

The 360° Economic Impact of Sametime and Sametime Unified Telephony

**Evaluating the Costs and Benefits for a
Large Enterprise**

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About Wainhouse Research

Wainhouse Research, www.wainhouse.com, is an independent market research firm that focuses on critical issues in the Unified Communications and rich media conferencing fields. The company conducts multi-client and custom research studies, consults with end users on key implementation issues, publishes white papers and market statistics, and delivers public and private seminars as well as speaker presentations at industry group meetings. Wainhouse Research publishes a variety of reports that cover the all aspects of rich media conferencing, and the free newsletter, *The Wainhouse Research Bulletin*.

Executive Summary

In today's global, mobile, and social business environment, success depends on people making connections and building relationships. Organizations transform themselves into social businesses when they activate networks of people to accelerate innovation, increase collaboration, and improve workforce productivity. Communications and collaboration are changing. People rarely dial a telephone number anymore, preferring to click on or touch the name of the person or persons with whom they wish to communicate. Mobile devices are prolific in many countries and cultures, opening new routes to market and new business collaboration opportunities.

IBM Sametime and Sametime Unified Telephony software combine to enable social business by extending real-time communications and collaboration capabilities, helping people create and sustain the human relationships that drive business results. Sametime and Sametime Unified Telephony work in harmony to enable people to more readily connect with people, not just an individual's phone, PC, mobile device or messaging system.

Using Sametime's rich presence information, enterprise instant messaging (IM), integrated VoIP and video, online meetings with audio and video conferencing, community collaboration and mobility support, companies of all sizes and in all industries are optimizing individual and team engagement through instant and regular collaboration – regardless of whether people use PCs, Macs, iPads, iPhones, Android devices, BlackBerrys, or Windows smartphones. Sametime Unified Telephony enhances Sametime by extending Sametime's click-to-call/click-to-conference interaction model to any voice device regardless of the underlying telephony infrastructure.

Organizations using Sametime and Sametime Unified Telephony provide employees with a common communications and collaboration interface and experience across the entire organization. This experience is the same for all users regardless of which telephony PBX's are deployed, which mobile handsets are used, and which personal computers or tablets are preferred. In an age of "bring your own device", Sametime and Sametime Unified Telephony provide consistent communications capabilities to the rapidly changing business communications ecosystem. It allows companies to consolidate communications, eliminate PBX upgrades, decommission some PBXs entirely, and better utilize mobile assets including laptops, tablets, and mobile phones. Enterprises deploying Sametime and Sametime Unified Telephony are realizing tremendous cost savings as PBX maintenance charges are reduced or eliminated, telephone handsets are no longer purchased, audio and web conferencing is brought in-house, and scarce IT human resources are freed up to focus on more strategic business-critical issues where their talents are better leveraged.

To understand the economic impact Sametime and Sametime Unified Telephony are having on organizations, Wainhouse Research interviewed six organizations who are deploying these solutions. Companies range in size from a few hundred users to over a hundred thousand users. Most of these organizations had previously deployed Sametime and were adding Sametime Unified Telephony. One began with IBM Connections, IBM's business-focused social networking software, and then added both Sametime and Sametime Unified Telephony simultaneously. Based on these interviews, Wainhouse Research created a composite company of 35,000 knowledge workers in order to perform a 360° analysis of the economic impact Sametime and Sametime Unified Telephony can have on a large organization.

IBM Sametime and Sametime Unified Telephony Accelerate Business, Save Money, and Provide System Stability

The focus of this study is on organizations that are deploying Sametime Unified Telephony along with Sametime. One of the surprising results is that several of the companies interviewed stated that they are deploying Sametime Unified Telephony first as a way to accelerate their business by being able to more rapidly reach out to, find, and communicate with coworkers; the underlying economics, which are compelling, were secondary. Other companies said they were no longer upgrading PBX nor were they buying telephone handsets anymore, which eliminates certain PBX-related expenses; several companies were using Sametime Unified Telephony to eliminate some legacy PBXs entirely, using Sametime Unified Telephony as an alternative to a PBX replacement strategy.

Wainhouse Research's interviews with six existing customers and our subsequent 360° economic analysis, as shown in Table 1, illustrates the ROI, costs, and benefits the composite organization will realize. Actual companies and organizations may expect similar results. Appendix A contains a description of the composite organization.

Table 1. Composite Organization Three-Year Return on Investment

ROI	Payback Period		Total Benefits (PV)	Total Costs (PV)	Net Present Value
	(Months)				
483%	2.5		\$141,957,611	(\$14,970,109)	\$126,987,502

Source: Wainhouse Research, LLC.

Benefits

The composite company will realize benefits from the following nine areas. These are described in detail in this report along with the assumptions and corresponding calculations.

- Cost avoidance by eliminating some handset purchases and repair and maintenance fees.
- Cost avoidance by eliminating the need to upgrade or replace PBXs.
- Cost savings from least cost routing and toll bypass.
- Cost savings from on-premises ad hoc audio and web conferencing.
- Reduced mobile device and calling card usage costs.
- Reduced IT and telephony labor costs.
- Cost reduction for help desk call reduction.
- Enhanced user productivity.
- Savings from travel cost avoidance.

Costs

The main cost categories for a Sametime Unified Telephony solution include:

- Sametime Unified Telephony physical servers.
- Fiber-Connected Storage Area Network.
- IP to PSTN media gateway.
- Sametime Unified Telephony end user licenses.
- Professional services to design and deploy the solution.
- Internal IT administrative costs for testing, deployment, ongoing management, and support.

- End user training costs.

Items Impacting Costs and Benefits

Several assumptions and factors influence these costs and benefits. Among them are the following.

- The composite organization is already a Sametime user; consequently, the servers and licensing required for adding Sametime Unified Telephony are included in the costs. The cost for Sametime Standard license maintenance is also included as annual costs.
- The benefits as calculated in this report include those for both Sametime and Sametime Unified Telephony.
- One of the biggest benefits is the productivity gains users realize from Sametime and Sametime Unified Telephony. In the analysis, we characterize these gains in terms of the time saved per day or week as a result of using the Sametime family of tools. A percentage of the burdened employee cost is then allocated toward doing useful business functions to monetize the benefit. Some organizations categorize these as soft savings versus hard savings because the company does not see an actual cost decrease. In this analysis, we have chosen to include them as a tangible benefit.
- This analysis assumes the IP network is already designed to handle the bandwidth and quality of service IP voice traffic requires.
- The analysis assumes that the composite company is large enough to negotiate favorable rates for mobile telephones as a replacement for desk handsets.
- Some companies will roll out Sametime's and Sametime Unified Telephony's capabilities faster or slower than those assumed in this analysis, and the calculations will need to be adjusted accordingly. Furthermore, the assumptions around the timing of PBX centralization and handset reductions will need to be adjusted when evaluating other scenarios.

