The New zEnterprise – A Smarter System For A Smarter Planet

PulseANZ 2010

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The IBM zEnterprise System – A System Of Systems

NEW

- Announced by IBM at NYC on July 22nd

- *"The most significant change in platform design in a decade or more"* - NY Times

- *"The new design is mainly about data center integration, being able to treat the data center as a single system"* - Rod Adkins, Sr. VP of Systems, IBM

- *"This is a systems discussion - simplify and drive down costs in the data center"* – Steve Mills, Sr. VP of Software, IBM

zEnterprise Is The Unification Of The Best Of Mainframe And Blade Technologies

IBM zEnterprise 196 (z196)

- Optimized to host large scale database, transaction, and mission critical applications
- Capable of massive scale up
- World's fastest system (based on 5.2GHz clock speed)

zEnterprise Unified Resource Manager

- Unifies management of resources, extending IBM System z qualities of service end-to-end across workloads
- Part of the IBM System Director family, provides platform, hardware and workload management

zEnterprise BladeCenter Extension (zBX)

- Selected IBM POWER7 blades and IBM System x Blades for tens of thousands of AIX and Linux applications
- High performance optimizers and appliances to accelerate time to insight and reduce cost
- Dedicated high performance private network

The IBM zEnterprise System
Delivers Greater Simplification, Flexibility, and Value

- Enables a mixed set of workloads to be deployed on **best fit** technologies

- Meets the need of today's heterogeneous data centers

- Improves service through tighter integration for multi-tier workloads

- Delivers lower acquisition and operating costs than a 'one-size-fits-all' approach

*Based on 5.2GHz clockspeed

Managing Diverse Workloads Across The Enterprise

Transaction Processing and Database

- Application Database
- Data Warehousing
- Online Transaction Processing
- Batch

Analytics

- Data Mining Applications
- Numerical
- Enterprise Search

Business Applications

- Enterprise Resource Planning
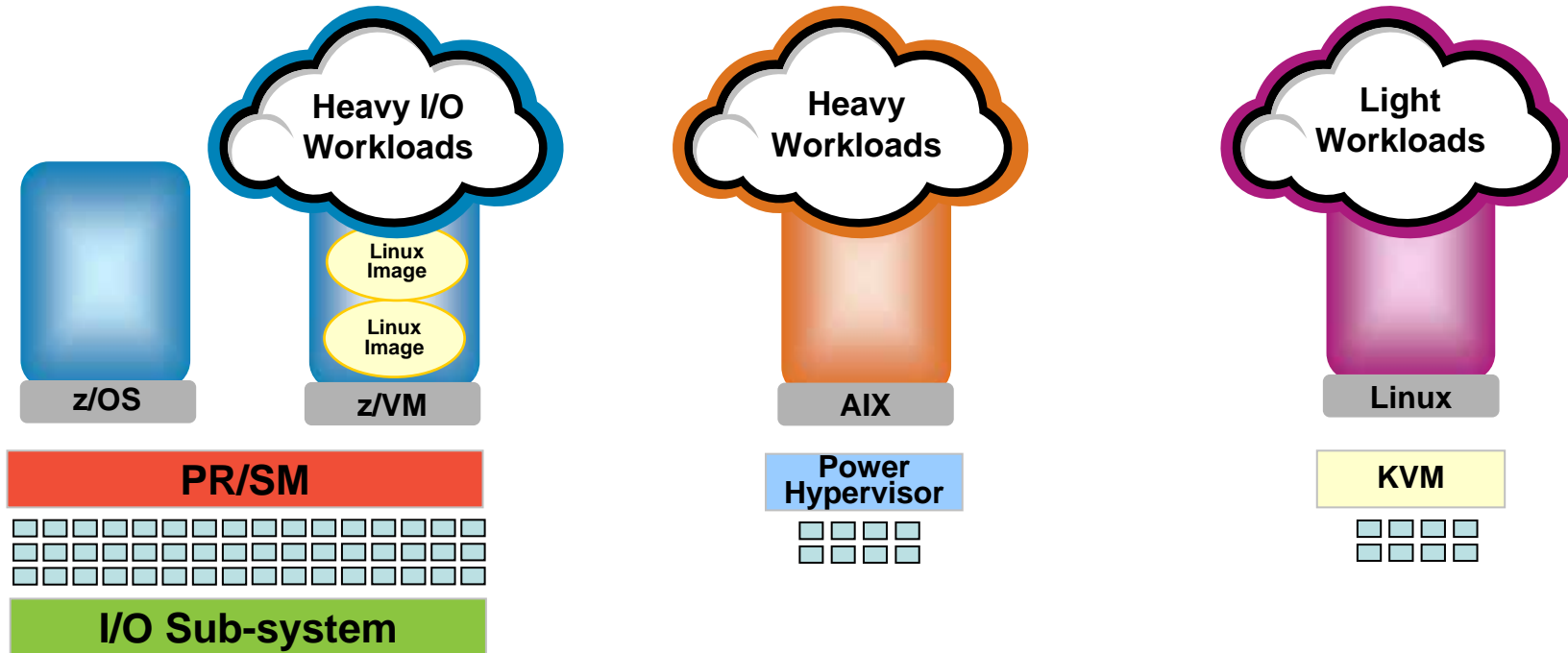- Customer Relationship Management
- Application Development

Web, Collaboration and Infrastructure

- Systems Management
- Web Serving/Hosting
- Networking
- File and Print

IBM Eagle Studies Demonstrate Most Mainframe Workloads are Already Best Fit

- A Total Cost of Ownership analysis study for customers

  ► Cost and risk analysis of mainframe vs. alternative

  ► Tailored to individual customer needs

    – Cost factors unique to each enterprise

    – Costs evaluated over five year period

- **48 of 50** IBM Eagle studies concluded that System z offered better TCO than a distributed alternative

