Company Name: Broadcom
Company Ticker: AVGO US
Date: 2018-12-06
Event Description: Q4 2018 Earnings Call

Market Cap: 93,951.64
Current PX: 227.24
YTD Change($): -29.66
YTD Change(%): -11.545

Bloomberg Estimates - EPS
Current Quarter: 5.202
Current Year: 22.124
Bloomberg Estimates - Sales
Current Quarter: 5523.885
Current Year: 22861.067

# Q4 2018 Earnings Call

## Company Participants

- Beatrice F. Russotto
- Hock E. Tan
- Thomas H. Krause

## Other Participants

- Vivek Arya
- Aaron Rakers
- Amit Daryanani
- Toshiya Hari
- Harlan Sur
- Romit Jitendra Shah
- William Stein
- Stacy Aaron Rasgon
- Craig A. Ellis
- Craig M. Hettenbach
- Vijay Raghavan Rakesh
- Ross Seymore
- John William Pitzer
- Timothy Arcuri

## MANAGEMENT DISCUSSION SECTION

### Beatrice F. Russotto

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

In addition to U.S. GAAP reporting, Broadcom reports certain financial measures on a non-GAAP basis

A reconciliation between GAAP and non-GAAP measures is included in the tables attached to today's press release

Comments made during today's call will primarily refer to our non-GAAP financial results

### Hock E. Tan

#### *Business Highlights*

##### *Net Revenue, EPS and FCF*

- Well, as you saw, we closed the FY on a very high note
- Consolidated net revenue for Q4 FY2018 was $5.45B, a 12% increase from a year ago; and EPS came in at $5.85, a 27% increase from a year ago

- Importantly, FCF was $2.53B or 46% of our net revenue
- I would like to provide you more color on the top line today, and I have a lot to cover today actually
- And please note, fourth quarter results do not include any contribution from CA.

### *Wired Results*

- Starting with Wired
- On the quarter results, starting with Wired, revenue was $2.2B, growing 3% year-on-year and the Wired segment represented 41% of total revenue for this quarter
- Looking deeper though, fourth quarter Wired results reflect very strong year-on-year growth for our networking and computing offload businesses, driven by robust demand from the cloud data center markets, as well as traditional enterprises
- And networking/computing offload represented over two-thirds of our Wired segment in the quarter, and grew 22% year-on-year in the quarter
  - This is on the back of growing 10% year-on-year in Q3
- So this part of the Wired segment continues to be very robust

### *Headwind*

- On the other side, as anticipated, cyclical headwinds in certain parts of our broadband business reflecting weak carrier spending in those areas continue to impact this part of our Wired business in Q4
- As a result, broadband was down y-over-y again in Q4, and offset partially the strong growth from data center spending

### *Enterprise Storage*

- Turning to Enterprise Storage, revenue was $1.3B, representing 23% of revenue
- And consistent with what we experienced in wired networking businesses, robust enterprise IT spending drove over 96% year-on-year revenue increase
- Now, of course, this includes contribution from Brocade, which we acquired about a year ago
- But even if we strip out Brocade, store Enterprise Storage grew double-digits year-on-year in the quarter

### *Wireless*

- Moving on to Wireless, revenue was $1.7B which was down 5% year-on-year
- The Wireless segment represented 31% of our total revenue
- And Wireless revenue, however, was somewhat better than our expectations for Q4 as we benefited from upside volumes of legacy phone generations at our North American OEM customer

### *Industrial*

- And finally our last segment, Industrial

- In Q4, Industrial segment represented 5% of total revenue
- Distribution re-sales, which is how Industrial are sold for us, continued to be strong, contributing to high-single digit year-on-year growth in the Industrial business

## *Q4 Results*

### *Organic Growth*

- With that, now let's talk about the segment performance for the full FY2018 which, interestingly enough, could be in stark contrast to Q4 results I just articulated
- Wired, for us, in FY2018 was up 1% as networking expanded, while broadband was down
- Meanwhile, Enterprise Storage was significantly supported by Brocade, as well as strong organic growth in our server storage connectivity business
- And Industrial performed extremely well, up [ph] 12% (00:07:09), helped by the healthy macro backdrop

### *Revenue*

- Finally, despite all the quarterly fluctuations, Wireless was actually up 20%
- So what's interesting and what I want to highlight when you step back from quarterly results and look at the annual performance, we had a great year
- Our revenues hit a new record high, growing 18% year-on-year to nearly $21B for FY2018
  - This clearly demonstrates how our diverse set of businesses drive stability and sustainability in our consolidated revenue, despite quarterly and even annual volatility in specific segments

