Q1 2021 Earnings Call

Company Participants

- Devinder Kumar, Executive Vice President, Chief Financial Officer and Treasurer
- Lisa Su, President and Chief Executive Officer
- Ruth Cotter, Senior Vice President, Worldwide Marketing, Human Resources and Investor Relations

Other Participants

- Aaron Rakers, Analyst
- Blayne Curtis, Analyst
- John Pitzer, Analyst
- Joseph Moore, Analyst
- Mark Lipacis, Analyst
- Matthew Ramsay, Analyst
- Ross Seymore, Analyst
- Stacy Rasgon, Analyst
- Timothy Arcuri, Analyst
- Toshiya Hari, Analyst
- Vivek Arya, Analyst

Presentation

Operator

Hello, and welcome to the AMD First Quarter 2021 Earnings Call and Webcast. At this time, all participants are in a listen-only mode. A question-and-answer session will follow the formal presentation. As a reminder, this conference is being recorded.

It's now my pleasure to turn the call over to Ruth Cotter, Senior Vice President, Worldwide Marketing, Human Resources and Investor Relations. Please go ahead, Ruth.

Ruth Cotter {BIO 16509123 <GO>}

Thank you, and welcome to AMD's first quarter 2021 financial results conference call. By now, you should have had the opportunity to review a copy of our earnings press release and accompanying slideware. If you've not reviewed these documents yet, they can be found on the Investor Relations page of amd.com.

Participants on today's conference call are Dr. Lisa Su, our President and Chief Executive Officer; and Devinder Kumar, our Executive Vice President, Chief Financial Officer and Treasurer. This is a live call, and will be replayed via webcast on our website.

Before we begin, I would like to note that our Annual Shareholder Meeting will be held on Wednesday, May 19th, as a virtual event accessible from our website. Dr. Lisa Su will provide a keynote presentation at the JPMorgan Technology Media and Communications Conference on Monday, May 24th. Dan McNamara, Senior Vice President and General Manager of our Server business will attend the Bank of America Global Technology Conference on Wednesday, the 9th of June. And our second quarter 2021 quiet time is expected to begin at the close of business on Friday, June 11th.

Today's discussion contains forward-looking statements based on current beliefs, assumptions and expectations speak only as of today and, as such, involve risks and uncertainties that could cause actual results to differ materially from our current expectations.

Please refer to the cautionary statements in our press release for more information on factors that could cause actual results to differ materially. We will refer primarily to non-GAAP financial measures during this call. The full non-GAAP to GAAP reconciliations are available in today's press release and slides posted on our website.

Now, with that, I'll hand the call over to Lisa. Lisa?

Lisa Su {BIO 5791223 <GO>}

Thank you, Ruth, and good afternoon to all those listening in today. Our business continued to accelerate significantly in the first quarter, driven by the best product portfolio in our history, strong execution and robust market demand. We delivered our sixth straight quarter of double-digit percentage year-over-year revenue growth and record quarterly revenue and profitability. First quarter revenue increased 93% year-over-year to $3.45 billion with growth in all of our businesses.

Turning to our computing and graphics segment, first quarter revenue increased 46% year-over-year to $2.1 billion, led by growth in both Ryzen and Radeon processor sales. In client computing, revenue grew by a significant double-digit percentage year-over-year and increased sequentially as we set records for client processor revenue and ASP.

Against the backdrop of strong overall PC demand, our revenue is growing significantly faster than the market, particularly in the ultrathin, gaming and commercial segments. As a result, we believe, we gained client processor revenue share in the quarter. Our revenue share has doubled over the last two years as we have expanded in the premium products.

In notebooks, we delivered our sixth straight quarter of record mobile processor revenue based on sustained demand for Ryzen 4000 Series processors and the launch of our new Ryzen 5000 Series processors. Ryzen Mobile 5000 Series processor revenue has ramped twice as fast as the prior generation. We expect continued growth in 2021 as the number of notebook platforms powered by our new processors is on track to increase by 50% compared to our prior generation. We're also making good progress in the commercial market as unit shipments of our Ryzen PRO processors grew by a strong double-digit percentage sequentially.

We secured multiple high volume wins across Fortune 500 aerospace, automotive, electronics and engineering companies in the quarter and we're well positioned for further growth as we have tripled our commercial notebook design wins with the largest OEMs this year.

In graphics, revenue increased by a strong double-digit percentage year-over-year and sequentially, led by channel sales growth as revenue from our high-end Radeon 6000 GPUs more than doubled from the prior quarter. We introduced our Radeon 6700 XT desktop GPU with leadership 1440p gaming performance in March and are on track for the first notebooks featuring our leading-edge mobile RDNA 2 architecture to launch later this quarter. We expect Radeon 6000 Series GPUs sales to grow significantly over the coming quarters as we ramp production.

Data center graphics revenue grew year-over-year and sequentially, driven largely by adoption of Instinct accelerators across cloud and HPC customers. We are making great progress on our data center GPU roadmaps and expect revenue to grow in the second half of the year as we begin the production ramp of our next generation AMD Instinct GPU to support multiple HPC wins, including Frontier, the first US exascale supercomputer. Frontier will use next generation AMD CPUs, GPUs, and software to deliver unprecedented scientific computing in AI capabilities, creating a blueprint for scientific, cloud and enterprise customers to enable exascale class computing and AI performance over the coming years.

