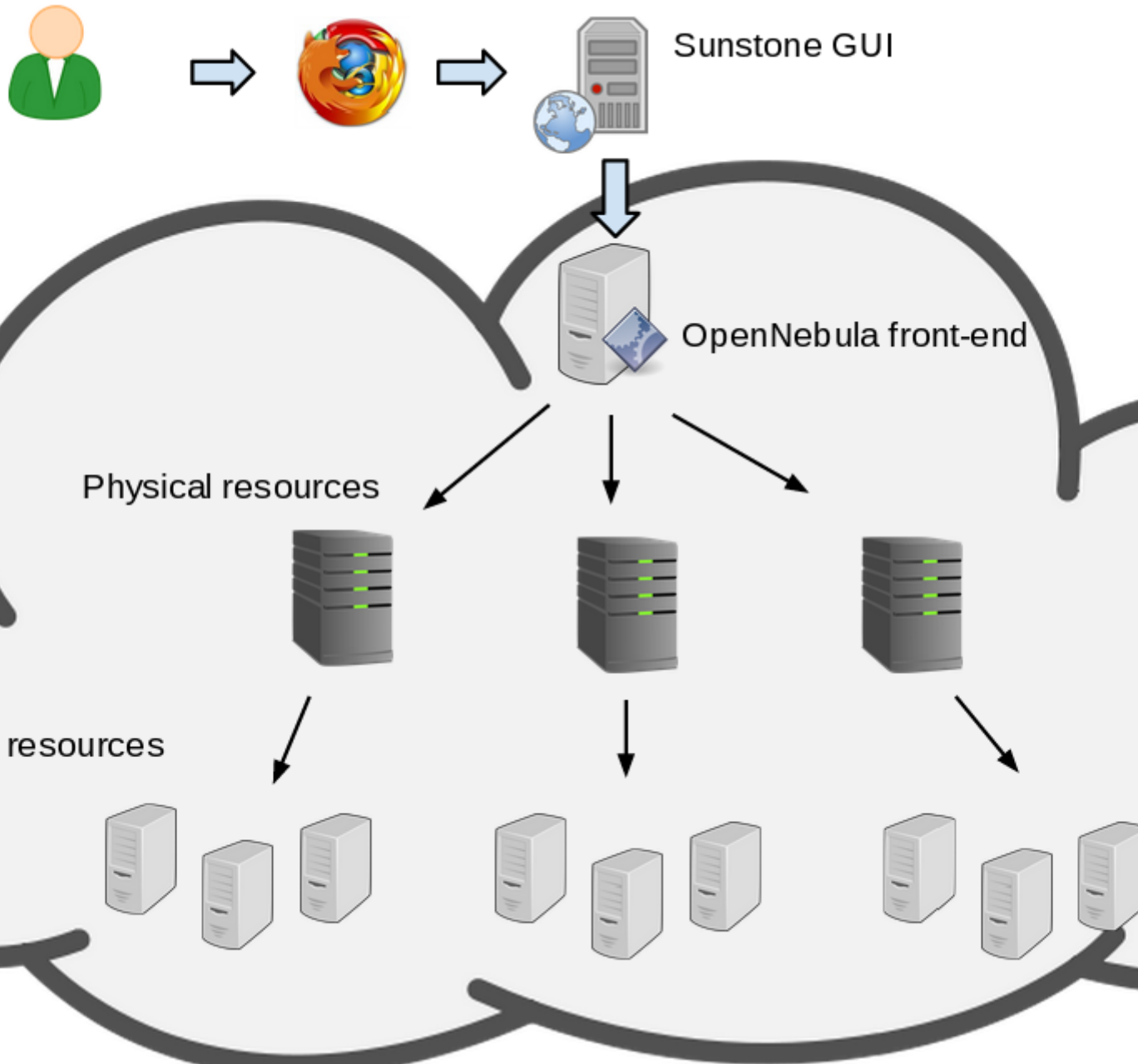


# Smart Cloud Scheduler

N. Balashov, JINR, LIT

# JINR Cloud structure

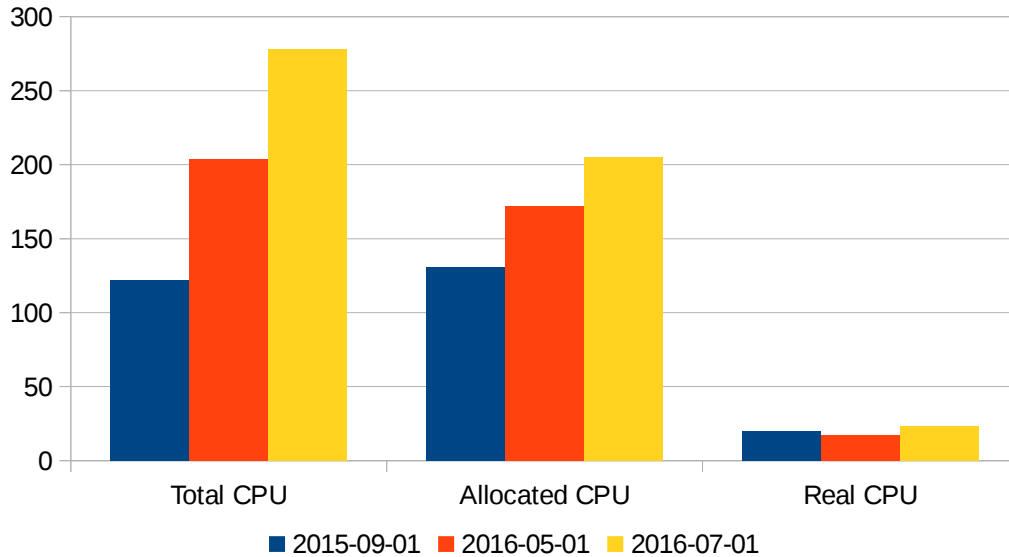


# Activities

- **Developers**
  - development, testing and debugging various apps in various environments.
- **System administrators**
