GARR-T:
stato della rete e sua evoluzione

Paolo Bolletta

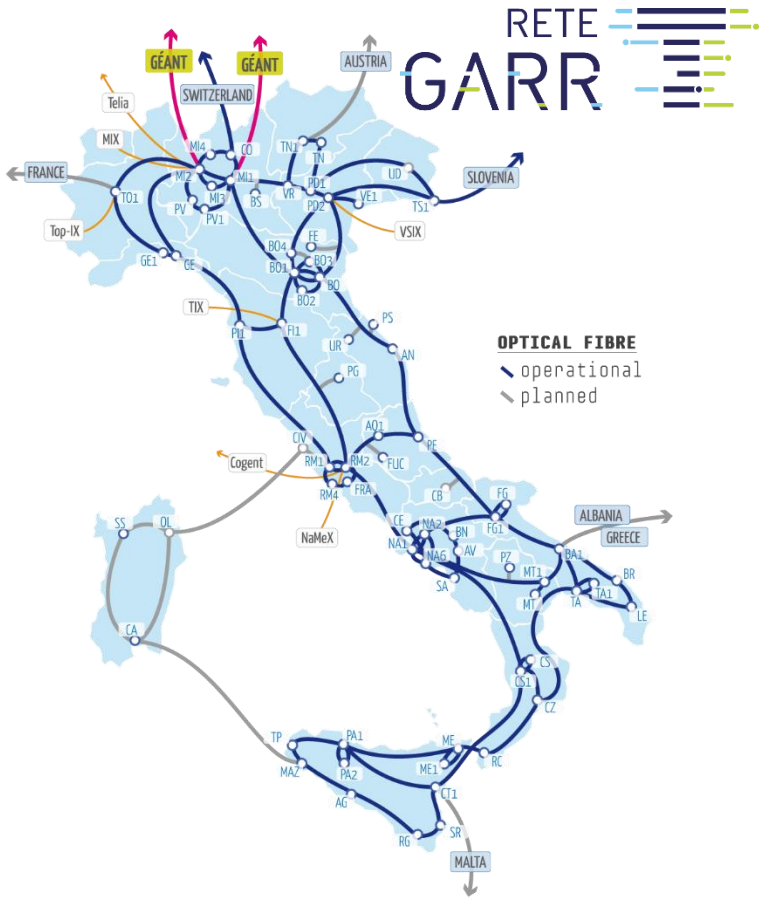
GARR

Agenda

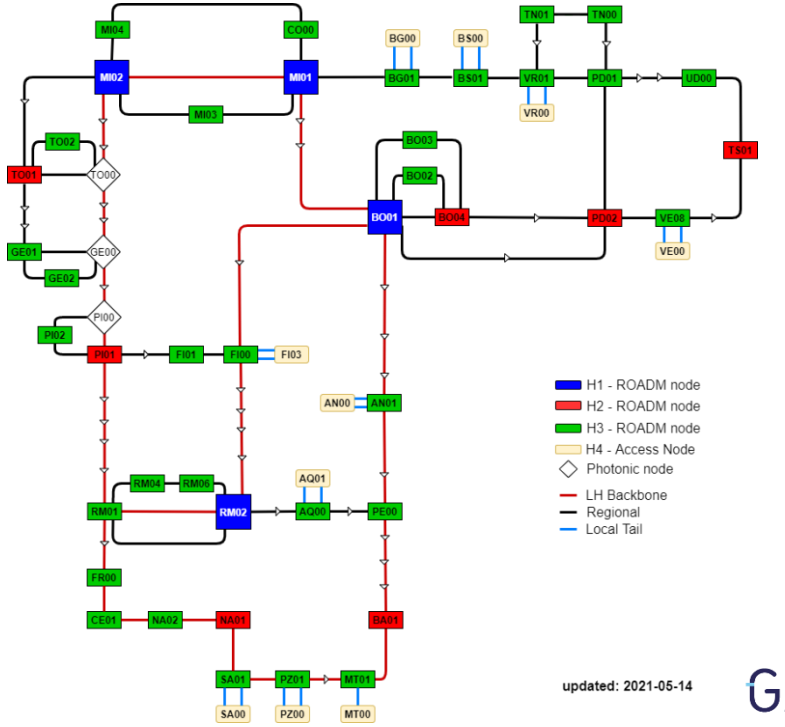
- GARR-T status
- GARR-T achievements
- GARR-T new developments (PNRR Projects: TeRABIT, ICSC)
  - Architecture
  - Network
  - Procurement
  - Roadmap

GARR-T (1.0)

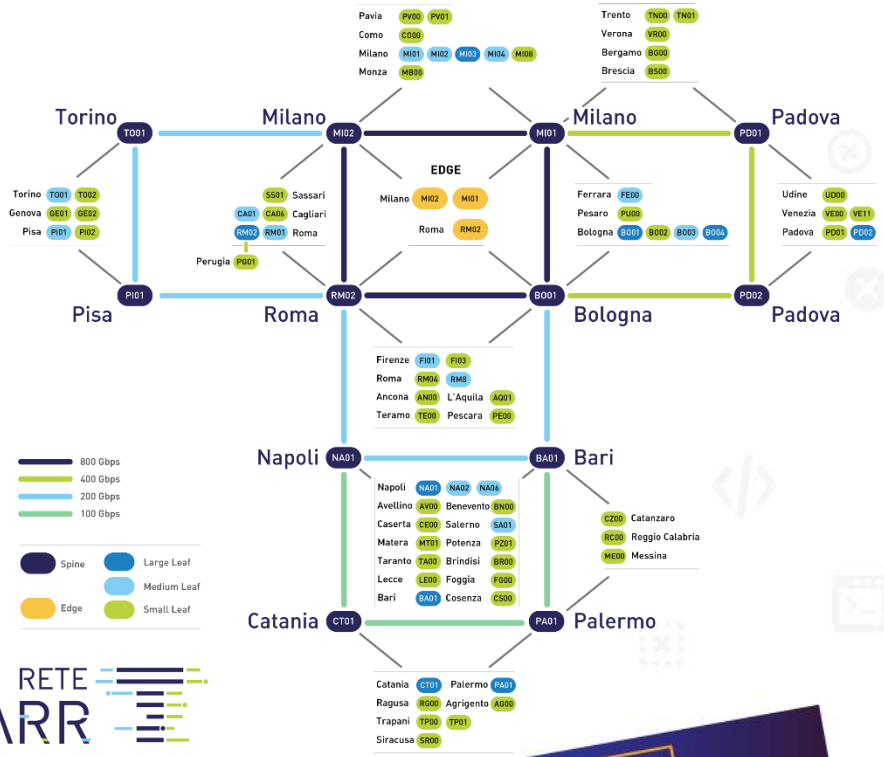
Backbone topology
750 km new infrastructure
6200 km infrastructure swapped



