A new way of working

The nature of work has changed fundamentally and forever and it continues to evolve rapidly. Geographic distance and borders are increasingly irrelevant and transparent.

- More than 6 in 10 end users indicate flexibility is more important than extra salary, driven by significant proportions in Australia, Brazil, Spain, India and Mexico. (Cisco)
- A third of office workers will no longer be based in a traditional office (Citrix)
- Nine out of ten organisations plan to embrace flexible working – 52% already have (Citrix)

The result is that a workplace revolution is underway. The workplace is no longer the office. Employees are working on any device and in any location and expecting the same corporate IT experience.

Organisations that are not embracing a new way of working and communicating risk not just impacting productivity but the ability to recruit and retain the next generation of employees.

As an international IT solutions and managed services provider, Logicalis can help organisations enable a comprehensive strategy for enabling flexible working, including the technological framework that enables collaboration and communication, securely across any device.

Logicalis in conjunction with Cisco, the worldwide leader in IT, have produced this Guide to Teleworking Technologies as an introductory overview and explanation of the role that technology plays in enabling effective teleworking – one of the established approaches to enabling Flexible Working.

“...work is something people do, not a place they go. Through mobile workstyles, work can be effortlessly shifted across people, locations, devices and time. It’s also a shift in fundamental thinking.”
Teleworking is part of a range of flexible work practices that has been growing progressively within organisations of all sizes and verticals globally, and fundamentally represents an extension of how an organisation or business works today. While not new in itself, but accelerating in popularity with the consumerisation and accessibility of enabling technologies, telework embodies a suit of new work practices that may include part-time work, job sharing, flexible start and finishing times, compressed working weeks, term-time work and arrangements to work from home or other remote locations.

Referred to narrowly as ‘telecommuting’ or more broadly as ‘anywhere working’, telework forms an important part of flexible work practices that is reshaping organisational culture. In many instances, these work practices are being demanded by employees and offered by employers to bring about better work-life balance for employees, to increase productivity and engagement, or simply as a talent acquisition or retention instrument.

For employers, telework offers greater employee engagement, job satisfaction and output leading to increased productivity; greater retention of valued staff; more ability to recruit staff with desirable skills and experience independent of where they live; reduced office costs; high floor-space utilisation; reduced carbon footprint from employee commutes, and business continuity in the face of major weather events and other disruptions.

Teleworking is the practice of working remotely on a scheduled or regular basis while using ICT to stay connected to the office. It by definition doesn’t imply that teleworkers must be removed on the office on a full-time basis (teleworking is actually more effective on a part-time basis), nor does it require that staff work from home. Teleworkers are fundamentally an extension of how an organisation or business works today.
For employees, telework provides better work-life balance, savings in the time, stress and cost of daily long commutes to work; greater ability to combine two-income parents with family and carer responsibilities; improved health and productivity; and greater ability to contribute to local community voluntary and cultural activities.

From a public policy perspective, telework also has the interest of government as a platform for technology adoption and economic development. Research has shown that if 10% of Australia employees were to telework 50% of the time, the total annual gains to the Australian economy would be around $1.4B - $1.9B and that, by 2020-21, would create the equivalent of an additional 25,000 full-time jobs. Social and environmental benefits of telework include helping reduce urban congestion and pressure on transport infrastructure in major cities, as well as increasing employment for people presently disadvantaged by location, disability, age and/or carer responsibilities.

To achieve the benefits of telework as part of flexible workplace practices, telework should not be treated simply as an add-on to existing work practices and management systems. Making telework a success requires the development of new skills and capacities for leaders, managers and employees, and spans:

- **People**: mindsets, leadership and management; relationships and collaboration; and social inclusion through workforce participation.
- **Processes and policies**: organisation culture; information management; time and productivity management
- **Infrastructure**: physical and technological

Telework is a feature of tomorrow’s workplace and the outcome of enabling a business for Flexible Working – using an agile IT infrastructure to allow staff to work collaboratively, independent of location and device (visit [http://www.au.logicalis.com/flexibleworking](http://www.au.logicalis.com/flexibleworking) for more background on this new workplace approach). Technology has a vital role in enabling teleworkers and providing capabilities that can compensate for being away from an office, but at its simplest, the requirements and tools for enabling Teleworkers are not that dissimilar to those required to enable staff working across different locations, and should be considered as part of a broader organisational worker-enablement strategy.

‘You are not alone. Nine out of ten organisations plan to embrace flexible working. 26% of staff want to be given the ability to work from home, and an additional 25% of staff want to be given the ability to work from anywhere, including home.’
From a technology perspective there is no singularly correct approach or solution for teleworkers. Multiple influencers exist, be they business size, role and function of the teleworker, how collaborative the organisation, and the anticipated frequency and volume of teleworking. It is also a multi-dimensional challenge (Figure 1) that must look to:

- **Employee workspaces** – catering to the needs to teleworkers when they are working remotely, but also when they are in the office
- **Tools and Systems** – the user-facing tools provided to staff, but also the back-end systems to enable teleworkers
- **Staff Enablement** – considering not just the enablement of teleworkers, but for all staff in being able to work with teleworkers.

The appropriate mix of technologies – whether networking, communication, collaboration and information management – should be defined by the business needs of teleworkers. In a growing number of businesses however, teleworking is an attribute of the evolution of organisational culture and technology platform around flexible working, collaboration (and video), mobility and bring-your-own-device (BYOD). Irrespective, the introduction of technologies in support of teleworking can be disruptive and businesses should be mindful that technology is only part of the flexible working / telework puzzle. It’s highly recommended that the expertise of an ICT solutions provider such as Logicalis be utilised to help navigate the range of technology options that are both available and relevant, negotiate the security implications of opening up business networks to external parties, and provide guidance on how to manage the people and cultural elements of technology change.

‘A comprehensive flexible working strategy generates the best results when it encompasses three main components: technology (the infrastructure that supports secure enterprise mobility and collaboration); policies and processes that mitigate risk and the physical workspace that makes it easy for employees to collaborate.’
Telework should not be confused with Remote Access (the simple ability for staff to access company networks externally). Teleworkers have a more consistent and prolonged need to remain connected and engaged with their co-workers and company systems; they need Remote Workspaces.

