Level 3 COMMUNICATIONS

Connecting and Protecting the Networked World℠

WHITE PAPER

COMBINING MICROSOFT SKYPE FOR BUSINESS WITH LEVEL 3 SIP TRUNKING: A BUSINESS CASE

Overview

High performance communications technologies are a critical need for any modern enterprise – large or small. Without the ability to talk to customers, suppliers, shareholders or the public, no business can survive for long. Unfortunately, due to the difficult economic climate, many businesses have delayed spending scarce capital on upgrading or replacing existing corporate telephone systems, many of which have exceeded their useful life and are becoming a maintenance headache. When replacing these legacy systems and networks, corporations are seeking ways to keep IT budgets under control while also delivering new tools to employees that can help them increase productivity and compete effectively in today's markets.

Fortunately, new technologies are now available from Microsoft and Level 3 Communications that not only provide a less capital-intensive way to replace aging private PBX and telco-based telephone systems, but also lower operating costs. These technologies, called Unified Communications (UC) and SIP Trunking, support a huge variety of innovative communications techniques that enable employees to not only communicate more efficiently among themselves but also to include people from outside the corporation in highly engaging and dramatically more productive ways than were ever possible with a traditional telephone on a desk.

Organization of this whitepaper

Transitioning from existing communications systems to Microsoft Skype for Business® (formerly Lync®) and SIP Trunking requires expenditures for software, hardware, services and training to replace equipment and to upgrade employee behaviors that have sometimes been in place for decades. Offsetting these costs are a number of benefits that can be measured in terms of actual dollar cost savings and in terms of harder-to-measure, but still very real, employee productivity improvements. This paper will first describe the benefits of both Skype for Business and SIP Trunking, followed by explanations of some of the costs of installing a Skype for Business system. The paper concludes with a financial analysis based on an example enterprise that has chosen to deploy Skype for Business using SIP Trunking, part of the Level 3® Voice Complete℠ service.

Unified Communications

Modern knowledge workers use many ways to communicate with colleagues, customers, suppliers, and collaborators in the course of their daily routine. Telephones, instant messages, presence, voicemail, videoconferencing, web conferencing, document sharing, collaborative electronic whiteboarding, and e-mail can all be used for conducting business. UC brings all these disparate tools into a cohesive system, allowing users to quickly and easily transition between communication modes, allowing a simple telephone call to smoothly morph into a videoconference with the ability to add new parties and share documents and whiteboards when additional expertise is required. By unifying communications, corporations can realize measurable productivity gains and streamline the flow of information throughout the enterprise.

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Microsoft Skype for Business

Microsoft Skype for Business is an advanced UC system that seamlessly combines a wide range of new calling features and capabilities into a single platform that can be accessed from a variety of devices. By equipping users with voice, video and data communications tools that have been combined into a comprehensive, unified system, enterprises can help ensure that employees have a wide variety of modern communication tools at their disposal from a single user application with a consistent interface across multiple platforms.

[1] http://transition.fcc.gov/pshs/services/911-services/voip/Welcome.html

Level 3 SIP Trunking

SIP Trunking is one of the primary enabling technologies for Skype for Business, providing a centralized connection to the public telephone network that can be used to bring voice into Microsoft's UC system. When used in conjunction with Skype for Business, the Level 3 SIP Trunking and Level® Voice Complete℠ service allows seamless transitions between voice and other types of communication and permits dramatically simpler network architectures to enable more robust disaster recovery solutions and reduce costs. In contrast, tying together ISDN PRIs from multiple locations into a consolidated Skype for Business architecture, while possible, is overly complicated, expensive and difficult to manage.

When used in conjunction with Skype for Business, Level 3 SIP trunking service allows seamless transitions between voice and other types of communication and permits dramatically simpler network architectures to enable more robust disaster recovery solutions and reduce costs.

Example of UC

During the preparation of this paper, a conference call was held between a group of Skype for Business users and an outside party. To set up the call, one Skype for Business user sent out an invitation that included the time and date of the call and list of participants. The external party received an automatically generated message that included a telephone number to access a voice bridge using a toll-free number along with a passcode that was unique to the planned meeting. (Unbeknownst to both parties, the dial-in number was provided by using the Level 3 SIP Trunking service.) The external party also received a link to a website that allowed a download of a desktop client program for the user's PC in order to support full Skype for Business functionality, including video calling, document sharing and whiteboarding. During the conversation, additional expertise was needed, so the Skype for Business user searched the corporate directory for an expert with the right skills. Before the expert was added to the discussion, active presence was used to verify that the expert was available, even though the expert was connected to the Skype for Business system over an Internet connection from a home office, which was necessitated by a snow day in the local school district. As different parties joined and left the call, audio levels were automatically adjusted to ensure that the participants could hear each other comfortably. When the call ended, each user had a copy of the whiteboard diagram available for their use.

