



Discovery, unconstrained by geography.



LHCONE P2P session NSI and Automated GOLE update

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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 progress
 - 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>



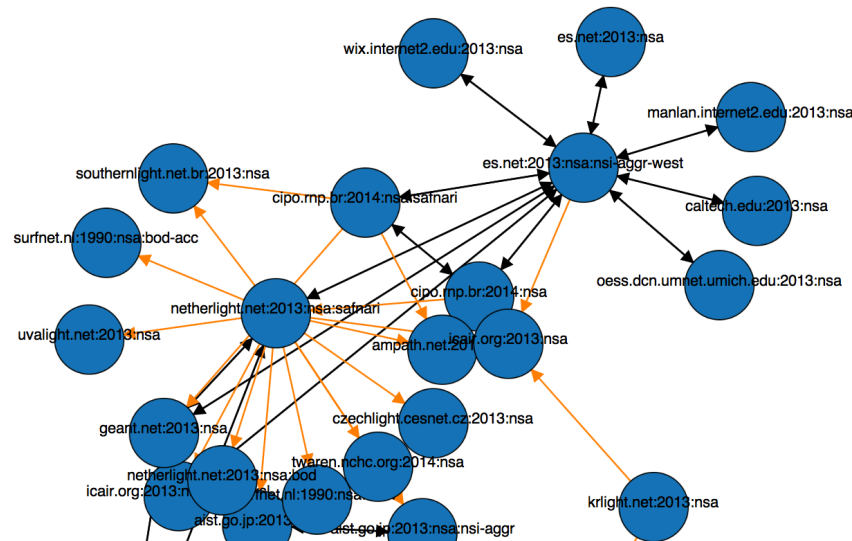
UNIVERSITY OF AMSTERDAM



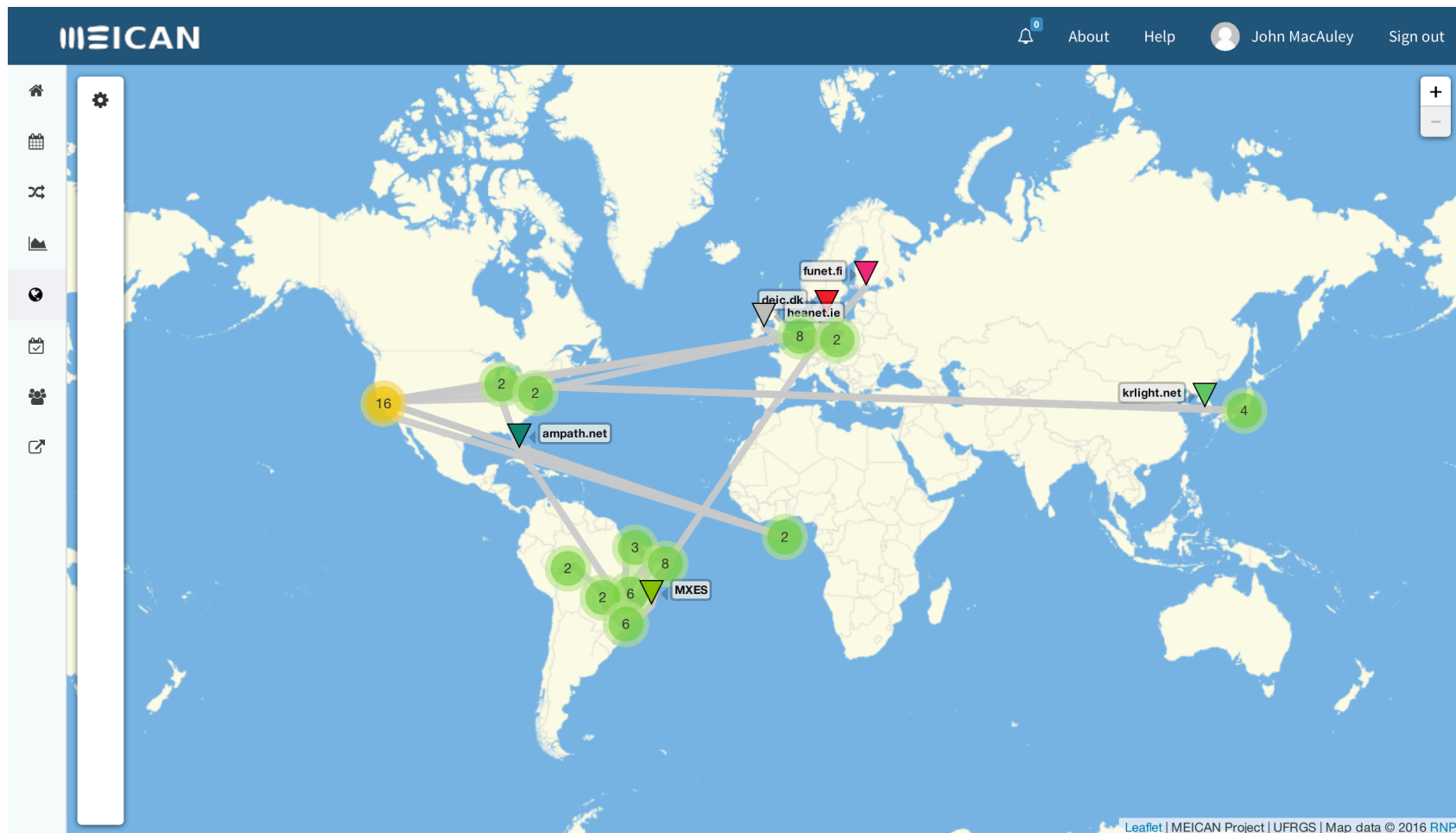
AutoGOLE Dashboard

