Introducing Linux on IBM z Systems

IT simplicity with an enterprise grade Linux platform

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What is Linux?

- Linux is an operating system
  - Operating systems are tools which enable computers to function as multi-user, multitasking, and multiprocessing servers.
  - Linux is typically delivered in a Distribution with many useful tools and Open Source components.

- Linux is hardware agnostic by design
  - Linux runs on multiple hardware architectures which means Linux skills are platform independent.

- Linux is modular and built to coexist with other operating systems
  - Businesses are using Linux today. More and more businesses proceed with an evolutionary solution strategy based on Linux.

What is IBM z Systems ?

- IBM z Systems is the family name used by IBM for its mainframe computers
  - The z Systems families were named for their availability – z stands for zero downtime. The systems are built with spare components capable of hot failovers to ensure continuous operations.
- IBM z Systems paradigm
  - The IBM z Systems family maintains full backward compatibility. In effect, current systems are the direct, lineal descendants of System/360, built in 1964, and the System/370 from the 1970s. Many applications written for these systems can still run unmodified on the newest z Systems over five decades later.
- IBM z Systems variety of Operating Systems
  - There are different traditional Operating Systems that run on z Systems like z/OS, z/VSE or TPF. With z/VM IBM delivers a mature Hypervisor to virtualize the operating systems. The newest Operating System that was made available is Linux on z Systems and the Open source Hypervisor KVM.

https://www.youtube.com/user/IBMSystemZ

Linux on IBM z Systems

What is it?

- An alternative to x86 platforms for consolidating or virtualizing workloads
- Build for high utilization rates
- System used most for massive parallel transactional workloads, for high dynamic workloads like Mobile, Web applications, or Enterprise Integration and hosting a variety of business critical databases
- It is used in many different industries around the globe
- Linux on z Systems is optimized to take advantage of specific z Systems hardware capabilities

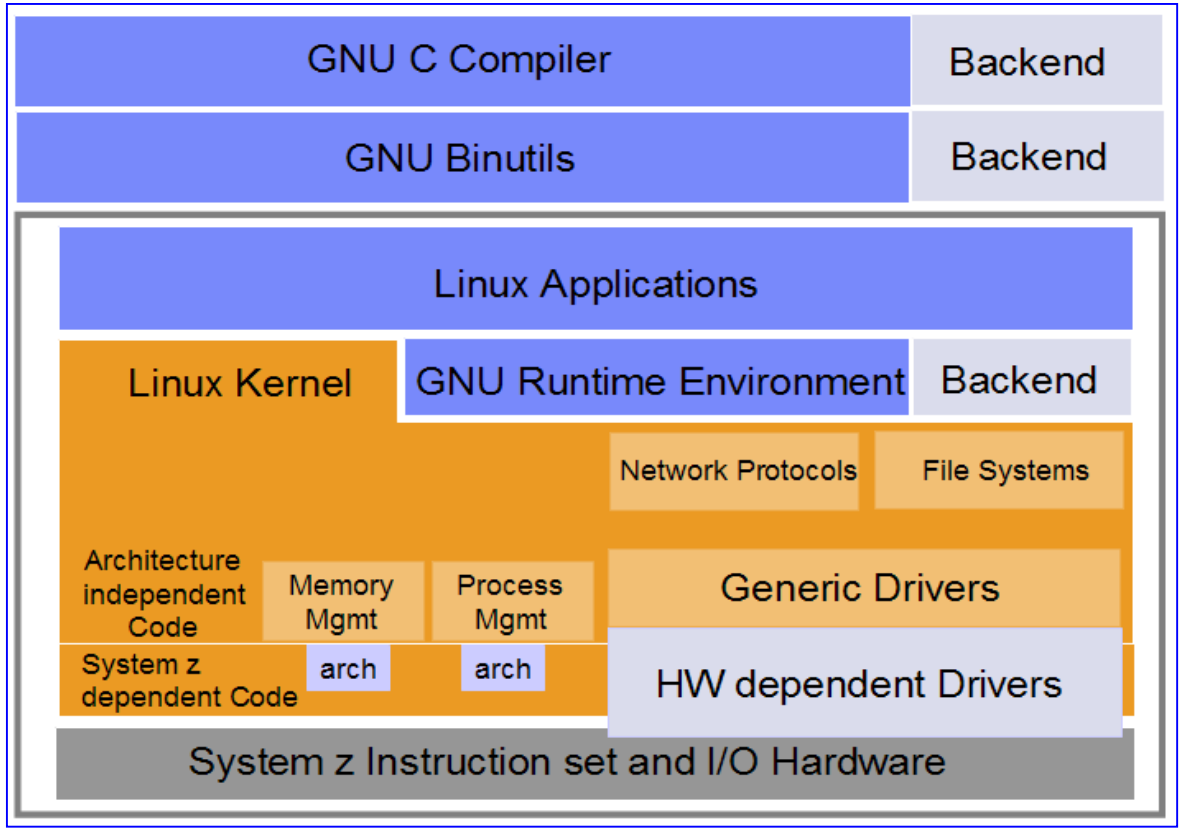
How does it work?