  - testing and studying specifics of installation and operation of new apps or testing updates
- **Physicists**
  - Major workload source – users and grid-jobs

As much as possible strategy

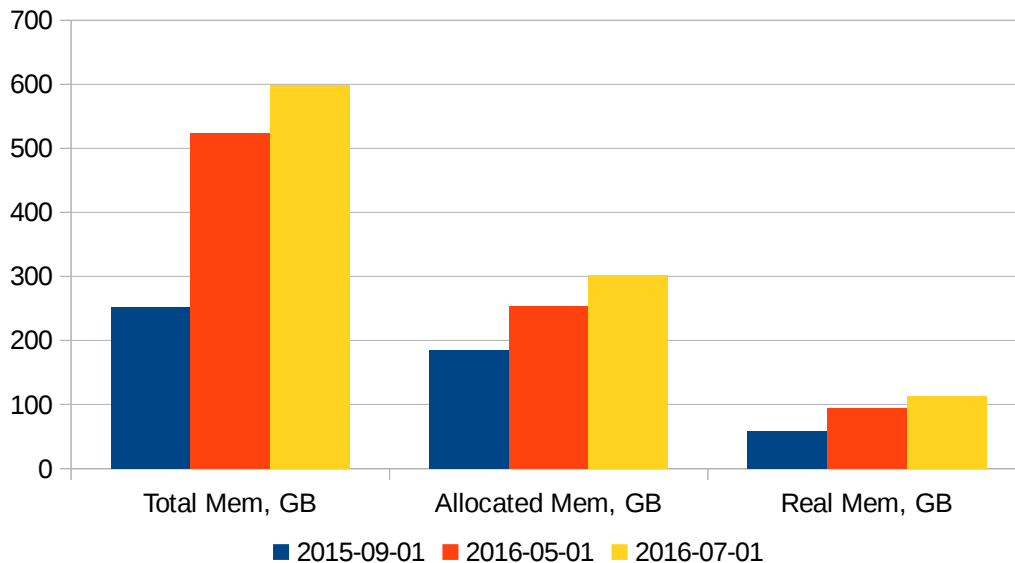
# Resources utilization



The number of VMs is growing constantly:

