

French “Triple-Play” Service Provider Deploys Fiber to the Home

FREE (The Iliad Group) builds out its FTTH network for differentiated services and upgrades to multichassis CRS-1 to double core capacity.

EXECUTIVE SUMMARY

FREE (a subsidiary of The Iliad Group)

- Industry: Service Provider
- Location: France

BUSINESS CHALLENGES

- Enable innovative services for continued differentiation in the market to fuel average revenue per user (ARPU) and minimize churn
- Meet customer demand for increased speed, quality, and multiviewing experiences
- Offer “triple play” on Fiber to the Home (FTTH) for the same price as on DSL (€29.99/month) to ease subscriber transition and optimize ROI
- Grow the core network to keep up with growing subscriber base (four million total subscribers by 2010) and prepare for new usage, while helping ensure integrity of the network

NETWORK SOLUTIONS

- Point-to-point FTTH access using Cisco Catalyst 4500 Switches
- In-service upgrade of Cisco CRS-1 core routers from single- to multichassis configurations, increasing capacity to 2.5 terabits per second (Tbps)
- New bandwidth-intensive services being introduced to attract more subscribers (for example, more than 200 digital channels, multi-device high-definition television (HDTV), self-produced video content, and very high-speed Internet)

BUSINESS RESULTS

- Services are delivered over new Ethernet FTTH (E-FTTH), underscoring FREE’s market position as an innovator and service leader, and providing users very high-speed Internet access (100/50 megabits per second for downloads/uploads) as well as multi-device high-definition television (HDTV)
- Future-proof, passive, point-to-point infrastructure, which allows unlimited bandwidth and is perfectly suited for unbundling, allowing complementary revenue from wholesale services
- Operationally optimized core network able to support new bandwidth-intensive services that will drive up ARPU

Business Challenges

FREE has been shaking up the French residential service provider market ever since it first offered Internet dial-up access in 1999 – for free (hence its name). When the company introduced DSL service in 2002, it created more shock waves by undercutting the incumbent France Telecom and other providers, and establishing the now standard price at €29.99 per month. FREE continues to stand apart with an impressive record for pioneering new services.

The monthly fee has never increased, and by the end of 2007 FREE had expanded its portfolio to include a long list of “triple-play” services including very high-speed broadband Internet access, with downloads up to 24 megabits per second (Mbps) and uploads up to 1 Mbps. FREE telephony service includes unlimited calls to France land-line numbers (except overcharged numbers), and to land-lines in 70 countries including the U.S., Canada, China, and the United Kingdom.

Television service gives subscribers more than 100 digital channels (with over an additional 150 digital channels available for an extra charge), HDTV, and other FREE media services such as video on demand (VoD), video recording, and electronic program guides. FREE also offers an option for total unbundling from France Telecom, to eliminate separate rental charges for telephone lines.

With the company’s industry-leading vision, execution, and innovation, FREE has been able to rapidly expand its subscriber base and currently serves almost three million subscribers. Last year, the company evaluated its network in anticipation of continued growth of subscribers and the planned service offering. Within the access network, FREE recognized the need to increase capacity, because IPTV and other high-bandwidth services were pushing the access network to its limits. Also, the core network was based on Cisco® CRS-1 Carrier Router Systems, which gave the provider an extremely resilient foundation for services. However, the single-chassis routers were reaching their maximum capacity. The provider needed a network-wide plan for increasing service capacity while protecting profit margins.

Network Solutions

Within the access layer, FREE wanted to overcome the inherent challenges of the copper-wire connections. The well-known limits of xDSL technology represented an obstacle to FREE’s market share goals. Because quality over copper degrades with distance, video services are restricted to customers located less than 5 km from the nearest central office. Even second-generation DSL bandwidth was limiting FREE in terms of its ability to support multiple in-home devices such as televisions, PCs, and other Web-enabled access devices, and the company

required an alternative solution. Simultaneously, FREE wanted to increase core capacity and recognized the opportunity for a cost-effective solution by upgrading from single-chassis to multichassis configurations for its Cisco CRS-1 core routers.

