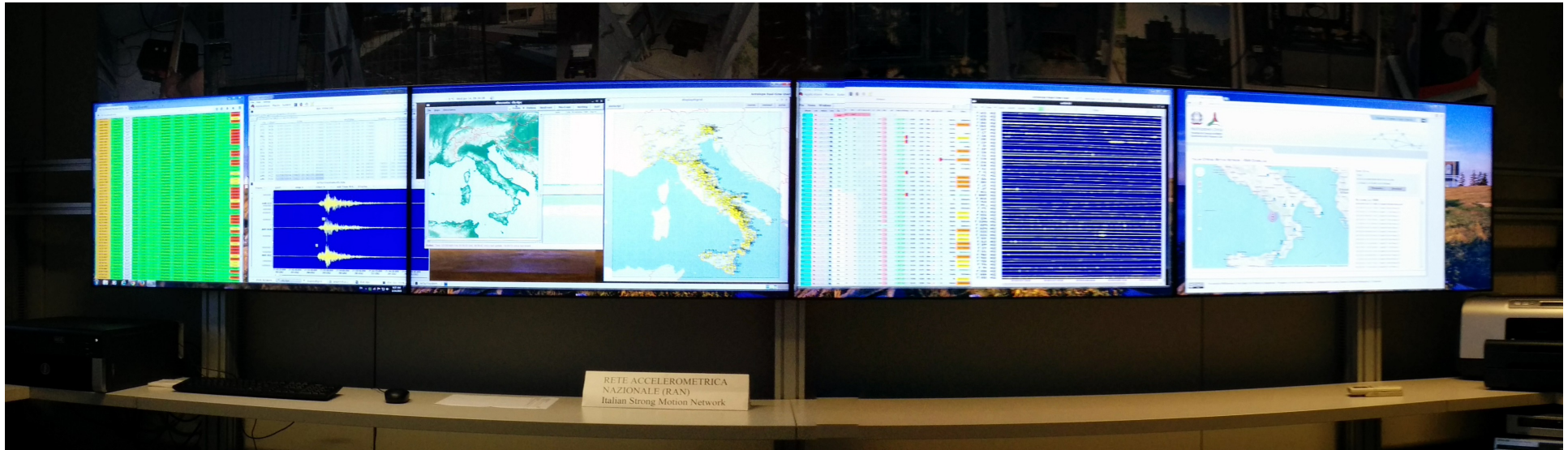




Antelope in an HA Cluster Environment

An Avenue to
Reliability and Transparency
Case Study: DPC

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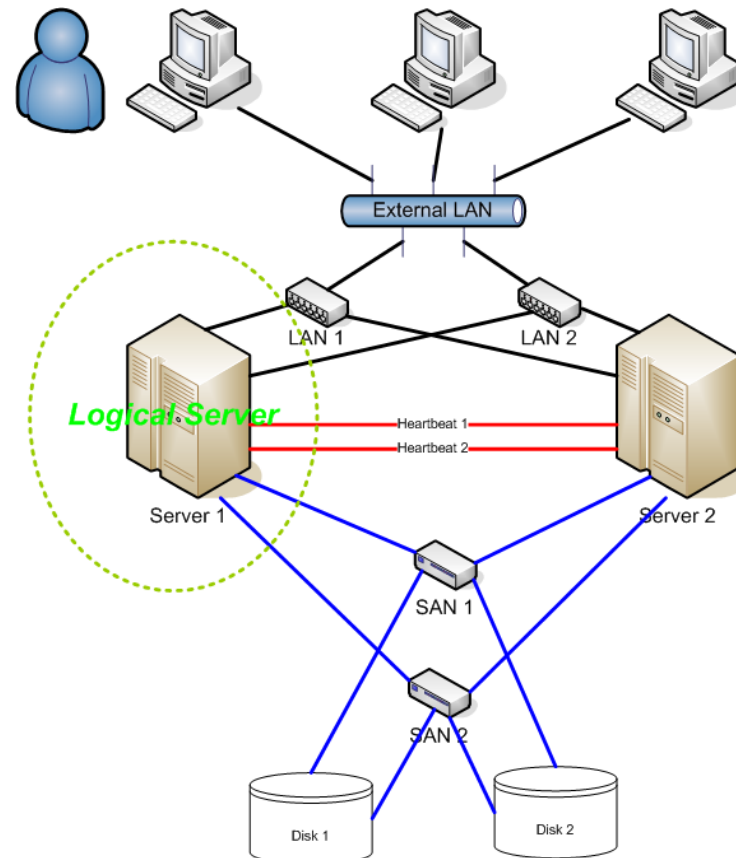
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What's an HA cluster?

- **High-availability clusters** (also known as **HA clusters** or fail over clusters) are groups of computers that support server applications that can be reliably utilized with a minimum of down-time.

