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The Campus Wears Tech

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The New age educational campuses flaunt their techy ensemble to click with the tech savvy generation of students. Here's a look at the networking wardrobe changes it involves

By Heena Jhingan

There is a pedagogical shift in the way students learn today. The traditional classroom of desks, notebooks, pencils, and blackboard is gradually giving way to an online forum of computers, apps, and the Internet.

Welcome to Education 2.0, where online publishing and sharing tools will make a lasting impact on the future of education. Though the version 2.0 is still in fancy in India, the higher education sector is fast embracing ICT practices to compete with global institutions. The new age educational campuses flaunt their “techy” environs with blanket Wi-Fi coverage and sophisticated administrative IT tools to click with the tech savvy and brand conscious generation of students.

A large number of Indian universities are now using technologies such as videoconferencing, learning management systems and cloud computing for better presentation and delivery of content. This has to ride on a strong IT infrastructure. The institutions are thus pumping in money to set-up robust network infrastructure capable of such delivery. Gone are the days of basic internet connectivity. The educational campus networks sport enterprise-class features, right from 24x7 connectivity and Wi-Fi coverage to multi-device support. That is a clear indication that there is a significant change in the way these institutions bought their switches, servers, cables and other networking hardware and software.

According to technology market researcher IDC, about 5% of the $40 billion IT market in India, including hardware, software and IT services, was in the education sector. The market is expected to grow at nearly 12% through 2017.

A CII-PWC report finds that, while the positive impact of information and communication technology (ICT) in the areas of delivery and collaboration has been long established, higher educational institutes are increasingly experiencing the benefits of using ICT tools for student and administrative management.

Higher education institutions in India are increasingly grappling with two major problems. First, their financial reliance on the government has been reduced and second, they have to reach out to the masses. There is usually a direct trade-off between finances and expansion for social inclusion, since higher education is typically very expensive in terms of human, operational and capital expenditure.

A paper of the Kerala state higher education council (2012) observes that the higher education spending in India is only 1.1% of GDP. The US spends 3.1% of its GDP on higher education while South Korea spends 2.4% of its GDP.
With more private and foreign universities entering the fray, higher education has become a highly competitive sector.

According to Calsoft Labs, the use of ICT for promoting education and development has always been a part of policy and plan documents on education. At the moment, the decision makers at both central and state are favoring inclusion of new computer and internet based IT/ ICT in education (adopting cloud based virtual classrooms/universities).

The Government of India has implemented several national as well as state specific schemes that run concurrent to large number of privately led IT initiatives at school and higher education levels. However there is significant disparity in ICT usage between institutions in urban areas and those in semi-urban/rural parts of the country. The quality of ICT infrastructure and its use is limited in a large percentage of autonomous/affiliated colleges especially due to lack of trained IT staff, connectivity issues and shortage of funds.

The National Mission on Education through Information and Communication Technology (NMEICT) is envisaged as a centrally sponsored scheme to leverage the potential of IT/ICT, in teaching and learning process for the benefit of all the learners in Higher Education Institutions in any -time any - where mode. Content generation and connectivity, along with provision for access devices for institutions and learners are the major components of the mission.

So far, over 400 universities have been provided 1 Gbps connectivity or have been configured under the scheme and more than 14,000 colleges have also been provided VPN connectivity, as per Calsoft Labs.

The National Knowledge Network (NKN) and Connected Digital has launched an initiative to cover 1,000 institutions besides providing digital campuses, video - conference classrooms, wireless hotspots, laptops/desktops to all students of professional/ science courses and Wi-Fi connectivity in hostels.

The enterprise class

Driven by competition, institutions are taking the IT route to focus on core academic by automating administrative activities that are resource and time consuming. Education institutions today are behaving more 'enterprise-like' and their IT needs to reflect this change.

Learning Management Systems (LMS), ERP, Library Management Systems, CRM, analytics etc., supported by a robust network are all gaining popularity in higher education space.

No wonder Mother Teresa Women's University recently deployed IBM analytics solution to promote academic success by training their management students on predictive analysis and reporting solutions.

Like enterprises, the educational institutions too witnessing the BYOD menace. Under pressure from ever increasing IT applications and multiple devices, the campuses are focusing on making the networks future-ready to cope with the impending invasion of video and other high bandwidth consuming applications.

The IIT-Madras Campus is one such example whose network has evolved from a simple twisted pair telephone cable network, to a 100% connected high speed campus network on fiber backbone with a fully functioning data center housing high performance. It has even conducted a 10 Gigabit network upgrade with assistance from networking solutions vendor Molex.

We look at some of the campuses to see how they design their networks to keep abreast of the trends of automation, e-learning, collaboration, network security and mobility.

