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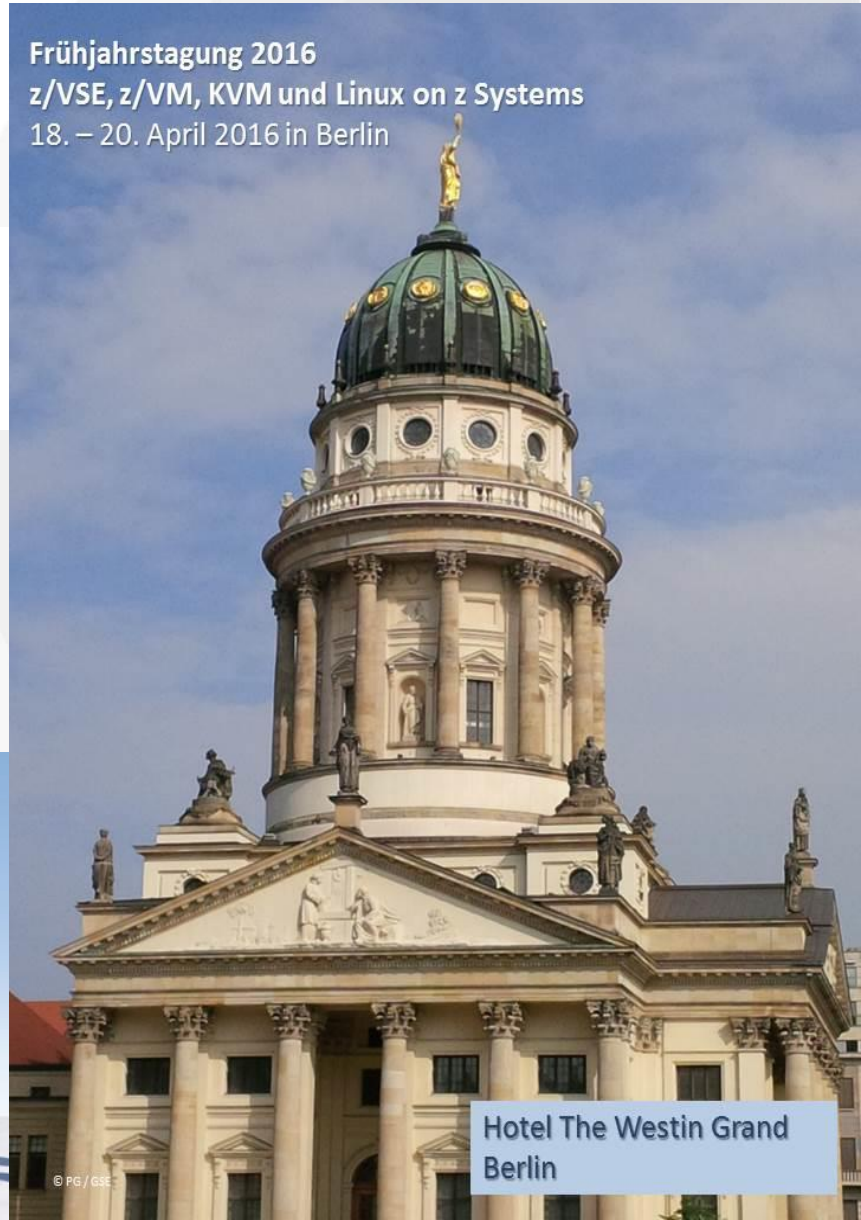

G08: Neues zu KVM für IBM z Systems

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Danksagung

Unser herzlichster Dank gehört

Tony Gargya
und
Arwed Tschoeke

für all die Beiträge, Material und Diskussionen im Vorfeld zu dieser Veranstaltung.

z Systems and LinuxONE Virtualization Options

IBM z Systems now has three strategic virtualization platforms

- KVM for IBM z Systems
- IBM z/VM
- IBM Processor Resource/System Manager (PR/SM)

KVM

KVM for IBM z provides an open source choice for IBM z Systems and LinuxONE virtualization for Linux workloads. Best for clients that are not familiar with z/VM and are Linux centric admins.

