

Virtualization with System x Enterprise servers



The Importance of Virtualization

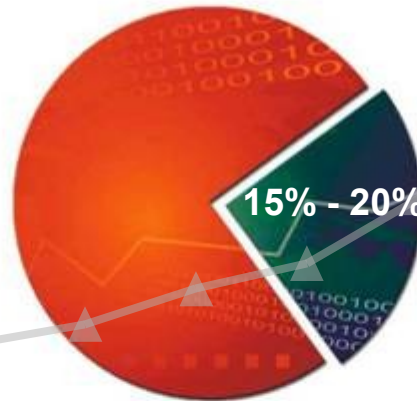
 **Used**
 **Idle**

85% idle

In distributed computing environments, up to 85% of computing capacity sits idle.



Mainframe



UNIX®



x86

Virtualisation – The Future of x86 Computing

Why customers virtualise?

Reduce cost... via efficient server utilization

Improve business continuity... from increased availability of HW and apps

Gain operational flexibility... with dynamic resource management

Yet, only 20% of workloads virtualised today

Barriers to adoption

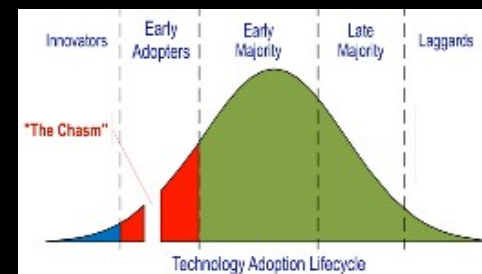
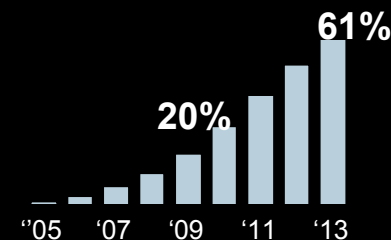
Cost prohibitive... expensive license, SW migration, resource intensive

Solution complexity... lack of training and expertise

Requires in-depth knowledge of servers, software, networking, storage, etc..

Disparate tools for ongoing management

VM Penetration of
Installed x86 Workloads



The Hypervisor

Rapidly becoming 'free'

Four major offerings

- VMware – First to market

- Microsoft HyperV – Growing rapidly

- Xen – Now owned by Citrix

- KVM – Open Source, included in next releases of RedHat and SLES

Focus is now becoming the management platform for the DataCenter

IBM will work with ALL hypervisors

X86 Portfolio Covering the Spectrum of IT Needs

IBM gives clients the RIGHT choice for TAKING COSTS OUT OF IT!

For client applications requiring massive scale out of 100's or 1000's of parallel processing nodes in Web 2.0 Data Centers, Clusters, and Large Grids

iDataPlex



High Value Portfolio

High Volume Portfolio

Enterprise eX4 (High-end)



Transition virtualization and enterprise workloads (SAP, Oracle, SQL, etc...) requiring high availability and large memory footprints to **High-end System x**.

Server Consolidation, Virtualization, Enterprise Workloads (SQL, SAP, Oracle)

Migrate client's rack installs for increased density, energy efficiency and simpler management with Chassis and servers tailored to client needs

BladeCenter



Find opportunities for single application deployments and sell value of an "Xccelerated refresh" to new technology using fewer servers with improved power efficiency and performance to take costs out

Web 2.0, HPC, Grid

Infrastructure Simplification, Application Serving, Energy Efficiency

Scale Up

Scale Out

System x Rack and Tower Single Applications



IBM Unmatched Reliability, Scalability and Performance

Mainframe Inspired Solutions for the x86 Market

Top 5 Reasons to purchase an IBM x3850 M2 / x3950 M2

1. Most Reliable x86 Platform for your Mission Critical Apps

Includes more reliability features than any industry x86 server

IBM Chipkill™ Memory

Memory ProteXion™

Hot Swap PCI & Memory

Predictive Failure Analysis

2. Low power and high utilization for maximum efficiency

Multi-processor utilization, DDR2 memory technology, and lower wattage energy efficient power supplies for lower total cost of ownership

