

Digitising Higher Education

To enhance experiences and improve outcomes



Introduction

Cisco has a highly experienced, dedicated Education and Research Team within its UK Public Sector business. The team works alongside our partners to help universities, colleges, schools and academies develop and deliver digital strategies in order to meet obligations and achieve their desired business outcomes.

The team has, for many years, successfully delivered digital technology to UK universities and associated institutions, such as university technical colleges and academies. The team works alongside a Global Education Team to uncover best practice when it exists in other countries.

It is now widely accepted that any modern organisation needs a digital strategy if it is to achieve its business objectives; and universities are no exception. The team created this paper to explain why this is the case, so setting out the opportunities that surround the use of digital technology and the threats if it is ignored.

The paper explains in some detail why a digital strategy is so important to a modern university. And suggests that it should sit alongside, and supplement, existing business plans. The paper also highlights the main components of such a strategy, and where Cisco and our partners have delivered digital technology that is offering real business value.

The main purpose of a university digital strategy is to signpost the value of digital technology by explaining how it can help create a distinctive brand identity, maintain financial stability, and further academic excellence. However, the strategy should also indicate areas where there is the potential for a university to be 'digitally disrupted' by a competitor institution with a superior digital offer for students, researchers or staff.

The approach advocated for universities follows the lead already taken by the private sector and by Government. Private sector companies are adopting digital strategies, largely to avoid 'digital disruption' by smaller, nimbler competitors. Government is adopting this approach because of the huge benefits of digital technology within an efficient and cost-effective business seeking to deliver services in new and differentiated ways. These factors are equally important to a modern university seeking to increase the size of its student body, and increase research participation, through enhanced brand and academic excellence.



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But what is a digital strategy?

Our working definition is 'A digital strategy explains how the newest digital technology can enable major business improvements including enhancing stakeholder experience, streamlining operations, and creating new business models.'

And what is this digital technology?

The definition adopted by Cisco for this paper is 'Digital technology is the name given to the newest Internet-based technologies (such as video and collaboration, social media, mobility, data analytics and embedded sensor devices) that hold the potential to transform businesses and shape people's lives.'

The business focus for a modern university should be the use of these newest Internet-based technologies in innovative ways so creating a superior environment and a superior experience for students, researchers and staff. And, in this way, creating differentiation from other universities.

But the definition of digital technology encompasses a very rich set of infrastructure, applications and services. The paper covers as much of this ground as is practical, while focussing on critical foundation IT infrastructure and the communications and collaboration services that will be used day to day by students, researchers, staff and external business partners.

The paper provides case studies to show how and where the recommended digital approach is delivering business value to universities worldwide. The final section summarises case study references and provides links to other Cisco resources.

Cisco and our partners can explain the value of a digital strategy, help you to develop your own strategy, and, of course, help you to execute it. Please see the section of the paper which explains how we can help. We look forward to that opportunity. To find out more, or to arrange a visit to Cisco to see some of our digital technology in action, please contact your local Cisco account manager or email us at heuk@cisco.com.

Higher Education Climate

In recent years, UK universities have been consistently challenged by unprecedented, market-shaping changes to financing, student expectations, and how to deliver teaching, learning and research.

To successfully face these challenges, universities have had to become more business-like in their approach. And they must continue to do this; by maintaining a sharp focus on brand, financial stability and academic excellence with digital technology supporting these objectives and acting as a differentiator.

At Cisco we see universities as large, complex businesses. And, like all large businesses, universities have very significant numbers of staff, substantial portfolios of buildings, and ever-increasing bills for energy and other utilities. Universities need to effectively manage these resources and their cost, and digital technology has a key role to play.

But, first and foremost, universities exist to provide teaching and learning for students, and to support research programmes for the benefit of Government and private sector organisations. In doing so, they must seek to provide an excellent experience for students and researchers, and this depends on having the right built environment supported by the best technology tools.

To deliver excellent experiences, care must be taken to identify the needs of the different stakeholder groups that make up modern university life. There are many internal stakeholder groups including staff, academics and researchers; as well as external stakeholders such as alumni, private sector companies, local public services, and Government.

Digital technology has a key role to play in meeting the expectations of each of these stakeholder groups. By providing the very best built campus environment for on-site communities, as well as the very best supporting facilities for virtual communities of external stakeholders. In particular, the built environment has a very significant impact on students and so plays a huge part in delivering positive business metrics for their satisfaction, retention and outcomes. Most universities recognise this need; and there is a very substantial investment in new-build and refurbished buildings to enhance brand and deliver the very best student experience.



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Running the business, delivering teaching, learning and research, and supporting stakeholder groups all depend on having the right IT infrastructure with the required robustness, flexibility, security and mobility support. But, they also depend on real-time applications that provide the essential foundation for communications, collaboration and information sharing across a modern university.

Cisco has been using technology to achieve business advantage for many years. And our dedicated education team understands the higher education business climate. We believe, therefore, that we are ideally placed to explain the opportunities and threats that digital technology poses for universities. But also to help you shape your digital strategy, fully exploiting the benefits of IT infrastructure and real-time applications to help you build brand, financial stability and academic excellence.

The Importance of a Digital Strategy

There is an increasing understanding that all organisations, whatever their size and shape, need to understand modern digital technology; and fully appreciate how it can be exploited **to realise desired business outcomes and to achieve differentiation.**

Private sector companies have been at the forefront of digital development. Household names have invested heavily in Chief Digital Officers (CDOs) to develop digital strategies that mitigate the risk of ‘digital disruption’ by smaller, more nimble organisations using technology to underpin their ‘go-to-market’ strategies. But, in addition, they have made these digital investments in the knowledge that, when aligned with profound business and cultural change, they will deliver essential improvements in efficiency and effectiveness.

There is the saying in business: ‘digitally disrupt or be digitally disrupted’. This now applies equally to the ever-more competitive university sector, as it does the private sector. We have already seen instances of digital disruption in higher education as universities compete for new students, fight to retain research revenues, and seek to align with city and regional plans for economic development.

So, for any modern university, a deep and informed approach to digital technology must at the heart of the life of the institution. The starting point should be the creation of a digital business – a digital institution. Within such a business, all staff and academics should use technology tools on a day to day basis in order to gain the real benefits of collaboration-enabled business processes.

And, those staff and academics should also have access to a smart and connected built environment – a digital campus – where the physical build, and the technology, support new work styles and new business processes.