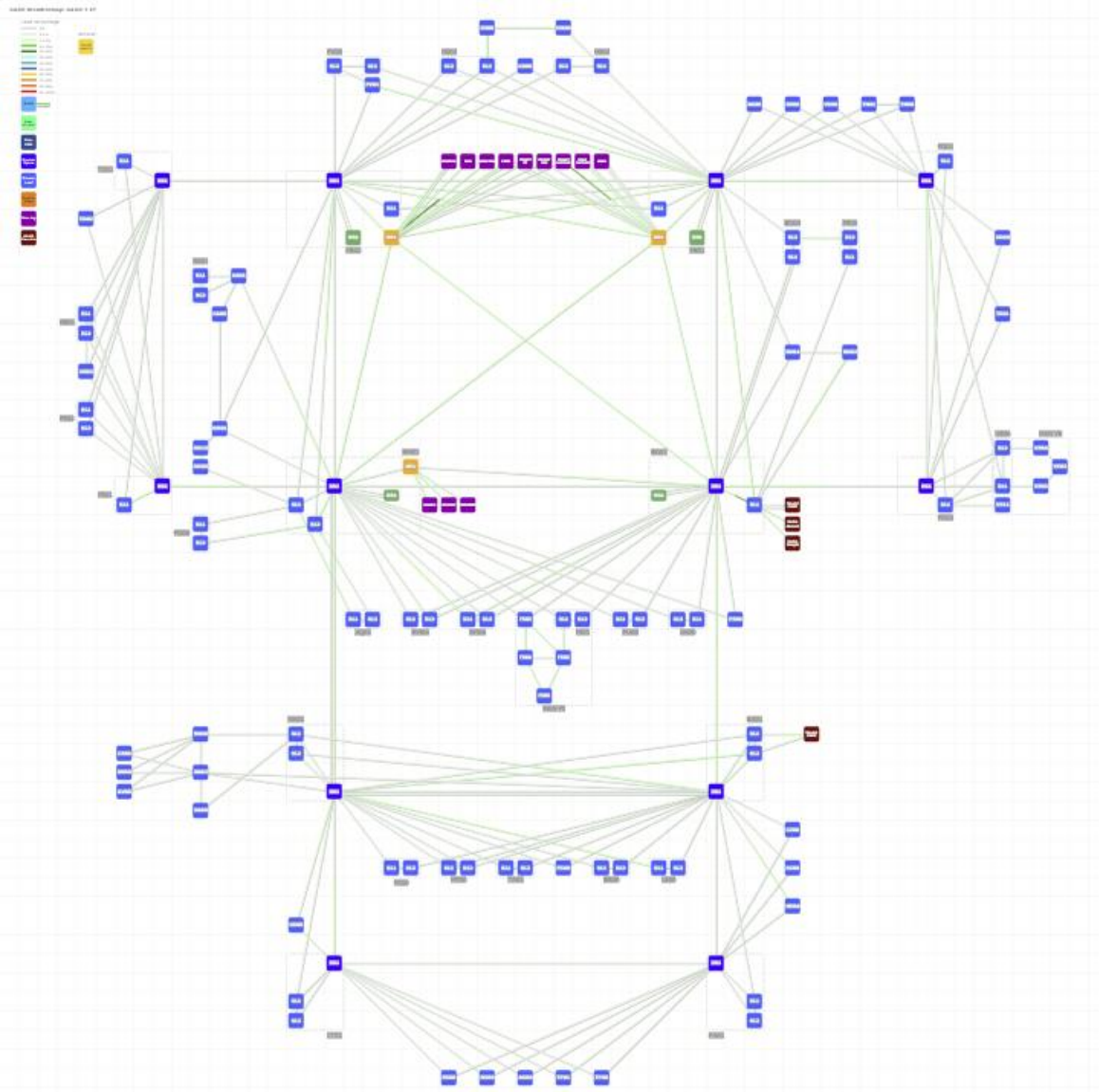
Optical Transport Layer
42 ROADM + 35 ILA
18Tbps day1 capacity

