

# Fujitsu Introduces the 26-port 10Gigabit Ethernet Switch IC MB86C69RBC

High-Performance Computing

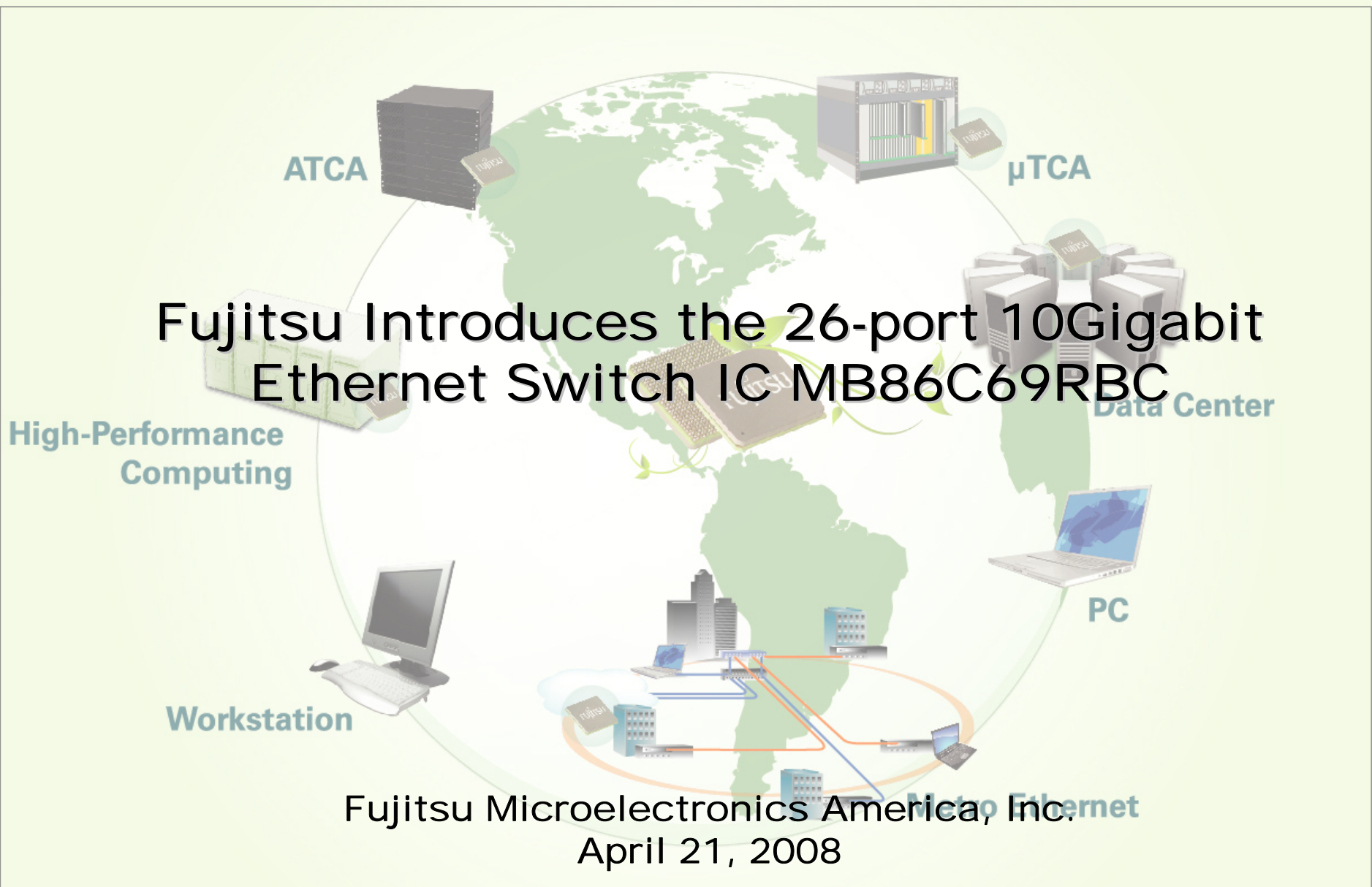
Workstation

Data Center

PC

Fujitsu Microelectronics America, Inc.

April 21, 2008



# Agenda

- The Market
- 10GbE Enterprise Switch Port Growth
- Fujitsu 10GbE Switch IC Roadmap
- Introducing the Fujitsu 26-port 10GbE Switch, MB86C69RBC
- Features
- How Does the Fujitsu Switch IC Fill the Need?
- Differentiation
- Applications
- Total Solutions
- Summary

