Limitations of State-of-the-Art Orchestration Frameworks on Edge

- Heterogeneity in hardware is still a problem for most frameworks [1,2]
- No support for diverse and dynamic networking conditions
- Service scheduling in this environment is a well-known NP-hard problem [3]
- No support for multiple virtualization technologies, e.g., Unikernels
- Different edge providers cannot collaborate in a federated environment

**Oakestra: Orchestration at the Edge**

- Heterogeneous and Constrained Hardware
- Scalable Orchestration
- Federated Multi Operator Edge Infrastructure
- Multiple Virtualization Technology Support
- Multiple Cloud Operators

**Supported Features**
- Modular Design
  - Standardized APIs for CLI and Dashboard integration
  - Extensible Scheduling Components
  - Networking and Execution Runtimes as a Plug-In
  - Scalable Components
  - Extensible SLA design

**Modular Design**
- Delegated Service Scheduling
  - Clusters represented as aggregated resources
  - The root scheduler finds a suitable cluster
  - The cluster scheduler finds a worker node
  - Multiple placement strategies available

**Demo Setup**
- GCP - Zurich
- AWS - Frankfurt
- Edge Cluster

**Future Work**
- Federated cluster authentication, and authorization
- Stateful application support
- Support for persistent volumes
- Sensors and Drivers mapping

**References**