How cloud-based PBX and PSTN save Microsoft more than $120,000 per day with Skype for Business

Microsoft defines digital transformation as reimagining the way a company brings together people, data, and processes to create new customer value and maintain a competitive edge. For business decision makers, this raises many questions. How can technology help you better engage your customers, empower your employees, optimize your operations, and transform the products and services you deliver?

Companies everywhere are in various stages of digital transformation. The continuous evolution of the cloud and other digital technologies has pushed businesses to reevaluate their IT investments and rethink relationships between IT and the business they serve. Companies face challenges when they update unified communications—the services that enable voice (telephony), audio and video conferencing, instant messaging, presence, and content sharing.

These services are a core part of your employees' daily life, yet the cost and complexity of maintaining them has grown as new features and trends appear. The typical medium to large business still relies on traditional unified communications services, such as on-premises telephony and third-party conferencing solutions. Cloud computing offers a path that bypasses these costs and helps achieves new levels of IT efficiency—but many businesses don't know where to begin.
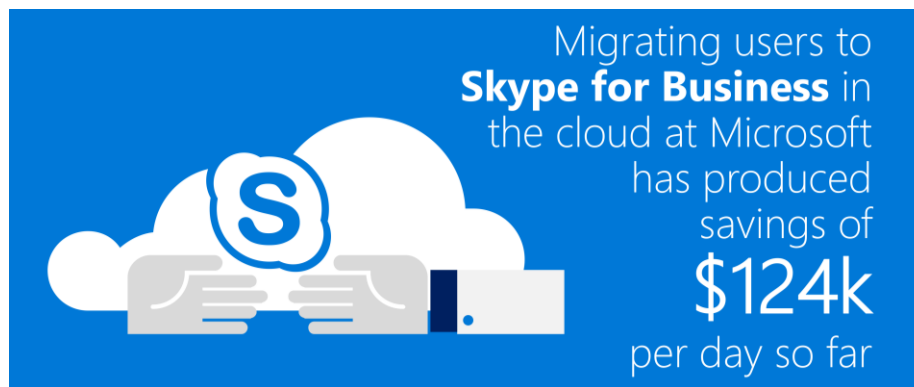

Figure 1. Cost savings at Microsoft from transforming unified communications

The journey of unified communications at Microsoft is a story of transformation and disruption. We seek a perpetual state of transformation as we modernize our technology and business practices, and take advantage of cloud-based efficiencies. As with most IT departments, our traditional approach to maintaining our environments is constantly affected by user trends such as an increasingly remote workforce and bring-your-own-device (BYOD).

But transformation and disruption are happening at other levels, too. In the case of unified communications, the move to the cloud is reducing our dependence on outside vendors to supply telephony and teleconferencing services. Instead, those services are managed by the cloud provider and are included with the cost of a cloud services subscription. In our case, we visualize an end state where all unified communications lives in the cloud and is managed with Skype for Business in Microsoft Office 365 and Azure.

This evolution permanently changes the model for companies who are accustomed to paying telecommunications providers every month for voice and conferencing services. You have an opportunity to realize cost savings, both in operational and capital expenses. But you also need to understand the steps and implications of migrating to a cloud-based unified communications solution and house those critical business services on a platform you can trust.

New Skype for Business services in Office 365 Enterprise E5

As part of Office 365 Enterprise E5, Skype for Business is a complete cloud-based unified communications solution, which includes cross-platform chat, presence, voice, video, and meeting services. We use Skype for Business at Microsoft for the same reasons as other companies—to optimize operations and realize productivity improvements—as well as enable Core Services Engineering (CSE, formerly Microsoft IT) to play a more strategic business role. The latest cloud enhancements in E5 offered an opportunity to achieve even better results than with past versions of Skype for Business, so we decided to migrate our users to the cloud.

Overall, Microsoft manages 114,000 employees in more than 775 locations. Like other software services at Microsoft, CSE manages unified communications for the company. We deploy Skype for Business to every new employee, and we use Skype for Business at every business touchpoint. Microsoft is using new and advanced Office 365 Enterprise E5 Skype for Business capabilities and realizing tremendous value. They include:

- **Cloud private branch exchange (Cloud PBX).** A modern, cloud-based voice infrastructure that supports standard telephony functionality.
- **Public switched telephone network (PSTN) calling.** A network technology enabling workers to make and receive phone calls through the Cloud PBX infrastructure.
- **PSTN conferencing.** A simplified, cloud-based meeting process, which supports both dial-in and dial-out conferences.