  ► Average cost of growing on System z was **41% less** than the distributed alternative

zEnterprise Extends Cost Advantages To A Broader Range Of Workloads

Heavy I/O Workloads

Linux Image

Linux Image

z/OS

z/VM

PR/SM

I/O Sub-system

Heavy Workloads

AIX

Power Hypervisor

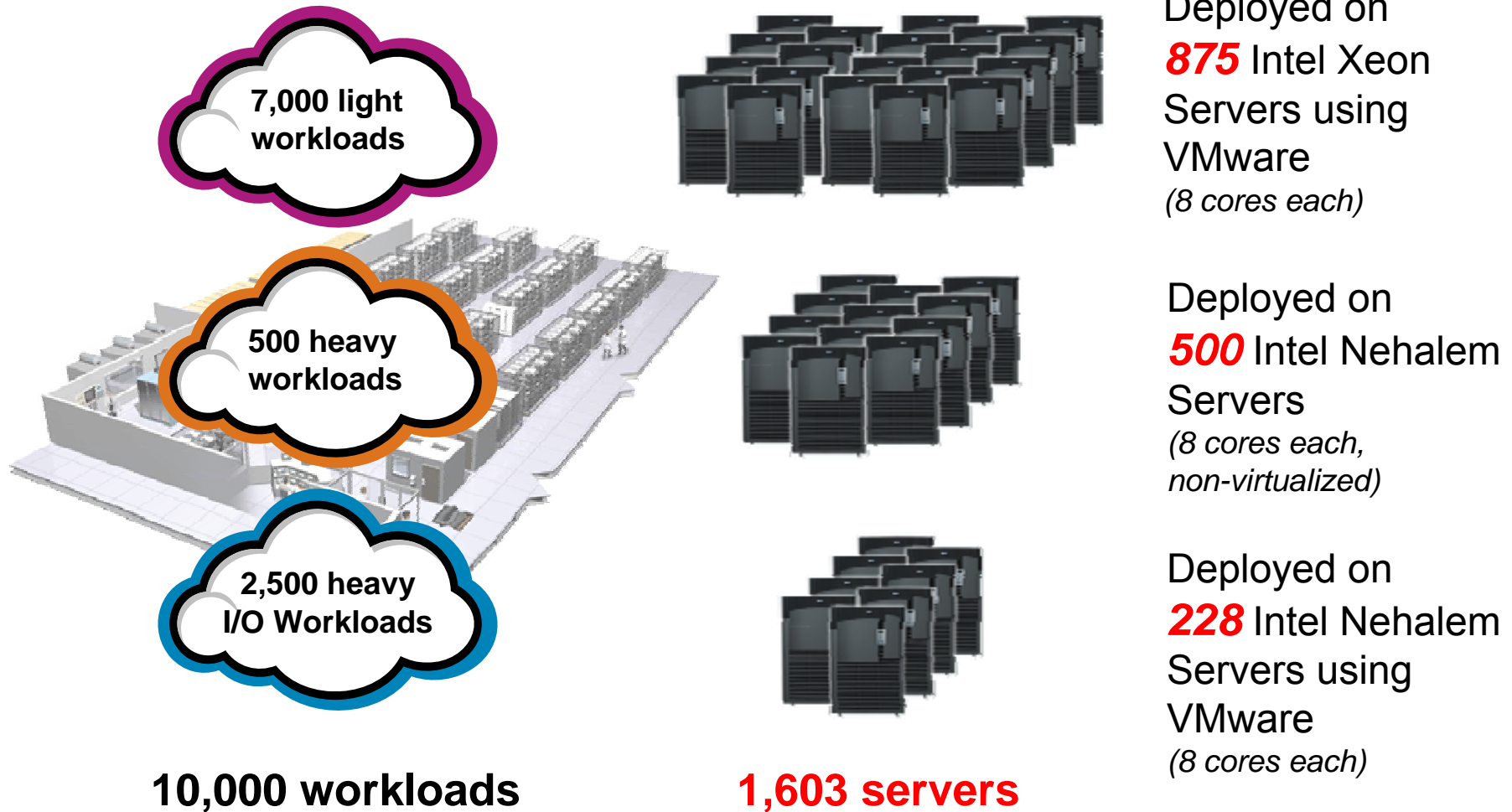**Light Workloads**

Linux

KVM

- Scale up to 96 cores in a frame (z/OS clusters with Sysplex)
- Dedicated I/O Sub System with up to 336 I/O processors
- Superior qualities of service

