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EDITED BRIEF

AMD.OQ - Q4 2020 Advanced Micro Devices Inc Earnings Call

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OVERVIEW:

Co. reported 2020 revenue of \$9.76b, non-GAAP net income of \$1.58b. Reported 4Q20 revenue of \$3.24b, non-GAAP net income of \$636m and non-GAAP diluted EPS of \$0.52. Expects 2021 revenue to grow approx. 37% and 1Q21 revenue to be approx. \$3.2b, plus or minus \$100m.

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OVERVIEW

Co. reported 2020 revenue of \$9.76b, non-GAAP net income of \$1.58b. Reported 4Q20 revenue of \$3.24b, non-GAAP net income of \$636m and non-GAAP diluted EPS of \$0.52. Expects 2021 revenue to grow approx. 37% and 1Q21 revenue to be approx. \$3.2b, plus or minus \$100m.

FINANCIAL DATA

- A. 2020 revenue = \$9.76b.
- B. 4Q20 revenue = \$3.24b.
- C. 2020 non-GAAP net income = \$1.58b.
- D. 4Q20 non-GAAP net income = \$636m.
- E. 4Q20 non-GAAP diluted EPS = \$0.52.
- F. 2020 YoverY revenue growth = 45%.
- G. 4Q20 YoverY revenue growth = 53%.
- H. 4Q20 QoverQ revenue growth = 16%.
- I. 2020 non-GAAP GM = 45%.
- J. 4Q20 non-GAAP GM = 45%.
- K. 4Q20 non-GAAP OpEx = \$789m.
- L. 4Q20-end inventory = \$1.4b.
- M. 2020-end cash, cash equivalents and marketable securities = \$2.3b.
- N. 2020-end gross debt = \$338m.
- O. 2021 revenue growth guidance = approx. 37%.
- P. 1Q21 revenue guidance = approx. \$3.2b, plus or minus \$100m.

PRESENTATION SUMMARY

I. ANNOTATION (R.C.)

- A. **Note:**
 - 1. On 03/02/21, Mark Papermaster will attend Morgan Stanley TMT Conference.
 - 2. 1Q21 quiet time is expected to begin at close of business on Friday, 03/12/21.
 - 3. Will refer primarily to non-GAAP financial measures.

II. 4Q20 REVIEW (L.S.)

- A. **Highlights:**
 - 1. 2020 marked an inflection point in Co.'s long-term journey as AMD made significant progress establishing AMD as high-performance computing leader.

2. Significantly accelerated business and exceeded aggressive growth goals for 2020, while navigating industry-wide challenges caused by COVID-19.
3. Built substantial momentum throughout 2020 as Co. successfully ramped volume production of more than 20 7-nanometer PC, gaming and data center products.
4. Annual revenue grew 45%, setting new record at \$9.76b.
5. Expanded GM for fifth straight year and more than doubled net income from prior year.
6. While PC market grew approx. 13% in 2020 to surpass more than 300m units for first time since 2014, annual client processor revenue grew by more than 50% as AMD Ryzen processor adoption increased.
7. Delivered record client annual processor revenue as Co. gained significant share in 2020.
8. Adoption of EPYC processors across cloud, enterprise and HPC customers accelerated significantly in 2020.
9. Set new all-time record for annual server processor revenue.
 - a. Server processor sales more than doubled YoverY and overall data center sales are now high-teens percentage of total annual revenue.
10. Looking at 4Q20, ended 2020 strong.
 - a. Revenue grew 53% YoverY to a record \$3.24b, while net income increased 66%.

B. Computing & Graphics:

1. Revenue \$1.96b, up 18% YoverY.
2. Desktop:
 - a. CPU revenue grew by strong double-digit percentage YoverY and sequentially driven by strong demand for Ryzen processor family in OEM systems and channel.
 - b. Sell-through of new Ryzen 5000 processors featuring Zen 3 core was particularly strong, more than doubling launch qtr. sales of any prior generation Ryzen desktop processor.
3. Mobile:
 - a. CPU shipments increased by double-digit percentage sequentially and YoverY.
 - b. Set records for quarterly and annual mobile processor unit shipments as Ryzen 4000 notebook shipments continue to ramp in support of 100 notebook design wins launched in 2020.
 - c. At CES, earlier this Jan., launched Ryzen 5000 mobile processors for ultrathin, gaming and commercial notebooks.
 - i. These new mobile processors featuring Zen 3 processor core extend Co.'s performance and battery life leadership, delivering up to 23% higher performance vs. previous generation and 17.5 hours of battery life.
 - ii. On track to increase number of notebook designs powered by new Ryzen 5000 processors by 50% vs. prior generation, positioning Co. well for further growth in 2021.
4. Graphics:
 - a. Revenue declined YoverY and increased sequentially.
 - b. Desktop GPU sales increased significantly QoverQ, driven by ramp of new Radeon 6000 Series GPUs featuring RDNA 2 architecture that deliver up to twice the performance and 65% more performance per watt than prior generation.
 - c. Sees strong demand for new GPUs.
 - i. Radeon 6000 Series are Co.'s fastest selling high-end GPUs ever with launch qtr. shipments three times larger than any prior AMD gaming GPU priced above \$549.
 - d. Continues to ramp production to meet strong demand and is on track to expand Radeon 6000 GPU portfolio in 1H21 with new RDNA 2 based desktop and mobile GPUs.
 - e. Data center GPU revenue decreased YoverY, but increased sequentially including initial shipments of AMD Instinct MI100 accelerator.
 - i. MI100 features new CDNA data center GPU architecture and is industry's fastest HPC accelerator for scientific research, and first data center GPU to break 10 teraflops barrier.
 - ii. Making strong progress on data center GPU hardware roadmap and expanding software ecosystem in preparation for launch of first exascale supercomputer in US, all AMD-powered Frontier system plan to go online later this year at Oak Ridge National Laboratory.