Now, turning to our enterprise, embedded and semi-custom segment. Revenue increased 286% year-over-year to $1.35 billion, driven by strong growth in both semi-custom and EPYC processor sales. Semi-custom revenue declined by a single-digit percentage sequentially, which is better than typical seasonality. We expect semi-custom sales to remain strong throughout 2021 driven by significant demand for the latest generation Sony and Microsoft consoles.

In server, we delivered another quarter of record server processor revenue as EPYC processor sales more than doubled year-over-year and grew by a strong double-digit percentage sequentially.

Sales of both our second and third-gen EPYC processors increased sequentially as growing adoption of our second-gen offerings was complemented by third-gen EPYC processors successfully ramping into production across multiple cloud and enterprise customers. Third-gen EPYC processors offer 25% more performance per watt compared to our previous generation and deliver both per socket and per core leadership across database, ERP, data analytics, Java, virtualization, cloud and supercomputing workloads.

Cloud demand was particularly strong in the quarter, as Tier 1 providers expanded their EPYC processor deployments to power more of their internal infrastructure and introduced 11 new AMD-powered instances. We expect the number of AMD-powered instances to double by the end of the year to 400 as Microsoft Azure, Amazon, Google, IBM, Oracle and Tencent significantly expand their offerings with third-gen EPYC processors.

For the enterprise, Cisco, Dell, HP Enterprise, Lenovo and Supermicro all announced plans to expand their AMD-based offerings with more than 100 new third-gen EPYC processor powered server platforms that deliver superior performance and total cost of ownership.

In HPC, we built momentum with new high volume wins, including the National Center for Atmospheric Research, Sweden's Institute of Science, as well as the unique on-prem and cloud solution for the United Kingdom's National Weather Modeling Service, that will be the world's most powerful weather and climate forecasting supercomputer.

Taking a step back, I'm very pleased with the progress we have made in our data center business over the last several years as each new EPYC processor generation has ramped significantly faster than the previous generation.

We have established AMD as a trusted strategic partner to the largest cloud enterprise in HPC customers based on developing and consistently delivering a leadership multi-generation CPU roadmap. 2021 marks an inflection point in terms of the scale, ecosystem support and customer adoption of our EPYC and Instant processors.

In the first quarter, data center product revenue more than doubled year-over-year and represented a high-teens percentage of our overall revenue. We expect data center product revenue to grow significantly as we go through the year, driven by our strong pipeline of new cloud, enterprise and HPC wins.

We significantly accelerated our business in the first quarter and now see higher growth for the year, driven by increased customer adoption for our products, overall market strength and additional supply from our supply chain partners.

We also passed another major milestone with our pending acquisition of Xilinx in the quarter as shareholders voted overwhelmingly to approve the transaction. We remain on track to close the strategic acquisition by the end of the year.

In closing, we have entered a high-performance computing megacycle with the strongest products and the deepest customer relationships in our history. Our success is built on delivering a consistent cadence of leadership products. We are increasing our R&D investments and aggressively driving our road maps to continue setting the pace of innovation for the industry and deliver best-in-class growth over the coming years.

Now, I'd like to turn the call over to Devinder to provide some additional color on our first quarter financial performance. Devinder?

Devinder Kumar {BIO 17763436 <GO>}

Thank you, Lisa; and good afternoon, everyone. AMD had excellent execution and very strong financial performance in the first quarter. Our multi-generation product roadmap is driving significant revenue growth and we delivered record financial results and free cash flow. Driven by this momentum, we delivered first quarter revenue of $3.45 billion, up 93% from a year ago and up 6% from the prior quarter. Year-over-year growth was driven by strong increases in sales across all businesses.

Gross margin was 46%, flat from a year ago despite significantly higher semi-custom product revenue.

Operating expenses were $830 million compared to $584 million a year ago as we continue to invest in our business.

Operating income was $762 million, up $526 million from a year ago, driven primarily by revenue growth. Operating margin increased from 13% a year ago to 22%.

Net income was $642 million, up $420 million from a year ago excluding $15 million of Xilinx acquisition-related costs. Diluted earnings per share was $0.52 per share compared to $0.18 per share a year ago.

Current quarter results include a 15% effective tax rate compared to a 3% tax rate a year ago. We continue to anticipate a cash tax rate of approximately 3% for 2021.

Now, turning to business segment results. Computing and graphics segment revenue was $2.1 billion, up 46% year-over-year, due to the significantly higher client processor and graphics revenue. Computing and graphics segment operating income was $485 million or 23% of revenue compared to $262 million a year ago.

Enterprise, embedded and semi-custom segment revenue was $1.35 billion, up 286% from $348 million the prior year. The revenue increase was driven by the ramp of semi-custom product sales and very strong growth in EPYC processor revenue, which more than doubled year-over-year. EESC segment operating income was $277 million or 21% of revenue compared to an operating loss of $26 million a year ago. The higher operating income was driven by higher revenue.

Turning to the balance sheet. Cash, cash equivalents and short-term investments were $3.1 billion, up from $2.3 billion at the end of the prior quarter. Inventory was $1.7 billion. Free cash flow was $832 million in the first quarter compared to negative free cash flow of $120 million in the first quarter of 2020. Principal debt was $314 million, including a $24 million reduction in our 2026 convertible notes which have only $2 million remaining.

Let me turn to the outlook for the second quarter of 2021. Today's outlook is based on current expectations and contemplates the current global supply environment and customer demand signals. We expect revenue to be approximately $3.6 billion, plus or minus $100 million, an increase of approximately 86% year-over-year and an increase of approximately 4% sequentially. The year-over-year increase is expected to be driven by growth in all businesses. The sequential increase is expected to be primarily driven by growth in data center and gaming.

