Industry Leading 1/10/40 GbE Technology From Fujitsu Frontech

Why Fujitsu 10 GbE Switches?

- Fujitsu is a $53 billion global IT solution provider

- Fujitsu is the largest IT company in Japan and the third largest in the world

- As a technology leader, Fujitsu switches are built to the same high quality standards that the Fujitsu brand name has represented for +60 years

- Fujitsu has been in the 10 Gigabit Ethernet market since its beginning
  - XG2600 family is the 4th generation switch based on Fujitsu's 4th generation switch ASIC
  - Fujitsu developed the world's first single "10 Gigabit Ethernet Switch on a Chip" in 2003

- Fujitsu switches pass packets fast and reliably which make them ideal for HPC and HA applications

- Fujitsu focuses on core competencies-Low latency

10 Gigabit Ethernet Market Growth

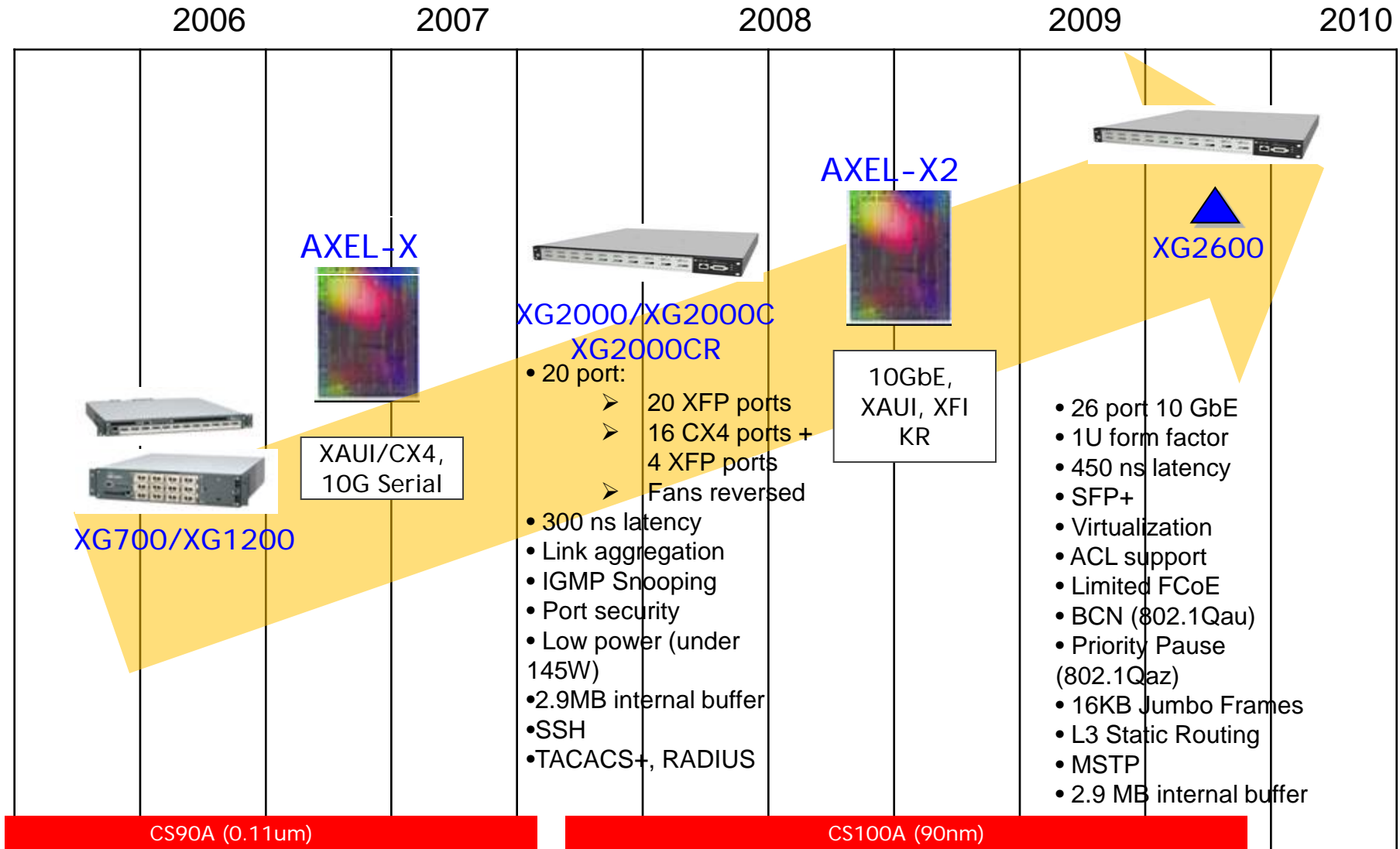## 10 Gigabit Ethernet Market Forcast (Billions)
[Switches and Network Adapters]