C. Enterprise, Embedded & Semi-Custom (EESC):

1. Revenue \$1.28b.
 - a. Up 176% YoverY, driven by strong growth in both Semi-Custom and server processor sales.
2. Semi-Custom:
 - a. Sales increased YoverY and sequentially, based on strong demand for next generation Sony and Microsoft consoles.
 - b. SoC sales are ramping faster than last console cycle.
 - i. Expects sales to be better than typical seasonality in 1H21 based on current strong demand.
3. Server:
 - a. Had record revenue in 4Q as cloud and enterprise sales grew sequentially.
 - b. Cloud adoption remains strong, as Google, Microsoft, Tencent and others continue expanding their use of EPYC processors that power larger portions of their critical internal infrastructure, and number of AMD-powered cloud instances expands.
 - i. 28 new public cloud instances launched in 4Q from Alibaba, AWS and Oracle, while Google expanded general availability of their confidential computing VMs powered exclusively by EPYC processors to nine regions.
 - c. For 2020, number of AMD powered instances available from largest cloud providers doubled to more than 200.
4. Enterprise:
 - a. Adoption of AMD-powered servers grew as Dell, HPE and Lenovo secured new end customer wins with Fortune 1000 accounts across key verticals, including manufacturing, financial services and automotive.
5. HPC:
 - a. Number of AMD-powered super computers on Nov. Top 500 list increased to 21 systems including two of Top 10 and fastest supercomputer in Europe.
 - b. Expects data center business to accelerate in 2021, as Co. further extends its performance, efficiency and TCO leadership with launch of next-gen server processors code named, Milan.
 - i. Milan production began in 4Q as planned with initial shipments to cloud and HPC customers.
 - ii. Pleased with performance of Milan.
 - iii. Conducted first public preview of Milan at CES, highlighting 68% better performance vs. two of highest end dual socket processors from Co.'s competition when running a compute-intensive weather modeling simulation.
 - iv. On track to publicly launch third Gen EPYC Milan processors in March with strong ecosystem support.

D. Summary:

1. Strong 2020 results and 2021 guidance demonstrate growing momentum for leadership product portfolio and robust demand for high-performance computing.
2. In 2020, all have seen first-hand essential role high performance computing now plays in daily lives and expects adoption to accelerate over coming years as Co. enters a high performance computing mega cycle driven by growing adoption of cloud computing services, accelerating digital transformation of industries and experiences, transition to exascale super computing and main stream adoption of AI.
 - a. Against this backdrop, Co. is confident it has right long-term strategy and capabilities to deliver strong cadence of leadership products and make AMD the premier technology growth franchise.
3. Longer term, strategic acquisition of Xilinx further strengthens technology capabilities and positions Co. well for growth across a broader set of markets.
 - a. Passed several important regulatory milestones today and remains on track to close transaction by end of 2021.
4. Proud of what AMD has accomplished over last few years as talented and dedicated employees established a new pace for innovation in high performance computing industry.
5. Excited about what Co. can accomplish over coming years based on roadmaps and strong opportunities Co. sees to play an even larger strategic role with customers and partners.

III. 4Q20 FINANCIALS (D.K.)

A. Overview:

1. 2020 was an outstanding year for AMD.

2. Industry-leading product portfolio and market share gains drove record annual and quarterly revenue with full-year revenue growth of 45%.
3. Achieved record annual net income and free cash flow.
4. Pleased with strong performance and leverage in financial model.

B. 4Q20:

1. Revenue \$3.24b.
 - a. Up 53% YoverY and up 16% QoverQ, driven by strong sales of Ryzen and EPYC processors and semi-custom game console SoCs.
2. GM 45%, approx. flat YoverY.
3. OpEx \$789m.
 - a. Up 45% YoverY, driven by increased investments in R&D, go-to-market activities and higher variable employee compensation-related expenses.
4. Operating income \$663m.
 - a. Up \$258m or 64% YoverY, driven by significant revenue growth.
5. Operating margin 20%.
 - a. 4Q19 19%.
6. Net income \$636m.
 - a. Up \$253m or 66% YoverY.
7. Diluted EPS \$0.52.
 - a. 4Q19 \$0.32.
8. Computing & Graphics:
 - a. Revenue \$1.96b.
 - i. Up 18% YoverY, primarily driven by significant Ryzen processor growth.
 - b. Operating income \$420m or 21% of revenue vs. 4Q19's \$360m, driven by higher revenue.
9. EESC:
 - a. Revenue \$1.28b, up 176% YoverY, driven by strong semi-custom product sales and continued EPYC server processor momentum across cloud and enterprise markets.
 - b. EPYC processor revenue grew sequentially including early shipments of third generation EPYC Milan processors.
 - c. Operating income \$243m or 19% of revenue vs. 4Q19's \$45m, driven by higher revenue.
10. Balance sheet:
 - a. Record free cash flow \$480m.
 - b. Inventory \$1.4b.
 - i. Up 8% QoverQ in preparation of 2021 sales.
 - c. Adjusted EBITDA \$753m vs. 4Q19's \$469m, driven by higher quarterly earnings.
11. GAAP tax item:
 - a. Based on financial results and strong outlook, released significant portion of tax valuation allowance totaling \$1.3b, which had GAAP EPS benefit of \$1.06 in 4Q and benefit of \$1.07 for full year.

