

Company Name: Intel  
 Company Ticker: INTC US  
 Date: 2018-01-25  
 Event Description: Q4 2017 Earnings Call

Market Cap: 221,217.08  
 Current PX: 48.47  
 YTD Change(\$): +1.54  
 YTD Change(%): +3.281

Bloomberg Estimates - EPS  
 Current Quarter: 1.222  
 Current Year: 4.501  
 Bloomberg Estimates - Sales  
 Current Quarter: 19016.697  
 Current Year: 71022.368

## Q4 2017 Earnings Call

### Company Participants

- Mark H. Henninger
- Brian M. Krzanich
- Robert Holmes Swan

### Other Participants

- John William Pitzer
- Joe L. Moore
- Ambrish Srivastava
- Stacy Aaron Rasgon
- C.J. Muse
- Vivek Arya
- Blayne Curtis

## MANAGEMENT DISCUSSION SECTION

### Mark H. Henninger

#### *GAAP and Non-GAAP Financial Measures*

A brief reminder that this quarter we've provided both GAAP and non-GAAP financial measures

Today, we will be speaking to the non-GAAP financial measures when describing our consolidated results

CFO commentary and earnings release, available on [intc.com](http://intc.com), include the full GAAP and non-GAAP reconciliations

### Brian M. Krzanich

#### *Business Highlights*

##### *PC-Centric and Data-Centric Businesses*

- 2017 was a record year for Intel, and fourth quarter results were outstanding, well ahead of the forecast we outlined in October, based on the strength on both our PC-centric and data-centric businesses
- I will review our results with you in just a moment

##### *Security*

- But before I do that, I'd like to share a few words about security
- We've been working around the clock with our customers and partners to address the security vulnerabilities known as Spectre and Meltdown

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- While we've made progress, I am acutely aware that we have more to do
- We've committed to being transparent, keeping our customers and owners apprised of our products and through our actions, building trust
- Security is a top priority for Intel, foundational to our products and it's critical to the success of our data-centric strategy
- Our near-term focus is on delivering high-quality mitigations to protect our customers' infrastructure on these exploits
- We're working to incorporate silicon-based changes to future products that will directly address the Spectre and Meltdown threats in hardware, and those products will begin appearing later this year
  - However, these circumstances are highly dynamic and we updated our risk factors to reflect both the evolving nature of these specific threats and mitigations, as well as the security challenge more broadly
- Security has always been a priority for us, and these events reinforce our continuous mission to develop the world's most secure products
  - This will be an ongoing journey, but we are committed to the task, and I'm confident we're up to the challenge

### ***Website Creation***

- To keep you informed, we've created a dedicated website and we're approaching this work with customer-first urgency
- I've assigned some of the very best minds of Intel to work through this, and we're making progress

### ***Q4 2017 Results***

With that, let's turn to our 2017 and fourth quarter results

We just wrapped up the best year in Intel's history with the best quarter in Intel's history

Revenue was up 4% y-over-y in Q4, 8% if you exclude McAfee, setting an all-time record

### ***Data Center, IoT and FPGA Businesses***

- Our Data Center, IoT and FPGA businesses, each set revenue records
- We met or exceeded all of the financial commitments we made to you at the beginning of the year
- And our focus on efficiency and profitable growth produced significant leverage, driving non-GAAP operating income up 21%
- Our data-centric businesses deliver the technology foundations for the new data economy, making the analysis, storage and transfer of data possible, giving our customers the ability to turn data into amazing experiences and actionable insight
  - They're essential to our strategy
- Data-centric revenue, excluding McAfee, was up an impressive 21% over Q4 last year
- And I'd like to share a few highlights with you, starting with DCG

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- DCG's revenue was up 20% over Q4

### ***Cloud and Comms Service Provider Segment***

- The cloud segment was up 35%, comm service providers were up 16%, enterprise was up 11%, and our adjacency revenue was up 35%
- We saw broad-based demand strength with customer preference for high-performance products driving richer ASP mix
- Cloud segment results were driven by significant volume growth and continued customer preference for higher performance products
- In the comms service provider segment, we continue to take share and grow revenue as customers chose IA-based solutions to virtualize and transform their networks

### ***Enterprise Segment***

- Enterprise segment's strength was driven mostly by ASP, as customers transition to Xeon Scalable products in a seasonally stronger fourth quarter IT buy window
- While we continue to see enterprise customers offload workloads to public clouds, we are also seeing those customers prioritize performance solutions for hybrid and on-premise build-outs
- Customers across all of our segments are accelerating deployment of Xeon Scalable processors, which is ramping roughly in line with our historical Xeon transition
- We continue to demonstrate leadership and progress in artificial intelligence with the data center, at the edge, and from hundreds of watts to milliwatts

### ***Software Optimization***

- Our software optimization for the Caffe framework has improved already strong Xeon Scalable ResNet-50 inference performance by 2 times, just since the launch in July
- The first generation Nervana neural network processor ran a neural network less than two weeks after we received silicon, and we shipped our first customer unit

