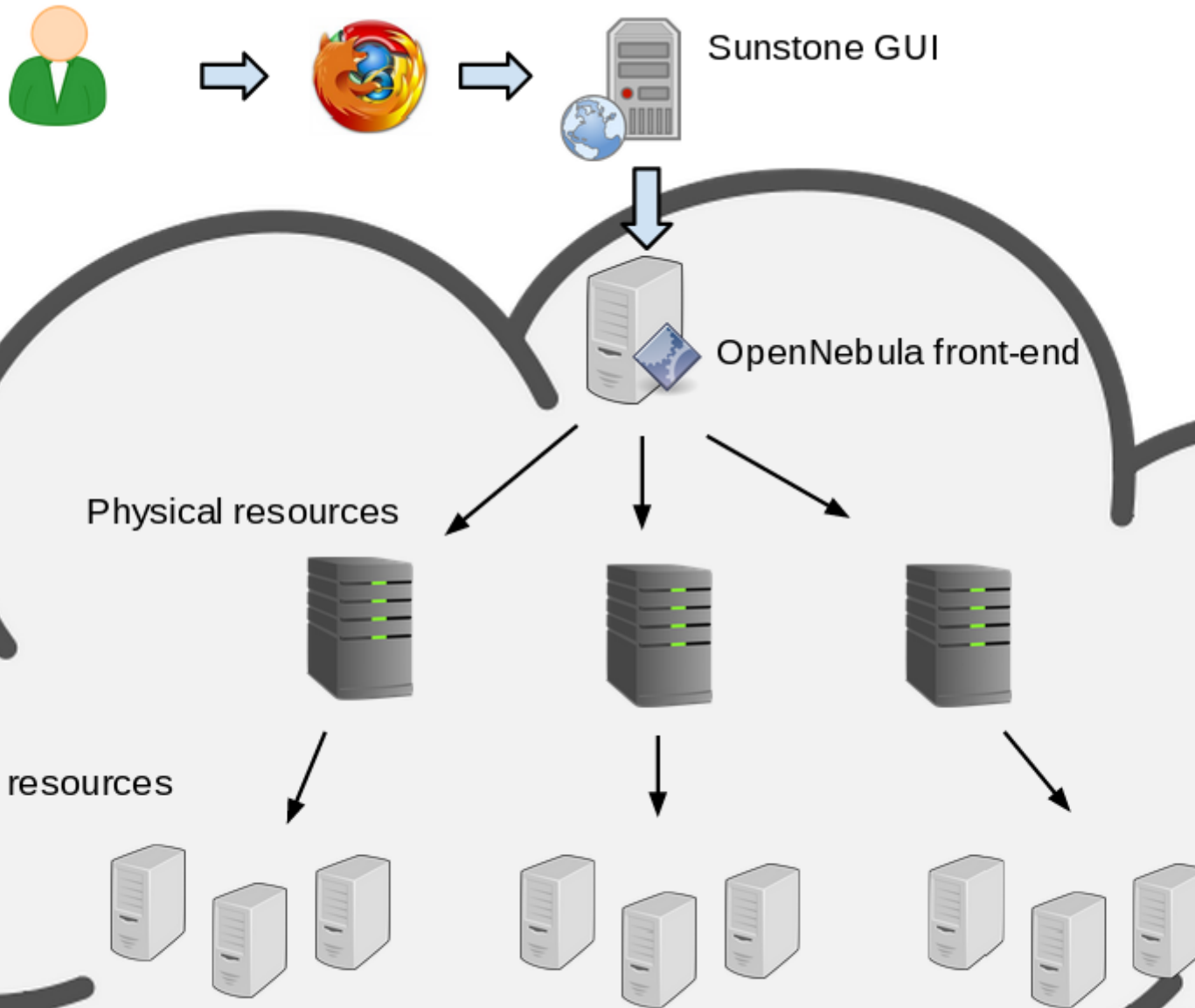# Cloud Meta-Scheduler for Dynamic VM Relocation