C. Full-Year 2020:

1. Revenue \$9.76b.
 - a. Up 45% YonY, driven by strong growth in both business segments.
2. GM 45%.
 - a. Up 190 BP YoverY, driven by Ryzen and EPYC products, partially offset by Semi-Custom and Radeon product sales.
3. OpEx 28% of revenue, improving from 31% in 2019.
4. Operating income \$1.66b.
 - a. Up 97% YoverY or 17% of revenue.
5. Net income \$1.58b.
 - a. Up 108% YoverY.
6. Balance sheet:

- a. Cash, cash equivalents and marketable securities totaled \$2.3b at year-end.
- b. Free cash flow \$777m vs. 2019's \$276m.
- c. Reduced principal debt by \$225m in 2020 and ended year with \$338m of gross debt.

D. Outlook:

1. 1Q21:

- a. Revenue, approx. \$3.2b, plus or minus \$100m, an increase of approx. 79% YoverY and down 1% sequentially.
 - i. YoverY increase is expected to be driven by growth in all businesses.
- b. Sequential performance is driven primarily by better than normal seasonality in PC and Semi-Custom businesses and strength in data center business.
- c. Non-GAAP:
 - i. GM, approx. 46%.
 - ii. OpEx, approx. \$830m.
 - iii. Interest expense, taxes and other, approx. \$105m, including effective tax rate of 15%.
- d. Diluted share count, approx. 1.23b shares.

2. Full-year 2021:

- a. Revenue growth, approx. 37%, driven by growth in all businesses.
- b. Non-GAAP:
 - i. GM, approx. 47%.
 - ii. OpEx, approx. 26% of revenue.
 - iii. Effective tax rate 15%.
- c. Cash tax rate, approx. 3%.

E. Summary:

- 1. 2020 results demonstrate strength of AMD's product momentum, customer traction and market share gains.
- 2. As Co. enters 2021 and continues to invest in business and execute long-term strategy, AMD is well positioned to drive GM expansion, increase profitability and deliver strong shareholder returns.

QUESTIONS AND ANSWERS

Operator

(Operator Instructions) Our first question today is coming from Blayne Curtis from Barclays.

Blayne Peter Curtis - Barclays Bank PLC, Research Division - Director & Senior Research Analyst

Congrats on the very strong results. But maybe first, just on the annual guide, obviously very robust. You said all segments up. But I was wondering if you could provide any color either by segment or by product, which ones would be better or worse than that very robust 37%.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Sure. So thanks for the question, Blayne. Look, we're excited going into 2021. Obviously, 2020 was quite a strong growth year for us. As we look at the annual guidance, we really do see strength across all of our businesses. So the -- it's led by our larger businesses. So significant growth -- we expect significant growth in server, growth in PCs as well as growth in the semi-custom console business. But we also see growth in our graphics business across consumer and data center graphics as we ramp the full product lines there as we go through 2021. So overall, I think we're seeing the strength of the new product portfolio as well as a positive demand environment.

Blayne Peter Curtis - Barclays Bank PLC, Research Division - Director & Senior Research Analyst

And then maybe as just a follow-up, I'm curious on how you think about the shape of the year. Obviously, March seems to be much better than seasonal across several product lines. I'm just curious how you're thinking about the overall PC market. I think Intel talked about for being first half weighted. And then obviously, semi-custom, you probably didn't as much in December as you did the first 3 quarters of 2020. Kind of curious how you just think about first half, second half within that.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes. So you saw that a little bit in our Q1 guidance. I think our Q1 guidance is better than normal seasonality. We normally see as the first half weaker than the second half just given the consumer bent.

What we see this year is a little bit of a different shape. The shape is -- from a market standpoint, we see PCs and gaming better than seasonal. There's some pent-up demand coming into the first half of the year, and that's baked into the guidance.

But we're also seeing a strong data center environment. So we see server up sequentially in Q1, and that's on the strength of both our current products or our Rome products as well as the Milan ramp. So a little bit different shape than normal, but I think we see strong demand across our PC gaming and data center segments.

Operator

Our next question today is coming from Matt Ramsay from Cowen.

Matthew D. Ramsay - Cowen and Company, LLC, Research Division - MD & Senior Technology Analyst

I wanted to start with server, and I've modeled a much bigger dollar contribution in 2021 to the growth than there had been in prior years. And I picked up in the prepared script, Lisa, that you mentioned accelerating growth for your data center franchise in 2021. I think that's probably off a business that doubled last year. So do I have that right that it will accelerate in percentage terms? And maybe you could break down a little bit. I saw Alibaba in the slides announced. There's a Milan launch coming that I think could push you into enterprise a little bit more than you've been in the past. Some drivers of that server growth would be really helpful.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes. Sure. So Matt, thanks for the question. We are happy with the progress in the data center business. I think 2020 was a strong year for us. We do see a significant growth into 2021.

I think there are a number of drivers. First of all, I think we're seeing the cloud business strengthen for us. So going into the first half of the year, and as I said, that's both on the current-generation Rome as well as the next-generation Milan. The reception to Milan is very strong. So we're pleased with the performance. We started shipments in Q4. That's continuing into Q1. You'll see -- we expect to see sort of more customers, sort of new customers adopt Milan than perhaps that had been on our previous generation. You'll also see a very strong enterprise portfolio. So I think we have a very strong time-to-market platforms with the key OEMs, and that's part of our launch plan later this quarter.

So overall, I think we are optimistic about the data center in 2021. I think there's a lot of need across cloud and enterprise, and we think Milan is very well positioned.

