Switch to 25/100 Gbit/s

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Background
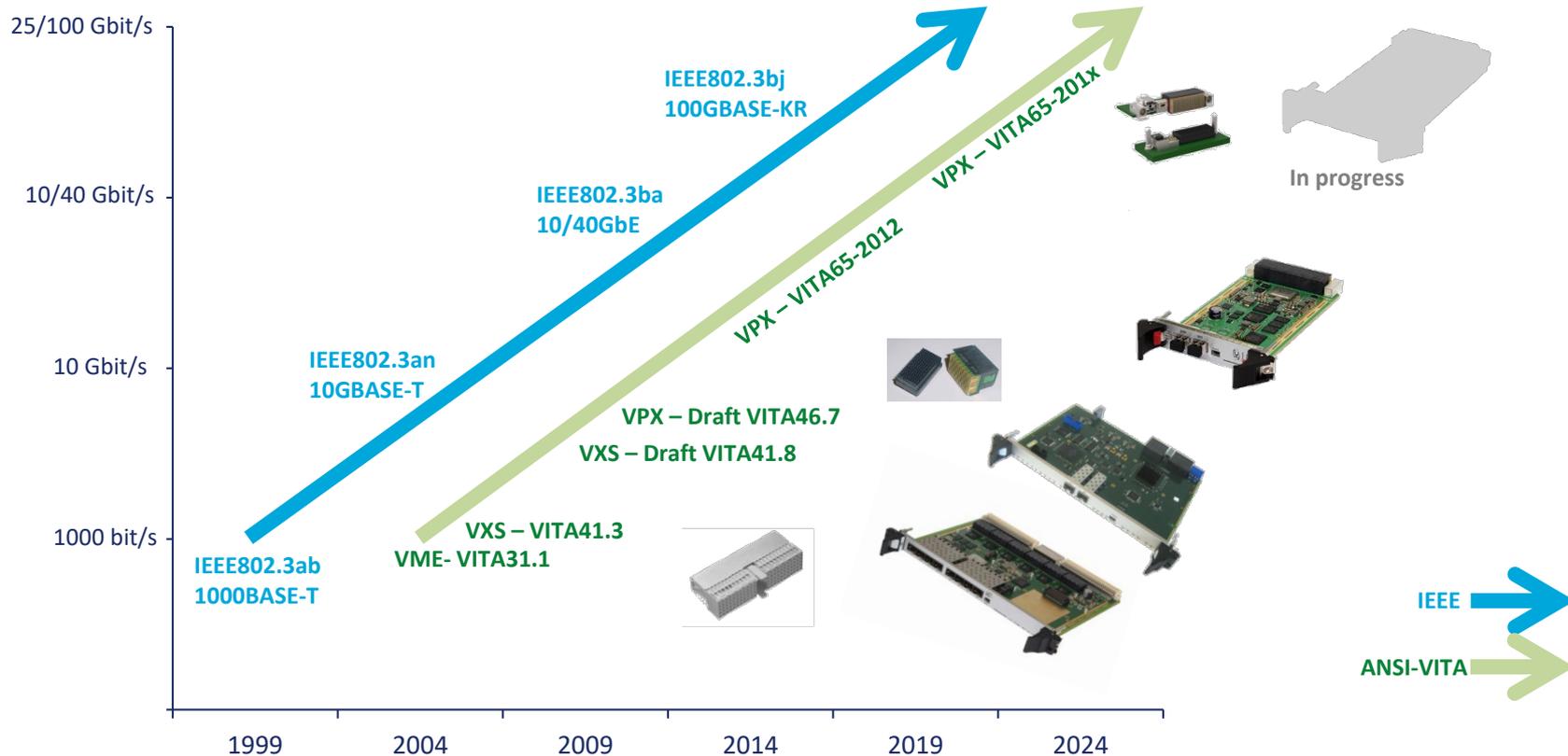
Technology shift