z/VM

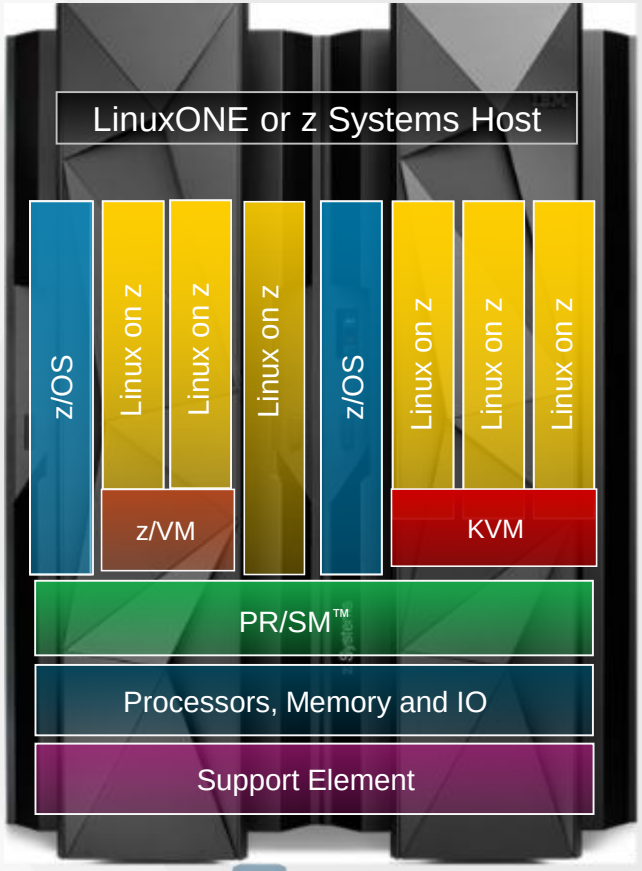
Proprietary Server Virtualization that is deeply integrated into System z. Complete hardware awareness. Supported on all IBM z Systems and LinuxONE servers. z/VM will continue to be enhanced to support Linux Workloads.

PR/SM

Divide one physical server into up to 85 logical partitions (LPAR) running a mix of multiple z/OS, z/VM, Linux, KVM for IBM z, Transaction Processing Facility (TPF) and z/VSE instances isolated and secured in parallel. Share resources across LPARs or dedicated to a particular LPAR. Running a mix of multiple z/OS, z/VM, Linux, TPF, KVM for IBM z and z/VSE instances isolated and secured in parallel.

Standards based virtualization for IBM z Systems and LinuxONE

- Standard KVM interfaces allow for quick startup for clients who are familiar with x86 Linux
- Standard management and operation controls leading to greater operational efficiencies
- KVM-based virtualization on z Systems and LinuxONE allows businesses to reduce costs by deploying fewer systems to run more workloads, sharing resources, and improving service levels to meet demand
- KVM open source solution for running virtual servers on z Systems and LinuxONE enables cloud deployments and big data solutions while reducing complexity and cost



A new hypervisor choice for z Systems

Clients have a choice !

z/VM

- World class security
- Exploitation of advanced technologies, such as:
  - Hipersockets, Hiperswap...
- Highly granular control over various resources
- Improves productivity by hosting non-Linux workloads such as z/OS, z/VSE, and z/TPF

KVM

- Standard skills, terminology and technology makes configuration and operation of server virtualization easier/faster
- Leverage common Linux administration skills to administer virtualization
- Flexibility and agility leveraging the Open Source community
- Provides an Open Source virtualization choice

Positioning KVM and z/VM for IBM z Systems and IBM LinuxONE

Target Customers for KVM
New Linux Clients that …

- Sold on Open Technologies, Open Source Oriented
- x86 centric – familiar with KVM or VMware
- Linux admin skills
- Need to integrate into a distributed Cloud environment, using standard interfaces

Target Customers for z/VM
Linux Clients that …

- Already use z/VM for Linux workloads
- Skilled in z/VM and prefer proprietary model
- Invested in tooling for z/VM environment
- Require technical capabilities in z/VM (e.g. I/O pass-through HiperSockets™, SMC-R, …)