In addition, for Q2 2021, we expect non-GAAP gross margin to be approximately 47%; non-GAAP operating expenses to be approximately $900 million; non-GAAP interest expense, taxes and other to be approximately $130 million; and the diluted share count in the second quarter is expected to be approximately 1.23 billion shares.

For the full year 2021, we now expect revenue growth of approximately 50% over 2020, driven by growth across all businesses, up from the prior guidance of approximately 37%. We continue to expect non-GAAP gross margin to be approximately 47%, non-GAAP operating expenses to be approximately 26% of revenue, non-GAAP effective tax rate to be 15% and we expect the company's cash tax rate to be approximately 3%.

In closing, we had an excellent start in 2021 with very strong year-over-year growth in both segments. We continue to invest in the business and drive strong financial returns.

With that, I'll turn it back to Ruth for the question-and-answer session. Ruth?

Ruth Cotter {BIO 16509123 <GO>}

Thank you. Devinder. And, operator, if you'd like to pose the audience for questions, please.

Questions And Answers

Operator

Absolutely. (Operator Instructions) Our first question today is coming from Vivek Arya from Bank of America Securities. Your line is now live.

Q - Vivek Arya {BIO 6781604 <GO>}

Thanks for taking my question. Lisa, you're guiding that you're increasing the full-year guidance by almost $1.2 billion, $1.3 billion, could you give us some sense for what has changed in the last three months, because your competitor was recently talking about cloud digestion and you're raising guidance by $1.3 billion. So I'm curious what changed in the last three months? And if you could help us parse which products or end markets are contributing to this increase? How much from servers or PC or semi-custom or if there is any crypto impact, so any color on what's driving this really released guidance and increase for the year would be very helpful?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. Absolutely, Vivek. Thanks for the question. So, we are -- we started the year very strong, very pleased with the first quarter performance and what we see overall for the year. So we are increasing our full-year guidance, we exceeded in the first quarter and we guided up in the second quarter and then that's carrying through to the second half of the year.

What we've seen is the following. We came into the year with an overall strong demand picture and that was certainly true. What's -- what we've seen over the last 90 days is consistent strong demand, very strong visibility from our customers on what they need throughout the year. Particularly you asked about data center, I think we saw actually strong signals in the first quarter that it would be a strong data center year for us. We're on a product ramp cycle. We launched new products in PCs on the mobile side with our Ryzen 5000. We launched new products on the graphics side with Radeon 6000 and then the launch of the third-generation Milan has actually gone very, very well.

So in terms of what we see, we see a very strong demand for our products, we see good customer ordering patterns and strong backlog, and then we have also seen that the supply chain has been tight overall for the semiconductor industry and we've been working very closely with our supply chain partners and so we also have good visibility to additional supply as we go throughout the year. So, with all that in place, I would say, we feel very good about how the year is shaping up.

In terms of where you see strength overall, I would say strength across all businesses, but particularly the strength in data center is good and we also see just again very good visibility and very close working relationships with our customers.

You asked about crypto, we do not -- we have negligible crypto in here. So this is really the foundational business, really the new products and just seeing the customers adopt and ramp quickly.

Q - Vivek Arya {BIO 6781604 <GO>}

Got it. Very helpful. And Lisa for my follow-up, should we assume that now you are getting adequate supply, so you're kind of caught up from a supply perspective and supplies no longer a constraint, or is that still a constraint and if it is, in which end market? Because you're keeping full year gross margins steady at 47%. So I was curious if there is any impact from supply or rising input costs that could be impacting your gross margins, which you decided to keep kind of flat versus your last outlook? Thank you.

A - Lisa Su {BIO 5791223 <GO>}

Yeah. I would say, Vivek, it's still early in the year, so the entire semiconductor supply chain is very, very tight. I think you hear that from all of our peers in the marketplace. That being said, we've been working very closely with our supply chain partners. We have seen improvements that have led to the improved full year guide. We're going to continue to work on that, because, right now, I would say the channel -- the inventories are very low throughout the entire supply chain whether you talk about our customers or in the channels and so there is a quite more that we would like to be able to do. That being the case, I think we continue to work well with our partners and take lots of actions there.

As it relates to overall costs and things like that, we are watching those things, I think, from logistics and some of the component costs and things like that. So there is -- mostly the gross margin guidance is reflective of the fact that we do have ramping of our new products and we also have some ramp of the gaming products, which are a little bit below corporate average, but we'll see how things progress as we go throughout the year.

Q - Vivek Arya {BIO 6781604 <GO>}

Thank you, Lisa.

A - Lisa Su {BIO 5791223 <GO>}

Thanks, Vivek.

Operator

Thank you. Our next question is coming from Blayne Curtis from Barclays. Your line is now live.

Q - Blayne Curtis {BIO 15302785 <GO>}

Hey. Thanks for taking my question and nice results. Maybe just following up on Vivek question. I was just curious, the semi-custom business obviously is not following any sort of seasonality, but there a lot of talk about supply constraints there as well. And you basically saw no seasonality in March and seems like it's not growing much in June. So maybe just -- is that still impacted by maybe not your charges, but others shortages and semi perspective on that business for the year?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. So, thanks, Blayne, for the question. I think the semi-custom business, if you look at the console launches that happened last year and they were phenomenally good launches, right, very, very good products. So, you're right. Seasonality is completely different this year than sort of a typical year. We had a strong first quarter better than seasonal, we were down but down single digits. There is a bit of growth as we go through the year, but it's just starting from such a high point in the first half of the year. So the way I would say it is, I think there is a strong secular demand for gaming and whether you're talking about consoles or you're talking about PC gaming or you're talking about the overall sort of gaming ecosystem, there is a significant demand. And so we believe there is strong demand and we're continuing to ramp supply to meet that.

