



# Build a Better Data Center with 24G SAS

## STA WEBCAST

Presented by:  
Rick Kutcipal, Dennis Martin  
and Bill Martin

## Today's Experts



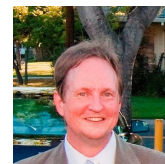
Rick Kutcipal, President, SCSI Trade Association; Product Planner, Broadcom Ltd.



Dennis Martin, President, Demartek



Bill Martin, Co-chair, SNIA Technical Council; Chair, INCITS T10; SSD/IO Standards, Samsung Electronics



# SNIA at-a-glance



**160**  
unique member  
companies



**3,500**  
active contributing  
members



**50,000**  
IT end users & storage  
pros worldwide

Learn more: [snia.org/technical](http://snia.org/technical)



# STA at-a-glance



- ◆ Celebrating 20 Years - Industry Alliance of Key Ecosystem Partners
- ◆ STA Promotes Small Computer System Interface (“SCSI”)
- ◆ We Welcome All to Join STA & Promote / Contribute to the Evolution of SCSI

***Storage industry leaders are members of STA***



Learn more: [scsita.org](http://scsita.org)

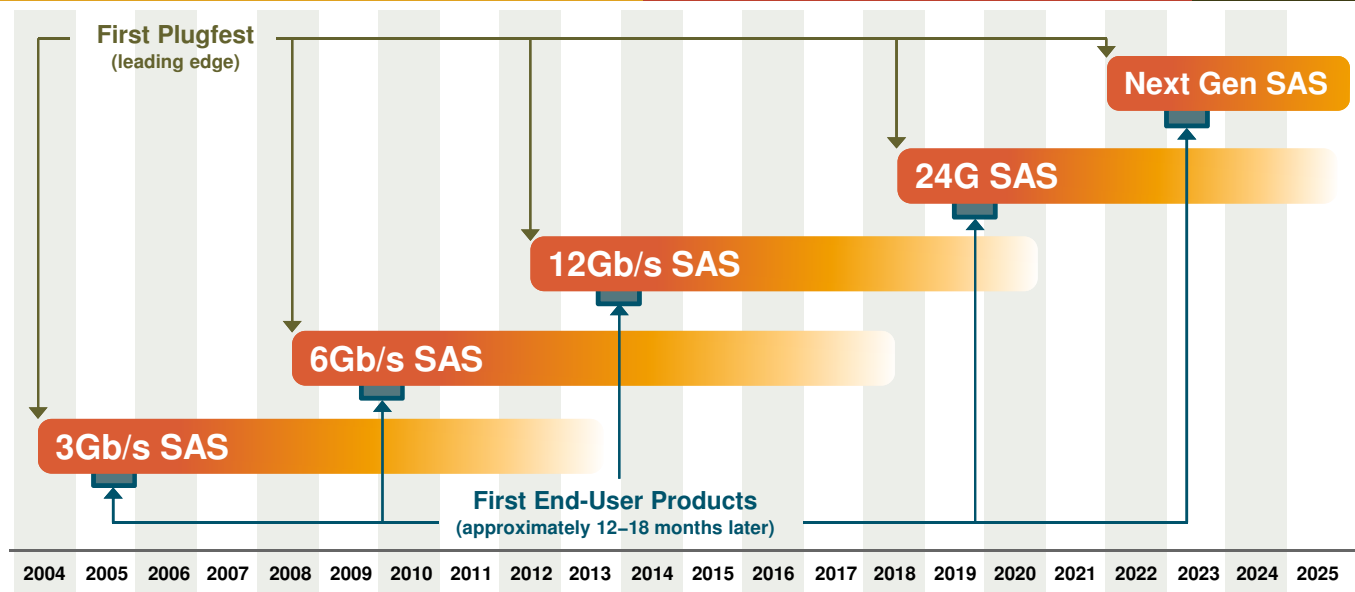
# Today's Webinar



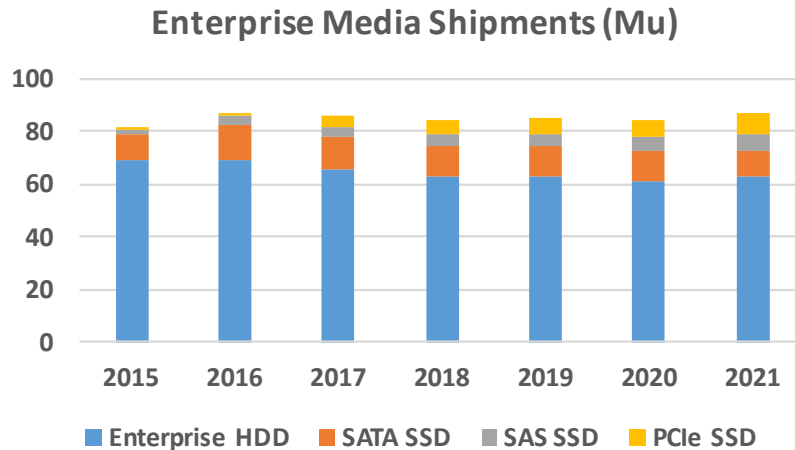
- ◆ 24G SAS Update – Rick Kutcipal
- ◆ What's New – Rick Kutcipal
- ◆ Build a Better Data Center with 24G SAS – Dennis Martin



# SAS Technology Roadmap



## Enterprise Media Shipments by Interface



Source: TRENDFOCUS 2017  
Long-Term Forecast

**SAS Infrastructure Enables >90% of  
Storage Devices in 2021**

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## 24G SAS – What's New?



