The Intelligent Network and the Future of the CIO

A smarter network will enable smarter IT

SUMMARY

In a nutshell

In any organisation today, the CIO has the hardest job. The pressure to do more with less is greater than ever, both from within lines of business and from end-users, and the evolution of technology will only add to the growing pressure on increasingly burdened CIOs. However, technology can also be a CIO's salvation: a well-managed network can help them satisfy ever-more demanding users, as well as meet the business targets set by the chief executive.

Ovum view

The intelligent network is becoming more relevant than ever. The enterprise network is being bombarded. There are a multitude of personal devices, including smartphones, tablets, and e-readers. More physical objects will be digitally enabled as communications nodes in machine-to-machine (M2M). There are new sources of content from public resources, new applications data, and a regeneration of voice-as-data, video, and other multimedia. These factors are combining to give existing networks the workout of their lives. Provisioning new capacity to meet extra demand is a big task, but it is only the first of many.

There are two direct impacts on the business. The network is now a key delivery mechanism for the distribution of information and applications around the organisation. However, what if the traditional corporate network is no longer the network preferred by end-users? More and more users wish to use their personal device to connect to corporate resources. The first job of the CIO is to ensure access for all qualifying employees and customers from anywhere and at any time,

and to secure, analyze, and prioritise the use of personal devices. As user demand continues to escalate rapidly a new wave of cost pressure will make new budget management options necessary.

However, if the network is intelligent, it becomes an asset. An intelligent network has the capability to address mixed end-user and customer requirements and manage traffic across a heterogeneous set of access points and underlying transport bearers. Users can even develop their own applications in the network, which will manage and prioritise their use. An intelligent network promotes on-demand distribution and consumption – to the right person at the right time – and is business-ready, anticipating future requirements.

An intelligent network can transform the role of the CIO. In a truly dynamic network environment, the CIO is freed from project-by-project resource building and allocation. Essentially, IT becomes decentralised, and the CIO is able to focus on innovation and matching IT capabilities with business and user requirements to a greater degree than had previously been possible. The CIO's new role is now part-COO and part-HR manager, responding to the individual and collective behavioural requirements of "employee-centric" IT users.

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HOW THE LANDSCAPE SHIFTED

Appreciating the value of the network

The credit crunch and ensuing recession were a reality check for enterprises. Networking is first and foremost about reducing costs, and in a recession that process is accelerated into a crash cost reduction program. However, this process highlighted the importance of the communications network in the life of the business, and as a means to help it respond better to changing market conditions. Managing costs while increasing capabilities within the corporate network is part of the balancing act of most corporate IT departments.

Out of the pressure cooker it was possible to observe a couple of things that highlighted the importance of the intelligent network to the business user. Companies were reluctant to delay technology investments. Some decided to hold back conversion to IP and UC integration, while others had second thoughts about green ICT and FMC. Most enterprises were committed to these projects, though, and especially to the conversion to IP communications including UC, and to value-added services. These projects are going to make a difference to the way companies deliver services to customers and to their own employees. Network resources and applications services are now an integral part of the business ecosystem, and this has been reinforced by the emergence of the cloud delivery model, providing a full end-to-end intelligent network.

What does a modern intelligent network mean for enterprises?

An intelligent network differs from a static network because it is more than just a point of consumption: it is the nervous system for applications management, and puts configuration, monitoring, and re-configuration all under the user's control.

Most service providers are avowedly "network-centric", and for the past five years at least have been seeking to convey the message that their network understands and can help the end-user in business. What does this mean?

- Most larger, multi-regional businesses run multiple WANs, some managed by a service provider, some run in-house. These often now comprise a complex mixed network that has typically not been optimised or rationalised for the demands of user-centric access to corporate resources.

- A revelation of cloud computing is that IT can be hosted actively in the network: not just stored or backed up there, but actively controlled and directed.

- The cloud does not apply just to IT and software. It applies equally to networks and their management, the systems and tools that enable a user to choose between network services, and therefore access to applications. For some types of enterprise users this is the most important impact of the cloud, as Ovum research among business verticals shows (see *Multinational Corporate Survey 2011: Cloud Services* for further information).

