

# AutoGOLE/SENSE Working Group

GNA-G Community VCs – 7-8 December 2020  
Gerben van Malenstein (chair)



*“The global advancement of **science** by realizing a multiresource infrastructure through international **collaboration**.”*



Schematic overview of the GNA-G AutoGOLE

# MEICAN – 2017

MEICAN

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Users

External Access

Circuit #182

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STATUS

Active

RESERVATION

Provisioned

AUTHORIZATION

Approved

UPDATED AT

02/21/2017 14:45

by Provider

Path

Map

Info

Leaflet | MEICAN Project | UFRGS | Map data © 2016 RNP

Details

Refresh

Edit

Cancel

Circuit ID

19761174-3f75-4846-aca0-c8ff27a82144

Name

Isanca - netherlight pS -- yet again

Bandwidth

100 Mbps

Start

02/21/2017 14:45

End

02/22/2017 00:00

Version

1

Type

NSI

Provider

RNP Aggregator

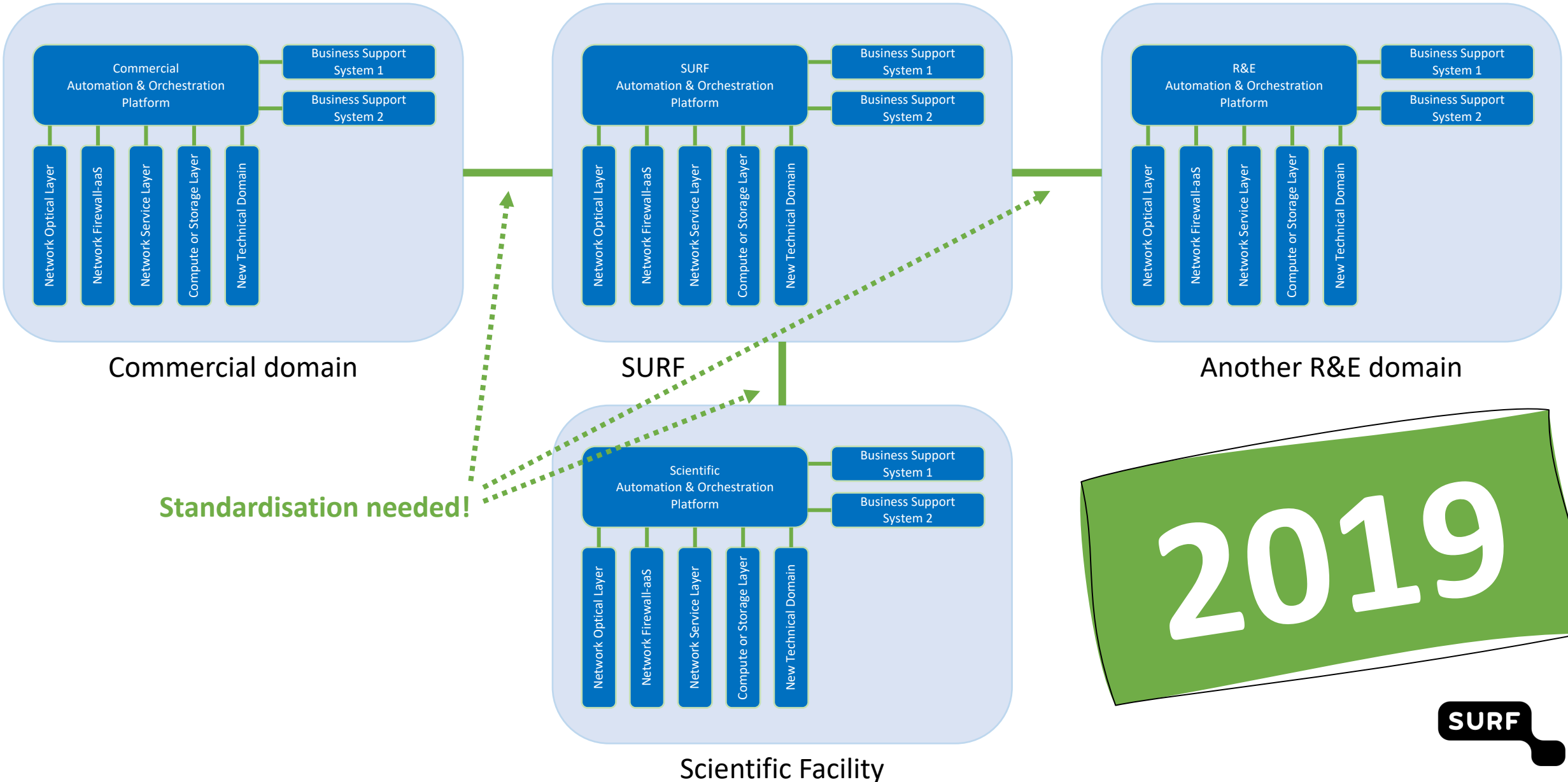
Traffic monitoring

Last hour

Refresh

History

Vision on Automation & Orchestration: multidomain interoperability, R&E + Commercial + Scientific Facility





# AutoGOLE/SENSE =

## Intercontinental Network Provisioning (AutoGOLE, SENSE)

- ✓ Dynamic networking with Network Service Interface (NSI)
- ✓ Layer 2 (dedicated capacity) / VLAN setup
- ✓ Multipoint network service capabilities
- ✓ MEICAN graphical frontend

## Data Transfer Nodes (SENSE)

- ✓ Layer 2 addressing
- ✓ Layer 3 addressing
- ✓ Configuration of user on the nodes