### ***Movidius Vision Processing Unit***

- At the edge, Google announced its AIY Vision Kit, featuring our Movidius vision processing unit
- And Amazon announced DeepLens, the world's first deep learning-enabled video camera for developers, which uses an Intel CPU, graphics and compute libraries for deep neural networks
- We're also seeing design wins that combine technologies from multiple data-centric business units, reinforcing the idea that we have developed a unique and differentiated collection of capabilities that can address customer challenges together more effectively than any one business could alone
- A great example is Dahua's recent announcement of their DeepSense product line, which combines Core CPU, Intel FPGA-based network video recorders, along with Movidius VPU-based cameras, enable people and automobile detection and smart city applications using artificial intelligence

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### ***Programmable Solutions Group***

- In the Programmable Solutions Group, we saw strong double-digit growth in the data center, auto, embedded, and advanced products categories, as well as last-time buys of legacy products
- That strength was partially offset by softness in the comms infrastructure

### ***Intel FPGA SDK***

- In Q4, we launched the Intel FPGA SDK for OpenCL to dramatically increase productivity for our customers
- We also delivered first-to-market leadership innovations in the Stratix 10 product line, including the first SoC FPGA with an ARM processor at more than 1mm logic elements and the industry's first FPGA with integrated HBM2 memory

### ***Internet of Things Group***

- Our Internet of Things Group grew 21% with continuing momentum in retail, video, and in-vehicle infotainment verticals
- Wind River saw strong multiyear contract renewals and delivered its most profitable quarter ever for Intel
- The memory business grew 9% and achieved profitability in Q4, as strong client volume was partially offset by a one-quarter qualification delay of a data center SSD volume
- Last quarter, I shared with you that our leadership technology is resulting in strong customer interest in long-term supply arrangements
  - That interest has continued to grow
- We have since signed additional agreements and now expect prepayments totaling roughly \$2B over the course of 2018

### ***Mobileye***

- Mobileye had another strong quarter, and business momentum is growing
- Our 30 design wins over the course of 2017 and 15 new program launches in 2018 are both increases of 2.5 times over the prior period
- We now have Level 2+ and Level 3 design wins with 11 automakers who collectively represent more than 50% of global vehicle production
  - These advanced programs launch over the next two years, and they represent a major leap in functionality vs. current semi-autonomous systems and are a significant step towards scalable Level 4 and Level 5 fully autonomous systems

### ***Level 3 through Level 5 Autonomous Driving Platform***

- We reached an important milestone in Q4, the announcement of our Level 3 through Level 5 autonomous driving platform based on EyeQ5 and Atom, which we'll sample over the next few months
- We believe this will be the most advanced, scalable, and efficient platform of its kind

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- EyeQ5 will deliver 24 tera ops of deep learning performance in a 10-watt power envelope, or about 2.5 times the efficiency of the competition

### ***Road Experience Management Mapping Solution***

- Just a couple of weeks ago at CES, we announced that by the end of 2018, we expect 2mm EyeQ-equipped cars will be collecting crowd-sourced data for REM, our Road Experience Management mapping solution
- The resulting map will first be utilized in Level 3 beginning in 2019
- The ability to crowd-source data to build and rapidly update the precision maps required for higher levels of automation is a major differentiator in our plan to build out the safest and most affordable autonomous vehicle system
  - It's also a great example of our data-centric strategy at work

### ***Client Computing Group***

- And finally, I'd like to touch on our PC-centric businesses, the Client Computing Group
- Over the course of the year, the PC market improved
- Our 14-nanometer manufacturing costs came down and the competitive environment intensified

### ***Innovation and Performance***

- Against that backdrop, PCG's focus on innovation and performance, especially in growth segments like gaming, 2-in-1, thin and light notebooks, and enterprise, led to a record Core mix and record i7 volume in Q4
- We also shipped our first low-volume 10-nanometer SKU
- And our modem business grew 26% over Q4 last year
- Intel is undergoing one of the most significant transformations in corporate history, from a PC-centric company to a data-centric company

### ***Investments***

- We've made thoughtful, disciplined investments along the way that have expanded our TAM to \$260B
- Those same investments have produced a collection of data-centric businesses that are unmatched, growing at double-digit rates, and approaching 50% of the company's revenue
- Our opportunity is larger than it's ever been, and we're hungry to compete and win
- In 2018, our highest priorities will be executing to our strategy and meeting the commitments we make to our owners and our customers
  - This includes our commitment to restoring customer confidence in the security of their data
- This year, Intel will celebrate a half-century of innovation that has profoundly changed the world
- Over the last 50 years, we invented the architecture and manufacturing technologies that have made personal computing, the Internet, and the cloud not only possible, but pervasive
- The journey hasn't been without challenges; nothing worth doing ever is

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- Our culture has been forged through taking challenges head-on and developing solutions our customers can count on
- That includes working directly to address the Spectre and Meltdown security threats

### ***Closing Remarks***

We leave 2017 on a financial high note, but I'm even more excited about what's to come, about our strategy producing great products for our customers and great returns for our owners

I see Intel innovation changing the world for another 50 years, and that journey starts with 2018

