AutoGOLE (LHCONE) R&D activities

GLIF @ TNC18 Based On Presentation From LHCOPN – LHCONE meeting • RAL Abingdon (UK)

6-7 March 2018 • Gerben van Malenstein Presented By Joe Mambrettti

SURF NET

Agenda

09:00 → 12:00 **LHCONE: R&D activities**

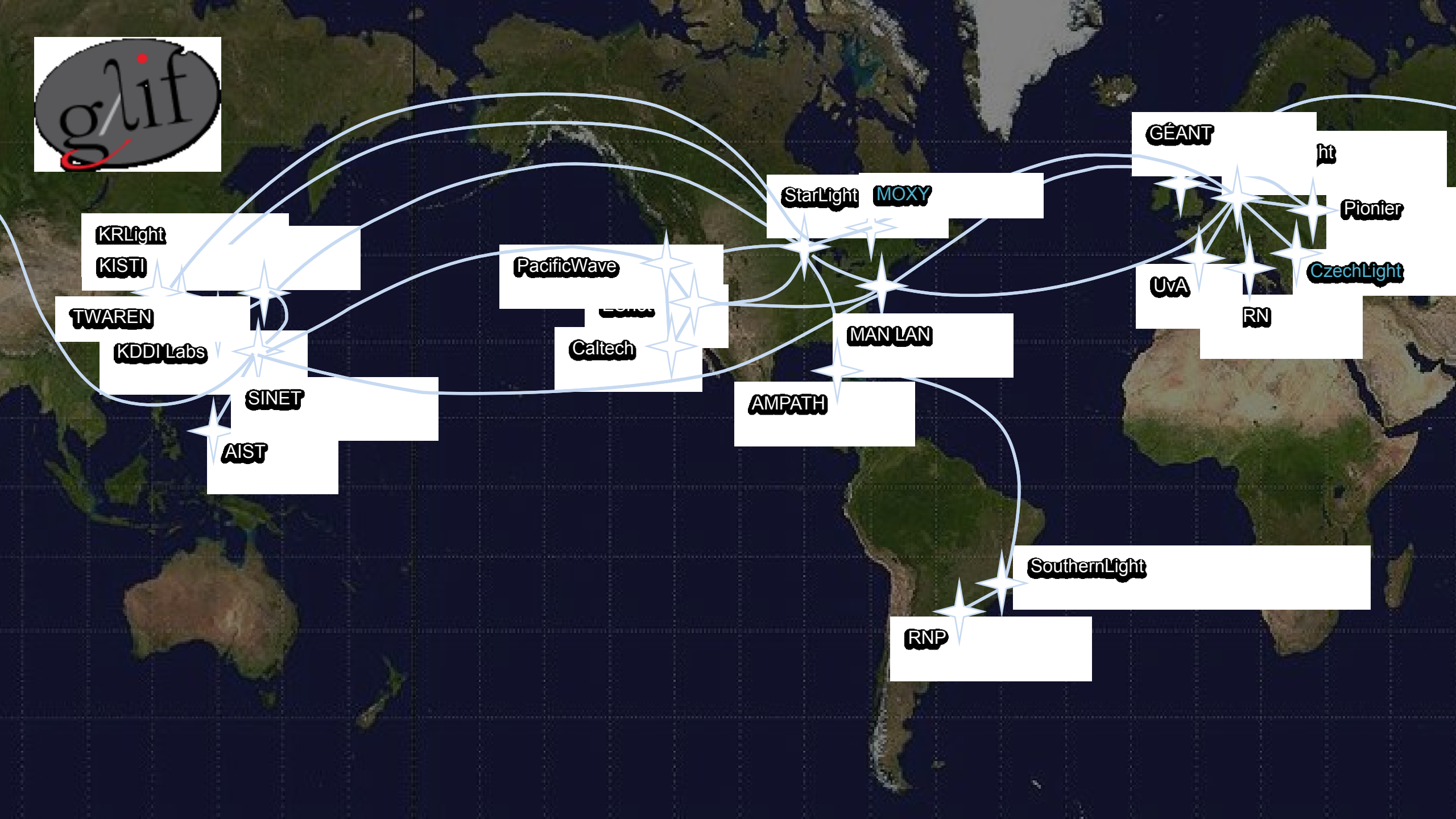
09:00	**Introduction** **Speaker**: Gerben van Malenstein (SURFnet)	10m
09:10	**AutoGOLE update** **Speaker**: Gerben van Malenstein (SURFnet)	20m
09:30	**Recent DTN demonstrations** **Speaker**: Joe Mambretti (International Center for Advanced Internet Research Northwestern University)	30m
10:00	**Routing with BGP route servers - update** **Speaker**: Magnus Bergroth (NORDUnet)	10m
10:15	**Global research platform update** **Speaker**: Joe Mambretti (International Center for Advanced Internet Research Northwestern University)	15m
10:30	**Coffee break**	30m
11:00	**NORDUnet activities** **Speaker**: Lars Fischer (NORDUnet)	10m
11:10	**Discussion: Next steps towards production service** **Speaker**: Gerben van Malenstein (SURFnet)	50m

