Deployment and Evaluation of AM-NVE

GOALS

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Distributed Shared Memory
- Availability
- Survivability
- Scalability
- Consistency (Atomicity)
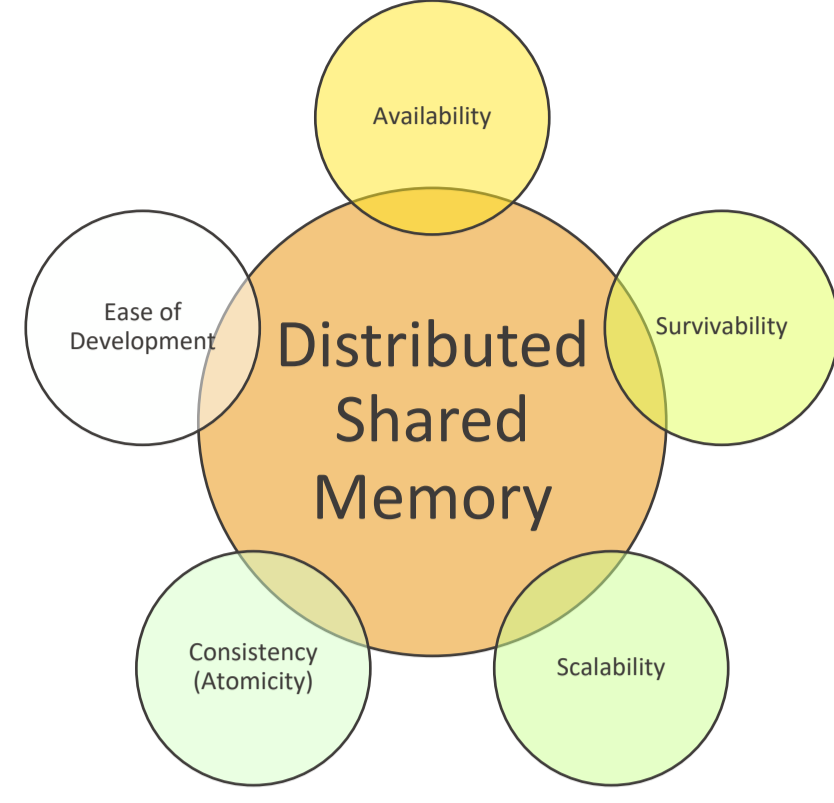- Ease of Development

Goal: Can we use read/write DSM for supporting Network Virtual Environment Applications?

CHALLENGES

Challenge 1 - Deployment
- Deploy our DSM PoC over a set of replica servers on GRID'5000
- Deploy an NVE that will contain at most 200 interacting network objects
- Prepare scripts to deploy the experiments

Challenge 2 - Experimental Evaluation
- Scalability Tests
- Concurrency Tests
- Fault-tolerance Tests

DEMO SETUP

Unity · Grid'5000 · ANSIBLE · Grafana

NVE Scenario
- **Leader-Follower** in drone swarms (**Unity**)
- Leaders **write** their position
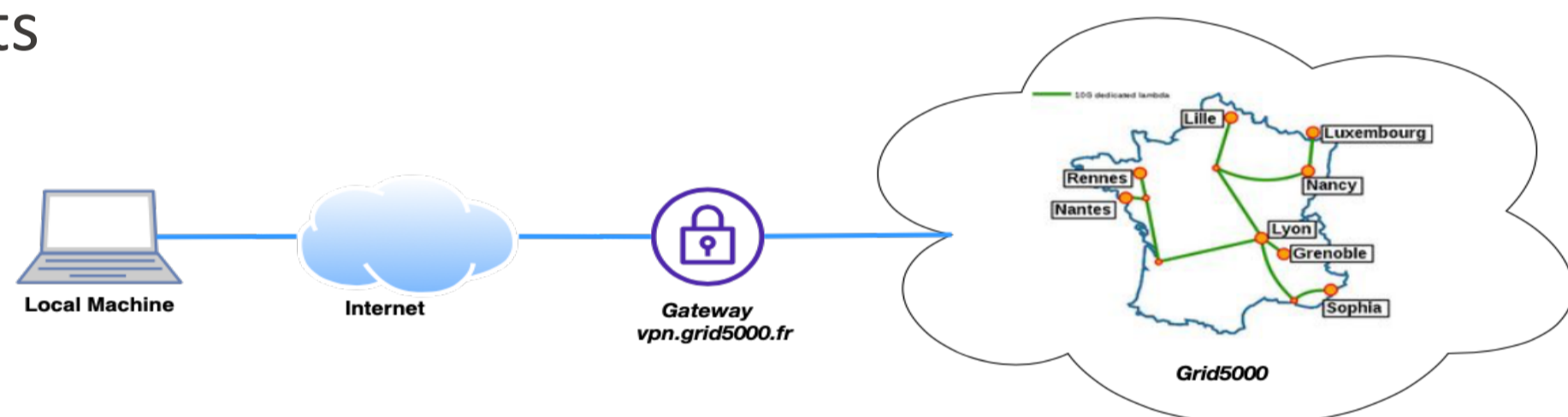- Followers **read** leader's position