Overview Control Plane Data Plane

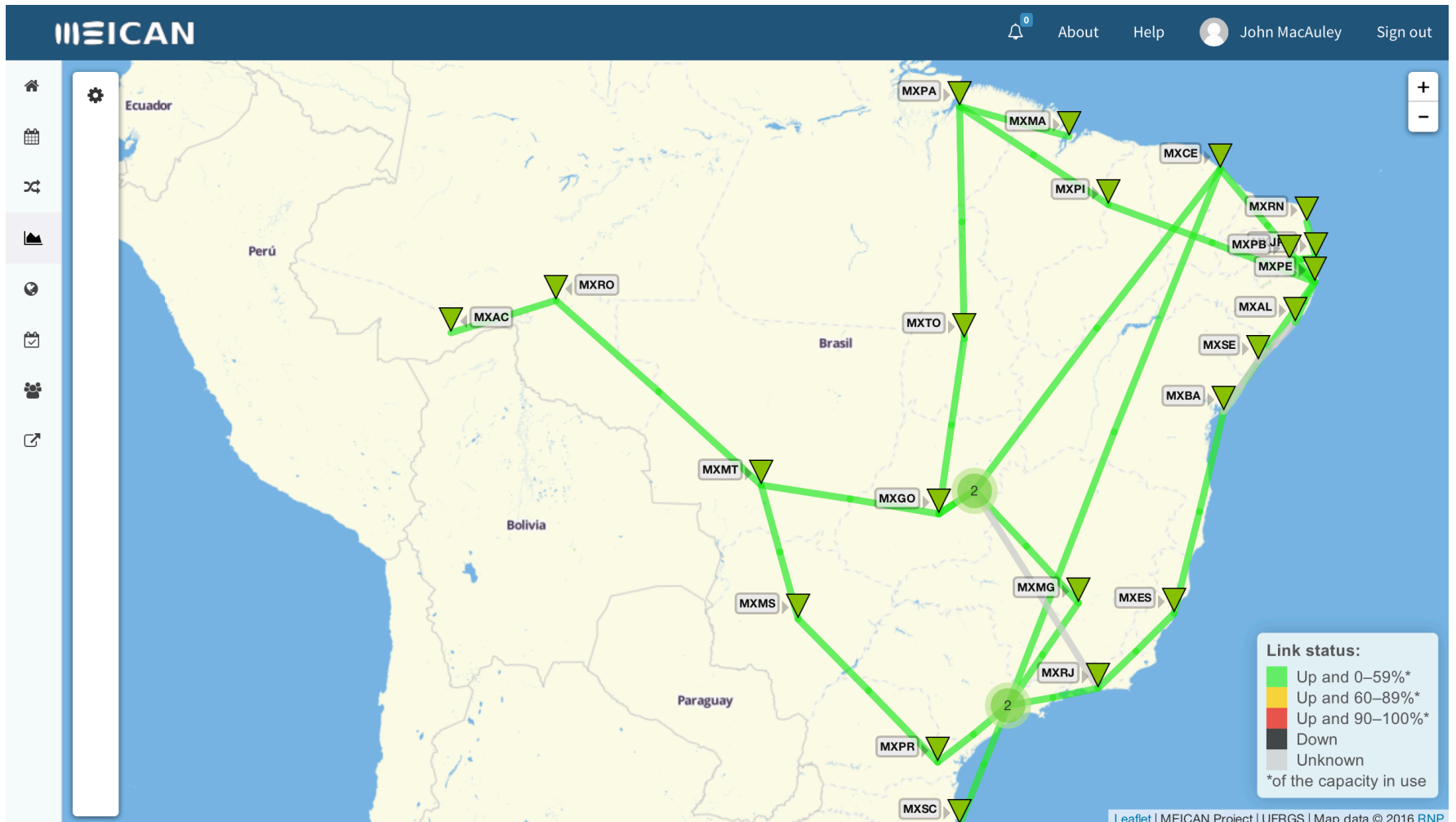
The control plane graph shows the NSI control plane peerings. On the graph it is possible to see control plane peering mismatches, NSA host reachability and Unknown NSAs. Alive NSA hosts marked as unreachable might need to allow ICMP traffic. More information for each NSA can be seen by clicking on a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



