

Open FinTech Forum

AI, Blockchain & Kubernetes on Wall Street

Modernizing Workloads with Linux on Your Mainframe

Elizabeth K. Joseph, IBM

• @pleia2

What is a mainframe?



IBM System 360 (s/360), 1964



IBM z15, 2019

What is a mainframe?



A big computer.

(but not as big as they used to be)

40TB of RAM, and 60 PCIe control units across 12 PCIe I/O drawers.

22 dedicated I/O offload processors (SAPs) pre-allocated and up to 85 Logical partitions (LPARs).

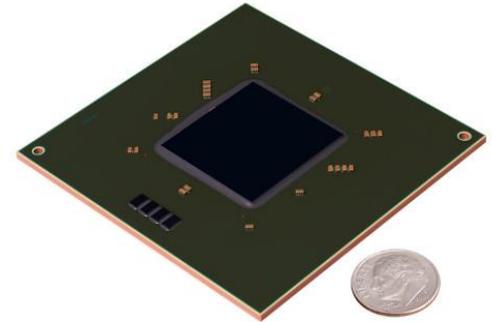
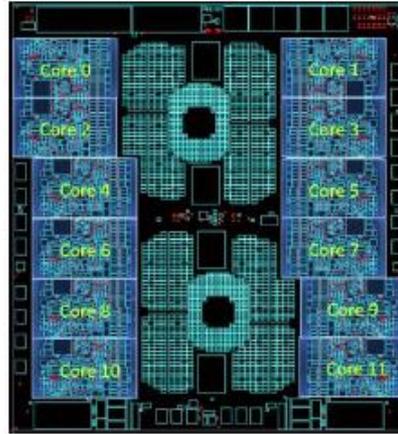


What is a mainframe?

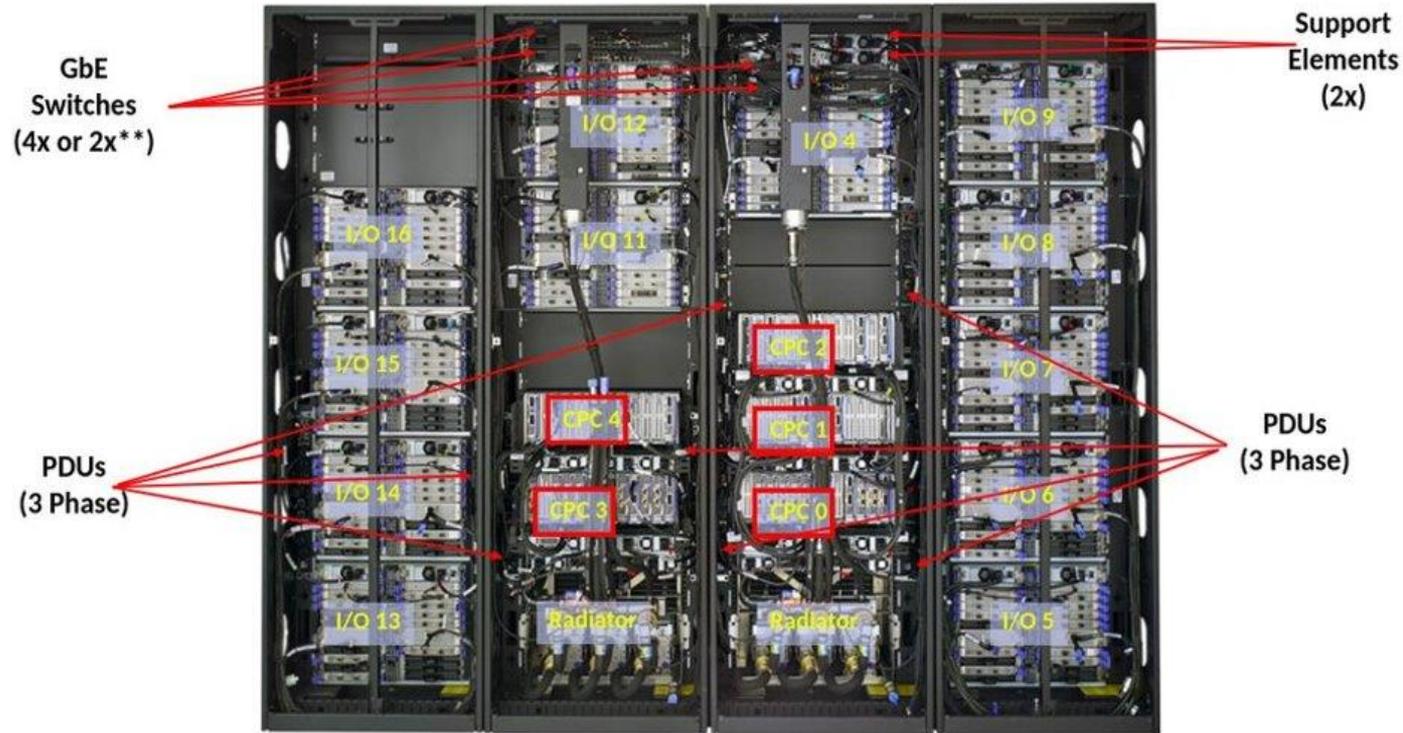
Not x86.

