

NIIF Cloud Infrastructure and Services

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Why?

The task of the NREN provider

To provide useful IT services to academic institutions those are either not found on the market or at least not at a reasonable price.

(And the cloud is Such A Thing.)

The problem

- Unconsolidated infrastructure
 - Static hardware configurations
 - Overprovisioning
 - Fragmented free capacities
 - Waste of hardware resources
- Hardware dependency
 - Failure sensitivity
 - Classical HA is expensive and limited, “new school” HA is immature
- Institutions: lack of possibilities and know-how to provide service reliably and efficiently

Project focus

- Infrastructure as a Service
 - Full virtualization of the infrastructure
 - Virtual machines, virtual networks, disk images, etc.
 - Not GlaaS (Grid Infrastructure as a Service)
 - Although it's designed with this also in mind
- Solution no software
 - Integrated storage management
 - Special network requirements
 - You need servers, storage, and network

Project schedule

- Project launch: February 2010
- 1st phase end: December 2010
- January 2011 – present: “1.5th” phase, beta test
 - Robustness
 - Multipathing
 - Distributed filesystem (Ceph)
 - Essential features
 - (Web-based) GUI
 - Access control lists
 - Deployment

Features

- Features
 - Public cloud: authentication & authorization
 - Self-service private virtual network management
 - Live migration of VMs between sites
 - Console access to VMs
- Non-features (yet!)
 - VM configuration modification (hot-/coldplug)
 - Sophisticated image and virtual disk management
 - Fine-grained access control system

(Seeds of) Features for the academia

- Dynamic scaling of existing computing resources
- Virtual networks
 - Self-service
 - Virtually L2 connected
 - Extensible beyond the cloud
- VM systems
 - Networks + arrays of VMs
 - Deploy “now or never”
 - Deterministic worst case job completion time

