

Learning for “Everyone, Everywhere” in a Smart+Connected Community

Customer Case Study



Cisco wireless technologies are helping City of Stockholm make ICT access available throughout its schools.

EXECUTIVE SUMMARY

Customer Name: City of Stockholm

Industry: Education

Location: Stockholm, Sweden

Size: 172 schools

Challenge

- Improve student academic achievement
- Facilitate collaboration and sharing of resources and information
- Create learning environment able to support city's strategic objectives

Solution

- Cisco Borderless Network architecture
- Cisco wireless LANs installed in 172 schools
- Unified security using 802.1X-based EAP-TLS authentication

Results

- Fewer barriers to integrating ICT into day-to-day activities
- New opportunities for extending learning beyond classroom
- Better communications and participation for teachers, pupils, and parents

Challenge

The City of Stockholm aims to become one of the world's great metropolises by 2030. It is well on track to achieving this vision. In 2009, the City of Stockholm was acknowledged as the Intelligent Community of the Year and in 2010 it was awarded the prestigious title of European Green Capital.

In the 1990s, the city led Europe in creating a citywide, high-speed broadband infrastructure based on dark fiber. Today, it is one of the most knowledge-intensive cities in the world, and is home to world-leading financial institutions and high-technology companies.

Information and communications technology (ICT) is seen as both a generator of revenue and as an enabler of growth and innovation, not just for commerce, but for society as a whole. Cisco shares this vision, which the company describes as Smart+Connected Communities. It is a vision of a framework and set of solutions that help transform physical communities into connected communities, which run on networked information to help them achieve economic, social, and environmental sustainability.

Education is one of the key pillars on which such communities will be built. Stockholm views education as fundamentally important to achieving its vision of maximizing social and economic opportunities in an increasingly globalized world.

The city's 172 public primary and secondary schools, serving children aged 6 to 18 years old, all enjoy high-speed broadband access over dark fiber. Kindergartens, serving children aged 1 to 6, are currently being upgraded from lower-speed ADSL connections to fiber.

Within schools, the use of ICT was very much determined by local policy, because head teachers and their teams in Sweden have considerable freedom as to how they run their schools. All schools used computers, but very often they were only installed in specially designated rooms, and there was little interworking between teachers and students.



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Mats Ostling
ICT Strategist
Stockholm Department of Education



The city understood that the Internet is revolutionizing how people, especially the young, are accessing and sharing knowledge from many types of devices and from any place, irrespective of geographical or organizational boundaries. Studies around the world had also shown that the use of ICT leads to higher academic achievement. But the city was also aware that any strategy is only as good as its weakest link.

Mats Ostling, ICT strategist for the Stockholm Department of Education, says: “We had often talked about how ICT is used by those people interested in it, but we stopped short of daring to say that, to be truly effective, everyone has to be involved in some way or another in using ICT. It only takes one person to say that they do not like technology, or it is not that important, for the choice and possibility that ICT offers to be taken away from a child.”

Solution

The city’s Education Department developed a three-pronged strategy to enable ICT for “everyone, everywhere” in schools. The first part of the strategy was to provide each school with a wireless local area network (WLAN). The school networks are operated by S:t Erik Kommunikation, a communications operator owned by the City of Stockholm. Cisco has worked with Stockholm for a number of years and is a trusted advisor, while S:t Erik Kommunikation outsources installation and support services to a Cisco partner, and so it was natural to look to Cisco to devise a WLAN solution for schools.

School networks are “business critical” and, with 30 to 40 students online via the same wireless access point at the same time, carry a higher load than most enterprise networks, while demanding similarly high levels of security and interoperability.

The WLANs use the 802.11N wireless networking standard, with typically 40 to 70 access points required to provide coverage throughout a school. The infrastructure is configured to provide two types of zones. “Performance zones” provide access from classrooms and assembly halls, while “coverage zones” offer access from corridors and other service areas through the signal strength of the access points cost-effectively extending services.

Security is provided through a unified authentication architecture based on the 802.1X standard. Teachers’ laptops use Extensible Authentication Protocol (EAP)/ Transport Layer Security (TLS) certificates. Students access a separate VPN by entering their username and password into a web portal. Not only does this segregate staff and student traffic, it also supports secure access by students using a wide range of devices, from laptops to mobile phones, and even games consoles. Centralized management and control are provided by Cisco® Wireless Services Modules (WiSMs) running within Cisco Catalyst® 6500 Series Switches within the S:t Erik Kommunikation WAN.

