MeshDapp: Blockchain-enabled Payment System for Wireless Mesh Networks (F4Fp-09)

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## Connectivity for Everyone

- The digital world demands a <u>sustainable</u> and universal network infrastructure to supply connectivity to anyone anywhere
- Sustainable networks require <u>balanced value flows</u>
- Focus on <u>**wireless mesh networks**</u>

## The need for connectivity: automation

- An **automated mechanism** where diverse participants, resource providers and consumers, can pool these resources with the confidence that the consumption of resources is accounted **fairly**, and that calculations and money transfers are **automated**, **irreversible**, **inexorable** and shared across different participants, to avoid the cost, delays, errors and potential mistrust from manual accounting and external payments.
- **Blockchain** smart contracts, a technological base to fulfil properties, as Solidity smart contracts in an **Ethereum PoA** local blockchain

MeshDapp Platform
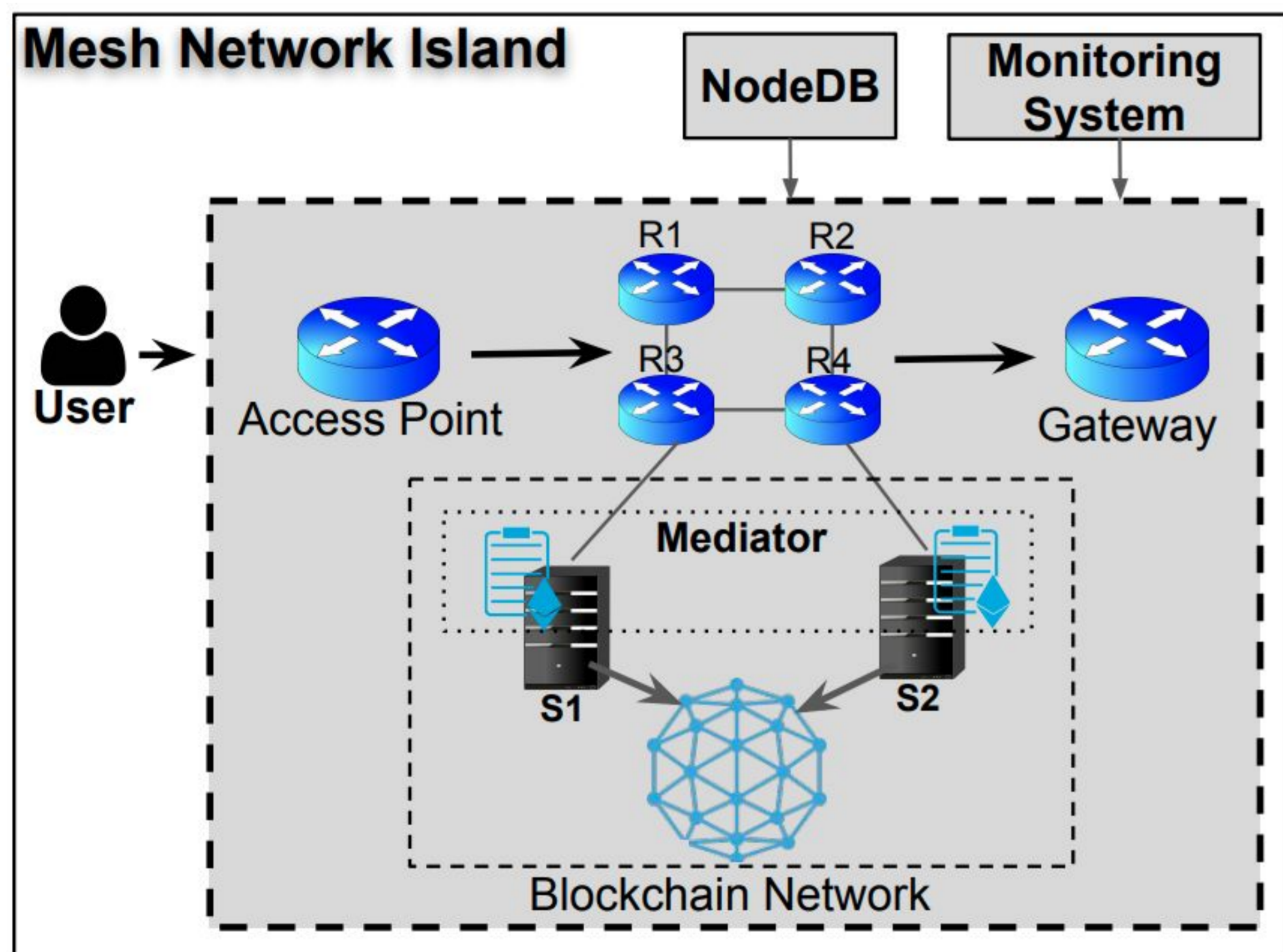
- A **mesh network island,** provides connectivity, Internet access, content, local services