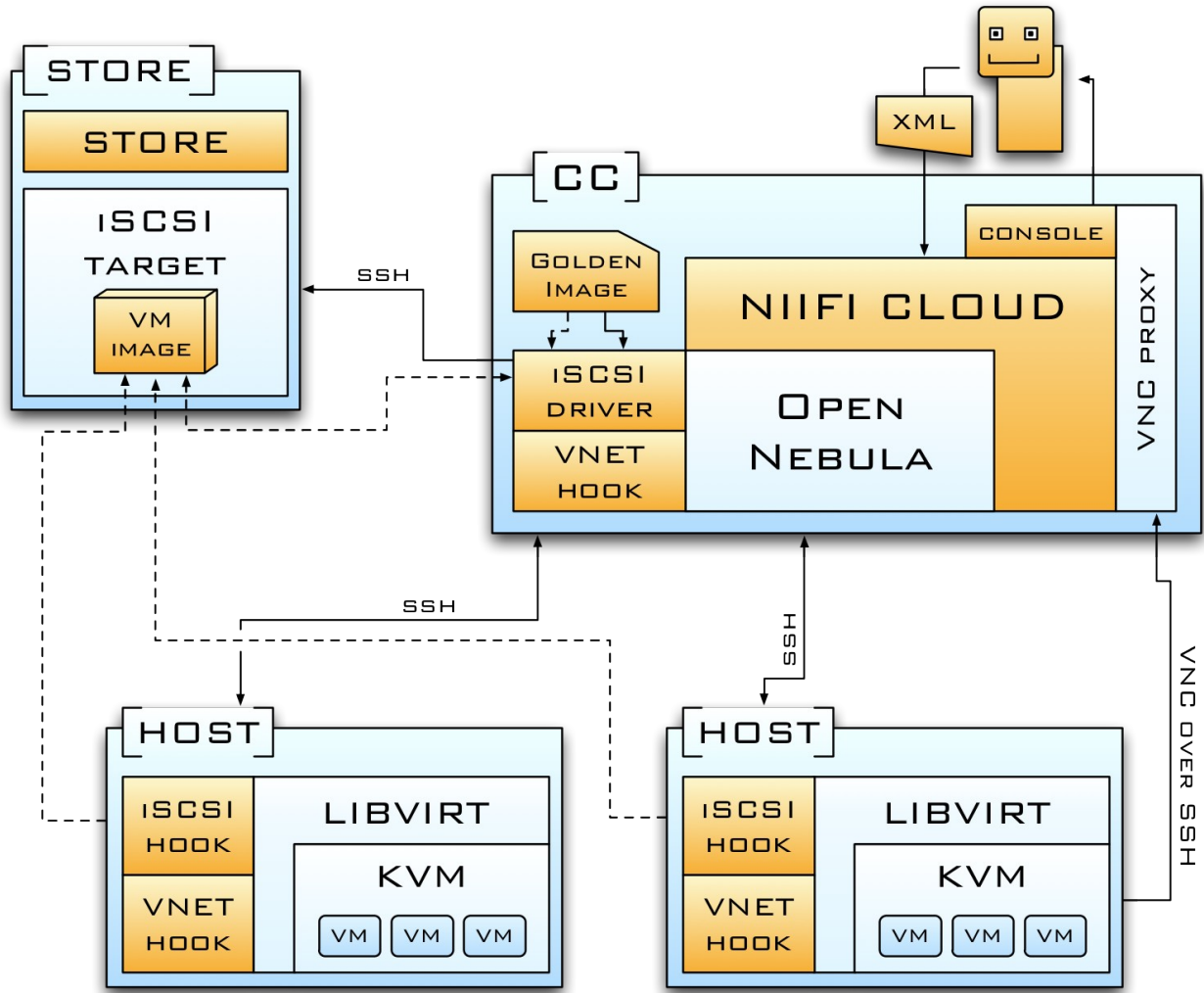
Entities

- Virtual Machine
 - Name + CPU + memory + disks + boot device + network interfaces
- Network
- Golden image (disk image)
 - Always clone, exclusive, read-write
- CD image
 - Never clone, shared, read-only
- Virtual machine systems
 - Networks + arrays of VMs