(IBM Z | zArchitecture | s390x)

190 5.2 ghz processor
units, with 12 cores per
chip.



What is a mainframe?



What is a mainframe?

Plus storage.

(measured in Petabytes!)



What does a mainframe run?

z/OS

z/OS, a widely used mainframe operating system, is designed to offer a stable, secure, and continuously available environment for applications running on the mainframe.

z/VM

As a control program, z/Virtual Machine (z/VM) is a hypervisor because it runs other operating systems in the virtual machines it creates.

z/VSE

z/Virtual Storage Extended (z/VSE) is popular with users of smaller mainframe computers. Some of these customers eventually migrate to z/OS when they grow beyond the capabilities of z/VSE.

z/TPF

The z/Transaction Processing Facility (z/TPF) operating system is a special-purpose system that is used by companies with very high transaction volume, such as credit card companies and airline reservation systems.

Linux

Several (non-IBM) Linux distributions can be used on a mainframe.

Source:

https://www.ibm.com/support/knowledgecenter/zosbasics/com.ibm.zos.zmainframe/zconc_opsysintro.htm

Yes, they run Linux!

- ...and they have for 20+ years.
- Community efforts to port Linux to the mainframe were made public in 1998.
- IBM released the first set of kernel patches in December 1999.
- In October of 2000, SUSE Enterprise Linux was released for the mainframe (the x86 version didn't come until April 2001!)
- Official support today for SLES, RHEL, and Ubuntu

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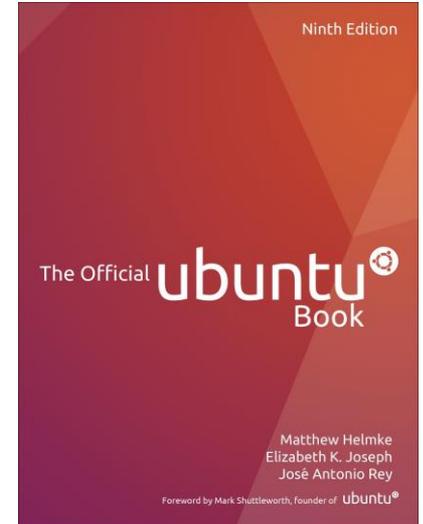
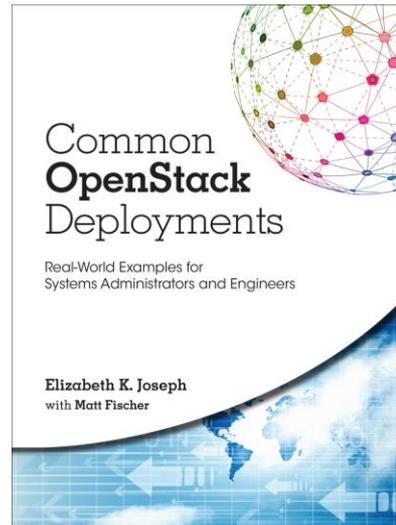
Linux Systems Administrator

Open Source Contributor

Developer Advocate

Author

And has no idea how to sell
you a mainframe



Why keep the mainframe?

