David (Dadi) Perlmutter;
Executive Vice President, Mobility Group

Female Voice: We request that you turn your cell phones off. Please turn your cell phones off. Please take your seats. We're about to begin. Thank you, good morning, and welcome. Ladies and gentlemen, please welcome Deborah Conrad.

Deborah Conrad: Good morning. Hi. Welcome to IDF, day two. We have a great day lined up for you.

I wanted to just do a quick recap of what we talked about yesterday. We heard from Paul and the continuum of computing and our relentless pursuit of Moore's Law. He showed the first working silicon of a 22-nanometer SRAM, which we're all extremely excited about. And then that led us into Sean's discussion about integration and innovation and all of the products that we're going to be seeing through the next year.

We also then heard from Bob Baker and the magic of the manufacturing process and how that will really help us continue to bring more power efficiency and performance to our processors and our solutions. Steve Pawlowski led a technical insight session on Nehalem-EX and cloud computing in the datacenter. And the industry insight session was led by HP on the datacenter. We opened up the tech sessions, and we held a lot of classes and the exhibits on a wide variety of topics and applications. We hope you got a chance to see that, and please continue to go look at that again today. We had a great party last night with Maroon 5, we hope you

enjoyed that. Thank you. And we've got a great day lined up for you today.

We're going to kick off with Dadi Perlmutter. I'm going to turn over the stage to him in just a minute. He's going to talk about mobile computing and the vision of mobility and how that will continue to go well into the future. Software is key to all of our innovation as well, and Renee James will be up here to talk about our enabling efforts to help developers build out your solutions. Ticky Thakkar will lead a technology session on mids and smart phones. And the industry insight session will be a roundtable featuring an astronaut, educators, and scientists. And they'll be there to help inspire you for meeting the new challenges. We have a session with the Intel fellows, and they're live and uncensored, and we encourage you to ask them all the tough questions. We promise no spin. I hope.

Eric Kim will kick off tomorrow and talk about interactive TV, and then Justin will close out tomorrow's – the day three of IDF with also a continuing discussion about interactive TV well into the future and how TV will be brought into even more devices.

Wanted to also just give you a quick reminder of the code breaker challenge. This is a very cool challenge. It's encrypted word games. We have them out at the registration desk. We encourage you to go ahead and take the challenge, and then there'll be a live session – a final time session in the tech showcase. The winners will be

announced tomorrow. There's prizes like Netbooks and PCs, and of course bragging rights. We'll announce the winner tomorrow – tomorrow morning, in fact.

I just have one more thing, which is in May we kicked off a new campaign called the sponsors of tomorrow. And it's really there to highlight technology and get people excited about technology and also hopefully get people excited about Intel. I'm going to show you a brand new ad. It has never been seen before. We hope you like it.

[Ad plays.]

Deborah Conrad: Thank you. I'd like you to have a great day, too, and now we're going to bring out Dadi Perlmutter. Thanks.

[Video plays.]

Female Voice: Ladies and gentlemen, please welcome Dadi Perlmutter.

Dadi Perlmutter: Good morning, everyone, and welcome to Intel Developer's Forum. Last year on this stage I was talking about where does on the go, go. This year about three weeks ago my daughter asked me, okay, Dad, what's going to happen this year? She was sitting in the first row and enjoyed my talk. And I said, well, I'm going to talk about how cool mobile is. Well, you should have seen the look on her face. She said Dad, you're probably one of the geekiest geeks I know on

Earth. This [all] really suits you really well, all these equations and all these [log] diagrams. But what do you have to do with cool?

Well, I hope that my daughter will at least get an answer and I hope you do too. Mobility has evolved from convenience to being cool. It used to be a very practical thing, people tried to use mobile in notebooks, in cell phones, for convenience. It became a fashion statement. The experience is what makes the mobile cool. You know, what makes a person cool is the personality. There's no single thing that you could say because of this, this person is cool. It's kind of the whole appearance. So, as a geek, I have to go build these cool things, and we ask ourselves, what does make a mobile cool?

There are plenty of things. It definitely has to look extremely sleek, nice looking, fashionable -- just see the colors that everybody's having for notebooks and handhelds and cell phones. It has to have a very snappy response time. People don't like to wait for ages to see the things that they want to see coming. They want to have the battery lasting very long so they don't even think about it, it's not something that they have to worry, nobody worries about cool things. They don't want to worry about the security of the data that is stored on the mobile device. And they definitely want to get connected all the time. They want to get into the network, into the social network.

