

SSICLOPS: Research Areas



SSICLOPS

02.2015 – 02.2018

- Management of federated private cloud infrastructures
- Network communication improvements
- Workload scheduling across datacenters
- Security- and privacy-aware storage and processing

Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart 2



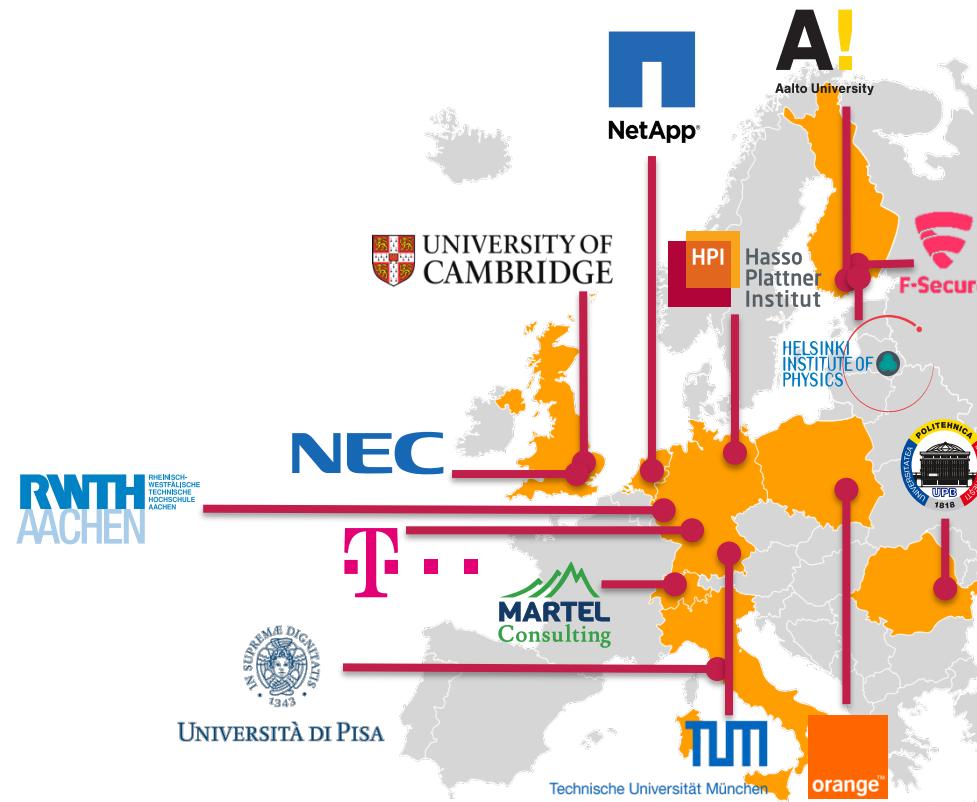
SSICLOPS

02.2015 – 02.2018

1. In-Memory Databases in the cloud (HYRISELab)
2. High-Energy Physics Workload
3. Network Function Virtualization in a NGPoP
4. Content Distribution and Caching

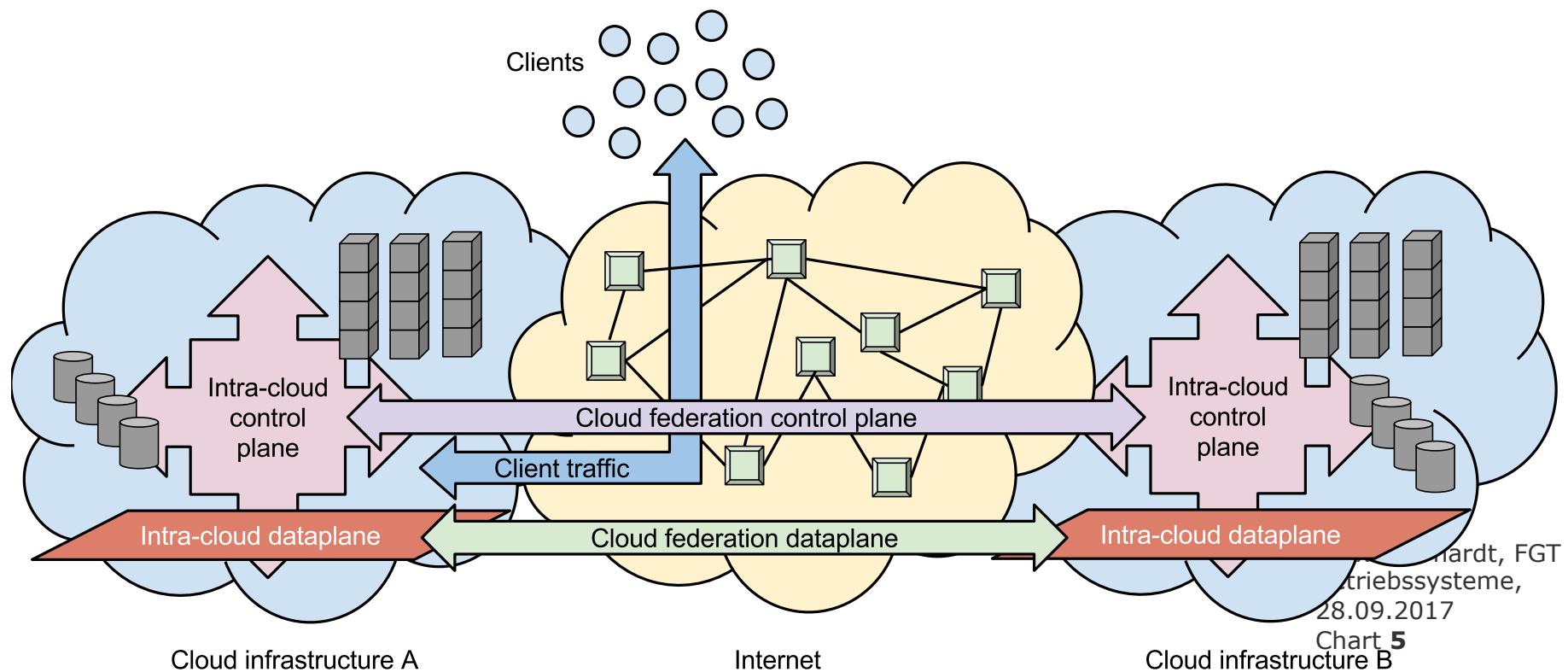
Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart 3

