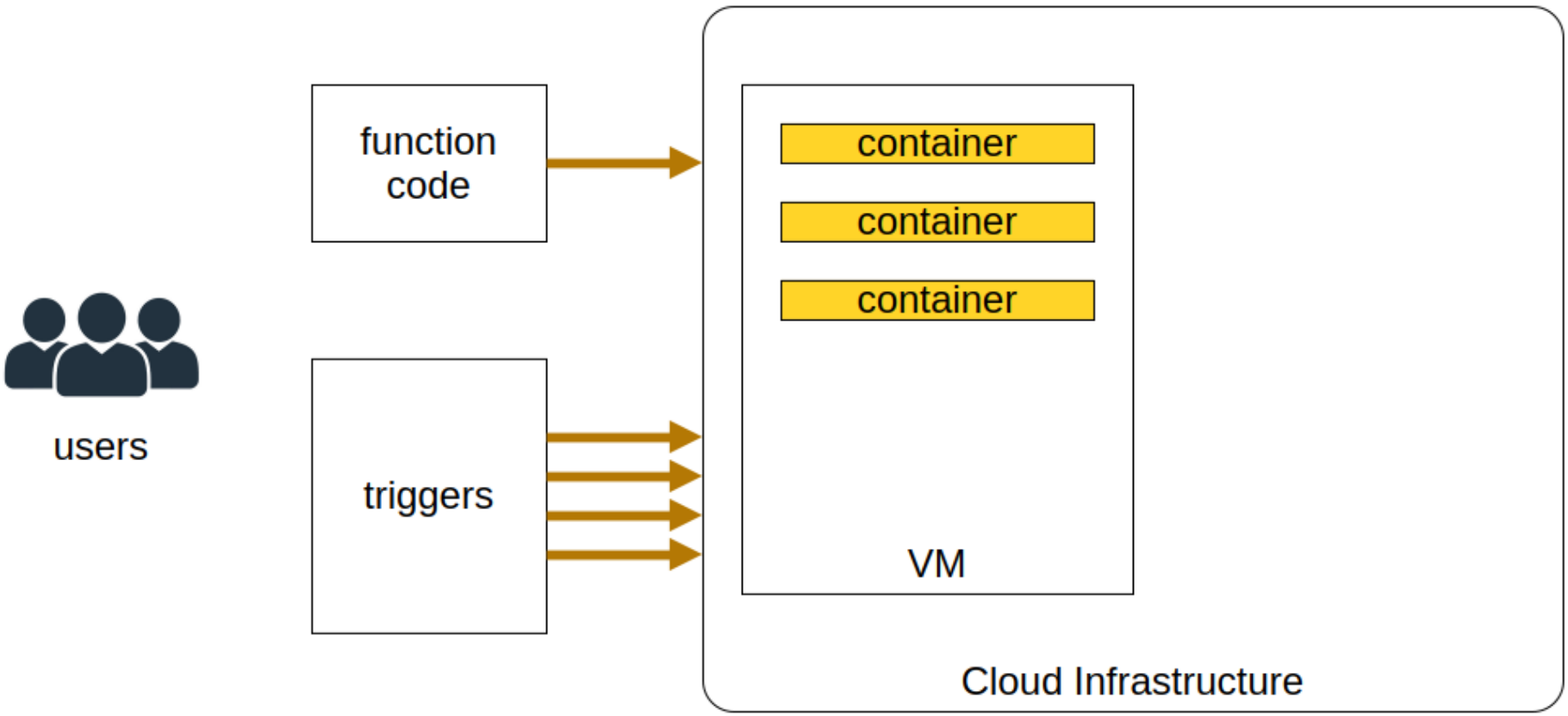
DSLab FaaS: Fast and Accurate Simulation of FaaS Clouds

GRID'23

Yury Semenov [1]
Oleg Sukhoroslov [2]

[1]MIPT
[2]IITP RAS

Function-as-a-Service



Platforms

Commercial

- AWS Lambda
- Microsoft Azure Functions
- Google Cloud Functions
- Alibaba Cloud Function Compute
- Huawei Cloud Functions