There are many obstacles. There's no surprise why this lady is kind of looking quite gloomy when she looks at her notebook. Kind of the old stylish, you know, the good old beige we all love to love or love to hate. It's thick, it's heavy; we all remember it not too many years ago. Battery life used to be measured in one, two, maybe two and a half hours. Not long enough to even carry a flight in the West Coast to read the mail. And prices have been high, $1,500 to $2,000 for a notebook. And it was slow and hardly connected.

So we have to go change all those things and change it in a very significant manner. And being cool is basically totally opposite to one-size-fits-all. Everybody has their own cool factor, everyone has their own specific needs.

It's even more than that. The same person may need different things and would consider cool at a different time of the day based on what this person is actually doing. And the person in the center, probably the representative of the geeks, is the designer. He wants performance. He needs to do very complex things on their Netbooks, and he would like to have the best-of-the-line, high-performing notebook. The super model on the right will definitely want to carry things in her purse, not worry too much about weight, and she wants to get connected and find out what's going on.

The lady on the left, she's the musician. She wants to download the latest music, find out what's going on, post her own music, and write blogs, and a Netbook could be the best cool thing for her to go

use. So in order to find out the difference between these two, I'd like to have [Cameron] and show us how these different form factors play the cool factor.

Cameron: Thanks for having me, Dadi. So basically what I have here is three different platforms basically to show you that there is an HD platform for everybody with different tastes. So what we're going to do here, this is a Netbook based on our Atom processor, we'll go ahead and we'll start this video. This is an HD streaming clip over wireless right now of my daughter playing at the beach. It's a decent experience, but it's not exactly what I want for high-end content. So we'll go ahead to the next one. This is an ultrathin Acer dual core system. A little better. You know, I like this performance. But actually if you want the HD high end, we'll go ahead and we'll start it off on this core two system. This is all integrated graphics, these two. This is exactly what your HD consumption should look like, I mean, this is butter, this is so smooth -- absolutely great experience.

Dadi Perlmutter: Very good. But can you show me something that runs better or good on the Netbook?

Cameron: Yes, absolutely. So don't want to hammer the system too much. This is the ultimate Internet consumption Netbook right here. We'll go ahead and we'll play a standard def on this, and if you go ahead and look: much better. It's a great experience. And by the way this is running discrete graphics, so no matter what anybody says about graphics, CPU is still king.

Dadi Perlmutter: So it's all about balancing the system with the right things to get the thing that you need.

Cameron: Absolutely.

Dadi Perlmutter: Okay, thank you very much, Cameron.

Cameron: Thanks, Dadi.

Dadi Perlmutter: So it really depends on what the use is you're trying to do. Netbooks are extremely cool. I have many of those over here on the shelf. They look very nice, they're very useful. If you want to have the first PC for your kids that's affordable enough to go do that, it's very useful for the kids to do what they want to do, their standard gaming, standard definition videos, surfing the Internet is extremely useful. It's a wonderful present to go buy because it's affordable enough. It's something you do not have to think too much to go buy your second or third computer at home. So Netbooks are extremely useful, they're extremely cool. You just have to make sure that you fit them to the usage model that you really want to get in.

So in order to get the mobile experience, you have to work on many things. The first, in the center, is the device. The device has to have several characteristics. First, it has to have the performance. It has to have the right size form factor. It has to have the power level that

really delivers the great battery life. And last but not least, it has to be managed and secured.

Around that is the compatibility. Paul talked yesterday about the continuum. The continuum means a lot: it means that no matter what device, what size of device you do -- a handheld, a Netbook, a notebook, or a desktop -- same look and feel. And, last but not least, it has to be connected. Connected in a broad sense. Connected to the Internet, connected to the devices and to the world around you. And we have done a lot in the past ten years to go make these mobile devices cool.

By the way, if you look at the power, we made it really cool. You know, measured by scientific measures by power and temperature. But we've done a lot on performance, and that's something you would expect Intel to go do. But unlike the way we handled performance in the '80s and the '90s, in this century it was all limited by power. So not only did we increase the performance, we reduced the power such that you could increase battery life from two to three hours to many of the notebooks run way above five hours.

