The New zEnterprise – A Smarter System For A Smarter Planet

System z And IT Economics

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

A system of systems that unifies IT for predictable service delivery

NEW

IBM zEnterprise 196 (z196)

- Optimized to host large-scale database, transaction, and mission-critical applications
- The most efficient platform for large-scale Linux consolidation
- Capable of massive scale-up
- New easy-to-use z/OS V1.12

zEnterprise Unified Resource Manager

- Unifies management of resources, extending IBM System z qualities of service end-to-end across workloads
- Provides platform, hardware and workload management

zEnterprise BladeCenter Extension (zBX)

- Selected IBM POWER7 blades and IBM x86 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

* All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

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

- The IBM zEnterprise 196 is the world's fastest and most scalable enterprise system
- Delivers lower cost acquisition and operation than a 'one-size-fits-all' approach
- Enables a mixed set of workloads to be deployed on best fit technologies
- Extends the reach of System z qualities of service
- Improves service through tighter integration for multi-tier workloads

Smarter Planet Solutions Usually Include Different Workloads

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*

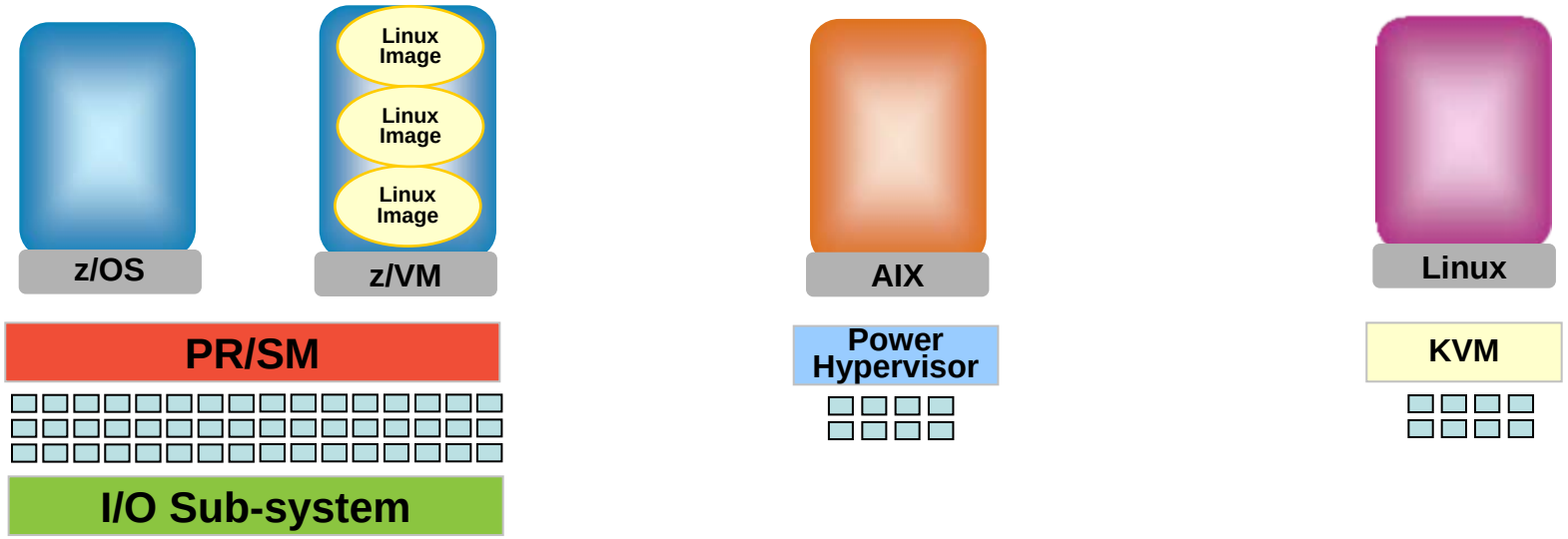
Different Workloads Have Different Characteristics

- Huge transaction workload
- High I/O bandwidth
- High quality of service requirements