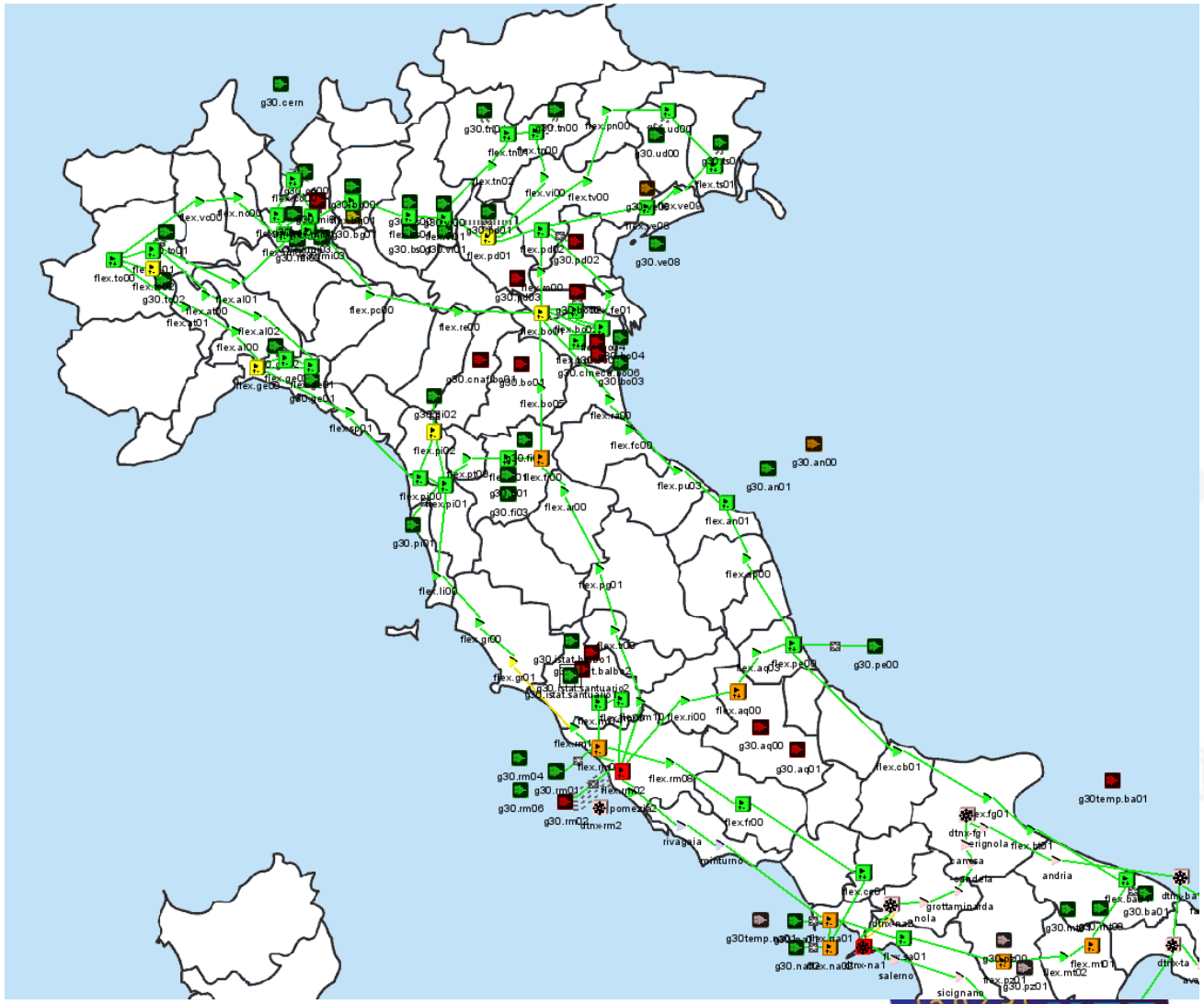


Packet Layer
78 PoP
136 pkt nodes
20Tbps capacity



Current Status: GARR-T UP and Running!!!





Achievements and opportunities to catch up

GARR-T rollout completed: 78 PoP

- Users live migration completed in 9 month

Network Visibility and Automation

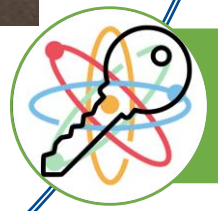
- Performance Monitoring / Log / Provisioning / Network Lifecycle Mgmt

1.6 Tbps DCI Bologna - Geneve

- Multidomain Spectrum Sharing – opening access to the photonic layer

Open Network Design and Planning

- Planning tool for multi-domain and multi-vendor environment



Beyond Data Services

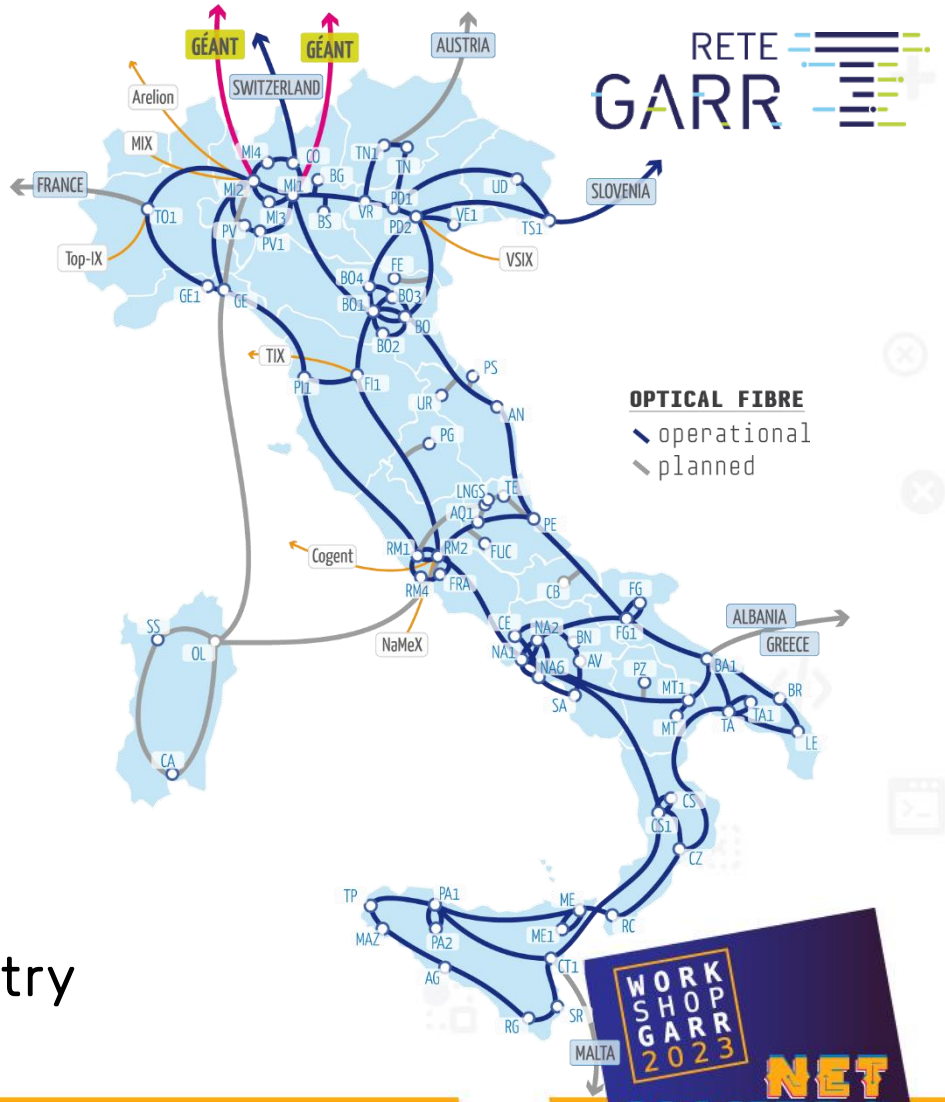
- Time&Frequency distribution / QKD / Seismology

