Introducing IBM BladeCenter Family

The value of simplification
The value of integration
The value of IBM

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Contents

- **Market overview**

- **Introduction → New Announcements**

- **Introducing the BladeCenter H**

- **Product features → mechanicals, blade servers, I/O modules, management**

- **Conclusion**

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Market Overview

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What is on the CIOs mind today?

- **Need for IT is outpacing my ability to add qualified IT managers**

- **My current facility is limited by power input or cooling capacity; driving down my effective density**

- **I am having a difficult time adapting to the changes that my business is going seeing**

- **I am seeing delays in delivery of new technology into my production environment**

- **I have to many under-utilized servers resulting in excessive downtime, IT staff attention, and poor customer satisfaction**

- **The IT solution I inherited requires dozens of different types of servers, OS, applications. The complexity is slowing the company's ability to adapt**

- **It is costing me a fortune to install all the new IT I am buying**

- **Nothing I buy this year seems to be valuable 12-18 months later**

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What problems should blades address?

BladeCenter was designed to help with the following:

– **Reduce power usage**

– **Be easier and less costly to cool (less heat and less air flow)**

– **Reduce points of failure and increase RAS (reliability, accessibility, serviceability)**

– **Reduce weight over 1U/2U alternatives**

– **Drive out costs and reduce TCO**

– **Increase manageability**

– **Speed deployment and future scalability**

– **Drive out cable complexity**

– **Be flexible enough to match current and future infrastructures and fabrics**

– **Be able to run all applications and OS varieties not just Linux/Windows on Intel**

– **Reduce the 'churn' needed to bring on new technology**

– **Increase density**

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What is announcing?

CURRENT   **NEW**

Chassis

BladeCenter
BladeCenter T
Management Module

BladeCenter H

IBM BladeCenter
Advanced Management Module

Blades

2-way Xeon
2-way low voltage Xeon
2-socket Opteron
2-way PowerPC

2-socket PowerPC Refresh (dual core)
2-way low voltage Xeon speedbumps
2-way Xeon RoHS
2-socket Opteron speedbump and RoHS
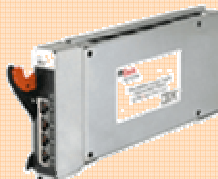2-socket ultra low voltage (preannounce)
Cell blade

Adapters

Dual Gigabit Ethernet
Dual iSCSI/TOE Ethernet
Dual QLogic Fibre HBA
Dual Emulex Fibre HBA
Dual Topspin 1X Infiniband
Dual Myrinet Fabric

Dual 4X InfiniBand HCA

Switches

Nortel
Cisco
QLogic
Brocade
McData
Topspin
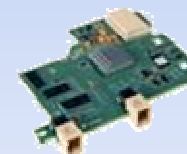
Cisco 4X InfiniBand Switch
Module (preannounce)

THE FOUNDATION CONTINUES

Ecosystem

The strength of the entire BladeCenter ecosystem – Includes 700 Alliance and OpenSpec Partners Blade.Org

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PSSC – IBM Customer Center Montpellier

Introducing the BladeCenter H

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High Speed BladeCenter: BladeCenter H

- **Enables new workloads: high bandwidth, data intensive, low latency**

  – Earth/Life Sciences

  – Data Intensive, Commercial Analytics

  – Next generation network applications

- **Up to 10X increase in bandwidth**

  – Accomplished via new 10Gb fabric support to each blade

  – Supports 4 10Gb channels to each blade

  – 4X InfiniBand, 10Gb Ethernet

- **Maintains same fabrics as BladeCenter as well**

  – Twice the number of channels (8) to every blade

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BladeCenter One Family
Investment Protection

BladeCenter T
Announced: Apr. 2004

8 Blades, 8U

Ruggedised Chassis

Telco, Military,

Medical Imaging Apps

BladeCenter
Announced: Nov. 2002

14 Blades, 7U

Enterprise & SMB Chassis

Mainstream Applications

Remote Sites (stores)

BladeCenter H
Announced: Feb. 2006

14 Blades, 9U

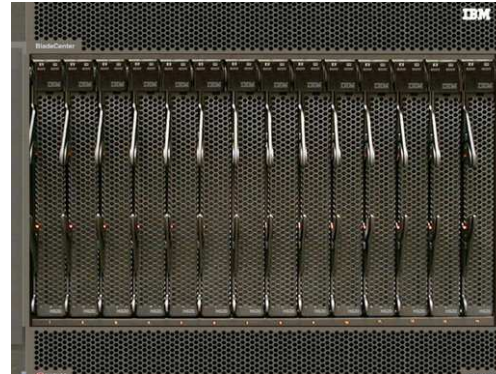**High Speed (>10GB)**

Extreme I/O for data intensive environments

← Common Blades, Common Switches →

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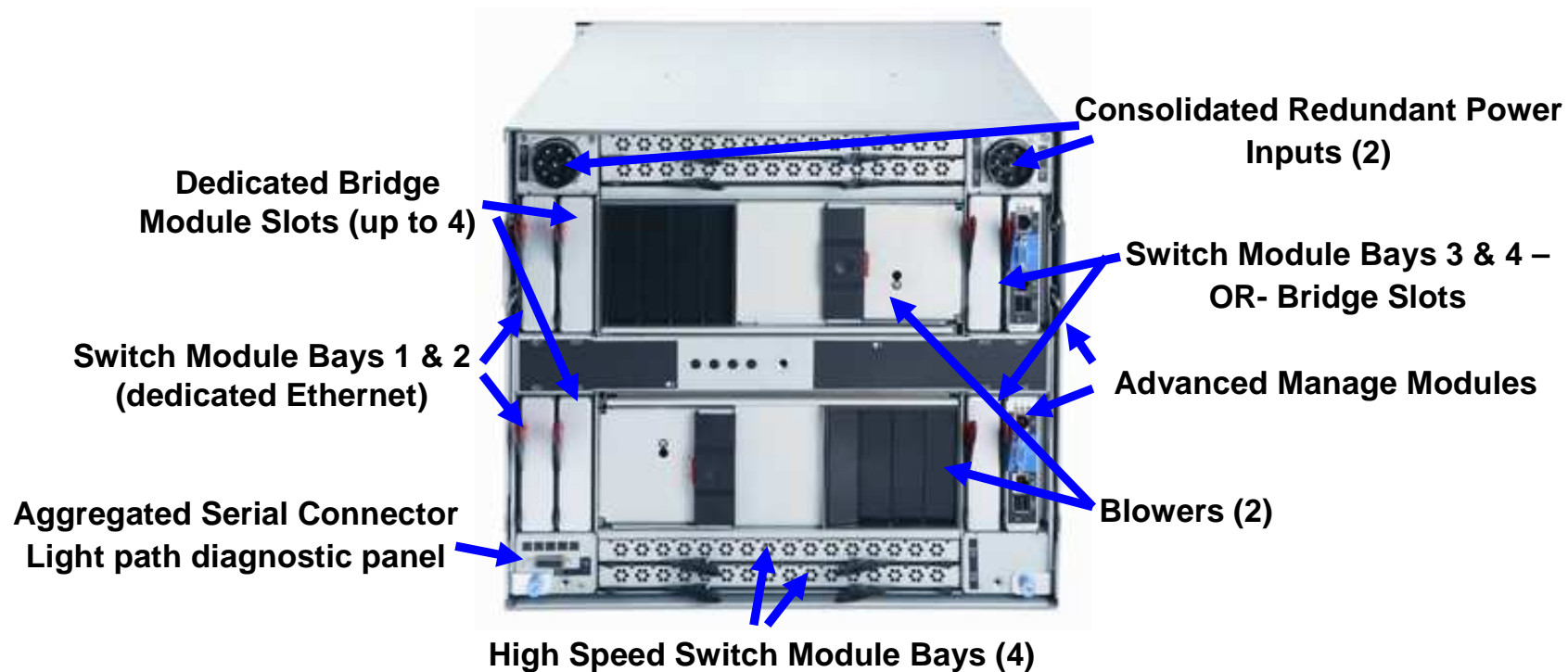# IBM BladeCenter H High level design details

- **System Overview**
  - 9U Rack Mount
  - 14 Blades, 30 mm pitch
  - Designed for dual 2006+ Processors
  - Legacy Switch Support (qty 4/2)
  - High Speed Switch Support (qty 4)
  - Bridge Support for High Speed Switch (qty 4)
  - aMM Support (qty 2)
  - 2900 Watt Power supply (up to 4)
  - 2 Blowers (AC), 12 Fans

- Provide increased power and cooling capability over BC-E
- Provide High Speed (10Gb) Internal Fabric
- Concurrent KVM and media (cKVM/cMedia) enabled
- Compatibility with current blades and switches
- Management Module 2 to replace Management Module 1

BladeCenter H Tour
What is Where?