Disclosures

Readers should be aware of the following:

- This report was commissioned by IBM, but all analysis has been done by Wainhouse Research.
- Wainhouse Research has maintained full editorial control over this document; however, the report has been reviewed by IBM to check the accuracy of product descriptions and pricing. The benefits were performed using costs estimated by Wainhouse Research based on our knowledge and understanding of the market. List pricing for some components was supplied by IBM, and an appropriate "street discount" of 30% was applied.
- While the costs and benefits in this analysis are reasonable for the composite company, Wainhouse Research makes no claim or assumption that organizations wishing to do a similar analysis will achieve the same benefit level. Rather, we encourage organizations to rely on their own estimates and cost factors to determine what the costs and benefits will be for their individual situation.
- Four of the customers interviewed were provided by IBM; Wainhouse Research provided two additional Sametime Unified Telephony customers to have an independent assessment of how customers are using Sametime and Sametime Unified Telephony.

The Customer Unified Communications Environment

All of the customers interviewed, with one exception, have been Sametime users for some time. The one exception was a multinational company that deployed IBM Connections for social networking first followed by Sametime and Sametime Unified Telephony in quick succession. Companies using Sametime prior to deploying Sametime Unified Telephony have the following communications capabilities.

Presence

Presence is a status indicator that conveys an individual's context and willingness to communicateⁱ. Many possible status indicators exist such as away, busy, in a meeting, on the phone, and so forth. Many presence engines allow people to provide a short text message providing additional contextual information, such as "Do not disturb, I'm with a client" to augment the status indicator. Modern presence engines can aggregate presence information from a variety of sources, called "rich presence", displaying presence information most frequently as a contact list or "buddy list". Common sources for a person's presence and context include a client on a PC that tells if the person is active on the machine (often referred to as computer presence), a PBX that indicates if a person's desk telephone is off-hook or on-hook (often referred to as telephone presence), calendar presence in which a person's availability is determined from the items listed on the calendar, and sometimes mobile phone presence wherein a person's presence status is changed based on whether the person is engaged on a mobile phone call. Some presence engines, such as Sametime, also display a person's location, which may be determined automatically from network settings, GPS information, or a personal entry.

Instant Messaging

Instant messaging (IM) is a form of real-time direct text-based chatting communication in push mode between two or more people using personal computers or other devices, along with shared clients. The user's text is conveyed over a network, such as a local or wide area network or the Internetⁱⁱ. More advanced IM clients provide emoticons, allow pasting of images in instant messages, and provide basic file transfer capabilities. Most IM systems provide group chat, which allows three or more people to participate in an IM conversation, and a few systems, like Sametime, provide persistent chat capabilities so that people can enter and exit a conversation, and even if all participants exit at the same time, the chat thread remains accessible and can be added thereto.

Voice over IP (VoIP)

VoIP is a family of methods and protocols that allow people to speak with one or more other individuals over an IP networkⁱⁱⁱ. The most common protocol for voice over IP is Session Initiation Protocol (SIP); Sametime has a VoIP client that allows people to communicate with one another using the SIP protocol. Up to twenty people can join together in an ad-hoc multiparty voice conversation. Sametime's VoIP client is an important capability because it interfaces with Sametime Unified Telephony to allow people to use Sametime as their voice endpoint even when speaking with people who are on legacy PBXs or connected to the public switched telephone network (PSTN)^{iv}.

Web and Video Conferencing

Web conferencing has become a required capability for knowledge workers. The ability to "see what I see", whether it is slides, spreadsheets, web pages, or other content, is critical in today's enterprise. Sametime was one of the first Web conferencing solutions available on the market, and it has continually evolved. Today, it is one of the few "zero download" Web conferencing solutions, making it lightning fast

for people to use and share content. Sametime also allows people to engage in video conferences, whether it is part of a web collaboration session or in one-on-one video calls. Up to 20 people may join a video conference in which the active speaker's video is displayed.

Click-to-Connect

In modern communications, people rarely dial a phone number, instead preferring to click on a contact's name if using a PC or touch a person's name when on a smartphone. Sametime was one of the first communications tools to provide this click-to-connect directory capability. Enhancements to Sametime also allow people to click-to-conference, meaning that they may highlight several names at the same time and bring everyone into a multiparty voice, video, and web conference automatically. People responding to such a meeting invitation simply click on a "join" button that pops up on the bottom right of their screen, and they are automatically connected to the conference. Sametime Unified Telephony expands on this click-to-connect concept by extending it to telephones and mobile devices.

Mobility

Mobile devices are becoming prolific in most enterprises, particularly for knowledge workers, and unified communications and collaboration tools are following right along. Sametime's convenient interface for reaching out and connecting with people works on perhaps more mobile devices than any other unified communications solution. Sametime's presence and IM capabilities supports Google Android™, Apple® iPhone, Apple iPad, RIM® BlackBerry®, Microsoft Windows® Mobile, and Nokia Symbian-based devices. In addition, BlackBerry users can attend Sametime web meetings using their BlackBerry smartphone, and Wainhouse Research believes meeting capabilities are in development for iPad and Android devices^v.

All of the real customers interviewed for this study are in the process of deploying Sametime Unified Telephony. One has it deployed to nearly 50,000 seats and will ultimately have at least 100,000 seats. Another has eliminated all PBXs in a mission critical operations group in favor of Sametime Unified Telephony. Others are in various stages of deployment from pilot testing to initial deployment; one is even deploying it on ships spread throughout the world that communicate via satellite. The point is that these organizations find Sametime and Sametime Unified Telephony a compelling business tool for connecting with people by communicating and collaborating with them in real time. And they can realize significant cost benefits and advantages by doing so.

Approach and Methodology

Wainhouse Research believes technology should be deployed when it impacts an organizations key business drivers including^{vi}:

1. The company's economic drivers,
2. What the company does best, or
3. What the company cares passionately about.

If it does not impact one of these three drivers, then technology should only be adopted if it is required to maintain parity with competitors. This concept provides a useful framework for CIOs and decision makers considering whether or not unified communications (UC) technologies should be adopted into their organization, and if so, to what extent. The question really should be, "Can unified communications impact my business drivers, and if so, how?"

Answering this question makes the issue of whether or not to adopt unified communications technology a binary decision: either it does or it doesn't impact my drivers.

In preparing this study, Wainhouse Research interviewed six companies who were using Sametime who are also in various states of deploying Sametime Unified Telephony. We looked at those drivers SUT impacts, many of which ultimately fall under the economic drivers. Productivity increases, better reachability, the enabling of mobile workers, and cost avoidance are among those more often referenced.