Q - Blayne Curtis {BIO 15302785 <GO>}

Thanks. And then just want to ask you on the competitive landscape on the client side. You clearly gained a couple of points of share in March. Intel was talking about they are being more aggressive on their percent of 10-nanometer products, maybe just talk about the competitive landscape as you look to the rest of the year and are you seeing any change to that landscape as they ramp 10-nanometer?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. So, Blayne, I think the PC business has certainly had a very strong second half of last year and is strong this year. I think, within that, we feel very good about our progress, particularly in notebooks and particularly in the premium segments of notebooks. So we had a strong record quarter for our notebook business. Our ASPs were up sequentially and year-over-year. I think we're seeing traction in sort of the premium ultrathin, gaming and commercial. We feel very good about the platforms that we have and the platforms that we have throughout the year. Ryzen 5000 is very competitive product. I will say that there are lots -- a bit of low-end units have come into the market, but our focus on the premium segments have done very well. So, overall, pleased with the PC environment and feel that we're very competitive.

Q - Blayne Curtis {BIO 15302785 <GO>}

Thanks.

Operator

Thank you. Our next question is coming from Aaron Rakers from Wells Fargo. Your line is now live.

Q - Aaron Rakers {BIO 6649630 <GO>}

Yeah. Thanks for taking the question, and congratulations on the quarter. I wanted to ask a little bit about the server CPU cycle. I know you've talked about kind of an expanding footprint with the cloud, guys, but I'm curious of where we stand today as far as more of the traditional OEMs, the progression of their systems, I think you've said 100 plus systems, when do you think that those will all be shipping in the market? And how would you put the context of Milan relative to Rome on that front? And I have a follow-up.

A - Lisa Su {BIO 5791223 <GO>}

Sure. So, Aaron, the data center business, obviously, is a very strategic focus for us and with that (technical difficulty) what each generation, we've really tried to expand the reach. I think here in the first quarter what we saw was very strong results, doubling year-over-year. It is a strength of cloud, but what we saw was both Rome ramping. So we saw Rome units up sequentially and we also saw Milan ramping.

And what that says, this is what we expected. We actually expected that we had a good footprint in Rome and that that would continue to be well deployed as we come into the first half of this year and that's played out and then Milan is just a very, very good product. I mean, it's extremely well positioned. Not only do we have per socket leadership, but we have per core leadership which again expands on the footprint.

So in terms of your question about cloud versus enterprise, we were more cloud-weighted in the first quarter as some of those instances, both internal and external, ramped. We would expect that enterprise -- both enterprise as well as HPC deployments will increase as we go through the next couple of quarters, but we'll see Rome and Milan in the market together all through this year and we expect strong adoption on the enterprise side.

Q - Aaron Rakers {BIO 6649630 <GO>}

Yeah. And then the other question kind of dovetailing off of that is, you talked in response to a couple of different questions. You've talked about visibility. Our visibility is very strong, it's improved, et cetera, so how would you characterize your visibility today relative to, let's say, what it was three months ago? And what gives you the confidence? Has there been something that's happened as far as discussions with the cloud guys that's giving you more confidence in the visibility, the growth through the remainder of this year?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. So, Aaron, I mean, we -- when we started this year we expected to have a strong product cycle just given everything that we saw in terms of platforms, design wins sort of customer engagements and process. But in the last 90 days, I think, we've seen that really firm up, so from the standpoint of just the consistency in all of the schedules that were supposed to be met, I think customers liking what they see, we are having multi-quarter conversations just given the tightness overall in the supply chain, I think everyone is wanting to be clearer and more transparent about their needs and that's very helpful for us frankly. That's very helpful for us in a tight environment. It gives us the ability to plan several quarters out. And so, I think, that's the differences. We have strong visibility into what customers want and what we can deliver, and so that gives us confidence that we have the right signals in place.

Q - Aaron Rakers {BIO 6649630 <GO>}

That's great. Thank you.

Operator

Thanks. Your next question today is coming from Matt Ramsay from Cowen and Company. Your line is now live.

Q - Matthew Ramsay {BIO 17978411 <GO>}

Thank you very much. Good afternoon. Lisa, I wanted to ask a question about the enterprise notebook business, and I noticed you highlighted in the release and in the slides where you are in several different verticals in design wins on enterprise notebook in the Fortune 500. And I wonder if you might speak a little bit about the relationships that you're building with the big enterprise customers, do you have SAE [ph] support, software support, firmware support, et cetera. Do you have the right people in place to really ramp that business more materially going forward? Thanks.

A - Lisa Su {BIO 5791223 <GO>}

Yeah. Definitely, Matt. It's been a high focus for us to ramp our enterprise notebook business as well as the enterprise server business and they actually share many of the same customers and IT departments. And so, yes, we made very good progress on the enterprise notebook business. I think we have a great set of platforms with our OEM partners. We've also ramped up our field application support and our customer engagement models and some for deployment, overall, I think we've gotten some very nice commercial notebook design wins.

And, again, in this environment, for us, the important thing is to stay very focused on the longevity of the business that we win, and so a lot of focus is on those commercial pipelines and how they develop both on the notebook side as well as on the server side and I think we've made good progress, but we still have a lot of opportunity to grow as we go through the coming quarters.