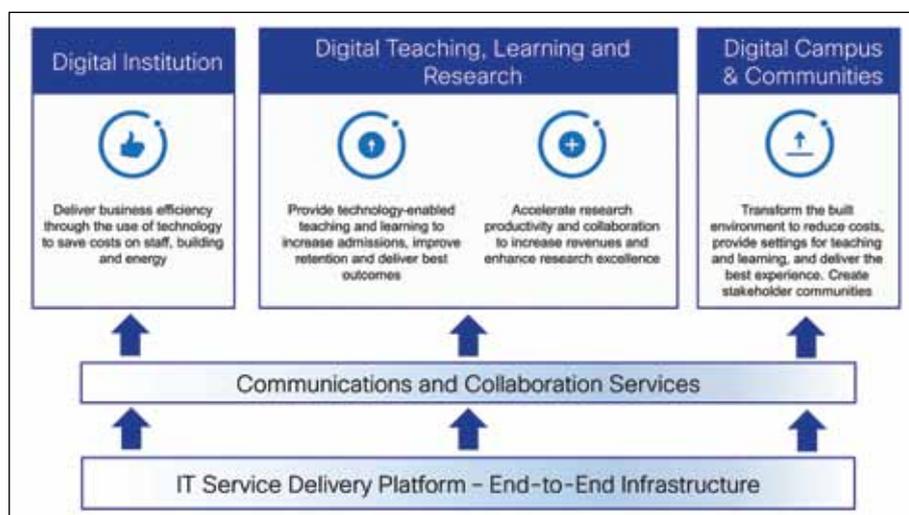
Regular and confident use of technology by staff and academics is the only way to bake it into the very heart of a modern university, and so create a digital business. But, this is not easy. It requires senior management leadership, linked to programmes of digital skills development, and significant cultural and process change. But only from such a firm foundation is it possible to accelerate the use of disruptive digital technology across all the other aspects of a university; including for digital teaching, learning and research, and for creating effective digital communities of stakeholders.

Our paper is structured around the key components of a digital strategy, shown in Figure 1 supported by the technology platform.

Digital Institution: how to place digital technology at the very heart of a modern university; to gain the fullest exploitation by staff and academics and create the conditions for the university to operate from a **Digital Campus.**

Digital Teaching, Learning and Research: how digital technology can be exploited to the fullest to realise distinctive approaches; to create teaching and learning that suits individual student styles, matched by settings in the digital campus; and exploitation of technology to the full to transform research programmes into rich, collaborative experiences capable of the very best outcomes.

Digital Stakeholder Communities: how to exploit connectivity, communications and collaboration to maximise the value of university partner communities.



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Figure 1: Components of a Higher Education Digital Strategy

The Digital Institution

Cisco is providing advice to private sector companies worldwide to help them to digitise their businesses. And we are now providing just that same support to UK universities to enable them to digitise their businesses and so become **digital institutions**.

But what do we mean by a digital institution?

Simply, a digital institution is one that runs all aspects of its business with digital technology at the heart; so harnessing all the benefits to enhance brand, achieve financial stability and further academic excellence.

Modern universities should seek business efficiency with the same passion as banks, retailers and manufacturing companies. And that passion needs to be supported by investment in a technology platform – the right IT infrastructure and the right suite of real-time communications and collaboration services.



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Efficiency and Cost Saving

Universities, like all modern businesses, must seek every means to drive efficiency and cost-saving.

But, in order to achieve these objectives, a university might simply reduce departmental budgets, including the budget for IT. This would have the immediate and unfortunate effect of positioning IT as a cost centre, rather than a value centre.

Plymouth University – Campus Energy Management

The Cisco Energy Management Suite is designed to help you cut energy costs across your campus buildings by up to 35 per cent and gain 100 per cent visibility of energy use in your data centre.

Find out more about energy management and control at Plymouth University by watching the video:

<https://www.youtube.com/watch?v=V-TMw9ZphYg>

However, a digital institution recognises that IT accounts for only around 4% of overall institutional budgets (source – Kable research data). And that it is far better to view IT as a value centre, with the ability to drive efficiency and cost-saving in the remaining 96% of the budget.

That remaining 96% of institutional budgets includes all the major cost centres: staff and academics, the estate of campus buildings, and energy and resources. Cisco recommends that all universities should adopt a business efficiency programme, focused on the use of technology, targeting each of the above cost centres plus university IT itself.

Staff and Academics: enable location-independent working as the first step towards changing ways of working and work styles; by implementing end-to-end IT infrastructure fully supported by network security and mobility services.

The Estate of Campus Buildings: create a built environment that supports the changing needs of staff, academics, students and researchers; by reducing the number and location of buildings, by adapting physical designs, and by providing technology support for new work styles and for new teaching and learning settings.

Energy and Resources: use technology to monitor and control the use, hence cost, of utility services; by exploiting the significant energy-saving benefits of IT consolidation, and by using available IT tools for energy management.

University IT: reduce the capital and operational costs of IT; by consolidation and virtualisation of infrastructure and services, and by adoption of new sourcing and financing models including cloud, managed and shared services.

Cisco has very considerable practical experience of efficiency and cost saving using technology from helping customers to tackle austerity in the wider Public Sector. That experience is now very relevant to universities. We have published advice and our recommendations in a paper entitled 'Operational Efficiency in the Public Sector - 10 Ways to Spend Less and Deliver More':

http://www.cisco.com/cisco/web/UK/public_sector/operational_efficiency/index.html

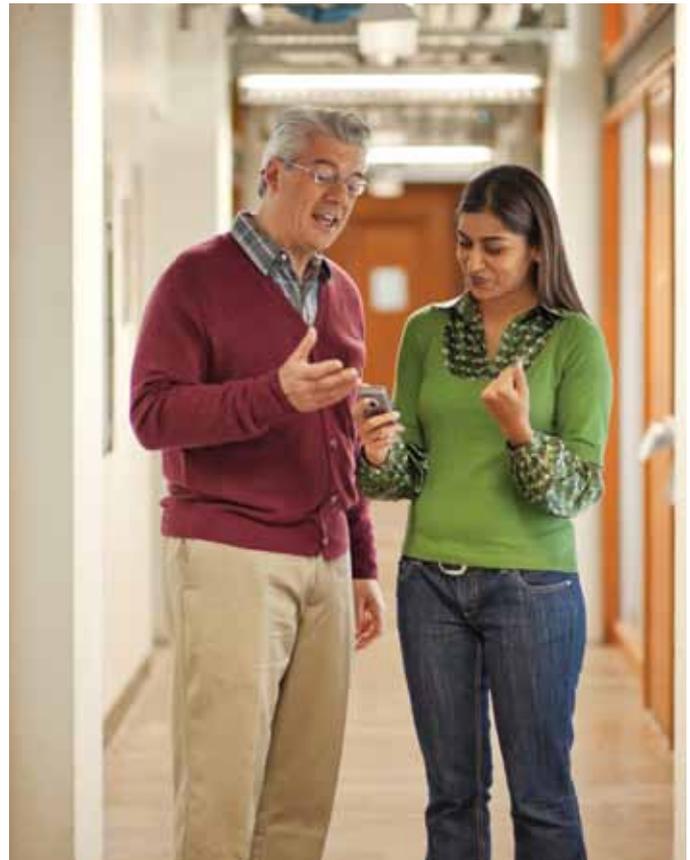
New, Collaboration-enabled Business Processes

