Microsemi
Powering China Data Center Infrastructure

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Vice President, Vertical Marketing, Microsemi Corporation

Microsemi一览

- **Leading-Edge Semiconductor Solutions Differentiated by:**
  - Performance
  - Reliability
  - Security
  - Power

- **Doubled in Revenue Over Last 5 Years!**
  - FY 2015 Revenue: $1.25B
  - Storage
  - FPGA
  - Timing Distribution and Propagation
  - Ethernet
  - OTN
  - PHYs/Optics

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多元化和坚韧的市场

Aerospace & Defense *30% of Revenue*	Communications *36% of Revenue*	Data Center *19% of Revenue*	Industrial *15% of Revenue*
Military Communication Information Assurance Engine Control Avionics Electronic Actuation Bus & Payload Electronics Launch Systems	Wireless Backhaul Base Station Routing & Switching Networking Access & CPE Wireless Terminal Fiber Optic Backhaul	Hyperscale & Enterprise Servers Storage Systems Rack Disaggregation NVM Solutions Security	Industrial Control Medical Devices Energy Automotive SEMI Cap Equipment Machine to Machine

Based on FQ2 2016 revenue

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宏观增长驱动力

Data Bandwidth

Data Security

Data Storage

Electrification

VOLUME

VELOCITY

4G – 5G Deployment
Bi-directional Data
High-Definition Media
DC-DC Connectivity (Cloud)

Information Assurance
Counterfeiting
Anti-tamper
Data Protection
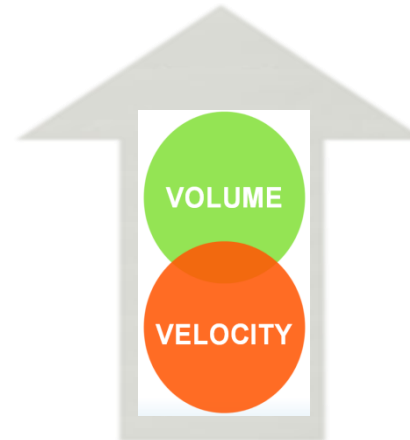
Hyper-scale
Software-Defined Storage
Converged Systems
Big-Data Analytics
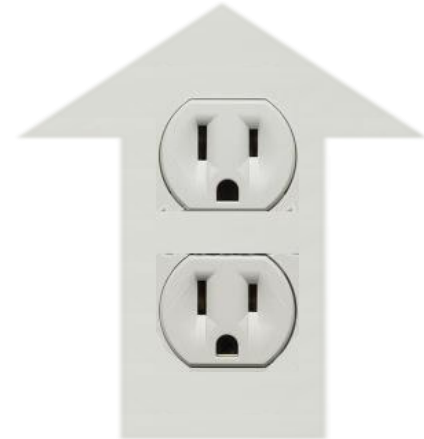
Transportation
Power Generation
Energy Management

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数据中心增长动力: 网络带宽

Global IP Traffic & Service Adoption Drivers

By 2019:

IP Broadband Growth Projections

23% CAGR 2014–2019

	2014	2019
More Internet Users	2.8 Billion	3.9 Billion
More Devices & Connections	14.2 Billion	24.4 Billion
Faster Broadband Speeds	20.3 Mbps	42.5 Mbps
More Video Viewing	67% of Traffic	80% of Traffic

Cisco VNI

Source: Cisco VNI Global IP Traffic Forecast, 2014–2019
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New Access Technology:

Increases BW demand!