These must be seamless and transparent to how teleworkers need to work, must be flexible in how they cater for a range of deployment situations, must be accommodating of different working styles, and inclusive in terms of allowing the teleworker to stay an active part of the organisation and their team. Consequently the infrastructure used to enable teleworkers and their Remote Workspaces must be simple (teleworkers cannot be expected to be IT specialists), predictable and robust.
Remote Workspaces manifest themselves in two broad ways:

- **Telework home offices** – an ergonomically safe and productive working environment within an employee’s home, capable of being closed off from household distractions. This is ordinarily a desk in a private space, a study, but can be as extravagant as a bungalow or as basic as a laptop on a kitchen table.

- **Smart Work Centres** – Also known as Digital Work Hubs or Telework Centres, these are a new form of urban or peri-urban infrastructure that provide a shared space from which teleworkers, mobile workers and small businesses can work. They typically provide a comprehensive set of office facilities similar to a serviced office (i.e. work spaces, meeting rooms, office equipment, networks and IT, kitchen etc.) but do so on a casual rather than leased basis - essentially ‘book-on-demand’ office spaces. *GPT, a large property investment company recently acquired a share in Liquid Space so that they can offer real estate tenants use of ‘on-demand’ office space for overflow or remote workers. Their attraction, beyond facilities which would be valuable to teleworkers who don’t have a suitable home workspace, includes social interaction that teleworkers may invariably miss if working remotely much of their time, the ability for multiple teleworkers from the same organisation to have a common, local and convenient place to meet, and the ability for businesses to utilise the Smart Work Centre as a local presence.*

The key technologies required for establishing an effective Remote Workspace, whether it’s at home or leveraging a Smart Work Centre are outlined in Figure 2 and include three broad elements:

- **Connectivity** technologies for enablement
- **Collaboration** technologies for productivity and effectiveness
- **Workplace** features to provide a professional working environment
Any focus on employee productivity and efficiency must be supported by the right foundation; whether it's workforce vision, change culture, tools or a combination. In the case of teleworkers, this foundation includes basic connectivity; enabling teleworkers to reach back into their organisations when working remotely in order to access the networks, resources and information that their individual roles may rely on.

While connectivity from a basic networking sense is fundamental and provides the means to move data and information from the office to the remote worker, security is paramount as telework invariably require users to connect via the Internet. The challenge with security is how to provide open and free access to authorised users, while being controlling and restrictive to those who are unauthorised, or are determined to appear authorised.

Teleworkers must also be provided access to the applications they need to perform their roles, which typically requires a review of application delivery and end-user computing approaches to ensure that applications can be delivered reliability and securely outside the business. This may look at the portability needs of remote workers as well as their support self-sufficiency, may extend to the devices they are provided, the commercial terms on which these are provided and allowances made in the office and at home, in terms of local access networks, to simply connection.

**Broadband Connectivity**
Teleworking doesn’t require a specific type of broadband service; wireless (e.g. 3G, 4G, WiFi, WiMax), or fixed (Cable, DSL, NBN) are all viable given they can provide sufficient speed (Mbps). Wireless connections can be problematic, sometimes hampered by coverage and signal strength issues inside teleworker houses, and in the case of 3G data, not designed to carry voice or video conversations. The predictability of “fixed” broadband services, and their ability to carry, data, voice and video make them ideal for teleworkers.

**Speed**
Download and upload speeds are equally important to teleworkers, influencing not just how fast documents and emails can be sent or received, but in the case of upload speeds, determining the types and quality of real-time collaboration that is possible.

Broadband speeds of 1.5Mbps down and 256kbps up (e.g. ADSL) are just suitable for teleworking and may struggle when trying to have a voice conversation or share a desktop while sending and receiving files. ADSL2+ or cable services that provide in excess of 10Mbps down and 1Mbps up are well suited for teleworking and allow for video calling. NBN services come into their own with promises in excess of 20Mbps down and 4Mbps up, making them ideally suited for all teleworker activities at once, including high definition video conferencing.
Service features such as Quality of Service (QoS) help broadband services balance the different performance needs of voice, video and data, and while preferable are by no means critical or essential for teleworking from home.

**Download Limits**

Broadband services typically impose a download limit (GB's of downloads per month) before the ISP begins to slow the speed of the connection. In the teleworking context, these limits apply not just to Internet downloads but to all data sent and received from the teleworker’s business. 1GB per day is an effective planning indicator for most teleworkers, although those who are frequent users of high definition video conferencing have been known to use up to 5GB a day.

**Funding**

There is no accepted practice for employer-funding of teleworker broadband services, with the matter left to the discretion of an individual organisation’s compensation and benefits policy. Some businesses operate on the premise that most of their employees have broadband already and view employer-funding as an unnecessary complication. Conversely, some businesses offer reimbursement of home broadband services (via a direct or expense-able stipend) as a general employee benefit in support of flexible working, and to reduce any potential negative sentiment from proactively encouraging teleworking.

**Secure Access**

Connectivity alone doesn’t enable teleworkers to access their organisation’s information and resources; a means of secure passage through the layers of IT security is necessary.

Virtual Private Networks (VPN’s) establish a secure, authenticated and encrypted link from the teleworker, across the Internet and into a VPN Concentrator located as a gateway to their employer’s internal network – a capability embedded in most business-grade Network Routers (such as Cisco’s Integrated Services Router – http://www.cisco.com/go/isr). Once in place, the VPN connection provides the conduit through which company internal information, systems and resources such as filer access become accessible.

Establishing a VPN connection typically requires a username and strong password that must be registered with the VPN Concentrator, although stronger implementations also utilise a token (such as RSA Security’s SecureID) or similar 2-factor authentication that follows to the principle of ‘something you know’ and ‘something you have’.
The most common method of VPN connection is via software client, a piece of software that is installed on a teleworker’s computer or as a feature of more recent operating systems. Teleworkers simply turn on their computer, open the VPN client and enter in their username and password to establish the VPN tunnel and become securely connected to their office network.

A less common, but emerging approach, and one that is preferred by larger organisations with advanced technology needs or a significant number of teleworkers, is to install a networking appliance in the teleworker’s home to initiate the VPN. These appliances can be Small Branch Routers (such as Cisco’s Integrated Services Router – http://www.cisco.com/go/isr), or optimised Wireless Access Points that can extend office wireless networks outside the business using VPN technology (such as Cisco’s OfficeExtend wireless solution – http://www.cisco.com/go/officeextend).