Matthew D. Ramsay - Cowen and Company, LLC, Research Division - MD & Senior Technology Analyst

My second question, I wanted to ask a little bit about supply. It's no secret that the industry is supply constrained, both due to growth and because of some of the challenges with COVID, and your company is no different. Maybe you could characterize for us the magnitude of supply constraints. And how much they might have been hindering what was obviously really strong growth as it was. But that's number one.

And then number two, I noticed that a lot of folks had maybe thought that the big CapEx increase from TSMC might have been something to do with Intel. And I think the incoming CEO there has maybe clarified some of those thoughts. But I wonder as you look forward through this year, how your guidance incorporates increasing supply coming online. And if you've guided to an assumption of better supply or what you have line of sight to with your partners.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes, sure. So certainly, when I look at the semiconductor environment in 2020, it was very strong. So we saw a strong revenue ramp in our business as well as across some of our peers. It's fair to say that the overall demand exceeded our planning. And as a result, we did have some supply constraints as we ended the year. Those were primarily, I would say, in the PC market, the low end of the PC market and in the gaming markets.

That being said, I think we're getting great support from our manufacturing partners. The industry does need to increase the overall capacity levels. And so we do see some tightness through the first half of the year, but there's added capacity in the second half.

And then as in terms of how we think about these things. So for our full year annual guide, we do have good visibility on both the demand side and the supply side. And that was the basis for the guidance across the businesses.

Operator

Our next question today is coming from Vivek Arya from Bank of America.

Vivek Arya - BofA Merrill Lynch, Research Division - Director

And congratulations on the strong outlook despite all the industry constraints. Lisa, just one question to go back to a prior one. I was hoping you could help us dissect Q1 and the 2021 outlook with and without your semi-custom business, so we get a sense for the different moving drivers of the business, both in Q1 and for the full year.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes. So let's see. Let me start with Q1. So as I said in the -- earlier that we do see the PC market and the console business a bit better than seasonal. Normally, consoles would be seasonally down quite a bit, double digits. You would expect consoles this quarter will still be, let's call it, modestly down. We do see a sequential increase in the server business as well as in the graphics business as we ramp new products there.

And then as we go into 2021, I would say we're now at the place where we have, let's call it, 3 businesses at scale. And so the guidance really encompasses very significant growth across our data center business in the service space, growth in PCs, just given the visibility that we have around platforms and platform launches on both the notebook side and the strength of our channel portfolio. And then we do see growth in the console business as well as there's a lot of demand for the new consoles.

So I think those are the 3 big drivers for the full year. And I would say it's well balanced between the 3. And then in addition, we also have growth in our consumer and data center GPU business as a result of some of the new products launched there. So it's a fairly, let's call it, broad based set of drivers, particularly around the product launches.

Vivek Arya - BofA Merrill Lynch, Research Division - Director

Got it. And for my follow-up, it's interesting that as you're launching Milan, your competitor is also launching their data center server. And so both kind of a near term and then a '21 question. So in the near term, there has been some discussion of cloud digestion. I know you're talking about your business actually growing sequentially. So I was hoping you could address what demand environment you were seeing in the very near term from your cloud and enterprise and HPC customers.

But looking out to 2021, both you and your competitor will actually be on very -- almost the same manufacturing node. So how do you think that will play a role in your decision-making of your customers. Because I think a lot of times the discussion kind of becomes one dimensional on who is at which manufacturing node. So talk to us about, even if you are on the same node as your competitor, what's your ability and confidence and visibility to take market share in the server CPU business.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes. Thanks, Vivek. That's a very good question. So in the near term, what we're seeing in the cloud is actually a period of strong demand. And so that's -- we saw it strengthening as we went through the fourth quarter, and we see demand environment robust in the first quarter. So I think that's a -- those are good signals for us.

I think for the year 2021, we're excited about Milan. I mean it's a very strong product. You've already seen a bit of what Zen 3 can do in just our desktop and notebook portfolio. I think it builds upon what we did in Rome. So I completely agree with you. I think manufacturing technology is one aspect of what makes a product competitive, but we have been very focused on overall performance, overall system performance, how it performs in the cloud and enterprise environments. I will say that I think Milan is the most balanced product that we have. Both for, let's call it, enterprise applications as well as for the broad set of cloud applications.

And in terms of visibility, I would say that we have better visibility starting this year than we've had in the past years because this is our third-generation with EPYC. So we're now on, let's call it, deep customer relationships. Many of the decisions have been made earlier as they were testing out our product. And we have good confidence that we're going to ramp well. So exciting year for the data center. But certainly, we're pleased with how Milan is performing and the interest in the marketplace.

Operator

Our next question is coming from Stacy Rasgon from Bernstein Research.

Stacy Aaron Rasgon - Sanford C. Bernstein & Co., LLC., Research Division - Senior Analyst

I wanted to start on margins first. So in the quarter, you had record server revenues, you said high teens, I'd put it to something like \$550 million or \$600 million which looks pretty good. At the same time, like gross margins sort of barely came in line with guidance. I mean they actually missed by a few kind of tens of basis points. I guess I'm just a little surprised, is that all console mix? And was consoles like that much better-than-expected relative to servers that you wouldn't see gross margin upside in the quarter? And I guess the same comments on the guide a little bit of upside. But at the same time, we've got consoles down. We've got everything else growing, and yet we've only got a little bit of upside in gross margins. So I guess if you could help me square that or square that with what you're seeing, that would be helpful, please.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes, sure, Stacy. Be happy to do that. So first, on the fourth quarter. I think we saw strength across a couple of different businesses relative to what we had guided. So we saw strength -- a little bit of strength in the console business, some strength in servers as well as some strength in PCs. And PCs in the fourth quarter tend to be a bit more weighted to the consumer side of the business. So those were some of the puts and takes. But from an overall sort of margin expectation standpoint, I think we were right where we expected to be.

