From:	Satya Nadella </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=MICROSOFT.ONMICROSOFT.COM-55760-SATYA NADELLA>
To:	Phil Spencer; Amy Hood
Sent:	3/19/2020 3:14:46 AM
Subject:	RE: Sony PS5 Reveal

This is really great to hear Phil.

Neither of us have announced pricing right?

Thx

Sent from Mail for Windows 10

From: Phil Spencer
Sent: Wednesday, March 18, 2020 6:55 PM
To: Satya Nadella; Amy Hood
Subject: FW: Sony PS5 Reveal

Even as I type this I know I shouldn't but I can't help myself.

We've all lived with 7 years of starting off a generation with a price and performance (and messaging) disadvantage to PS4 with Xbox One. I have to admit this morning when I woke up knowing the PS5 reveal was today that the stress level was higher than normal. Now after almost 12 hours of soaking in their unveil, taking apart their specs and looking at the community responses I just wanted to say that I'm proud of our team.

We have a better product than Sony does, not just on hardware but equally important on the software platform and services on top of the hardware. We have the ingredients of a winning plan. I felt the feedback from the BoD discussion on being too confident and maybe this will just reinforce that perception, I get the need to be humbly confident but today was a good day for us.

We haven't won anything. And I know we have hard discussion about pricing, P&L, investments etc. This mail isn't trying to scoop any of that, those discussions really matter. But we can take confidence in our product truth here and I do believe any conversation needs to start with believing in that. This was a good day for Xbox.

Thanks for indulging me,

Phil

From: Liz Hamren <liz.hamren@microsoft.com>
Sent: Wednesday, March 18, 2020 3:18 PM
To: SLT <SLT@service.microsoft.com>
Cc: Gaming LT <gaminglt@microsoft.com>; Andrew Goossen <andrewgo@xbox.com>
Subject: Sony PS5 Reveal

SLT –

This morning in a livestream Sony unveiled the tech specs and technical investments for PS5, their next generation console. Overall, Sony's announcements were in line with our expectations, and we continue to feel good about our offering relative to theirs.

It is now evident that Xbox is the clear next generation technology leader, both in performance and next generation features, which are critical to enthusiast and developer audiences. Broad consumer audiences will likely perceive

the Xbox Series X and PS5 as roughly comparable. We have significant strength in backwards compatibility. Sony set expectations that the vast majority of the top 100 games on PS4 would be available on PS5 at launch, while we expect to have over 3,000 titles available at launch. We believe at the same price point we will fare well in head-to-head comparisons especially as we continue to shift the consumer mindset from console-only exclusives to ecosystem advantages/features.

The reveal confirmed that they have some of the features we announced on Monday, but we have developer facing features we still believe are unique to us including Variable Rate Shading (VRS) and Sample Feedback Streaming (SFS).

Their key messages were:

- PS5 key spec reveal
- "Boost" mode: variable GPU / CPU clock rates [versus us running at higher *sustained* rates]
- SSD performance [they have a 2x advantage]
- Off the shelf expandable storage options [similar to us in reality due to minimum size and speed requirements]
- 3D spatial audio [similar]

Details:

Mark Cerny, PS5 architect, walked through the design approach to their console – balancing developer familiarity with innovation. He emphasized that GPU teraflops and CU is not a good measurement of performance. We made this same point with Digital Foundry, but we do have a clear performance advantage (12 v 10). He also dedicated significant time to their boost mode where their GPU and GPU run in variable frequencies which required them to build a custom cooling solution. We explicitly rejected this design as it is a significant challenge for developers and effective performance is expected to be lower than these boost clock metrics. We expect that we'll have 30% advantage on GPU performance and a 25% memory bandwidth advantage in terms of real-world performance.

Cerny talked at length about the move to SSDs and the advantages for game developers and consumers. They have optimized for raw higher raw throughput (2x ours with slightly better hardware compression and associated performance improvements) as opposed to a more integrated streaming architecture enabled by Sampler Feedback Streaming.

Their approach to expansion is different from ours. We have a custom expansion card while they are using a more standard NVMe m.2 SSD slot. No existing drives meet their required performance or physical form factor constraints, but in the long term, their approach may provide price advantage.

Cerny also spent what seemed like a disproportionate amount of time on audio innovations, and we believe we have similar capabilities.

Spec Comparison:

Spec	Xbox Series X	PlayStation 5
CPU	8x Zen 2 Cores at 3.8GHz (3.6GHz with SMT)	8x Zen 2 Cores at 3.5GHz (variable frequency)
GPU	12 TFLOPs, 52 CUs at 1.825GHz, Custom RDNA 2	10.28 TFLOPs, 36 CUs at 2.23GHz (variable frequency)
Memory	16GB GDDR6 w/ 320 bit bus	16GB GDDR6/256-bit
Memory Bandwidth	10GB at 560GB/s, 6GB at 336GB/s	448GB/s
Internal Storage	1TB Custom NVMe SSD	Custom 825GB SSD
IO Throughput	2.4GB/s (Raw), 4.8GB/s (Compressed)	5.5GB/s (Raw), Typical 8-9GB/s (Compressed)
Expandable Storage	1TB Expansion Card	NVMe SSD Slot
External Storage	USB 3.2 HDD Support	USB 3.2 HDD Support
Optical Drive	4K UHD Blu-ray Drive (50GB)	4K UHD Blu-ray Drive (100GB)

The technical deep dives:

PlayStation 5: https://www.eurogamer.net/articles/digitalfoundry-2020-playstation-5-specs-and-tech-that-deliver-sonys-next-gen-vision

Xbox Series X: https://www.digitalfoundry.net/2020-03-18-xbox-series-x-the-complete-specs-next-gen-features-revealed

Next up on the horizon… price and content reveals!