How z solutions impart value in today's business

Claire Connor
IBM

November 2018
Session AF

Place your custom session QR code here. Please remove the border and text beforehand.

Me

- Graduated 2010
- Graduate scheme October 2012
- zHardware CTS October 2014
- zClient Architect January 2016

The University Of Sheffield.

Agenda

- Brief overview of new features in z14 & zR1
- Highlights of GA2
- Intro to z Economics
- Solutions
  - API connectivity
  - Hybrid cloud integration
  - Security
  - Consolidation
  - New world DBs

New pricing constructs

IBM Z® Generations

N-4

IBM z10 EC M/T 2097
- Announced 2/2008
- 4.4 GHz
- Up to 64 cfg cores
- CP, IFL, ICF, zAAP, zIIP
- Up to 1.5 TB Memory

IBM z10 BC M/T 2098
- Announced 10/2008
- 3.5 GHz
- Up to 10 cfg cores (5 CP)
- CP, IFL, ICF, zAAP, zIIP
- Up to 248 GB Memory

N-3

IBM zEnterprise 196 M/T 2817
- Announced 7/22/2010
- 5.2 GHz
- Up to 80 cfg cores
- CP, IFL, ICF, zAAP, zIIP
- Up to 3 TB Memory

IBM zEnterprise 114 M/T 2818
- Announced 7/12/2011
- 3.8 GHz
- Up to 10 cfg cores (5 CP)
- CP, IFL, ICF, zAAP, zIIP
- Up to 248 GB Memory

N-2

IBM zEC12 M/T 2827
- Announced 8/28/2012
- 5.5 GHz
- Up to 101 cfg cores
- CP, IFL, ICF, zAAP, zIIP
- Up to 3 TB Memory

IBM zBC12 M/T 2828
- Announced 7/23/2013
- 4.2 GHz
- Up to 13 cfg cores (6 CP)
- CP, IFL, ICF, zAAP, zIIP
- Up to 496 GB Memory

N-1

IBM z13 M/T 2964
- Announced 1/14/2015
- 5.0 GHz
- Up to 141 cfg cores
- CP, IFL, ICF, zIIP
- Up to 10 TB Memory

IBM z13s M/T 2965
- Announced 2/16/2016
- 4.3 GHz
- Up to 20 cfg cores (6 CP)
- CP, IFL, ICF, zIIP
- Up to 4 TB Memory

N

IBM z14 M/T 3906
- Announced 7/17/2017
- 5.2 GHz
- Up to 170 cfg. cores
- CP, IFL, ICF, zIIP
- Up to 32 TB cfg. Memory

IBM z14 M/T 3907
Announced 4/10/2018
4.5 GHz
19" Rack
Up to 30 cfg cores (6 CP)
CP, IFL, ICF, zIIP
Up to 8 TB cfg. Memory

z14 ZR1 Functions and Features (Driver Level 32)

System, Processor, Memory
One model, one CPC drawer, four available sizes
10 core 14nm PU SCM (5, 6, 7, 8, or 9 active cores per PU SCM)
Up to 30 configurable PUs as CPs, zIIPs, IFL, ICFs, or optional SAPs (up to 6 CPs)
Increased uni-processor capacity
156 Capacity settings
19" Rack, ASHRAE class A3 (for Data Center requirements relief)
Enhanced SMT (for IFLs and zIIPs only) and SIMD
Enhanced processor / cache design with bigger cache sizes
Up to 8 TB of Memory protected by Redundant Array of Independent Memory (RAIM)
16U Reserved (rack space) feature
Up to 40 LPARs
IBM Dynamic Partition Manager
Secure Service Container
LPAR Group Absolute Capping
CPUMF sampling w/o PE Mode enablement