- This is how Ovum sees the evolution of the intelligent network: one which allows an organisation to dynamically provision (or self-provision) according to minute-by-minute business requirements, which will themselves be increasingly driven by user expectations and needs.

THE ENTERPRISE NETWORK IS BEING BOMBARDED

A multitude of devices

Ovum forecasts that the number of smartphones in use will more than double from 288 million at the end of 2010 to more than 600 million in 2015. Many of the owners of those devices will be taking them into work. Devices that are explicitly supported by IT, and even some that are not, will be used to access data on the corporate network, and that data will be multimedia-rich: it will include video as well as high-resolution, picture-based features. Some of this will be personal to the user as a private citizen, as they update a social network page and manage their personal affairs, but much will be useful and pertinent to the user as an employee.

The machines take over and overtake human users

At the same time as employees are bringing smarter devices into the enterprise, businesses are seriously contemplating enabling every terminal, asset, and unit of sale with machine-to-machine technologies in an unprecedented extension of process automation from product design to disposal. Ericsson's famous claim that there will be 50 billion connected devices by 2020 may be ahead of the game, but even so, projections about the size of the M2M market opportunity abound in the industry with many different billion number estimates. Ovum has seen figures varying between 15 billion and 1 trillion connected devices by 2020. Most of these "forecasts" are estimates built on top of today's personal mobile market, which is currently around 5.5 billion connections, and is forecast to grow to 7.5 billion by the end of 2015. The assumptions used are based on the number of objects associated with individuals, and the likelihood that these will become connected in future. M2M may not entirely live up to the hype, but we are confident that there is indeed a massively increasing demand for connecting devices to networks, and a related increase in the number of devices per user.

New sources, communication applications, and volumes of information

Public content

Enterprises have always depended on public information and data sources for market and customer engagement, but there are now multiple methods of accessing such information. The growing use of electronic media allows for greater access to information than ever before. The ability to access, tag, and correlate information will be ever more critical, allowing enterprises to assess, analyze, and save pertinent data for each user, device, or application.

Applications data

We expect the number of enterprise mobile applications to multiply in the next few years, and it may not be long before enterprises have a choice of 100 million apps. We also expect that most of the current corporate applications will be accessible by mobile devices, which will put an increasing burden on secure access to such applications.

There are hardly any applications available today on the fixed network that are not also being developed for mobile use. At a simple level, the implication is that the applications load will soon have doubled. Usage volumes will be different, but in any case the developer world is generating many additional applications for smartphones and smart device users. These are both "outbound", where the organisation defines and designs its own apps for its specific requirements, and "inbound", where apps are downloaded from the Web into the organisation.

Voice communications as data/video/multimedia exchange

Increasingly voice is being delivered internationally as IP data in enterprise networks, as well as over international carrier networks. Voice communication services in fixed and mobile network environments are richer, more engaged, and more distributed. The richness comes in HD quality, the engagement in call recording and response, increasing multimedia communications, and realtime messaging. They also address the increasing need for ad hoc, unscheduled communication sessions outside the traditional corporate communication methods and policies, and these communications are now cutting across devices, networks, and the mix of applications on them.

THE TWO DIRECT IMPACTS ON THE BUSINESS

Impact 1: Managing a network of networks

While Ovum has written extensively on the increase in mobile working, there is an implication that has not always been addressed head on: that in the future, the corporate fixed network may become the least popular connectivity option for business users. Managing networks of networks for access to and distribution of information and applications will therefore be fundamental.

Providing access anywhere to any device and securing it

Mobility will be almost ubiquitous, and will depend on a variety of WLAN, mobile, and wireless networks. Most communications will include sessions over many devices and many networks.

The need to secure this variety of networks is a given, but it will also be necessary to secure the variety of devices that will be in use. Ovum anticipates that more and more businesses will have moved to bring your own device (BYOD) policies and that the old model of corporate liable (CL) and individual liable (IL) will be on the wane.

While more than 37% of companies provide mobile phones to employees today, already more than 27% provide smartphones and laptops with mobile connectivity. The proportion of companies providing the latter device types is expected to increase to 30% within two years, while the percentage providing feature phones will start to decline.

In supporting these devices, the management of the costs associated with mobility and international roaming in particular dominates the list of priorities for CIOs. In Ovum's annual survey of mobility requirements, securing remote access to the network is the number one priority. Mobile policy (ensuring staff use company devices appropriately) is of high importance after those cost-management issues.

