# A retrospective outlook on home-grown IaaS services

## Lessons learned

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# The rationale - motivations

- During the establishment of the in-house NOC we had to re-design & re-house all servers,
- Recession paves the way for consolidation of infrastructures,
- Small institutions could not/want to cope with hardware management; need to focus on provisioning of advanced services,
- Not mature (free) solutions at that time,
- A challenge we cannot miss.

# Design decisions

- Simplicity,
- Flexibility,
- Re-use existing components,
- target commodity hardware,
- release to community as open-source.

# IaaS Platforms

Virtual Machines (ViMa)

- Software project name: ganetimgr
- Stable VPS service
- Apply → Approve / Install → Run/Re-install
- Long-running VMs
- Geared towards Power users/Administrators
- Controlled resource usage
- Monitoring of clusters/nodes/jobs
- Stateless architecture
- FAST
- (Very) easy to setup
- No API (yet)

# IaaS Platforms

~okeanos

- Software project name: synnefo
- Operates on ganeti clusters
- Exposes OpenStack APIs (Nova, Neutron, Glance, Cinder) on top of Ganeti
- Services:
  - Identity (incl. SAML authentication)
  - Object Storage
  - Compute (Quotas per user/project)
  - Network
    - Users can create their own virtual networks
    - Floating IPs
    - NIC hotplugging
  - Image -User-created custom images-
  - Volume VM's disks, snapshots
  - Archipelago
    - Unified cloud storage resources
    - Decouples storage resources from storage backends
  - Very simple UI

# Show me your users!

- Students (~okeanos)
- Teachers/Classes/Labs (~okeanos)
- Science (~okeanos)
- NOCs (ViMa)
- Libraries (ViMa)
- Research institutions (ViMa)
- Ministries/Government (ViMa)

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- 125 Users
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- ~7100 Active VMs (>380k spawned)
- ~3500 Users with VMs (>10k total)
- 13 clusters

# Security concerns

Should I care?

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**A lot!**


- Dealt with thousands of abuse requests,
- Special attention is paid to avoid IP space blackhauling. Especially for ViMa,
- Dedicated security-aware helpdesk,
- Job security for CSIRT team.

# The bill please

So, how much will it cost me?

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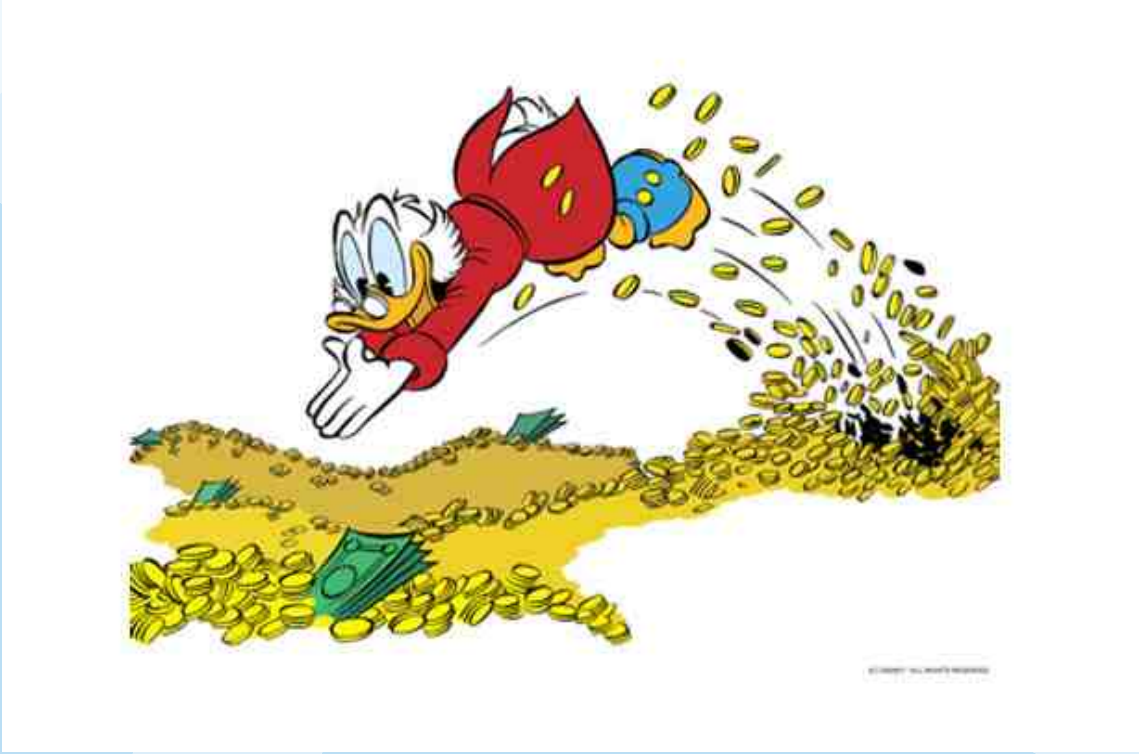
**A LOT**