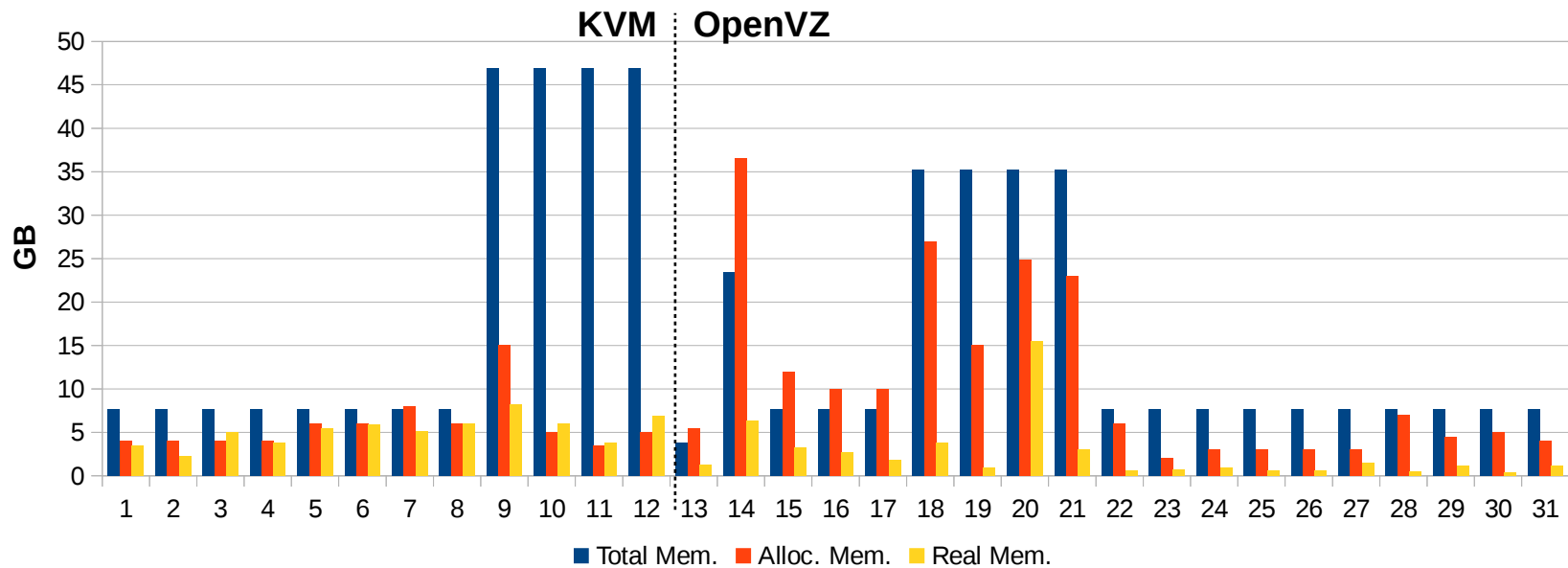
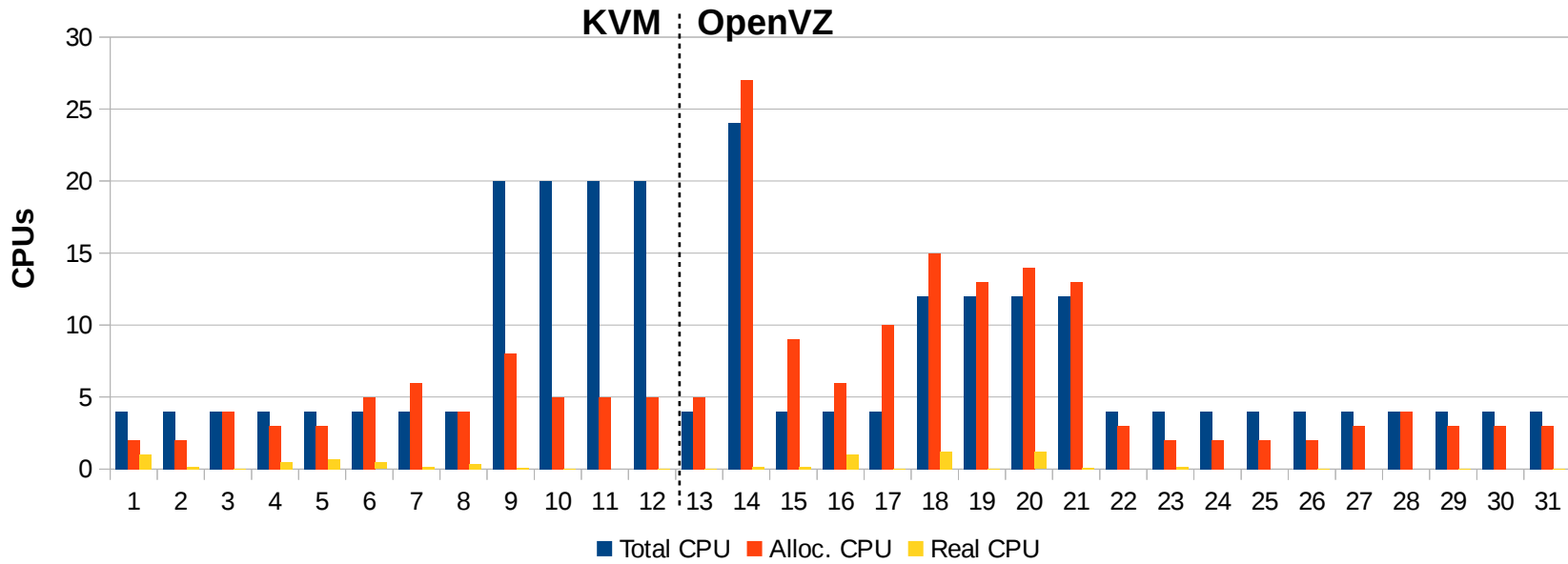
- 78 in September, 2015
- 108 in May, 2016
- 130 in July, 2016