Over the coming year, we'll bring amazing innovation and performance to the PC market, advance the state of art in the artificial intelligence, lead the way towards mass 5G deployment, launch the industry's first new memory architecture in two decades, and take another step toward a safer world in which autonomous driving is a reality

Looking back on 2017, I could not be more proud of our team and all they have accomplished

As I look to our 50th year, I'm more optimistic and confident than I've ever been about Intel's future

## **Robert Holmes Swan**

### ***Financial Highlights***

#### ***Revenue, Operating Income and EPS***

- Q4 was an outstanding close to a record 2017, and we are building real momentum heading into 2018
- Revenue for the quarter was \$17.1B, up 8% y-over-y
- Operating income was \$5.9B, up 21% y-over-y
- And EPS of \$1.08 was up 37% y-over-y

#### ***Capital Allocation***

- From a capital allocation perspective, we redeemed \$1.6B of 2035 convertible debt, reducing our share count by 59mm shares; and repurchased \$500mm of higher-coupon debt and exchanged \$1.8B into 30-year debt at a 1% lower coupon rate
- On tax reform, our Q4 GAAP earnings reflect a one-time tax impact of \$5.4B
- And our guidance reflects approximately 7-point improvement in our effective tax rate going forward

#### ***Intel's Data-Centric Businesses***

- To summarize, we had a fantastic quarter and year and are on track to exceed the three-year targets we laid out at our Analyst Day one full year ahead of schedule
- Our Q4 results demonstrated continued momentum in our transformation from a PC-centric to a data-centric company
- Intel's data-centric businesses, those outside of the PC segment, are at an all-time high mix of 47% of our revenue, up from approximately 40% in 2012



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- We've made significant investments to expand our TAM into new data-rich markets like memory, programmable solutions, and autonomous driving
  - These investments are just starting to pay off and will fuel Intel's growth going forward

### ***PC-Centric Business***

- Our PC-centric business was down 2% in a declining PC market, and it continues to be a great source of profitability
- DCG delivered its most profitable year since 2011 by focusing on premium and growth segments with industry-leading products
  - This business generated the cash to fund Intel's investments in new data-centric growth

### ***Q4 Earnings***

- Moving to Q4 earnings, we generated significant EPS expansion in the quarter, up 37% year-on-year
- Our EPS improvement was driven by strong top line growth, a five point improvement in operating margin and significant gains from our ICAP portfolio
- Our gross margins expanded two points in the quarter
- And our spending as a percent of revenue declined by three points, as we delivered \$700mm more revenue and \$300mm less spending

### ***Operating Efficiency and Spending***

- In terms of operating efficiency, we're well ahead of schedule of meeting our commitment by reducing spending to 30% by 2020
- We now expect to achieve this goal no later than 2019
- Total spending was down 6% y-over-y in Q4, while we continued investing in our key priorities including driving Moore's Law forward, winning in artificial intelligence, and autonomous driving
- R&D spending, as a percent of revenue, is down approximately one point
- And our SG&A costs were down over two points, as we rationalized our marketing and sales programs and generate significant leverage in our SG&A functions

### ***Segment Performance***

#### ***Client Computing Group***

- Let me touch briefly on our segment performance
- Client Computing Group had another strong quarter
- Revenue of \$9B was down 2 points
- And operating margins were down 2 points
- Operating margins were lower on 10-nanometer transition costs

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- We saw strength in the commercial gaming business, and we believe the worldwide PC supply chain is operating at healthy levels

### ***Data Center Group***

#### ***Revenue, Operating Income & Margin and Unit Volume***

- The Data Center Group had record revenue of \$5.6B, up 20% y-over-y
- And operating income of \$3B grew 59%
- Q4 operating margin was 54%
- As Brian mentioned earlier, we had strong growth and execution across all segments
- Overall unit volume was up 10%, ASPs were up 8%, and our adjacencies grew by 35%
- Our ASP strength demonstrates the value customers see in our high-performance products
- Xeon Scalable launched in July
- It's ramping well, with customers broadly deploying this leadership product family
- Revenue scale from leadership products, ASP strength, and the exclusion of 2016 one-time charges drove strong operating income growth for the business
- For the full year, revenue was up 11% and operating margin came in at 44%, both ahead of the expectations we provided at the beginning of the year

### ***IoT, NSG and PSG Business Segments***

- The IoT, NSG and PSG business segments are becoming a larger component of our overall business, collectively growing 19% y-over-y
- Our Internet of Things business achieved record revenue of \$879mm, growing 21% y-over-y, driven by strength in industrial and video and continued momentum in our retail business
- Operating profit was \$260mm, up 43% y-over-y

### ***Mobileye and Memory Business***

- The Mobileye business also had a record quarter, and we are on track to our deal thesis
- As we called out last quarter, results for the Mobileye acquisition are included in our All Other segment and reflects Q4 integration of Intel's autonomous driving group spending into Mobileye
- Our memory business had revenue of \$889mm, up 9% y-over-y with strong demand for data center SSD solutions and demand signals outpacing supply
  - This segment was profitable for the quarter, and we expect the segment to be profitable for the full year of 2018

### ***Programmable Solutions Group***

- Programmable Solutions Group had record revenue of \$568mm, with 35% growth, driven by strength in data center, automotive, and embedded