12:00 → 13:00 **LHCONE: plans**

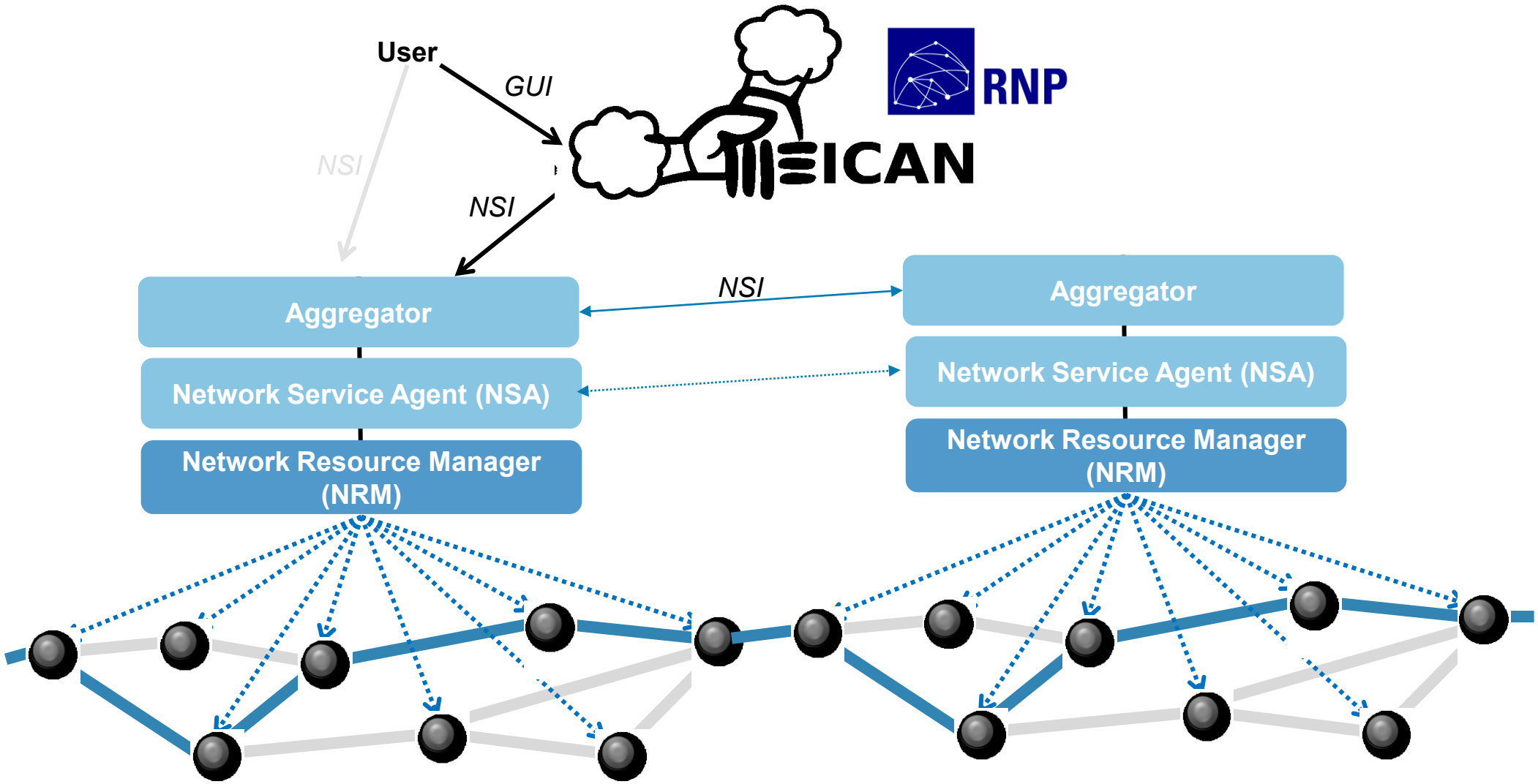
12:00	**Next actions**	15m
12:15	**Wrap-up and next meeting**	15m

AutoGOLE update: overview

- **AutoGOLE fabric delivers dynamic layer 2 network services between Open Exchanges and networks, designed as a multi-domain system**
  - Based on Network Service Interface (NSI) Connection Service
    - Hub and spoke architecture
    - 29 Network Service Agents (6 aggregators, 23 uPA) advertising 30 networks worldwide
  - Using DDS service for NSA discovery and document propagation between aggegrators
  - Advanced capabilities
    - Experimenting with new path finding and signaling algorithms
    - Additional network modeling for optimizations
    - Reducing old-school multi-domain human provisioning lead times
  - Introduction of multi-domain possibilities for monitoring, troubleshooting and provisioning
    - AutoGOLE Dashboard (former prototype)
    - MEICAN Pilot


glif
KRLight
KISTI
TWAREN
KDDI Labs
SINET
AIST
PacificWave
Caltech
StarLight
MOXY
MAN LAN
AMPATH
GÉANT
Pionier
CzechLight
UvA
RN
SouthernLight
RNP

