

# Automated GOLE Update



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# 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

# Projects using the Automated GOLE

- MEICAN by RNP
- Intent-base API prototype by ESnet
- 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

# 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, with Pacific Wave, and ,... joining
- **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>





# MEICAN introduction

- During the May 2016 Chicago AutoGOLE meeting it had been agreed that we are looking for one provisioning portal for world-wide circuit requests
  - The AutoGOLE TF members suggested several software suites
    - These have been evaluated
    - MEICAN (by RNP) is most promising to support the AutoGOLE:
      - Offers circuit request/reservations, status, user roles and authorizations
- MEICAN pilot kick-off September 21, 2016
  - Gaining experience with tool
  - Ironing out bugs / topology interpretations



# MEICAN // Dashboard

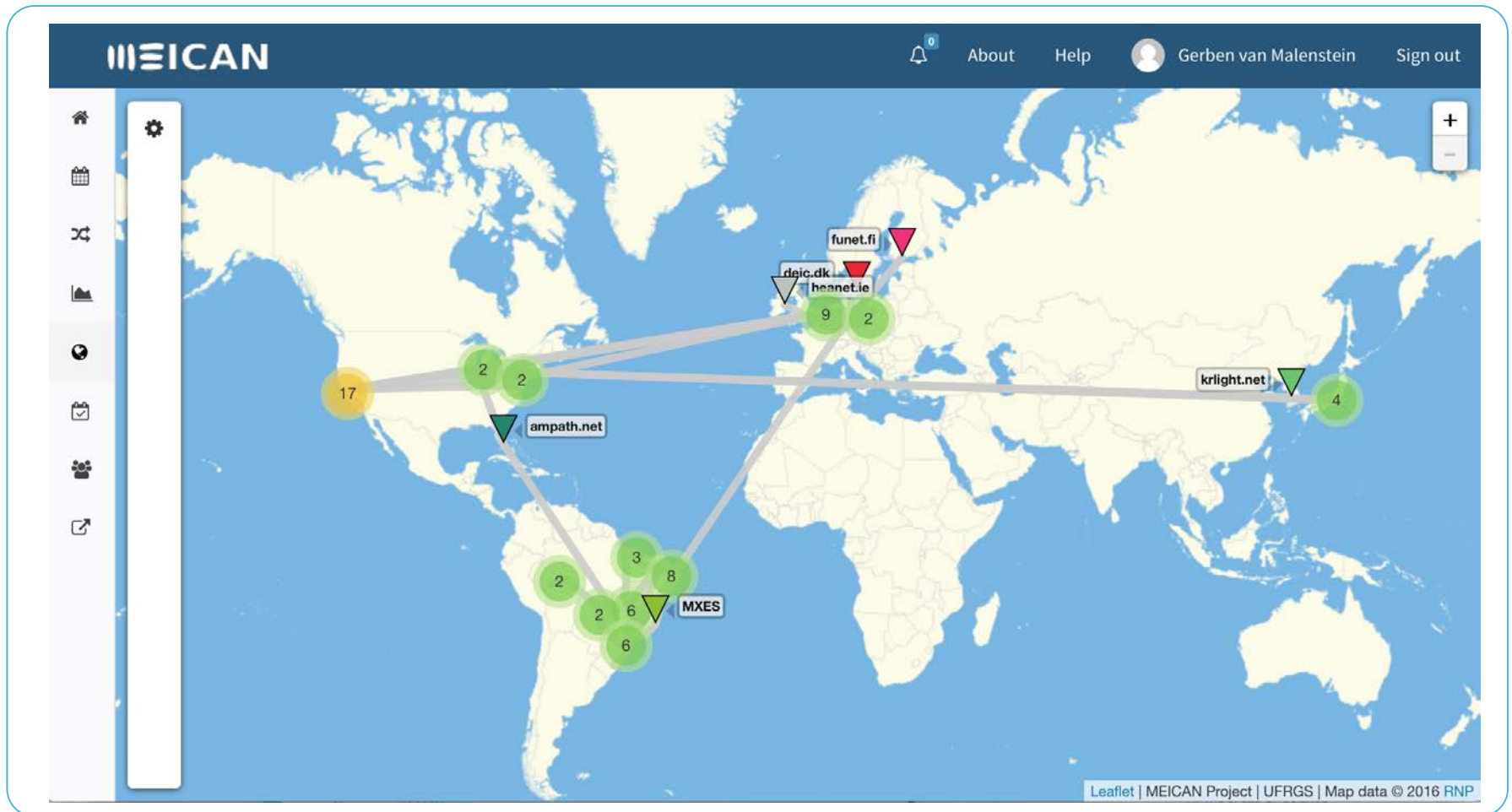
The screenshot displays the MEICAN Dashboard interface. At the top, a dark blue header contains the MEICAN logo on the left, a hamburger menu icon, and on the right, a notification bell icon with a '0' badge, and links for 'About', 'Help', a user profile for 'Gerben van Malenstein', and 'Sign out'.