Also the thickness. Because of the lower power, the notebooks could be built thinner than they used to be built before. And performance does matter, no matter what people say, that “who cares about performance?” When you try to run an HD video on a CPU that is not adequate for that, you do not like what you see.

People want more things. High-def media is the cry of today. In the future, I would like to speak in a more native language and I would like the people in China to understand me -- real-time language translation would be extremely useful. And going forward into having the mobile as the key server for life.

But performance is not limited only to notebooks. You definitely want to have great performance coming from your handheld. Why do you do that? Definitely people want to do more and more high-definition video on their handheld. They definitely want to have visual recognition so when they take a picture of a location it's being recognized and they know exactly where they are and they get the information. All the way to mixed and augmented reality, when information, animation, being built real-time around the place where you are or on videos that you're taking.

In order to reach this performance, we're going to continue our development in the cadence that we have shown you time and again in IDFs. Paul talked about it yesterday, we're going to have the ticks and the tocks and the ticks and the tocks to the boring version – there are a lot of boring things happening when you have to go deliver cool stuff. And Paul showed yesterday 22-nanometer wafers. We have designed things working on both the tick and the tock for 22 nanometers. For us 22 nanometers is already here. We just have to work out to make these cool things coming forward.

We have doubled up on the Atom roadmap, and we're going to deliver for every [partial] generation a new microarchitecture, because the performance needed, the power level needed, and the average power needed -- there's a lot of technology you have to build time and again every [partial] generation. And surrounding it is going to be augmented with a system on a chip suitable for every specific market segment that we're hitting. Let it be a Netbook, a handheld, a consumer electronic device, an embedded control, or many other functions we may find useful or our customers may find useful to use our technology.

So first is the device. The device is in the center. And what's better, when you talk about the device, is to talk about the great technology that up to now we talked in relation to server, in relation to high-end desktop. Today we are bringing this revolutionary microarchitecture into mobile. We are bringing in the sort of Core i7 Extreme and Core i7 with 2 gigahertz, going all the way up in 2 ball to 2.3 gigahertz. And the quad core 2 ball is going to get you to 3.06, away from 1.6 gigahertz.

These are great products, and who is better to talk about this cool CPU than a cool guy? Probably one of the coolest at Intel. He wears the strange hat, he talks in a funny accent, funnier than mine, I bet. I would like to Mooly Eden, the general manager of PC Client team and the vice president. Hi, Mooly.

Mooly Eden: Funny accent, you want us to elaborate on it?

Dadi Perlmutter: Sure.

Mooly Eden: Have you heard your TH?

Dadi Perlmutter: I erased all THs from all my keynote.

Mooly Eden: One correction, this is not strange, and it's not a hat. That's a brand. But let's go on.

So first of all, good morning, everybody. I'm delighted to be over here and to be part of the introduction of Clarksfield. We'll try to take a sneak peek over here very fast, and I'll elaborate it later on. At 11:30 a.m. we'll have a deep dive for those of you who would like to go into the schematics and into the broader [unintelligible] and understand what we have.

So what do we have over here? We've got several technologies. We've got first of all the Intel Turbo technology. And you heard Dadi say, "Guys, it's a 2 Gigahertz, but with Turbo it can go to 3.2." And I believe this is the first time that we actually spoke about the frequency. More than 1.2 Gigahertz that you kick the microprocessor in order to run faster.

Hyper-threading technology, in order to be more power efficient, rather than doing one thread at a time, each one of the core can run two threads in parallel, get a much better efficiency, utilize all the resources. So now in clouds we've got four cores and eight threads.

An integrated memory controller on top of the eight cache, which is a smart cache. 8 meg level three cache with level two with level one. Because the locality of the cache is not good enough, in addition to all this huge amount of data that we store on chip, we need to have a wider bandwidth to go to the memory to feed all this MIPS-hungry cores with all the data that they need to do.

So these are the three technologies. Let's have just a sneak peek, as I said, because we'll cover it much broader into the Turbo technology. What do we mean by the Turbo technology? We've got four cores. Let's say the TDP thermal design power of the four cores is 40 watts. Each one of the cores is 10 watts. We used to work with the 10 watts, measuring it. And this was the frequency.