- High processing intensity
- Integer or floating point

- Light to moderate processing
- Modest quality of service requirements

zEnterprise – Environments Optimized For Different Workloads

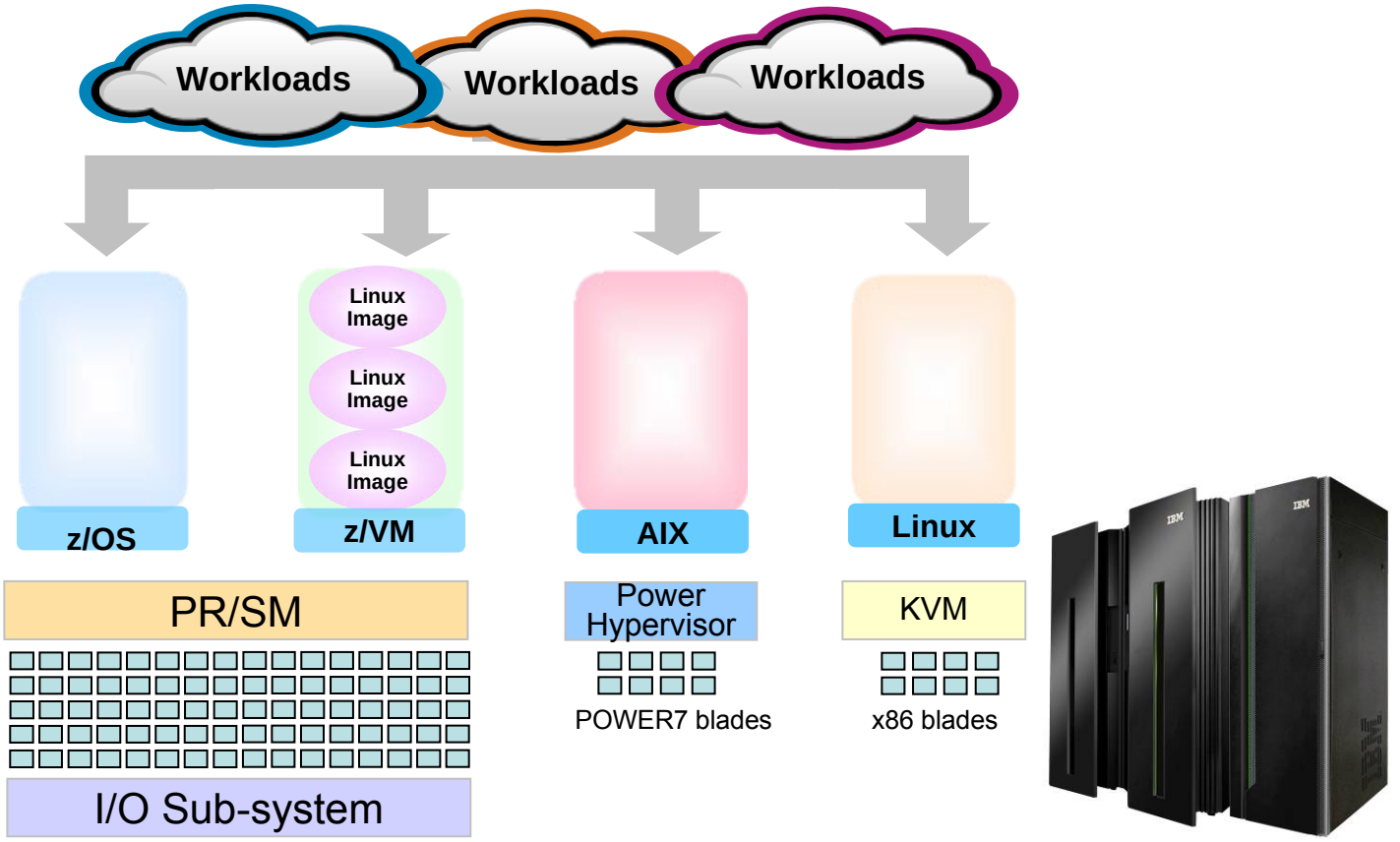


- Scale up to 96 cores in a frame (z/OS clusters with Sysplex)
- Dedicated I/O Sub-system with up to 336 I/O processors
- Superior qualities of service

- 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

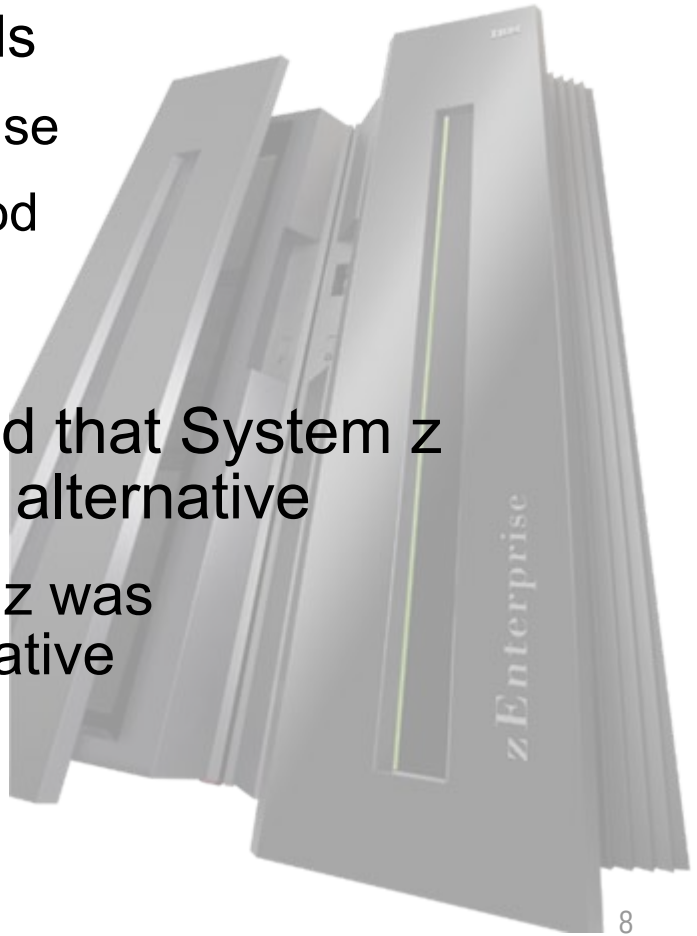
“Best Fit” Proposition



- Deploy or consolidate workloads on the environment best suited for each workload
  - Yields lowest cost of operation for workload requirements