And then going into 2021, if you're talking about the first quarter guide, I think my commentary was that we see PCs and consoles a bit better than seasonal. So consoles would normally be let's call it, down double digits, and that's not the case in this particular quarter. We have server up. And so again, these are just a few puts and takes, but we do see the sequential increase into Q1. And then for the full year, as we see the mix of business.

Stacy Aaron Rasgon - Sanford C. Bernstein & Co., LLC., Research Division - Senior Analyst

Got it. I guess for my follow-up, just to push on that a little bit. So what are you seeing on the pricing environment, especially in servers. I mean your competitors actually talked quite actively about a more competitive environment for servers. We're actually starting to see some impacts on their ASPs and their margins. What are you seeing -- I guess what did you see in terms of server pricing specifically on those kinds of trends in the quarter. And what are you incorporating in your guidance for price -- the pricing environment in data center in 2021.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes. So in the quarter, we saw ASPs in the server business actually up sequentially, and that was mostly because of mix, just mix between customers and the ramp of Milan. So as we go into 2021, again, I would say the environment's competitive. So I don't know that it's gotten more competitive. I think it's about as competitive as it's always been. Our focus has not been to compete on price, but to compete on overall value and total cost of ownership.

As we go into 2021, again, I think for us, ASPs are primarily determined by the mix between cloud and enterprise in any given quarter. We're still cloud weighted, and I would expect us to be cloud weighted as we go into 2021. But overall, I would say the ASP environment is about what it's been for the last [year].

Stacy Aaron Rasgon - Sanford C. Bernstein & Co., LLC., Research Division - Senior Analyst

Got it. And just one last thing is just high teens data center, that's in the quarter or that was for the -- for Q4, was high teens percent of revenue data center.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

It was high teens for the year.

Stacy Aaron Rasgon - Sanford C. Bernstein & Co., LLC., Research Division - Senior Analyst

For the year. Okay. What was it in the quarter?

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

It was -- given the strength...

Devinder Kumar - Advanced Micro Devices, Inc. - Executive VP, CFO & Treasurer

I think it's similar.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes. Thanks, Devinder.

Stacy Aaron Rasgon - Sanford C. Bernstein & Co., LLC., Research Division - Senior Analyst

What was that, Devinder, I'm sorry?

Devinder Kumar - Advanced Micro Devices, Inc. - Executive VP, CFO & Treasurer

It's similar. Similar.

Stacy Aaron Rasgon - Sanford C. Bernstein & Co., LLC., Research Division - Senior Analyst

Similar.

Devinder Kumar - Advanced Micro Devices, Inc. - Executive VP, CFO & Treasurer

Yes. You've got to remember the data center GPU is a little bit lumpy, and the server business is where we've had strength in 2020 compared to 2019.

Operator

Our next question today is coming from Toshiya Hari from Goldman Sachs.

Toshiya Hari - Goldman Sachs Group, Inc., Research Division - MD

And congrats on the strong results. Lisa, I'm sorry if I missed this, but can you speak to your expectations for the PC market. This year, obviously, there's a bit of concern following the very strong year in 2020. What's sort of embedded in your full year guidance for the PC market. And then as sort of a second part to that question, if you can give us an update on your traction on the commercial side of the market as opposed to consumer, that would be helpful.

Lisa T. Su - Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director

Yes, sure. Thanks for the question. So 2020 was a very strong year for the PC market. I think you've heard that from a number of the OEMs in the market. 2021, most people are saying, let's call it, mid-single-digits type growth. We see something similar to that. This shape is perhaps a bit different than normal in the sense that the first half is a bit stronger than it would normally be.

Our focus in the PC market, though, is -- has been very clear on sort of the subsegments where we could actually move up the stack. So if you look at our focus on gaming, particularly gaming notebooks and desktops, premium consumer as well as commercial. And we made very nice progress on the commercial side. And I think that business tends to also develop over a number of quarters.

So overall, I think our expectations are -- the PC market will continue to be strong as we go into 2021. That being the case, it's one element of our growth. And particularly, we're focused on growth in commercial, growth in gaming as well as sort of in the premium consumer segment. And the Ryzen 5000 series that we just launched in both mobile and desktop have actually gotten very strong reception from the OEMs in terms of overall platforms.

Toshiya Hari - *Goldman Sachs Group, Inc., Research Division - MD*

Got it. And then as a quick follow-up on OpEx. The rate at which you're spending is very consistent with your long-term target. But that said, I mean, you are growing -- spending at a very fast clip. Can you remind us where the focus is today in terms of your spending profile? And how do you see that translating into future growth over the next couple of years? You have this 20% top line growth target out through 2023. You just grew 45% last year. You're guiding this year to up 37%. Is 20% still the right number? Could we envision something better?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. Sure. So I don't think we're going to change our long-term growth rate just yet. We set that in March, and I think it's the right long-term growth rate. That being said, we're very happy with the growth of the business. And from our standpoint, this is a great time to invest in the business. So the model has always been, let's invest in the business, let's call it, at a rate slower than revenue growth so that we get leverage in the model. And so we're doing that. Yes, you can see the percentage of OpEx as a percent of revenue has come down over the last couple of years and will come down as well in 2021.