A left-hand sidebar lists the main navigation items: Dashboard (with a home icon), Circuits, Workflows, Monitoring, Topologies, Tests, Users, and External Access. Each item has a small chevron icon to its right.

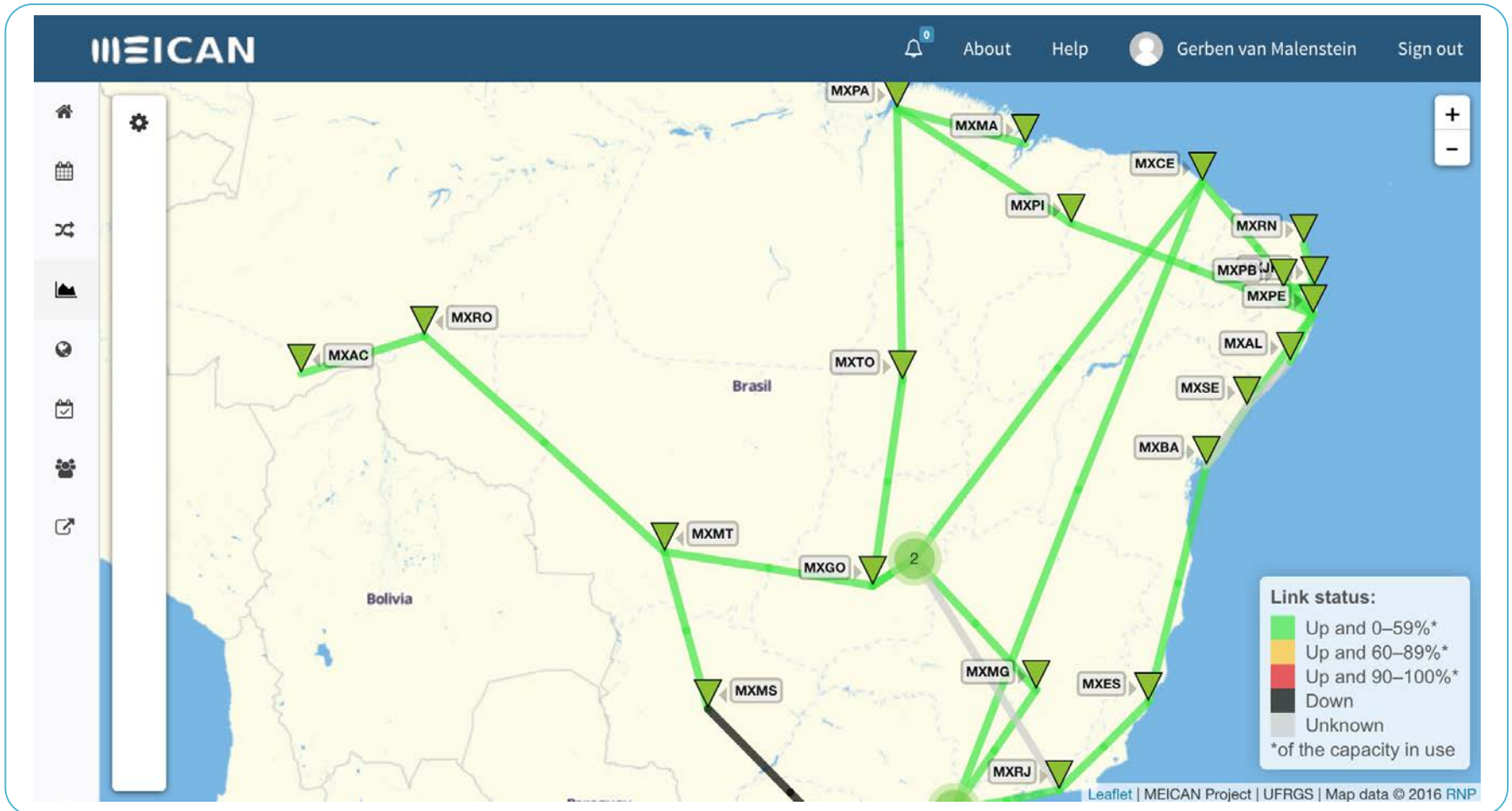
The main content area, titled 'Dashboard', features four large, light blue cards with icons and labels: 'Reserve' (with a map icon), 'Circuits' (with a circuit board icon), 'Users' (with a folder icon containing three people silhouettes), and 'Authorizations' (with a clipboard icon). The 'Reserve' card is positioned above the 'Authorizations' card.