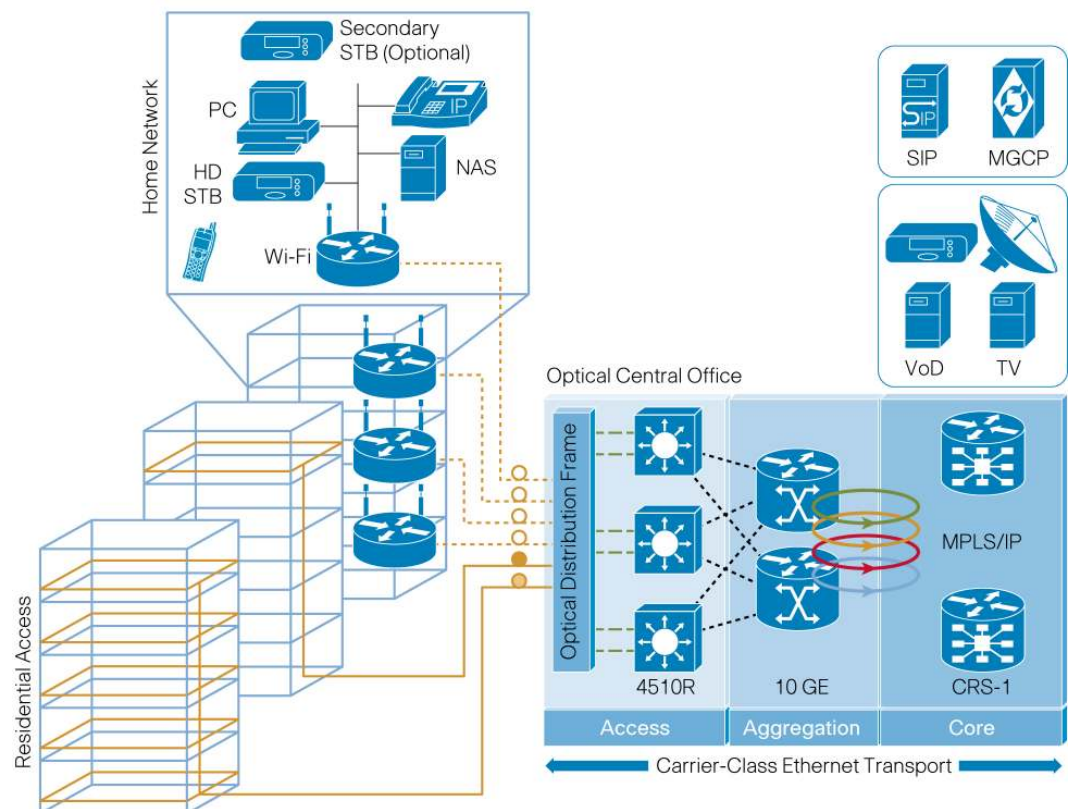
Introducing Fiber Local Loop

To overcome the signal degradations, gain distance-independence, and increase capacity in the access network, FREE made the decision to adopt point-to-point FTTH. FTTH would also help FREE sustain and aggressively adopt directions from the French regulator (ARCEP, www.arcep.fr), which were aimed at introducing a new network infrastructure in France.

The provider selected the Cisco Catalyst® 4500 Series Switches to gain the necessary bandwidth scalability, and to enable high-bandwidth services that can perform optimally for all subscribers. The new point-to-point FTTH deployment utilizes the inherent security, quality of service (QoS), and reliability of the Catalyst 4500 Series. Today, FTTH enables 100-Mbps connections, and in the future, FREE will be able to deliver 1-Gbps and even 10-Gbps connections over the same fiber. The Cisco Catalyst 4510R has been optimized for Ethernet FTTH, and allows FREE to cost-effectively deploy dedicated fiber optical links to each home.

Point-to-point Ethernet FTTH provides dedicated fibers from every endpoint to the termination point on an Ethernet switch located at the nearest point of presence (an optical central office). Individual apartments within a building are typically connected through single-mode, single fiber strands with Ethernet transmission. The Cisco Catalyst 4500 Series Switches at the new optical central office will be connected over 10 Gigabit Ethernet uplinks to the FREE core network to make optimum use of the increased capacity provided by the Cisco CRS-1 Carrier Routing Systems.

Figure 1. The New FREE FTTH Network



Independence from France Telecom

The introduction of its own fiber local loop allows FREE to avoid significant service charges related to the alternative use of France Telecom central office connections. The savings include the elimination of the one-off connection fee (€50 per customer) and the monthly local-loop unbundling (LLU) fee (€9.29 per customer for full loops).

In-Service Core Upgrade

The Cisco CRS-1 core routers gave FREE an elegant and simple path to increased capacity. By upgrading its full 16-slot single-chassis CRS-1 system to a multichassis configuration, FREE doubled capacity from 1.2 Tbps to 2.5 Tbps and is ready to grow even higher. The operation was completed without any interruption to subscriber services. Given the scale of its network, FREE worked closely with Cisco to develop the technical architecture and ensure meeting high-priority requirements.