Today, we actually measure the actually participated. And if the cores are not utilizing all the resources, they're not using the divider or the multiplier or any part of the resources, the measurements say yes, there's 10 watts, but it doesn't use all the 10 watts. You can boost up the frequency and the voltage in order to get better performance.

So we've got two bins, each bin 133 megahertz, two bin, 266 megahertz. And even in quad core if all the cores are working, you can get the boost. If we switch off two cores, now you can take the headroom of the power which is not used by the two cores and move them over to the two functional cores. This gives us an extra eight bins.

I believe according to the script this is the stage it's time for me to be quiet, and you need to say, "Wow!"

[Laughter]

So let me repeat, eight bins.

Audience: Wow.

Mooly Eden: [Laughs] Thank you. Can we do a rehearsal? This was not part of the script. And if you switch one of the two cores and stay with one core only, you can get an extra bin to run it out. And the reason it's only one, if there's more, there's a limit to how much we can crank the voltage up due to reliability.

So we take everything, and I believe the bottom line of the message is the following. The Clarksfield is the best quad core, dual core, and single core microprocessor, because we always take the extra headroom and move it to the cores. I can continue to talk about it for a long time, and we'll do it at the 11:30 session. But I'll need to run forward, but I will just need to leave you. If you are leaving with just one thing about Clarksfield, about the Nehalem architecture, it's the Turbo which works great in desktop, but even much more so in Notebooks because of the limited power headroom.

Now, what are we going to do with this product, quad core, hyper-threading, eight threads? It's a great gaming machine. I believe you'll see all the

gaming machines that exist over there. You'll see multimedia engine. If you want to do some heavy-duty, definitely this is the right thing.

And last but not least, it's a mobile workstation. If you want to have a workstation, guys, it's called mobile, it's called workstation, but it says the power of a server [unintelligible] two years ago.

Dadi Perlmutter: Mooly, you're talking too much.

Mooly Eden: You are right.

Dadi Perlmutter: [unintelligible] [Laughs]

Mooly Eden: Don't laugh. This was also –

Dadi Perlmutter: I was in idle mode, low power up until now.

[Laughter]

[Game Demo]

Mooly Eden: So this is IDF, and that is right. I was already four minutes of stage without a demo. What do we see over here?

Male Voice: You're talking about ultimate gaming. This is the ultimate gaming mobile platform right here by Alienware. It's running our Clarksfield-XE part.

Mooly Eden: So this is Clarksfield already, ready-to-ship system, gaming system?

Male Voice: Absolutely.

Mooly Eden: What do we see over here?

Male Voice: So we're seeing Resident Evil 5 by Capcom. It's one of the most popular games out today and also one of the most violent.

Mooly Eden: It is popular. This is what our kids are playing with?

Male Voice: Absolutely, unfortunately.

[Laughter]

Mooly Eden: Scary. I love these zombies, you know?

Dadi Perlmutter: Mooly, is there something less violent, a little bit more – ?

Mooly Eden: Yes, two things – yeah, yeah, two things are selling, you know, violence and –

Dadi Perlmutter: Mooly, stop here.

[Laughter]

Mooly Eden: No.

Dadi Perlmutter: Don't get me into trouble.

Mooly Eden: Okay, so for the geeks we've got something nice, you know? We take a lot of pictures. We stitch it together. And there's a lot of MIPS running here.

Dadi Perlmutter: And the nice music.

Mooly Eden: And the nice music. And you can see all the threads are working. And because the four cores are working, but they are not utilizing all the compute power, there's small ingredients inside the core, we can even have the kickoff of Turbo Boost. We're going from 1.6 to 1.83. And in a minute a few of the cores will be idle, and you'll see that some of the cores will be dormant. Immediately the rest will kick off in order to finish the job.

And with this in mind, in order not to take time, I will bring the baton back to Dadi. They made me swear that I'll not take it with me backstage, although I have this temptation. Thank you very much, gentlemen.

[Applause]

Dadi Perlmutter: Thank you, Mooly. You bet we are not going to stop Nehalem at the very high end. We are going to bring this technology to the masses next year, early next year. It's going to be in the form of Arrandale. This is a time we're going to combine on the same package a 32-nanometer Westmere CPU and a 45-nanometer graphics and chipset.

