1986–2016
ESnet
30 YEARS OF NETWORKING
AT THE SPEED OF SCIENCE

Discovery, unconstrained by geography.

LHCONE P2P session
NSI and Automated GOLE update

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Office of Science

BERKELEY LAB

NSI Document Status

- Published
  - NSI CS 2.0
  - Network Services Framework 2.1
  - NSI Signaling and path finding v1
- Public Comment
  - NSI Signaling and path finding v2
  - NSI Policy (completed)
  - NSI NSA description (completed)
  - NSI AA (completed)
- Editor Review
  - NSI DDS (completed)
  - NSI AA (completed)
  - NSI CS v2.1
  - CS v2.0/v2.1 delta
- In progess
  - NSI Topology

Automated GOLE Fabric

Automated GOLE

- **AutoGOLE fabric delivers dynamic network services between GOLEs and networks**
- Based on NSI Connection Service v2.0
  - Redundant Aggregator backbone with a leaf uPA per network (hub and spoke architecture)
  - 29 Network Service Agents (6 aggregators, 23 uPA) advertising 30 networks
- Using DDS service for NSA discovery and document propagation between aggregators
- Introduction of monitoring, troubleshooting, and provisioning tools
  - Dashboard, MEICAN, DDS Portal, etc.
- Advancing capabilities
  - Experimenting with new path finding and signaling algorithms
  - Additional network modeling for optimizations

Project using the Automated GOLE

- FELIX consortium, 2015
- Open Cloud eXchange (OCX) by GÉANT
- SC'13 and SC'14 'Portable cloud' by JGN-X
- NRM with OpenFlow underneath by iCAIR
- UltraGrid by CESNET
- NEXPReS by JIVE
- MEICAN by RNP
- Intent-base API prototype by ESnet

Automated GOLE Dashboard

http://dashboard.lab.uvalight.net/overview

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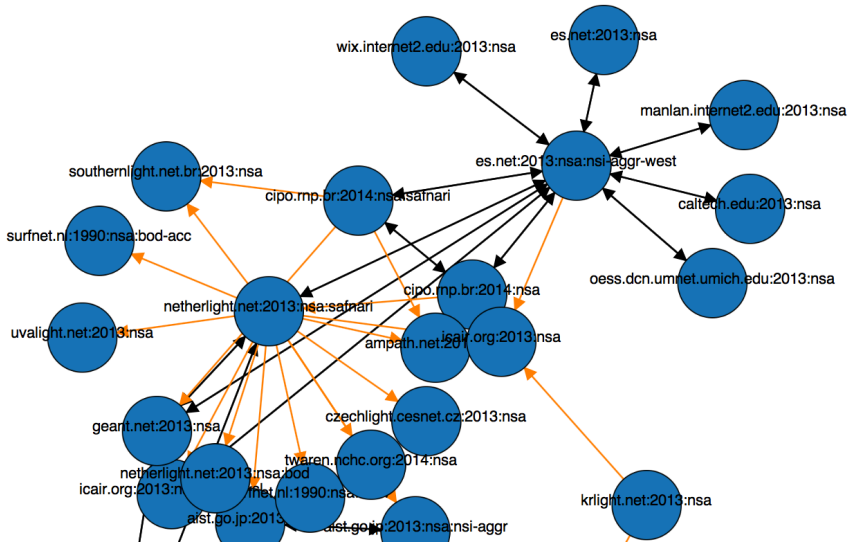
SURF NET

