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# Experiences of Interoperability across Cloud Infrastructures using OpenNebula

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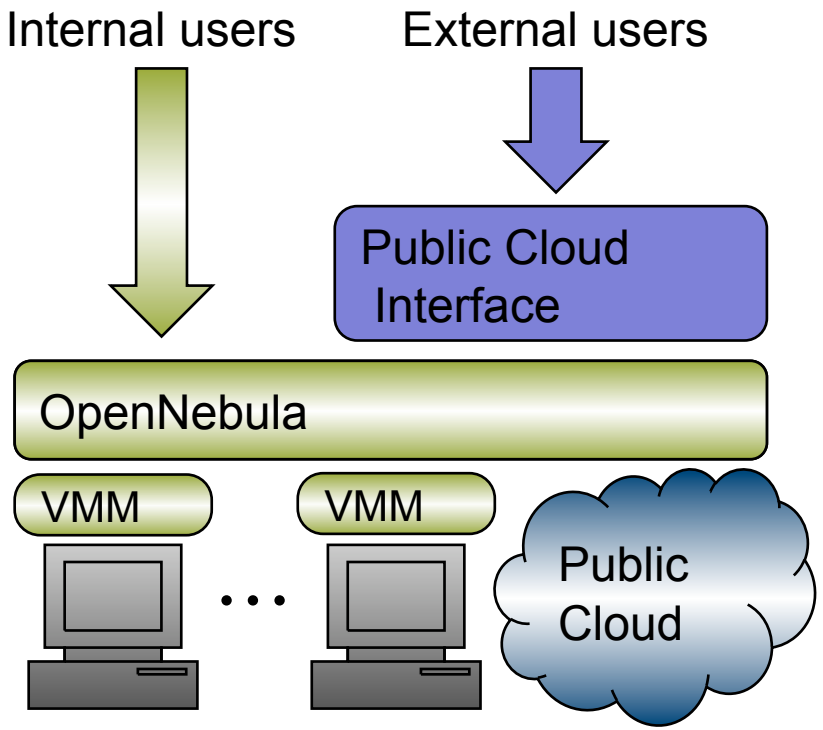
# What is OpenNebula?



## Extending the Benefits of Virtualization to "Distributed Infrastructures"

- Dynamic deployment and re-placement of virtual machines on a pool of physical resources
- Transform a rigid distributed physical infrastructure into a flexible and agile virtual infrastructure




- Backend of Public Cloud: Internal management of the infrastructure
- Private Cloud: Virtualization of cluster or data-center for internal users
- Cloud Interoperation: On-demand access to public clouds