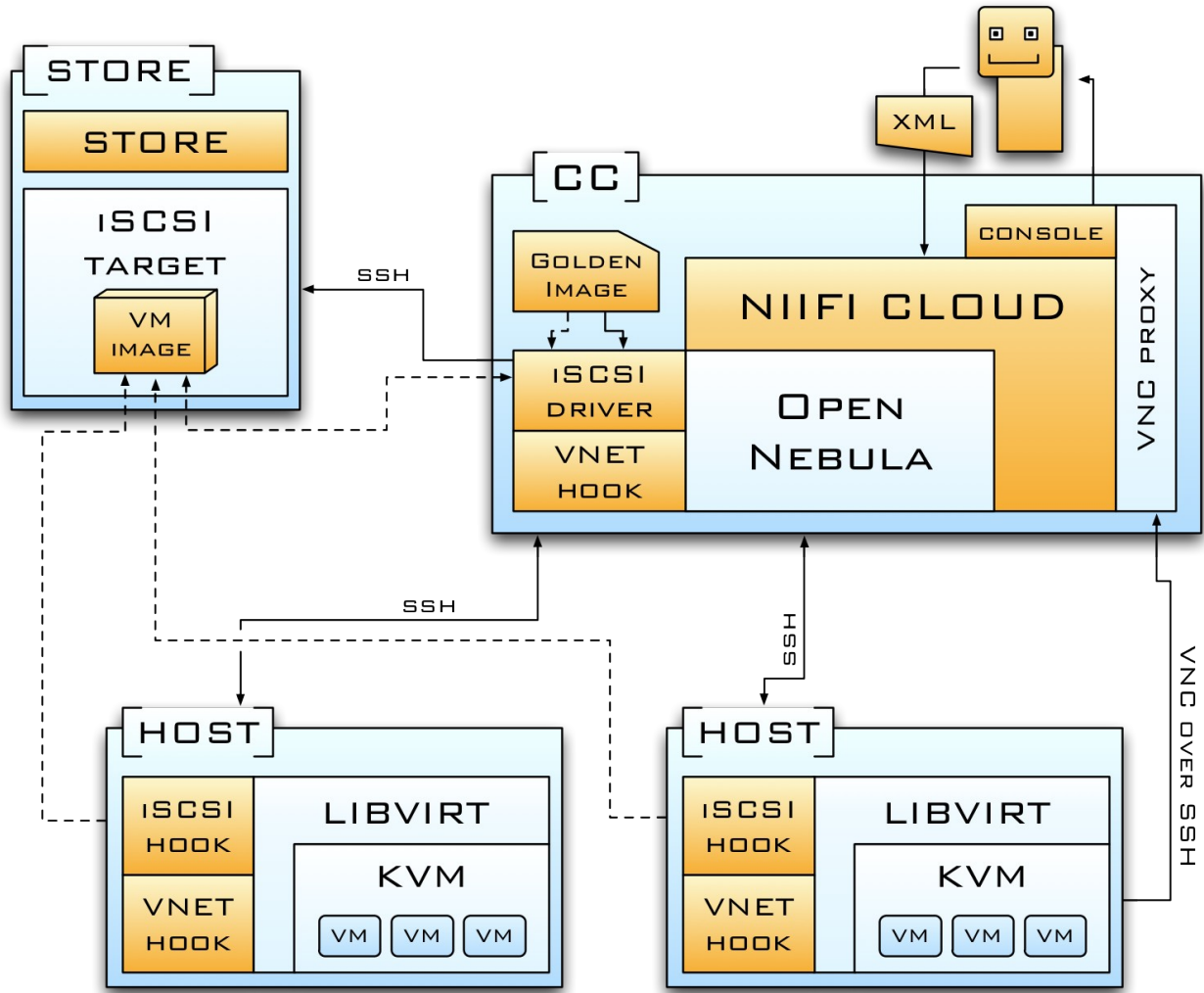
A fundamental assumption

One virtual disk = One iSCSI target

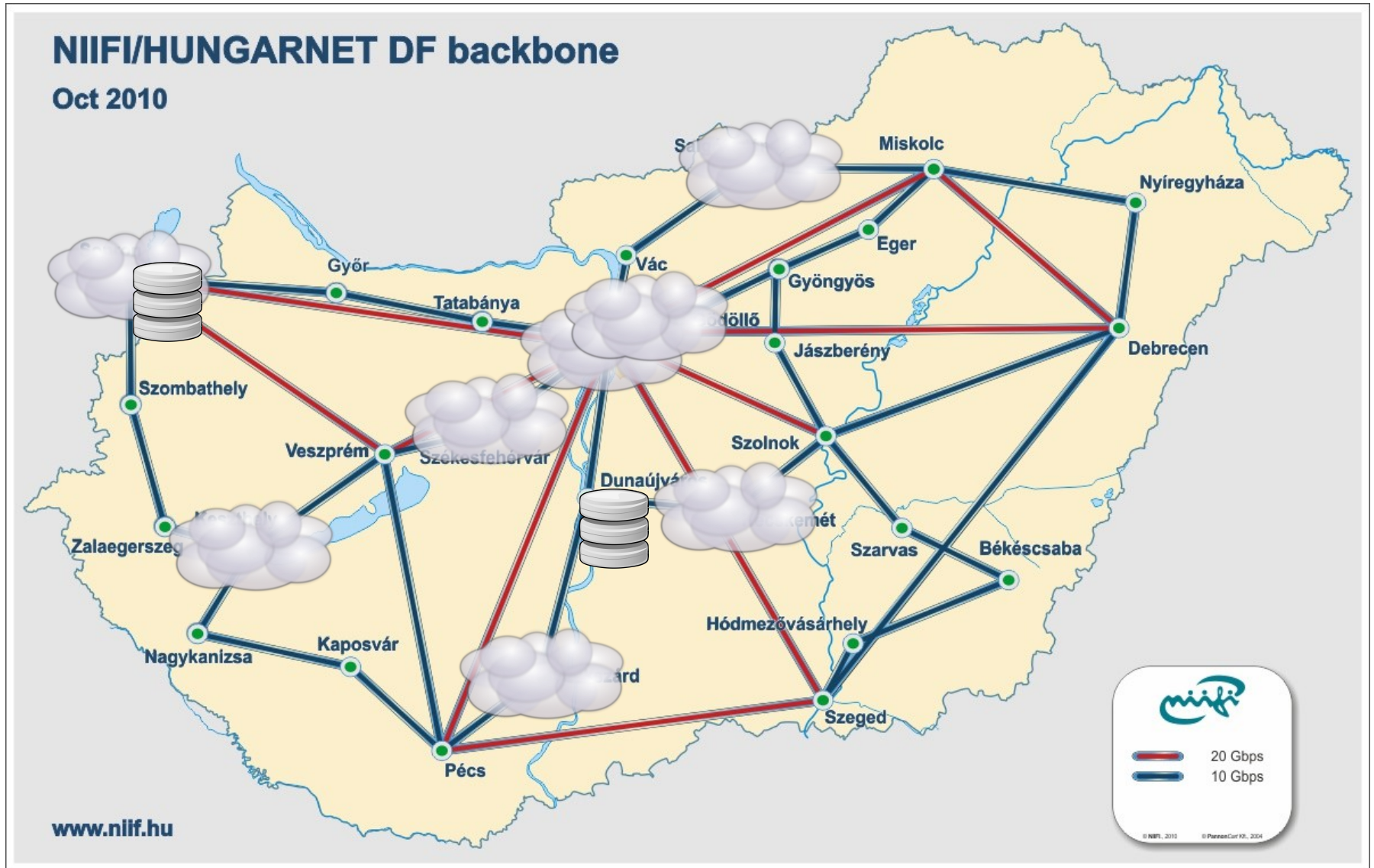
Under the hood



Under the hood



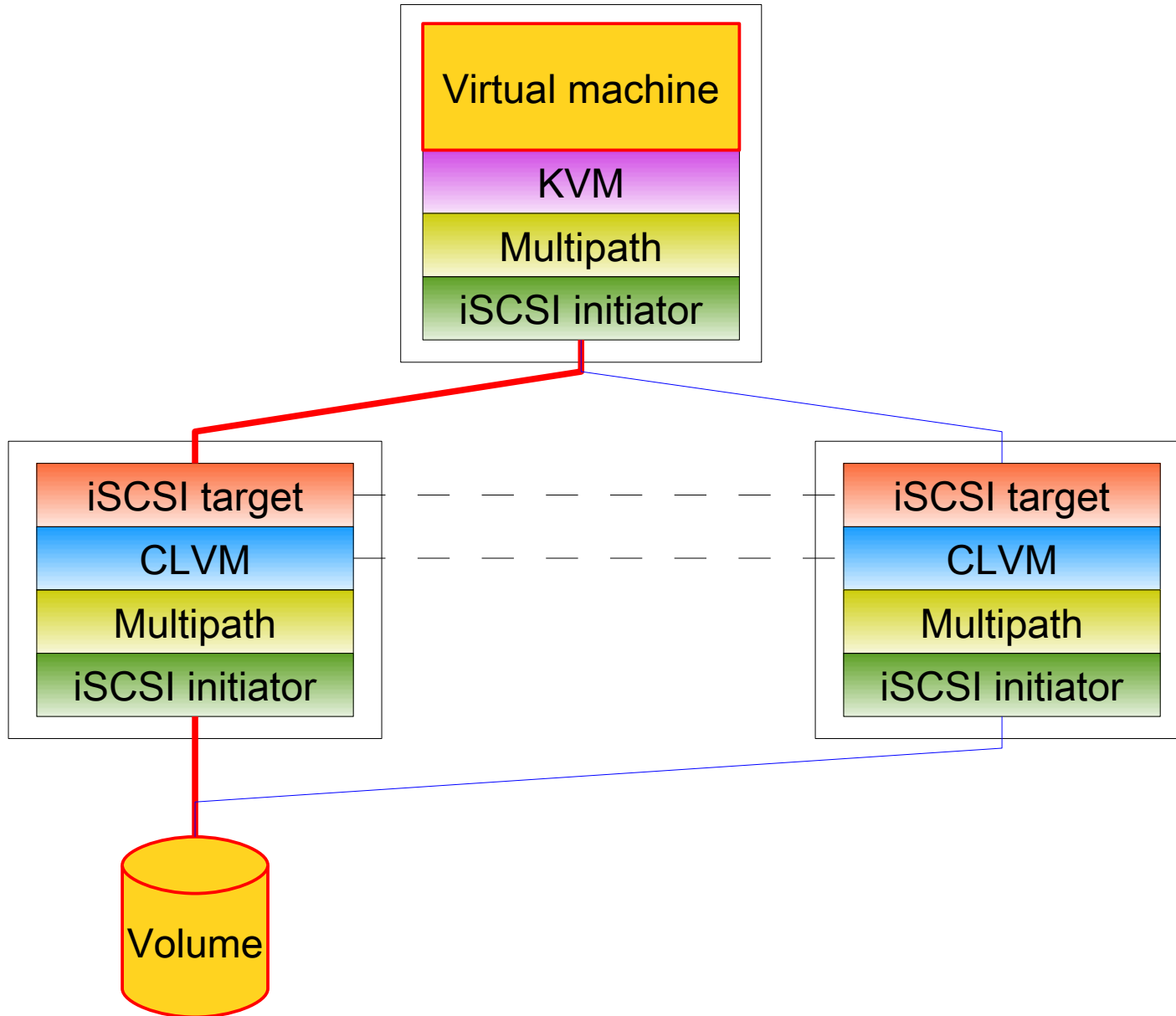
Physical deployment



Backend storage (plan)



Virtual disk access



Tasks before release & plans

- Access Control Lists (done)
- Distributed storage (done)
- GUI (done)
- Deployment

~~• Cold-/hotplug support (CPU, memory, disks, NICs, etc.)~~

public release

- Replace OpenNebula
- IPv6 support
- Exploit grid features
- Add more features (snapshotting, persistent disks, APIs, etc.)
- Modularization

Thank you. Question time!

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