Spóroljon gyorsabban!
Bemutatkoznak az IBM hálózati eszközei
New PureFlex and Flex System offerings for Q4 2013

Simplify service delivery, accelerate system deployment and drive improved efficiency for cloud environments with new PureFlex and Flex System offerings.

**New PureFlex offerings**
- New PureFlex Express
- New PureFlex Enterprise
- New PureFlex Compute capabilities
  - Flex System x222, p270, p460
- New PureFlex Networking capabilities
  - 10GbE Converged networking
- New SmartCloud Entry 3.2 offering
  - New support for OpenStack

**New PureFlex and Flex System Solution offerings**
- IBM PureFlex Solution for SmartCloud Desktop Infrastructure
- IBM PureFlex Solution for IBM i
- Flex System Solution for Microsoft Hyper V
- Flex System Solutions for Microsoft SQL and Exchange

**New Flex System offerings**
- New Flex System x240 models with up to 46% better x86 performance
- IBM Flex System EN4023 10GbE Scalable Switch
- Cisco Nexus B22 FEX for IBM Flex System
The Flex System Portfolio Continues to Grow

**x86**
- NEW Models
  - x222
  - x220
  - x240
  - x440

**POWER**
- p24L
- p260
- p270
- p460

**Networking**
- SI4093
- EN4093R
- EN6131
- CN4093
- EN2092
- FC5022
- FC3171

**NEW Offerings**
- EN4023
- Cisco Nexus B22 FEX

**Storage**
- Flex System V7000
- Storwize V7000

**Management**
- Flex System Manager

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## x240 - Enterprise Class 2S EP Compute Node

### Compute

- **Industry leading form factor**
- 2-socket Sandy Bridge / Ivy Bridge up to 135W support
- 24 LP DDR3 DIMMs, 768GB Max, 1333MHz / 1600MHz
- 10Gb Converged LOM FCoE/iSCSI protocol support
- 2 hot swap 2.5” SAS/SATA SSDs or HDDs
- Redundant Hypervisor – ESXi on Flash Key Option

### System Infrastructure

- IBM 2S EP Compute Node
- Uncompromised Compute, IO, and Storage performance, designed for mainstream virtualization, and a broad range of workloads

### Key Features

- **2x IO Mezzanine Cards**
- **2x Intel E5-2600 Processors**
- **24 LP DIMMs**
- **Keyboard, Mouse, Video Dongle connector**
- **Release latch**
- **2x Hot Swap, Small Form Factor HDDs**
x240 Compute Node Details

- Standard Node Form Factor, Half Width Compute Node
- 2-Socket Ivy Bridge-EP (Xeon E5-2600v2 Series Processor) 135W
  130W, 115W, 95W, 80W, 70W, 60W (Up to 12 cores)
- 24 LP DDR3 DIMMs / Up to 1866MHz
  - 768GB with 32GB LR-DIMMs
  - 1 DPC @1866MHz
  - 2 DPC @ 1600MHz with 1R/2R RDIMMs
  - 3 DPC @ 1066MHz
  - Support LRDIMMs, RDIMMs, or UDIMMs at either 1.35V or
    1.5V (LP DIMM)
  - Memory Mirroring, Memory Sparing
  - Chipkill – x4 Independent Mode (4 channels)
    ➢ No support for Lockstep (i.e. no x8 chipkill)
- Chipset – Patsburg B (Intel C600 Series)
- 2x2.5" Hotswap SAS/SATA/HDD/SSD
- Onboard ServeRAID H1135 SAS Controller (RAID 0, 1) 6Gbs +
  Optional ServeRAID M5115 (RAID 0,1,5,6,10,50) with Flash-
to-cache, supports eight 1.8inch SSDs
  - SAS or SATA drives
  - LSI 2004 connects to Patsburg with x4 PCIe Gen2
- Integrated 10Gb Dual Ethernet - Models with LOM and LOM-less
- Up to 2 Fabric Mezzanine Cards
  - Installing Mezz card in I/O slot 1 card requires removal of LOM
    Periscope connector
- Embedded Hypervisor – ESXi on Flash key option (supported with
  unique DIMM air baffle)