Open-Source

- OpenWhisk
- OpenFaaS
- Fission
- Kubeless
- Knative

Challenges

- Cold starts
- Function interference
- Resource utilization

Competitors' Problems

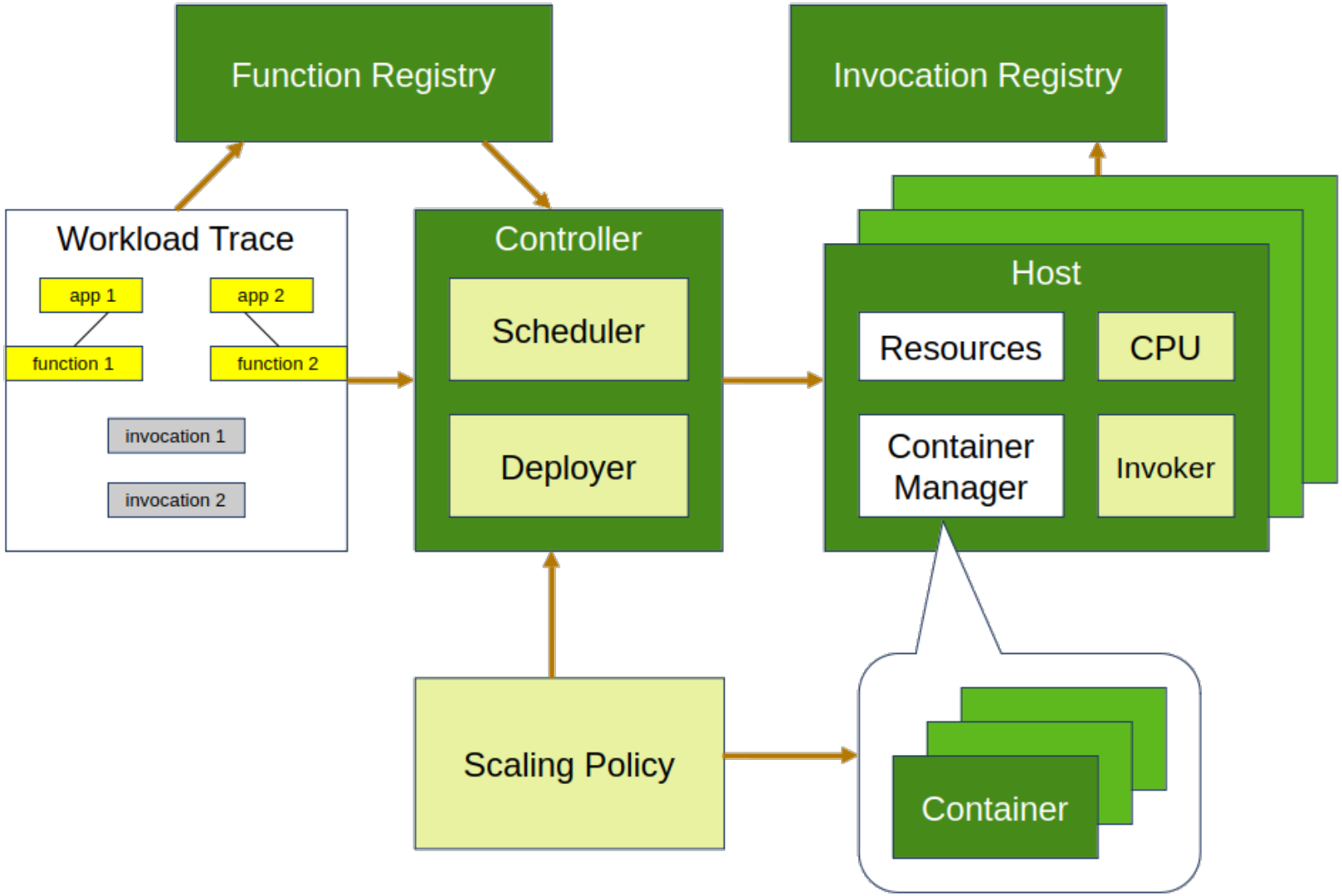
OpenDC 2.0 FaaS