### *Acquisitions*

- With this in mind, we plan to move away from quarterly guidance to annual guidance going forward
- Annual growth and guidance reflect, we believe, more accurately how we manage our business and also aligns very well with how management and employees in this company are measured
- In addition, viewing our business broadly, you can see we have created over the years, organically and through acquisitions, a substantial core revenue stream in semiconductors based on technology enabling connectivity solutions across a broad set of end markets
  - We continue to remain focused on the sustainability and growth of this core business
- But in addition, with our acquisition of Brocade, we created a complementary revenue stream to our semiconductor solutions that we are now calling infrastructure software
- With the acquisition of CA, I may add, we will grow this revenue stream and build upon it through acquisitions, consistent with our business model

### *Semiconductor Solution and Infrastructure Software*

- As a result, going forward, our two primary segments will be semiconductor solutions and infrastructure software
- And so, for FY2019, this coming year, the outlook for business is as follows

- In the semiconductor solutions segment, we expect continued robust demand from cloud customers with the ramp of next generation Tomahawk 3 switches and from the launch of our next generation routers, Jericho 2
- We also expect to see recovery of spending by carriers, operators, in cable as well as in communications, as we expect the broadband market recovery to start to progress through the year
  - We have already seen that happen this quarter

### *Wireless Business*

- Storage we believe will be stable relative to FY2018
- And as we previewed last quarter, we believe the reset in our Wireless business in H1 2019 from share loss in the current phone generation will be followed by a substantial recovery in H2 as we take share back for the next generation
- So while there will be lots of puts and takes here, our outlook for the semiconductor business is for modest revenue growth in 2019
  - This may be somewhat dampened relative to our long-term mid-single digit growth expectation by Wireless

### *CA Business Model*

- Now, turning to infrastructure software segment
- Before providing our outlook, I should take a few minutes to outline the substantial changes we're making to the CA business model
  - We expect these changes to result in a dramatically more profitable revenue base which is more aligned to the rest of Broadcom and that we expect will grow
- First and foremost, gone are the days of trying to land new products with new customers; and I'm referring to enterprise software
- We're focusing all our attention on renewing existing products with existing mainframe-centric customers, customers that represent virtually all of the world's largest enterprises and largest spenders on IT

#### *Core Mainframe Customer Base*

- We're also targeting expansion opportunities within this core mainframe customer base
- The cost of running this renew and expand model will be substantially less than the legacy land-at-all-cost model and, importantly, renewing and expanding plays to CA's strengths

### *Revenue*

- Let me explain
- Today, over 70% of CA's revenues are derived from its top 500 accounts
- In almost all cases, these top customers have been licensing CA mainframe products for more than a decade and oftentimes several decades
- CA contracts with these customers are primarily broad-based, multi-year license agreements and include a term license with maintenance for mainframes

- At this end customer, enterprise products are sold, but sold as perpetual licenses with maintenance embedded in the license agreements

### *Double-Digit Rate*

- At each of our top customers, we have two primary objectives
- One, we want to expand our efforts on mainframe and make sure that we are realizing the full value that our mainframe tools are delivering to our customers
- And as we discussed on the prior call, usage, as defined by [ph] MIPS (00:14:20), has been growing at double-digit rates at all these top accounts
- Logically, we're now more focused because of that on prizing mainframe based on consumption
  - We also feel there's a huge opportunity for customers to save money by leveraging our broad mainframe portfolio to drive more conversions to CA tools

### *Enterprise Software End Market*

- Going on to the second objective, we really want to expand our enterprise software products within the same top accounts
- Now, it is true that lower-cost and lighter-weight SaaS alternatives have been creating challenges for CA for some time in their enterprise software end market
- But what's interesting is that CA actually has very highly rated – in fact, Gartner upper right-hand Magic Quadrant categories for enterprise software for enterprises
  - While they are very well suited to the private cloud IT environment of the largest enterprises, these enterprise software are just too expensive relative to SaaS.