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- Operating profit was \$156mm, up 95% y-over-y
- The Stratix 10 design win pipeline, which represents PSG's largest ever, doubled over the last year due to engagements in 5G, cloud computing, and the infrastructure transition to network function virtualization

### ***Capital Allocation Priorities***

- We laid out our capital allocation priorities early in the year: invest organically, expand acquisitively, and return capital to our shareholders and do it wisely
- In the year, we delivered on our promise
  - First, we generated strong FCF of \$10.3B in the year and returned \$8.7B to shareholders through dividends of \$5.1B and share repurchases of \$3.6B
  - Second, we funded a majority of the Mobileye acquisition from the sale of non-core assets during the year, including McAfee and the sale of ASML shares
  - And, third, we redeemed \$1.6B in convertible debt, reducing 59mm shares
- And we also tendered higher-coupon debt for lower-coupon debt

### ***ICAP and Treasury-related Transactions***

- Let me expand on the ICAP and Treasury-related transactions we executed in the quarter
- First, we sold 11.4mm shares of our ASML Holding, which generated \$2B in cash proceeds and a gain of \$1.5B.
- Second, we redeemed our 2035 convertible debenture
  - This redemption created \$2.8B cash outflow and a non-cash loss of \$385mm, which was tax-deductible
  - Since this debenture was convertible and therefore dilutive, the redemption effectively acted as a buyback that will reduce diluted share count by 59mm shares
- And, third, we successfully tendered \$2.3B of high-coupon debt in the quarter
- We exchanged \$1.9B of old debt into \$2B of 30-year new debt, reducing our coupon rate by 1%
- We also redeemed \$425mm of old debt for cash
  - This transaction both lowered our leverage and our interest expense

### ***Revenue, Operating Income and EPS***

- Adding it all up, 2017 was another record year for Intel
- Revenue of \$62.8B was up 9% y-over-y, driven by 16% growth in our data-centric businesses and 3% growth in PC-centric businesses
- Operating income of \$19.6B was up 18% on strong execution across the businesses and disciplined spending
- EPS of \$3.46 was up 28% on excellent operational performance and the benefit of \$0.35 from ICAP net gains
- With the change to the accounting rules for recognizing price changes on equity investments, we do not expect to see these ICAP gains repeat

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### ***Impact of Tax Reform***

- Before I turn to guidance, let me provide a little more context on the impact of tax reform on our business
- Intel's fourth quarter results reflect a higher GAAP income tax expense of \$5.4B as a result of U.S. corporate tax reform enacted in December
  - This includes a one-time required tax adjustment on previously untaxed foreign earnings, payable over eight years, which was partially offset by the re-measurement of deferred income taxes for the new U.S. statutory tax rate

### ***Tax Rate***

- Looking ahead, we expect the Tax Cuts and Jobs Act will help level the playing field for U.S. manufacturers like Intel that compete in today's global economy
- We expect the 2018 tax rate of approximately 14%, driven by a lower U.S. statutory tax rate of 21%, lower tax on foreign income, benefits from U.S. exporters, and the continuation of the R&D credit
- The change in our tax rate drives approximately \$0.28 in 2018 EPS
- Intel has a rich history of investing in U.S.-led research and development and U.S. manufacturing
- Just last year, we committed to the fit-up of our Fab 42 facility, creating thousands of jobs at completion
  - These tax reforms provide further incentive to continued investments like this

### ***Accounting Rule Changes***

- Before we turn to our 2018 outlook, I also want to highlight two accounting rule changes: first, new accounting rules for revenue recognition; and, second, accounting for equity gains and losses
- We do not expect a material impact to revenue from the revenue recognition accounting change
- The changes in accounting for equity gains and losses will require the recognition of unrealized price changes each quarter
- To equity holdings, like our ASML position, we'll see mark-to-market adjustments that will flow through earnings in 2018, which may create greater volatility on a GAAP basis
  - This change resulted in an impact of \$2.7B of net unrealized gains at year-end that we booked to equity on January 1, 2018

### ***Full Year***

#### ***Revenue and Operating Margin***

- Now, moving to the full year
- We are forecasting the midpoint of the revenue range at \$65B, up 4% y-over-y
- We expect operating margin of approximately 30%, with gross margins down 2 points to 2.5 points; and spending, as a percent of revenue, to be down 1 point to 1.5 points
  - The decline in gross margin was driven by growth in our adjacent businesses as we play in an expanded TAM and the transition cost associated with 10-nanometer, both partially offset by higher gross margins

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from our 14-nanometer products

### ***EPS, CapEx and FCF***

- We expect EPS of \$3.55, up 14%, excluding the ICAP net gains, driven by a strong top line growth and a lower tax rate of approximately 14%, which will increase EPS by approximately \$0.28
- We expect net capital deployed of \$12B
  - This reflects gross CapEx of \$14B, offset by approximately \$2B of customer prepayments for memory supply agreements
- Increasing CapEx reflects our and our customers' confidence on our memory technology leadership
- We expect FCF of \$13B, an increase of approximately 30%, directly contributing to our decision to raise our dividend by a full 10%