# What is Driving 10GbE?

## ■ Explosive growth in bandwidth usage

### ■ The trigger?

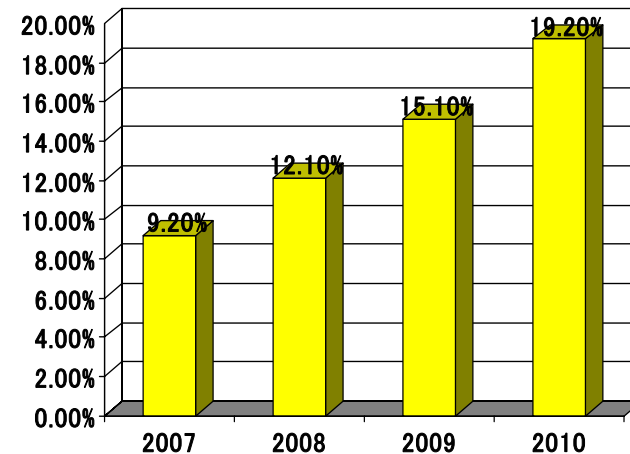
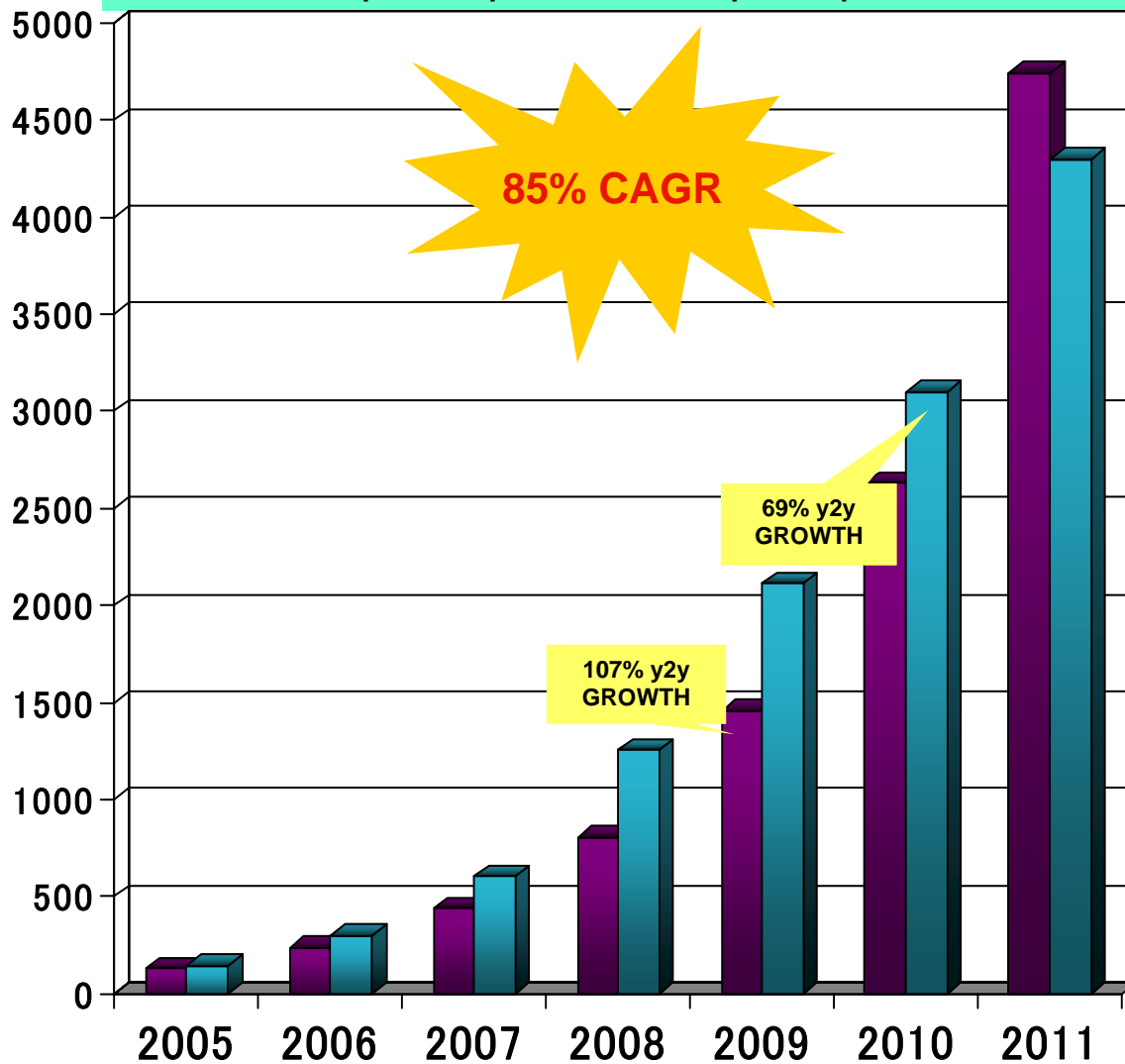
- “The Apple iPhone has given the mobile Internet a much-needed kick in the pants,” according to a new report from M:Metrics
- The mobile media researchers
  - 85% of iPhone users in the U.S. used the device for Internet or data access
  - 31% of iPhone owners watched mobile TV or video
  - Nearly 50% used their phone to access a social networking site, such as Facebook or YouTube (source: Light Reading/Unstrung)

### ■ The impact?

- Social networking and mobile communications (ala peer-to-peer communications, gaming and video services) are driving explosive growth
  - Exposes the under-capacity of bandwidth in access, backbone networks and servers
    - Data traverses the wireless networks into the carriers' networks, right into the data center and back
  - Network providers need to upgrade their networks
    - 10GbE PON is on the way
    - Carrier Ethernet is the only way to support the metro
  - Data centers need to expand their capacity to provide for the 18-to-29-year-olds
    - Expanding capacity does not mean adding more servers, but upgrading the servers to higher performance and capacity
      - Have to remain within the power constraints of the green IT initiative