- Scales to 8 cores per blade
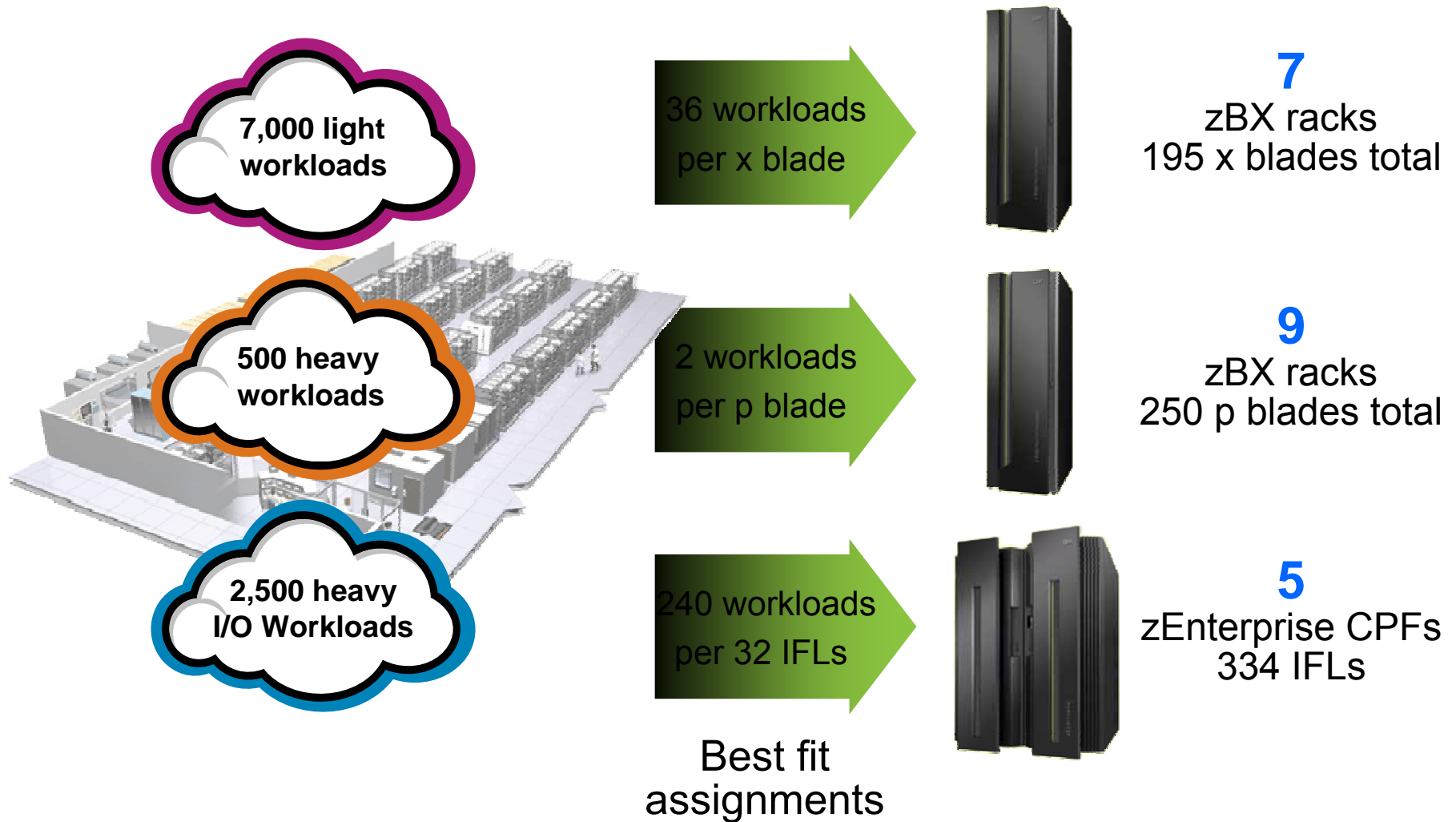- Larger number of fast processing threads
- Floating point accelerators

- Scales to 8-12 cores per blade
- Fast processing threads
- Commodity I/O
- Modest qualities of service

Large Data Center - What Did It Cost To Deploy 10,000 Workloads On Virtualized Intel Servers?

7,000 light workloads

500 heavy workloads

2,500 heavy I/O Workloads

Deployed on
875 Intel Xeon Servers using VMware
(8 cores each)

Deployed on
500 Intel Nehalem Servers
(8 cores each, non-virtualized)

Deployed on
228 Intel Nehalem Servers using VMware
(8 cores each)