# Cost categories

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- Potentially you need to design/procure and build a data center,
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## OPEX

- More contracts for the lawyers and the procurement teams,
- Call-center and helpdesk to support end-users,
- On-site support engineer(s)
- Developers,
- Engineers to operate the servers and the networks

# Actual numbers

## Assumptions

- Depreciation in 5 years
- Cost of energy based on Greek price-list,
- Environmental operational data follow Greek mean values (temperature etc).

- Energy cost  12% of the TCO
- TCO per year = ~2m€
- OPEX = 40% of CAPEX
- OPEX = 57% of TCO
- CAPEX = 42% of TCO
- ~280€/VM/year

Conclusion: Cost follows *closely* commercial prices.

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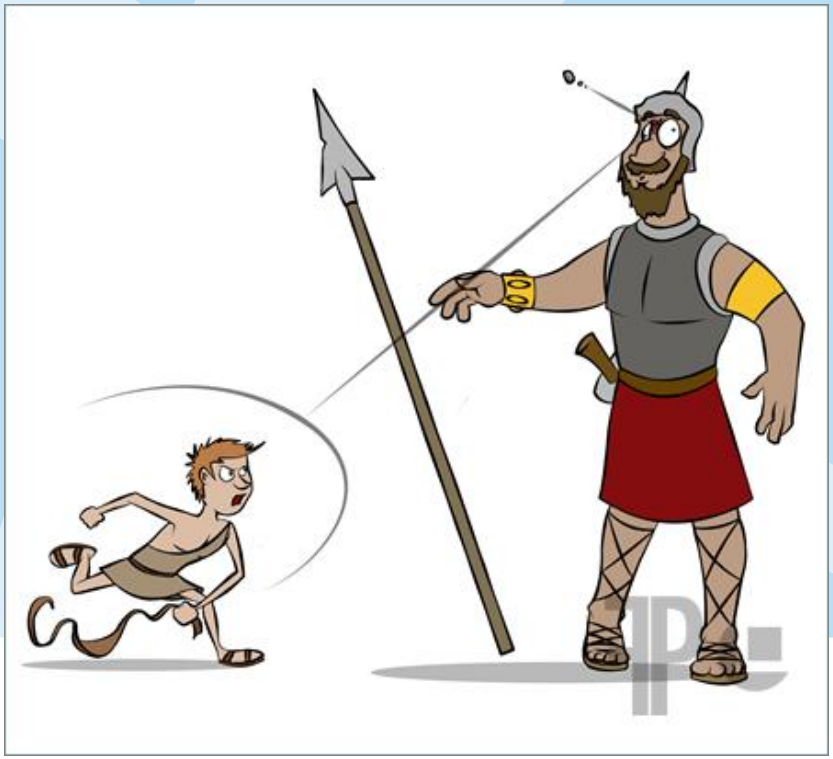

# Conclusions

- Scalable to the thousands,
- Company needs to undergo major changes. New entities/procedures/teams (DevOps, Data Center engineers, developers etc) should be introduced to the organisation,
- Users are resource-hungry; no accounting or billing will drive you soon off your limits (Caveat: we don't charge our customers),
- Keen on establishing synergies,
  - we provide resources to GNx,
  - we have eduGAINised an okeanos cluster for experimentation;
- services are tailored to the needs of this community,
- fully open-sources solutions (GPLv3),
- We gained a lot throughout this journey.

# Thank you

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