But the overall dollars have allowed us to expand considerably, and really just build out the foundation of the company. So our investments are really across R&D, expanding our product portfolio. We've leaned in hard on both the CPU, foundational IP, the GPU foundational IP as well as on the GPU side, we have split out the architectures between gaming and compute, so that we have very competitive offerings in both spaces.

As we go forward, more investment on some of the system IPs that link the CPUs and GPUs as well as investments on the software side and then investments in go to market. So across the board, I think we're becoming, let's call it, a company of scale. And that helps ensure that we have sort of the breadth and depth of road map as well as customer support to support the long-term growth objectives.

Operator

Your next question today is coming from Aaron Rakers from Wells Fargo.

Aaron Christopher Rakers - *Wells Fargo Securities, LLC, Research Division - MD of IT Hardware & Networking Equipment and Senior Analyst*

And congratulations on the quarter as well. I want to go back to the Milan processor commentary. I think at the Analyst Day, you talked about just continually expanding your ability to address workloads in the enterprise market. As we think about the positioning of Milan, how would you compare that relative to Rome? And how should we possibly think about the -- is there a potential ASP uplift that one should consider with Milan as it starts to ramp?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. So definitely. So we do see sort of the expansion of, let's call it, our competitiveness across the enterprise set of workloads as well as the broad set of cloud workloads. Our goal in life is to make sure that we're offering improvements in total cost of ownership to our customers. So as the performance goes up, we do expect some ASP lift as well. But overall, from a customer standpoint, it's so important that the TCO really improve generation to generation.

Particularly with Milan, some of the single-threaded performance is very, very helpful. And we expect on some of the enterprise workloads that perhaps can't use all of the cores for -- that we have -- we'll be able to benefit significantly from Milan just given the uplift in overall performance. So we're excited to tell you more about it. Like I said, we'll be launching that later this quarter. But overall, we feel very good about the positioning of Milan.

Aaron Christopher Rakers - *Wells Fargo Securities, LLC, Research Division - MD of IT Hardware & Networking Equipment and Senior Analyst*

And then as a quick follow-up on the data center side as well. On the GPU side, I know it's been lumpy, and it looks like it might continue to be a lumpy business. But is there a point in time over the next couple of years that you foresee that actually being a consistent incremental revenue growth driver? What should we be thinking about to kind of get us to see that as a key additional growth driver for the company.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. Absolutely. Look, I think the data center GPU business is definitely coming into its own. And it will still likely be lumpy quarter-to-quarter just because the number of customers is not that large. But in terms of as a growth driver for the company, we see 2021 as a growth year for data center GPU, especially as the CDNA architecture comes into manufacturing and production and goes into some of the larger HPC installments as well as some work that we're doing in the cloud, around machine learning and AI. And more importantly, we see it as a multiyear growth driver over the next couple of years.

So we feel very good about the CDNA architecture. It's positioning. I think this is an important year for the data center GPU business, and it will be an important growth driver for us over the next few years.

Operator

Our next question is coming from Ross Seymore from Deutsche Bank.

Ross Clark Seymore - *Deutsche Bank AG, Research Division - MD*

Congratulations on the really strong quarter and year. Lisa, I just had a question competitively on the GPU side of things, more so on the traditional client side of the equation. You've done a great job taking a ton of share in the CPU side. It sounds like you're optimistic about what the client GPU business is going to do in 2021. Can you just walk us through some of the differences, some of the opportunities and/or challenges of taking share in the GPU market versus where you've already succeeded so much and will continue to on the CPU side of things?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Sure, Ross. So the graphics business, I think, has really been focused on ensuring consistency in road map, very similar to the CPU side. So we launched the first generation RDNA architecture that had a 50% performance per watt improvement. We launched second generation of RDNA 2, just a few months ago, and then we're going to fill out that portfolio here in the first half of the year. And I think that consistency is important in the road map. There is a lot of pent-up demand for graphics cards and gaming. And we see that, and we see it as an attractive market. So I do see that the consumer graphics business will grow in 2021. We expect to continue to make progress, both with the OEM business as well as the add-in board business.

And over the coming years, there's -- the team is working very hard on the next-generation RDNA 3 architecture as well. So I think the consistency in the road map, the top to bottom stack and really using sort of the depth and breadth of our customer relationships is sort of our strategy there.

Ross Clark Seymore - *Deutsche Bank AG, Research Division - MD*

And I guess as my follow-up one for either you or Devinder, on the gross margin. You gave the shorter-term answer for the fourth quarter and the first quarter, but I wanted to ask one about 2021 as a whole. It's good to see that it's rising again up to that 47% target. I just wanted to walk through the puts and takes on that. And I guess the core question is if the semi-custom business is going to grow substantially as a percentage of your revenues, what's offsetting that to have the gross margin rise year-over-year. Is it mix between segments, so server, for example, is going to keep up with that? Or is there something within the segments that is also improving, whether it be in semi-custom or graphics or some area like that?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. Maybe let me start...

Devinder Kumar - *Advanced Micro Devices, Inc. - Executive VP, CFO & Treasurer*

Let me start and then Lisa -- go ahead. Go ahead, Lisa.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Go ahead, Devinder. You start.

Devinder Kumar - *Advanced Micro Devices, Inc. - Executive VP, CFO & Treasurer*

So if you look at the businesses, we've been pretty consistent. Server and client up in 2021, obviously, helped the gross margin. And you are right, semi-custom in 2020 is the initial ramp in a couple of quarters, and then it grows in 2021. And with the guidance that we gave, we are talking about going from 45% to 47% as overall for the year on a year-on-year basis. And semi-custom, obviously, lower than corporate average with higher revenue full year in 2021, does have an offset there from client and server.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Right. So maybe just to add to that, Ross. So the -- I think the answer that -- to what you asked is, yes, consoles are, let's call it, below corporate average margin, although quite reasonable operating margins. Server is above and server is growing substantially in 2021.