3. Greatest top end performance x86 platform

Large 64 Dimm Memory Capacity, IBM eX4 Technology, and scalability to 16 sockets delivers leadership performance

#1 tpc-c x86 score

#1 VMmark 24-core score

4. Lowest cost for large memory and socket licensed software

10% cost savings for high memory capacity, combined with 40% lower memory latency and 60% more memory bandwidth ability to have 64 Dimms with only two processor, creates ideal memory rich platform

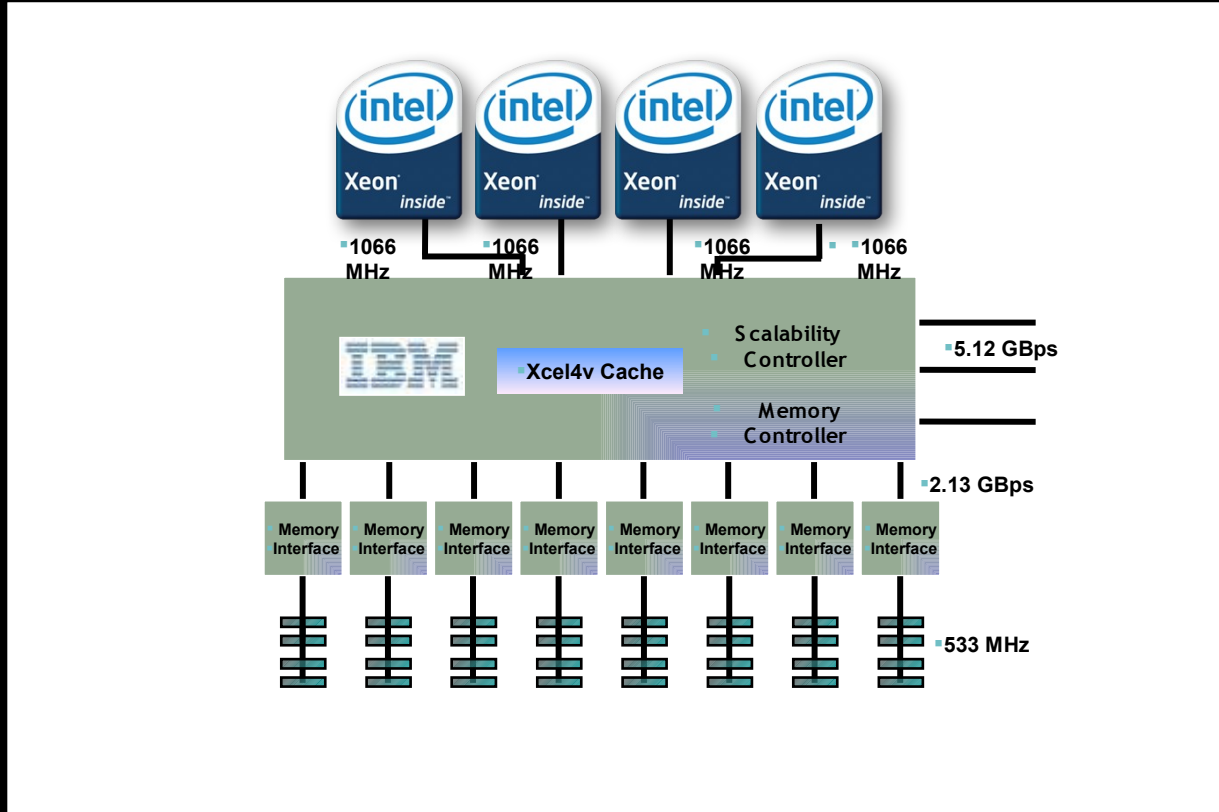
22% lower cost per SAP SC 22% lower cost per VMWare VM

5. Investment protection with 'pay as you grow' scalability

Modular scaleable design allows your system to grow as your business grows up to 4 times an original fully loaded configuration, without any additional initial cost expenditure



