Company Name: AMD
Company Ticker: AMD US
Date: 2017-10-24
Event Description: Q3 2017 Earnings Call

Market Cap: 29,559.14
Current PX: 27.33
YTD Change($): +8.87
YTD Change(%): +48.050

Bloomberg Estimates - EPS
Current Quarter: 0.054
Current Year: 0.659
Bloomberg Estimates - Sales
Current Quarter: 1256.958
Current Year: 6821.103

Q3 2017 Earnings Call

Company Participants

- Laura Graves
- Dr. Lisa T. Su
- Devinder Kumar

Other Participants

- Vivek Arya
- David M. Wong
- Mark Lipacis
- Kulin Patel
- Joseph L. Moore
- John W. Pitzer
- Ross C. Seymore
- Matthew D. Ramsay
- Blayne Curtis
- Hans Mosesmann
- Vijay Raghavan Rakesh
- Wayne Loeb
- Tristan Gerra

MANAGEMENT DISCUSSION SECTION

Laura Graves

GAAP and Non-GAAP Financial Measures

Additionally, please note that we will be referring to non-GAAP financials during this call, except for revenue and segment operational results, which are on a GAAP basis

The non-GAAP financial measures referenced are reconciled to their most directly comparable GAAP financial measure in the press release and CFO commentary posted on our website at quarterlyearnings.amd.com

Dr. Lisa T. Su

Business Highlights

Revenue and Gross Margin

- Q3 was a strong quarter for us, demonstrating the significant growth potential of AMD, driven by our strong high-performance products, leadership IP, and long-term strategy
- Revenue increased 26% from a year ago to $1.64B

- Gross margin also improved significantly y-over-y as we achieved profitability and generated positive FCF in the quarter

Computing and Graphics Segment

- Looking at our Computing and Graphics segment, we made excellent progress in Q3, as the continued success of our Ryzen family of CPUs, combined with significant graphics growth, resulted in a 74% increase in Computing and Graphics segment revenue y-over-y
- Client computing revenue increased by a strong double-digit percentage from a year ago, as we expanded our Ryzen processor family and saw increased demand in the desktop market
- Ryzen 5 and Ryzen 7 processors have ramped well in the desktop channel market, reaching 40% to 50% desktop market share at strategic e-tailers worldwide
  - In addition, OEM adoption is accelerating as customers ramp shipments in advance of the holiday sales cycle

New Product Launches

- In the quarter, we launched additional Ryzen CPUs, including Ryzen 3, expanding our reach in the mainstream and value market segments, Ryzen Threadripper processors, returning AMD to the high-end desktop market, and Ryzen PRO-based offerings, which have been adopted by all major commercial PC providers, including Dell, Lenovo, and HP, expanding our presence in the commercial space

Acer, HP and Lenovo

- Also, in the quarter, we qualified and began early shipments of our Ryzen mobile processors combining our Zen CPU cores and Vega GPU cores in a high-performance APU designed to power ultra-thin and two-in-one notebooks
- Acer, HP, and Lenovo plan to launch their initial Ryzen mobile-based systems in the coming weeks and we expect an expanded assortment of premium notebooks to launch in Q1 2018

Graphics

- In graphics, we achieved record GPU revenue in the quarter based on significantly improved ASPs and higher unit shipments from a year ago
- These financial improvements were driven by the launch of our Vega-based GPUs and had strong demand for Polaris products across both gaming and blockchain markets

Radeon RX Vega

- In the quarter, we expanded further into premium portions of the graphics market with new consumer and professional GPU solutions
- Our Radeon RX Vega family of GPUs launched in the channel targeted at the enthusiast-class gaming segment
- Revenue from initial shipments of these products is significantly outpacing previous premium Radeon GPUs
- Radeon Instinct MI25, our GPU compute solution, also began shipping in volume to mega-cloud datacenter customers

- And Radeon Pro WX 9100 professional graphics cards, targeting the high-end professional content creation market, started shipping late in the quarter

Amazon Web Services

- In addition, we saw expanded AMD Radeon adoption with cloud customers in the quarter, driven by our investments in GPU compute
- Amazon Web Services announced that they have deployed AMD Radeon Pro technology to power Amazon AppStream 2.0, driving GPU-accelerated cloud delivery of virtual applications
- We also announced a collaboration with Baidu to build more flexible and powerful AI computing platforms based on the deployment of our Radeon Instinct GPUs in their datacenters