And also the PC business within the PC business, we do see some mix improvement as we focus on, let's call it, the more premium part of the stack. And those are some of the drivers for the margin in 2021.

Operator

Our next question today is coming from John Pitzer from Crédit Suisse.

John William Pitzer - *Crédit Suisse AG, Research Division - MD, Global Technology Strategist and Global Technology Sector Head*

Lisa, maybe I can ask Ross' gross margin question a little bit differently. I would kind of argue, given the mix in the December quarter and the fact that it was the first quarter of the console ramp, that the gross margins you were able to put up were quite good. And I'm kind of just trying to understand how we should think about gross margins ex console. And as we think about '21 unfold, typically in the console business, gross margins start relatively low, but there is good improvement over time. And so what's kind of the exit rate of gross margins in your 47% full year guide? And I guess why isn't it higher? It might just be that you guys are being conservative, but it seems like you got a lot of tailwinds as the year unfolds.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. So again, maybe, Devinder, I'll start and see if you'd like to add to this. John, I think it's early in the year. So let me state that. We have good visibility into sort of the puts and takes in the various places. But obviously, there's a lot to unfold over the next 11 months. I do think all the statements that you made are accurate. So the console business does have a history of improving over time. I do think, though, that we'll just have to look at the mix of all the businesses, again, as it plays out.

And from an exit velocity standpoint, we're guiding to 46% for Q1 and then 47% for the overall year. So we will see improvements over the year. And the key is what is the mix amongst the businesses in any given quarter.

John William Pitzer - *Crédit Suisse AG, Research Division - MD, Global Technology Strategist and Global Technology Sector Head*

That's helpful. And then, Lisa, as my follow-up, it's pretty clear that semiconductors are becoming much more strategic to nation states and world governments. And there's a lot of speculation that your chief competitor is lobbying Washington pretty hard to get some incentives for domestic manufacturing.

I'm just kind of curious how you're trying to be part of that conversation? Because clearly, given the IP portfolio you have, given the share that you're taking, I would argue you're as much a national champion as anyone in semis, but it does seem like the focus is on manufacturing. So how do you kind of get the ear of Washington to make them understand how important you are in this whole mix?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Well, I think the overarching point that you make, John, is the right one, which is semiconductors are becoming increasingly important and increasingly strategic. And I think we all believe that. As it relates to what's important, I think the focus on manufacturing is certainly well documented. I think there's also a focus on leading-edge research and making sure that the leading edge research is also very well supported in the overall conversation. So we participate in many of the industry associations and the conversations. And the key is to continue to invest at both the leading edge in both research and manufacturing to sort of push the envelope on sort of the next 5 to 10 years. And that's one of the reasons we're investing as much as we are, and we continue to also agree that it's important as an industry that we continue to invest.

John William Pitzer - *Crédit Suisse AG, Research Division - MD, Global Technology Strategist and Global Technology Sector Head*

So Lisa, do you think you'll be a direct beneficiary of any incentives that come out of Washington? Or will it be more indirect through your foundry partners?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Well, I think much of that is still playing out. So I think we'll see how that plays out. But in terms of the manufacturing side, it would be through our foundry partners in terms of the research side as some of that plays out. We've certainly been very involved in some of the research, and we'll continue to do so.

Operator

Our next question today is coming from Mitch Steves from RBC Capital Markets.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Mitch, are you there?

Mitchell Toshiro Steves - *RBC Capital Markets, Research Division - Analyst*

Can you hear me okay?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes, we can hear you now. Yes.

Mitchell Toshiro Steves - *RBC Capital Markets, Research Division - Analyst*

Okay. Perfect. Yes. So there's 2 questions. The first one's actually on the manufacturing side, I feel like people are poking about on the gross margin. But when you look at the company, you guys are driving 3 products ramp up. So the question I kind of want to pose here is what would the gross margin look like if you didn't -- if you had yields similar to what you had about 2 years ago, meaning that are the yields per TSMC and your -- I guess your overall foundry partners improving at the same rate as a normal environment? And then I have a follow-up after that.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. Well, Mitch, maybe let me start by level setting the conversation with gross margins. I mean we're right where our road map says we would be, right. Our long-term road map says, given the mix of the business, we set out a target to be greater than 50%. I think we're right on track for that. I think as we go through each of the product ramps, there are the ebbs and flows. But that being the case, I think the yields are right on track with where we expect them to be as well.

And the most important thing is we're now seeing growth across, let's call it, 4 -- I'd say, 4 or 5 large businesses. And so again, there are some ebbs and flows between them, and sort of the mix between cloud and enterprise, the mix between consumer and commercial and then just the mix between consumer and data center graphics.

So put all that together, and like I said, I think we're pleased that we grew margins 2 points last year, and we're again, guiding to growing margins 2 points this coming year, and it's right in line with our overall road map.