At the bottom of the dashboard, the footer contains '© 2016 RNP' on the left and 'Version 3.0.0' on the right.

# MEICAN // Topology view



# MEICAN // Traffic view



# MEICAN // Provisioning

**MEICAN** 0 About Help Gerben van Malenstein Sign out

**Step 1: Path**

Search + Location File

Source

- none + ↑ ↓
- none + ↑ ↓

Destination

Next step

Domain: `cipo.rnp.br`  
Device: `MXPI`

From here Add waypoint To here

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

# MEICAN // Provisioning

The screenshot displays the MEICAN web interface for provisioning. The top navigation bar includes the MEICAN logo, a notification bell, and links for 'About', 'Help', 'Gerben van Malenstein', and 'Sign out'. The main content area is titled 'Step 1: Path' and features a search bar with a magnifying glass icon, a location pin icon, and a document icon. Below the search bar, there are two source nodes:

- Source 1:** cipo.rnp.br  
Device: **MXGO**  
Port: **ge-2\_3\_4:+**  
VLAN: **209**
- Source 2:** icair.org  
Device: **icair.org**  
Port: **ps**  
VLAN: **1785**

The destination node is not explicitly named but is represented by a location pin icon. The map on the right shows a path connecting these nodes through several intermediate network nodes: f10-dynes.dcn, icair.org, sw.net.manlan.internet2.edu, sw.net.wix.internet2.edu, and ampath.net. The path is highlighted with a red line. The map also includes a zoom control (+/-) in the top right corner. The footer of the map area reads: Leaflet | MEICAN Project | UFRGS | Map data © 2016 RNP.

# MEICAN // Networks

MEICAN

Home > Topology > Networks

© 2016 RNP

Version 3.0.0

Name	Urn	Latitude	Longitude	Domain
<input type="checkbox"/> production7	netherlight.net:2013:production7	52.3567	4.95459	netherlight.net

# MEICAN // Ports

MEICAN

Home > Topology > Ports

Domain - netherlight.net

Add Delete

	Network	Device	Name	Urn	VLANs	Max Capacity (Mbps)
<input type="checkbox"/>	production7	netherlight.net	Asd001A_8700_07 4/1 UvA (SNE)	netherlight.net:2013:production7:uva-3	1779-1799	(not set)
<input type="checkbox"/>	production7	netherlight.net	Asd001A_8700_07 7/2 NORDUnet (nl-sar2-nordunet xe-0/0/3)	netherlight.net:2013:production7:nordunet-1	2-4095	(not set)
<input type="checkbox"/>	production7	netherlight.net	Asd001A_8700_07 8/1 StarLight/ICAIR (via GEANT Open London)	netherlight.net:2013:production7:starlight-1	4020-4039	(not set)
<input type="checkbox"/>	production7	netherlight.net	Asd001A_8700_07	netherlight.net:2013:production7:iperf1-2	3000-4000	(not set)

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

About Help Gerben van Malenstein Sign out

# MEICAN // Workflow

**MEICAN** ☰ 🔔 [About](#) [Help](#) 👤 Gerben van Malenstein [Sign out](#)

[Dashboard](#) [Circuits](#) [Workflows](#) [Status](#) [Monitoring](#) [Topologies](#) [Tests](#) [Users](#) [External Access](#)

## Create a workflow

[Home > Workflows > Create](#)

Owner Domain: netherlight.net

Workflow Name:

Workflow Diagram:

```
graph LR; A[Arriving a New Request] --> B[User (click to edit)]; B --> C[Filter by Domain]; B --> D[Filter by Device]; C --> E[Success]; D --> F[Failure]
```

**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



# MEICAN demonstration

- *Fingers crossed, it's demo time!*
- <http://meican-test.cipo.rnp.br/meican>
- MEICAN wiki: <https://wiki.rnp.br/display/secipo/AutoGOLE+MEICAN+Pilot>
- MEICAN user guide: <https://wiki.rnp.br/display/secipo/MEICAN+User+Guide>

# 2017 / Discussion

- Using the AutoGOLE for automated interconnects
  - International: for R&E based on MEICAN
  - For 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
  - 2017: Letting AutoGOLE grow by using MEICAN as world-wide provisioning system
- Suggestions for other/new user communities?



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