Enterprise, Embedded and Semi-Custom Segment

- Turning to our Enterprise, Embedded and Semi-Custom segment, revenue was approximately flat y-over-y and increased 46% sequentially
- Sequential growth was based on a seasonal increase in semi-custom revenue, as well as growth in server revenue from our EPYC datacenter processors
- Our semi-custom business continues to perform as expected for the year and we anticipate seasonal demand to remain healthy as our customers enter the holiday sales cycle with Sony's PlayStation 4 Pro and Microsoft's Xbox One X

Server Business

- In our server business, server revenue increased from a year ago as we began ramping sales of our EPYC datacenter processors to key cloud and OEM customers
- Customer engagement with our EPYC processors is growing as the true performance and features of the platform are tested and implemented with Tencent and JD.com joining the list of datacenter customers planning to deploy EPYC processors

Mega Datacenter

- In a short period, three of the super seven mega datacenter providers have publicly announced plans to deploy EPYC-based products into their hyperscale environments, including Baidu, Microsoft Azure and Tencent
- And we have strong engagements with other major cloud providers
- In addition, HP Enterprise and Dell are in the process of bringing their first EPYC-based platforms to market in Q4, and we are actively engaged with them to accelerate testing and validation of EPYC-based systems in datacenters across a broad number of large and medium enterprise customers

Ongoing Strategy

- We remain confident and focused on the steady expansion of our datacenter presence over the coming quarters based on the high-performance and rich feature set of the EPYC product

- In addition, as a part of our ongoing strategy to monetize our differentiated IP, we successfully closed a patent licensing transaction in the quarter

Conclusion

In closing, we are very pleased with our third quarter results

Throughout 2017, we have delivered significant year-on-year revenue growth and margin expansion as we achieved multiple major product, customer and market milestones

As we head into the final quarter of the year, we look forward to continuing to accelerate our business

2017 annual revenue growth is now tracking above our previous estimates and we remain confident in our ability to make AMD one of the premier long-term growth companies in the tech industry

Devinder Kumar

Financial Highlights

Revenue and Net Income

- I am pleased with our performance for Q3 2017
- We increased revenue 26% y-over-y, expanded gross margin and achieved both operating and net income with net income of $110mm and diluted earnings of $0.10 per share
- We are executing well with our strongest portfolio of products in many years including our Ryzen, EPYC and Radeon Vega offerings

Computing and Graphics Segment

- Let me provide some specifics for Q3
- Revenue of $1.64B grew 26% y-over-y and 34% sequentially
  - This is our highest quarterly revenue since Q4 2011
- Y-over-y growth was primarily due to our Computing and Graphics segment, while sequential growth was driven by the Enterprise, Embedded and Semi-Custom segment revenue seasonality, as well as higher Computing and Graphics segment revenue
- We also took another step in our IP monetization efforts by closing a patent licensing agreement that had a positive impact on both our segments

Gross Margin

- Gross margin was 35%, up 4 percentage points y-over-y, primarily driven by the benefit of IP-related revenue and a richer mix from the Computing and Graphics segment, which were partially offset by costs associated with our global foundries wafer supply agreement for wafers purchased at another foundry
- We continue to make good progress on the ramp of our new high-performance products, which had a positive impact on our gross margins

Operating Expenses

- Operating expenses of $419mm compared to $353mm a year ago
- The increase was primarily due to higher R&D-related investments and expenses related to annual employee incentive programs, driven by our better financial performance
- Operating income was $155mm in Q3 2017, a solid improvement on $70mm a year ago

Net Interest Expense

- Third quarter net interest expense, taxes and other was $45mm, up slightly from $43mm a year ago
- Lower interest expense from a year ago was largely offset by withholding taxes for licensing revenue

Net Income and Diluted EPS

- Net income was $110mm or diluted earnings of $0.10 per share as compared to $27mm, or $0.03 per share a year ago
- The diluted EPS calculation for Q3 2017 was based on 1.143mm shares, which includes 100.6mm shares related to our 2026 convertible notes
- Adjusted EBITDA was $191mm compared to $103mm a year ago

Segment Results

Computing and Graphics Segment

- Now turning to the business segments
- Computing and Graphics segment revenue was $890mm, up 74% y-over-y, primarily due to strong sales of our Radeon graphics and Ryzen desktop processors
- Computing and Graphics segment operating income was $70mm compared to a loss of $66mm a year ago
- The solid improvement was primarily due to higher revenue