### *Broadcom Software Business*

- So moving forward, we are going to move away from the inflexible perpetual license model for enterprise software to an enterprise-wide, all-you-can-eat license for all of our core accounts
- By doing this, we expect to remove the friction caused by selling expensive upfront perpetual licenses, so that the incremental costs for our customers to expand the use of enterprise products will be highly competitive relative to SaaS-based alternatives
- Bottom line, we are adopting a fully ratable subscription model for the Broadcom software business
  - This new business model, we believe, plays to our strengths, focusing on the largest 500 customers tied to mainframes with the ability to upsell enterprise software competitively using an all-you-can-eat subscription-based model

### *Revenue Base*

- We expect this transition, though, to take a couple of years, given the timing of contract renewals
- But once completed, we expect revenues to stabilize at over $3.5B annually and grow from there
- And to support that revenue base, we do not expect to spend more than $900mm per year

### *CA Restructuring and Integration Process*

- And as a result, we expect to achieve more than $2.5B per year in operating profitability from the CA business once we go through this transition
- We are well on the way today with the CA restructuring and integration process, including announcement of the Veracode divestiture to Thoma Bravo and the outsourcing of the CA services business to HCL

### *SAN Switching*

- So with that as background, let me talk about our outlook for the infrastructure software segment in 2019
- Now, SAN switching, Fibre Channel SAN switching here performed beyond expectations in 2018 on the back of very strong enterprise demand, as well as meaningful share gains
  - While we expect to continue to see healthy demand, we do not expect in this forecast to have this sustained through 2019

### *Infrastructure Software Segment*

- Furthermore, since we are moving mainframe and enterprise software products to a fully ratable revenue recognition model and just focusing on the top 500 accounts, we expect a reset in the CA revenue starting Q1 2019
- As a result, our revenue outlook for the infrastructure software segment for 2019 will be approximately $5B
- Combining the semiconductor solutions, in summary, we are forecasting consolidated revenue to be approximately $24.5B FY2019
  - This will be, to repeat, driven by a very stable semiconductor business that will be complemented by an infrastructure software business that we are rapidly building up

## Thomas H. Krause

### *Financial Highlights*

### *Net Revenue, Gross Margin and Operating Expenses*

- My comments today will focus primarily on our non-GAAP results from continuing operations, unless otherwise specifically noted
- Let me walk through our results for Q4 FY2018
- Fourth quarter net revenue was $5.45B, ahead of the midpoint of guidance
- Our gross margin from continuing operations was above the high-end of our guidance at 68.4% as we benefited from a more favorable product mix in the quarter
- Operating expenses were slightly lower than expected at $863mm
- As a result, we achieved record profitability in the quarter

### *Adjusted EBITDA*

- Operating income from continuing operations was $2.86B and represented 52.5% of net revenue
- Adjusted EBITDA was $3.02B and represented 55.4% of net revenue
  - This figure excludes $132mm of depreciation
- And the company delivered $5.85 of EPS in the quarter off of a 435mm weighted average fully diluted share count
- This represents 27% EPS growth compared to the same quarter last year

### *Working Capital*

- Working capital, excluding cash and cash equivalents, increased approximately $105mm compared to the prior quarter, due primarily to an increase in receivables
- This increase was driven by seasonally higher shipments in the last month of the quarter
- In addition, we spent $106mm on CapExs
- As a result, we had record FCF from operations at $2.53B or 46% of revenue
  - This represents 47% growth in FCF from operations compared to Q4 of 2017

### *Stockholders and Debt*

- In the quarter, we returned $2.26B to stockholders, including $723mm in the form of cash dividends and $1.53B for the repurchase of 6.4mm AVGO shares
- We ended the quarter with $4.3B of cash, $17.5B of total debt, 408mm of outstanding shares and 432mm fully diluted shares outstanding

## *Non-GAAP Guidance*

Now, let me turn to our FY2019 non-GAAP guidance

We do intend to update our annual guidance on our quarterly earnings calls throughout the year

And, as normal, this guidance is for results from continuing operations only

### *IP Licensing and Operating Margin*

- As Hock discussed, net revenue for FY2019 is expected to be approximately $24.5B, including approximately $19.5B from semiconductor solutions and approximately $5B from infrastructure software
- IP licensing is not expected to generate a material amount of revenue
- Operating margins are expected to be approximately 51%
- I'd like to note, post CA integration/restructuring, we do expect to move closer to 55% operating margins in 2020

### *Net Interest Expense, Tax Rate and CapEx*

- Net interest expense and other is expected to be approximately $1.25B, and reflects maintaining a target cash balance of approximately $4B and servicing total debt outstanding of approximately $37B, following the close of the CA deal

