

Broadband Series Provider Express National Network



hellas online builds a mesh DWDM network that spans Greece

EXECUTIVE SUMMARY	
CUSTOMER NAME	· hellas online
LOCATION	· Athens, Greece
INDUSTRY	· Telecommunications
COMPANY SIZE	· 638 employees
CHALLENGE	<ul style="list-style-type: none"> · Managing the rapid growth of broadband penetration in Greece · Large-scale deployment connecting 280+ exchanges · Scaling infrastructure and preparing for future growth
SOLUTION	<ul style="list-style-type: none"> · Metropolitan-area and regional dense wavelength-division multiplexing solution · Optical add/drop multiplexing functions
RESULTS	<ul style="list-style-type: none"> · 3800km of fibre-optics in Greece · Co-location in 255 OTE local exchange centres · International capacity of 10 Gbps

Challenge

In 1993, hellas online (HOL) became Greece’s first commercial Internet services provider and has since evolved into one of the country’s leading broadband service providers. The Company offers integrated telecommunication services to a large subscriber base that ranges from residential to corporate customers.

hellas online attributes its success largely to a rapidly growing optical network that currently extends over 3800km and connects more than 280+ local exchanges. Although this may seem fairly typical of ISP evolution, the organisation’s nationwide optical network sets it apart because it is the only telecom provider whose network footprint now rivals the incumbent.

“Reaching an increasing number of local exchanges is crucial to our ongoing growth, and to our promise to make our services available throughout Greece” says Dimitris Gorgias, director of Network Engineering and Operations. “By efficiently deploying our network, we can bring triple-play services to more residential customers, and extend our SDH and Metro Ethernet services to decentralised business areas.”

“The rapid growth of broadband penetration in Greece set the pace for us,” Gorgias says. “We knew our optical transport network had to comply with increasing demand, so it had to be scalable, future-proof and of high capacity. We were looking for an architecture that

would support optical mesh networking, be reconfigurable and able to deliver a wide variety of services. DWDM (dense wavelength-division multiplexing) stood out as the only solution that could deliver the bandwidth to satisfy our immediate and future demands.”

Solution

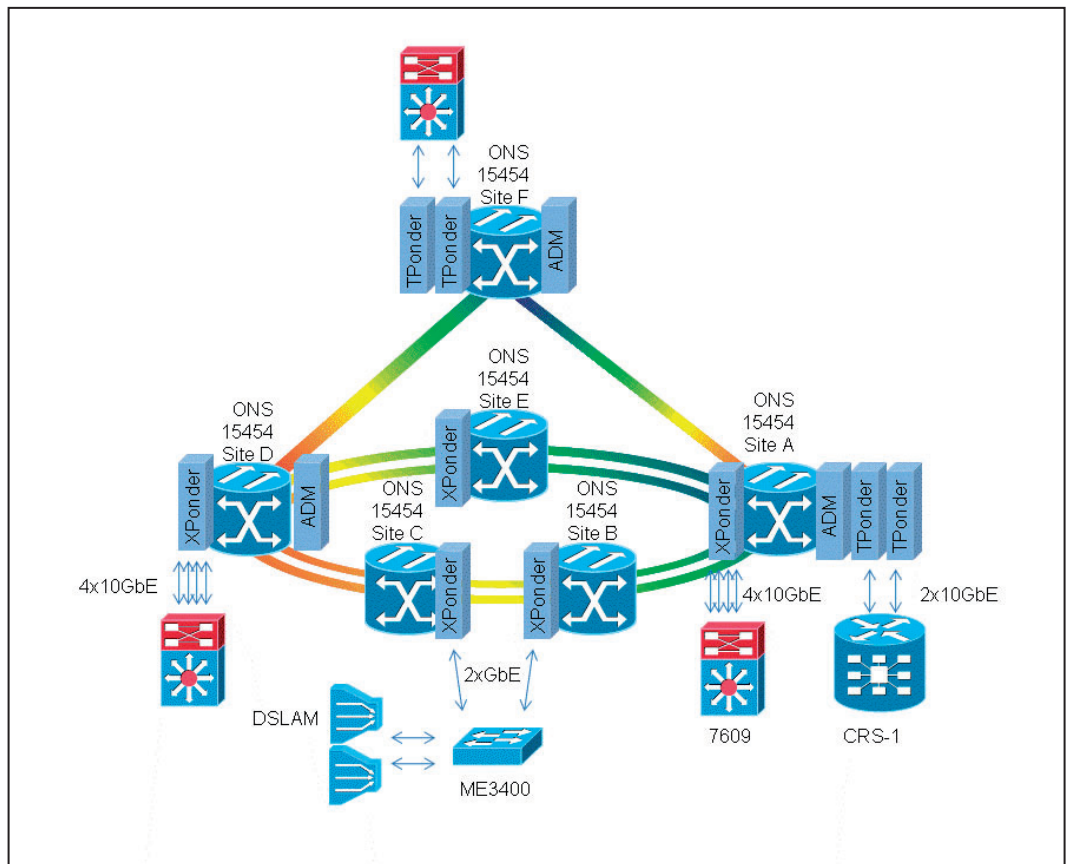
Cisco® ONS15454 Multiservice Transport Platform (MSTP) was hellas online's solution of choice for several reasons. On the optical layer, the Wavelength Cross Connect (WXC) cards enable 40 wavelengths to be added or dropped omnidirectionally and so create a mesh traffic pattern able to match increasing bandwidth needs. On the network layer, the new XPonder and MSPP-on-a-blade cards embed Layer-2 functionality and SDH multiplexing capabilities respectively. This layer consolidation offered hellas online the opportunity to simplify its architecture and reduce operational complexity.