I/O Subsystem, Parallel Sysplex, STP, Security
Up to eight (8) PCIe Gen3 I/O fanouts with 16 GBps Busses
New PCIe+ I/O Drawer (up to 4 per system, up to 64 PCIe features),
3 LCSSs, 3 Subchannel Sets per LCSS
32K I/O Devices per channel for all FICON features
FICON Express16S+ and FICON Enhancements
zHyperLink Express
10 GbE RoCE Express2
Shared Memory Communications - Direct Memory Access over Internal Shared Memory (ISM) – SMC-D
Virtual Flash Memory (512 GB per feature, up to four features)
CFCC Level 22
Crypto Express6S and Crypto enhancements

RAS, Other Infrastructure Enhancements	
Keyboard Video Monitor Switch, single display console	Ethernet switches replace SCHs
STP Enhancements - Configuration	Rack-Mounted Support Elements (CPC rack)
Key Locks for doors	Tower & Rack-mounted HMCs and TKEs
Support for ASHRAE Class A3 datacenter	TKE 9.0 LICC

GA2 highlights

Data Serving

IBM Adapter for NVMe* "vendor card adapter Beta" provides the ability for embedded storage within the system through the PCIe bus interface. This feature uses PCIe adapter cards with attached Solid State Drives (SSDs) that connect directly to the I/O backplane, providing customers with the ability to have embedded storage without the need for external DASD or Tape (after initial install). This feature can help with memory-intensive workloads, real-time analytics, fast storage workloads such as streaming, paging/sorting, and traditional applications such as relational databases.

FCP Express32S* provides high-speed network technology for use with Storage Area Networks (SANs). FCP32 provides the ability for 32 Gigabits per second (Gbps) speeds over a fast fibre channel protocol. This feature provides the ability to consolidate multiple / slower FCP cards and allows higher bandwidth and I/O rates for the most advanced data-serving needs.

Support for zHyperLink™ Writes accelerates Db2 log writes to help meet clients most stringent requirements and deliver superior service levels by processing high volume Db2 transactions.

*** Available on LinuxONE only**

Integrate analytics and AI into transactions for accelerated insights

A new solution, MLz for Db2z Solution, based on Db2® AI for z/OS® finds the best SQL access path through the optimizer to deliver better performance and lower CPU consumption.

By incorporating advanced cognitive capabilities with Machine Learning, IBM Z® delivers true Hybrid Transactional and Operational Processing (HTAP) and Db2 for z/OS with orchestrated knowledge built in.

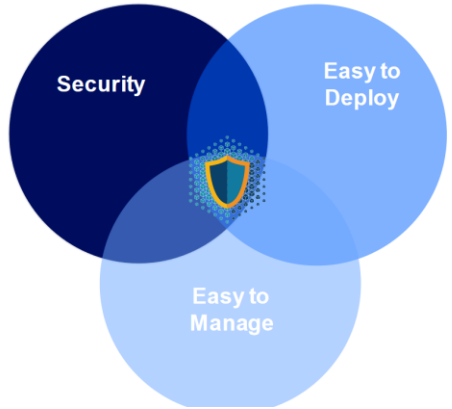
NEW

System	DS8882F
Processor complex (CEC)	2 x IBM Power Systems S822
Frames (min / max)	None
POWER 8 cores per CEC (min / max)	6
System cache (min / max)	64 GB / 256 GB
Ports (min / max)	8 / 16
Flash cards (min /max)	16 / 48
Capacity (min / max)[1]	6.4TB / 368.64 TB
Max IOPs	550,000