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JINR Cloud

Sunstone GUI

OpenNebula front-end

Physical resources

Virtual resources

Our users

- 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

- PC-style users

  - Physicists

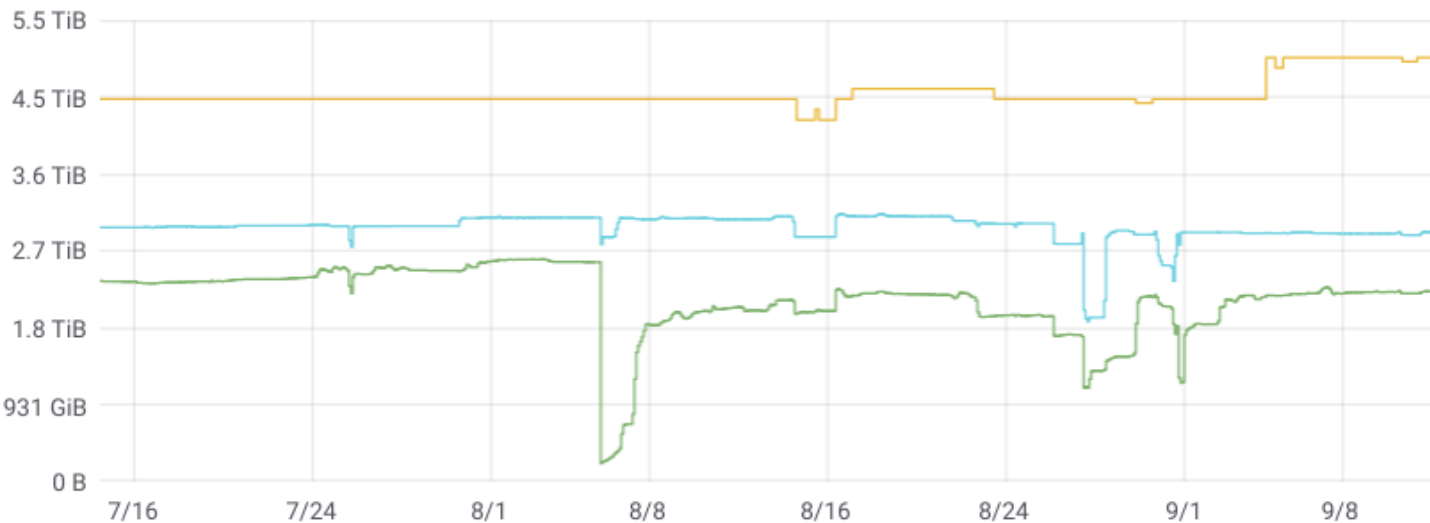- Automated systems

  - Batch-schedulers (DIRAC, HTCondor)

JINR cloud workloads

CPU Load
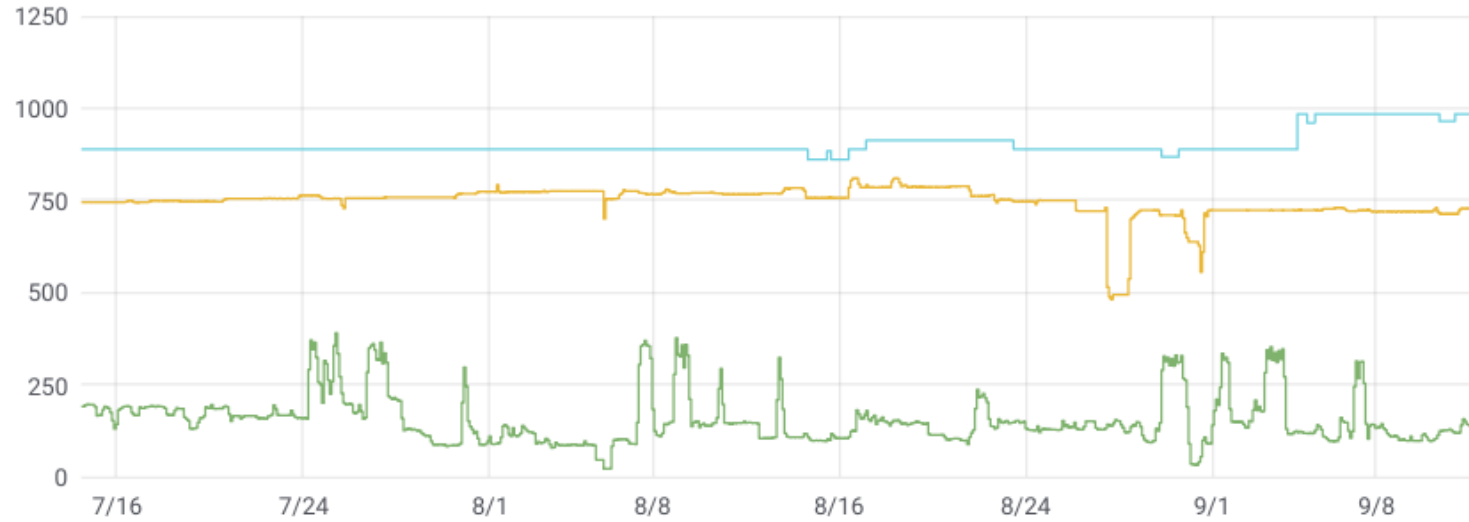
	min	max	avg
Load	21	390	155
Allocated cores	481	810	746
Available cores	860	984	902

