# Credit Suisse Technology, Media & Telecom Conference

## Company Participants

- Colette Kress, EVP

## Other Participants

- Unidentified Participant, Analyst, Unknown

## Presentation

### Unidentified Participant

Good. The clock is counting backwards, which means we should probably start. I would like to welcome everyone to the session this morning. It's my pleasure to introduce Colette Kress, who's the Chief Financial Officer of NVIDIA.

We have sort of a hybrid presentation and fireside chat format this morning. Colette's going to go through probably 10 minutes' worth of slides. Then we're going to transition into a fireside chat. As always, if you have a question, just please raise your hand. And we'll get you a mic. And with that, let me pass things over to Colette.

### Colette Kress {BIO 18297352 <GO>}

All right. Thank you so much. I just wanted to start off, for those that may be familiar with NVIDIA or may not be, in terms of our key areas of focus. We are the world leader in visual computing. Our focus is to focus on four key markets, using the same underlying unified architecture across there.

Our four markets that we serve are both gaming and overall primarily PC gaming, pro-visualization, datacenter and automotive. And we'll talk about each one of those key great opportunities as we go forward. But each one of them are great both growth opportunities for us, expansion in terms of TAMs, in terms of what we think going forward; probably 10 times the TAM that we currently sit today.

Our focus has not been as a chip or component provider that you may have seen more than 15 years ago. But our focus is really as a platform for each of these key markets. And providing end-to-end underlying chip, software. And overall solution to approach each of these markets.

Part of this transformation can be seen just here in terms of our business mix. If you go back as early as fiscal year 2013, just a couple years ago. And you look at those

four key markets of gaming, pro-vis, datacenter and auto. That represented a little bit over 50% of our overall market.

Our PC and our Tegra SOC OEM market, where we sell in directly to OEMs, still represented about 40% of our overall market. And then a small amount from our IP, which was about 6%.

In our latest last quarter of Q3 fiscal year 2016, we've now moved that to where 85% of our revenue is now focused on these four key platforms. And our PC and Tegra OEM business is less than 10% of our overall business. So a large transformation away from that chip component to those key platforms.

And you can see that also on the right-hand side, if you look at our overall growth mix. Over the last couple of years our revenue growth in the white bars, moving from 13% growth last year. So far year to date this year, we're at 5%.

But the green bars in here actually represent, in terms of those growth platforms and how fast they are growing. And more than 20-25% on average over the last three years, as we've moved to these growth platforms. So a key part of our strategy, key investments that we've made several years ago, in moving towards the platforms are truly, truly paying off now in terms of the revenue.

What that has driven in terms of fiscal year 2015, we approached record revenue at the end of the fiscal year 2015 with 13% growth. And almost $4.7 billion of revenue. So far through year-to-date 2016, we are growing about 5% overall year over year.

Last year we also reached record gross margins. And finishing the year at a full 55.8% in terms of gross margin. And increasing 70 basis points. As well as in fiscal year 2016, we've also hit another record in terms of our gross margins growing. With this last quarter we reached 56.5% in terms of gross margin.

Our platform approach has really helped us in terms of improving gross margins, as the customers can truly see the value of the platform, the ASPs. And we can command-- to get better profitability for those investments that we've made.

But lastly, focused on our EPS and our overall profitability, at the end of fiscal 2015 no matter how-- what measure you chose in terms of profitability, whether that was operating income, EPS or net income, most of them grew more than 50% year on year, as we focused on a unified investment strategy across our architecture and honing in our investments. And seeing that pay off in terms of the top-line revenue. It produced a tremendous amount of profitability at the bottom line. So far this year continued growth in terms of our operating margins as well, as we continue to focus as operating margin as one of our key measures of performance going forward.

So breaking down those four large markets, gaming is our largest market. It represents probably more than 50% of our overall Company size revenue. At the

end of fiscal year 2015 it had grown 36% year on year. So far year to date, fiscal year 2016 it's grown 42%. What's driving our overall gaming market? The excitement around gaming, the overall architecture, new products coming out. But also the key games. The production value of the games that are hitting the market now couldn't be stronger. Demand in the overall performance of a strong GPU to enable that performance.

The key thing about gaming is you can have a different position in your game, depending on the type of GPU that you have purchased. So they can continue to upgrade their overall experience with a new GPU.

Coming down the pipeline, there's excitement regarding the next generation of gaming and virtual reality, as well as there continues to be stronger and stronger games, as well as EES [ph] boards, where people are actually watching others game online, multiple players producing more and more demand in terms of the overall GPUs underneath their platform.