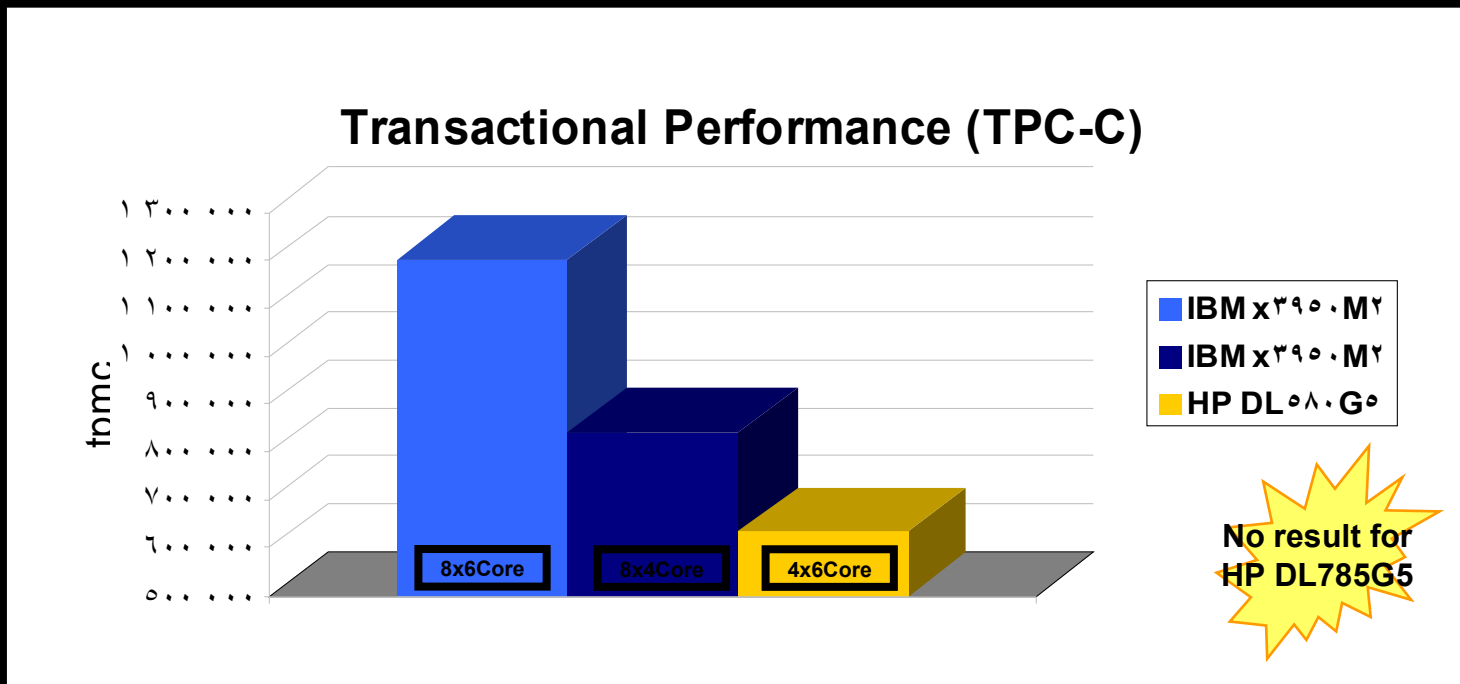
IBM eX4 chipset makes the difference



First x86 server to break the 1-million-transaction-per-minute barrier

1.2 million transactions per minute. Done.
Real world performance for your business
→ Learn more

System x3850 M2 and x3950 M2 Protect your data IBM Responds to the Competition





IBM System x Enterprise servers

Target applications:

- **Virtualization** – scale-up = recommended virtualization design by VMware for virtual SMP systems
- **Database servers** (MS SQL, Oracle, DB2) – based on MS Windows or Linux
- **ERP/CRM systems** (SAP, Siebel, ...)
- **HPC** (High Performance Computing)

Scaling from:

- 2-way to 16-way (8 cores up to 96 cores)
- up to 256GB RAM/box => up to 1TB RAM/server



