Linux and z Systems in the Datacenter

Berthold Gunreben
Build Service Engineer
SUSE Linux

Available Architectures for SUSE Linux Enterprise Server

- X86, z Systems, Power
- Common Source Code for all architectures

Running a Datacenter

- Requirements:
  - RAS
  - Scalability
  - I/O
    - Network
    - Disk
  - Main Memory
  - Computing power
  - Multi-tenancy
  - Monitoring

What is different with Mainframes?

Characteristics of a Mainframe

- RAS Criteria
- Up to 10 TB of main memory
- I/O up to 832 GB/s
- Scalability up to 141 CPUs
- Virtualization up to 8000 Servers
- Integrated multi-tenancy

Mainframe Operating Systems

- z/OS
- z/VM
- KVM
- Linux for z Systems

Mainframe Scalability

- License only the CPUs you need
- Increase capacity on demand
- Designed to run at 100% load
- Add additional CPU and memory without service interruption
- Add new I/O paths during normal operation

The Mainframe Designed for Virtualization

Levels of Virtualization

First Level Virtualization

- LPAR
  - Hardware Virtualization Features
  - Minimal Overhead
  - Number of available LPARs
  - I/O Virtualization (disk, network)
  - LPAR compares to a virtualization Server
- Operating Systems:
  - z/VM
  - KVM
  - Linux

Levels of Virtualization

First Level Virtualization

- Linux on LPAR
  - HMC as management interface
  - Deployment methods
    - DVD in HMC
    - Boot from remote
    - Virtual Appliances?
  - Hipersockets
  - Highest level of separation (up to Common Criteria with level EAL 5)
  - Physical Hardware interfaces (OSA, FICON, FCP)

Levels of Virtualization

Second Level Virtualization

- z/VM
  - Amount of virtual machines only limited by available Ressources
  - Huge memory overcommit possible
  - Easy administration and self-service for Guests
  - Seamless serviceability with SSI and LGR
- KVM
  - Very similar to KVM on other platforms
  - Disk and network access provided with virtio

Levels of Virtualization

Second Level Virtualization

- Linux on z/VM
  - Optimal integration with hardware
    - Provides Dynamic I/O
    - Direct attachment of FCP, FICON, and OSA
    - Emulated DASD with multipath of FCP
    - Hardware supported VSWITCH
    - Link aggregation provided by z/VM
    - Multiple consoles for guests
    - Software defined interconnect between guests
  - Needs additional skills

Levels of Virtualization

Second Level Virtualization

- Linux on KVM
  - Any linux admin with KVM experience can manage this.
  - Coexists with other Linux and z/VM LPARs
  - Uses “Start Interpretive Execution” SIE instruction in hardware:
    - Describes the state of a virtual CPU
    - Uses “Dynamic Address Translation” DAT

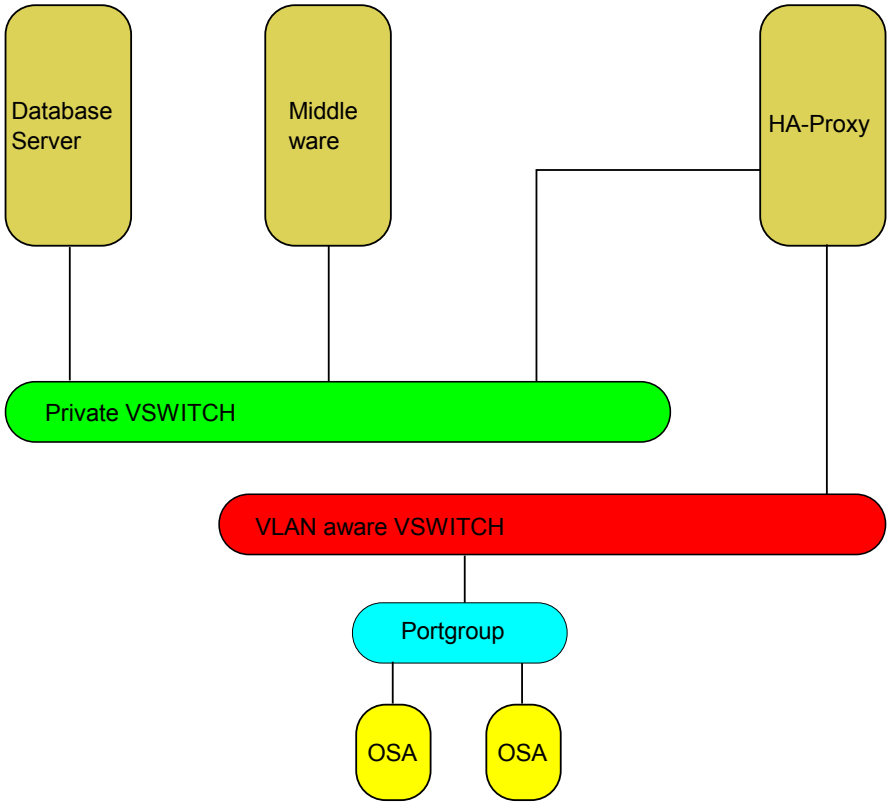
Multi Tenancy

Multiple admins running the same hardware

- Get the privileges you need
  - HMC: multiple users have access to their resources on LPAR level
  - z/VM:
    - Users have immediate access to their servers
    - System programmer, operator, security specialist, and auditor are prepared as different users