And the question would be: why would you put two of these together? There are many benefits. One, to really talk about, you talk about Turbo. It's all about managing the thermal. Imagine that you can do Turbo between the CPU and the graphics, and you could see that sometimes one thing is operating at full steam, and the other time the other one is operating at full steam. This is going to give us great opportunities to get the best of the graphics and the best of the CPU.

We are going to move on, and on 32-nanometer we are going to have a second generation, Tuk. This one we're going to move monolithic. We're going to improve significantly all the parameters you could think about from CPU to graphics to adding new instructions and to way better manage. This is an example of the functionality you already see on extremely early material of Sandy Bridge just getting out of our factories into the labs to the [unintelligible]. So expect great new cool products coming out on the Intel in the same boring year-after-year coming out with new technologies.

This is all to create these extremely fashionable nice-looking devices. But doing silicon and microprocessors is not sufficient to deliver these fashionable, cool-looking things. There's a lot of other technologies that are developed in our lab to help our OEM customers and the developers to go do the coolest, nicest-looking things. We are doing computational fluid dynamic simulations of the boxes.

And it's all about thermals. Mooly talked about the fact that you could do Turbo. The Turbo is very much dependent on how good the thermal design of the platform is. The better it is, the better the Turbo could get. And you could see over here a comparison that we did in our lab. Using the Core i7, we could get at 45 watts to a higher performance than we could get on a previous generation quad core Xeon products just a year or two earlier.

There are many other things we do. We reduce the size of the packages. We reduce the power of the devices. It went from 45 watts to 35 watts, going to 25 watts. We're going to go from three packages to two packages when you go to Arrandale. And we're going to have great-looking products.

It's amazing what you can do when you have an extremely low-power microprocessor. This is a Dell Latitude, 16-inch. It used to the 16-inch high-performance products, this would be very thick.

This one is extremely thin. It has a dual core called 2 Duo inside, a very nice design.

We are developing concept platforms. This is the way we are trying to ignite innovation of the industry to help you, the developers, come up with nicer, cooler-looking devices. The one at the top left is the one I like the most, you know? Unlike AIG, I have to fly coach. I don't have a private jet. And if you fly – I presume some of you do fly coach, at least the Intel guys.

[Laughter]

And when you do email and then the guy in front of you reclines, there a few things you can do: either go to sleep; or you type that way; or you have this wonderful device. You bring the screen in, and you type below the screen. A wonderful way to increase your productivity.

Not too many people know, but if you look at the Business Week article from May, 2007, we show that concept that you can design a thin device. That was the thinnest notebook ever designed. The industry came later on and, of course, used the technology that we developed. We paved the way for the developers to go bring extremely cool, nice-looking, thin devices. And the ideas continued to move on and on.

And I would like to show another concept that we are doing as part of our design. This is a new development that we are doing. It's called Tangent Bay. I don't know what Tangent Bay has to do with it. It has one big screen. You could do whatever you do -- either do email, you could see video.

You have these wonderful three screens [above]. You could have your social networking activities on over here; you could have your calendar show over there; you could have some other things done over here. And I'm told – and this is going to work completely -- you could, with your fingertip, you could do that, and move whatever's on that screen to the other screen. These are great ideas. I do hope that eventually they end up into the market, because these are all kind of great [unintelligible] that we are doing.

Battery life is another important factor. Independent of where you are on the globe -- U.S., China or any other places. People bring and put a lot of value, and they are willing to pay for better battery life.

There's a lot of technology that we do, not just battery technology, in order to make it happen. One of the things that enables this 2 ball, the great 2 ball that Mooly talked about, is what you call the power device.

In order for the CPU to be really at zero power -- means that even leakage is not doing -- we have a transistor that really connects or cuts the CPU completely from its power source. Which means no

current is flowing, which means that you allow more headroom for the other CPU to grow.

There are other factors that are important. We talked about security. Last year, we introduced anti-theft technology. This year, we are [bringing it up] with version two.

And we are working with additional partners, PGP and WinMagic. And we are bringing in a better-enhanced data encryption. It's all about protecting the device from people that steal it from you and want to get and use your data. This technology will be available next year.