- This forecast does not contemplate any debt paydown in FY of 2019
- The tax rate is forecasted to be approximately 11%, and includes a slight negative impact from the CA acquisition
- Depreciation is expected to be approximately $600mm
- CapEx is expected to be approximately $550mm
- As a result, FCF from continuing operations is expected to be approximately $10B

### *Stock-Based Compensation Expense*

- And, finally, stock-based compensation expense is expected to be approximately $2.1B
- Now, this is a substantial increase in our stock-based compensation expense, and let me take a moment to explain
- We are implementing a special broad-based multi-year equity award program for our employees, including our new CA employees
- Each multi-year equity award will vest on the same basis as four annual equity grants made on March 15 of each year, beginning in 2019
- And it is expected that a maximum of approximately 31mm shares of common stock in aggregate will be issued in vest over the next seven years
  - This is the same number of shares, in aggregate, as we would have expected to grant over the next four years annually
- The spike in the 2019 stock-based comp will start to come down in 2020 and decline from there back to our normal level by 2022

### *Labor Market*

- So, in summary, really, this is an accounting dynamic that impacts the stock-based comp in 2019
- We do believe providing four years of equity grants upfront provides clarity regarding future compensation that creates a powerful retention incentive in an otherwise tight labor market and a sharpened focus on long-term stockholder value creation
  - In addition, it allows us to maximize the use of the remaining authorized share reserves under our 2009 Avago equity award plan, which unfortunately is expiring in 2019
- As broad-based employee stock ownership is the fundamental tenant of our company, it is important that we continue this legacy while our current equity plans enable us to do so

### *PSUs*

- I would note couple of things
- One, Hock is not participating in this program and, as previously disclosed, will not receive another equity grant until at least 2021
  - In addition, for executives, 50% of the awards are PSUs, the vesting of which is tied to total shareholder return, similar to our prior annual awards to executives

- Finally, no further annual grants are planned for employees who'll receive this award until at least 2022

### *Capital Allocation Plan*

- Now, let me turn to capital allocation plans before we open the call for questions
- Consistent with our capital allocation strategy, we are focused on returning approximately 50% of our prior-year FCF to stockholders in the form of cash dividends, with the balance being allocated to a combination of stock buybacks and acquisitions
- In addition, we plan to also continue to use our balance sheet to fund acquisitions while focusing on maintaining our investment-grade credit rating

### *Dividend*

- With that, on the dividend, based on approximately $8.2B of FCF that we generated in FY2018, we are increasing our target quarterly cash dividend starting this quarter to $2.65
- This constitutes an increase of 51%
- We plan to maintain this dividend payout throughout the year, subject to quarterly board approval, which means we plan to payout over $4B in cash dividends in FY2019
- Consistent with our capital allocation policy, we will reassess the dividend at this time next year based on our FY2019 FCF from operations

### *Stockholders*

- Now, given the dilution stockholders are bearing from the multi-year grant and given the FCF yield that Broadcom is currently generating, we are also budgeting to return an additional $8B to stockholders through stock buybacks in FY2019
- Coupled with the dividend, this means we are planning to return approximately $12B to stockholders in FY2019, which constitutes all of our projected FCF, plus the excess cash that we have on our balance sheet today

# QUESTION AND ANSWER SECTION

**<Q - Vivek Arya>**: Congratulations on the good execution. Hock, I understand – I appreciate keeping the focus on longer-term trends. But just because removing the guidance on a quarterly basis is a big change, just for this quarter could you give us some color on how Q1 trends are shaping up, especially given all the concerns around trade and tariff and your largest customer? So even if you can't quantify everything, if you could just give us some color commentary on what's going on in different segments in Q1, that will be very helpful.

**<A - Hock E. Tan>**: I'll give you the answer, it's okay. Remember, we have backlog out 18 weeks for most of our products. That's longer than a quarter, which runs 13 weeks. And based on that, what we have in place, it's trending pretty well compared to Q4, okay? And keep in mind, there are puts and takes even in all of this. And broadband starts to recover, as I mentioned before, finally, long last. And networking/offload computing is still nicely holding up. But handsets, Wireless, you've seen it out there. We expect to see a seasonal downtick. So storage, flattish, back to moderation. So all combined together, things are kind of what it is, okay.

**<Q - Aaron Rakers>**: I want to understand maybe the puts and takes a little bit better in the infrastructure software guide. If we look at CA's results on a standalone basis, it looks like they're about, call it, $3.5B. You're stripping out the services business, you've sold Veracode. So can you help us bridge a little bit more the uplift you're seeing from that level of revenue to that $5B guide for the full year? Thank you.