Based on these responses, Wainhouse Research has created a TCO model that examines costs and benefits for Sametime and Sametime Unified Telephony. To exercise this model, a composite organization of 35,000 people has been created to which the costs for a full Sametime Unified Telephony deployment have been applied and the corresponding benefits compiled. We have used actual data from IBM on costs and have applied a reasonable discount rate. To compute benefits, we have used actual costs for telephony equipment maintenance, audio and web conferencing costs, and third-party equipment. Where necessary, we have estimated reasonable burdened costs for human resources, as well as practical costs for certain telephony services.

This 360° economic impact methodology provides a sensible approach to computing ROI, providing a solid framework from which to evaluate investment decisions.

Analysis

Interview Highlights

Six organizations that use Sametime and Sametime Unified Telephony (SUT) were interviewed for this study including:

1. Global engineering, procurement, construction and project management company with over 42,000 employees.
2. Global building materials company with offices in 50 countries and 46,500 employees.
3. The military for a Scandinavian country.
4. Regional insurance company based in the United States.
5. Global IT and business consulting firm with over 100,000 employees.
6. Global shipping company managing over 100 vessels traversing all the world's oceans.

All six of these companies are implementing Sametime Unified Telephony, and they are in various stages of deployment from fewer than 200 to more than 50,000 installed seats. Key findings from the interviews include the following:

- Several of the companies deploying SUT are doing so for the productivity benefits first and foremost. These benefits far outweigh the deployment costs; in fact, deployment cost is really secondary for these organizations.
- SUT provides a natural extension of Sametime's presence, IM, and click-to-connect model. It facilitates needed interaction with people who must use mobile devices or the PSTN while traveling and makes it easier to reach people who are outside the organization.
- SUT gives Sametime users the ability to make, receive, route, and control regular voice calls using their already familiar Sametime client interface.
- More and more people are becoming mobile and they are often working at home. SUT allows companies to eliminate desk phones for some individuals.
- SUT has call control and call routing capability built in, allowing organizations to eliminate PBXs entirely and/or to reduce the number of licenses and their corresponding maintenance charges.
- Organizations with PBXs from multiple manufacturers can "front" these PBXs with SUT, providing Sametime's consistent unified communications user interface for all users regardless of which PBX they may happen to be homed to. One user indicated that with SUT, the Sametime client is all they need on a PC, versus an IM/presence client from one vendor and a softphone from another.
- The world is using social media, and SUT provides integration with all types of social communications capabilities.
- SUT is a feature rich offering in terms of user environment along with an excellent roadmap.
- SUT can be used as a business continuity and disaster recovery solution. In fact, one customer is deploying SUT with business continuity as the primary driver after an ice storms and snow closed

offices for days. SUT would have allowed these people to continue working from remote locations.

- SUT integrates well with other IBM software organizations may have in place.
- Because SUT runs on separate servers from Sametime, the solution can be deployed without any downtime to normal collaborative processes and remaining PBXs.
- SUT does not require a forklift upgrade; organizations can keep their existing email system (Microsoft Exchange or Lotus Notes) and their phone systems.
- Younger employees expect tools like Sametime and SUT on their desktops to enable instant, ad hoc, voice, video, and data collaboration.
- The cost for SUT is between 1/3 and 1/2 of what companies would pay to upgrade legacy telephony environments.

The Composite Organization

Given the variety in the sizes of the companies interviewed, Wainhouse Research has developed a composite organization in for which it has performed a 360° economic analysis. Organizational characteristics are as follows:

- 35,000 knowledge workers with 140 locations, half in North America and the others in Europe and Asia Pacific; \$7 billion in revenue.
- The company has Sametime Standard Edition already deployed, and it uses Lotus Notes for email^{vii}.
- The organization has a variety of device types including Windows PCs, Macs, Linux PCs, iPhones, iPads, Android-based phones and tablets, BlackBerry phones and tablets, and a few Windows Mobile smartphones.
- The composite organization is consolidating PBXs in North America by centralizing the PBX capability into a single data center. As a consequence, 70 PBXs will be eliminated through this consolidation initiative over a three year period, 28 in years one and two, and 14 in year three.

The composite company is seeking the benefits of improved collaboration and reachability among its employee base. This must be done with at least a 10% discount rate^{viii} in order to be accepted in today's economic environment. Employees in the company are becoming increasingly mobile and are working more from home; hence, they need a reliable mobile communications and collaboration solution that can move with them wherever they may be. PBXs and their corresponding handsets are seeing less use as a result of voice over IP (VoIP) and mobile phone usage.

Costs

Costs for SUT are based on list costs published by IBM with a 30% street discount. Costs for professional services are based on representative costs from IBM Global Services for similar engagements. Each organization's actual costs will vary depending on the company's actual geography, size, infrastructure environment, and business drivers.

The six main cost categories for an SUT solution include:

1. SUT physical servers - Telephony Control Server (TCS) and Telephony Application Server (TAS).

2. Fiber-Connected Storage Area Network.
3. Media Server.
4. IP Gateways.
5. Sametime Unified Telephony end user licenses^{ix}.
6. Professional services to design and deploy the solution.
7. Internal IT administrative costs for testing, deployment, ongoing management, and support.
8. End user training costs.

It is important to note that with this solution, no telephony equipment will be upgraded and no new handsets will be purchased. SUT integrates with existing PBX equipment and users may continue using existing telephones. We have assumed that the North American part of the company will centralize call control, thus eliminating 70 regional PBXs over the three year cost period, fronting the centralized PBX with SUT. European and Asia Pacific PBXs will remain, but also will be fronted by SUT. Consequently, a gateway is required between SUT and the PSTN for 17,500 users in North America.

SUT Physical Servers

In the Sametime Unified Telephony architecture, two different types of servers are required: a Telephony Control Server and a Telephony Application Server. Telephony Control Servers interface via SIP with existing telephony equipment such as gateways and PBXs; they route Sametime voice calls to a PBX or the PSTN, and they provide single number reach capability. TCS servers always come in pairs for high availability, and a single pair supports 100,000 users.

Telephony Application Servers provide call routing, mid-call controls, and call flow logic. Each TAS server can support 15,000 users.

The composite organization will require six TCS servers, two in North America, two in Europe, and two in Asia Pacific. It will also require seven TAS servers, three in North America, two in Europe, and two in Asia Pacific^x. Note that this configuration provides full solution redundancy for all geographies.

The list cost less 30% discount for TCS and TAS servers are as follows:

- IBM System x3550 TCS Server - \$13,300
- IBM System x3650T Server - \$14,000

Total SUT server-side hardware list cost is \$177,800. Annual maintenance is 15% per year. Note that there is no software licensing for the TCS and the TAS servers; the costs above are inclusive of any software that runs on them.