5G

INDUSTRIAL INTERNET OF THINGS

Download from Dreamstime.com
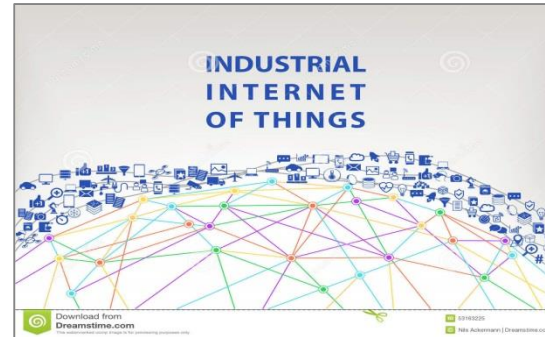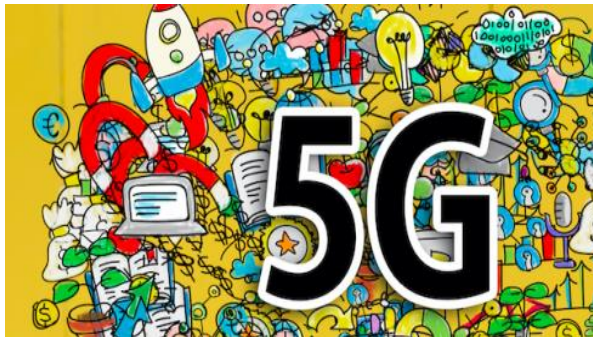
Emerging Applications:

Increases BW demand!

Increasing East-West Metro and DC Traffic

Data Center Interconnect

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数据中心增长动力: 网路储存
"不可用"的泽字节时代
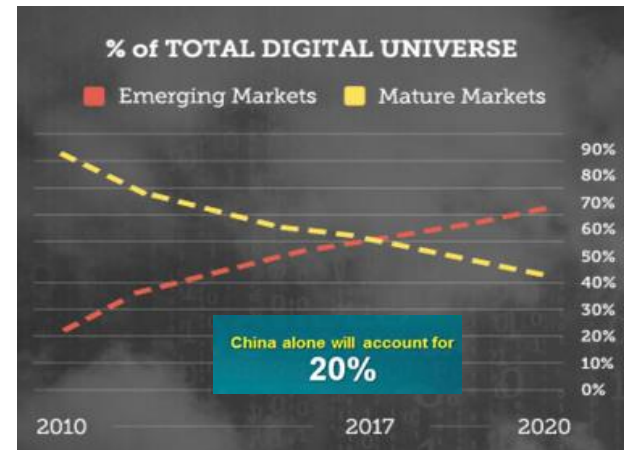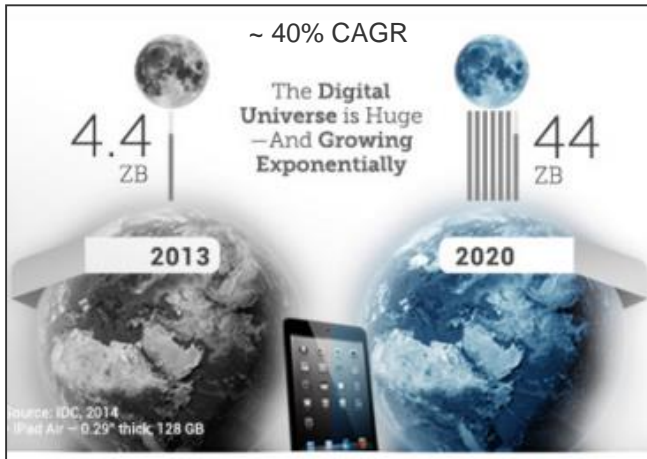
In 2013, the available storage capacity could hold just 33% of the digital universe.
By 2020, it will be able to store less than 15%.

The Problem:

- Generation of ZB vs. Manufacturing Storage ZB's

- HDD and SSD Gap requires multi-billion investment in new manufacturing to meet storage capacity

Solutions:

- Cloud services – Centrally managed facilities where high-density and lower power equipment is located

- Deploy NVMe SSD's for IOPS and Low Latency vs. HDD

- Real-Time Filtering and Analytics – Pre-Processing

More Data Stored Allows Better Analytics

数据中心增长动力: 安全
商业模式可信度

Anti-Tamper – Secure Boot

Apple suspects server tampering during shipping
24 March 2016   By Jack Loughran

"Apple has long suspected that servers it ordered from the traditional supply chain were intercepted during shipping, with additional chips and firmware added to them by unknown third parties in order to make them vulnerable to infiltration.