# 10GbE Enterprise Switch Port growth

10GbE Switch port shipment has Outpaced previous forecast

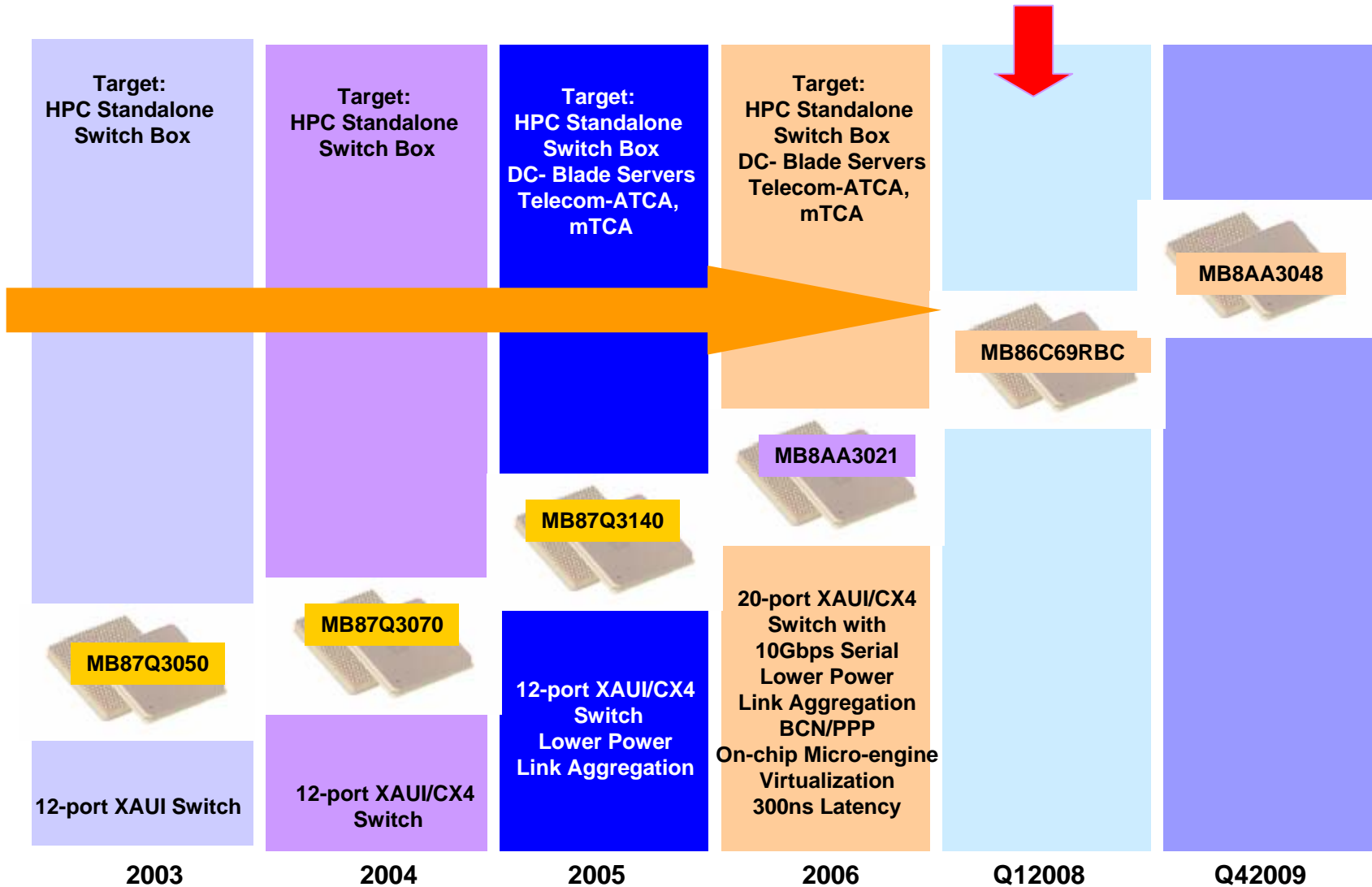


End User Spending  
10G vs. the rest

- 10GbE Switch Ports - Gartner 2007
- IDC Switch ports - IDC 2007

- Does not include Backplane driven applications such as Server Blade or ATCA Market
- Overall 10Gbe semiconductor market will grow to \$2.1B by 2012