Q - Matthew Ramsay {BIO 17978411 <GO>}

No. Thanks for that. For my follow-up, it's a bit unrelated. One of the businesses that maybe you've not had supply or there has been other parts of the business growing much more quickly, I wanted to ask a bit about gaming. The new RDNA 2 architecture, I think, bring some new features, but obviously there is a strong incumbent competitor in the gaming market. Maybe you could just talk about where you are competitively right now? How you see supply coming online that might support that gaming franchise a bit better? And just -- maybe those -- the lay of the land in gaming right now, because it's one piece of the business that everything else is going so well, I think there are some opportunities there? Thanks.

A - Lisa Su {BIO 5791223 <GO>}

Yeah. So the consumer graphics or the gaming graphics business as you talked about has actually done well for us, grew double digits this past quarter. We had a very deliberate strategy here with the launch of RDNA 2. We started at the top of the stack with our big NAVI product and then we've now introduced a couple of additional products. And you'll see that both from the channel sort of add-in board cards into more OEM systems and notebook business as well as additional variance.

So it's an important market segment for us. We're happy with the progress. I think gamers really appreciate the product. It's fair to say that the graphics demand is very high across the marketplace. So we've actually put quite a bit of product into the market, but the demand still exceeds supply. You'll see that increase as we go through the second half of the year. And, overall, I think the progress that we've made with RDNA 2 is fantastic, and we continue to believe that gaming overall is a great secular growth story.

Q - Matthew Ramsay {BIO 17978411 <GO>}

Thanks, Lisa. I appreciate it.

Operator

Thank you. Our next question today is coming from Toshiya Hari from Goldman Sachs. Your line is now live.

Q - Toshiya Hari {BIO 6770302 <GO>}

Hi. Good afternoon. Thanks so much for taking the question. Lisa, I wanted to ask about the data center GPU business. I realize it's still a relatively small percentage of the overall business. You talked about production ramping in the second half of this year. You talked a little bit about Frontier as well, but what kind of customer pull are you seeing in your data center GPU business? And I got a quick follow-up.

A - Lisa Su {BIO 5791223 <GO>}

Yeah. Toshiya, thanks for the question. We're making very nice progress in the data center GPU business. It's in the investment mode now, so we're investing heavily in the business. We launched the CDNA architecture or the compute-optimized architecture last year. You will see updates to that this year as we bring out the next generation with our Frontier systems. The revenue is albeit on the lower side in terms of just size of the business relative to the rest of the business, but we will see growth into the second half of the year and the business here is actually very strategic, right. It's the idea of really putting together heterogeneous systems and bringing our CPU technology with EPYC together with our GPU technology with Instinct with software capabilities that we have been investing in and really getting strong HPC systems as well as AI machine learning capabilities. So we will see growth in the second half this year. It will still be a smaller business, but we see it growing in the strategic timeframe over the next couple of years and it is very much that end-to-end story of what you need to really satisfy sort of the key workloads in the data center.

Q - Toshiya Hari {BIO 6770302 <GO>}

Great. And then as my follow-up I wanted to ask about the potential threat from ARM longer-term. Within x86, obviously, you've got a significant runway from a market share perspective, but how are you thinking about the potential threat from ARM-based processors both in your client business as well your server business? You've got Apple obviously internalizing some of their CPUs on the client-side, Hyperscaler is talking about an internal solutions and your closest GPU competitor launched or introduced rather ARM-based CPU multiple years out. So any thoughts on ARM versus x86? And how you address that would be helpful? Thank you.

A - Lisa Su {BIO 5791223 <GO>}

Yes. So, absolutely. I think the key point here is, you really have to have a very, very strong product roadmap and that is really what we're focused on. I think the overarching trend that computing is becoming very important and so there are additional entrants trying to address different aspects of computing, I think, is to be expected.

And when you look at the data center, in particular, I think the trends that computing is becoming more workload-optimized is also an important trend. These are the things that we've been thinking about for a long time, and we've been looking at and ensuring that we address that in our roadmap. So our focus is to continue to optimize solutions across the data center and across the PC ecosystem, make sure that what we have is very competitive, addressing what customers' needs are, and we also have the ability to customized solutions as well with our strong IP portfolio. So all that being the case, I think the answer is very competitive market, but we feel very good about the roadmap that we have in front of us.

Q - Toshiya Hari {BIO 6770302 <GO>}

Great. Thank you so much.

A - Lisa Su {BIO 5791223 <GO>}

Thank you.

Operator

Thank you. Our next question today is coming from John Pitzer from Credit Suisse. Your line is now live.

Q - John Pitzer {BIO 1541792 <GO>}

Thanks, guys, for letting me ask questions and congratulations on a solid result. Lisa, maybe another way to ask that last question of x86 versus ARM and I'm wondering if you could address it from the perspective of general-purpose compute versus semi-custom and ASIC, because clearly as Moore's Law is coming up with some issues, the move towards semi-custom and ASIC is much more prevalent. I know to the answer of Toshiya's [ph] question, you said that you're doing or you have the ability to do semi-custom, do you actually have engagements? And how do you see sort of general-purpose compute versus semi-custom ASIC playing out over time?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. So, John, the way I would address that is, I think, there's a whole range of computing solutions that you need and this is back to a few years ago, our conversations about heterogeneous compute being you need to have the right compute for the right workload. So I think that's the overarching aspect of it. No question that for our business general-purpose compute is the largest piece of our business and will continue to be so. We are doing -- we certainly do optimizations for specific customers today and I think that for large cloud customers they expect that and we are doing that.