Integration

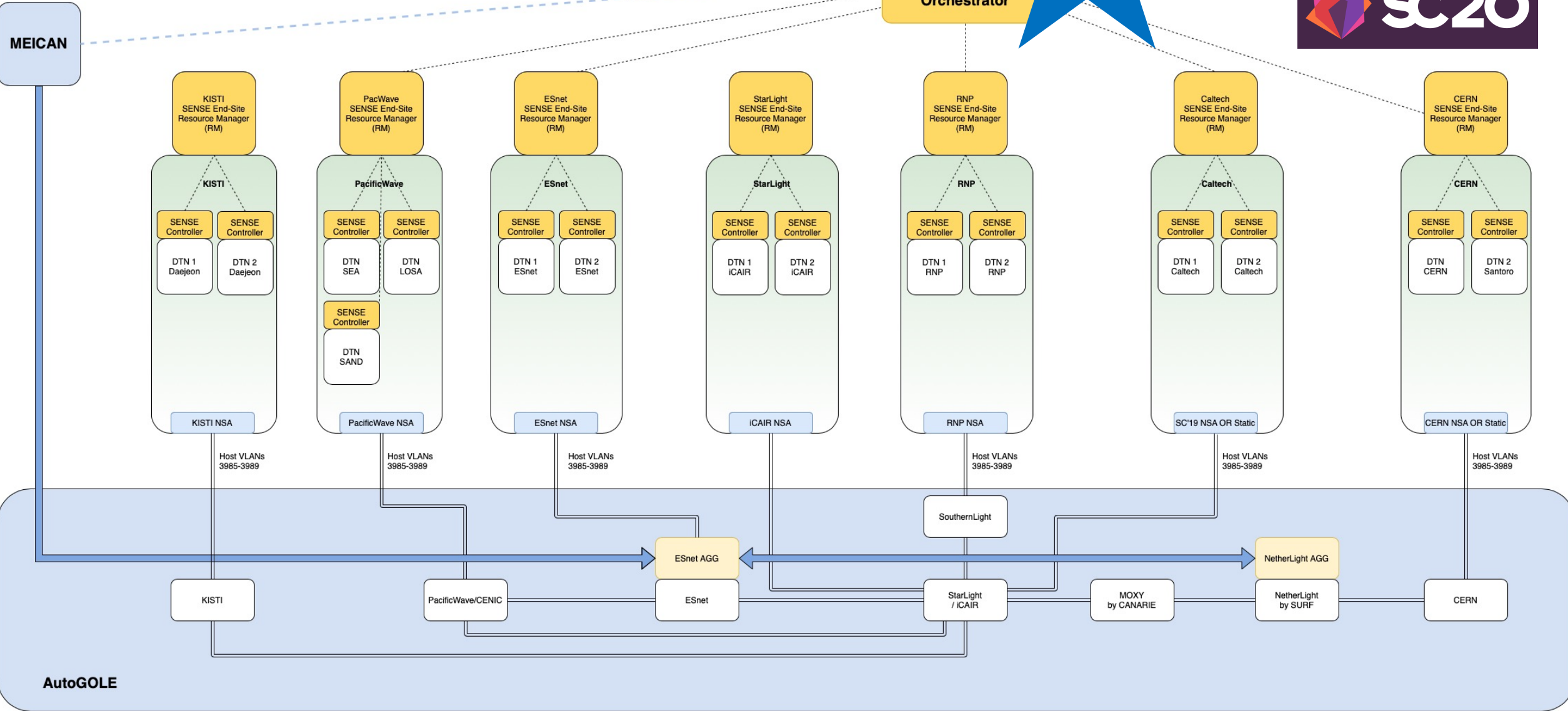
SURF

# The Persistent Multiresource Infrastructure



Persistent Multiresource Infrastructure 2020 update 4

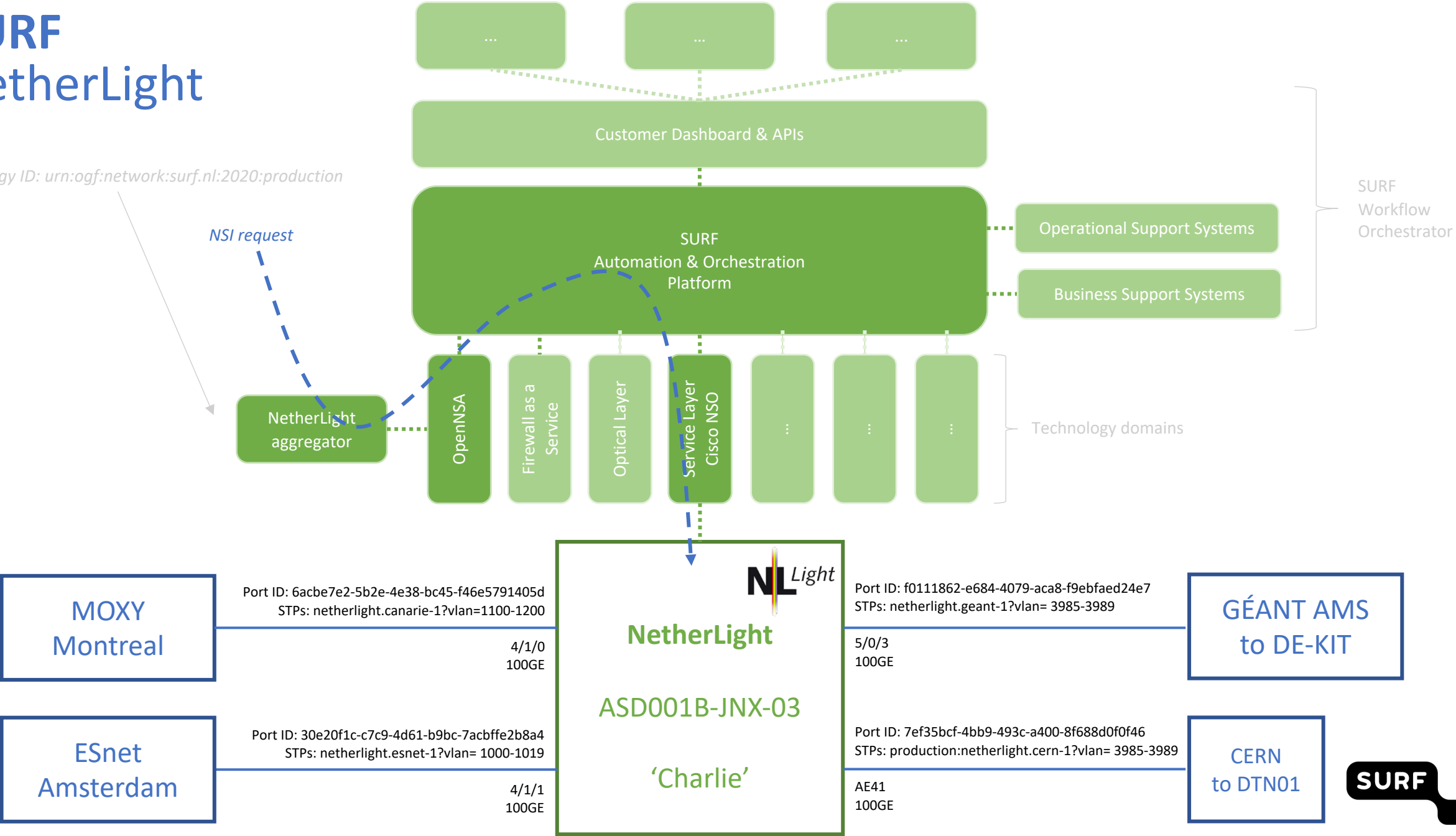
Garben van Malenstein





# SURF NetherLight

Topology ID: urn:ogf:network:surf.nl:2020:production



CATALOG VISUALIZATION

# SC'20 – NRE014

Service Instances

SERVER TIME: 2020/11/12 14:33:33

Alias	Reference UUID	State	Created