Enterprise, Embedded and Semi-Custom

- Enterprise, Embedded and Semi-Custom revenue was $824mm, approximately flat y-over-y due to lower semi-custom SoC sales, partially offset by IP-related revenue
- Additionally, server revenue increased from a year ago, driven by the increased sales of EPYC products
- As you heard earlier from Lisa, customer interest and deployment plans are strong
- Operating income was $84mm, down $52mm from $136mm a year ago, primarily due to higher costs

Balance Sheet Items

Cash, Cash Equivalents and Marketable Securities

- Turning to the balance sheet

- Our cash, cash equivalents and marketable securities total $879mm at the end of the quarter, up from $844mm in the prior quarter, primarily due to higher revenue
- Inventory at the end of the quarter was $794mm, down 5% from $833mm in the prior quarter

Debt and FCF

- Long-term debt on the balance sheet was $1.36B
- Total principal debt, including our secured revolving line of credit, was $1.74B
- In Q3, we used $28mm from our lower interest secured revolving line of credit to pay down long-term debt, which has a higher interest rate
- FCF was $32mm compared to $20mm in the year-ago period

Revenue Growth

- Before turning to our outlook for Q4 2017, which is a 13-week quarter, let me remind you, for comparative purposes, that Q4 2016 was a 14-week quarter
- For Q4 2017, we expect revenue to decrease approximately 15% sequentially, +/- 3%
- At the midpoint, this equates to revenue growth of approximately 26% y-over-y

Non-GAAP Gross Margin and Inventory

- Non-GAAP gross margin to be approximately 35%, non-GAAP operating expenses to be approximately $410mm, non-GAAP interest expense, taxes, and other to be approximately $30mm, and inventory to be down sequentially
- We now expect 2017 annual revenue to increase by greater than 20% over 2016 compared to the prior guidance of mid to high-teens percentage growth
- We do not anticipate significant changes to the diluted share count in Q4 and you can find additional information regarding the share count in the CFO commentary, which is posted online

Closing Remarks

In closing, Q3 was a strong quarter and we are pleased with the momentum of our new premium products

We are making solid progress towards our growth and margin expansion objectives; and as our financial performance improves, we remain committed to investing in our multi-generational road maps and achieving our long-term financial targets

QUESTION AND ANSWER SECTION

<Q - Vivek Arya>: For the first one, I was wondering if you could help quantify the benefit of your IP license in the two different segments, and is this a one-off? Or do you see ongoing benefits in Q4 and beyond?

<A - Dr. Lisa T. Su>: Sure, Vivek. Hey, thanks for the question. We did close a IP-related transaction. It was a patent licensing transaction. The revenue and benefit was spread over both segments. When we look at it going forward, we have a pipeline of IP deals and we're constantly looking at them. And from our standpoint, we're working several deals in progress. So we believe that IP-related revenue will be a factor as we go forward, but our primary focus is on the product-related revenue and the product-related growth.

<A - Devinder Kumar>: Yeah, so, Vivek, just to remind you, in line – you've heard us talk about our IP monetization efforts, and this is very much in line with that. And as Lisa said, the benefit is spread over both the segments.

<Q - Vivek Arya>: Got it. And then, for my follow-up, Lisa, when I look at your Q4 outlook, it's sort of in line with seasonality, perhaps somewhat better. Can you give us more color around the adoption of the new Ryzen mobile portfolio, but more importantly, your EPYC products, when will we start to see a more tangible contribution from your EPYC product sales? Thank you.

<A - Dr. Lisa T. Su>: Yeah, absolutely, Vivek. So look, we are very pleased with how the revenue ramp is going in general on our new products. When you look at Q4 guidance, y-over-y, we'll be up 26%. So we're really accelerating the business as we go into H2. As you know, our business is typically seasonal. And so Q3 is the peak and then we're down seasonally from Q3 to Q4 due to some of the semi-custom revenue. But what we see going into Q4 is we see a strong ramp of new products. We see Ryzen continuing to ramp. We will ship volume of Ryzen mobile in Q4 and then more in H1. We will see a ramp of EPYC and we will also see an OEM ramp of Vega.

In terms of the headwinds, we have the semi-custom seasonality and we're also predicting that there will be some leveling-off of some of the cryptocurrency demand. As we look at it, it continues to be a factor, but we've seen restocking in the channels and stuff like that. So we're being a little bit conservative on the cryptocurrency side of the equation.