Consolidated Redundant Power Inputs (2)

Dedicated Bridge Module Slots (up to 4)

Switch Module Bays 3 & 4 – OR- Bridge Slots

Switch Module Bays 1 & 2 (dedicated Ethernet)

Advanced Manage Modules

Aggregated Serial Connector Light path diagnostic panel

Blowers (2)

High Speed Switch Module Bays (4)

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What works with BladeCenter H?

- Blades
  - All HS20 blades - type 8678 , type 8832 , type 843
  - All HS40 blades - type 8839
  - All JS20 blades - type 8842
  - All LS20 blades - type 8850
  - Supporting all future blades
- Switches
  - All current fibre channel switches
  - All current Gb ethernet switches
  - IBM BladeCenter Optical Pass-thru Module
  - IBM BladeCenter Copper Pass-thru Module
  - TopSpin Infiniband Switch
  - Supporting all future legacy fabric switches
- Management Modules
  - AMM (note: today's MM will not fit in BCH)

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Product features:
Mechanicals, blade servers,
I/O modules, management

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Product features

Mechanicals

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Power Supply overview BCH

- Power Module Bays
  - Maximum of four per chassis
  - Two ship standard with the chassis
  - Other two come as a single option part number

- Power domains
  - BladeCenter H chassis deploys same 'domain style' power topology
  - Having two domains reduces the chance that any catastrophic failure can take out all four power supplies as might be seen in a topology where all supplies are on same bus

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BladeCenter AC Power Topology

- **New power supply option for BladeCenter H**
  - Rated DC output of supply is 2900W
  - Power Modules directly attach to Mid-plane, AC input provided by internal cabling
  - Power Modules 1 and 2 ship standard, 3 and 4 are optional
  - Optional Power Supply Module includes 2 power supplies and matching fan kits

- **Front loading for easier service – no cable removal for replacement**

- **ROHS ready**

- **Power subsystem is completely redundant**
  - VPD available via I2C

- **Each power supply includes a three pack of fans**
  - Two of three fans needed for operation
  - 60mm fans (3), and is a CRU
  - Fan Pack control logic is via I2C bus thru supply
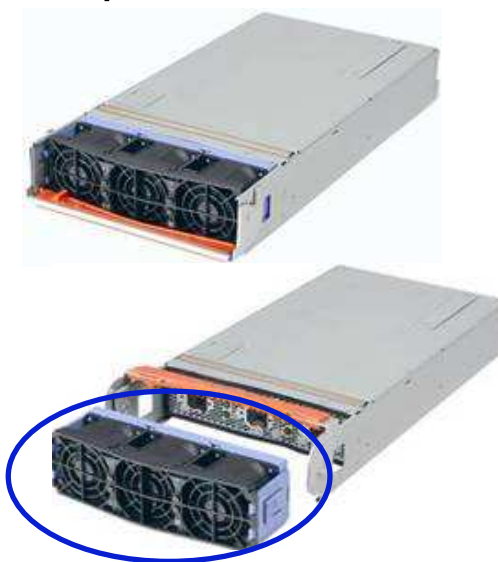
BladeCenter AC Power Topology

- New power simplifies power inputs for BladeCenter
  - Allows several power cord input options
  - Solution will vary based on number of chassis being installed

- Differs with WW location of solution set up - several Geo/Region specific options

- Connector on the back of the BladeCenter assures that the cable can not be installed incorrectly

- These cables work in the same fashion as the connectors on many of the IBM PDU family
  - Customer serviceable
  - Easy to install and remove
  - Same chassis WW

This end of the cable allow a single chassis to work WW.

Different voltages

Different ratings

WW Safety certifications

BladeCenter H Blower Modules

- Customer serviceable
  - Simple handle design makes installation and removal simple
  - When one blower is removed, chassis is designed to prevent air flow issues
  - Single unit fits in either blower slot

- Hot Swap

- Full N+N Redundant

- Directly powered by AC for maximum efficiency

- Highly efficient use of air- the blower speed is controlled by MM according to incoming air temperatures into the chassis

Media Tray Overview BCH

- **Customer Serviceable Media Tray**
  - New half blade design media tray slides in and is serviceable similar to a blade
  - Direct wired to the mid-plane
  - Can be removed without impacting operation of chassis
  - Tray contains
    - 2 External USB connectors, 1 Internal connector
    - Full Light Path Diagnostic Panel
    - 9.5mm DVD

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Blade servers portfolio

	HS20 2-way Xeon	HS40 4-way Xeon	JS20 PowerPC	AMD Opteron LS20
Features	■ Intel Xeon DP ■ EM64T ■ Mainstream rack dense blade ■ High availability apps ■ Optional HS HDD	■ Intel Xeon MP processors ■ 4-way SMP capability ■ Supports Windows, Linux, and NetWare	■ Two PowerPC® 970 processors ■ 32-bit/64-bit solution for Linux & AIX 5L™ ■ Performance for deep computing clusters	■ Two socket AMD ■ Single and Dual core ■ Similar feature set to HS20
Target Apps	■ 32 or 64 bit ■ Edge and mid-tier workloads ■ Collaboration ■ Web serving	■ 32 bit only ■ Back-end workloads ■ Large mid-tier apps	■ 32- or 64-bit HPC, VMX acceleration ■ UNIX server consolidation	■ 32- or 64-bit HPC ■ High memory bandwidth apps

Common Chassis and Infrastructure

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HS20 and AMD Opteron LS20 blade servers

IBM eServer BladeCenter

HS20
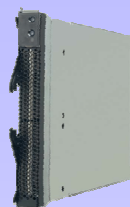
- Dual Intel Xeon EM64T 2.8GHz - 3.8GHz with 800MHz Front Side Bus
- 14 Blades per Chassis (30mm blade width)
- 2 Gb Ethernet Ports standard
- 4 DIMM slots (512MB-4GB) up to 16GB
- Base memory starts at 512MB
- Up to (2) 73GB SFF SCSI w/ RAID 1 standard
- Internal Switches (Enet/FC/KVM)
- Redundant/hot swap fans standard
- Hot swap power optional
- Redundant/hot swap mgmt optional
- Support for SCSI Storage Expansion Unit and Hot Swap HDDs
- Support for dual SCSI drives and Expansion Card
- Support for IBM Director/RDM/Altiris

AMD Opteron LS20 for

IBM eServer BladeCenter

- Dual AMD Opteron up to 2.4, 2.6GHz and 2.8GHz single core and up to 2.0Ghz and 2.2GHz dual core with Integrated Memory Controller
- 14 Blades per Chassis (30mm blade width)
- 2 Gb Ethernet Ports standard
- 4 DIMM slots (1GB – 4GB) up to 16GB
- Base memory starts at 1GB
- Up to (2) 73GB SFF SCSI w/ RAID1 standard (no support for Hot Swap SCSI enclosure)
- Internal Switches (Enet/FC/KVM)
- Redundant/hot swap fans standard
- Hot swap power optional
- Redundant/hot swap mgmt optional
- Support for dual SCSI drives and Expansion Card
- Support for IBM Director/RDM/Altiris

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HS40 and JS20 blade servers

IBM eServer BladeCenter

HS40

- Up to 4 Intel Xeon MP 2.0GHz - 3.0GHz with 400MHz Front Side Bus
- 7 Blades per Chassis (60mm blade width)
- 4 Gb Ethernet Ports standard
- 8 DIMM slots (512MB-2GB) up to 16GB
- Base memory starts at 512MB
- Up to (2) 60GB ATA-100 IDE
- Internal Switches (Enet/FC/KVM)
- Redundant/hot swap fans standard
- Hot swap power optional
- Redundant/hot swap mgmt optional
- Support for SCSI Storage Expansion Unit and Hot Swap HDDs
- Support for IBM Director/RDM/Altiris

IBM eServer BladeCenter

JS20

- Dual PowerPC 970 2.2 GHz (Power 4 based)
- 14 Blades per Chassis (30mm blade width)
- 2 Gb Ethernet Ports standard
- 4 DIMM slots (256MB – 2GB) up to 8GB
- Base memory starts at 256MB
- Up to (2) 60GB ATA-100 IDE (no support for Hot Swap SCSI enclosure)
- Internal Switches (Enet/FC/KVM)
- Redundant/hot swap fans standard
- Hot swap power optional
- Redundant/hot swap mgmt optional
- Support for IBM Director/RDM/Altiris

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New blade servers just announced