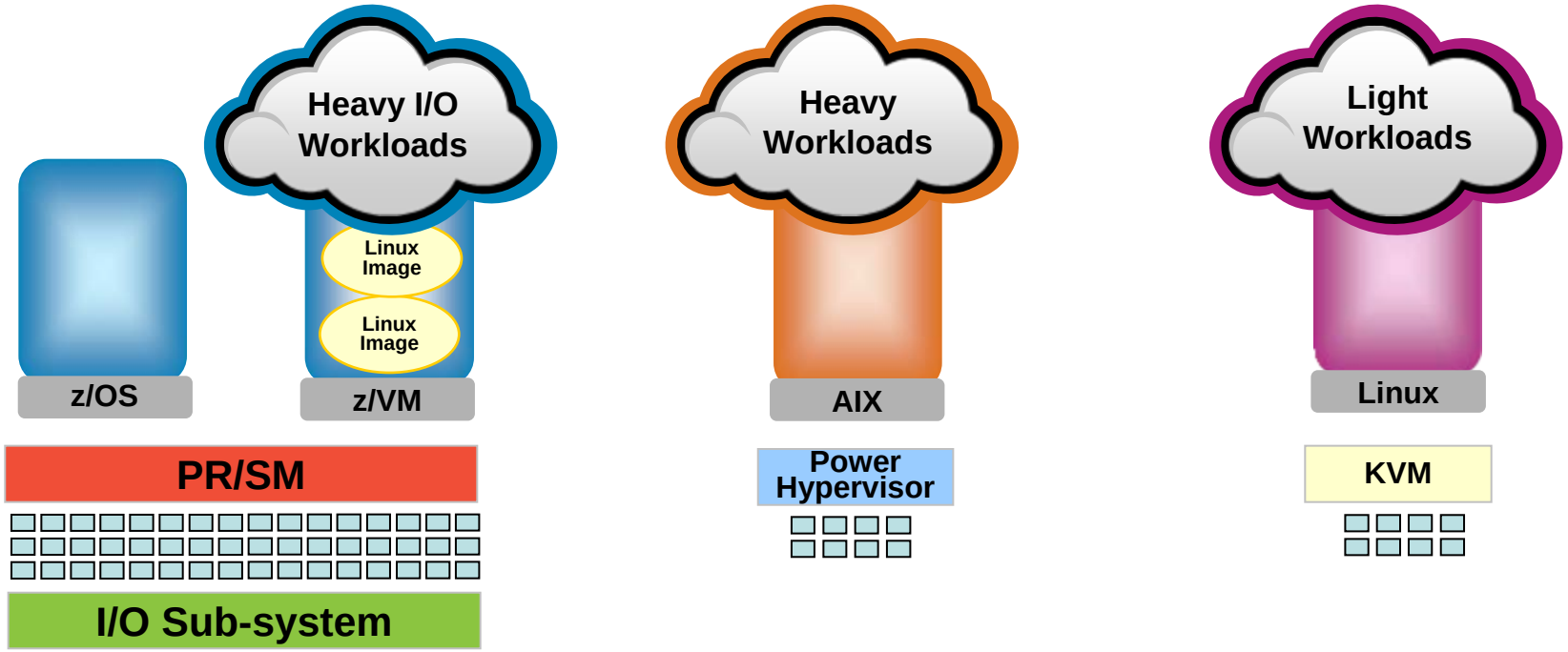
IBM Eagle Studies Demonstrate Most Mainframe Workloads Are Already Best Fit

- 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



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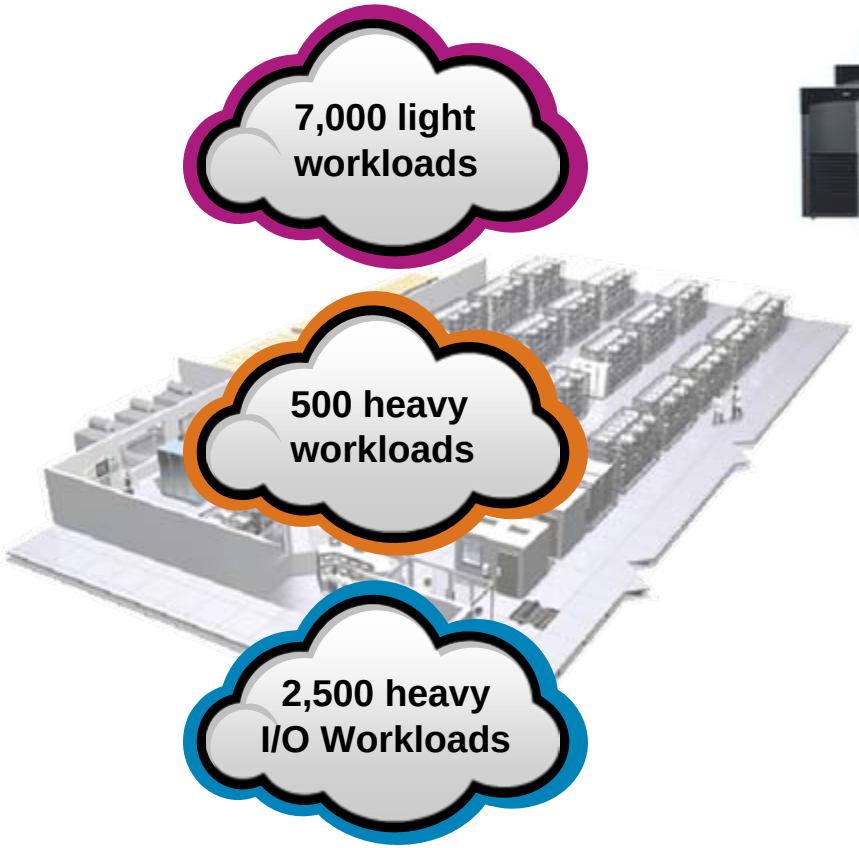
Large Data Center – What Does It Cost To Deploy 10,000 Workloads On Virtualized Intel Servers?