Memory

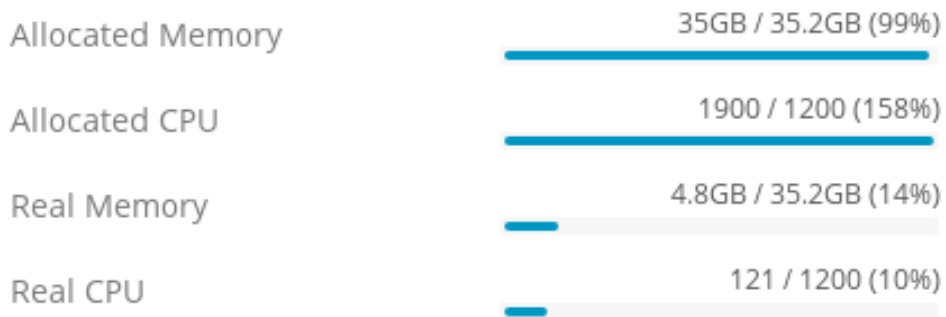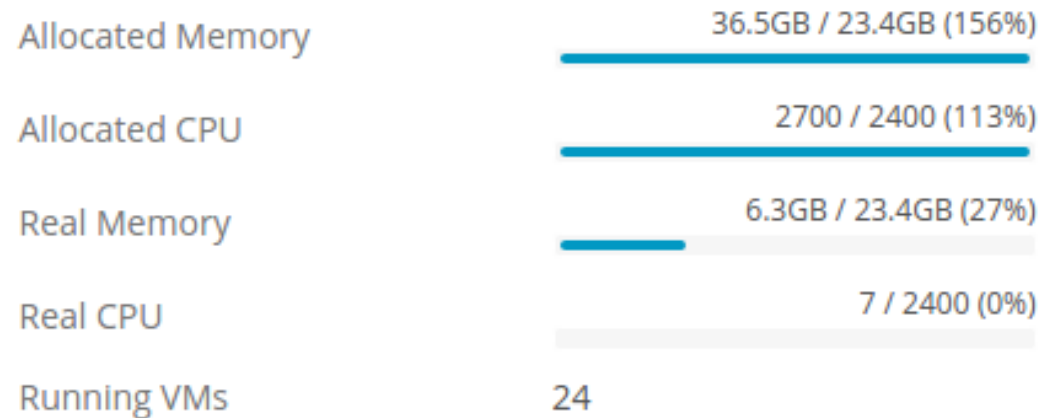|	min	max	avg
Used	216 GiB	2.63 TiB	2.15 TiB
Available	4.28 TiB	5.01 TiB	4.59 TiB
Allocated	1.89 TiB	3.16 TiB	3.00 TiB

