

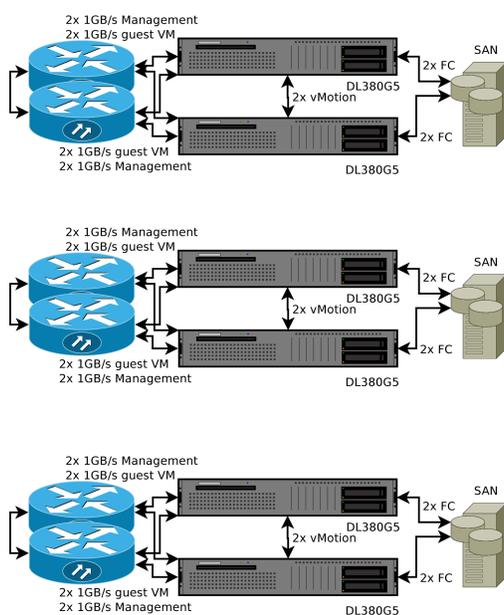
VIRTUALIZATION INFRASTRUCTURE WITHIN THE CONTROLS ENVIRONMENT OF THE LIGHTSOURCES AT HZB

RACK-BASED HOSTS

HP DL380 G5
2x Intel® Xeon® CPU X5160 @ 3.00GHz (4 Cores)
64 GB RAM, 438GB local HDD, 2x FC Cards (SAN)
Six Port Network:

- 2x 1GB/s management
- 2x 1GB/s VM guest LAN
- 2x 2x1GB/s vMotion

VMware® ESXi® 5.0.1



HARDWARE / SERVICE INFRASTRUCTURE

CTL CLUSTER SERVICES

- Soft IOCs
- OPC Server
- Cold standby fileserver

ACC / BLADE / POGO CLUSTER SERVICES

- Read only control system consoles, accessible from any office
- Testinstallations
- Build- and deploy hosts
- Archive for legacy software installations
- Network services like DNS, DHCP, database etc. (no core systems)
- Network diagnostic and management

MLS CLUSTER SERVICES

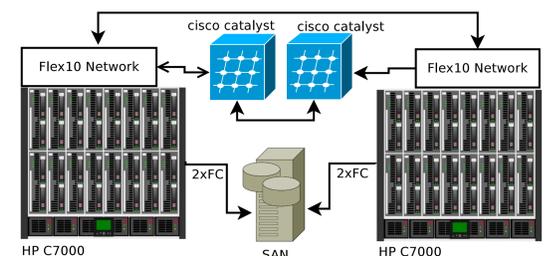
- Soft IOCs
- OPC Server
- Cold Standby Fileserver

BLADE BASED HOSTS

HP Blade 460 G7/G8
2x Intel® Xeon® CPU X5670 @ 2.93GHz (6 Cores)
48GB RAM, 300GB local HDD, 2x FC Cards (SAN)
Flex10 Network with following partitioning:

- 2x 0,5GB management
- 2x 7GB VM Guests
- 2x 1,5GB/s vMotion
- 2x 1 GB/s FT

VMware® ESXi® 5.1



CHALLENGES



TIME SYNCHRONIZATION

It is possible to distribute the time from the virtualization host to the virtual machines, but this include two serious problems.

- Misconfigured, forgotten or unavailable timeservers are able to corrupt the time in the virtual machines.
- By scheduling virtual machines, kernel ticks are missing. The Hypervisor and the OS are able to correct the time. But if both compensate the kernel tick the times run into the future. And it is not corrected by VMware® Tools. (tested in VMware® ESX® 3.5)

Both problems have the same result, File and EPICS timestamps are wrong, OPC Servers does not service. So it is a must have to disable the hypervisor time synchronization and to configure a ntp client.



UNPREDICTABLE POWERDOWN

The automatic host restart after host down should be disabled, to prevent the restarting in a incomplete network and storage infrastructure.

After powering up the management server, the management server automatically restarted all VMs on the available hosts.

A simultaneous powering up of a complete cluster, offer a shared workload of booting up the virtual machines.



SAN BREAKDOWN

If the SAN is not available, the virtual machines are frozen in the attempt to read or write data.

The same happens to the management host, if the management host is virtualized too.

After restoring of SAN, most of virtual machines continue to run. Some virtual machines need a re-boot.

PRO VIRTUALIZATION

- Less general hardware infrastructure
- Less amount of connection cables
- Less cooling and space requirement in the server room
- Less hardware maintenance, hardware service contracts
- Good consolidation of services running on old hardware and non portable software
- Very low maintenance time on infrastructure and host Upgrades/Changes
- Central backup and disaster recovery of VMs
- High availability without configuration in the VMs
- Possibility of taking snapshots of a VM
- Clone VMs to suppress update downtime.
- Clone VMs for quick backups

CONTRA VIRTUALIZATION

- Virtual Machines are abstract for many users and administrators
- Problems in the VMs itself are often blamed on the virtualization hosts
- One defect host potentially crashes many services
- Integration of some specific features of new hardware (like blade management) requires upgrade of the whole virtualization environment.
- More management resources needed at each infrastructure update
- After a power loss waiting time to start the whole infrastructure accumulates (network, storage, blade management etc.) before the virtual environment can be restarted.