BIOS, Firmware, Container, OS code all need to be protected with OTN, Router, Switch, Server, and Storage Infrastructure

Data at Rest – Controller Encryption

amazon webservices

Microsoft

Emerging trend in Hyper-Scale

Securing Data at Rest with Encryption

Ken Beer and Ryan Holland

November 2013

Cloud security controls series:
Encrypting Data at Rest

September 10, 2015 - Tim Rains - Director, Security

Only ~50% protection by 2020!

Global Data-at-rest Encryption Software market by Segment

Full Disk Encryption (FDE)
File Level Encryption (FLE)

The comprehensive view on the % share of market by segment (2020)
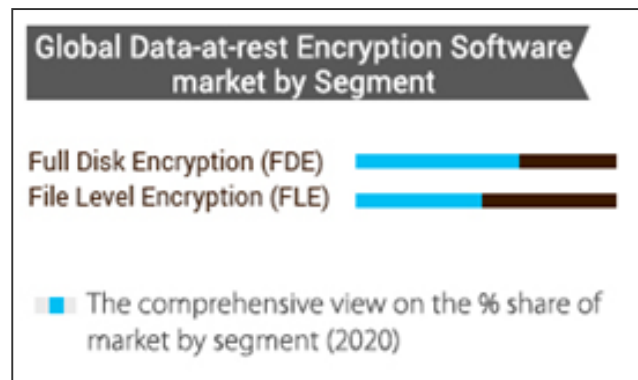
Microsemi在数据中心的领导地位
解决关键应用难题

Including: Worlds Top 10 Hyper-Scale Data Centers

EMC²

IBM

HITACHI
Inspire the Next

NetApp

HUAWEI

DELL

lenovo

ORACLE

ERICSSON

inspur

SUPERMICRO

Hewlett Pack
Enterprise

intel

Seagate

WD Western Digital

Quanta
Optimize Your Datacenter

wiwynn

FOXCONN

Inventec

zt Systems

SanDisk

Micron

HGST
a Western Digital company

Storage Systems
- SAS/PCI Switching
- Ethernet Switching
- Clock Management
- Signal Integrity
- FPGA
- Security

Rack Scale Architecture
- SAS/PCIe Switching
- Ethernet Switching
- Signal Integrity
- Clock Management
- FPGA

Servers
- RAID/HBA Controllers
- SAS/PCIe Switching
- Data Protection & Security
- Caching Software
- FPGA
- Power Management

NVM Storage
- NVMe Controllers
- FTL Software
- NVRAM Cards
- Power Management
- FPGA

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Microsemi数据中心产品系列
设备设施，存储，和主机板的器件

Grandmaster Clock

OTN
(10G, 40G, 100G)

SONET/SDH
OTN
Carrier Ethernet
Fibre Channel
Video

Data Center Interconnect
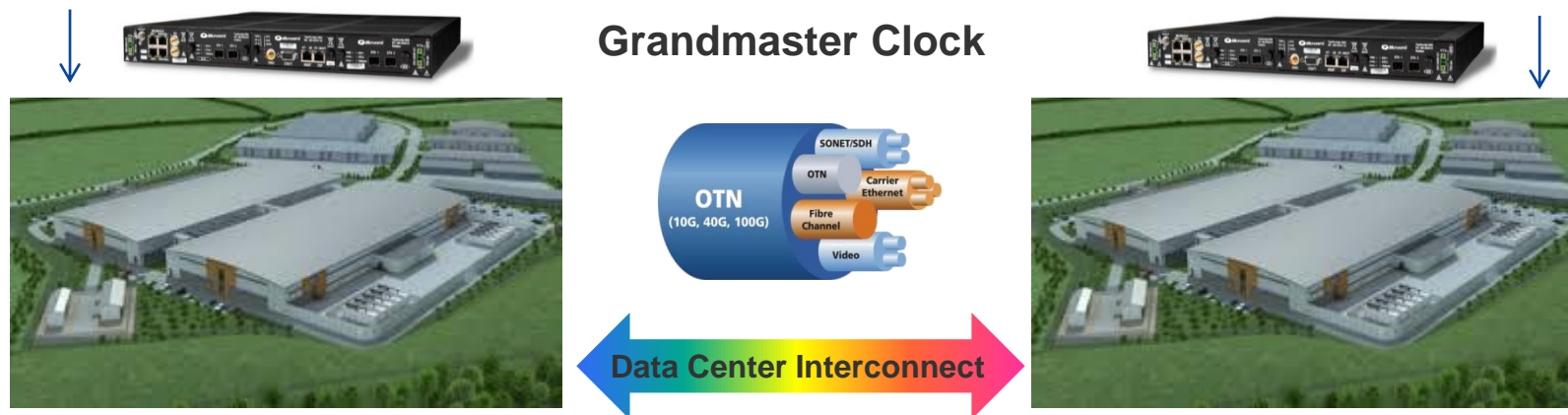
1. *Data Center Infrastructure:* **Network Timing Distribution and OTN DCI**