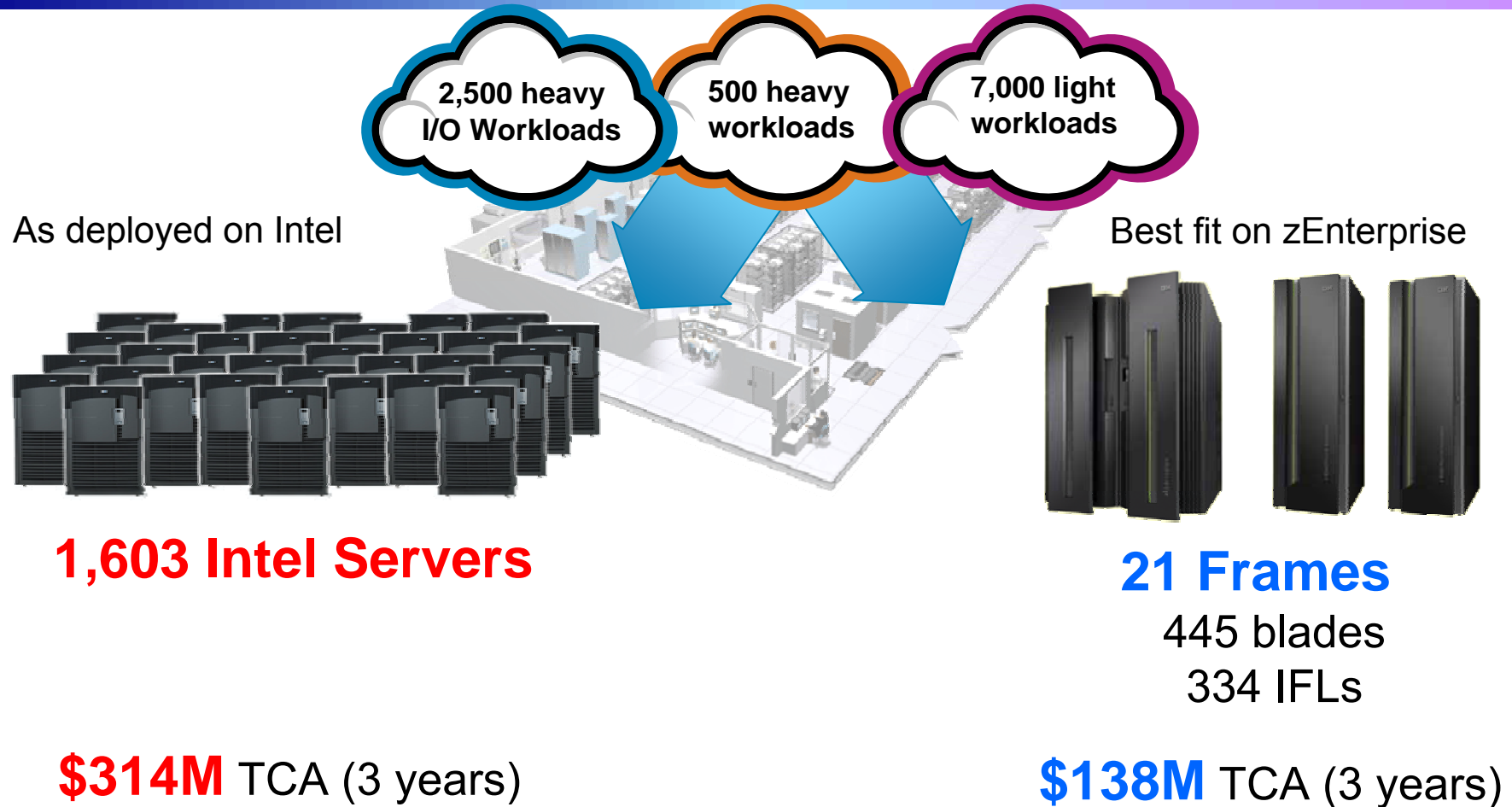**10,000 workloads**

1,603 servers

IBM analysis of a customer scenario with 10,000 distributed workloads. Deployment configuration is based on consolidation ratios derived from IBM internal studies.

zEnterprise Launch Comes To You – V2.1

9

Large Data Center - What Does It Cost To Deploy 10,000 Workloads On zEnterprise?

7,000 light workloads

36 workloads per x blade

7 zBX racks 195 x blades total

500 heavy workloads

2 workloads per p blade

9 zBX racks 250 p blades total

2,500 heavy I/O Workloads

240 workloads per 32 IFLs

5 zEnterprise CPFs 334 IFLs

Best fit assignments

Configuration is based on consolidation ratios derived from IBM internal studies. z196 32-way performance projected from z196 8-way and z10 32-way measurements. The zBX with x blades is a statement of direction only. Results may vary based on customer workload profiles/characteristics.

Compare Server Cost of Acquisition

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

As deployed on Intel

Best fit on zEnterprise

1,603 Intel Servers

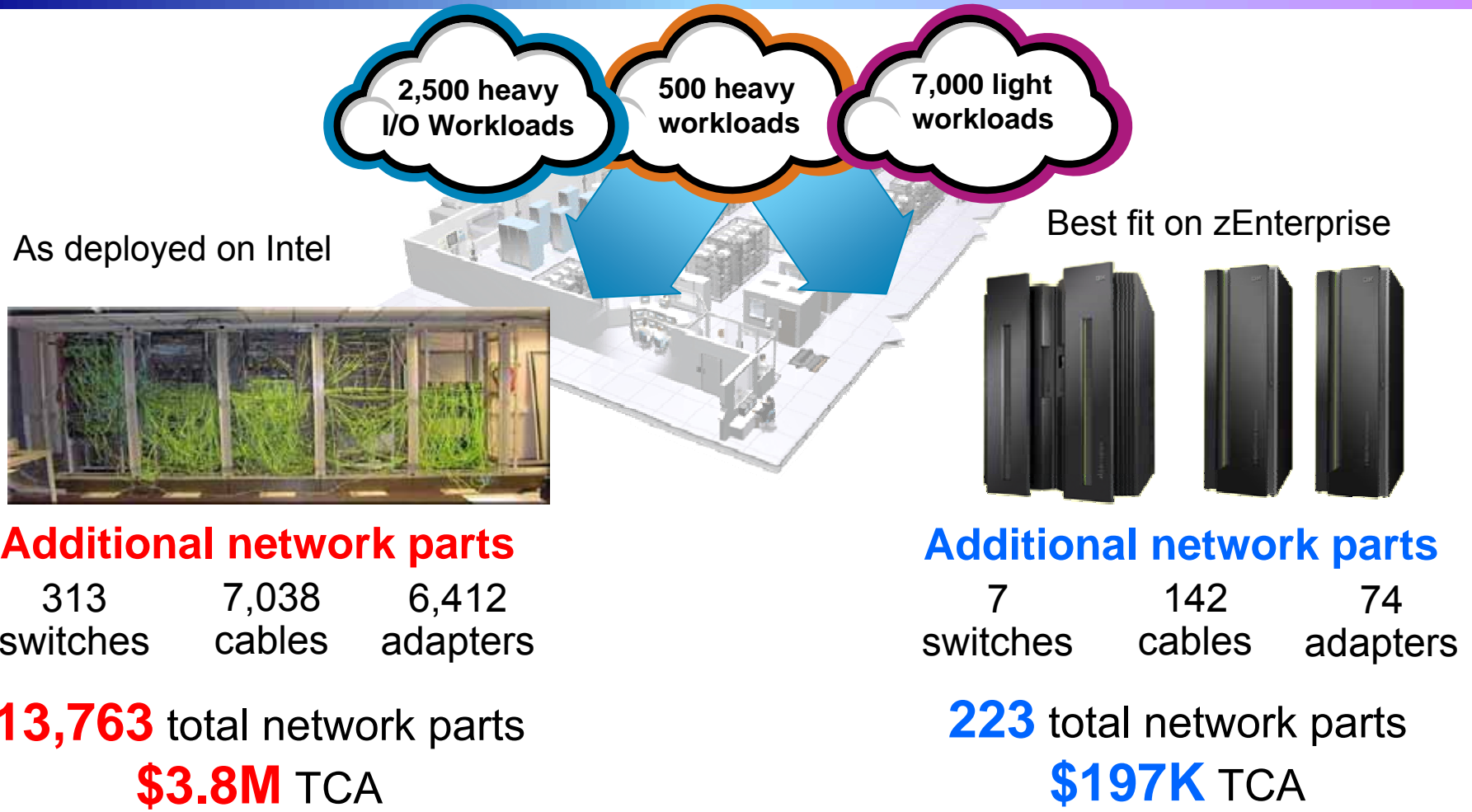**21 Frames**
445 blades
334 IFLs

$314M TCA (3 years)