SSICLOPS: Partners

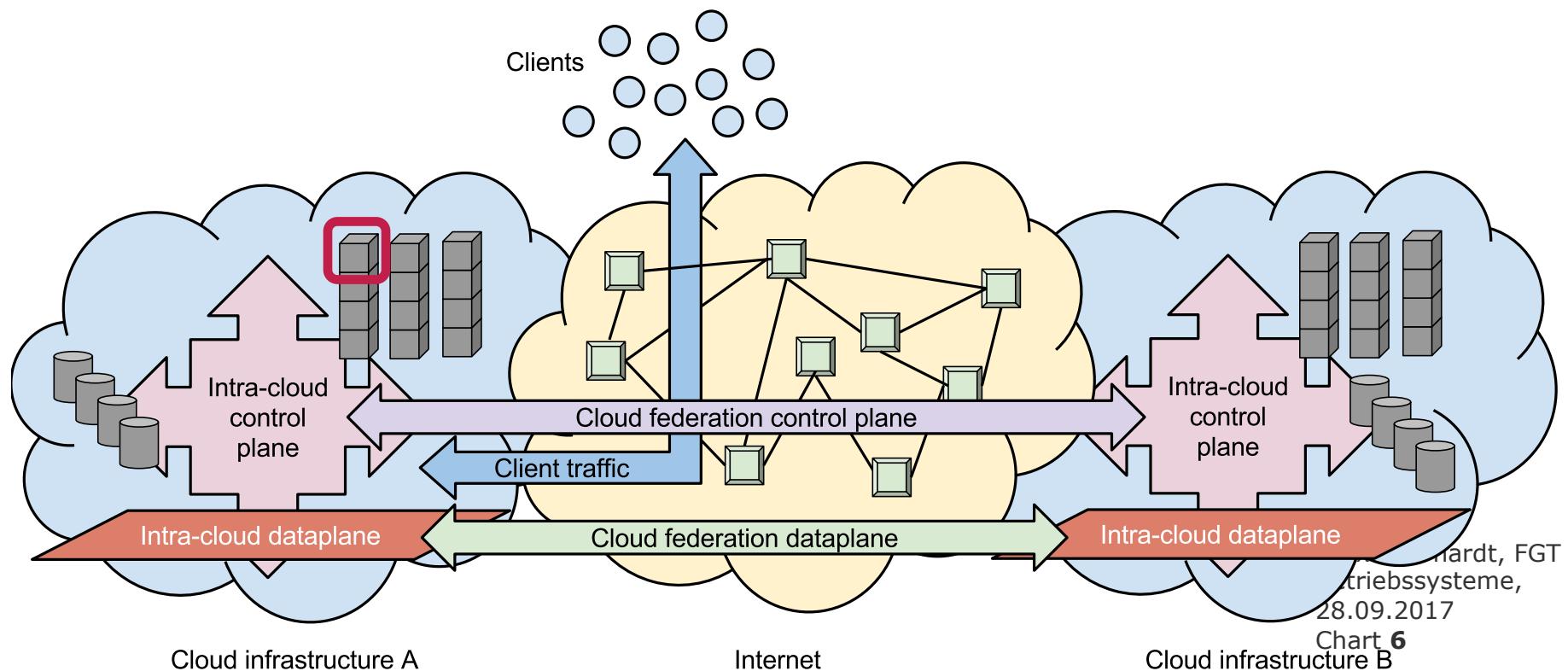


Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart 4

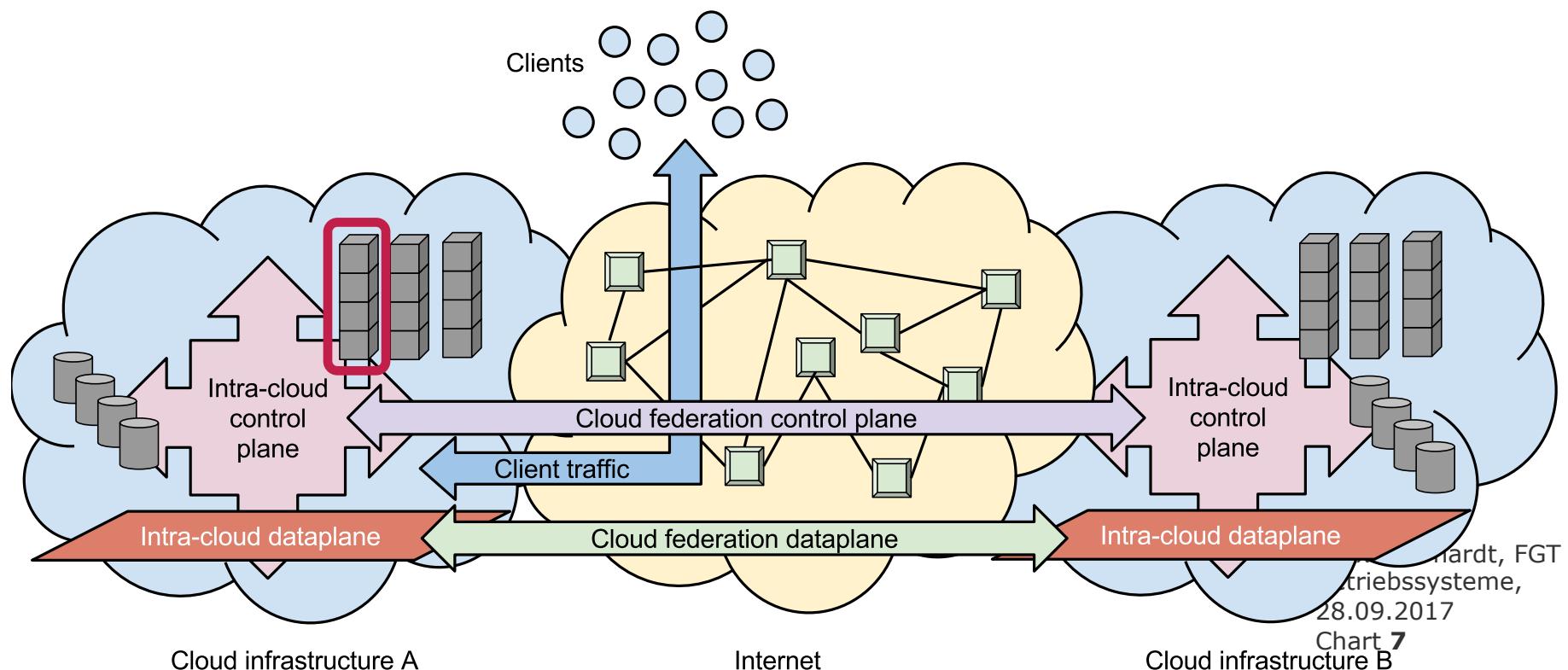
SSICLOPS: Big Picture



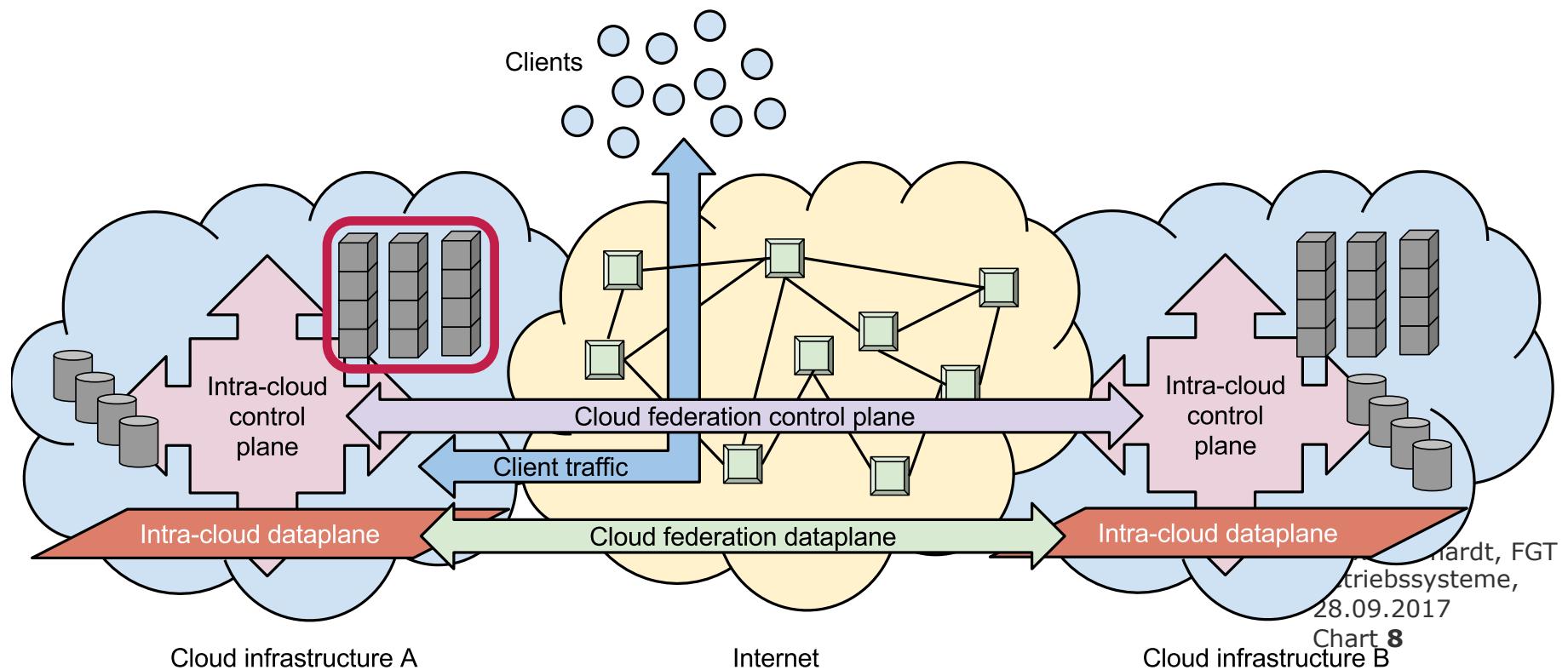
SSICLOPS: System Level