- Poor host-level modeling
- Supports own trace format only
- High memory usage

FaaS-Sim

- Tailored to Edge FaaS
- No builtin support for common trace formats
- Slow

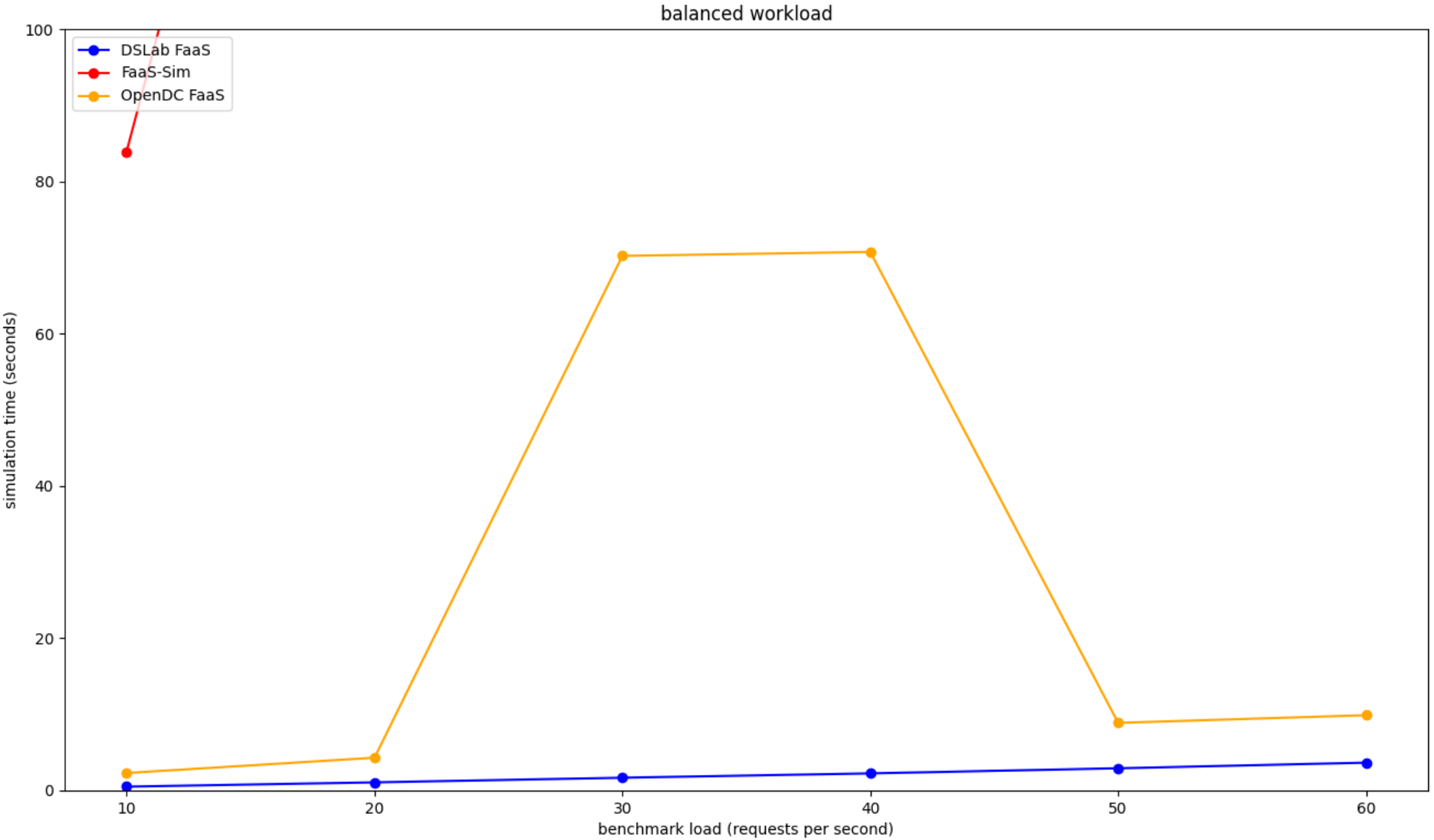
Architecture