OnDemand services, multi-domain

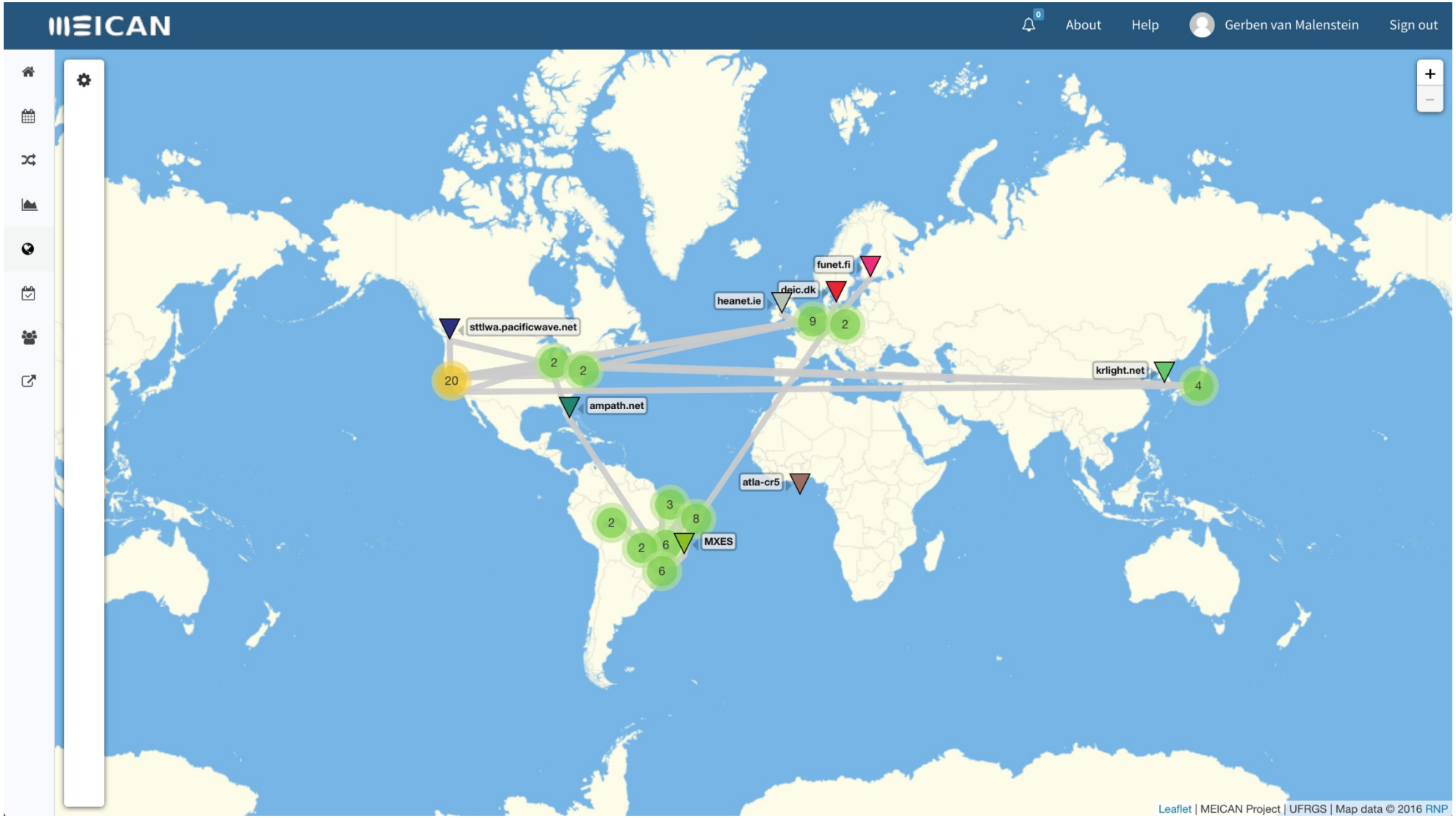


Why MEICAN for the AutoGOLE?