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2. *Storage Connectivity, Data Protection and Security*

RAID Controllers   *SAS/SATA Controllers*   *NVMe Controllers*

PCIe Switching   *SAS Switching*   *Ethernet Switching*

3. *Motherboard Components and Rack Connectivity*

Signal Integrity   *Clock Management*   *Co-Processors/FPGA*

Power Management   *Timing*   *PHY/Optics*

High Performance and Low Power Driving Data Center Scalability

存储领域的领先地位

Market Adoption and Success

#1 in SAS ports shipped

#1 in Storage Systems

#1 in Performance

#1 in Density / Port Count

#1 in **nvm** EXPRESS™ Flash Controllers

Technology and Innovation

1st Controller-Based Encryption

1st 24-Port SAS Controller

1st PCIe Gen-3 RAID Controller

1st NVMe Flash Controller

1st PCIe Storage Switch

Microsemi Adaptec™
Highest SAS/SATA
port density and
performance

Switchtec™
Industry's leading
PCIe port count and
signal integrity

Flashtec™
Industry's highest
performance NVMe
controller
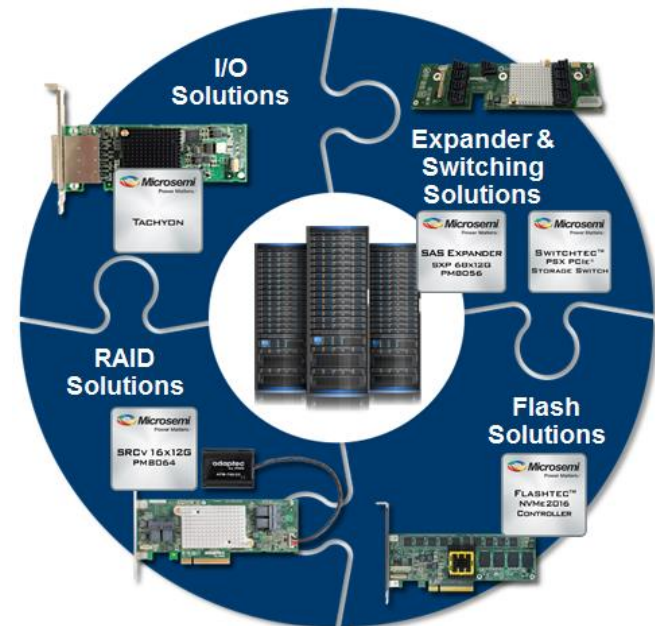
Microsemi和存储系统
媒体连接平台的选择

HOT

PCI EXPRESS®   nvm EXPRESS™

| Microsemi Power Matters. CLOCK TREE & RE-TIMERS | — | Microsemi Power Matters. PSX PCIe STORAGE SWITCH |

Low-Latency NVMe Storage Systems

Warm

12Gb/s SAS   MultiLink SAS™

| Microsemi Power Matters. TACHYON | — | Microsemi Power Matters. SAS EXPANDER SXP 68x12G PM8056 |

High-Density and Large Topology Storage Systems

COLD

ethernet alliance   KINETIC Open Storage Project

| Microsemi Power Matters. ETHERNET SWITCH 1G, 2.5, 10G |

Cold KVP Object Storage Systems

存储服务器产品组合
最高的密度和最低的延迟

PCIe

Microsemi Adaptec RAID Adapters
Microsemi Adaptec SmartHBAs
& HBA's
High-Capacity SAS/SATA