Fiber-Connected Storage Area Network

Between the TCS servers and the TAS servers, a common storage area network assures that data moves rapidly between them and the database. One SAN will be required in each region: Europe, North America, and Asia Pacific. Total list cost less the street discount is \$16,800 each or \$50,400.

Maintenance is 15% per year.

Media Server

The media server is used for audio conferencing applications and may be used for changing from a G.711 codec to a G.729 codec (G.729 requires less bandwidth). For this deployment of 35,000 seats,

three media servers are required. List cost after discount is \$24,500 for a total of \$73,500. Maintenance is 15% per year.

IP Gateway

An IP gateway is required to convert signaling and media between the PSTN and the Sametime Unified Telephony TCS servers for North American users^{xi}. We have assumed that a centralized PBX in North America will still need to provide PBX functionality for 1050 lines, such as those for call center agents and conference rooms. We have assumed that 17,500 users in Europe and Asia Pacific will remain on their existing PBXs. If we assume a gateway port ratio of 5 users to 1 port (assumes 20% of people will be on an external call at any one time), then we need a gateway with at least 8,750 ports. Ninety two Dialogic 4000 series gateways will provide sufficient capacity. Each gateway costs \$9,100, so the total gateway cost will be \$837,200 (30% street price discount already applied) with an assumed annual maintenance cost of 15%.

Sametime Standard Maintenance Costs

Since the composite organization has already deployed Sametime Standard Edition to its workforce, the only costs for Sametime will be the end user license maintenance costs. Sametime Standard maintenance costs (discounted) run about \$10 per user per year. For 35,000 users, the Sametime software maintenance will cost approximately \$350,000 annually.

SUT End User Licenses

SUT licensing is very simple. Each end user will require his or her own SUT license. A prerequisite for SUT is that the end users already have a Sametime Standard or Advanced license. List cost less discount for SUT is \$111.30 user with \$23.37 maintenance in years two and three for a total of \$3,895,500 in initial costs and \$817,950 in annual maintenance costs.

Headsets

For people to use their Sametime client as a voice endpoint, they will likely need a headset. Given that Sametime is already deployed, many employees in the composite organization will already have headsets, but we will assume that the company will purchase new Sametime certified headsets for everyone at \$31.99 each. Thus the headset cost for 35,000 employees totals \$1,119,650.

Professional Services for Assessment, Design, Pilot Testing, and Implementation

Professional services for planning a SUT deployment and doing all of the design, testing, and final implementation is dependent primarily on the number of locations involved and the number of PBXs. It is not dependent upon the number of users. Organizations may obtain SUT professional services from IBM Global Services or an authorized third-party provider. Most companies do their own maintenance following installation. Service costs vary between providers. For a 35,000 person deployment, assume the cost is \$425,000 for the services with an additional 15% for travel, hotels, and meals, for a total of \$488,750.

Internal IT Resources

The composite enterprise will require internal IT resources to assist with the SUT deployment. We assume that 10 individuals will be required for two 40-hour work weeks, or 80 hours each, for a total of 160 hours. We assume the burdened cost is \$75 per hour, for a total of \$60,000 internal IT resource effort.

After the SUT implementation, we will assume that SUT maintenance requires a total of 52 person weeks per year, for a total of \$156,000 in personal costs annually.

Training and On-Going Maintenance

Most training will be done through a series of web conferences and online video session. Several IT people will be trained personally by the professional services organization. Since SUT is so tightly integrated into Sametime and our composite organization has been a Sametime user, we assume that a maximum of 2 hours per end user will be required. Many employees will actually need only a few minutes training to be fully functional with the added capabilities SUT offers. We assume a burdened average cost of \$65/hour for 35,000 knowledge workers for two hours, for a total of \$4,550,000.

Total Costs

Total costs for a Sametime Unified Telephony deployment are shown in the table below.

Table 2. Total Costs for a 35,000 person Sametime Unified Telephony deployment (assumes Sametime Standard is already deployed^{xii}).

Costs (US Dollars)	Initial	Year 1	Year 2	Year 3	Total
SUT Servers	\$177,800	\$26,670	\$26,670	\$26,670	\$257,810
Storage Area Network	\$50,400	\$7,560	\$7,560	\$7,560	\$73,080
Media Server	\$73,500	\$11,025	\$11,025	\$11,025	\$106,575
IP Gateway	\$837,200	\$125,580	\$125,580	\$125,580	\$1,213,940
Sametime Standard Maintenance Costs		\$350,000	\$350,000	\$350,000	\$1,050,000
Sametime Unified Telephony Licenses	\$3,895,500	\$0	\$817,950	\$817,950	\$5,531,400
Headsets	\$1,119,650				\$1,119,650
Professional Services	\$488,750				\$488,750
Internal IT Resources	\$60,000	\$156,000	\$156,000	\$156,000	\$528,000
Training	\$4,550,000				\$4,550,000
Total	\$11,252,800	\$676,835	\$1,494,785	\$1,494,785	\$14,919,205

Source: Wainhouse Research, LLC.

Benefits

In interviews and discussions with Sametime Unified Telephony customers, Wainhouse Research had identified the following benefits associated with a SUT deployment. Many are cost avoidance items, but some are associated with business acceleration and productivity enhancements.

1. Cost avoidance by eliminating some handset purchases and handset repair and maintenance fees.
2. Cost avoidance by eliminating the need to upgrade PBXs.
3. Cost savings from least cost routing and toll bypass.
4. Cost savings from on-premises ad hoc audio and web conferencing.
5. Reduced mobile device and calling card usage costs.
6. Reduced IT and telephony labor costs.
7. Cost reduction for help desk call reduction.
8. Enhanced user productivity.

9. Savings from travel cost avoidance.

Eliminating Handset Purchases and Repair and Maintenance Fees

Wainhouse Research knows of several companies who no longer buy desk telephones. Some employees in these companies are moving completely away from desk phones, in favor of using their Sametime VoIP client via SUT or their mobile device, leaving a surplus of handsets in the enterprise. Should a handset break or malfunction, rather than buying any new handsets or repairing broken devices, these companies simply replace them pulling one from their surplus stock, or they use the broken handset as an opportunity to transition an employee away from a hard telephone.

Our composite company has decided that it will not purchase any new desk phones for its employees. Furthermore, since it is transitioning many of its employees to SUT, it will no longer pay any handset maintenance fees.