- Consumers (users) connect through access points in coverage areas, mesh routers interconnect, servers deliver local services, gateways deliver connectivity
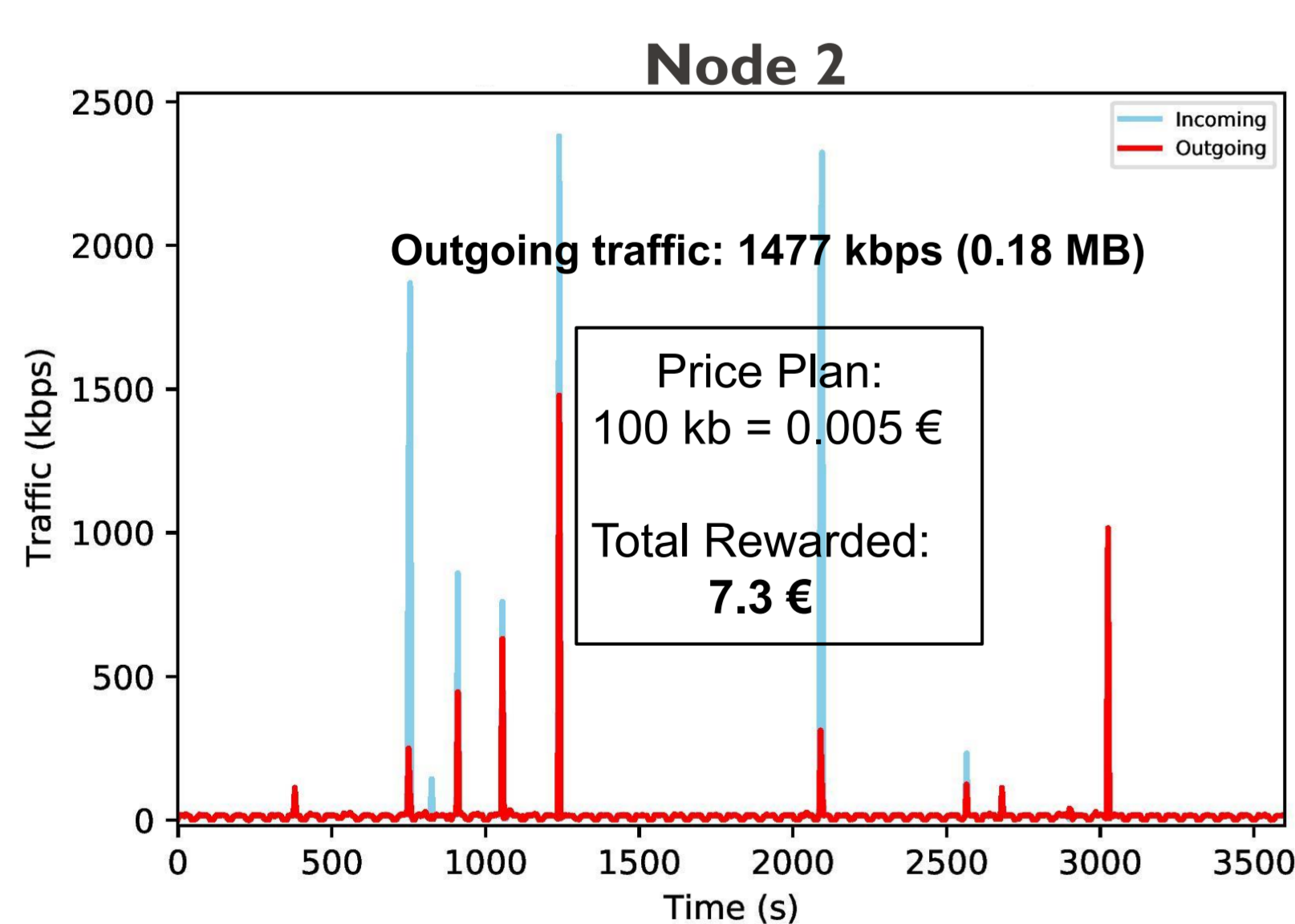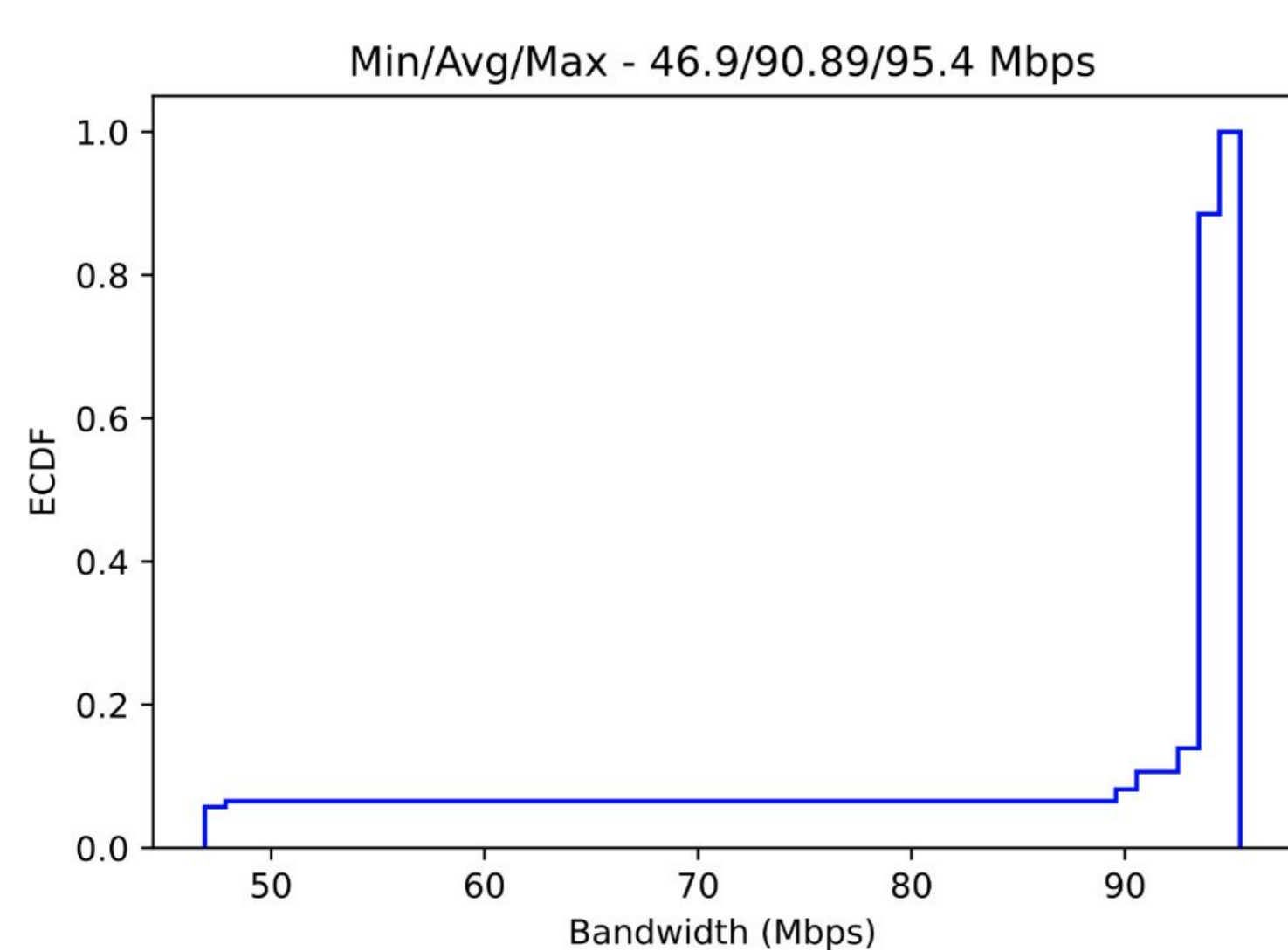
Demo Setup (CityLab)
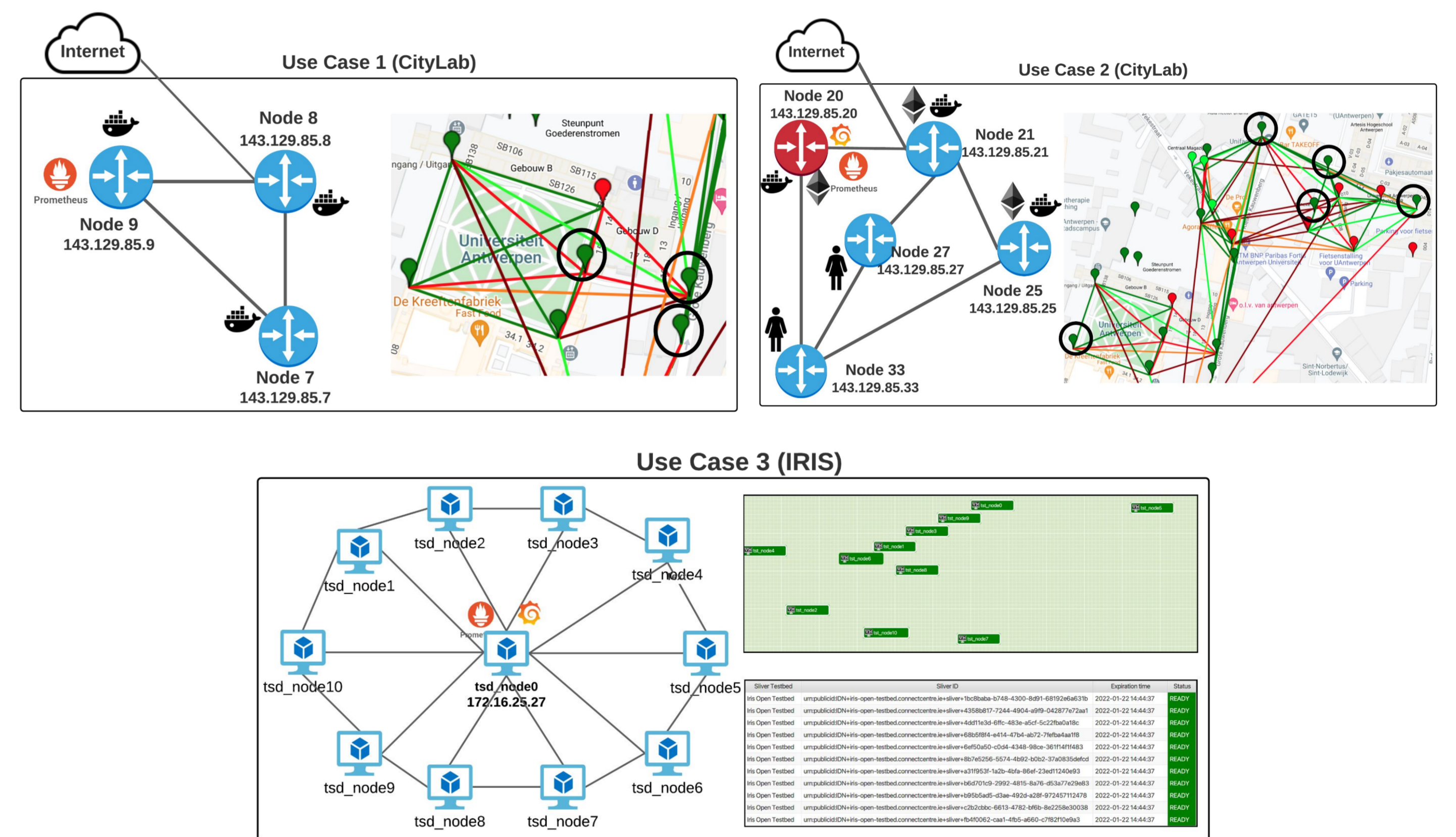
- 8 Wireless nodes in CityLab FIRE testbed (<u>mesh</u>)
- 11 VMs in the IRIS (TCD) testbed
- WiFi 802.11ac on 2.4GHz - 5GHz (Ubuntu 20.04)
- **Monitoring server** (Prometheus), key entity
- Docker containers for in/out traffic measurements

Results and Lessons Learned

Incoming and Outgoing Traffic

Node 2

Outgoing traffic: 1477 kbps (0.18 MB)

Price Plan:
100 kb = 0.005 €

Total Rewarded:
7.3 €

Network Bandwidth

Min/Avg/Max - 46.9/90.89/95.4 Mbps

- Monitoring System of MeshDapp platform **successfully** deployed in CityLab testbed
- Incoming/Outgoing traffic and network measurements logged
- **Smart Contracts** deployed in the nodes of CityLab and IRIS
  - **3 seconds** to process 100 transactions in CityLab
- **40** is the maximum number of transactions per second that the blockchain could process

Transaction Completion Time and Transaction Rate

Total Time Required (1s block)

Transaction Rate (1s block)