Technology has a key role to play supporting new ways of working and new work styles within a business. So, within a digital institution, all staff and academics should have the confidence and skills to use technology tools on a day to day basis.

The underlying IT Service Delivery Platform enables mobility and secure, location-independent working for staff and academics. This drives direct savings and efficiency through increases in productive time, reductions in expenses, and enhanced business agility because academic and project teams can meet at very short notice to make business decisions.

But real-time communications and collaboration services further develop the value of location-independent working by enabling virtual meetings and virtual information sharing. These capabilities act as the essential catalyst for the development of new collaboration-enabled business processes, and for new ways of accessing content, applications and services.

To achieve this, staff and academics in a digital institution require on-demand access to a suite of communications and collaboration services - namely voice and contact centre, unified communications, web conferencing and collaboration, video and video conferencing, and information sharing.



Cisco on Cisco - IT Changing our Business

"A key competitive advantage for Cisco is how we use our own technology to drive productivity"

John Chambers, Executive Chairman

Cisco has always shared our IT experience and IT business success stories.

The Cisco website, for many years, has included 'Cisco on Cisco' content that takes a look inside Cisco IT. The aim is to help you find out how Cisco addresses many of the same technology challenges that you face every day.

Cisco on Cisco allows you to benefit from our practical experience and the lessons learned deploying Cisco products and technologies. And also to see how these solutions help to implement business strategies that get real results.

<http://www.cisco.com/web/about/ciscoitwork/index.html>

The Digital Campus

A digital institution recognises the full value of the resources and facilities provided by its physical campus.

A well-designed physical campus, fully incorporating digital technology, is essential for building the brand of a university – by enhancing the student experience, and delivering the right settings and facilities for teaching, learning and research. We refer to such a physical environment as a **digital campus**.

Within a digital campus, technology can reduce operational costs, enhance safety and security, and provide information tools for staff, academics, students and researchers. These benefits deliver real value – both to university operations, and to the experience of students and researchers.

Technology to support the digital campus comprises two main elements. Firstly, it re-uses the IT Service Delivery Platform – end-to-end infrastructure – to provide network connectivity, mobility and security for all applications and services across the campus. Secondly, it incorporates a wide range of Internet of Things (IoT) applications operating over the platform to support the business of the university, enable teaching and learning activities, and deliver a good student experience. Note – tutorial information on IoT can be found in the references and case studies section of the paper.

IoT applications differ from conventional network applications as they support sensors and sensor data, rather than users and user data. IoT applications for the digital campus fall into five main categories as shown in Figure 2:

- Building Control and Management;
- Security and Access Control;
- Video and Information Systems;
- Location and Attendance Systems;
- Energy Monitoring and Control.

University of New South Wales (UNSW) – Digital Transformation with the Internet of Things

UNSW delivers a great user experience for 55,000 people using 168,000 devices.

At UNSW, the Internet of Things (IoT) is changing the student learning experience as well as facilities management. By connecting people, process, data and things, UNSW is creating a digital campus of the future using Cisco wireless solutions. Besides Wi-Fi communication, the wireless network support information gathering for planning. Find out more about the connected campus at UNSW by reading the case study at:

http://www.cisco.com/c/m/en_us/iox/digital-transformation-stories/index.html#/story?storyId=940