Benefits of Combining Skype for Business with SIP Trunking

Convergence and Access

The purpose of SIP Trunking is to replace the public telephone network connections provided by traditional PBXs with a solution that is more efficient and easier to integrate. It provides the same basic functions as a PRI (Primary Rate Interface) trunk on an ISDN system or a T-1 trunk on a traditional digital telephone system, which is to supply a path for both communication (such as voice calls) and signaling (i.e. the dialing instructions and call supervision/control) between a customer's equipment and a carrier's equipment. SIP Trunking works by converging voice and data access onto a single network, thereby reducing the cost of maintaining duplicate backbones for communications.

Pooling Concurrent Call Paths

Carrier contracts for SIP Trunking will normally specify a maximum number of Concurrent Call Paths (CCPs) that will be supported. One CCP is occupied during each active SIP call that is routed through the carrier and then released back into the pool of available CCPs when the call ends. The total number of CCPs indicates the total number of simultaneous calls that can be transmitted over the SIP trunk.

When multiple sites are connected with SIP telephony over a corporate WAN, the CCPs from all the sites can be pooled into a single SIP Trunking connection to the carrier. This standard feature from Level 3 (which is an optional extra from a few other carriers and not available from most others) is particularly beneficial for smaller company sites. Instead of requiring a 24 voice-channel T-1 or a 23 voice-channel ISDN PRI telephone company connection to a remote office

that may have only a dozen employees (and therefore a need to support perhaps three to seven concurrent calls), these callers can be grouped together with all of an enterprise's other sites, and share a common pool of CCPs. The benefits are similar to the practice of centralizing and aggregating Internet trunks in a data center rather than buying direct Internet access into each branch.

SIP Trunking works by converging voice and data access onto a single network, thereby reducing the cost of maintaining duplicate backbones for communications.

Interoffice Calling

Cost savings can also be generated by routing calls among different locations of an enterprise using SIP telephony over the corporate WAN. The Skype for Business server can automatically recognize and route calls to destinations that are within the enterprise. Plus, unlike services from many other carriers, SIP Trunking services from Level 3 offer free calling among enterprise locations, even when the calls are routed over the Level 3® Network instead of through the enterprise WAN.

Teleconferencing

Carriers and third parties offer commercial-grade teleconferencing services for what seem like small per-minute fees. However, given the number of hours that employees typically spend on conference calls each month, these costs can accumulate over time and become a major expense item. With Skype for Business, these expenses are eliminated, because the servers that form the core of a Skype for Business system installation provide the voice bridging functions that are required for conference calling. These services can also be expanded beyond the boundaries of the enterprise to enable external customers and collaborators to easily participate in a teleconference.

Web Conferencing

As in the market for teleconferencing, a number of service providers and technology suppliers have emerged over the past decade to supply web conferencing services that allow employees to deliver rich-media presentations, including video, application sharing and whiteboarding, to viewer PCs. Building and operating these systems can be expensive, both in terms of technology license fees and in terms of support and other recurring costs. Skype for Business natively incorporates a full suite of these functions, eliminating the expense of purchasing, installing, operating and/or leasing third-party tools for Web conferencing.

IT Labor Savings

Because of the simplicity of installing and maintaining a single, unified platform with Skype for Business and SIP Trunking, overall IT staff support costs can be significantly reduced, as compared to managing multiple legacy applications on different platforms. Here are five examples of ways in which Skype for Business with SIP Trunking can lower IT costs:

- Call admission control (CAC): CAC allows sophisticated control of media flow to ensure balance between real time media and corporate applications. By routing videoconferencing traffic over the corporate IP backbone to the Internet and voice traffic over SIP trunks, CAC allows IT staff to observe call traffic volumes in real time. IT staff can use this information to help decide if a reported call failure is due to exceeding traffic limits or due to a failure that requires troubleshooting, such as quality issues resulting from insufficient bandwidth.
- PowerShell scripting: This tool supplies a scripting language and a command-line shell that allows Skype for Business to be customized to blend seamlessly into existing corporate work procedures. It is also incredibly powerful, allowing for very complex operations to be performed on the system quite simply. Combined with Role based Access Control (RBAC), administrator activity can be scoped to precisely the areas they are responsible for.
- Skype for Business's Web-based control panel: This provides a mechanism for monitoring the status of a Skype for Business system from multiple locations without special monitoring software. The

control panal also offers a monitoring capability that provides near-realtime reporting on dozens of detailed metrics about the status of every call in the network.