$138M TCA (3 years)

56% less

Server configurations are based on consolidation ratios derived from IBM internal studies. Prices are publicly available US list, prices will vary by country
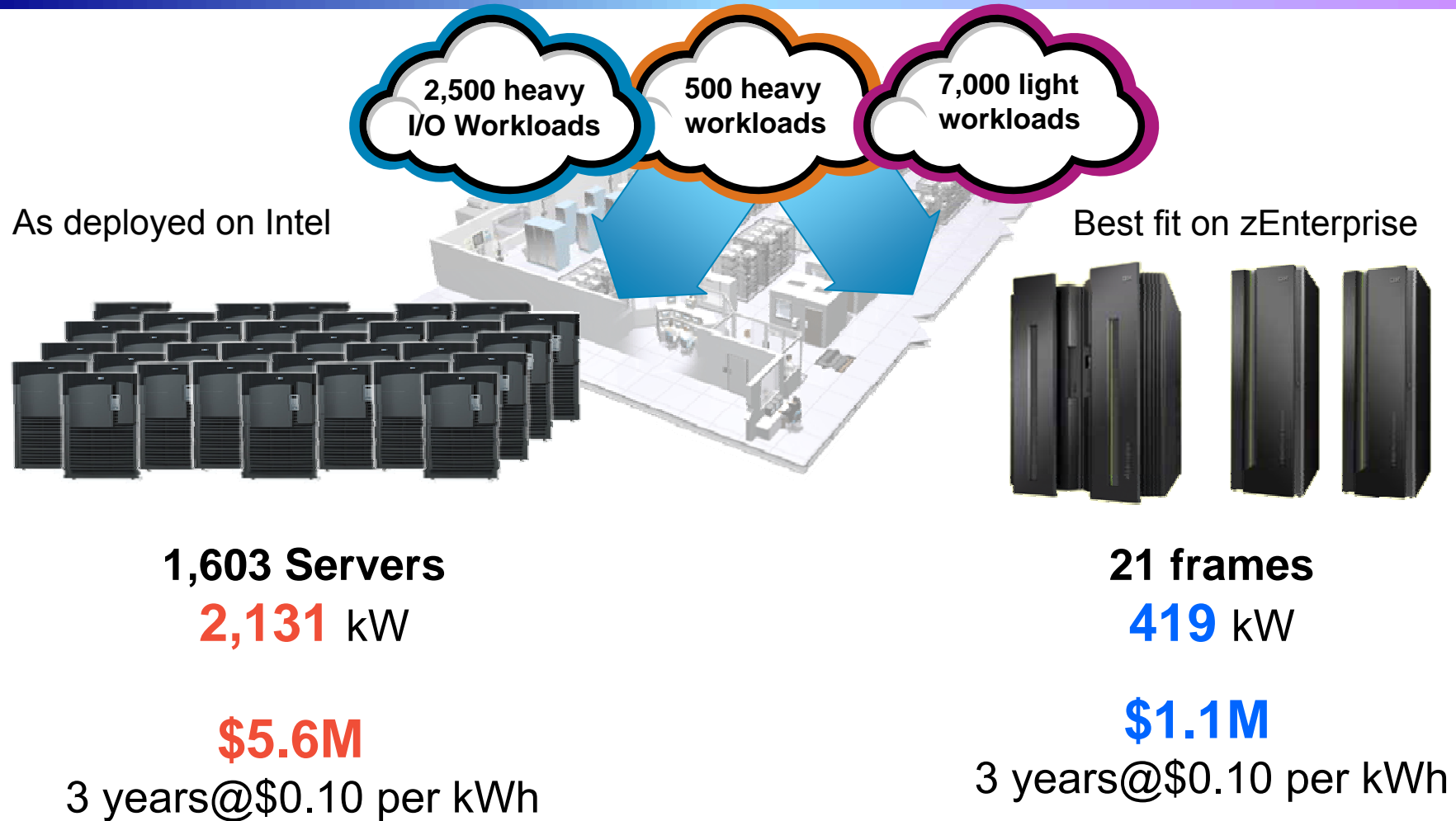
Compare Network Cost of Acquisition

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

As deployed on Intel

Best fit on zEnterprise

Additional network parts

313 switches	7,038 cables	6,412 adapters

13,763 total network parts

$3.8M TCA

Additional network parts

7 switches	142 cables	74 adapters

223 total network parts

$197K TCA

95% less

Network configuration is based on IBM internal studies.
Prices are publicly available US list, prices will vary by country