### ***Q1 2018***

- As we look to Q1 2018, we are forecasting the midpoint of revenue range at \$15B, up 5% y-over-y
- We expect operating margin of approximately 27%, flat y-over-y, with a 3 point decline in gross margins offset by a 3 point decline in spending
- We expect EPS of \$0.70, up 11%, excluding ICAP net gains from the strong top line growth and a lower effective tax rate

### ***Closing Remarks***

We believe 2018 will be another record year for Intel, and we feel great about where we are entering year two of our three-year transformation

We've met and exceeded our commitments

Our PC-centric team continues to operate very well in a down market

And our data-centric businesses are up double-digits collectively as we continue to transform the company to power the cloud and smart connected devices

## **QUESTION AND ANSWER SECTION**

**<Q - John William Pitzer>**: My first question just revolves around the revenue guidance for the March quarter. At the midpoint, down about 12% sequentially is a lot worse than I guess normal seasonal. And I guess I'm trying to figure out the parameters that you guys are using to come up with that number. Was there something in the DCG strength in the calendar fourth quarter that you don't think is repeatable? Given your comments around the PC supply chain being healthy, that to me feels a little bit more seasonal than not in the March quarter. So I'm just curious as to why Q1 revenue would be so much below what has been the five-year median seasonality for Q1.

**<A - Robert Holmes Swan>**: John, thanks. It's Bob, so really two things going on. One, the enterprise growth in DCG, as Brian highlighted, was up 11% in Q4, so extremely strong seasonal growth for enterprise; a little bit more than we expected, frankly. That's number one.

Number two, PSG 35% growth was helped by end-of-life sales during the course of the quarter. And if you adjust for maybe more normalized enterprise growth and PSG growth, you get to more of a seasonal Q4 to Q1 dynamic, so in line with seasonal if you make those two adjustments.

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**<Q - John William Pitzer>**: That's very helpful. And then, Brian, my second question revolves around CapEx. I think it was a year ago on this conference call that you mentioned that you thought that CY2017 and CY2018 would be above trend line CapEx spending for you guys. And then you thought it would come down again in CY2019 to a more normal trend, albeit you didn't quantify the trend. Just given the big uptick in 2018 to \$14B, I realize \$2B of that's already being covered by prepayments. But how do we think about the trend line CapEx from here, especially in light of the changing relationship between yourself and Micron on IMFT?

**<A - Brian M. Krzanich>**: Sure, John. So my perspective is if you take a look at it, logic on our CapEx just scales with our increase in revenue and our overall growth rate. So that's still in line.

With memory, we're going to take a look at it really on a year-by-year basis. And I'd tell you that Bob's really doing a good job of helping the business unit look over the capital. And when we have demand and people are willing to pay up front for that demand and reserve the capacity, like we've done this year. We're going to go ahead and put that capacity in place plus what we think the overall market – we can do as distributing across the overall market.

That's really independent of the changing relationship with Micron. That's really more about how we're doing development work out in time really. That's actually still two generations away. That really didn't affect 2018. This was really about what we saw for the overall NAND memory market plus the additional capital and capacity that people wanted to reserve through that process. We look at that each year, John, and say okay, as we look out into 2019 at the end of 2018, we'll do that same analysis.

**<Q - John William Pitzer>**: Thanks for the clarification.

**<A - Robert Holmes Swan>**: I would just – sorry, just to follow on to Brian's comments. The way we're looking at memory, and we've talked a bit about this on the last call, is increased confidence in our customers in the technologies that we're developing, where those relationships, they will help fund the scaling of the capacity to grow the business. And we're really trying to match net capital employed to be in conjunction with known customer demand.

So what that meant for 2017 is the net capital is roughly \$1.5B, and we've held that relatively flat in 2018. So while gross capital is higher, we have more conviction in the customer base to fund \$2B of the gross capital. So memory, we're really trying to focus on customer adoption of our technology to effectively and efficiently scale the business.

And then, just the only other point I would make on logic, remember a year ago in terms of our outlook for growth, we're well ahead of our outlook for growth. We were probably at the time, implied in our outlook was probably \$62.5B number in 2018. Obviously, with our guide now of \$65B, we're \$2.5B higher. And it's that incremental growth that's placing more demands on logic capacity, both for 14-nanometer, 10-nanometer, and as we think forward, on 7-nanometer.

**<Q - Joe L. Moore>**: I wonder if you could talk about OpEx. Obviously, you've been pretty disciplined there bringing that down, but you've also got some other initiatives. You announced the discrete graphics effort. Maybe if you talk about – it seems like that would cost a lot if I just look at what your competitors are spending. And then at some point, you're going to spend money on NAND that used to be shared with Micron. So just can you talk about the puts and takes there? And is there something that we should think about that's coming down to offset those potential increases?

**<A - Brian M. Krzanich>**: Sure. I'll start, and then I'll let Bob give you the under-the-cover detail of the dollars. But, Joe, really we've already factored all of those things in. So things like the discrete graphics is a ramping spend. The memory is R&D spending out in time, so for 2018 has no really effect. And then we've driven overall efficiency in all of our R&D spending to offset that. So increasing in GPU spending, there are some other increases as well around things like autonomous driving and some of the other – artificial intelligence and some of the emerging areas.