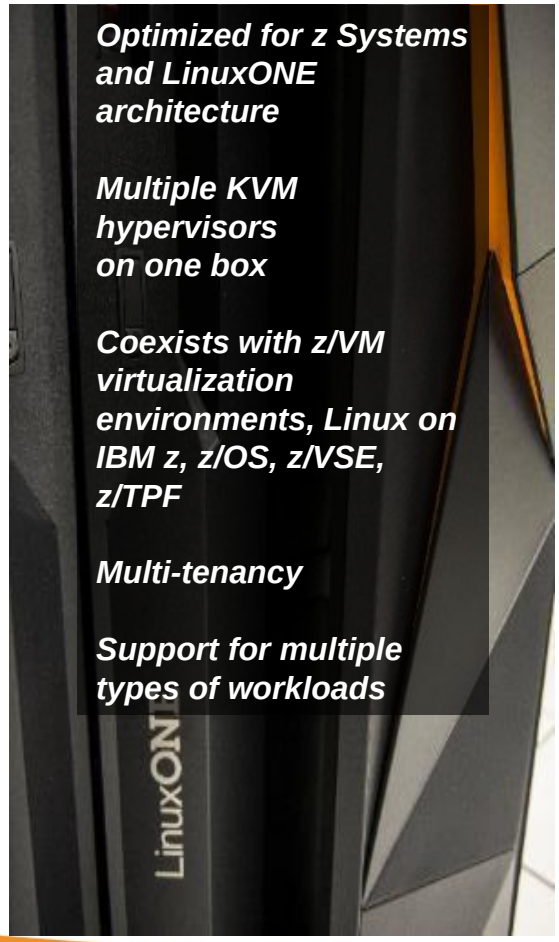
When should a seller propose KVM ?

For a new Linux client that … is Open Source oriented; not z/VM knowledgeable; already uses KVM; has x86 Linux centric admins, does not need to run Oracle, wants to implement cloud
For existing IBM z Systems customers who … do not have z/VM, but have KVM skills and large x86 environments, does not need to run Oracle, implementing cloud

When should a seller propose z/VM?

For a new client that needs …. a highly secure and scalable cloud infrastructure; needs to improve productivity by hosting non-Linux workloads such as z/OS, z/VSE, and z/TPF on IBM z Systems; needs to run Oracle
For existing IBM z customers who …. have invested in an existing z/VM environment; have z/VM skills or want to consolidate and use IBM Wave to manage LinuxONE or z Systems in order to streamline system administration and management; needs to run Oracle

KVM for IBM z Systems v1.1.0 GA 09/2015



Optimized for z Systems and LinuxONE architecture

Multiple KVM hypervisors on one box

Coexists with z/VM virtualization environments, Linux on IBM z, z/OS, z/VSE, z/TPF

Multi-tenancy

Support for multiple types of workloads

Industry standard KVM hypervisor *enables single cross-platform virtualization to help simplify systems management*

Open Source *enables flexibility and agility*

Enable better utilization *by sharing physical I/O resources among virtual servers to reduce cost*

Eliminate downtime by dynamically *modifying I/O device configuration for virtual servers so business applications remain active*

Live virtual server workload migration *for minimal impact to your business while workloads are relocated*

Save on storage cost *with copy-on-write virtual disks by not needing full disks until used*

Policy-based goal-oriented monitoring and management *of virtual server CPU resources so critical workloads receive priority*

Memory and CPU overcommit *to achieve higher VM density per virtual host, increasing consolidation ratios and providing a more efficient scale up – scale out model for savings and a lower cost per application versus alternative solutions*

Tool to simplify *the installation of the hypervisor*

KVM for IBM z Systems v1.1.1 GA 1Q2016

Support new analytics workloads *with Single Instruction Multiple Data (SIMD) for competitive advantage*

Deliver higher compute capacity *with support for* Simultaneous Multithreading (*SMT) to meet new business requirements*

RAS support enhanced for problem determination *and* ***high availability*** *to reduce down time and quickly react to business needs*

Secure and protect *business data with Crypto exploitation that leverages hardware acceleration for cryptographic functions – increase randomness*

Provide clients with choices for flexibility *based upon their storage environment*

- *Connect a variety of peripherals, especially storage devices drives, with Internet Small Computer System Interface (iSCSI)*
- *Access files on remote hosts exactly the same way a user would access any local files with Network File System (NFS) which works across a variety of server and host architectures*

KVM for IBM z Systems v1.1.1 GA 1Q2016

Unattended installation of the KVM hypervisor simplifies administration

Supported by DPM simplified interface for platform management. KVM for IBM z is the only supported hypervisor. Modify system resources without disrupting running workloads

Single Hypervisor Management GUI manage attached storage and networks without deep system z knowledge

Upgrade tool easy upgrade from 1.1.0 to 1.1.1

Customer choice of Linux Distribution with planned support for Canonical Ubuntu distribution in addition to SUSE