<Q - David M. Wong>: Can you give us some idea of whether you have any semi-custom wins that might bring in new revenue streams in 2018? Specifically, are you in any discussions with potential customers for semi-custom designs in autonomous driving or datacenter processor and accelerator applications?

<A - Dr. Lisa T. Su>: Yes, sure, David. So, look, the semi-custom business continues to be a business that's performing well for us. So we are – as we go into 2018, we are expanding the customer set beyond our traditional Sony and Microsoft game consoles. Actually, this past quarter, we announced that Atari will be adopting a customized processor for their next-generation. We also have a number of new opportunities that we continue to work. And they are in markets outside of game console, including some of the markets that you mentioned. So overall, we do expect there will be some puts and takes in the semi-custom business as we go into 2018 and there will be some new product revenue that will ramp particularly in H2 2018.

<Q - Mark Lipacis>: First one on the gross margin outlook for Q4, it looks like it's flattish vs. Q3. And I guess, I might have expected the sequential increase given that you will likely have a better mix. So I'm hoping you can reconcile that. I'm wondering if licensing had an impact on that, or it's just fixed cost absorption?

<A - Dr. Lisa T. Su>: Yeah. Let me start, Mark, and then maybe Devinder will add. So, look, we have multiple puts and takes in the business as we look at gross margin. When we look at gross margin in Q3, we were pleased with the gross margin progress, and yeah, that came from both the virtue of mix of our Computing and Graphics revenue y-over-y as well as some benefit from the IP-related transaction. As we go into Q4, we have new products continuing to ramp.

So you'll see Ryzen, Vega and EPYC ramp. And the primary driver for Q4 gross margin is the product revenue. And we do have sort of the headwind of not having the benefit of the IP revenue in Q3. So those are the puts and takes. But the main point is the new product revenue is ramping and the gross margins are accretive. And that's contributing to our Q4 gross margin outlook.

<Q - Mark Lipacis>: Okay.

<A - Devinder Kumar>: Hi, Mark. If I can just add, if you look at the margin trend compared to 2016, 2016 we had 31% gross margin. And we expect to be at 34% this year. And that's primarily based on the strength of the new product that Lisa referenced. And from a long-term model standpoint, we are on track with what we laid out in the financial Analyst Day of going from 31% to 34%, and then expecting to be greater than 36% in 2018 on the strength of the new premium products that are ramping into 2018.

<Q - Mark Lipacis>: That's helpful. Thank you. And a follow-up, if I may. On the EPYC server side, can you help us understand to what extent you're shipping to customers who are going through testing right now vs. shipping into customers who are actually deploying EPYC in live datacenter applications. Thank you

<A - Dr. Lisa T. Su>: Yes, absolutely, Mark. So, look, we're pleased with how things are going with the EPYC ramp overall. So we have been shipping to both cloud as well as non-cloud customers in Q3 mostly early platform-type testing. In Q4, we expect to see some level of deployment again both in cloud and non-cloud applications. With the new platforms coming in from HP Enterprise and Dell, what we're saying is actually a ramp of new seating opportunities, particularly, in medium and large enterprise customers. So overall, the EPYC ramp is going well and we expect more deployments as we go into Q4 and into next year.

<Q - Kulin Patel>: You highlighted in your PR that you had a GM headwind related to buying wafers at another foundry. Do you expect any meaningful external purchases in Q4, or going forward in 2018 that could be a headwind to gross margins?

<A - Devinder Kumar>: I think the way I look at that is if you look at Q3 from a volume standpoint and the volume is pretty high, and that's why it's highlighted from a viewpoint of the calls, but the way you want to look at it going forward Q4 and beyond is all of the costs related with the WSA that's referenced in the scripts is contemplated in our guidance and our long-term models.

<Q - Kulin Patel>: Okay. Thank you. And I had a question on – you launched the Radeon Instinct MI25 maybe last quarter. Can you discuss the traction you're seeing in that product? Are you seeing any meaningful revenues in Q3 and in your Q4 outlook?

<A - Dr. Lisa T. Su>: Yes. So the Radeon Instinct MI25 is Vega for the cloud datacenters. We did actually start shipping volume in Q3 to multiple customers. We do see a very high interest in the product portfolio. And so we expect that to continue to ramp into Q4. And there's a lot of focus on increasing the software usability and the software flexibility. And so we continue to invest in those areas. But, overall, I'm actually very pleased with the interest in MI25 and it's coming from multiple customers in a number of markets.