GARR-T: next steps…

GARR-T (2.0)
new developments: PNRR projects (2023-2025)

terabit

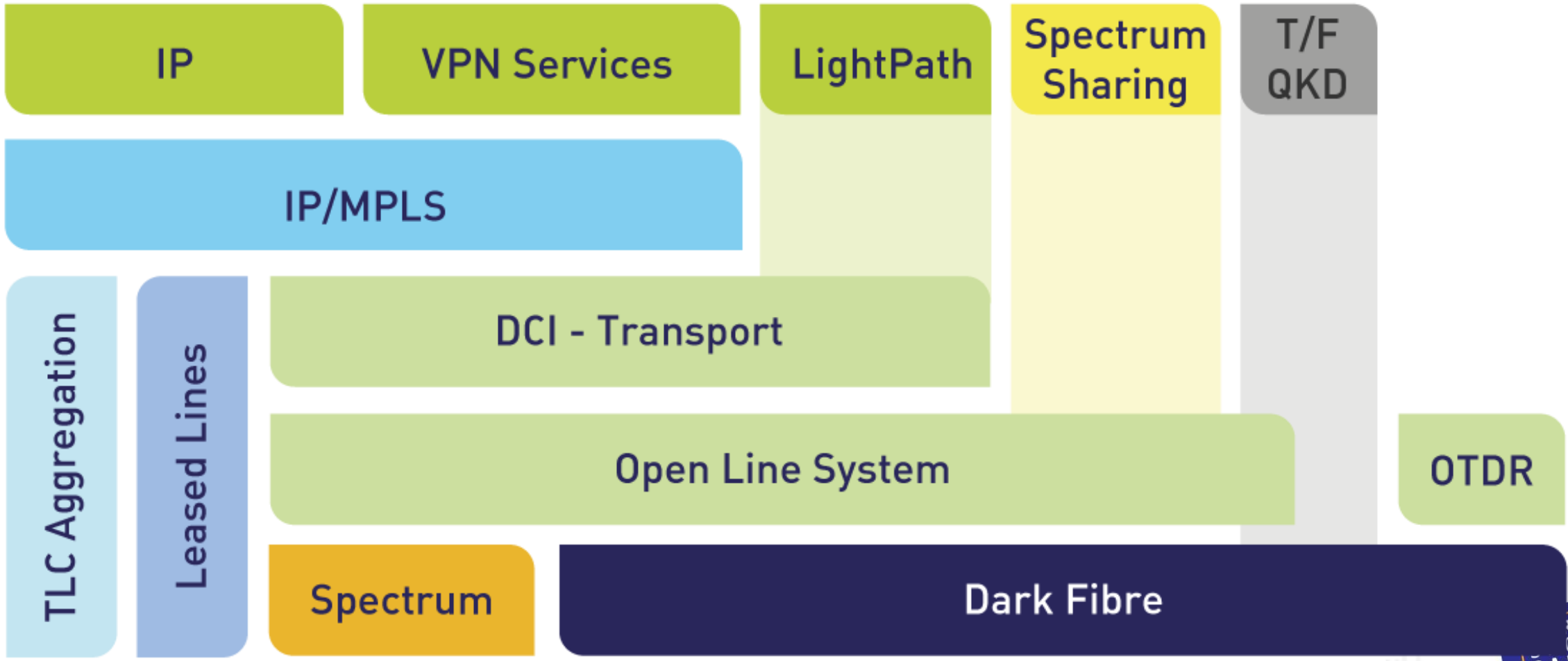
ICSC
Centro Nazionale di Ricerca in HPC,
Big Data and Quantum Computing



Opportunity to develop GARR-T network:

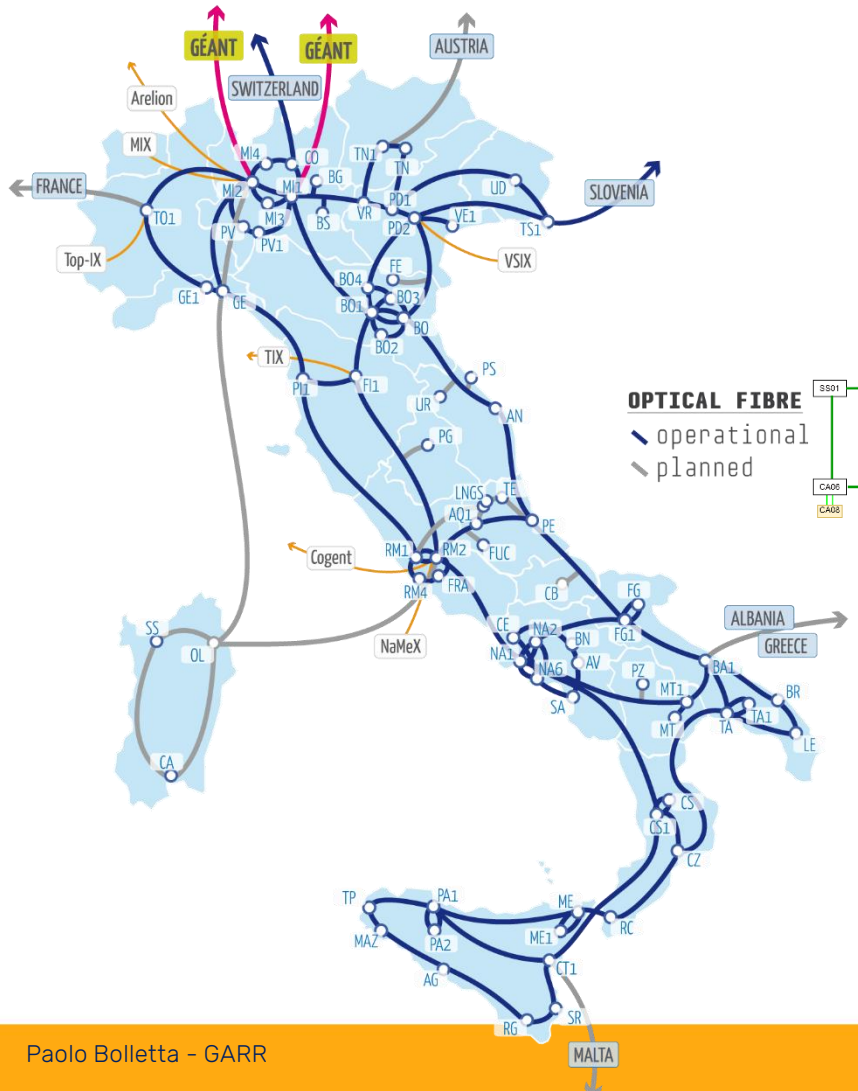
- Reach new areas: Sardinia and Abruzzo
- Upgrade and integrate network in the South of Italy
- Scale-up performance for HPC
- GARR-T can reach the goal to become a fully unified and pervasive network for R&E community in the whole country