Overcommitment ratios

Capacity
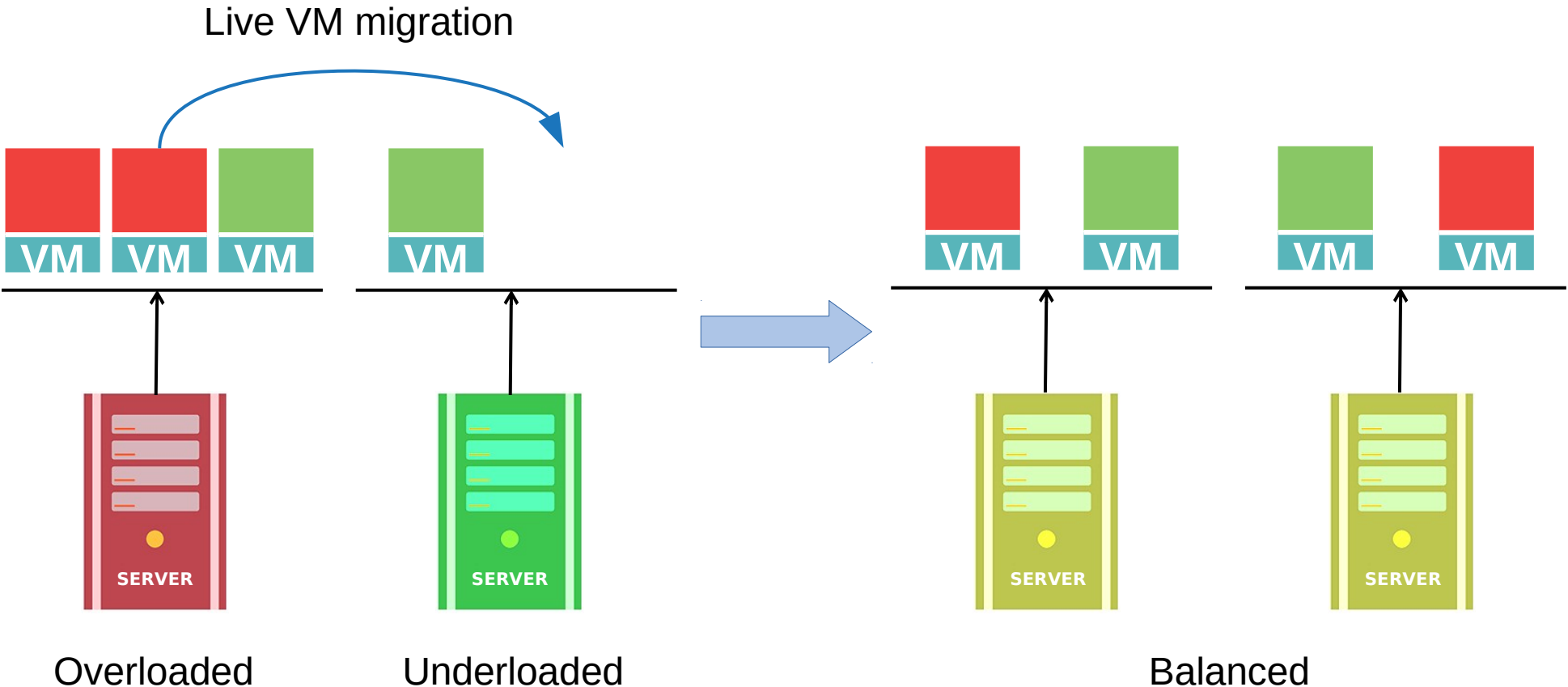
Allocated Memory		35GB / 35.2GB (99%)
Allocated CPU		1900 / 1200 (158%)
Real Memory		4.8GB / 35.2GB (14%)
Real CPU		121 / 1200 (10%)

Host 1:

- High CPU overcommitment
- No memory overcommitment