en.wikipedia.org/wiki/High-availability_cluster



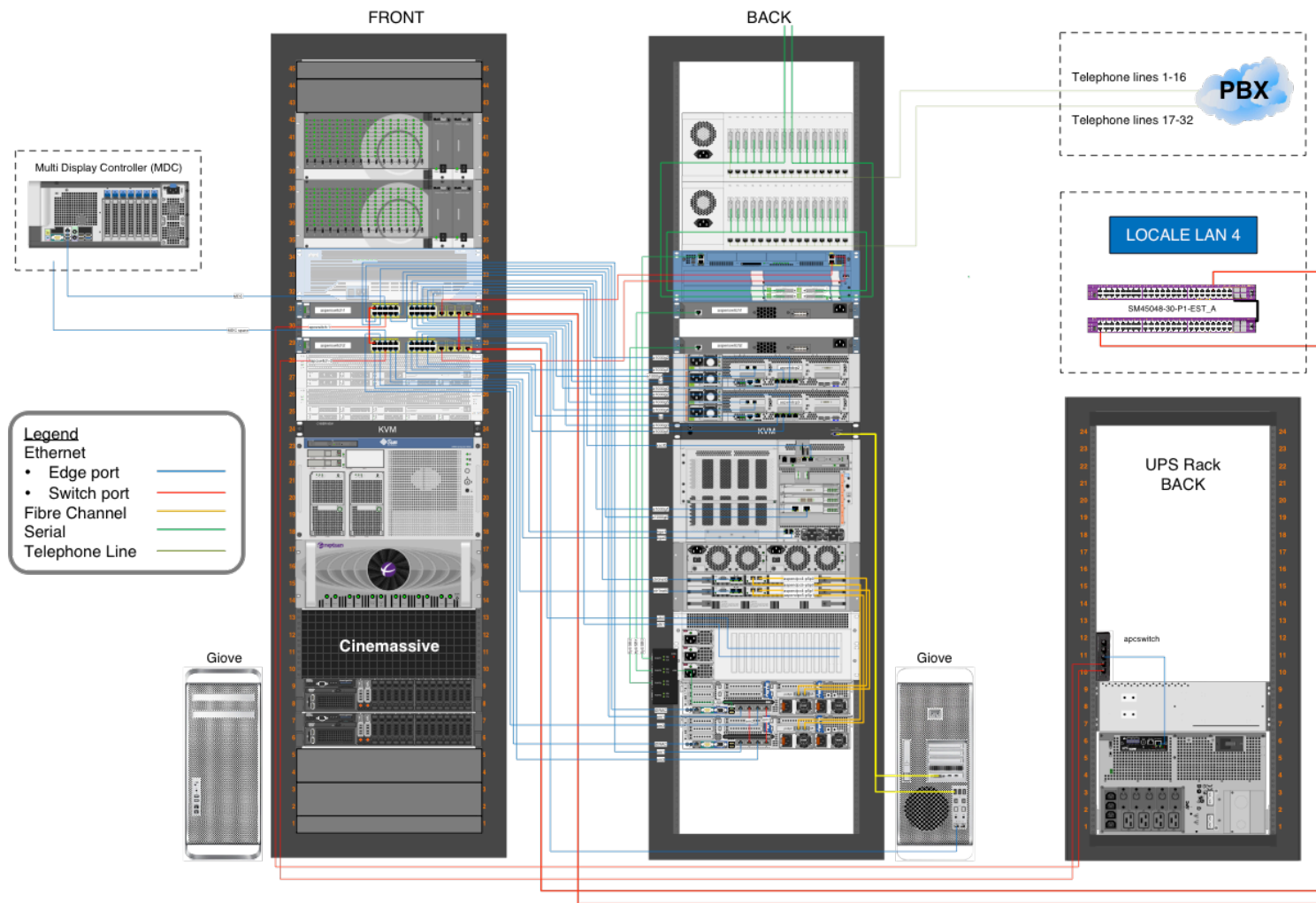
Features

- Redundant computers
 - Detect hardware/software faults
 - Eliminate single points of failure by design
 - Resolve resource dependencies
 - Restart failed services and applications
 - Reduce downtime
 - Increase RAM
- (**R**eliability/**A**vailability/**M**aintainability)

Infrastructure

- 2 x Dell PowerEdge R720 servers
 - Lot of memory (128G each)
 - Fiberchannel HBA
- Nexsan SATABeast
 - Redundant controller
 - 4 Fiber channel ports (direct attached)
- 2 x Cisco 2960S switches
- Managed UPS with „redundant Ethernet“