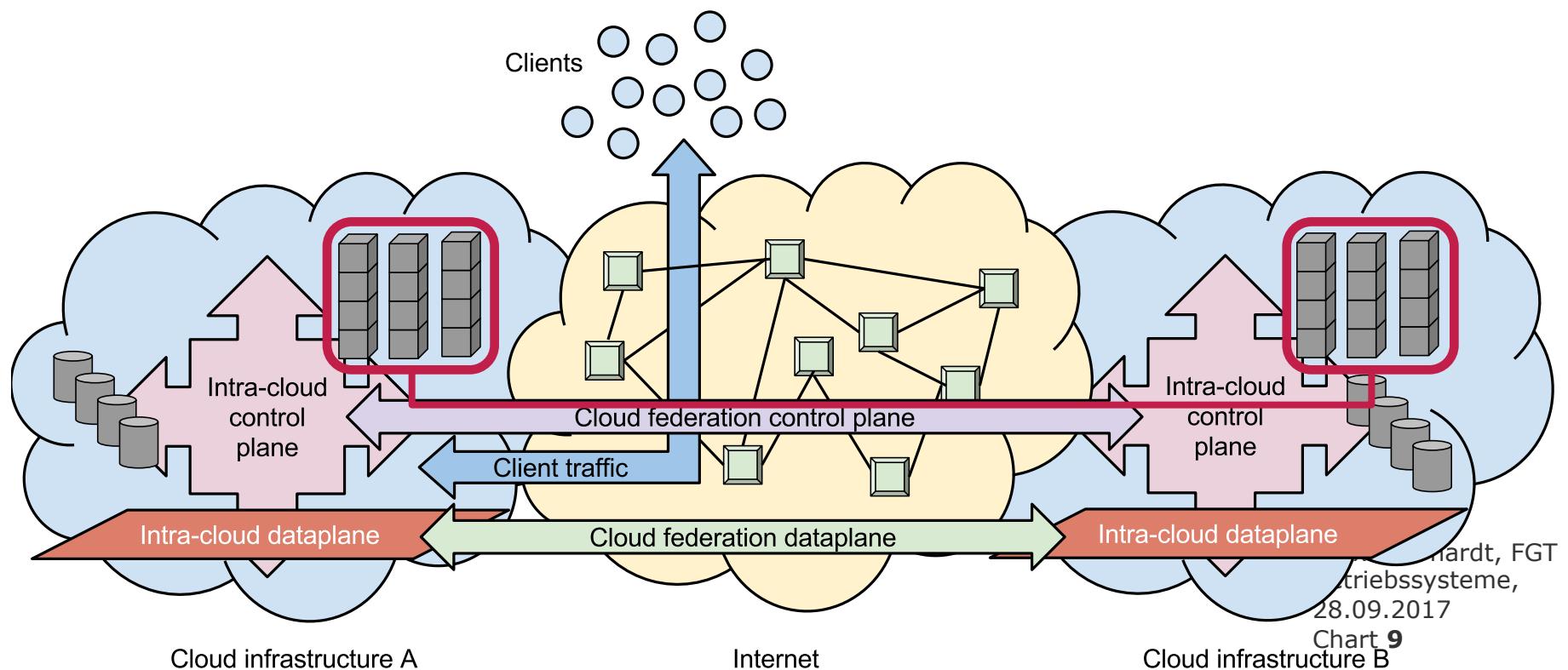
SSICLOPS: Rack Level



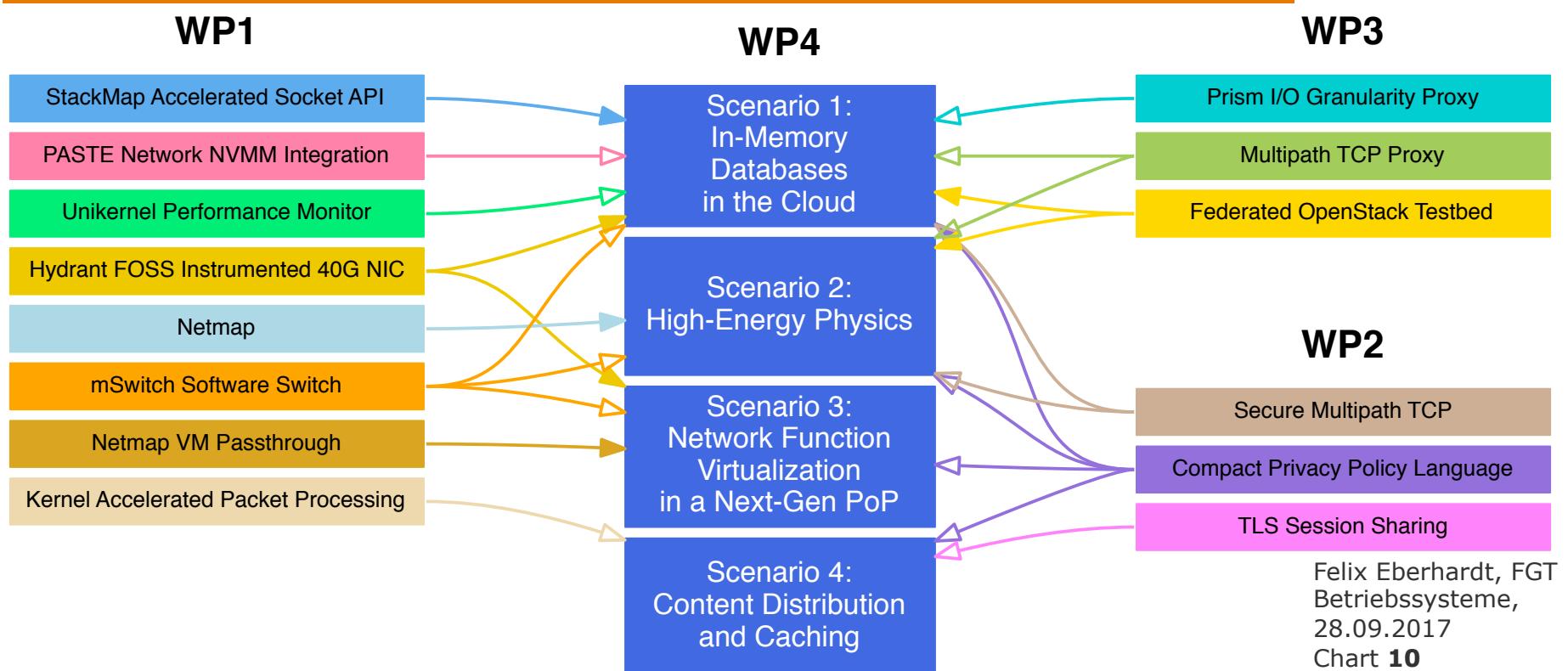
SSICLOPS: Intra Cloud Level



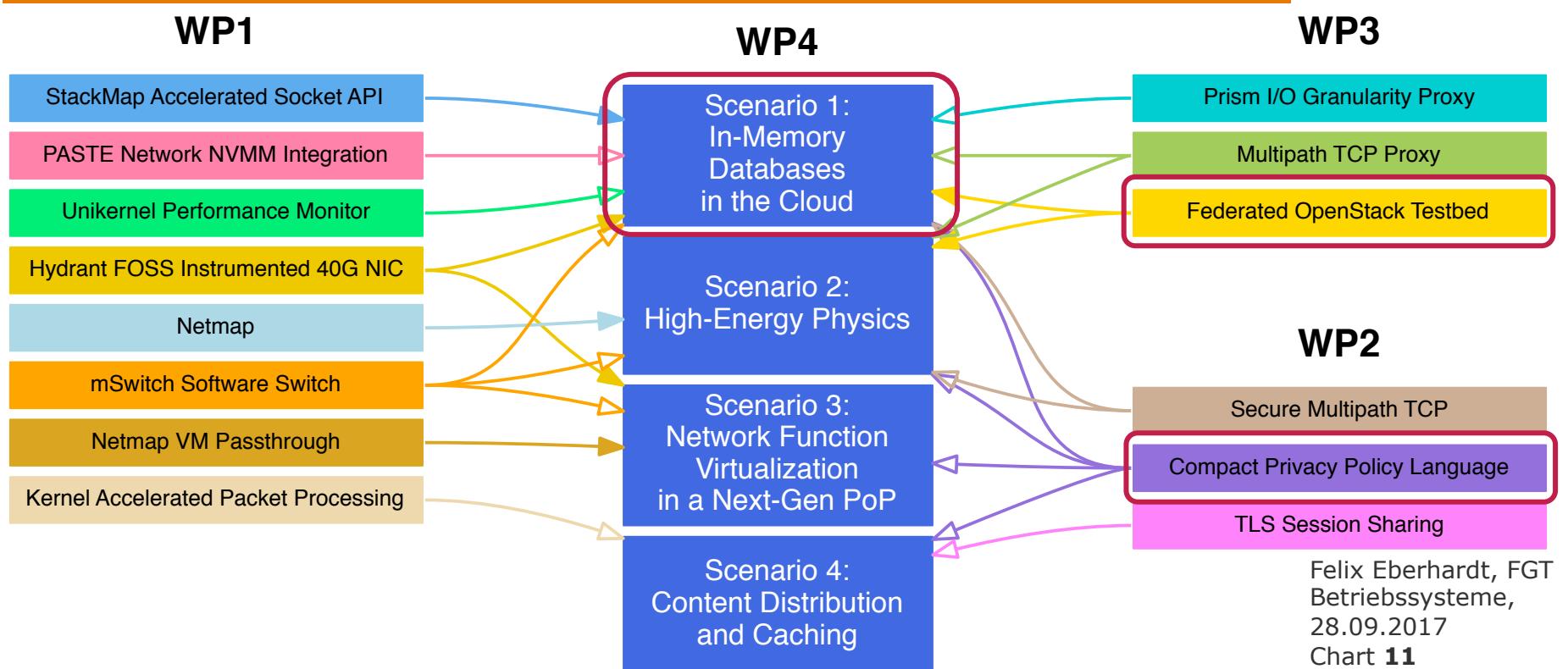
SSICLOPS: Inter Cloud Level



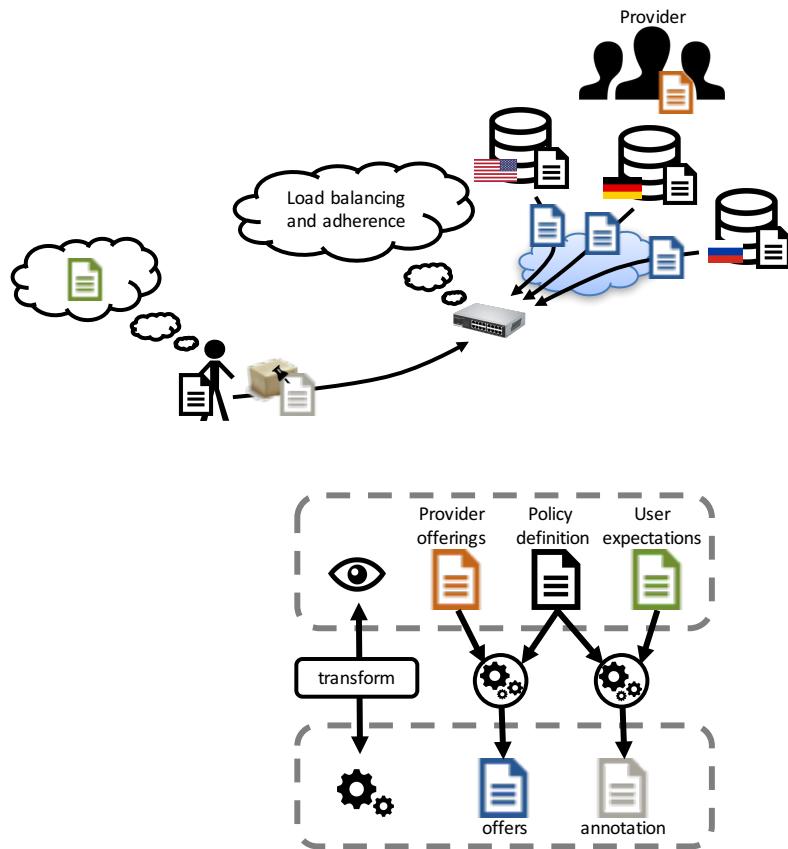
SSICLOPS: Collaboration