Host 2:

- Low CPU overcommitment
- High memory overcommitment

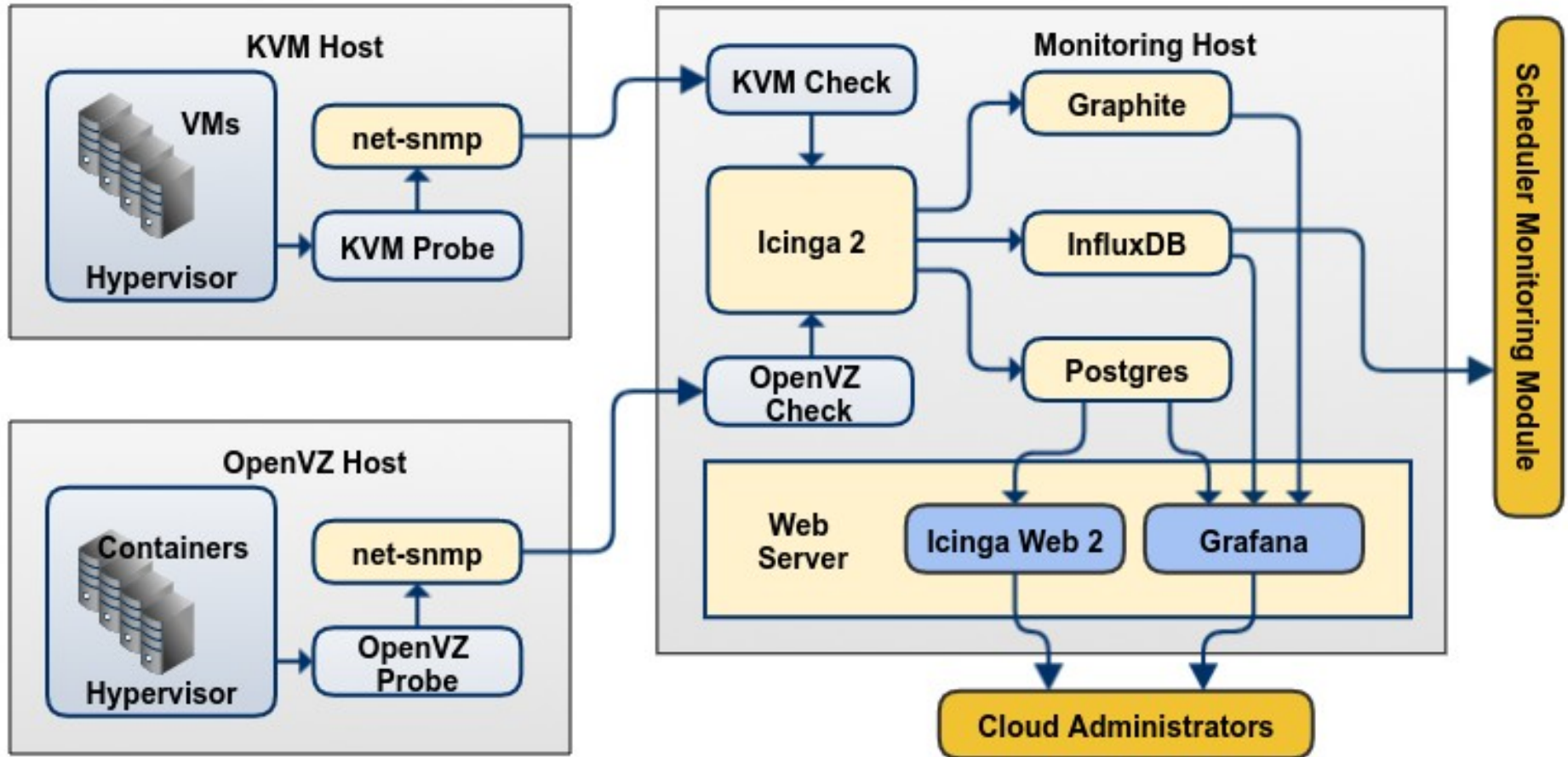|		
Allocated Memory		36.5GB / 23.4GB (156%)
Allocated CPU		2700 / 2400 (113%)
Real Memory		6.3GB / 23.4GB (27%)
Real CPU		7 / 2400 (0%)
Running VMs	24	