# Fujitsu Switch IC Roadmap



# The 26-port 10GbE Switch IC, MB86C69RBC

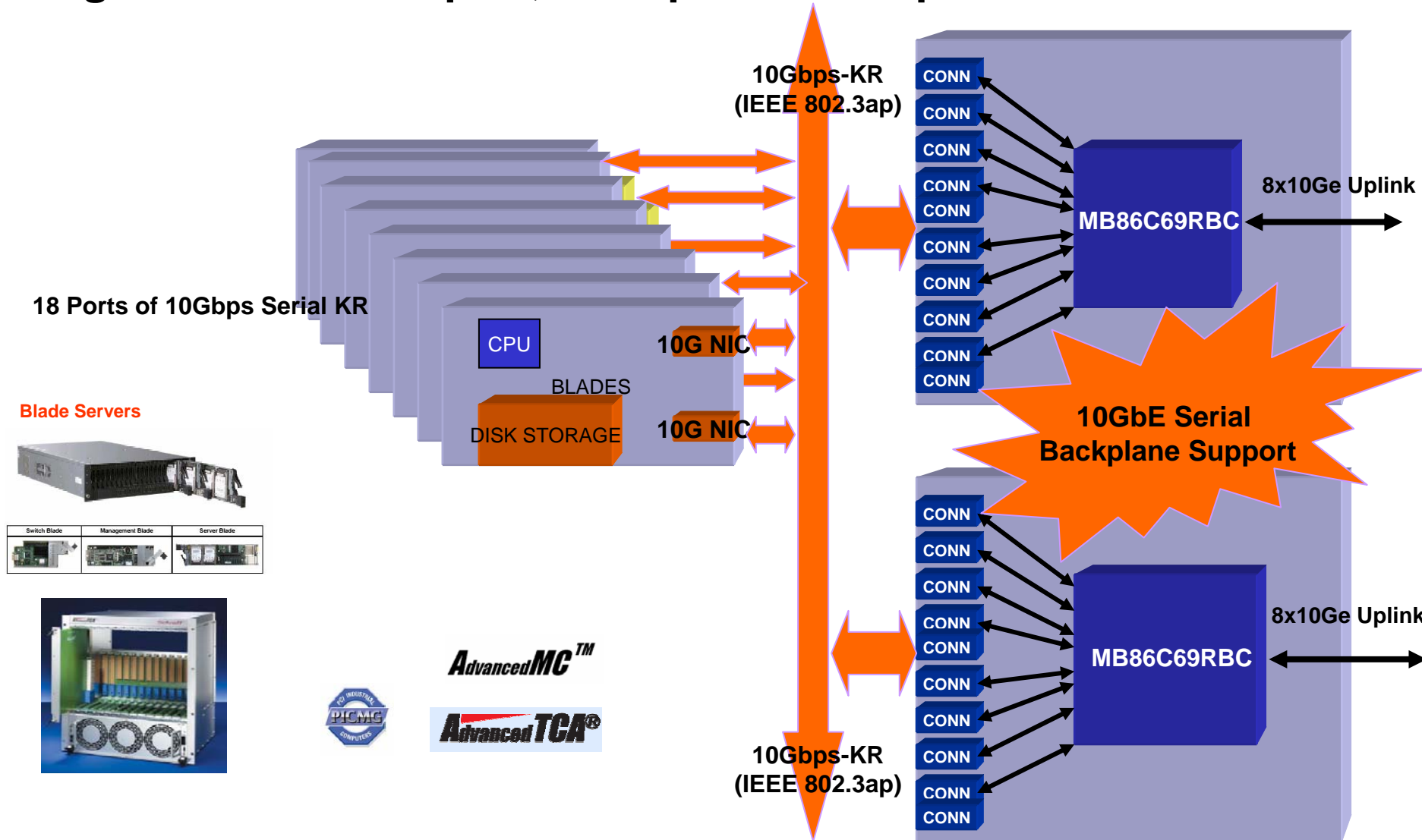


- The industry's first:
  - Highly integrated 28 ports (26 x 10Gbps plus 2 x 1Gbps)
  - 10Gbps serial-KR compatible
  - Multi-rate 10GbE switch with 26 10Gbps multi-rate ports, and
  - Two additional 10/100/1GbE management ports
  - On-chip PHYs
    - Supporting the 10GbE backplane standard (802.3ap), also known as KR
    - Supporting interface compatible to direct drive XFP and SFP+ modules
  - L3 features
  - Data-Center Ethernet Features
    - Congestion Notification and Priority PAUSE

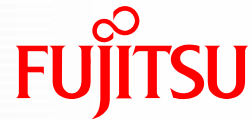


# MB86C69RBC Support 10Gbps Serial – KR

## Designed to Drive 26-port, 10Gbps KR Backplanes



# MB86C69RBC – 26-port Switch



## ■ Industry Firsts

- 26 ports x 10GbE switch with 520G+ non-blocking operation
- 10GbE serial backplane – direct KR-compatible interface

## ■ Other Key Features

- Single-chip, 10GbE switch
- Number of 10GbE ports: 26
- Throughput: 520+Gbps
- MAC address: 16K
- VLAN: 4K
- Internal buffer: 2.9MB
- Management interface: two GbE/100/10 ports
- Built-in micro-engine
- Multi-rate PHY interfaces
  - XAUI / CX4 / KX4 (3.125Gbps x 4)
  - 10Gbps serial XFI-compatible support
  - 1000 KX and 2.5Gbps
- Congestion notification and priority PAUSE support
- VLAN translation
- L3 ACL and forwarding

- Power and physical size
  - Around 22W
  - FCBGA1156 (35mm x 35mm)
- Technology
  - CMOS 90nm process