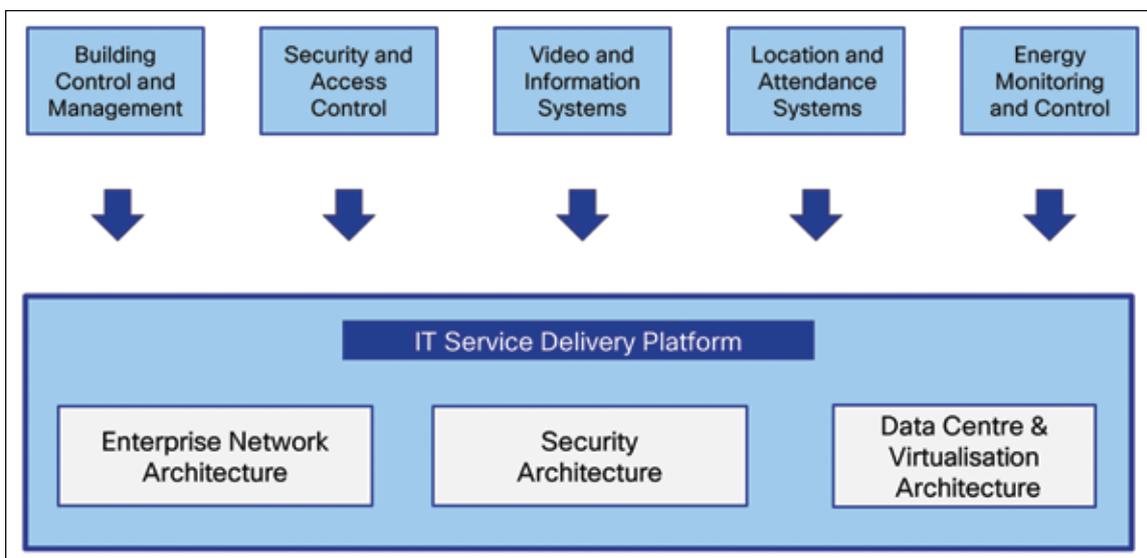
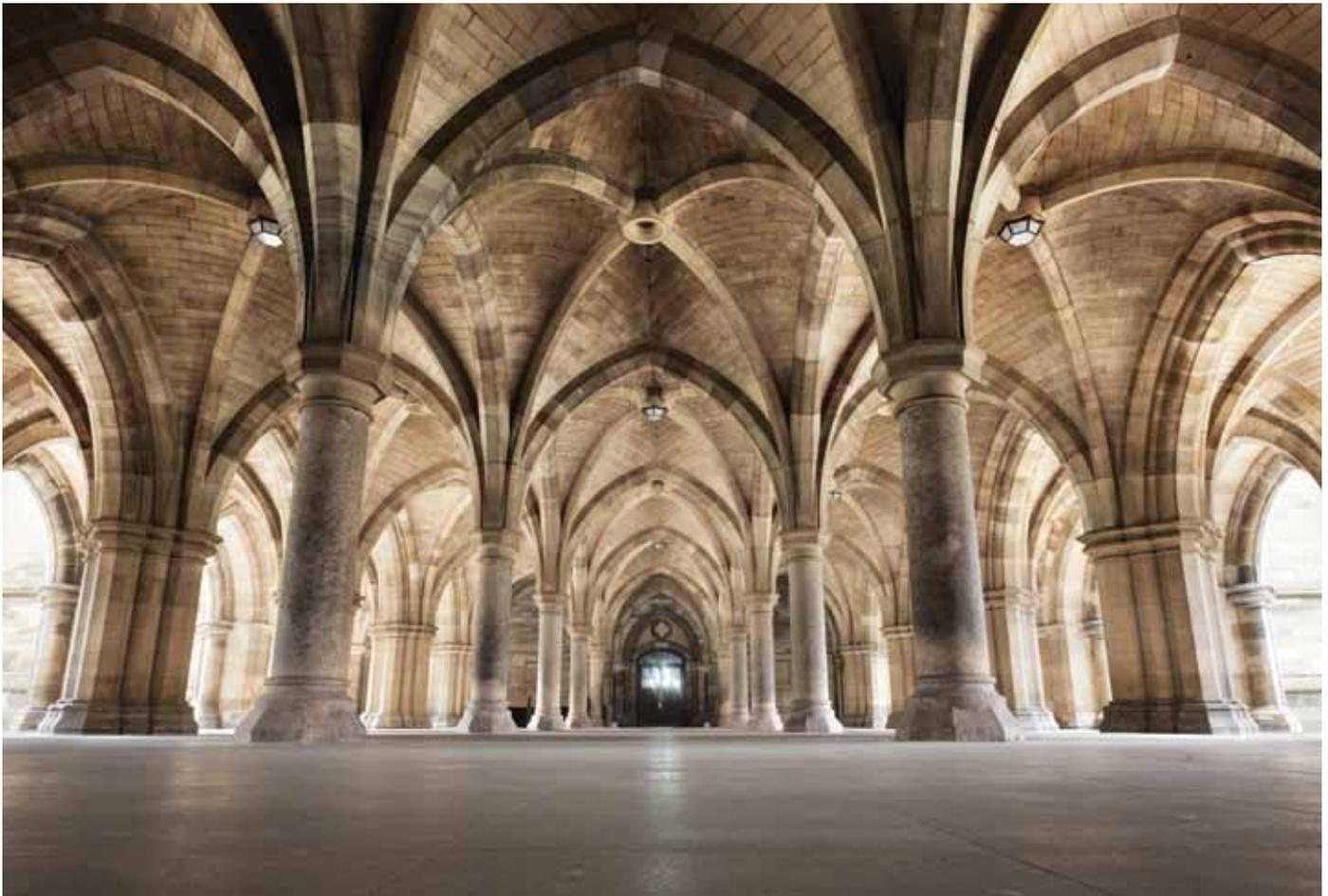


Figure 2: IoT Applications for the Digital Campus



The wireless network has a key role to play within the digital campus and so must be designed for robustness and to meet the high-density demands of a modern university. Clearly the wireless network provides network connectivity for staff, academics, students and researchers but also, increasingly, for sensor data supporting IoT applications. But today's wireless networks are also capable of providing location information on users of the network. This affords the opportunity for a modern university to use location information to build up a picture of campus use and patterns of individual use. Location analytics applications, such as Cisco Mobile Experiences (CMX), deliver real business value by providing user data analytics and the capability of pushing location specific information (for example to students and guests) to smartphone applications.

The wireless network has a key role to play within the digital campus and so must be designed for robustness and to meet the high-density demands of a modern university

Deakin University - Wireless-based Location Analytics on a Smart Campus

Deakin University has decided to enhance the value of its Cisco wireless network by deploying Cisco Mobile Experiences (CMX).

CMX, using the Cisco Mobility Services Engine (MSE), provides location analytics information that enhances the student's learning experience and provides library usage data to the university.

Find out more about how Deakin University are deriving that from their wireless, CMX and location analytics investment by watching their video:

http://air.deakin.edu.au/public/media/Smart+Campus+Connected+Mobile+Experience+%28Location+Services%29/0_q6oak5ds



Digital Teaching, Learning and Research

A digital institution must seek to deliver technology - enabled teaching and learning, and enable collaborative research programmes.

Technology-enabled Teaching and Learning

Universities have long recognised the ability of technology to disrupt teaching, learning and assessment. And further technology disruption is essential if a modern university is to differentiate its student offer so increasing admissions, improving retention and, critically, delivering better outcomes.

But preparing confident students for the world of work is complex. It requires strong academic leadership, access to a high quality curriculum and content, and the exposure of students to the effective use of business technology. Furthermore high quality teaching and learning must seek to support the learning style of each individual student; whether it be peer group learning, individual learning or 'learn-by-doing.'

This approach encourages students to take ownership of their own learning, seen as an essential step towards achieving the best outcomes.

Digital teaching and learning is critically dependant on the communications and collaboration services within the technology platform. These services enable new forms of interaction between academics and students, within student groups, and between students and business partners. They provide choices for all student, academic and business partner stakeholders, so that they can all choose the best options to suit preferred learning styles and desired outcomes.

The key communications and collaboration services for teaching and learning are unified communications, web conferencing and collaboration, video conferencing, video capture and storage, social media and information sharing. These are shown in Figure 3. They sit alongside and complement the virtual learning environment (VLE) and support pervasive access to education content.

... technology disruption is essential if a modern university is to differentiate its student offer



Edinburgh Napier University - Old School meets New School

Edinburgh Napier University has streamlined long-distance learning with a joint collaboration solution from Cisco and CirQlive.

“Now users can schedule a whole semester’s worth of classes in just a few clicks.”