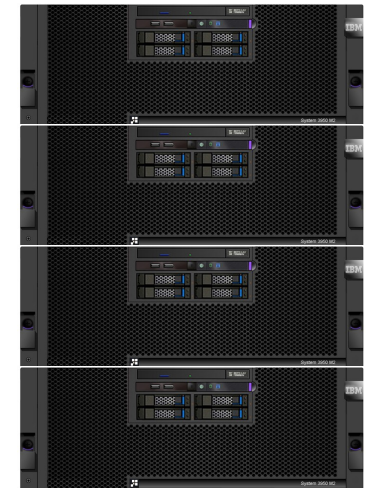
4-way x3950M2
(24 cores, 256GB RAM)



8-way x3950 M2
(48 cores, 512GB RAM)



12-way x3950 M2
(72 cores, 768GB RAM)



16-way x3950 M2
(96 cores, 1TB RAM)

Memory-Intensive Applications Benefit from MP

Deploying MP makes sense when workloads require more than 64GB memory

Targeted Multi-Processor Workloads

Large Enterprise ERP/ DB Deployment

- Estimated Up to 54% Lower TCO over 4 Year period

Large Scale Server Consolidation

- Estimated 46% Lower Cost/VM for average utilization VMs
- 32:1 S-Con ratio on x3850 M2, 16:1 S-Con ratio on x3650 M2

Virtualization of Mission Critical Applications

- Estimated 38% Lower Cost/VM for Virtualized ERP Instances
- 12:1 S-Con Ratio on x3850 M2 vs. 4:1 S-Con Ratio on x3650 M2

IBM System x 3850 / 3950 M2
128GB Memory



\$27,201

Expandable Up to 256GB
and 16 Sockets

Targeted Dual-Processor Workloads

Virtualization of Infrastructure Applications

- Increase server utilization

High Performance Computing

- Up to 118% increase on HPC workloads such as simulation, modeling

eBusiness/eCommerce

- Workhorse for single and multiple application hosting

Business Critical Collaboration

- Up to 70% performance increase on general business / commercial workloads

IBM System x 3650 M2
128GB Memory



\$30,636

No Additional Headroom

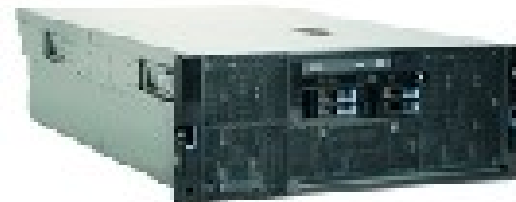
*Higher than 64GB Memory is not cost-effectively available on a 2-socket server

Selecting the Right Server for Virtualization

Server Consolidation

- Lowest Server Count**
- Memory and I/O Intensive**
- Less Predictable Workloads**
- Headroom For Peak Demand**

x3850 M2



Powerful, expandable 4P+ servers designed to handle any virtualization project with ease, especially when >48GB memory, intensive I/O, or server reliability are critical considerations
 Large 20+:1 virtualization projects while maintaining peak load application responsiveness

Infrastructure Virtualization

- Raise Server Utilization**
- Small Infrastructure Apps**
- Predictable, Stable Workloads**

x3650 M2

HS22



2 socket licensing, excellent price/performance/watt with quad-core technology on Intel® Nehalem™ processors make these servers ideal for smaller IT virtualization projects
 Small to medium size consolidation typically ranging from 8-16:1 of infrastructure apps

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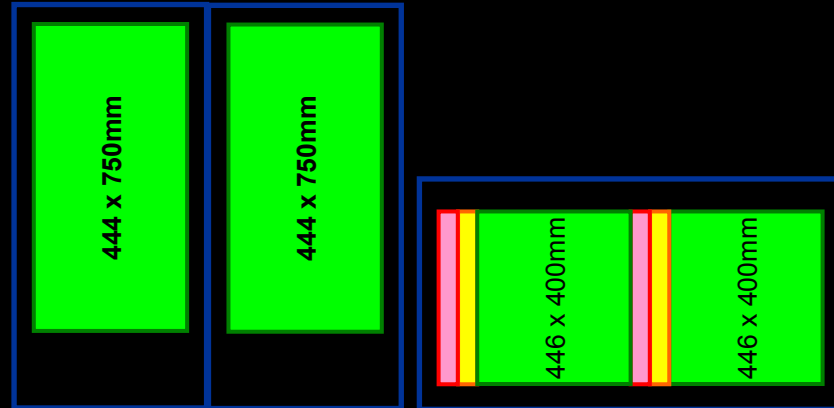
System x Rack and Tower Single Applications



iDataPlex - Designed for Data Center Efficiency

Floor Space Efficiency

- Same server density in half the footprint
- 84U of Server space + 16U for infrastructure components (PDUs, switches, etc.)
- Designed for standard Data Center tile layout
- Up to 66% greater density with an iDataPlex-optimized Data Center layout