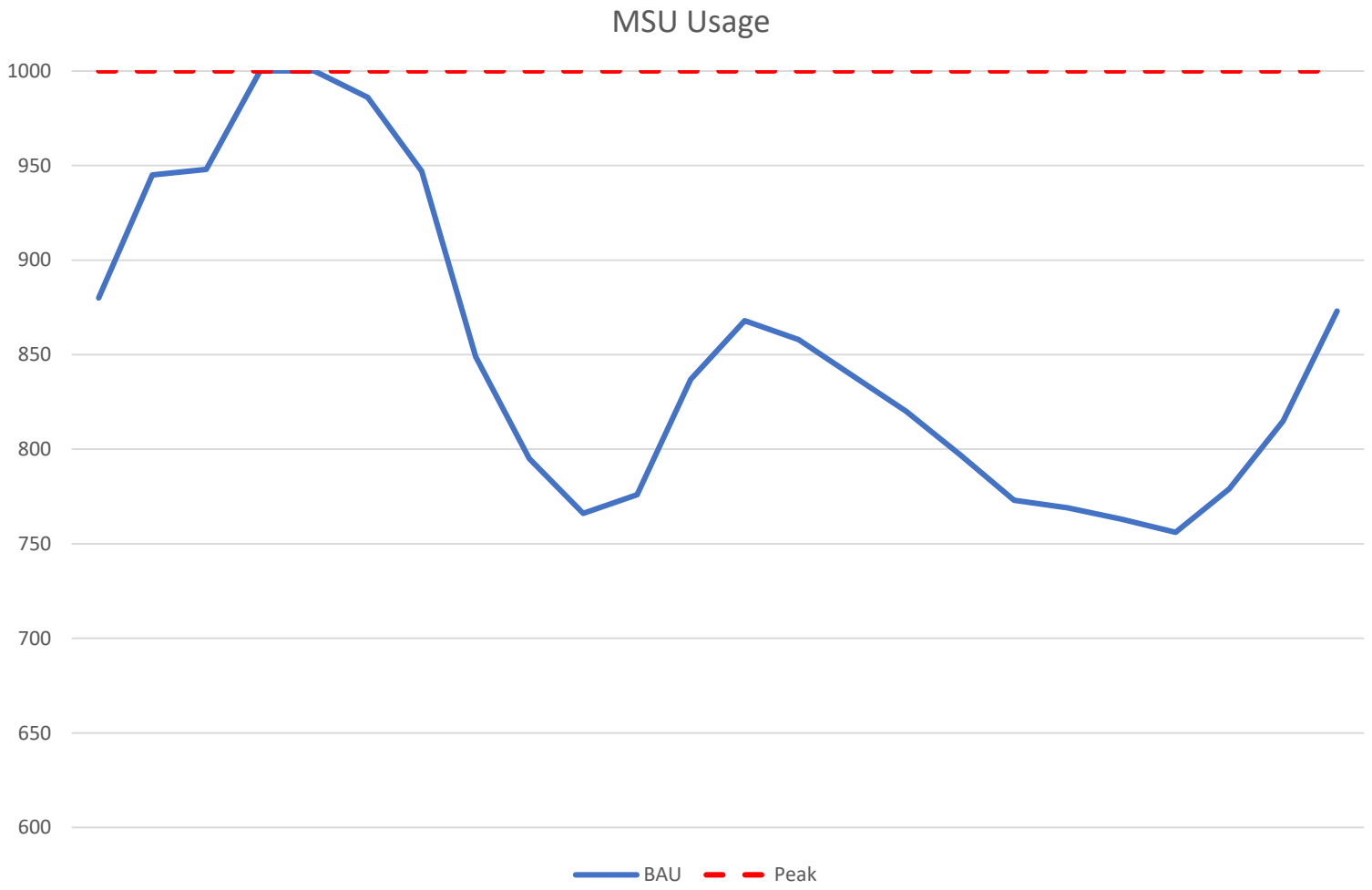
What is the **IBM Secure Service Container**?

Secure Service Container

IBM Secure Service Container provides the base infrastructure for an **integration** of operating system, middleware and software components into an appliance, which works **autonomously** and provides **core services and infrastructure** focusing on **consumability** and **security**.



