

The New Converged Network: Presence Technology and IP Integration Lower Costs and Raise Productivity

White Paper
October, 2007

Abstract

Organizations of all kinds are taking advantage of IP network convergence solutions to integrate applications, boost productivity, save on network management and maintenance, and lower the cost of communication. These new solutions bring people together more efficiently to connect with customers, solve problems, and make better decisions. The underlying concept that allows this to happen is termed “network convergence.” Network convergence describes the elimination of network and resource boundaries between business applications by standardizing communication on the Internet Protocol, or IP.

IP convergence does not require rip and replace modifications. Converged IP services, software and equipment can be added as necessary and infrastructure can be improved incrementally. The IP networks already exist at most organizations. This solution brief describes the network-related challenges facing information workers, the business case for converged networks, evolving IP convergence solutions, and specific D-Link solutions for network convergence.

The People Silo Challenge

IT departments have been addressing the “silos of information” issue for quite some time. Now, as more and more business resources utilize the IP infrastructure that has evolved from networking implementations and Internet applications, this silo metaphor is being extended to people, processes and projects. Organizations want to leverage their IP infrastructures to bring workers closer together, help them work more productively, and allow them to share information more freely and flexibly.

Network convergence includes both software solutions and the hardware/software solutions that accompany them. A robust physical network is needed to support presence-aware applications, for example. VoIP phones are needed to support IP PBX systems and so forth.

D-Link delivers numerous solutions that fit the convergence model and are designed for advanced collaboration and communication efforts. Our network switches, wireless access points, IP cameras, Web cams, and VoIP phones all support seamless, presence-aware applications across converged IP networks. The switches themselves are key components to converged networks, of course.

Practical, Real-World Issues

Convergence addresses a wide variety of day-to-day business challenges and promises a significant upside in terms of increased productivity and ROI. Some of the ideas are fairly simple. For example, workers often need to ask colleagues questions, but they don't want to interrupt them by ringing their phones. People get frustrated waiting for voicemail and busy signals, as well. And they carefully consider who they give their mobile phone number to, because they want to control their availability.

It's also difficult to get dispersed co-workers together for conference calls and meetings. You have to try a bunch of different numbers to track even one participant down. It's tough to know when people are available with any degree of accuracy. The terms “voicemail jail” and “phone tag” are commonly used to describe the gyrations people go through to get things done. A recent Microsoft survey showed that the average information worker spends 37 minutes per week in voicemail jail or playing phone tag. That adds up to more than 30 hours a year.

Broadband connections now support video conferencing, but, if you can't get everyone together at the same time, it won't happen. Even the simplest things, like transferring a call or assembling a conference call can be challenging for the most techie workers. With an intelligent, converged IP network, all of these difficulties can be avoided. As we describe below, IP convergence brings people, information and processes together in a coordinated,

collaborative manner. D-Link is one of the many pieces to the puzzle, with the hardware, software integration, and strategic partnerships needed to take advantage of converged networks, presence-aware applications, and a more tightly integrated communications infrastructure.

Business Applications

Generally, network convergence concerns breaking down the barriers between network resources that enable voice and video communications, data sharing, and collaborative applications. Integrated VoIP, LAN, and WAN networks, for example, deliver e-mail, voice mail, faxes, and calendar events to one inbox. Any of those messages can then be forwarded or broadcast to other contacts or even to thousands of people with just a few clicks. Messaging interfaces similar to email allow you to prioritize messages and integrate them with calendar features. They can be attached to contacts, as well.

VoIP systems that integrate with messaging systems enable message forwarding (again, faxes, email, voicemail, or live calls), as well as “find-me, follow-me” capabilities. Find-me, follow-me routes messages to the recipient based on availability settings and pre-determined business rules (see definitions section for more details). Presence-aware applications and directory databases make these capabilities possible. We discuss these two topics in more detail in the next section.

With an integrated, converged network and the appropriate software, users can transform phone calls, IM conversations, and conference calls into other messaging formats on the fly. For example, you might pull available contacts in an email thread into a conference call by simply dragging and dropping their contact info into the conference call interface. You could right-click an IM participant to call them and clarify a point verbally. Participants in a chat room could be instantly pulled into a video conference call. The key is that everything is just one click (or drag) away.

Messaging systems that link to CRM applications add even more power. Detailed customer records can follow communication events throughout a support organization, for example, eliminating the bothersome need for support reps to constantly ask for account numbers. Screen sharing, video, and collaboration applications extend connections even further. With facial cues and body language, communication proceeds more efficiently and richly. As a result, problems are resolved quicker and better decisions can be made. IPTV extends the visual medium even further, with plenty of opportunities for education, training, presentation, and entertainment. Converged collaboration applications help bring minds together, re-enforce individual contributions, clarify goals, and showcase successes.