Mitchell Toshiro Steves - *RBC Capital Markets, Research Division - Analyst*

Okay. Perfect. Yes, that makes complete sense to me. I think it's very difficult to grow the gross margin line with so many yields ramping up right now. The second one I just had, in terms of the overall addressable market, I realize you guys don't guide by segment. But I think that one of the big things that happened last year is PC surprised me as on the upside. So maybe you could level set us in terms of the 3 major markets you guys serve. GPUs, CPU PC side and servers. Just what do you think the total industry is going to do? This way, maybe you can give us at least an idea of what you guys view as a full year, and then we can kind of come to our conclusions -- our own conclusion, sorry, on what that means for AMD.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. So I think my commentary was PCs, if you just look at what various sources are saying, we would say, sort of mid-single-digit growth, and I think we would agree with that. I think server as a market, if you take a look at enterprise and cloud, again, they have different growth rates, but let's call it, modest growth. And then gaming is hard to call because, again, it's a different cycle.

Within that sort of market backdrop, I think we see, let's call it, 37% growth. And much of that is because of the product ramps and the product portfolio that we have. So we're pleased with the growth. We think we're growing significantly ahead of the market. That being the case, we'll have to see what happens in 2021 because, as you said, the 2020 market was stronger than most projected at the beginning of 2020.

Operator

The next question is coming from Mark Lipacis from Jefferies.

Our next question is coming from Joe Moore from Morgan Stanley.

Joseph Lawrence Moore - *Morgan Stanley, Research Division - Executive Director*

I wonder if you could talk about your cloud business for server. And maybe give us a sense. You've talked about in the past about the need to sell twice. You're sort of selling to the cloud service provider, and then they're selling it to the enterprises that they service. How are you doing with that? And where are you with sort of internal cloud workloads that they're internally focused on versus enterprise-facing workloads within the cloud?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. Thanks for the question, Joe. Yes. So if you look at the cloud environment, we call it both internal as well as sort of the external-facing workload. I would say we've done very well with internal workloads in the last couple of quarters, Joe. We've seen a number of applications just ramp here in the second half of this year and going into next year. So we're pleased with the performance on the internal workloads.

We see that carrying over to Milan. And sort of the -- let's call it, the move from Rome to Milan is not too heavy a lift. And so we expect that, that will continue going into 2021. And in terms of the external-facing workloads. We've spent quite a bit of effort sort of building our, let's call it, sort of the business development engine that sort of, let's call it, sells along with the cloud vendors as well as, frankly,

enterprise OEMs. And so our conversation with large enterprises is usually a hybrid conversation. It's -- if you want to buy on-prem, let me tell you what AMD EPYC can do. If you want to use cloud instances, we have a wide variety of cloud instances across all of the largest cloud vendors. And that's actually progressed very nicely. So I think, overall, that's leading to some of our positive commentary in cloud is that we have seen both progress on internal as well as the external sale with motion.

Joseph Lawrence Moore - *Morgan Stanley, Research Division - Executive Director*

Great. And then I wonder, in terms of data center GPU, you've talked about some of the emerging applications. But cloud gaming has been an investment that some of your customers have made. What's the status of that? And how big a portion of your data center GPU business do you expect to be driven by cloud gaming in 2021?

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Sure. So I think the cloud gaming portion of the business was a larger portion of the business in sort of past years for the data center GPU. In 2021, we do have additional cloud gaming engagements that will ramp. But I would say it would be the smaller portion of the business. And HPC would become, let's call it, the larger portion of the business in 2021.

Operator

Our final question today is coming from Timothy Arcuri from UBS.

Timothy Michael Arcuri - *UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment*

So I guess my first question, Lisa, based on your commentary on data center revenues and your splits, and you mentioned a question before about ASPs in Q4. It sounds like server CPU share is running like 12.5% on your \$20 million TAM base that you use. So you have Milan ramping and you're talking about a lot of visibility on that ramp this year. So I'm sort of wondering if maybe you can give us what your guidance implies or sort of what the next milepost to think of would be in terms of server CPU share as you sort of exit the year and maybe look into next year.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. So Tim, thanks for the question. What I would say is I don't have a new market share target. And I think just given all of the variance in the market. But what I will say is, we've given you a good view of the business through sort of the percent of revenue it is. And as I said in the prepared remarks, the data center business was high-teens percentage of annual revenue, and it was predominantly server. So the data center GPU was a very small piece of that, and it was predominantly server.

As we go into 2021, again, we see significant growth. I would say it's one of the key growth drivers for the company. And we'll give you updates as we go along the way in 2021 in terms of how it's growing as a relative size of the business.

Timothy Michael Arcuri - *UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment*

Okay. Got it. And then just quickly on data center GPU. It looks like it was maybe flattish this year, year-over-year. And obviously, it's going to grow this year as Frontier comes in midyear. Can you just sort of maybe give us some sense in terms of how much you think it could grow. I mean could it double year-over-year? I understand it's not big from a dollar point of view. But could it double year-over-year? Maybe just talk about how big Frontier could be as a contributor to that business.

Lisa T. Su - *Advanced Micro Devices, Inc. - President, CEO & Non-Independent Director*

Yes. So I think -- as I previously stated, the data center GPU business is still relatively small for us. It was actually down year-over-year. So from 2019 to 2020, it was actually down year-over-year because some of the cloud gaming ramps in 2019 paused in 2020.

In terms of what it could do in 2021, we see it as a growth driver in terms of relative size, yes, it could double. I think the way to think about it, though, is we said that we would like to get that business to, let's call it, \$0.5 billion as sort of the first milestone. And I think we're making good progress towards that milestone. But that's what I would say about it.

Ruth Cotter - *Advanced Micro Devices, Inc. - SVP of Worldwide Marketing, HR & IR*

Great. Operator, that concludes our call. Thank you.

Operator

Thank you. That does conclude today's teleconference. You may disconnect your line at this time, and have a wonderful day. We thank you for your participation today.

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