



EXECUTIVE SUMMARY

Customer Name

Croatian Academic and Research Network (CARNet)

Industry

Education

Location

Croatia

Number of Employees

90

Business Challenge

- Provide infrastructure and resources to enable higher education, science, academic research, and government institutes to improve performance
- Help ensure schools in remote locations have equal access to education

Network Solution

- Cisco IP network connecting 249 institutions in 387 locations nationwide
- Platform extension to support e-learning at 1300 primary and secondary schools

Business Results

- Improved environment for educators and learners
- Easier for schools to collaborate and access information, tools, and resources
- Greater visibility of performance and progress in schools

Building Croatia's Information Society

CARNet closes the digital divide by making connected learning available to 1300 schools nationwide.

Business Challenge

To make Croatian science and education the most competitive in Eastern Europe by 2010, the government has undertaken major reforms in the past four years to develop IP technology as the essential infrastructure for a knowledge-based society. The Croatian Academic and Research Network (CARNet) is at the heart of this transformational process.

Having started out as Croatia's first Internet service provider, CARNet provides the IP backbone that today connects 249 institutions from higher education in 387 locations and 1300 schools. Built on Cisco technology, this core infrastructure enables scientists, researchers, educators, and students to share ideas, information, and learning with maximum efficiency and effectiveness. It also provides a collaborative platform with academic institutions throughout Europe via GÉANT, the high-speed research and education network.

CARNet has been instrumental in helping to increase information and communication technology (ICT) skill levels and improve career and economic opportunities. The institute was home to the Croatia's only regional and first local Cisco Networking Academy® (there are now more than 20), and is now a Local Academy for CCNA, CCNP and CCNA Security

programs, Regional Academy for CCNA, and a member of Central and Eastern Europe CCNP Virtual Academy. CARNet has always attached high importance to ensuring that user training and support accompany the introduction of any new technologies.

The next phase of CARNet's strategy, the Connected Schools project, intends to close the digital divide further still by making the opportunities in primary and secondary education more equal for all. This goal, however, presented some unique challenges, not least because Croatia has the largest archipelago (698 islands, 389 islets, and 78 reefs) in the Adriatic Sea, and the second largest in the Mediterranean Sea after Greece.

"Up until recently, only a few schools in the main cities had access to computer-based education," says Zvonimir Stanic, CEO, CARNet. "This had a hugely divisive and disruptive effect. For example, parents would often have to relocate from remote areas, like the Croatian Islands, or worse still send their children away in order to give them the best chance in life. Education should not come down to a lottery based simply on where you are born."

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— Zvonimir Stanic, CEO, CARNet

Network Solution

By extending its existing Cisco® National Research and Education Network, CARNet has built a sustainable educational model to enable and improve school and academic learning in Croatia.

The collaboration between CARNet, Cisco, and other leading technology partners is based on providing users with a unique virtual identity, via eduroam, which can be used in any institution to access education services, shared content, and online learning and support tools. Provided free of charge to schools, these services include email, Internet, videoconferencing, and web hosting. Members can also access the online national encyclopedia (the first of its kind in Croatia), applications for content management and portal building, information exchange forums, and the Internet via the GÉANT network.

"So far, more than 1300 primary and secondary schools have been connected to our Cisco IP network," says Stanic. "In addition, we have equipped all scientific and academic libraries, 650 school libraries, 700 branch elementary schools, 391 secondary school staff rooms, and 54 high school dormitories in Croatia with computer equipment and Internet access. This includes a room-based videoconference system, with 34 teleconferencing classrooms in 15 cities."

CARNet's innovative use of Cisco wireless technology has made it possible to connect 21 schools on the islands around Zadar, Šibenik, Trogir, and Dubrovnik with regional schools. The award-winning¹ e-Islands project delivers digital education content and enables teachers on the mainland to give lectures to pupils on the islands using video and multimedia equipment, such as projectors, cameras, microphones, and smartboards (touch-sensitive whiteboards for displaying computer output) over the IP network.

Croatian schools can also take advantage of Cisco WLAN solutions that are helping universities, for example in Zagreb and Rijeka, to migrate to the new 802.11n standard and extend collaboration and resource sharing.