Infrastructure



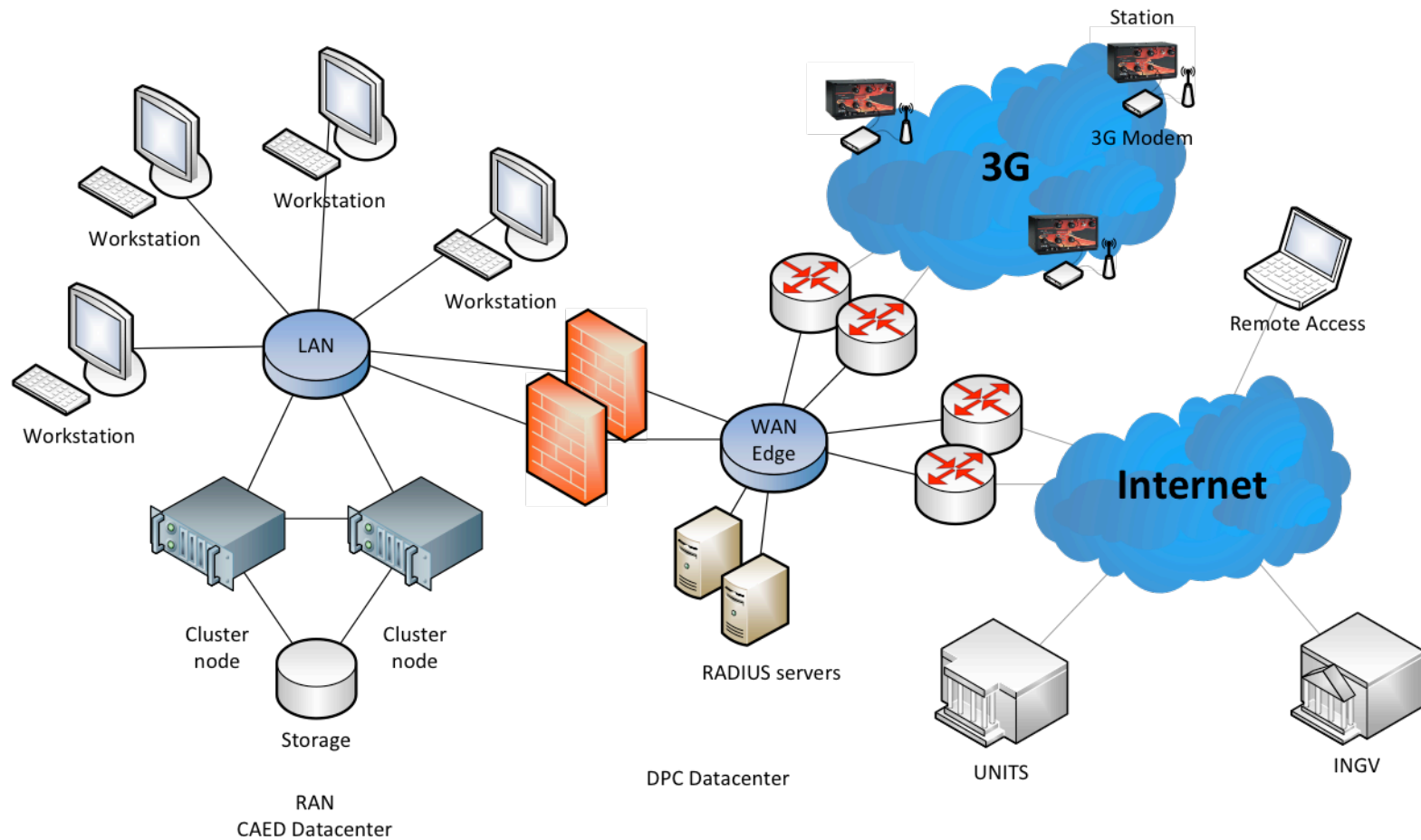
Servers and Storage

- Dual Dell PowerEdge R720 servers
 - Red Hat Enterprise Linux 6.5
 - Redundant power supplies (1+1)
 - Redundant boot subsystem (RAID1)
 - Redundant network interfaces (2 x 2)
 - Dual-CPU
 - ECC Memory
- NexSAN SATABeast
 - Redundant power supplies (1+1)
 - Redundant controllers (2)
 - Redundant fiber-channel paths (4)

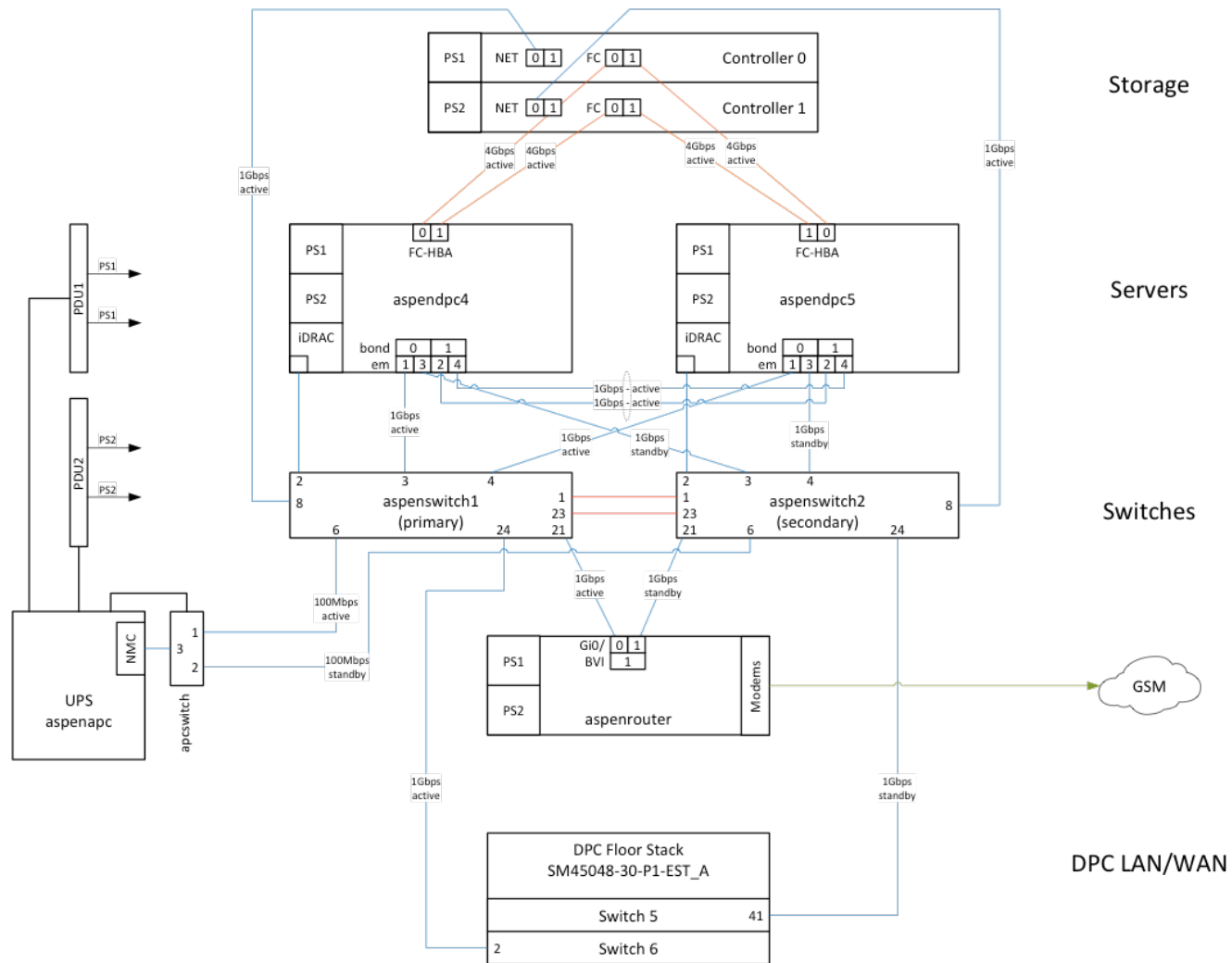
Network & Infrastructure

- Dual Cisco 2960 switches
 - Redundant paths (Rapid Spanning Tree)
 - Single power supply
- Dual firewalls
- Redundant WAN (Wide Area Network)
- Managed UPS