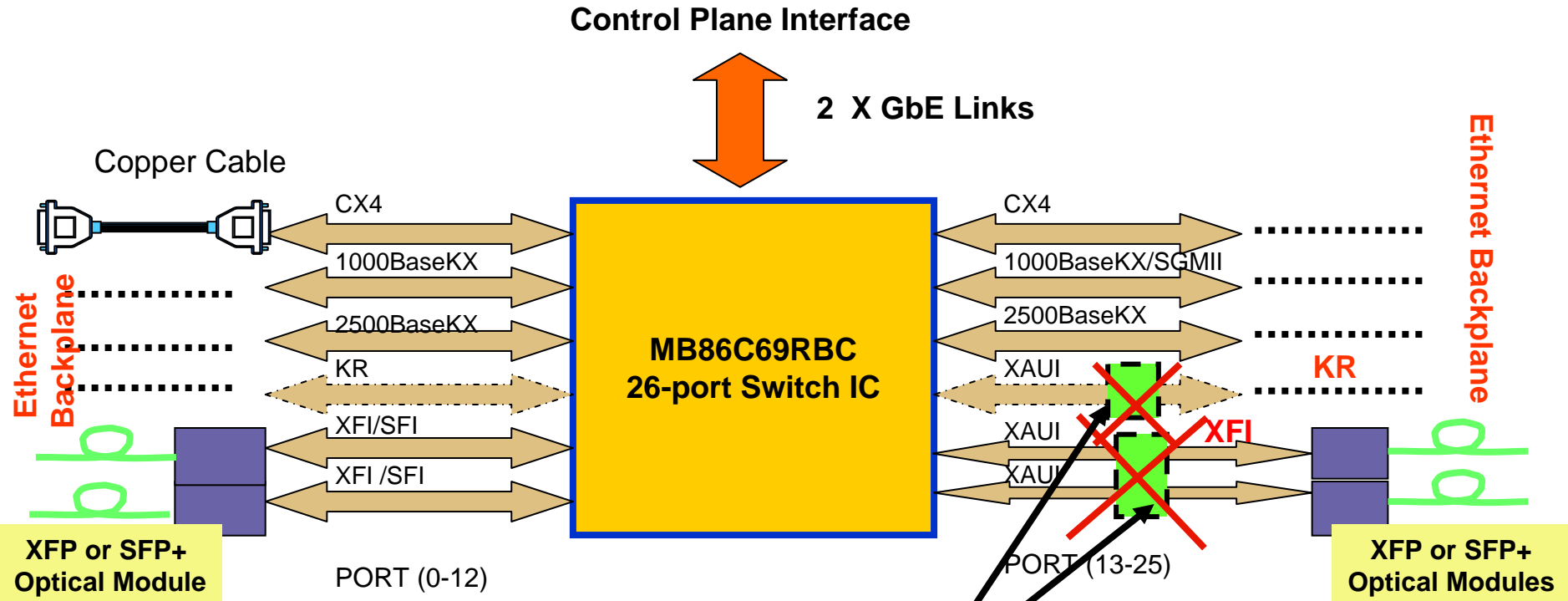
## ■ Benefits

- Board area and power savings
  - Fewer interconnects
  - Reduced chip count and costs in having direct XFP/SFP+ interface
  - Board area savings
  - Low power requirement
- Enhanced QoS
- Fast firmware development
- Non-blocking wire-speed operation
- Low latency (300ns)

## ■ Enabling Technologies

- Multi-rate integrated PHY driving 10Gb serial backplane
- 90nm process
- Multi-stream / multi-port memory

# Fully Configurable, Highly Integrated PHYs



Penalty	With SerDes	MB86C69RBC
Cost	\$50 per port	\$0
Latency	300ns	0ns
Power	2.5W per port	0W
Area	19mmx19mm	None
Routability	16 traces	4 traces

# How Does the MB86C69RBC Fill the Need?

## ■ ATCA

- Typically 16 to 18 slots with 2 slots for switching
- 26-port switch fits the need for the XAUI / 10GbE KR backplane switching, AMC and RTM connectivity
- Multi-rate ports allow for legacy 1GbE cards

## ■ Blade Servers

- Typically range between 16 and 18 slots
- 26 ports fit the needs for XAUI / 10GbE KR backplane switching, plus additional ports for uplinks

## ■ Top-of-the-Rack Switches

- Typically 24 ports
- 26 ports fit the needs with extra ports for inter-switch connectivity

# Target Applications

## ■ Backplane Configuration

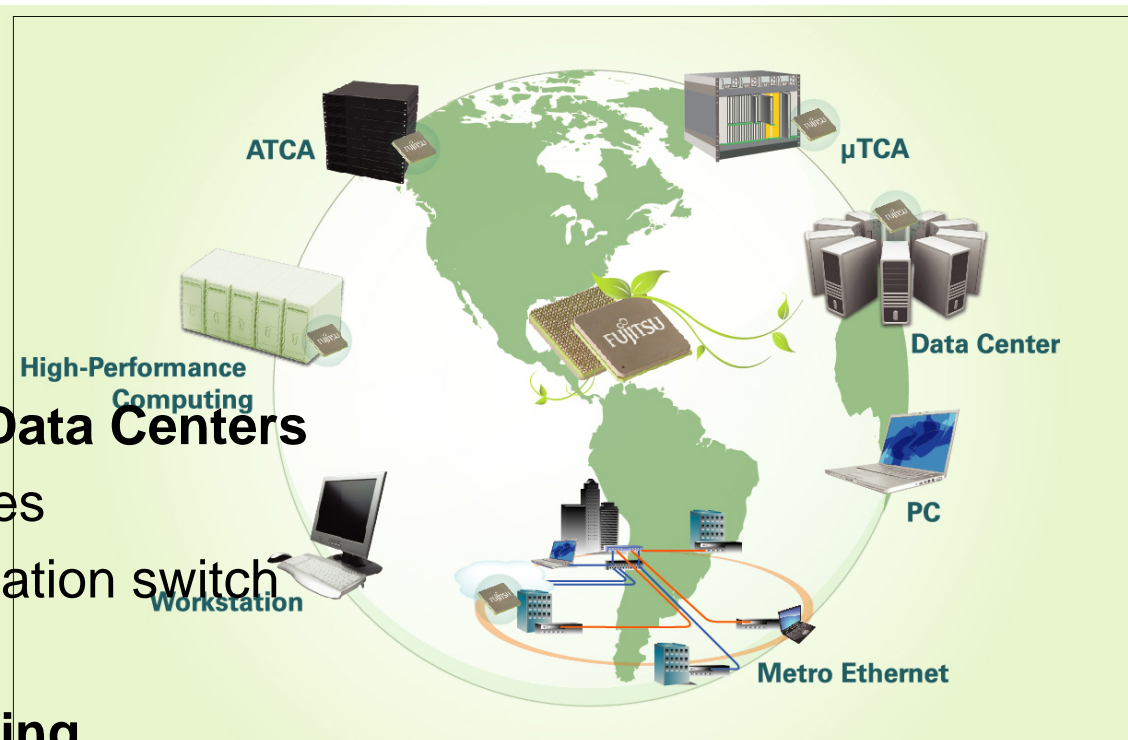
- Blade-server switching blade
- ATCA carrier node blade
  - Mesh configuration
  - Centralized switch
- microTCA hub MCH
- Modular switches

