

NOKIA



With Mégalis, the Brittany region of France is improving the performance and usage of their core optical network



The Brittany region has renovated its core optical network, interconnecting its main higher education and research sites, in order to improve its performance and resilience and to prepare for the network to be available for other uses, as part of the digital development of its territory.



About Mégalis Bretagne

1. Created in 1999, the public agency called Mégalis Bretagne is a territorial cooperation structure composed of the following members: The Region of Brittany, the 4 Departments, 60 EPCI. Through its members, this syndicate represents more than 1,200 municipalities that can use its services.
2. It is in charge of the operation and management of the Bretagne Very High Speed network aiming at connecting 100% of the households to fiber.
3. It also provides Breton local authorities and economic operators with digital services and supports them in developing their use.

Project background

In 2008, the European University of Brittany (UEB), since renamed Université Bretagne Loire (UBL), set up the connection to the RENATER network (Réseau National de télécommunications pour la Technologie, l'Enseignement et la Recherche), the National Research and Education Network (NREN) interconnecting the research and education community in France, to the main members of the higher education and research community in the region.

This network, put into service in 2009, was a half-loop connected to the RENATER network in Nantes on one side and Rennes on the other. It was based on Nokia 1830 PSS32 multiplexers, from which two 10 Gb/s wavelengths were extracted.

Higher education institutions had two main requirements:

1. A reaffirmed need for connectivity,
2. Significantly greater needs in terms of throughput

... The region also asked us to find a more economical, more sustainable system that would allow us to move up the value chain and limit operating expenses.

Patrick Malfait, DG, Mégalis



Figure 1: Map of the old and new Breton core optical network

The dark fiber supply market and the delegation to RENATER (ending in 2019), in 2015, the Brittany region launched a study on the continuity and evolution of the network. Following this study, in 2017, it asked Mégalis to ensure the implementation of a solution for the continuity and evolution of the network and services.

This evolution had several goals:

1. To respond to the increase in exchanges between higher education and research institutions.

2. To achieve savings in operating costs for the regional community.
3. To broaden the potential uses of this regional loop, to allow the study and the immediate or future implementation of extensions towards sites currently not served and to support an enlarged use of this loop by other public entities, due to a shared network.

This evolution could also gradually be used to establish the junction between this backbone network and the optical nodes established on the Brittany Very High Speed network, with the aim of increasing the use of this network by a greater number of local authorities and public establishments.

Project background

In 2018, the Steering Committee from the Region, UBL and Mégalis, decided on the main optical architecture of the new network.

Required improvements to the existing architecture included:

- The elimination of the existing individual points of failure for the cities of Lannion, Vannes and Lorient.
- The desire to create a true closed loop in Rennes, to improve the resilience of the network.
- Increasing the capacities supported in anticipation of new uses and the use of the network by new players.
- The service of new cities such as Pontivy, Saint-Malo and Morlaix could be envisaged in a second phase, depending on needs.

In addition, Mégalis wanted to set up an evolving optical structure and asked in the consultation that site relocations be possible due to the opening of the network to new users.

Finally, the quality of service is very important for Mégalis. The closed loop needed to allow dynamic reconfigurations and on the equipment: Recovery Time Guarantee (RTT), network availability commitments, Location and organization of teams supporting the network.

“We decided to build a complete loop, which allows us to be more resilient in the event of a network outage.”

Patrick Malfait, DG, Mégalis



Solution

Nokia and Tibco partnered to ensure the success of the Mègalis BTHD project

In order to best respond to the tender for the Megalis BTHD project, Nokia and Tibco have partnered to cover the full spectrum of the project. Nokia provides optical equipment, network supervision and level 2 and 3 maintenance services, while Tibco provides engineering, planning, and hands-on services from installation to level 1 maintenance, as described in Figure 2.

At the request of Mègalis, Nokia carried out a project re-engineering mission, where the quality of the fibers was evaluated to propose an optimized architecture that would take into account their new requirements

Nokia and Tibco's offer was based on the latest generation of 1830 PSS optical switches as well as Wavelength (figure 3) which meet the new network performance improvement needs

1. Improved throughput.

- Two 100 Gb/s wavelengths over the entire loop, with rerouting capabilities.

- Two additional 100 Gb/s wavelengths without this rerouting functionality, between Rennes and Nantes.

- Each wavelength can be segmented into 10 times 10 Gb/s.

- The services delivered to users are therefore at least 1 Gb/s, 10 Gb/s, 40 Gb/s, 100 Gb/s.

2. Improvement of network resilience:

- Automatic rerouting of flows in the event of a fiber interruption on the loop. Traffic must be automatically rerouted on the

remaining operational path, to ensure better service availability.

- Localization of fiber failures using OTDR (Optical Time Domain Reflectometer) cards to accelerate their identification and therefore their repair.

The optical equipment implemented can also combine Ethernet switching functions to enable Mègalis to offer VLAN switching in addition to wavelength services if needed in the future.

Finally, the racks in which the current equipment and the optical drawers are located are reused to respond to Mègalis' desire to recover and reuse the existing infrastructure as much as possible.