Compare Power Consumption

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

As deployed on Intel

Best fit on zEnterprise

1,603 Servers
2,131 kW

$5.6M
3 years@$0.10 per kWh
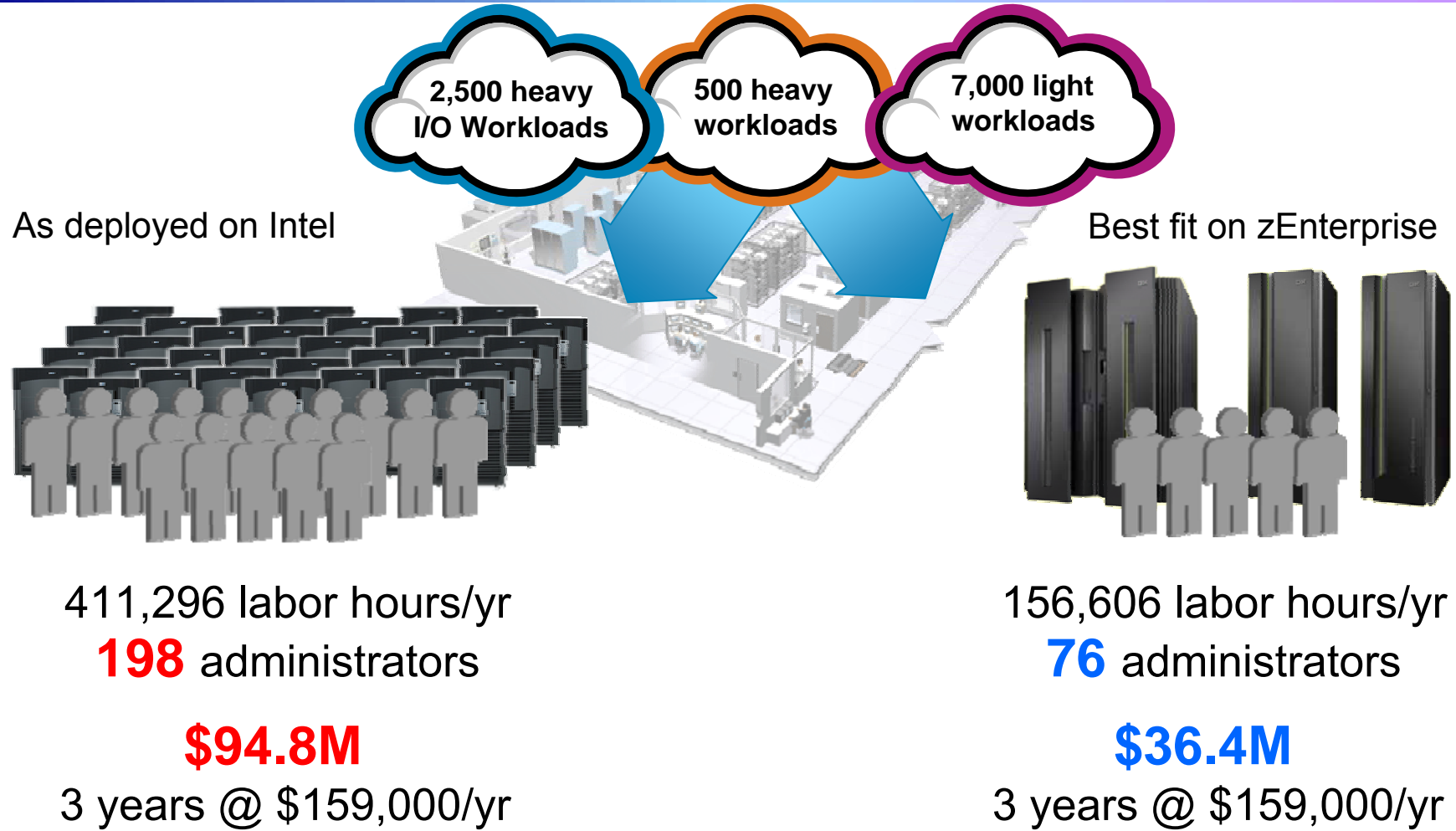
21 frames
419 kW

$1.1M
3 years@$0.10 per kWh

80%
less

Server configuration based on IBM internal studies. Calculations for Intel servers based on published power ratings and industry standard rates. Prices are publicly available US list, prices will vary by country

Compare Server Infrastructure Labor Costs

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

As deployed on Intel

Best fit on zEnterprise

411,296 labor hours/yr
198 administrators

156,606 labor hours/yr
76 administrators

$94.8M
3 years @ $159,000/yr

$36.4M
3 years @ $159,000/yr

62%
less

Configuration based on IBM internal studies. Labor model based on customer provided data from IBM studies
Labor rates will vary by country

Compare Storage Cost

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

As deployed on Intel

Best fit on zEnterprise

3 DS8700

6 XIV via SAN

1 SONAS

7.7 PB embedded storage
31% utilization
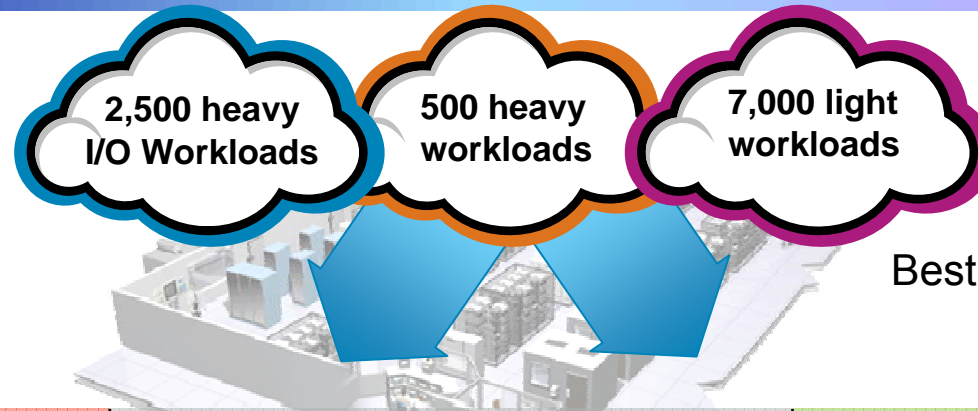1,603 points of admin

$211M TCO(3 years)

240GB active storage required per workload (2.4PB total)

Storage configuration is based on IBM internal studies.
Prices are publicly available US list, prices will vary by country

4.5 PB provisioned storage
53% utilization
10 points of admin

$108M TCO (3 years)

