



The Future of High-Performance Flash Cards

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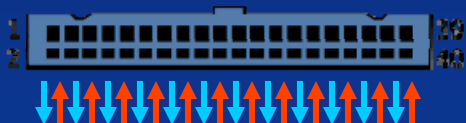


Interface Trends

Past... Present... Future...

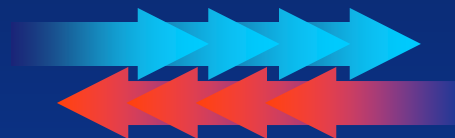
The Past...

Parallel I/F Transfers



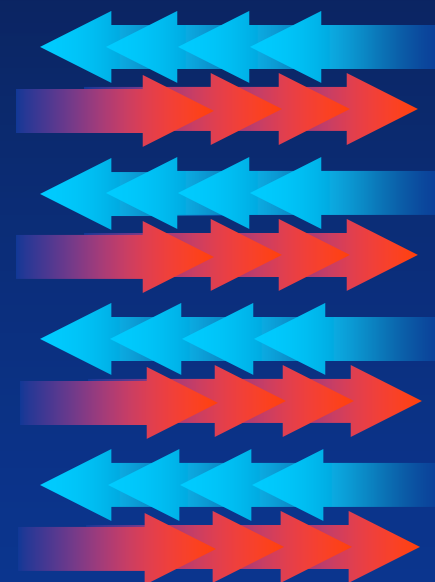
The Present...

Serial I/F Transfers



The Future...

Parallel, Serial I/F Transfers



Leverage from Existing Growth Technologies Key

Where are Today's Speed Limits?

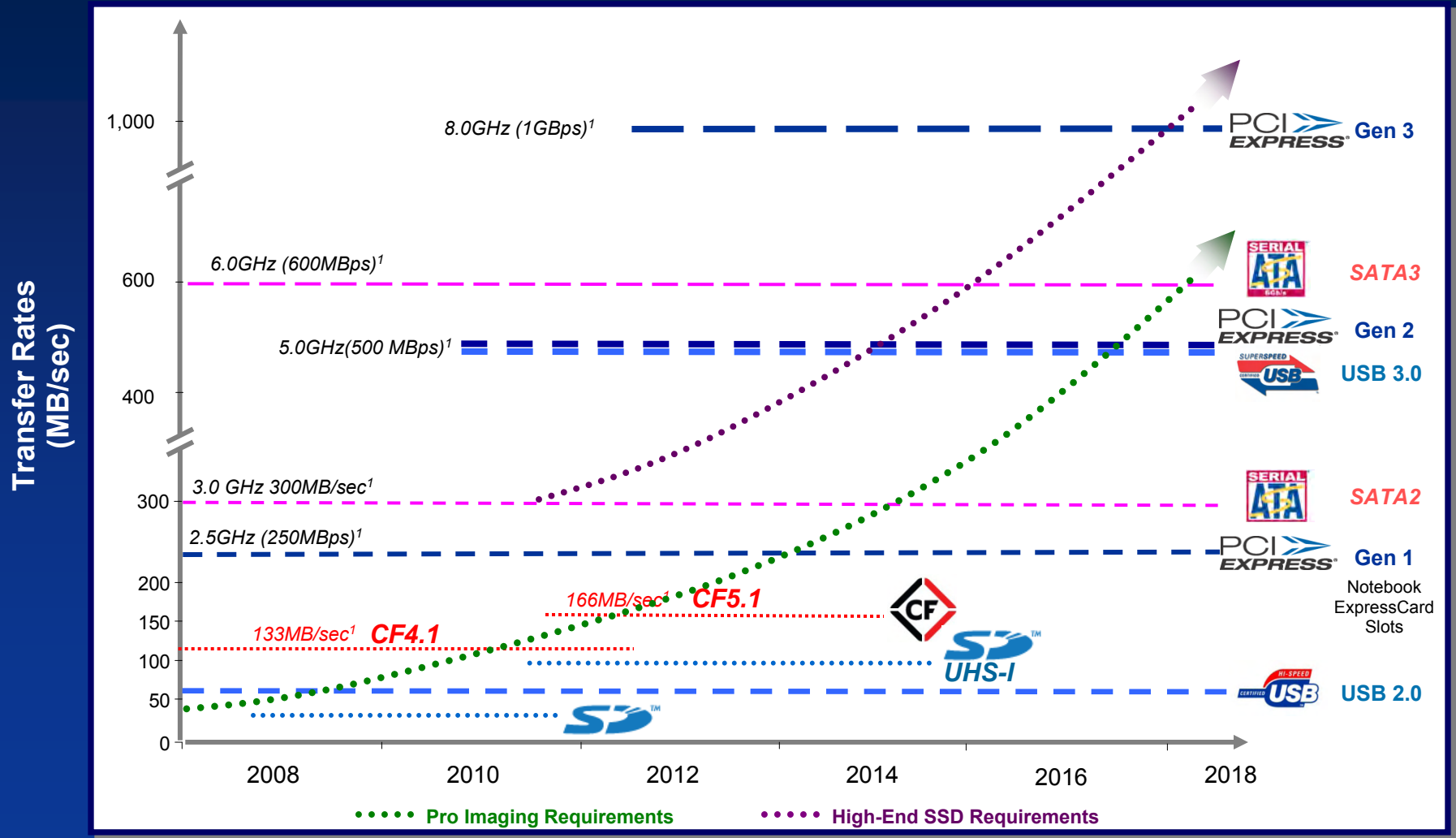
- SD UHS-I = 104 MB/s¹ ➔ UHS-II ??
- CompactFlash = 133 MB/s¹ ➔ 167 MB/s¹ ➔ ??
- SATA 6G = 600 MB/s¹ ➔ no 12G planned
- USB 3.0 = 500 MB/s¹
- PCIe Gen 2 = 500 MB/s¹ ➔ Gen 3 = 1 GB/s¹
- What's next for external storage devices?