“Eliminating the need for an external switch or ADM and concentrating all our end nodes directly on one piece of equipment is a great consolidation for the network and provides a flexible and scalable architecture. The further aggregation of all the Gigabit XPonder cards on four 10 GbE ports and the introduction of the coloured, tunable interfaces directly on routers contributes significantly to cost effectiveness,” says Orestis Karadimitriou, senior manager of Transport and Access at Network Engineering. “We are extremely satisfied with the progress that Cisco is making in the layer convergence of the network and transport layers.”

By providing efficient aggregation of the DSL equipment and the lower rate Metro Ethernet customers, Cisco Catalyst® ME 3400 Series Switches and the ES20 cards on the Cisco 7609 Series Aggregation Routers complement the new optical architecture.

Finally, the CRS-1 routers are the heart of this network, providing the core routing functionality.

Figure 1: Simplified Representation of hellas online's Network Services.





Results

hellas online has used up its national network to connect all its data centres, local exchange offices and business customers across Greece. "Our national DWDM network enables us to effectively utilise our fibre infrastructure to cover our growing bandwidth needs but also to provide wholesale bandwidth to other companies that also wish to expand. With multiple point-to-point 10 GbE links, Ethernet and SDH rings, the ONS platform offers great flexibility over the whole spectrum of our services portfolio," says Gorgias.

Time was a crucial factor for hellas online's network deployment and rapid footprint expansion. "The demand for triple-play services over unbundled local loops in the countryside was more than a business opportunity; it was a commitment on behalf of the company," says Gorgias. "We couldn't afford to spend time dealing with multiple components and vendors in implementing a multi-service national network. Cisco's solution gave us the opportunity to deploy a national network quickly and effectively."

The Xponder technology and add/drop multiplexer (ADM) capabilities give hellas online the potential to serve new areas with the existing fibre to the business (FTTB) services (SDH & Metro Ethernet). "We already have a large clientele of fibre-to-the-business customers in the two largest cities of Greece. The DWDM network will offer the platform to interconnect these deployments with more cities where our own fibre infrastructure is available. This is great news for business customers who have been tied to a single network till now."

The valuable lessons obtained from utilising the Cisco ONS15454 platform are:

Improved Performance. The common backbone eliminates the need for additional Ethernet, SDH or even IP backbone rings, decreasing the response time between network nodes by 8 to 10 ms. The average service availability has increased to above-market standards.