With this migration, want to implement these new features and, in doing so, achieve cloud-scale financial and productivity benefits. This case study examines the challenges we faced and how we overcame them.

Like most large companies with an on-premises unified communications solution, we knew that moving to the cloud would never be a mission we could do all at once. Business, logistics, and technical considerations made it impossible to migrate every user in a single project. Instead, we made plans for a *hybrid cloud* solution that allowed us to keep portions of the on-premises solution for some users while offering other services in the cloud. Eventually, our goal is to have 90 percent or more of users fully served by cloud-based unified communications; but until then, we rely on hybrid architecture to meet our needs. It's realistic that other large companies planning similar migrations do the same.

Our Skype for Business journey has lasted for many years. Although we're moving to the cloud, we've found that CSE still needs to partner closely with network and infrastructure teams. Almost any component of our IT infrastructure can affect Skype for Business, such as networking conditions, wireless upgrades, and so on.

Identifying key transformation drivers

Our primary reasons for moving to cloud-based unified communications included reducing expenses, enabling productivity, and increasing our support for remote users, who represent a growing percentage of our worker population. In the process, we also wanted to examine the changing role of our CSE organization, considering the changes to our technology, so that our personnel can refocus on achieving business priorities.

Reducing expenses

Unified communications in our IT-managed datacenters incurred multiple ongoing costs. We aimed to reduce these costs by taking advantage of the Office 365 Enterprise E5 cloud-based architecture.

- **Third-party carrier expenses.** Operating our voice services on-premises meant paying carriers to offer session initiation protocol (SIP) services so that our voice-over-IP (VoIP) services could interface with traditional telephony transports. Meanwhile, we also paid third parties to give pay-per-minute bridge services to support conference calls and other teleconferencing capabilities.

  Cloud-based unified communications offered us the chance to reduce these fees by using Office 365 E5 as the provider for our SIP voice and conferencing services. Instead of contracting with outside carriers, our technology would provide for telephony and meeting services for our cloud-based users, along with other unified communications features like presence and chat.

This reality continues the theme of transformation and disruption in the unified communications market, as cloud services such as Skype for Business displaces external telephony and conferencing providers. Instead of costly pay-per-use billing to third parties in addition to the cost of maintaining on-premises servers and applications, businesses can realize the savings of having telephony and conferencing delivered as part of their Office 365 subscription.

- **Capital and operating expenses.** Running services in a datacenter is inherently costly. Servers must be housed, cooled, powered, updated, and fine-tuned to maintain optimal operations. The services that run on each server must be carefully monitored for maximum operability and efficiency.

  Beyond these capital expenses, on-premises servers naturally incur considerable overhead expenses in the form of datacenter personnel and other resources. The time and effort needed to update and maintain the servers that run unified communications services, including the PBX servers, is a considerable drain on a company's IT budget.

  As with any cloud migration, by transferring the burden of service operation from a shared datacenter to the cloud, we anticipated significant savings in our capital (hardware and infrastructure) and operating (IT management and disaster recovery) expenses.

  Business continuity and disaster recovery (BCDR) planning is another opportunity to save. The IT-managed datacenters we operate require rigorous BCDR strategies with multiple environmental redundancies and significant capital outlay—all in support of services we hope we will never need. Our cloud services have Azure BCDR capabilities built in, spanning multiple datacenters. Availability is guaranteed, and all the equipment and overhead of supporting whole failover environments simply goes away.

- **Travel expenses.** Every year, Microsoft spends millions of dollars for employees to make business trips, incurring costs for airfare and lodging—plus lost productivity. Like many businesses, we look for ways to reduce travel costs without sacrificing the quality of our customer relationships. In addition, business travel has ecological implications. Like many companies, we try to reduce our carbon footprint and look for ways to reduce the impact our travel and business practices have on the natural environment.

  Unified communications was created, in part, as a response to travel-related concerns. When people meet in digital rather than physical environments, the travel cost savings can be measured as a product of per-attendee resource gain times the number of attendees. The cloud also offers the chance to do more with meetings because of the service availability and reliability improvements of an optimized, scalable cloud service.