We continue to work with our partners. And we bring in new ones, LoJack. And this one is bringing new capabilities. This allows you to do a message. So if someone steals your notebook, you can have, if you are a nice kind of person like this Dadi – that ask you to please return. Some other people will say not only that the data is going to be shredded in the way Paul showed yesterday, but I'm going to shred you, too. That could be another message. Up to you . . . It's customized to fit to your personality.

We are bringing in more and more OEMs that are building anti-theft into their solutions. We are bringing in Dell and Panasonics on top of the many other partners, like Lenovo, Acer, Asus, and Fujitsu, that already have solutions on their notebooks. So I'd like to show the video to get you the insight of what does it do.

[Video plays.]

Dadi Perlmutter: A little bit of applause [unintelligible] will help.

[Applause]

I mentioned earlier a [snippy] response. We are getting closer to it. And I'd like to show how solid-state drives are going to help us together. So, Cameron, please come back onstage and show us what solid-state do to us to have a very fast response.

Cameron: I don't know about you. But cool to me is actually not waiting two minutes for my system to boot. We what we've done here on your side of the stage, Dadi, is we actually have an Acer with a hard drive. And then we have – on this side, we have a solid-state drive.

And they're both running Windows 7 in both Acers. There's nothing else different except for the hard drives. So, as you can see, the solid-state drive system is actually already booted. It's getting into its workload, hits the Internet, and we're actually going to open up a video even before this one even gets to the boot-up screen. It's about 2X. And this is our 34-nanometer Postville part. Pretty incredible performance.

Dadi Perlmutter: I was told that solid-state drives are not only better on performance, but are great in having better reliability.

Cameron: Yeah. I thought you'd ask me about this. So what we've done here is – it's a little dramatic. But what we'll do here is we'll turn this on. A little shake. So, basically, you'll see the solid-state drive is actually performing exactly what it was whereas the hard drive is actually – it'll actually stop.

And what this is – and you travel probably a lot more than I do. But if you're traveling on a plane or in a car, you hit a bump, you need to have access to your information. And if you're doing a document, you might actually have to reboot your system and you'll lose everything you've done.

Dadi Perlmutter: Okay. Thank you very much for the shaky experience.

[Applause.]

Dadi Perlmutter: I talk about notebooks and Netbooks. But we have many aspirations going into handheld. Handheld is a challenge of its own. It requires way better power and still deliver the performance we want.

In 2008, we launched our Menlo technology that was aimed predominately at Netbooks. And we're going to continue with Moorestown. And then on 32 nanometer with Medfield. This is a great product line.

We are putting a lot of engineering both into our [unintelligible] technology improvements that Paul talked yesterday about leakage

and about architecture. We are putting in a lot of features for power-gating, for mixed signal, for software next-generation operating system, power management, and, last but not least, an extremely low-power I/O.

This picture illustrates the great benefits of power-gating. On the left, you see the power of when nothing is gated. Everything is on. When you turn everything off, then basically you draw no power. And you could have a lot of states in-between. So you turn off and on circuits only when you need them.

The results are astounding. If you look at, on your play deck, in idle, it's basically zero comparing to hundreds of milliwatts on Menlo technology. This is really what you expect when you build a product for handhelds.

And even when you play a very high-definition – 700p, 720p on a handheld is very high – it's about 5X better than what it was before. Performance is built-in very much into this technology as well. And we put a lot of integration, a lot of new components, better graphics, and using a leading-edge 45 nanometer. So I would like Cameron to show up and show me again the performance that we could get comparing to other architectures using this technology.

Cameron: So what we have here is our Moorestown platform we call our Brentwood Bay. It's our development platform. And we just wanted

to show you the difference in performance between one of the best-selling handhelds out on the market today and best-performing.

And, as you can see, if you look up, Moorestown is actually playing pretty well. And these are both playing a [4AP] clip, the exact same clip on both devices. And the handheld is actually struggling through it. Pretty incredible performance that you'll be seeing when it's released next year.

Dadi Perlmutter: Okay. That's very good. And I presume that these are running at exactly the same power.

Cameron: Yes, exactly.

Dadi Perlmutter: Okay. So at the same power you expect to get from a handheld you get way better performance running video and many other things.

Cameron: Absolutely.

Dadi Perlmutter: Thank you very much.
[Applause.]