Several support options are available to help improve ICT literacy. The CARNet e learning Academy offers a selection of tutorials and workshops. Alternatively, the Nikola Tesla National Portal for Distance Learning provides access to online content, such as the European Computer Driving License. The portal can also be used to check teaching and exam schedules, access records, and receive other related services.

¹Cisco Networking Innovation Award 2008 for Most Society Impacting Network of the Year



CARNet has also been able to use the network to unify communications. A cluster of Cisco Unified Communications Managers provide server-based call processing and call control, which along with Cisco IOS® software helps ensure the efficient delivery of high-quality voice-over-IP between sites. The introduction of Cisco Unified Contact Center Enterprise has helped CARNet to create a highly professional IT front office, providing systems administrators and users with a responsive fault diagnostics and maintenance service. CARNet's security team also uses the contact centre to constantly monitor the network for any suspicious activity or malicious threats.

Protection and high availability of the network have been enhanced by Cisco firewall services in the data center and also at the school perimeter. In addition, Cisco has provided a content-filtering solution that allows CARNet to effectively manage the activities of over 550,000 pupils browsing the Internet. The solution allows CARNet to easily and effectively block access to inappropriate sites.

“Pupils like the fact that e-learning is fun, simple to use, and easy to repeat if they do not understand the first time. It also allows them to choose the time and place for learning. In general, pupils feel more motivated, which results in a noticeable increase in class activity and involvement.”

— Zvonimir Stanic, CEO, CARNet

Business Results

Although the project is relatively new, it is already helping to make a difference to Croatian schools. This view is endorsed by a survey² of 415 pupils in nine towns, which confirmed that the vast majority preferred digital learning to more classical methods.

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² Project Tesla in Schools, CARNet, July 2009.

Results from the survey showed that:

- 76 percent of pupils found digital educational content very interesting or interesting (the use of video to provide visual examples and explanations was considered by many as a great tool for helping with assignments).
- 74 percent believed it was purposeful and could see a connection to everyday life.
- 84 percent said that it contributed towards a more relaxed and productive classroom environment.
- 75 percent felt they were participating more than before in class.
- 68 percent said that they acquired the lesson content completely or mostly when digital content was used in class.

Moving schools onto a digital platform has also helped with performance measurement, a key component for the progress of any educational system. Croatia will publish national rankings for schools for the first time ever.

The project also presents exciting new collaboration opportunities. “Together with the city of Split, we plan to leverage project investment in optical infrastructure to run services to citizens, accelerating return on investment to just four months,” says Stanic. “We believe this shared infrastructure approach provides a replicatable model for best practice in Eastern Europe and beyond.”

“Today it is not important to know everything. It is far more important to know where to find information. Our collaboration with Cisco effectively puts this power into the hands of all educators and learners in Croatia. It means that knowledge is only a few clicks away.”

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Next Steps

The Connected Schools model can also be applied to schools in underdeveloped and geographically less accessible regions of the mainland. In the near future, there are possibilities to expand the project and connect local healthcare institutions to the network. This would create new opportunities, for example, to implement Telemedicine solutions, such as [Cisco HealthPresence](#), in turn helping to reduce the patient transportation requirements for medical examinations and check-ups for citizens living on the islands. This model could also be applied to education systems and public services in other countries with remote populations or islands.

CARNet and Cisco are also collaborating with local institutions to build an IP Next-Generation Network (NGN). Based on a Cisco CRS-1 Carrier Routing System design with five major optical nodes, the NGN will deliver industry best practice (IPv6 performance, GRID computing and virtualized resources) while simultaneously driving down operational cost. This step will enable Croatia’s scientific and research community to advance GRID computing, supercomputer networking, and green technology projects.

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Product List

Routing and Switching

- Cisco Catalyst® 3560 and 6500 Series Switches
- Cisco 7200 and 7600 Series Routers

Voice and IP Communications

- Cisco Unified Communications Manager
- Cisco Unified Contact Center Enterprise

Wireless

- Cisco Aironet® 1310 Outdoor Access Points
- Cisco Wireless LAN Controllers

For More Information

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