Enabling productivity

A more intangible benefit is the boost in productivity we knew we could realize by moving our unified communications to the cloud. For us, productivity is measured foremost by how well we enable our employees. However, the cloud-based solution also means a huge gain in IT productivity.

- **User productivity.** Our business teams use Skype for Business to communicate, collaborate, and share meeting documents—all in one place. In addition to voice calls, by using Skype for Business, they share content, participate in IM, add attachments, co-author Office documents, and turn voice calls into video calls to increase momentum and collaboration.

  In the days before unified communications, very little of this was possible. Companies that still use land-based telephone services and conference calling bridges know firsthand the limitations of traditional telephony: Your phone is at your desk, and if you're not there, you're not part of the conversation. Your ability to share ideas is limited to what you can say. Your collaboration abilities are limited, especially in larger groups.

  Skype for Business features overcome these limitations for Microsoft employees. Wherever our people go, as long as they carry their Skype-enabled device, all of the service's built-in capabilities go with them. By implementing Skype for Business as a cloud-based service, we aimed to support these features more reliably and with an optimal experience for our users, where their data is available anytime on any device, no matter where the user is.

- **IT productivity.** On-premises servers are expensive and time-consuming to run and maintain. But CSE budgets and schedules are further affected by the nuisance of procuring hardware and setting it up. Before we started our cloud journey, our team ordered and deployed all Skype for Business servers in our datacenters. A typical server

order could take 6 to 8 months for delivery. Then it took us time to build out the servers, and we often incurred other expense by adding capacity and redundancy to ensure availability and performance. When the environment was fully set up, we ran Skype for Business as a shared service, which required us to make sure it didn't suffer from any conflicts with other services shared on the same equipment. And as needed for all our datacenter assets, we had regular update and maintenance cycles to keep the servers healthy.

Cloud-based architecture makes these headaches a thing of the past. Running our PBX and PSTN as cloud services releases our team from the expensive and laborious rituals of procuring, setting up, and maintaining unified communications servers. The Azure support model meets our needs for tuning performance and scaling our capacity up and down.

- **Facilities setup.** When an employee moves their office from one location to another, it's up to CSE to make sure the software they need moves with them. With the old model of on-premises PBX and PSTN, office moves required many people—in our case, third-party vendors supplied by our telecommunications carrier—to decommission users in one location and set them up in another.

    With cloud-based unified communications, relocation is simple. The services follow the employee wherever they go, on any device, and so the physical move is transparent to the service. The employee arrives at the new location and their services are just as they left them. In this way, the cloud enables both CSE and the business it supports to be more productive, because CSE doesn't spend as much time or resources moving offices, and employees don't have a gap in their access to communications services.

Supporting remote users

Remote users, such as field personnel and employees who work from home, often connect over wireless networks of variable quality; these networks are affected by quality and reliability issues much more often than corporate network-connected users. Providing unified communications to these users is a unique challenge because network quality issues beyond our edge (such as home networks, public networks, and outside wireless networks) are beyond our control.

Reshaping the IT-to-business relationship

One important outcome of digital transformation is the changing relationship between IT and the business it serves. In all of this transformation, many businesses wonder: Without datacenters and servers, what's the new role of our IT staff?

At Microsoft, our shift to the cloud has brought new opportunities for CSE to engage business units in more proactive and productive ways. We can be more strategic with our resources, taking time to understand business requirements at a level that we couldn't before. With Skype for Business, our migration team traveled around the world to learn what would maximize the impact of our deployment. In these *listening and education tours*, we engaged user groups and CSE managers in conversations about how they used Skype for Business and what difficulties they encountered.

In this same way, companies that move their unified communications to the cloud should expect IT personnel who were focused on tactical functions to be retrained or moved to play more strategic roles. By spending more time with the business units, learning about the obstacles they encounter and working with them to develop solutions, IT can play a more prominent and effective role in achieving the company's business goals than it ever has before.

Our Skype for Business journey to the cloud

The path we've followed to continuously improve Skype for Business at Microsoft has had several key steps. Starting in 2011, when Microsoft acquired Skype, we deployed updated unified communications to all users in what was (at the time) a typical fashion—as a fully on-premises resource managed by CSE in our datacenters. In the years since then, we have looked for ways to optimize the service and overcome the limitations that we discovered along the way.