49% less

Simplification – Fewer Parts To Assemble And Manage

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

As deployed on Intel

Best fit on zEnterprise

1,603	**Servers**	21 frames
13,763	**Network (parts)**	223
2,131	**Power (KW)**	419
198	**Administrators**	76
1,603	**Storage admin points**	10

The Savings Are Cumulative

2,500 heavy I/O Workloads

500 heavy workloads

7,000 light workloads

Three Year Cost of …	Deploy on Intel	Best fit on zEnterprise
Servers	$ 314M	$ 138M
Network	$ 3.8M	$ 0.2M
Power	$ 5.6M	$ 1.1M
Labor	$ 94.8M	$ 36.4M
Storage	$ 211M	$ 108M
Total	*$ 629M*	*$ 284M*
Total cost per workload	*$ 63K*	*$ 28K*

55%
less

Results may vary based on customer workload profiles/characteristics. Prices
based on publicly available US list prices. Prices may vary by country

Accurate Cost Allocations Show A True Picture Of Costs And Aid Investment Decisions – An Example

- Best practice allocation should use *actual* distributed and mainframe costs
- In this example, the mainframe allocation decreased from 71% to 40%

|	Typical Allocation – Management Estimates				Best Practice Allocation – Actual Costs			
	Distributed	%	MF	%	Distributed	%	MF	%
Power Cost	0	0	$15,084	100	$11,917	79	$3,167	21
Labor Cost	0	0	$350,000	100	$210,000	60	$140,000	40
Floor space	0	0	$11,620	100	$6,300	54	$5,320	46
Software OTC depreciation	$120,240	60	$102,472	40	$216,194	97	$6518	3
Software S&S and MLC	$168,783	50	$168,783	50	$181,242	54	$156,325	46
Hardware OTC depreciation	$103,691	25	$311,074	75	$184,435	44	$230,330	56
Hardware Maintenance	$20,276	25	$60,829	75	$37,151	46	$43,953	54
Network	0	0	$4,758	100	$4,758	100	$0	0
Total	$412,990	29	$1,024,620	71	$851,997	60	$585,613	40

Based on IBM analysis of customer data. Individual customer results will vary.

Total $1,437,610

Total $1,437,610

# Accurate Charge Back Practices Can Reflect These Savings

*Internal Charge Back Practices Were Improved Over Time
at a Large Financial Institution*
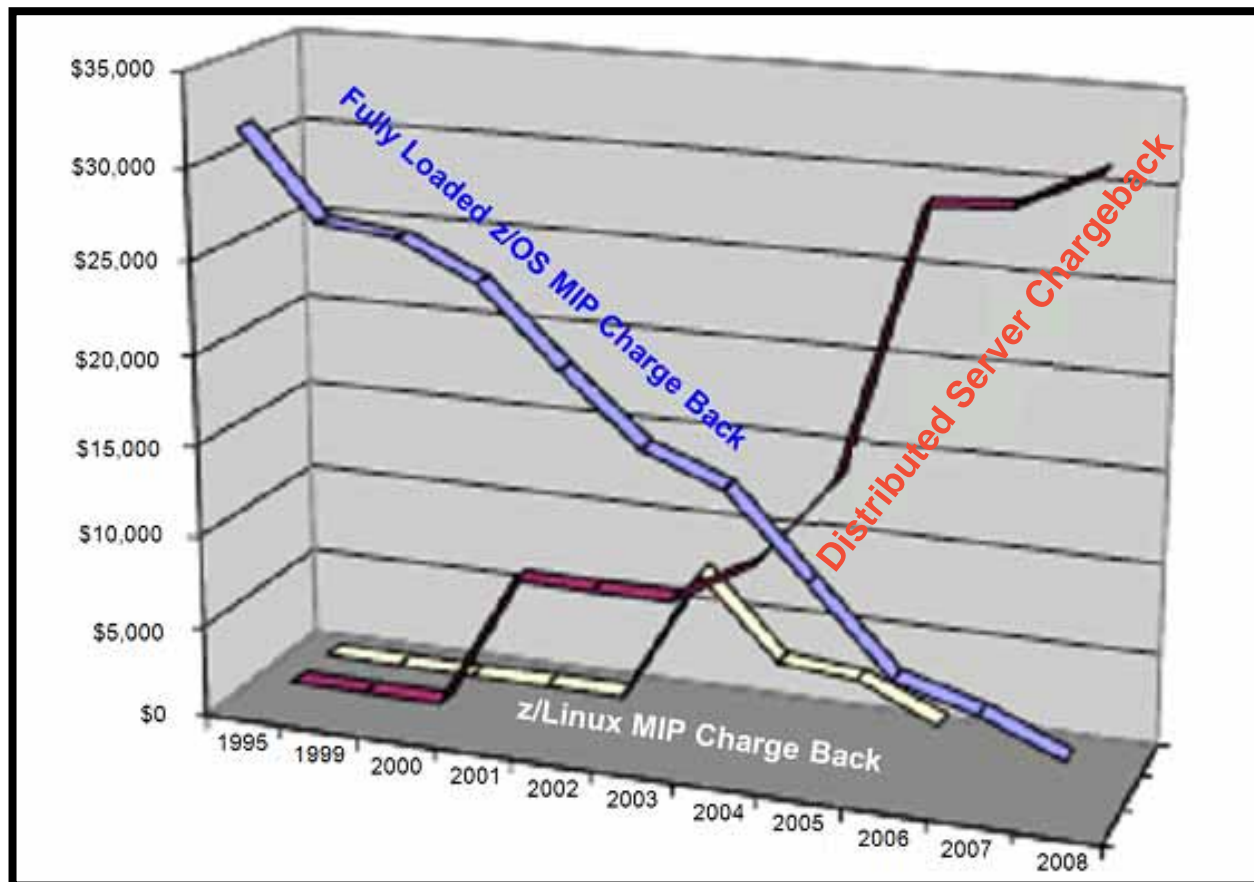
Extending zEnterprise Unified Resource Management With Integrated Service Management