Many vendors will charge a maintenance fee on telephone handsets, which can range from 10% to 22%^{xiii}. If we assume a middle of the road 16% annual maintenance fee on telephones that average \$250/phone across the organization, then for 35,000 people, just the handset maintenance fee cost avoidance is \$1,400,000 annually.

Centralizing PBXs and Eliminating PBX Upgrades

Although not everyone Wainhouse Research surveyed is eliminating PBXs, some are, and most are eliminating upgrades to some of their remaining PBXs. In the composite company, there are approximately 140 PBXs; if 70 PBXs in North America are completely eliminated through a combination of centralization and reduced PBX usage (28 in years one and two, and 14 in year three), some interesting cost dynamics emerge.

The cost savings for our composite company come from eliminating PBX software maintenance fees, MACDs (moves, adds, changes, and deletes), and from PRI circuits no longer needed as voice becomes centralized via SUT with a gateway to the PSTN.

For a typical IP PBX, software maintenance costs run approximately \$70 per user per year^{xiv}. For our example, we will assume there are 250 users/PBX for an annual savings of \$17,500 per PBX eliminated.

MACD costs vary widely from \$65 to over \$400 depending upon location and the system being serviced^{xv}. If we assumed 15 MACD changes/month at \$65 each, the total annual cost per PBX eliminated would be \$11,700.

PRI circuits cost approximately \$500 per month in North America. The annual PRI cost per PBX would be at least \$6,000. Thus, removing PRIs is another cost saving element^{xvi}.

When a PBX is eliminated, there will never be a need to buy a new handset since that PBX will not be replaced or upgraded. Handsets often make up half of the cost for a new PBX, and they range in price from around \$100 at the low end to nearly \$900 at the high end. Since our composite enterprise will not upgrade the PBXs it consolidated, it will not need to buy new phones. If we assume an average price of approximately \$250 per IP phone that the company will not need to buy, the onetime handset cost avoidance per 250 person PBX that is not replaced or upgraded is \$62,500.

Table 3. Cost savings from PBX consolidation.

Cost Avoidance from PBX Consolidation	Annual Benefit	Year 1	Year 2	Year 3	Total
Cumulative number of PBXs eliminated		28	56	70	
PBX software/hardware maintenance	\$17,500	\$490,000	\$980,000	\$1,225,000	\$2,695,000
Moves/Adds/Changes/Deletions	\$11,700	\$327,600	\$655,200	\$819,000	\$1,801,800
PRI Circuits	\$6,000	\$168,000	\$336,000	\$420,000	\$924,000
Handsets not purchased	\$62,500	\$1,750,000	\$1,750,000	\$875,000	\$4,375,000
Total		\$2,735,600	\$3,721,200	\$3,339,000	\$9,795,800

Source: Wainhouse Research, LLC.

Savings from Least Cost Routing and Toll Bypass

Organizations rolling out Sametime Unified Telephony have an opportunity to save significant money through least cost routing and toll bypass; both of these mechanisms route calls in a way that reduces the overall cost.

SUT leverages least cost routing, which is a function that chooses the least expensive telephony service provider based on predefined criteria, typically the time of day and the number dialed. In deregulated telephony markets like the United States, Canada, and most of Western Europe, providers adjust their tariffs and pricing models several times each year^{xvii}. Large companies supporting relationships with several providers can use this capability to route calls using the least expensive provider's service for any given time of day and location. Least cost routing tables may reside in a remaining PBX, or they can be programmed into SUT.

Mobile device and smartphone users may install a small SUT application that provides a mobile dialer that interfaces with SUT. When a mobile device user clicks on a person's name to place a call (or dials the digits) the mobile dialer sends dialing information to SUT over the mobile device's data channel. SUT uses this information to take advantage of least cost routing to assure that the call route is optimized from a cost perspective. SUT calls back to the mobile device and then calls the person who was dialed.

If each person in the composite company makes 10 long distance calls per week either domestically or internationally and can save just 2 cents per call on average using least cost routing, then the savings mount up. Over a week's time cost avoidance for 35,000 people would total \$7,000. For an entire 52 week year, the savings would add up to \$364,000.

Toll bypass is similar to least cost routing with the difference being that calls are routed over a company's own IP network versus using a service provider's network. Thus, calls between company locations can run over the company's internal network at no charge^{xviii} instead of over the PSTN. In addition, organizations can use their networks and existing PBXs to route international calls at local calling rates. For example, if a person in a company in New York needed to call a supplier in the Netherlands, the call would be routed over the company's IP network between New York and the Amsterdam office, and from the Amsterdam office out through the local PBX or gateway to the PSTN. Thus, the international call only costs the company what a local call between the Amsterdam PBX and the supplier in the Netherlands would cost.

If our composite company were to move all locations onto its IP network, then all of the costs for long distance calls between those locations would go to zero^{xix}. If each person, on average, made 50 long

distance calls per month between locations and the savings were \$0.03 per minute, then the annual savings from toll bypass would total \$630,000. If international locations were involved, then the savings could be much more significant.

Table 4. Cost avoidance from least cost routing and IP toll bypass.

Cost Avoidance from LCR and Toll Bypass	Year 1	Year 2	Year 3	Total
Least Cost Routing Savings	\$364,000	\$364,000	\$364,000	\$1,092,000
Toll Bypass Savings	\$630,000	\$630,000	\$630,000	\$1,890,000
Total	\$994,000	\$994,000	\$994,000	\$2,982,000

Source: Wainhouse Research, LLC.

Cost Savings from On-Premises Ad Hoc Audio and Web Conferencing

According to Wainhouse Research data for unattended audio conferencing services and web conferencing services^{xx}, each conferencing user in North America and Europe averages \$38.88 in audio conferencing charges annually paid to a service provider^{xxi}. Likewise, each enabled user averages \$22.52 in web conferencing charges annually.

A reasonable, and conservative, scenario would be to bring half of the conferencing in-house^{xxii}. Thus, if only half of the audio and web conferencing was done on-premises using Sametime Unified Telephony and Sametime's web conferencing capabilities, each user would average \$19.44 savings in audio conferencing and \$11.26 savings in web conferencing annually. For our 35,000 person composite company, this amounts to \$680,437 savings annually in reduced payments to audio conferencing service providers and \$394,018 savings annually in payments to web conferencing service providers.

Table 5. Cost avoidance by using on-premises audio and web conferencing versus paying a conferencing service provider.

Cost Avoidance from On-Prem Audio/Web	Year 1	Year 2	Year 3	Total
Audio Conferencing (50% on-prem)	\$680,437	\$680,437	\$680,437	\$2,041,310
Web Conferencing (50% on-prem)	\$394,018	\$394,018	\$394,018	\$1,182,054
Total	\$1,074,454	\$1,074,454	\$1,074,454	\$3,223,363

Source: Wainhouse Research, LLC.