HS20 ULP	JS21	Cell Blade
Features		
• **Dual-core Intel Xeon DP** • **32-bit** • **Leadership performance per watt**	• **Dual-core PowerPC® 970MP Processor** • **Built-in virtualization** • **Scalable UNIX® Blade** • **Integrated vector co-processor for high-performance parallel computing**	• **Dual Cell BE based Processors** • **EIB is extended transparently across high-speed coherent interface between dual Cell BE Processors**
Target Apps		
• **Windows workloads** • **Integer-based HPC applications** • **Customers dealing with power and cooling constraints**	• **32- or 64-bit HPC, VMX acceleration** • **UNIX server consolidation**	• **High performance workloads** • **Digital media, medical imaging, aerospace and defense, communications**

Common Chassis and Infrastructure

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BladeCenter ultra low power HS20
Performance Without the Power

- A new dual core, dual socket HS20 Intel Xeon blade with leadership performance per watt

  – Processor consumes only 31W of power

  – Blade draws only 180W in max configuration

- 32-bit high performance, optimized for power and cooling

- Target markets: Windows workloads, integer-based HPC applications, customers dealing with power and cooling constraints

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Ultra Low Power HS20 Specifics

- Dual socket, dual core blade based on Intel Low Voltage Xeon processors and Lindenhurst chipset

  – 1.67GHz, 2.0 GHz

- Processors consume only 31W of power per socket

  – 180W per blade

- Four DDR2 DIMM slots supporting up to 16GB of memory

- Two SFF SAS hard drives – 36 and 73GB

- LSI SAS RAID controller supports RAID 0,1

- Broadcom 5704 NICs

- Does not support Blade Storage Extension (BSE) unit

- Supported in all three IBM BladeCenter chassis

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JS21: 3X performance with dual-core PowerPC 970MP versus JS20[*]

NEW! **IBM BladeCenter JS21 for HPC Linux Clusters, AIX 5L on Blades, server consolidation/workload migration, and Web serving**

- First BladeCenter blade server with built-in virtualization (APV)[1]

- **First blade server designed for 10Gb-capable BladeCenter H**

- **Greater reliability and performance with SAS Hard drives, DDR2 memory, and integrated PCI-Express**

- Differentiated solution for life and earth sciences with AltiVec acceleration, HPC Linux® Clusters, server consolidation, and WebSphere on AIX 5L

What's your requirement?

▶ High-speed, low-latency fabric such as InfiniBand for HPC

▶ Blade that supports AIX 5L for WebSphere or server consolidation

*IBM results submitted to SPEC as of 2/9/06. Claim based on IBM BladeCenter JS20 2-core 2.2GHz SPECint_rate2000 result of 21vs. JS21 4-core 2.5GHz result of 67.9, http://www.spec.org
1 Must acquire optional VIOS license to utilize Micro-Partitioning

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IBM BladeCenter JS21 Specifics

- PowerPC 970MP 2.5 GHz/2x1MB L2 DC

- Max 16GB DDR2 PC3200 ECC/Chipkill

- Up to two 73GB SAS HDDs + RAID10

- PCI-Express (10GbE/4X IB) + Dual GbE

- Integrated Systems Management

- Support for AIX 5L and Linux

Cell Blade
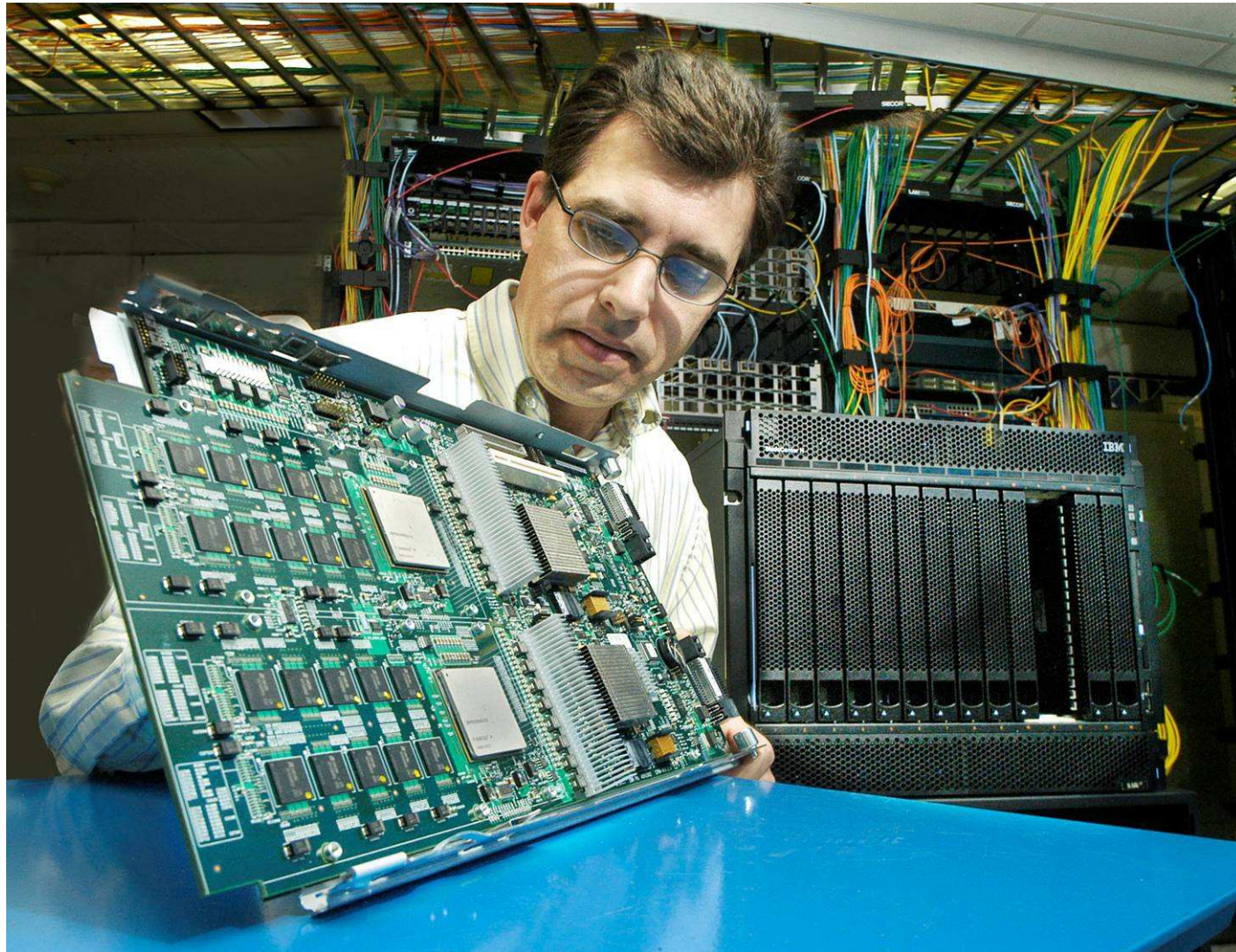
BladeCenter Cell-based Blade
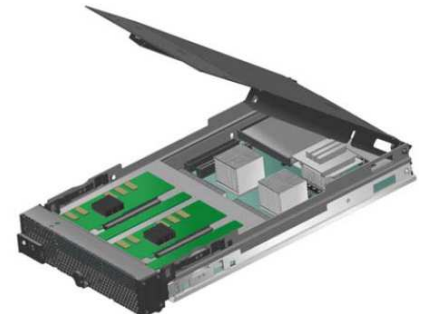
- **Breakthrough nine-core Cell Broadband Engine (BE) based Processor blade**

- **Target markets: high performance workloads across a number of industries including digital media, medical imaging, aerospace and defense, communications and the high performance computing industry**

Cell-based Blade Specifics
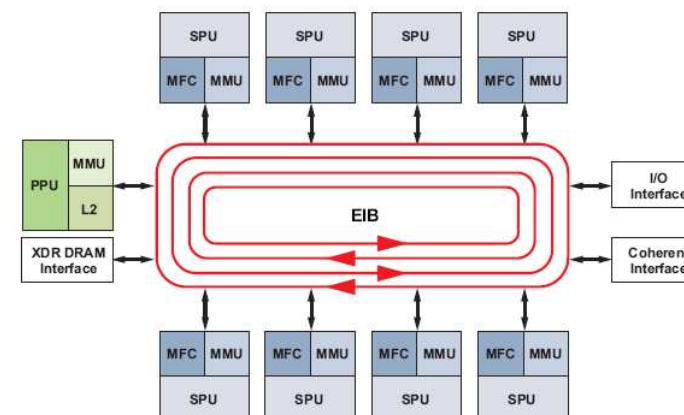
Figure 1. Cell Broadband Engine Processor Block Diagram

- Dual Cell BE based Processors
  - Each with nine-cores: 1 Power Processing Element (PPE) plus 8 Synergistic Processing Units (SPUs) connected via high speed data ring (192 GB/sec), the Element Interconnect Bus (EIB)

- EIB is extended transparently across high-speed coherent interface between dual Cell BE Processors
  - Runs at 20GB/sec in each direction between processors

