zCloud - Dare to be Different

Introducing the worlds leading Cloud platform:

} *Accelerate business growth*

} *Scale dynamically to business needs*

} *Improve "shop front" availability*

} *Explode your margins*

IBM

In Summary

} x86 is **<u>NOT</u>** the only way to deliver Public and Private Clouds

} zCloud can deliver the same services in a more effective way

		zCloud		Typical x86		Typical Public Cloud* "Market price"	
* Published WWW pricing 2012-05-28		Cost	Margin	Cost	Margin		
z114	100 VMs	£148.21	Loss Making	£ 112.51	Loss Making	£ 97.02	£ 89.90
z114	200 VMs	£81.18	16%	£ 83.62	Break Even		
z114	400 VMs	£62.35	36%	£ 73.99	21%		
z196	400 VMs	£66.76	31%	£ 73.99	21%		
z196	1600 VMs	£40.33	58%	£ 65.39	32%		
z196	3200 VMs	£35.54	63%	£ 65.39	32%		

Note: All figures per VM per Month

} So "Daring to be different" means more:

– Margin per M^2/Ft^2

– Workload per M^2/Ft^2

– Less Watts per M^2/Ft^2

A Journey, an evolution … an opportunity

zCloud

The IBM 1401 an all transistorised data processing machine

The IBM 370 with the worlds first monolithic memory

Worlds first hypervisor introduced for the IBM 360

The introduction of a one million bit static random access memory chip

z/VM an advanced Hypervisor capable of hosting thousands of Linux VMs

IBM announces zEnterprise z196, z114

The IBM 305 RAMAC the worlds first computer with a disk drive and a capacity of 4.4MB

CP/CMS is introduced the worlds first time-sharing operating system

The worlds first 1Mb memory chips

IBM introduces a 300Mhz chip for the IBM S/390

IBM introduces the worlds first 5.2GHz CMOS

The IBM 7094 introduced solid state technologies and increased operating speeds

The IBM 370 expands with Multi-processor models

IBM pioneers the development of Magnetoresistive (MR) heads **making Big Data a reality**

The IBM 701 is introduced which signals IBM's entry into electronic computing

First virtualised storage

The worlds first 1Mb memory chips for the IBM 3090

The IBM 390 delivers the worlds first Billion Instructions per Second (BIPS) machine

X86

Intel established by Gordon Moore

The 80486 Intel chip first delivered at 50MHz and 40MIPS

The Pentium III Katmai, Coppermine, & Tualatin Intel chips with up to 1400MHz

The Schottky 64-bit SRAM introduced

Vmware established

Vmware Virtual Centre launched

The Intel 4004 chip introduced

The P5 Intel chip first delivered at 60MHz and 100MIPS

Vmware GSX server delivered to the market

The Pentium M with speeds up to 2.5GHz

The Intel 8086 chip introduced

The iconic 32-bit 80386 Intel chip first delivered at 12MHz

The P6 Pentium Pro Intel chip first delivered at 200MHz

The Pentium Nehalem architecture arrives with speeds up to 3.9GHz

1950   1960   1970   1980   1990   2000   2010

Is zCloud even in use today?

… and many many more

Why do these customers choose zCloud?

- *Scalability* – zCloud customers need to scale quickly and efficiently both up and down with complete confidence and zero loss of availability

- *Availability* – a guaranteed capability there when you need it to bolster a reputation for the highest service quality

- *Multi-Tenancy* – delivering core server incubation services for local businesses

- *Performance* – consolidation of a distributed x86 Linux domain onto a single IBM zCloud with Linux

- *Security* – unmatchable world class system security with ensured isolation and protection of each virtual server environment

VietinBank.
- 800 Bank branches
- 1200 ATM's
- 35% YoY growth

fildex
- A SaaS Cloud
- 69,000 users
- 100% YoY growth

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO
- An IaaS Cloud
- 60+ tenants

BALDOR MOTORS · DRIVES · GENERATORS
- 60% compute performance improvement
- 25% employee efficiency

Handelsbanken
- Improved business continuity posture
- Enhanced security

Great but Cloud is for x86! Isn't it?