AutoGOLE Dashboard

Overview | Control Plane | Data Plane

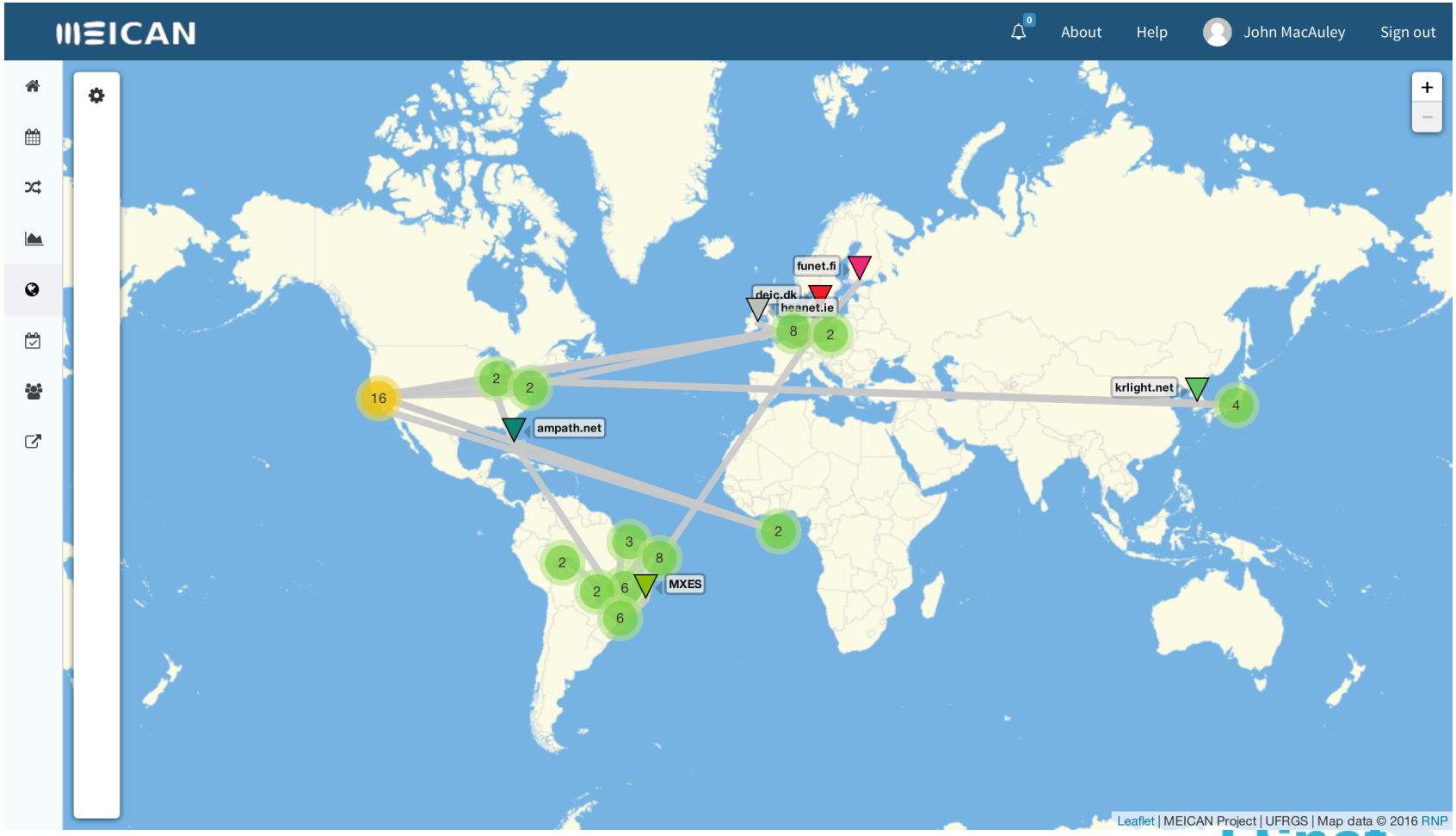
The control plane graph shows the NSI control plane peerings. On the graph it is possible to see control plane peering mismatches, NSA host reachability and Unknown NSAs. Alive NSA hosts marked as unreachable might need to allow ICMP traffic. More information for each NSA can be seen by clicking on a node and by looking at the tables below.