zEnterprise Unified Resource Management

- Workload-based resource allocation and provisioning for zEnterprise
- Physical & Virtual Resource Management
- Goal Oriented Management of zEnterprise resources (Availability, Performance, Energy, Security)
- Faster transaction processing with reduced network latency
- Operational Controls for Hardware/Firmware
- Service & Support for Hardware/Firmware
- Hardware configuration mgmt.
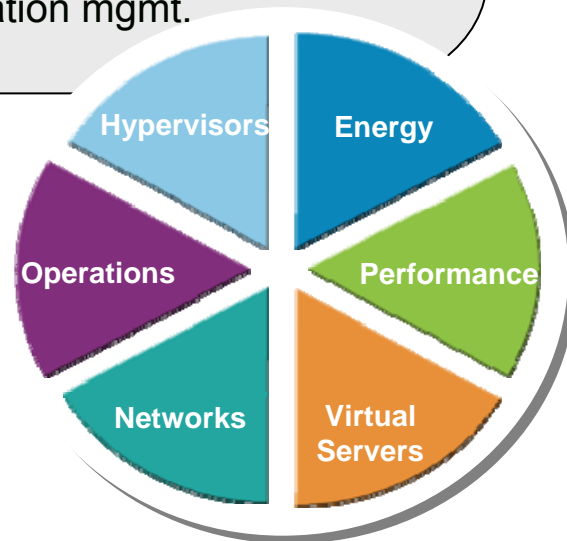
Tivoli & Integrated Service Management

Visibility, Control and Automation for Applications, Transactions, Databases, all Datacenter Resources

- Integrated Operational Dashboards to monitor and manage service impacting events

- Key Performance Indicators (KPI) applied to Business Services for impact analysis

- Heterogeneous data in ONE

- Business Service Modeling for planning

- Contextual Correlation to reduce Mean time to repair (MTTR)

- Establish and automate service level agreement (SLA) tracking

Hypervisors | **Energy** | **Operations** | **Performance** | **Networks** | **Virtual Servers**

IBM Smart Analytics Optimizer - Capitalizing On The Best Of Relational And Columnar Databases

Workload optimized, appliance-like, add-on, that enables the integration of business insights into operational processes to drive winning strategies.


- **Performance:** unprecedented response times to enable 'train of thought' analyses frequently blocked by poor query performance

- **Integration:** connects to DB2 through deep integration providing transparency to all applications

- **Self-managed workloads:** queries are executed in the most efficient way

- **Transparency:** applications connected to DB2, are entirely unaware of ISAOPT

- **Simplified administration:** appliance-like hands-free operations, eliminating many database tuning tasks

Breakthrough technology enabling new opportunities

*Based on Internal IBM test results that reflect actual client queries

zEnterprise Is A Roadmap To The Data Center Of The Future

Heavy Distributed I/O Workloads

Heavy Distributed Workloads

Light Distributed Workloads
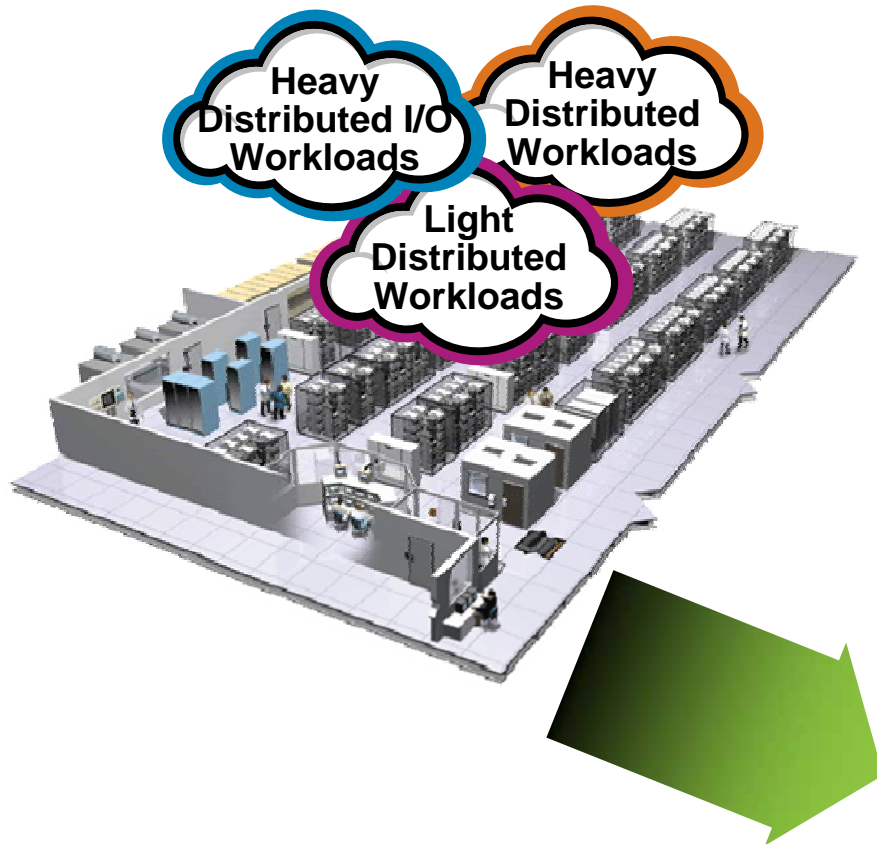
- Lowest cost per unit of work for large scale workloads

- Revolutionary cost reductions for smaller scale workloads

- Data center simplification

- Improve quality of service

- **No Other Platform Can Match!**

**Mainframe workloads
+
distributed workloads
best fit for cost**