

## Business Update Call

### Company Participants

- Colette M. Kress, Executive Vice President and Chief Financial Officer
- Jeffrey D. Fisher, Senior Vice President, GeForce Business Unit
- Simona K. Jankowski, Vice President, Investor Relations

### Other Participants

- Vivek Arya, Analyst, Bank of America Merrill Lynch
- Will Stein, Analyst, SunTrust Robinson Humphrey

### Presentation

#### Operator

Ladies and gentlemen, thank you for standing by. And welcome to the NVIDIA Virtual Fireside Chat. At this time, all participants are in a listen-only mode. (Operator Instructions)

I would now like to hand the conference over to your speaker today, Simona Jankowski, Vice President of Investor Relations, NVIDIA. Thank you. Please go ahead.

#### **Simona K. Jankowski** {BIO 7131672 <GO>}

Thank you. Hi, everyone, and thank you for joining us today. Also thank you to Vivek Arya from Bank of America and Will Stein from SunTrust for moderating today's fireside chat with NVIDIA's CFO, Colette Kress; and SVP of Gaming, Jeff Fisher.

I'd like to remind you that our chat is being webcast live on NVIDIA's Investor Relations website. The webcast will be available for replay until March 24, 2021. The content of today's call is NVIDIA's property. It can't be reproduced or transcribed without our prior written consent.

During this chat, we may make forward-looking statements based on current expectations. These are subject to a number of significant risks and uncertainties, and our actual results may differ materially. For a discussion of factors that could affect our future financial results and business, please refer to our most recent Forms 10-K and 10-Q and the reports that we may file on Form 8-K with the Securities and Exchange Commission. All our statements are made as of today, March 24, 2020, based on information currently available to us. Except as required by law, we assume no obligation to update any such statements.

Okay. So, with that, let me turn the call over to Will Stein from SunTrust to kick off the Q&A with Colette. Will?

## Questions And Answers

### **Q - Will Stein** {BIO 15106707 <GO>}

Thanks so much and good morning to you Colette and Jeff as well for -- and thank you for allocating this time for the investment community. I'm hoping, Colette, you can maybe start by assuring us that you and your family and the broader NVIDIA family are safe and healthy today, and maybe along with that, say that, these are certainly unprecedented times and I'm hoping you can maybe give us a little general introduction and talk about the current environment and what NVIDIA is doing to work through it today?

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

Sure. Will, thank you so much for the question. So, first, let me start off, our hearts go out to everyone affected by this virus. Us too here at NVIDIA, at our corporate home base, our offices are closed. Our employees are sheltering in place and we are using this time to take care of all of our employees, our partners, and our contractors. NVIDIA though is in full operations, our employees are working from home worldwide, as well as here in the Santa Clara Valley. Our partners are nearly fully back online at this time. But even though we hold off the GTC news that we originally had planned for these weeks, our products are on track and in contributing to this quarter.

It is certainly interesting times indeed, but we are all working in new and creative ways to power ahead. This week we launched GTC Digital. GTC Digital is bringing hundreds of online sessions to researchers and developers all around the world even though we couldn't do it in person. So far we have more than 30,000 developers, researchers, that have registered for our GTC Digital. We decided to hold off on issuing our news or doing a keynote on our conference call at Jensen as we wanted this time to allow people to really focus on this crisis, even though we couldn't get our news out for this week, our products are very much on track and are contributing to this quarter. We look forward to telling you more about them in the coming weeks when we determine a great date that we can come forth.

But we did want to stay in communications with you and our investors, and again, we do thank you for holding this call. The company is continuing to pay our allied workers and even though most of them are still unable to come in during this environment. We're also donating to local organizations that can help the most vulnerable in our communities. And then, lastly, one of the key things that we're proud about is that we opened up our power brick genomic sequencing software available for free over the next 90 days to help our researchers take care of this virus. Power brick uses GPUs, for example, to accelerate as much as 50X the analysis of sequencing data. So that's to kind of give you a opening in terms of what we are doing, how our operations are going.

**Q - Will Stein** {BIO 15106707 <GO>}

Well, that really helps. Thank you, Colette. It's natural, of course, for investors to focus on comments that you made in your last earnings call where you indicated your expectation for a roughly \$100 million impact to revenue from COVID owing to some combination of supply and demand, and split broadly between gaming and data center. I'm wondering if you're able to provide a directionally updated view on that, and perhaps, maybe frame the possibilities for what we might think about July?

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

Sure. When we had guided -- we had guided our quarter back in the middle of February, we said more than a month since then. But our guide at that time was about \$100 million of revenue impact to our Q1 results. This comprehended both supply and demand impacts, and we had roughly split that between our overall gaming business and our overall data center business.