There is a profusion of confusion in Cloud choice

... if you call this choice

A typical scenario for a Cloud Service Provider

Workloads	Workload Descriptions	Number of Workloads	x86 Tech
Web	- An apache web service - Peak hits of 4000/hour - Integrated PHP/Perl/other cgi scripting	200	Technology specifications for Virtual Machines (VMs) by workload: - Up to 1 Dedicated Core - Up to 8GB of memory per VM
Application	- Bespoke in-house created Java or C, C++ applications - Common-off-the-shelf (COTS) software applications	100	
Database	- Oracle, MySQL or other SQL database - Up to 10 concurrent users - Maximum size of 6GB - Up to 50 I/O per second	100	

IBM

The typical scenario translates to the following per VM Market Prices when utilizing x86 technologies

	DIY In-house	Typical Public Clouds[TM]	
Web (200 VMs)	Typical Blade Approach: ■ 28 Blades ■ 2 Blade Enclosures		
Application (100 VMs)	£73.99 per VM Per Month	£97.02 per VM per month	£89.90 per VM per month
Database (100 VMs)			

Expanding the typical scenario for increased and decreased numbers of VMs with x86 technology

	x86	Typical Public Clouds™	
100 VMs	£ 112.50	£ 97.02 per	£ 89.90
250 VMs	£ 89.39		
400 VMs	£ 73.99		
1600 VMs	£ 65.23		
3200 VMs	£ 65.23		

Note: All prices per VM per month and assuming 24x365 availability & usage

For a Cloud Service Provider the potential Gross Profit per VM per Month is …

	x86
100 VMs	Loss Making
250 VMs	Break even
400 VMs	21 %
1600 VMs	32 %
3200 VMs	32 %
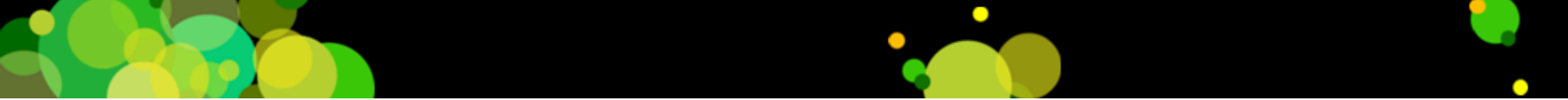
For a Cloud Service Provider the power (watts) per VM is …

	x86 (watts per VM)	x86 Power Draw (kVA)
100 VMs	39.4	2.25
250 VMs	30.8	4.5
400 VMs	30.8	7.91
1600 VMs	30.8	28.13
3200 VMs	30.8	56.25

For a Cloud Service Provider the space per VM per month is …

	x86 (u per VM)
100 VMs	0.42u
250 VMs	0.17u
400 VMs	0.09u
1600 VMs	0.05u
3200 VMs	0.05u

1	Introduction & Histories

2	Typical Cloud Approaches

3	There is a significant Alternative

4	The Advantages of being zCloud

5	Summary

There is an alternative if you "dare to be different"

The typical scenario translates to the following per VM Market Prices for x86 and "Linux on z" or zCloud

	DIY In-house	zCloud
Web (200 VMs)	Typical Blade Approach: ▪ 28 Blades ▪ 2 Blade Enclosures	
Application (100 VMs)	£73.99 per VM per month	**£62.35 per VM per month**
Database (100 VMs)		

Note: All prices per VM per month and assuming 24x365 availability & usage

Expanding the typical scenario for increased and decreased numbers of VMs on x86 and zCloud reveals

		zCloud		x86	Typical Public Clouds™	
™ Published WWW pricing 2012-05-28						
z114	100 VMs	£148.21		£ 112.50		
	250 VMs	£81.18		£ 89.39	£ 97.09	£ 89.90
	400 VMs	£62.35		£ 73.99		
z196	400 VMs	£66.76		£ 68.36		
	1600 VMs	£40.33		£ 65.23		
	3200 VMs	£35.54		£ 65.23		

Note: All prices per VM per month and assuming 24x365 availability & usage

For a Cloud Service Provider the potential Gross Profit per VM per month for zCloud is …

		zCloud	x86
z114	**100 VMs**	Loss Making	Loss Making
	250 VMs	**16%**	Break Even
	400 VMs	**36%**	21%
z196	**400 VMs**	31%	21%
	1600 VMs	**58%**	32%
	3200 VMs	**63%**	32%