- uEFI / IMMv2 / TPM 1.2 Rev 1.03
- Power Management – xSmartEnergy Control
  ➢ Capping w/Pstate and SCI, Sys Power Maximizer
- Support for Flex System Chassis
- Front panel – one USB connector and one KVM dongle
  ➢ Dongle includes two USB, video, and one serial port
- Management
  ➢ iMM V2 Management Controller
  ➢ RTMM for Power Exec and Power Sequencing
Introducing IBM Flex System x222 Compute Node
Optimized for Virtualization, Virtual Desktop Solutions, Cloud and Infrastructure Consolidation

**Compute**

- Double the density: 28 servers per 10U chassis
  - 2-socket Xeon E5-2400 per twin
  - 12 LP DDR3 DIMMs / 1333MHz / 1600MHz per twin
  - 2x 10GbE ports standard per twin. Optional 8Gb/16Gb Fibre Channel or QDR/FDR Infiniband
  - 1x 2.5” SATA HDD or 2x Hot swap 1.8” SSD per twin

---

**x222 provides clients with 60% increase in VDI user density. Supports over 2800 users per chassis compared to standard density blade offerings**

**Increase server density & business performance:**
- Double-dense design that can support 28 servers per IBM® Flex System™ Enterprise Chassis
- More business and floating point operations per chassis
- Over 150% increase in server density compared to a std 1U rack server in 10U of rack space
- 58% better compute throughput per chassis vs. HP BL460c

**Ann: Aug 6, 2013**
**GA: Sep 10, 2013**
PureSystems Interconnect - Networking
Robust connectivity: Switch, asic and adapter level redundancy

asic level redundancy

Adapter level redundancy
IBM Flex System Chassis Unmatched Ethernet Portfolio

IBM Flex System scalable and flexible
Includes robust Ethernet & Converged switches

**EN2092** – 1Gb Int. & 1/10G Ext.
**SI4093** – 10Gb Int. & 10/40G Ext.
Simple Connectivity

**EN4093R** – 10Gb Int. & 10/40G Ext. (Multi Modes: L2, L3, OpenFlow, Easy connect)

**CN4093** – 10Gb Int. & 10/40G Ext. – FCoE & low cost FC connectivity

**EN4091** – 10Gb Pass-Through

Expanding Flex System eco-system
New offerings provide customer choice

**NEW!**
Cisco Nexus B22 Fabric Extender for IBM Flex System

**NEW!**
IBM Flex System EN4023 10Gb Scalable Switch (Brocade)

**EN6131** – 40Gb Ethernet - Mellanox

Scalable
IBM Flex System Fabric EN4093R 10Gb Scalable Switch

Overview
• Layer 2/3 data center design – upgrade in order

Leadership
• Exceptional price/performance
• Investment protection – scalable pay-as-you-grow
• FCoE convergence as a transit switch
• Stacking or vLAG
• Virtualization – VMready, Virtual Fabric (UFP)
• Multi-Tenancy – Switch Partitioning (SPAR)
• Seamless interoperability with other vendors switches
• Warranty & software upgrade licenses match the chassis
• **NEW** OpenFlow enabled
  • Available to new and existing Clients as feature update at no extra cost

Ethernet Connectivity

- OpenFlow support enables Software Defined Networks (SDN)
- “Pay as you grow” scalability
- Optimized for performance
- Enhanced virtualization intelligence
- Seamless interoperability

Scalable 10Gb Ethernet with 10/40Gb Uplinks

<table>
<thead>
<tr>
<th>Total Ports</th>
<th>10Gb Downlinks</th>
<th>10Gb Uplinks</th>
<th>40Gb Uplinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base System</td>
<td>14</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(95Y3309, ESW7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrade #1</td>
<td>28</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(49Y4798, E1EL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrade #2</td>
<td>42</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(88Y6037, E1EM)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Base 10 x 10GbE SFP+
- #2 = 4x10GbE
- #1 = 2x40GbE

1GbE Mgmt
IBM Flex System Fabric SI4093 System Interconnect Module

**Ethernet Connectivity**

- Simplifies chassis connectivity without compromising performance
- Designed for easy connectivity and management
- Pre-configured from factory – enhances ‘out of box’ experience for Clients
- Rapid network provisioning without configuration errors
- Investment Protection – scalable pay-as-you-grow design reduces cost and complexity
- Intra chassis switching for optimal performance (Ex. vMotion)
- Virtual Fabric capability reduces cost and improves IO utilization
- Seamless interoperability with other vendors switches like Cisco, Juniper and Brocade