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

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

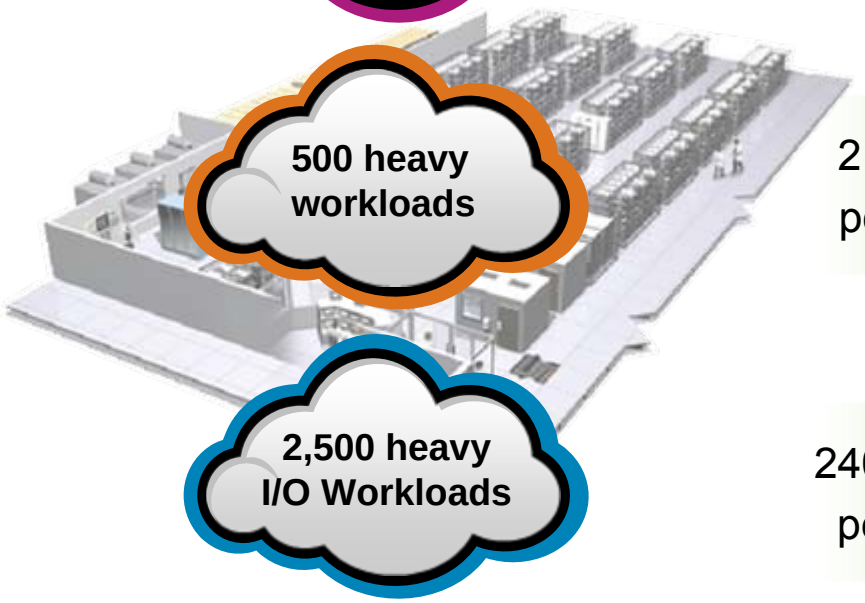
Deployed on ***228*** Intel Nehalem Servers using VMware
(8 cores each)

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.

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



36 workloads per x blade

7 zBX racks
195 x blades total

2 workloads per p blade

9 zBX racks
250 p blades total

240 workloads per 32 IFLs

5 zEnterprise CPCs
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 x86 blades is a statement of direction only. Results may vary based on customer workload profiles/characteristics.

Compare Server Cost Of Acquisition

As deployed on Intel

1,603 Intel Servers

$314M TCA (3 years)

Best fit on zEnterprise

21 Frames

445 blades

334 IFLs

$138M TCA (3 years)

56%
less

Server configurations are based on consolidation ratios derived from IBM internal studies.
Prices are in US currency, prices will vary by country.

Compare Network Cost Of Acquisition

As deployed on Intel

Additional network parts

313 switches	7,038 cables	6,412 adapters

13,763 total network parts

$3.8M TCA

Best fit on zEnterprise

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 in US currency, prices will vary by country.

Compare Power Consumption

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

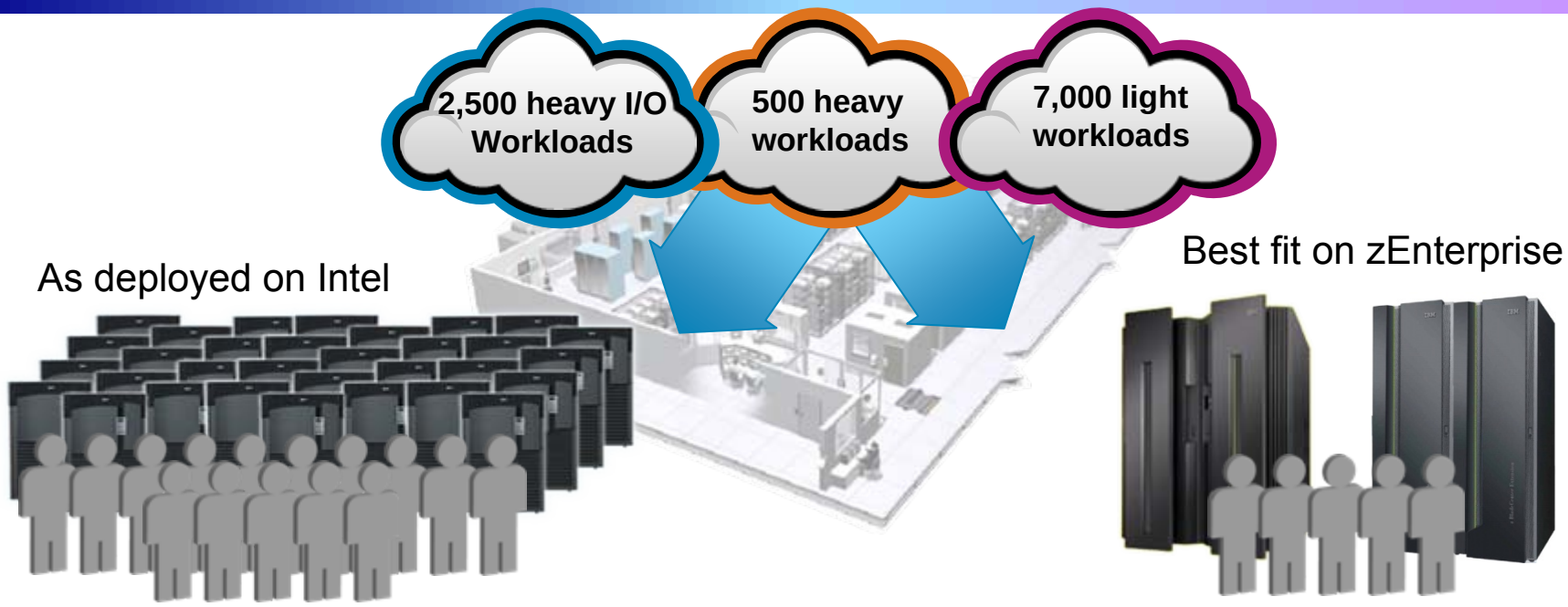
$1.1M

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 in US currency, prices will vary by country.