- On z Systems, the processor cores for Linux are called IFLs – Integrated Facility for Linux
- They can “decrease” SW licensing costs: As you add workloads, the cost per virtual machine server (VM) drops
- Server consolidation: virtualization via z/VM or KVM
- Most efficient resource sharing among VMs, i.e CPUs, memory & network resources
- Dynamic reallocation of resources
- Co-location of applications & data in same “box”, between Linux and z/OS workloads via internal Hipersockets network
- Room for capacity growth with simply adding IFLs and VMs

https://www.youtube.com/watch?v=JyhvyNXZwv8

Linux on z Systems - Linux is Linux

- **Not a special Linux**
  - Everything relevant to Linux and z Systems is given to the community
  - About 5% - 10% code customized
- **Does run either in a Logical Partition (LPAR) or virtualized in a Hypervisor**
- **Complements other Operating Systems on IBM z Systems**



... and Linux on IBM z Systems exploits the unique values of the platform!

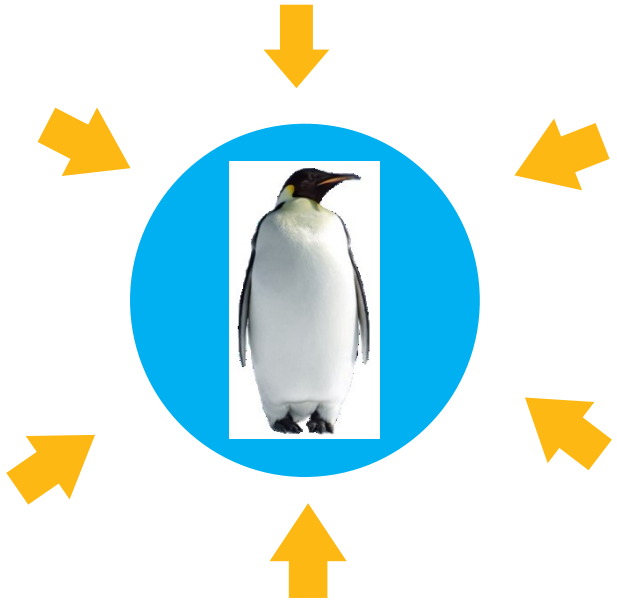
Linux on z Systems has a continuous focus on z Systems characteristics the Business benefits from

Security Capabilities:

- Privacy,
- Regulatory requirements,
- Identity management,
- Common Criteria Certification,
- Image Isolation,
- Cryptographic Acceleration,
- Centralized Authentication,
- Physically secure communications with HiperSockets™ and Guest LANs

Consolidation Capabilities:

- Server, Network, Storage, Staff, Skills, Utilities, Environmental, Applications Hosting of different workloads at the same time



Business Resiliency Capabilities:

- High Availability,
- Disaster Recovery, xDR, Serviceability, Reliability
- Storage failover (HyperSwap™), Data replication (Metro / Global Mirror)

Operational Simplification Capabilities:

- Virtualization,
- Single Point of Control,
- Single System Image,
- z/OS Similarities/Synergies,
- Resource Sharing

Flexibility / On demand Capabilities:

- Mixed Workloads: Scale-up & scale-out,
- Rapid server (de)commissioning,
- Idle Servers don't consume resources

Proximity / Collocation to z/OS data:

- Increased transaction throughput, HiperSockets
- Shared data access
- Integrated storage management

IBM collaborates with the Linux community

- IBM has been a very active participant since 1999
- IBM is one of the leading commercial contributors to Linux
- IBM has many developers working on Linux and open source projects

Linux Kernel & Subsystem Development

Kernel Base Architecture Support
GNU
Security
Systems Management
Virtualization
Special Projects
Filesystems, and more...