Cooling Efficiency

- Half-depth servers with shared fans achieve better airflow than standard full depth servers
 - Half the distance for air to travel
 - Lower airflow impedance over components, optimized heat sinks for efficient airflow over CPU's
- High efficiency fans, automatic fan speed control to fine-tune airflow to server's requirements
- 63% less fan power required per 1U server
- 20% less Data Center cooling required vs. 84 1U servers
- Optional Rear Door Heat Exchanger for >100% heat extraction



Power Efficiency

- Power optimized server design
- High Efficiency 2 domain Power Supplies

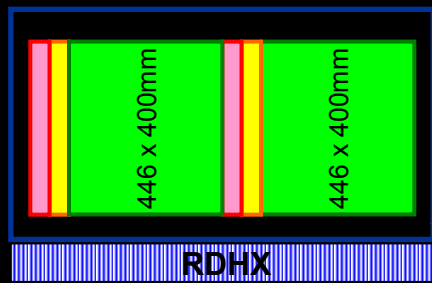


iDataPlex Rack -vs.- Standard 19" Rack

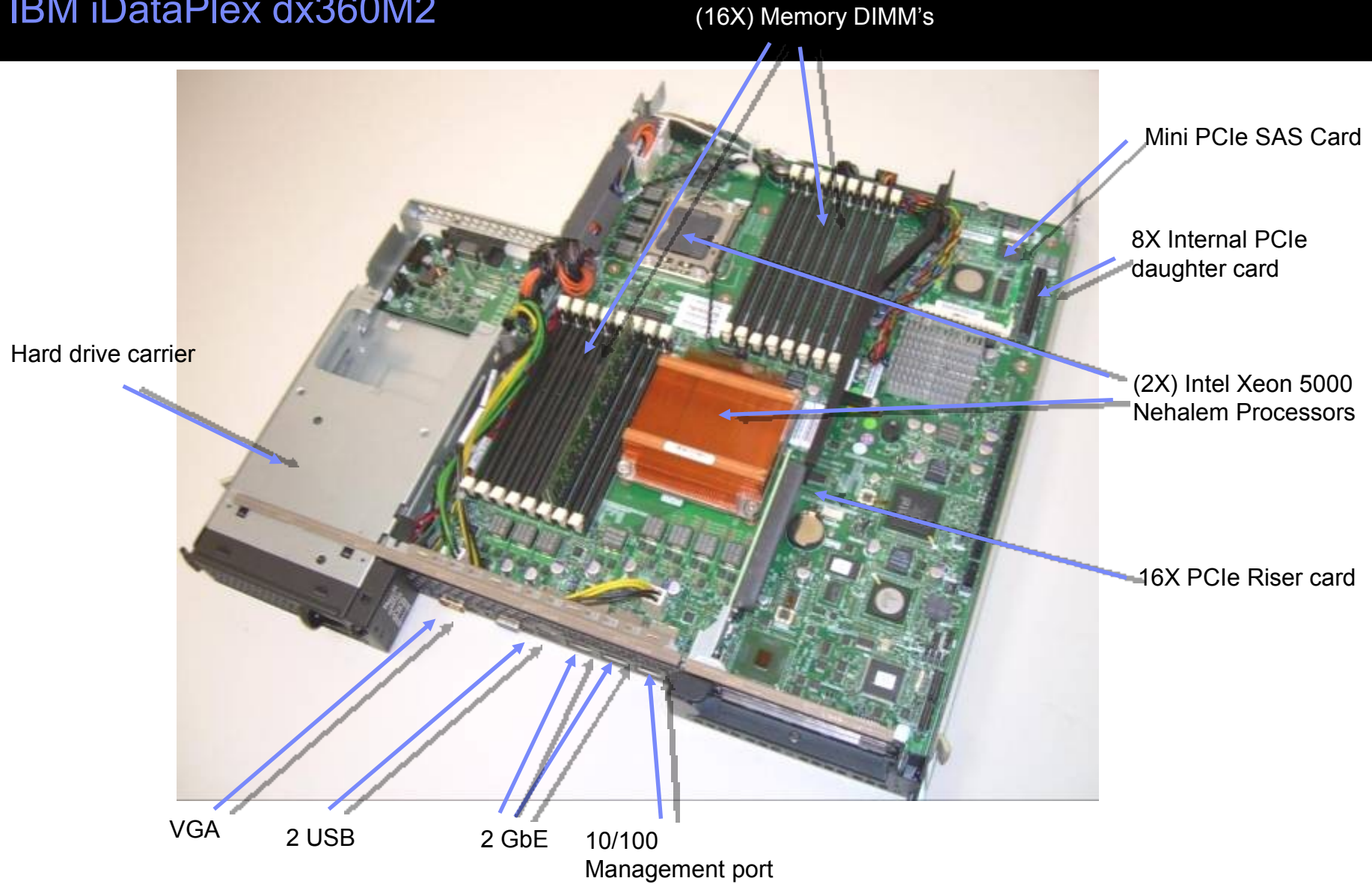


- iDataPlex Rack design:**
- Rack is rotated 90°
 - Half-depth, front-access servers.
 - Low airflow impedance.
 - Servers located side-by-side.
 - Doubles server density in similar footprint.
 - Greater cross-section for RDHX.
 - 100U Rack
 - 84U for Nodes, etc.
 - 16U for switches, etc. (vertical)
 - Space-saving footprint

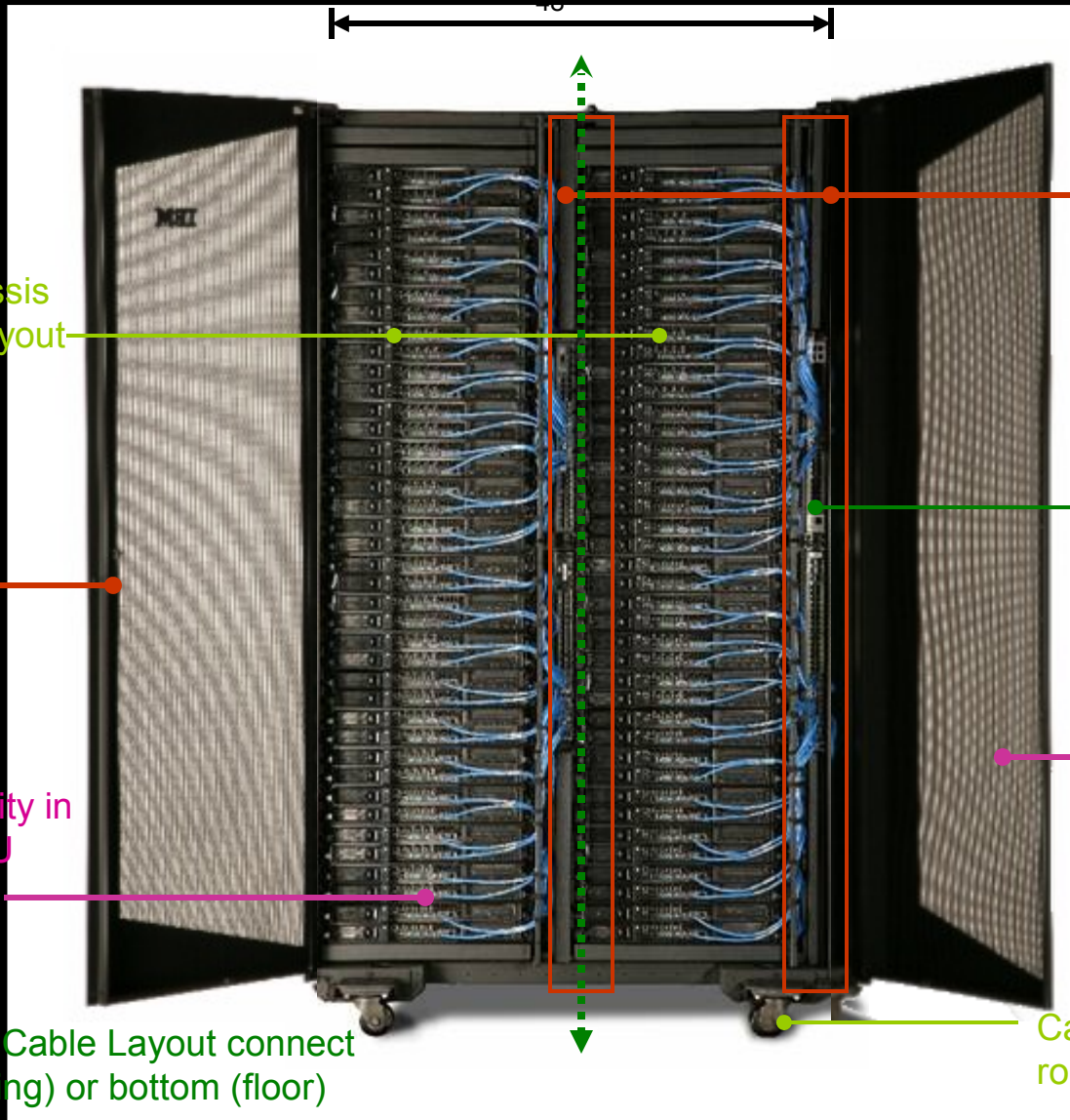
1200mm wide x 600mm deep.