Real CPU utilization is very low

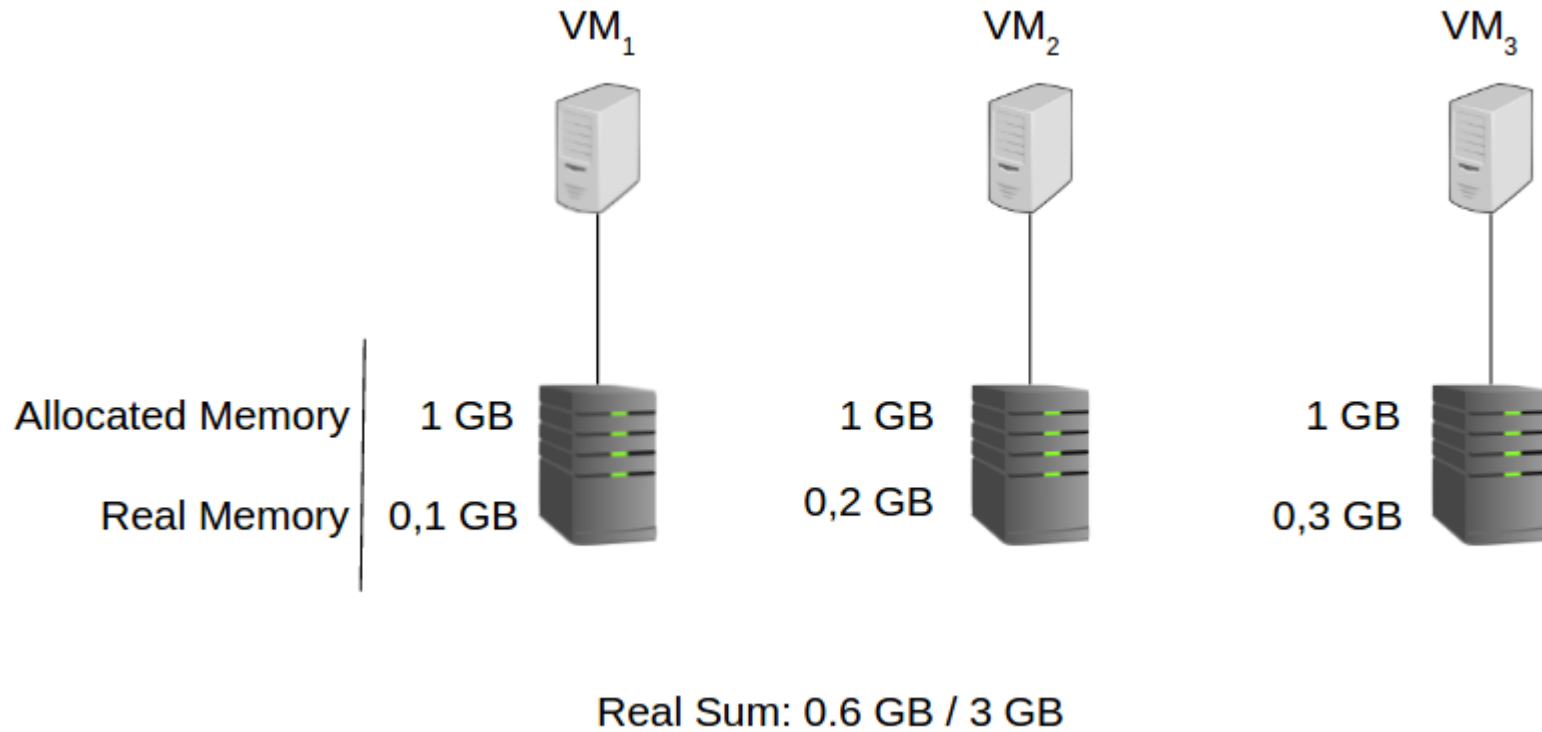


Real memory utilization is better, but still could be better

# Per Host Utilization



# Overcommitment



# Overcommitment

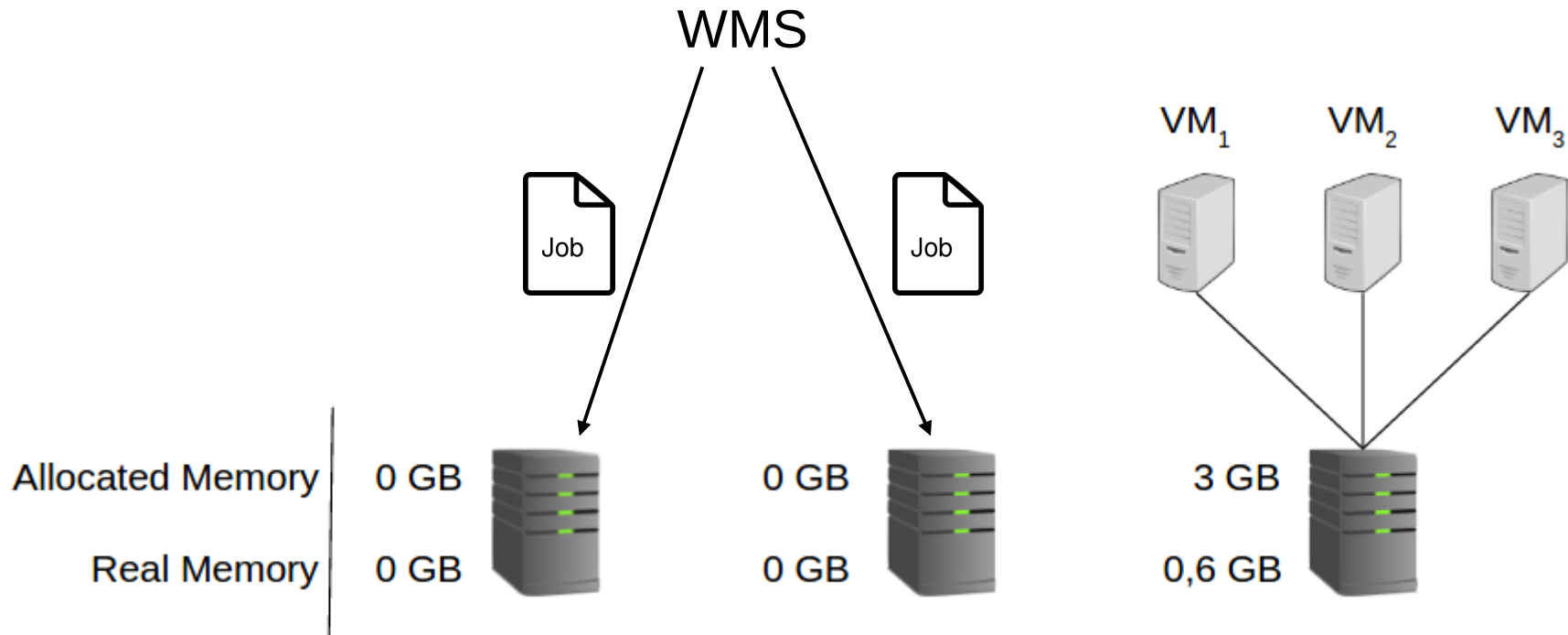


- **Improving utilization efficiency** by reusing freed resources
- **Reducing energy consumption** by suspending the nodes

Everybody does so...