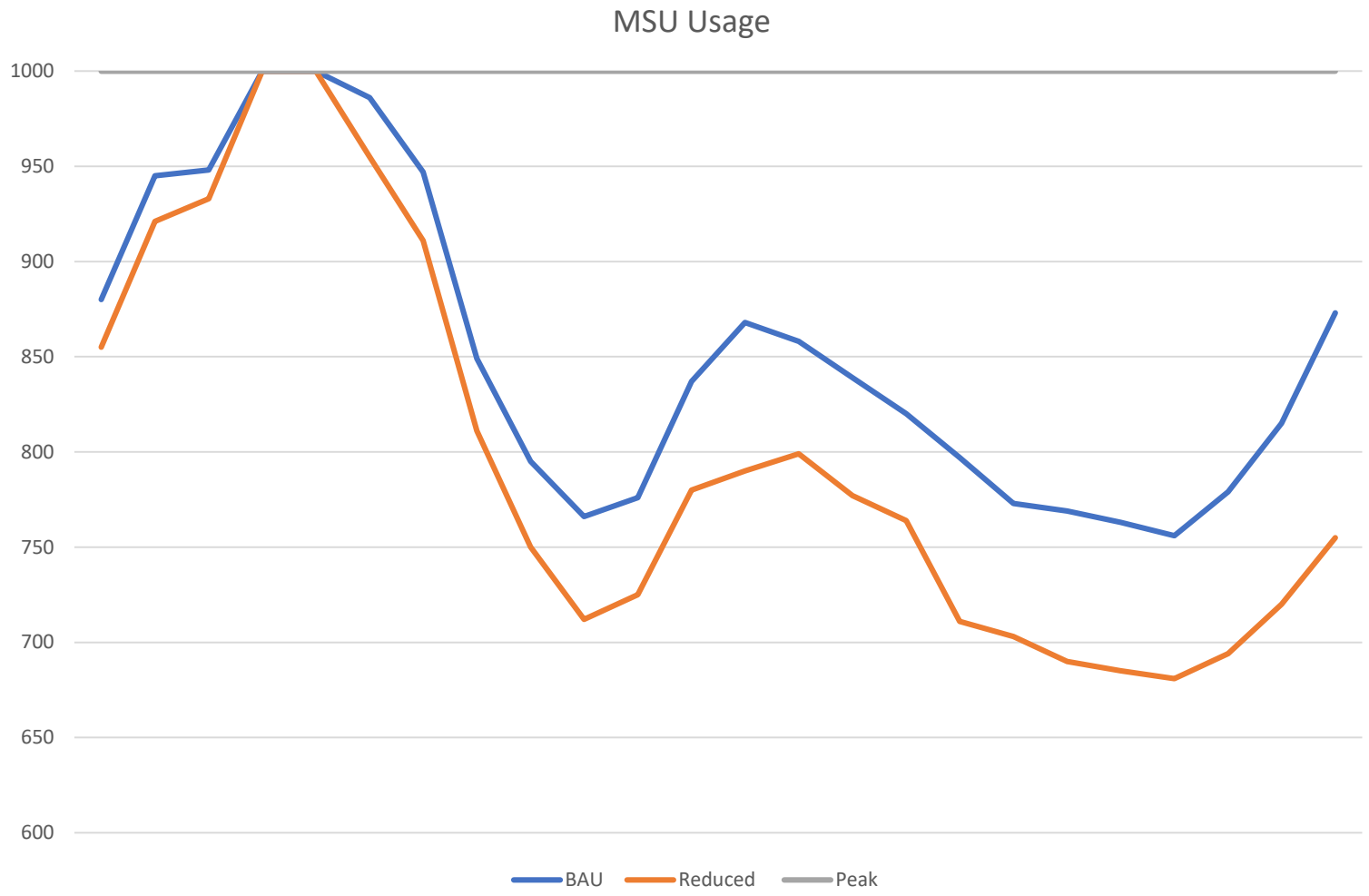
Economics



This graph shows a typical day for a customer where the peak usage is during the overnight batch.

The dotted red line shows the peak which is where MLC is charged.