**<A - Thomas H. Krause>**: Yeah. Hey, Aaron. It's Tom. I think, keep in mind, there are now two substantial businesses, I should really say three, in that number as you properly pointed out. There's the CA business for a couple data points; Veracode run rate business is about $150mm a year, it was growing; and we've outsourced the services business, so that business will start to tail off through the course of 2019 and largely be gone in 2020.

But then, keep in mind also there's Brocade, the SAN Fibre Channel switching business, which is performing very well for us. We're not breaking out the specific revenues for that particular business, but it's also providing a substantial portion of the overall $5B.

So, in total, we see a reset in the CA business starting in Q1. We do expect based on the renewal expectations around our core 500 customer base to grow throughout the year with CA. And we also expect to continue to maintain reasonably high levels of revenue with the Brocade Fibre Channel business.

**<Q - Amit Daryanani>**: When I think about the $2.5B operating profit target from CA, can you just talk about the timeline to achieve that? And when I look at the accretion or the incremental contribution that I get from – for CA, the accretion I guess, how much of that is going to come in COGS vs. OpEx for you guys?

**<A - Hock E. Tan>**: Well, very interesting question. And let me outline again what I went through in my remarks fairly quickly. And as Tom actually articulated earlier in answer to this question, we start 2019 partly because of a resetting from recognizing perpetual licenses on an accelerated manner to ratable, subscription-based revenue recognition. 2019 will take a step down from what you typically expect the rate to be. And you will rapidly build up over the next two, three years to the level, as we spoke about, closer to over $3.5B.

On the spending side, if you recall, before we acquired CA, the last quarter, stripping out services, taking out services, [ph] which was a wash (00:33:21), total spending was about $2.4B, $2.5B, per year. We're bringing it down to $900mm, and we are able to bring it down to $900mm is – for one, I purposely articulated in my opening remarks, okay?

A large part of that $2.4B of spending was attributed to the various sales motion, development motion, I should say, of trying to land new customers, as well as land existing customers with new products, but basically landing new customers. And a lot of these customers are, I would consider, the long tail of a long list of customers.

The largest 500 customers in the world are [indiscernible] (00:34:26) their customers through mainframes. But a big amount of that spend, I would guess, what we're seeing is to the tune of more than $1.5B at least – are spending $2.4B, sorry, $900mm is [indiscernible] (00:34:47) close to $1.5B is used to try to develop new product and land on new customers.

By moving away from that, focusing on the largest 500 customers we think with renewals, with mainframes, but upselling on enterprise software, we basically get to the same revenue number with much less spending substantially. And that $3.5B, say, as conservatively we get to in year two or year three from today. And last the $900mm end state spending is where we believe we get to around the $2.5B operating profit target.

**<Q - Toshiya Hari>**: Hock, you talked about your intention to regain share in the RF business next year. I think that's consistent with what you had said three months ago. I appreciate the time you spend with your customers designing these products and you probably have some visibility, but I was under the impression that the SKUs for next year haven't been set. So I guess the question is, what gives you the confidence that you can indeed regain share in that business? Thank you.

**<A - Hock E. Tan>**: We're just confident. And, obviously, we have not been idle; we have been working. So these are very difficult products, very complex technologically advanced products to do; and we have been working on it for over a year with customers.

**<Q - Harlan Sur>**: Hock, you talked about continued strong trend FY2019 in networking demand, cloud and enterprise. I was hoping you could quantify a bit more. Next year, it's still looking like the cloud guys are growing their spending again a bit at a lower rate vs. this year. But then, you layer on the 200-gig, 400-gig upgrade cycle with

Tomahawk 3 and then you've got the ramp of some of your AI and deep learning and Smart NIC ASIC programs. Given all of this, I kind of wanted to know if the team still feels like they can sustain double-digit y-over-y growth rates for this segment, FY2019.

**<A - Hock E. Tan>**: Very good question. Thank you. Yes, public cloud, I call it, spend part of our networking/compute offload business, so to speak. The public cloud side, which is about half or at least half of our revenues right now, in that sector that does networking and compute offload, continues to be extremely strong. And it's strong not because of anything else; in 2018, we didn't launch any major new milestone products and we still grew, as we indicated. We grew double digits.