Switchtec PCIe Switching
Fan Out and Storage Switches
High- Density Servers

Flashtec NVMe Controllers
Low-Latency Storage

Microsemi Adaptec Expander Cards
High-Density Servers

Flashtec Solutions
Partners and In-house
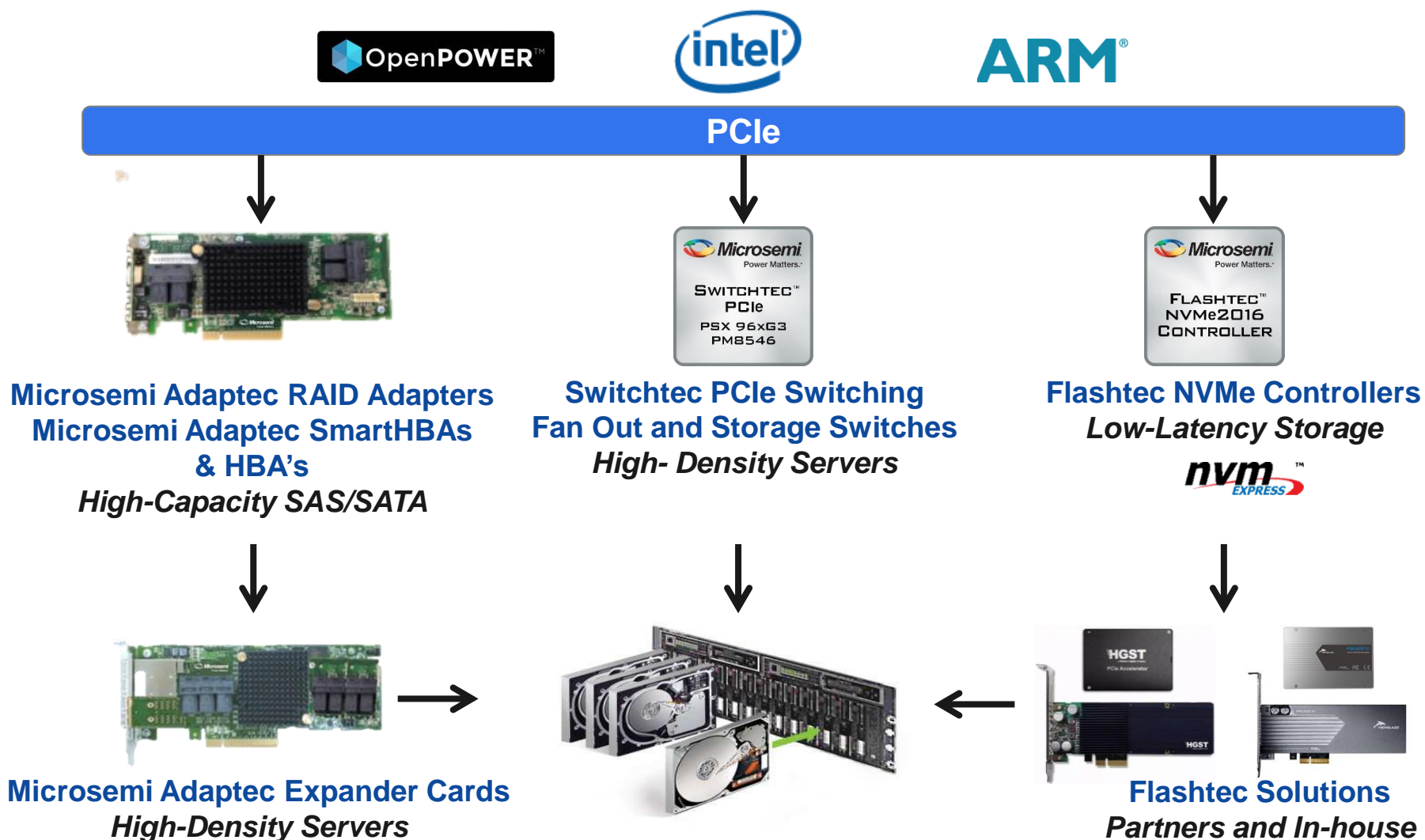
主板和机架式基础结构的附加值

Key Benefits and Focus

Low-Power and Footprints

Security Hardened – FIPS

Performance – Low Jitter, etc.