Compare Server Infrastructure Labor Costs



411,296 labor hours/yr

198 administrators

$94.8M

3 years @ $159,600/yr

156,606 labor hours/yr

76 administrators

$36.4M

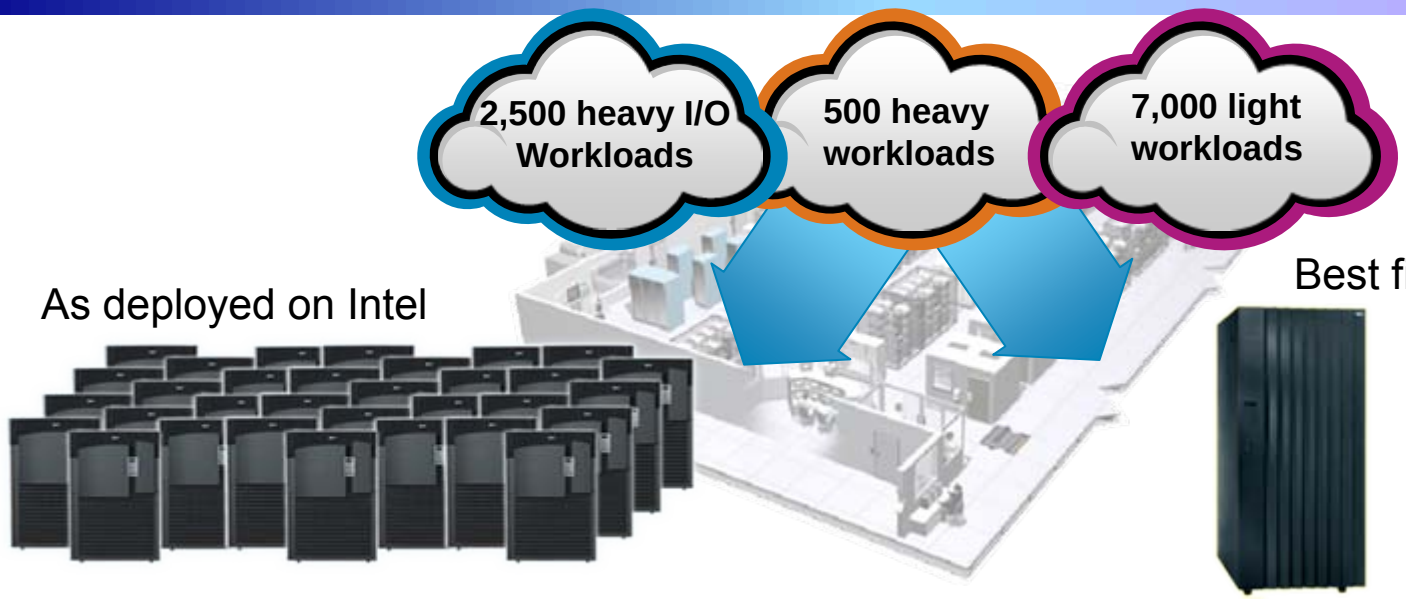
3 years @ $159,600/yr

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



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)

4.5 PB provisioned storage
53% utilization
10 points of admin

$108M TCO (3 years)

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

49%
less

Storage configuration is based on IBM internal studies.
Prices are in US currency, prices will vary by country.

