

University Switches on Remote Learning Power



Cisco network expands learning choice and enhances staff efficiency at Italy's University of Cagliari

EXECUTIVE SUMMARY

Customer Name: University of Cagliari

Industry: Education

Location: Sardinia, Italy

Number of Employees: 2550

Challenge

- Equip 32,000 students with Wi-Fi access and transformational e-learning tools
- Improve efficiency of university staff through improved collaboration
- Save on operational cost of running network spanning ten campus sites

Solution

- High-capacity multisite Cisco wireless network with 800 access points
- Cisco Unified Communications with IP telephony, Jabber, Presence, and Unity
- Data center consolidation/virtualization based on Cisco Unified Computing System

Results

- Wi-Fi video applications widen learning choices comprising 30 percent of all traffic
- Data center supports 250 virtual machines, ample for growth without new capital expense
- Virtualized data center gains from operating expenditure cost saving of €150,000 a year

Challenge

The University of Cagliari (UniCA) is the top higher education establishment in Sardinia. One of the region's largest enterprises, it caters for 32,000 students, with 1300 teaching staff and 1250 others working in technical or administrative posts. Its facilities are spread over ten campus locations around the Sardinian capital. The student population, accounting for almost a quarter of Cagliari's residents, is crucial to the health of the island's economy.

Established in 1620, UniCA has reshaped its academic focus and direction several times, as political control of Sardinia changed and fresh ideas were brought in. Today it is a leading public university, part of the European Higher Education Area, aiming to provide a multidisciplinary education and research program. The university has 17 departments and 11 faculties (shortly reducing to six) offering 38 three-year degree courses, 38 degree courses, and 6 single cycle degree courses, 38 specialization schools, and 35 doctorate courses.

Roberto Porcu, CIO at the University of Cagliari, says: "Our scale and economic importance mean that a high value has long been attached to equipping staff, students, and administrators with the best in modern information and communication technologies." In fact, four of the university's six faculties teach science-based disciplines, both pure and applied, each of which tends to develop its own data-intensive research programs.

UniCA installed a Cisco dual data center solution six years ago, assigning one data center to scientific research tasks and the other to administrative service support. With four classes of user to cater for (professors and researchers, administrative staff, students, and guests) the challenge was to set up high-speed links between all sites, separate the user types into secure domains, and combine scalability and resilience with ease of infrastructure management.

Solution

The university's first metropolitan area network (MAN) provided speeds of 1Gbps to the ten campus sites in a ring configuration. VRF-lite (Virtual Private Network Routing and Forwarding) was used to partition the domains, with Cisco firewalls in each data center. Exponential growth in bandwidth needs, arising from new services and applications residing in the cloud, then mandated an upgrade to carrier-class equipment across the network.



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This second stage of network evolution saw the development of a three-node core. The seven remaining campus sites are linked to that core by optical fiber, running at 10Gbps and capable of scaling up to an impressive 40Gbps. Based on multi-protocol label switching (MPLS) and using VPNs for segmentation, this architecture will also facilitate the coming switchover to the new IPv6 protocol.

Next, the data centers were consolidated by bringing in four Cisco Unified Computing System™ (UCS™) server arrays with EMC storage and VMware virtualization software. Providing a total capacity of 130 Terabytes, the platform enables UniCA to run 250 virtual machines, which is ample for medium-term growth without any new investment. The UniCA system environment has thus evolved in six years from DC1.0 (one application per server), through DC2.0 (unified storage), to DC3.0 with consolidation, virtualization, and unified computing.

The functional division between data centers remains much the same. Research support and e-learning applications are managed from a data center in the engineering faculty. Meanwhile administrative support services such as enterprise resource planning (ERP), business intelligence, and career management reside in a second data center at the main UniCA administration building. This separation may be less clear-cut in future, because each data center is scheduled to provide disaster recovery back-up for the other. A third data center, on the university’s largest campus, will be the main platform for further development.