BOM Consolidation

Platform Integration

Technology and Innovation

Secure Boot

Ultra-Low Jitter

Hysteretic Control

SEU Immunity

Extreme Timing Accuracies

Clock Tree
Synthesis, Rate Conversion, Attenuation, and Distribution

FPGA
Low Power, Reliable, System Solutions

DC Converters
Hysteretic Control, Energy Management, Hot Swap Support

Re-Timers and Value add PHY's
1588, MACsec
Synchr⦿PHY

Clock Management

Signal Integrity & PHY

PCIe Re-Driver

Multi-Media PHY's

Power Management

E-Fuse Regulation

SmartFusion2 SoC FPGA

IGLOO2 FPGA

SOC/FPGA
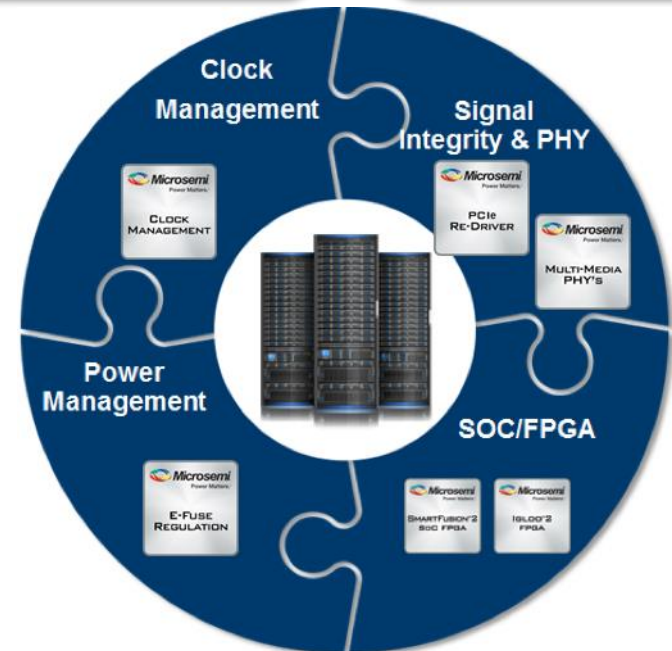
主机板和机架式基础结构的产品
使用例证

1. *PCIe DAS Switching Platform*

+

- **Clock Gen**
- **Re-Driver**
- **Clock Buffer**
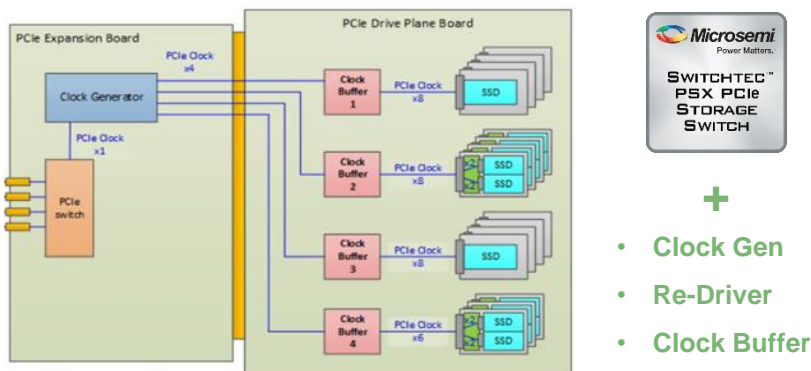
2. *Power Management Solutions*