Figure 2: Role distribution between Nokia and Tibcoo

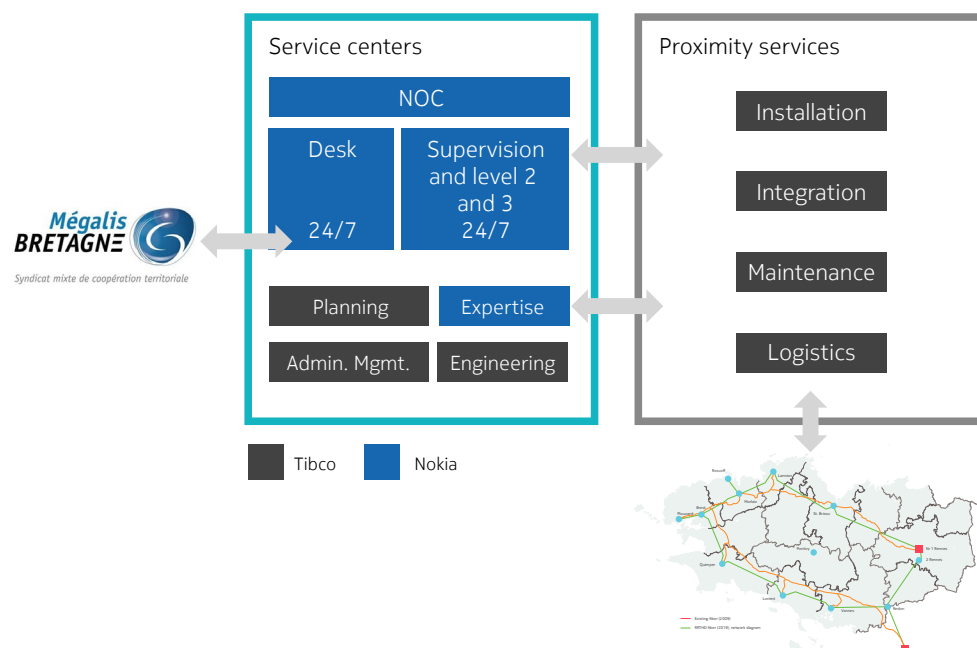
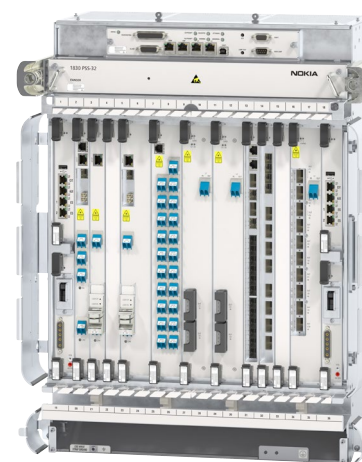


Figure 3



1830 PSS-32



Wavelength Access 200

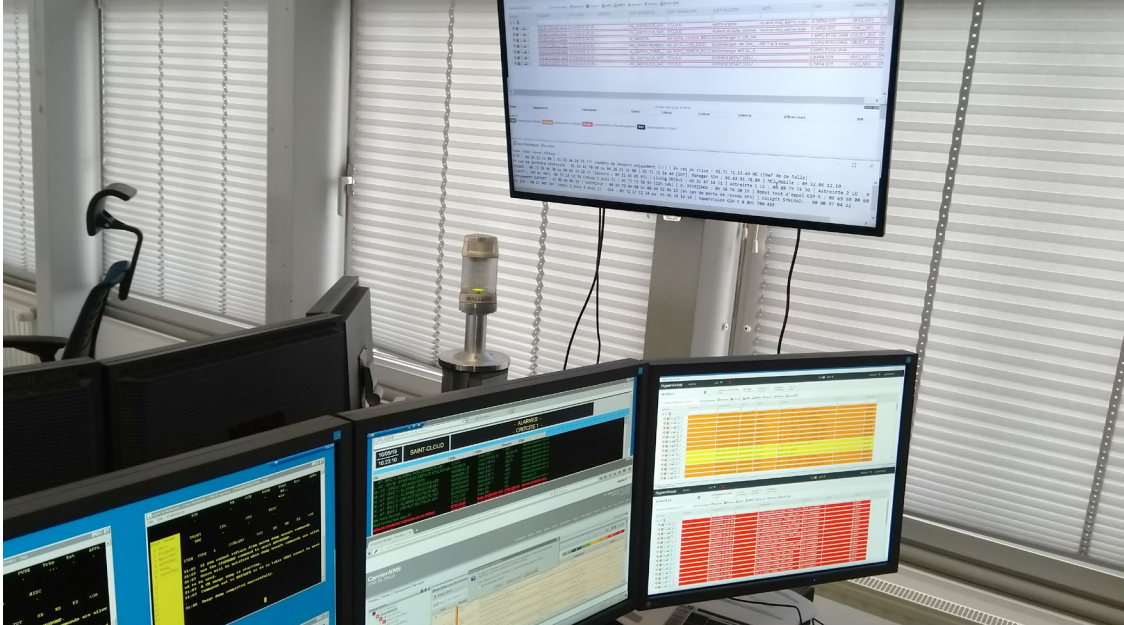


Figure 4: Supervision center of the Mégalis core optical network

A complete range of professional services

In order to meet the demand for a high level of professional services, Nokia and its partner Tibco are responsible for the installation, operation, supervision and maintenance of the equipment, required for the proper functioning of the network and for the full satisfaction of the users of the optical loop.

