gartner slide -- the netbook has been able to fill in the gap that without it would ultimately have led to a down year, I think.

I'm comparing here the first six quarters of shipments of the three hottest consumer electronics devices in the last three years: the iPhone\*, the Wii\*, and the netbook. And the netbook has outpaced all of these after the third quarter, and there's really no looking back.

So as we look at the opportunity around netbook volume and how to accelerate that even faster, one of the things that becomes very clear to

us is that we need a better applications environment. These devices, as Art pointed out, are ultra-portable. People want to do more on them than just running legacy applications. And, increasingly, we're finding Atom is also at the heart of a lot of these other devices.

So we have a common operating system strategy. What we need for this now is a common run-time strategy. And I'm very pleased to announce today that Adobe\* and Microsoft are supporting both Moblin and Windows with their run-time operating environments, and we expect to have very shortly a similar level of support on JavaFX\*. So you'll see Atom-based software environments continuing to flesh out in terms of multiple vendor support to allow you to do whatever you want on this.

We also think we need a new developer program, and today we're announcing one. It's the Intel Atom Developer Program. And the focus here -- we're aimed at developers and ISPs -- is we want to create new or port existing programs over to Atom. We will develop and deliver tools and STKs for this. We'll enable developers to be able to sell their components to other developers to be able to get a commercial arrangement going on there. And, ultimately, I think we can drive much more innovative applications around Atom as a result of this.

The first in the lineup is netbooks, but it's going to be followed by Atom-based handhelds and consumer electronics devices. An important piece in delivering this, I think, is an app store framework,

because users are increasingly comfortable in buying their applications from app stores, and many of our customers already host their own app stores and want to host more. So what we're working on is a framework to allow customers to do that.

This is a mock-up of a storefront that a fictitious customer will be able to host using this framework. And today I'm very happy to announce that we have our first three customers committed to doing this: Asus\*, Acer\* and Dell\*. Let's just hear from a couple of those CEOs right now on their view of this product.

[video]

Paul Otellini: So let me summarize this announcement. It's a new development program targeted at first of all netbook application developers. It's going to start out in netbooks, but we expect it to span this continuum, expanding down to handhelds and ultimately up into mainstream personal computers. It will work on Windows and on Moblin and in major run-times. We will deliver developer STKs, tools, text support and communities to enable this.

And we envision, as you see now, a wide variety of OEM and service-provider storefronts, all taking advantage of these common application frameworks to bring a whole rapt of new applications out to end-users. I think this will help accelerate Atom deployment into this wide variety of devices that I just described.

The next area where we see Atom moving is connected devices in the embedded world. At the highest level, every electronic device is likely to be connected to the Internet at some point in time. And we think the architecture to do this, obviously, is Atom.

We have over 460 Atom design wins in embedded space today and 2,000 engagements. The scrolls along the slide there are just some of the applications, and I thought they were so interesting we we'd let it flow through here. But, it's everything from machines that are on the hospital bedsides, to security IP cameras to slot machines. We're finding customers wanting the level of intelligence and the software reusability that is capable on these machines.

One of the segments, I think, is worth a deeper dive, though, and that's in-vehicle infotainment. This is already a multi-billion dollar industry. I think it's a strong growth area for Intel Corporation, and it's an important part of the continuous bringing of computing and information and the Internet to the car.

This is a chart that shows how fast in-vehicle infotainment systems are growing – a 17 percent [category] even in this environment with depressed automotive sales. One of the things that's happened is that these systems in the past have been islands. Each manufacturer tended to use their own system, and they would rebuild the entire base of that system generation after generation. They too are seeing the benefits of a consistent, persistent architecture. And one of the things that many of the automotive manufacturers and the suppliers to that industry have



come together on is a new alliance called GENIVI which is focused on creating interoperable standards for in-vehicle infotainment across the automotive industry.

There are a lot of players in the IVI industry today. One of them is a company called Harman Becker\* that Intel has been working with for over three years now. They are a leader in the in-vehicle infotainment space, focusing on significant multimedia experiences in the car. They've chosen Atom for their high-performance designs.