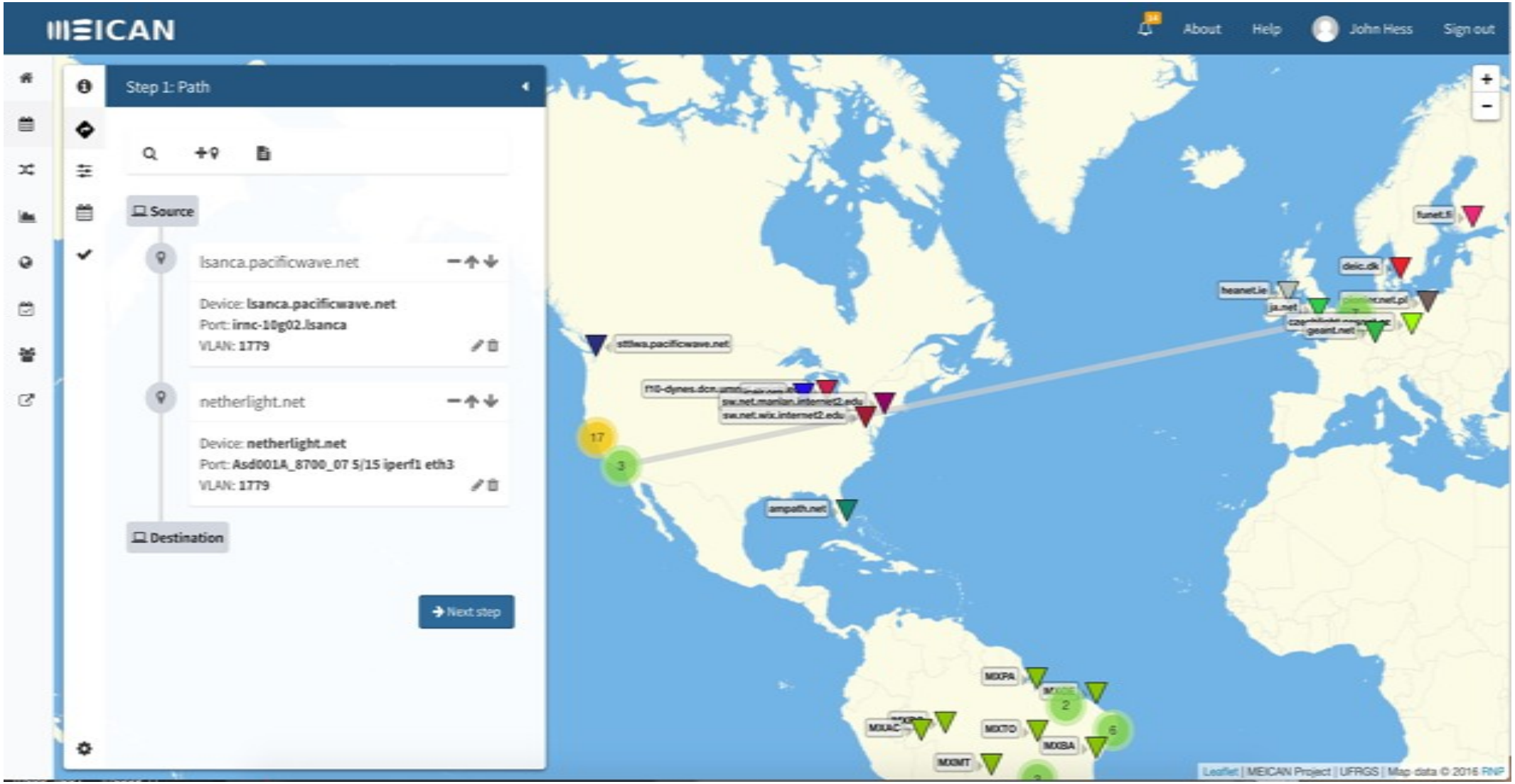
- **Looking for 1 provisioning tool for NOCs and users, a front-end for the AutoGOLE**
- Comparison of multi-domain provisioning systems after GLIF AutoGOLE meeting in May 2016
- MEICAN
  - Interface offers support for creation, modification and deletion of multi-domain services
  - Interface is intuitive, easy access to world-wide (true multi-domain) provisioning of service
  - Offers features such as user roles, authorization and workflows
  - Monitoring of services becomes possible
  - Debugging for NOCs possible
  - Supporting the Network Service Interface

MEICAN: moving towards a production-grade multi-domain network service provisioning tool

