

Overcoming the Challenges of Running Linux and the Cloud on System z

SHARE Boston
August, 2013

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Cloud Infrastructure

- Linux is the OS of choice for the cloud
 - Used by ½ top 10 most reliable internet hosting companies
 - 2 use Microsoft, 3 use FreeBSD
- Did you know that you can deploy Linux onto System z?
 - Don't assume that the people in your org know!
 - Utilizes IFL specialty processors, doesn't increase GP MIPS
 - It's the same old Linux that you deploy today; since 2000

LINUX ADOPTION GROWING TO SUPPORT CLOUD & MISSION- CRITICAL WORKLOADS

FIVE YEAR PLANS FOR INCREASED OS INVESTMENTS

Increasing Use of Linux



Increasing Use of Windows



LINUX IS CORE TO THE CLOUD

Maintaining or Increasing Linux to Support Cloud



Decreasing Linux to Support Cloud



Data source: 2013 Enterprise End User Report: Linux Adoption;
Third Annual Survey of World's Largest Enterprise Linux Users
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www.linuxfoundation.org



It should be this simple...



Pick one of the following for your corporate cloud platform:



The original virtualization platform which happens to be the most secure, highly available, robust, performant and economically viable cloud platform in the world



A sub-standard, insecure, resource-hogging, floor space eating, generally underpowered and highly inflexible cloud platform that can barely do nine 5s never mind five 9s

It's not about the technology, it's about the culture...

Why System z for the Cloud?



DISTRIBUTED PERSPECTIVE

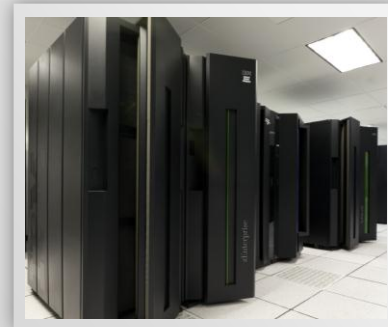
- Want to keep/move critical cloud workloads in-house
- Require high RASSS environment
 - Reliability, Accessibility, Security, Stability and Scalability
- Looking to lower costs



VS

MAINFRAME PERSPECTIVE

- Interoperability with z/OS subsystems
- Major growth area for System z
- Leverage specialty processors
- Network and system security



Why System z for



DISTRIBUTED PERS

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03/10/2013

→ Linux on System z—A Cost Saver?

One of the claims that we in the Linux on System z world make is that it can be more cost effective to run your systems on the mainframe than using a distributed x86-based architecture. I was trawling my research and decided to post some of the key data points and quotations that support this hypothesis. There's a huge amount of research behind this but if I were talking to a customer and wanted to hit the highlights this would be a good starting point:



- Over a three year period, total costs for hardware, software and support can be up to 80% less with similar dramatic savings on floor space and energy.
- Using a fully configured machine running Linux for System z, clients can create and maintain a Linux virtual server in the z114 for as little as \$500 per year.^[1]
- Extra resources to manage an additional 10 IFLs? Probably none at all but add 100 x86 cores you'll need an additional two people.
- Clients can consolidate workloads from forty x-86 processors running Oracle software on to a z114 with just three processors running Linux.
 - Run production, development and QA environment on single machine
 - Much better resource utilization (often 90%+) without degradation on service vs. x86 typically at 10-20% utilization levels
- Just take Oracle licensing costs as an example. A System z10 BC with one IFL compared to cluster of two x86 dual-processor Intel quad-core servers:
 - Saving 87.5% on licensing Oracle Database Enterprise Edition Full License
 - Saving 87.5% per annum on the cost of Oracle Database Enterprise Edition
- According to Gartner, one major Insurance Company
 - Saved ~80% of floor space and a similar percentage of electric power
 - Avoided investing additional \$10 million for backup
 - Reduced TCO by \$15 million in 3 years

^[1] <http://www-03.ibm.com/press/us/en/pressrelease/35013.wss>

Posted on 03/10/2013 at 06:38 PM | [Permalink](#)
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Mainframe on the Cloud – Why/when would you do it?



In no particular order from our customers:

- Direct access to z/OS subsystems
- Better security, especially with z/OS
- High availability for business critical systems
- Performance considerations
- Economic drivers
 - Oracle licensing alone
 - Data center/server consolidation
 - Efficient use of MF capacity
 - Better utilization rates of systems 90%+ vs. 20-30%



Mainframe on the Cloud – Why should you care?