Well, let me first start and discuss what we're seeing in terms of the demand impact on our overall gaming business. China was the first region to be impacted by this virus, deep in the epidemic and right around the time that we had given the guidance. But we saw headwinds in the overall iCafe and essentially the traditional retail channel markets, as much of the foot traffic in China shut down in February through the early part of March. We saw, however, better trends in the e-tail and the e-commerce channel.

As so many students and workers remain home, there was a surge in PC game play. So today now in China, laptop continues to grow. Our overall China desktop is normalizing as retail demand shifts to e-tail and our iCafes are starting to reopen in China too. We are seeing similar trends emerge in North America, as well as in EMEA. Yes, retail has been impacted. But, however, there are no iCafes in these regions and from an e-tail perspective, the channels are doing better. We're seeing a lot of evidence of a surge in the gaming activity. I'll let Jeff Fisher talk about this in a little bit more time.

Moving to the supply chain impact, our inventory was available going into Chinese New Year as this is typical for that holiday season for them to have inventory on hand. This helped as the virus took suppliers offline early in the quarter as much as China remained on holiday while waiting to be able to return to work. We have seen improvement in our supply chain as the virus impact had moved through. Some suppliers are further along than others, but we think things are normalizing through this March month that we are at. I will let Jeff Fisher, again, talk a little bit more about what we're seeing in terms of the supply on gaming.

**Q - Will Stein** {BIO 15106707 <GO>}

Great. Maybe, Colette, I'd like to dig a little bit more into supply conditions. It sounds like things at NVIDIA are just fine, and I think, you talked about your partners. But if you look maybe a layer or two behind you and then in front of you through the supply chain, is there anything you see that is out of the ordinary, certainly, I don't

think we'd be surprised if there were some shortages, but I'm wondering if there is any update you can provide there?

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

Yeah. So when we are working through our overall deep in terms of supply channel, as well as our overall channel market, in terms of what they're bringing to market. We are solid in terms of the supply that they have available and may not be at perfect stages, but being able to transport the supply, so that they can finish the overall manufacturing of the products is probably a key part right now. So the material is moving, the material and the overall workforce is coming back to contract manufacturing, so that they can build these products. So we feel we are getting into better shape than where we were sitting in February. Hopefully, as we move through March, get to the end of March, we'll be probably close to maybe 70% to 80% in terms of the supply necessary for the products that we'll bring to market.

**Q - Will Stein** {BIO 15106707 <GO>}

Then maybe we can switch to the demand side a little bit. I'm going to let, Vivek, of course, do the gaming part of the business. But, perhaps, you can talk to us about what you're seeing more, let's say, current and near-term in terms of data center where -- our contact suggest that demand there remains robust, automotive, which -- and I wouldn't be surprised if there is some weakness there and maybe the market that doesn't get as much attention as ProViz. If you can dig into each of those a little bit, we would love to hear that?

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

Sure. So what we are seeing in some of our other businesses outside of our overall gaming is, there are some areas that are definitely benefiting from this area. The work from home is really driving a laptop business, which is influencing not only just mobile laptops but also in terms of our virtual GPU business, GRID, virtual desktop workstations, our hyperscale orders also remains strong this quarter as we've increased the use of Internet services and also cloud computing drives up this utilization.

Regionally, China's coming back quite well. Our US and Europe also remain quite solid at this time. But on the flip side, there are some verticals that we're going to likely see a little bit of a negative impact. Our automotive business is probably about 5% of our overall revenue and is likely to see some negative impact. For the US, our sectors, our -- some of our vertical sectors are also impacted areas such as oil and gas or financial services. But these are a very small percentage of our overall revenue, and probably, will not have a material short-term impact in terms of what we're seeing. Now, if we take a look at the longer term. Keep in mind that our data center business continues to be on a strong growth trajectory, driven by a lot of new waves in terms of our AI investments across several of our overall sectors. I'll let you take it from here as well.

**Q - Will Stein** {BIO 15106707 <GO>}

Well, that really does dovetail nicely with the next question I was going to ask about trends that might benefit your business and you highlighted work from home and the relevant laptops. Are there any other parts of the business that might see some benefit. You mentioned that there is an application in the data center in the deep learning side that might help researchers in sequencing? Maybe you can talk a little bit about what you're seeing in terms of customer demand there?

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

Sure. So when we think about the urge across the world right now in terms of finding a solution to the virus, finding a solution to the virus faster than some of the things that have occurred in the past. Key areas in terms of health care looking for the compute, looking for accelerated method. So we do -- we'll probably see an increase in health care, but also in terms of the government focus as well to see what we can do.