Expanding the Open Source Ecosystem

Apache & Apache Projects
OpenStack
Hyperledger
MongoDB
ostgreSQL
ocker and more...

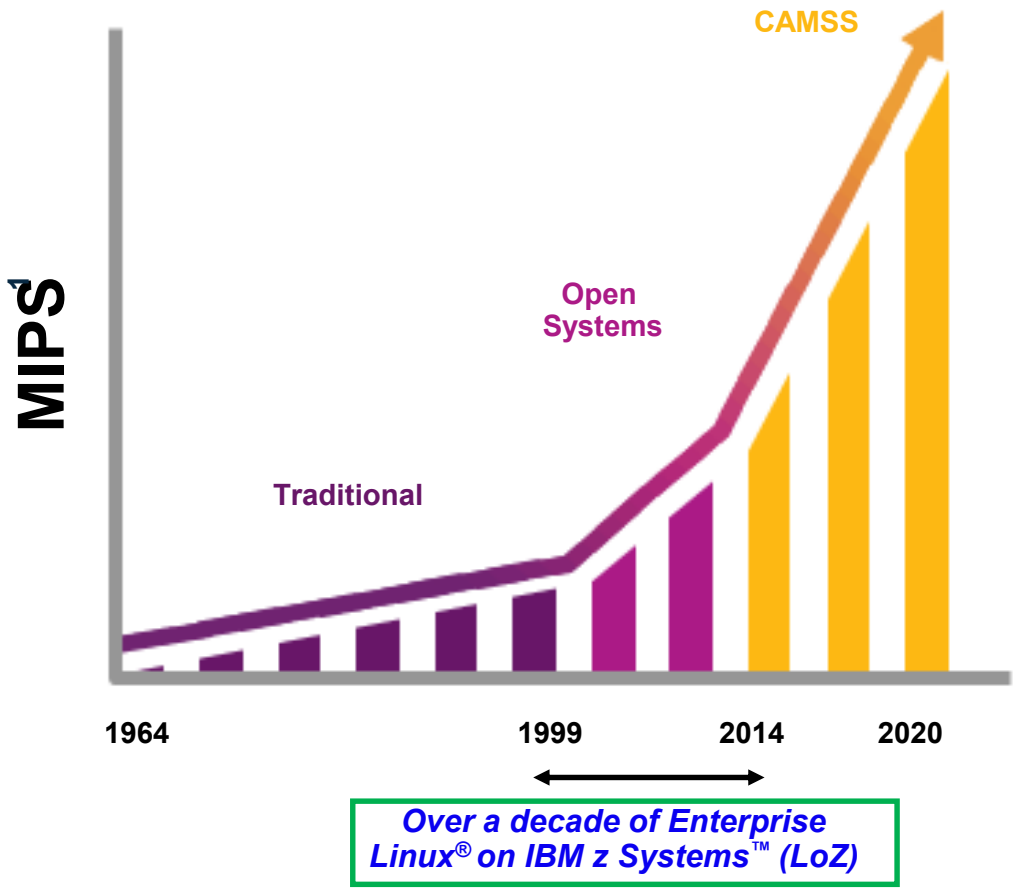
Foster and Protect the Ecosystem

Software Freedom Law Center
Free Software Foundation (FSF)
Open Invention Network, and more...

Promoting Open Standards & Community Collaboration

The Linux Foundation
Open Mainframe Project
Common Criteria certification
Open Software Initiative, and more...

Mainframe dynamics drive hyper growth with Linux on z Systems



Traditional
1964–2014
- Batch
- General Ledger
- Transaction Systems
- Client Databases
- Accounts payable / receivable
- Inventory, CRM, ERP

Linux & Java
1999–2014
- Server Consolidation
- Oracle Consolidation
- Early Private Clouds
- Email
- Java®, Web & eCommerce

Cloud, Analytics, Mobile, Security
2015–2020
- On/Off Premise, Hybrid Cloud
- Big Data & Analytics
- Enterprise Mobile Apps
- Security solutions
- Open Source LoZ ecosystem enhancement