<Q - Joseph L. Moore>: I was interested in your comments that the sequential growth in the Computing and Graphics business was driven primarily by graphics. How literally should we take that? And I guess, if graphics is up close to $150mm sequentially, is that business now on par with the CPU business? Can you just give us a general sense of the size of the two businesses there in that segment?

<A - Dr. Lisa T. Su>: Yeah. So overall, the growth in Computing and Graphics, when you look over the past few quarters has been very strong. And we've seen growth both on the Ryzen side, particularly in the desktop side of the business as well as on the graphics side. So in terms of size of the business, again, I think we stated in the prepared remarks that the GPU business had a record quarter for us and we're seeing very strong growth.

We're seeing strong growth as a result of the new product launches. So the Vega product actually did very well for us in the quarter as well as overall Polaris in both gaming and blockchain markets. But yes, we're pleased with the graphics performance. But I'll also say Ryzen did very well in the quarter. We look at the progress that we're making in the desktop channel when you look across retailers and e-tailers across the world. And in the Ryzen 5 and Ryzen 7 segment, we're seeing significant share gain in those parts of the business. So I think both parts of the Computing and Graphics business are doing well. And we continue to expect growth as we go forward.

<Q - Joseph L. Moore>: And is it possible to size the blockchain portion of that?

<A - Dr. Lisa T. Su>: I think the blockchain tends to be, again, it's hard to separate because it goes through some of the same channels as gaming does. I will say that blockchain sort of behaved as we expected in Q3. So we didn't see anything that we didn't expect. We did see some benefit of channel restocking. So if you look at our channel inventories today compared to July, we had healthier channel inventory levels. And we expect that consumer blockchain will level off a bit as we go into Q4. But there's also commercial blockchain component that we believe is interesting and likely to continue into the medium term. As we look into Q4, though, we also see growth from just the

OEM side of the GPU business as we start ramping Vega into OEMs.

<Q - John W. Pitzer>: Apologize, I'm kind of juggling a couple calls like everyone else. I apologize if this is a repeat. But I'm just wondering, just given the qualitative success of Ryzen and the accretive ASPs and gross margins, I'm wondering if you could just help us understand on a more quantitative basis how much of your PC unit business is now Ryzen. And I guess, more importantly, how do we think about that progressing over the next several quarters? And kind of where is the tipping point where you think we'll start to see some significant leverage relative to the accretive ASPs and the accretive gross margins?

<A - Dr. Lisa T. Su>: Yeah. Absolutely, John. So look, we are really pleased with how Ryzen is performing competitively in the market. It's fair to say though that we're still at the early stages of the Ryzen ramp. So primarily in Q2 and Q3, Ryzen has been a desktop channel phenomenon. So most of the sales have been in the desktop channel. We have started ramping OEMs in the desktop space. And we will continue ramping OEMs as we go into Q4. But it's nowhere near the majority of the client revenue.

You should expect that Ryzen will continue to ramp for us through H1 next year, because we're adding more and more platforms as we speak, both on the consumer and also on the commercial front. And so we see again, it's ramping well. The ASPs are good. So actually, we saw some ASP increase in Ryzen as we went from Q2 to Q3, and we launched the high-end desktop version as well as Ryzen 3 and will continue to ramp into Q4 and H1 next year.

<Q - John W. Pitzer>: And then, Lisa, just as my follow-on, Kind of a similar question around EPYC, and just I know you guys have kind of talked about potentially exiting the end of next year at about a 2% share. I'm just kind of curious how you think about the ramp of EPYC. And if you can differentiate between sort of your hyperscale customers who might take it a little bit sooner vs. the more traditional OEM channel, how should we be thinking about that on EPYC?

<A - Dr. Lisa T. Su>: Yeah. So, John, I'm not sure we ever said 2% by the end of next year. But what I would say is that we expect EPYC to be a sizable portion of our revenue in 2018. So H2 this year, we're doing early pilots and we're doing some early deployments. The hyperscale guys are aggressive and they are first. We will start seeing some enterprise revenue here in Q4 as the early platforms launch. But I expect more of the enterprise to fill in as we go into 2018. And I think the important point is as we look at the product, as we look at the competition and where we're positioned, the product positioning is strong. And so the customer engagements are growing. And we're seeing significant interest from enterprise customers ramp now as some of the OEM platforms are becoming available and starting their seating. So overall, EPYC will continue to ramp into 2018 and should be a sizable – we expect it to be a sizable portion of our revenue in 2018.