Today I'm very happy to announce that Harman has secured two pretty big design wins for Atom-based systems: BMW\* and Daimler.\* Daimler will put it into their S-Class and C-Class series starting in 2012, and BMW is developing a cross-platform, which means it goes across all their models, as an option for 2012 and beyond. You're starting to see the momentum around this very scalable, reusable architecture.

The last Atom area I wanted to discuss is handhelds. This is a slide I think we showed you at the last IDF that showed our roadmap on bringing Atom into handheld space -- three generations: Menlow, Moorestown and Medfield. And with each of these, we committed that we would reduce power, size and increase performance, and we're doing that.

With Menlow we delivered the 10x reduction in TDP. With Moorestown we're delivering a 50x reduction in platform idle power.

Menlow launches in the first half of 2010 as a silicon chipset from Intel with our customers bringing out devices in the second half of 2010. It will bring the PC and Internet and multimedia performance with phone capabilities, I think, into a very pocketable device.

In 2011 we move to 32 nanometers in Medfield, and that really allows us to bring our architecture into smart phones in the smallest format. It reduces again the board size, the power, the chip count, et cetera, and I think it's going to unleash as yet unimagined devices.

But as we look into the handheld space, it's pretty clear to us that these new platforms need a new type of software.

I talked about Moblin before. We've been shipping Moblin and its new user interface for netbooks for a while now. If you haven't played with it, I would encourage you to do so in the showcase.

What we're talking about today, as you'll see, is the first demonstration of Moblin version 2.1 for handhelds. And for handhelds we had to rethink the user experience. And to do that we put together kind of a conceptual video that we would take out to end-users around the world and look at what can this device do? What should we build into the user interface? Let me run that video for you now.

[video]

[Applause]

Paul Otellini: Hi, Claire.

Claire Alexander: Good morning. So what I've got with me today is an early version of Moblin 2.1 actually running on a MID. As you are aware, one of the big advantages we gain by using an Intel Atom processor is the ability to re-use much of what we've already developed on the likes of netbooks and nettops.

At the back of the stage, Mark also has one of these devices running the software. He's going to drive the software while I talk you through a few of the key features.

So this is the device home screen. At the top you have the time toolbar, which displays the time and date, the device status and notifications. The remainder of the screen is display [unintelligible]. As you just saw in the video earlier, this essentially services all of your recently used content, social network feeds, upcoming talks and events. And you can also get shortcuts to your favorite applications.

If we double-tap on the time toolbar, it brings down an array of panels. This is a zones panel, which I'm going to come back to in a second. So let's just switch to the people panel.

In Moblin, we really care a lot about the people. So here we have the dedicated panel just for your contacts where you can quickly and

easily engage in a conversation, whether that be via IM, by standard call, SMS. You can do it right from here, quick and easy, no problem.

The next panel is the status. This essentially allows you to broadcast to all of your station networks. Again, really quickly and simply, you can just enter in what you're up to on a day-to-day basis and just send it off, and it posts it to your social networks.

I'd also like to show you the applications panel. This again gives you quick and easy access to all of your applications on your device. So you can just come here, search, or quickly just tap one of the icons, and then it will launch the application.

And then finally, the zones panel. This allows you to really simply and quickly flick through any of your running applications, which again is a real advantage with the platform we have, in that we can actually run multiple applications no problem at all.

Let's pop over to the browser. This is a really interesting area, as I was talking about earlier, where we have actually re-used much of what we did on the network. So it has the same full Internet experience built with the Mozilla-based engine. But the UI has been tweaked so that it's optimized for the small screen and, obviously, touch-based interaction.

Paul Otellini: That's great. Now I told the audience, Claire, that we're shipping Moorestown in the middle of next year. Will Moblin be ready for that?

Claire Alexander: Sure, we'll be ready, no problem.

Paul Otellini: Oh that's great, thank you.

Claire Alexander: But in the meantime, you can experience Moblin on netbooks -- example here -- and also in many of our booths downstairs.

Paul Otellini: Super, thanks a lot.

Claire Alexander: Thank you.

Paul Otellini: Bye. The last chunk of hardware that I want to discuss is the data center and servers. And it's pretty clear that all of these new devices and new usage models are continuing to drive Internet traffic -- that's some of the data that's up behind me.