Example Scenarios
or How to setup a virtual Appliance

Web Application with Database Backend

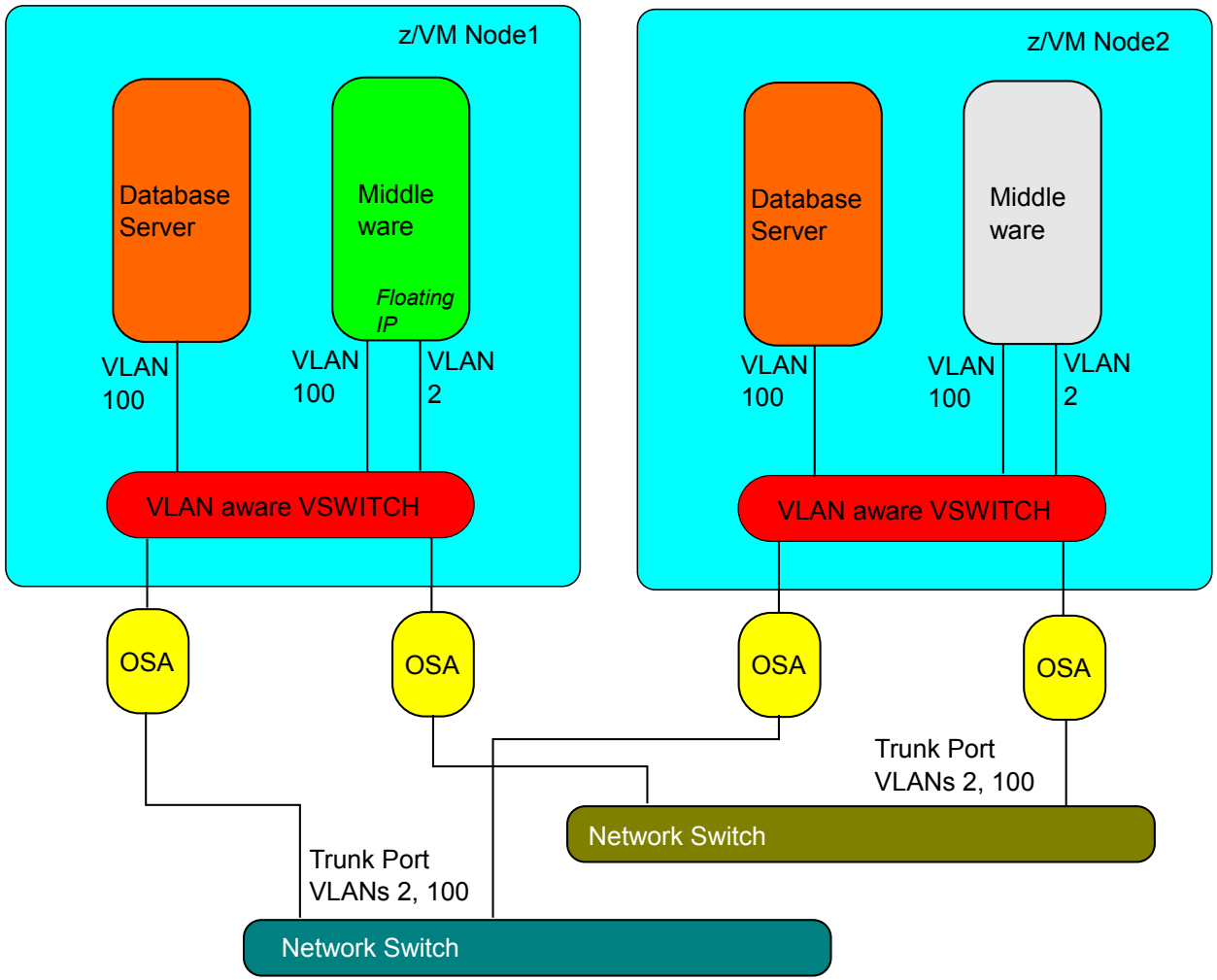


- private VSWITCH without external device that connects involved machines
- HA-Proxy acts separation from external net