1. MIPS :Millions of Instructions per Second or the metric z uses to measure client workload

Linux running on IBM z Systems

- built for scale
- perfect for cloud

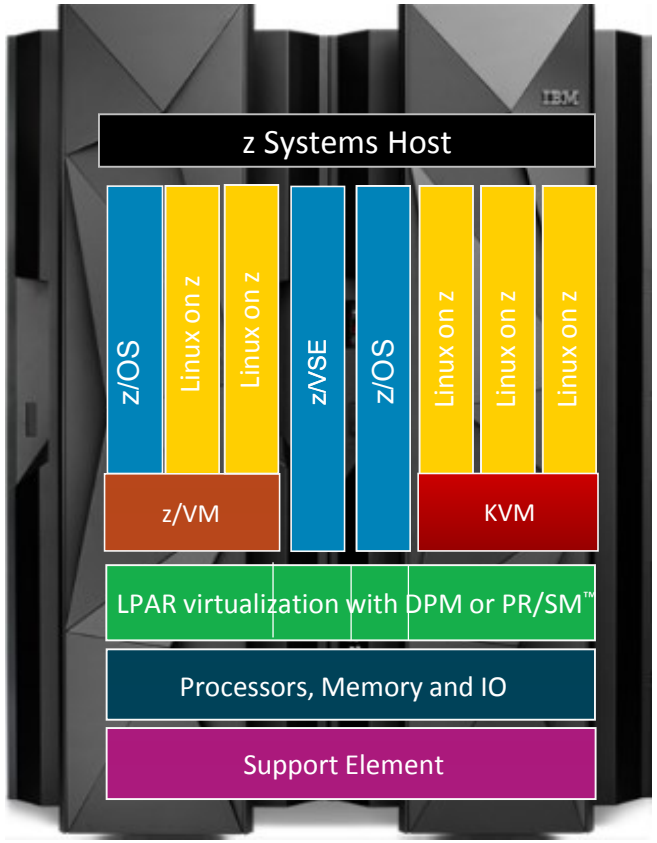
- IBM Linux on z Systems supports tens of thousands of concurrent users
- You can run development, test, and production servers in a single system
- Shared resources and shared development environments increase productivity
- Scale OUT and scale UP on the same z Systems with Linux

http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=SP&infotype=PM&htmlfid=ZSS03128USEN&attachment=ZSS03128USEN.PDF

Virtualization options for IBM z Systems with Linux

IBM z/VM

- World class quality, security, reliability - powerful and versatile
- Extreme scalability creates cost savings opportunities
- Exploitation of advanced technologies, such as:
  - Shared memory (Linux kernel, executables, communications)
- Highly granular control over-resource pool
- Provides virtualization for all z Systems operating systems



KVM for IBM z Systems

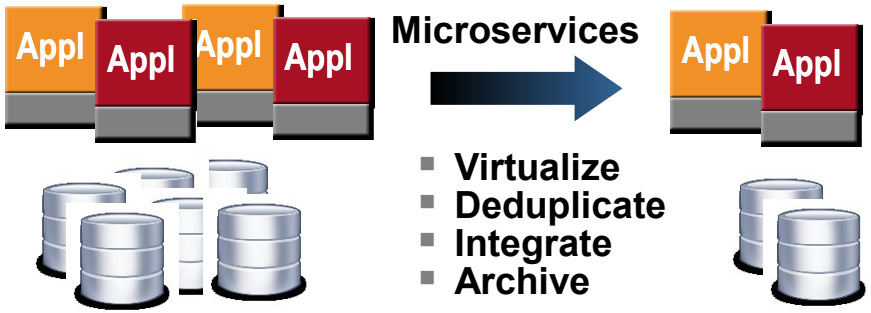
- Standardizes configuration and operation of server virtualization
- Leverage common Linux administration skills to administer virtualization
- Flexibility and agility leveraging the Open Source community
- Provides an Open Source virtualization choice