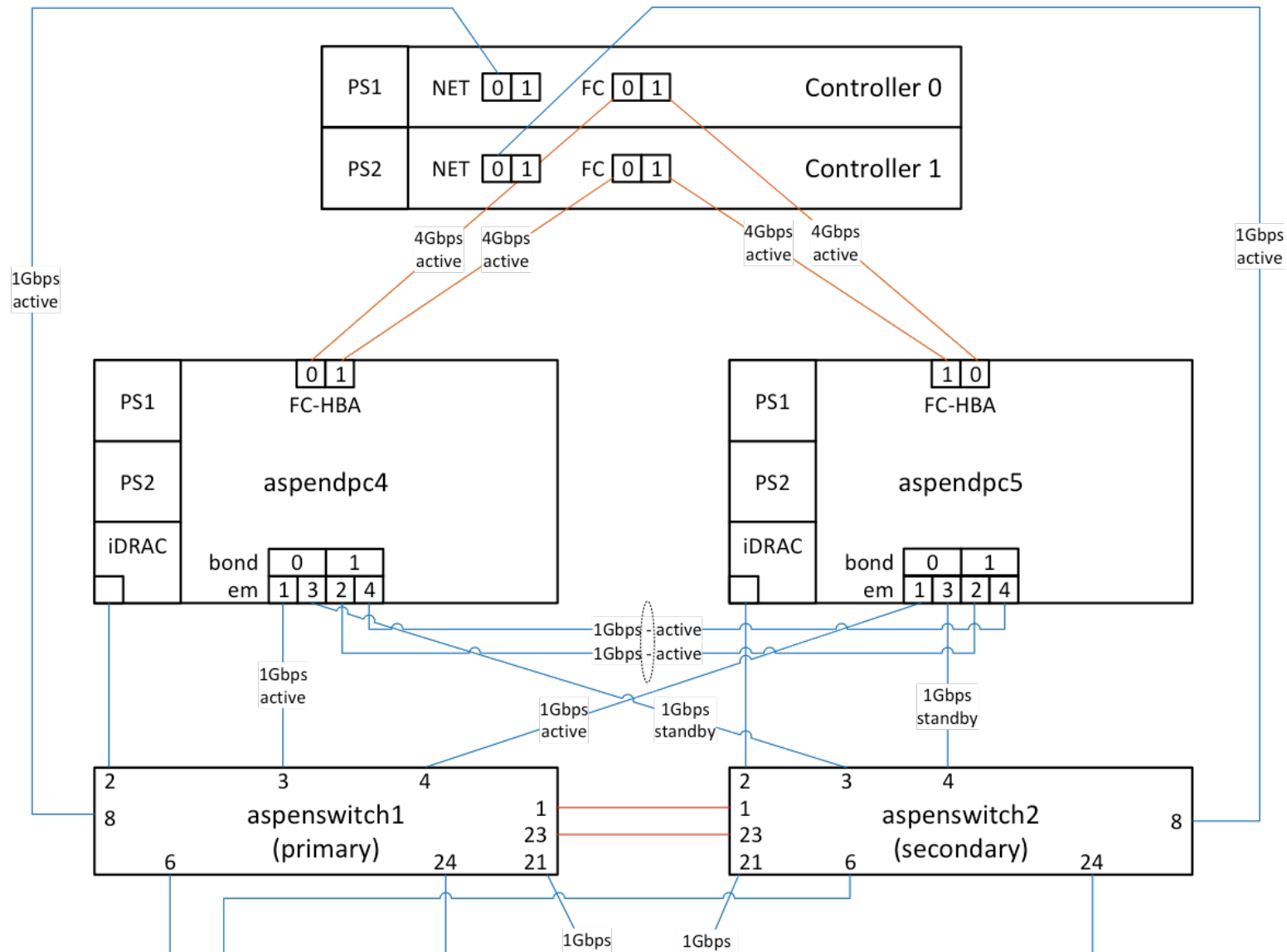
Network & Infrastructure



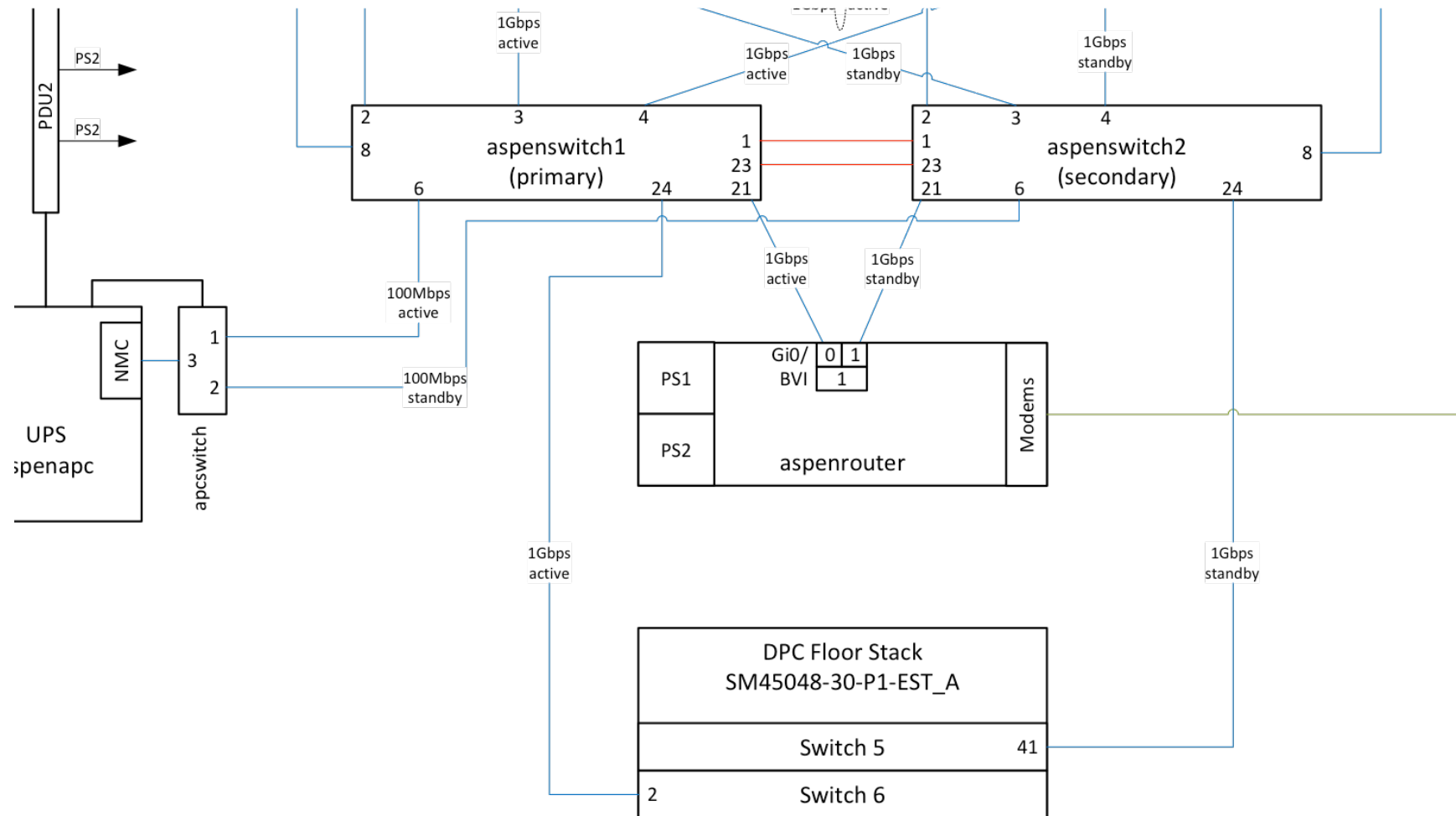
Redundancy



Redundancy



Redundancy



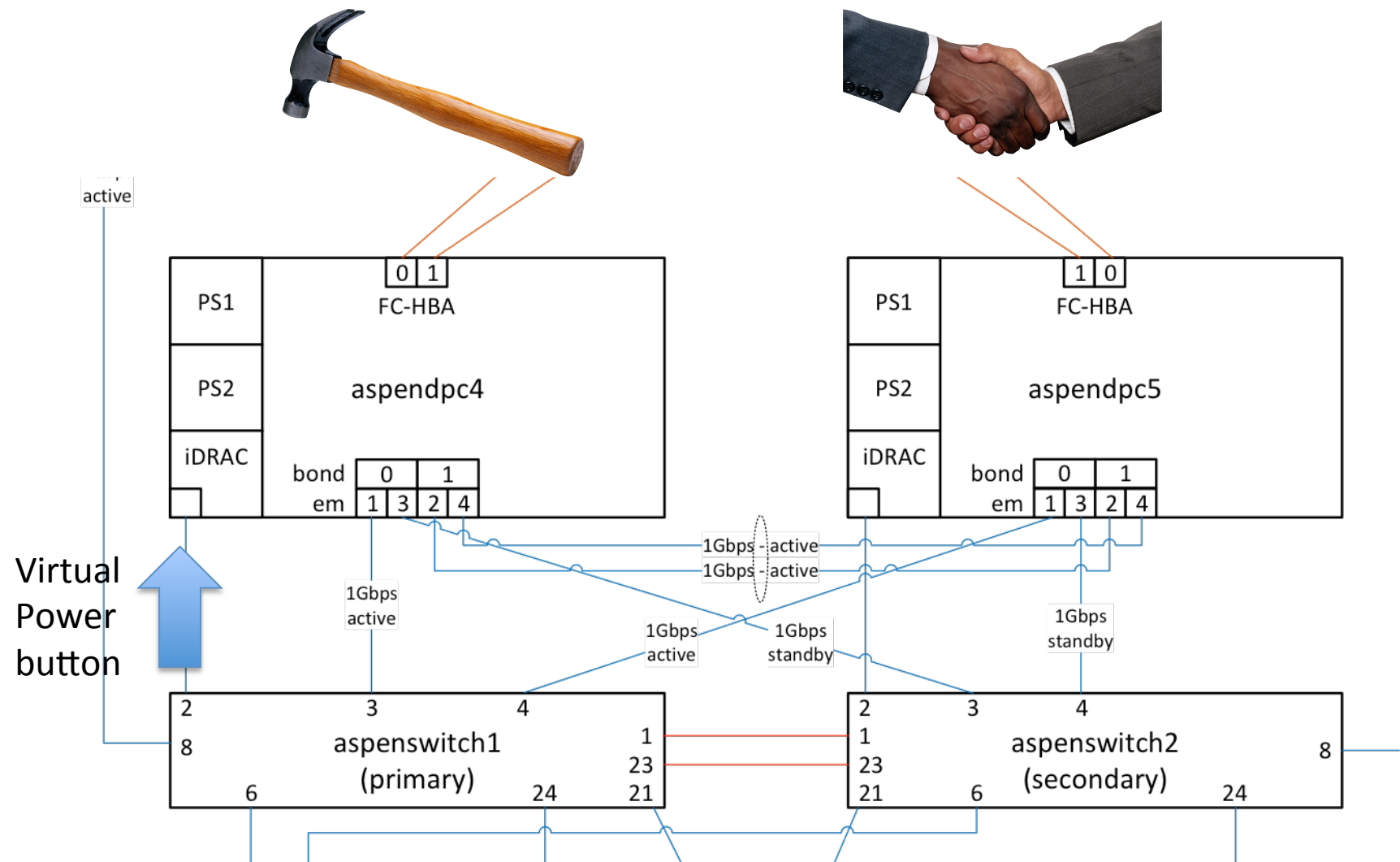
OS & Cluster software

- Red Hat Enterprise Linux 6.5 Server
- Red-Hat Enterprise Linux High-Availability Add-On
 - Corosync cluster engine
 - complex cluster framework
 - maintains communications and
 - in-memory cluster database
 - Pacemaker resource manager
 - Single configuration tool „pcs“
(pacemaker/corosync configuration system)
 - Resource agents
 - OCF (Open Cluster Framework)
 - LSB (Linux Standards Base)
 - Fencing