For a Cloud Service Provider the power (watts) per VM is …

		zCloud	x86	zCloud Power Draw (kVA)	x86 Power Draw (kVA)
z114	**100 VMs**	**46**	39.4	**2.63**	2.25
	250 VMs	**22.4**	30.8	**3.2**	4.5
	400 VMs	**12.6**	30.8	**3.25**	7.91
z196	**400 VMs**	**27.2**	30.8	7	7.91
	1600 VMs	**11.5**	30.8	**10.5**	28.13
	3200 VMs	**9.6**	30.8	**17.5**	56.25

x86 vs. zCloud – Power Comparison

Comparing x86 & zCloud Power (Watts) per #VM
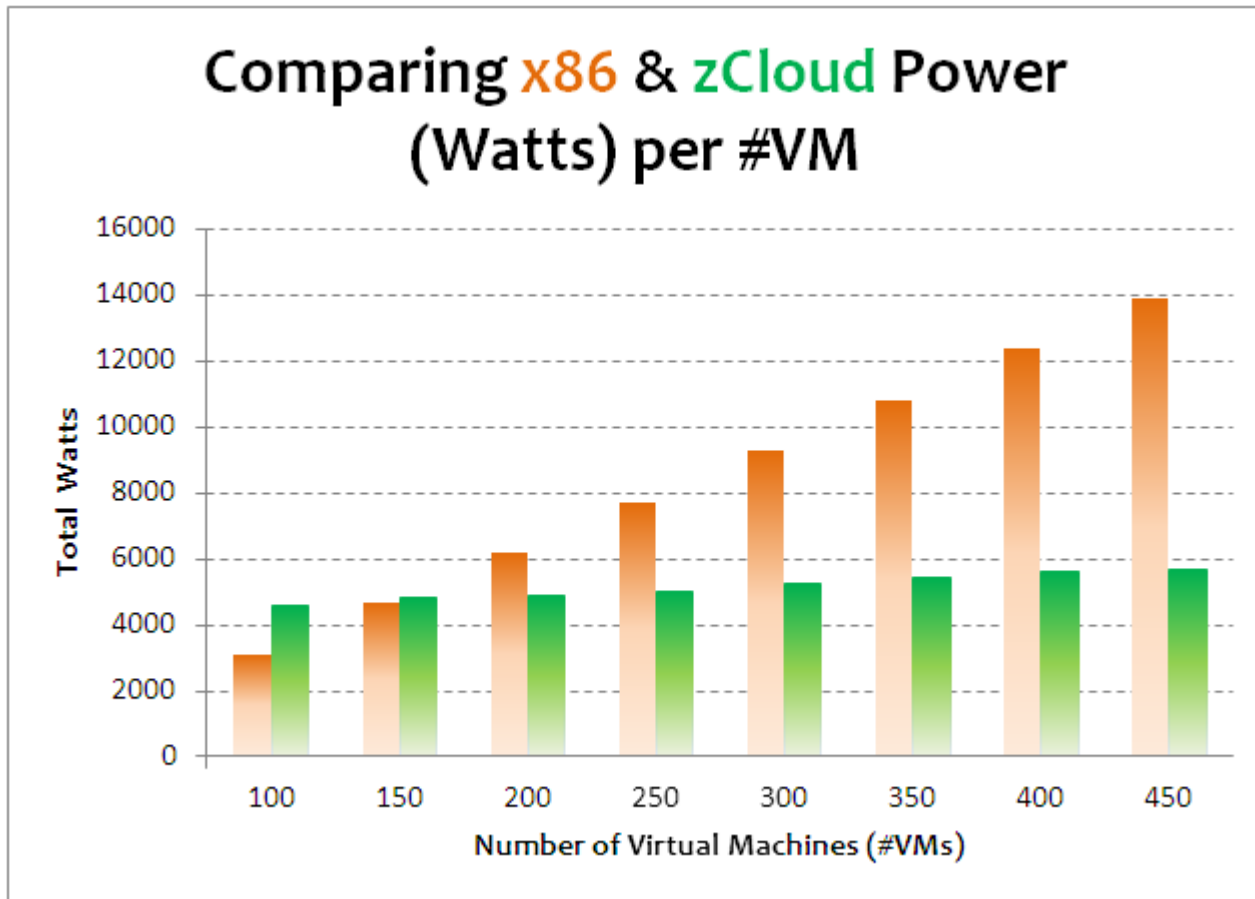
For a Cloud Service Provider the space per VM is …

		zCloud	x86
z114	100 VMs	0.42u	0.42u
	250 VMs	0.17u	0.17u
	400 VMs	0.09u	0.09u
z196	400 VMs	0.19u	0.09u
	1600 VMs	0.05u	0.05u
	3200 VMs	0.03u	0.05u