- No-fuss, enterprise-grade storage, and fast access to that storage.
- Fastest commercially-available processors.
- Unmatched hardware reliability and 99.999% uptime.
- Fast, pre-configured communication between VMs.
- Hardware-driven cryptography.
- Security through the highest rated HSM (Hardware Security Module).

And with Linux...

The latest, industry-standard tooling!

So, you have everything?

Well, no.

Some projects do porting.

The distributions handle some of the porting.

Porting teams at IBM work continuously to port software and work with communities to keep it current.

Unleash the power to innovate with IBM **LinuxONE**[™] Community Cloud



The IBM LinuxONE Community Cloud provides a no charge, self-provisioned SUSE or Red Hat virtual machine on an IBM LinuxONE Enterprise Server (s390x architecture) to develop, test and run your apps.

<https://developer.ibm.com/linuxone>

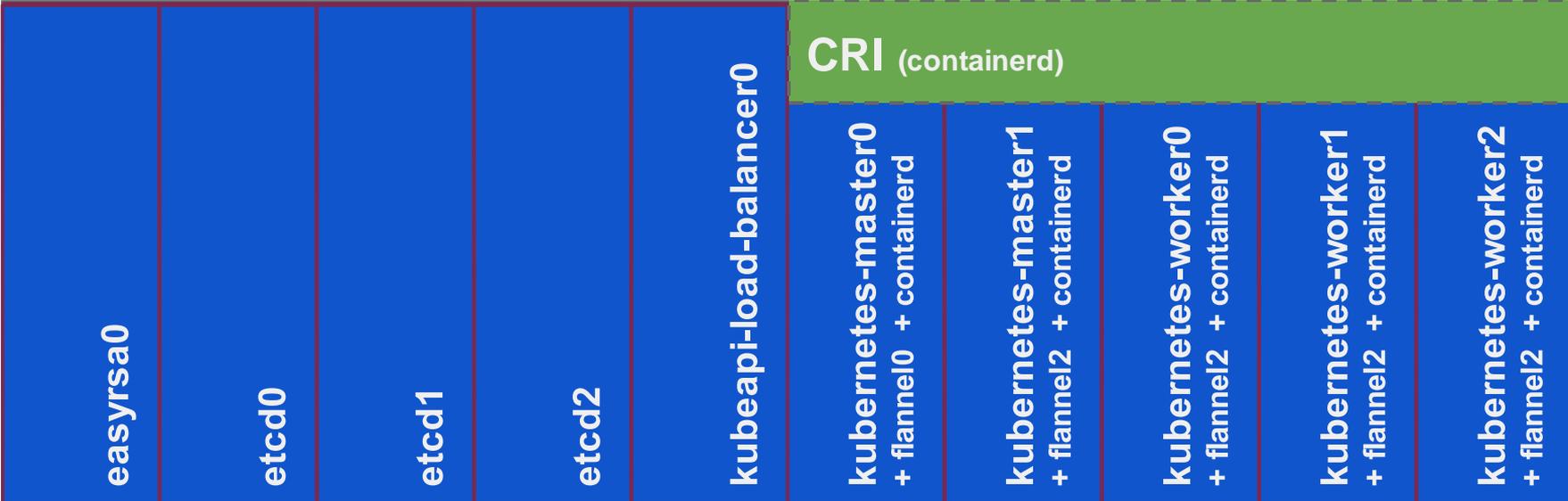


- The Kubernetes project releases s390x packages
- SUSE: <https://www.ibm.com/blogs/systems/announcing-our-direction-for-red-hat-openshift-for-ibm-z-and-linuxone/>
- Red Hat: <https://www.ibm.com/blogs/systems/announcing-our-direction-for-red-hat-openshift-for-ibm-z-and-linuxone/>
- Canonical: <https://ubuntu-on-big-iron.blogspot.com/2019/08/deploy-cdk-on-ubuntu-s390x.html>

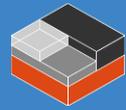
CDK Infrastructure

C1 C2 C3 C4 C5 C6 ...

