Towards XtreemOS in the Clouds

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Outline

XtreemOS Objectives

- Design & implementation of an open source Linux-based Grid Operating System with native VO support
- Two fundamental properties: transparency & scalability
  - Bring the Grid to standard users
  - Scale with the number of entities and adapt to evolving system composition

Cloud Computing

- On-demand provisioning of (virtualized) resources as a service
- Commercial clouds: Amazon EC2, Microsoft Azure, etc.
- Private clouds: bring the cloud computing paradigm to institutions' resources

Different Types of Cloud Computing

- IaaS: Infrastructure as a Service
  - Elastic provisioning of virtual machines
  - User has full control over the VMs
  - Amazon EC2, Rackspace, etc.
- PaaS: Platform as a Service
  - Gives a full execution stack to developers
  - Usually tied to a specific language or development environment
  - Google App Engine, Microsoft Azure, etc.
- SaaS: Software as a Service
  - Builds on IaaS and PaaS to bring hosted software to users
  - Gmail, Flickr, etc.

Nimbus

- Open-source IaaS software
- Built on the Globus toolkit
- Replicates the Amazon EC2 API
- Uses Xen as the virtualization technology

XtreemOS in the Clouds

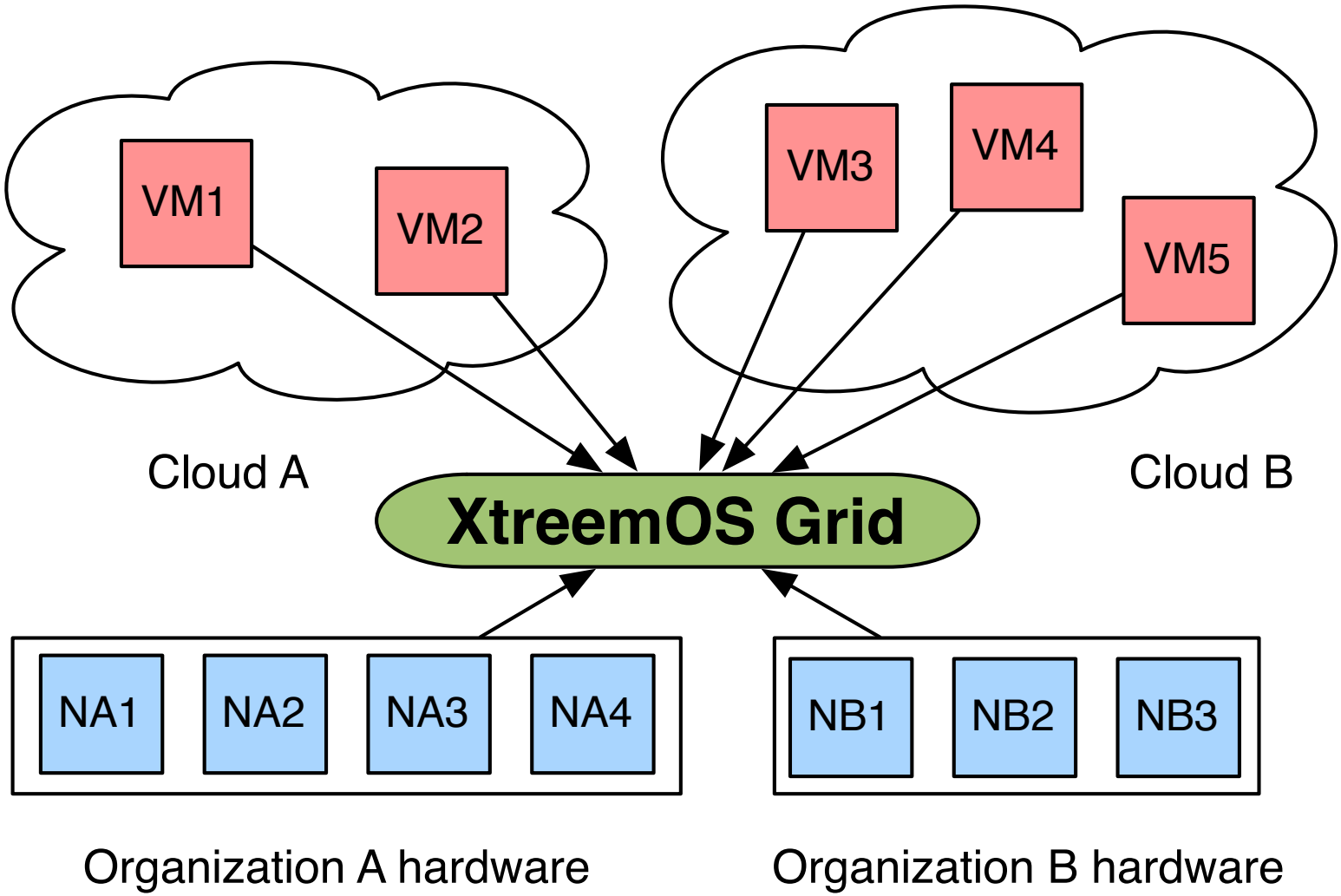
XtreemOS for Supporting Cooperation over Clouds

- XtreemOS used to support cooperation between users and organizations over clouds
  - Distributed services of XtreemOS bring significant advantages to end-users
  - XtreemFS, VOs, etc.

Dynamically extend XtreemOS to use cloud resources

- Institutions participating in a XtreemOS grid might need additional resources
- Use cloud computing resources when no more physical resources are available

Dynamic extension of XtreemOS



Dynamic extension of XtreemOS

- AEM: Application Execution Manager
- XtreemOS service responsible for finding resources and monitor execution of a job
- Goal: extend the AEM service to dynamically use cloud computing resources

Work done by Eliana

- Deployment of XtreemOS core and resources nodes on a Nimbus cloud
- Automatic configuration of XtreemOS resource nodes (joint work with Yvon)
- $\Rightarrow$ building blocks for extending XtreemOS on the cloud

Conclusion

- XtreemOS: Linux-based Grid Operating System with native VO support
- Dynamic extension of XtreemOS
  - Brings the Cloud to standard users
  - On-demand scaling
- Future works
  - Integrate Nimbus/EC2 client with the AEM
  - Set up policies in the AEM to trigger reservation of cloud resources
  - Test on Nimbus and Amazon EC2