Size matters to make it cooler, too. So the sizes that we see, they're going to get even better, going forward to 32 nanometer, a way-higher integration product which is going to deliver things that go from a credit card-size all the way to a large [stem] size.

I want to talk about something that may be odd. Why do you talk about that? And it's cool. Compatibility is cool. Why do I think so? Because it's great when you could run the same set of software, the same set of applications, you're used to and you get to know across the products that you get from Netbook to notebook. And the software compatibility is running across, of course, the basic hardware, the core, the operating system, the applications, the Internet application. There are millions of plug-ins that are developed directly on a PC that you would want to run, as they are, onto the handheld. And the result is that you could run the same ways, let it be Windows, let it be Mobelin with the user interface that Paul showed yesterday. And let it run the same rich set of applications that you get on whatever form factor you want to get.

Another cool factor is connectivity. This is the era of getting connected. You know, my daughter asked me – the same daughter that laughed at me for being a geek – "how many friends do you have?" I have maybe three, four, five very good friends. "Hmm, that's nothing. I have 352." Well, how do you meet all these people? "Well, I meet them every day. We exchange notes and everything on Facebook." You have to get connected all the time. This generation will not accept the fact that you are not connected in a single moment, because how could I miss the nice video my friend posted out just two seconds earlier on the other side of the ocean.

Well, this amount of data – and this younger generation moves the same terabyte again and again and again over the network – that

creates a real jam. If you think about a good data device – and let's assume that the laptop is a great data device – it generates 15X more data transfers than a smartphone and 450 more than a voice. And you could see articles being written about how the great cool devices that are being put on the network, like an iPhone and many others, are generating a jam on the 3G networks.

Well, maybe there is something into building a data network that is built from the get-go for data. And we are working very hard. Last year we introduced the first embedded WiMax that goes into notebooks. But having products with WiMax doesn't matter. It's all about having networks, because if you cannot connect, then it doesn't matter. And we have networks being built in North America, in Russia, in Japan, and we have networks already there. We are building with our partners networks in other places like India, Malaysia, Taiwan. And many, many other places have all sorts of mobile and fixed WiMax all over the globe.

But I will not talk about that. I'd better have someone that really builds networks to go talk about networks. And I'm very happy to call Peter Cannistra. He's the vice president for embedeed devices in Clearwire. And he's going to talk about his experience. Good morning.

Peter Cannistra: Thank you, Dadi.

[Applause]

Peter Cannistra: Thank you very much.

Dadi Perlmutter: How are you doing?

Peter Cannistra: Doing great.

Dadi Perlmutter: So the real question is why WiMax?

Peter Cannistra: Well, it's a great question. So Clearwire has built a flat all-IP network from the ground up, like you said, that's built to optimize data transfer and the Internet. That, combined with our huge amount of spectrum in each market, will really lead to a wireless broadband service that puts the Internet in your hand wherever you go in a very broadband way. So you'll experience broadband, just like you do at home in a wired connection or in your office with a T1 line, wherever you are in any device you have.

Dadi Perlmutter: Can you kind of compare the WiMax network performance versus, say, 3G?

Peter Cannistra: Absolutely. Given our spectrum position and the fact that we built this from the ground up to optimize data traffic, 4G is fundamentally different than 3G. And we're seeing right now in the markets that we've launched – our customers are seeing three to six megabits per second, bursting up to 10 megabits per second.

Dadi Perlmutter: Wow.

Peter Cannistra: Instead of just talking about, let's take a look and see how the WiMax performance really does on the network.

Dadi Perlmutter: Hi, Tim. Long time no see.

Tim: It's been a while, Dadi. Glad that we're able to meet this way. We've got two simultaneous video conferencing calls going on at the same time here. On the top video, we have a fourth-generation WiMax connection, and on the bottom we have a 3G connection, one of the more popular networks here, what I happen to be connected to.

As you can see, it's a difference in the quality of the video. The uplink speed seen on the 3G side is 100 to 200 kilobits, and on the 4G WiMax we're seeing 800 kilobits to a megabit of uplink. We're really showing you the uplink performance here. And as you can see, the latency is quite good on the 4G WiMax side.

Dadi Perlmutter: Okay. Thank you very much, Tim. See you.

Tim: Have a good presentation the rest of the day. Thanks a lot.

Dadi Perlmutter: Okay. So it's all about the network and [unintelligible] build-out.