x86 vs. zCloud – Space Comparison
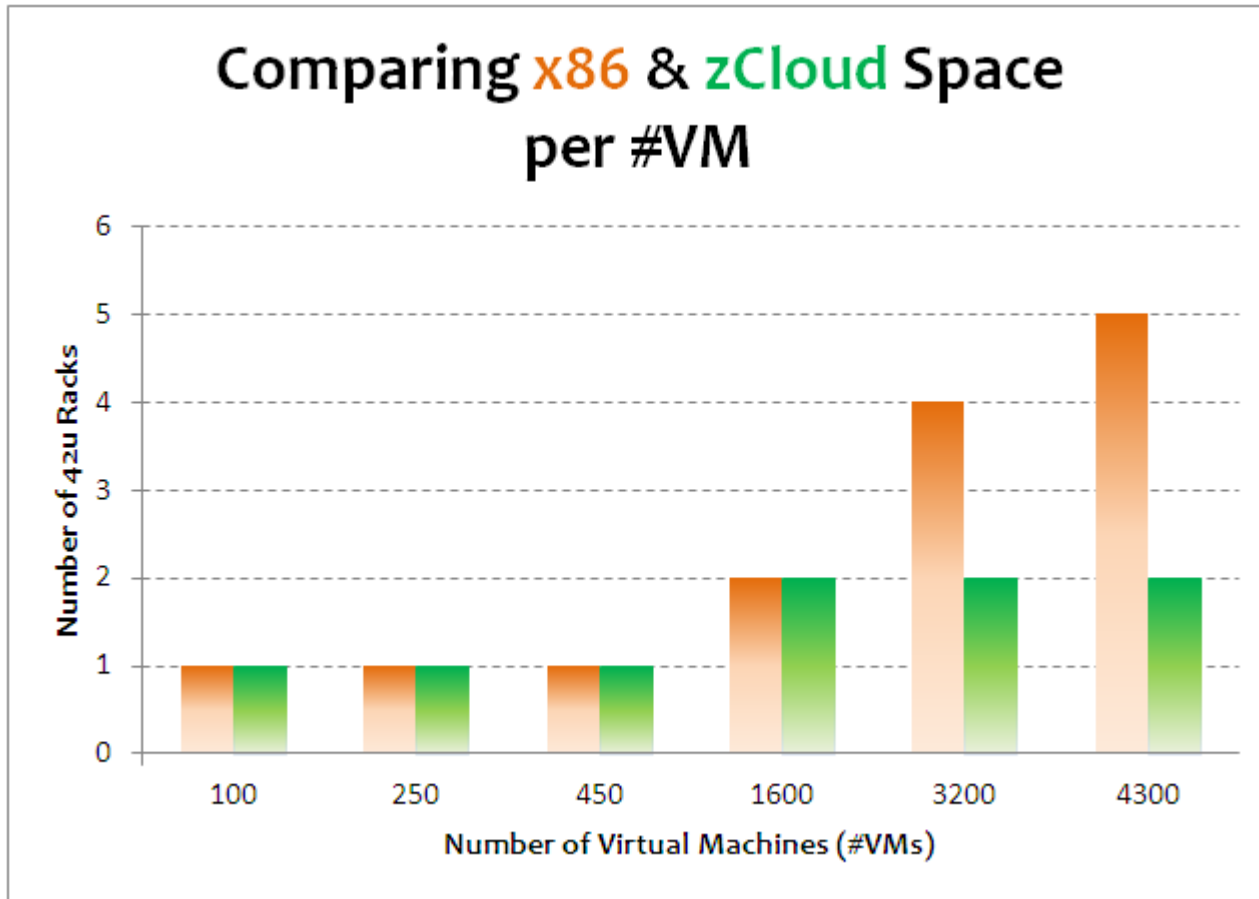
Comparing x86 & zCloud Space per #VM

1	Introduction & Histories
2	Typical Cloud Approaches
3	There is a significant Alternative
4	The Advantages of being zCloud
5	Summary

Deliver more VMs for less cost!