- ◆ 22.5 Gbaud
- ◆ Efficient Encoding – 128b/130b
- ◆ 20 Bit Forward Error Correction
  - Targeting a 30dB channel
- ◆ APTA (Active PHY Transmitter Adjustment) – Continuous Adaptation
- ◆ Fairness Enhancements
- ◆ Other Features Aligning with 24G SAS
  - MultiLink SAS™ - wide port SAS for increased performance
  - Storage Intelligence – optimized for solid state storage
  - Zoned Block Commands – enhancements for capacity-optimized media (SMR)



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## About Demartek



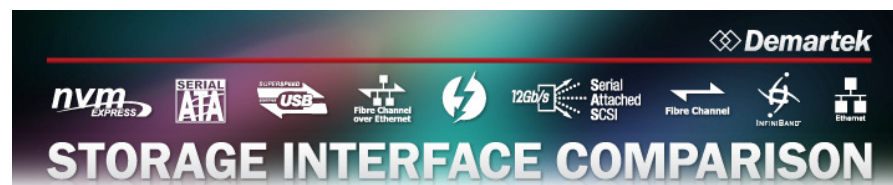
- ◆ Industry analysis and ISO 17025 accredited test lab
- ◆ Lab includes enterprise servers, networking and storage (6/12Gb SAS, 10/25/40/50/100GbE, 8/16/32GFC, NVMe)
- ◆ We prefer to run real-world applications to test servers and storage solutions (databases, Hadoop, etc.)
- ◆ Demartek is an EPA-recognized test lab for ENERGY STAR data center storage testing
- ◆ Website: [www.demartek.com/TestLab](http://www.demartek.com/TestLab)

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## Demartek Storage Interface Comparison



- ◆ Free reference page on demartek.com
  - [www.demartek.com/Demartek\\_Interface\\_Comparison.html](http://www.demartek.com/Demartek_Interface_Comparison.html)
  - Search engine: “storage interface comparison”
  - Includes transfer rates, history, roadmaps, cabling, connectors, etc.
- ◆ Demartek is NOT a product vendor
  - We use these technologies in our lab:



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## 24G SAS



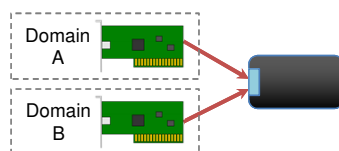
- ◆ **Bandwidth**
  - Each 24G SAS lane has 19.2 Gbps of bandwidth
  - Each PCIe 4.0 lane has 15.8 Gbps of bandwidth
- ◆ **Compatibility**
  - 24G SAS is compatible with SATA, 6Gb/s SAS and 12Gb/s SAS
  - Backwards compatibility allows mix-and-match
- ◆ **Scales to thousands of devices**
  - Built-in support from very small to very large-scale implementations

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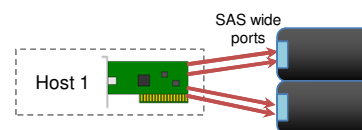
## 24G SAS Dual-port & MultiLink SAS™



- ◆ **Dual-ported**
  - Typically used for redundancy in either active/active or active/passive configurations
  - Devices have an “A” and “B” channel
- ◆ **MultiLink SAS™**
  - Provides the option for additional bandwidth and additional host connections
  - Can provide 2, 3, 4, 8 or more SAS lanes



Dual-port example



MultiLink example

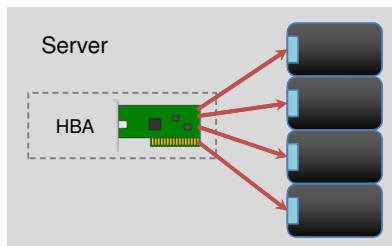
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## 24G SAS Use Cases



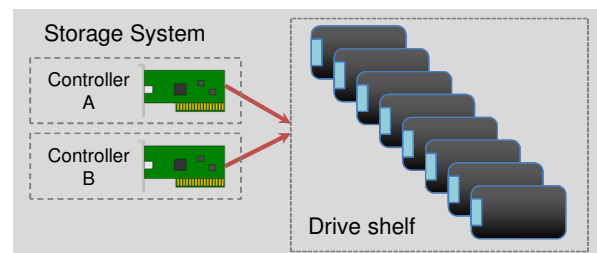
### ◆ Server Use Case

- Typically want matching number of HBA ports and devices to have balanced bandwidth between HBA and device ports



### ◆ Storage Array Use Case

- Bandwidth oversubscription possible because devices typically are not generating full bandwidth I/O all the time
- System architected to handle this



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## 24G SAS Support



- ◆ Hot-swap (surprise insert/removal)
- ◆ Multi-path I/O (MPIO)
- ◆ Broad operating system and hypervisor support
  - OEMs are moving to 24G SAS
- ◆ Management infrastructure

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# Benefits of SAS White Paper



- ◆ Public white paper
- ◆ SAS ecosystem
- ◆ Expanders, JBODs
- ◆ Dual-ported drives
- ◆ MPIO, Hot-swap
- ◆ Power consumption
- ◆ Cabling and connectors



[http://www.demartek.com/Demartek\\_Benefits\\_of\\_SAS\\_2017-07.html](http://www.demartek.com/Demartek_Benefits_of_SAS_2017-07.html)

<http://www.scsita.org/content/library/the-benefits-of-sas/>

# Questions and Answers



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