	10/40 Gbit/s	25/100 Gbit/s
Switch technology	SerDes@10Gbit/s	**High speed enhanced SerDes**
Protocols	10GBASE-KR/40GBASE-KR4	25GBASE-KR/100GBASE-KR4
Signaling speed	10.3125 GBd (per lane)	**25.78125 GBd (per lane)**
Encoding	64b/66b block	256b/257b (PAM2 with NRZ)
PCB material	FR408, MEGTRON 6	**MEGTRON 7, Tachyon®−100G**
Connectors	RT-2 (R), *Light*ABLE™	RT-3, *Light*ABLE™ LL
Ecosystem	Xeon®-D, QorIQ® T/LS, ARM Cortex-A72, Virtex-6/7etc.	**ARM Cortex-A7+, QorIQ LX2xxx, UltraScale+™, Ice Lake-D.**
Watts	**4 lanes @ 10G => 1.6 W**	**4 lanes @ 25G => 2.8 W**

Challenges to address

- **Heat Dissipation**
  Air Flow Thru, and Liquid Flow Thru Cooling

- **New SI Modeling and PCB Materials**
  Signal Rates now increase from 10Gbit/s to 25Gbit/s
  New PCB routing methods, mainly for the vias definitions
  Continuous correction between Simulation and Measurement
  New measurements tools (VNA) to qualify signals
  Higher Speed PCB Material, like Megtron 7

- **New connectors**
  RT3 Connectors and other fiber optic connectors

- **Integration and Test complexity at the system level**
  VITA68.1 compliance for each part of the system
  Investment in High-end test equipment
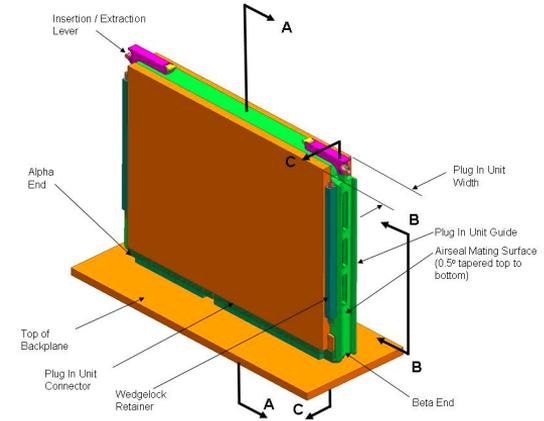
Spirent test center

Switching to 25/100 Gbit/s is obvious

Strengths

Ethernet switch is now ubiquitous

25/50/100Gbit/s are standardized

Speeds supported by chips, connectors and material

Weaknesses

Time to design/market

Complexity of integration

Cost of development / Cost of technology

Enhanced comms' channels vs processing capabilities

Extra bandwidth to provide more security functions

Increase the product value
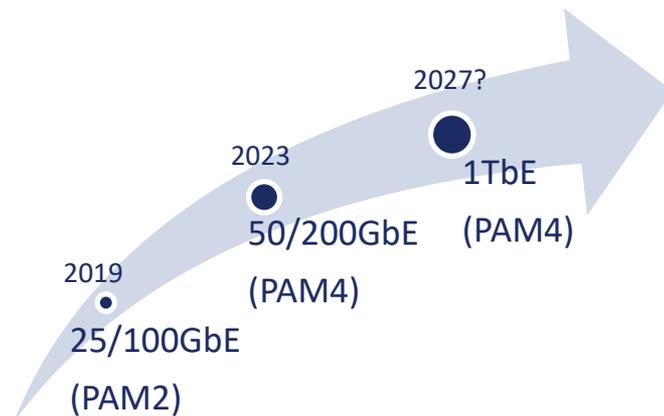
Products cost and related industrial risks

The market size is TBD

Incomplete ecosystem (Chipsets, Boards, PCBs etc.)

Opportunities

Threats

Summary

- Ethernet is the preferred network interconnect technology

- IEEE Core standards allow early access to support PHY, and Matrix Chips

- Market will depend on Sensors and Systems needs

- Chip Performance requires high module interface speeds driven by new FPGAs, Processors and GPGPUs

- New Cooling standards will be required

- Transition to Terabit Ethernet will be again more expensive

2027?

2023

1TbE

(PAM4)

50/200GbE

2019

(PAM4)

25/100GbE

(PAM2)

Thank you for your attention!