You're right, over time, we'll increase spending in NAND in R&D, but those are being offset by efficiencies that we're driving into the rest of our product R&D. And we really feel like we're getting to a good point where we can keep the pace of innovation going on our core products, while we fund these new initiatives as well and not pick a beat from our continued efficiency efforts across spending as a percent of revenue.

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**<A - Robert Holmes Swan>**: Joe, just to add some numbers to Brian's words. We've kind of come down from 36% to 35% to 34% to a H2 2017 at roughly 31% of revenue. So we've been coming down as we've been doing two things: one, the investments that we've been making are paying off in terms of higher growth; and number two, we're making real trade-offs in where we're investing our money.

As implied in our guidance, as we go into 2018, we're expecting our spending levels to be roughly flat with an annualized 2017 spending level. And underneath that, continuing to drive efficiencies in sales and marketing as we become more of a B2B or data-centric company and getting real leverage on our G&A functions across the board.

So we've made real progress during the course of the last couple years, including H2. We expect to make continued progress, while making the critical investments in things like discrete graphics, autonomous driving, artificial intelligence and continuing to invest in Moore's Law.

**<Q - Joe L. Moore>**: Okay, great. And as you think about that NAND investment, I guess people have asked me what the separation from Micron on a long-term path means. Does that mean there's sort of a more focus on propriety products like 3D XPoint? Or do you remain firmly committed to a more competitive NAND market?

**<A - Brian M. Krzanich>**: Fair. So I just want to make sure we clarify a little bit, Joe. The separation of development work is again out in time. Think of it in the 2020 timeframe is when the real independence come, and it's NAND-specific. So we continue to work together on 3D XPoint. And this is really just – it's not a separation of the companies or something about the relationship.

The relationship with Micron continues to be a good one, and I foresee it will continue to be a good one in the future as well. This is about direction of where we're going to take our products, and we've talked about ours are very data center-centric and really tied to performance and aligned to the customer market that we're really looking at. And so, the spending in R&D we're talking about right now is clearly NAND-specific. 3D XPoint continues to be a joint effort.

**<Q - Ambrish Srivastava>**: I wanted to go back to DCG, specifically on the op margin front. We've not seen a five handle, if my model is correct, it's been eight-plus quarters. So can you please speak to the sustainability of the op margin? And kind of what were the drivers that got you to that level? And then, I had a follow-up as well, please. Thanks.

**<A - Robert Holmes Swan>**: Yeah. So we came into the year and we indicated that we expected margins for the full year to be in the kind of 40% to 45% range. And, obviously, we started out low, but we set our expectations where that would grow throughout for the course of the year.

So a couple things in Q4. Obviously, growth, so real good leverage on our existing investment was a big contributor. Secondly, ASPs were up 8%. So of the 20% growth, ASPs accounted for 8 points of that. And as Brian highlighted, whether it's cloud, comms or enterprise, customers in the quarter were really paying for performance. That performance for us was higher ASPs.

Third, continued progress on unit costs. And then last, you may remember last year's fourth quarter, we had some warranty and IP-related charges in the data center business that I think cost us roughly 4 points a year ago. So last year is – we're a little bit deflated, but good volume leverage, strong ASPs as customers paid for performance and unit costs improving.

**<Q - Ambrish Srivastava>**: So we should expect this level going forward, Bob?

**<A - Robert Holmes Swan>**: I think I wouldn't get too far away from the 40% to 45%, to be honest with you. I think as we go into 2018, we think good cloud momentum that's been consistent performance over the course of the year, last couple years. Comms, our performance we believe was real strong in a somewhat sluggish market, so real share gain. But the high kind of seasonal enterprise growth and strong ASPs in the quarter we think are more seasonal in nature. And we're not anticipating enterprise growth to stay at these levels as we go into 2018.

**<A - Mark H. Henninger>**: Thanks.



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**<Q - Ambrish Srivastava>**: Okay, that's helpful. And then, for my follow-up on the gross margin for next year, you provided sort of qualitatively that adjacency, as well as the cost impact from the 10-nanometer ramp. But, A, I was surprised you didn't mention competition because now AMD will have a full year of product in an area they never were for – I shouldn't say never – they were not in an area for a long time. So question is, are you seeing any competition? Are you factoring that in? And then, B, would it be possible to quantify the two impacts that you mentioned? Thank you.

**<A - Robert Holmes Swan>**: Yeah. I'd highlight three things that are driving the deterioration. But I'd start first with, we've always characterize our long-term gross margins to be in the 55% to the 65% range. And for the last several years and included in our guidance this year, we'll be at the upper end of that 60% to 65% range. But for the last couple years, we've had maturity of 14-nanometer. And that maturity, both in terms of getting more and more performance and lower and lower unit costs, has been contributors to gross margins.

And as we go into 2018, we see 14-nanometer modest contribution from profitability because we've matured on the cost curve. That's an increasingly competitive environment, and we don't anticipate dramatic ASP improvements over the entire company in some cases, yes, but for the most part, no. So we'll see some continued improvement in 14-nanometer products during the course of the year.