While more costly than VPN software clients, these devices make teleworker enablement a function of IT rather than the employee and effectively extends an organisation’s network into the teleworker’s home. There are many advantages associated with this approach including full IT visibility and management of the teleworking experience right to the employee, the ability to extend company wired and wireless networks securely into the employee’s home, the simplicity of teleworkers not needing to do anything special when working from home versus the office (including entering multiple levels of usernames and passwords), and the ability for teleworkers to use a range of physical devices, including desk phones, as part of their telework setup. This approach also allows for enterprise-grade security to be extended to the teleworker, and for the broadband service connecting the teleworker to be managed and optimised for communication, collaboration and cloud-based application delivery.

Appliance-based teleworking is favoured by global IT equipment manufacturer Cisco, where a majority of employees have telework as part of their workplace arrangements and where a range of virtual infrastructure solutions have been developed internally to serve their 25,000+ strong community of formal teleworkers. Learn more about Cisco’s experiences at http://blogs.cisco.com/ciscoit/how-cisco-it-delivers-teleworker-services

Not all telework enablement uses a VPN. Organisations who use a cloud-based application model (where content and applications are delivered from public or private clouds – see the Applications section) avoid the need for VPN’s per se by using web browsers or specialist receiver applications to connect to Cloud applications. This approach allows teleworkers to remotely view, interest and modify documents without requiring them to leave the security of their employer’s secure facilities. Authentication is by username and password, similar to VPN’s, with encryption provided by the web-browser or receiver application.
Applications
Teleworkers need to be able to apply the same work practices across traditional and Remote Workspaces, which means that they need to have a consistent set of applications available to them no matter where they work. The challenge in enabling teleworkers is to determine the best approach for delivering the required applications, ensuring that teleworkers can be supported like any other user, and managing the security of data used by any given application.

While the mix of applications will vary from business to business, three broad application delivery models exist for teleworkers:

Local Desktops
Teleworkers are provided a notebook or similar personal computer on which applications and content are stored. IT administrators need to be concerned with data protection (backups in the event of loss), data security (virus protection, hacking) as well as the ongoing management and support (upgrades & patches) of remote users.

Desktop Virtualisation
Applications and content are moved off the local desktop and served from an enterprise data centre. Multiple computing desktops (for each staff member or teleworker) reside as virtual computing instances on centralised computing infrastructure, becoming accessible to teleworkers through their web browser or a special receiver application. From a user perspective, the instances look and act like a local desktop but the advantage is that the applications are centralised for easier management, content and data is stored in a secure data centre on not on teleworker laptops, and the desktops themselves can be accessed from virtually any device platform; home computer, company notebook, tablet or even smartphone. Desktop Virtualisation can be enabled by software applications such as Citrix XenDesktop (http://www.citrix.com/xendesktop), Microsoft’s Windows Terminal Services or solutions such as Logicalis’ Virtual Workspace (http://telework.au.logicalis.com/LVW).

Figure 5: Desktop Virtualisation moves content and applications into the data centre, via multiple virtualised computing instances
‘Like widespread access and use of electricity, cloud computing is a potentially disruptive and transformative innovation. The term ‘cloud’ refers to the fact that a user of a service no longer needs to buy, build, install and operate expensive computer hardware. Users simply access computing resources as a utility via a ubiquitously available wired or wireless network – from the ‘cloud’.

Department of Broadband, Communications and the Digital Economy

Cloud Services
Cloud services provide a new form of consumption for businesses to deliver applications to their end users. Instead of making large investments in dedicated software systems and computing infrastructure, businesses (or users) pay a monthly (or periodic) utility fee to a service provider who provides the application, the computing power behind it and its ongoing management and support – effectively a complete application outsource, or Software as a Service (SaaS). From a teleworking perspective, and like Desktop Virtualisation, Cloud services allow teleworkers to access their applications and data through a web browser, from any device of their choice, and anywhere with an internet connection; whether in the office or out of the office.

Organisations who transition their staff population to Cloud services, apart from the scalability, functionality, agility and commercial benefits, are able to provide teleworking to all staff with minimum expense. Over the next decade, IDC is predicting that business innovation will be based on high-value, industry-transforming solutions and services built on a cloud platform, in what they term the second and third “waves” of the Cloud: “solution-driven growth of cloud services means that cloud can no longer be viewed as a standalone technology. Big Data, mobile, and social technologies and solutions are all heavily dependent on the cloud services delivery model: in effect, these solutions can’t exist without the cloud model as the underlying platform.”
Computing Mobility

Mobility is an essential aspect of teleworking, in part because teleworkers can be expected to move between their office and a Remote Workspace, but also because teleworkers inherently develop a sense of location independence. This may see them work from home, from smart work centres, or from local cafes – however they see fit for their own personal productivity.

The computing options available to teleworkers are limited when a Local Desktop application model is in use. Notebook PCs in their various size and performance flavours are essentially the only viable option, although the advent of PCs in tablet form factors – which add touch and pen-based input options, such as Samsung’s ATIV Tab (http://www.samsung.com.au) – provide some additional utility.

This model works best when the computers are employer-provided, enabling an organisation’s Standard Operating Environment (SOE) – complete with licensed applications and appropriate security controls – to be carried around by staff. Using home computers introduces complications with application licensing, ensuring the right types and versions of software are available to teleworking staff, and managing the security risk from any viruses, malware or other exploits that may be on the home computer.

Some smaller organisations use remote access software, such as the Remote Desktop feature of Microsoft Windows or Symantec’s PC Anywhere, to allow home based workers to use a home computer to access physical work computer in their office. This overcomes software licensing and most security issues but in itself can prove a clumsy approach with regular and sustained use. It requires two computers to be active, often isn’t optimised for extended use, and will require staff in the office to assist with ensuring computers are on (or leave the work computer on all the time) and assisting if physical intervention is needed in the case of a computer or software crash.

A broader range of options become available when using a Virtual Desktop or Cloud Service application model:

- **Notebook PC’s (employer-provided)** – while not precluded for use with Desktop Virtualisation or Cloud Services, these become more platforms for mobility than computing, which can leave them being expensive under-utilised assets.