**Unmanaged 10Gb module with 10/40Gb Uplinks**

- "Pay as you grow" scalability

**I/O Infrastructure**

<table>
<thead>
<tr>
<th>Total Ports</th>
<th>10Gb Downlinks</th>
<th>10Gb Uplinks</th>
<th>40Gb Uplinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base System (95Y3313, ESWA)</td>
<td>14</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Upgrade #1* (95Y3318, ESW8)</td>
<td>28</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Upgrade #2* (95Y3320, ESW9)</td>
<td>42</td>
<td>14</td>
<td>2</td>
</tr>
</tbody>
</table>

*Upgrade in order

Default end host mode
VLAN aware mode

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IBM Flex System Fabric CN4093 10Gb Converged Scalable Switch

Overview – Update any order

<table>
<thead>
<tr>
<th>Total Ports</th>
<th>10Gb Downlinks</th>
<th>SFP+ Ports</th>
<th>Omni Ports</th>
<th>QSFP+ Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base System (00D5823)</td>
<td>14</td>
<td>2</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Upgrade #1 (00D5845)</td>
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<td></td>
<td></td>
<td>+2</td>
</tr>
<tr>
<td>Upgrade #2 (00D5847)</td>
<td>+14</td>
<td></td>
<td>+6</td>
<td></td>
</tr>
<tr>
<td>Upgrade #1 &amp; #2</td>
<td>42</td>
<td>2</td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

Leadership

- **NEW** Hybrid Stacking reduces cost up to 28% over a traditional converged stack*
  - Reduce management configuration and set up
  - 2 CN4093’s with up to 2 – 6 EN4093R’s
- **NEW** Stand alone FCoE LAG – increase uplink throughput
  - Ability to aggregate uplink groups 10Gb => 40Gb
  - Omni Ports allow flexibility 10GbE or 4/8Gb FC
  - Low cost Ethernet and Fibre channel connectivity
  - Scalable pay-as-you-grow design
  - Virtualization – VMready and Virtual Fabric (UFP)
  - Seamless interoperability with other vendors

* 8 CN4093’s ($167,192) vs 2 CN4093’s ($41,798) + 6 EN4093R’s ($79,194) => $46K reduction in cost or 27.6%
Cisco Nexus B22 Fabric Extender for IBM Flex System

Connectivity

- Easy access to Cisco network with Flex System
  - 100Mb to 10Gb Ethernet
  - 14 internal ports, 8 uplinks
- Scalable, consistent server access
- Integration with upstream Cisco Nexus switches
- Single management entity
- Seamless interoperability

Cisco Nexus B22 designed for IBM Flex System Enterprise Chassis

- Allows clients to implement an unmanaged device inside the chassis.
- Acts as a port aggregator for compute nodes inside the chassis.
- Managed via the Nexus 5000/6000 top of rack switch.
- 14 internal 10Gb ports and 8 10Gb Ethernet fabric interfaces (SFP+)
- Ethernet and FCoE protocol supported
- Planned availability in 4Q2013
IBM Flex System EN4023 10Gb Scalable Switch

Connectivity

“Pay as you grow” scalability

Optimized for performance

Designed for Cloud Scale Out Solutions

Enhanced virtualization intelligence

Automated configuration

Seamless interoperability

10Gb Ethernet Fabric with 10/40Gb Ethernet and Dynamic Ports-on-Demand (DPOD)

Port Flexibility

- Dynamic POD allow flexibility for port selection
  - Allocate ports for internal or external use
  - Flexible upgrades available
- Select combination of internal or external ports
  - Base Switch provides 24 10Gb ports
  - Upgrades for additional 10Gb Ethernet and 2 x 40Gb QSFP+
    - Maximum of 58 ports
- Use LOM, 4x10Gb mezz, 8x10Gb adapter cards with base model.
- No upgrades required to use denser adapter cards
- Brocade Virtual Cluster Switching (VCS)
  - Simplifies network design and operations
  - More automated and efficient network
  - Cloud ready infrastructure
- Integrate into existing Ethernet or Brocade VDX networks (Brocade NOS 4.0)
Decision Tree: Understanding clients’ network requirements