With the advent of cloud computing, we re-plotted our path to reap the benefits of scale and efficiency that the cloud provides—first in a hybrid environment, and after that, in the cloud. The following diagram shows the three steps in our cloud journey: The fully on-premises environment where we started, the interim hybrid environment where some services are cloud-based while others stay on-premises, and the fully cloud-based environment that uses Office 365 Enterprise E5 for both voice and conferencing services.

For each step in the journey, Figure 2 shows how the central limitations of staying on-premises are gradually overcome, leading us to make users and CSE more productive, simplify our operations, transform our focus, and save money.
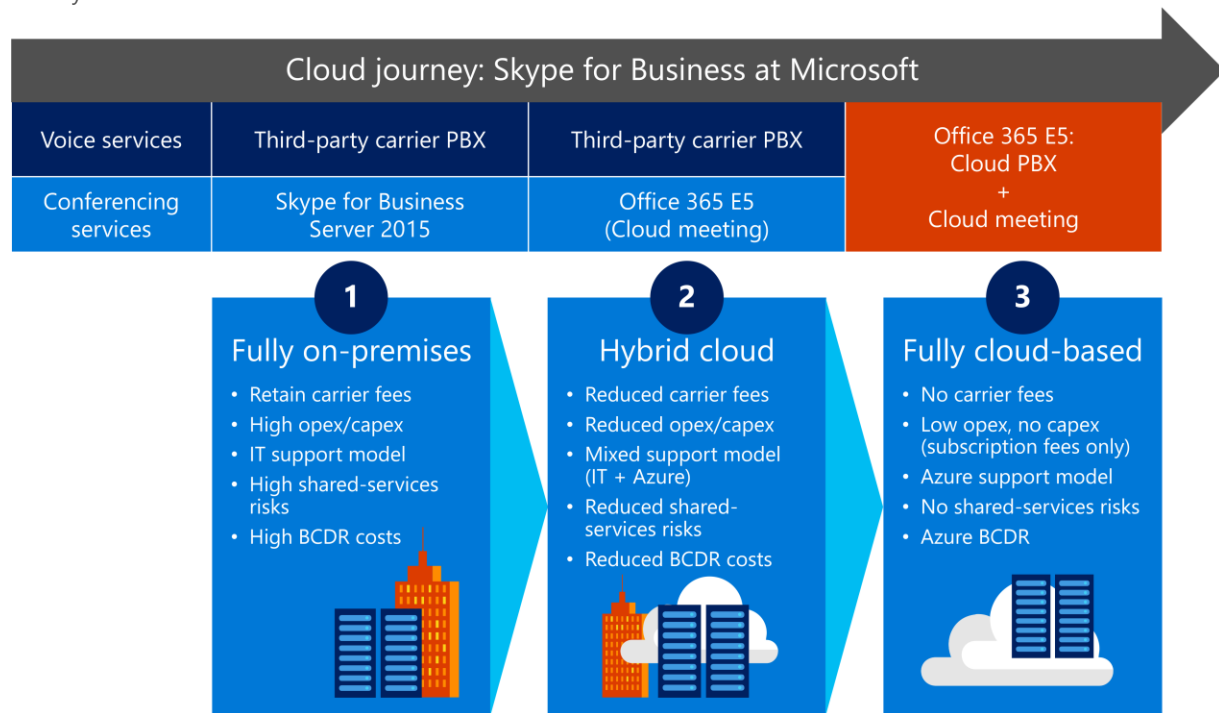

Figure 2. Three steps to cost savings and higher productivity in our Skype for Business journey

Our goal is to host all our enterprise users in the cloud for efficiency and cost savings. As we roll out voice services globally, we continue to move more workloads from on-premises to Skype for Business in the cloud. The business benefits throughout this journey are measurable in multiple ways:

- The elimination of monthly and per-use *carrier fees* is a significant savings. By hosting conferencing services in the cloud, followed by voice services, we reduce the amount that is paid to third-party providers.

- The *capital expenses* (capex) of owning and maintaining unified communications servers in our datacenters is replaced by the cloud-based efficiencies of hosting the same services in Office 365 and Azure. Similarly, our datacenter *operating expenses* (opex) for unified communications are replaced by the lower fees of the cloud-based Office 365 Enterprise E5 subscription.