Those are some of the underlying areas right now that we expect to also increase during this time. But I think it's a good time to kind of go back and remember what we had already expected or incorporated into our current quarter, as we outlined in terms of our guidance at the very beginning. As you recall, our data center business has grown quite well at the end of Q4 and as we moved into Q1, we continued to see a strong overall visibility into the quarter as well. That has been influenced by certain vectors, in terms of, in our overall AI investments that we have done.

First, in terms of natural language understanding, conversational AI and deep recommend daters. Given everybody online, these are continuing to be great areas of overall demand. But in the back end, it is driving giant models for overall training. Our growth in overall influence as AI shifts to the development portion to overall production is also a key growth area for us as well.

We're also seeing a huge rise in the adoption of the public cloud right now and we have more than 6,000 AI start-ups worldwide. Edge AI with areas such as the US Postal Service and Walmart are another key example of things that are online and people focusing on their supply and demand forecasting through this time.

Now from a competitive forces, we still need to think through some of the things that are out there. The need for accelerated products for AI is very well accepted and very important for us as we go forward. That's why we have been focusing on building the accelerated AI platform for over five years and we have more \$1.7 million, overall, developers.

Our performance and programmability matter as the world's data centers become AI data centers, running this huge variety of AI networks and workloads. But the true test of our industry standard is looking at the overall benchmarks. NVIDIA was the only provider to submit for MLPerf for all of the five benchmark wins back in the overall fall and this has been very important at these times, as we lead in this overall AI space that we're in.

**Q - Will Stein** {BIO 15106707 <GO>}

So it sounds like the long-term trends are very solid in data center as well given the distinguishing factor your -- in your product solution is more software-based. Maybe we can transition to talking a little bit about the balance sheet, it's much stronger than most semi companies that note, you have almost \$11 billion of gross cash only \$2 billion of gross debt. So a lot of net cash, last 12 months EBITDA, I think, is over \$4 billion, so great shape there. But if we think about the potential for a more sudden decline in demand. It sounds like that's not really what you're seeing. But if we were to see that materialize over the next quarter or two, can you talk to us about NVIDIA's approach to balancing the desire to preserve all your capabilities which might profitability a bit versus the desire to preserve profitability?

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

Yeah. So a really good question, and yes, our overall balance sheet position is quite, quite strong. Our cash balance been in the double digits, more than \$11 billion probably at this point and looking in terms of the amount of operating cash flows that we were able to complete at the end of fiscal year '20 at about \$4 billion.

Our debt, we have a small amount of debt. We have \$1 billion of that debt due in 2021. We have another \$1 billion due in 2026. But our cash is invested in very conservative portfolio low risk and essentially liquid instruments at this time. Our overall liquidity position is extremely solid and we really have no concerns.

So as we move forward, our focus is really in terms of confirming the business, making sure that we can operate both of our overall OpEx and we do see some really great opportunities as we go forward that we think we will weather through the storm. So, given the strength of the balance sheet, given what we've already discussed in terms of great opportunities in front of us, in front of the data center, as well as what we're seeing in gaming and graphics. I think we're well set up to weather through this storm.

**Q - Will Stein** {BIO 15106707 <GO>}

Thanks, Colette. Maybe asking a little bit more explicitly on this question. In the more industrial part of my coverage investors talk about incrementals and decrementals, but to maybe state it more simply, can you talk about the split of fixed versus variable costs in both your cost of goods and your OpEx?

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

In our overall costs, when we think about our fixed and our overall variable. I would say, the lion's share of our costs are overall variable, variable related to our products that we're bringing to market and pain for the overall creation of those products that are overall contract manufacturers. Almost all of it is an overall variable.

From a fixed proportion, you are just talking about our teams on board right now and what they're doing to work with all of our contract manufacturers and ourselves to build those products. Sure, though, we do have in some cases procured long-term

agreements in order to purchase overall inventory that we have to keep in mind, and that is visible, if you look at our overall 10-K filing in terms of that amount.

Now, when we think about our OpEx. Our OpEx, for the most part, is our employees, our employees make up a very large percentage of our overall OpEx and we kind of consider that to be a fixed cost. In addition to the overall compute that our overall engineers are also working on to build the great products that we have and make the investments of the things that we have in the future. So we feel solid again with both our cash-on-hand and what we think as terms of long-term demand as we go forward.

**Q - Will Stein** {BIO 15106707 <GO>}

Well, thanks, Colette. Maybe we can take one step higher a little bit and think about NVIDIA's capital allocation strategy in general and then also in particular, we'd love to get a status update on Mellanox. I know there were some news reports this morning of some -- maybe some movement in that transaction, but any update there would be very helpful?

