

The background of the slide is a dark, high-contrast photograph. The upper right portion shows a close-up of a keyboard with black keys, receding into the distance. The lower left and center portions show several dark, rectangular SSD chips mounted on a circuit board. The lighting is dramatic, highlighting the textures of the keys and the metallic surfaces of the chips.

Opportunities and Challenges in China SSD Market



Shannon Systems
宝存科技

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- ◆ Launched world's highest capacity 6.4TB PCIe Flash in FHHL add-in card at Flash Memory Summit 2014 in Santa Clara, CA, US.
 - ◆ Launched Shannon Direct-IO PCIe Flash-U.2 with VMware official certification at vForum Beijing 2014.
 - ◆ Announced the launch of first PCIe-RAID Flash solution at Flash Memory Summit 2015.
 - ◆ Launched Hyper-IO S3C, the first SATA SSD adopts 3D NAND Flash at DTCC 2016 in China.
 - ◆ Launched world's highest capacity 12.8TB PCIe Flash in FHHL add-in card at GITC 2016.



CHALLENGE →

OPPORTUNITY →

CHALLENGE and OPPORTUNITY are always on the same way.

Challenge? Advantage?

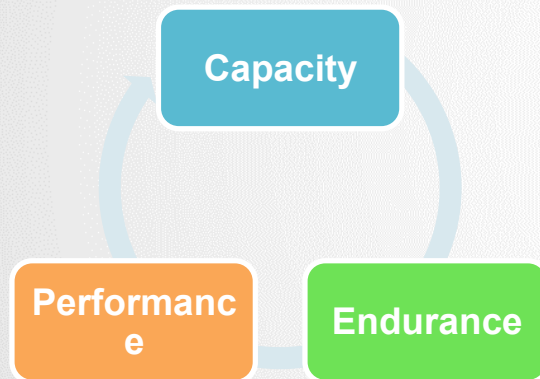
	International Brands	Local Brands
Brand Awareness	★★★★★	★★★
Input Cost (Manpower, Material Resource, Advertising, etc)	★★★★★	★★★
Price	For customers, cost performance depends on these two factors.	
Product Performance		
Service System	Agent Response	Direct Response

The opportunity ahead is...