Economics

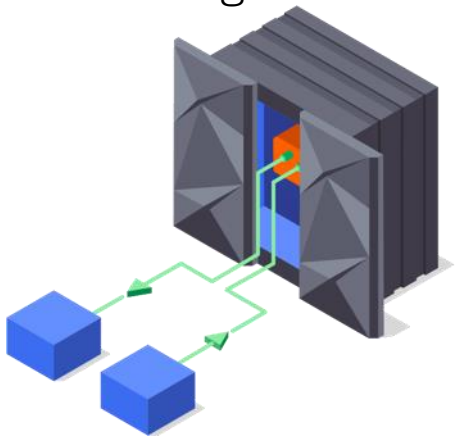


Whilst this workload has been removed from the mainframe, the actual saving to the client is nothing, assuming no MLC software has been totally removed from that client.

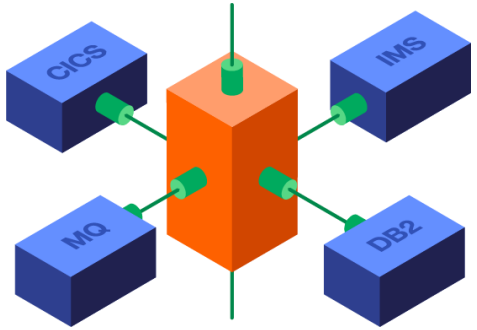
Unlock mainframe applications & data services

Truly RESTful APIs to and from your mainframe

for building microservices and succeeding in the API economy



APIs to and from the mainframe



Comprehensive subsystem support

Point-and-click API creation

Call external APIs from your mainframe applications, or expose those applications as easily consumable RESTful APIs with OpenAPI descriptions - with simple integration into enterprise API management solutions.