- Double-wide blade; up to 7 blades per chassis

- Supports 1 IDE drive per blade

- 2 embedded 1Gb NICs and 2 InfiniBand daughter cards supported on each blade for connection to external I/O

- Evaluation Cell BE software available on IBM alphaworks website

- Open source software available at University of Barcelona website

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Product features

I/O Modules

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InfiniBand on BladeCenter H
Enterprise Virtualization Plus High Performance

- **IBM and Cisco jointly developed a 4X (10Gb) InfiniBand solution for BladeCenter H**
  - Daughter Cards: Provide dual 4X connectivity to high speed switch modules - use PCI-Express (PCIe) connection on next generation Blades (e.g., JS21)
  - InfiniBand Switch Module: (14) 4X ports interfacing to blades (with daughter card) and (2) 4X and (2) 12X (30Gb) ports to network

- **Virtualized I/O via VFrame (Cisco) software**

InfiniBand Market Segmentation

HPC – High Performance Computing

- Low Latency/High Bandwidth applications

- Linux Only

- MPI and IB over IP

- Myrinet substitute

Enterprise Data Center

- I/O Virtualization configurations

- Windows and Linux

- Boot over IB

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InfiniBand on BladeCenter H
Enabling High Performance and Virtualized I/O

- **Expanding BladeCenter Ecosystem with Cisco Systems**
  - Switch module and daughter card designed for BladeCenter H available in 2Q

- **Help Reduce Data Center Complexity**
  - Reduce the number of adapters, cables, and switch ports required
  - Manage the addition or removal of I/O or storage bandwidth centrally
  - Enable users to adjust resources on demand without downtime

- **High Performance Computing Features**
  - Leverages RDMA to deliver low latency performance
  - Delivers higher bandwidth connectivity (160 Gbps to chassis)
  - 2 times the bandwidth to the chassis than BladeCenter
  - 4 times the bandwidth to each blade than BladeCenter

- **Commercial Enterprise Solution**
  - I/O Virtualization via Cisco VFrame
  - Seamless Connection to SAN and LAN networks
  - Achieve Port consolidation through I/O Consolidation

BladeCenter H InfiniBand Solution provides high-speed, low latency solutions while lowering TCO

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Current BladeCenter Connectivity

BladeCenter

Blade 1
Blade 2
Blade 3
Blade 14

Ethernet Switch
FC Switch
FC Switch
Ethernet Switch

SAN Fabric
IP Network

────── **GigE / 100Mb Ethernet**

────── **2Gb Fiber Channel**

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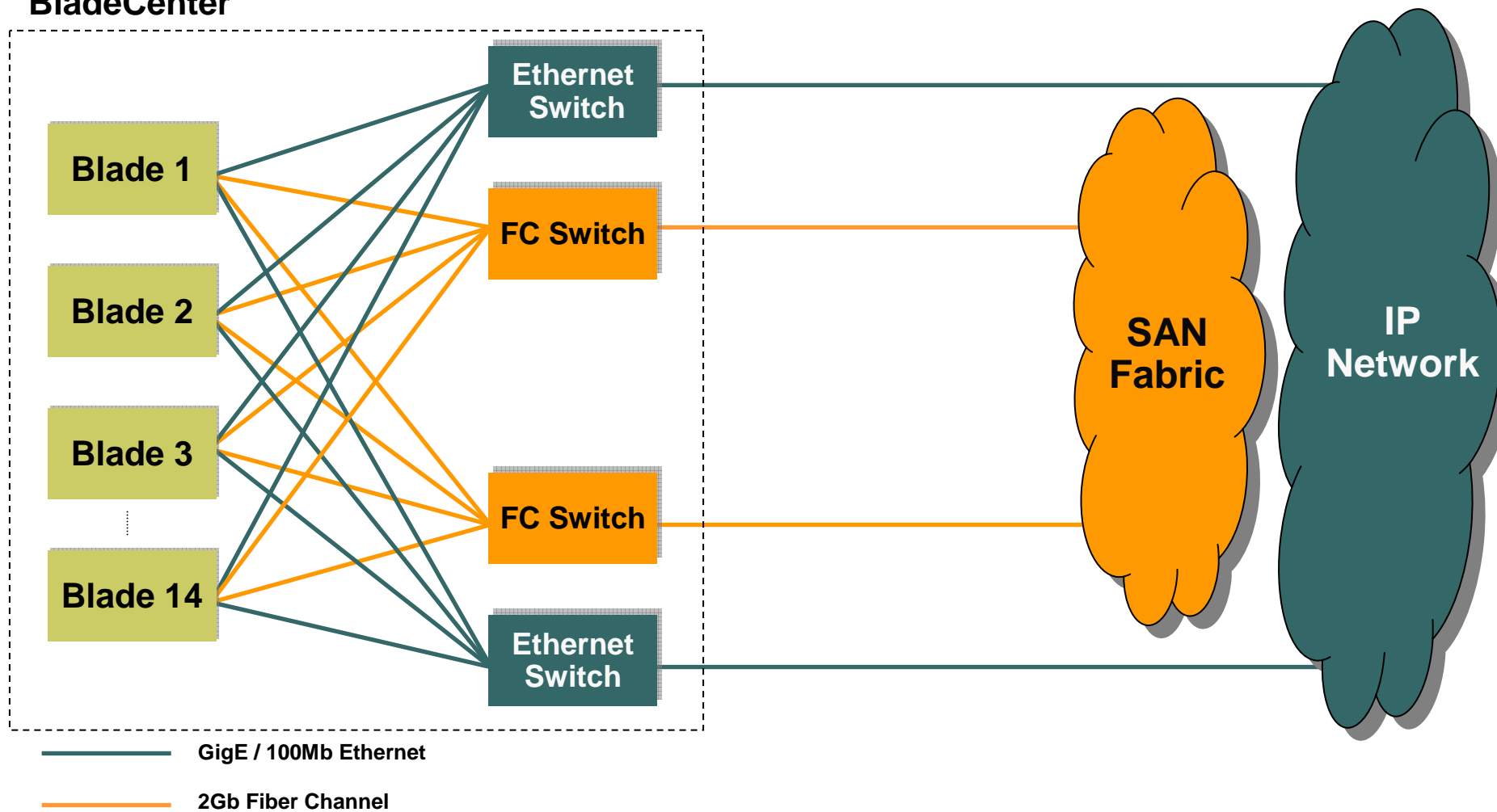
BladeCenter with InfiniBand Connectivity