HALF
THE PRICE

Facilities/Space
Software
IT Admin & Management
Power
Hardware

Traditional x86 Cloud | zCloud

Time
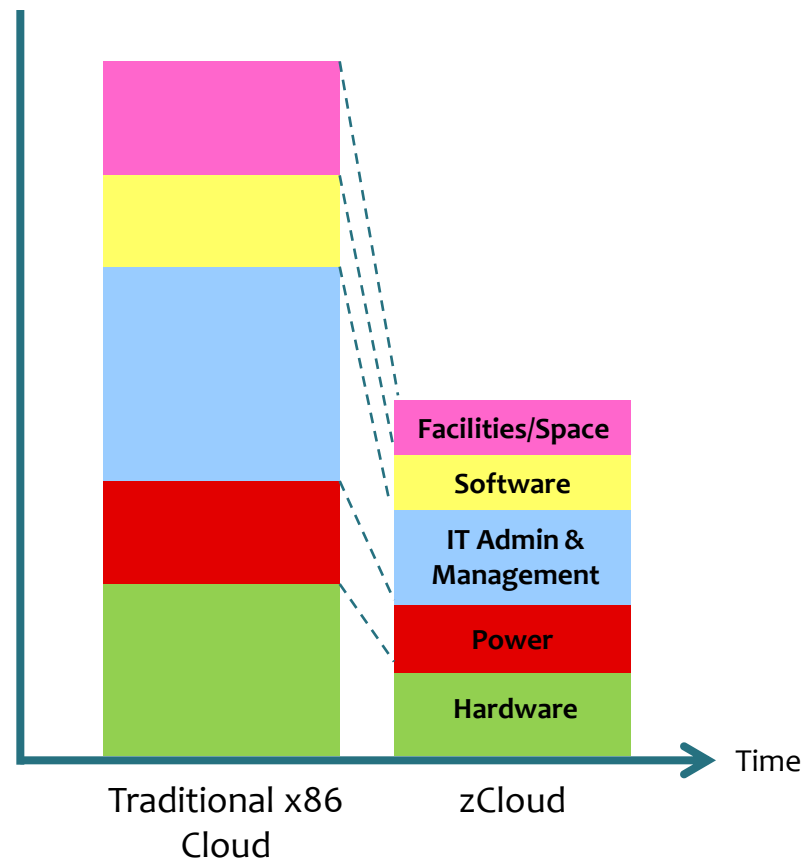
Note: Assumes 4,350 VMs

Deliver more VMs with less power!

} At 400VMs on a z114 the power draw is 12.6 Watts vs. 30.8Watts for x86

} At 3200VMs on a z196 the power draw is 9.6Watts vs. 30.8Watts for x86

HALF
THE POWER

Note: Assumes 3,200 VMs

Deliver more securely!

} Highest security classification of any commercially available server

} Awarded Common Criteria Evaluation Assurance Level 5 (EAL5) by the International Standards Organization

} Virtual network and workload isolation

} Improved network security with lower latency, less hops and less complexity

} Improved control of access due to management of hypervisors as firmware

} Support for Elliptic Curve Cryptography (ECC)

MORE
SECURE

IBM

Manage more easily!

} Heterogeneous management: Total systems management across heterogeneous resources

} Integration: Single point of control, common skills for resources, reduced complexity of day to day operations

} Monitoring. New dashboard for CPU resources and energy management

} Simplified installation: Auto discovery and configuration of resources and workloads with single interface

} Service and support management: Hardware problem detection, reporting and call home supported for virtual

MORE
CONTROL
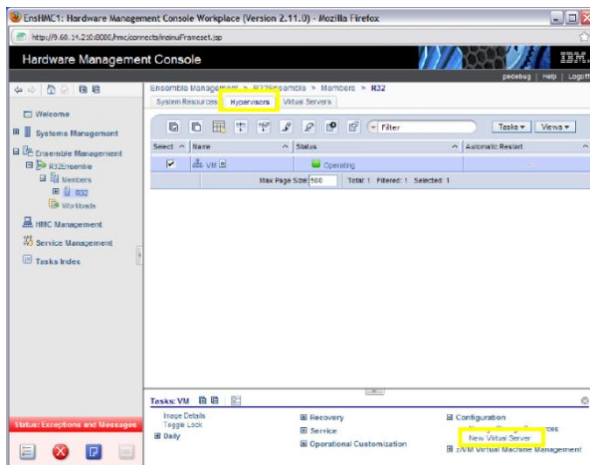
Deliver more availably!

MORE PERFORMANCE

} Proven scaling of a single zCloud for Call Centers with 35,000 users and sub-second response times

} Consumer Product Management (CPM) with 9,000 users and a response time of 1.1 seconds

} A hybrid CPM scenario delivered 12,000 users with 1.22 seconds response time

} In addition to incredible performance you can take advantage of zClouds active/active continuous availability

} RTO's measured in minutes not hours

Why not join the ranks of UK&I customers who already "Dare to be Different" with their "Private Clouds"?

IBM

1	Introduction & Histories
2	Typical Cloud Approaches
3	There is a significant Alternative
4	The Advantages of being zCloud
5	Summary

So Cloud isn't just x86 - there are BETTER alternatives

IBM Commercial in Confidence

IBM

"Dare to be Different"

IBM