2016 ESnet 30 YEARS OF NETWORKING AT THE SPEED OF SCIENCE

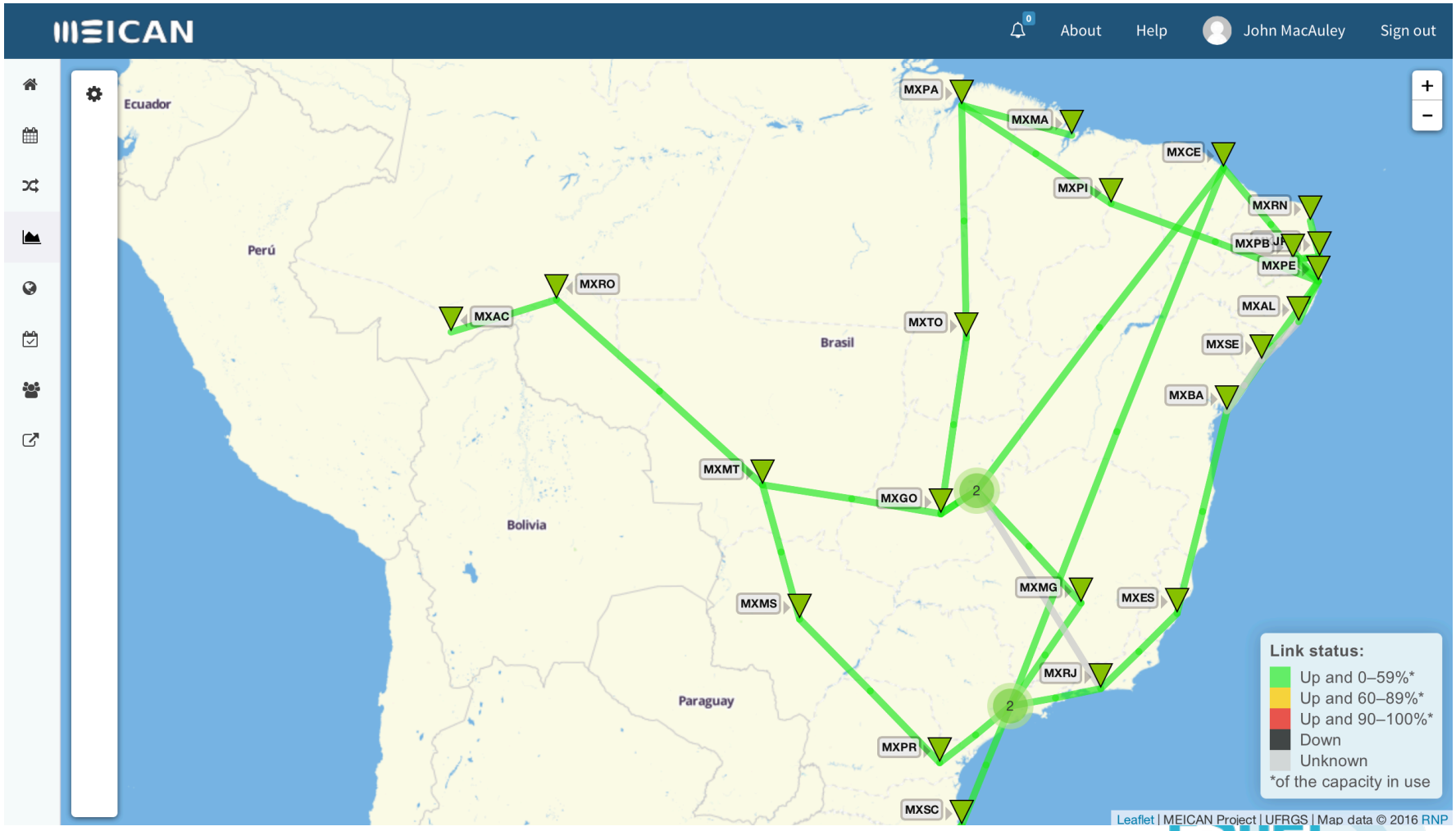
Management Environment of Inter-domain Circuits for Advanced Networks