Simplification – Fewer Parts To Assemble And Manage

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

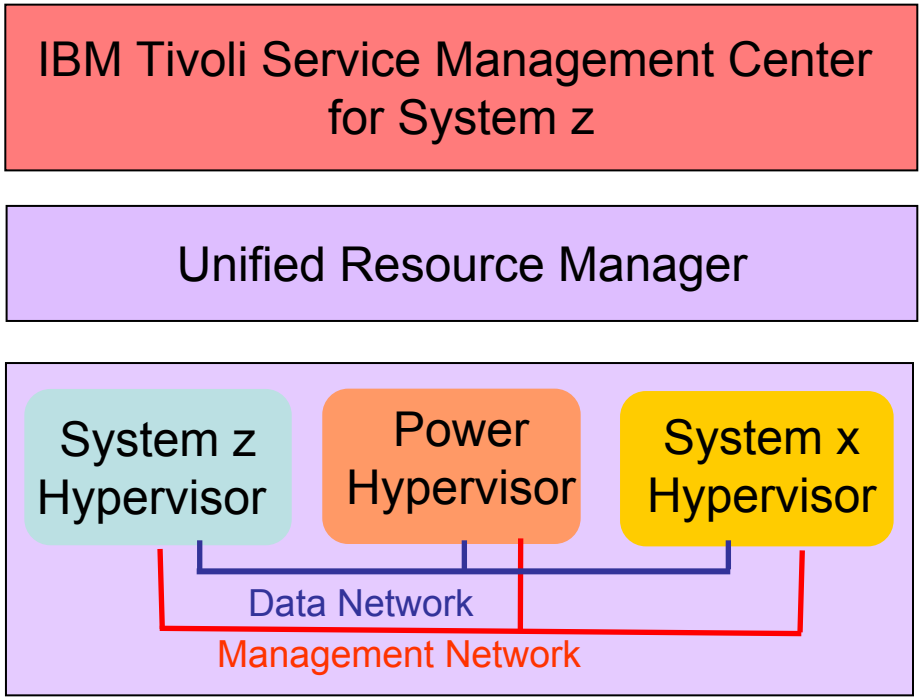
The Savings Are Cumulative

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

Manage All Four Environment As A Single Unified Platform



End-to-End Service Management

Integrated Platform Management

Integrated Fit-for-Purpose Platform

zEnterprise

Extends System z quality of service to all environments

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

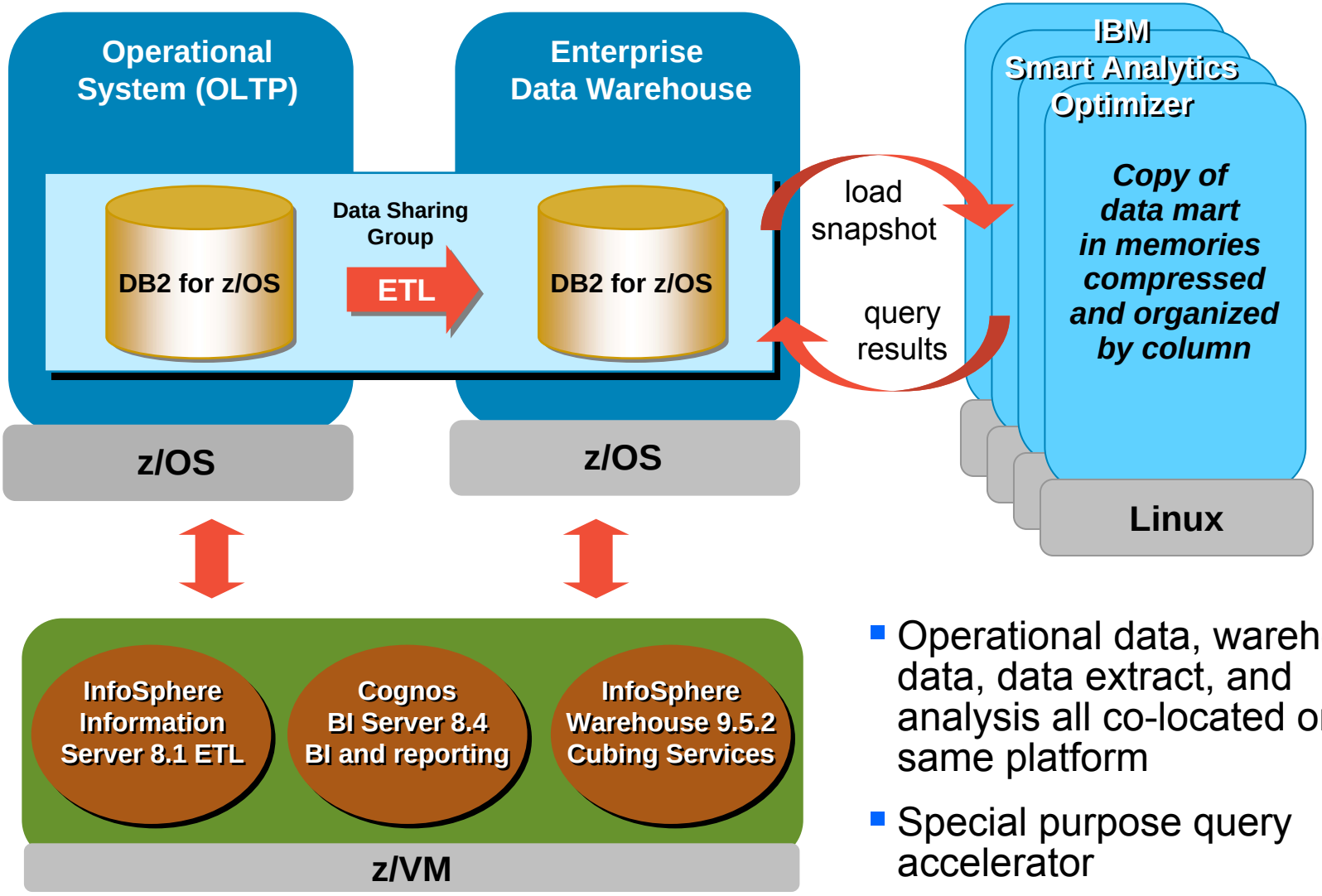
Workload optimized, appliance-like, add-on, that enables the integration of business insights into operational processes to drive winning strategies.

- **Performance[1]:** unprecedented faster performance for some queries enables 'train of thought' analyses frequently blocked by poor query performance
- **Integration:** connects to DB2 for z/OS 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 the optimizer
- **Simplified administration:** appliance-like hands-free operations, eliminating many database tuning tasks