Dynamic relocation

Live VM migration

VM VM VM VM

Overloaded   **Underloaded**

VM VM   VM VM

Balanced

Scheduler scheme
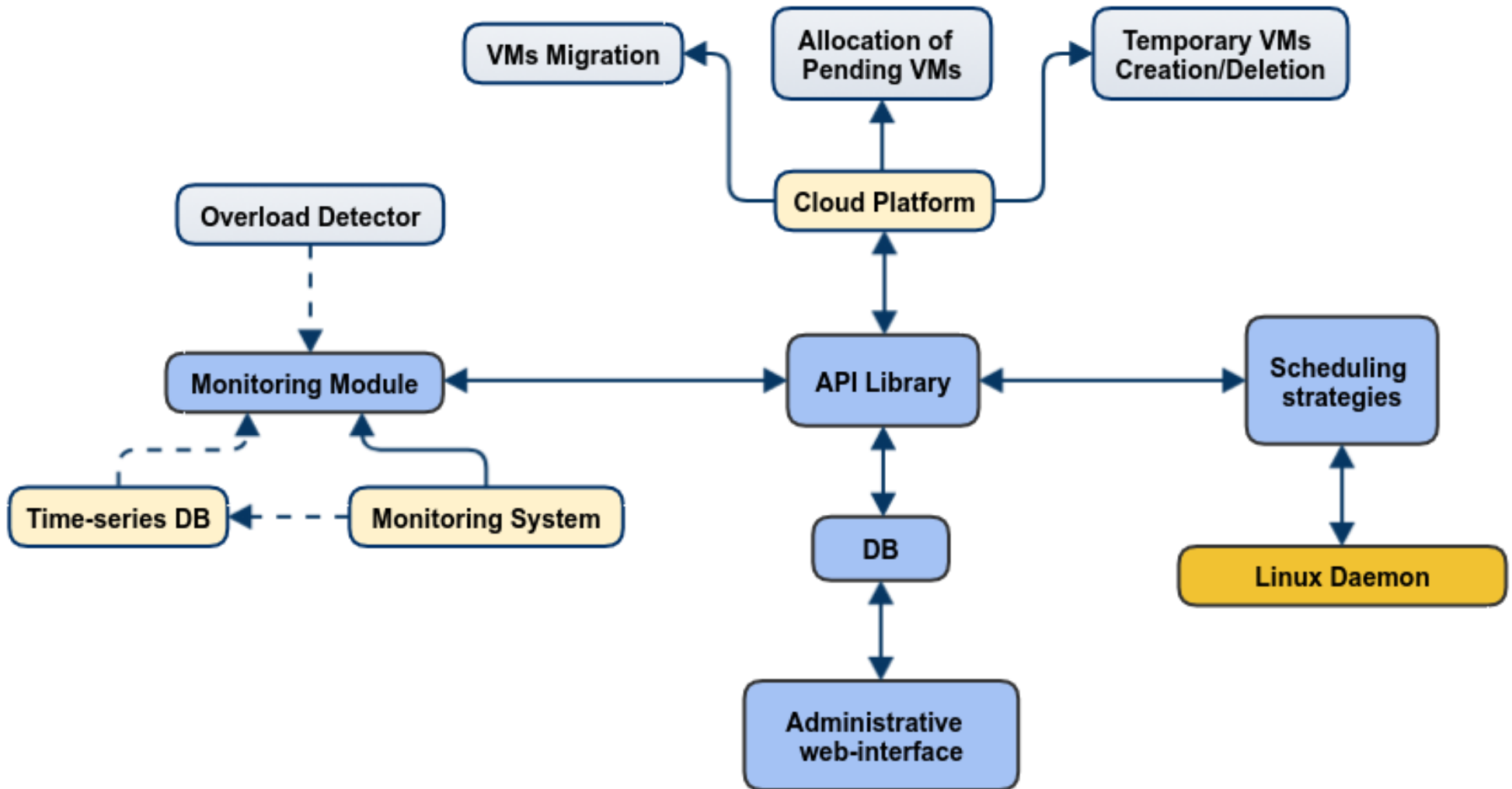
Monitoring

Administrative web-interface

VMs classification

Simple VM relocation strategy