- Increases usage of mainframe
 - Reduces unit cost across zEnterprise
 - Increases stickiness in the organization
- They're accessing your data
 - Data protection, monitoring and orchestration
 - Hipersockets vs. external network devices
- ~~The personal satisfaction of knowing that you're doing the right thing for the company~~
 - Power!





Three common success cases:

1. Need for RAS-SSS

- Reliability, Availability, Security, Serviceability, Stability, Scalability

2. Proximity to z/OS workloads

- Ownership or just common sense

3. Company understands “fit for purpose”

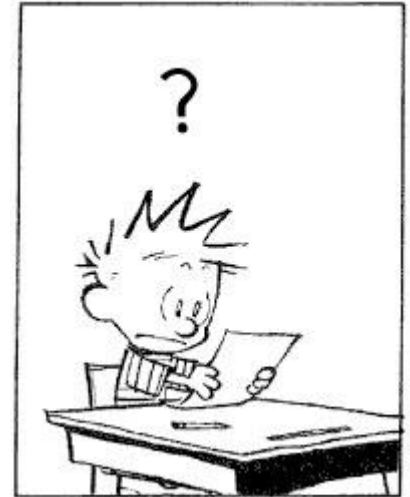
According to IBM...

- 180+ new clients since 2010
- ½ Linux, the rest z/OS
- ¾ of top 100 clients use Linux
- 20% of MIPS shipping are Linux
- In Q4 '12 50% of MIPS were specialty engines.



— Confusion

- Linux runs where?
- Unclear messaging
 - What should I move?
 - When is it cost effective?
- Verses what?
 - Other mainframe OS? z/OS, VSE
 - Platforms? Mid-range platforms



— Mystical stack

- Lack of understanding of the Mainframe as a platform
- Lack of available skills

Barriers to Adoption



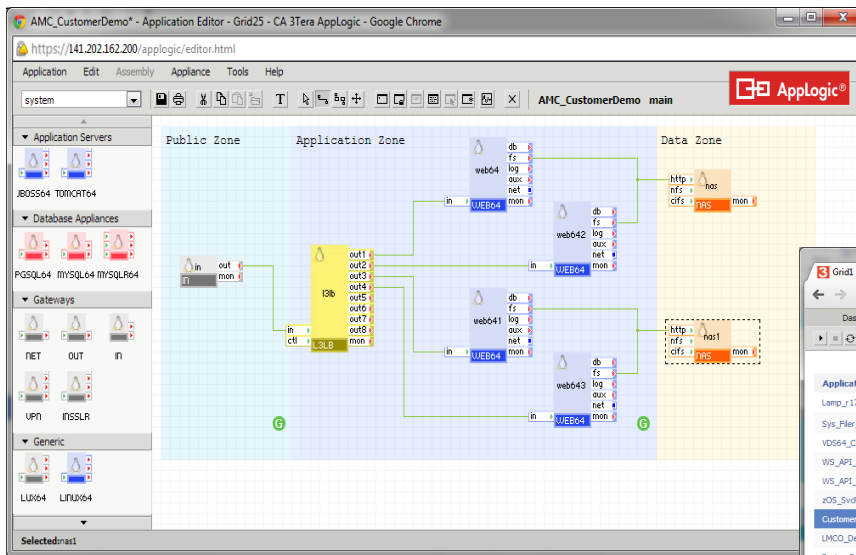
- Apathy
 - I don't need yet another "option"
 - Mid-range servers have served us well in the past...why change?
- Politics
 - Lack of access to the right people...Linux, Platform, Mainframe, ???
 - *"I just approved another \$10M of capital for x86 servers, I can't go back and say that I only needed \$2M!"*



Barriers to Adoption



- Lack of professional tools
 - Little competition in the market means little noise, little choice...
 - Ironically, we'd like to see more.
 - Need to mature the offerings to play in the major leagues...



The screenshot shows the 'Instance Settings' window for a 'web64' instance. It displays a table of resource allocation settings.

Attributes	Resources	User Volumes	Property Values	Notes
CPU (num)	Min: 0.10, Max: 16, Default: 0.30			
Memory (bytes)	Min: 160M, Max: 32G, Default: 512M			
Bandwidth (bits/sec)	Min: 1M, Max: 2G, Default: 250M			

The screenshot shows the 'Applications' dashboard in the AppLogic interface. It displays a table of applications with their status and resource usage.