MEICAN – Topology View

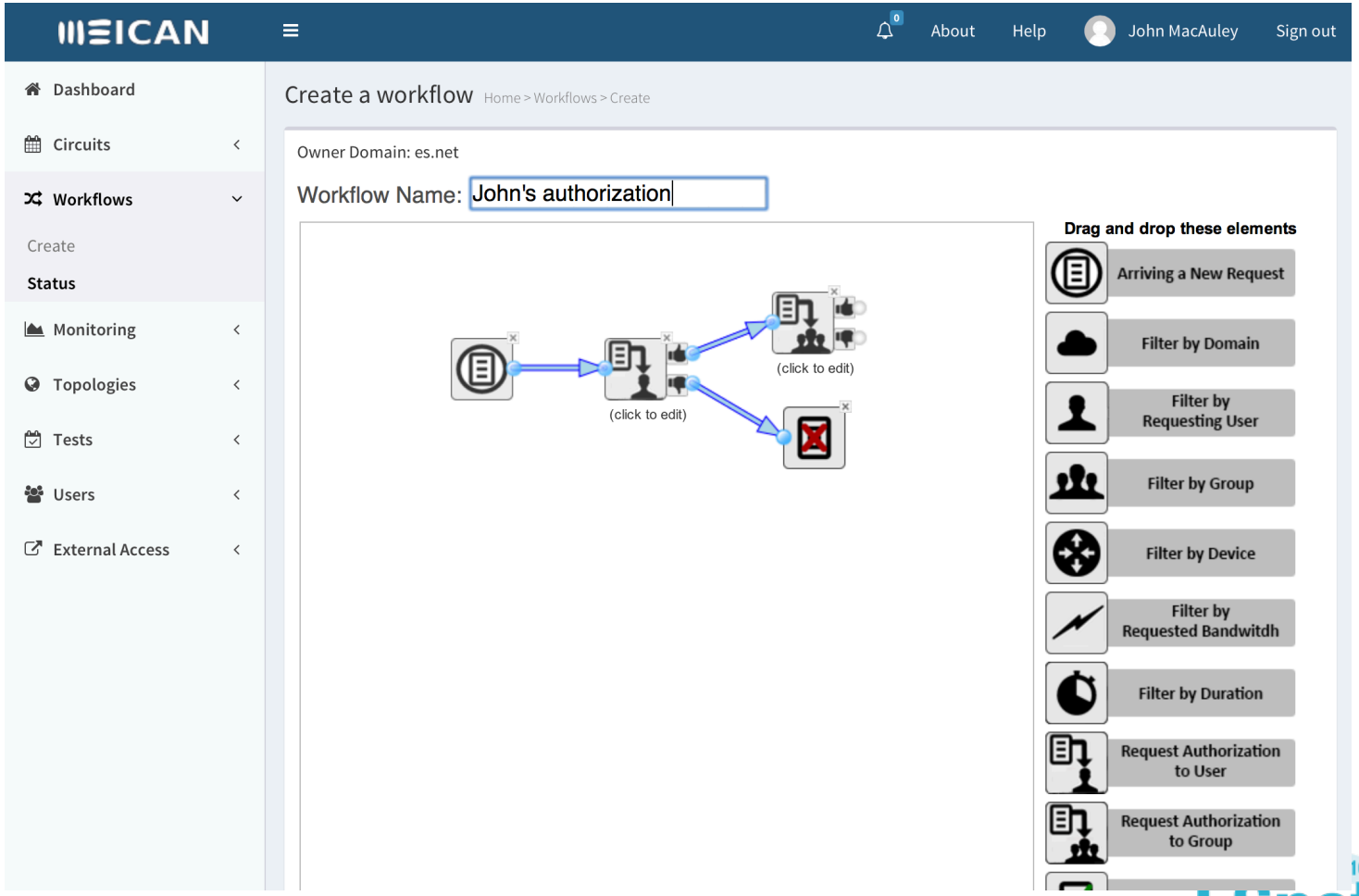


Management Environment of Inter-domain Circuits for Advanced Networks

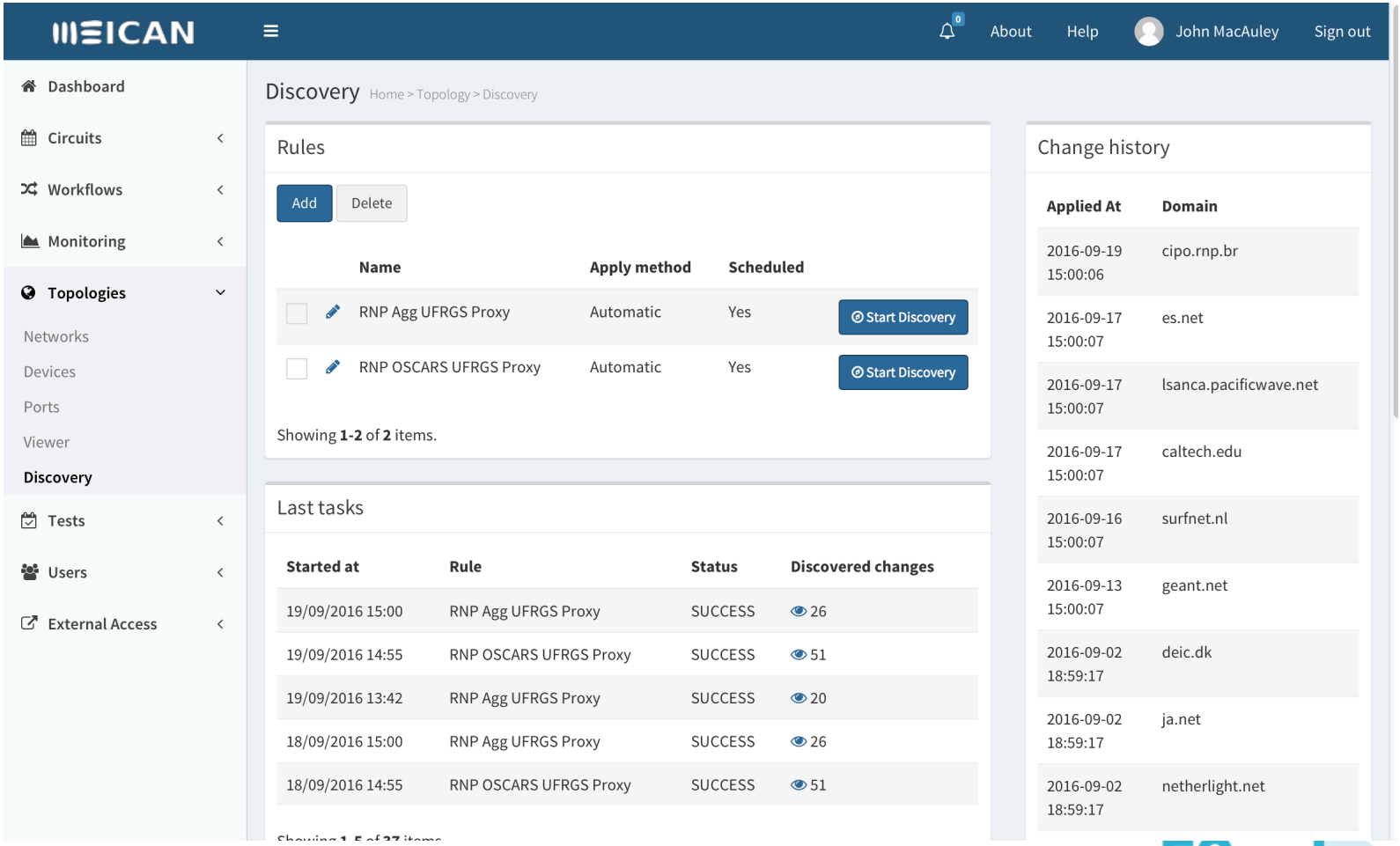
MEICAN – Monitoring View



MEICAN – Workflows

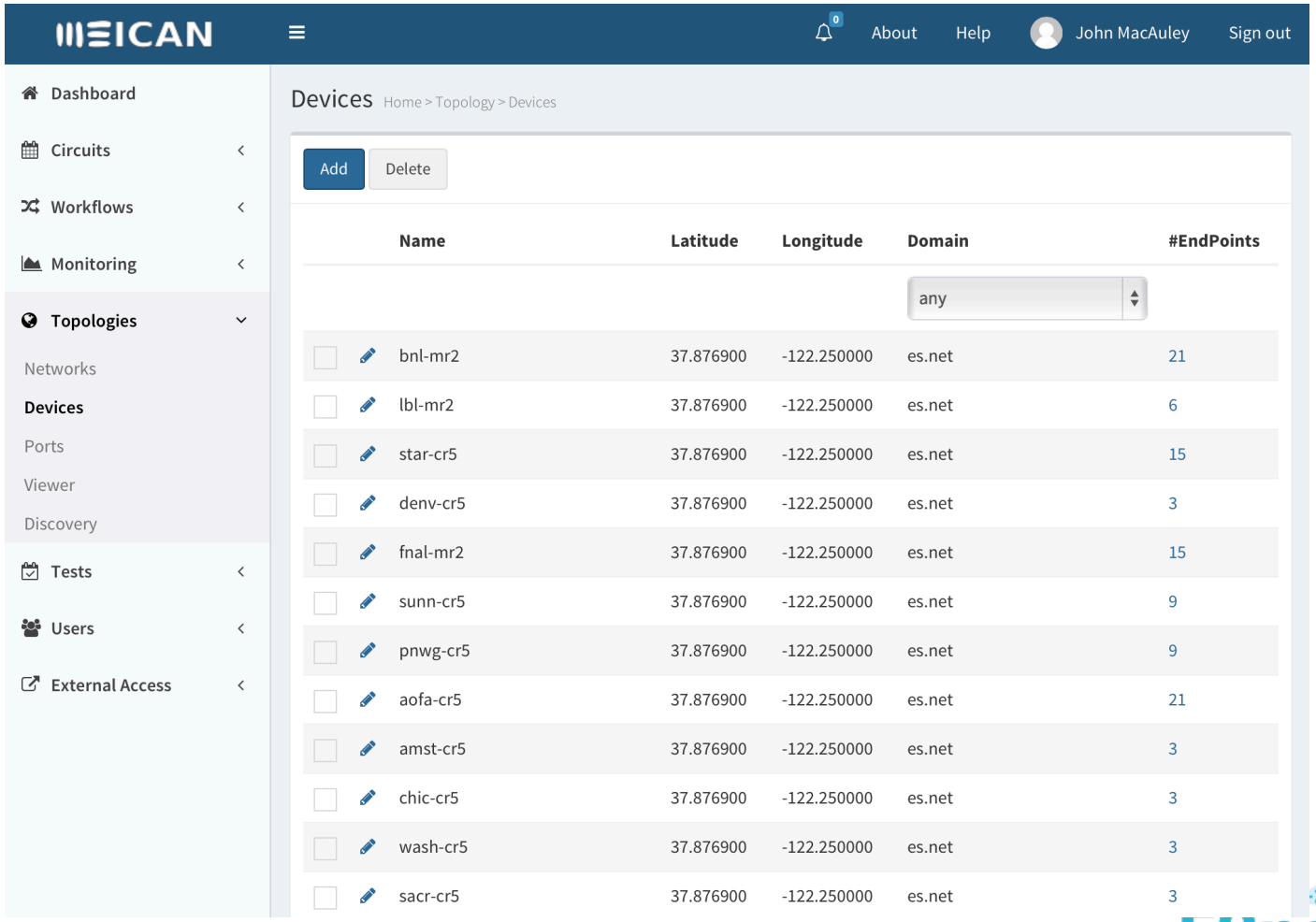


MEICAN – Discovery

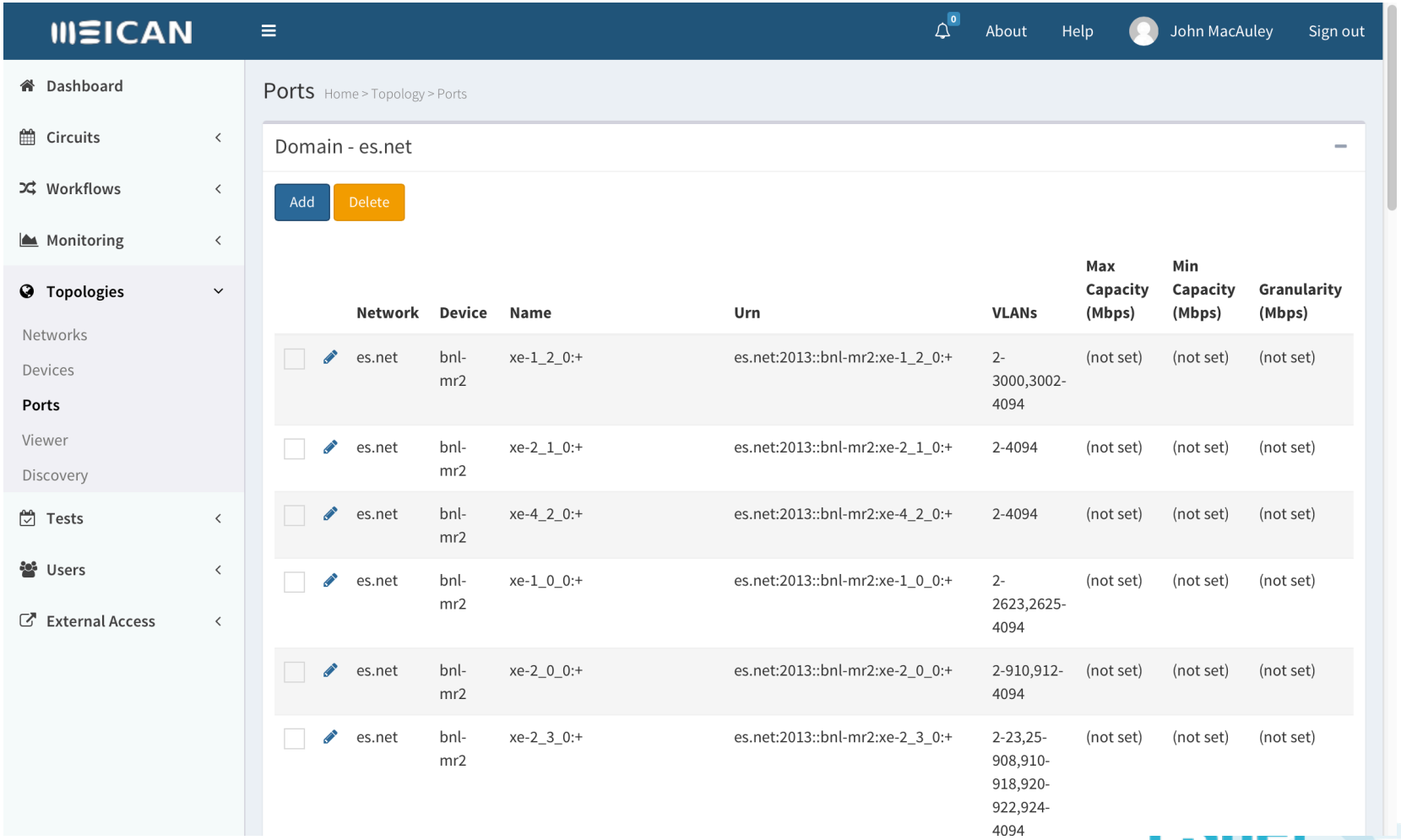


Management Environment of Inter-domain Circuits for Advanced Networks

MEICAN – Device Inventory

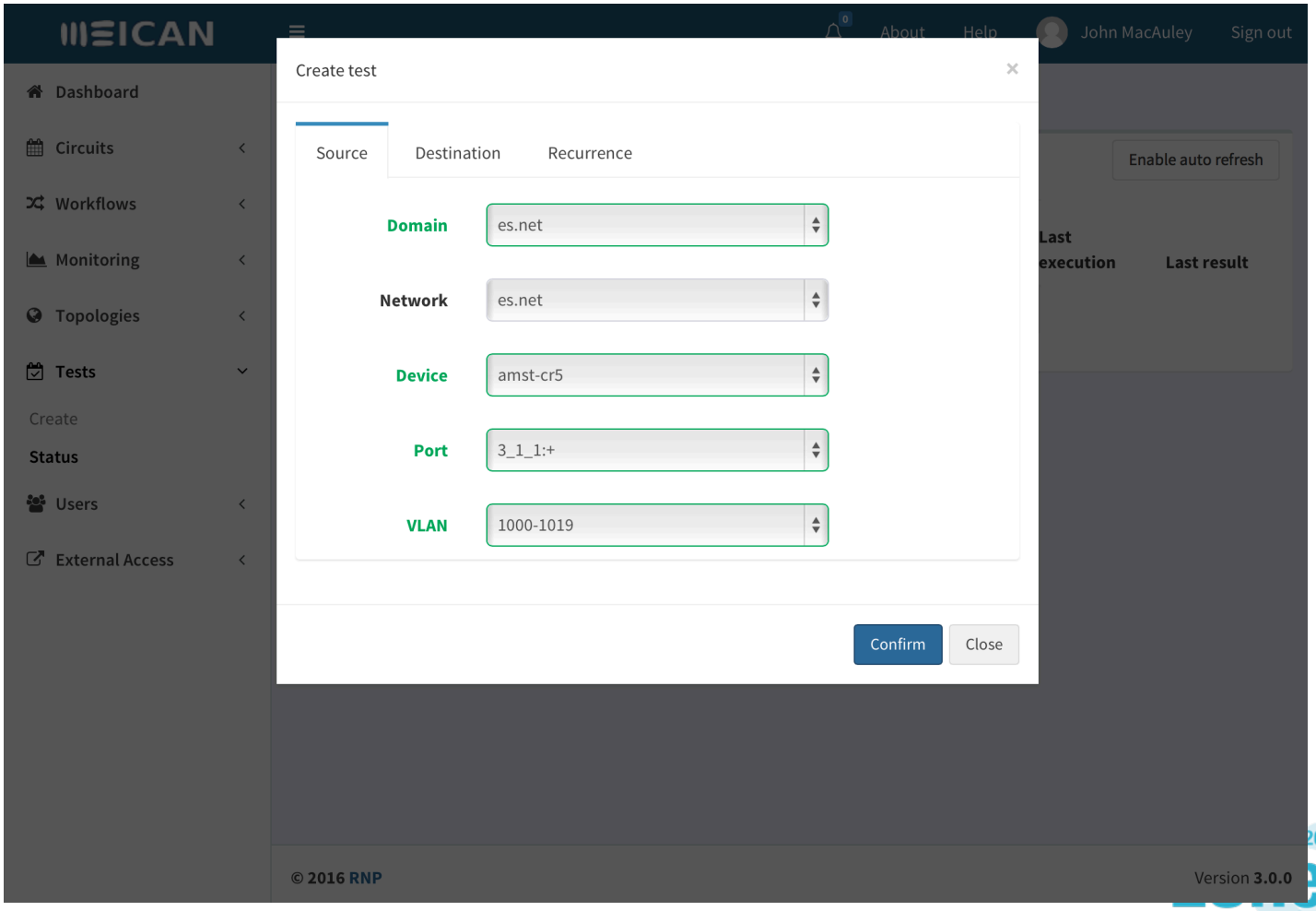