Experiment Setup
- **Grid5000** testbed: x5 Physical Nodes
- **JFed** tool to provision the experiments

Experiment Deployment
- **Ansible** for experiment automation
- **Grid5000 VPN** to connect NVE to Grid5000 network

Measurements
- Plots outcomes using **Grafana**

RESULTS

SCALABILITY TEST
- Increasing the number of followers and leaders increases the operations' latencies.
- Lower performance than expected (the read/write operation latencies demand more than 200ms, while the desired was under 150ms)
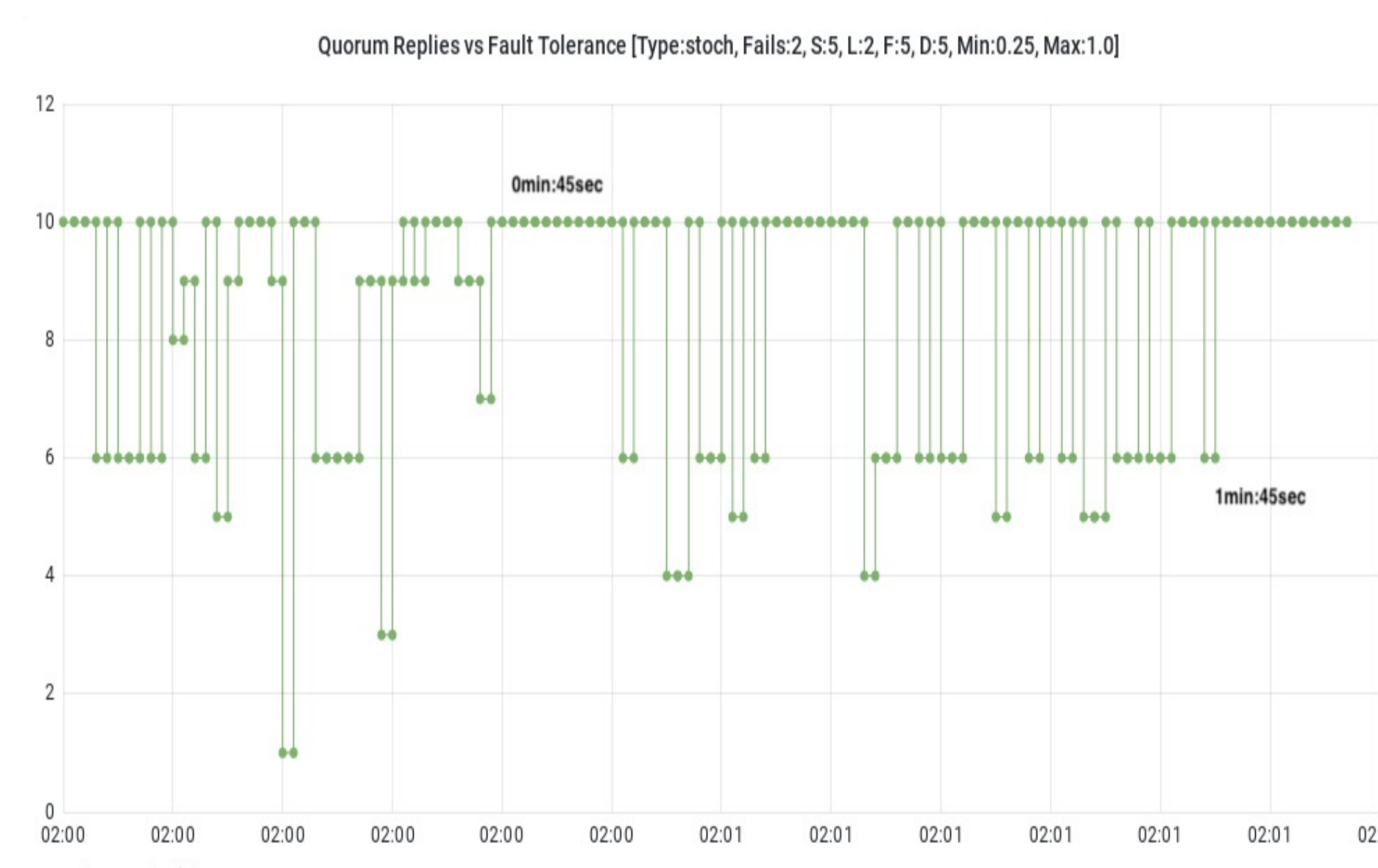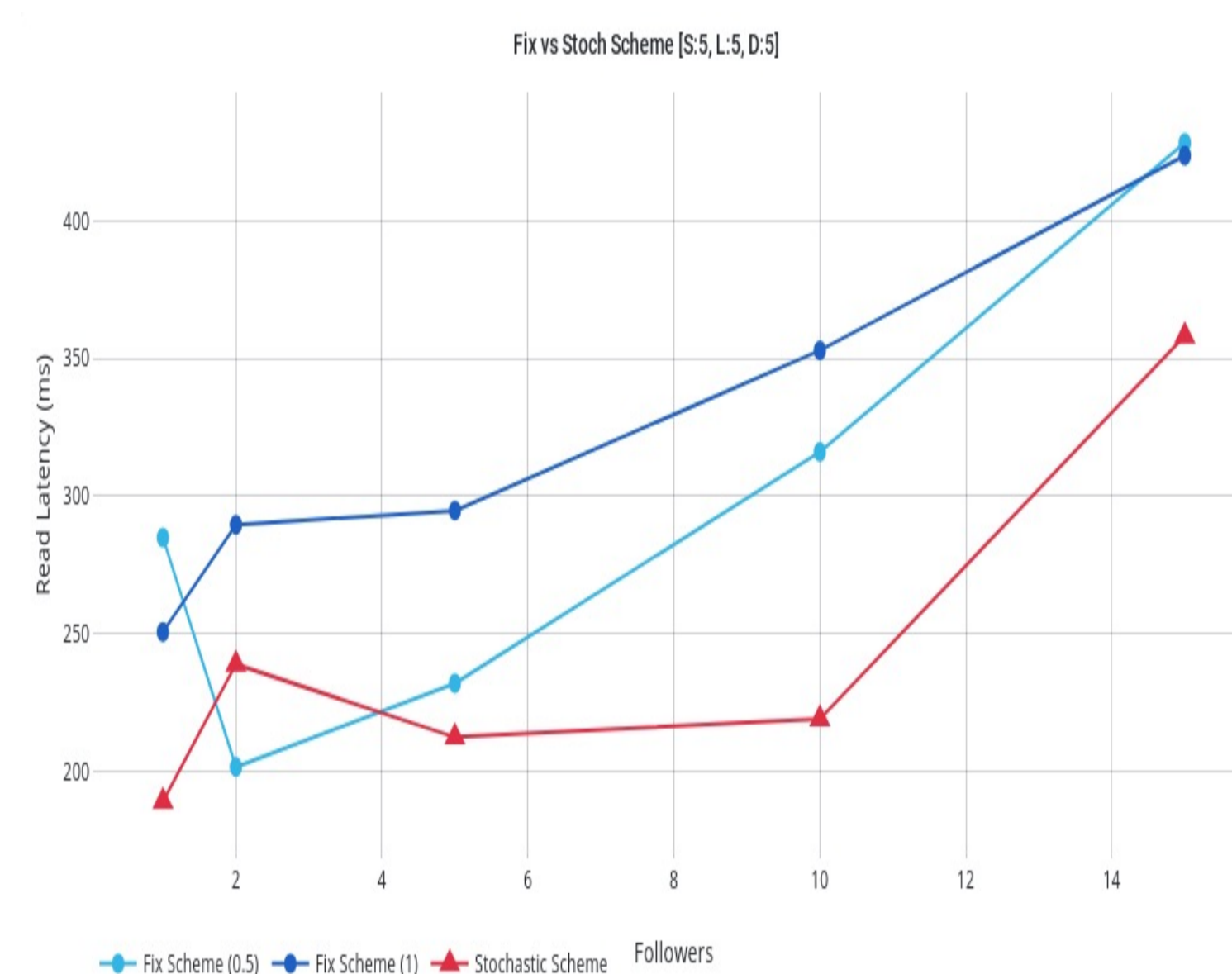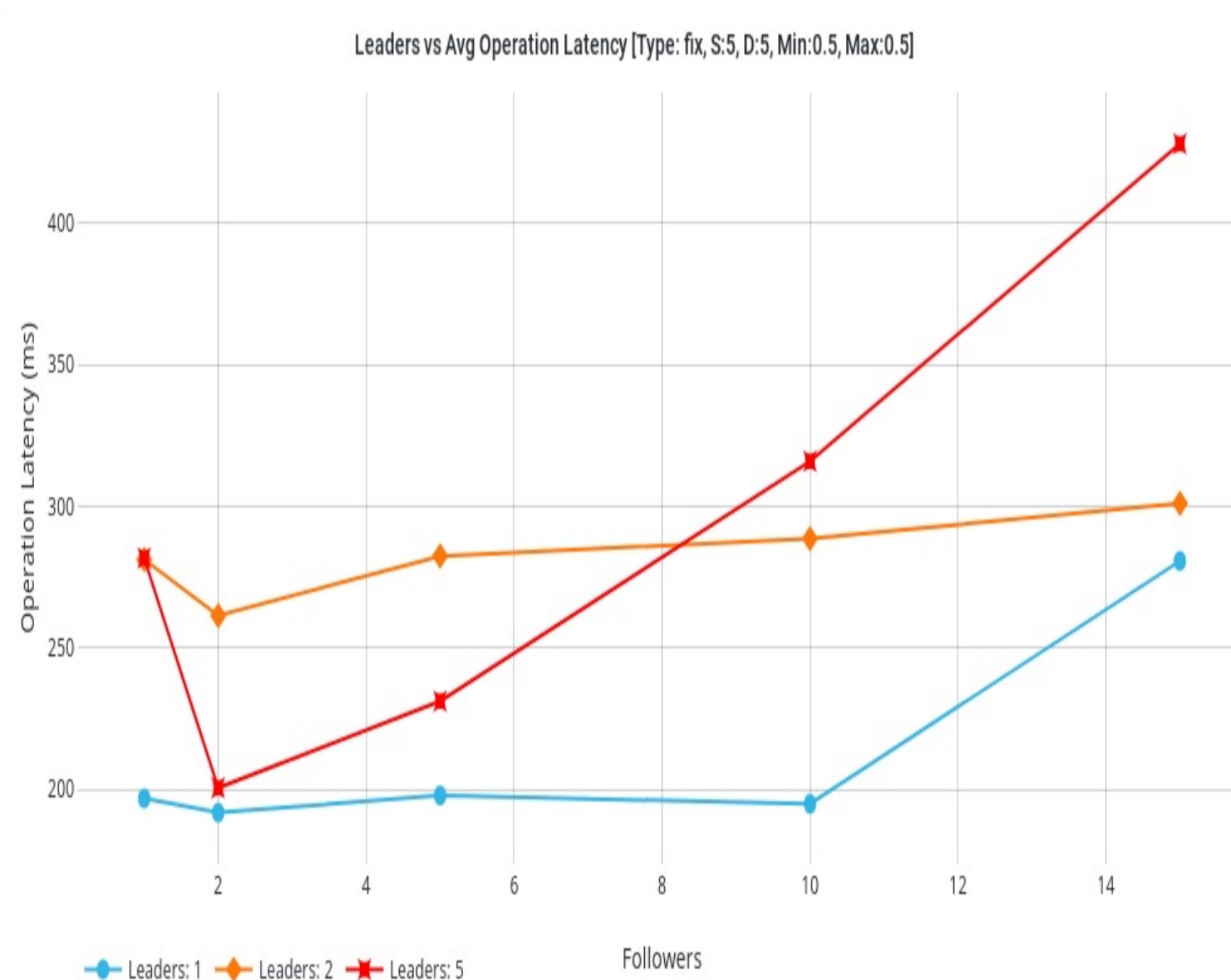
CONCURRENCY TEST
- In the stochastic scheme read operations complete faster than in the fixed scheme

FAULT-TOLERANCE TESTS
- Verify the fault-tolerance guarantees

MORE RESULTS

Fault tolerance test:
- *server B is crashed at time 0:45*
  - *quorums with ids [1,..,3] become inactive*
- *server A is crashed at time 1:45*
  - *only the quorum with id=10 remains active*

CONCLUSIONS

- For the purposes of Networked Virtual Environments further optimizations are necessary
- Decrease latencies before commercialization
- Investigate implementation optimizations
- Fed4FIRE+ ideal platform to run experiments on Distributed Algorithms
  - Various Nodes Architectures
  - Various Node Locations
  - One platform to control all testbeds

POST MORTEM

Thanks to the experiment conducted within Fed4FIRE+ we identified several shortcomings and performance bottlenecks in our approach and look forward to address them and conduct further experiments in the near future!