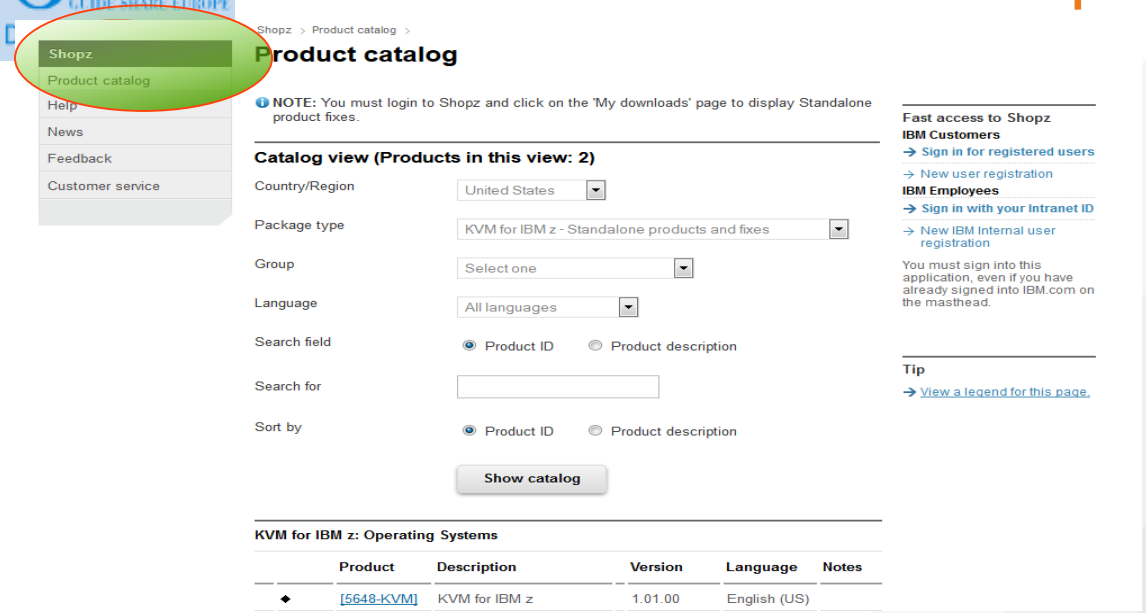
Software Development Kit (SDK) enables clients and IHV/ISVs to extend the hypervisor with their applications. For example they can build management agents which need to run on the hypervisor.