Fencing

- Isolate a mal-functioning node
- STONITH = **S**hoot **T**he **O**ther **N**ode **I**n **T**he **H**ead
- Last resort for unresponsive nodes or resources
- Establish a well-known-good state (after boot)
- Utilize built-in server hardware (iDRAC,BMC)

Fencing



Antelope Failover

- LSB 3.2.0 compliant init script
(LSB = Linux Standards Base)
- Start/Stop/Status
- Customized S99antelope script
- Pacemaker resource agents
 - Virtual IP address (ocf::heartbeat:IPaddr2)
 - Storage (ocf::heartbeat:LVM)
 - Filesystem (ocf::heartbeat:Filesystem)
 - Antelope (lsb:antelope-*)

Sample Antelope Subsystem (antelope-proc)

- /etc/init.d/antelope
- /etc/init.d/antelope.pl
- /etc/init.d/antelope-proc
- /etc/sysconfig/antelope-proc
- Pacemaker Resource Group: RANPROC
 - ranproc-IP (ocf::heartbeat:IPaddr2)
 - VolGroup02 (ocf::heartbeat:LVM)
 - VolGroup02-Aspen (ocf::heartbeat:Filesystem)
 - antelope-proc (lsb:antelope-proc)

Antelope Failover

- Pacemaker checks Antelope subsystem status
- When Antelope stops it is restarted, if it fails too often it is restarted on another node
- All resources needed by Antelope subsystem are moved with Antelope (resource group)
- If a resource (group) cannot be stopped the node is fenced (rebooted/reset) before the Antelope subsystem is started on the other node.

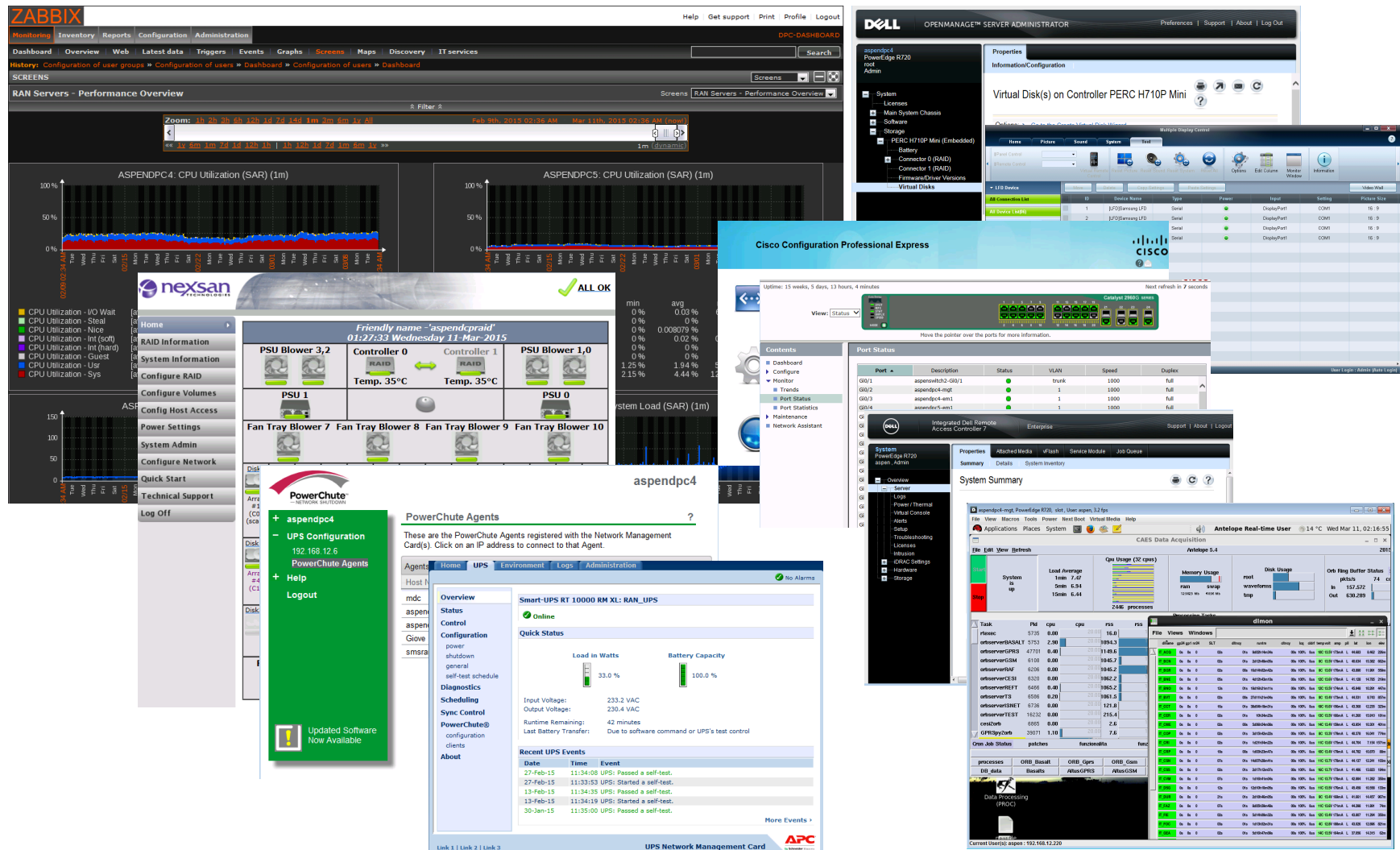
Cluster Caveats

- Fencing is a (useful) beast
 - Timeouts
 - Turn off STONITH during testing
 - Avoid power off fencing (try reboot instead)
- Resource groups
 - Keep it simple
 - Avoid large resource groups (long chain)