<Q - Ross C. Seymore>: I wanted to go back to the mix of the business, and specifically, in the Computing and Graphics segment. The client ASPs were down sequentially and you highlighted that being because of mobile. Somewhat similar to John's question, Lisa, when do you expect to see the ASPs in that segment of your business start to turn to be a positive driver as opposed to a bit of a headwind?

<A - Dr. Lisa T. Su>: Yeah. So definitely, desktop ASPs are up; mobile ASPs are down. I think we will see – again, there will be a initial ramp of Ryzen mobile in Q4, but I think in H1, you should see a significant amount of the volume that we ship into notebook be with Ryzen mobile. When I look at sort of the rate and pace of the ramp, I think it's going as we expect with desktop channels first, then desktop OEMs, and then commercial desktop, and then, say, consumer notebook starting in Q4 ramping into Q1. And then, we'll see commercial platforms in H1 2018 as well.

So I think there should be a steady ramp of ASPs as we go forward. We're also taking some opportunity, as you can imagine, to clean up some excess inventory as we transition to the new product. And so that's part of what we're doing to just ensure that we have a strong launch as we go into the new product portfolio. But overall, behaving as we expected, and in some sense, we're very pleased with how we're positioned competitively with the product.

<Q - Ross C. Seymore>: And I guess, as my follow-up, switching to one for Devinder on the OpEx side of things, OpEx was a little higher in Q3, dropping sequentially into Q4. You've talked in the past about a 31% OpEx to revenue guide range for this year. You're probably not going to guide for 2018 with that much precision tonight. But is there any sort of puts and takes we can think of as far as how you guys are considering your investment philosophy as we move into 2018?

<A - Devinder Kumar>: I think the first thing I'll say is we do want to invest in the business, especially with the growth opportunities we have and primarily targeting the OpEx investments towards R&D. They are, in the current moment, with a lot of products ramping, just in the last few months, you heard about the Ryzen ramp, you heard about EPYC, we talk about Vega, and obviously, their go-to-market cost will ramp up new products. But as far as 2017 guidance is concerned, I had said previously 31% as the potential of revenue, but I think right now, where the numbers are coming out especially with the strength on the revenue side of the equation, we think we end up at about 30% on an expense to revenue ratio in 2017, which, as you probably recall, is at the upper end of what we had said our long-term target model which is 26% to 30%.

So actually, I'm pretty pleased because if everything works out in Q4 guidance that we gave, and in 2016 would have been a 32% of revenue; in 2017, approximately 30%; and then obviously, we'll see where we get into 2018. We're very pleased from a viewpoint of being able to make the investments in the business to support the product road map, the go-to-market cost for the ramp of new products, and at the same time, bring down the percentage of OpEx over revenue.

<Q - Matthew D. Ramsay>: Lisa, I wanted to ask a little bit about the forward roadmap, particularly, in the processor group. I know that you guys have talked quite a bit about taking the roadmap down to 7-nanometer next year. And I think Mark gave some public comments about doing some stuff on 12-nanometer with GF. So I think it'd be helpful if you could talk to the extent that you can about some of the future road map and things that might be follow on to the products that are ramping currently. Thank you.

<A - Dr. Lisa T. Su>: Yeah, absolutely, Matt. So 7-nanometer, we've talked about is a very important node for us and it's an important node for the industry. It's a major node. So we have a lot of engineering resources on that. And you should expect that that will be across all of our businesses. And we're actively working on those products now. We do see an opportunity with 12-nanometer. 12-nanometer is a relatively small engineering lift. And I would view it as a performance enhancement to our current road map.

And so we are working on taking some of our products, I would say, a subset of our products into 12-nanometer in 2018 to augment the performance of our client and graphics road map. But I see – the significant resources are on 7-nanometer, and that's progressing well. We're overall pleased with how the performance on that is looking. And then, we will opportunistically look at some products to go into 12-nanometer as it makes sense for the road map.

<Q - Matthew D. Ramsay>: Got it. Thank you. And, Devinder, I wanted to press a little bit harder on the gross margin impacts of a few things that you called out. Particularly, is there any way that you can quantify for us at all the impact of the IP revenue on gross margin, either in Q3 or comparatively into Q4? And second, I think a lot of us are aware of the forward charges you'll get for using wafers from other foundries. But I assume that that applies also to the gaming console business that comes out of TSMC currently. If you could clarify those two things that would be great. Thank you.

