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# University of Toulouse Centre for Integrative Biology (CBI)

The Centre for Integrative Biology (CBI) is a research federation set up by the CNRS (Centre national de la recherche scientifique) and the University of Toulouse III - Paul Sabatier. CBI brings research teams, technological platforms and services together in a highly modern architectural complex which has been, fully equipped with an FTTO (Fibre To The Office) network. This makes it possible to cater to a wide range of internal user requirements and anticipate future evolutions.

## THE CHALLENGE: BRINGING TOGETHER TEAMS WITH DIFFERENT NEEDS

Created in January 2016, the Centre for Integrative Biology (CBI) brings together some forty research teams that share an objective: understanding how living organisms function. To facilitate this, CBI develops multidisciplinary, multi-scale approaches and works at modelling numerous organisms, ranging from bacteria to humans.

When the CBI was founded, part of its research teams (some 150 people) were housed in the CNRS 'IBCG' building. The other teams (about 250 people) were located in the 4R3 building on the Toulouse III



- Paul Sabatier University campus. The construction of a new building (CBI-4R4), connected to the 'IBCG' building, was proposed within the framework of the 'Campus Plan'. The idea was to bring together all CBI Federation staff within the same architectural space. The CBI-4R4 project was selected as part of the 'Toulouse Campus Plan' and its construction benefited from this investment programme.

The CBI currently brings together 40 research teams, seven technological platforms and five types of service. There are over 400 people on site, of which more than 250 have taken up residence in the new building since November 2020. The structures are connected to the national telecommunications network for technology, education and research (réseau national de télécommunications pour la technologie, l'enseignement et la recherche, or RENATER). The IBCG building retains its internal network, whereas the new 4R4 building is fully equipped with Aginode' FTTO LANactive solution.

## FTTO IS PART OF THE NEW BUILDING FOR LIFE

«The new building required a future-proof investment, a flexible solution that would last throughout the building's projected lifespan of some 30 years,» explains Jocelyne Pérochon, IT Manager at CBI. «Another key element was the interconnection with the existing IBCG building, requiring full compatibility between the two systems.»



The CBI's Information Systems Department (ISD) was already aware of the advantages of fibre optic solutions, through the RENATER network (the national research & education network in France) in particular. Other CNRS laboratories on the Paris-Saclay cluster (a research-intensive and business cluster under construction) had shared highly positive feedback on the innovative FTTO concept, and the quality of the support provided by its teams. As a result, CBI's ISD was in favour of the LANactive FTTO solution.





The FTTO concept, an alternative to copper cabling systems, revolves around the installation of fibre optic media from the network core to the workplace. Universally mountable switches are integrated into the user environment, allowing connection of various devices (PCs, IP telephones, printers, WAP, cameras, etc.) using standard copper patchcords.

Compared to traditional copper-based technologies this solution has many advantages. First of all, single-mode optical fibre imposes no physical bandwidth limits. This is essential to CBI, as the research teams exchange very large files that require significant bandwidth. With the FTTO solution, the fibre is brought as close to workstations as possible, with a point-to-point link to the core.



This long-term investment provides great flexibility that makes it possible to easily and cost-effectively meet changing needs over time. Users can be added cost-effectively by plugging into available FTTO Switch ports. Furthermore, the CBI teams' demands vary over time: its technological platforms and the teams working in microscopy work with large data volumes that may be tens of terabytes in size. The previously deployed fibre infrastructure can simply be used to add a dedicated link for the new service.

Thanks to the LANactive Manager configuration and administration platform, granular distribution of services is possible, and networks can be easily managed from one location. Accurate mapping of infrastructure status allows quick detection and repair of faults or configuration errors, saving considerable time.

An additional benefit of FTTO is the fact that it limits the amount of space required for IT infrastructure, thereby optimising use of the room available for offices and laboratories. Only 1.3km of fibre was required to connect the 1554 distributed outlets, compared to some 55km of copper in a traditional solution. A single extractable cable loop is deployed across the floors.