SSICLOPS: Collaboration

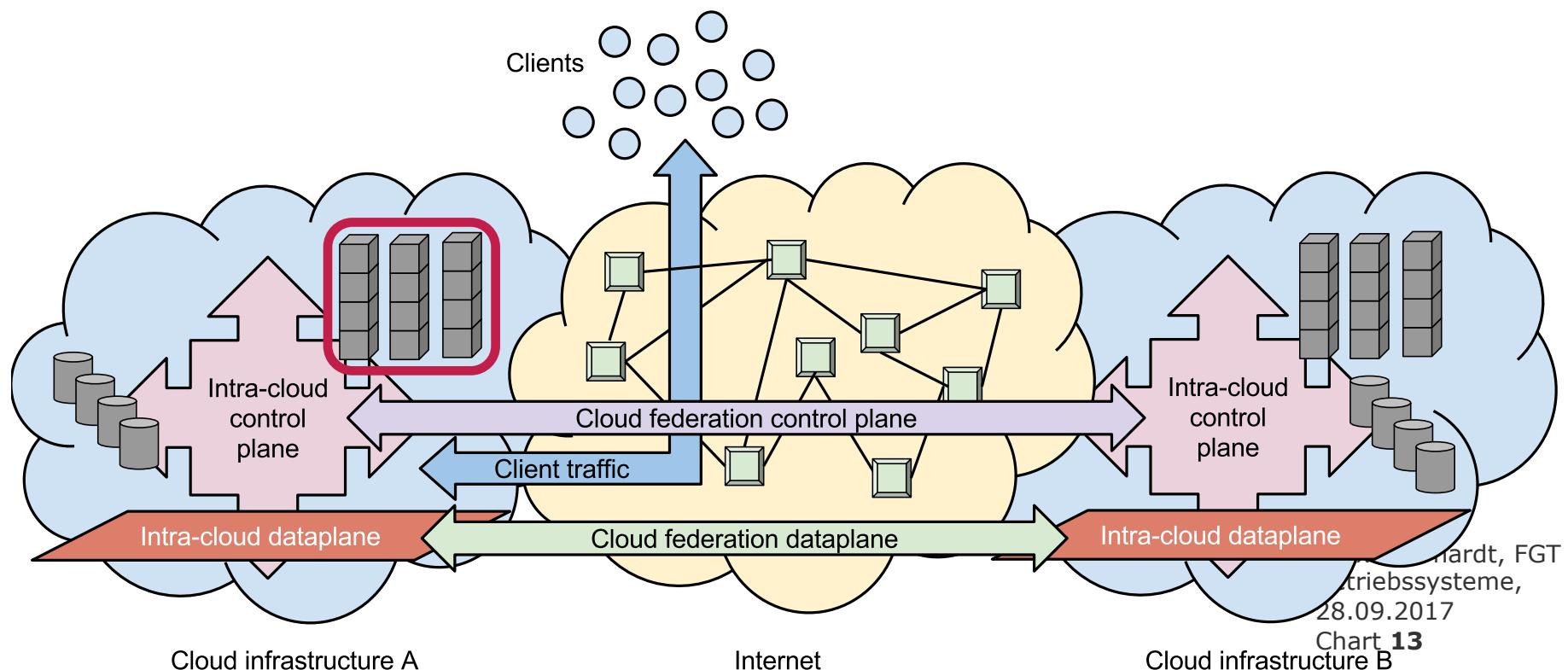


SSICLOPS: Policy Language

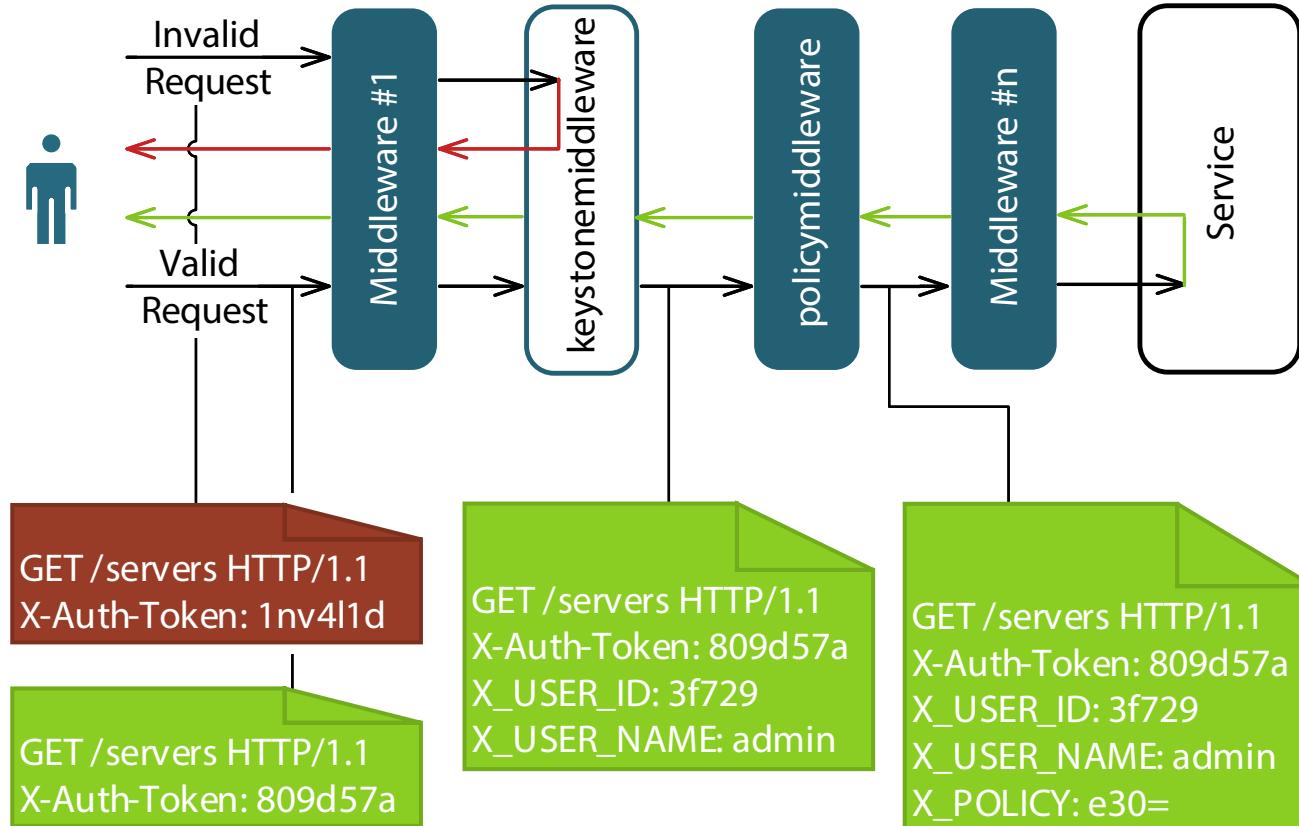


```
storage.provider != "CompanyA"
& storage.log_access = true
& storage.deleteAfter(1735693210)
& storage.notify("delete", "email", "example@example.eu")
& storage.backupHistory("1M")
& ( storage.location = "DE"
  | ( storage.location = "EU"
    & storage.fde.activated = true
    & storage.fde.algorithm = "aes"
    & storage.fde.keySize = 256
  )
)
& storage.replication >= 2
& storage.availability >= 0.99
```