What's driving these performance requirements?

- Professional Imaging and Professional Video
 - Over 200 MB/s need today
 - Mega-Pixels / second & work flow
 - Expected to double every 2-4 years
- High-End SSDs
 - Crucial RealSSD™ C300 is over 350 MB/s today!



Interface Performance Comparison





Extendable USB 3.0-based Architecture

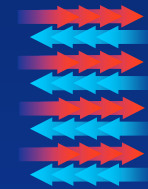


BluLightning

What is BluLightning?



- A high-performance, scalable architectural proposal based on an existing technology & market – **USB 3.0**
- Targets pro-imaging / video & high-end SSD applications - *first*
- Provides USB 3.0 speeds today – (Gen I) with flexibility to define higher performance (Gen II & III) over the next 6-18 months
- Provides multi-lane support from UAS SAS model
 - Parallel, Serial I/F transfers
- Provides for 100% backward compatibility – critical in card markets
- Establishes a roadmap to 20 GHz +
 - Extendable to 10-15 yrs



UAS = USB Attached SCSI SAS = Serial Attached SCSI

BluLightning Pro Card

- Leverage USB 3.0 Micro-B

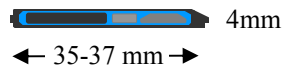


BluLightning Pro-Card

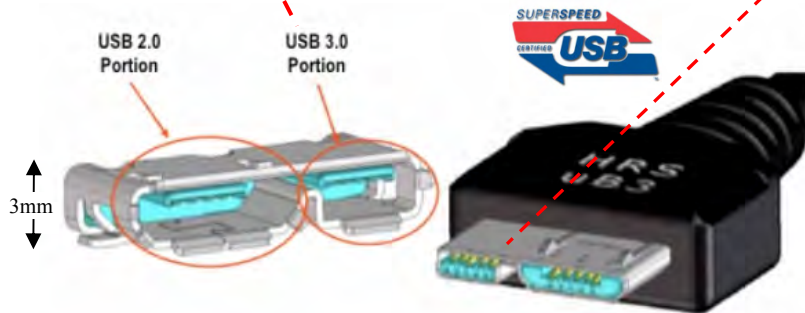


Reserved Cut-out Enables

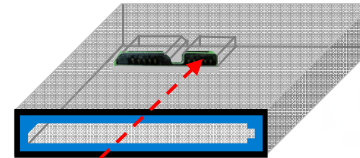
- Backward Compatibility
- Support for Future Performance Lanes
- Capability to be defined later



Pro-Cards support both
USB 3.0 & 2.0



BluLightning Pro-Slot



Hosts support only
USB 3.0 & 3.3v

Easy Connection to the PC:



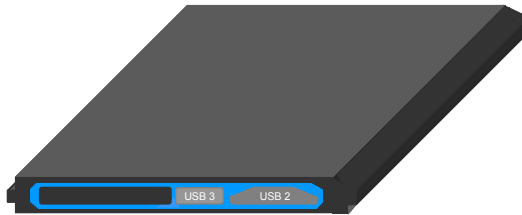
Low cost cables

BluLightning SSD

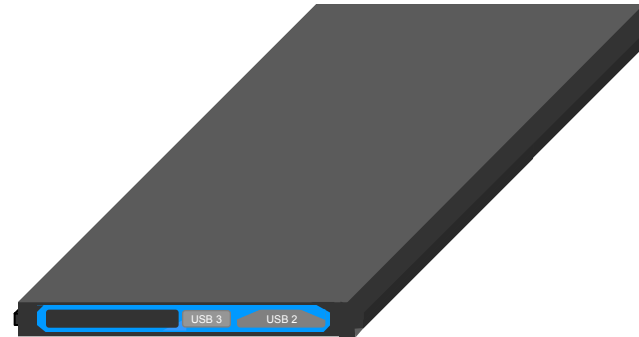
- Leverage the Pro Card Design



BluLightning
Pro-Card



BluLightning Gen II
SSD



- Higher Capacity & Performance
- First Platform for Multi-lane Design ?
- Slim-line Design for Tomorrows' Mobile Platforms