Kreonet-CERN-3987	418eaf45-4d51-4fba-89b5-a6da198d67a6	CREATE - READY	

[Create Filter](#)

Service Instance: Kreonet-CERN-3987

418eaf45-4d51-4fba-89b5-a6da198d67a6  
Reference UUID

Dynamic Network Connection  
Type

CREATE - READY  
State

[CANCEL](#) [DELETE](#) [FULL DETAILS](#)

DETAILS

VISUALIZATION

ADDONS

LOGGING

SYSTEM MODEL VERIFICATION




SYSTEM MODEL VERIFICATION

urn:ogf:network:cern.ch:2013:cixp-surfnet-dtn.cern.ch

```
"typeList": 1 items
"name": "cixp-surfnet-dtn.cern.ch"
"insertTime": 1 items
"longitude": 1 items
"latitude": 1 items
"hasService": 0 items
"hasBidirectionalPort":
0: "urn:ogf:network:cern.ch:"
```

[CLOSE](#) [PREVIOUS](#) [NEXT](#)

Verified Addition



[VIEW MANIFEST](#) [VIEW TEXT MODEL](#)

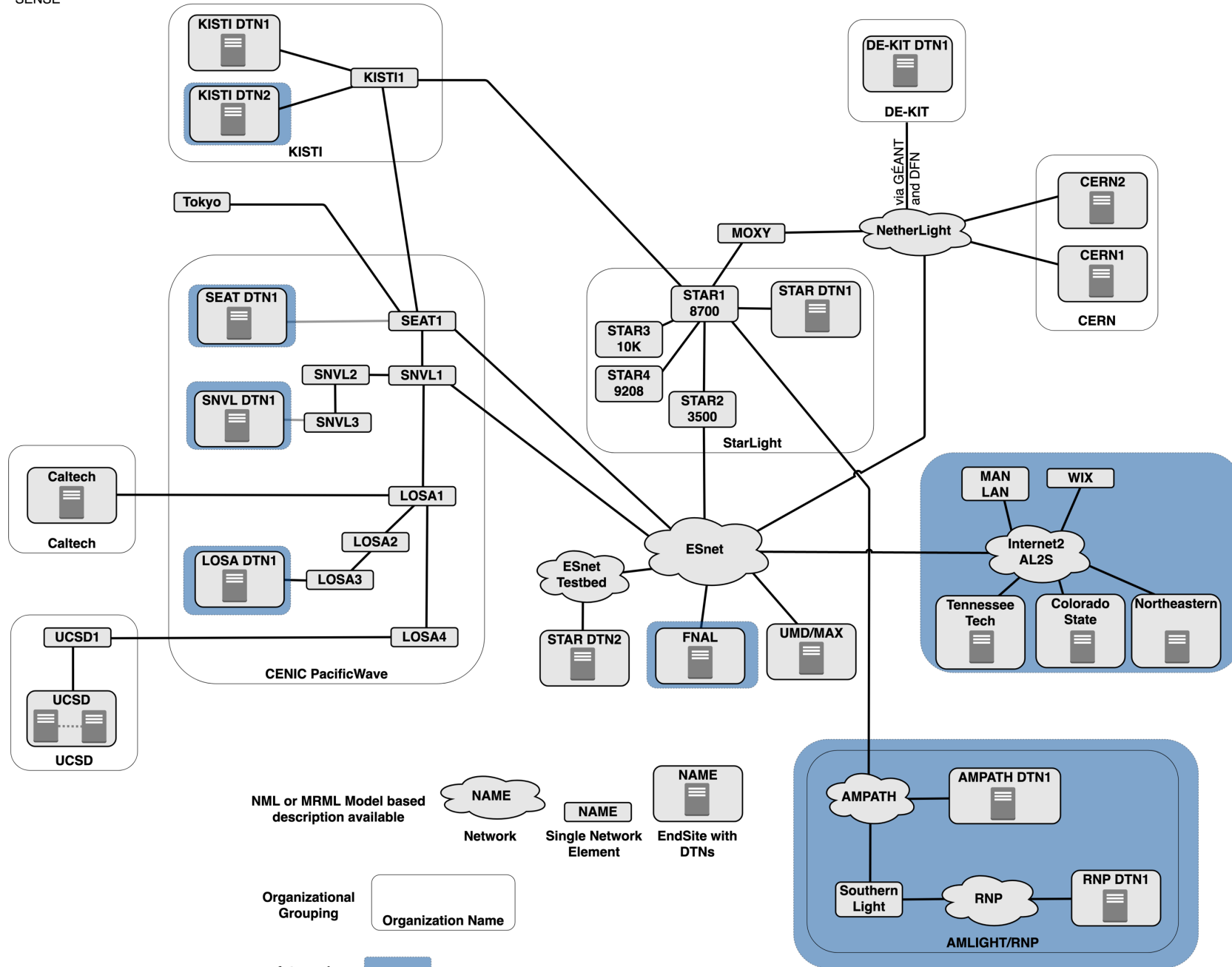
Having everything up on the control plane across 10 domains in 2 minutes is cool.