<A - Devinder Kumar>: Yeah. I think if you look at it from an overall standpoint, if you look at the cost impact, it's all within our guidance. I think if you look at IP from that standpoint, we have several IP deals in the pipeline for Q3. Basically, we thought it was likely that we would be able to close on IP-related deal in the quarter, and that's how it turned out. And you see the benefit across both the segments. And from a go-forward standpoint, despite the cost of being there, we look at it overall from a viewpoint of the trend of the margin. Major provider of the gross margin uplift is the premium new products that we are launching. And then, obviously, there's opportunities from an IP standpoint to benefit the P&L if we go ahead and put that in the equation.

<Q - Blayne Curtis>: Just wanted to better understand the December guidance a bit. Maybe if you could talk about it between the two segments. The embedded business last year was down 40%. It's been tracking down slightly y-over-y. So is that the right way to think about that segment this December? And then, maybe you can talk about on the graphics side, I just want to understand the commentary. You said that crypto or blockchain was kind of flattening out and that you were kind of getting some restocking. Just kind of understand when you look at growth in that segment, what are the moving pieces? Thanks.

<A - Dr. Lisa T. Su>: Yeah. So, Blayne, let me answer that question. So overall, I think our business does have the seasonal pattern where Q3 is the peak and we're down in Q4, primarily due to the semi-custom business. I believe those dynamics are the same. We've looked at sort of how the business will perform on a y-over-y basis. We believe that semi-custom revenue will be down a little bit on a y-over-y basis, and that's expected. We're in the fifth year of the cycle and you would expect that units to be down, although we have some positive mix because of the new launch of the Microsoft Xbox One X console, which is a higher ASP product for us.

When you look at the graphics business, again, overall, we see the business as quite strong. We see Vega ramping as we go into Q4. We see that from an OEM ramp standpoint. We see that from a GPU compute standpoint. And that's offset with a little bit of leveling-off of the blockchain demand. But overall, I think we see sort of Computing and Graphics continuing to grow as we go into Q4.

<Q - Blayne Curtis>: Thanks. And then, just maybe a second question, following up on some of the questions on process node. You had high reuse with the server product this time. How do you think about the R&D cost in terms of if you were doing a core at TSMC vs. doing one at GloFlo, a dual track, as you look into 2018, how should you think about the OpEx required to do that?

<A - Dr. Lisa T. Su>: Yeah. So it's part of our engineering model. So we've sort of engineered a model where we can use our IP at multiple foundries. And that will continue as we go into 7-nanometer. So if you look at this year, we have multiple products in 16-nanometer and 14-nanometer. As we go into 2018 and beyond, it's the same thing. So there are no additional costs related to our dual sourcing strategy.

I think from an overall R&D standpoint, as Devinder said, we will look to ramp our spending in line with revenue. And primarily it's around continuing to invest in our new market opportunities, continuing to invest on the GPU side and what we're doing in the compute markets, continuing to strengthen our sales and marketing as we go to market with these broad new products. But there's no particular OpEx impact of using multiple foundries.

<Q - Hans Mosesmann>: Hey, Lisa, can you give us in terms of timing 7-nanometer for next year and what products would be the focus initially for that node?

<A - Dr. Lisa T. Su>: Sure, Hans. So I'm not going to comment directly on timing of products because obviously there's a lot of R&D yet to be done. But I would say that our product portfolio in general will take advantage of 7-nanometer. So you should expect our server portfolio, our graphics portfolio and our client portfolio to all take advantage of 7-nanometer at some point in time. And we like the performance as well as the power and the density shrink that we get from it. And so again, we think it will really help to improve our competitive positioning as we move forward.

<Q - Hans Mosesmann>: All right. And then as a follow-up, if you can answer this and maybe it was already answered so forgive me. On the IP front in Q3, did you indicate what end market or what type of application or what geographic location the IP relationship is all about?

<A - Dr. Lisa T. Su>: Yeah. So we did say that the IP transaction was a patent licensing related transaction. So that's different from the technology licensing, for example, that we did with THATIC. This was a straight patent licensing. And the great thing about our patent portfolio is beyond sort of our core markets, it has applicability across a broad range of markets. And so this was a patent transaction and not a technology licensing transaction.

<Q - Vijay Raghavan Rakesh>: Yeah. Hi, Lisa. So I was just wondering on the datacenter side, when you look at – you mentioned EPYC was strong. I was wondering if you can break out how much revenue came out of the datacenter sector from EPYC, and how it grew sequentially and have you see it going into the December quarter as well?