- **Chromebooks** – a relative new type of computing platform driven by the emergence of web-based applications and Cloud services, these provide a notebook-style experience but with a web-optimised operating system (the Google-led Chromium OS, based on Google’s Chrome web browser) instead of the more traditional Microsoft Windows or Apple OSX. Cloud services allow Chromebooks to have substantially reduced computing power, which in turn makes their cost significantly below that of a ‘normal’ notebook.
Personal (Home) computers; notebook or desktop – as Desktop Virtualisation and Cloud Services are accessible through web browsers or freely downloadable receiver applications (such as that used with Citrix Virtual Desktops or Citrix Virtual Applications), home computers can be used as teleworking platforms without requiring the installation and licensing of business software, or introducing virus and malware concerns into an organisation’s internal network.

Thin Clients – these are stripped-down desktop computers that run a web-optimised operating system like Chromium OS, or a lightweight ‘embedded’ version of Microsoft Windows. Like Chromebooks, thin clients rely on Cloud services or Desktop Virtualisation to provide most of the computing effort, reducing their required computing power and therefore their cost. While not in themselves mobile, a teleworker could move between thin clients at their office and a thin client provided as part of their remote workspace with, in the case of Desktop Virtualisation, their desktop instance remaining active in the background as they log out from one terminal and in from another.

Zero clients – are exactly like thin clients but without an embedded operating system. They have one function only – to boot into a Citrix-style Receiver application that provides access to a Virtual Desktop session. As zero-clients avoid the licensing costs of an operating system, they are slightly cheaper again than thin clients.

Tablets – with web browsers and virtual desktop receivers being available for the iPad and Android tablets, the prospect of using standard business applications on tablets (or smartphones) becomes a reality. Tablets are better suited for occasions when teleworkers are between workplaces rather than as a main computing platform replacement, but with tablets having more computing power than thin clients, and the ever-growing accessories market introducing external monitor, keyboard and mouse options for some tablet models, this time won’t be far off (see http://telework.au.logicalis.com/labs).
Funding
The accepted practice of employers providing computers to their staff as business tools extends to teleworking. In the case of notebook PC’s, it’s the same device used for in the office and the Remote Workspace, although with the adoption of Cloud Services or Desktop Virtualisation, employers could provide a teleworker with a thin client for their home and the office and still have change left from the cost of a notebook.

The emergence of Bring Your Own Device (BYOD) as an alternative to the Corporate Owned, Private Enabled (COPE) model above leads to some confusion when it comes to teleworkers. A BYOD situation creates itself when an employee elects to bring a device into the workplace that is an alternative to the corporate standard (e.g. An Apple MacBook Air, when the standard laptop may be a Samsung Series 3), or is supplemental (e.g. an iPad for business use, when tablets aren’t a standard issue device). Some organisations go as far as paying staff a stipend for the projected cost of the company-funded standard device to allow them to purchase one of their own preference.

In the teleworker context, some employers question whether technology in the office should be their responsibility and computing in the home offices that of the employee via a BYOD model; therefore pushing the responsibility for purchase and upkeep onto the employee? While at the discretion of each independent business, the common recommendation is for teleworking policies to define the standard computing model for all employees: teleworker or otherwise (preferably this computing model would provide for employee mobility and workplace flexibility). Any deviation from this policy would be considered BYOD, and fall under the relevant BYOD policy and IT control measures.

Some organisations also operate under the belief that allowing their staff to BYOD introduces a security risk. BYOD, left unchecked, can be a source of security concern but widely proven approaches exist from technology, policy and management perspectives to manage these effectively. BYOD for example, coupled with Desktop Virtualisation, Mobile Device Management software and Network Admission Control technologies (see Figure 9) allows organisations to set security policies and controls on BYOD devices (e.g. passwords, version numbers). These are then validated by the network prior to allowing connection to the business (Network Admission Control security posture assessments), with Desktop Virtualisation managing the delivery of applications and content. More insight into BYOD and its management within the business can be found at http://telework.au.logicalis.com/BYOD.

Office WiFi

Figure 9: BYOD security model
A Mobile Computing approach needs to be supported by an easy way for teleworkers to connect when they move between workspaces and offices. Office wireless networks (WiFi) provide this flexibility by allowing visiting staff to easily connect to the office network from anywhere they can open their computer. When provided as part of a Remote Workspace, WiFi provides the same flexibility for teleworkers in their home and avoids the needs for cables (which themselves may be a workplace safety issue if not appropriately implemented).

WiFi networks are constructed using Access Points and Controllers, with multiple Access Points used in office networks to meet user-density, coverage and throughput (performance) requirements. A single Access Point is usually all that is required for a Remote Workspace. There are several different WiFi types, with a different level for performance – older 802.11a/g (found in smartphones, tablets and older laptops) can provide speeds up to 54Mbps, 802.11n (newer computers) can provide speeds up to 600Mbps and the newly released 802.11ac provides up to 1Gbps. WiFi standards are generally compatible with each other, so an 802.11ac standard network can still connect older (slower) devices, with throughput shared across all devices that connect to an Access Point. Security is most commonly managed by WiFi Protected Access (WPA2), a collection of authorisation and encryption technologies that in some ways can make WiFi networks more secure than wired networks.

Activity-Based Working
Office WiFi has an import role to play not only in the support of teleworking in the traditional workplace, but also workplace evolution. Office spaces are starting to evolve in layout and design to be based on activity rather than location, and to allow staff in the office to easily collaborate with those that are remote. The longer-term trend is towards Activity-Based Working (ABW), characterised by a dynamic and stimulating environment offering a range of functional spaces and settings aligned to the tasks individuals and groups undertake.

ABW workspaces are mobile offices enabled by technology. Staff can choose to work in a high-walled ‘cubbie’, a quiet library space or to connect with their team in a meeting room of café area, with full access to email, Internet and phone, all enabled by office WiFi.

Learn more about Activity-Based Working at http://telework.au.logicalis.com/ABW.
Providing platforms for collaboration between staff is a telework must-have. According to research undertaken by the Institute for a Broadband Enabled Society (IBES) at the University of Melbourne, productivity gains from telework are closely linked to the availability and use of adequate technology to enable and support telework, and enable employees to work seamlessly from virtually anywhere.

Not only does a well-planned and executed collaboration capability support organisation productivity and effectiveness, it can underpin teleworker engagement and the ability to extend the social culture of an organisation into Remote Workspaces.

‘The productivity, satisfaction and wellbeing of teleworkers relies on a broad collaboration strategy that provides for messaging, application, phone and video interaction while providing an intrinsic awareness of the activities, movements and achievements of co-workers.’