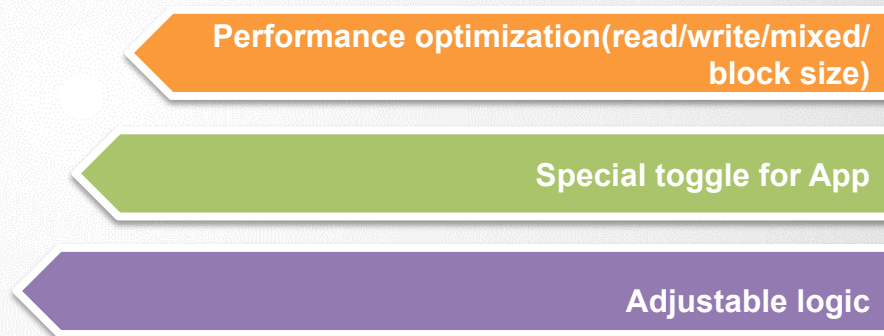


Customization

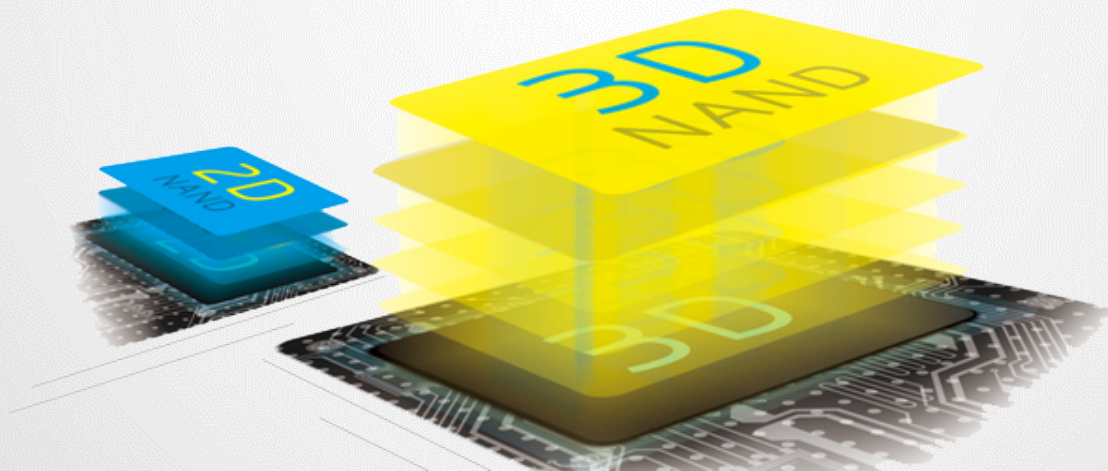
Diversity



Function



After **3D Nand Flash** takes place of 2D,
What else will be changed?

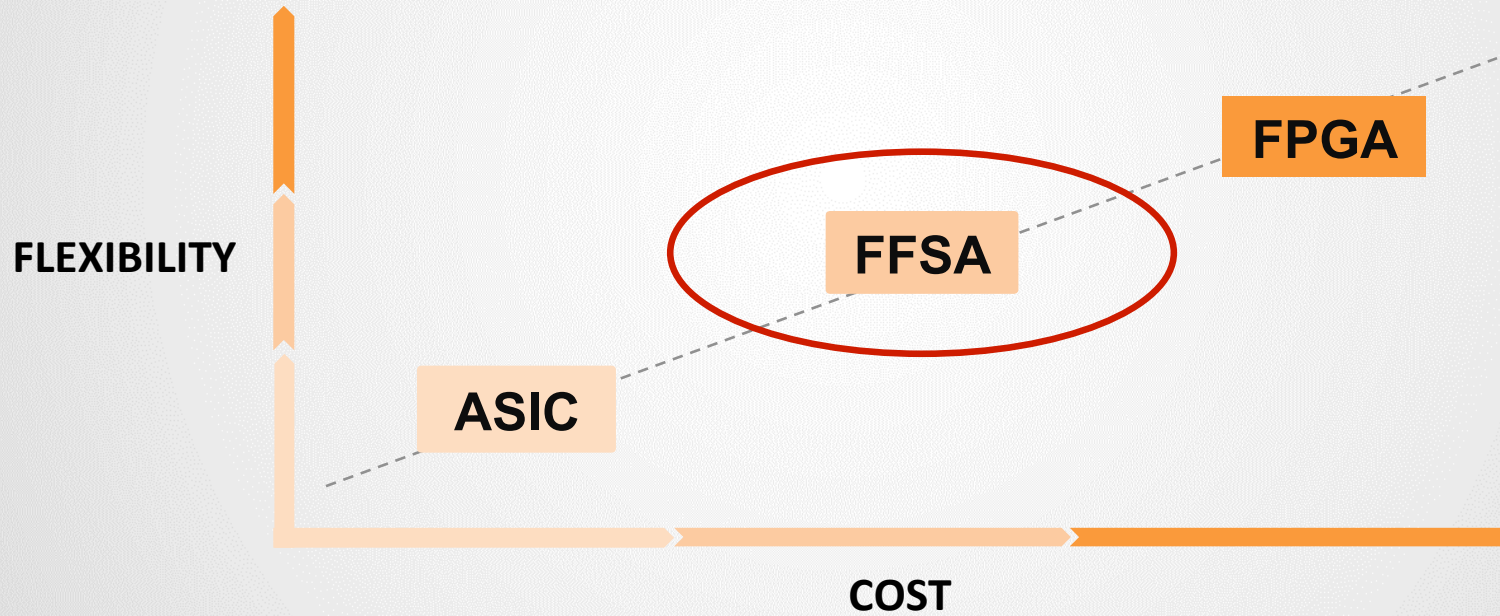


FFSA

- Fit Fast Structured Array, provided by Toshiba
- The 5th generation of Direct-IO controller
- The first that is not based on FPGA
- Targeted for 3D NAND, MLC and TLC



Under the same performance, FFSA is...