Reduced Mobile Device and Calling Card Usage Costs

SUT users have the ability to significantly reduce mobile device charges, and in some instances, calling card usage charges. Because users have access to the Sametime VoIP client, they are able to make and receive PSTN calls using their Sametime client anytime they have an IP connection rather than using their mobile device. In addition to long distance charges, users in foreign countries often also pay a termination fee for calls to wireless devices. Thus, long distance calls using a mobile phone to Western Europe from North America may cost \$1.29 per minute for the long distance plus \$0.25 per minute termination fee.

If a significant number of employees are mobile and regularly call from locations outside of their home country, they could spend upwards of \$1.50/minute for every call they make. In our composite company, if 5% of the employees are sometimes mobile outside of their home country, and they have to call an

average of 40 calls per year for 5 minutes each, then the cost would be \$525,000 annually. If half of these could be done using SUT, the savings would be \$262,500 annually.

Another scenario for saving on mobile telephone charges is by using a mobile carrier that intercepts mobile phone calls and routes them to the device preferred by an SUT user or routes them over the enterprise IP network rather than the mobile carrier's network. Sprint^{xxiii} in North America, for example, offers medium to large enterprises a service in which it will intercept inbound and outbound mobile calls at the media gateway controller^{xxiv} (MGC) in the Sprint network. When an inbound mobile call arrives, which is destined for a person's mobile phone, the MGC first checks with SUT to see if the user prefers the call to be routed to another device, such as a Sametime client or a user's hard phone in a home office. These types of calls do not traverse Sprint's mobile network, and consequently do not consume mobile minutes. Outbound calls dialed by a mobile phone user can also be intercepted by the MGC and again, the MGC can query SUT for the least cost way to route that call. If the call is routed over the company's IP network, then no mobile minutes are used. If 3,500 users could save \$10/month by using a mobile plan with fewer minutes, the savings would amount to \$420,000 annually.

Table 6. Mobile phone charge cost avoidance.

Cost Avoidance from Mobile Phone Usage	Year 1	Year 2	Year 3	Total
International Mobile Phone Toll Savings	\$262,500	\$262,500	\$262,500	\$787,500
Lower Mobile Phone Plan Cost Savings	\$420,000	\$420,000	\$420,000	\$1,260,000
Total	\$682,500	\$682,500	\$682,500	\$2,047,500

Source: Wainhouse Research, LLC.

Reduced IT and Telephony Labor Costs

Although SUT tightly integrates into existing Sametime deployments, it will require persons with telephony knowledge and understanding to assist in configuring SUT and in maintaining it. Some IT staff who previously managed the PBXs, which were consolidated, may be redirected to SUT while most of them may be refocused to work on more mission critical IT projects for the enterprise. If three IT resources are freed up in year 1, four resources in year 2, and two additional resources in year three, then costs for these resources may be allocated as a benefit since they will be either eliminated or redirected to other projects. If we assume that the burdened cost for a full time IT resource is \$135,000, then the composite company can redirect \$405,000 in year one, \$945,000 in year two, and \$1,215,000 in year three toward other projects.

Table 7. IT and telephony human resource savings or redirection savings.

IT and Telephony Labor Savings	Annual Benefit	Year 1	Year 2	Year 3	Total
Number of IT resources reassigned		3	7	9	
Savings/IT resource/year	\$135,000	\$405,000	\$945,000	\$1,215,000	\$2,565,000
Total		\$405,000	\$945,000	\$1,215,000	\$2,565,000

Source: Wainhouse Research, LLC.

IT Help Desk Call Reduction

Using SUT is no more difficult than using Sametime; in fact, Sametime users will find it intuitive and easy to use the enhanced calling features of SUT. And because Sametime Unified Telephony provides a

graphical user interface to do mid-call controls (mute, transfer, hold, etc.) and to bring people into conferences, there will be fewer calls to the telephony, IT, and conferencing service provider help desks. If we assume that each of the 35,000 users in the composite company make one less support call in the first year and two fewer support calls in subsequent years, the help desk savings can be significant.

If the hourly burdened cost for a help desk resource is \$45 per hour and each help desk call averages 20 minutes, then for this scenario, help desk savings will amount to \$525,000 in year one and \$1,050,000 in subsequent years.

Table 8. Help desk call avoidance savings.

Help Desk Cost Avoidance	Year 1	Year 2	Year 3	Total
Number of calls avoided	35,000	70,000	70,000	
Average length of each call (hours)	1/3	1/3	1/3	
Hourly help desk representative cost	\$45	\$45	\$45	
Total	\$525,000	\$1,050,000	\$1,050,000	\$2,625,000

Source: Wainhouse Research, LLC.

Enhanced User Productivity

Several of the companies interviewed in preparation for this report indicated that Sametime Unified Telephony was implemented not for the cost savings, but for the ability to more rapidly reach out and communicate with people. In fact, any cost savings were secondary to the productivity increases. Nevertheless, this productivity benefit may be monetized as follows.

If we assume that each person in our composite company can save just one hour per week using Sametime and SUT, and the company is able to capture half of this time in increased productivity, then the potential economic impact can be tremendous, approaching \$126 million over three years at an average burdened cost of \$50 per hour per employee.

Table 9. The economic benefit from enhanced user productivity.

Productivity Increase Benefit	Year 1	Year 2	Year 3	Total
Number of workers	35,000	35,000	35,000	
Average hourly wage per worker (burdened)	\$50	\$50	\$50	
Hours saved per week	1.00	1.00	1.00	
Weeks/year (less vacation and holidays)	48	48	48	
Percent of labor redirected	50%	50%	50%	
Total	\$42,000,000	\$42,000,000	\$42,000,000	\$126,000,000

Source: Wainhouse Research, LLC.

Travel Cost Avoidance

Unified communications and collaboration tools can significantly reduce travel because people can see one another face-to-face using Sametime's multiparty desktop video capability, and they are able to share documents and presentation to others attending the meeting. Thus, while some travel is necessary, certain types of travel can be completely eliminated.

Assume the average business trip costs \$1,500, and 25% the people in the company travel, taking eight trips on average per year. A very conservative approach is to assume the organization can eliminate just 5% of these trips using Sametime and SUT. Under these conditions, the savings from even this very small percentage of trips avoided adds up to a very significant number.

Table 10. Travel cost savings.

Travel Avoidance Benefit	Year 1	Year 2	Year 3	Total
Number of workers	35,000	35,000	35,000	
Percentage who travel	25%	25%	25%	
Average trips per year	8	8	8	
Average T&E cost per trip	\$1,500	\$1,500	\$1,500	
Percent of trips avoided by UC&C	5%	5%	5%	
Total	\$5,250,000	\$5,250,000	\$5,250,000	\$15,750,000

Source: Wainhouse Research, LLC.