1. **Vendor Lock in** (ie Cisco, Juniper etc)
   - Understand clients’ flexibility and environment

2. Open to alternatives that provide Value (ie All IBM)
   - Understand clients’ flexibility and environment

3. Ethernet only
   - Simple Ethernet or Converged
     - FCoE Converged
       - Ethernet only
         - Simply Ethernet or Converged
           - FCoE Converged

4. Ethernet only
   - Cost & Simplicity
     - FCoE Converged
       - Ethernet only
         - Simply Ethernet or Converged
           - FCoE Converged

5. Cost & Simplicity
   - Flexibility modes
     - FCoE Converged
       - Ethernet only
         - Simply Ethernet or Converged
           - FCoE Converged

6. Cost or Flexibility
   - Ethernet only
     - Simply Ethernet or Converged
       - FCoE Converged

7. Ethernet only
   - Cost or Flexibility
     - Ethernet only
       - Simply Ethernet or Converged
         - FCoE Converged

8. Ethernet only
   - Flexibility Modes Networking or SDN
     - Ethernet only
       - Simply Ethernet or Converged
         - FCoE Converged

9. Ethernet only
   - Integrated FC from chassis
     - Ethernet only
       - Simply Ethernet or Converged
         - FCoE Converged

10. Ethernet only
    - Easy Connect
        - Ethernet only
          - Simply Ethernet or Converged
            - FCoE Converged

Legend:
- **SI4093**
- **EN4093**
- **CN4093**
- **EN6131**
- **TOR**

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IBM System x Networking Portfolio

- **Bandwidth / Latency**
  - **1GbE Portfolio**
    - Intel 1GbE Adapters
    - Broadcom NetXtreme 1GbE Adapters
  - **10GbE Portfolio**
    - Broadcom Base-T
    - G8264T
    - QLogic 8100 CNA
    - Emulex VFA II & III (PCI & Mezz)
    - Brocade CNA
- **FCoE / iSCSI**
  - 10GbE LAN / SAN converged solutions
- **Networking Connectivity**
  - More than 10 millions ports in production!
How important is.....

- **Price** – IBM/BNT is a fraction of the price
  - IBM is up to 60% less
  - HP is up to 40% less
  - Others are up to 35-45% less

- **ISCLI** – Cisco like CLI

- **Performance & Latency**
  - Low latency = 2-5 times lower!
  - Full line rate / non blocking

- **Power & Cooling (Redundant Hot-Swap)**
  - Up to 50-75% less power
  - Datacenter airflow

- **Interoperability & Functions**
  - Connect to Cisco, Juniper…
  - VMReady, Virtual Fabric, UFP, vLAG, etc.
  - Tolly Reports
Software Offerings

**IBM Networking OS**
- Virtualization features
- Standards-based VMready virtualization-aware networking for virtual machine mobility
- Massively-scalable distributed virtual networking with Edge Virtual Bridging (IEEE 802.1Qbg)
- Support for OpenFlow – G8052, G8264/T, G8316 more to come
- Upgrades included with warranty
- Software ships with switch – no additional purchase required

**System Networking Switch Center**
- Help reduce cost and simplify management
- Improve Network visibility
- Performance analysis and tuning
- Help improve reliability and availability
- Standards-based VM policy enforcement (EVB: IEEE 802.1Qbg)
- Launch-in-context and single sign-on capabilities with IBM Systems Director
- Software Licenses
  - Sold in 1 or 3 year Service & Support
  - Licenses per 20, 50, 100, 250, 500 or 1000 Switches

**Future of differentiation is moving to software!**

**System Network Element Manager - EOL!**
IBM System Networking - Overview

**Mission:**
- Help IBM deliver on the promise of the best “Systems Company” by providing the best server-to-server, server-to-storage, storage-to-storage, and system-to-system connectivity.