Iain Bruce, Senior VLE Developer, Edinburgh Napier University

Find out more about the business value of integrating communications and collaboration with Virtual Learning Environments by reading the case study:

<http://www9.cisco.com/c/dam/en/us/solutions/collaboration/napier-university-cs-d3.pdf>

A programme of work to digitally disrupt teaching and learning might comprise the following threads:

- Location-independent access to the VLE, to other teaching and learning applications, and to education content;
- Unified communications, video and social media to allow students to access academic resources;
- Unified communications, video and collaboration for peer group learning;
- Stored video capture and storage to support independent learning, and allow exploitation of ‘flipped classroom’ models;
- Stored video tools for assessment;
- Video and conferencing for access to partners participating in the learning environment.

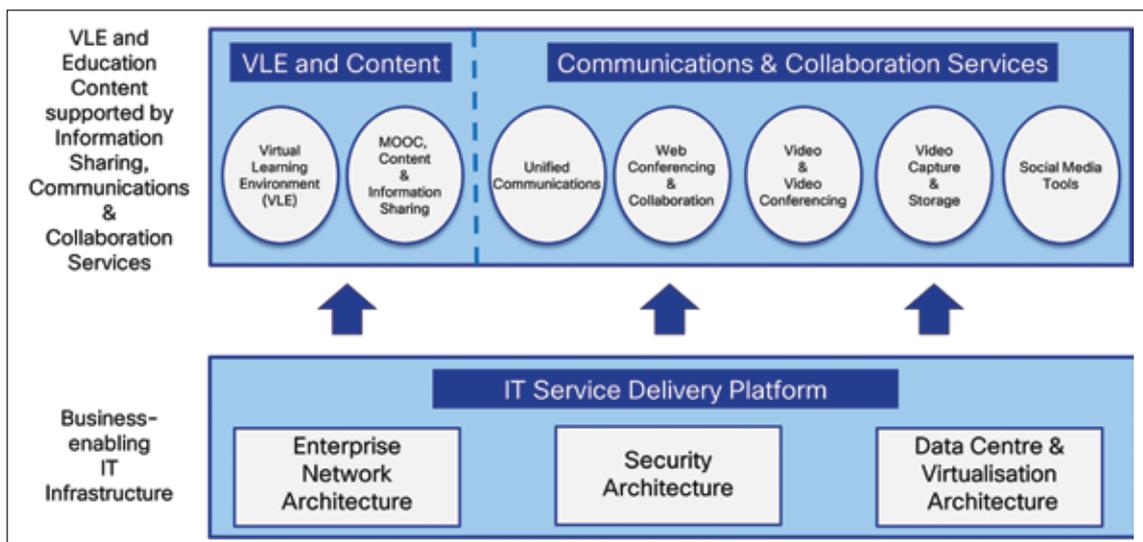


Figure 3: Communications and Collaboration Services for Digital Teaching, Learning and Research



Collaborative Research

Universities fully recognise the important role that technology plays in leading-edge research; both by increasing the success rates of research programme bids, and by delivering better research outcomes.

But, once again, technology disruption is essential for a modern university. Technology can allow a modern university to successfully differentiate its research offer, and so increase the number of research programmes and partnerships, and enhance its brand.

Research has always been very dependent on IT. And having the right compute and storage for high performance and ‘big data’ computing, supported by robust research data management, is still at the heart of research. But there are other, increasingly important, factors that need to be addressed by research leads.

Security and information governance must be a key focus to ensure intellectual property is protected, and research data can be accessed over whatever retention period is demanded by a programme. And, collaboration tools are also critical. Research is fundamentally a collaborative process and providing the right tools to get the very best out of individual researchers, team structures and peer organisations is now of critical importance.

These collaborative research tools can be found within the communications and collaboration suite. They will enable better communications and collaboration between researchers, allow effective virtual meetings (on-demand if necessary) and provide new forms of interaction to review data and reports. Once again, the availability of a comprehensive suite of services will provide choices for researchers, so that they can choose options that best suit their preferred work styles.

The programme of work to digitally disrupt research might comprise the following threads:

- Location-independent access to research data and other content;
- Unified communications, video and collaboration for peer group interaction between researchers;
- Stored video tools to capture new forms of research data and report research programme progress and findings;
- Video and conferencing for access to peer institutions and public and private research sponsors.

Sam Houston State University, Texas - Advanced Malware Protection Supporting Teaching, Learning and Research

Sam Houston State University understood the need for advanced security tools to support their needs to secure student data and research assets.

Tim McGuffin, information security officer at Sam Houston State University, describes how they maintain a secure infrastructure while ensuring academic freedom and research with Cisco’s Advanced Malware Protection for Endpoints.

You can learn more about this Cisco solution at :

https://www.youtube.com/watch?v=RjPB_9Blww

Digital Stakeholder Communities

For many universities links to external stakeholders and stakeholder groups are becoming ever more important. This is particularly the case for 'place-centred' universities with the mission to deliver educated and skilled graduates into their local economy, thereby supporting local authority drives for economic prosperity and political devolution.

For such universities, there are key partnerships with the local Public Sector (local authorities, NHS Trusts and colleges, schools and academies) and with local businesses (start-up and established businesses) to further local economic activity including apprenticeships, placements and research activity. Typically, up to six external stakeholder groups can form an integral and essential part of university life as shown in Figure 4.

It is important that each stakeholder group operates as a thriving community – a digital stakeholder community – if a university is to be successful in delivering its model of education and research, and achieving its regional ambitions.

Once again, technology plays a key role by allowing each stakeholder group to become a thriving community supported by the ability to connect, communicate and share information. The required connectivity will vary markedly for each stakeholder group. But, the required collaboration tools will be re-used services from the suite already in place for business efficiency, for teaching and learning, and for research.