SSICLOPS: Policy Support in OpenStack

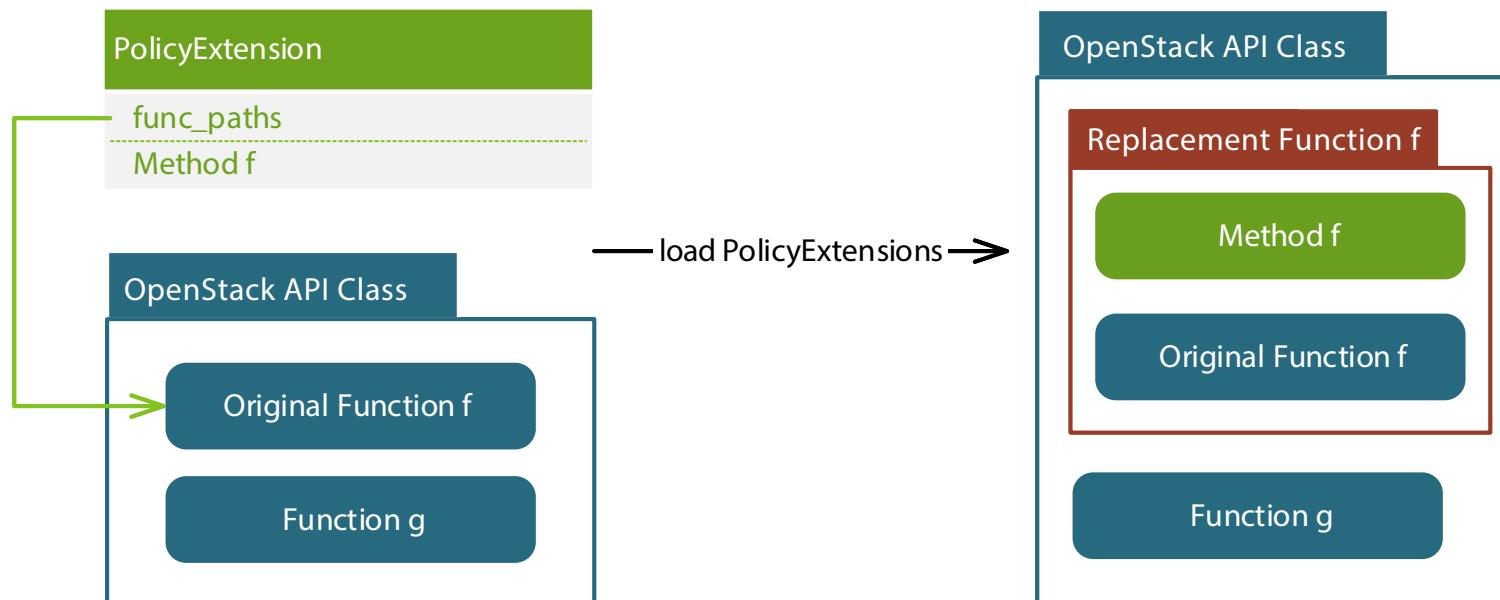


Experiments: Federated Cloud Replication



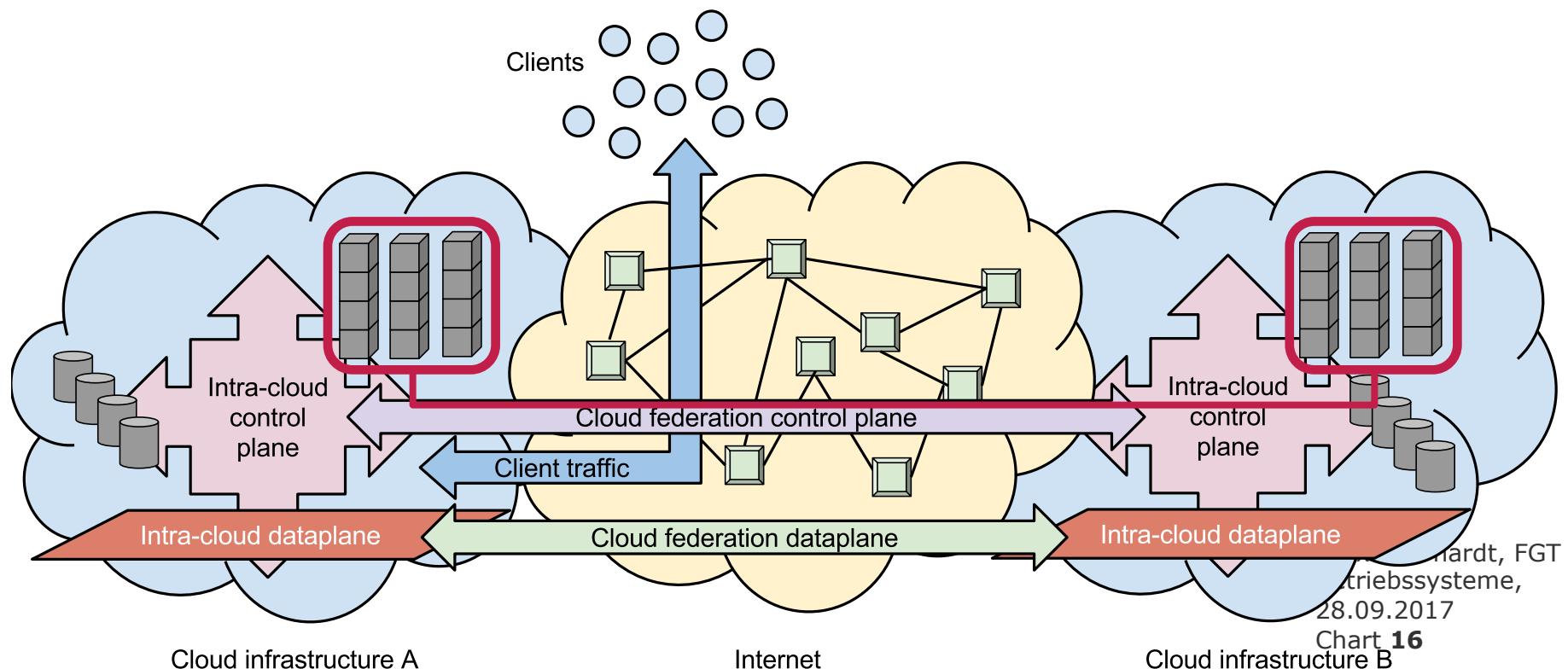
Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart **14**