**Multi-protocol:**
- Ethernet – IBM engineered and designed in over half of Fortune 500
- FCoE – IBM innovations
- Fibre Channel – External Offerings – OEM relationships

**Multiple form factors based on standards and simple integration into existing networks**
- Soft switches – VMware today – more to come
- Embedded connectivity or Layer 2/3
- Top-of-Rack (access & aggregation switches)
- **Software Defined Networking**

350 of the Top 500 Enterprises Use Our Ethernet Products
Life is not fair

…for Networking Professionals
Comparing servers, storage and network

Programmable by orchestration application

Client value examples:
- Policy based automation that uses analytics to model workload requirements
- Analytics & API based data placement that balance storage performance & cost

Virtualized System
- Apache
- Websphere
- DB2

Virtualization layer (Hypervisor)

Virtualized Storage
- NAS
- LUN 1
- LUN 2

Virtualization layer (NAS, SCSI LUNs, SVC ....)

Servers
- Dynamically provisioned
- Scalable capacity
- Abstracted HW complexity
- Highly utilized servers

Storage
- Dynamically provisioned
- Scalable capacity
- Abstracted HW complexity
- Highly utilized storage

Network
- Statically provisioned
- Box level scale
- PhD in vendor hardware
- Under utilized

Lack API ecosystem & programmability
Clients seek smarter System Networking
Getting life back for the Network Administrator

Programmable by orchestration application

- Dynamically provisioned
- Scalable capacity
- Abstracted HW complexity
- Highly utilized network
The 4 Layers of SDN

- **Layer 1: Physical Infrastructure**
  - Stable & reliable OpenFlow agent
  - Wire-speed, low-latency network devices

- **Layer 2: Overlay Network**
  - Scalable network overlay technology
  - Span over existing L3 infrastructure
  - Use standard common frame format

- **Layer 3: Controllers**
  - Resilient controllers
  - Inter-operable with other devices
  - Enterprise-class software
  - Secure architecture

- **Layer 4: Applications**
  - Standard Northbound API
  - Openstack/Quantum
  - Orchestrator integration

- **IBM Programmable Network Controller (PNC)**
  - SDN VE (Virtual Ethernet controller)

- **SDN Virtual Ethernet (Distributed Overlay Virtual Ethernet)**

- **IBM RackSwitch and Flex Switches**
What is OpenFlow and how it works?

Control plane is extracted from the network
OpenFlow - Replace traditional Network Protocols

- OpenFlow Paradigm
  - Access to the Forwarding Plane
  - Path of the network determined by external controller
  - Program HW tables instead of trusting switches to learn on their own

- Replaces traditional network protocols:
  - Spanning Tree
  - OSPF, BGP, IGMP
  - IP PIM
  - ACLs
  - PBR
  - etc
IBM SDN VE - A hypervisor for the network

- Based on IBM’s Distributed Overlay Virtual Ethernet (DOVE) technology
- Uses existing IP infrastructure — **No change to existing physical network**
- Provides server-based connectivity for virtual workloads

Diagram:
- IBM SDN VE Connectivity Server
- IBM SDN VE Management Console
- IBM SDN VE Virtualized Network
- IBM SDN VE vSwitch
- Existing IP Network
- RESTful, Quantum APIs
- OpenStack
- Applications
- Cloud/DC Provisioning
- Virtual Appliance
- IBM SDN VE Connectivity Server
- IBM SDN VE Management Console
- IBM SDN VE Virtualized Network
- IBM SDN VE vSwitch
- Existing IP Network or OpenFlow
- TUNNEL
- End Station
- End Station

Notes:
- Based on IBM’s Distributed Overlay Virtual Ethernet (DOVE) technology
- Uses existing IP infrastructure — **No change to existing physical network**
- Provides server-based connectivity for virtual workloads
IBM SDN – next step

- IBM SDN Platform: Global Virtual & Physical State Management
  - Connectivity Service
  - Network Optimization
  - Northbound API

- IBM SDN VE
- OpenFlow

- Cloud/Data Center Provisioning Platforms
  - IBM
  - Tivoli
  - Cloud
  - Storage

- Applications
- Network Services

- Shipping Today
  - Vmware only
  - Independent of HW

- Require Switch
  - Server independent

- Virtual Network
- OpenFlow Network

- Existing IP Network
- OpenFlow Network
IBM OpenFlow and SDN VE DEMO