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

Sure. We've identified about three uses of our overall accounts. The first one is investing into our business. We play in a number of large and high-growth markets and we need to assure that we continue to invest into that. That investment position will take us through the long-term, but will also allow us to address these long-term opportunities that are in front of us. We expect to make those investments in the future, both organically with the overall team that we have, but also through opportunistic M&A as we go forward. We are committed to continue to pay our dividend that we have right now. And then, lastly, looking at our share repurchases, we will stay nimble and think about the overall timing of when we would think about future overall repurchasing shares. On the Mellanox front, we feel good about the deal closing. We do expect this deal to close in the first part of 2020.

**Q - Will Stein** {BIO 15106707 <GO>}

Great. Maybe along the lines of investing in the business, sometimes these periods of great dislocation offer opportunities to accelerate investments either through M&A or through organic investment, anything like that that NVIDIA is contemplating in the current environment?

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

As we work through right now and think about the impacts of this market, we do want to just make sure that we secure what we need right now from both supply standpoint and making sure that we can meet the overall demand that we think is arriving right now. We will continue to look at the opportunities that we can make going forward certainly and those overall growth opportunities. There may be an opportunity opportunistically for us to make some investments just back into our overall business or from an overall M&A piece. But right now, I think, right now we're just focused on that overall, meeting the overall supply and demand needs that we are in the current quarter.

**Q - Will Stein** {BIO 15106707 <GO>}

Thanks, Colette. I'm on my last question, it may be -- it may require a little bit of a longer answer. But we'd love to hear about what happens when the dust settles relative to the current situation. If this current phenomenon of social distancing last for some number of months or comes in waves, when all those impacts are behind us, would you expect anything with NVIDIA's business, its market position, its supply chain or other aspects of the business to change in any, let's say, a structural way?

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

Sure. So if we think about our overall growth opportunities that we have, it's kind of - I think it's a good reminder to help people understand that our gaming and graphics business is definitely driving. The number of gamers globally continues to grow and eSports continues to gain popularity with these audiences in hundreds of millions. Our Max-Q technology has been an important piece of unlocking the overall notebook market and also in terms of the workstation market, as a new type of both the gaming device and an opportunity for enterprise graphics by keeping it thin and light, as well as influencing the mobility that is necessary.

Our Studio line is a new entrant that allows us to address the 40 million creatives and freelancers that are out there that could benefit from the NVIDIA GPU. Cloud Gaming is clearly in its development but holds a great long-term opportunity for us as we expand to reach more than 200 million gamers and address a whole opportunity of probably 1 billion gamers that are out there.

Our data center business will also continue to grow. We outlined late last year in terms of a \$50 billion TAM that we've identified in front of us. Training will continue to benefit and we see exponential increases in the AI model complexity that will continue to fuel the overall training market.

Overall entrants will continue to benefit from increased performance requirements and the overall shrinking latency budgets. We are set up quite well with our overall inferencing product, given the overall software enhancements that we have and the overall programming that we have to address these larger and larger opportunities for inferencing.

Edge AI, we think will be a very large business and will continue to ramp as we extend our reach to the data centers to the edge across industries. And most importantly, AI is probably a technology force of our time and NVIDIA is uniquely positioned to power a good portion of the AI that's out there.

**Q - Will Stein** {BIO 15106707 <GO>}

Well, Colette, thanks so much for your time today. That's it for me. And I guess, I'll turn it back to Simona.

**A - Simona K. Jankowski** {BIO 7131672 <GO>}



Okay. Thank you very much, Will. And I think I'll turn in right back over to Vivek for the gaming part of the call.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Okay. Great. Thanks, Will, and thanks to Colette, Jeff and Simona for this opportunity. Good to note that the NVIDIA communities is broadly doing okay. So maybe let's get into gaming, fun market, most of the time, maybe extra important in these trying times. Jeff, let's start with the question that, I think, it's on top of mind for investors and Colette touched on it at a high level. But what you are seeing from your perspective positive or negative on the demand side, because of the ongoing COVID-19 headlines? Any differences from a geographic perspective, any sense of channel inventory and sell-through trends or ASP trend, just give us a snapshot of what you -- changes positive or negative that you've noticed over the last few weeks and how they should inform us of your gaming business at least in the near-term?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. Thanks, Vivek, and thanks for hosting this. It's certainly been an interesting year to say the least in gaming, and it's still playing out as you know, but the fundamentals are very encouraging. Our work from home is now global. I think we're all probably sitting home right now on this call. And graphics, as we've seen is an important enabling technology for folks who are working remotely.