## ■ Enterprise Switching and Data Centers

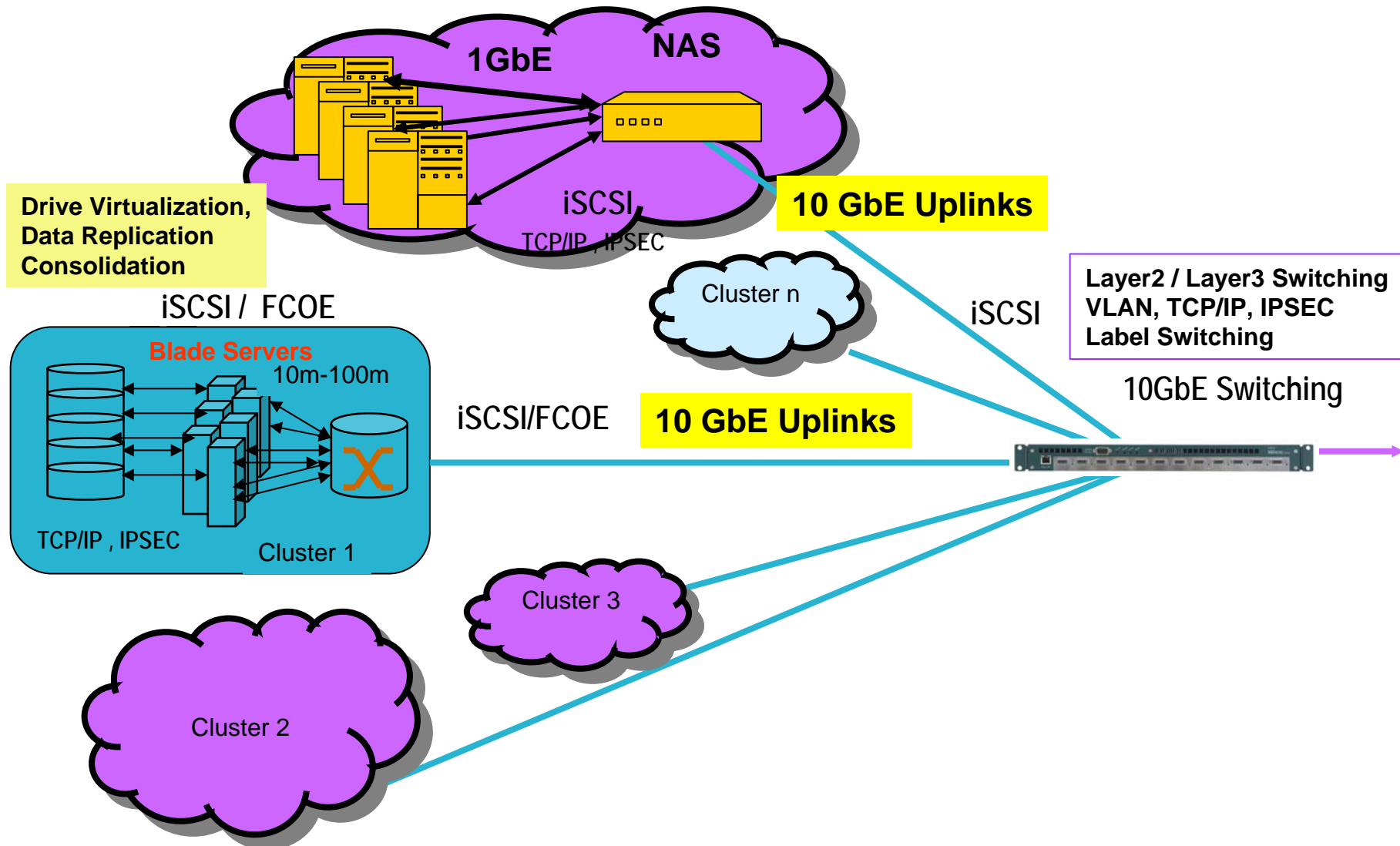
- Blade-server switch blades
- 10GbE backbone aggregation switch
- Top-of-the-rack switches