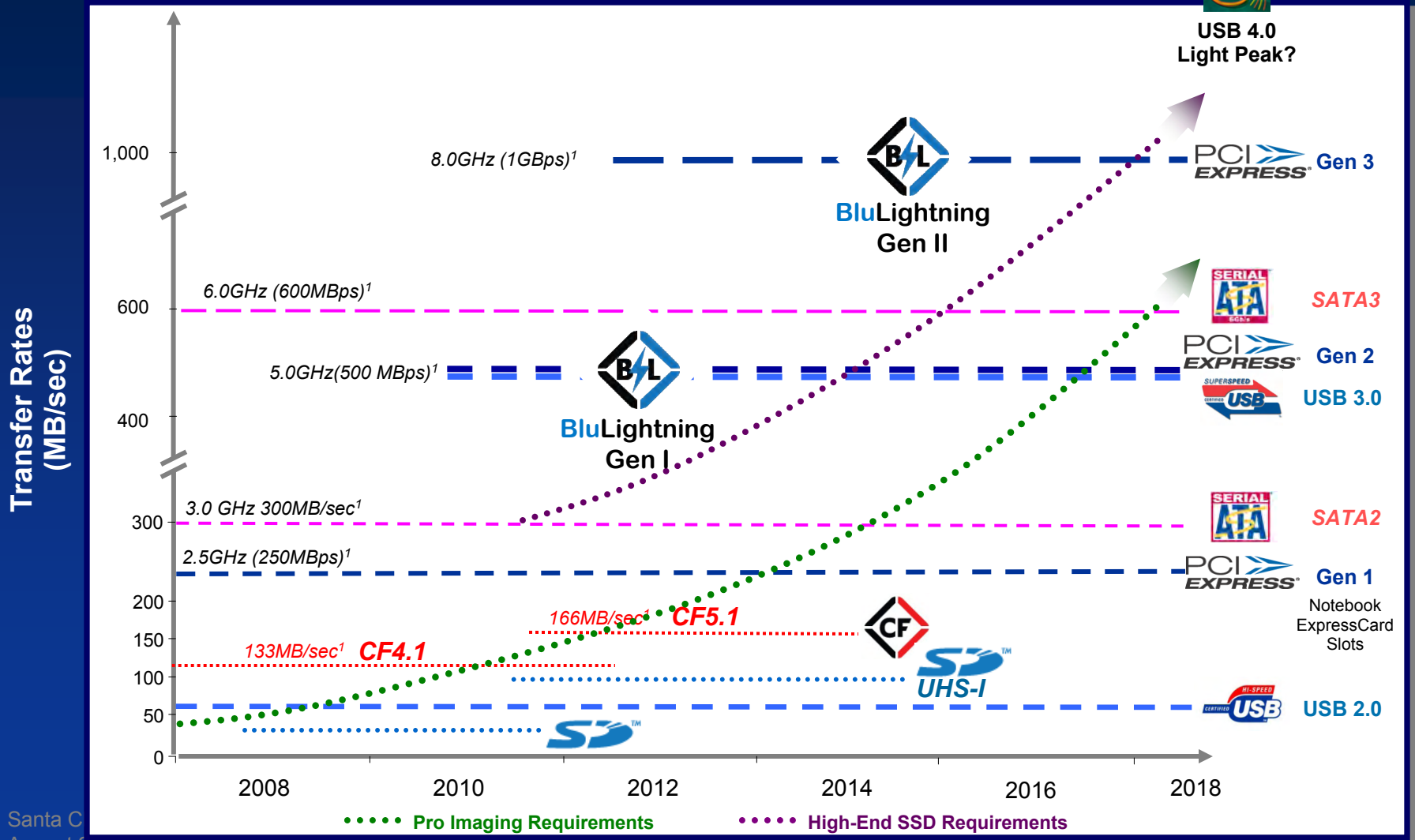
Interface Performance Comparison



20GHz-100GHz (2GBps-20Gbs)¹



BluLightning Gen III



¹ Max theoretical limit



Why BluLightning?



- **The right ecosystem (USB 3.0)**
 - External & internal connectivity
 - Defined & ubiquitous protocol
 - High volume - low cost ASICs
- **Broad markets & applications appeal**
 - Cameras, Netbooks, Tablets, oh my!
 - Hi-Def movies from PCs or Kiosks in seconds!!
- **Race to sleep power control**
 - High speed access needs high active power
 - When the access stops, the power needs to stop
- **The right performance expansion**
 - A solid entrance with a long range roadmap
 - Multi-lane capable for parallel, serial I/F transfers
 - Optical extension outlasts the event horizon!

Expected USB 3.0 Milestones¹

2010 Q4 : 30M hosts shipped

2010 Q4: Host IC's by NEC,
ASmedia, TI, Intel

2011 Q2: Native AMD support

2012 Q1: Native Intel Support

2012 Q4: 200M devices shipped

High-Performance Storage Interface for the Next 10-15 Yrs