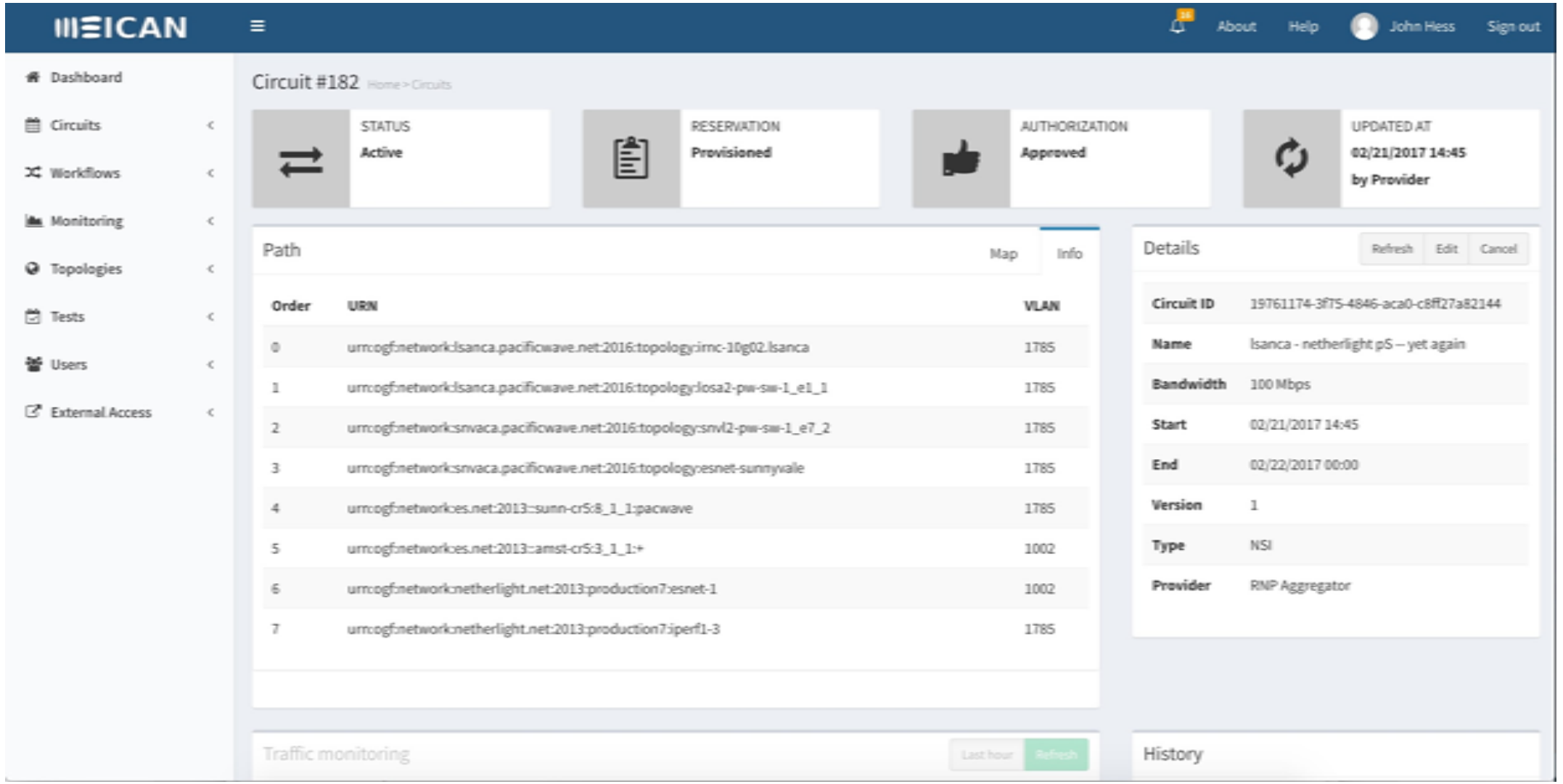
MEICAN Topology



MEICAN Circuit reservation



MEICAN Circuit reservation – path info



MEICAN experiences and results so far

- RNP provides active participation and support to the AutoGOLE project
- International circuits for research activities have been created
- NOC engineers involved

- https://wiki.rnp.br/display/secipo/AutoGOLE+MEICAN+Pilot

Timeline 2016-2017 MEICAN pilot

Phase 1
2016Q4

Phase 2
2017Q2

Phase 3
2017Q3

Phase 4
2017Q4

Phase 1
Form a coalition of AutoGOLE partners that want to join. These are: PacificWave, SINET, StarLight, RNP, NetherLight/SURFnet.

AutoGOLE is open to others joining this effort.

Phase 2
Create and test an implementation with MEICAN.

Engage NOC engineers and put them into the Playground first, then production system, get their feedback.

Phase 3
Try-outs of MEICAN by production NOCs.

Phase 4
Facilitate collaborations and research projects.

Show the difference between regular IP connectivity and on-demand circuits.

AutoGOLE workplan 2018

1. More peerings & expansion (data plane, world-wide coverage)

- Adding 100G DTN hardware, integrating DTNs in the WAN
- Onboarding CESNET, GTS, MOXY

2. Recurring process to check link state

- MEICAN can also setup connections automatically

3. Growing MEICAN setup (control plane)

- Collaboration with the GNA TF provisioning subgroup (next slide)
- Assigning a responsible operations engineer per site

Global Exchange Point Working Group Charter

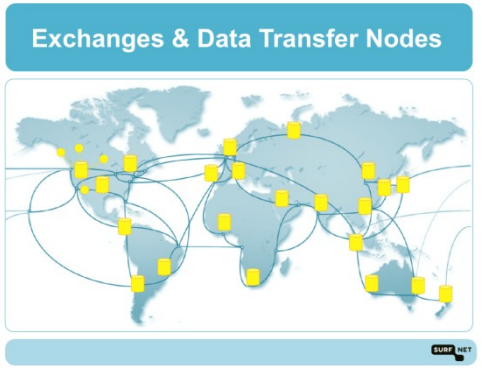
- The core goals of this group is to make Global Exchange Points more useable by defining how to build on GNA 1.0. In particular the group will aim to achieve a very useable Global Exchange Point that includes provisioning interfaces, measurement interfaces, and reporting that will help make interactions with the open exchange user-friendly.