## ■ High-performance Computing

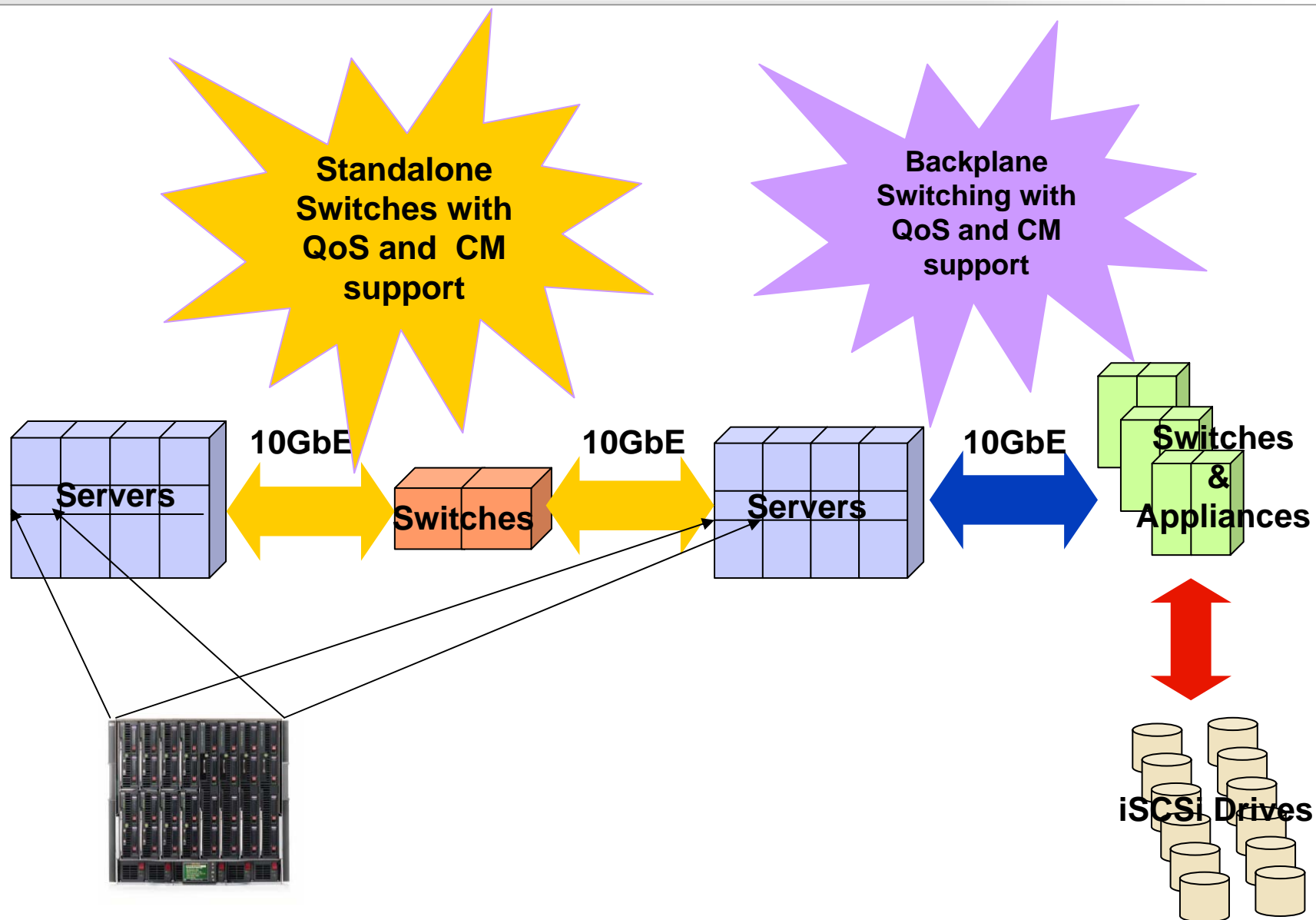
- 10GbE interconnect switch



# 10Gbps Ethernet Interconnects



# Data Center Ethernet (Inter-Connect)



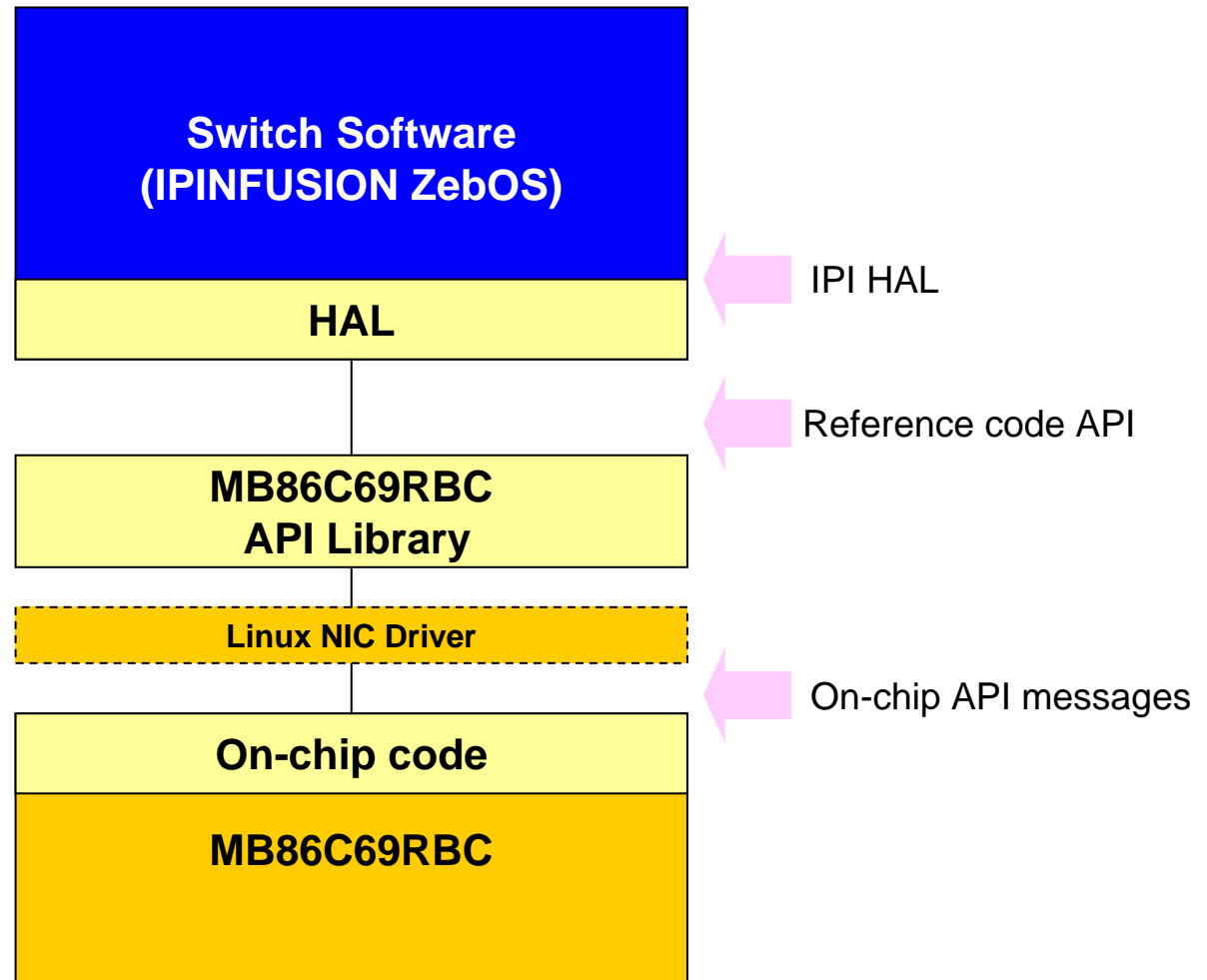
# Key Technical Advantages

- 26 x 10G, or 26 x 1G, or 26 x 2.5G ports + 2 x 1GbE ports
- 10G serial capabilities – direct KR and XFP/SFP+ interface
- VLAN virtualization and translation
- Enhanced QoS with congestion management and priority PAUSE
- Large shared memory (2.9 MB), 2-to-3x the competition
- Receiver hardware adaptive equalization
- GbE management ports
- On-chip micro-engine facilitates firmware development
- ECC memory protection
- Early drop at the ingress and egress buffer HOL blocking avoidance
- Ingress buffering to provide loss-less operation
- 16Kbytes of jumbo frame compared to 9K for the competition
- Small footprint in 35mm x 35 mm package
- Low latency (300 ns)
- Low power (15-22W)

- Software suite to support the embedded switching solutions
  - Partnered with third-party software vendors to provide full L2+ protocol stack
- Hardware reference design