Application Name	State	Description	CPU	Mem	BW
Lamp_17 (template)	Stopped	LAMP Application (v2.0.0-2 s390)	1.05	1.53G	900.00M
Sys_Filer_Linux (template)	Stopped	Linux Filer Application (v4.1.0-1)	0.05	256.00M	1.00M
VD564_CentOS62_1 (template)	Stopped	Virtual Dedicated Server - Based on 64-bit CentOS 6.2 (v2.0.0-1 s390)	0.25	512.00M	1.00M
WS_API_1 (template)	Stopped	REST - based AppLogic Web Service API (v1.0.19-1)	1.00	1.41G	1.40G
WS_API_SAMPLE_1 (template)	Stopped	AppLogic API Sample Application	1.05	1.66G	1.15G
iOS_SvcPL_Admin_1 (template)	Stopped	AppLogic i/OS Service End Point Administration UI	1.05	2.00G	1.20G
CustomerDemo1	Stopped		1.85	3.97G	1.65G
LMCO_Demo	Stopped		7.55	18.31G	6.35G
PartnerDemo0123	Stopped		3.05	3.47G	3.90G
vd01	Stopped		0.00	0.00	0.00

Considering the entire Application Lifecycle...



Provisioning just Linux or entire application? Consider...

Provisioning

- Speed to value
- Accuracy
- Auditing and reporting
- Resource allocation and constraints



Ongoing Management

- Manage to service level objectives
- Linux patching and upgrades
- Component patching and upgrades etc.
- Charge/show back



Controlled De-provisioning

- End of application lifecycle
- Varying capacity demands
- Efficient use of system resources



What about some good news?



Reasons it will succeed



The cloud isn't a pet project or a fad anymore...

- Companies are moving business critical workloads to the cloud and we need the infrastructure to support this...
- The mainframe offers a lot in this space...

Forbes New Posts +4 posts this hour Most Popular What 20-Year-Olds Don't C Lists America's Top Colleges D

TECH 8/30/2012 @ 11:15AM 1,308,732 views

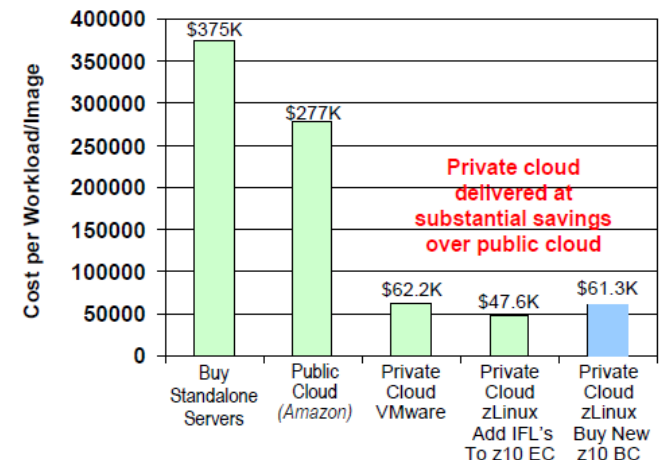
Amazon Cloud Goes Down Friday Night, Taking Netflix, Instagram And Pinterest With It

How A Switch Failure in Utah Took Out Four Big Hosting Providers

By: Jason Verge
August 5th, 2013



Cost Per Image for Linux Workloads (5 Yr TCO)



http://www-01.ibm.com/software/se/collaboration/pdf/CloudTCOWhitepaper_04212009.pdf
Advantages of a Dynamic Infrastructure: A Closer Look at Private Cloud TCO



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How A
Hosting Providers

By: Jason Verge
August 5th, 2013

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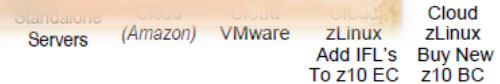
IBM System z keeps running and the cloud doesn't fail...ever.



Bloomberg – Aaron Ricadela – 8/7/13

An IBM System z mainframe computer running Linux under the management of CA's market leading AppLogic for System z product kept running... not as interesting as other stories but a heck of a lot more useful.