Open
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Forum



LXD



Ubuntu Server

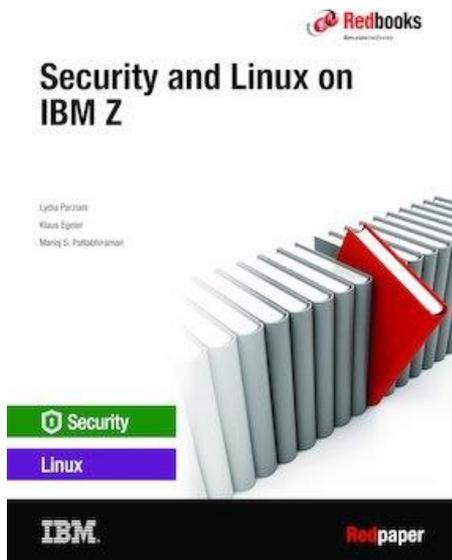


LPAR



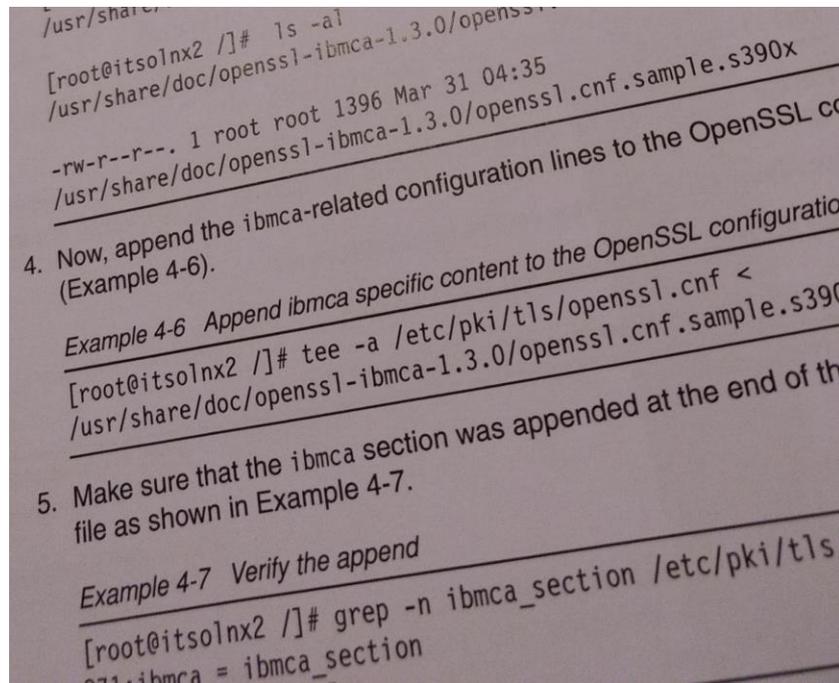
- Ansible
- Chef
- Juju
- Puppet
- SaltStack

- Docker
- Jenkins
- Travis CI (currently offering s390x builds for open source projects)



"Security and Linux on z Systems"

<http://www.redbooks.ibm.com/abstracts/redp5464.html>



- Python
- Golang
- Ruby
- PHP
- R
- Node.js, Swift, Java (z/OS too!)
- ...

- z/VM can be driven by new open source tooling
- KVM is supported, allowing you to use libvirt and a large ecosystem of other open source tools built for KVM

Open Mainframe Project: Feilong

"Feilong is a z/VM Cloud Connector that provides virtual resource management for z/VM. Users can manage the VM lifecycle dynamically and automatically without deep knowledge of z/VM itself through REST API. Users do not need to manually provision, manage, and destroy guests. Feilong also provides an SDK to make it easy to develop system management tools. Fundamentally, Feilong allows IaaS/PaaS solutions such as OpenStack™ or Terraform to consume z/VM by providing REST APIs, making time to market faster."