Analyzing, recording, and prioritizing traffic in line with business requirements

Strategic IT projects that aim to transform processes and productivity across organisations need applications to be delivered to employees across the wide area network in a timely and reliable way. The intelligent network gives enterprises a powerful helping hand in performance optimisation and acceleration solutions. They are particularly effective when deployed by the network operator as part of a managed service, and across a range of tasks. For example, Cisco and Silver Peak's WAN optimisation solutions, Juniper and Riverbed's discovery, analytics, and implementation tools, and Compuware's web performance monitoring tools (which are especially effective for

SaaS-type applications across the Internet) are all well embedded in the intelligent network, and are now open to view by the enterprise manager. Ipanema's solutions even help enterprises set up their own service-level agreements (SLAs).

The changing nature of network SLAs: from uptime to dynamic resourcing

The deployment of these technologies is transforming SLAs, which can now extend beyond the network guarantees for deployment, break/fix, and applications uptime to provide a guarantee of how applications will really perform.

Realtime communications traffic, including voice-over-IP, collaboration, and video conferencing, is a challenge for optimisation technologies that typically rely on caching, data compression, application streamlining, and/or protocol grooming. There are no roundtrips, and little duplication of traffic in video and VoIP. However, service providers are in a powerful position to help. They can optimise realtime traffic, where they manage both the network and the voice or video endpoints, giving them complete end-to-end control over the realtime application.

The cloud only increases the imperative

A similarly thorny issue affects enterprises moving applications to the cloud, especially where data centre hosting infrastructure is shared or where the enterprise or service providers can install an appliance at only one end of the link.

We expect vendors to partner with public cloud computing providers such as Amazon to host WAN optimisation appliances in the cloud. These can then be shared between enterprise customers. The advantage of the intelligent network is that it allows service providers to show the enterprise customer those vendor services directly, as well as through the service provider managed network.

Service providers are increasingly in a position to provide both application and network optimisation services to enterprises that are high users of realtime communications such as IP telephony and video conferencing.

A service provider will aim to have visibility of applications from desktop to data centre. By offering services from managed desktop and managed LAN through to a virtual data centre offering, it can provide effective end-to-end management of applications, and end-to-end SLAs for its enterprise customers.

The CIO gains more control

From the point of view of enterprise users, this brings several benefits. They have the possibility to:

- choose what application and network SLAs they would like

- include application optimisation as part of their managed services

- accelerate access to cloud resources, particularly for remote and mobile workers.

Over the next few years attention will turn to remote and mobile workers, and how to optimise their experiences and use of applications. This will be a major chance to improve the applications experience, and change the business culture that has accepted a poorer state of connectivity for remote and mobile workers.

Impact 2: Controlling costs as user demands escalate

There is some question as to who is best equipped to serve and to continue to help those under-pressure enterprises that are having a hard time balancing internal priorities with cost pressures. Networks combine global reach with service level competency, hybrid applications, and value-added services. They can reach SMEs as well as MNCs. But they also must be able to take account of the cost of supporting the business requirements of any corporate user in all locations, on all devices.

The intelligent network will offer CIOs the greatest range of billing, payment, and cost management tools they have ever seen. At a simple level it can offer a shortcut to cost reduction through the cloud consumption model for network services.

CIOs can take advantage of intelligent network features such as:

- the ability to provision new capacity quickly and to scale it up quickly

- the cost controls implied in "no minimum contract" and pay-per-use

- a network management dashboard provided via an online network management portal

- the operational advantages of knowing they can closely match capacity to seasonal or variable demand.

Key trends in network services drive intelligent network uptake

The advantages of pay-per-use, service-by-service, are especially relevant given market trends:

- Enterprises' VPN bandwidth requirements have doubled every two to three years. This will continue for at least the next decade, fuelled in part by the growing role of video, which means there will be enterprise bandwidth growth of at least an order of

magnitude by 2020. We expect to see this at branch sites, headquarter offices, and enterprise data centres.