Legend:
- Financials
- Cloud
- Storage
- HPC
- Data Center
- SMB
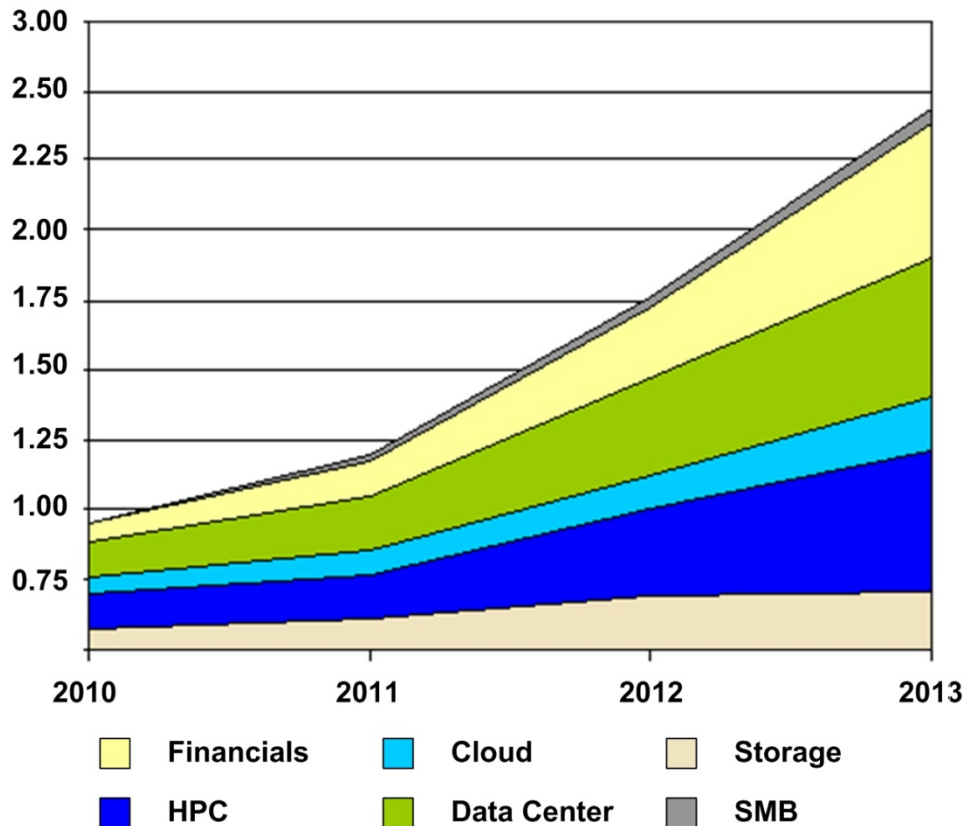
- 33% growth rate of entire market in the last quarter of 2010 topped $1B (Dell'Oro)

- Servers, Storage, driving need for more network bandwidth
  - Multi-core processors
  - Server consolidation
  - Increasing application performance
  - Storage exponential growth

- Applications requiring higher bandwidth and lower latency

- 10GbE market growth is unprecedented considering cost now economically practical, and moving quickly down price curve
  - < 4x cost of 1G with 10x performance (today)
  - 10GBASE-T products will drive cost lower in 2011

- 1GbE/10GbE edge switch market growth is also growing aggressively as IT departments increase delivery of 1 GbE to clients.