GNA: Automating Global Exchange Point provisioning

“This work items recognises that Global Exchange Points are not operated by a single network provider, but are operated by separate network providers. This means that commercially available control planes for service provisioning are not suitable for provider-to-provider service instantiation. This task will investigate recent work to solve this problem and propose a solution that best suits the needs of the GNA community.”

Data Transfer Nodes

- International setup based on LHCOPN-LHCONE discussion at CERN 10 Jan ’17



- Research by University of Amsterdam in 2017
  - Demo on Aircraft Maintenance at SC’17
    - http://sc.delaat.net/sc17/posters/Poster-use-case-aircraft-maintenance-SC.pdf

Data Transfer Nodes

Figure 1: The flow of data in the Accelerated Data Transfer work flow.

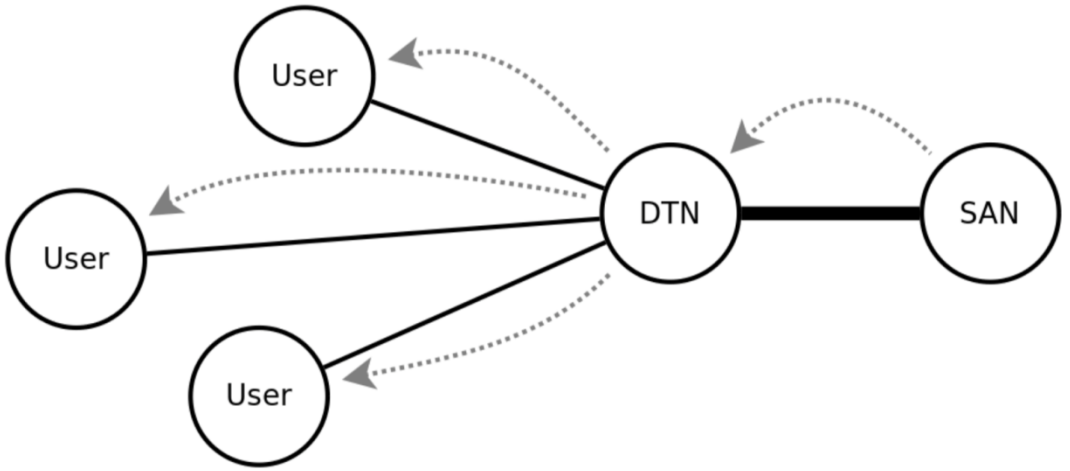
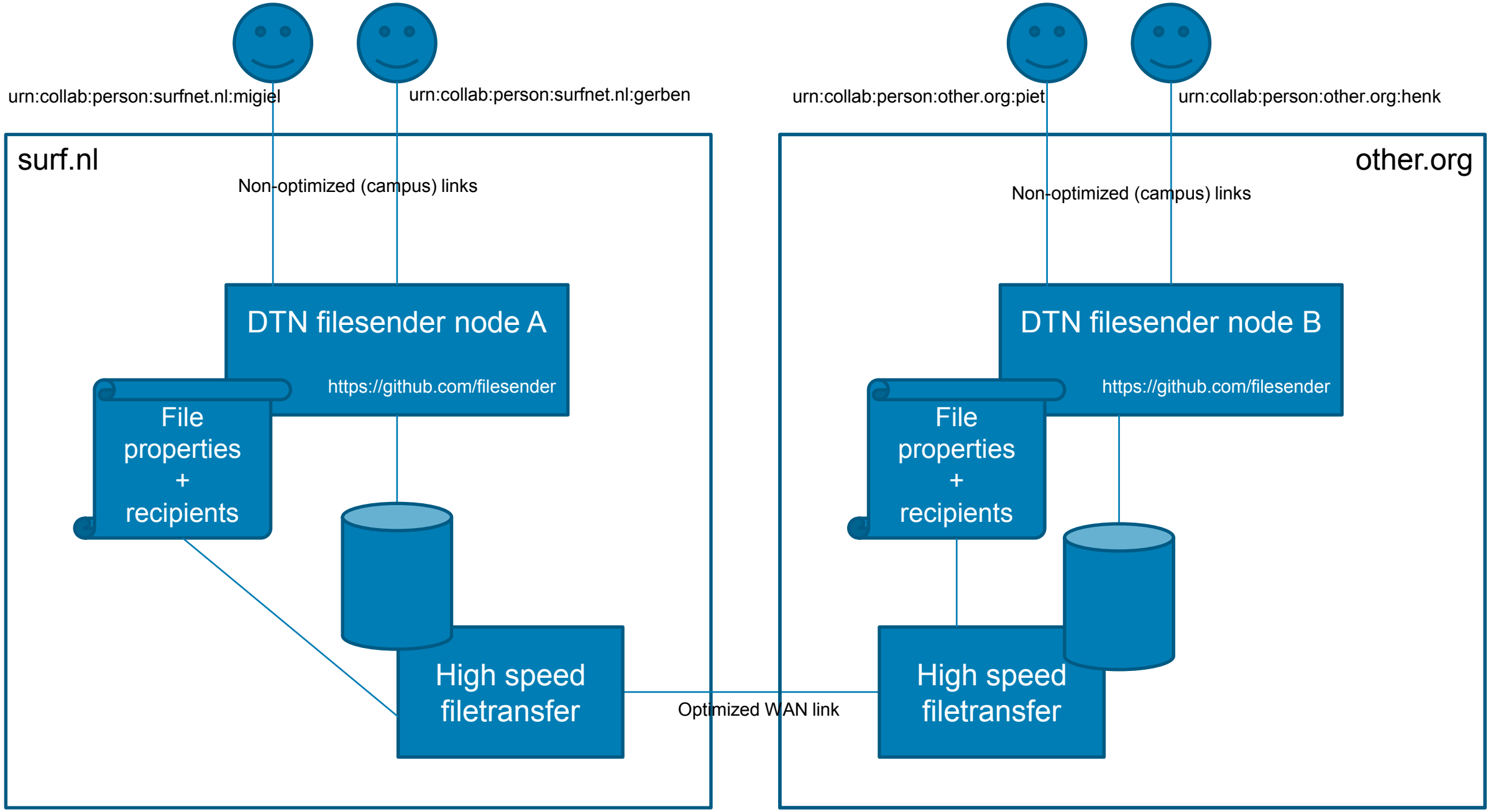