2019, we have, in addition to that natural momentum, the addition of the fact that we're launching two significant products, the top of the rack switch, the Tomahawk 3, 12.8 terabit per second big throughput switches which are very welcome, very – basically will be very much in use by the hypercloud guys. That will be a big driver of growth. In addition, but perhaps in use in some of the spine architecture of those hypercloud data centers, but more on just – also at operators for their routing applications, we're launching, middle of the year, Jericho 2.

So we have two product drivers on top of the natural momentum of increasing content that we are seeing, that you articulated, in those data centers at cloud, especially from compute offload, where we're talking about modern controllers, we're talking of deep learning content, we're talking about compression, encryption, and we're just talking broadly about anything to do with offloading CPU cycles from servers. And that's a very long-term tailwind that we have basically been able to take advantage of and continue to benefit through probably more than one year.

**<Q - Romit Jitendra Shah>**: Tom, I just want to make sure I have my facts correct on the option grant. So $2.1B for FY2019 and you have that coming down over – is it over a four-year period and does it go back to the FY2018 levels or some level above that? Thank you.

**<A - Thomas H. Krause>**: No, I think that's the right way to think about it, Romit. It's a four-year grant accelerated and done in one shot this year, as opposed to doing it over four years. So in aggregate, you wouldn't have any difference. But from an accounting perspective, you'll have to take all the step up this quarter. It'll start to bleed off next year and decelerate back to where we were over a four-year period. So I look at the 2018, $300mm a quarter type stock-based comp run rate as the run rate roughly for the company on a steady-state basis.

**<Q - William Stein>**: I'm particularly focused on the dividend. There was a significant increase this quarter. And when we contemplate the company's ability to grow the top line long-term, expand margins and your capital allocation plans save any further M&A, what does management expect the sort of long-term growth rate of that dividend to be?

**<A - Thomas H. Krause>**: Sure, Will. So I think we've spelled it out fairly clearly both on the policy in terms of returning the 50% of FCF from the prior FY, and we've spelled out now what we think we can do from a FCF from operations perspective in 2019, which is the $10B.

So when you take into account the buyback expectation that we've also articulated of approximately $8B, the outstanding shares should come down, as well as the FCF is going to go up. So when you do that math, you're going to come up with a number that's north of 20% in terms of potential for dividend growth.

Now, going forward, we'll have a couple of other tailwinds that we've benefited from in the past, which is, frankly, M&A and the accretion that we drive once we're fully integrated and restructured. And so, as Hock's been articulating, when we get to the $2.5 billion-plus of operating profit, that's going to start to be realized in 2020, into 2021.

Absent additional M&A, we would continue to focus not just on the dividend, but also the buyback, which would allow us to reduce the share count as well. So I think we have a good setup to continue to be able to drive the dividend well into the double-digits over the next several years.

**<Q - Stacy Aaron Rasgon>**: I was wondering if you could elaborate a little bit on the all-you-can-eat model that you're developing now for your enterprise software business. Does that basically work one license that a customer takes for anything that you buy going forward and put into that segment? And if that's true, how do you grow the business without taking those rates up over time if you're still selling to the same customers? Like what does that model actually look like over time?

**<A - Hock E. Tan>**: Oh, yeah. Oh, yeah. That's a very good point. And you're right, we provide that enterprise-wide license to those core customers only, by the way, product-by-product. Obviously, it's not across all our enterprise products at the same time, but it's only when the customer is adopting it. And so, that part of it becomes very important, you're right.

If one of those big core customers adopts, say, Agile operations, one of Agile operation software or what we call Rally, which is for projects, and they want more seats, they want more capacity, what we will provide is for a license contract on a multi-year basis we expect to get a certain amount of dollars as you say and we'll give them under that enterprise-wide unlimited license, and you're right.

So for that particular product, limited ability to increase except on the fact that after, say the contract is three years, end of three years, inflationary improvement in our product, innovative improvement in not putting more features in the product, but we better be selling them another product on the same basis, and that's how we expect to be able to grow. And so, from two fronts, improving the product we have on an ongoing basis, but also selling the customer another product from our very broad suite of enterprise software products.

**<Q - Craig A. Ellis>**: I'll echo the congratulations on the good execution. Tom, I think it was in your comments where you mentioned the aspiration for 55% operating margins in FY2020. But since that would represent a 400 basis point increase from what you're targeting in FY2019, can you just walk us through some of the assumptions that could lift the operating margin level of that magnitude? Thank you.