MEICAN – Port Inventory



	Network	Device	Name	Urn	VLANs	Max Capacity (Mbps)	Min Capacity (Mbps)	Granularity (Mbps)
	es.net	bnl-mr2	xe-1_2_0:+	es.net:2013::bnl-mr2:xe-1_2_0:+	2-3000,3002-4094	(not set)	(not set)	(not set)
	es.net	bnl-mr2	xe-2_1_0:+	es.net:2013::bnl-mr2:xe-2_1_0:+	2-4094	(not set)	(not set)	(not set)
	es.net	bnl-mr2	xe-4_2_0:+	es.net:2013::bnl-mr2:xe-4_2_0:+	2-4094	(not set)	(not set)	(not set)
	es.net	bnl-mr2	xe-1_0_0:+	es.net:2013::bnl-mr2:xe-1_0_0:+	2-2623,2625-4094	(not set)	(not set)	(not set)
	es.net	bnl-mr2	xe-2_0_0:+	es.net:2013::bnl-mr2:xe-2_0_0:+	2-910,912-4094	(not set)	(not set)	(not set)
	es.net	bnl-mr2	xe-2_3_0:+	es.net:2013::bnl-mr2:xe-2_3_0:+	2-23,25-908,910-918,920-922,924-4094	(not set)	(not set)	(not set)

MEICAN – Automated Tests



Work items 2016

- **I. AutoGOLE Dashboard**
  - Overview of both control plane and data plane of the AutoGOLE
- **II. Supporting LHC Sites**
  - Supporting LHC sites that want to connect to the AutoGOLE (Brookhaven and NL-T1 tested last year)
- **III. Connecting Data Transfer Nodes**
  - Kick-off by StarLight, Caltech, RNP, University of Amsterdam this fall
- **IV. AutoGOLE MEICAN Pilot**
  - Run a pilot of the RNP's Cipó Service front-end interface – the MEICAN – being used by participant research and education networks (RENs) and exchange point (IXP) operators to configure multi-domain point to point circuits. The participants will evaluate the MEICAN as the main interface for AutoGOLE GLIF Project.
  - https://wiki.rnp.br/display/secipo/AutoGOLE+MEICAN+Pilot

Other topics / Moving forward / Discussion

- Using the AutoGOLE for automated interconnects with service providers:
  - GÉANT-Microsoft Azure ExpressRoute connections are now being setup using GÉANT and NetherLight's automated provisioning systems to prevent manual configuration for each service request.

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Thank you!