- Survivable Branch Appliance (SBA): Used in place of legacy PBX equipment, these devices (which are available from multiple manufacturers) provide survivable communication services in remote end offices, even during network outages Level 3's Voice Complete solution leverages SIP trunking with native PRI handoff eliminates the need for a secondary local loop and enables inbound and outbound calls.
- Simplified capacity management: SIP trunks from Level 3 do not block calls, and are limited only by the bandwidth of the converged data backbone. Capacity management is thereby simplified to a single network.

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Fewer Help Desk calls

Skype for Business uses one integrated client package on each user's desktop to provide access to multiple UC and SIP Trunking functions, thereby reducing the number of desktop applications that help desk staff need to support.

Increased User Productivity

With a powerful set of UC tools at their disposal, employees will be able to more quickly and effectively communicate with other people, whether they are located inside or outside of the enterprise.

- Automated Presence: User presence is a means for reporting the current status of a person, indicating modes such as "Away," "Meeting," "In Conference Call," "Available," etc. With Skype for Business, each user's status is consolidated to a common application (the Skype for Business client) and automated so that the presence indicator is updated each time the user changes to a different mode. Users can also override this function — for example, setting "Do Not Disturb" when an important project needs to be completed.
- Skill search: When someone needs advice on, say, tax laws in Cambodia, Skype for Business's interface to the online SharePoint skills directory can be consulted to quickly locate people who could have the required knowledge.
- Activity feed: This capability gives users the ability to post information about their current (job-related) activities and interests.
- Whiteboarding over conferencing: Sharing an electronic whiteboard over a desktop conferencing system allows users to be more engaged in a discussion, with all parties able to see, modify and save a common drawing that has been created by the group.
- Click to communicate: Point-and-click access to colleagues can help eliminate the time that would have otherwise been spent searching through paper or online directories and dialing phone numbers on a telephone keypad, and is supported by applications such as Outlook and SharePoint.
- Immersive meetings and application sharing: The single Skype for Business client enables rapid connection and reconfiguration among different collaboration modes, greatly simplifying the process of, say, initiating a whiteboard sharing session from a simple voice call. Skype for Business's simplicity helps encourage users to focus on actual communication instead of on the technologies used to support various modes of communication.

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Costs of Skype for Business and SIP Trunking

SIP Trunking

The primary costs of SIP Trunking are billed as monthly recurring costs from a carrier like Level 3, and consist of three main components: Network Access, Concurrent Call Paths, and Usage.

Network Access represents the cost of physically connecting the enterprise's telecommunications network to the carrier's network and the cost of additional bandwidth required to carry voice over the enterprise WAN. In traditional telephone systems, connections would normally be made by way of dedicated ISDN PRI circuits or T-1 circuits at each site. With SIP Trunking, these costs are replaced by an IP or VPN connection from the enterprise to the carrier and WAN or Internet capacity at each office location that is typically underutilized. (In many cases existing WAN or Internet capacity at sites is underutilized and no additional capacity is required.) As a result, the overall costs are normally significantly lower with SIP Trunking.

Concurrent Call Paths represent the cost of providing capacity in a carrier's network for the total number of calls that can be active at any one time. With SIP Trunking, the CCPs are pooled across the entire organization, thereby reducing the number of peak call paths required for the same level of service provided by legacy T-1 or ISDN lines.

Usage represents the cost of long-distance minutes of telephone call traffic consumed by the enterprise, which can be reduced in two ways through the use of SIP Trunking. First, all charges for calls between enterprise locations are eliminated, even if they are from an office on one side of the country to the other, because these conversations are carried over the enterprise WAN using UC/SIP. Second, the costs of calling people outside the enterprise are often reduced, due to the attractive rates offered by Level 3 for SIP Trunking customers.

The Business Case Scenario included later in this whitepaper includes the net effect of conversion from legacy telco interfaces to the Level 3 SIP Trunking service. Since the costs are lower, the net cost savings of SIP Trunking are represented as a cost benefit in the financial analysis.

Skype for Business Hardware Requirements

A combination of centralized equipment and distributed equipment is required for a complete Skype for Business installation. Database servers are required to support the active directory and user lookup/presence functions. Standard servers are required to process the various forms of media content, including audio, video and desktop application sharing as well as signal conversion between different bit rates and device types.