Breakthrough technology enabling new opportunities

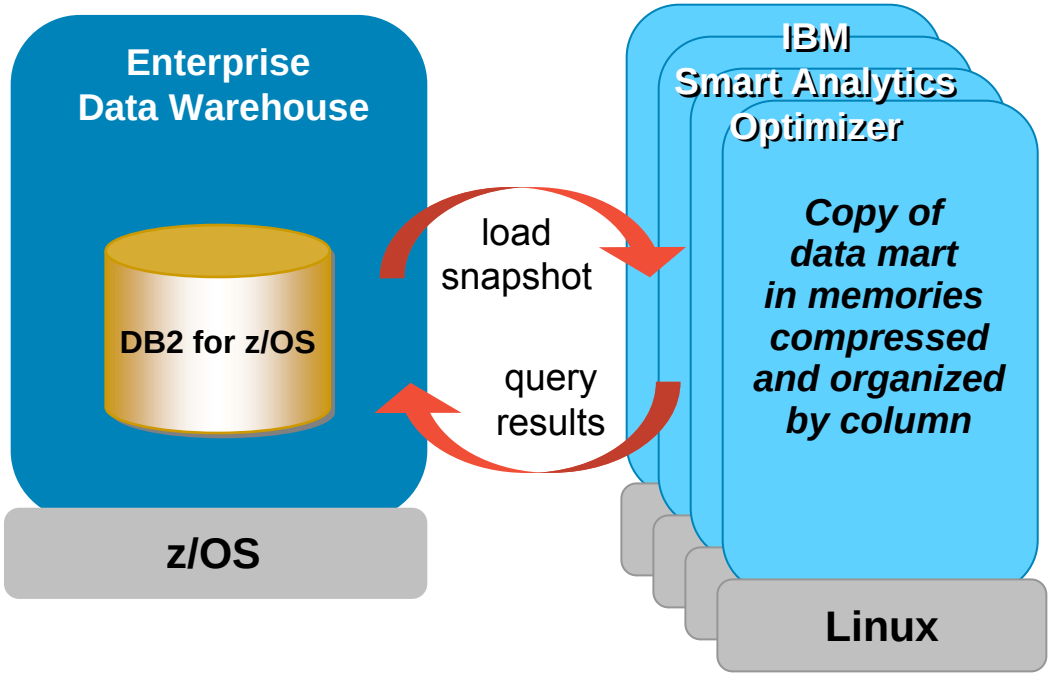
[1]Based on Internal IBM test results that reflect actual client queries

Consolidate Complete Business Intelligence Solution On zEnterprise



- Operational data, warehouse data, data extract, and analysis all co-located on the same platform
- Special purpose query accelerator

IBM Smart Analytics Optimizer Enables Near Real-time Analytics On zEnterprise

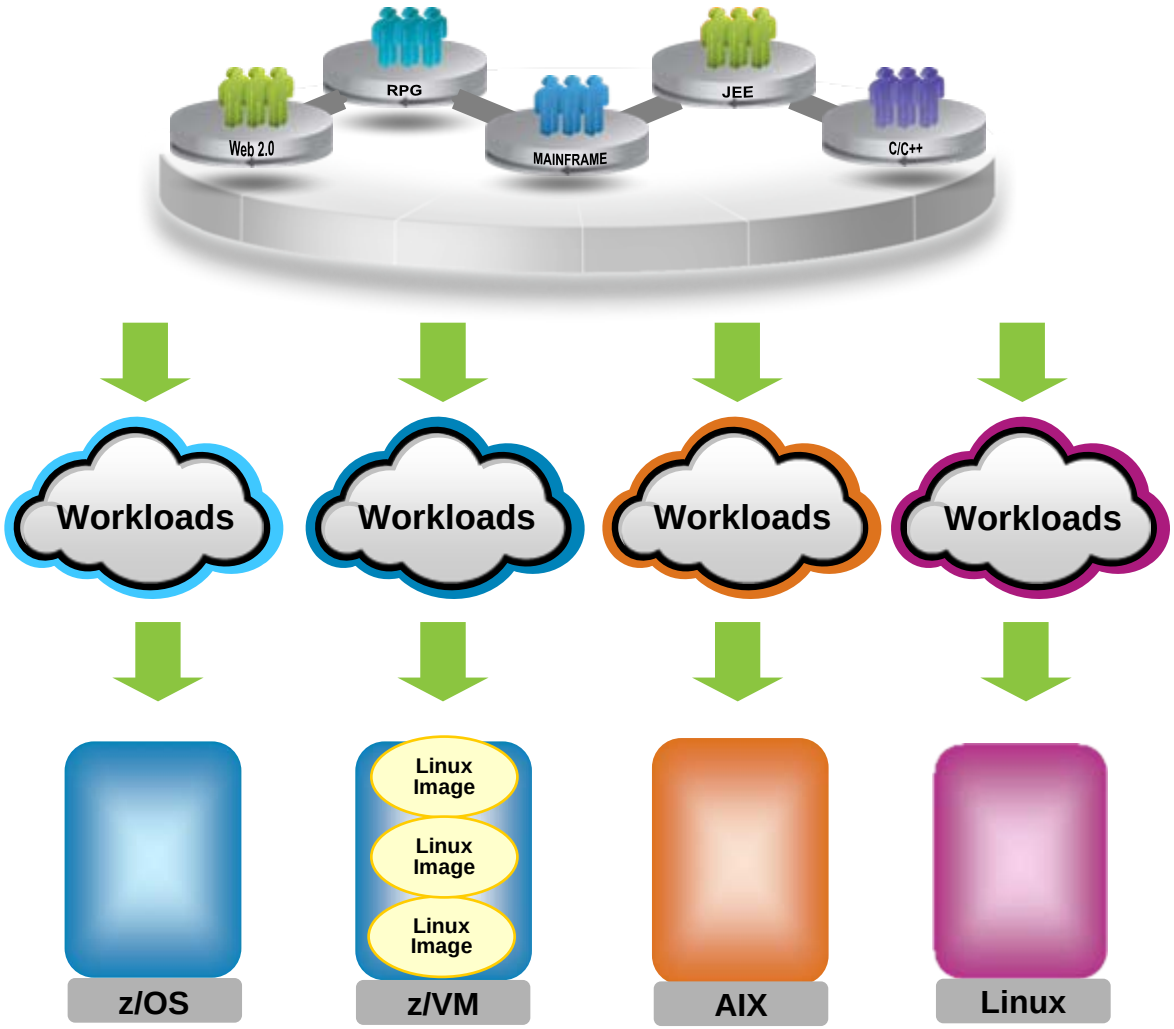


- IBM Smart Analytics Optimizer
- Leverages blade memory and processors for warehouse queries
- Load snapshot then execute queries