GARR-T Architecture

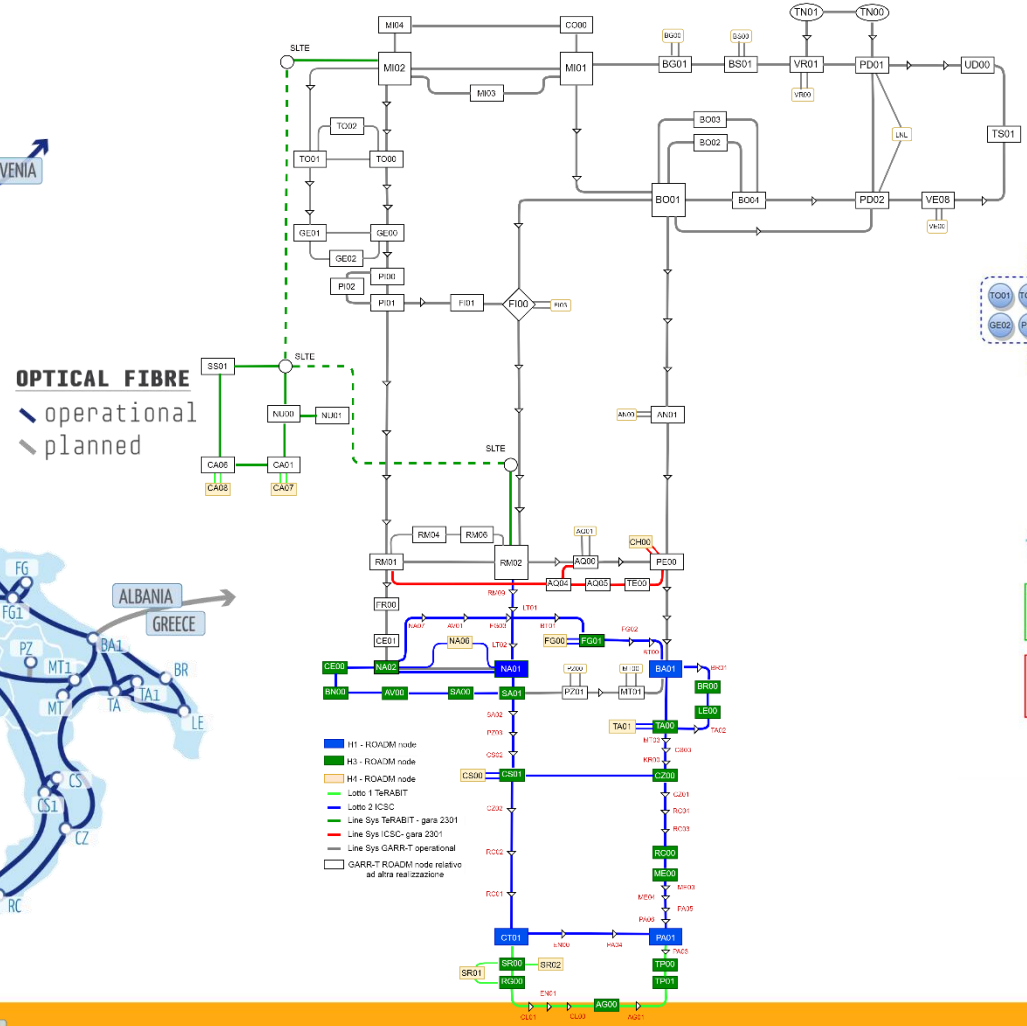


GARR-T new deployments (PNRR) - network overview

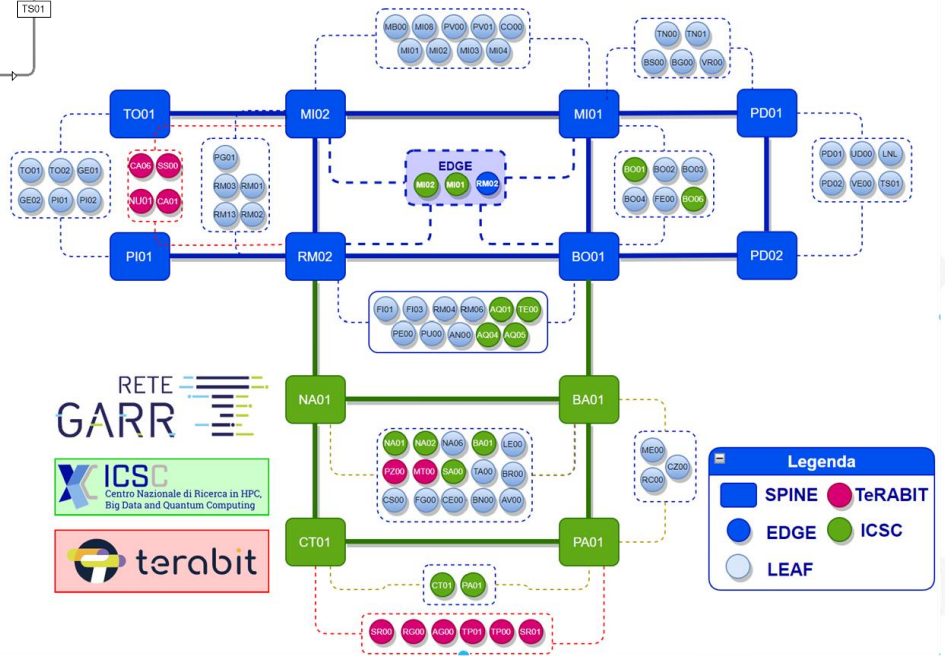
Backbone topology



Optical Transport Layer



Packet Layer



GARR-T: Optical Network current status and evolution

COMPLETED

2020-2023
6200 km
42 ROADMs
35 ILA
18 Tbps day1 client capacity

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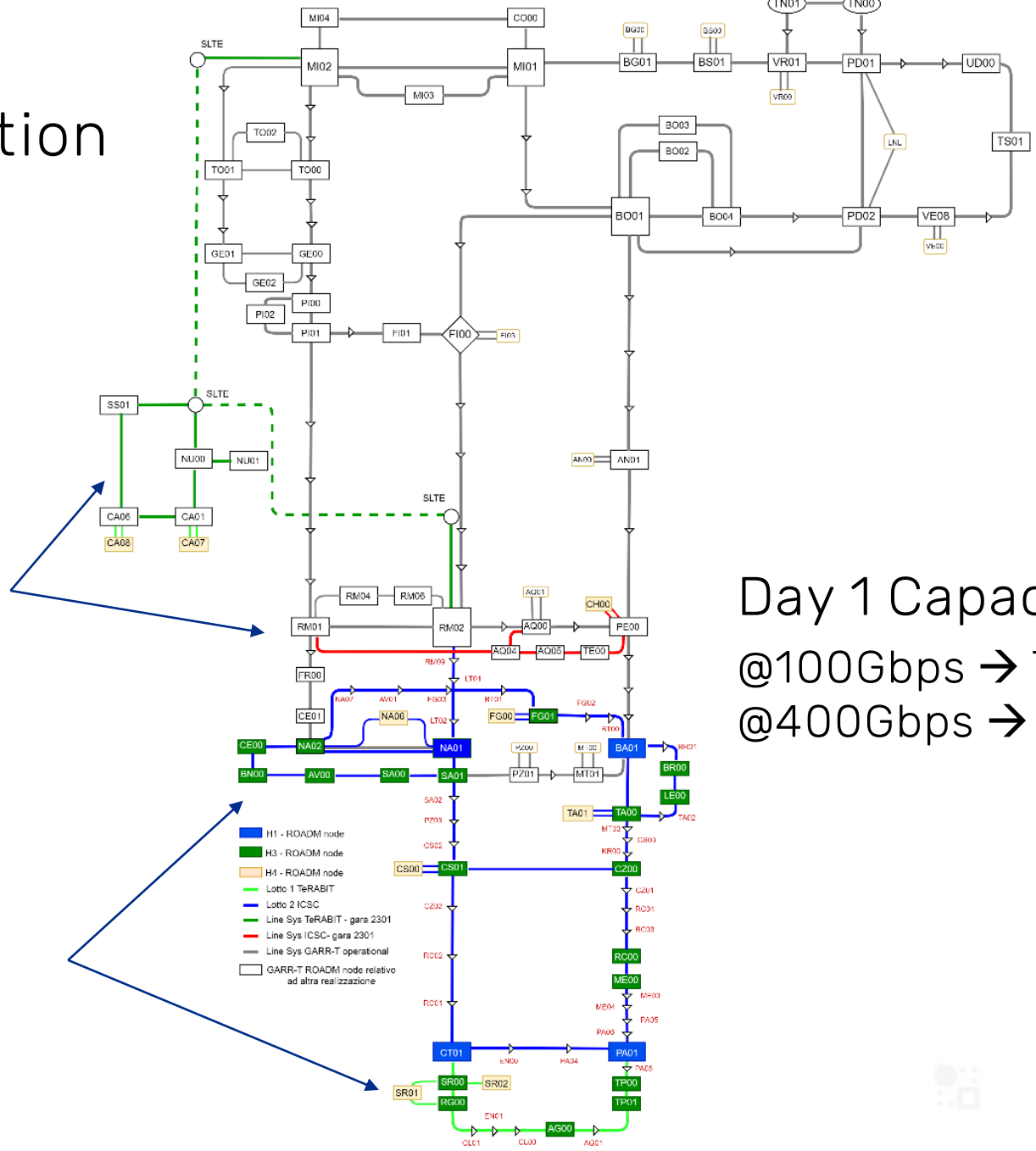
ICSC
Centro Nazionale di Ricerca in HPC, Big Data and Quantum Computing

next step

2023-2025
5000 km
35 ROADMs
38 ILA
2 sub-sea cable systems (spectrum)
16 Tbps day1 client capacity