First of all, gaming, I mean, as you've read and it could imagine, the hours of gameplay are increasing. We've seen in our installed base an increase of about probably 50% of gaming hours. This is also evident in Steam where they've broken a new concurrent gaming records of about 20 million gamers, all playing at the same time on the Steam platform. We saw this first in China, coming out of Chinese New Year and in early Feb, and now we're starting to see it in the West in the last one week to two weeks, in terms of viewers as well, Twitch has also, you may have read averaged -- they've doubled their average viewership year-over-year in the last several weeks. It's interesting even pro sports which is now also on a hiatus is moving to eSports. Formula One, NASCAR, IndyCar have drivers are organizing races for viewers to tune in and watch. There were 70,000 viewers on a NASCAR-e -- an online e-NASCAR race this week.

So overall we're seeing pretty good demand trends in gaming. But obviously things are a little fluid and we'll talk a little bit more about that in a bit. Students, hundreds of millions of students are now studying from home. OEMs are seeing a lift in laptop demands across the performance and price range, as a result of students who now need to take the work at home either for video conferencing or for more advanced engineering or math work.

And then there's data scientists, then pros, designers data science creators, pros who are working at home. There is about 20 million enterprise-based Quadro workstations, this isn't in the gaming space, but I just wanted to comment on it. Workers who need performance laptops or they need remote into data centers for virtual Quadro workstations. So we're also seeing some -- a trend around higher performance workstation-based laptops being sold to these types of workers.

You also mentioned the supply chain, I'll talk a little bit about that. Our supply chain is getting back to work. I think, Colette, had mentioned in our discussions with our ASC partners and this is on the desktop side, primarily about 70% to 80% are back to work. I will say 70% to 80% of capacity is back in place. AIC's and OEMs are all working to catch up on inventory -- channel inventory that had been drawn down as a result of the CNY plus COVID extended shut down.

For the most part on the desktop side channel inventories are being replenished. They're approaching healthy numbers. On the laptop side, it's the supply chain is a little more complex, takes a little longer and it may take a little longer to come back. As we noted, and as I'm sure you've read demand has been strong for laptops due to this work at home scenario. So I believe inventories are likely to remain below normal for some amount of time. I don't know did you want to keep -- you want to ask me some questions or I can keep adding some color?

**Q - Vivek Arya** {BIO 6781604 <GO>}

Yeah. Maybe just to kind of nail down the specific impact, how do we connect the dots between gameplay and your ability to ship GPUs or just the demand for actually GPU shipments and as part of that, if you could also give us a sense for any trends that you might have noticed from an ASP perspective that people who are maybe gaming more at home or otherwise, are they preferring certain kind of GPUs from an ASP or a mix perspective than you would have noticed otherwise? Like what is the specific demand side impact on NVIDIA?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. So I think let's talk about regional first, and I think, Colette, had mentioned that iCafes represent, I think, you guys know reasonable amount of demand in China. Throughout COVID, iCafes have been shut down. So that demand has -- was weaker at the beginning of the quarter. I think that's part of what we had observed at the beginning of the quarter and now iCafes are starting to reopen. It's still early. I would say in the 10%, 20% iCafe traffic is starting to return and it will take some time, but they're starting to reopen and will over time be normalizing.

We've seen a demand shift from retail to e-tail. It's -- the market has been very efficient, I mean, I am proud of our channel, it's very resilient and find ways to get product to market. In China, the -- when retail shut down, e-tail really stepped up to pick up the demand and now we're starting to see that in other regions in the west as well.

You talked about ASP trends. It's probably too early to tell. I mean, we've seen our demand continues to be intact up and down the stack. So, I guess, I wouldn't expect too much of a shift in demand as a result of COVID. But we'll get -- we'll continue to watch that. There is definitely a correlation between gaming hours and amount of time people are playing games and how they -- how important it is for them to win and compete, and demand in gaming products. But it's -- so it's -- we've seen demand is definitely intact throughout this environment, but it is hard to really put an exact number on that correlation.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Got it. Then maybe, Jeff, going to the technology aspect of your business, can you give us a sense for the adoption of ray tracing technology and during among your customer base. I think, when you guys launched that specific technology, it was at least from the outside, perhaps, seen as a little bit ahead of its time. What is the current status of that adoption? Do you think game publishers need an extra incentive to adopt that? And just as part of that, I think, yesterday you also launched DLSS 2.0, maybe explain to the investors what the benefits are and how it can adopt maybe faster, maybe how it can drive maybe faster adoption of ray tracing among game publishers and importantly gamers?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Okay. Yeah. Good question. I mean, Turing is doing great. About 50% of our -- sorry, 15% of our installed base is upgraded to Turing. If you at a high level that ramp continues to outpace our prior-gen Pascal. Remember that our Pascal stack launched all at the same time, effectively from 1.99 up Pascal was all in-market within several months of each other.