**Figure 10 : Collaboration is critical for teleworker engagement**
In a traditional working arrangement (Figure 10), staff may have team members and co-workers in other office locations, but it’s the team members and co-workers in the same office that help create a sense of belonging and community, and contribute to overall employee engagement with the organisation. Teleworkers if left unchecked can become isolated from their team members and co-workers for anything other direct job-related interactions. All contact with organisation culture and the social workplace, and ongoing employee engagement, becomes dependent on the broadband link back in the business and the collaboration and social interaction and collaboration options available over it.

It’s important to keep in mind that collaboration is a cross-organisation capability that needs to be applied to the teleworker and extended to everyone in his or her community of interest. Some collaboration technologies can be introduced via the teleworker and extended to office-bound co-workers on a per session basis (see Web Conferences). Others (see Presence, Messaging, Video) require whole of business enablement as a parallel project to telework enablement. Others (see Social & Knowledge Tools) can be on a per community basis, but again as enablement project beyond teleworking.

Figure 11: The right scale and approach must be taken to tool selection and organisation enablement
Voice & Conferencing

Phone conversations are the staple of the teleworker, and it’s important to ensure that not only teleworkers can make calls from their Remote Workspace, but that co-workers, customers and suppliers can easily contact them.

Leveraging the home phone is a basic starting point but has complications which result in it being ineffective:

- **Calling Line ID** – the feature that displays your number to people you call. This may mean that teleworkers are presenting their private, ‘afterhours’ number to contacts, with obvious privacy concerns and issues with returned business calls being made to an employee’s home phone.

- **Features** – home phones can’t access common features of the office phone system, such as the dial-plan (limiting the ability for short-number extension-to-extension dialling), conferencing or various group options such as hunt groups and group pick-up. The loss of these may be more critical in medium or large organisations.

- **Cost** – the ability to make ‘internal calls’ is lost, with every call incurring a charge for the teleworker. The teleworker also loses access to least-cost routing of the business’s phone system, incurring further charges for long distance and international conversations (without access to the buying power of the business to drive down tariffs). Cost recovery (reimbursement) is also difficult, requiring the teleworker to separate personal expenses from business on their phone bills. Installing a second address later, but introduces additional line rental costs.

- **Contactability** – a home line means that the teleworker has a different contact number that must be used if they are to be reached. This either needs to be published (resulting in questions of ‘which number is x on today?’ and requiring contacts to commit to more effort to reach the teleworker), or be call forwarded to from an office phone (complications in remembering to activate, and generating additional business expense from call forward charges). A work-around is for teleworkers to monitor their voicemail regularly but this is neither productive nor efficient for the teleworker or the individuals trying to contact them who lose the opportunity for an immediate response.
Mobile phones provide an alternative, particularly if they are already provided to teleworkers as a business tool. Many home line issues can be solved with mobiles, particularly since the idea of having two contact points (an office / desk and mobile) is ingrained in Australian business culture. Access to features and cost remain issues, although the later can be addressed through service provider fleet plans.

Modern business phone systems use VoIP (Voice over IP) or IP Telephony technology that can transport voice calls over data networks. With a broadband connection in place to teleworkers, businesses with these systems are able to extend office phones into the homes of their teleworkers with obvious benefits:

- **The Remote Workspace number is the Office Number** – calls delivered to the office phone system can be answered by the teleworker, and calls made by the teleworker are made using the office number. Multiple phones can share the same number, so when the office phone rings, so does the Remote Workspace phone.

- **Phone services are portable and can be logged into like computers**. Teleworkers can have their own dedicated phone in their Remote Workspace, but log into a shared phone provided as part of a Hot Desk or Touch-Down Station when visiting the office. This personalises the hot desk phone for the teleworker, including assigning it their phone number, features, quick-dials and other preferences and settings. Vendors such as Cisco refer to this as Extension Mobility.

- **Access to business features** – as an extension of the business phone system, all the conferencing, directories, dial-plan, least-cost routing features made available to traditional office users are immediately available to the teleworker, including the more advanced Unified Communications features (explained later).

Hot Desks or Touch-Down Stations are an approach to real estate optimisation where dedicated desks are removed in favour of shared spaces that staff casually use when they are in the office. They are commonly used in offices to maximise desk space when normal operations may see 20-30% of staff out of the office at any given time, but are equally useful for providing desks for teleworkers who periodically visit an office. Simulations conducted by Logicalis indicate that an organization that enables 50% of its staff to telework 2-3 days a week can use Hot Desks to achieve a 38% reduction in floor space.
‘Informal polling of Cisco employees who telework using Cisco’s Virtual Office solution indicate a high propensity for hard phone use, even though it is an option and an additional departmental expense.’

Cisco

There are several options to providing voice and conferencing services to teleworkers:

**Soft Phones**
These are phone applications installed on teleworker computers that, with the aid of a headset, allow the computer to be used as a business phone extension. Their advantage is they are highly portable, low cost, and can be used by teleworkers using software-based VPN's; their disadvantage is the loss of a physical handset that can be unnerving for some, and their dependence on the computer. Nearly all major phone system vendors provide softphone options.

**Hard phones**
Hard phones (or desk phones) are ideal for teleworkers who prefer a physical device whether out of tradition, habit, for access to features such as video calling and quality hands free, or to make voice communications independent from their computing. Apart from the cost of providing hard phones to teleworkers, these come with the added complication of needing to be connected into a home network. Basic phone models must be connected by a network cable, meaning they must be used somewhere in the vicinity of a broadband modem or wired network port. Higher-end models have wireless link options that simplify connectivity dramatically, or may be wireless handsets themselves. As end-points to a business phone system, typically some level of IT involvement is required to activate teleworker phones once they are connected. Deploying Remote Workspaces using a network appliance model simplifies this, but is not a pre-requisite. The unbridled advantage of using hard phones in Remote Workspaces is their utility; higher end phones such as those from Cisco can be used also as video conferencing terminals, and as a thin-client computing platform – with monitors and keyboards connecting directly into the phone and displaying Virtual Desktop sessions.

*Figure 12: Cisco IP Phone*
Cloud Services
Teleworkers can also make use of free Cloud services such as Skype or GoogleTalk to provide voice connectivity. These are a peer-to-peer system of sorts that, once installed on a user’s computer, allows communication by voice, video and text over the Internet. Calls to other users within the service are free (but they must be also running the same application) but calls to landlines and mobiles are charged via a debit-based account system. While free, these services have questionable security and suffer the same issues identified for home phone line use. They provide an easy teleworker solution for small businesses but are not generally used by medium or large organisations.