GARR-T: Optical Network current status and evolution

New Infrastructure:
Sardegna e Abruzzo
Fiber + Optical Line system

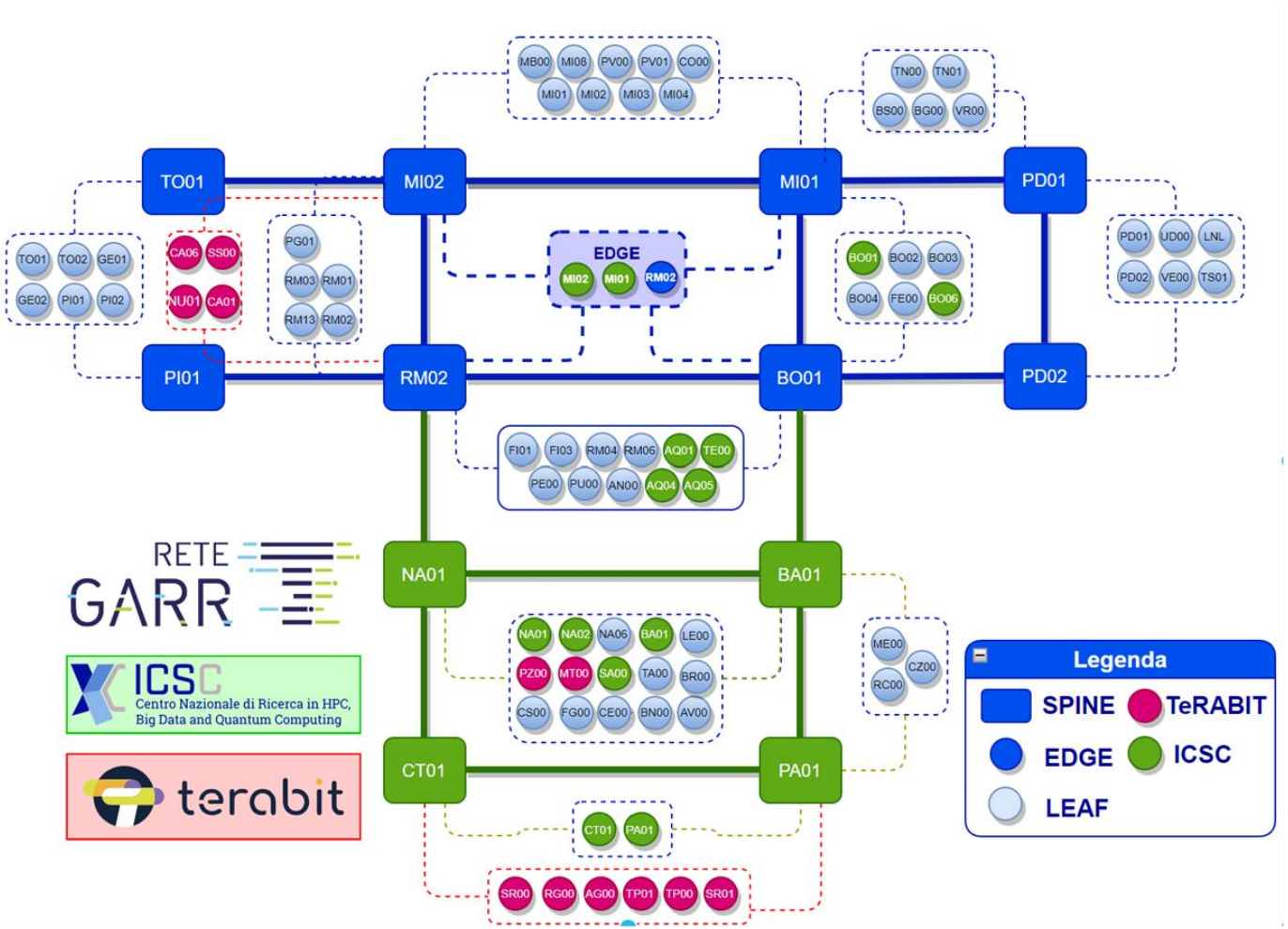


Optical Network refresh and live migration
GARR-X Progress footprint

Day 1 Capacity

@100Gbps → 77 services
@400Gbps → 22 services

GARR-T: Packet Network current status and evolution



- 2023-2025
  - 60+Tbps packet platform upgrade
  - 17 new nodes
  - 400GEth user interface on packet service platform

Procurements Procedures

Procedura di gara 2301 – [20.7 M€]

- New Infrastructure
- Optical Fibre + Open Line System
  - [TeRABIT] Sardinia
  - [ICSC] Abruzzo

Procedura di gara 2302 – [15.0 M€]

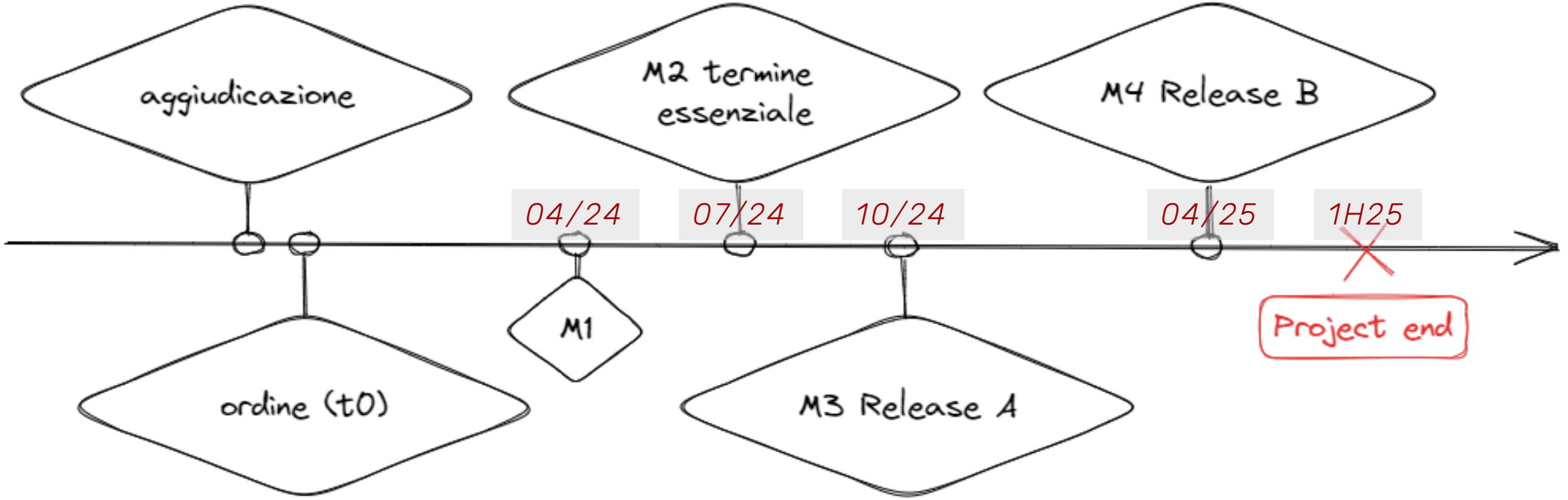
- Upgrade GARR-X Progress Optical Network → GARR-T unified optical network
- Network Transport Capacity over Open line system
  - [Terabit] Sardinia, Southern Sicily
  - [ICSC] Abruzzo, Campania, Puglia, Calabria, Sicilia