10 Gigabit Ethernet Markets/Use Cases

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- **HPC**
  - Academic
  - Government/DOD/DOE
  - Pharmaceutical
  - Life Sciences
  - Healthcare
  - Oil & Gas
  - Modeling/CAD

- **Financial Services**
  - High frequency low latency trading
  - High frequency, low latency transaction accounting and billing

- **Cloud Computing**
  - Private and Public Cloud scaling

- **SMB to Enterprise**
  - 10/100 Mb to 1/10 Gb network transitions
  - 1/10 Gb to 40 Gb network transitions
  - Data Center Virtualization
    - Workload consolidation
    - VDI

- **Storage**
  - iSCSI
  - NAS/NFS

XG Series Switch / AXEL Chip Roadmap

2006	2007	2008	2009	2010

AXEL-X2

AXEL-X

XG2600

**XG2000/XG2000C
XG2000CR**

- 20 port:
  - ➢ 20 XFP ports
  - ➢ 16 CX4 ports +
  - 4 XFP ports
  - ➢ Fans reversed

**10GbE,
XAUI, XFI
KR**

XAUI/CX4,
10G Serial

- 300 ns latency
- Link aggregation
- IGMP Snooping
- Port security
- Low power (under 145W)
- 2.9MB internal buffer
- SSH
- TACACS+, RADIUS

XG700/XG1200

- 26 port 10 GbE
- 1U form factor
- 450 ns latency
- SFP+
- Virtualization
- ACL support
- Limited FCoE
- BCN (802.1Qau)
- Priority Pause (802.1Qaz)
- 16KB Jumbo Frames
- L3 Static Routing
- MSTP
- 2.9 MB internal buffer

CS90A (0.11um)	CS100A (90nm)

XG0224/XG0448 – Bridging 1 GbE to 10GbE

XG0224

- 24 ports, 10/100/1000BASE-T auto-negotiated Ethernet ports
- 4 SFP 'combo' ports
- Optional dual port 10GbE uplink card -- CX4 or SFP+
- 88 Gbps switching capacity
- Latency as low as 4.1 us
- Physical
  - 1U 2 post rack mount
  - Power consumption: < 80W
  - Long life cooling fans
 - Airflow: Left to Right
- RoHS6

XG0448

- 48 ports, 10/100/1000BASE-T auto-negotiated Ethernet ports
- 4 SFP 'combo' ports
- Optional 2 dual port 10GbE uplink cards – CX4 or SFP+
- 176Gbps switching capacity
- Latency as low as 4.1 us
- Physical
  - 1U 2 post rack mount
  - Power consumption: < 133W
  - Long life cooling fans
  - Airflow: Left to Right
- RoHS6

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XG0440 – Bridging 1 GbE to 10GbE

XG0440

- **40 port 1 GbE + 4 port 10 GbE**
  - **1 GbE ports,10/100/1000 Mbps autonegotiation**
  - **10 GbE ports support SR/LR SFP+ transceivers and Direct-Attach cables**
  - **160 Gbps switching capacity**
  - **Latency as low as 4.1 us**
- **Physical**
  - **1U, 4 post rack mounting**
  - **Hot swappable redundant power supplies**
  - **Power consumption: <102W**
  - **Long life cooling fans**
  - **XG0440DC (port to rear airflow); XG0440DCR (rear to port airflow)**
- **RoHS6**

Green Policy Innovation
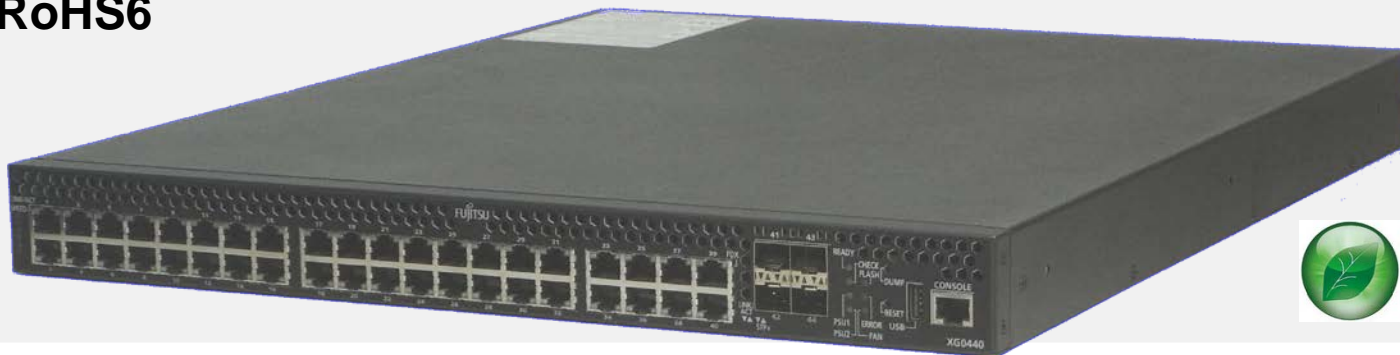
XG2600 10 GbE SFP+ Switch

