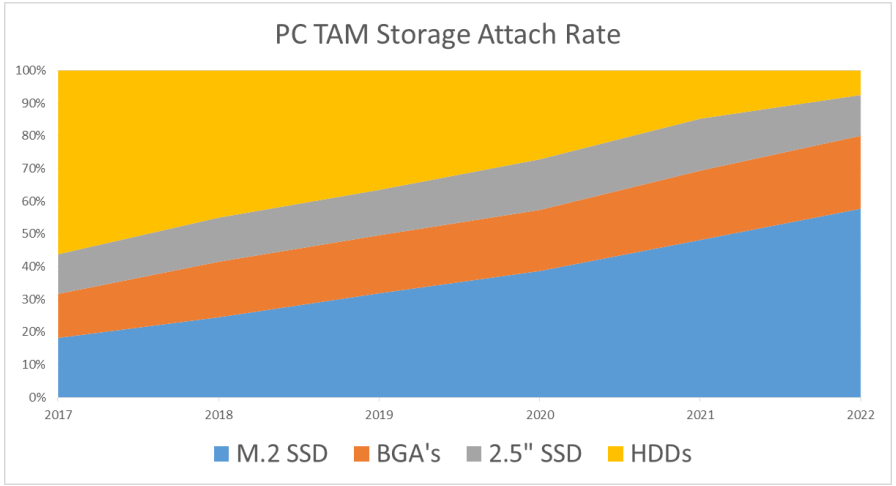
Flash Memory Summit

M.2 Evolves to Storage Benefit

Anthony Constantine
Platform Architect
Intel Corporation

M.2 Growth in the Market

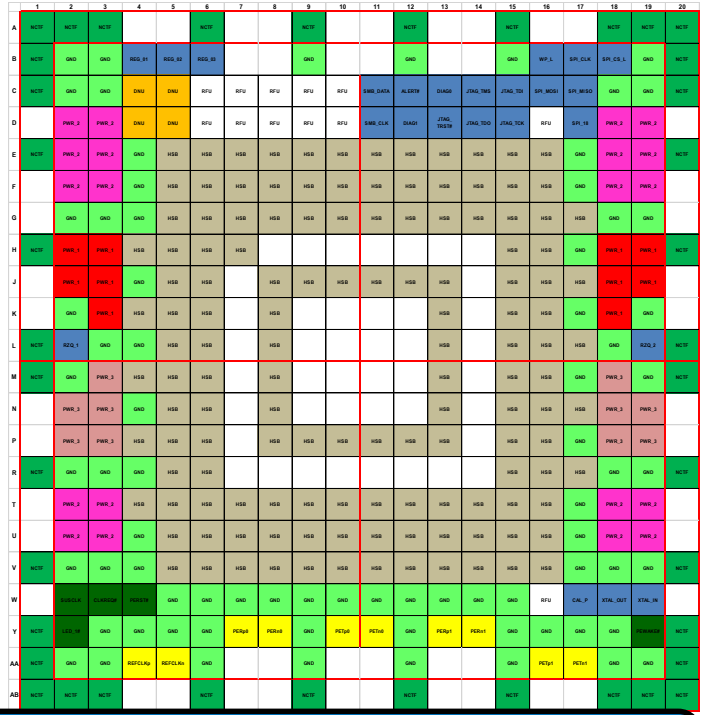
- M.2 SSDs have strong and growing adoption in client
  - Dominant form factor in Laptops
  - Increased utilization in Desktops
  - Also used in specific data center instances
- As adoption grows, the spec needs to evolve for the expanding needs



Source: Intel NSG Q3'18

Changes for SSDs Since M.2 rev 1.1

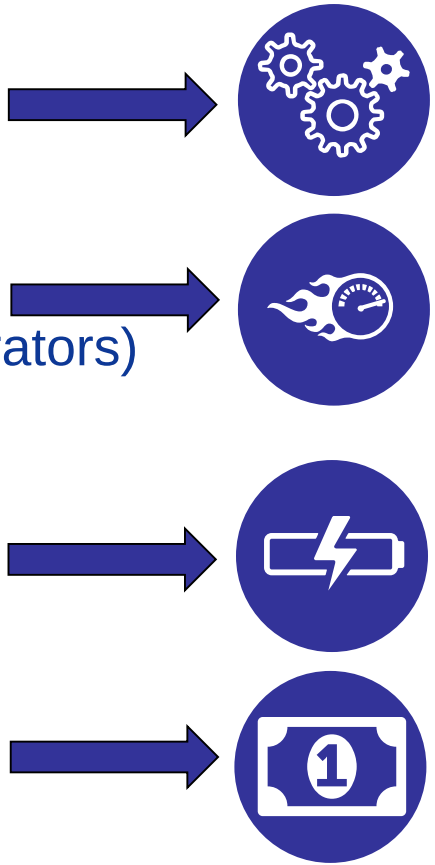
- 11.5x13 BGA
  - Advantageous size for mobile
- BGA Support for 2.5V NAND
  - Will enable lower power consumption
- NCTF GNDs for 11.5x13 BGA
  - Sacrificial grounds improve manufacturing while retaining redundant grounds for power/thermals



These are published at http://pcisig.com/specifications
Expect to see these changes in a new revision of M.2 coming soon!

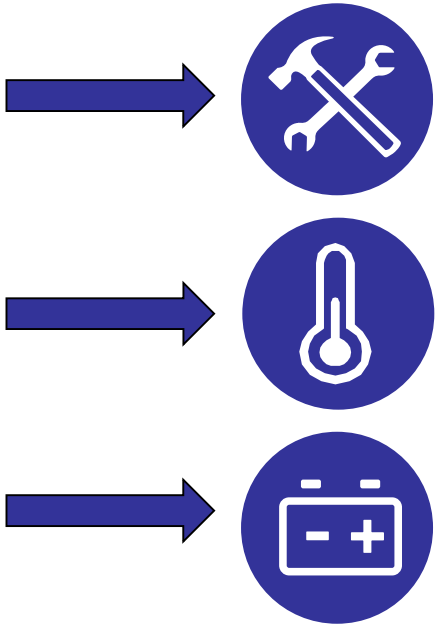
Future M.2 SSDs Concepts

- PCI-SIG® M.2 Compliance for SSDs
  - More robust interoperability between host and device
- Higher Power Support for thermally optimized systems
  - Enables higher performing applications (e.g., Accelerators)
  - Not meant for mobile
- Power Loss Notification through additional pins
  - Early warning for protecting data
- 1.8V sideband support through additional pins
  - Eliminates need for level shifters



Future M.2 SSDs Concepts Cont'd

- USB 2.0 for non-SSDs (e.g., HW accelerator)
  - Support for a debug channel
- Increased component height, taller connectors
  - Thermal relief and expanding usages
- Voltage Support Detection for BGA SSDs
  - Simpler system implementation



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Summary

- M.2 is evolving with client usages and is helping certain short term needs in the datacenter
- Follow PCI-SIG® (http://pcisig.com/specifications) for latest specifications and Engineering Changes (ECN's) and participate in PCI Express-Mini to provide feedback
- Thanks!

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