

GOALS

“UNIC brings together lightweight clouds, CDNs and the novel FED4FIRE experimentation environment to achieve improved QoS and QoE through tackling scalability, heterogeneity issues, and realizing adaptability to dynamic network conditions and user requirements”.

We experiment with:

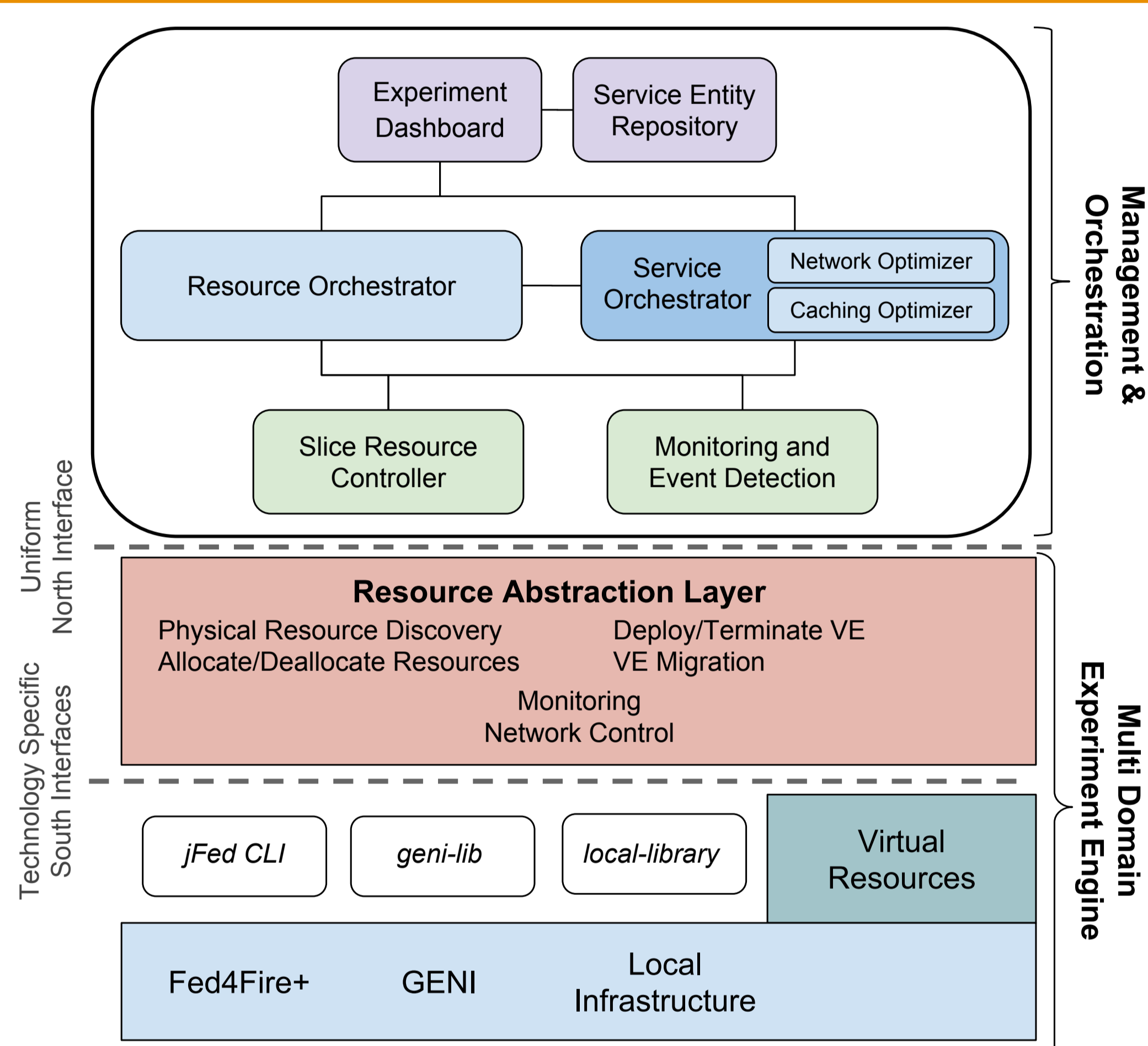
- early content popularity change detection driving content distribution service elasticity
- Unikernel-oriented VM placement algorithms considering real-time server resource utilization and content provisioning requirements