XG2600

- **26 port 520 Gbps wire speed switching**
  - **4K VLANs + ACLs**
  - **2K Multicast Groups**
  - **STP/RSTP/MSTP**
  - **16K Jumbo frames**
  - **Latency as low as 450 ns**
- **Physical**
  - **1U, 4 post rack mounting**
  - **Hot swappable redundant power supplies and long life cooling fans**
 - **Power consumption: <120W**
  - **Airflow is user configurable**
- **RoHS6**

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1.2Tbs 40/10GbE New Fabric Switch

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New Fabric Switch

- **2 1/10/40 GbE IF modules on a 1.2Tbps backplane**
  - **16 port 10 GbE SFP+ plus 4 port 40 GbE QSFP module(Upon Release)**
  - **8 port 40 GbE module(Upon Release)**
  - **24 port 10 GbE module (2013)**
  - **16 port 4/8/16 Gb SFP+ FCoE/FC module (2013)**
- **Physical**
  - **1U, 4 post rack mounting**
  - **Hot swappable redundant power supplies and long life cooling fans**
  - **Power consumption: <300W**
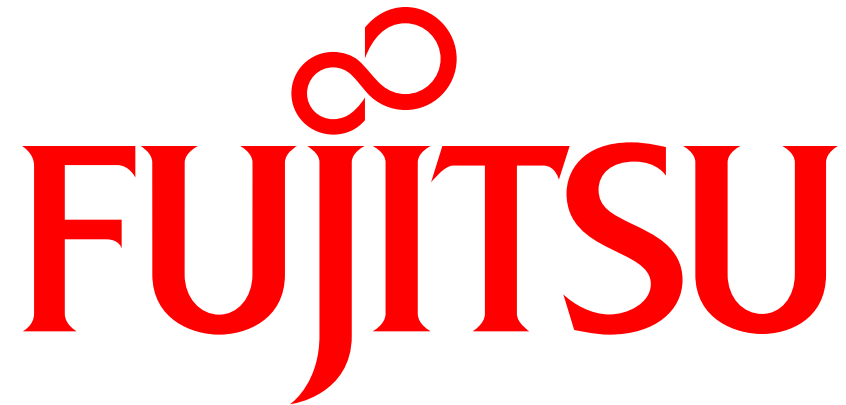 - **CFX2000DC (port to rear airflow); CFX2000DCR (rear to port airflow)**
- **RoHS6**

Green Policy Innovation
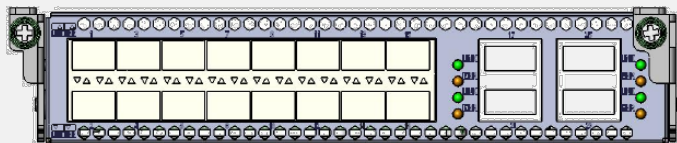
16x10GbE(SFP+) +4x40GbE(QSFP) Module

8x40GbE(QSFP) Module

Keeping Pace with the IT Market
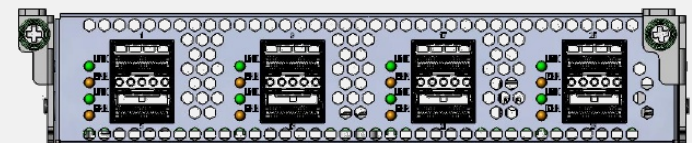
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New Fabric Switch -- Additional Features

- Network virtualization support for Cloud-based systems via Fujitsu's Data Center Bridging (DCB) Ethernet Fabric. Automated, dynamic, fabric configuration

- LAN/SAN Consolidated Networks reduces switch count

- Centralized management of all FFAB switches. Orchestrator ROR and OpenFlow support

- Active-Active Multi-path Connectivity (No STP networks)

- Hardware offloading for VM Live Migration, and automatic Port-changing (interoperable with Hypervisor vSwitches)

- Network Multi-tenancy to improve physical device utilization & security