Enterprise graphics, also a key market for us. This is where we are using overall graphics capability in many of the designs. Enterprise workloads where graphics is key for that overall performance. We have a leadership position as well. This tends to work in line with the overall enterprise capital expenditures. But we see no material change in there, continue to hold that leadership. And producing better and better and graphics for the enterprise market.

Datacenter, we just came off of a great Supercomputing 2015 in Austin, where we talked about some of the key things evolving in the supercomputing world. Both the acceptance of acceleration in some of the top supercomputers around the world. Of the 500 supercomputers, 100 of them use acceleration. This is not where you're using the graphics part of the GPU. But the overall performance, horsepower and compute capability that the GPU is enabling in these areas.

Of those 100, we tend to have the highest market share of more than 70% of that acceleration in the datacenter. Prior to Supercomputer 2015 we also announced two new areas focused on hyper scale for the overall datacenter. And producing a card for both training applications with internet service providers, training applications that do things such as image detection, voice recognition, voice translation; things [ph] when you speak into your phone and ask for a response versus actually typing into the internet. That is using a training algorithm that leverages GPU from the datacenter to produce that right service for the underlying application.

We also announced a new product that can also be used in terms of inference in the datacenter acceleration. That you're actually using that training capability into production. And using that to produce the application horsepower in that area as well.

So our datacenter business, at the end of fiscal year 2015, had grown more than 50%. We're still on a growth path right now year to date in fiscal year 2016. And our

expansion that we see of acceleration in the datacenter couldn't be stronger in terms of our pipeline.

Our automotive, we usually talk about automotive right after we talk about datacenter. Because it is essentially the future of taking a supercomputer. And putting it inside of a car. Looking at the underlying computing capabilities within a car for autonomous driving as we go forward. And looking at an ability to have that central compute function that can handle any of the cameras, the sensors, the LiDAR, the RADAR, into one single computing function of unstructured data to put up a set of instruction sets, even to the driver in the short term, or long term to actually overall drive the car.

Currently our auto business is about $80 million a quarter. And it is growing quite strongly, more than 80%. Right now, most of our revenue right now is associated with infotainment systems in many of the high-end cars and mainstream cars that you see coming out. Mostly with Audi, BMW, Tesla, Honda in Europe. And many other different types of cars leverage that infrastructure to put infotainments systems in the digital dashboards or the center consoles for the user experience that we have come accustomed to seeing inside the cars.

In Frankfurt, at the international auto show in the last month or so, you saw many of the auto manufacturers talked about a virtual cockpit for the automotive space, removing all the dials, removing all the buttons in there and having one single dashboard. That is being leveraged using NVIDIA technology behind it. So this is the area of key focus as well for auto, as well as that center compute [ph].

I'll let-- now see if we can turn back to any key questions that you may have regarding any one of those four markets.

# Questions And Answers

## Q - Unidentified Participant

Yes, perfect Colette. Maybe I can kick things off. And we have mics if people have questions in the audience. I guess one of the questions I get asked most often about you is about the datacenter. And as you mentioned, Supercomputing 2015 was just over. You talked about 100 of the top 500 computers, supercomputers, having acceleration; you having over 70% market share.

I'm kind of curious though. How do you think about the acceleration application migrating out of the supercomputer market, more into the hyper-scale cloud market? Specifically, what % of your revenue today in datacenter is actually from hyper-scale customers. And how do you see sort of that TAM evolving over the next-- call it-- 1 to 3 to five years?

## A - Colette Kress {BIO 18297352 <GO>}

Yes. So our overall datacenter business probably two to three years ago was primarily just HPC, high-performance computing. And an area that is still growing and continues to grow even today. As new supercomputers and the emergence of accelerations in supercomputers continues to grow. But a lot of the continued growth, both from today and what we see in the next couple years, will continue to come from the hyper-scale arena.

I think long term, we believe that acceleration in the datacenter will be everywhere. There is nothing that will probably stop the possibility that acceleration is almost on every single server in terms of datacenter. Our work with both researchers. But also with the web service providers themselves in designing their datacenters and what they need, has really allowed us to produce this pipeline. And produce the results that we have here.

We have very, very strong relationships with all of the key ISPs around the world, many of them focused on the West Coast of the US. But ranging far in terms of the Asia Pacific and European area as well. They see the importance of acceleration. We have seen the early signs that Moore's Law will probably slow down. But the datacenter is not going to slow down. They're looking for the need of acceleration. And we're producing products that are really, really tailored toward them to get their workloads complete.

## Q - Unidentified Participant

When you're thinking about acceleration as an application in the hyper-scale market, it's still very early. But I think one of the questions I get asked often. And I'm trying to figure out, is what % of that acceleration application do you think will be done on a GPU versus an FPGA over time?