**<A - Thomas H. Krause>**: Yeah, good question. So there's a number of things that [ph] affect (00:46:25) that. I think, first and foremost, we do continue to see the ability to grow the business. In the core semiconductor business, we do expect, especially as Wireless recovers in the back half, to see a return to more standard sort of mid-single digit growth rates in 2020.

On the software side, as we continue to grow into the ratable model, we also expect to continue to see growth there in 2020 and into 2021. And then, as is consistent with what you've seen over the last many years, our model is very focused on gross margin expansion. We will continue to drive incremental expansion in gross margins, especially on the semiconductor side.

And then, finally, we've talked about it a lot on this call, but we are going to be reducing expenses dramatically with CA and we're doing that because of the change in the business model and the focus on the top 500 accounts, the focus on leveraging mainframe with these great enterprise products, and moving to a fully ratable model. This is a much lower cost, much more profitable way to run the business.

And so, you're going to see the benefits of that in 2020, which will actually continue to show progress even into 2021 I think. So 55% operating margins we think is very achievable as a result of all those factors as we look out beyond 2019.

**<A - Hock E. Tan>**: And to be specific, Craig, today – this FY2019, when we buy a company, a company especially as complex and large as CA, it takes us a year or two to transition to the end state. FY2019, I would estimate, we are carrying something like $1B of transition expenses in FY2019 alone. Now, it won't all evaporate by FY2020, but a big part of it will evaporate by FY2020. And that, with the revenue increase Tom is talking about, gets us to that 55% operating margin.

**<Q - Craig M. Hettenbach>**: Hock, just a question. Any particular feedback from large customers now that you have Brocade and CA together? And anything you'd like to discuss in terms of some of the synergies and overlap with customer base and things you can do?

**<A - Hock E. Tan>**: Great question. Yes, I have met with quite a few CIOs, COOs, and CIOs of some of the largest customers of CA, who happens to be, coincidental or otherwise, the largest end use customers of Brocade as well, which is SAN switching. And you may know, we have mentioned in prior quarters, SAN switching, which is attaching to storage arrays, is very, very connected to mainframes as well in hardware and software, the way storage is done. And

[ph] a lot of interest (00:49:38). And basically all these CIOs, a lot of them, are, as you well know, thinking through the high levels of IT spending each of them has to go through.

Each of them are trying to figure out what's the best structure, architecture for their data centers. And many of them are regulated, which means they can't go completely to the cloud. So a lot of them are talking about, as we all hear, hybrid cloud. A lot more of them are thinking of building their own private cloud. We have all the technologies, hardware and software to enable them to build those private clouds. And each of those CIOs in these larger companies who are spending several billion dollars at least a year in IT are quite able and have the skill to do that.

So there is potentially a lot of synergies, and it's not just in the technologies we have and collaborate as one; it's also the go-to-market model that would be very much simplified as we now reach out to those end user customers who are in CA, who are in Brocade and who indirectly develop building, are buying big data centers, compute storage, networking, indirectly from us. So there is a lot of synergies, and we have begun the process of engaging in a dialogue.

**<Q - Vijay Raghavan Rakesh>**: Hock, you mentioned the all-you-can-eat model for software. I was wondering if you continue to do more M&A on the software side that you can stack on that same model. Thanks.

**<A - Hock E. Tan>**: That's a great idea and we definitely want to do that because we have built up with CA the platform; that platform for support, ensuring customer success and a platform for directly touching, engaging. In fact, heavy touching, I call it, on those largest 500 customers. And as we add on more products, software products, be they particularly on enterprise software, we believe this is an opportunity for us, as we say, to build on that second complementary revenue stream in infrastructure software.

**<Q - Ross Seymore>**: Congrats, especially on the cash return side. Hock, I wanted to ask a bigger question. With all the uncertainty, China trade, macro, et cetera, you mentioned you have the 18-week backlog and that Q1 I think is doing fine, to paraphrase what you said. Have you noticed any change in any of the various end markets that you have, given these uncertainties, in the customer behavior in any way, shape or form?

**<A - Hock E. Tan>**: Oh, yeah. I'm sure there are. But I'm not sure if some of it is related more to microeconomic variations in those niche markets we deal with vs. the bigger concern with respect to tariffs, is what I think you are referring to. It's hard to tell. But as we said, we're across so many different end markets, niche markets some of them, we do see some of them – your question is, are they all consistently trending down? No. We do not see that. But we do see some that are down and we do see some that are up. And is that an indication that is tariffs vs. just very typical microeconomics? Can't really tell because some of the color that I've given you guys are not affected by those.