IBM iDataPlex dx360M2



IBM System x iDataPlex Rack : Front



42 Flex 2U chassis
Side by Side Layout

Latch Lock for
Security

102 Units of capacity in
same standard 42U
rack dimensions

Flexible Cable Layout connect
top (ceiling) or bottom (floor)

16 units of
Vertical Space
for switches,
cables & PDU's

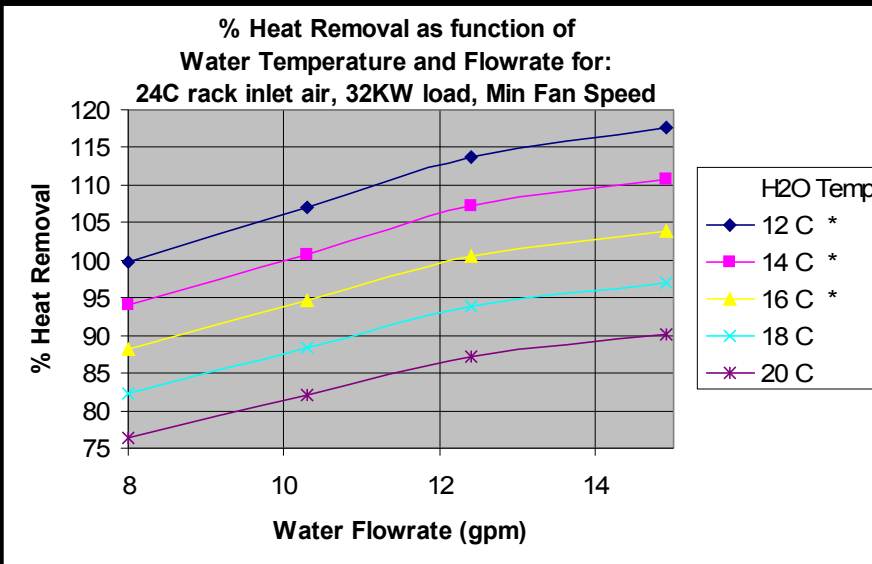
Labeled vertical
slots on front
and rear