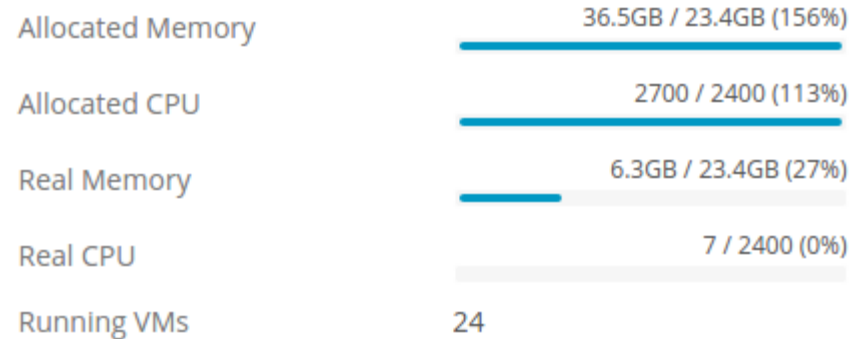
# Utilizing Opportunistic Resources



WMS: Dirac, Panda, HTCondor, Vcycle

# JINR Cloud Overcommitment

- Opennebula lacks tools to overcommit automatically
- We have to and we do overcommit manually



## Problems of manual overcommitment

The need to handle each VM creation operation manually makes sysadmin's life much harder