Each user needs an audio device to use telephone functions; a number of choices are available. For employees who need a device that operates independent of a computer workstation, IP-enabled phones connect directly to the IP network and may have advanced capabilities such as color displays to provide directory information. Lower-end desktop devices may also have a look and feel similar to a traditional telephone handset with a dial pad, but are connected to a user's PC by a USB port and depend on the PC for directory and other functions. An even more economical option is to use a PC equipped with a USB headset where voice processing is done internally to the PC.

Optionally, a Survivable Branch Appliance (SBA) can be installed in one or more remote offices to provide local call processing support and to provide backup connections to the local public telephone network in the event that communications with the central servers are interrupted.

Skype for Business Software License Requirements

Two different tiers of software licenses are required for a fully-equipped Skype for Business system: server licenses and user licenses. Server licenses are required for the central call processing and database management systems. A user software license is required for each authorized user in order to access the Skype for Business system.

Other Services

Configuring and installing a Skype for Business system can be complicated, so it may make sense to enlist the aid of a partner that has appropriate training and experience. In many cases, suitable suppliers of professional services can be found that are third-party Microsoft Partners.

Internal company IT labor can be used for planning, setup, testing and coordinating professional services in conjunction with the third-party partner. These resources can also be used to help train end users in system operation and routine usage.

Assuming that each end user will require four hours of training, the primary cost of teaching new users how to use Skype for Business will be opportunity cost. In other words, the time spent in training classes by staff members will not be available for the normal tasks that they would perform. Interestingly, in the economic analysis provided later in this whitepaper, the opportunity costs of staff training is one of the largest components of the overall system installation cost.

Hosted Services

As an alternative to purchasing hardware and acquiring software licenses, it is possible to lease Skype for Business services from a provider in a "hosted" environment. In this scenario, up-front costs are converted into monthly recurring costs, which may be financially preferable for some enterprises. Note that the cost impact of SIP Trunking does not depend on whether the Skype for Business system is purchased or hosted by a third party.

Business Case Scenario

An example business case has been developed to help fully describe the financial impact of installing a Microsoft Skype for Business system in conjunction with the Level 3 SIP Trunking service. This model is based on an example enterprise with 5000 employees in 150 different locations.

To properly analyze this business case, the benefits as well as the costs must be evaluated. As shown in the spreadsheet on page 9, these costs and benefits are grouped into three categories: SIP Trunking Benefits, Skype for Business Benefits, and Skype for Business Costs. Several comments apply to each category.

SIP Trunking Benefits

These calculations show the net impact of SIP Trunking – i.e. the difference between the costs of a legacy ISDN PRI/T-1 infrastructure and the costs of a SIP trunking infrastructure. As described earlier in this paper, the savings are due to eliminating many of the local access lines needed to support each location, pooling the Concurrent Call Paths (CCPs) across the organization, and virtually eliminating the costs of voice calls between locations. This calculation also adds the impact of a lower long distance (LD) rate, which will apply to most customers switching to Level 3 voice services. Note that the savings in each category are phased in over the three-year analysis period; this is based on the assumption that fifty percent of the potential yearly savings will be achieved in the first year, seventy-five percent in the second year, and the full amount of savings will be achieved in the third year.

The benefits of Skype for Business increase over time as the deployment spreads throughoutthe enterprise

Skype for Business Benefits

Descriptions of most of the benefits of installing a Skype for Business system were provided previously in this whitepaper. For these calculations, the assumptions on savings are intended to be conservative. For example, the analysis assumes that each person will spend only four hours per year using teleconference services.

This analysis adds cost savings due to the elimination of annual license/upgrade fees for the PBX, and removing the need for labor to perform adds/moves/changes to the PBX extensions, since Skype for Business allows essentially unlimited mobility for users within the network. Also note that there are negative savings (i.e. costs) in Year 1 for Help Desk Call Reduction – this assumes that there will actually be more help desk calls in the first year of deployment as users become accustomed to the new system.

As in the case of the SIP Trunking analysis, the benefits of Skype for Business increase over time as the deployment spreads throughout the enterprise. For example, the reduction of business travel was assumed to be five percent of the total corporate travel budget in years 2 and 3, but only half that amount in year 1.