## A - Colette Kress {BIO 18297352 <GO>}

Yes. I think that's a good question to contemplate on which one will actually be done. But it's key to understand that there's different ways, of course, to do acceleration. But there's key benefits or key differences between many of those different forms of acceleration.

The GPU is a very well-known form of acceleration. One, because of its ease [ph]--ability for programmability. It is programmable, not at the hardware level. But it's programmable in a software capability. It's designed with a computing programming capability of CUDA that enables you to program in something similar to C++, something relatively common, as well as something we've also continued to branch out to many different training centers around the world.

The best integratives that are coming out of research institutions or higher education, are being trained on CUDA. And programming on a GPU. It makes it easier at that software level for continuing to revise algorithms, continuing to revise the overall programming to match the overall application down to the hardware. It's just an easier form factor.

Additionally the GPU has tremendous performance. The multiplication factor of that acceleration factor that a GPU enables is bar none to any other type of acceleration that's there. And we'll continue to see the demand of that both on the performance and the programmability to be some of the key reasons why GPU continues to take a leadership position on a lot of this acceleration.

## Q - Unidentified Participant

I think, Colette, if you think about Intel's footprint of the datacenter today, even by their own admission as they bring Altera in house, it's going to be a while before they can have it integrated on chip. CPU, FPGA will be integrated in package first. But how do you think about competing in that market as Intel talks the big talk around optimizing their CPU for an FPGA and ultimately bringing onto the same piece of silicon? And as you answer the question, maybe you can talk a little bit about your efforts in power. And you efforts in ARM [ph] as well.

## A - Colette Kress {BIO 18297352 <GO>}

Yes. So the reference that you speak about is about a year ago, last fall, supercomputers of the future in the US, Department of Energy; two of the top supercomputers going forward have designed in the architecture of IBM power servers, as well as NVIDIA's GPU, as well as NVIDIA's NVLink, which is that overall buff between the CPU and the GPU. Very, very important signs of the key architectures in these supercomputers going forward.

Running [ph] those top two key supercomputers is very, very important of understanding how the architecture is key and important. We can only understand our work right now with the existing service providers, the existing supercomputers around the world. And their desire to work with us in providing the solutions that they need.

So we're here today. We're not here in the future. We're here now with a set of products and a growth that is really tailoring to the key things that we need. And that's going to be our focus as we go forward.

## Q - Unidentified Participant

Before I switch gears to another end market, I just want to pulse the audience. And see if there's any questions specifically on the datacenter business. Maybe we can talk a little bit about the gaming market.

One of the potential drivers of revenue growth there is just market share. And I'm just kind of curious how you see your market share today, versus kind of your long-term targets against AMD. And kind of why you think you're winning in the marketplace from a share perspective.

## A - Colette Kress {BIO 18297352 <GO>}

Yes. On the gaming platform, we-- primarily our business is focused on an add-in card market for overall gamers. Our approach though, it is not a chip solution. We

are really working with the gamers with many key features that you receive with a GPU from NVIDIA.

We focus on a set of game works, which is a set of software capabilities that enables games with different features than how it comes out that are enabled with a GPU. It makes hair better, smoke better, water better; a lot of those key features.

Secondly, we have a phone-home capability. We have a full platform of GeForce experience where they are in touch with us in terms of finding new capabilities to make their experience better, new sets of drivers, new sets of software capabilities that enables it. We really focus on a full end-to-end platform that the GPU enables all of gaming. And we work directly with the gamers on that.

Just a different approach than probably how AMD approaches that market. Our share of discrete GPUs continues to be more than 80% of all GPUs, discrete GPUs that are out there. But I think the key part is the focus on how many of those gamers turn towards NVIDIA. We continue to have a tremendous leadership share in there, as many of those high-end gamers look for NVIDIA for their performance of their gaming.

## Q - Unidentified Participant

Colette, every year we do a sentiment survey before the conference starts. And one of the questions we always ask is, what's the most investable buzz word for the coming 12 months? VR was actually number two. And I think it was the first time it actually showed up on the survey.

I'm kind of curious. As you think about virtual reality as an application, what does it do to the gaming TAM when you think about the compute power necessary to really create a VR environment?

## A - Colette Kress {BIO 18297352 <GO>}

Yes. VR is a great solution going forward to improve the next generation of gaming. I think there's a great set of new products from Oculus and a couple other high-end providers, really enabling virtual reality for gaming. The key thing about why we also get excited about that is in order for a VR experience to be solid from a performance and reduce the overall latency. And produce the framerate that is necessary, you need one of our three highest GPUs.