Experiments: Federated Cloud Replication

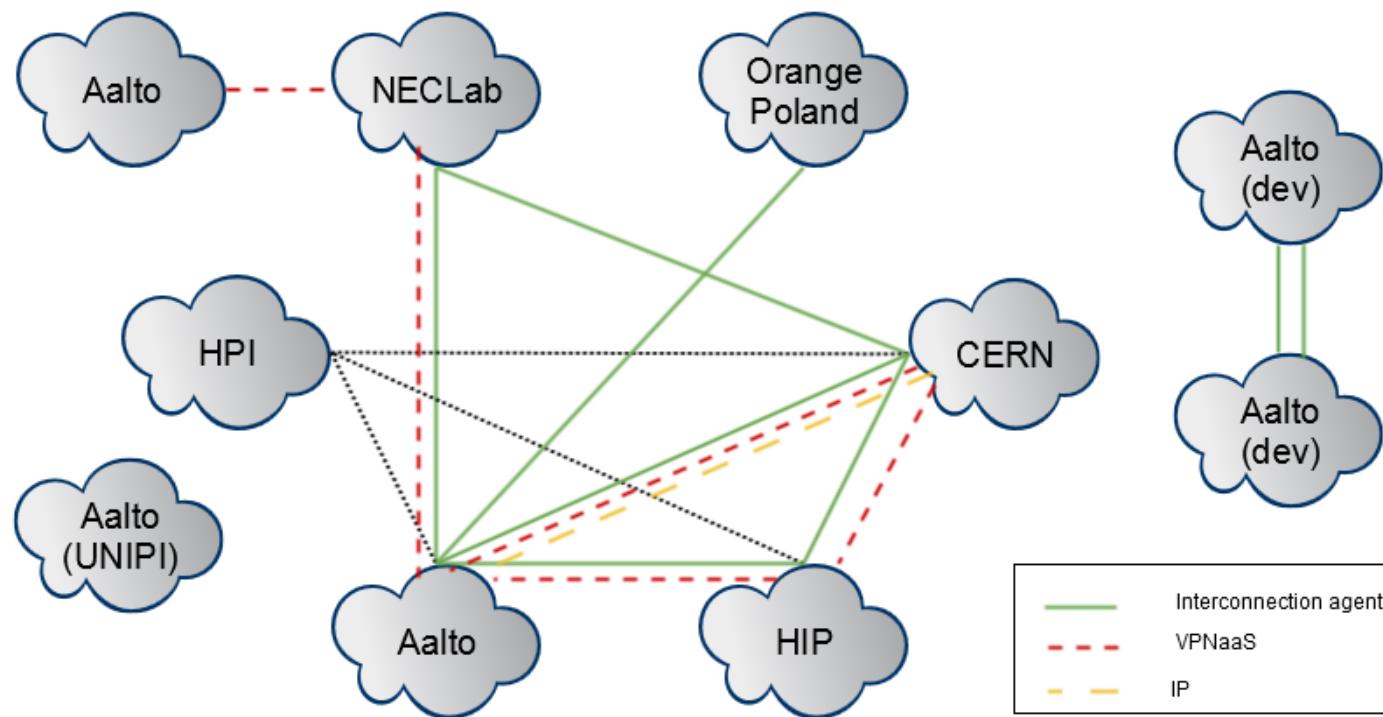


Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart **15**

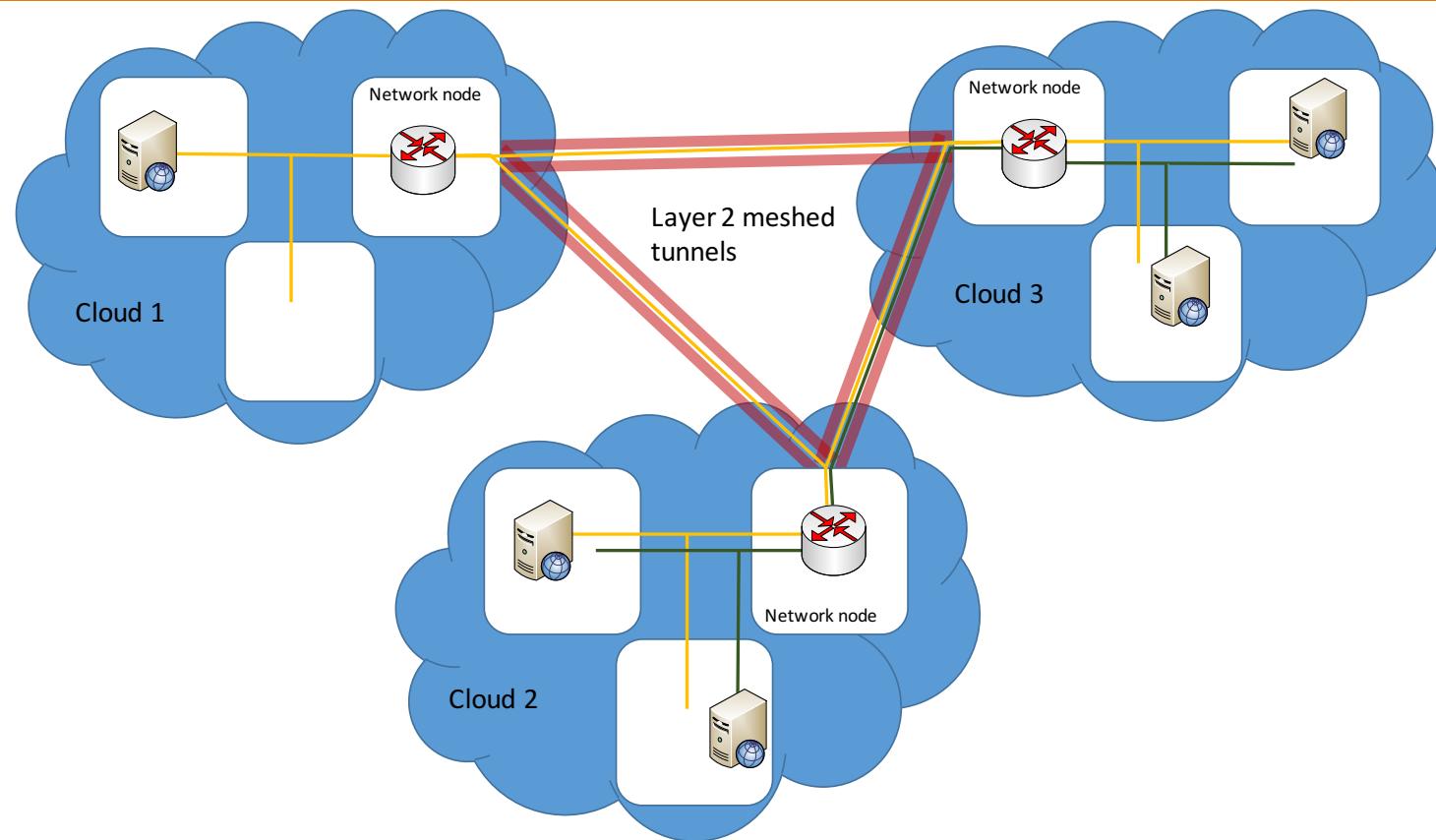
SSICLOPS: Testbed



SSICLOPS Testbed: Federated Clouds

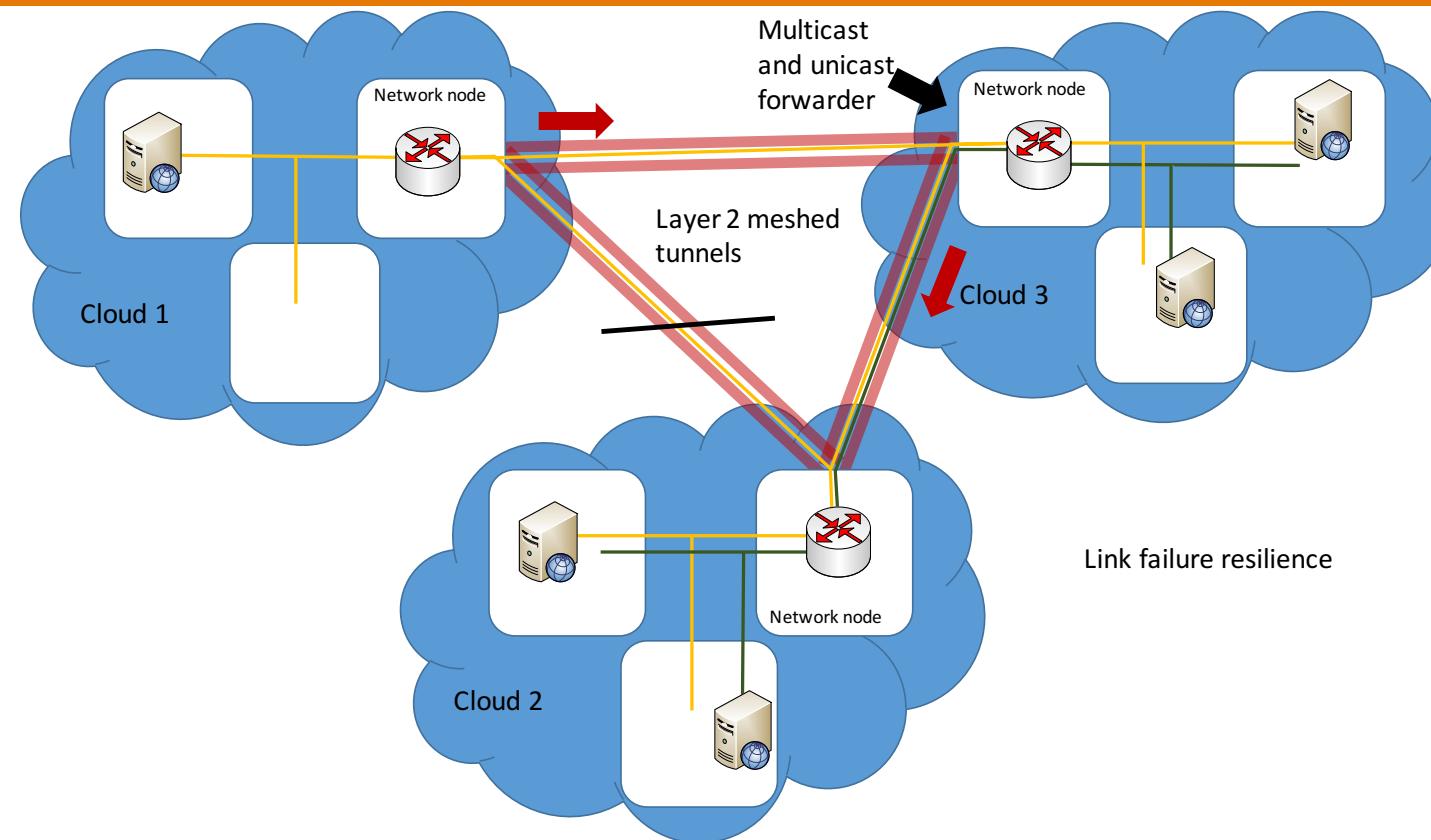


SSICLOPS Testbed: Federated Clouds – MPTCP Proxy



Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart **18**

SSICLOPS Testbed: Federated Clouds – MPTCP Proxy



Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart **19**

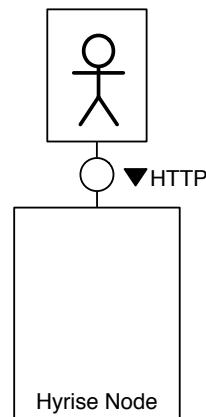
SSICLOPS: Use Case In Memory Database

Single node in-memory database

- Open source database
- No policy support
- No scale-out support

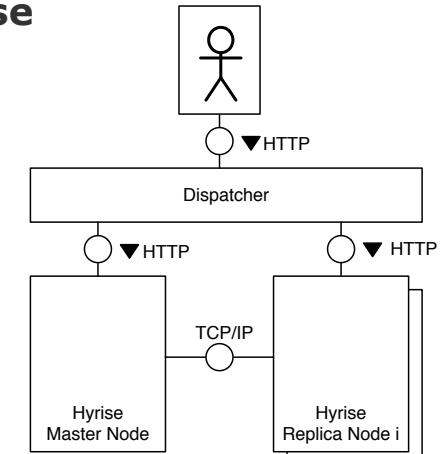


<https://github.com/hyrise>



Multi node in-memory database

- Compact Privacy Policy Language (WP2)
- Elasticity: OpenStack (WP3)
- Scale-out: StackMap (WP1)
- Availability: MPTCP (WP1)



Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart **20**

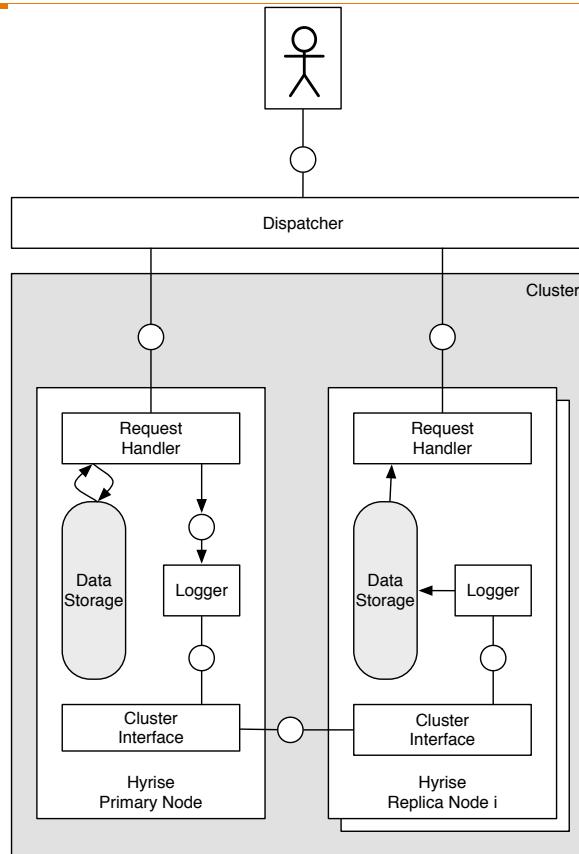
SSICLOPS: Use Case In Memory Database

Cluster interface sends (dictionary encoded) log information to replicas

Frequency is configurable and based on

- Number of calls
- Exceeding buffer size
- Time since last transmission

Ongoing Cooperation with SSICLOPS partner NetApp (WP1).



Use Case In Memory Database Elasticity

Elasticity is the capability to shrink and extend the database cluster depending on the current workload.

- Hyrise-R dispatcher monitors workload
- Hyrise instances can join and leave the cluster

HYRISE-RCM Swarm Manage HYRISE-R Monitor Demo Configure

Hyrise-R Instances

Dispatcher: running | Master: running | Replica: running

Instance Type	Node	Load	Avg Latency
dispatcher	vm-imdmresearch-keller-01	0.6	0
master	vm-imdmresearch-keller-02	0.8	0
replica	vm-imdmresearch-keller-03	0.63	0
replica	vm-imdmresearch-keller-04	0.28	0

Start Dispatcher Start Master Start Replica Stop All Instances

Felix Eberhardt, FGT
Betriebssysteme,
28.09.2017
Chart 22

Use Case In Memory Database Policy Language Integration