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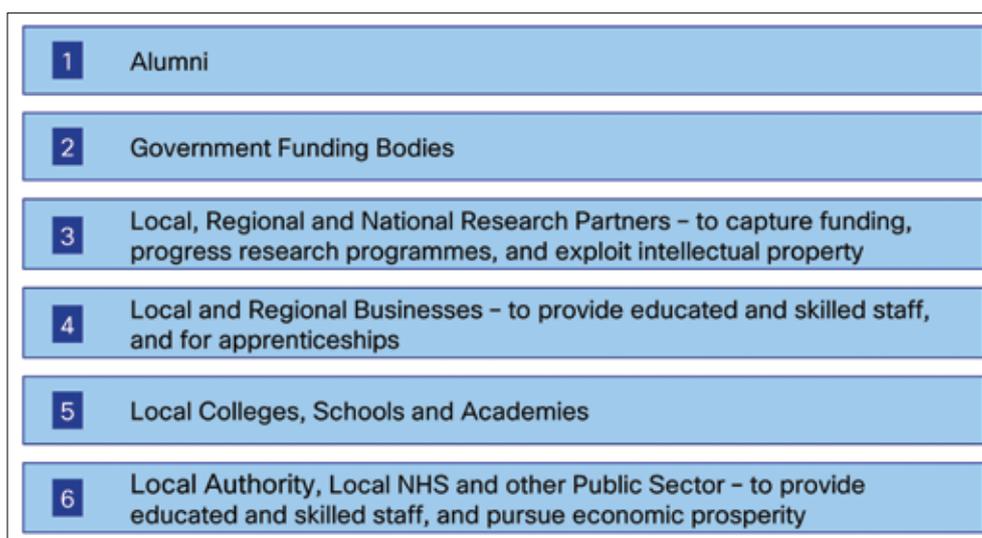
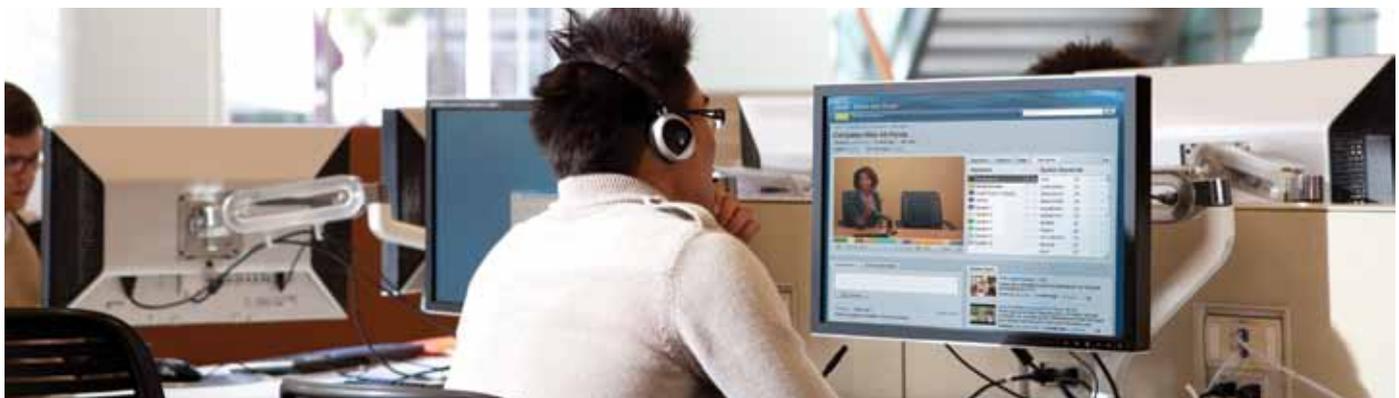


Figure 4: Digital Stakeholder Communities



The Technology Platform

The mission of a modern university is critically dependant on both IT infrastructure and real-time IT services in addition, of course, to line of business, back office, and education applications and services.

Cisco refers to essential IT infrastructure and real-time IT services as the '**Technology Platform**'.

The technology platform comprises these two main components; the infrastructure component we refer to as the '**IT Service Delivery Platform**', and the real-time IT services component we refer to as a '**Suite of Communications and Collaboration Services**'.

The IT Service Delivery Platform should be considered a business critical asset for a digital institution, as it comprises the end-to-end IT infrastructure that runs the business. The Suite of Communications and Collaboration Services provides business-critical real-time communications capability for a business. As described earlier, these services drive disruption in ways of working; for technology-enabled teaching and learning, for collaborative research, and for enabling stakeholder communities.

Re-use of IT is an important factor affecting technology investment. Re-use can reduce technical complexity and risk and, of course, reduces cost. Communications and collaboration services are an excellent example of technology re-use. They can be used, and then re-used, in different settings by different stakeholders to deliver ongoing business value. An example of this might be video conferencing services; they may first be used by staff to run effective virtual meetings, but then re-used by academics to support multi-site and remote learning, and then re-used again by researchers to support richer collaboration for research programmes.

The role and value of the technology platform to the business life of a modern university must be set out clearly within the digital strategy. What the technology platform comprises, and how it should be delivered, must be set out in an associated IT strategy.

The IT Service Delivery Platform should be considered a business critical asset for a digital institution



The IT Service Delivery Platform

The IT Service Delivery Platform (or just IT Platform) is end-to-end foundation infrastructure deployed to support every aspect of university life. As stated above, the platform should be considered a business critical asset, designed to support all the needs of the business, including those of teaching, learning and research.

Physically the platform should be architected from three main components as shown in Figure 5.

A Unified Access Network: comprising ubiquitous wired, wireless and remote-access VPN connectivity; and offering borderless access to education resources and applications for staff, academics, students and researchers. The network must support integral security and mobility services, and have the capability to act as a sensor to detect security breaches. The wireless component of the network is of particular importance and must be designed for robustness and high-density operation.

Virtualised Data Centres: housing real-time services, education applications and content, and back office applications in a secure, flexible and energy-efficient manner; using virtualisation, where possible, to deliver content and applications at the very best cost point.

Defence-in-Depth Security: providing layers of security provision for infrastructure and information assets; offering protection for continuity of operations, and assurance for intellectual property and sensitive student and business records.

Logically the platform should provide a rich set of embedded software services to support the successful convergence of data, voice and video applications and services. The increasing importance of video to universities – to support new ways of working, and for teaching, learning and research – means that the platform should be designed with rich prioritisation capabilities to allow concurrent video streams to be managed and controlled successfully.

More architectural detail on the infrastructure products and solutions can be found in the references and case studies section of this paper.