Secondly, we are really accelerating the growth of our adjacent businesses. The investments that we've been making in both the data-centric businesses and our growth in modem, those are contributing to our year-on-year EPS growth. However, both of those product lines or businesses have lower margins. So our success in modem and memory is having a mix impact on our gross margins.

The third area is we're going from 10-nanometer start-up, where costs are coming down, to more the ramp to the 10-nanometer. And that ramp is going to weigh on the margins as we begin to develop production going into H2 where we're way up the curve on where our yields and costs are. So those are kind of the three things as we see it. And if I were to characterize, roughly plus one, roughly minus two, roughly minus one, rounding those.

**<A - Brian M. Krzanich>**: And, Ambrish, on your question specifically around competition, I think every year we look at it as the competitive environment and we're out to compete for our customers. And so, we factor that in each year appropriately, I think, against the competition. So we looked at the competitive environment. And we believe Xeon Scalable, a great performance that has. Our overall product roadmap, we think we have a highly competitive roadmap and have adjusted for that in our forecast.

**<Q - Stacy Aaron Rasgon>**: Firstly, can you walk us through your FCF waterfall? I can't get there. Flattish operating income on 4% revenue growth. You lose a couple billion dollars on ICAP gains. CapEx, I guess maybe flattish with the memory prepayments. Taxes maybe gets me a third to half of the way there. But where does the rest of the FCF come from? Are you just draining a ton of working capital or what? Can you walk us through?

**<A - Brian M. Krzanich>**: Yes. First, \$13B in FCF, up roughly 30% year-on-year. First, higher cash earnings. Our guide has EPS up roughly 14%. In that guide, depreciation has grown in 2018 relative to 2017. So that has just higher cash earnings.

Secondly, we do expect lower working capital as we go through 2018. Third, we have higher strategic customer supply agreements. And those three things are all contributing to the positive. And obviously, Stacy, the higher gross capital is a little bit of an offset. So stronger cash earnings, better working capital, more strategic supply, partially offset by higher CapEx.

**<Q - Stacy Aaron Rasgon>**: Okay. For my follow-up, I want to ask about the growth next year of your kind of adjacent businesses vs. your core businesses. Of that \$65B, of that 4%, can you give us a feeling how much of that is coming from the adjacent, I guess mostly memory and modems vs. the core? It must be decent given the gross margin pressures. And I guess as a corollary to that, you mentioned the one quarter delay in data center memory. Was that a statement on XPoint?



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<A - **Brian M. Krzanich**>: No. That was a NAND – I'll start with just the answer to that question, Stacy. That was a 3D NAND SSD. We had some delays in Q4, and those are being addressed now. So that was that comment.

<Q - **Stacy Aaron Rasgon**>: And growth – I'm sorry, go ahead.

<A - **Robert Holmes Swan**>: I think on your first question, in the \$65B, we characterized it as roughly low single digit decline in our PC-centric businesses. So implied in that is PC maybe declining a little bit more and modem adjacency within the CCG segment partially offsetting that.

In the overall guide, we said that the data-centric businesses would be growing in the mid-teens. Obviously, we believe that will be the strongest growth segment within the makeup of our data-centric businesses will be in memory. And it will be a function of customer quals that Brian just highlighted. And we expect NSG growth to accelerate throughout the course of 2018.

<Q - **Stacy Aaron Rasgon**>: So what is the...

<A - **Robert Holmes Swan**>: So it's a low single-digit decline on PC-centric and mid-teens growth on data-centric businesses.

<Q - **Stacy Aaron Rasgon**>: So what does that memory strength imply for the data center growth, the DCG growth, particularly given the strong performance in Q4?

<A - **Robert Holmes Swan**>: For the most part, the ins for NSG that will go through data center will be late in 2018 and won't really have an impact on the overall growth rate of that business. So it's primarily about growth of 3D NAND during the course of the year. Thank you.

<Q - **C.J. Muse**>: I guess a couple housekeeping questions, if I could put them together. I'm curious if you could share with us how you're thinking about CapEx spend between logic and memory. And then on the 10-nanometer startup, can you share with us when you're expecting to begin depreciating those costs?

<A - **Robert Holmes Swan**>: First on the CapEx, we indicated gross capital in the year of \$14B that we get customer strategic supply agreements of roughly \$2B. So our net capital is \$12B, \$12B in the year. Again, I'd break that into two pieces: memory, net capital employed, no change, and logic CapEx up roughly \$1B year on year. And as we mentioned earlier, that \$1B is a function of primarily growth: continuing to grow 14-nanometer; second, scaling up 10-nanometer; and third, investing in next node 7-nanometer during the course of the year. So those three things are really driving the \$1B increase in CapEx for logic.

The second part of your question – so for 10-nanometer, as we bring that equipment online, there's some equipment now that's being depreciated. But as we bring more online as we ramp in H2, when we turn that equipment on is when we start depreciating it. So we'd expect our depreciation bill in H2 to be growing.

<Q - **C.J. Muse**>: Thank you.