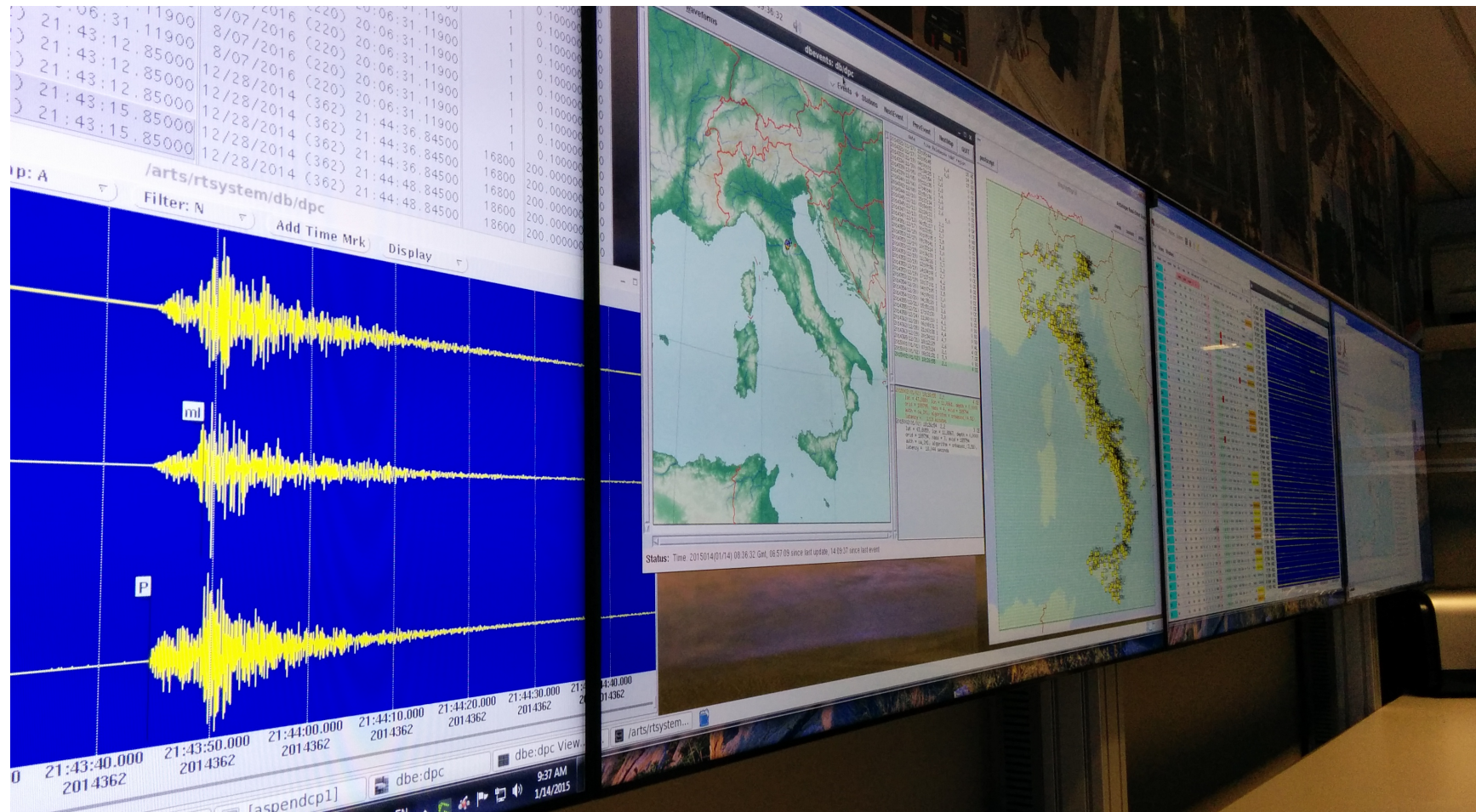
Management & Monitoring

- Web-based component managers
 - Dell Remote Access Controller
 - Storage controller
- OpenManage Server Administrator
- Zabbix
 - IPMI and SNMP based hardware monitoring
 - System monitoring
- Alerting (E-mail)
- PowerChute Network Shutdown