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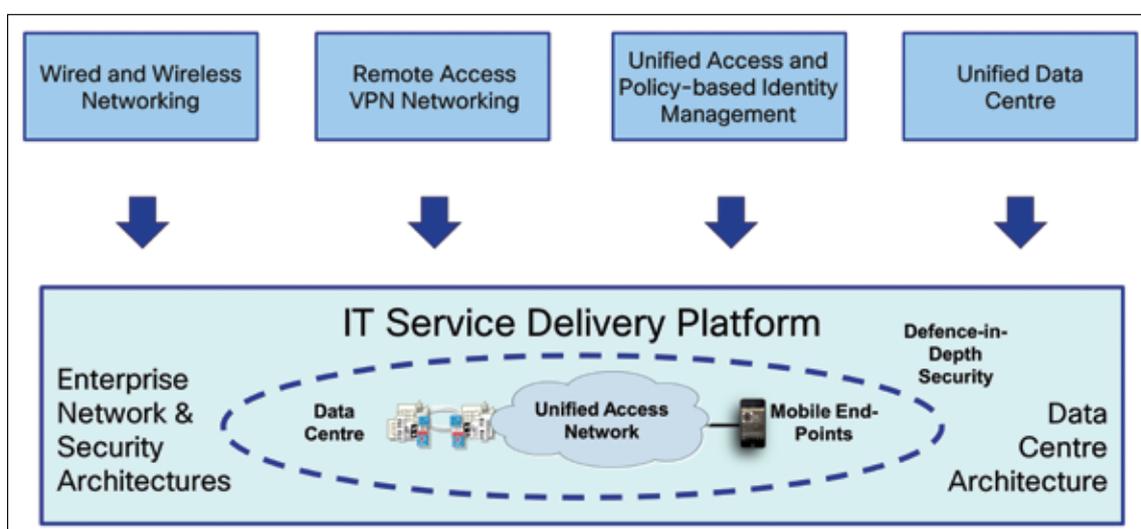


Figure 5: The IT Service Delivery Platform

The Suite of Communications and Collaboration Services

The suite of communications and collaboration services is a set of shared, real-time IT services that will support all aspects of university life. Like the IT Platform, it is a business critical asset and designed for use and re-use in different settings within a modern university.

The suite should be specified and designed with richness of function as the key investment priority. In this way it will have the flexibility and capacity to support all business needs now and into the future.

Figure 6 shows the suite and its services in schematic form.

Voice and Contact Centre: comprising voice services for fixed phones and softphones, voicemail, and contact centre; offering enterprise telephony to suit all stakeholders, and contact centre services for specialist functions and for student engagement during clearing.

Unified Communications: comprising instant messaging and presence, single number reach, and fixed-mobile convergence services; ensuring staff, academics, students and external stakeholders are reachable and have a wide range of available communication options.

Web Conferencing and Collaboration: supporting audio and video meetings, document sharing, and white boarding;

providing a rich set of services to support staff and academics in the business, and all internal and external stakeholders engaged in teaching and learning interactions.

Video and Video Conferencing: from user end-point devices, such as smartphones, and room-based devices; providing the richest set of video options for interaction between individuals, within peer groups, and between meeting and lecture rooms.

Video Capture and Storage: allowing lectures and personal videos to be captured, stored and indexed for use by academics and students; providing a rich base of education content to support new ways of teaching and learning, such as flipped classroom, so enriching interactions between students, academics and external business partners.

Social Media Tools: allowing the university to use social media for effective communication with students and other stakeholders; permitting the new university to project its distinctive brand, and teaching and learning offer, and monitor external commentary on its offer and performance.

Information Sharing Tools: providing all stakeholders with the ability to store, share and comment on information assets within the university; social media in style to allow interest groups to be formed and to interact, and for feedback on documents, papers and videos.

More architectural detail on the services contained in the suite can be found in the references and case studies section of this paper.

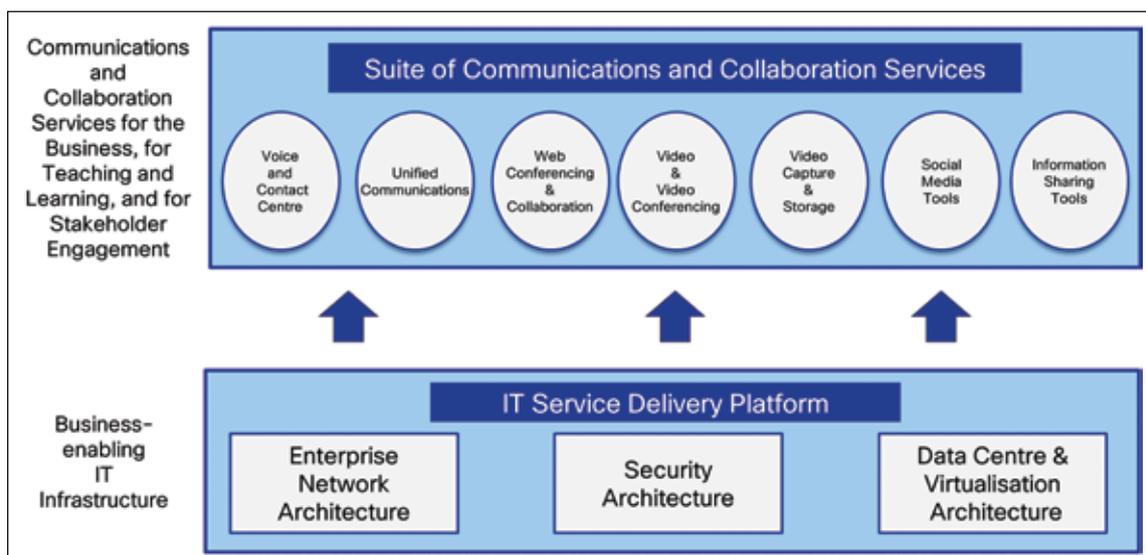
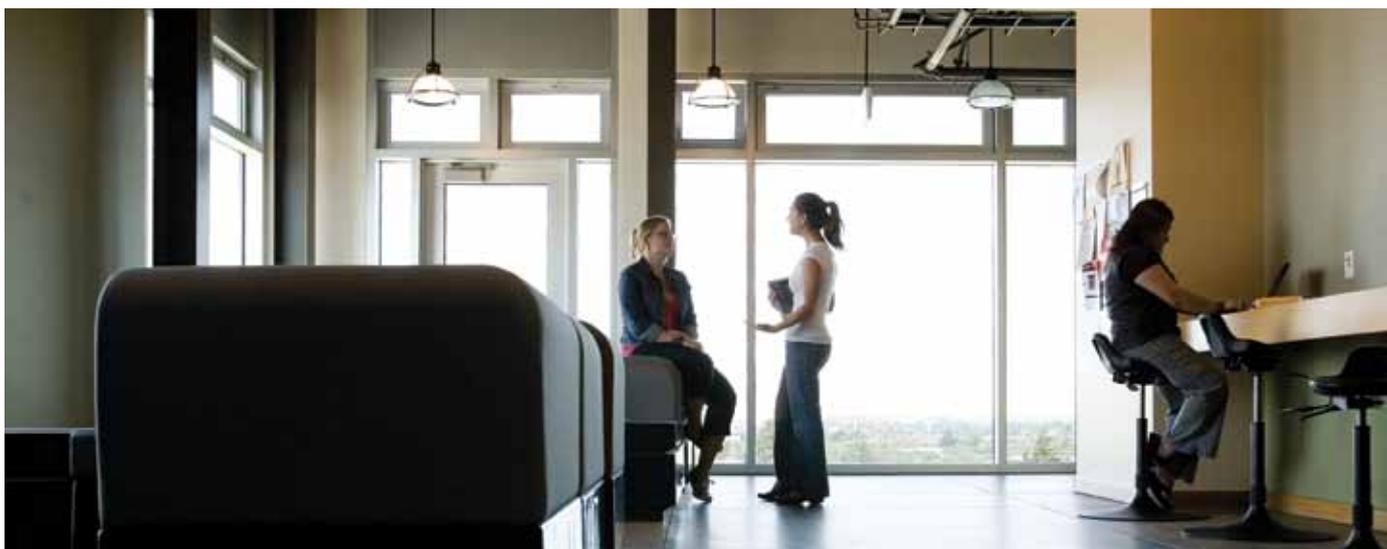