We've even had the endorsement from the providers of the glasses in terms of what their recommended specs are for that VR experience. So the excitement is there because solution to the infrastructure has been there to enable a great experience. We see tremendous amounts of startups focused on the content as well. And we see the desire from a lot of gamers, the growing population over what gaming will be in terms of the future.

I think VR also has a continued path, even in terms of the enterprise as we go forward, many uses in terms of prototyping that can be saved, in terms of walking

through areas, simulations, which will be important for the enterprise as well. But the key thing that had to come together was both the solution to the overall framerates, the ability to-- the mind to understand that it's really immersed in that type of experience. And that is here today. So it should be an exciting area.

## Q - Unidentified Participant

Well Colette, you mentioned that VR is driving a move to the higher end of the stack, your product stack. Is there anywhere to sort of bolt that part, quantify how much higher the ASPs would be in VR versus the blended average selling price today within your gaming business?

## A - Colette Kress {BIO 18297352 <GO>}

Yes. I mean you can get a great experience game playing by buying a retail price of maybe about $100 in terms of the GPU to do regular type of gaming. However, to meet the overall specs for virtual reality, they're probably recommending a card that's in excess of probably $300. So we're talking about a significantly different price point to enable the VR experience.

## Q - Unidentified Participant

Are there any questions from the audience? One right in the back.

Thank you. I just wonder if you can talk a little bit, try and size the gaming opportunity in the sense of if you look at the core gaming opportunity; how big is the unit volume there? Then when you think about over the next two or three years, virtual reality, how big is that unit volume?

## A - Colette Kress {BIO 18297352 <GO>}

Yes. The gaming, there's been a lot of outside people that have tried to look at overall PC gaming. And what they consider to be a market of both hardware, software and all of the underlying infrastructure associated with that. From those outside views, there's a thought that this will continue for several years. It could be near double-digit growth rate for the next three for gaming. Of course that's an outlook that we can all maybe point to, to see what it is. We have grown stronger than that over the last couple of years. But I think the excitement around the infrastructure, the overall new games that will come out. And the excitement of VR will keep overall gaming at a very positive point for the near future.

When we think about VR, I think that's a little bit harder. I think a lot of the excitement is about the upcoming infrastructure and glasses that will be there from the vendors. But we just haven't seen that market start yet. So there is excitement as we head into 2016. But I think we're thoughtful. As we know some are already probably purchasing to enable their VR experience when the glasses actually come here. So those will be probably the first movers. But there's definitely an upgrade cycle for some to take advantage of VR.

It's just too early. We're not at the realm to understand how many units will actually be available in the market.

## Q - Unidentified Participant

Colette, maybe as we have time for maybe one last question. And on that question, I think that the area I get the most skeptic kind of responses from investors when I'm talking about NVIDIA is your auto footprint. Everyone, I think, is a little bit worried about whether or not your moats are wide and deep there vis-a-vis other competitors. So can you talk a little bit about where your footprint in the car is today? And as you think about the autonomous driving car, why you think the GPU solution is going to be the best solution for that.

## A - Colette Kress {BIO 18297352 <GO>}

Yes. So when we think about our automotive business right now. And in terms of the slice that we have, probably more than 300 million, it's essentially been focused on the infotainment systems, the digital dashboards that we have inside of the cars. And that has been the focus for the last several years, eight or more years that we've been involved with these key OEM manufacturers.

But the key part of that is we've continued to establish a premium brand for those infotainment systems. And allowing them to move into the mainstream parts of the piece. When we move into autonomous driving, it's a different form factor. It can be an extension of the infotainment systems. But we're really trying to be the underlying compute platform. And we don't see actually anybody that is approaching that problem in the same manner.

But the way we've approached it as very similar to what we experienced in the datacenter, a deep narrow network of a datacenter problem that needs to be solved around a car. Absorbing all of the different information around a car, whether it's coming in through cameras or sensors, or any other type of form factor, it needs to be processed in a parallel speed. And a very, very hard problem to set up a solution on driving a car.

So our focus has really been working with those OEM manufacturers on what they see they need in terms of a solution for driving a car. I think over the next several years, we're going to see different form factors to solve autonomous driving. We're going to see probably an area of a confined community where autonomous driving is being done. And that has been a very key area of focus, working with a lot of those startups with us.

So I think it's early in the process. I think we're very confident in terms of the solution. Because we have been working with so many OEM manufacturers on the platform.

## Q - Unidentified Participant

Great. With that, we've come to the end of this session. I want to thank Colette and everyone in the audience for joining us this morning. Thank you very much.

**A - Colette Kress** {BIO 18297352 <GO>}

Thank you.