BladeCenter

IP Traffic

| Blade 1 |
| Blade 2 |
| Blade 3 |
| Blade 14 |

InfiniBand

I/O Bridge

FC Traffic

InfiniBand

I/O Bridge

FC Traffic

IP Traffic

FC Network

IP Network
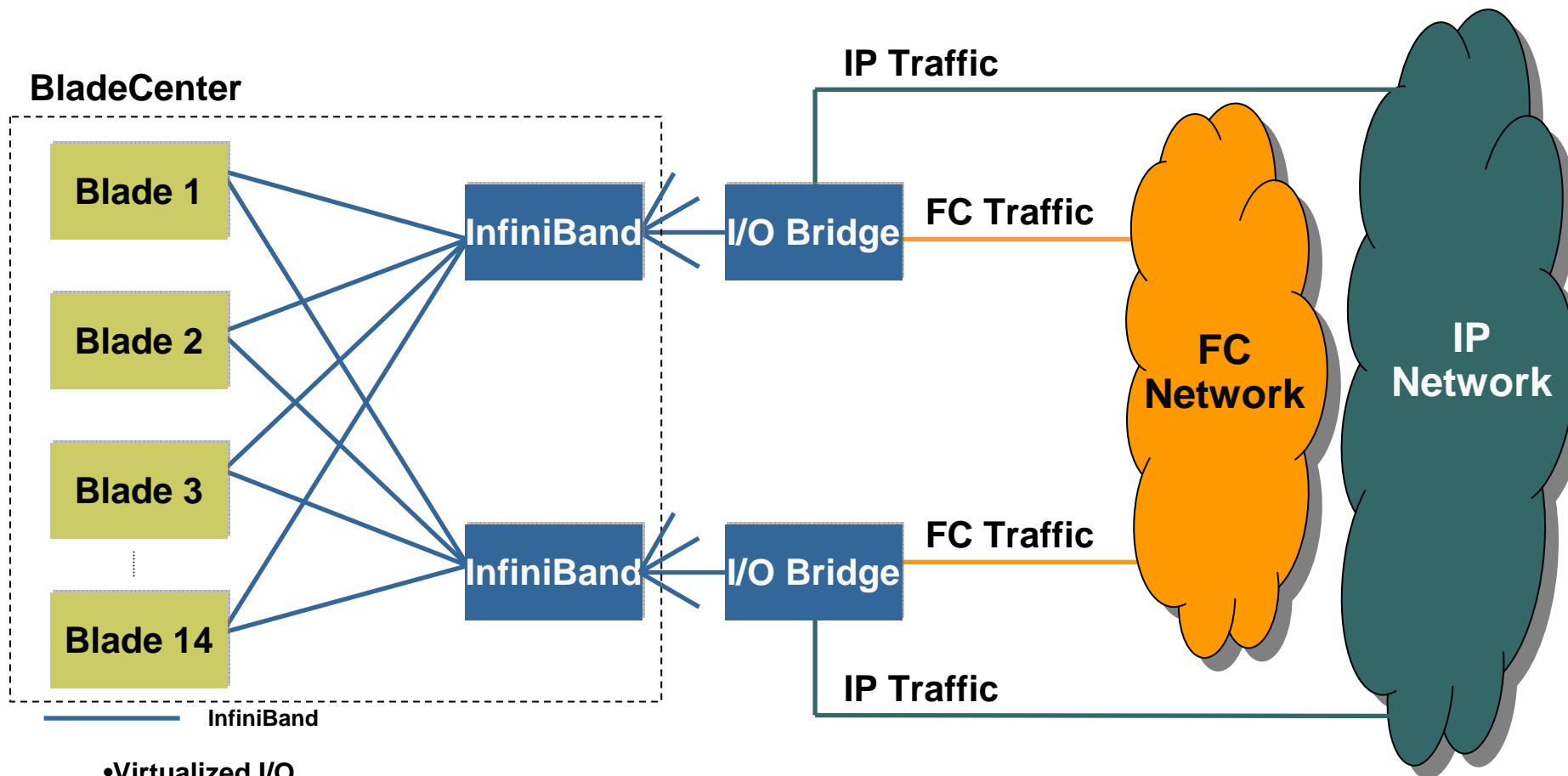
InfiniBand

- Virtualized I/O
- Less port complexity in BC chassis
- Higher interconnect speeds
- RDMA Enabled

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BladeCenter H InfiniBand Connectivity

BladeCenter H

Blade 1

Blade 2

Blade 3

Blade 14

InfiniBand
Switch Module

InfiniBand
Switch Module

Up to (2) 4X and (2) 12X
InfiniBand

Up to (2) 4X and (2) 12X
InfiniBand

InfiniBand
Network

———— **4X InfiniBand**

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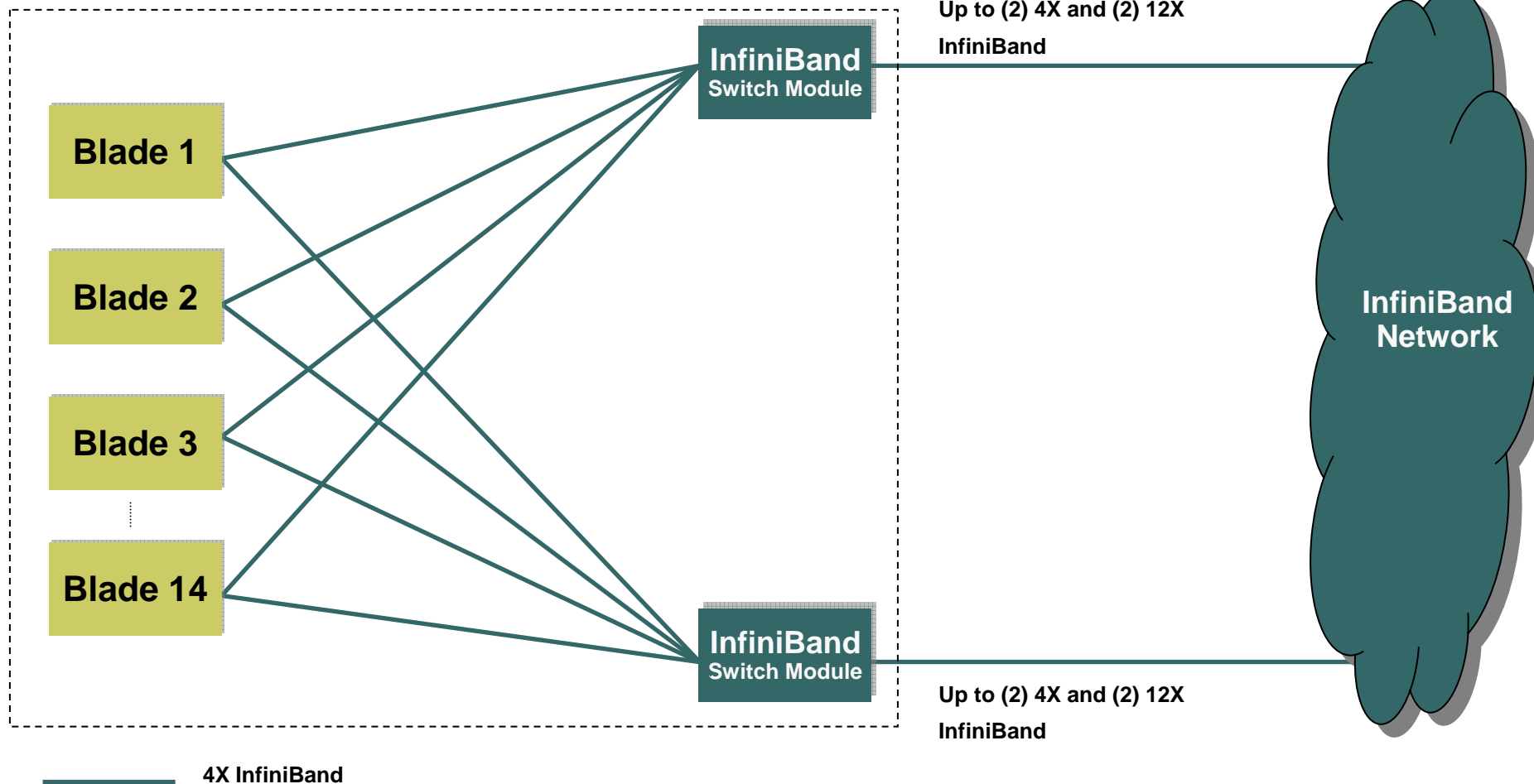
BladeCenter Ethernet Networking Directions

Ethernet Networking

Nortel
1Gb, 4 ports
Copper, L2/L7

Nortel
1Gb, 6 ports
Copper, L2/L3

Nortel
1Gb, 6 ports
Fiber, L2/L3

Cisco
1Gb, 4 ports
Copper, L2

Cisco
1Gb, 4 ports
Fiber, L2

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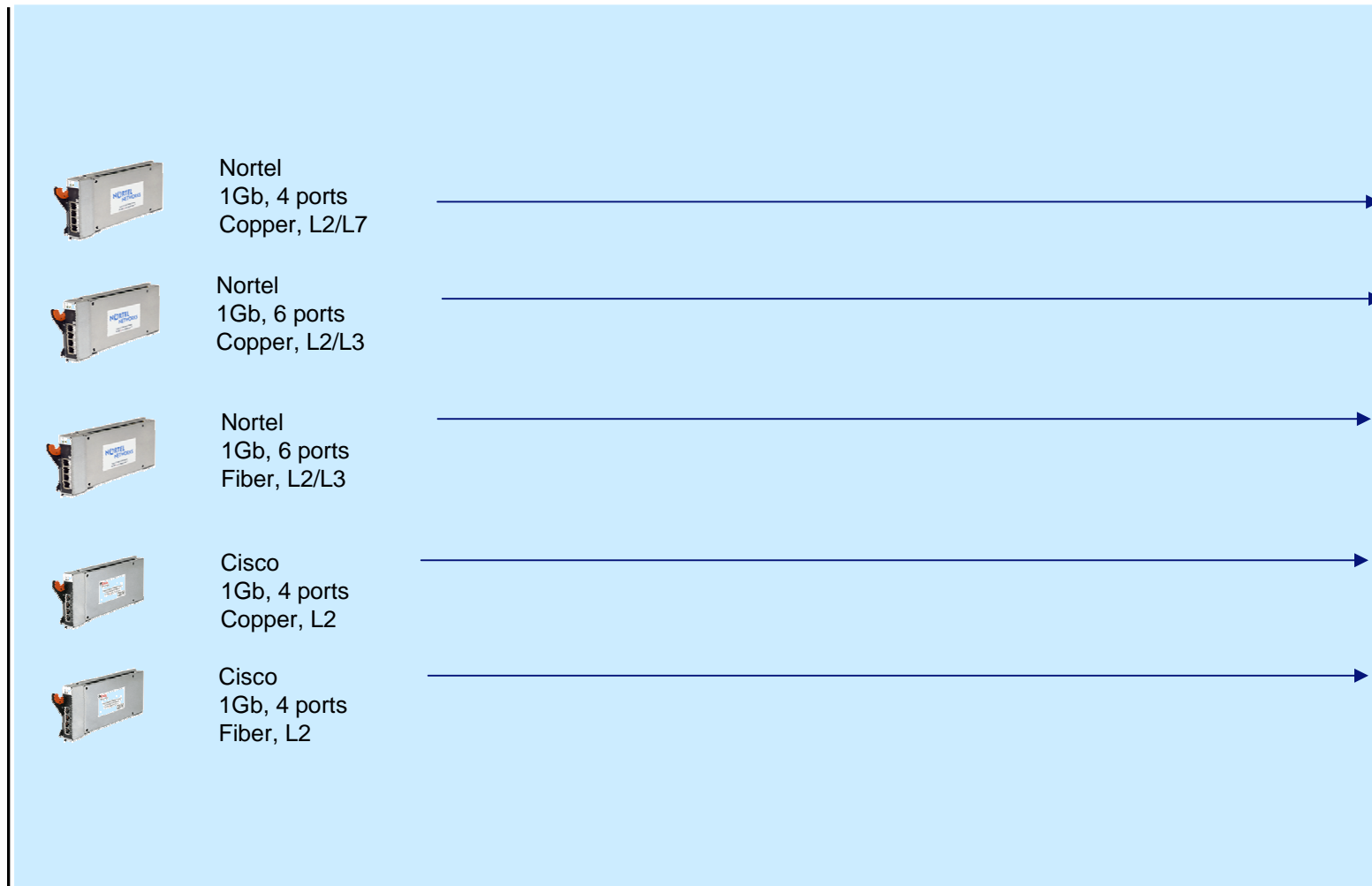
Nortel L2/3 Gigabit Ethernet Switch Modules