Mégalis required that during the installation of the new network by Tibco's teams, that any outage times (due to the migration of the existing network to the new one) be reduced to a strict minimum, in order not to disturb the current operation of the links.

Nokia provides network supervision functions through its NOC (Network Operation Center - Figure 4) for the operation and maintenance of the overall structure. In addition, Nokia performs all the tasks necessary for the proper operation of the network, including configuration management.

As well, Nokia is the technical contact for the operators providing the optical links; allowing a global view of the entire network in case of an incident. In the event of a problem, Nokia is also responsible for organizing the rapid restoration of the fibers.

The environment: A priority for Nokia and Megalis

Nokia and Tibco are companies with strong environmental awareness.

In this respect, they have met the needs of Mégalis, which is particularly interested in the eco-responsible aspect of the equipment installed in the initial RENATER network, with respect to:

1. Controlled electrical consumption of the equipment.
2. Equipment design:
 - a) Prioritizing components that are recycled and recyclable,
 - b) Minimizing the use of components containing rare earths whose extraction is now recognized as having a negative impact on the environment.
3. Recycling obsolete equipment that was removed from the RENATER network.

Thus, the cards or other equipment withdrawn from operation have been:

1. As a priority, either given to organizations such as Télécom Sans Frontière which could reuse the discarded equipment, giving then a second life,
2. Or, if these organizations are not interested, recycled, with particular attention to elements considered strategic by the European Commission.

Finally, the methods of processing packaging (cardboard, wood, plastic packaging, etc.) have encouraged their recycling and reuse.



The Tibco teams, because of their local presence, are able to intervene quickly for level 1 or 2 problems, and to answer the strong demand of high availability of the network.

Finally, a web tool has been made available to Megalis allowing it to know in real time the state of the network, such as the operational capacities and those which are not. This service can also be offered to users who prefer it, such as RENATER.

The strong presence of Nokia and Tibco in Brittany and in France was a favorable factor in their selection for the deployment of this network. Nokia has an advanced optical competence center there, which is the level 3 technical support hub for the optical division for the entire Europe, Africa and Middle East region, and the supervision center for the Mégalis optical network is located in Lannion

For its part, Tibco and its collaborators bring together telephony knowledge and corporate networks expertise (engineering, cabling, distribution, training, maintenance and operation) with nearly 90 TIBCO agencies implanted everywhere in France and in Brittany for more proximity with its customers.

At the heart of Tibco's solutions:

- A very strong economic competitiveness, sustainable over time
- Local interventions in soft mobility
- The sale of eco-recycled equipment
- The repair service to increase the life span of the equipment
- The accompaniment of Mégalis in its sustainable digital uses

These services have enabled us to offer Megalis an offer that combines performance, comfort and streamlining while adding a strong eco-responsible dimension. This is a strong strategic axis for TIBCO, which has the ambition to become the 1st eco-responsible digital service provider. Its goal is to guarantee a viable, efficient, and sustainable digital world, taking care of the economy, the people and the planet. Tibco has made the commitment to do its part with and for its customers, while transforming its business model to reconcile economic, human, and environmental interests, in order to generate a positive impact for the environment.

Thus, Mégalis can benefit directly from this expertise for immediate local support in French for any operational optical subject. It can also rely on these first-rate capabilities to test and validate all new functionalities.





The Benefits

A project for the digital development of the region and its actors

This has been a successful project with Mégalis for the Brittany region, with a strong French and regional added value. The new network was commissioned in late 2019 and meet the requirements.

First of all, the higher education and research institutions connected to the network can benefit from ultra-high speed links at 10 Gb/s, thus meeting the increase in capacity that

they had requested. In addition, they benefit from the improved resilience of the network, with outages that are no longer noticeable.

Patrick Malfait is pleased to state that “The higher education and research establishments that used to complain in the event of a power cut ... now we don't hear them anymore”,

The Brittany region also uses the network to support new uses. For example, it is sending data flows from the high schools served by the network to the center of

Rennes. The significant gains in operating costs are redirected to improve the connectivity of those who are not connected because they are too far from the network.

Finally, the network has opened to new players. Today, a department uses it, notably to interconnect its data centers. Mégalis also rents network segments to regional telecom service providers, in areas that are poorly covered by the major national service providers. All these services help to balance the network operating budget for the community.

Building on this initial success, Mégalis plans to continue developing its network. “We want to do more; the first axis is the territorial networking with a new link to Pontivy in central Brittany. We will continue to go up for an even more resilient network.” confirms Patrick Malfait. “We want to continue to open it up to other communities, why not with health establishments to connect hospitals,” he adds by way of conclusion.”

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As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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