Our Turing stack was staggered. With 2060 and below, 3.99 and below really shipping about six months after the higher end of the stack. So when you look at the ramp of Turing relative to Pascal, the way we try and explain it is by normalizing this to the T0 of each product when it ramped and in that regard the Turing ramp is outpacing Pascal and we're super excited as is the end market. Some of the core features that Turing brought to market, I mean, Turing announced and is really delivering a reinvention of graphics, ray tracing, AI, and a number of features we will talk about in a minute that have come to play through Microsoft's new update to Direct X.

But you asked about ray tracing in particular to start and ray tracing has been around for years. It's the movie industry for computer graphics has used it to deliver cinematic scenes. However, it's required that each frame be rendered offline to get that type of realism in a CG type frame. RTX changed that overnight by delivering the ability to render frames in real-time, ray traced range in real-time.

You talked about adoption, games take years to develop. Many developers want to lead in visual realism, they want to be the first one out, they are proud about it and their gamers expect them to have really movie cinematics in their games as they come to market. And these early adopters are really the first games that have embraced ray tracing and have come to market and the games are just amazing. I'll mention some of them in a minute.

On top of that, the installed base for hardware-accelerated ray tracing is about to explode, I know we want to talk about consoles in a bit. But both Sony and Microsoft have now announced and revealed that they have hardware ray tracing capabilities in their consoles, as this footprint continues to expand, it will bring the entire industry forward and it's going to bring excitement among developers and gamers alike to bring these type of effects that ray -- real-time ray tracing is going to enable.

So we think this is a kind of a perfect moment and a really about to usher in a new wave of ray-traced content.

Looking at the games, we've had a number of games come to market already for that are real-time ray tracing, some of them are just unbelievably amazing. Metro recently shipped earlier this year. Control is one of the more recent games that really took advantage, took ray tracing to new level, Deliver Us The Moon, an indie title that is just stunning. But looking forward, as we've talked about, we've been working with Microsoft and Mojang to bring ray tracing to Minecraft. And if you look at what's possible with realistic effects that ray tracing brings to Minecraft, it's just mind-boggling.

Minecraft is probably the most important game in the world, has 100 billion views on YouTube. There's 100 million monthly gamers playing Minecraft. And as you'll see later in the year as Minecraft comes to market what creators and moderators are able to do with this game exploring the world through Minecraft is going to be pretty amazing. So we think you add Cyberpunk 2077 to that and we think this year is going to be a great year for this technology.

You asked about DLSS 2.0. So let me talk about that, one of the core features of Turing and our RTX technology is what we call Tensor Core, which brings AI to graphics. DLSS takes advantage of the Tensor Cores to bring AI to gaming for the first time. And DLSS is effectively an AI image reconstruction technology, it's a real-time -- in real-time, it can fill in missing bits from every frame, allows -- which delivers effectively a doubling of performance, you could think of a RTX 2060, which is our 299 to 349 GPU performing at a game with DLSS at roughly the performance of a 2080 tie, which is our 999 GPU. So DLSS can effectively double the performance of our entire stack as games -- as more and more games integrate this capability.

DLSS 2.0, DLSS was announced with Turing architecture back in -- at Gamescom 2018 and has continued to evolve and more games have been added. But with DLSS 2.0, it's our next-generation of this technology and it brings a new level of performance and a new level of realism. Some of the artifacts as you could imagine that come along with AI, reconstruction are now being -- are being resolved with DLSS 2.0. In fact, the image is being delivered by 2.0 are often seen as better than the original game frame.

DLSS 2.0 also has the capability, we train the network, the neural network on non-specific content. Let me describe that for a moment, with the original, when DLSS was first launched, we had to train the neural net, the gaming -- the imagery construction based on every game. So a game that had DLSS had to be trained on the frames in that game itself was very time consuming, it took a great deal of tuning per title.

DLSS 2.0 trains on non-games-specific. We use generalized images to train the network. The results are not only much better, but the integration into games now is much faster. And as part of this expectation that DLSS will become more prevalent in

more and more games and easier to integrate. Unreal Engine 4 now integrates -- well, the next release of Unreal Engine 4 will have integrate DLSS. So it will be available to any game developer who is using UE 4 for a fairly simple integration and then we'll work with the developer to make sure that it's tuned for their game.