- Integrates Layer 2/3 networking technology

  into BladeCenter at entry level pricing

- Comprehensive set of Layer 2 and Layer 3 features

  - Multicast – IGMP Snooping
  - QoS features
  - Routing

- Two Interface Options:
  - Copper – 6 1G uplinks
  - Fiber – 6 1G uplinks

- Modular Switch Module Design for Future Upgradeability

Cisco Systems Intelligent Gigabit Ethernet Switches

- Integrates Cisco networking technology

  into BladeCenter

- Helps reduce datacenter complexity and

  networking complexity

- Comprehensive set of Layer 2 features with Layer 3/4
  services
  - Multicast – IGMP Snooping
  - QoS features

- Supports IOS (Cisco Internetworking Operating System)

- Reduces deployment and configuration time

- First blade solution in industry with

  embedded Cisco switching

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Cisco Systems IGESM Description

- Equivalent software feature set to Cisco Systems® Catalyst 2970 providing Layer 2+ functionality
- High Availability: Enhanced Spanning Tree Protocol, IGMP snooping
- Enhanced Security: 802.1x, Port Security, MAC address notification, RADIUS/TACACS+
- Advanced QoS: 802.1p, WRR, Strict Priority Queu
- Interfaces
  - 4 - 1GB External Ethernet (Copper) interfaces
  - 14 -1GB Internal interfaces to blades
- Management / Monitoring
  - Cisco IOS Command Line Interface
  - Cluster Management Suite
  - SNMP - Management Information Base (MIB) based applications such as CiscoWorks
  - Management and Power through Management Module
  - Console Port on faceplate

Nortel Networks Layer 2-7 GbE Switch Module

- **Availability**
  - Reduce unplanned application down-time in the event of a switch module, server blade, or chassis failure
  - Reduce need for planned application downtime

- **Performance**
  - Enable on demand computing
  - Better serve the processing demands of bandwidth- intensive applications
  - Enhance application performance

- **Manageability**
  - Reduce time/effort required to deploy new datacenter infrastructure
  - Simplify datacenter administration

- **Greater infrastructure scalability**

- **Enhanced server security**

- **Integrating L2-7 switch into blade chassis reduces datacenter infrastructure TCO by as much as 65%**

Layer 5-7 **Layer 4** **Layer 2/3**

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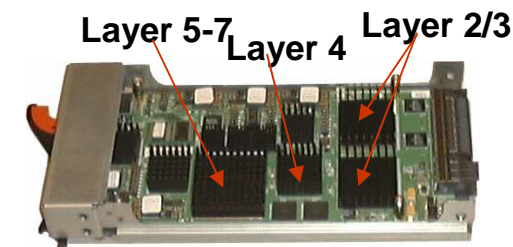
BladeCenter Storage Networking Directions

InfiniBand

Cisco (Topspin)
4X Infiniband

Cisco (Topspin)
1X Infiniband

Fibre Channel

Brocade
2Gb, 2 ports
Fibre Channel

Brocade
4Gb, 6 ports
Fibre Channel

McDATA
2Gb, 6 ports
Fibre Channel

McDATA
4Gb, 6 ports
Fibre Channel

QLogic
2Gb, 6 ports
Fibre Channel

QLogic
4Gb, 6 ports
Fibre Channel

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QLogic® Switch Modules

- Standards-based, FC-SW-2 compliant, Fibre Channel switch for flexible Storage Area Networks

- 2Gb switch – available in 20-port version (with 6 external ports)

- 4Gb switches - available in 20-port and 10-port versions

- Delivers high performance, highly-available Storage Area Network at an entry price point

- Easy to set up and integrate into core or edge SAN configurations

- Supports advanced zoning, fabric-wide performance monitoring, fabric management, remote switch activation and extended fabric activation

- Can be supported by TotalStorage, EMC, HP StorageWorks, and Hitachi Data Systems

McDATA® Switch Modules

- Provides McDATA capable fabric services

- Supports McDATA SANtegrity® Security options – McDATA SANtegrity Binding and Authentication

- Delivers McDATA HotCAT™ functionality

- 2Gb switch – available in 20-port version (with 6 external ports)

- 4Gb switches - available in 20-port and 10-port versions

- Can be supported with TotalStorage, EMC, HP StorageWorks, and Hitachi Data Systems

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Brocade® Switch Modules

- Integrates Brocade's award winning technology fabric into the BladeCenter architecture

- Fully compatible with existing Brocade fabric, Brocade OS, and Brocade SAN management tools

- 2Gb switches – available in Entry and Enterprise versions

- 4Gb switches - available in 20-port and 10-port versions

- Delivers the advanced Brocade functions, performance, manageability, scalability and security required by the most demanding storage area networks

- Fully upgradeable using Brocade's suite of advanced fabric services

- Can be supported by TotalStorage, EMC, HP StorageWorks, and Hitachi Data Systems

BladeCenter Infiniband/iSCSI/FC HBA Directions

InfiniBand

Cisco (Topspin)
1X, 2 ports

Cisco (Topspin)
4X, 2 ports

iSCSI

NEW QLogic
1Gb, 2 ports
iSCSI/TOE
Standard Form Factor

QLogic
2Gb, 2 ports
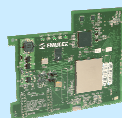Fibre Channel
Small Form Factor

NEW QLogic
4Gb, 2 ports
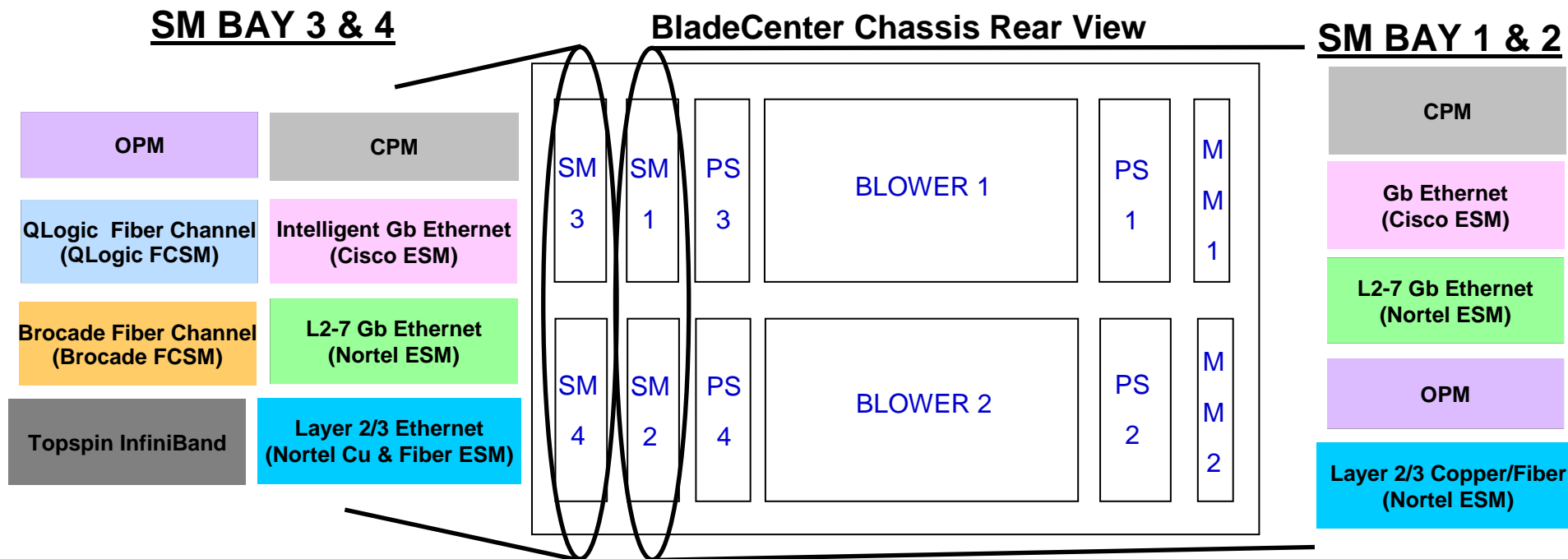Fibre Channel
Small Form Factor