For instance, broadband recovery I think is more tied to the lumpiness in the cycle of carriers and operator investment, especially in Europe and U.S. more than anything else, and we are benefiting from that. Meanwhile, cloud spending, be they in the U.S. or China, is still unchecked. I guess that's still going on very well. Enterprises, maybe we start seeing some level of slowdown in enterprises, but that's only down to a small part of our broader system.

So it's a lot of mix. And at the end of the day, it's not that clear yet how this will affect the business we are in, which is largely enterprises and operators. Our exposure to consumer is limited to couple of these high-end phones. And in that regard, as we all have seen, the phone market has not been exactly very strong this past several months.

**<Q - John William Pitzer>**: A lot of my questions have been answered. But, Hock, just to follow on to Ross's question, you made some comments about cloud/hyperscale and that's clearly an area where I think growth has been particularly strong this year and there's some investor angst about whether or not, from these high levels, that can be sustained into 2019. I'd love to get your view on that?

And as you answer the question, I'd love to get sort of a differentiation between kind of your core ethernet business and maybe some of your new emerging ASIC business you have with the hyperscale guys, especially around acceleration and AI and how that's playing out?

**<A - Hock E. Tan>**: Okay. Two questions. Let's try the first one. The cloud guys, as we see, the spending is still going on. I mean, their spending pattern, to some extent, almost is starting to track or copy those of operators. They get lumpy. They don't spread evenly across a year. That's part of the reason why we want to go to an annual thing, because you do it quarterly, it's not driving me crazy; it's driving you guys, who track us, crazy. Because it gets very lumpy, especially with the level of spending, they are all coming in and the level of spending they make on our products.

But if you look at it across a period of a year, they're sustaining; and they're sustaining – and I really mean the large cloud guys, which include both China and U.S., but also even the Tier 2 guys.

It's still sustaining, and part of it is also content. We're selling them more and more stuff, as I said, products. It's not just switching and, to some extent, routing. It's not just switching that we've started with initially, which is why I highlight, and it's not newer generation of switching as they go to scale out of the data centers and higher capacity switching. We sell interconnects like fiber optics. And as it goes from 10-gigabit, to 100-gigabit, now 100-gigabit to 200-gigabit and 400-gigabit, the price point, the content of those fiber optics shoots up fairly exponentially and very nicely.

And then, we also do this computing offload, which is really a nice description of broad base of, as I say, you call it accelerators; and, true, they are mostly accelerators, and deep learning chips, network, ethernet controllers, Smart NICs as some people call them, encryption, compression, video, delivery chips, all those going bigger, the content keeps going up. And that's why at some level when you pull it all together, where do you see cloud going? And as I said, most of these are not one generation or one year at a time, they go beyond one year.

So, overall, we see it as a continuum that is growing. How fast does it grow? That 20%, I mentioned in Q4, seems somewhat unusual, but that's because of the lumpiness. And that's why we don't want to give you guys the wrong impression because the quarter before was closer to 10%. And on average, I will say, the cloud guys grow more likely in the high-single digits to 10% year-to-year, then 20% that any particular quarter might lead us to think. But it's there and very stable. And it's there to replace to some extent the enterprises, the traditional enterprises.

**<Q - Timothy Arcuri>**: Tom, I'm just trying to get kind of an apples-to-apples bridge on the $24.5B relative to the $23.9B that was shown as a pro forma in the presentation for the CA deal. I know you're losing Veracode and you're losing some of the stuff around HCL, but you're also getting a bump from the change in the model in the software business. So I'm just trying to get a bridge on the apples-to-apples on that $24.5B relative to that $23.9B that you showed in the presentation. Thank you.

**<A - Thomas H. Krause>**: It's a challenging bridge only because you're talking about, first of all, two accounting standards of ASC 605 vs. ASC 606 on the CA side. But be as it may, I think the right way to think about it is the $24.5B. We've talked a lot about where we think semiconductor growth will be. It's a new way of reporting for us, but we think we're going to have modest growth on the semiconductor side.

And then, you've got two businesses, you've got CA and Brocade which is constituting the $5B that we're building up on the infrastructure software side. So we're quite comfortable based on modest growth in semis. And we've articulated, I think, quite clearly how we get there on top of what, at the end of the day, is a solid Brocade business, plus the restructured and reset CA business, and that's how we get to the $24.5B.