**Q - Vivek Arya** {BIO 6781604 <GO>}

And--

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Go ahead.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Yeah. Maybe just a quick follow-up on that, one question that comes up is that, I think, investors understand that as the game, the production quality goes up, that's an incentive for people to upgrade their gaming cards. But what about eSports? Because there, the perception is that maybe the quality requirements are not as high, so as eSports takes off, what is the impact on your gaming business, does it change, whether it is ASP's or units or any other metric? If eSports becomes the dominant growth driver?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

We're excited about both growth drivers. I mean, the AAA games and the cinematic realism definitely drives higher-end GPUs and developers really love to take advantage of the capabilities of RTX to deliver next-generation visuals and realism. But you mentioned, eSports, which we're also super excited about because, I don't know if you've seen our campaign, but there is now science behind the fact that frames wins games. The lower the latency, the higher the frame rate, the more accuracy you're going to have as a competitive gamer.

And if you look at the number of the installed base of users of our gamers who have -- who can't deliver 144 frames per second or higher, it's a large number. So we believe that there is an installed base -- as eSports grows there is an installed base, it's going to want to upgrade to get low latency high frame rate, so they can excel and be more competitive in eSports. Both of these factors, AAA and eSports, national in our business going forward.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Got it. And you brought up the game consoles that looks like they are still on track for the second half. One perception is that is there some kind of pause before these game consoles come out as gamers, perhaps, want to see what the important features are and maybe what games are launch alongside. But the other aspect is, historically, I remember that they have often stimulated the demand in the PC gaming market as well. How are you looking at the impact on your business as these game consoles are launched? And as part of that, if you could also, perhaps, help us understand what impact it will have on, again, the mix of your cards, because when I look at the performance attributes of some of these game consoles, they are

significantly higher than what they have been in prior generations. So what is the impact overall of these game console launches in the back half on your business?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. I think, you had mentioned it, I mean, historically, new consoles cycles have been very good for PC gaming. They basically rise the tide. They give a higher benchmark for developers to target to and the next wave of games are all going to require higher end hardware. We've not seen installs in PC gaming, PC gamers buying ahead of consoles in the past, I wouldn't expect that this time around either. I think, fundamentally, gamer -- PC gamers buy stick with PC because of the scalability and the visual, what you're able to play on PCs. I don't expect that will change this time.

What's exciting about this cycle is that these consoles are bringing new technology to the market. Ray tracing is probably the most important one. It's something that we've been shipping for the last two years. We've got -- we've established a bit of an installed base around it. I think of us as being a couple of years ahead of the industry in this respect. So the opportunity for consoles combined with RTX to really continue to accelerate this reinvention of graphics is super exciting to us.

Let me comment about performance. I see the performance, we've read the same things about what's coming in consoles as you guys have. I think at the end of the day the -- with today's games, the consoles are going to land somewhere between the middle and the higher end of our stack. But I also think that when you add the fact that our ray tracing capabilities are a couple of years ahead of consoles and we have this, we have AI for graphics, we've started to deliver that in content. I think you'll see our stack having a similar differentiation from console as what you've seen in prior cycles, and of course, we're not standing still, we're working on next-gen hardware as well.

**Q - Vivek Arya** {BIO 6781604 <GO>}

So when we see headlines in the media about particular console having center teraflop or slow teraflops, what does that imply to you, Jeff, in terms of what is the comparable graphics card that delivers that level of performance or it isn't apples to apples doing those kind of comparisons?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. I think it's comparing teraflops is not apples to apples. I mean you can even look at our architectures relative to our competitor game performance to game performance and teraflops to teraflops, and I think, it's -- you'll see -- you won't see a direct correlation between those numbers. The real question is what was the ultimate game play performance. And as I mentioned, as we see games moving more and more to RT and we have more and more games using DLSS. I think you're going to see a real disconnect between those numbers. As I mentioned, 2060 with DLSS performs around the 2080 tie performance and that's -- that could be a real discontinuity as well.