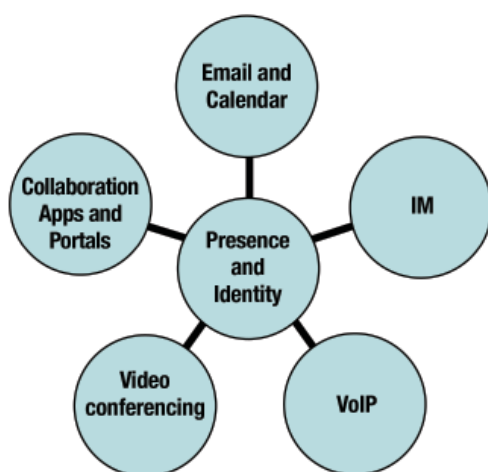
All these systems enable users across the globe to effectively collaborate, present, educate, resolve issues, and train without the limitations of space or proximity. A PC, an Internet connection, and a converged network are the only prerequisites. Fortunately, most of that infrastructure is already in place.

Furthermore, converged networks, databases, and applications facilitate regulatory and audit compliance. As regulations like Sarbanes-Oxley and HIPAA continue to place pressure on executives, the ability to connect decisions, events, dollars, and strategic directives is so important. The extent to which messaging, recordings, and their associated documents can be indexed, saved, backed up, and meta-tagged for search is limitless in a converged IP setting.

Presence-Aware Applications and Directories

Software, in the form of presence-aware applications and directory databases, enables converged networks to deliver availability features. For example, a presence-aware email application shows whether the person you just received an email from is available for a phone call. It relies on the network for seamless connectivity to the contact directory information and the VoIP network for instant availability and dialing information. Any status can be communicated, including “out of town,” “in a meeting,” “on a plane,” “on vacation,” “reachable via email,” “call my cell,” etc.

Leading software vendors like Microsoft, SAP, and Oracle, to name just a few, are already embedding presence controls in their applications. With the advent of Skype, IM, and chat applications, users are becoming more and more comfortable with logging their presence or availability information, as well.



A converged network enables shared directory services to support a wide array of applications and communication efforts across networks and devices.

With a VoIP system in place, the advantages extend even further. Phone numbers linked to directory information can follow the person, presence status can be changed on the hand set, and modality changes (cell, desk phone, email, chat, IM, videoconference) can be made on the fly according the situations, user preferences, and business rules.

The Benefits of IP Convergence

- Dramatic hardware, software, space utilization, maintenance, and support cost savings
- Increased employee productivity and mobility
- Videoconferencing reduces travel costs
- Seamless communication improves decision making
- Memorization of multiple phone numbers, screen names, and email addresses eliminated
- Single, unified, open IP platform requires only one skill set for maintenance and support
- Easy to train users and support staff
- Applications and functionality available anywhere in the world

The benefits and advantages of convergence are also compelling from an IT perspective. The beauty of the architecture is that presence and connectivity rely on infrastructure that is often already in place. Companies that use Microsoft Outlook, for example, already have the benefit of a centralized contact database. LDAP servers enable the same kinds of centralized directory advantages.

Converged IP networks also enable class of service differentiation and QoS routing for better utilization of resources. The infrastructure intelligently handles error rates and performance differences for different types of applications. And, since most new business applications include built-in IP support, converged systems are future-proof and lead directly to the next generation of integrated communications solutions.

Converged networks can be more secure than multi-tiered, mixed technology networks, as well. End-to-end security management is much simpler when all devices and networks use the same protocol. Less admin overhead, less vulnerability points, and more simplified back-up and recovery processes make it easier to manage and maintain security.

Converged Wireless and Wireline

Since companies will continue to use PBX systems because of prior investments, IP systems have been designed to accommodate both. The common term used to describe converged wireless and wireline technologies is IP Multimedia Subsystem (IMS). IMS describes systems that support any type of communication session – wireless, PSTN landline, IM, push-to-talk, videoconferencing, video-on demand (VOD) and so forth. This includes fixed-mobile convergence

services (see definitions) that enable seamless switching between Wi-Fi networks for VoIP and cell networks.

The term Computer Telephone Integration (CTI) is also used to describe convergence features. CTI enables caller authentication, where callers are screened against a directory. With CRM systems, directory information can be displayed while customer conversations are live or routed across the organization. CTI may also include voice recognition software that enables intelligent message forwarding and interactive voice response (IVR) for callers. Microsoft's Response Point software, which is used in some of D-Link's IP PBX equipment, enables such features.

Cost Reduction and ROI

There are a number of ways to look at the cost reductions and ROI that converged systems realize. Traditional PBX or PSTN costs include complicated re-wiring and re-provisioning activities every time a user moves. Some estimate this cost at around \$700 to add a new employee. Frost & Sullivan recently estimated the change, add, remove cost at \$1000 per incidence/phone. This can become costly as employees are added and people change offices. In addition, lead times for changes can take up to a week or more. Services inevitably require the help of outside vendors or a telco service technician.