Video Conferencing
The adage that human communication is 7% attributed to the words used, 38% the tone and 55% to the visual cues (Albert Mehrabian, 1971 in Silent Messages) describes the influences of whether a person is liked when delivering a message. While not directly attributable to how people communicate, it provides a powerful indicator that communication is vocal, voice and visual. In particular it captures that importance of face-to-face communication, and the role of video technologies when co-workers, suppliers or customers can’t be in the same room.

Video conferencing has come of age over the last several years, and with the reduction in the cost of network bandwidth and the introduction of high definition technologies, it has reached a point where it has specific and high value to offer to communication and is just not a tool for the international corporate boardroom.

There are different approaches and levels of video solution that can be used with teleworkers:

Desktop
These are software applications, either standalone or integrated with a telephony (soft phone) function as part of a Unified Communications solution that can run on a computer, tablet or smartphone. They make use of in-built cameras, or external webcams when a better quality and positioned camera is required. Desktop video is the most cost effective entry point for video conferencing but also offers the lowest quality of overall experience, with screen position and size, lighting and camera type all influencing the outcome. Common business telephony system solutions include Cisco Jabber, Cisco Jabber Video (Cisco’s dedicated video conferencing client). Cloud services such as Microsoft’s Skype provide free video calling amongst users, and applications such as Cisco’s Webex (www.webex.com) provide a powerful video solution as part of a comprehensive Virtual Meeting solution.

‘The verbal component of a face-to-face conversation is less than 35% and that over 65% of communication is done non-verbally.’
Personal systems are also designed for the desktop but provide a more engineered, controlled and refined experience, albeit at a cost. Videophones, such as Cisco’s DX650 Desktop Collaboration Handset (www.cisco.com) provide an always-on high definition video calling capability that frees up a teleworker’s computer to be used freely during video calls. Personal TelePresence systems, such as Cisco TelePresence EX90, also provide an always-on high definition video capability but do it using a much larger screen that mimics a face-to-face conversation (hence the phrase Tele-Presence). These systems include added benefits of being able to be used as an external computer monitor while including a document camera. Personal TelePresence systems are ideal for regular teleworkers who are highly collaborative or traditionally find themselves in many face-to-face meetings (e.g. managers of distributed teams).

Multi-Purpose Rooms
Room-based video conferencing systems aren’t necessarily for teleworkers, but form part of an organisation’s ability for staff in a traditional office to collaborate with other offices, and with video-enabled teleworkers. These are large-screen systems with cameras that look out over groups of attendees sitting around a meeting room table. Multiple rooms or participants can join the one meeting and share video as well as the display from connected computers. More advanced derivations (see http://telework.au.logicalis.com/labs) add the ability for mobile users to join from tablets, for Virtual Workspaces to be integrated as part of a video conference, for participants to wirelessly share content from computers and tablets using features such as Apple’s AirPlay, and have the potential for a single virtual whiteboard to exist across all meeting participants.

Figure 14: Personal video solutions - Cisco DX650 phone (left) and TelePresence EX90

Figure 15: Room-based Video Conferencing system
Immersive Rooms
Like multi-purpose rooms, these are beyond the needs of the typical Teleworker. Immersive TelePresence represent the upper echelon of video technology, offering life-sized images, special lighting and audio that all designed to replicate a face-to-face meeting as much as possible, including tables that give the illusion of being extended through the video conference. They aim to make the video conference as transparent as possible by tricking the sub-conscious into thinking that the parties are sitting in the same room, and across a table from each other. Immersive TelePresence systems have found their way into the homes of senior corporate executives or bureaucrats who rely on teleworking to manage work-life balance around the demands of extended work days, or find themselves meeting managers, peers or staff across multiple time zones in early mornings and late evenings.

Enabling teleworkers with video is an import contribution to their potential productivity but it must be kept in mind that video conferencing is a two-or-more-way exchange, and that providing teleworkers with video is pointless unless those they are expected to collaborate with are also enabled. A video investment strategy across the organisation that includes rooms, private breakouts and eventually desktops is just as important as enabling teleworkers.

It follows then that interoperability is necessary between Desktop, Personal and Immersive approaches, and between staff working in traditional offices, teleworkers working from Remote Workspaces and even staff who are mobile in the field. The ability to conference into other organisations is also an advantage, and while industry standards are working towards making this a common capability, varying implementation approaches, security models and configuration schemes make this a challenge for basic video calling, let alone more demanding video conferencing.

Businesses should also not underestimate the strain that video conferencing can place of networks. There are the natural bandwidth implications to consider across both local- and wide-area networks (a high definition video conference images can require as much as 15Mbps on a shared network), as well as specific infrastructure requirements to enable conferencing (video switches, scheduling systems, conference bridges) and intercompany connectivity (gateways, transcoders).

Presence
Members of teams distributed across different locations lose visibility of each other’s movements, activities and availability once they lose the ability to see each other’s desks. So too do teleworkers when they remove themselves from a traditional workplace and start working remotely.
Unified Communications

Unified Communications (UC), as a direction of the IT industry, has worked to address this with a collection of tools and capabilities built around the convergence of telephony, computing and networking. It aims to integrate a suite of communications capabilities – including voice, e-mail, instant messaging and presence; web and video conferencing; and social media capabilities – and give users a single interface from which to access them. Unified Communications is recognition that the way we work is changing to be more participative and collaborative, that email and phone calls are no longer sufficient, and that communication needs to expand to include broader, richer interactions. More explanation of UC, its benefits, and its application to your organisation can be found at http://telework.au.logicalis.com/UC.
Presence is Key

Presence is a status indicator that conveys to co-workers a willingness and ability to communicate. It is provided in two parts:

- **A Presence service** – either as part of a business’ Unified Communications infrastructure, such as Cisco Unified Communications Manager (CUCM) or as a free online service from Skype, Google, Yahoo! which may suit smaller organisations.

- **A client** – interacts with the Presence service and displays the status of users being followed. Each Presence service usually has its own client; Cisco Jabber, Skype, GoogleTalk or Yahoo! Messenger, although there are a multitude of application alternatives that provide different user interfaces or aim to consolidate multiple services into one view.