Cost Savings. The ONS15454 Multiservice Transport Platform offers increased bandwidth for all transported services while reducing the total cost of ownership (TCO). Because the deployed cards are fully tunable, and due to the advanced operations intelligence of the ONS15454, reconfiguring the optical path as the network evolves is easy.

Investment Protection. The new XPonder's embedded Layer-2 functionality and the Multiservice Provisioning Platform (MSPP)-on-a-blade card's SDH multiplexing capabilities simplify deployment, and improve return on investment (ROI) and service quality. However, the real difference is that there is no limitation in turning on future wavelengths by reusing existing transponder cards.

Network Resilience. Terminating the network at multiple transmission points of presence nationwide allows for physical diversification of the overlay services, as well as load sharing and fault tolerance.

Network Compatibility. As hellas online operates a Cisco network, the migration of the existing network benefits from equipment interoperability and network features.

Next Steps

Based on the growth estimates of hellas online, 20 more wavelengths will soon propagate over its network. "By using Cisco's Transport Planner too, we made sure our network was ready for us to add even more wavelengths without any operational downtime," says Karadimitriou. "The optical routing is already in place; only additional client cards need to be plugged in. We look forward to seeing this happening."

In developing hellas online's national network, more than 100 ONS 15454s were used to guarantee a highly reliable service. The ONS network will "keep expanding so that customers can get the hol out of it," says Karadimitriou.

Technical Implementation

The Cisco XPonder technology was used to create aggregation Ethernet rings across the nodes of the network. Each intermediate node in the ring is equipped with a 20 x 1 G port version of the XPonder card, while in each of the two data centres per ring a 4 x 10 G port version directs traffic towards the ES20 cards of the 7609 Aggregation Router. The ME3400 switches used in the Local Exchange Offices connect both – east and west – to two XPonder cards, creating two subsequent paths for link protection. The use of 802.1Q-in-Q VLANs also made it possible to provision new services with any-to-any traffic patterns over Ethernet rings, and adjust the traffic matrix respectively.

The MSPP-on-a-blade technology with its ADM functionality provides STM-1/4/16 ports directly on the ONS15454 MSTP. The absence of these cards in the past would signal the need for an external SDH ADM with STM-16 ports. Cisco's ADM-on-a-blade cards changes this by enabling hellas online to extend its SDH services to its remote data centres without any further equipment requirements. In turn, this helps reduce footprint along with power and cooling requirements.

The Cisco 7609 routers located in the nationwide data centres are connected to the CRS-1 routers in the company's central data centres via point-to-point 10G services. These services are deployed using multi-rate TPonder cards that are fully tunable across the C-band. In combination with the multi-degree wavelength switching capabilities of the OXC cards, reconfiguring the optical path is a feasible option for an evolving network. Some of the 40 wavelengths that ONS15454 offers are already present; others have been forecasted. However, what really makes the difference for hellas online is that the ONS15454 nodes in the network support the maximum number of wavelengths from day one. Creating extra wavelengths doesn't require additional hardware and it's operationally simple through end-to-end point-and-click provisioning. You can also reduce operational cost and complexity because intermediate sites don't need a technician to visit to establish the connection.

For More Information

To find out more about Cisco Optical Solution, go to www.cisco.com/go/optical

PRODUCT LIST	
Routing and Switching <ul style="list-style-type: none"> • Cisco ONS 15454 MSTP • Cisco Transport Manager • Cisco Wavelength Cross Connect (WXC) • Cisco 20-port 1 GbE XPonder Cards • Cisco 4-port 10 GbE XPonder Cards 	<ul style="list-style-type: none"> • Cisco Add/Drop Multiplexer (ADM) on-a-blade • Cisco 10G TPonder Cards • Cisco Catalyst ME 3400 Series Switches • Cisco 7609 Series Aggregation Services Router • Cisco Carrier Routing System (CRS-1)



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