A move to completely converged IP networks makes management simpler, easier, and supportable by a smaller administration staff. Some start-ups bypass PBX and install VoIP systems that reduce per-phone costs dramatically. With a converged IP system, changes are facilitated through a simple PC interface. Any minimally savvy computer user – from the receptionist to the company president

– can make changes to voicemail, forwarding rules, message routing and so forth. Instead of rewiring for each new employee or office change, you simply change directory information and the phone number follows the person.

Soft cost reductions related to productivity savings and process improvements are not as easy to quantify. Better communication channels, faster meetings, and more efficient workflow translate to better customer service and improved productivity that can both save hard dollars and generate new business.

Video conferencing helps organizations avoid unnecessary air fares. The savings can be easily tabulated throughout the year. And again, with existing IP infrastructure, you don't have to duplicate directories and database information that already exists, nor do you have to replace PCs, Internet connections, or existing IP network equipment.

D-Link Solutions

Most of D-Link's products support IP convergence in some way or another. D-Link switches, SIP phones, wireless access points, IP PBX phone systems, IP surveillance cameras, Web cams, broadband accelerators, and more all enable integrated communications. We provide the hardware infrastructure and devices necessary to take advantage of converged services like collaboration, VoIP, presence-aware applications and so forth.

Just a few examples of D-Link's growing line of convergence and presence-aware solutions are described below. We have dozens of switches, phones, and integrated solutions to meet the needs of every type and size of company. Please feel free to explore www.dlink.com to learn more about our full product line.

SWITCHES

D-Link DWS-3200 Series Switches

D-Link's xStack 3200 Series switches provide effortless wireless technology convergence with traditional Layer 2 data access switching. The switches feature the latest stacking technology from D-Link (up to 16 units and up to 400 Gigabit ports). The DWS-3227P, in particular, transforms from a standard Layer 2 switch into an integrated wired and wireless switching solution with a simple firmware upgrade. The switch provides powerful wireless security, easy deployment, the ability to detect rogue access points, and centralized management for all compatible WLAN components. Centralized management is crucial for wireless technologies deployed in real-time inventory, data mining, and an array of personal electronics that demand mobility and seamless integration such as 3G/VoIP mobile phones.

D-Link DES-1008PA

The D-Link 8-Port Desktop Switch with 4 PoE Ports (DES-1008PA) enables both home and office users to easily connect and supply power to Power over Ethernet (PoE) devices such as wireless Access Points (APs), IP cameras, and IP phones while adding more Ethernet devices like computers, printers, and Network Attached Storage (NAS) onto a network.

For more information, please visit <http://www.dlink.com/business-switches>

WIRELESS ACCESS POINTS (APs)

D-LINK DWL-2130AP

The D-Link DWL-2130AP Access Point is designed specifically for business-class environments that require secure, manageable wireless LAN options. The access point uses the 802.11g standard and is backward compatible with 802.11b, ensuring compatibility with a wide range of wireless devices. Since wireless security remains a strong concern among businesses, the DWL-2130AP provides Enhanced

Wireless Security Features to ensure your data is protected from hackers. Support for WEP, WPA and WPA2 encryption guarantees the privacy of your network data. Rogue AP detection and containment ensure only the APs you install are able to function on your network.

D-Link DWL-7130AP

The DWL-7130AP is similar to the DWL-2130AP but includes 802.11a/g compatibility, in addition to 802.11b backwards compatibility.

D-Link DWL-2230AP

The DWL-2230AP is an 802.11g access point with 802.11b backwards compatibility and integrated 802.3af Power over Ethernet (PoE) support. PoE enables installation in areas where power outlets are not readily available. The access point features all the strong security features of the devices mentioned above, as well.

For more information, please visit <http://www.dlink.com/business-wlan>

VOIP SOLUTIONS

D-LINK DVX-2000MS VOICECENTER™

The upcoming D-Link DVX-2000MS VoiceCenter™, a Microsoft® Response Point™ IP Phone System, is an out-of-the-box solution designed for small businesses with 5 to 50 users. The system integrates easily through the Local Area Network (LAN) to the Internet or via traditional public switched telephone network (PSTN) lines. It offers all the essential telephony features required for small businesses, including voice recognition and built-in Auto Provisioning configuration capabilities. The system also offers call forwarding, call hold, find me-follow me, and several voicemail functions, including voicemail-to-email forwarding and voicemail retrieval over the phone. The solution is perfect for both new businesses looking for an economical phone system, as well as for businesses looking to migrate from old telephony systems to new, cost-saving VoIP solutions.