Double Perforated
Doors for Airflow

Caster wheels for
rolling onto floor

Rear Door Heat Exchanger (RDHX) for iDataPlex

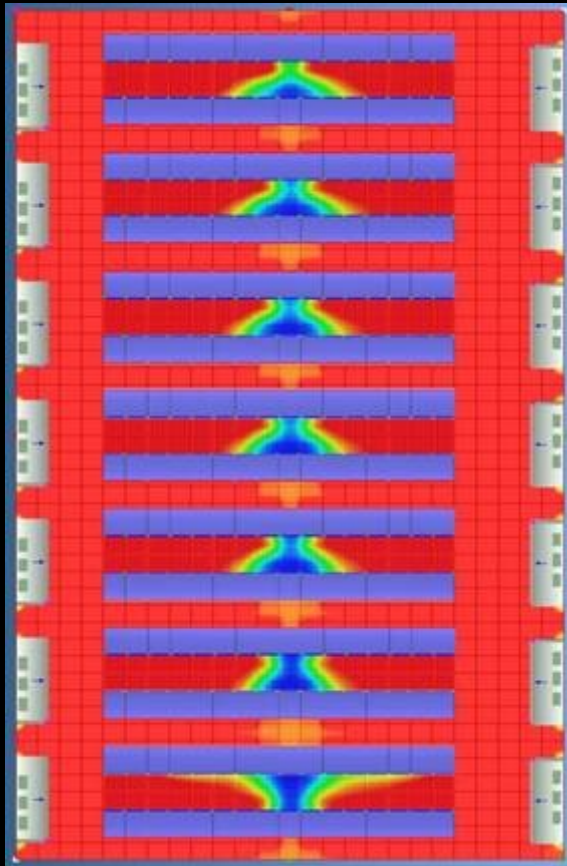
- 100% heat removal possible
- Passive heat extraction
- Low airside impedance for rack
- Low waterside impedance
- Uniform node airflow optimizes RDHX performance
- Exit air temperatures uniform across rack height (for 2U node configuration)



18C water, 32KW rack power, 24C air inlet to rack

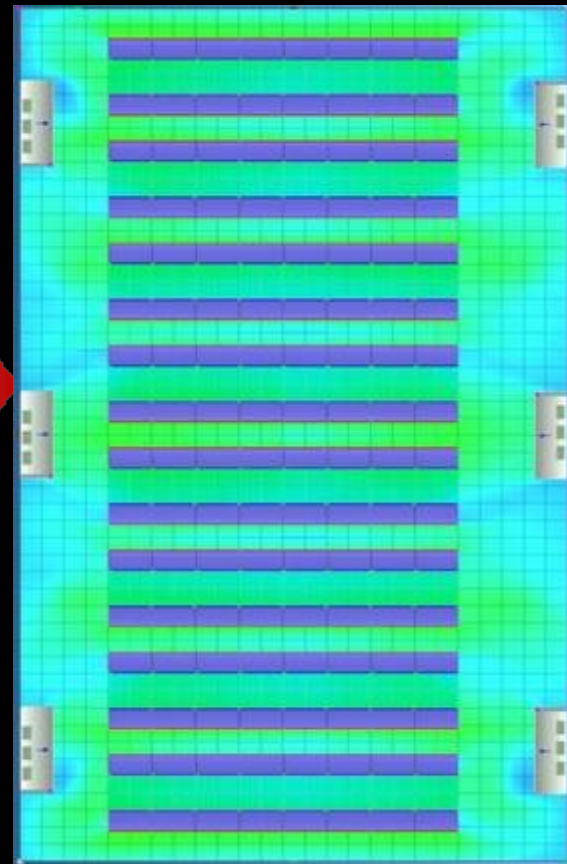
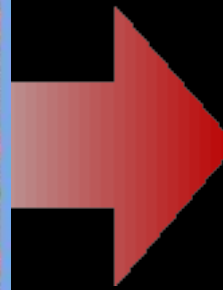
Innovative Cooling Solution

*15% more Servers
58% less CRACs*



1U Air cooled

224 Racks, 9.4K Servers (42 / Rack)



iDataPlex - Rear Door Heat eXchanger

128 Racks, 10.7K Servers (84 / Rack)

Save on infrastructure with IBM power tools

IBM Power Configurator

Get better information for up-front planning by sizing the power needs of your unique configurations

Select systems and IT infrastructure that best fit
your data center infrastructure before you commit to buying
the first server

IBM Systems Director Active Energy Manager

Monitor and track power over time
Make choices based on accurate information
Take command with power virtualization