We do have the ability to optimize on a more specific basis. And if you look at the evolution of our architecture, I think that -- when we do these chiplet architectures and things like that, it really allows that. So lots of good engagements going on with customers overall. And I think the key is to be able to have the right IP building blocks and that's what we're focused on, right, having the best CPU cores, the best GPU capability, having great interconnect and then with the bringing on of Xilinx having the adaptive computing solutions there as well, it gives us a lot of options to optimize solutions with customers.

Q - John Pitzer {BIO 1541792 <GO>}

That's helpful. And, Lisa, as my follow-up, you're still relatively early in this new gaming console cycle and typically through those cycles your products' gross margins has had some pretty good uplift. I am wondering if you can just help characterize where you think you are in sort of the gross margin cycle for the gaming console business? And if you wanted to tell us, kind of, how dilutive you think it is too overall margins and where that might go by end of the year, that would be helpful?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. John, I would say that we're still very early in the console cycle and from -- if you think about it, we're only a couple of quarters into it. So, I think, this is a big cycle and there is a lot of momentum in the cycle. We're going to continue to work on improving costs and improving margins and things like that, but I would say that we still have a ways to go and lots of opportunity there as we go through the next couple of years.

Q - John Pitzer {BIO 1541792 <GO>}

Thank you.

Operator

Thank you. Our next question today is coming from Mark Lipacis from Jefferies. Your line is now live.

Q - Mark Lipacis {BIO 2380059 <GO>}

Hi. Thanks for taking my question. Lisa, I guess, you had indicated you believe -- I believe you said you thought you gained share in the server market. My back of the envelope calculations suggest you gained at least 2 points of share in servers, which is an acceleration on my estimate of about 1% share gain a quarter over the previous four quarters. So, I guess, can you tell me if my math is materially off? And if not, what is -- is this a new higher rate of share gains and what would you chalk this up to? Are you guys had a tipping point, are your customers had a tipping point for embracing AMD as a supplier they have increased comfort or embrace your ecosystem for support. Can you just maybe give us the higher level picture about where you think your customers are and really embracing and ramping up your server offerings at a higher rate? And I have follow up, if I may.

A - Lisa Su {BIO 5791223 <GO>}

Yeah. Sure. So in terms of our data center performance in the first quarter, it was quite strong. And when I look at the drivers of that, we saw cloud in particular quite strong. And when I look at the drivers underneath that, there are a couple of things that have come together. First of all, I mean, we've been very, very deeply engaged with our customers for the last number of quarters in qualifying new instances, qualifying new internal workloads, really expanding the regional capability of our coverage, and so all of those things, I think, have left -- led to some lift overall in the data center business.

And then, going forward, I think the other piece of it is, if you recall, when we did the Naples to Rome transition, that transition was pretty much people switch from Naples to Rome. What we're seeing in this cycle is a bit different. What we're seeing is that, Rome has a set of very strong coverage in terms of applications that they're in, that are ramping very nicely, that are having good demand. And then on top of that, we're adding Milan, which is just a very strong product on top of that.

So, I think, that those are some of the things that are perhaps a bit different about what we're seeing, right now. That being this case, things move around from quarter-to-quarter. So I would say that the data center signals that we're seeing are positive. We're excited about what we're seeing. It's a lot of engagements with customers. And the main thing for us is, as important as the current year is, we're also very focused on the long-term roadmap. And so we're engagement -- we're engaging now on Gen4 and beyond. So it really is a multi-generational discussion with our top customers.

Q - Mark Lipacis {BIO 2380059 <GO>}

Great. That's very helpful. And then a follow-up on just coming back to ARM, you answered the previous questions with kind of talking about embracing the idea of having heterogeneous architectures and semi-custom and working with your customers to develop solutions. If I go back, AMD had an ARM server offering before. Can you give us an update on the state of that ARM server IP? Is that something that you can resurrect or have you been keeping it the developed and working on that? And can you discuss, are your customers asking for your help in delivery in semi-custom solutions that have an ARM component to it? Because from what I can tell, it looks like three cloud service providers have ARM server offerings in their platform and -- but there is a lot that don't -- and don't have quite the development capability. So I was hoping if you could just talk more specifically about the IP that you had? And are you bringing it back to if your customers asking for it? Thank you.

A - Lisa Su {BIO 5791223 <GO>}

Yeah. Sure, Mark. So we know the ARM architecture well, certainly our engineers know it well and we consider ARM a partner in many respects, we use ARM IP in various aspects of our devices. In terms of that specific custom ARM design, we don't have that in plans right now. In terms of whether we would do custom ARM designs, I think the answer is yes. That's the whole idea of the semi-custom business. And so, I think it's less about ARM versus x86, and much more about having the right IP in the right sort of combination to satisfy sort of the customer solutions and that's the way we looked at it. It's really what problem are you trying to solve and let's look at sort of the collection of IP that we have and the capabilities that we have to help address that set of -- sort of issues.

Q - Mark Lipacis {BIO 2380059 <GO>}

Got you. Very helpful. Thank you.

Operator

Thank you. Our next question is coming from Ross Seymore from Deutsche Bank. Your line is now live.