<A - Dr. Lisa T. Su>: Okay. Yeah. You broke up a little bit there, Vijay, but I think I got the question. So the question was sort of the strength of EPYC and where do we see it going in Q4. Look, I think EPYC had a good quarter. Obviously it's growing off of a small base since we had a small base for the server revenue, but we certainly saw growth in unit shipments and revenue into Q3. We will see more growth or we expect to see more growth into Q4, especially as some of these trial runs turn into more deployment activity. And as more OEMs ramp our platforms, the platforms will be more available in the industry. And we're seeing growing interest from a number of enterprise customers as well. But we should think about EPYC as a long-term growth driver. So yes, we will see growth into Q4, but it will be a sizable portion of our revenue as we go into 2018.

<Q - Vijay Raghavan Rakesh>: Got it. And do you see – and then you would start breaking out that enterprise, datacenter out of semi-custom like your peers are doing [indiscernible] (45:55-46:04).

<A - Laura Graves>: I think the question was whether we would begin breaking out enterprise separately as a segment, and I don't know that we've made any decisions to do that. And then the second question was very hard to hear, Vijay. We'll ask you to repeat it, please.

<Q - Vijay Raghavan Rakesh>: Yeah. Just channel inventory in GPUs. How do you see channel inventory on the GPU side?

<A - Dr. Lisa T. Su>: Yes. Okay. So for your first question, I think as Laura said, we haven't made any determinations about different segment reporting. But we will give you markers on how the business is growing. And I think it will be clear just given the accretive nature of EPYC, as we start ramping that product, you'll see more impact of the product-related revenue. The second question is as it relates to channel inventory in graphics. I believe that channel inventory is healthier in graphics here in October than it was in July. We've certainly restocked some of the channel both for Polaris as well as the Vega products. I would still say that channel inventory might be a little bit light. It's not fully restocked yet, but it's certainly healthier than it was in the July timeframe.

<Q - Wayne Loeb>: Can I ask you how you feel you did share-wise in CPU and GPU in Q3?

<A - Dr. Lisa T. Su>: Yes. So we will have to wait until obviously the share results come in. I think when we look at the CPU side of the business, we feel really good about how Ryzen is doing in the desktop channel. So we think we definitely made progress there. As you look overall, we'd have to see how the overall results come in. And on the GPU side, again, we ship a significant volume that was a record quarter for us and we saw strength across our new products as well as our current products and we saw significant ASP growth, which is important for us. But, again, I would wait until the overall results come out in a few weeks.

<Q - Wayne Loeb>: Thank you. Could you also give your view on the overall PC industry? Was it better? Worse? The same? As expected?

<A - Dr. Lisa T. Su>: I think – that's a good question. I think the overall PC industry is about what we expected. Maybe a tad bit better. But I would say about what we expected. We see good geographical sort of – the geographies are doing well particularly North America and Europe. There's a little bit of softness in China particularly at the low-end of the market. And I think there's some change in dynamics in China. But, overall, I think the PC market was about what is expected and that's a good thing.

<Q - Tristan Gerra>: You've announced some design-wins for EPYC. Have you seen the number of design-wins increase in the quarter? And is what you have enough to reach that longer-term target of 10% market share? Or do you need to line up more design-wins to get there?

<A - Dr. Lisa T. Su>: Yeah. That's a very good question. So we have seen design-wins and customer engagements increase in the quarter. We've seen customers who started with one platform now looking at multiple platforms with EPYC. And then, in terms of design-win coverage, we believe we have design-win and platform coverage to meet or exceed our share goal targets. So it's not a design win statement. It's really a conversion of design-wins to revenue as we help our customers ramp in the coming quarters. So very happy with the customer progress; very happy with the number of platforms that we have and we continue to expand those platforms in the customer base over time.

<Q - Tristan Gerra>: Okay. And then, my quick follow-up will be how do you see the opportunities of selling EPYC and Vega in – notably in enterprise platforms? Is that a setting factor to customers value this as a system solution vs. just one architecture?

<A - Dr. Lisa T. Su>: Yes. We have seen a good interest from both OEMs as well as end customers on looking at EPYC and/or MI25 product together. We actually have a working machine, the P47 petaflop machine that we announced at SIGGRAPH. And we have actually a number of customers using that to trial their software and their application. And so, yes, I do think it's a selling point. I do believe that customers do want some integrated system solutions, but as we always say, the products operate very well standalone and they work with other products as well, but we will continue to work on those system-level solutions for customers.