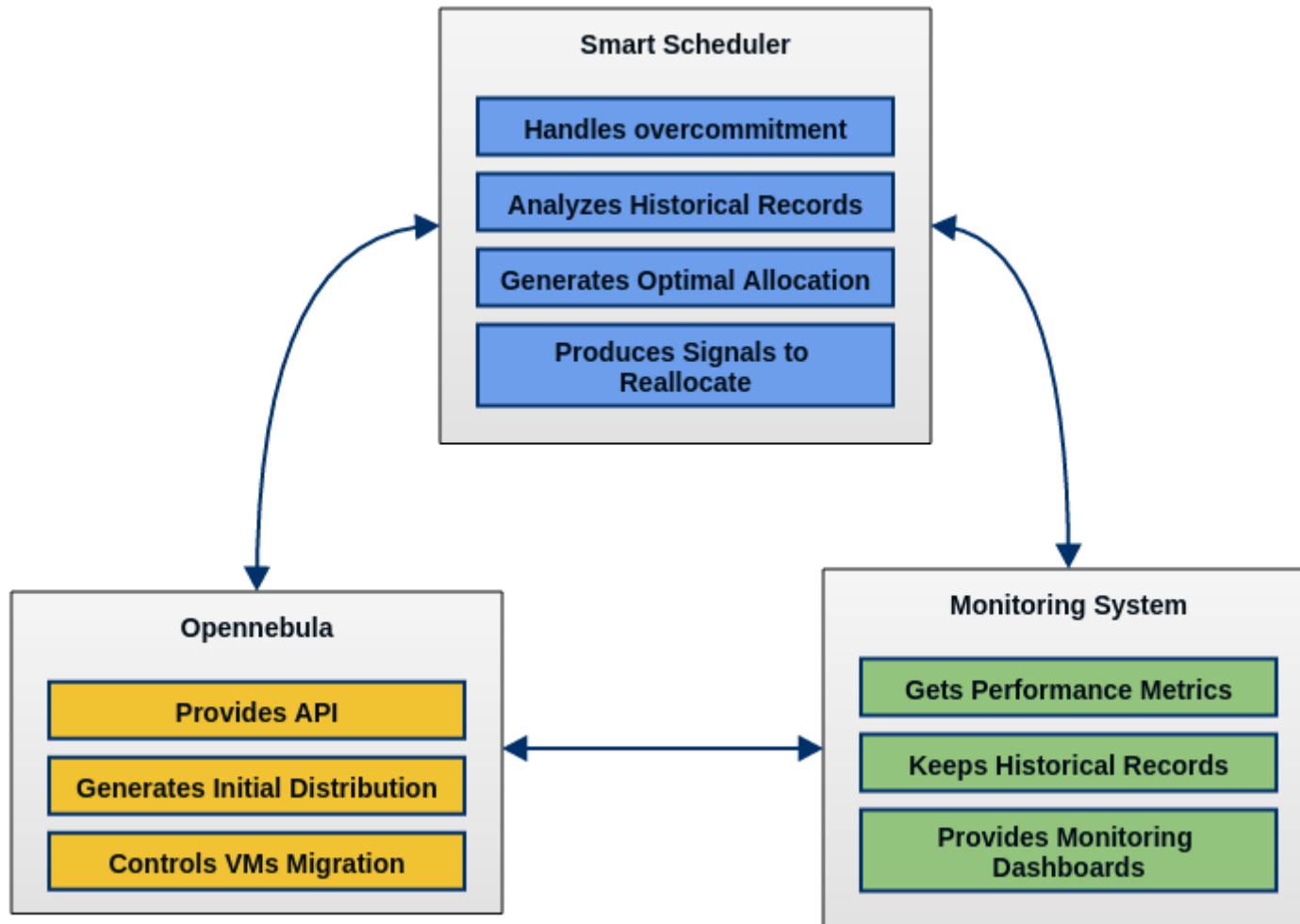
Longer response times



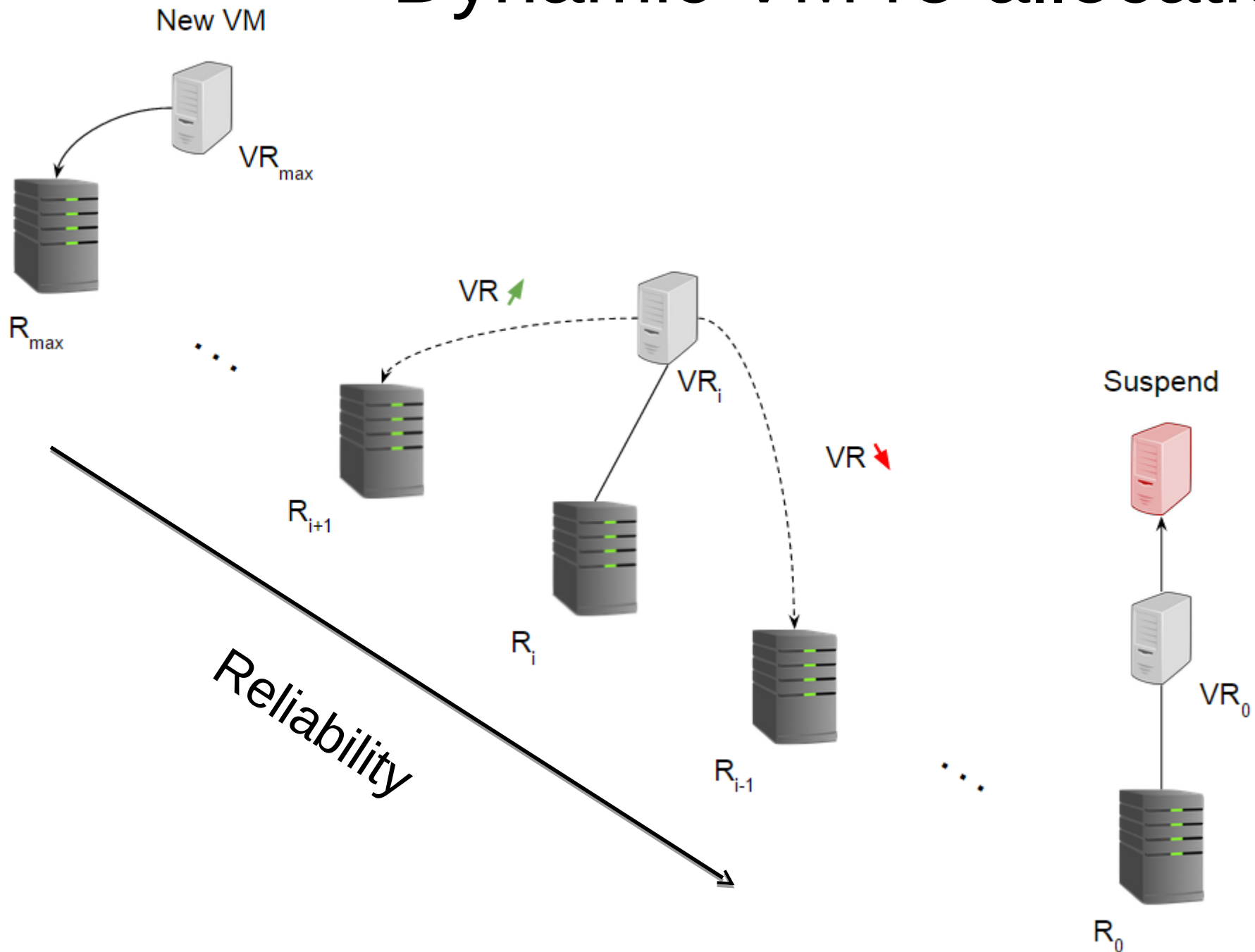
Decreases usability for the users

And it's really hard (or even impossible) to keep the system stable on large infrastructures