- As we go from fully on-premises to hybrid to fully cloud-based, our *support model* gradually transitions to being part of the Azure fully managed datacenter, included in every Azure subscription. This new model allows us to retrain and repurpose our IT teams for more strategic and business-focused efforts.

- When we ran Skype for Business in our CSE-managed datacenters, we ran it as a *shared service*, meaning it was co-located with other critical business applications for hardware and cost efficiency. However, this configuration regularly introduced a risk of service failure, as changes to one of the shared services can often inadvertently affect the others. By running Skype for Business as a cloud-based service, this risk is transferred to the Azure fully managed datacenters, where the service runs on dedicated servers and is subject to the service agreements included in the Azure subscription contract.

- Azure datacenters also include their own *business continuity and disaster recovery* (BCDR) capabilities. For us, this represents that opportunity to fully retire our own BCDR investment in Skype for Business—most notably, the server redundancy opex and capex expenses required to keep the service fully available in the event of a disaster or outage.

Results

Migrating to PSTN conferencing and enterprise voice has saved nearly $124,000 per day. We avoid 45,000 trips per year, which represents a $92 million savings in travel expenses. We calculated these savings based on our current adoption achievement of 127,000 enterprise voice users, 50 percent of whom are remote, as well as the usage metrics shown in table 1. Note that your company's costs and savings—for activities such as decommissioning PBX infrastructure, deploying Skype for Business, and acquiring licenses—may differ from ours. Figure 3 shows data points from our transformation and the cost savings and productivity gains to our business.
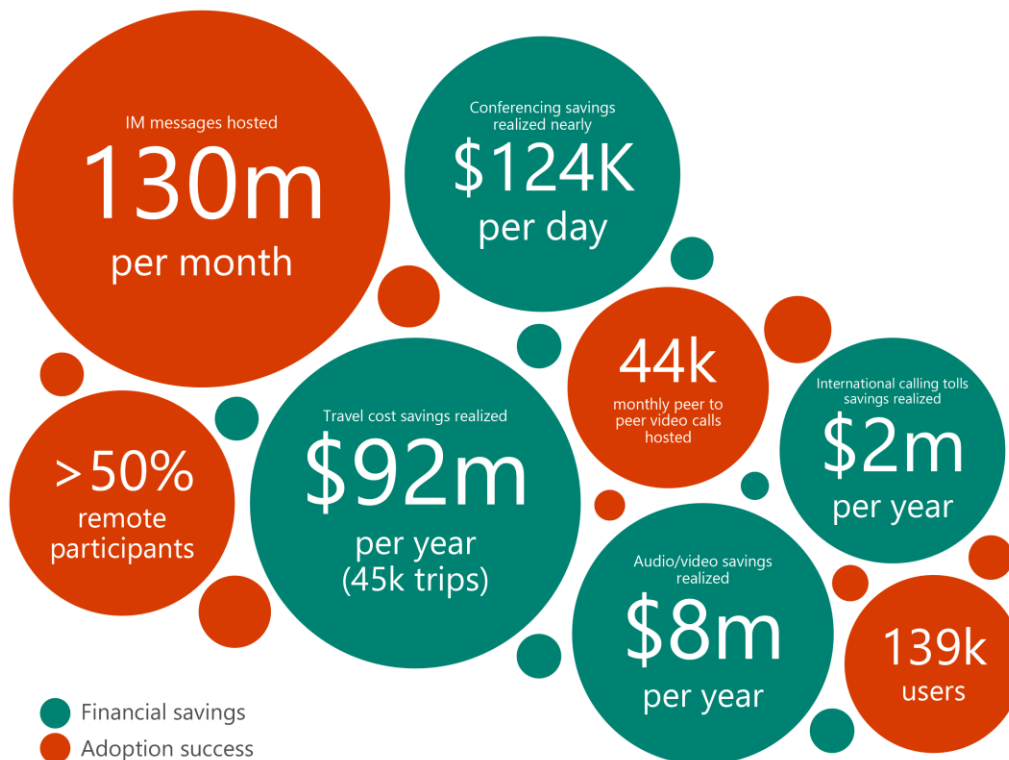

Figure 3. Overall savings and adoption

To look at the numbers in more detail, we can break them down by different cloud-based unified communication components.