"I'm kinda' bored, this thing just keeps on going. I might go back to the mid-range team, much more exciting there." said Linus O'Perator, Fluffy Outsourcing, Ireland.



http://www-01.ibm.com/software/se/collaboration/pdf/CloudTCOWhitepaper_04212009.pdf
Advantages of a Dynamic Infrastructure: A Closer Look at Private Cloud TCO





IBM is moving the mainframe towards mainstream computing:

- zEnterprise focus
- Latest release includes specific “Enterprise Linux Server”
- Continuing to push zBX

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07/24/2013

→ Should IBM drop the “Mainframe” Moniker?

IBM announced its latest Mainframe system yesterday which includes even more support for Linux and Cloud. This morning, I came across [this article](#) in which Quocirca's founder [Clive Longbottom](#) suggests that companies are put off from considering System z as a valid Cloud platform because they associate the mainframe with a monolithic, outdated technology.

"Call it anything – call it Jennifer if you want – just get away from 'mainframe'. IBM has got to change the way it is messaging these items," Longbottom concluded.

So, I kind of agree...but with concerns. I'd love companies to see System z as the amazing platform that it really is and see that for many types of workload it really cannot be beaten. However I see two problems with changing the name and pretending that it really is just another platform:



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Cost and efficiency pressures

- Scaling midrange servers is a linear cost
 - Servers, staff, floor space, power, cooling, licenses, etc.
- Ratios
 - Software costs – ratio of cores:
 - x86/RISC : IFL = 50 : 1
 - Maintenance – ratio of physical systems:
 - x86/RISC : IFL = 50 : 1
 - Energy and real estate:
 - Rooms : Refrigerators = 1 : 1



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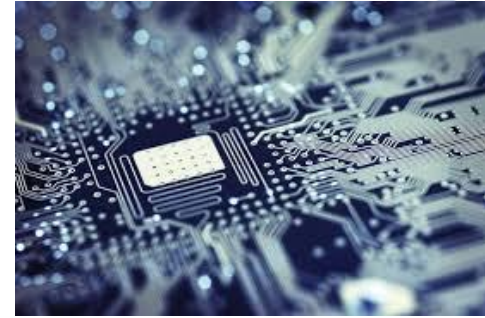
The City and County of Honolulu

- Honolulu deployed a custom cloud using an Integrated Facility for Linux ... on the city's IBM System z10 Enterprise Class server.
- The IBM solution reduced application deployment time from one week to only hours, lowered licensing costs for one database by 68 percent ...
- Honolulu deployed a custom cloud using an Integrated Facility for Linux (IFL) engine running Linux on the city's IBM System z10 Enterprise Class server.

Other reasons it will succeed



- Superb I/O on mainframe
- Better resource utilization (90%+) without degradation on service.
- Unmatched scalability
- People cost.
 - How additional many people to add 10 IFLs = none, for 100 x cores = +2
- Security: external attacks, workload isolation, memory protection...
- Software cost reduction (per core pricing)
- Built to manage mixed workloads: OLTP, Batch, BI, Web, etc.
- Dynamic add of resources, VLAN, VSWITCH, etc.
- Memory to memory data exchange with e.g. z/OS via Hipersockets
- Sharing of storage infrastructure (disaster recovery)



Again, it's not about the technology, it's about the culture...



We need to educate the larger IT community

- Make Linux on System z less of an exception
 - Hide implementation and platform details
 - Promote modern tooling
 - Don't call it zLinux...
- Encourage the community
- Do it: deploy Linux on System z and then talk about it
 - In person and with Social Media
 - Share success stories internally and externally
 - Remove the FUD from Linux on z
- *Visit CA at booth #221 and see a demo of AppLogic*



It's not about the technology, it's about the culture...

Summary

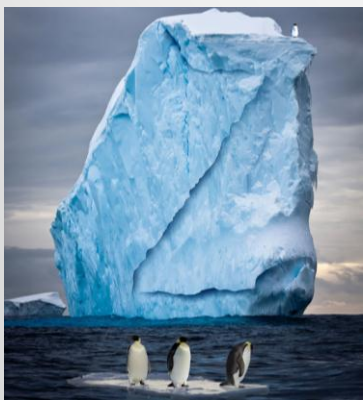


**Linux on System z
is the optimal
platform for
many scenarios**

**There's
nothing as
secure as the
mainframe for
the cloud**

The midrange team are not thinking about the mainframe as a platform, share with them:

- Direct access to z/OS subsystems
- Better security
- High availability for business critical systems
- Performance considerations
- Economic drivers



Q&A



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