  - 24-port standalone switch with flexible I/Os available as reference design for ODMs and customers

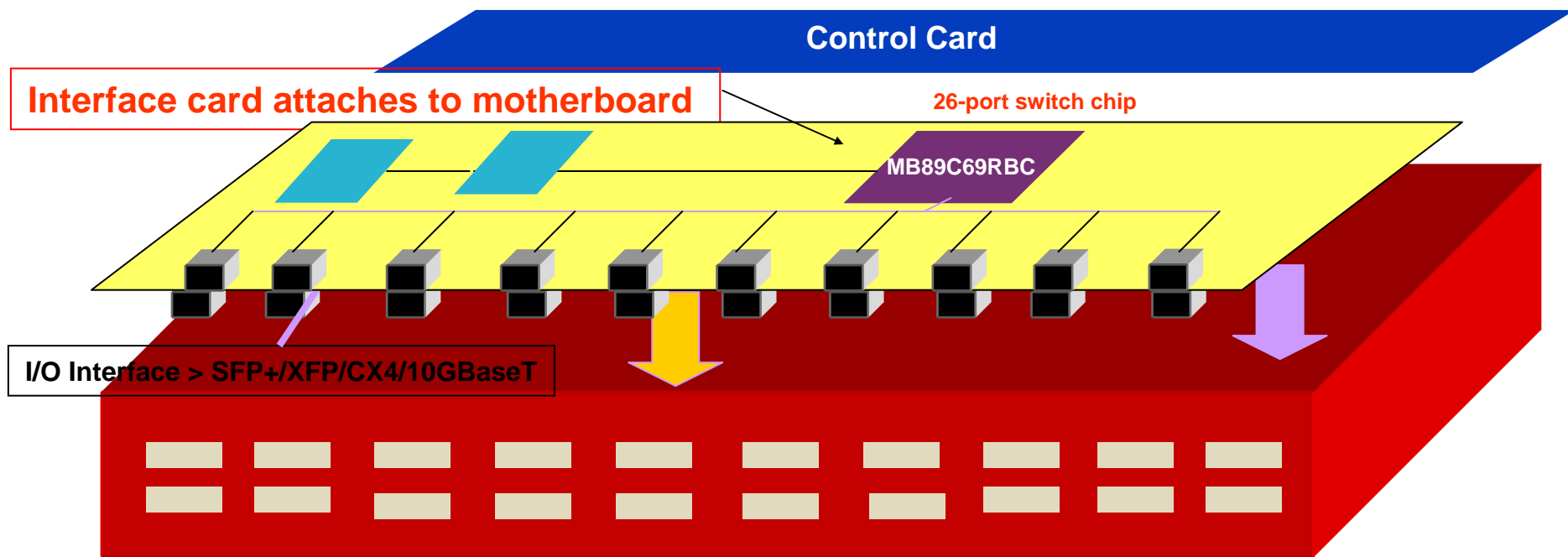
# Total Solution – Software

IPINFUSION ZebOS supports all of the L2 Protocol stack required to manage the MB86C69RBC switching functions




# Total Solution – Hardware

ODM Ready Reference Design for a 26-port 10GbE switch with a flexible I/O interface



## 24+2-port Switch Design with SFP+ interface

- **Fujitsu brings its experience and interconnect technology into Ethernet switch design**
  - First-of-its-kind leading-edge features
    - Highest port counts
    - 10GbE serial for backplanes
    - Enhanced BCN and PPP
    - VLAN translation
  - Highest performance
  - Low power
  - Low profile
- **Value Proposition**
  - Build reliable, faster, and high port-count layer-2+ switches at lower cost and power
  - Lower the total system cost of the high-performance LAN infrastructure for the enterprise and data centers
  - Provide support for state-of-the-art LAN services with very high-quality service



**FUJITSU**

**THE POSSIBILITIES ARE INFINITE**