Q - Ross Seymore {BIO 20902787 <GO>}

Hi. Thanks for letting me [ph] to ask few questions, and congratulations on the strong results and guide. Lisa, I wanted to ask you a little bit of a conceptual question. In your full year guidance, you clearly raised the revenues to a very strong number, but you kept the margins the same. I think people understand the operating margin side of it that you have an opportunity to invest and great opportunities in front of you to grow, but on the gross margin side of things, I'm just a little surprised given the strength that you're talking about in the data center business, the HPC, Frontier, those things kicking in the back half of the year. I'm a little surprised that it didn't go up. Now you've delivered very consistent guidance and increased improvements over time and I don't -- I can't recall the last time you missed your gross margin guidance, but I'm just wondering what the puts and takes are there that would keep that gross margin guidance flat for the year?

A - Lisa Su {BIO 5791223 <GO>}

Yeah, Ross. Sure. So let me perhaps start and then Devinder may have a few comments. So, I think, from an overall revenue standpoint, I think we are very comfortable with the guide up just given the visibility that we have on the customer demand front and on the supply front.

On the overall margins, we are guiding up sequentially as we go from Q1 to Q2. And then I think for the second half of the year, what we would say is, look, it's still early in the year and it's a very dynamic environment, Ross, I mean very dynamic environment. And so, yeah, we're watching the puts and takes and there is always product mix things that come into play in terms of the puts and takes. But I think we're confident that we're in a good place and as we go through the year, we'll give you more updates on that. But there isn't anything more than that. I think it's just where we are in the year and given the dynamic environment we have in the marketplace, that's what gives us approximately the 47% guide.

I don't know, Devinder, do you want to add to that?

A - Devinder Kumar {BIO 17763436 <GO>}

So the only thing I'll add, Ross, I think, as you know, the situation is pretty tight as we talked about, the overall global supply situation in semiconductors. So we are seeing some increases in component costs. But, overall, we're managing it in on the higher revenue by more than $1 billion. We are maintaining the 47% guide for 2021, which is up from last year and last quarter was 45%, this quarter 46%, guiding 47%, the trend is very good and we are very, very happy with that.

Q - Ross Seymore {BIO 20902787 <GO>}

Thanks for those details. That's really helpful. For my follow-up, I want to get a little more tactical, but it will somewhat fold into your answers to the first question and that is for your second quarter guide from the midpoint of up roughly 4%, could you give us a little bit of puts and takes between your two main segments? And I guess the slightly longer term question part of that would be data center being high teens and the first quarter was a great sequential growth doubling year-over-year, any sort of color on how you think that percentage changes throughout the rest of the year, given your 50% growth guidance for the entirety of the year?

A - Lisa Su {BIO 5791223 <GO>}

Sure, Ross. So in terms of the second quarter, as we look at sequential growth, we do see a sequential growth in the data center business, so on the server side as well as on the data center graphics side as well as some growth on the gaming side. As we look at the full year, our expectation is that the percentage of the company that is -- sort of the data center percentage of the company will increase as we go through the next couple of quarters. And that's just the dynamic of some of the strength in the consumer businesses in the first half. So that's not normal seasonality and just the acceleration or some of the growth that we see in the data center business as we go throughout the year would lead to a higher percentage of revenue in data center on higher revenue.

Q - Ross Seymore {BIO 20902787 <GO>}

Perfect. Thank you.

Operator

Thank you. Our next question is coming from Stacy Rasgon from Bernstein Research. Your line is now live.

Q - Stacy Rasgon {BIO 16423886 <GO>}

Hi, guys. Thanks for taking my question. I first had a question on data center in the quarter. So the EESC was up almost $100 million, EPYC was up and semi-custom was down, which means EPYC was up even more than that. Can you -- I know that -- it was -- both Rome and Milan grew, but how much of the actual growth in the $100 million plus sequentially there must have been EPYC, how much of that growth -- how does that split out between Rome and Milan? Was it like the majority of the growth was Milan? And how do you see Milan as a percentage of our data center CPU mix in Q2?

A - Lisa Su {BIO 5791223 <GO>}

Sure, Stacy. So if I look at the first quarter, we shipped Milan as well in the fourth quarter, right. So we shipped a good amount of Milan in the fourth quarter, good amount in the first quarter. I would say, in terms of growth, it was probably more Rome weighted in the first quarter compared to Milan. But there was good growth in both. And then as we go into the second quarter, we would still expect to see growth in both Rome and Milan with Milan growing faster as that ramps and we would expect by the third quarter that it would crossover and Milan would perhaps be higher than Rome.

Now, obviously, these things change a little bit as customers go through their ramps, but that's sort of what we see. So the meta point is, Rome demand is robust and will stay a good part of the revenue for this year in its entirety, and then Milan is ramping quickly and customer adoption is strong. And so we expect -- it will ramp quickly as we go through the next couple of quarters. Hopefully, that answers your question.

Q - Stacy Rasgon {BIO 16423886 <GO>}

It does. Thank you. I have a follow-up if you don't mind. I actually do want to ask a question about OpEx. So I know the model you gave at the Analyst Day had a midpoint for OpEx revenue of 26.5%, and I know you're running ahead of revenue and everything right now. But if I sort of back out the second half implied guidance topics, it actually is [ph] at 26.5% run rate in the second half to get to 26% for the full year. Should we think about you -- I guess, like, as we go into 2022, do you think you're sort of at the model OpEx run rate that sort of, you know, like more than 26%, 26.5% on whatever the revenue is, is that the right way to think about the OpEx trajectory going forward? And I guess, like, you -- do you think you're actually spending enough at this point given where you're taking the roadmap? Are you spending at the right levels right now to ensure that that roadmap is actually cemented in turn [ph].