The second part of the strategy took advantage of another ICT initiative. In 2009, the City of Stockholm outsourced the provision of IT services and support to the city’s technical departments, district administrations, companies, and schools. The objective was to not only reduce costs and achieve economies of scale, but also to free departments from the burden of supporting their IT infrastructures. The arrangement included provision to replace computers and help ensure a common set of applications, including the Microsoft Live@Edu collaboration platform for teachers and students.

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The third part of the department’s strategy was its commitment to a national program to help ensure that all teachers have the ICT skills and understanding to apply ICT in their everyday activities, thereby removing a potential barrier to adoption. 2009 saw the start of a three-year program that will see every teacher in Stockholm becoming certified for Practical ICT and Media competence (PIM).

Results

The fact that all of Stockholm’s head teachers are expected to request WLANs to be installed is in itself an endorsement of the Education Department’s strategy. In the first phase of the initiative, WLANs are being installed in 144 primary schools and 28 secondary schools, and each teacher is being provided with a laptop. S:t Erik Kommunikation also extends WLAN coverage beyond schools, for example, to all libraries, administration buildings, offices and even to other organizations within the City of Stockholm, for example, district councils, specialist committees and companies. This extensive WLAN coverage means that any end user within the city is able to reach their own “home network” directly wherever, they connect to the City of Stockholm WLAN network.

Teachers are able to access the Learning Management System anywhere on school premises over their WLAN and have their own virtual classroom. As well as supporting administrative tasks, such as class roll-call, teachers benefit from a range of applications and planning tools, and from being able to integrate web-based content and e-learning techniques into lessons.

Students will also be able to access designated parts of the system, not only benefitting from direct access to materials, but also the two-way flow of assignments and feedback. Outside lessons, while access to some content will be restricted, students will be able to access the Internet and sites such as Facebook and Twitter, which are expected to add new dimensions to learning.

Some schools are also developing a “one student, one laptop” policy, but this could be just the starting point. Ostling believes the ability of the WLANs to support secure access using any device, such as tablet PCs, games consoles, or mobile phones, will create a new world of possibilities. “Enabling access from a range of devices will really change the way we think about content and content creation,” says Ostling. “A mobile, for example, connects you in a more direct, instant, and intense way. You could be discussing a topic on Twitter, sharing information sources, or taking part in a survey, for example, about migrating birds that have just flown by.”

Current trends indicate that each student could potentially want to access the network via approximately four devices. Not only will the networks support this, but it is also seen as a way of taking pressure off central budgets as students will be able to use their own equipment.

The “Everyone, Everywhere” concept also extends to parents. “Parents in Sweden generally want to know what their children are doing and how well they are doing” says Ostling. “Enabling greater sharing of information will change the balance between schools and parents, and will provide the opportunity for greater involvement, which is very important.”

Seeing the network and its services as a utility, as important as power or water, has the consequence of changing the way the network is planned, delivered, and supported. Centralized management and security mean that schools no longer have to bear the IT support burden themselves.

“Today schools still make the decisions, together with the education department, but now they become part of our centrally provided communications infrastructure. Centralization means that it is much easier to extend services, to connect organizations and companies, without having to build alternative networks or support teams.”

Ake Sundin,
Managing Director
S:t Erik Kommunikation

“We are a communications operator providing services for the entire city,” says Ake Sundin, S:t Erik Kommunikation’s managing director. “Until 2009, only ten schools had wireless networks. Today schools still make the decisions, together with the Education Department, but now they become part of our centrally provided communications infrastructure. Centralization means that it is much easier to extend services, to connect organizations and companies, without having to build alternative networks or support teams. We are also able to take a centralized approach to security, which greatly reduces the threat of any backdoor vulnerabilities that could be exploited.”

Next Steps

Plans are being made to provide kindergartens with high-speed access and then to install wireless networks. “Studies show that 50 percent of children at the age of four use the Internet every week. The kids have shown what they can do and what they want and we have to follow them. I don’t think it is realistic to believe that we can be ahead of them, but if they benefit from using the Internet at an early age, then I think we should meet that need,” says Ostling. It is a view that is helping Stockholm to become a Smart+Connected Community as it makes real its goal of becoming a world-class Stockholm.

For More Information

To find out more about Cisco’s Smart+Connected Communities please go [here](#)

Product List

Routing and Switching

- Cisco Catalyst 6509-E Switches
- Cisco Catalyst 3560-CG Compact Switches

Wireless

- Cisco Wireless Services Module controller
- Cisco Aironet® 1142 Wireless Access Points



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