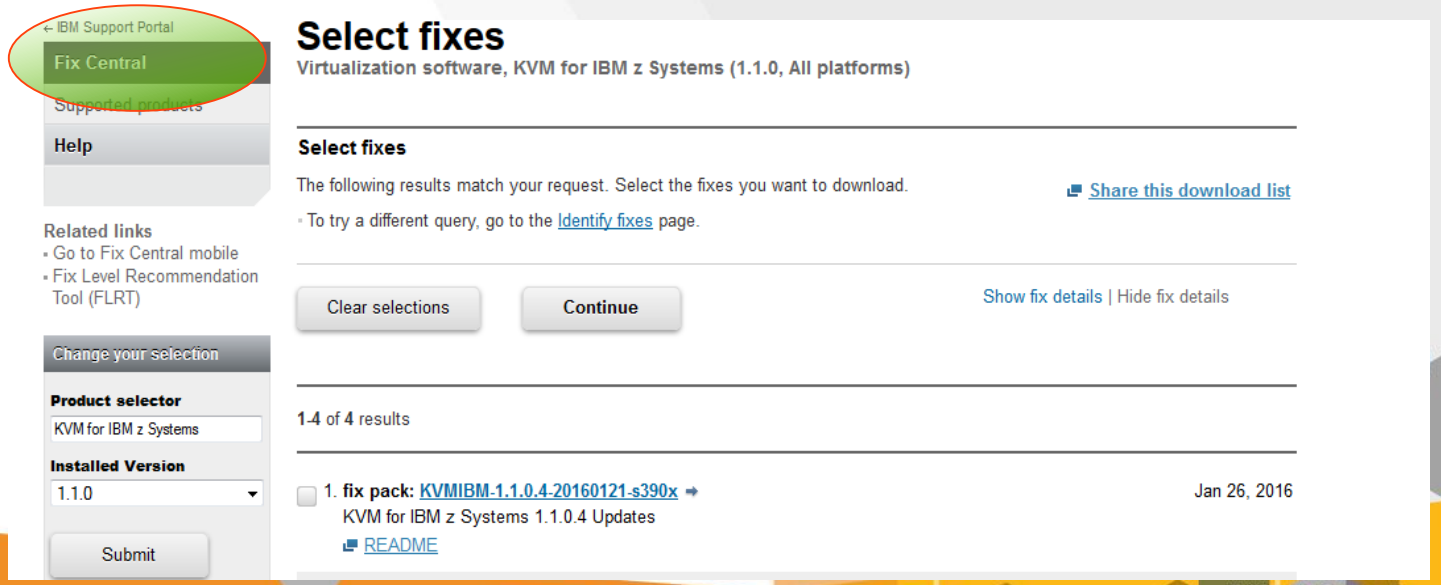
KVM for IBM z 1.1.1 Systems pre-reqs

Servers	IBM z13™ IBM z13s™ IBM LinuxONE Rockhopper™ IBM LinuxONE Emperor™ IBM zEnterprise® zEC12 IBM zEnterprise® zBC12
Guest Operating systems supported	SUSE Linux Enterprise Server (SLES 12 SP1) Ubuntu 16.04 for z Systems – Date TBD
Networking features supported	IBM OSA-Express5S IBM OSA-Express4S IBM OSA-Express3 (zEC12 and zBC12 only)
Crypto Coprocessor supported	Crypto Express4S Crypto Espress5S
Storage devices are supported .	ECKD™ DASD ▪ DS8000® (FICON®-attached) FCP SCSI disks: ▪ XIV® ▪ Storwize® V7000, V5000, V3700, V3500 ▪ FlashSystems™ ▪ SAN Volume Controller ▪ DS8000 (FCP-attached) ▪ DS8880 (FCP-attached)

Note: Refer to the KVM for IBM z Systems: Planning and Installation Guide (SC27-8236) for the most current information

How to order / obtain Fixpacks





Systems Lab Services – KVM for IBM z Jumpstart Services

- This Jumpstart service can help to accelerate your KVM for IBM z and LinuxONE implementation
- This service offering provides planning, installation, and usage assistance
- We work with the Linux support staff and tailor the installation for the specific environment

Key Features:

- This service helps accelerate the deployment and exploitation of KVM for IBM z
- Assistance planning and installation for the initial deployment. Other services beyond the base Jumpstart service are available to cover other phases.
- Provide recommendations on deployment aspects such as storage and networking implementation options
- Demonstration how to deploy an initial group of virtual servers and how to perform related lifecycle operations
- Basic Jumpstarts typically complete in one week, but they can be customized to include more systems or skills transfer.

Business Drivers:

- Open/Standard interfaces to reduce complexity
- Reduce need for constrained skills
- Increase IT staff productivity
- Reduce operational costs

Contact:

- for questions specific to this service.

Our z Systems and LinuxONE experts have experience in working with KVM

KVM for IBM z Systems

Open source virtualization hypervisor

KVM for IBM z Systems provides open source virtualization for IBM z Systems and the LinuxONE platforms. Using the combination of KVM virtualization and IBM z Systems and LinuxONE, you have the performance and flexibility to address the requirements of multiple, differing Linux workloads. KVM's open source virtualization on IBM z Systems and LinuxONE allows businesses to reduce costs by deploying fewer systems to run more workloads, sharing resources and improving service levels to meet demand.

Highlights

- **Open virtualization:** Take advantage of the performance, scalability and security built into Linux and KVM and gain a cost effective alternative to proprietary x86 virtualization.
- **Quality of service:** Gain easy provisioning for predictability of delivery of service at high utilization rate.
- **Operational efficiencies:** Use familiar Linux interface to gain greater operational efficiency.

Learn more

- → Announcement letter
- Data sheet (192KB)
- FAQ (1.55MB)
- Technical Information (812KB)
- → Redbook

Benefits

- Reduce operating costs through x86 server consolidation and deployment of Linux workloads.
- Simplify systems management through familiar interfaces to enable a single cross platform virtualization.
- Accelerate cloud deployments by seamlessly working with OpenStack.
- Run your Linux workloads on the most trusted, scalable, available, and secure platform.
- Meet changing server demands with automatic provisioning of computing resources.
- Gain high virtualization and consolidation for price performance advantage, scalability on demand, security and extreme availability.