CHALLENGES

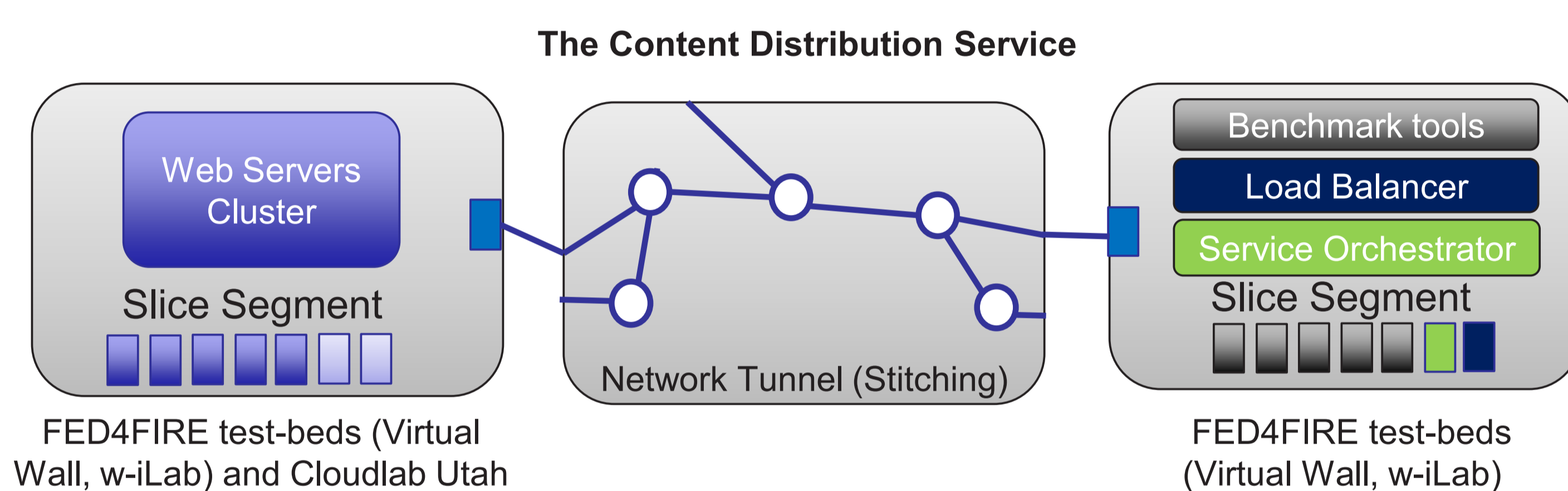
The emerging 5G networks call for new approaches to CDNs through addressing challenging issues, such as:

- **scalable** and **holistic** resource utilization, spanning from large data centers to the user device, including edge clouds
- incorporation of **heterogeneous** physical and virtual resources
- **adaptability** to dynamic user requirements, server resources and network capacity constraints