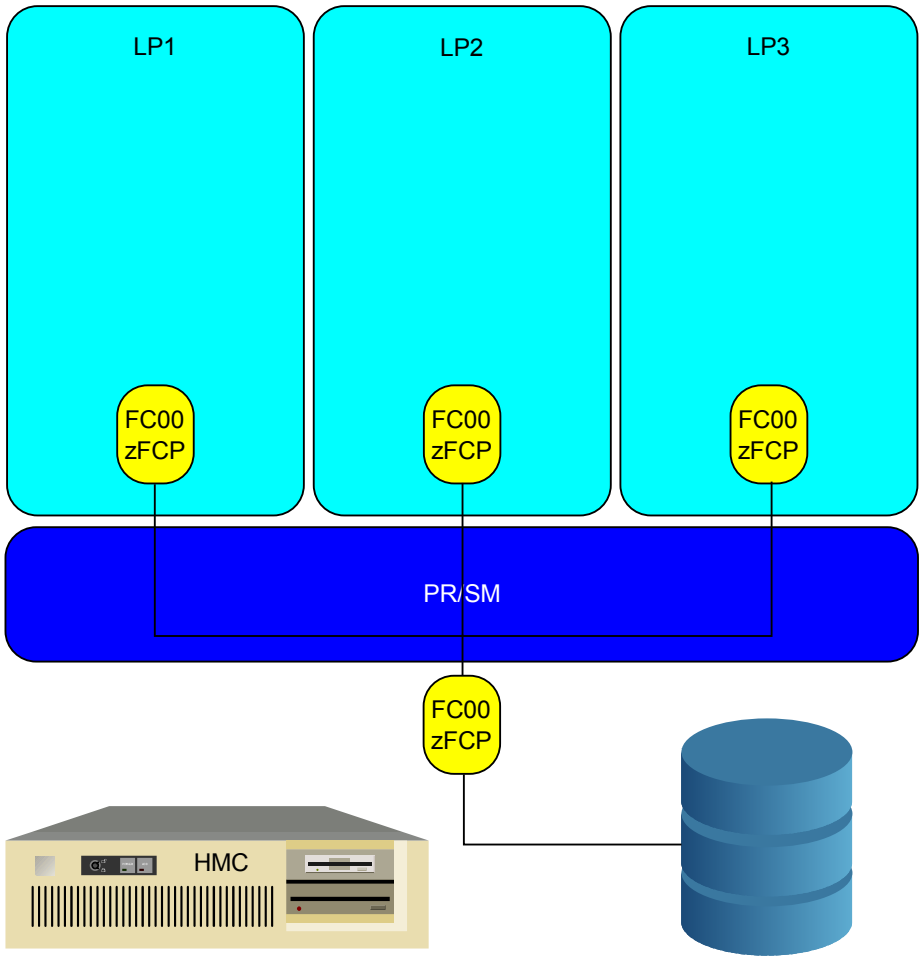
HA Setup with SUSE Linux Enterprise

- Interconnect to Backend Server over VLAN aware VSWITCH
- Use VLANs to separate private interconnects
- Example with SSI

HA Setup with SUSE Linux Enterprise



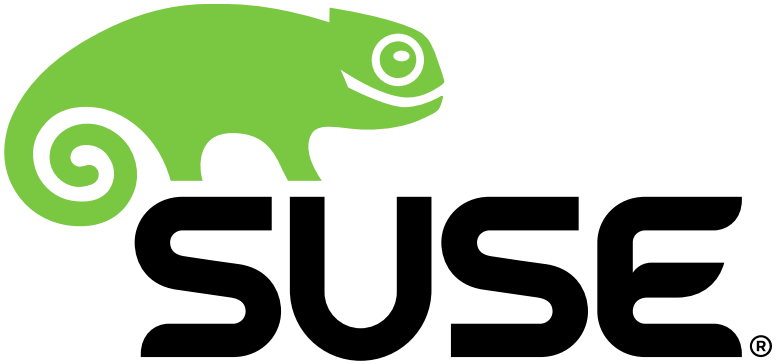
Virtual Appliance on LPAR

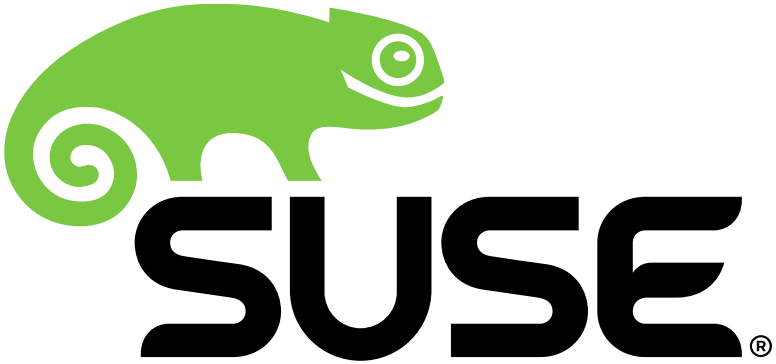


More Linux on Mainframe @SUSECon

- CAS19992 - What´s Old is New Again: Consolidation and Innovation with Linux on the Mainframe at Sparda DV
- BOV19372 - KVM and Linux on z Systems
- BOV19919 - SUSE Manager on z Systems
- BOV19995 - 15 Years of SUSE Linux Enterprise Server on the Mainframe: Control, Optimize, Innovate!
- TUT19925 - Linux High Availability on Mainframe
- TUT20511 - SUSE Linux Enterprise Server on IBM z Systems, the Highly Scalable Hub for Mobile Workloads in the Enterprise
- FUT20719 - SUSE Linux Enterprise Server for System z Roadmap: Building enterprise IT with SUSE Linux Enterprise on IBM Mainframes

Questions?


SUSE®
We adapt. You succeed.



Corporate Headquarters
Maxfeldstrasse 5
90409 Nuremberg
Germany

+49 911 740 53 0 (Worldwide)
www.suse.com

Join us on:
www.opensuse.org