<A - **Robert Holmes Swan**>: That's one of the contributors really to come full circle. That's one of the contributors to the gross margin deterioration during the course of the year as we start to ramp 10-nanometer.

<Q - **Vivek Arya**>: For the first one, Brian, I'm curious. Are you baking in any effect on sales or costs or pricing from any resolution on the processor security issues? There is one line of thinking that says customers might decelerate their purchase. And then you have others in the industry saying that customers might accelerate their purchase later on. So I'm just curious how you're looking at the financial implications, positive or negative, from this issue near term and longer term.

<A - **Brian M. Krzanich**>: Sure, so let me try and break it into two kinds of answers for that, Vivek. From a cost standpoint, we've baked in and we've talked about that. We don't expect any material impact of the security exploits on our spending or product costs or any of that. So that's how we baked that in.

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From a forecast standpoint, we actually made our forecasts. And we've checked it as we go through the first few weeks here in the year against our prior forecasts to make sure that the forecast incorporated any changes or any signs we're seeing up or down. And I'd tell you, at the highest level, we're not seeing much of a change in those forecasts as a result of this.

So I'd tell you it's pretty balanced right now. So spending not material and didn't make any adds there. And then our forecast – we had a forecast. We've checked it as we go through the first few weeks of the year, and it hasn't really changed or altered as we looked at it.

**<A - Robert Holmes Swan>**: And the only other thing I'd add, per Brian's comment earlier, we go into the year realizing that it's an increasingly competitive environment. And our focus is on, right now, continuing to bring the best highest performance products to market, but also lots of time and energy spent on focusing on fixing this issue, primarily through software patches as opposed to short-term hardware things.

**<Q - Vivek Arya>**: Got it. And as my follow-up, for the full year, how should we think about growth in just the DCG business? I understand you gave some color around the entire data-centric group which includes memory and other segments. But just sort of apples-to-apples, how should we think about growth in just DCG, which had a very strong double-digit growth here in 2017? Thank you.

**<A - Robert Holmes Swan>**: Yeah. Throughout the course of 2017, we kind of guided to high-single digit and we kind of executed to that throughout. And then, Q4 wasn't dramatically different than the first three quarters of the year, really with the exception of the high seasonal spend for enterprise. And that really took us from a high-single digit to low-double digit or 11% growth for the year.

As we go into 2018, we do not expect that. We think that in the enterprise space, things will go back down to negative single-digit range and, therefore, don't anticipate a dramatic difference in how we laid out DCG a year ago.

So that's how we're thinking about it. If I maybe elevate that, back up a little bit and just think about when we're putting together our plans for the year, there's two areas where our tendency is to be a little cautious on the outlook. One is, PC TAM. We tend to be a little more cautious on PC TAM, and we tend to be a little more cautious as we think about enterprise growth in the DCG business.

And the reason we do that is we think it's important to be cautious, get our cost in line. And if our assumptions on market rates of growth turn out to be conservative, we believe we'd benefit from higher volume and real strong flow-through to net income. That's how we plan the year coming into 2017, and we did kind of the same thing for 2018. So I don't anticipate dramatically different DCG growth in how we laid out 2017 as we entered 2018, because we really haven't assumed a change in trajectory of enterprise CIO spending in the course of the year.

**<Q - Blayne Curtis>**: Just wanted to go back to the DCG ASPs. You had talked about the ramp of scalable being kind of to plan, but then I think you got a nice tailwind. And I think it implies enterprise had a higher percent of scalable. So just wondered if you could just talk on broad strokes just where the scalable ramp is here, and your expectations kind of getting through the year and where that could go?

**<A - Brian M. Krzanich>**: Sure. So I'll start and Bob can add some number detail and all. The Xeon Scalable ramp is right in line with the prior ramp of similar products on our DCG road map. And what you saw when we talked about Q4 was not necessarily more Xeon Scalable, but people buying up the stock on Xeon Scalable which drove the ASP.

So they're buying the higher-performance, higher-priced part. And that's not uncommon when at the early stages of the ramp people come in and they typically want to buy the highest performing parts at the beginning. And then they fill out their distribution as other buyers come in and other parts of the market open up. So ramps on schedule and aligned with prior ramps. And the ASP was more about SKU – buying up on the higher-performance parts than necessarily a volume statement.

**<Q - Blayne Curtis>**: Got you. And then I also want to go back on just – sorry. Thanks. I just want to go back on gross margin as well. As you look for March, you mentioned the drop is from adjacent business as well as 10-nanometer. Obviously, memory you're signaling a big ramp, but it doesn't [indiscernible] (01:02:10) fully. I just wonder if, Bob,

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you could just walk through the 10-nanometer start-up costs as they kind of move through the year and kind of if you can outline between those two, in Q1, what's the bigger factor?

**<A - Robert Holmes Swan>**: So I think mix dynamics are going to be a bigger factor overall for the year, both in Q1 and for the rest of the year as our memory and modem business continue to accelerate strong growth. So that's going to be the biggest impact. I think 10-nanometer will have an impact just right out of the gate and will kind of continue throughout the year as we scale volume, but also need to improve yields during the course of the year. So, hopefully, that's helpful

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