Size matters

- With FPGA we are severely constrained by logic resources
- Now we have 3 times the gates to play with
 - Stronger and flexible ECC engines
 - Better and faster NVMe endpoints
 - More flexible and general control logic
 - More flash channels
 - 25.6TB+ capacity achievable

Power matters

- About half the power consumption as FPGA
 - Cooler is better
 - Higher ceiling for doing more

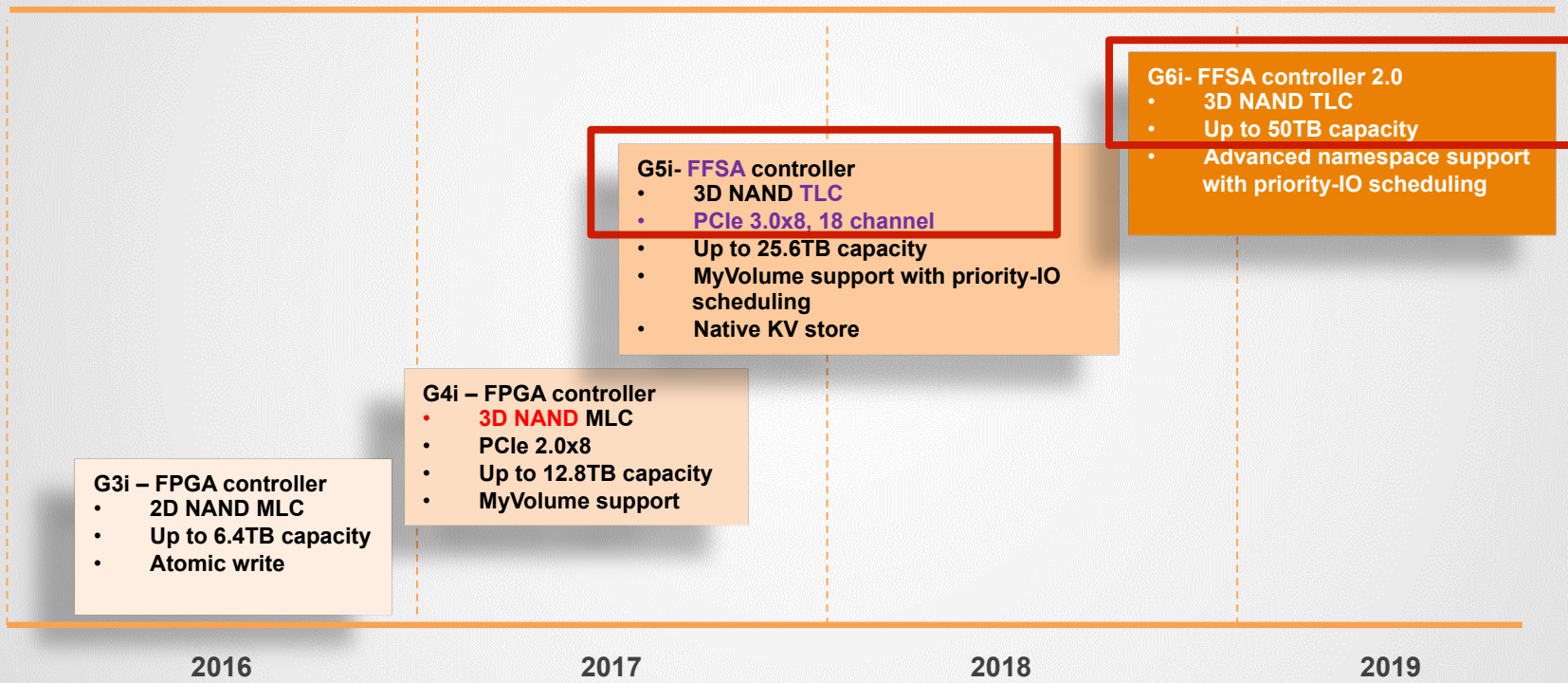
Speed matters

- Achieved >1.5X core frequency comparing to FPGA
 - Everything faster
 - Significant performance gain
 - >1 Million IOPS for a single device
 - Idle earlier, idle often

Robustness matters

- SEU a thing of past
- Cooler = longer life
- More protection for your data

Shannon Direct-IO PCIe Flash Roadmap



Thank you!

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