A - Lisa Su {BIO 5791223 <GO>}

Yeah. Stacy, very good question. I think, we are -- the revenue is well above our long-term model and certainly in this year, it's well above our long-term model, last year was well above our long-term model, and we're taking the opportunity to invest. And from that standpoint, our investments in R&D really, really, as you said, cementing the roadmap, our investments across sales and field support and all the customer-facing support and, frankly, we're making investments in sort of some of the infrastructure surrounding the company as well since it's just a much larger company than it was a few years ago. So I think the answer is yes. We're investing enough and I think we're taking the opportunity to be very aggressive with those investments to -- given the strength of the revenue growth. Maybe, Devinder, you want to add to that or?

A - Devinder Kumar {BIO 17763436 <GO>}

No, I think that's good. I think you covered it. We've been very disciplined, as you know, Stacy, over the years about managing the OpEx. It does scale with revenue. But OpEx is growing lower than -- lower rate than revenue and, obviously, that shows up in the financial results from a model standpoint. The leverage, as you mentioned, the operating margin is going up for the company.

Q - Stacy Rasgon {BIO 16423886 <GO>}

Got it. Thank you, guys.

A - Ruth Cotter {BIO 16509123 <GO>}

Operator, we'll take two more questions, please.

Operator

Certainly. Our next question is coming from Timothy Arcuri from UBS. Your line is now live.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Thanks a lot. Lisa, I wanted to ask also about share gains. You've done a great job this year in both client and data center. At the same time, as was referenced before, Intel's tone is definitely changing. They used the word leveraging relationships and they talked about other tactics to sort of stem or arrest some of the share losses and they are now offering actually six cores via foundry and things like that. So, I guess, the question is sort of beyond this year, because the competitive environment this year is pretty much set, so can -- do you think we can extrapolate the success you've had this year into '22 and '23, or do you think the competitive environment will intensify in the next few years? Thanks.

A - Lisa Su {BIO 5791223 <GO>}

Well, Tim, I would say that we have always expected the competitive environment to be very strong and we still do. So there is -- by the way, there are lots of competitors out there. From our standpoint, I think, over the past few years and the past few generations, I think we've built a track record with customers and we've built a set of deep relationships and we've learned a ton about what's important to customers, where to spend the time, the effort and where we need to close partnership. So I feel very good about where we're positioned this year, but I feel very excited about what we have in the roadmap going forward. And, I mean, we are not slowing down. So there is a lot in the roadmap and we have more resources and more capabilities to bring to the market and I think we're going to be very competitive going forward.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Totally. Thanks. I guess as my follow-up then, can you give just -- Devinder, maybe give us some sense of what the loading is for semi-custom in first half to back half? It seems like it's going to be about even back half versus front half of this year, is that correct?

A - Devinder Kumar {BIO 17763436 <GO>}

It was slightly up in the second half, because the launch of product in the second half of last year started out strong, because it's a new unit -- it's new console generation and then maybe slightly up in the second half as well, I would say.

Q - Timothy Arcuri {BIO 3824613 <GO>}

Okay, Devinder. Awesome. Thank you.

Operator

Thank you. Our final question today is coming from Joe Moore from Morgan Stanley. Your line is now live.

Q - Joseph Moore {BIO 17644779 <GO>}

Great. Thank you. You talked a little bit about the supply constraints that you've been dealing with, can you talk about where those are coming from? Is that a wafer constraint, substrate constraint, both, or other stuff? And where we are making progress and kind of getting more supply out, what's the source of that progress?

A - Lisa Su {BIO 5791223 <GO>}

Yeah. So, I think, -- so, I would say, overall the demand, if we look at coming into this year, the demand has been sort of higher than our expectations and they're sort of industry-wide types of things that are going on. We work very closely with our supply chain partners. So whether it's wafers or back-end assembly test capacity or substrate capacity and we work it on a product line by product line level. So I don't know that there is a single thing that I would point out. I would say that on a product line level, what we've done and what we'll continue to do is ensure that there are multiple sources for things particularly in the back-end that gives us flexibility to move things back and forth.

We continue -- on the substrate side in particular, I think there has been under-investment in the industry. And so we've taken the opportunity to invest in some substrate capacity dedicated to AMD and that will be something that we continue to do going forward.

We're also -- I mean, we also have fantastic engineering teams that are just looking at how we together in the ecosystem just get more productivity into the system. And we work very closely with TSMC to make sure that we're forecasting well and getting the right support. So I think it's all of the above in terms of making sure that we have the capabilities.

And the other thing I'll mention, Joe, is just -- it's not just about processors, but it's included -- it's also ensuring that there are match sets in the ecosystem. And so our teams are also working very closely with our OEMs to make sure that we're together ensuring that there is the full system components necessary. So it is a complex supply chain environment and I will tell you given everything that I've seen, it is a complex environment, because all markets are so hot, but I'm happy that we've been able to make progress. And, by the way, we're not done, right. There is plenty more that we would like to do to get more capability in the supply environment and, I mean, so we're working closely with our partners across the board.

Q - Joseph Moore {BIO 17644779 <GO>}

Great. Definitely very impressive results in the context of everything going on. Thank you.

Operator

Thank you. We've reached end of our question-and-answer session. I'd like to turn the floor back for any further or closing comments.

A - Ruth Cotter {BIO 16509123 <GO>}

Thank you, Kevin. We'd like to thank everybody for joining today's call, and we'll look forward to engaging with you throughout the quarter. Thank you, everyone.

Operator

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