HDD

I/O Cards

SSD
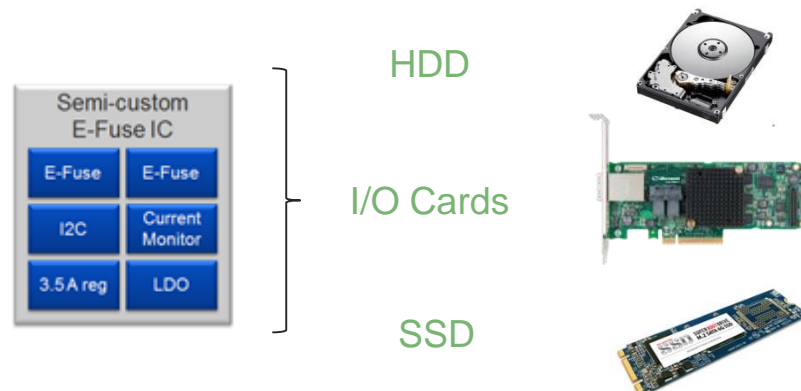
3. *FPGA Integration w/TPM*

4. *PHYs & Switches*

SmartNIC   *1G Management Switch*
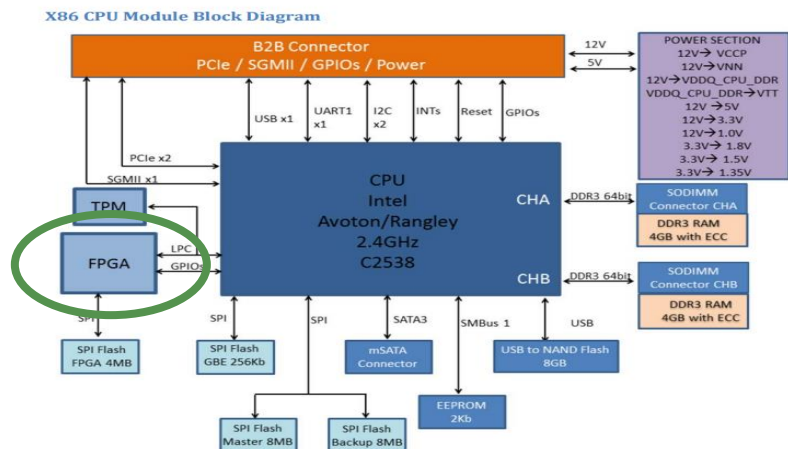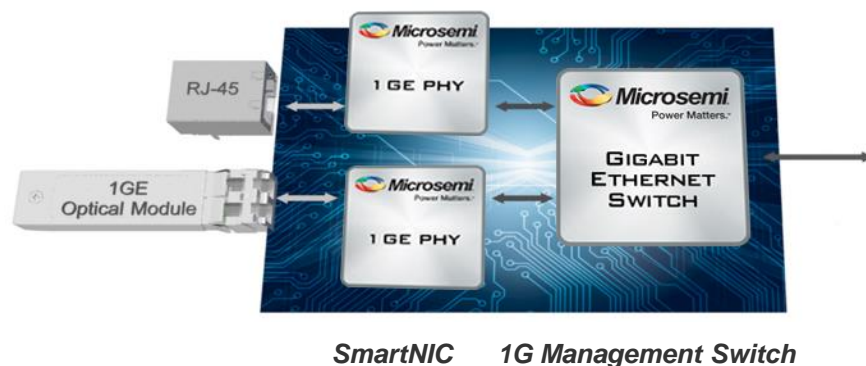
数据中心环境
答案和创新
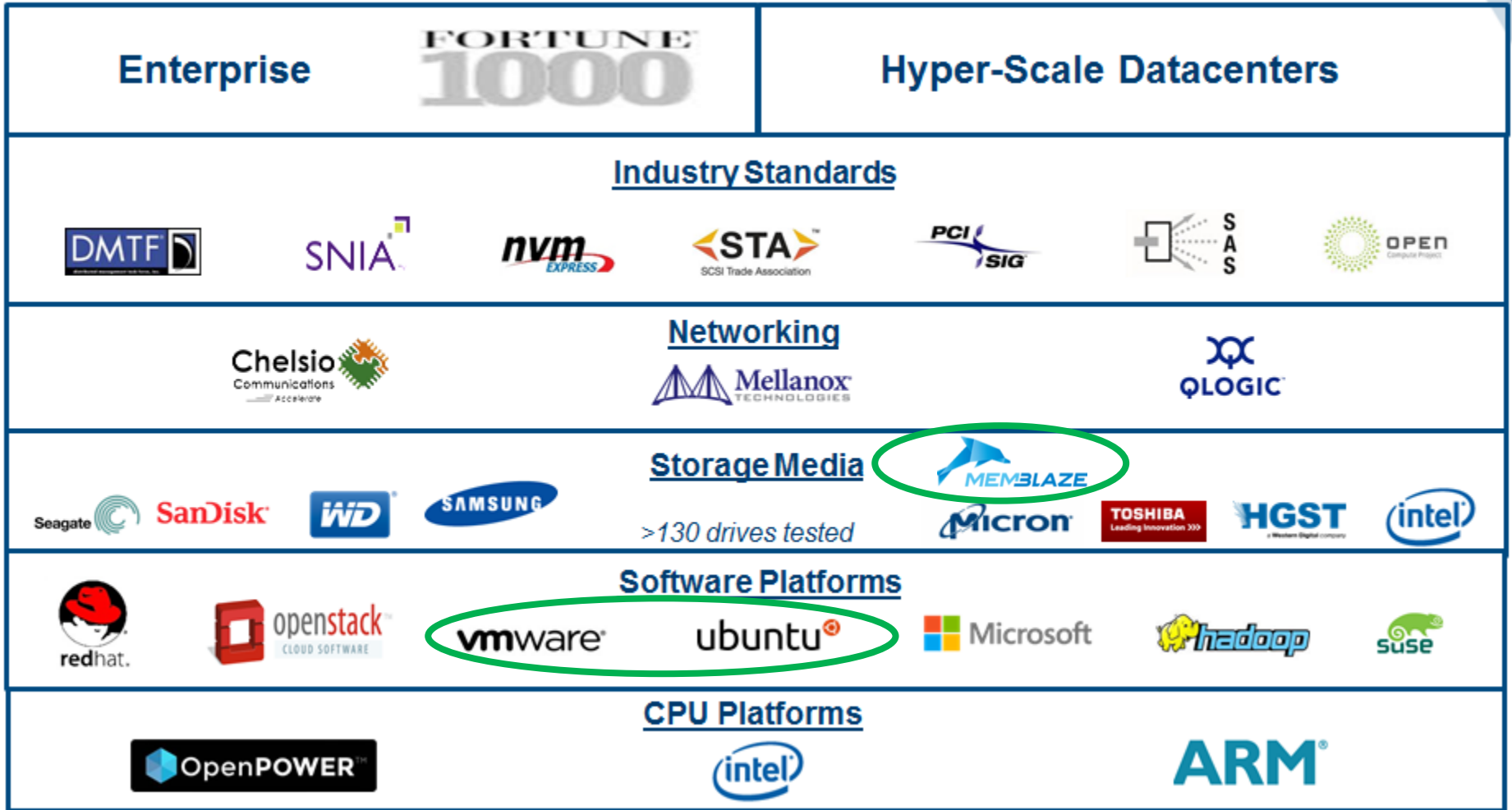
总结

Data Center Timing

System Initialization:
Power, Cooling, Telco, *Timing Source*

Data Center Interconnect

Storage Leadership

VOLUME

VELOCITY

System Infrastructure Components

Timing

FPGA

PHY

Secure Boot

Power Mgmt

Optics

SI
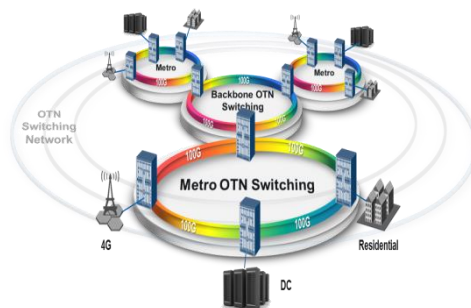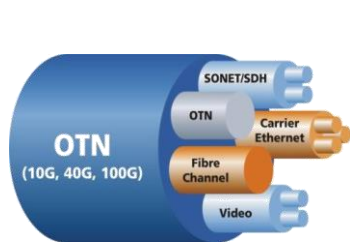
Microsemi – Powering the China Cloud!

谢 谢 ！

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