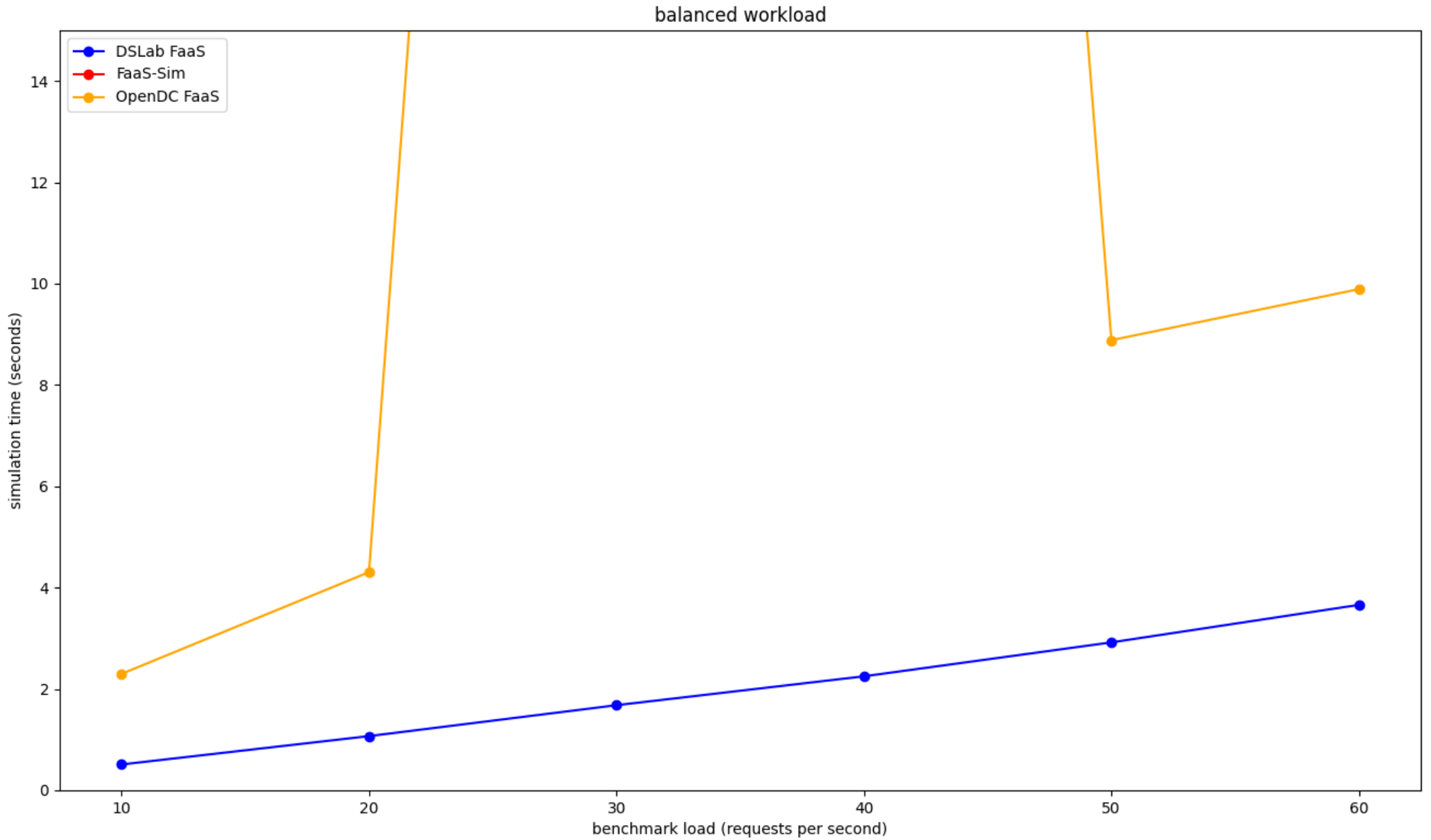
Performance Benchmarks

- 30 apps from Microsoft Azure workload
- 1 day
- Balanced and skewed workload patterns
- Load varied from 10 to 60 RPS (requests per second)
- Median of 7 runs