Options to Improve Value and reduce Complexity and Costs with Linux on z Systems

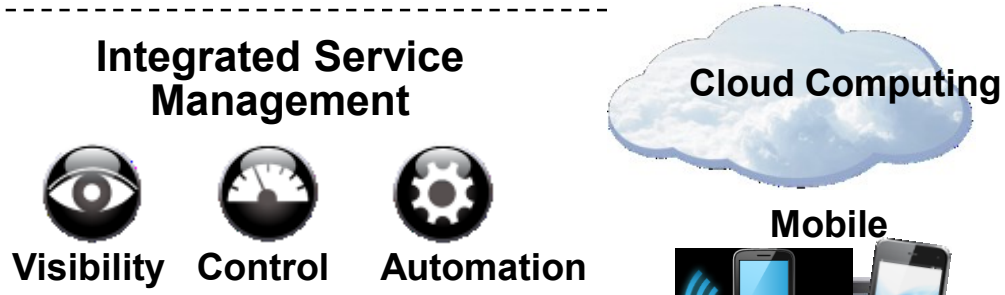
Optimize the Overall IT Environment

- **Simplify Hardware Infrastructure**

- **Integrate Redundant Software and Data**



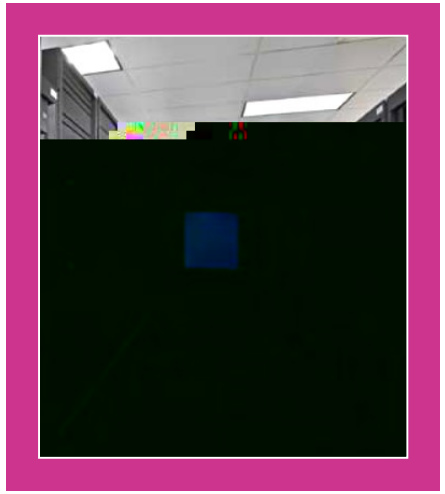
- **Improve Service Delivery**



Linux your Way: Greater flexibility and choice with Open Source on Linux on z

Distributions	Hypervisors	Languages	Runtimes	Management	Other	Database	Analytics
ubuntu Supported by Canonical	KVM	python	node.js	docker	Drupal	MariaDB	Spark
redhat	LPAR	php	RAILS	CHEF	kafka	mongoDB	hadoop
		R		openstack	RabbitMQ	PostgreSQL	elasticsearch
		ERLANG	OpenJDK	vmware vRealize	Joomla!	cassandra	logstash
		Scala		Cloud Manager		CouchDB	Kibana
		Clojure		urban{code}	Apache Solr	MySQL	IBM InfoSphere BigInsights
		JS	Java	puppet labs		ORACLE Diamond Partner	
		OCaml		SALTSTACK	SUGARCRM	DB2	
		NTLR	XMLSec Library	Apache JMeter		IBM Cloudant	
		Xerces	Apache maven	HA PROXY	Magento Open Source eCommerce	redis	
		doxygen	Jenkins	NGINX	WildFly	APACHE GEODE	SPSS AN IBM COMPANY
		WordPress		Apache ZooKeeper			COGNOS AN IBM COMPANY
		fluentd	ANSIBLE	cAdvisor			

Conclusion: IBM z Systems with Linux – scalability per excellence



Improved effectiveness and efficiency

- Operational and management reduction
- Software acquisition and licensing cost reduction
- Maximized hardware utilization
- Network reduction
- Collocation of data and applications
- Floor-space and energy reduction
- Growth inside a server
- Improving security
- Disaster recovery cost reduction and simplicity

IBM z Systems with Linux

Designed to provide unrivaled power, performance, reliability, security and flexibility for all kind of Linux workloads in a single economical server, reducing the complexity of distributed systems.

http://www-03.ibm.com/systems/z/os/linux/index.html

Linux OS on IBM z Systems

Linux OS on the reliable, secure IBM mainframe platform

The Linux OS on z Systems offers a uniquely powerful enterprise Linux solution for data center simplicity, trusted operations and unrivaled economics. As well, using the Linux OS on z Systems allows for an easy integration with workloads running on z/OS or z/VSE. It's an enterprise grade platform for Linux.

Take Linux to a new level

→ See where Linux means business

IBM pushes z Systems head-on into the open source arena

→ Get the IDC paper

Take your choice – select from the premier Linux distributions for z Systems

↦ Red Hat and z Systems

↦ SUSE and z Systems

↦ Ubuntu and z Systems

What we offer

- Solutions and software
- Tools, support and services
- Documentation and education
- Resources

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Priority code: **z Systems**

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LinkedIn: z Systems Linux

Join a Linux on z virtual class

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Events and training

Master hybrid cloud. Tackle cyber security.

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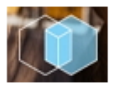

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Questions?

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