Redundancy is provided by creating a second technical room in the new building, linked to the technical room in the IBCG building. Network availability at the physical level is ensured by a redundant star infrastructure up to the user, enabling continuity of service even in the event of a problem on the network (such as a broken fibre, or core network failure). The network is bidirectionally redundant with a high-availability system; flows can go to either the network core or the technical premises in each building.

What's more, because of the large number of outlets required, each FTTO Switches offers five RJ45 ports and Power over Ethernet (PoE), allowing for a smaller footprint in the office.

It should be noted that the management of the building is divided between three operators: CBI, CNRS and Paul Sabatier University. Each has a distinct control focus (one manages PCs, another access control and cameras, for example) with different network access rights. Thanks to FTTO, granularity can be realised at FTTO switch level. For example, 802.1x authentication is managed at the level of Aginode products, even though this was not originally planned.

Numerous security features are provided directly by the FTTO Switches. This includes access control through authentication of all equipment and secure and reliable flow backups.

## AN EXCEPTIONAL LEVEL OF SERVICE

Initially motivated by bandwidth demand and the anticipation of network evolution, the CBI was also able to take advantage of the FTTO concept to integrate services provided by the university. The new network is available to the CNRS and the university for services such as Wi-Fi, access control, IP telephony, and alert management. IP convergence and interconnection are also provided by the new network.

To achieve this and ensure interoperability of equipment from multiple vendors, a Radius server was deployed on the FTTO switches at the functional level rather than at the core switch level. «Transferring these services from traditional Switches to the FTTO Switches allowed us to isolate issues, reduce implementation constraints and benefit from enhanced granularity of interventions,» states Pierre Solbes, system and network administrator at CBI. «The LANactive Manager software is easy to understand. It is really helpful during startup and for daily management of the network. When we take delivery of a building, there are many things we need check and this tool has made our work easier.»

Due to time constraints, related to the Covid-19 situation in particular, the CBI teams moved in just after the installation of the new network, during the test period. This is usually carried out before the teams are installed. «Aginode' teams provided strong support with this challenge. We appreciated

their responsiveness in answering all our questions. This level of support is quite exceptional. They continued to support us fully until every single issue had been resolved,» adds Pierre Solbes.

## ADVICE FROM INSTALLER SPIE

A different brand than Aginode had already been specified in the tender for which SPIE was selected. However, SPIE wanted to open up the contract to a number of suppliers and contacted various companies. Aginode responded with a price offer comparable to the competition but offered more interesting technical performance. "Aginode' commercial policy is much more open, as it allows several solutions to be mixed, offering greater flexibility and adaptability. This is a huge advantage for clients as well as contractors," says Jeremy Parde, Project Manager at SPIE Industrie's Commercial division. Aginode' proposal was chosen by the project management and approved by the client.

This project was SPIE Industrie's South-West Business Unit - Tertiary Division's first experience with FTTO cabling. The support Aginode' teams provided in optimising fibre optic distribution in the building and their proposal to create a sustainable solution that allows installation of new outlets without laying new cables were highly appreciated.

"Overall we are very satisfied with the solution and the technical backup. We were very well supported on this very technical subject, which is not usually the responsibility of the electrical installer," adds Jeremy Parde.

## Key figures - new building 4R4

- 12,000 m2
- 5 floors
- 2 laboratories
- 250+ employees
- 7 technology platforms
- 411 FTTO Switches
- 1554 distributed outlets
- 1.3 km of 96-strand fibre cables, with a diameter under 1 cm
- 1 technical room

## Implementation schedule

- 2014 Project for foundation of CBI initiated
- 2016 (January) foundation of CBI
- 2017 New building tender launched - SPIE selected
- 2018 Technology solution tender launched - Aginode selected
- 2019 (end), installation completed
- 2019 - 2020 Delay, caused by Covid-19 in particular
- 2020 (October) Delivery of the building
- 2020 (October to December) Phased move-in of 250 employees

## Solution benefits

- Sustainability of the network (scalable, flexible, sustainable)
- Network security
- Area optimisation (no LTE)
- Improved energy efficiency
- Lower operating costs
- Easy administration, flexibility in use
- Quick and easy installation
- Support for PoE evolution, PoE+, PoE++
- Interoperability / IP convergence

#smartconnection



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