“Cisco gave us a solution that met our capacity requirements, and allowed us to carry out the enhancements without any disruptions to our subscribers; it was completely invisible to them,” says Maxime Lombardini, chief executive officer at FREE. “With the new configuration, we can handle the increasing IP traffic and deliver the high-quality services that are our hallmark.”

Business Results

The new network gives consumers a higher standard of service. The first phase of the fiber project will connect more than two million people in the city of Paris on the largest fiber network in Europe. The fiber network offers the potential of virtually unlimited symmetrical bandwidths, where upstream and downstream traffic can flow at the same speed, which is currently unique for mass-market broadband services. Fiber is also being deployed to other cities including Montpellier and Valenciennes. FREE has confirmed the required capital expenditures per existing subscriber, and the results show that the deployment costs are not significantly higher for the solution while the long-term benefits clearly reinforce this decision.

Rolling out its own fiber local loop allows FREE to operate more independently from France Telecom, while improving margins and strengthening its service differentiation in the marketplace. The point-to-point infrastructure deployed by FREE is completely neutral from a technological point of view (point-to-point Ethernet, Ethernet over Passive Optical Network, Gigabit Passive Optical Network, etc.) and is designed to accommodate multiple Service Providers, optimizing its return on investment (ROI).

“Cisco has helped us gain a network of the future,” says Lombardini. “We are confident about our choice of Ethernet point-to-point FTTH, because it gives us a future-proof architecture and healthy returns on our investments in this area. Once again, FREE has clearly set itself apart from the competition. With fiber optic links directly to the home, we are helping to maintain our country’s position as a technology and applications leader and have built a strong foundation for innovation that will give us returns over the next few decades.”

PRODUCT LIST

Routing and Switching

- Cisco Catalyst 4510R Switches (access, optimized for aggregation of FTTH)
- Cisco CRS-1 Multishelf Carrier Routing System (core)

Technical Implementation

The Cisco Catalyst 4500 Series Switches at the new optical central offices will be connected over 10 Gigabit Ethernet uplinks to the FREE core network. These high-speed connections make optimum use of the increased capacity provided by the Cisco CRS-1 Carrier Routing Systems.

FREE needed to implement new Optical Central Offices able to support very high capacity in terms of number of subscriber lines. Importantly, the Cisco Catalyst 4500 enables video traffic over an optimized infrastructure that provides 10 Gigabit Ethernet with nonblocking switching capabilities. The Cisco Catalyst 4500 addresses mission-critical applications like VoD and HDTV over IP, where packet loss causes substantial degradation of the user perception.

The Cisco Catalyst 4500 Series meets the requirements for a very-high-speed FTTH access network, including:

- **Bandwidth:** The Cisco Catalyst 4500 allows FREE to provide 100/50 Mbps in downstream/upstream connection to their FTTH customers today with the ability to increase when needed to up to a 1-Gbps connection.
- **Small footprint:** The Cisco Catalyst 4510R chassis, with 48-port line cards, provides a high-density (up to 384 ports per device, 1152 ports per rack) solution for minimizing the amount of fiber required to pass all the homes.
- **Redundancy:** The Cisco Catalyst 4510R can offer high availability with dual AC or DC power supply, as well as in supporting 1+1 redundant supervisor engines with subsecond failover time.

Located in optical central offices, the Catalyst 4510 access switches connect to 10 Gbps Cisco 7600 Series Routers for aggregation. For the optical central offices, size depends on the density of the covered area, but typically handles from 10,000 to 30,000 homes. Cisco 7600 Series Routers are directly connected to FREE's core network to make optimum use of the increased capacity provided by the Cisco CRS-1 Carrier Routing Systems.

Among the very rich feature set of the Cisco Catalyst 4500 platform, FREE is most dependent on its:

- **Multicast:** TV and HDTV services are delivered using IP Multicast, which must scale both in the control and forwarding planes to provide multichannel per subscriber.
- **Security:** Numerous security features are enabled to protect the network devices as well as the subscribers from different type of attacks.
- **Quality of Service (QoS):** The end-to-end QoS model is based on Differentiated Services (Diff-Serv) Architecture with marking, policing, queuing, and congestion avoidance mechanisms enabled.

FREE's carrier-class Ethernet transport and all-IP network simplifies the provisioning of data, voice, and video services, and also streamlines the processes required for service delivery, service monitoring, and reacting to network performance.

For More Information

To find out more about Cisco FTTH, go to:

http://cisco.com/en/US/netsol/ns577/networking_solutions_solution.html

To find out more about Cisco CRS-1 solutions, go to:

http://cisco.com/en/US/netsol/ns573/networking_solutions_solution.html



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