- Networked applications, from SAP and Oracle to VoIP and video, demand efficient use of bandwidth without impairing high performance. More than half of MPLS VPNs now make use of class of service (CoS) to prioritise types of traffic, for example to give business applications and realtime voice priority over email and web traffic. CoS is also being adopted with the new generation of Ethernet VPN services such as VPLS (virtual private LAN service).

- Bandwidth-intensive applications such as telepresence, storage area networks (SANs), and cloud computing need a variety of on-demand and dynamic capabilities. In the intelligent network, enterprises will be able to perform upgrades to bandwidth in just a few seconds, if not instantly. On many services the network will automatically and instantaneously adjust bandwidth to meet the requirement for specified applications so that, for instance, a VPN service would not degrade even if several concurrent telepresence sessions were running over the network.

- We have seen a major move from layer 2 VPN technologies (frame relay and ATM) to layer 3 technologies (public Internet and MPLS-based IP VPNs) over the past decade. Wide area Ethernet has replaced many high bandwidth private lines. VPLS, a layer 2 VPN technology, now provides the "any-to-any" connectivity of IP VPNs together with the CoS and robust SLAs that have been a key attraction of IP VPNs. VPLS is quickly becoming established alongside IP VPNs, and there are already examples of these technologies coexisting in the same enterprise WAN. These examples use VPLS for high bandwidth connections between head offices and data centres, and IP VPNs for branch sites.

- Cloud computing and SaaS have added to the strain on the public Internet to support the service levels that business users expect. A migration from IPv4 to IPv6 will increase the number of IP addresses available to accommodate the new traffic mix. A concerted effort from industry standards bodies is still needed to support service provider SLAs over the public Internet, and will address availability, latency, jitter, and packet loss.

AN INTELLIGENT NETWORK IS AN ASSET

The value of switching

New technologies offer the prospect of moving to a new enterprise network model based on a mixed estate of layer 2, layer 3, and Internet-based VPNs. The key to this evolution will be increased confidence in networking controls that can manage traffic and size the network effectively to adapt to up-to-the-moment requirements.

An intelligent network must help the corporate end user. It must help service providers with revenue potential, advanced network services, and strategy; and end users with value for money, network performance, and support for the business. The intelligent network that is aligned with business objectives and requirements becomes an asset whose value is apparent to users and budget holders alike.

Enabling application development, management, and prioritisation

Ovum's Technology Trends survey showed a significant increase in spend on enterprise applications in 2010. Investment in enterprise applications, and especially apps developed on the in-house network rather than outsourced or bought-in, has climbed to become the second-highest investment priority after security.

A good service provider will now be delivering managed applications services on its networks, some of which it has helped develop for the customer, and for which it has done dedicated network engineering, monitoring, and integration. These require class of service for HD video, for example. They also require very secure transport environments.

This is true whether the application sits in a public or private cloud, as more applications, no matter how they are deployed, will rely on an intelligent network to deliver the experience required by the end user. From video to the latest analytics or business intelligence application, and from financial packages to field sales and service, timely access depends on a high quality network, with high levels of availability, reliability, and support in the network SLA, which will include an application end-to-end SLA.

Being business-ready: anticipating future requirements

The network of the future will be incredibly flexible and intelligent. Services will be consumed dynamically, and this will be made possible by, and is completely dependent on, dynamic and flexible network services. Does that mean we will not have CoS, QoS, SLM, or business KPIs? As

yet we do not know what those things will look like across the industry, or whether they will be true end-to-end application or business outcome SLAs.

This is hugely significant for the CIO. If they cannot provide these features and functions in-house, they should have a service provider who can help manage all of them.

THE CHANGING ROLE OF THE CIO

The CIO as service provider

In the future, a CIO's view of the network might be that of a virtual service provider, federating pieces of infrastructure across corporate customer premise-based LANs and the company's own service management architecture. These CIOs will have access to an intelligent network that will act in a similar way to a development toolkit. This network will share platforms and features internally, and, most importantly, will be open to service partners, third-party application developers, and the corporate customer.

Ovum has evidence of this occurring already. We track an increasing combination of network infrastructure, software, and business process outsourcing (BPO) in service delivery for large businesses. This is a phenomenon that Ovum has identified in its ICT services market quarterly analysis (*ICT Services Market Share: 2Q11*). Our data shows that all the elements of the ICT services proposition – network infrastructure services, software and IT services, and business process consulting – combine in the modern intelligent network.