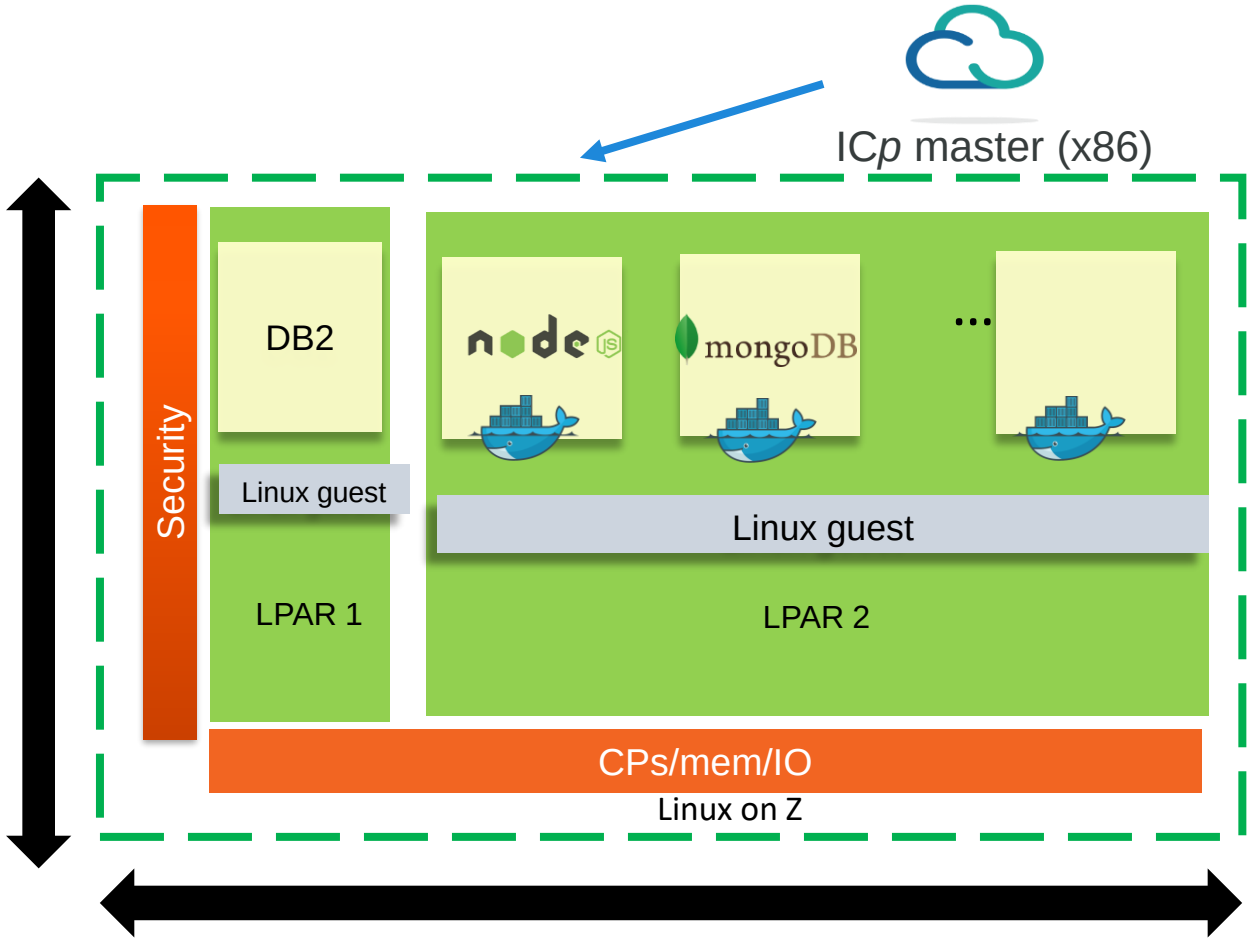
Learn more: ibm.biz/zosconnectdc

Try for yourself: ibm.biz/ibmztrial

Value

IBM Cloud Private on z

Compose high-performance scalable applications. Dynamically and seamlessly re-allocate resources between guests. Provide right-time analytics and powerful engagement



Extreme Virtualization and Scale

Hypervisor partitioning built into firmware
Complete isolation – **EAL5+**
Supports as many as 85 hypervisor instances – z/VM or KVM
1k Linux guests/hypervisor
+**2 million docker** containers
17TB Mongo instance
Hypervisor communication is via fast, in-memory TCP/IP
Hipersockets or Shared-OSA – **5x less latency than discrete servers**

- Massive dedicated I/O – **640 power co-processors**
- **960Meg L4 cache, 5Ghz core, dual-TLBs, crypto acceleration**

Super Elastic System

Combine horizontal and vertical scaling
Non-disruptively add/remove resources from Linux guests
Non-disruptively add/remove Linux guests

Value

Pervasive Encryption with IBM z Systems

Enabled through full-stack platform integration

Integrated Crypto Hardware		Hardware accelerated encryption on every core – CPACF performance improvements of up to 7x Next Gen Crypto Express6S – up to 2x faster than prior generation
Data at Rest		Broadly protect Linux® file systems and z/OS data sets using policy controlled encryption that is transparent to applications and databases
Clustering		Protect z/OS Coupling Facility data end-to-end, using encryption that's transparent to applications
Network		Protect network traffic using standards based encryption from end to end, including encryption readiness technology[2] to ensure that z/OS systems meet approved encryption criteria
Secure Service Container		Secure deployment of software appliances including tamper protection during installation and runtime, restricted administrator access, and encryption of data and code in-flight and at-rest
Key Management		The IBM Enterprise Key Management Foundation (EKMF) provides real-time, centralized secure management of keys and certificates with a variety of cryptographic devices and key stores.

And we're just getting started …

Security- Key management

- A flexible and highly secure key management system
- basic key management functions to consider
    - key generation
    - key import
    - key extraction
    - key print
    - key administration
    - high volume certificates and encryption key distribution
- All keys and certificates are stored in a central tamper proof repository

Value

Security- HSM Consolidation

Example
One European bank wanted to replace their HSM estate which contained 100+ production 476* crypto cards servicing their Internet banking application.
They chose to do this on z13 technology.