MEICAN – Topology View



MEICAN – Monitoring View



MEICAN – Workflows

MEICAN

Dashboard

Circuits

Workflows

Create

Status

Monitoring

Topologies

Tests

Users

External Access

Create a workflow Home > Workflows > Create

Owner Domain: es.net

Workflow Name: John's authorization

Drag and drop these elements

- Arriving a New Request
- Filter by Domain
- Filter by Requesting User
- Filter by Group
- Filter by Device
- Filter by Requested Bandwidth
- Filter by Duration
- Request Authorization to User
- Request Authorization to Group

MEICAN – Discovery

The screenshot displays the MEICAN Discovery interface. The top navigation bar includes the MEICAN logo, a menu icon, a notification bell with '0', and links for 'About', 'Help', 'John MacAuley', and 'Sign out'. The left sidebar contains a navigation menu with items: Dashboard, Circuits, Workflows, Monitoring, Topologies (expanded), Networks, Devices, Ports, Viewer, Discovery (selected), Tests, Users, and External Access. The main content area is titled 'Discovery' and shows a breadcrumb 'Home > Topology > Discovery'. It features three sections: 'Rules', 'Last tasks', and 'Change history'.

Rules

Buttons: Add, Delete

Name	Apply method	Scheduled	
<input type="checkbox"/> RNP Agg UFRGS Proxy	Automatic	Yes	Start Discovery
<input type="checkbox"/> RNP OSCARS UFRGS Proxy	Automatic	Yes	Start Discovery

Showing 1-2 of 2 items.

Last tasks

Started at	Rule	Status	Discovered changes
19/09/2016 15:00	RNP Agg UFRGS Proxy	SUCCESS	26
19/09/2016 14:55	RNP OSCARS UFRGS Proxy	SUCCESS	51
19/09/2016 13:42	RNP Agg UFRGS Proxy	SUCCESS	20
18/09/2016 15:00	RNP Agg UFRGS Proxy	SUCCESS	26
18/09/2016 14:55	RNP OSCARS UFRGS Proxy	SUCCESS	51

Showing 1-5 of 27 items

Change history

Applied At	Domain
2016-09-19 15:00:06	cipo.rnp.br
2016-09-17 15:00:07	es.net
2016-09-17 15:00:07	lsanca.pacificwave.net
2016-09-17 15:00:07	caltech.edu
2016-09-16 15:00:07	surfn.net
2016-09-13 15:00:07	geant.net
2016-09-02 18:59:17	deic.dk
2016-09-02 18:59:17	ja.net
2016-09-02 18:59:17	netherlight.net

MEICAN – Device Inventory

MEICAN 0 About Help John MacAuley Sign out

Dashboard
Circuits
Workflows
Monitoring
Topologies
Networks
Devices
Ports
Viewer
Discovery
Tests
Users
External Access

Devices Home > Topology > Devices

Add Delete

Name	Latitude	Longitude	Domain	#EndPoints
<input type="checkbox"/> bnl-mr2	37.876900	-122.250000	es.net	21
<input type="checkbox"/> lbl-mr2	37.876900	-122.250000	es.net	6
<input type="checkbox"/> star-cr5	37.876900	-122.250000	es.net	15
<input type="checkbox"/> denv-cr5	37.876900	-122.250000	es.net	3
<input type="checkbox"/> fnal-mr2	37.876900	-122.250000	es.net	15
<input type="checkbox"/> sunn-cr5	37.876900	-122.250000	es.net	9
<input type="checkbox"/> pnwg-cr5	37.876900	-122.250000	es.net	9
<input type="checkbox"/> aofa-cr5	37.876900	-122.250000	es.net	21
<input type="checkbox"/> amst-cr5	37.876900	-122.250000	es.net	3
<input type="checkbox"/> chic-cr5	37.876900	-122.250000	es.net	3
<input type="checkbox"/> wash-cr5	37.876900	-122.250000	es.net	3
<input type="checkbox"/> sacv-cr5	37.876900	-122.250000	es.net	3