Carbon Footprint Benefit

For the number of trips saved in the trip avoidance benefit, there is a positive environmental impact: reduced CO₂ emissions. Based on the U.S. EPA CO₂ emission coefficient for air travel^{xxx}, companies using Sametime and SUT to avoid the travel as indicated above can save approximately 1,923,600 Kg in greenhouse gas generation over a three year period.

Table 11. Greenhouse gas emissions saved through travel avoidance.

Carbon Footprint Benefit	Year 1	Year 2	Year 3	Total
Number of air trips avoided	3,500	3,500	3,500	10,500
Round trip distance (miles)	800	800	800	
Miles Avoided	2,800,000	2,800,000	2,800,000	8,400,000
CO ₂ emsion reduction (.229 kg/mile)	0.229	0.229	0.229	
Total CO2 Improvement (kg of CO2)	641,200	641,200	641,200	1,923,600

Source: Wainhouse Research, LLC.

Total Benefits

Summarizing the benefits, it is clear that investing in Sametime and Sametime Unified Telephony has tremendous value for an enterprise. The non-risk adjusted benefits for the composite company are summarized below.

Table 12. Total economic benefits from using Sametime and Sametime Unified Telephony.

Benefit	Year 1	Year 2	Year 3	Total
Direct Cost Avoidance - Handset Maintenance	\$1,400,000	\$1,400,000	\$1,400,000	\$4,200,000
Direct Cost Avoidance - PBXs Eliminated	\$2,735,600	\$3,721,200	\$3,339,000	\$9,795,800
Direct Cost Avoidance - Least Cost Routing	\$364,000	\$364,000	\$364,000	\$1,092,000
Direct Cost Avoidance - Toll Bypass	\$630,000	\$630,000	\$630,000	\$1,890,000
Direct Cost Avoidance - Audio Conferencing	\$680,437	\$680,437	\$680,437	\$2,041,310
Direct Cost Avoidance - Web Conferencing	\$394,018	\$394,018	\$394,018	\$1,182,054
Direct Cost Avoidance - Mobile Phone Tolls	\$262,500	\$262,500	\$262,500	\$787,500
Lower Mobile Phone Plan Cost Savings	\$420,000	\$420,000	\$420,000	\$1,260,000
Labor Cost Avoidance - IT/Telephony	\$405,000	\$945,000	\$1,215,000	\$2,565,000
Help Desk Cost Avoidance	\$525,000	\$1,050,000	\$1,050,000	\$2,625,000
Productivity Increase	\$42,000,000	\$42,000,000	\$42,000,000	\$126,000,000
Travel Avoidance	\$5,250,000	\$5,250,000	\$5,250,000	\$15,750,000
Total	\$55,066,554	\$57,117,154	\$57,004,954	\$169,188,663

Source: Wainhouse Research, LLC.

Financial Summary

The financial results displayed above can be used to evaluate whether an investment in Sametime and Sametime Unified Telephony is justified. The table below shows the return on investment (ROI), net present value, and the payback period for the 35,000 person organization that deploys these solutions. For calculation purposes, the discount rate specified is 10%.

Table 13. Annual cash flow calculations and present value using a discount rate of 10%.

	Cash Flow Calculations					
	Initial	Year 1	Year 2	Year 3	Total	Present Value
Costs	(\$11,252,800)	(\$676,835)	(\$1,494,785)	(\$1,494,785)	(\$14,919,205)	(\$14,970,109)
Benefits		\$55,066,554	\$57,117,154	\$57,004,954	\$169,188,663	\$141,957,611
Net Benefits	(\$11,252,800)	\$54,389,719	\$55,622,369	\$55,510,169	\$154,269,458	\$126,987,502
ROI	483%					
Payback(Months)	2.5					

Source: Wainhouse Research, LLC.

Based on the characteristics of the composite company, Wainhouse Research calculated a three-year ROI of 483%. Risk factors could be applied to adjust these numbers up or down, but they would not significantly impact the magnitude of the result or the implication that such a dramatic ROI demands investment.

Based on interviews with real SUT customers, they either now are or expect to see benefits in the following areas:

1. Cost avoidance by eliminating some handset purchases and handset repair and maintenance fees.
2. Cost avoidance by eliminating the need to upgrade PBXs.
3. Cost savings from least cost routing and toll bypass.
4. Cost savings from on-premises ad hoc audio and web conferencing.
5. Reduced mobile device and calling card usage costs.
6. Reduced IT and telephony labor costs.
7. Cost reduction for help desk call reduction.
8. Enhanced user productivity.
9. Savings from travel cost avoidance.

In calculating the economic benefits of using Sametime and Sametime Unified Telephony, the economic benefit is tremendous. Additional benefits, not specifically estimated above include

- Embedding communications into dashboards, mashups, social software, and line of business applications.
- Federating with people in the value chain to enable presence and IM exchanges as well as saving on audio and web conferencing charges by using in-house conferencing resources versus paying a conferencing service provider.
- Calculating the economic benefits from reduced CO₂ emissions in European Union countries.

Appendix A: Composite Organization Description

In this study, Wainhouse Research considered the 360° economic impact for an organization with the following attributes.

Organization Size

- 35,000 knowledge workers, 17,500 in North America with the remainder in Europe and Asia Pacific., \$7 billion US in revenue.

Communications and Collaboration Environment Prior to SUT

- The composite company has already invested in Sametime Standard Edition. Consequently, all knowledge workers have access to this solution and used it regularly.
- The company has a variety of device types including personal computers running Windows, Mac, and Linux operating systems. Furthermore, users have a variety of smartphones including iPhone, Android, and BlackBerry.
- A variety of PBXs exist.

SUT Investment Drivers

The primary driver is increased productivity and reachability. Although a person's colleagues are available using presence and IM, the added ease of reaching those individuals using voice is very important.

The new voice capabilities SUT provides offers users significant ease of use advantages when trying to communicate including click-to-call, click-to-conference, single number reach, single voice mailbox, mid-call controls, and call routing preferences.

SUT provides a consistent user interface across the entire organization regardless of which PBX a person's phone may be pointed to. SUT can front existing PBXs, letting the company avoid a rip-and-replace scenario, or SUT can be used to retire a PBX, replacing PBX functionality with call control and routing based entirely within SUT.

Sametime allows companies to federate so that people in different companies can connect with one another easily. With SUT, people in different organizations can easily connect using voice in addition to IM/presence.

SUT was designed from the ground up as a highly scalable, highly available solution. IBM only sells it in a redundant configuration so as to maintain business continuity in the event of a component failure.