- Early customer results[1]
  - Analysis jobs execute ***3 - 171*** times faster
  - Cost per job reduced by ***1.4 - 1838*** times in continuous use
  - Real time analytic performance ***7 - 387*** samples per day

[1]Based on results from 3 customer studies

Rational Delivers A Unified Development Tool Set For All zEnterprise Environments



- Unified edit, compile, debug
- Unified development processes
- Unified test
- **Improve development productivity by up to 30%[1]**

[1]Based on IBM customer study

Thriving System z Ecosystem

Linux on System z: Fastest growing server platform

- Installed Linux MIPS growth of 43% CAGR (2004-2009)
- Shipped IFL MIPS increased 65% (YE07 to YE09)
- 70% of the top 100 System z clients are running Linux on z
- Linux is 16% of the System z customer install base (MIPS)

Thousands of ISVs investing in System z platform

As of 1H2010:

- 1,650 unique ISVs have enabled more than 6,300 applications on the System z platform
- 3,000+ Linux applications are supported on System z:
  - 550 new Linux applications added in 2009; another 80 applications already enabled in 2010
- 4,000+ applications are enabled on z/OS:
  - 2,000+ applications are enabled on z/OS 1.9 and later

Worldwide adoption of mainframe curriculum

Students educated:

- Over 50,000 worldwide, 5,000 more students in China by 2010

University adoption:

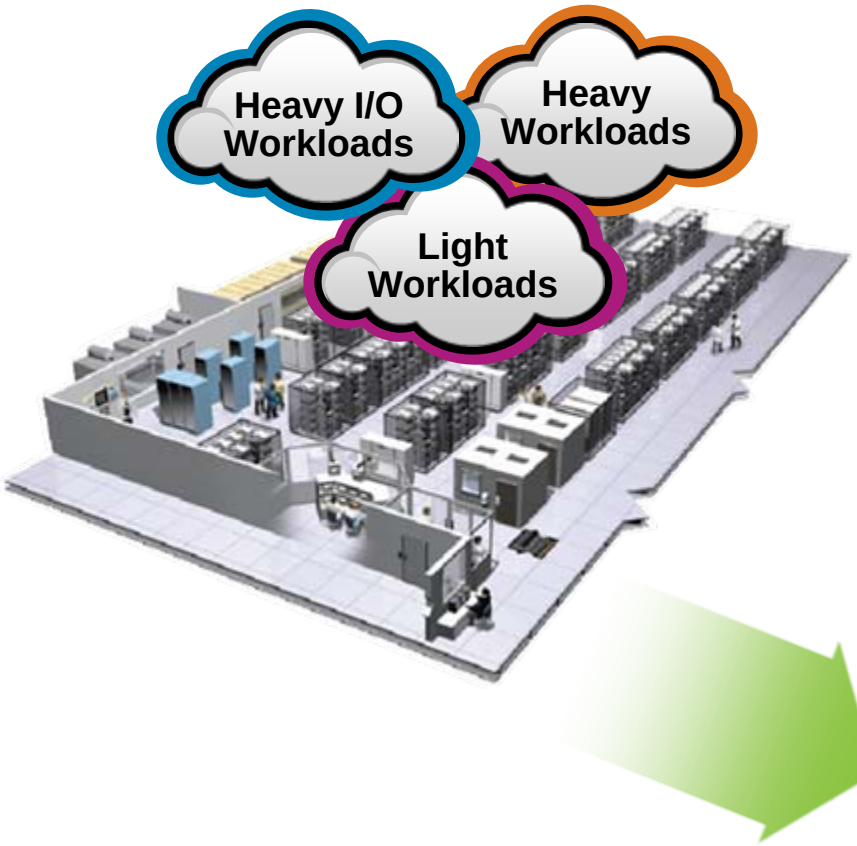
- Over 600 schools enrolled globally
- 90% growth in 2 years; 2,000% since 2003; continued flow of schools adding curricula
- 50%+ outside of US

Worldwide skills:

- 40,000 mainframe skills in growth economies

Based on IBM market analysis

zEnterprise Is A Roadmap To The Data Center Of The Future



- 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

Our Agenda Today

10 Minutes	*Welcome by Regional Sales Exec*
35 Minutes	System z and IT Economics
30 Minutes	A Closer Look At zEnterprise
20 Minutes	***Break***
45 Minutes	Virtualization and Consolidation on zEnterprise
40 Minutes	Reduce Labor Costs with zEnterprise
60 Minutes	***Lunch***
45 Minutes	Deploying Web Applications
30 Minutes	Modern Data Serving – Why DB2 On z/OS Is The Best Choice
20 Minutes	***Break***
45 Minutes	Modern Business Analytics On A Single Platform
45 Minutes	Unify Mainframe and Distributed Development

DEMO: Architecture