Figure 6: The Suite of Communications and Collaboration Services



The Cisco Architectural Approach to IT

A digital strategy must have a companion IT strategy to explain what enabling digital technology needs to be provided, and how it can best be consumed by the university.

IT consumption models are extremely important for any modern business. Cisco believes a modern university should adopt a ‘hybrid cloud’ consumption model, exploiting a combination of local, remote and shared services that best suits institutional needs. The IT strategy is the right place to analyse available consumption options, and recommend the right approach for the business.

Our experience has shown that an IT strategy should take an architectural approach, linking business priorities directly to IT investments. The methodology employed to develop the IT strategy should make that linkage very clearly, in order that technology investment can deliver full business value. Cisco uses an approach where we refer to ‘**Plan-Down**’ from business requirements, and ‘**Build-Up**’ starting with IT infrastructure.

An architectural approach will also deliver a couple of other key benefits for IT and for the business.

Firstly, the approach provides access to ‘architectural blueprints’ that describe individual IT components and their relationships. The blueprints can be shared with, and agreed, between project stakeholders so reducing complexity and risk. And, in addition,

the blueprints inherently provide roadmaps for delivering the incremental performance and functionality needed to meet new and changing business needs. Finally, each Cisco architecture is complemented by a set of **Cisco Validated Designs (CVDs)**; these are ‘how-to guides,’ developed in Cisco’s development laboratories, and made available to support customer or partner technology implementations.

Secondly, the approach delivers IT building blocks that can be used, and then re-used, to build new IT solutions. Re-use of technology is an important business and technology consideration, as stated earlier. A good example of this is Cisco Unified Communications Manager (CUCM) which sits at the heart of our collaboration architecture. CUCM can initially be deployed to provide telephony switching to meet the essential telephony and contact centre needs of an institution. But, then subsequently re-used to provide video switching for video and video conferencing services. Re-use of CUCM in this way supports new ways of working, teaching and learning, and research without the need for new technology investment.

We recommend that you review each of the four Cisco technology architectures – enterprise networks, security, collaboration, and data centre virtualisation – and the CVDs and other assets that support them.

References to each of these four architectures and their supporting materials can be found in the references and case studies section of this paper.

How Cisco and our Partners can help

Cisco and our business partners have a wealth of knowledge and expertise; both of the higher education sector and of delivering innovative technology solutions.

We can provide trusted advice on how to develop a digital strategy for your institution; on how to create supporting policies; and on how best to create an IT strategy that defines enabling digital technology and how best to consume it.

We can also, of course, provide the technology components for the IT service delivery platform; namely networks, data centres, mobility solutions, and defence-in-depth security. And also the rich suite of communications and collaboration services that can be used and re-used across the business.

We have always believed that Cisco delivers the very best technology in our marketplace. But now you can deploy that technology locally within your institution, or consume it as a cloud or managed service from one of Cisco's provider partners. We can advise you on those Cisco partners that can best meet your technology needs through the supply of cloud and managed services.

Let us also advise you on best options for sourcing technology. We can introduce you to Cisco Capital. They have a flexible range of financing options to suit either capex or opex priorities. They can also create finance contracts that are usage-based, and incorporate technology refresh.

Finally, Cisco and our partners are renowned for the very best service and support. From consultancy services to shape your planning and strategy, through to product support services for your deployed IT. Our advanced services teams can work directly with you, or your chosen implementation partner, to ensure that complex technology can be deployed quickly and effectively to support your business.

We would be delighted to review the contents and recommendations in this paper with you, and discuss how they might apply to your institution. We'd also be happy to explore how we might be able to help you more directly; either with advice on developing your own digital strategy, or with financing or services to help you implement it. Please contact your local Cisco account manager or email us at heuk@cisco.com.



References and Case Studies

Cisco UK Public Sector Home Page

http://www.cisco.com/cisco/web/UK/public_sector/new/index.html

Cisco UK Education and Research Home Page

http://www.cisco.com/cisco/web/UK/public_sector/education/new/index.html

Cisco on Operational (Business) Efficiency

http://www.cisco.com/cisco/web/UK/public_sector/operational_efficiency/index.html

Cisco on Cisco

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Plymouth University

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University of New South Wales

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Deakin University

http://air.deakin.edu.au/public/media/Smart+Campus+Connected+Mobile+Experience+%28Location+Services%29/0_q6oak5ds

Edinburgh Napier University

<http://www9.cisco.com/c/dam/en/us/solutions/collaboration/napier-university-cs-d3.pdf>

Sam Houston State University

https://www.youtube.com/watch?v=RjPB__9Blww

Cisco Enterprise Network Architecture

<http://www.cisco.com/c/en/us/solutions/enterprise-networks/index.html>

Cisco Data Centre Virtualisation Architecture

<http://www.cisco.com/c/en/us/solutions/data-center-virtualization/index.html>

Cisco Security Architecture

<http://www.cisco.com/c/en/us/products/security/index.html>

Cisco Collaboration Architecture (Communications and Collaboration Services)

<http://www.cisco.com/c/en/us/solutions/collaboration/index.html>

Cisco Validated Designs (CVDs) - Cisco Design Zone

<http://www.cisco.com/c/en/us/solutions/enterprise/design-zone/index.html>

Cisco and the Internet of Things

<http://www.cisco.com/c/en/us/solutions/internet-of-things/overview.html>



Cisco UK Education and Research Home Page

http://www.cisco.com/cisco/web/UK/public_sector/education/new/index.html



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