Please have a look at our screen capture showing a live NSI-based connection and configuration of Data Transfer Nodes through SENSE:  
<https://www.youtube.com/watch?v=GvKLQVQ2dPs>

**SURF**





# Persistent Multiresource Infrastructure

# GNA-G AutoGOLE/SENSE WG deliverables



## **Implementing SENSE**

- ✓ End-to-End Testing Complete - Q4 2020
- ✓ SENSE Services Integrated with AutoGOLE Infrastructure - Q4 2020

## **Dynamic ANA**

Design and Implementation Options Defined - Q4 2020

Implementation Option Selection and Schedule - Q2 2021

## **Persistent Multi-Resource Infrastructure**

Design of monitoring system complete - Q1 2021

Deployment monitoring system complete - Q2 2021

Development of automated regular testing system - Q2 2021

Deployment of automated regular testing system - Q3 2021

Domain Science Application Workflow Agent Integration and Testing - Q3 2020 and ongoing



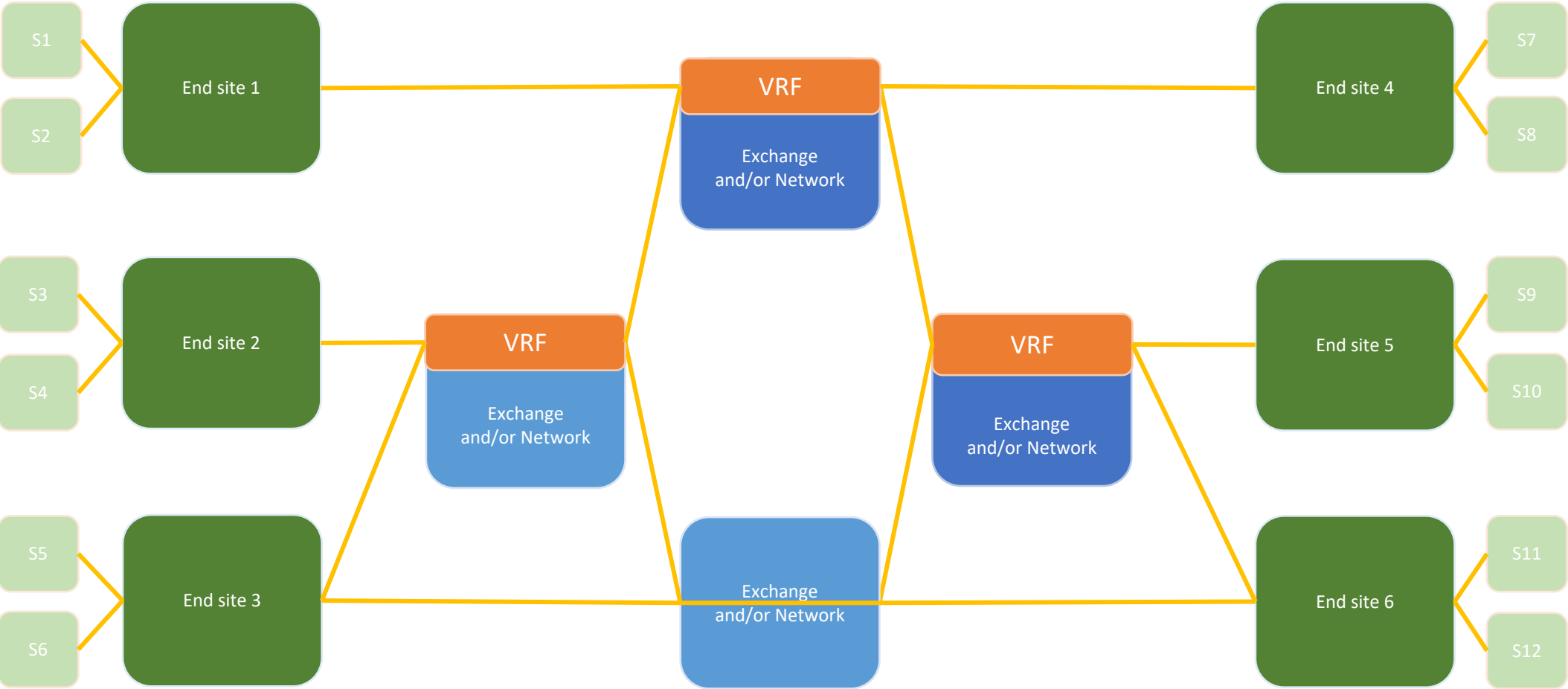
## So far ...

- we successfully setup an intercontinental network that talks NSI: **the AutoGOLE**
- we conducted various experiments on **dynamic circuits with LHC sites**
- we introduced **beyond-the-network resources on a global scale**
- we have **proven the true multidomain interoperability** between our networks, exchanges and user resources/data transfer nodes: combining the network with compute and storage

- The Persistent Multiresource Infrastructure is **just at the beginning of its era**
- it will be **extended** and **serve many scientific disciplines**
- via **reliable operations** and further **expansion** of the system