# Open and Flexible Architecture

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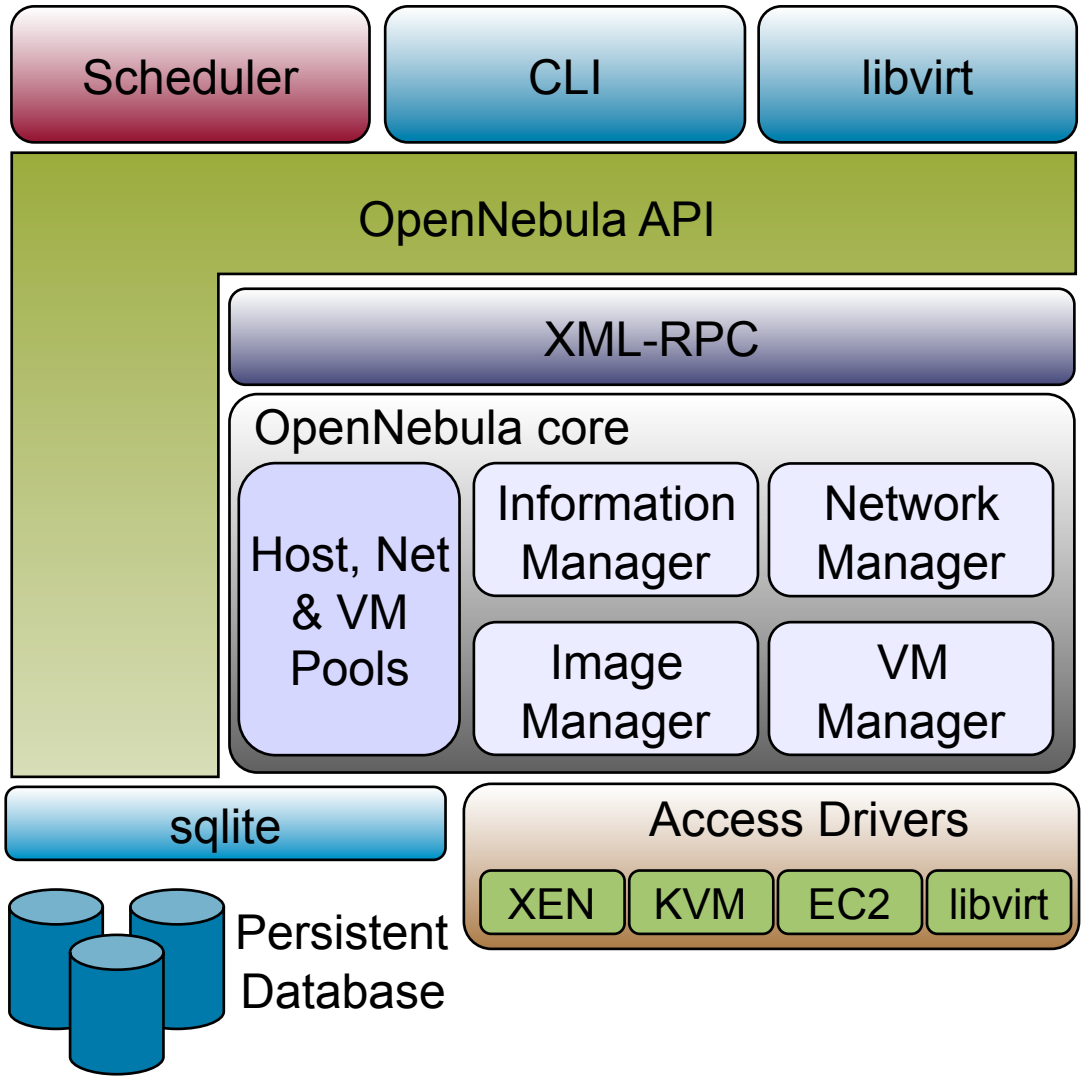