D-Link DPH-50U

The DPH-50U Skype USB Phone Adapter allows you to accept both regular telephone and Skype calls from the same phone. When you receive a Skype call while talking to someone on your regular telephone line, you can easily switch lines to take the Skype call or vice versa, just like call-waiting. You can also connect conference calls between your regular telephone and Skype lines. The adapter allows you to use all the features of your existing telephone, including speed dial, redial, mute and caller ID.

The DPH-50U can be configured to forward incoming Skype calls to another destination such as your cell phone so that you never miss a call while you are away. It includes a toll bypass feature that is ideal for the following two scenarios: 1) You are in the same geographical area as the DPH-50U and want to make an international call. You simply call the computer that the DPH-50U is connected to from your cell phone and make a low cost SkypeOut international call. 2) You are traveling abroad and want to call someone who lives in your home area. You make a Skype-to-Skype call to the computer where the DPH-50U is connected to and use your regular telephone line to make a local call.

DVA-G3810BN

The upcoming DVA-G3810BN is a fully integrated device designed to work with ADSL and home multimedia networks, VoIP and wireless. It includes interfaces for USB, HPNA, DSL, Ethernet LAN and WAN and voice port (FXS). It also comes with a WLAN 802.11G antenna.

For more information, please visit <http://www.dlink.com/business-voip>

INTERNET CAMERAS

DCS-6600 Series

D-Link's DCS-6600 Series IP cameras feature dual codec support, 10x optical zoom lenses, 802.11g wireless connectivity, built-in microphones, two-way audio, and low-light sensitivity. The cameras also offer motorized pan, tilt, and optical/digital zoom, giving you greater remote viewing options.

DCS-5000 Series

D-Link DCS-5000 Series Wireless Pan/Tilt Internet Cameras are fully-featured surveillance systems that connect to Ethernet or wireless broadband networks to provide remote high-quality video and audio. Using the latest 802.11g wireless technology, the cameras securely communicate at 54Mbps and allow viewing of live video feeds on compatible 3G mobile phones or PDAs. This latter feature is designed for users that are often on the road and desire around-the-clock monitoring for applications such as home/office surveillance, checking up on infants, kids, or family members. Users can monitor and manage up to 16 cameras simultaneously, set recording schedules, enable motion detection settings, and change settings to multiple cameras.

DCS-3000 Series

The DCS-3000 Series cameras offer full-featured surveillance systems that connect to Ethernet or wireless broadband networks to provide remote high-quality video and audio. These wired and wireless (802.11g/b) cameras offer 4X digital zoom and two-way communication capabilities.

DCS-1100 Series

D-Link's DCS-1100 Series cameras support 802.3af Power over Ethernet (PoE) and offer slim-line housing. PoE support, when used with a compatible PoE power injector or PoE switch, eliminates the need for mounting the camera near a power supply. With 0.5 Lux light sensitivity, these cameras are capable of capturing video in rooms with minimal lighting, making it ideal for use at night. When enclosed in an optional outdoor housing, the DCS-1110 makes an excellent home security camera.

For more information, please visit <http://www.dlink.com/business-ip-cameras>

DEFINITIONS

VoIP: (Voice over Internet Protocol) A digital telephone service that uses the public Internet as well as private backbones instead of the traditional telephone network. Many companies, including Vonage, 8x8 and AT&T (CallVantage), typically offer calling within the country for a fixed fee and a low per-minute charge for international. Broadband Internet access (cable or DSL) is required.

SIP: (Session Initiation Protocol) An IP telephony signaling protocol developed by the IETF. Primarily used for voice over IP (VoIP) calls, SIP can also be used for video or any media type; for example, SIP has been used to set up multi-player Quake games. With SIMPLE extensions for IM and presence, SIP is also used for instant messaging.

Find Me/Follow Me: Call forwarding services used in conjunction in IP telephony systems. Find me service allows the user to receive calls at any location; follow me service allows the user to be reached at any of several phone numbers. In a unified messaging system (UMS), find me / follow me may route messages among VoIP, voice email, fax and text messaging applications.

FMC: (fixed mobile convergence) Seamless switching between cellular and local networks for mobile users. The goal is to have a handset that switches automatically from the cellular network to the local, wireless Wi-Fi network when entering a building in order to save cell phone minutes.

IP Multimedia Subsystem: (IMS) An integrated network for telecommunications carriers that uses the IP protocol as its foundation for packetized voice, video and data. Supporting voice over IP (VoIP) in all its flavors (SIP, H.323, MGCP, etc.), the IP Multimedia Subsystem (IMS) is designed to interface with the PSTN and provide traditional telephony services such as 800 numbers, caller ID and local number portability.

IPTV: (Internet Protocol Television) Scheduled TV programs and video-on-demand (VOD) via the IP protocol and digital streaming techniques used to watch video on the Internet. In order to receive and decode the images in real-time, the user requires either an IPTV set-top box or a computer and software-based media player.