Cloud PBX results

With Skype Cloud PBX, we no longer have to contract with a telephony carrier for services, use traditional phone hardware, or use an on-premises PBX, because all calls are routed over the Internet. Cloud PBX hardware support and management usually happens at an CSE datacenter, rather than at a dedicated PBX site. We can even replace proprietary and expensive dedicated desk telephones with lower-cost headsets.

In the past six years, while migrating to cloud-based PBX, we've decommissioned 70 percent of our owned PBX hardware, which is 141 PBX systems. This represents a savings of more than $2,500 per day, for a total of $4 million so far. At the same time, our enterprise voice sites have grown by 238 percent.

Figure 4. Cloud PBX savings

PSTN calling and conferencing results

Cloud-based PSTN calling has eliminated the need to pay for voice services. Our users make and receive calls using Skype for Business, using existing phone numbers and calling plans. With PSTN calling, users are assigned to subscription-based plans either for domestic calling or local and international calling. We now support 131,000 enterprise voice users making 9 million calls per month. Of those, 20,000 users and approximately 2 million monthly calls are cloud-based, with the numbers growing daily. Notably, more than 50 percent of these calls are made remotely, away from the Microsoft corporate network.

Likewise, PSTN conferencing has simplified our meetings and reduced costs. Dial-in conferencing lets users call a local number to join Skype for Business meetings from any phone, such as when network conditions don't support using Skype for Business. Dial-out conferencing lets us add a user to an active Skype for Business meeting by connecting to their phone from Skype for Business. Overall, PSTN conferencing saves us 95 percent in outsourced audio/video costs.

Overall, our infrastructure for PSTN conferencing isn't very different from a third-party conferencing system. The main difference, of course, is that using PSTN conferencing services—built directly into Skype for Business—means that we don't have to outsource conferencing to third parties. As a result, we've dramatically decreased our voice infrastructure costs. We've eliminated lots of costs associated with third-party conferencing services, such as per-minute national/regional or international tolling, and audio/video support.

When we take advantage of unlimited audio conferencing to eliminate per-minute costs that third-party audio conferencing providers previously charged, the value realized has been dramatic. Overall, we've seen a 95 percent reduction in audio conferencing costs, which translates to $8 million per year.

Figure 5. PSTN calling and conferencing savings

Benefits

- **Cost savings.** Our ongoing migration of Skype for Business users to cloud-based Office 365 Enterprise E5 cloud meeting and cloud PBX continues to yield savings in the millions of dollars. These savings consist of reduced capital and operating expenses from shifting CSE-managed datacenter services to the cloud, as well as from terminating agreements with third-party carriers who charged for the same services.

- **Ease of monitoring.** The Call Quality Dashboard, which has evolved over successive releases of Skype for Business, provides a powerful tool for CSE managers to proactively monitor, detect, and resolve issues with network and other infrastructure that has a high impact on users of the Skype for Business service. With the dashboard and other tools, we have reduced the time spent diagnosing quality issues and beginning remediation from several months to just a few hours.

- **Increased business productivity.** With a higher level of control over Skype for Business service quality, CSE can focus on helping workers maximize their productivity using unified communications tools. This includes offering a better user experience for remote users and others affected by external network dependencies.

- **Deployment learnings.** At Microsoft, our unified communications projects required careful and thoughtful collaboration with multiple teams, starting with the Skype for Business product team that was continuously improving the service. Because of this collaboration, we have achieved a deployment approach that establishes a model for future cloud migrations, both for us and for our customers.

- **Focus on business needs.** We can now shift the focus of our CSE employees from maintaining servers to better understanding and responding to the needs of our business users.

For more information

Implementation details about our Skype for Business cloud migration are available in the technical white paper How Microsoft IT planned and deployed Skype for Business to the Office 365 Enterprise E5 cloud.

For more information, visit:

- Skype for Business page on microsoft.com
- Skype for Business Operational Framework
- Collaborative events highlight digital transformation at Microsoft
- Skype for Business accelerates modern collaboration at Microsoft
- Skype for Business add-on licensing support
- Compare all Office 365 business plans
- Set up Skype for Business Online

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