Fibre Channel

QLogic
2Gb, 2 ports
Fibre Channel
Standard Form Factor

NEW QLogic
4Gb, 2 ports
Fibre Channel
Standard Form Factor

Emulex
2Gb, 2 ports
Fibre Channel
Standard Form Factor

ON DEMAND BUSINESS™

Switch Module Bay Configurations Supported on BC -E

SM BAY 3 & 4

BladeCenter Chassis Rear View

SM BAY 1 & 2

OPM	CPM
QLogic Fiber Channel (QLogic FCSM)	Intelligent Gb Ethernet (Cisco ESM)
Brocade Fiber Channel (Brocade FCSM)	L2-7 Gb Ethernet (Nortel ESM)
Topspin InfiniBand	Layer 2/3 Ethernet (Nortel Cu & Fiber ESM)

SM 3 | SM 1 | PS 3 | BLOWER 1 | PS 1 | MM 1

SM 4 | SM 2 | PS 4 | BLOWER 2 | PS 2 | MM 2

SM BAY 1 & 2
- CPM
- Gb Ethernet (Cisco ESM)
- L2-7 Gb Ethernet (Nortel ESM)
- OPM
- Layer 2/3 Copper/Fiber (Nortel ESM)

NOTE:
1. Any combination of modules listed under SM BAY 1 & 2 can be inserted into BAYS 1 & 2
2. The switch module in BAY 4 must match the switch module in BAY 3 and the corresponding I/O Expansion card is required on the blade server to enable BAYS 3 and 4

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Switch Module Bay Configurations Supported on BC-H
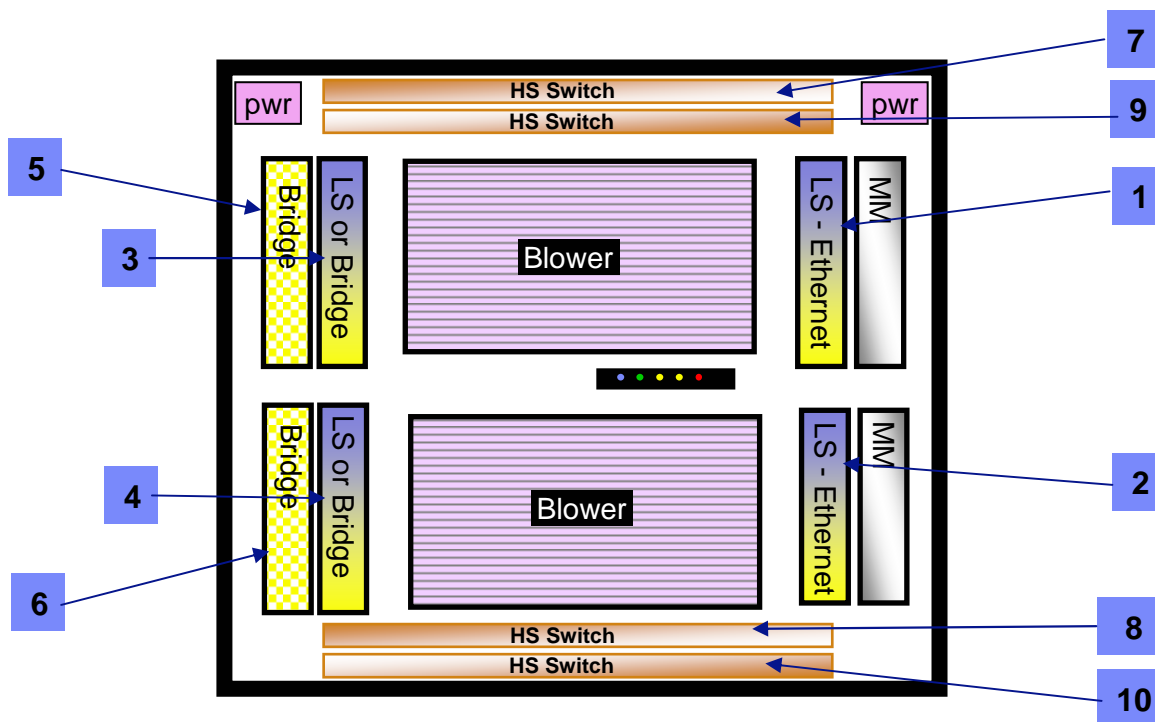
1. **Legacy Switch (Ethernet)**
   - **ESM**
   - **CPM**
   - **OPM**
2. **Legacy Switch (Ethernet)**
   - **ESM**
   - **CPM**
   - **OPM**
3. **Legacy Switch or Bridge**
   - **ESM**
   - **FCSM**
   - **CPM**
   - **OPM**
4. **Legacy Switch or Bridge**
   - **ESM**
   - **FCSM**
   - **CPM**
   - **OPM**
5. **Bridge Module**
6. **Bridge Module**
7. **High Speed Switch**
   - **InfiniBand**
8. **High Speed Switch**
   - **InfiniBand**
9. **High Speed Switch**
   - **10Gb ESM**
10. **High Speed Switch**
    - **10Gb ESM**

Product features

Management

The value of simplification
The value of integration
The value of IBM

ON DEMAND BUSINESS™

The BCH Light Path Diagnostics and Serial

- **Serial Connection**
  - Gives direct serial connection to each blade
  - Only works for the newer style blades with serial wiring connection to blade
  - Alternative to the Serial over LAN available though the Advanced MM

- **Light Path Diagnostic Panel**
  - Gives user a quick and easy way to check for fault and warning conditions while at the back of the rack

ON **DEMAND BUSINESS**™

Simplify Management: Advanced Management Module
The Power of One – Manage the Chassis Not the Parts

- Consolidates management for the entire chassis
  - Manage, control, install from a single point
  - Empowers IT managers to do more
  - Delivers "RSA like" remote functionality
  - Complete KVM switch local functionality
  - Serial connection

- BCH comes standard with one Advanced MM; second one is available as an option for redundancy

- Hot swap, removal of the MM does not effect server operation

- Local KVM is USB based
  - Keyboard and mouse are now USB connections
  - Older Management Module was USB internal, but PS2 external
  - There are several IBM and non-IBM USB based KVM solutions. There will also be a USB to PS2 conversion cable announced with BCH

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Management module comparisons

Advanced Management Module

- **Open Source Linux OS**
- **Industry Standard Technology Enablers**
  - Apache
  - PHP
- **Industry Standard Management Interfaces**
  - SMASH/CLP
  - CIM
  - HPI
- **Modular Architecture**
- **Backward Compatibility**