New VM

No overcommitment   Low overcommitment   High overcommitment
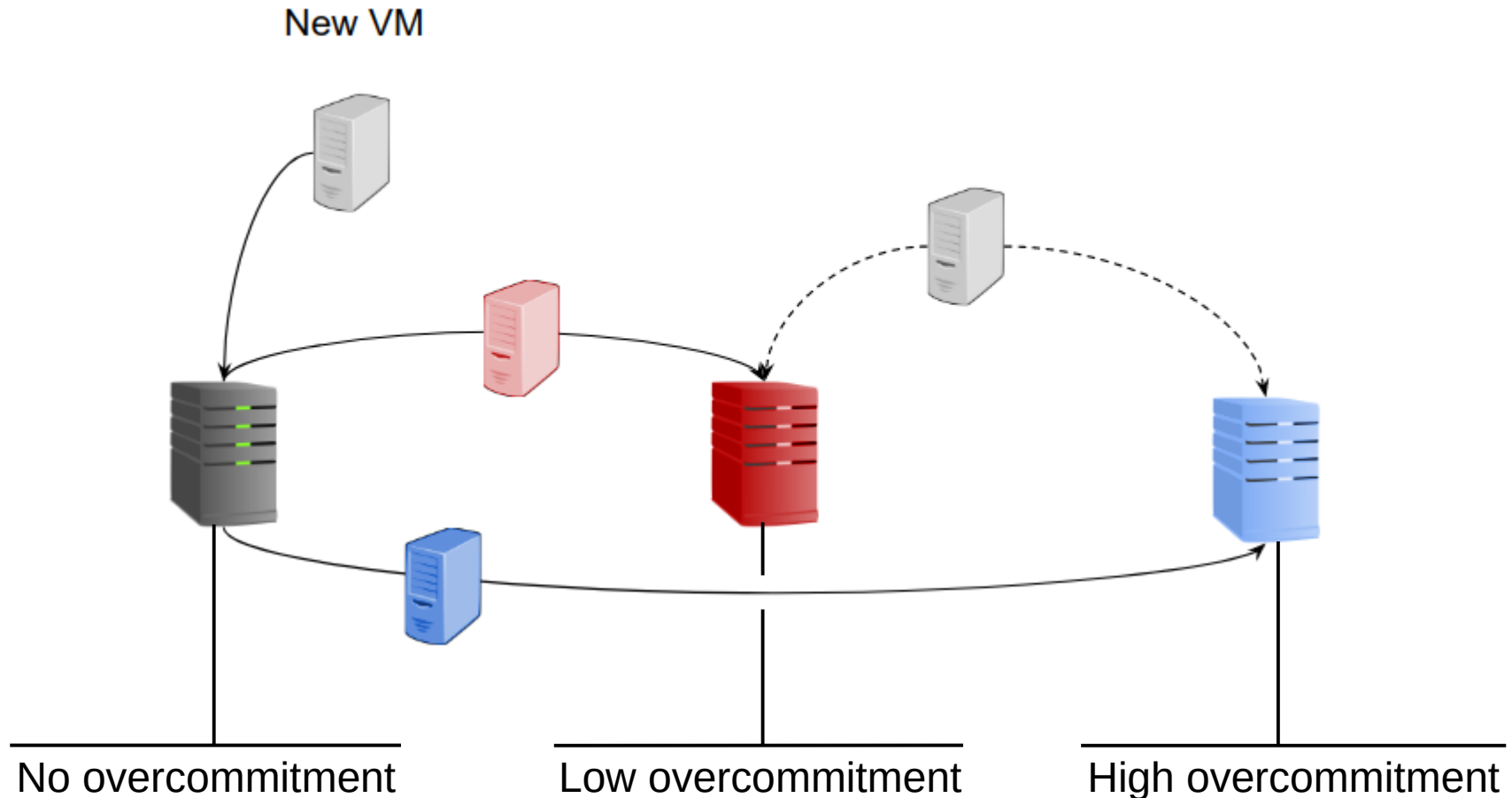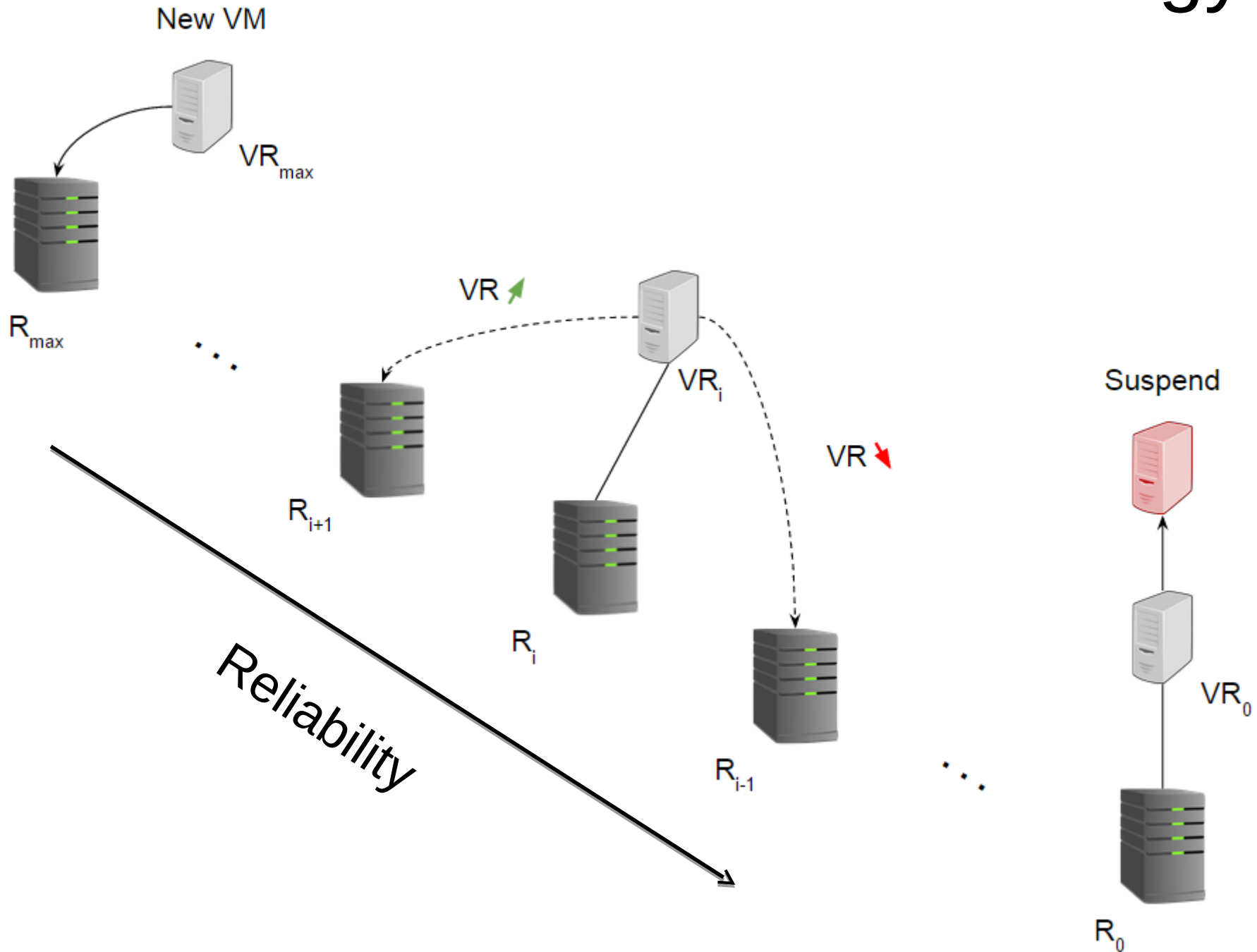
Number of VM class changes
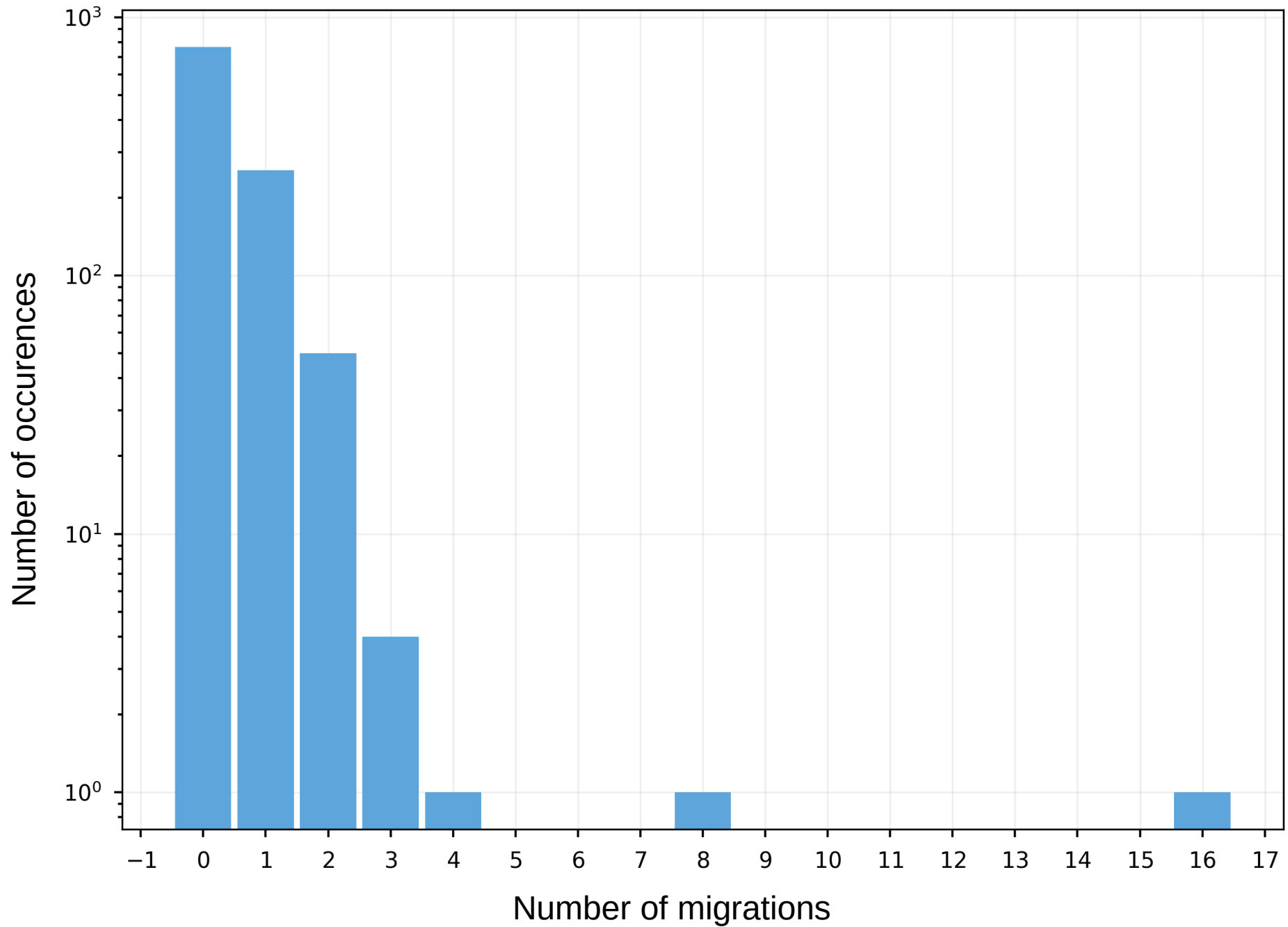
Generalized strategy

Summary

- The goal of the project is to optimize cloud resources utilization

- A basic software framework was designed: github.com/jinr-lit

Plans

- Implement interfaces for reutilizing idle cloud resources with preemptable batch jobs

Thanks!