Peter Cannistra: Absolutely.

Dadi Perlmutter: What's your plans in Clearwire?

Peter Cannistra: Absolutely. Well, we've already launched major cities in the United States, like Portland, Chicago, Las Vegas. We expect to launch Chicago and Dallas before the end of the year. And next year, we should have 120 million pops, or people covered, in 80 markets, in 2010. In addition, right here in San Francisco, we have what's called the WiMax Innovation Network, which is limited right now, but it's a developer-only network that's set up to cover the Intel, Cisco, and Google campuses here in the market. And it's a developer-only network that will be a precursor to the commercial launch here in San Francisco.

Dadi Perlmutter: Great. I'm looking forward to being connected via WiMax.

Peter Cannistra: Absolutely.

Dadi Perlmutter: Thank you very much, Peter.

Peter Cannistra: Thank you.

Dadi Perlmutter: Pleasure to see you.

[Applause]

Dadi Perlmutter: WiMax is great. I think it delivers great performance. I wish I could get 10 megabit per second coming to my home on my cable service. Maybe I should connect to WiMax soon.

But WiMax is not covering all the world. We have to be realistic. We are going to support multiple protocols on our products, and we're going to build Wi-Fi and WiMax and integrate more functionality into it and on the bottom we see [unintelligible], which are handheld devices for WiMax. And of course, in the future, we'll continue to integrate more and more functions.

Now I'm going to change my habit a little bit, because I always talk about – in communication, I talk about wireless. But when you talk about opticals, you want to talk about wired as well. We are announcing today a new technology we're working on. We'll have the components next year, but it's going to be a long-term transition. This is going to have 10 gigabit per second being transferred on an optical wire, and it could go all the way up to 100 meters. And it could be multiple protocols from high-definition display, LAN, storage, and all being done on one small, tiny cable. Many years from now – and we all know that legacy takes a long time to make a transition – we hope that this one single cable is going to replace these many cables that we currently use today. And I have a very light notebook, but I carry a huge amount of cables with me all the time. So over here – talking without seeing is not believing – I have here a demo platform. But unfortunately, I don't see – where is the display?

Male Voice: Over here, Dadi.

Dadi Perlmutter: Okay. Here you are.

Cameron: So basically what we're demoing is a new high-speed optical I/O. As you said, it's 10 gigabit throughput, pretty incredible performance. Here we have about 30 or 40 feet between. It can actually go up to about a hundred meters in length and send your HD display over. It can do your land, as well as your storage.

Dadi Perlmutter: Okay. This is great.

Cameron: Yeah. It looks awesome.

Dadi Perlmutter: Okay. Thank you very much.

Cameron: Thanks, Dadi.

[Applause]

Dadi Perlmutter: We call this technology, surprisingly enough, Light Pick, at least a name that made sense at Intel one time. We're working with the industry partners. We have a quote from Sony, and we work with some others. And Sony is extremely excited about the potential of the Light Pick technology. This is one of the ways that we at Intel

are working extremely hard in our labs and our product teams, to make sure that we bring new technology into the future.

So I think I've covered a wide spectrum of mobile. We covered things from the device, to compatibility, to connectivity. I hope that we really made the case about that being cool. We introduced the fastest, greatest technology of Core-i7 coming to mobile, and it's going to ramp through the notebooks and the desktops next year to a very high-volume using our 32-nanometer manufacturing. And we are going to continue later with a next-generation 32-nanometer microprocessor.

We're going to use our architecture leadership and our personal technology leadership to continue to improve our products, Atom products, to be better, low-power, low-cost, all the way down to extremely small, nice-looking handhelds like we have over here. These are going to be in sizes that you like, and cherish, and appreciate today in cell phones. And they're going to get even smaller.

We've talked about technology that goes beyond the silicon. It has to do with security; has to do with manageability; has to do with connectivity. And we've shown that WiMax is coming. It's already real, already in production, with networks being built around the globe.

We also introduced a new core technology using optical wires to really change the way we connect. And the reason it's being shown in the mobile part is that the amount of connectors you have in the back of your notebook is one of the limiters of how small it could get.

Overall, great technology, great products, leading mobility to be real cool. Thank you very much.

[Applause]

[Music]

[Video plays]

[End of session.]