Presence draws its data from a range of manual and automatic inputs such as activity timers, calendars, and registered phones. It enables a user (e.g. a teleworker to their peers, or peers to teleworkers) through a single interface to check the availability of people they follow in different locations, reporting various states such as “available”, “busy”, “away”, “on the phone”, “in a meeting” or “do not disturb”, as well as custom messages that users may use to broadcast other rich information (see Figure 18).

While provided through dedicated clients, presence information is also finding itself integrated across computing environments. Common examples include being added against user addresses in emails and in documents and against author details in document management systems like Microsoft’s Sharepoint. With this integration into various business applications and process workflow tools, users can be alerted to each other’s availability before ‘click-to-dial’ing or determining a more appropriate method of contact.
Messaging
Messaging is part of the Unified Communications capability-set and a valuable contributor to a teleworker’s collaborative potential.

Email
Email is a given considering its capacity as a major conduit of messages, communication and files between an office and teleworkers. External email services need to be extended to teleworkers without complication, whether done so via VPN only or by enabling external access for email clients through features such as Microsoft Outlook’s Web Access.

Unified Messaging
A common enhancement to voicemail, unified messaging delivers voicemail messages to a teleworker’s email inbox, usually as a message with an audio file attachment, or via playback through a Unified Communications client. Unified Messaging is ideal for teleworkers not equipped with a phone extension in their Remote Workspace (perhaps working off their mobile phone). Rather than periodically checking for messages manually, Unified Messaging allows the teleworker to see voicemail messages as they are left.

Instant Messaging
Instant Messaging (IM) provides an online chat capability to teleworkers that transmits text in real-time. Having been designed around conversations of short messages between parties, and accepted to have a style that is relatively informal like mobile text messaging, it is considered faster than email and is often extensively used by teleworkers.

IM is tightly linked to Presence and in most incarnations is provided as a feature of the same applications (Figure 17). The services that provide instant messaging are either internal – as part of a UC implementation – and keep IM chatter inside the secure perimeter of the business, or are external and somewhat insecurely transmit messages between users. Public and Private IM networks can be federated to allow communication between companies and user groups. IM can also involve non-text exchanges including the exchange of files and the transmission of images.

A profound impact is often felt by businesses that deploy presence and instant messaging. It alters the way in which conversations are started and how information is shared. Most conversations seemingly start with a Presence check following by an IM exchange; and often don’t need to progress to a phone call or more formal email. The multitasking value of IM becomes quite obvious when an employee is on the phone.

For teleworkers IM provides the important ability to have short-informal conversations with colleagues without having to resort to a phone call or drafting an email. Like Presence however, IM needs to be part of a whole-of-organisation enablement program to be truly useful.
Sharing & Knowledge Tools
Access to, and sharing of knowledge become significant requirements for teleworkers once they remove themselves from the physical office. Beyond sending messages and having conversations, teleworkers need to be able to replicate a key attribute of face-to-face meetings - the sharing, review and joint discussion of documents. For teleworkers, Desktop Sharing facilitates this. The ability to tap in the residual knowledge of an organisation is a challenge for all staff no matter where they work from, including teleworkers. Here Expertise Engines and Enterprise Social Tools prove invaluable.

Desktop Sharing
Desktop sharing is the practice of using collaboration tools to provide a view of what is on a computer desktop to other users using similar tools. Users are typically provided the ability to pass control of the application or desktop being shared between participants during a sharing session.

For presentations, these tools allow teleworkers to share their desktop and their content with other teleworkers, or with office staff sitting in front of their computers or gathered in meeting rooms. The teleworker is able to control the slideshow, or pass control of their computer to other users for them to take control (i.e. in a shared presentation model).

For documents, a similar set of capabilities exists. Teleworkers can share their desktop or application and show the document being worked on in real time. By passing control to another user, the ability to edit and change the document can also be passed, with the teleworker viewing the changes as they are made.

Desktop Sharing is also a Unified Communications feature that can be found in telephony clients such as Cisco Jabber, and it can also be a feature of web conferencing services, such as Cisco Webex. These provide desktop sharing in one-to-one or one-many scenarios and couple it with meeting tools that include whiteboard note-taking, annotation, video and audio conferencing or text chat (see; to desktop users or mobile participants joining from smartphone or tablet. These platforms can also usually record meetings – screen share, audio, video and notes – for later playback and review. They have the advantage that they can be activated for teleworkers and extended on an on-demand / per-session basis to non-teleworking staff without needing a whole-of-organisation adoption program.
Expertise Engines
Business directories that capture the contact details of staff are commonplace, yet the challenge in distributed and growing organisations is not necessarily finding people, it’s knowing whom to find. This challenge is exasperated for teleworkers who don’t have the luxury of casually asking the person next to them for help.

Expertise Engines, also known as Media Engines, are a relatively new technology that inspects data and information as it traverses networks, categorises it by subject matter, tags it based on content and originator, and adds the result into business directories and search engines. This avoids the need for manual staff-driven tagging that invariably inaccurate, incomplete and becomes out-dated.

Particularly relevant to [large] organisations with highly distributed workforces including teleworkers, Expertise Engines are adept at identifying hidden knowledge and data in an organisation and making it available to staff.

Enterprise Social Tools
Social networks have proven effective at sharing life’s moments, events and thoughts amongst friends, family and acquaintances. The same principles and approaches are beginning to be adapted by businesses in the hope of achieving the same level of impact, awareness and participation in a ‘knowledge enterprise’.

Enterprise collaboration platforms, such as Cisco’s Webex Social (http://www.cisco.com/go/webexsocial), look to combine social networking with content creation and real-time communications, with the objective of breaking down organisational silos and promoting more effecting communication, as well as sharing and collaboration across departments and geographies.

These tools sit atop a Unified Communications infrastructure and provide staff access to:
- Online workspaces with file storage, version tracking and commenting
- Discussion groups to drive online conversations on project work or deliverable
- Collaborative editing of documents and information
- Community document creation and editing; like Wiki’s
- Micro-blogs of personal activity and focus
- Dynamic communities of like-minded, skilled or aligned people
- Searches across people, experts, communities and content
- Activity feeds on file-uploads, downloads, comments and individual activity
- Group task allocation and management

Social tools are a growing trend across businesses of all sizes, and through the ability to move knowledge management and organisation awareness out of the physical office and into a web browser or application, are highly relevant to teleworkers.
Beyond technology, there is additional infrastructure and programs that may be appropriate to consider as part of teleworker enablement:

- **Furniture** – Employee comfort, workplace safety assessments or company standards may require ergonomic chairs, lighting, secure file storage (for organisations with particularly stringent privacy requirements) and, less commonly desks, to be scoped as part of a Remote Workspace enablement. This can also include computer monitors and keyboards, if not already captured by the telework computing strategy.