Management Module

- **Proprietary RTOS**
- **Proprietary Technology Enablers**
  - RTOS Web Server
  - RTOS Web Scripting
- **Proprietary Hardware Management Interfaces**
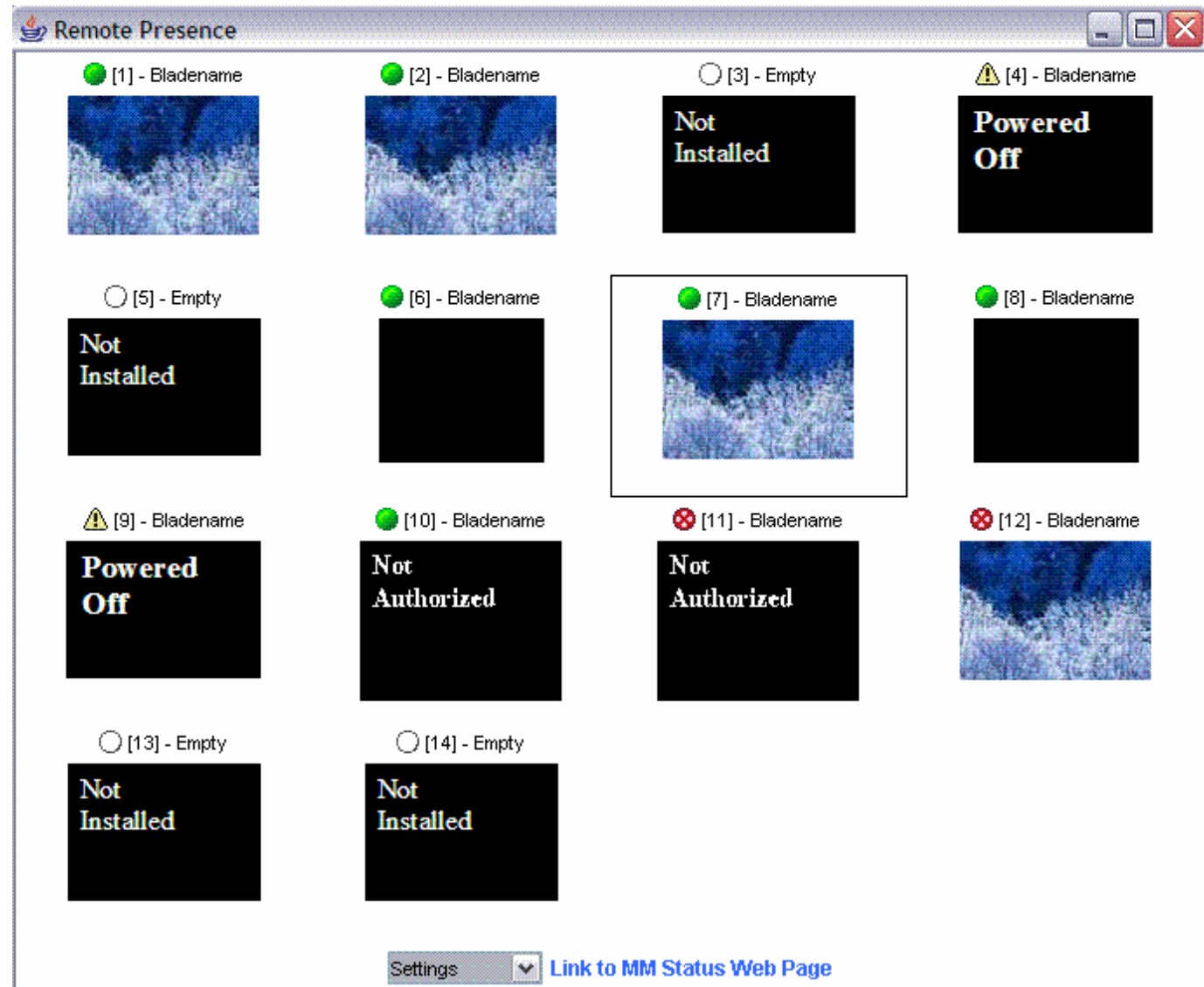- **Monolithic Architecture**

More function, better RAS, long term protection, and improved total solution management

- **Open, Industry Standard, Secure**
- **Improved serviceability**
- **Improved TTM on new functions**
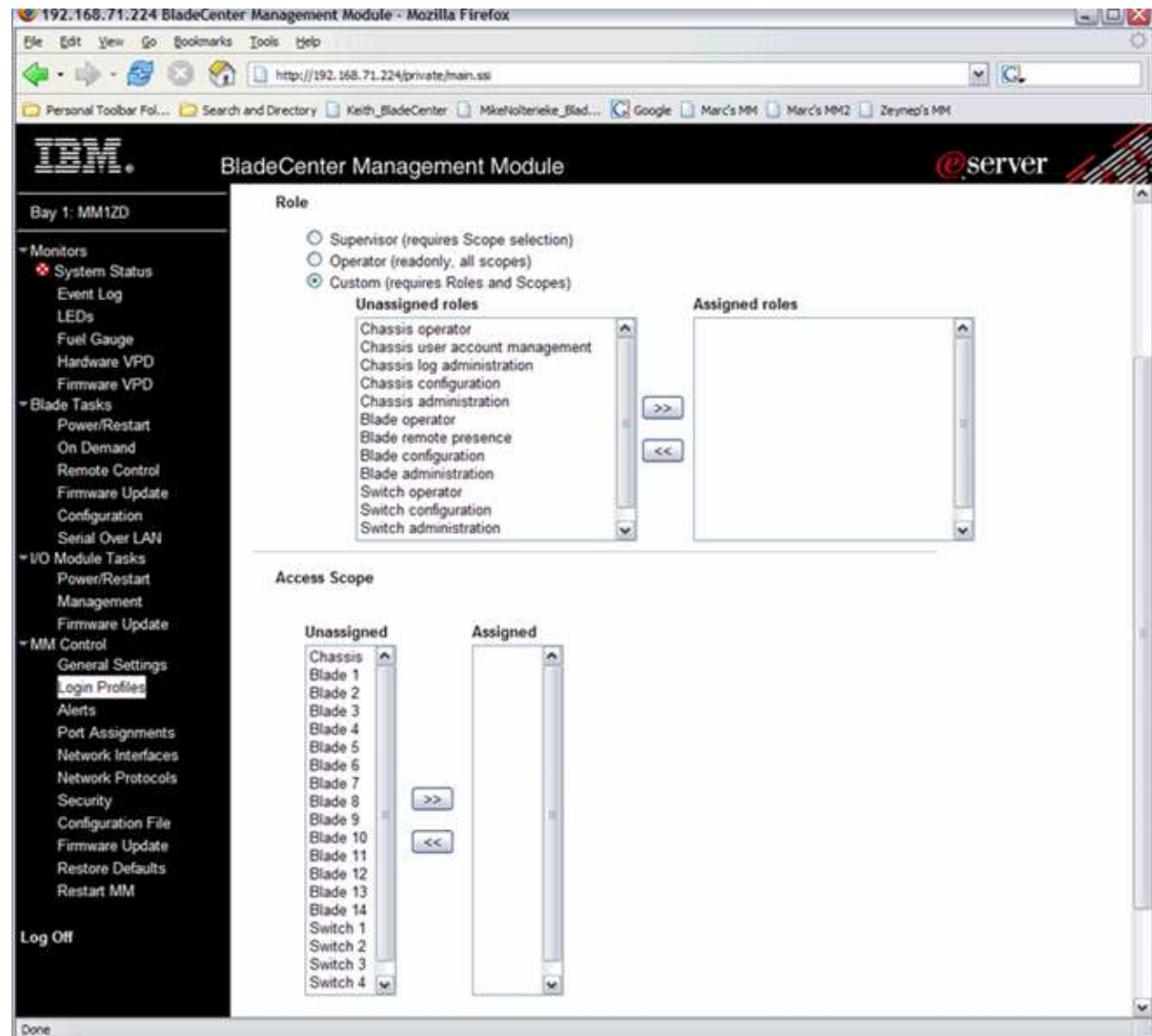- **Enables more 3rd party ecosystem development and integration**

ON DEMAND BUSINESS™

New Remote Control Launch Page

New Role Based Security

- These features are being added to allow greater granularity for access control

Proposed MM/aMM Functional Support Matrix

	BC w/MM	BC w/ aMM	BC H w/ aMM
Presently shipping blades	Yes	Yes	Yes
Presently shipping switches	Yes	Yes	Yes
F/O Intel, Power & AMD Blades **(Auto detect, i.e. current level)**	Yes	Yes	Yes
BSE2, 3	Yes	Yes	Yes
PEU, PEU2	Yes	Yes	Yes
Concurrent KVM (cKVM)	No	Yes	Yes
Concurrent Media (cMedia)	No	No	Yes
High Speed Switch Adapters	No (N/A)	No (N/A)	Yes
Storage Blades	No	Yes	Yes
High Speed Switches (ex. 4x IB switch)	No (N/A)	No (N/A)	Yes (N/A for BC-1)
RoHS support	No	Yes	Yes
Power Executive advancements	No	Yes	Yes
Smash CLP	Yes – Proxy model	Yes – embedded	Yes – embedded
KVM interface	USB internal PS2 out	USB	USB

Blades are not just about servers

Application	Environment/Performance	Data Center

Microsoft · **redhat**
HS20 2-way Xeon

Novell. · **vmware** AN EMC COMPANY
HS40 4-way Xeon

SOLARIS · **suse**
AMD Opteron LS20

AIX **L**
JS20/JS21 PowerPC

BladeCenter E/H

BladeCenter T

BROCADE

Myricom

CISCO SYSTEMS

QLOGIC

NORTEL NETWORKS

IBM + Partners

IBM

IBM + Partners

BladeCenter delivers a single IT building block

ON DEMAND BUSINESS™

IBM

Blade.org