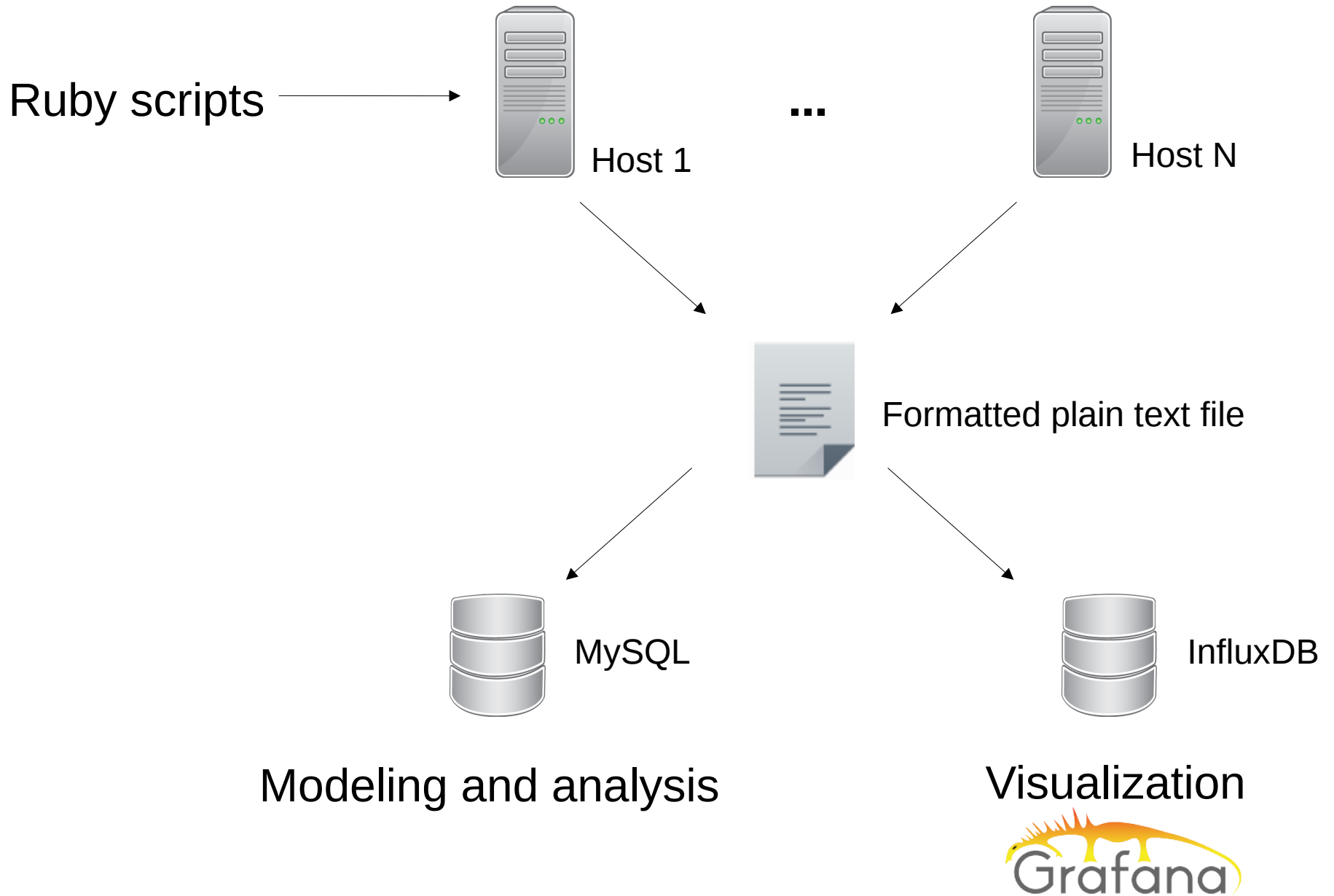
# Smart Scheduler



# Dynamic VM re-allocation



# Monitoring System Prototype



# Alternative Solutions

- OpenStack Neat
- Green Cloud Scheduler for OpenNebula

Goal: minimize power consumption

# Work and plans

## Other talks on GRID-2016

- Monitoring systems analysis – presented by **Ivan Kadochnikov**
- Development of the JINR Cloud model – presented by **Vagram Airiian**

## Plans for nearest future

- Define hosts and VMs ranking criteria
- Develop live-migration map and study offline migration possibility
- Define safe VM consolidation thresholds
- Develop the Smart scheduler framework

Thanks for your attention!