- **Incidentals** – Remote Workspaces are in effect offices and depending on the nature of the employee’s role and anticipated telework activities, incidental items such as whiteboards, shredders, printers and document scanners may need consideration.

- **Installation & Onboarding** – Teleworkers cannot be assumed to be technically literate and capable of self-installing the technologies associated with enabling their Remote Workspace. Any technologies deployed need to come with on-site installation and configuration; and as a foundation for productivity, some degree of user familiarisation and training (e.g. usage and adoption focus).

- **Support** – With teleworker technology issues usually the result of integrating a Remote Workspace into a home environment, it is neither effective nor efficient to rely solely on office-bound or phone IT support for teleworkers. Teleworkers and their Remote Workspaces should be considered as small branches, and need to have suitable on-site support models in place to preserve operational uptime.

- **Change Leadership** – modifying where and how an organisation’s staff work is a disruptive change that technology alone cannot address. Organisations need to look beyond the basic introduction of technology and to its people and process. The art of change (communication and training) must be managed, but so too the mindsets, attitudes and behaviours of teleworkers and staff. This requires a Change Leadership program across the organisation; from executive to management to staff (general and teleworkers). Learn about the importance of change leadership in technology projects at http://www.au.logicalis.com/change.
Bringing Together a Strategy

Through the range of technology options, a consistent narrative exists that captures the best practice of how enterprises are approaching teleworking.

Central to these efforts, and captured in Figure 21(1), is the whole-of-business efforts to create collaborative knowledge enterprise and provide unified communications (UC) capabilities to all staff as a standard business toolset. Across desktop and mobile platforms, this includes activating or adding presence, instant messaging and web conferencing via internal telephony infrastructure. It includes the introduction of social tools (knowledge management and group collaboration) to drive the development and growth of internal knowledge communities, and the extensive use of video to improve teamwork and business alignment across different locations while driving out travel costs. In the case of the latter, this includes the democratisation of video and making video conferencing a basic facility feature in second and third tier meeting rooms. Usage and adoption initiatives, enabled by change leadership programs, underpin these efforts and drives benefits realisation.

Figure 21: A best practice model describing the Enterprise teleworker narrative
Telework Capability

Current focus of Enterprise efforts are around establishing a Telework Capability, and developing core business infrastructure such that it can bring in remote users securely at volume, with a higher level of business-day dependability, and supporting the portfolio of collaboration services expected (moving beyond email and supporting voice and video).

Figure 21(2) captures a ‘today’ view. Users work remotely, typically connecting with VPN clients that provide access to resources, applications and tools through a secure tunnel. This approach reflects the current widespread computing and application model that has user data and applications sitting on a company-provided computer.

Figure 21(3) represents the drive for infrastructure agility, support for different computing models, (including BYOD) and the provision of greater security and protection for data. Earmarking a shift to Desktop Virtualisation, this captures the general sense of thinking around the future model of application and content delivery within business. All content and applications are brought back into the data centre (whether private or public) with the ability provided to users to securely and remotely connect. There are no local applications, no local content, and centralised application support on known operating improvements simplifies IT operations – allowing for Desktops to be outsourced as a utility service. While this improves the support and security of applications and content, the ability for users to connect, use applications and collaborate – particularly teleworkers – is still beyond the organisation’s control.

Evolution to Telework Solutions

The emerging direction of enterprises is to evolve from Telework Capability to Telework Solutions. This is more than simply providing the ability for users to connect but captures the delivery of a defined, structured, controlled and predictable experience to staff working remotely, including full manageability and support for teleworkers. It extends the enterprise permitter into the home, establishes new demarcation points and allows IT to support the Remote Workspace as a small or micro-office. VPN Appliances drive the introduction of this demarcation, extending the management edge into the home network, and onto the business devices that connect.

Figure 21(4) is the evolution of today’s telework capability model and maintains the status quo of current local desktop strategies. The Remote Workspace becomes enabled, and rather than staff connecting using VPN clients back into the enterprise, they connect to the enterprise WiFi network enabled in their house. This becomes an operationally prudent approach for supporting teleworkers and providing them a business-grade service, while still maintaining a known and understood computing model in a non-disruptive fashion.

Figure 21(5) is the end-game for telework enablement and desktop computing. It is the vision of most CIO’s of larger organisations, or any business contemplating a significant proportion of their staff to be capable of teleworking. It too provides full network visibility and management out to the edge in the teleworker’s home, but utilises thin clients to provide a lightweight and easily maintained computing model, as well as the use of tablets for mobility. Enabled by ubiquitous connectivity (NBN in the home, 3G/ 4G when mobile), this approach involves no local content or no local applications. With all teleworker resources and collaboration tools being delivered from the enterprise cloud, and full location and device independence on offer, it also represents the complete enablement of Flexible Working.
About us

**About Logicalis**

*Logicalis* is an international IT solutions and managed services provider with a breadth of knowledge and expertise in collaboration, data centre and cloud services and managed services. Logicalis enables organisations to move to a new workplace model that enables communication and collaboration in ways that were simply not possible before. In the process, this creates new opportunities for innovation, productivity and cost savings. They work with customers in all major industry sectors and public services to improve the experience of both front-line workers and back-office IT professionals.

**About Cisco**

At *Cisco*, customers are an integral part of our DNA and our focus is on working with our partners to transform their businesses for optimised productivity, increased innovation and sustainable growth. Cisco’s strategy is to best meet our customers’ future requirements in the face of critical industry inflection points.

Cisco was one of the first companies in Silicon Valley to launch a formal teleworking program for all employees in 1993. Since 2007, Cisco Australia’s teleworking program has provided its employees with greater flexibility in scheduling their work hours, resulting in a significant increase in work-life flexibility, productivity and overall satisfaction as a result of employees’ ability to work remotely. Cisco is proud to be partnering with the Australian Federal Government to promote telework.