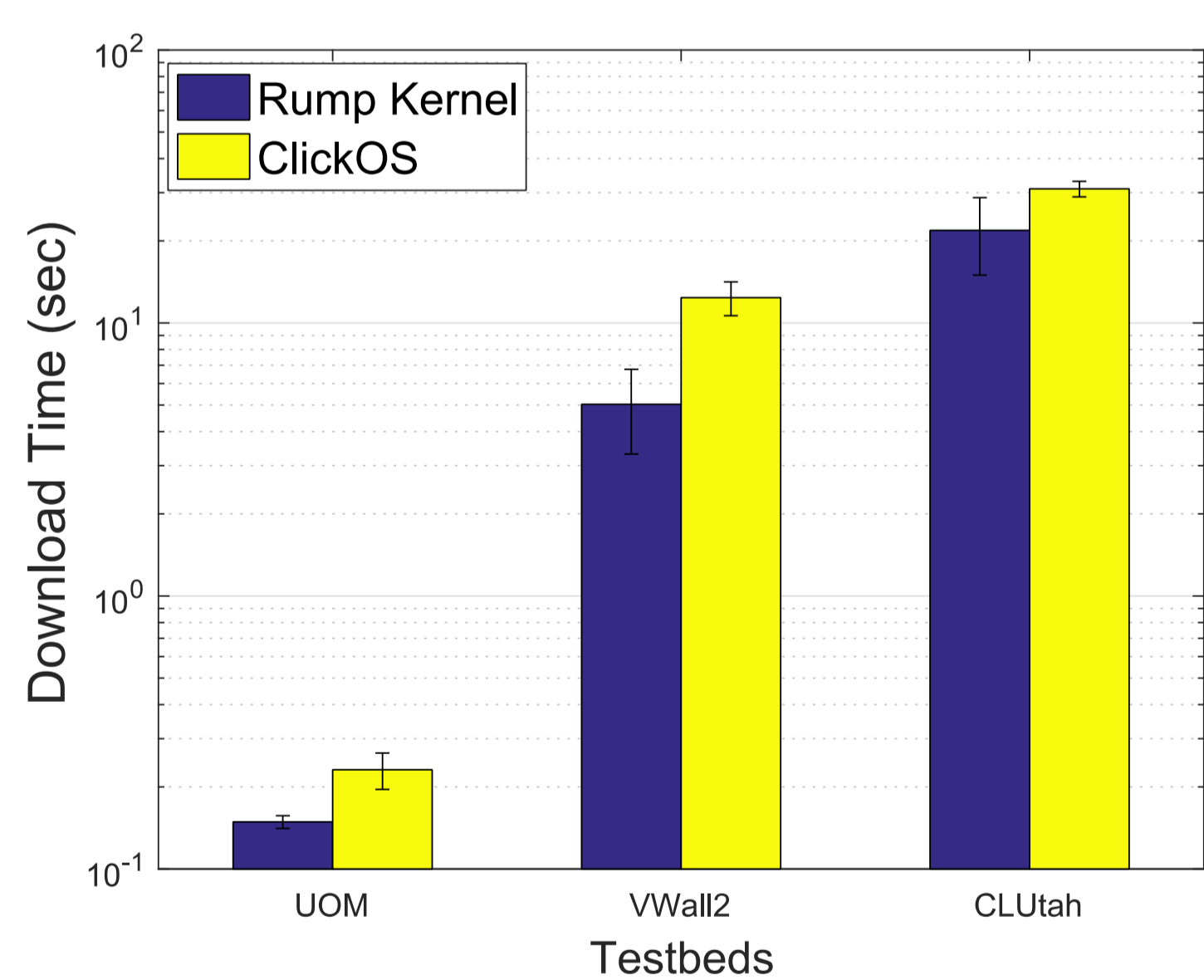
ARCHITECTURE



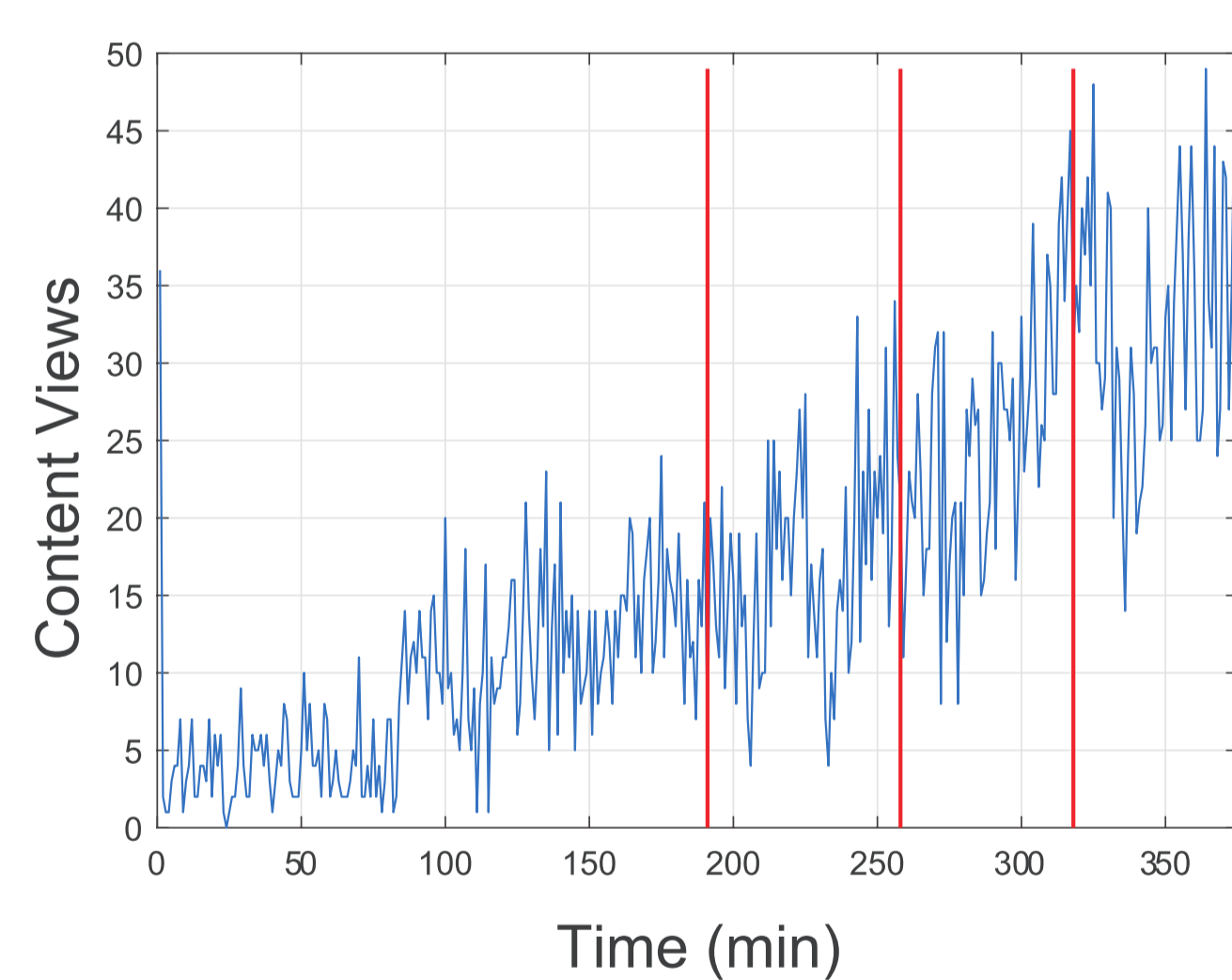
DEMO SETUP



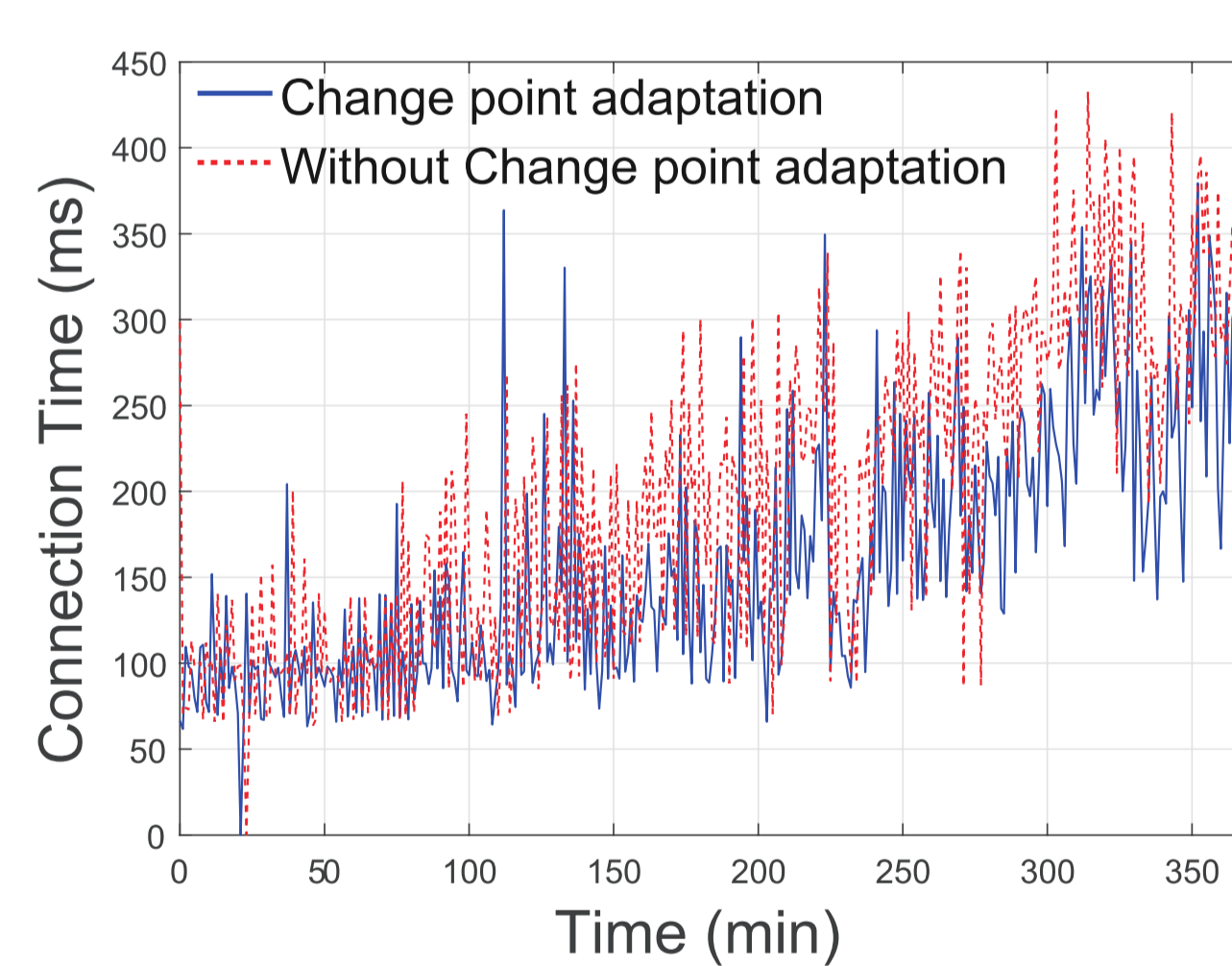
RESULTS



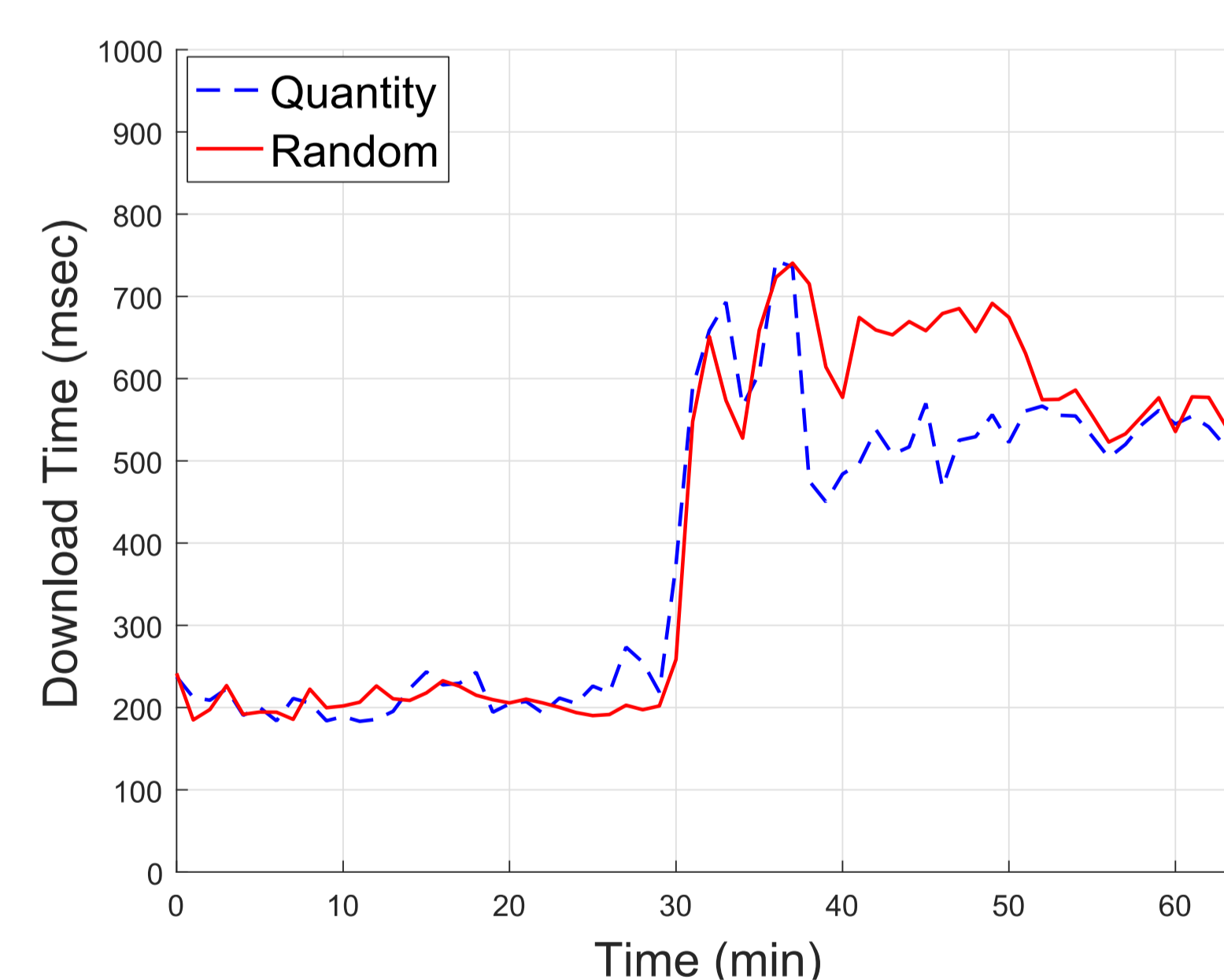
Content download time over multi-domain E2E slices



Content views per minute and detected change-points



Impact of change-point detection on web client connection time



Impact of VM placement algorithms on web client download time

CONCLUSIONS

- The FED4FIRE facilities and tools enable large-scale experimentation of next-generation CDN services
- The UNIC high-level abstractions extend the automation of FED4FIRE tools towards novel content distribution services
- Novel service & resource orchestration mechanisms can be tested in a realistic environment
- Resource heterogeneity and scalability impact the design of such mechanisms

NEXT STEPS

- Further automations in the CDN service experimentation over the FED4FIRE test-beds
- Large-scale experiments over multiple test-beds and heterogeneous resources, representing both edge and core clouds
- More sophisticated VM placement algorithms and extensions in our change-point detection mechanisms to support 2nd order statistics
- Organize the results and submit them to Zenodo open-data repository