The CIO as COO: operational preparedness and business process Czar

The CIO must be equipped and organised to drive the migration from the old model and architecture to the new intelligent provision model. In this environment, the CIO is taking a role akin to a COO, starting to assume responsibility for the transition and for managing the business process changes required of the enterprise.

Many of the new communications services allow for greater collaboration and co-operation among employees, but we have found that all enterprises require special programs to encourage the use of new communication tools. This is no different to application training for the users of a newly deployed software application, except that the CIO is now being asked to be responsible for the ROI and increased use of such applications, and not just for their development and deployment.

The CIO as internal IT distributor

The CIO has become the responsible party for the deployment, maintenance, and maximum usage of IT resources and applications. With the increased importance of the network within communications, IT, and cloud services, it has become critical to consider all vendors, including telco operators, when making decisions on services. It is also less feasible than ever to consider IT services and network services separately.

As applications and services have moved to the network, where they increasingly are hosted, stored, and dispersed, the first task of CIOs is to find a network partner. This means a service provider that can optimally distribute and redistribute IT resources to exactly where they are needed, at exactly the right time. Luckily, service providers have acquired new technical capabilities, behind which they have added corresponding professional services, customer support, and management processes.

The CIO as HR manager: "employee-centric" IT

In addition to the employees within the CIO's traditional organisation, the CIO has to manage the technical skills of the enterprise at large. They also have to manage user expectations in a world where consumer experience is influencing employee perceptions of business IT. With the increasing number of remote employees, the CIO must also be concerned with a range of devices and methods of corporate resource access, as well as the management of employee expectations and HR policies regarding device and safe network use.

The increased number of devices, applications, and various network assets will put stress on some CIOs to work with HR departments. They must work together on the screening of new employees and the assessment of existing employees in relation to the appropriate and efficient use of corporate resources.

However, not everything will be more of a headache. A self-service model for corporate users will emerge, modeled on consumer self-service, where online support is the preferred method by corporate users.

THE NETWORK AS AN INTELLIGENT ASSET

Enabling the CIO to be strategic

Put simply, the CIO's set of KPIs is dramatically different from just a few years ago. The CIO must deliver strategic development for the organisation, and this depends on the compute power, budget flexibility, and control that an intelligent network can bring. An intelligent network can help an organisation come to grips with the multifarious challenges to efficient and effective IT delivery in a world where content and access within the enterprise are being "democratised".

Ovum believes the CIO of tomorrow should:

- Take a forthright approach to enterprise requirements. The intelligent network offers multiple services and features, but their use is not compulsory, and as we have seen, a mixed estate approach may well be appropriate in many cases. Likewise, the CIO does not have to opt for the highest levels of user access and control for everybody.

- Identify ways to move from cost to opportunity, and convince other senior managers of the strategic nature of the network. They should be able to explain the potential for promoting business development, as well as supporting a group-wide cost-management program.

- Reinforce partnerships with service providers and technology suppliers. They must help partners to understand the role of their service or product in the enterprise's business plan, as well as the CIO's own plan for the development of network-based applications and processes.

- Prepare the IT office for new ways of working within the organisation. This means co-operating with other departments, including operations and HR, and their leaders, and taking a more direct role in helping employees understand and use networking resources more effectively to meet their own KPIs.

- Above all, be honest in the evaluation of the intelligent network, and ask if it is working to the company's advantage. Does the conferencing management tool work effectively with the other UC applications? Is it easy to use, and is service quality maintained in all sessions, even when demand is visibly heavy? If the CIO is getting good service from the intelligent network, they can feel confident that clients are too.

APPENDIX

Methodology

This report is based on surveys of 600 large businesses and 110 multinational corporations conducted throughout 2011, as well as Ovum analyst conversations with CIOs at the world's largest corporations, and interviews with over ten service providers regarding network and cloud-based ICT services.

Further reading

Enterprise Networking in 2020, OVUM051793 (January 2010)

ICT Services Market Share: 2Q11, OT00089-003 (September 2011)

Multinational Corporate Survey 2011: Cloud Services, OT00080-016 (August 2011)

Multinational Corporate Survey 2011: Sourcing Global Services, OT00080-017 (October 2011)

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