Amity University

Unified networking for efficiency

Amity University is one the first few hi-tech educational institutions in India. With over 100 campuses and 85,000 students, the group was striving for ICT innovation to connect all its campuses through a unified network. Thus, the IT team headed by Assistant Vice President of the group **J.S. Sodhi** decided to rely on the hub-spoke model IT networking with the hub being at the Noida campus. All the other institutions of the group are

spokes and connected to Amity-Noida via MPLS.

Sodhi explains that to be able to connect all the campuses, they built an ISO-27001 certified data center at the Noida hub and chose to rely on enterprise class Cisco 6500 Managed Switch and Blade Server. They also invested in EMC Celerra NS-350 Unified Storage System. Back in 2011, the group deployed virtual desktop solution from NComputing.

Amity has automated all its operations through the intranet; it has an interactive intranet portal called Amizone, a home grown ERP system that can be accessed by students, faculty and parents. The institution is a believer in the philosophy of change. Sodhi says that the organization recognizes the fact that education has evolved and it is no more about blackboard and textbooks, the education sector needs to be abreast with the technological shift that is happening, and instead of treating as a challenge, efforts should be made to leverage it to improve the quality of learning.

“For this reason, we are not wary of BYOD, we understand the role of Internet connectivity in education. We are completely Wi-Fi enabled campuses. In all, we have about 400 access points in the hostel areas and 550 in the academic area, so at Amity campus you will find seamless Wi-Fi coverage and not just hotspots," he says.

All this, is not possible without a robust network. Amity has wireless broadband internet connectivity with over 75 kms of fiber optic/LAN cable backbone structure. Each student is provided with a smart card for access control/e-wallet. It subscribes to 650 Mbps bandwidth from multiple ISPs. Of which, Sodhi says, only 450-500 Mbps is used on an average. The network is secured by MAC (message authentication code) authentication, only registered devices can browse internet in their network.

“We have Saba Centra solution for eLearning platform and Moodle (Modular Object-Oriented Dynamic Learning Environment), a free source e-learning software platform, that is configured for recorded lectures, course flow etc. as a complete e-Learning program," he informs.

Over the years, they realized that the campuses in the remote locations could access richer academic content through audio video streaming. Sodhi decided to leverage the existing infrastructure. Instead of making a fresh investment, he integrated e-learning software and over 500 surveillance cameras, which are used for distance learning and general surveillance.
The campuses at remote locations can now benefit from guest lectures, and special sessions at metro locations. Sodhi credits this to the network design they had adopted foreseeing the growing demand for audio-video streaming, which is likely to grow in years ahead.

Sharda University

Beyond boundaries with a robust network

Greater Noida-based Sharda University is a one of the emerging names in higher education in India. Spread over about 63 acres, the institution aspires to bring the best of ICT practices to establish itself in the Indian education landscape.

The university has a dedicated data center with Cisco 6500 switch and it has secured its network using Cisco ASA 5510 and Cisco 5520 Firewall for gateway security.

Pradeep Joshi, Assistant Registrar - IT Services at Sharda University says wireline connectivity alone is a pass In an era where consumers be it students, teacher or parents demand access to information anytime and anywhere, it is inevitable to have a robust wireline and wireless infrastructure backbone that comes from setting up a reliable network.

The campus has connectivity from BSNL (1 Gbps pipeline with 150 Mbps of bandwidth) and CJ online (50 Mbps of bandwidth) to cater the internet requirements. The entire campus is covered with seamless wireless connectivity using Cisco access points, controlled by central WiSM (wireless service module) installed in high end Cisco 6509 E switch.

“Over 350 indoor and 10 outdoor access points are installed to provide the wireless connectivity and are capable of handling the load of thousands of concurrent sessions. This is critical as a majority of the students prefer to carry devices that they can connect with the institution's Wi-Fi to access data on the go, today some even carry more than one of such devices, Joshi reasons.

He says, “ BYOD for users is ease of use, however for the IT managers, it is about supporting a variety of devices, their operating systems, and maintaining an expected level of service. We need to focus on better connectivity of Wi-Fi networks in each class room, hostels and other campus areas. Though at present our bandwidth consumption is not that high, we understand it is bound to spike with further automation and video consumption.”

Sharda University has 70 dome IP cameras and 5 PTZ cameras to monitor various buildings including different schools of Sharda University, hostels and staff quarters.

Last academic session, the organization had automated and integrated its Admission, Finance, HR, Inventory, Hostel Management and Library systems with Oracle PeopleSoft ERP. The Oracle solution is meant to offer scalable online, self-service interface for the institution's 6500 students, faculty members and administrative staff. IBM P series Servers and IBM Storage have been deployed to support the ERP system.