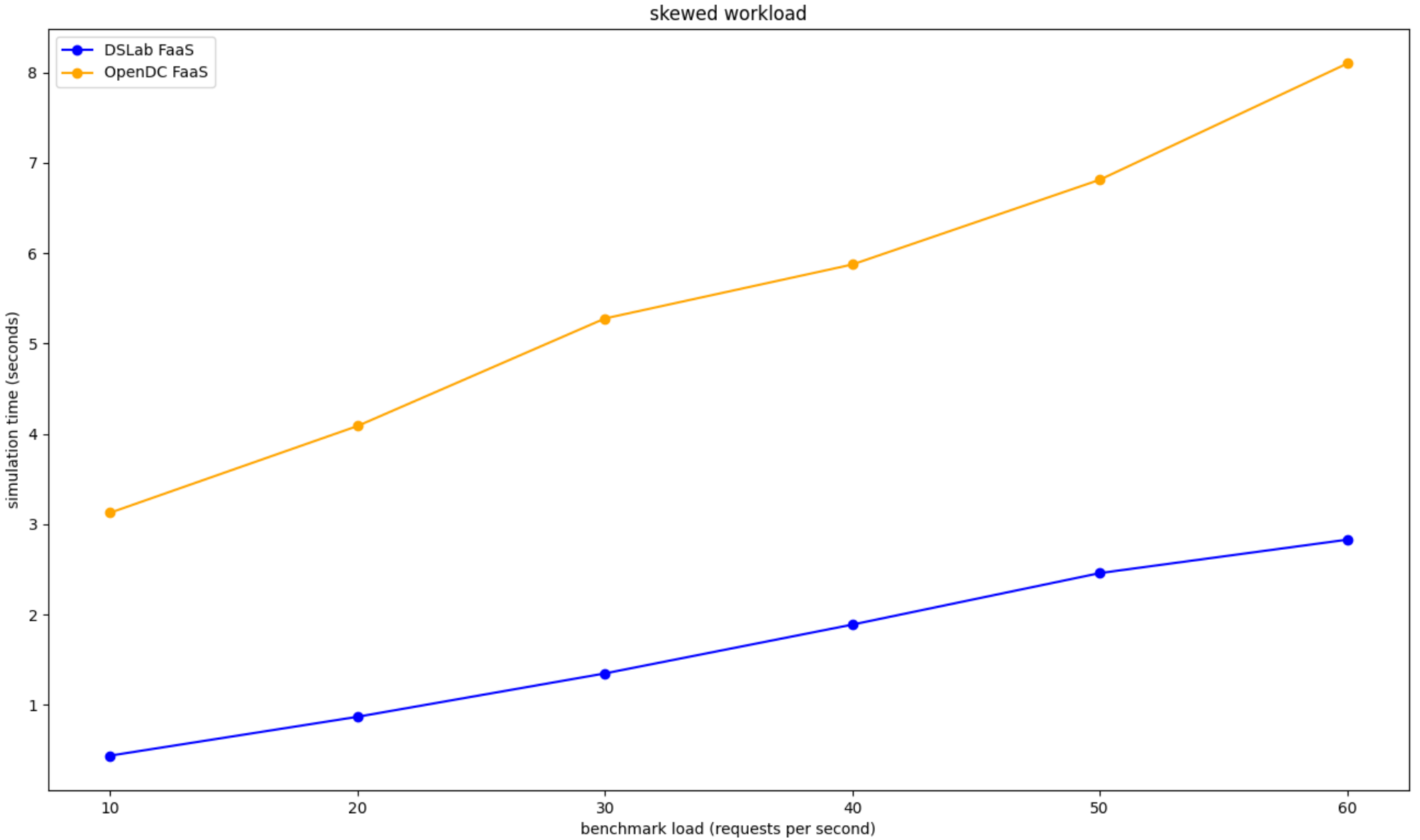
Balanced Workload



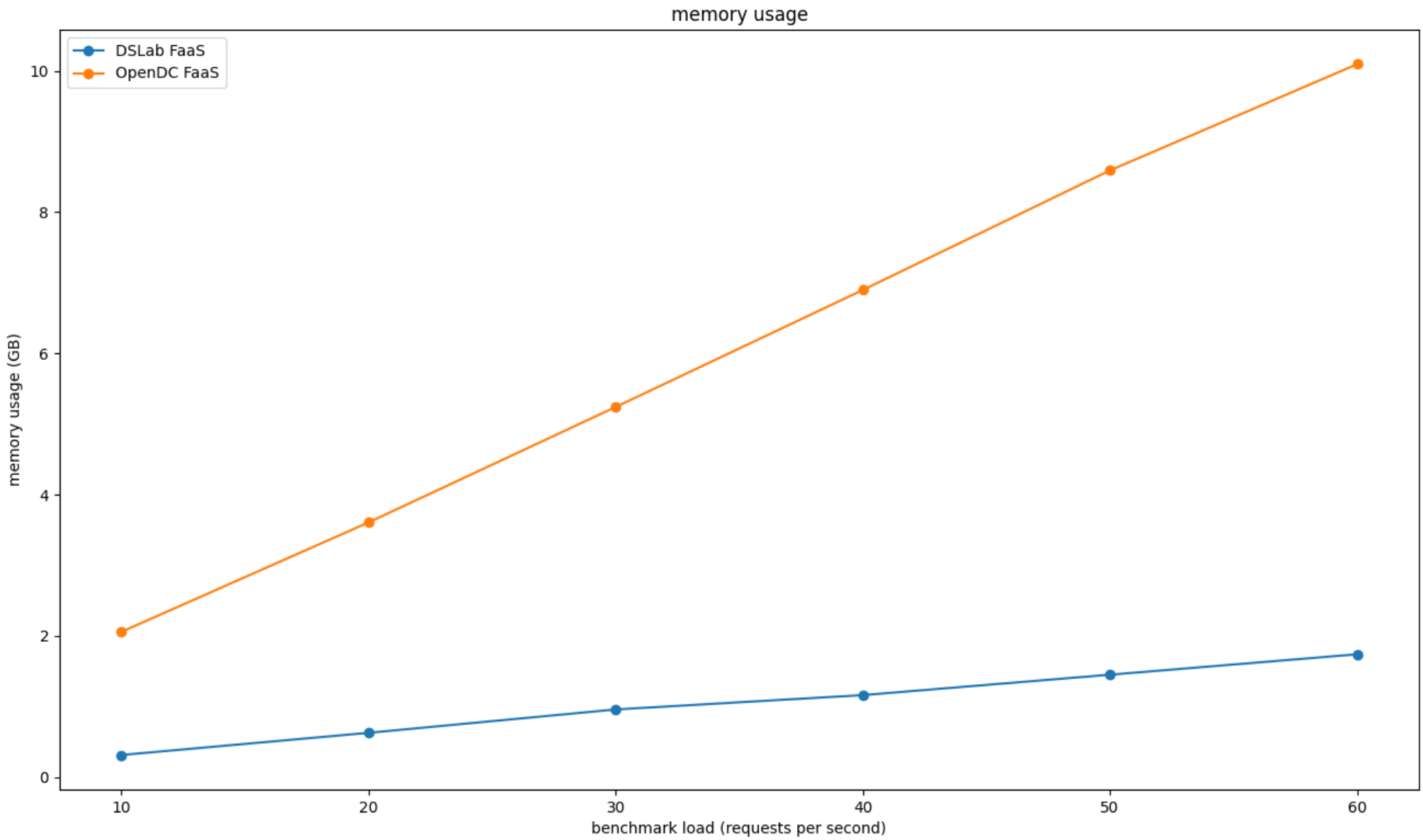
Balanced Workload



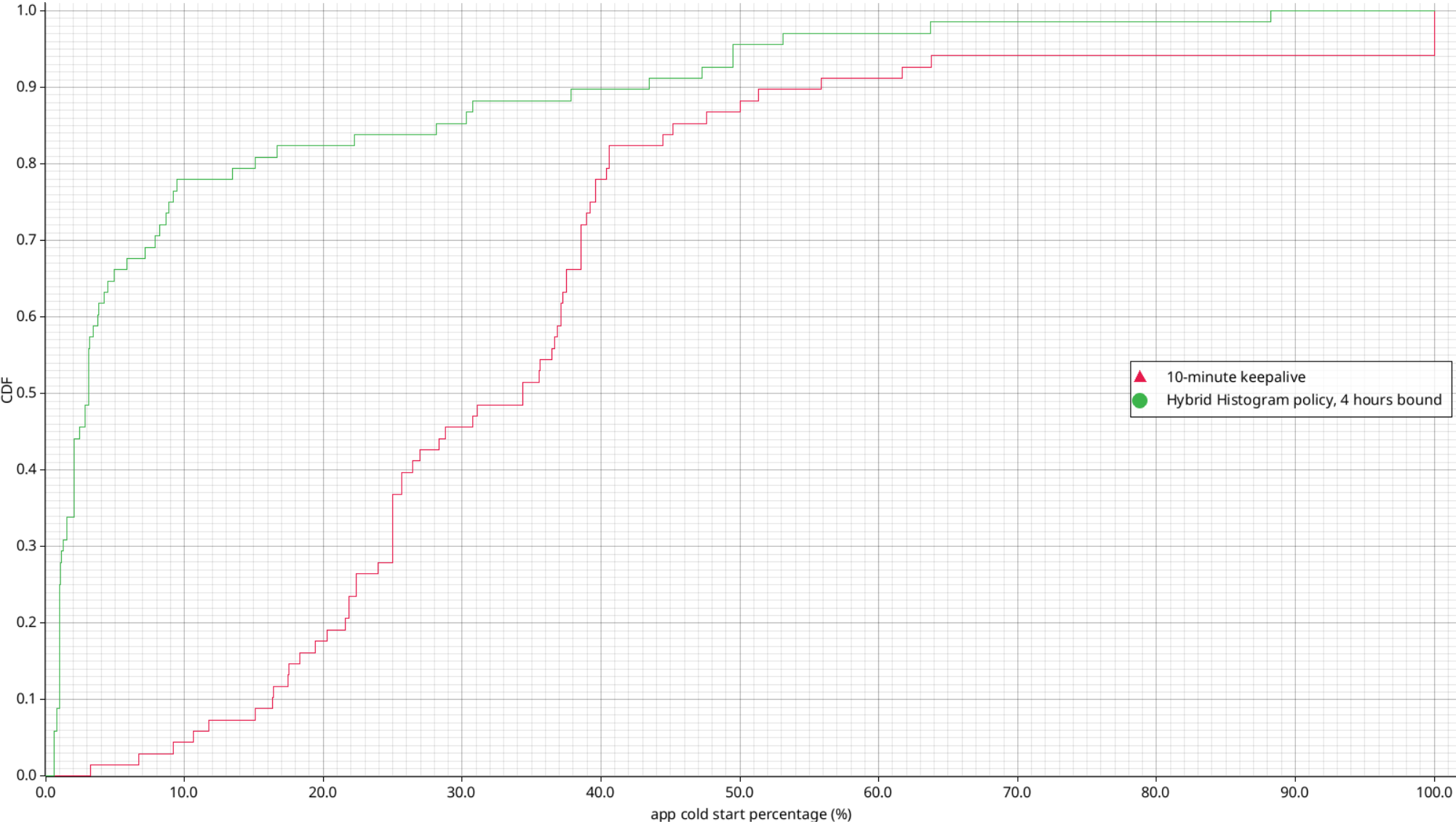