The numbers they have given us for the calls being made are as follows

On a regular day, the bank see 165 million crypto calls to HSM
The peaks are seen at around 500,000 calls per minute
Sustained workloads have seen 300,000 calls per minute (5,000 per second) for a period of 30 minutes.
This runs only 25% of their crypto capacity which is 4 crypto express cards

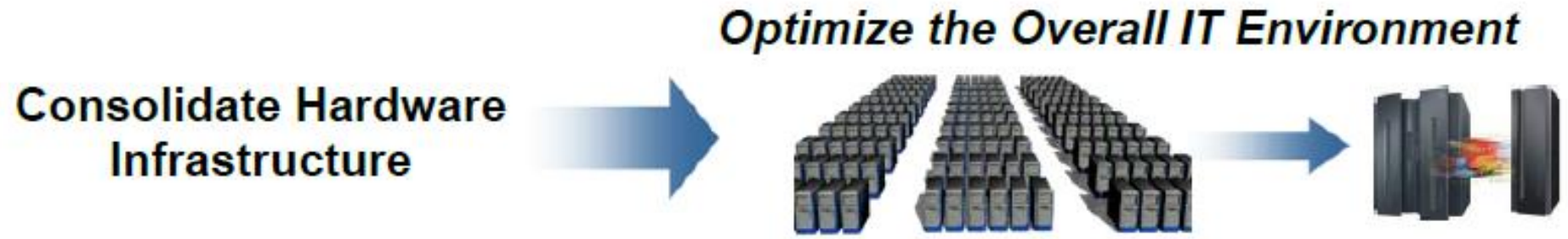
Centralisation has given them Agility, Speed and Savings

Oracle/ Linux consolidation

Reduced
- Physical Space
- Power & Cooling
- Maintenance
- Lowers Software Licensing
- Administration and Management
- Cabling
- Networking Infrastructure
- Servers & Storage

- Typical UNIX, Linux Server, Oracle, MQ, Infosphere Datastage consolidation ratios of up to 40 x86 Cores to 1 IFL for non virtualised … Up to 8 to 1 for virtualised

- Lower software (middleware) license costs from running workloads more efficiently



Example

One UK Finance Company consolidated:

- **288 cores** of **x86** servers running **144 Oracle** licenses
- **Cost** over **3 years** @ **£25K** / **license** / **core = £3.6M**

- Consolidated to **1 ELS server** running **12 cores**
- **Cost** over **3 years** @ **£25K** / **license** / **core = £300K**

- **£3.3M saving** in Oracle license costs over 3-years

Additional savings were also made in …

Floor space, power, cooling, operating software licenses, maintenance and support

z14 Announcement – Container Pricing for IBM Z

- IBM is introducing **Container Pricing for IBM Z**, providing:
  - Greatly simplified software pricing for qualified solutions
  - Flexible deployment options that support best technical fit, not driven by pricing
  - Competitive economics that are directly relevant to each solution
  - Possibility of different pricing metrics in the same logical partition

1. **The New Application Solution** will provide a highly competitive stand-alone priced offering for new z/OS applications, such as CICS TS or WebSphere applications. The New Application Solution is the strategic replacement for the current zCAP and IWP priced offerings.

2. **The Application Development and Test Solution** will provide highly competitive stand-alone pricing for z/OS based development and test workloads. Modern DevOps tooling can be optionally added at uniquely discounted prices.

3. **The Payments Solution** will provide a 'per payment' pricing option for IBM Financial Transaction Manager for z/OS deployments. This new offering directly ties operational cost to business value by basing the price on the number of payments processed, rather than capacity used to process them.

We want your feedback!

- Please submit your feedback online at ….
  - http://conferences.gse.org.uk/2018/feedback/AF

- Paper feedback forms are also available from the Chair person

- This session is AF