So I think we've got to see how it plays out, but my general assessment is that the performance of consoles is -- of the range of consoles that are coming out and we still don't know exactly what the different models would be, it will be somewhere between -- in a range between the middle of our stack and the higher end of our stack -- of our current stack.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Maybe just let me ask that one last way, which is, if you look at your deployed base of gamers and you look at the performance attributes or gameplay attributes of the new consoles, what proportion of your deployed base of gamers today has access to that level of gameplay performance?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Well, if you look at ray tracing, I mentioned, RTX is about 15% of our installed base. So, maybe I'll start with that. I'm not -- if the question is, what kind of lift or refresh might we see from the impact of new consoles, the performance of new consoles. I think, it -- a majority of our installed base would want to upgrade to new -- to a new level of performance that the games that are coming out over the next few years will require.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Got it. Perfect. Maybe one more level of technology detail. How important is the manufacturing node in terms of maintaining your competitive edge because your main competitor has adopted the 7-nanometer node ahead of you. Why has it taken NVIDIA longer to adopt that and whenever you adopted, what could be the potential benefits and just how important is the manufacturing node when it comes to maintaining your market share dominance in this market?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. It's a good question. I mean, the race to be first into a node for very large ships, the benefits of that have really kind of waned Moore's Law has slowed down and architecture becomes really the most important thing. We've been competing against 7-nanometer products for almost a year now with our 12-nanometer solution. We continue to have the best price-performance. We continue to have the best power efficiency, which you might think of as illogical if you just look specifically at the nodes, but that's where really design architecture execution becomes super important and that's an area we excel. When we ultimately move into smaller technology, I think, you will see the benefits of our architecture to scale even more. So we're really looking forward to that. I don't think it's a race to be the first into a node anymore. It's really who has the best architectures, the best features and the best execution.

**Q - Vivek Arya** {BIO 6781604 <GO>}

Got it. And maybe one last one, Jeff, before we turn it back to Colette for closing comments. Maybe the impact of game streaming on your business. I think, Colette, touched on that, but if you could perhaps give us some more color on -- is GeForce now kind of becoming more important to the business, and as, let's say, 5G takes off,

right, that does it provide another driver for most game streaming and overall is this additive to the business? Just some comments on game streaming?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. Thanks. GeForce NOW, I think, you're referring to is really exciting. It's an interesting time for game streaming. I think with work from home is -- as we're hearing about all the demands on the Internet, not just for game streaming, but for all forms of streaming. I mean, we've seen definitely an uptake in our service. Gamers are now playing longer -- for longer sessions, we have streamed about 10 million hours this month so far on GeForce NOW. We've added 1.5 million users since we launched officially took the service out of beta in February. And you're right, we see GeForce NOW as really incremental adding to our TAM. The strategy is to reach gamers on any device, who are under power devices. The \$1 billion gamers in the world.

On GFN, if you look at our user base, about 80% of them are playing on under power devices, on Macs, on phones, on TVs, and certainly, in a majority on just low-end PCs. We'll be opening that up to Chromebooks in a few months. So we're also really excited about that opportunity. Let's see, so, Vivek, did you have another question there on game streaming?

**Q - Vivek Arya** {BIO 6781604 <GO>}

Yeah. Maybe just any -- do you think 5G becomes an incremental driver for more --

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah.

**Q - Vivek Arya** {BIO 6781604 <GO>}

-- game streaming, because I know in the data center you have -- you guys have been working with telecom carriers and Ericsson and whatnot on 5G. So I was wondering if there is a kind of synergy between your gaming and the data center business as 5G takes off?

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Sure. Yeah. No. Really good question. I mean, 5G is -- gaming is a killer use case for 5G and telcos recognize that and we've been working with many of them around the globe to bring our service to their user base. This past week we announced even yesterday, KDDI, one of the largest telcos in Japan. We're partnering to bring GFN into their user base. This is in addition to SoftBank in Japan and LGU Plus in Korea, huge gaming market. And GFN.ru, our partner in Russia, which is also bringing GFN and has been now for several months operating GFN inside of Russia. And there's other telcos around the globe that are going to be bringing GFN in the markets and that's really our expansion strategy. But 5G is going to ultimately bring the type of bandwidth and interactive -- interactivity required for this class of gaming to the billions of gamers in the world. So it is an enabling use case and it is super exciting for us and telcos.



**Q - Vivek Arya** {BIO 6781604 <GO>}

Great. Thank you so much, Jeff. I really appreciate your time. And with that, maybe let me turn it back to Colette for closing comments.

**A - Jeffrey D. Fisher** {BIO 2373419 <GO>}

Yeah. Thanks a lot, Vivek.

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

Okay. Thank you. So, in summary, NVIDIA is in full operation. So even though we paused our GTC news that we were planning for this week, our products are on track and are contributing to this quarter. In terms of demand, hyperscale demand remained strong and our exposure to challenge verticals is small.

In gaming and graphics, e-tail is currently an important route for this demand and new opportunities for gaming, graphics and commute, computer merging as students and the global workforce are at home. Also discussed today, China is coming back. While our China supply chain is normalizing, we are staying alert now for any of the global disruptions.

Our balance sheet is strong and we have ample liquidity. We remain confident that we will close the Mellanox acquisition and we are taking care of our employees, our partners, and our contractors. Together we will weather the storm. Thank you, Vivek, and Will, for hosting us today. We will stay connected with the investment community and thanks all for joining this call.

**Operator**

This concludes today's conference call. You may now disconnect.

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