Skewed Workload



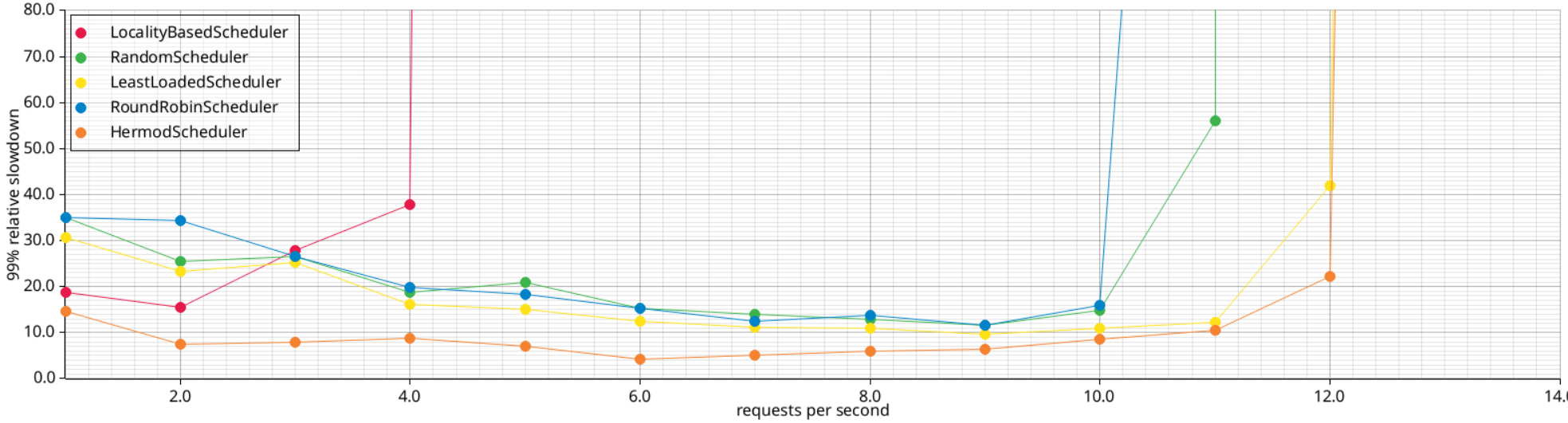
Memory Usage

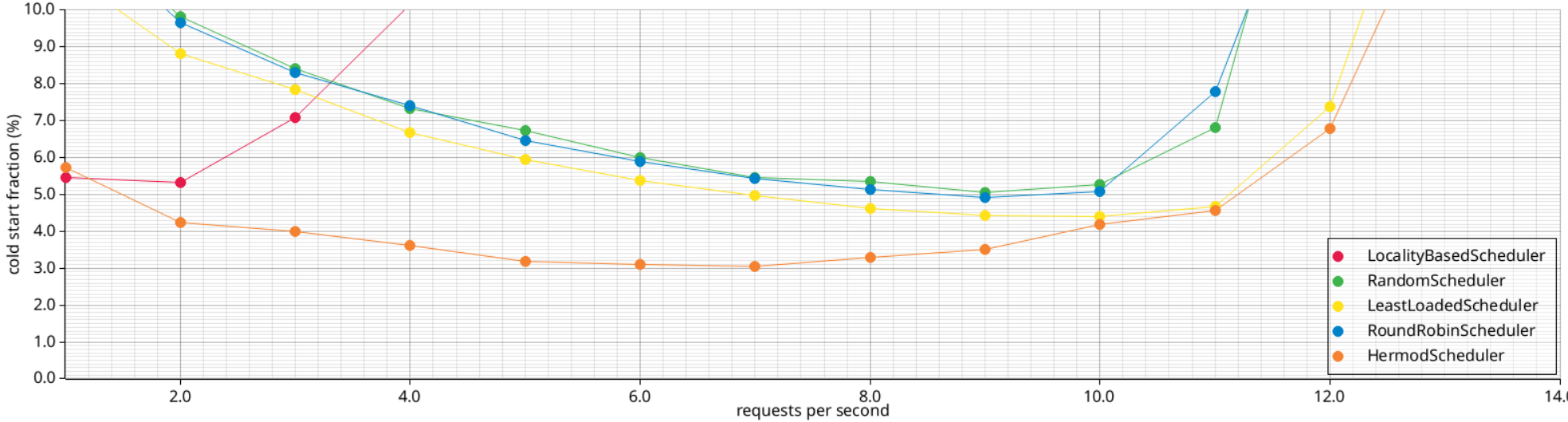


Reproducibility: scaling



Reproducibility: schedulers





Conclusion

- We developed DSLab FaaS — a novel framework for simulating FaaS platforms
- We proved DSLab's superiority to competitors in terms of performance by conducting computational experiments
- We proved DSLab's accuracy by reproducing relevant research

Thank you!

contact: yusemru@gmail.com