The number of handheld Internet devices is expected to grow by almost a factor of eight over the next five years; the rich services and applications on those devices by a factor of four-and-a-half over those five years. Servers are the backbone to this continuum. They support all the uses, all the devices. They support the new software distribution model. They support the service revenue model and the applications infrastructure.

Now the opportunity in all of that is for companies -- businesses that want to service those devices -- to leverage all the data that you have and all the interactions that you have with customers to drive new business models and improve your customer support.

The challenge, though, is to do it in an affordable, scalable fashion. Data's growing so fast that if you're not careful, just running the data centers -- scaling them up -- is going to be unaffordable. So how have we focused on addressing that?

There are two fundamental technologies, I think, that are essential to attenuating that curve and making it affordable. One is virtualization and the other is cloud technology. Cloud services very clearly expand the market potential. The service providers love this kind of technology; it allows them to build it and then pump the applications and services down through their networks. Large corporations like this too. It allows them to drive economic value from their cloud IT investments. And virtualization itself, I think, enables a faster refresh cycle and a richer set of configurations in the data centers.

No surprise to you -- this is what we designed Nehalem for the server space. We have a common architecture that runs everything from the ultra-low power embedded server products -- sub-30-watt products -- up to Nehalem EP and EX dual-processor and multi-processor systems that take on the highest end requirements in computing. So our view is

that now with this, you now can see IA continuing to scale all across this continuum.

The last topic is what's in it for developers -- for you out there. I think at its highest level, what the continuum means is what you're developing today can be used and leveraged in adjacent markets tomorrow -- when you don't even know what those markets may be.

You have Intel Architecture, which is the common denominator that you can build on and scale into all these markets. You can count on reusability, on scalability, on the ability to deliver exactly what the user wants here.

And I think our combined opportunity is really to deliver these new use models to what the world needs. In 2004 at IDF, I talked about convergence – convergence of computing and communications. I was interested to see that Justin's talk on Thursday is “convergence is so yesterday” or something like that.

Convergence really is so yesterday. It's not about convergence anymore. People have accepted that this has happened. We're making the convergence. But what's important is that it's just a stepping stone. Gluing the devices together -- the computing and communications devices -- allows us to dream up and conceive of something like a continuum where all of these devices interoperate in a seamless fashion. Technology makes this possible.

Intel is going to be using the continuum opportunity as an ability to move from personal computers as a company to personal computing. And we'll continue to support you here. We are committed to advancing technology. You've seen that now, generation after generation. We'll invest significant resources into standards and into industry consortia.

On the research side, we're going to drive the future of mobile and the computing experience in every way we know. And we're expanding the spectrum and gluing it all together. We have a lot of work to do together.

What do I mean by that? One of the things that we've done in the past few months, as part of our "Sponsors of Tomorrow" campaign, is we ran large electronic billboards in some of the major cities in the world. The picture here is the one in Times Square. And we asked people to text in their ideas of what they wanted from technology – what they wanted from computing in the future.

And we were surprised. During the time we ran this campaign, we got 24,000 suggestions a day. And as we went through them we found it inspiring, because it says that we can't, as a developer community, sit still. Our customers don't want what we have today; they want what we can invent tomorrow.

Sean talked about new inventions pulling the industry through the recession. I think that's been very clear so far. But when I let you see



some of these ideas that people have submitted, you see we have a long way to go. Let's roll that film.

[Video]

Paul Otellini: Inspiring ideas. They give you an idea of what we have to build. Some of those things are kind of wacky. Some of them, I think, are great business ideas. Some of them we know how to do. Some of them, like the time machine, are a little ways out.

But it's pretty clear that delivering on what our customers want is going to take the energy and the collaboration of everyone in this room and in the industry. And in doing so, we have a chance to make computing truly personal. And we have opportunity to do all this together and to grow our businesses. So join us and enjoy IDF. Thank you, this morning.

Female Voice: Ladies and gentlemen, that concludes this keynote session. Press and analysts, we invite you now to join us onstage for a photo opportunity. Thank you. Have a wonderful morning, everybody.

[End of session.]

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