<https://www.openmainframeproject.org/projects/feilong>

Distributions

Hypervisors

PaaS / IaaS

Languages

Runtimes

Management

Database

Analytics



Community Versions

IBM Cloud Private



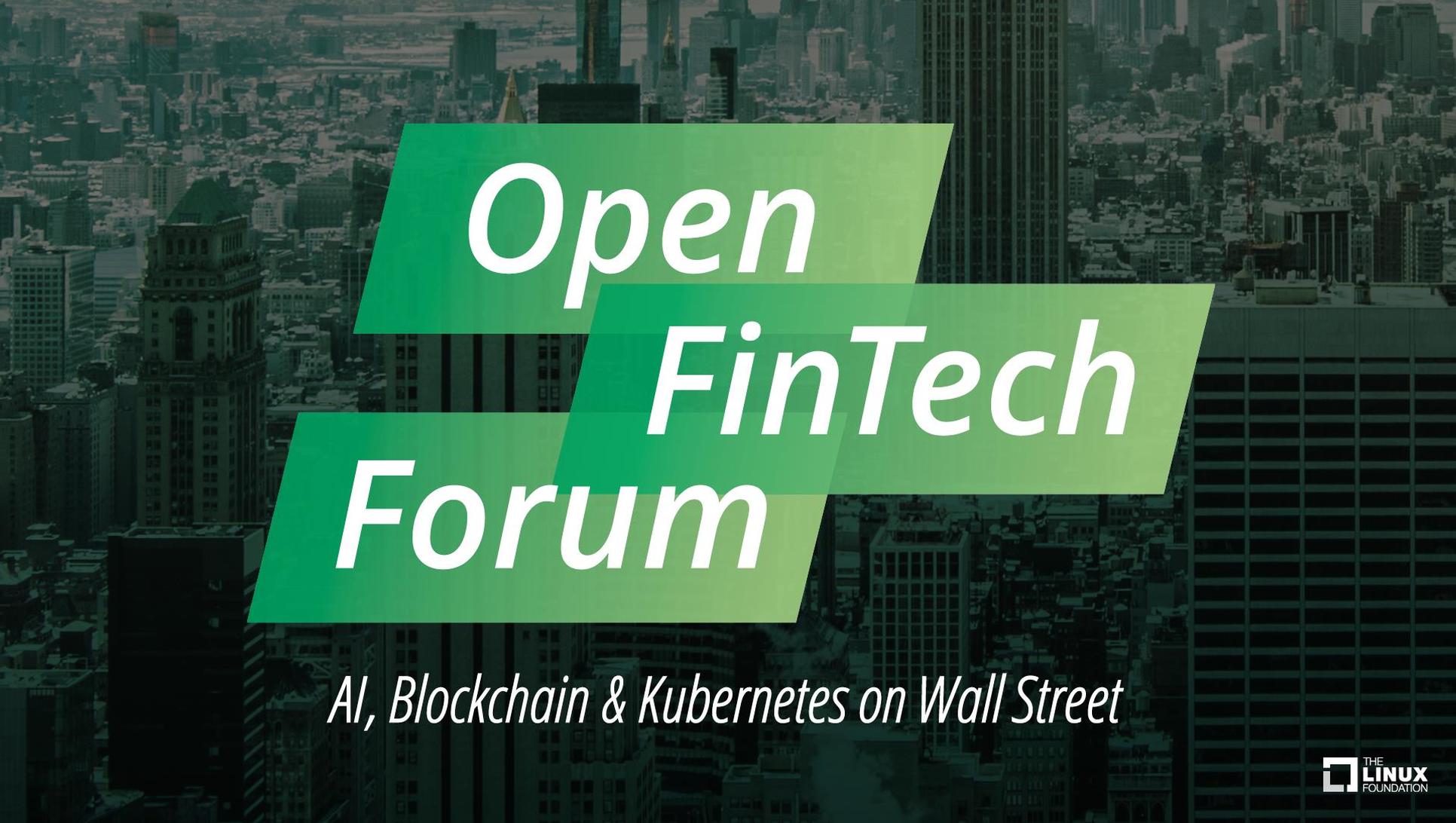
<https://www.ibm.com/community/z/open-source-software/>

Bring your mainframe team and Linux team
together

Cross-train on certain roles

Questions?

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- @pleia2

An aerial view of a city skyline, likely New York City, with numerous skyscrapers and buildings. The image is overlaid with three green, semi-transparent rectangular shapes that serve as a background for the text.

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