Management & Monitoring



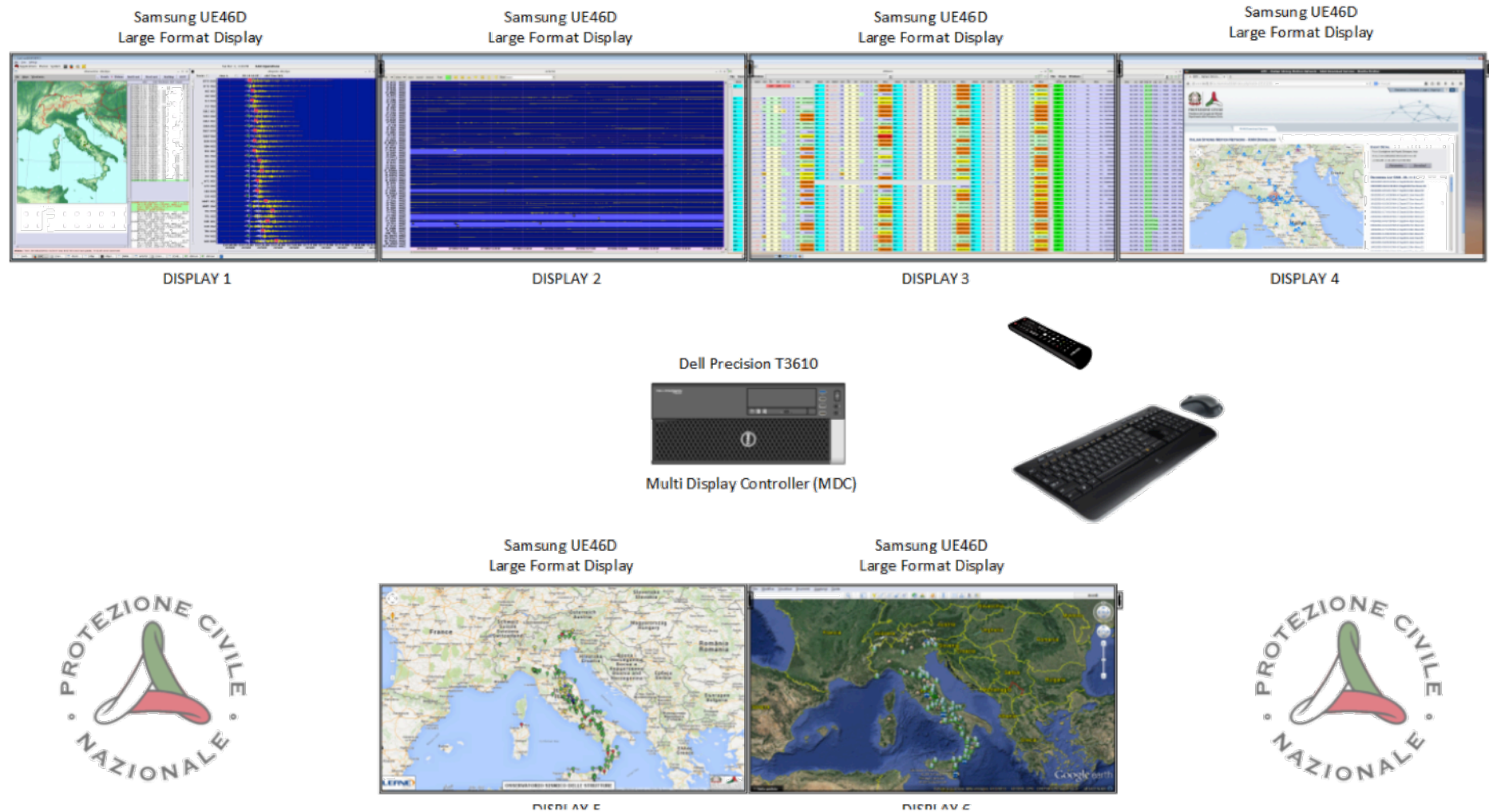
Seismic Monitoring Center



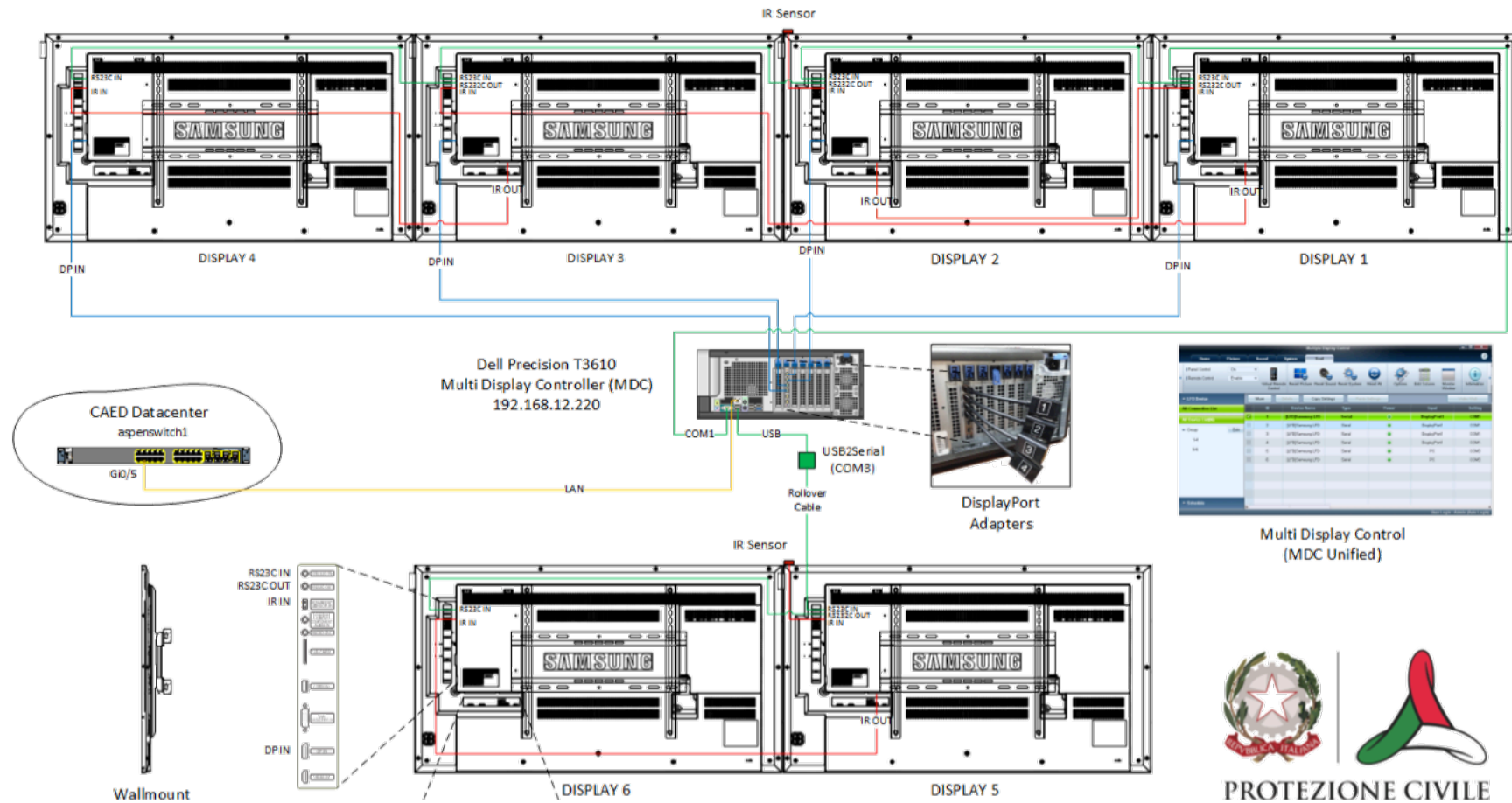
Seismic Monitoring Center

- COTS hardware & software
- Windows Workstation
- X-Windows virtual desktops
- Web-based information systems
- Flexible videowall solution
- Monitoring & control facility

Seismic Monitoring Center



Multi –Display Control



THANK YOU



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