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For more Information

- **Portal**
  http://www.ibm.com/systems/z/solutions/virtualization/kvm/
- **Product Documentation** at **http://www-01.ibm.com/support/knowledgecenter/linuxonibm/liaaf/lnz_r_kvm.html**
  - KVM for IBM z Systems: Planning and Installation Guide SC27-8236-00
  - KVM for IBM z Systems: Administration Guide SC27-8237-00
  - Linux on z Systems: Virtual Server Management SC34-2752
  - Linux on z Systems: Virtual Server Quick Start SC34-2753
  - Linux on z Systems: Device Drivers, Features, and Commands for Linux as a KVM Guest SC34-2754
  - Linux on z Systems: Installing SUSE Linux Enterprise Server 12 as a KVM Guest SC34-2755
- **Redbook: Getting Started with KVM for IBM z Systems**
  http://www.redbooks.ibm.com/redpieces/abstracts/sg248332.html?Open
- **Performance Data / Planning Tools**
  - Limits: http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS5331
  - Large Systems Performance Reference (LSPR):
    - https://www-304.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprITRKVMonZv110?OpenDocument
  - zPCR
    - http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381
- **List of supported IBM SW:**
  http://www.ibm.com/software/reports/compatibility/clarity/productsOnVe.html

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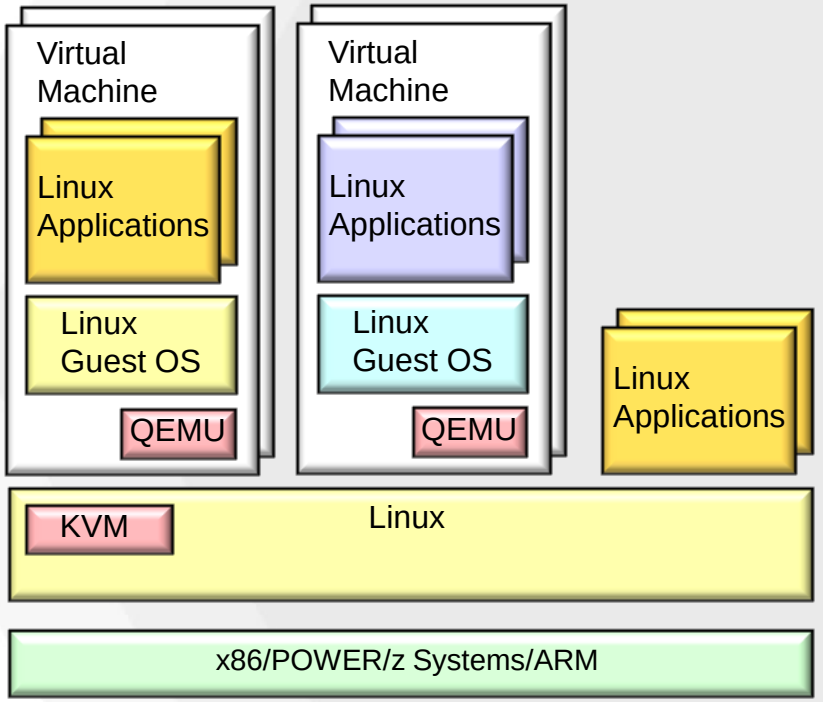
Appendix

Kernel Based Virtual Machine (KVM)

- **An open source hypervisor based on Linux**
  - Linux provides the base capabilities
  - KVM turns Linux into a hypervisor
  - QEMU provides I/O device virtualization and emulation
- **Provides flexibility in technology choices**
  - Open
  - Scalable
  - Economical



Limits as in KVM for IBM z 1.1.0

Category	Function	Recommended Limit	Maximum Limit
CPU	Overcommit	10:1	N/A
	Host CPUs	z13: 28-36 (1 drawer)	101 (z12) 141 (z13)
	Per Guest vCPUs	Guest vCPUs <= Host CPUs	64
Memory	Overcommit	2:1	N/A
	Maximum Host	1 TB (z12/z13)	1 TB (z12), 8TB (z13)
Networking	OSA CHPIDs per Host	16	N/A
	Virtual NICs per Host (with OpenVSwitch)	4096	8192
	Virtual NICs per Guest	8	32
Storage	Total attached zFCP LUNs	1024	2000
	Total attached ECKD Devices	4096	64K
	Virtual Block Disks per Host	4096	64K
	Virtual Block Disks per Guest	500	1024
Others	Guests per Host	512	4096