Procedura di gara 2303 – [7.1 M€]

- Upgrade GARR-T Packet Network
  - [Terabit] Sardinia, Southern Sicily
  - [ICSC] Abruzzo, Campania, Puglia, Calabria, Sicilia, Backbone and Edge Connectivity

Roadmap

Gara 2301 – 09/23
Gara 2302 – 10/23
Gara 2303 – 07/23

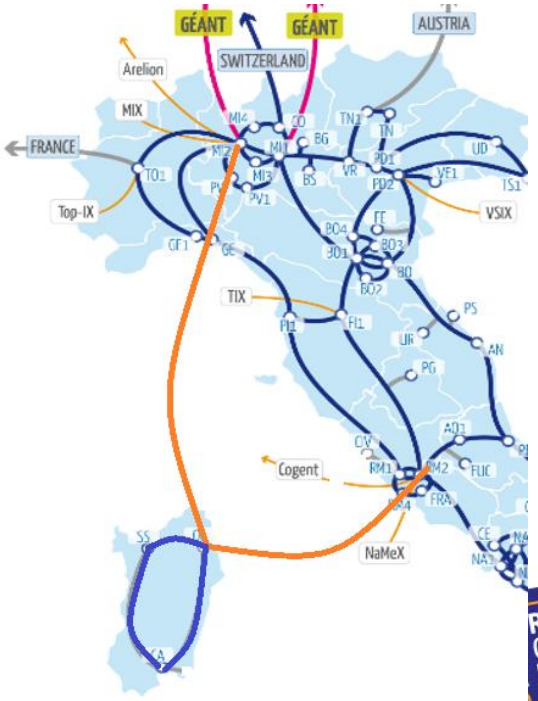


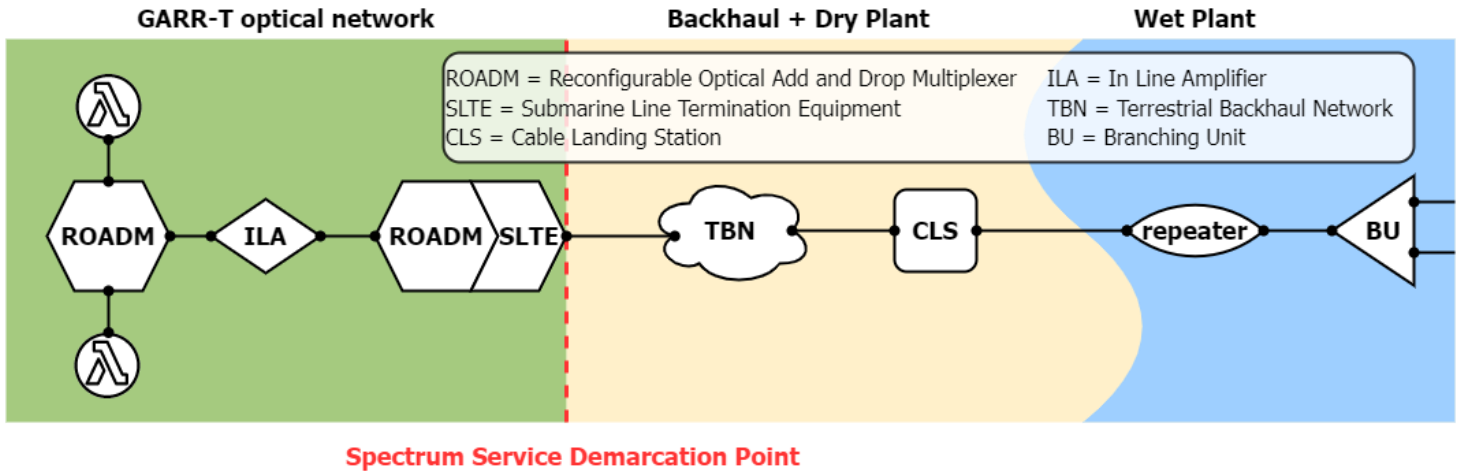
Gara 2301 – 10/23
Gara 2303 – 10/23
Gara 2302– 11/23

New playground: Spectrum over Subsea Open Cable

GARR-T aims to complete a unified infrastructure all over Italy reaching also Sardinia through subsea cables.

- 900GHz of spectrum over Open Cable Subsea System
- Direct interconnection between Sardinia and Rome and Sardinia and Milan (Core Nodes)
- 20 years IRU
- nx400GEth interconnections





Conclusion

Achievements:

- GARR-T Migration Completed
- Enhanced new services (e.g. multidomain 1.6Tbps DCI)
- Telemetry and Automation

Opportunities:

- Expansion in new areas
- Complete GARR-T as a unified network platform
- Beyond Data Services

Challenges:

- PNRR time requirements
- HW Shortage
- Spectrum Over Open Cables

RETE GARR

WORKSHOP GARR 2023

NET MAKERS

Q&A

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