Skype for Business Costs

The major cost factors of a Skype for Business system consists of hardware, software, services and training. Since most of these costs are incurred a project startup, the analysis shows these costs as part of startup. Of all the cost items, user training is the largest single expense; this is calculated based on four hours of opportunity cost for 5,000 employees at an average hourly wage of $65.00.

Actual Payback

Based on this scenario, the payback of the original investment will occur in just over ten months from the project launch. There are, however, a number of factors that can impact the actual payback period for an enterprise. One factor that can impact the payback period is the number of offices that are present in the organization – as this number increases, the savings from SIP Trunking increase rapidly, due to both the elimination of telco connections and due to the increased efficiency of sharing CCPs across the organization. One factor that could decrease the savings of presented in the scenario would be if the WAN bandwidth had to be significantly expanded to support the extra demands of the UC features and functions.

Table 1: Hard Benefits and Costs

	Startup Costs	Year 1	Year 2	Year 3	Total
SIP Trunking Benefits					
Convergence & Access		4,548	6,822	9,096	20,466
Pooling CCP's		146,454	219,681	292,908	659,043
Interoffice Calling/LD Usage		9,360	14,040	18,720	42,120
		160,362	240,543	320,724	721,629
Skype for Business Benefits					
PBX's Eliminated or Avoided		47,000	94,000	117,500	258,500
Teleconferencing		72,000	108,000	144,000	324,000
Web Conferencing		150,000	225,000	300,000	675,000
IT and Telephony Staff Labor		135,000	270,000	540,000	945,000
Help Desk Call Reduction		-29,700	74,250	148,500	193,050
Travel Cost Savings		750,000	1,500,000		3,750,000
			2,271,250		6,145,550
Skype for Business Costs					
Server Hardware + Maint.	56,000	945	945	945	58,835
Server Software	31,000	6,400	6,400	6,400	50,200
User Software CAL	646,695	163,000	163,000	163,000	1,135,695
User Phones/Headsets	364,000				364,000
Professional Services	90,000				90,000
IT Labor - Setup/Test	24,000				24,000
	1,211,695	170,345	170,345	170,345	1,722,730
Hard Payback in Months	12.91				

Table 2: Soft Benefits and Costs

	Startup Costs	Year 1	Year 2	Year 3	Total
Lync Benefits					
Increased User Productivity		1,750,000	3,500,000	7,000,000	12,250,000
Lync Costs					
User Training ($260/user)	1,300,000				1,300,000
Total Payback in Months	10.61				

Conclusion

To create a meaningful business case, a variety of inputs are needed. First, a solid understanding of employee populations at each location is required, along with some concept of the calling patterns within the company and with parties outside the company. An understanding of current expenditures on services such as teleconferencing and web conferencing is also important to know.

Many times, the results of the analysis will show significant hard-cost savings and significant soft-cost savings. The hard savings (i.e. those that can be reliably quantified) are concentrated in the areas of cost avoidance, such as replacing legacy telephone company services with SIP Trunks. The soft-cost savings (i.e. those that are harder to quantify or may be small changes in large numbers) are more likely to come from productivity and efficiency improvements, which depend on the adoption rate of Skype for Business functionality by users in the enterprise. Fortunately, the hard-cost savings generated by the SIP Trunking service and reduced expenditures on teleconferencing and Web conferencing can go a long way towards justifying the costs of a Skype for Business installation, making the soft-cost savings of Skype for Business Unified Communications a welcome, but not essential, benefit of deployment.

Microsoft has a long history in the Unified Communications field, with products such as NetMeeting first released in 1996 as an add-on to Internet Explorer 3.0. Level 3 has been a pioneer in VoIP and SIP technology over the past 4 years, and is currently a leading provider in the United States. With over 125 patents issued and pending for VoIP and Soft Switch technology, Level 3 has the experience and capacity to process over 13 billion voice call minutes per month. Microsoft and Level 3 make an ideal team to handle UC and SIP requirements for any enterprise, large or small.

To find out more about Level 3 products and technology, please visit our Level® Voice Complete℠ page at http://sip.level3demandcenter.com/index_g.html?WT.mc_id=t3sipvoicecompt_l3homepage_marqueebanner_1, where much more information can be found, including a webinar that provides a thorough overview of UC and SIP Trunking. This page also includes Level 3's SIP Trunking Calculator, which is a simple-to-use tool that can be used to model the economic benefits of SIP Trunking for a wide range of enterprises.

Note: This paper builds upon ideas and financial analyses previously developed in a paper entitled "The Total Economic Impact of Microsoft Lync Server 2010" that was prepared for Microsoft by Forrester Research, Inc. © 2010

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