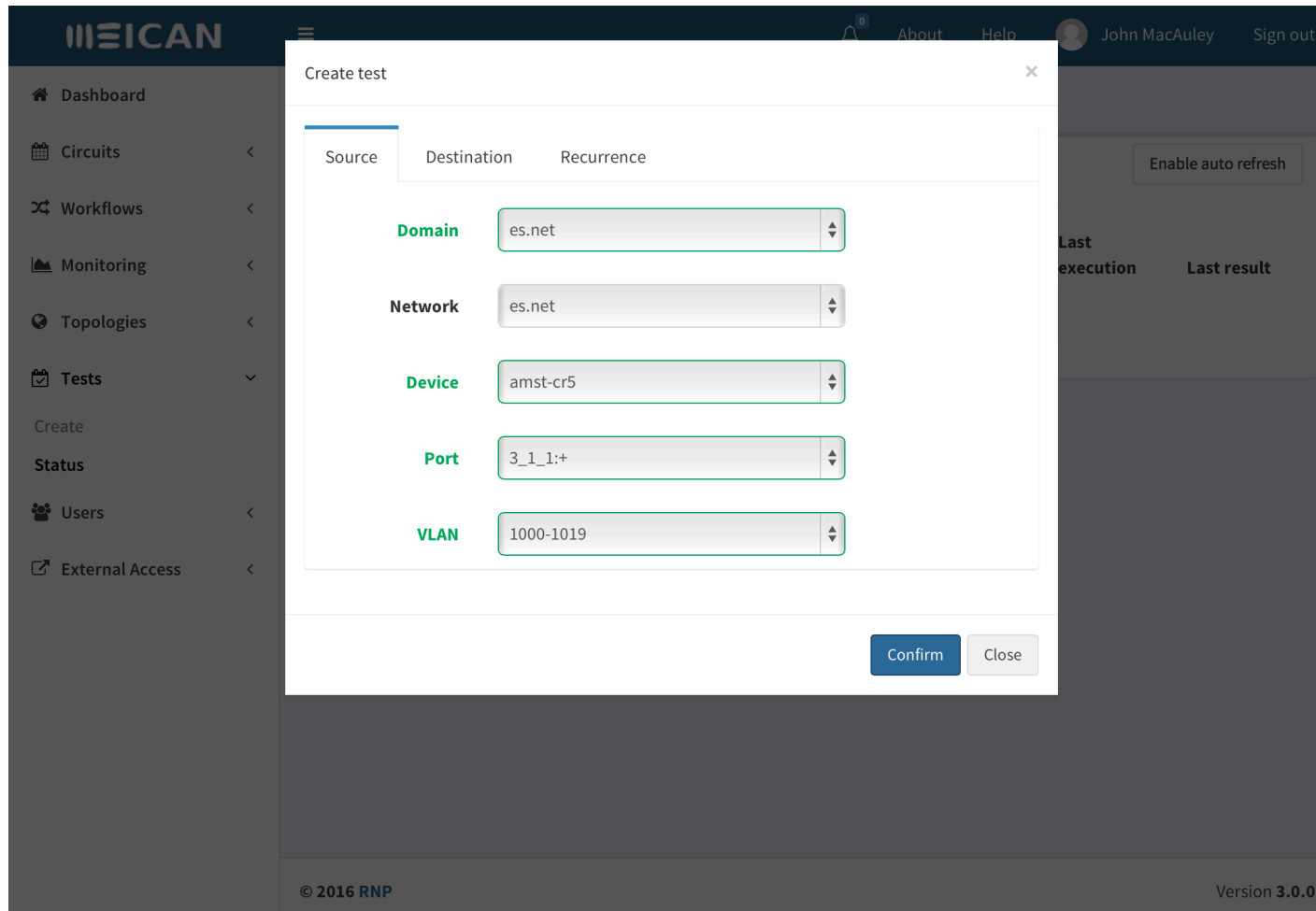
any

MEICAN – Port Inventory

The screenshot shows the MEICAN web interface. The top header includes the MEICAN logo, a menu icon, a notification bell, and user information for John MacAuley. The left sidebar contains navigation options: Dashboard, Circuits, Workflows, Monitoring, Topologies (expanded), Networks, Devices, Ports (selected), Viewer, Discovery, Tests, Users, and External Access. The main content area is titled 'Ports' and shows a sub-section for 'Domain - es.net'. It features 'Add' and 'Delete' buttons and a table of port inventory.

	Network	Device	Name	Urn	VLANs	Max Capacity (Mbps)	Min Capacity (Mbps)	Granularity (Mbps)
<input type="checkbox"/>	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)
<input type="checkbox"/>	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)
<input type="checkbox"/>	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)
<input type="checkbox"/>	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)
<input type="checkbox"/>	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)
<input type="checkbox"/>	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!