The ICT department’s next big step was to implement a Cisco wireless network. “We wished to offer the benefits of mobile access to e-learning materials, video content, online collaboration, student services, and more,” says Porcu, “while meeting the fast-growing demand for the ease and convenience of a bring-your-own-device environment.”

The system first consisted of 250 Cisco® wireless access points, controlled by Cisco Catalyst® 6500 Series Wireless Services Modules (WiSM) in the learning support data center. Designed to scale up to 800 access points, the Wi-Fi network now runs on the fast 802.11n protocol at two frequencies, 2.4Ghz and 5Ghz. High security is maintained through Secure Sockets Layer (SSL) VPNs using Cisco Any Connect and Cisco Adaptive Security Appliances (ASA).

The most recent element to be slotted into this sophisticated network architecture is to improve administrative efficiency via Cisco Unified Communications Manager (UCM). In addition to migrating basic telephony services to IP, UniCA is implementing Cisco Presence and Cisco Jabber™, along with Cisco Unity® voicemail and Cisco Unified Personal Communicator. Three Cisco gateways have been installed, with one functioning as a media termination point.

Results

The effect of the Cisco Wi-Fi network on the flexibility of learning choice among students has been dramatic, adding new dimensions of accessibility at all academic levels. “Students can now attend lectures remotely in real time, by streaming them across the wireless network. They can also download the content later to review it,” says Porcu. “Any Wi-Fi enabled device can connect from anywhere, and stay always connected.”

The average number of students connecting by Wi-Fi each day is at presently about 2000, but the system has the capacity to accommodate five times that number of simultaneous users. “Around 30 percent of the content currently being accessed over the Cisco wireless network is video,” Porcu says. “That includes real-time streaming, video on demand, and the downloading of stored video content.” That share is likely to increase as new methodologies of learning take a firmer hold and become cohesively integrated into teaching practice.

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The advanced UniCA Cisco networks, wired and wireless, empower the university to offer open-source platforms to support learners. They include Moodle (Modular Object-Oriented Dynamic Learning Environment), an open-source virtual learning environment (VLE) that facilitates the creation of online courses based on interaction and collaborative working.

OpenSimulator (OpenSim) is a multiplatform, multiuser 3D application server, which helps enable users build virtual environments in an adaptable, easily extensible framework. The third key component in the UniCA e-learning toolbox is OpenMeeting, a free browser-based application that allows instant web conferencing, using microphones and webcams, with online sharing of documents and whiteboards and easy-to-use recording functions.

With 10Gbps connectivity between all its campus sites, ample capacity exists on the main network for student learners, all administrative functions, and the needs of the scientific research community. Meanwhile, efficiencies derived from server virtualization, including the Lightweight Directory Access Protocol (LDAP) server that provides the backend database for web authentication and the email server, have yielded significant cost savings. “The cost reduction currently amounts to €150,000 a year,” says Porcu.

The university’s main portal now accommodates links to some 200 websites and 500 blogs. That adds new strands of interest for those considering the university as a place to study, and enhances the public image of UniCA as an institution that cultivates real breadth and depth of intellectual inquiry. No less important is the ability to keep in touch with a wide range of external contacts in the global and European spheres, and maintain close links with the large number of organizations on the UniCA roster of international academic partnerships.

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For More Information

To learn more about the Cisco technologies described above, please go to:

www.cisco.com/go/borderless

www.cisco.com/go/datacenter

www.cisco.com/go/collaboration



Product List

Data Center

- Cisco UCS Chassis 5100 with 6120 Fabric Interconnect and B200-M2 Blade Servers
- Cisco Nexus® 5548P
- Cisco Catalyst 6500

Metropolitan Area Network

- Cisco ASR9006 Routers
- Cisco ME3800X Switches

Wireless LAN

- Cisco Catalyst 6500 WiSM Controllers
- Cisco Aironet® Wireless Access Points 1140, 1242, and 3502I
- Cisco ACS 4.2 LDAP server

Security

- Cisco ASA 5550

Cisco Unified Communications

- Cisco Unified Communications Manager 8.6



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