  - continuous monitoring and security
  - amount of sites and data transfer nodes
  - amount of scientific and network users
  - availability of system yellow pages
  - expanding to new/other resource types

# Architectural draft for a multiONE instance by AutoGOLE

Control plane not drawn



## Legend

Link: VLAN, IP

- Scientific system / DTN
- VRF
- Open Exchange
- Network



# Outlook, Ideas & Next Steps

- The Persistent Multiresource Infrastructure needs improvements to guarantee reliable operations: **monitoring**
- Scaling the Persistent Multiresource Infrastructure to scientific disciplines: **multiONE**, from **individual researcher**, **research groups** to **global VOs** such as LHC, SKA, **<new ideas here>**, commercial cloud service connections, ... e.g. via GNA-G Data Intensive Science (DIS) WG, GRP, FABRIC, ...
- Providing **Common interface** to scientific programs e.g. RUCIO/FTS, BigData Express, K8s...
- Adopting new/other resource types: **400G**, **1T**, supporting provisioning of **VRF** and even **scientific instruments** and **open software** for switches and routers

# More information



- **SC'20 AutoGOLE/SENSE Movie**

<https://www.youtube.com/watch?v=GvKLQVQ2dPs>

- **AutoGOLE/SENSE Working Group Homepage**

<https://www.gna-g.net/join-working-group/autogole-sense/>

- **AutoGOLE/SENSE Working Group Mailing List**

[autogole@lists.gna-g.net](mailto:autogole@lists.gna-g.net)

- **Join our bi-weekly calls**

Tuesday 15:00 – 16:00 CE(S)T



Thank you!



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