Figure 2: The flow of data in the Data Access Point work flow.

Research by UvA, funded by SURFnet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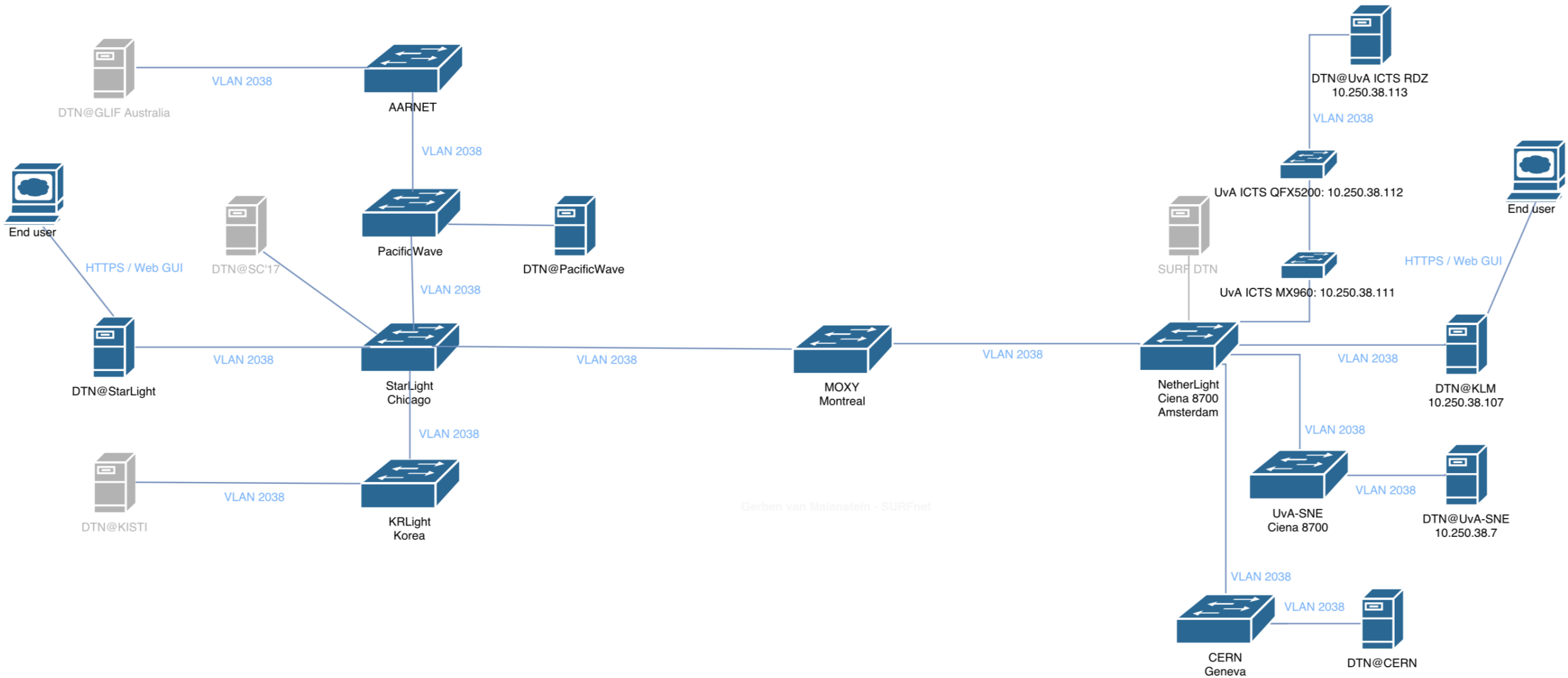
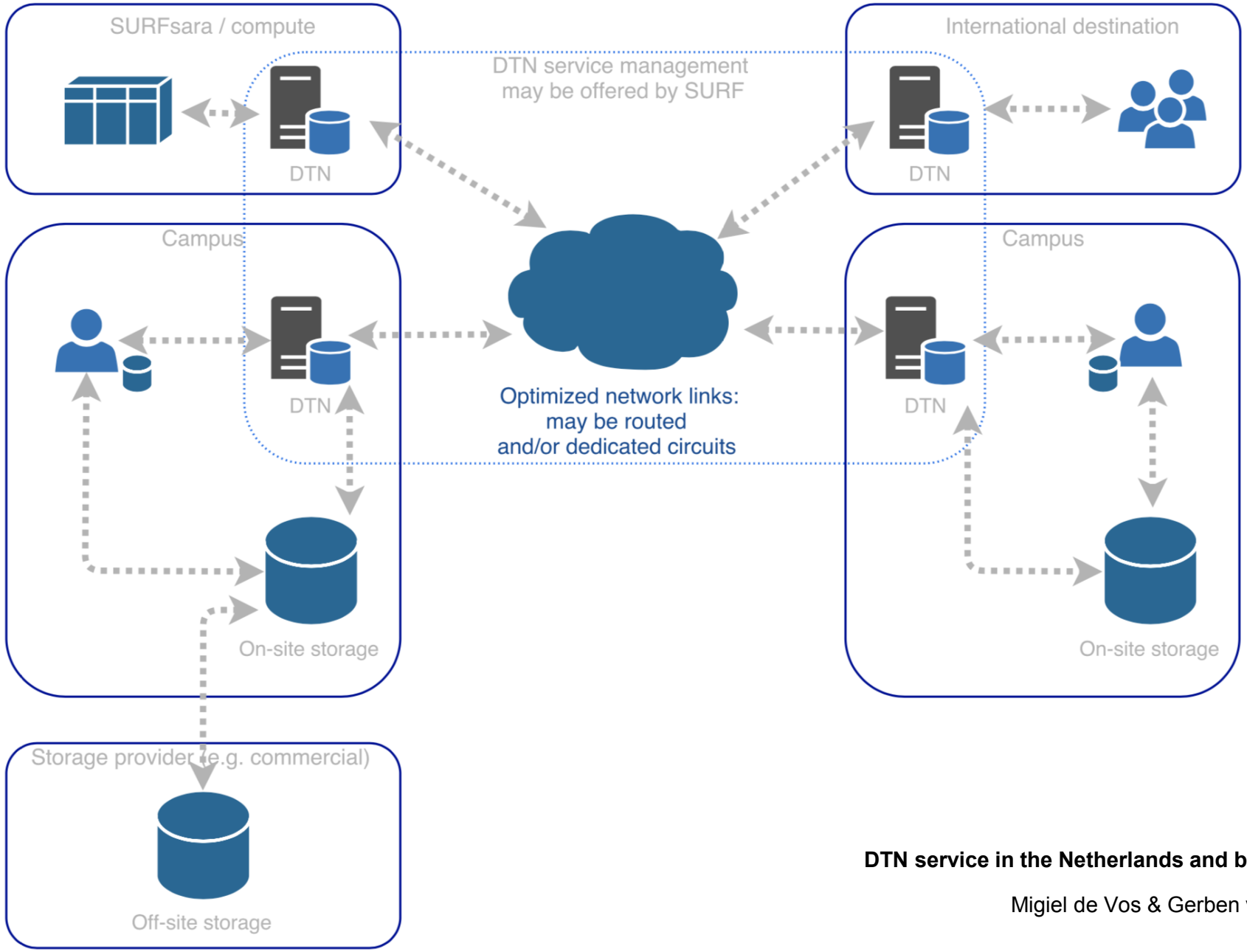
urn:collab:person:surfnet.nl:gerben
surf.nl
Non-optimized (campus) links
DTN filesender node A
https://github.com/filesender
File properties + recipients
High speed filetransfer
Optimized WAN link
urn:collab:person:other.org:piet
urn:collab:person:other.org:henk
other.org
Non-optimized (campus) links
DTN filesender node B
https://github.com/filesender
File properties + recipients
High speed filetransfer

International Connectivity for Data Transfer Nodes

Version 6, 26 January 2018, Gerben van Malenstein, SURFnet





DTN service in the Netherlands and beyond, discussion slide

Migiel de Vos & Gerben van Malenstein, SURFnet

Data Transfer Nodes

- More on research projects and DTNs @ TNC18, Including By J Mambretti

  (Wednesday – Next Generation DTNs for Global Data Intensive Science)

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WHAT SURF CAN DO