# Cloud Interoperation

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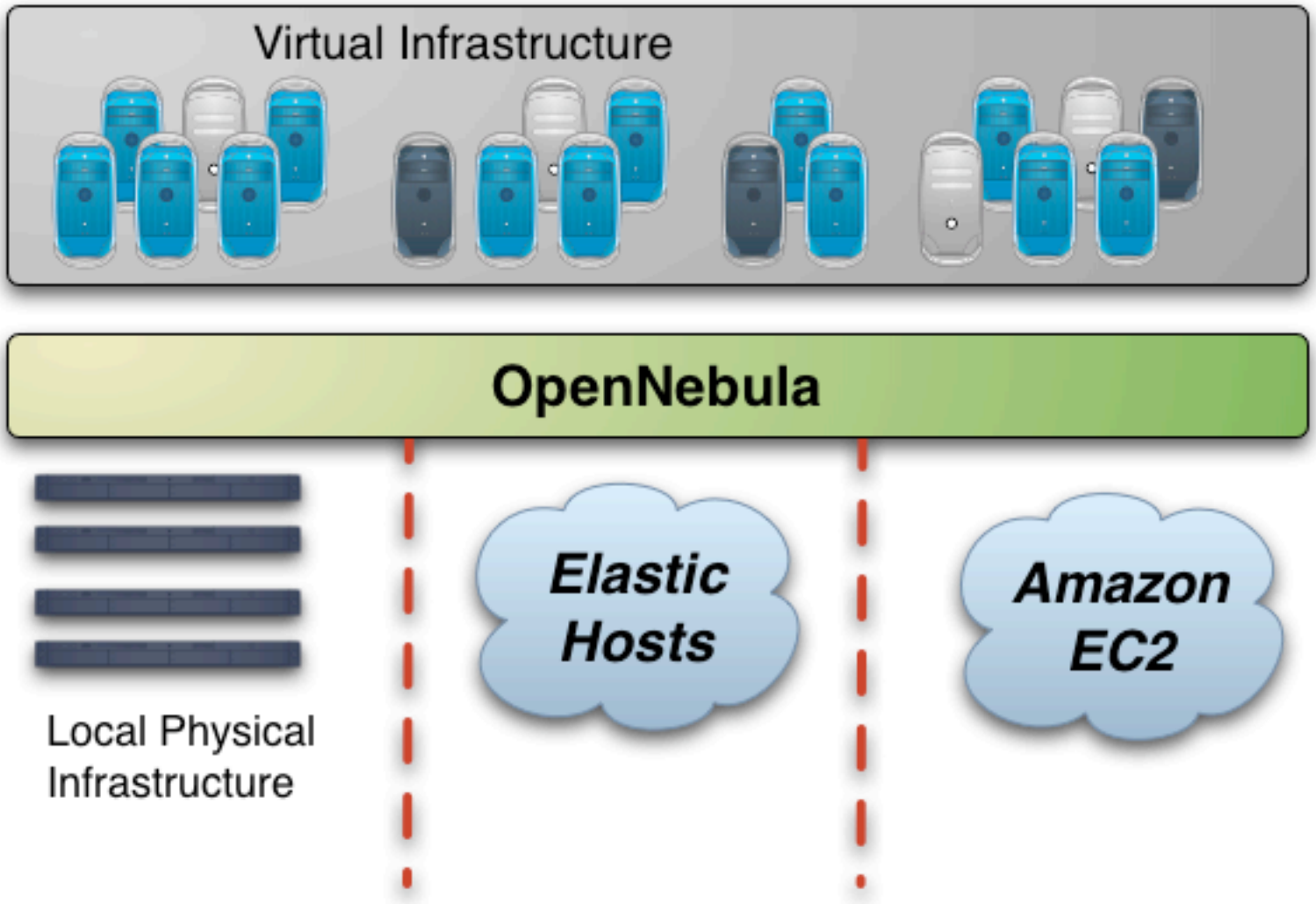
## Service running on geographically distributed resources





# How do we achieve it



## Common template

- Richer attributes for local deployment
- Specific section for each cloud provider with limited attributes

## Image Management

- Need to preregister images in S3 / Drives API
- Checkpointing not allowed: no migration
- Different possibilities: EC2 1 image, EH multiple

## Network Management

- Local VMs = total control
- EC2, EH = public IPs
    - SGE Use Case: Need to set up VPN

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# How do we achieve it



## Mapping of VM life-cycle commands

| OpenNebula | Amazon EC2 | ElasticHosts Server API |
|---|---|---|
| create | ec2-run-instances | /servers/create |
| shutdown | ec2-terminate-instances | /servers/SERVER/shutdown |
| cancel | ec2-terminate-instances | /servers/SERVER/destroy |
| save | N/A | N/A |
| restore | N/A | N/A |
| migrate | N/A | N/A |
| poll | ec2-describe-instances | /servers/SERVER/info |

# Conclusions



## Simple API for VM management

- **Amazon EC2**
  - de-facto standard
  - maybe too complex
- **ElasticHosts**
  - neat and simple
  - easy client development

From the point of view of cloud interoperability, the principal concern should be to find a subset for VM life cycle management. Following this principle, ElasticHosts REST API is a good starting point

THANK YOU FOR YOUR ATTENTION!!!
More info, downloads, mailing lists at
www.OpenNebula.org

# Come and see a Demo in Booth 4

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www.reservoir-fp7.eu/

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