“In an effort to support the e-Learning program we have a tied up with different publishers and e-library providers like Delnet, Springer and Scopus. We are also in the process of deploying a Learning Management System, Joshi says.

Lovely Professional University

Paperless efficiency and more

Sprawling over an area of 600 acres in Punjab, Lovely Professional University is a place of learning to over 25,000 students. Projecting it as a technology driven campus, the administration swears by IT tools to usher paperless efficiency.

Ashok Mittal, Chancellor, Lovely Professional University says that right from the institution's inception, the management unanimously conceived making it a world-class education place to bring best in class to the Indian students, and today we serve students from the country, and from across the world.

“To be a world-class set-up, we needed to keep pace with the trends in the global education milieu, and we realized that technology was fast getting central to educational system, and we had to be with the time,” Mittal says.

They set up their data center with about 40 blade servers, which were later scaled to 60 with Cisco catalyst 6509E core switch to provide the needed scalability and traffic control. The networking solution was implemented by Nortel.

Mittal informs that initially they invested in 40 km fiber backbone for providing seamless connectivity, and today the coverage has been enhanced to about 60 Kms.

“We are a completely Wi-Fi campus with about 1200 access points, supported on technology from players like Ruckus and Cisco. With 624 Mbps of bandwidth for internet from Reliance and Videocon, we believe we are fully equipped to meet not only the data needs today, but also in the future as well,” he says.

Mittal adds that of the current bandwidth capacity, they are using only about 25%. “Our network is robust enough to support about one lakh concurrent sessions, we have about 30,000 students, we would still be comfortably placed even if each student carries more than one device," he reasons.

With about 15 libraries, they follow a ring topology, where all of them are connected to each other, enabling students to self check-in and check-out.

Reiterating the organization's faith in IT tools for smooth functioning, Mittal says that to begin with they considered buying ERP solutions from the likes of SAP and Oracle, however, they had greater expectations.

They engaged a 40-member team to develop a University Management System (UMS), customized to their requirements. They implemented a Learning Management System (LMS) and a Relationship Management System (RMS) as well.

He concludes by saying, “We have taken utmost care in making our network scalable yet secure.”

Indian Statistical Institute

Structuring IT right

As a part of an IT upgrade, Indian Statistical Institute wanted a network infrastructure that would meet all its needs for 20 years or more. It chose to deploy 10G copper and fiber solutions from CommScope Systimax portfolio, coupled with VisiPatch patching solution.

Headquartered on a 30 acre site in the northern suburbs of Kolkata, the Indian Statistical Institute focuses on projects and consultancy in statistical quality control and operations research. Most of the Institute's 255 academic staff is based in Kolkata, Delhi and Bangalore where it has 110 undergraduates, 225 post graduates and 40 doctoral students It also has offices in Chennai and Tezpur.

The IT team of the institute specified the new infrastructure that it wanted, to meet all the institute's needs for at least two decades to come. So, although the network was initially specified with 100Mbps and 1Gbps switches, the connectivity requirement was for data transmission at up to 10Gbps.

“A longer effective life means payback on infrastructure investment can be spread over more years, lowering the overall annual cost of ownership,says, Amitava Datta, Head of Department, Computer & Statistical Services Centre in Kolkata. So, we needed structured cabling with performance that could meet all the data transmission needs of future academic and administrative applications.”

Amitava Datta and his team wanted high performance and reliability that was backed by solid guarantees and application assurances. They also wanted a supplier who would offer a detailed infrastructure design proposal and demonstrate its effectiveness as part of the tendering process.

To meet all these requirements, the team chose a solution designed and installed by IBM India. The solution included CommScope's GigaSPEED X10D UTP (unshielded Twisted Pair) copper cabling for connections within the academic building. End-to-end performance of this solution matches the full specification of the Category 6A/Class EA standard for 10Gb/s connections up to 100 metres.

For the connection to the Kolkata campusmain administrative building, IBM Automation team proposed the LazrSPEED 300 fiber solution. This multi-mode fiber comfortably exceeds the OM3 fiber standard and supports 10G data transmission up to a distance of 300 meters.

 “With 10G cabling in its horizontal connections as well as its network backbone, the institute can comfortably meet the needs of applications like video conferencing,says **Natarajan Viswanathan," Managing Director, India & SAARC of CommScope.**

He explains that such network infrastructure has plenty of reserve performance to meet future needs. This is especially important in academic and research organizations because the bandwidth demands of their systems increases relentlessly every year.

“The 10G copper and fiber cabling chosen by the Indian Statistical Institute will meet its network performance needs for decades to come. And the high density of VisiPatch 360 patching hardware, combined with its modular, scalable design, make it easy to add more connections as these are needed. These and many other features of the Systimax solutions chosen for Kolkata campus all help to reduce its overall infrastructure costs,” Vishwanathan says.