On-premises audio conferencing as enabled by SUT provides significant cost saving over using a conferencing service provider for every conference call. Furthermore, web and audio conferencing are automatically combined, and clicking on a "join" popup button can bring someone into both a web and an audio conference whether that person is attending using a desk phone, a mobile device, or the PC softphone.

Given that the organization has experience in IBM products, including Lotus Notes and Sametime, the integration advantages of using SUT are significant. Furthermore, SUT and Sametime integrate seamlessly with other IBM social business tools, like Connections for social networking, and Quickr for

shared workspaces. In addition, should the underlying email infrastructure ever migrate to Microsoft Exchange/Outlook, users would see no difference in their communications and collaboration environment.

Using Sametime and Sametime Unified Telephony together create an environment that has significant cost advantages. This report illustrates an example of a 35,000 person organization achieving rapid ROI and tremendous financial benefit when using Sametime and Sametime Unified Telephony. Readers are encouraged to supply their own cost factors in order to determine the benefit their organizations would realize from a Sametime/Sametime Unified Telephony deployment.

About the Author

E. Brent Kelly is a Senior Analyst and Partner at Wainhouse Research specializing in unified communications applications and enabling infrastructure. Brent has authored numerous reports and articles on unified communications. He has forecasted both the premises-based UC products market and the emerging hosted/managed UC services market. He has created in-depth profiles on over 50 UC providers. Brent has written lengthy reports on Microsoft's UC strategy, IBM Sametime and IBM's UC² Strategy, and Telephony-Based Unified Communications providers. He has also written reports about migrating to IP communications, video network service providers, and the collaborative reseller channel. Dr. Kelly has authored articles for Business Communications Review Magazine, NoJitter.com, and he has taught workshops in North and South America, Europe, and Australia as well as at major industry events such as Enterprise Connect (formerly called VoiceCon). With over 21 years experience in developing and marketing highly technical products, Brent has served as an executive in a manufacturing firm where he developed and implemented a manufacturing, marketing, and channel strategy that helped land national accounts at major retailers. Previously, he was part of the team that built the devices Intel used to test their Pentium microprocessors. He has also led teams developing real-time data acquisition and control systems, and adaptive intelligent design systems for Schlumberger. Brent has worked for several other multinational companies including Conoco and Monsanto. Dr. Kelly has a Ph.D. in engineering from Texas A&M and a B.S. in engineering from Brigham Young University. Brent serves as an elected official in his community. He can be reached at bkelly@wainhouse.com.

Endnotes

ⁱ Source: Wikipedia.org, http://en.wikipedia.org/wiki/Presence_information.

ⁱⁱ Source: Wikipedia.org, http://en.wikipedia.org/wiki/Instant_messaging.

ⁱⁱⁱ Source: Wikipedia.org, http://en.wikipedia.org/wiki/Voice_over_Internet_Protocol.

^{iv} A fine point involving calling must be clarified. Calls can be made by the Sametime client in two ways: VoIP calls to other Sametime users or calls made through Sametime Unified Telephony. If a multiparty VoIP call is created using only Sametime, then PSTN participants cannot be added to the call. However, in any call setup using Sametime Unified Telephony, any participants may use SUT to dial out to others who may join using the PSTN or any other endpoint SUT rings.

^v In this document, forward looking statements with respect to products or solutions IBM will or will not deliver are assumptions by Wainhouse Research and do not commit IBM to creating these products or services and should not be construed as product announcements or availability by IBM.

^{vi} These drivers are taken from the book, "Good to Great" by Jim Collins. They are articulated in Chapter 7 titled, "Technology Accelerators".

^{vii} Sametime also works equally well with Microsoft Outlook; it just so happens that the six customers were Lotus Notes users.

^{viii} Discount rate is the rate used to discount future cash flows to the present value. It is a key variable in net present value calculations and can be thought of as the rate of return an investment would need to receive in order to be approved over alternative investments, including doing nothing.

^{ix} We have not included the costs for Sametime Standard Edition because the organizations have already deployed it. To be technically accurate in the calculations, there would be a Sametime Standard maintenance charge of approximately \$10/user/year, which we have included in our calculations.

^x Three TAS servers are required in North America to provide 100% redundancy since a single TAS server can support 15,000 users. With 17,500 users in North America, two TAS servers are required for normal operation, and a third is required for redundancy.

^{xi} Another option instead of using IP to PSTN gateways is to use SIP trunking. If each of the 17,500 North American users used 14,750 minutes per year, the total minutes would total 258,702,000 minutes/year. At a cost of \$0.01 per minute, SIP trunking would be \$2,587,025 annually. When T1 cost savings of \$400/month/T1 were included as a benefit, the SIP trunks still cost slightly more than using the gateways and T1 lines. If the cost for SIP trunking could have been \$0.008/minute or lower, then SIP trunking would have been the less expensive alternative. Costs for SIP trunking were taken from the Broadvox website at http://www.broadvox.com/sites/default/files/GO!Domestic_2011.pdf.

^{xii} If Sametime Standard were not already deployed, then there would be an additional cost for Sametime Standard licenses and the physical server costs. These one-time charges would total approximately \$1,493,100 with server maintenance charges adding \$13,965 annually.

^{xiii} Source: Robin Gareiss, Numertes Research, <http://www.rts.com/docs/Nemertes%20-%20A%20Case%20for%20Avaya%20VoIP.pdf>.

^{xiv} This is the street cost for maintaining the PBX server license as well as individual licenses for call control and voice messaging. The cost reported is from a PBX vendor after discounting for street pricing.

^{xv} Ibid Gareiss. We have assumed a service provider performed the MACDs. This report suggests that if the enterprise does the MACDs, the cost is about \$10/each. However, that does not factor in the cost to get administrative personnel trained to a level that they can do these changes.

^{xvi} We may not be able to save all of the PRI circuit costs because we will need more PRI connections at the central location since calls will be routed to the central gateway in order to get to the PSTN. However, calls between locations will no longer need to be routed through the PSTN, so many PRIs can be eliminated.

^{xvii} Peer Hasselmeyer, “A Novel Architecture for Dynamic Least Cost Routing”, <http://www.hasselmeyer.com/pdf/scom00.pdf>.

^{xviii} The no charge comment implies that the enterprise IP wide area network has the capacity to carry the voice traffic. Some companies do find it necessary to upgrade their WANs in order to facilitate toll bypass.

^{xix} In some countries, toll bypass is prohibited. We have assumed it is permitted in most countries where the composite company operates.

^{xx} The data used in these calculations come from four research reports published by Wainhouse Research: 1) The North American CSP Market Forecast, 2) The European CSP Market Forecast, 3) Collaboration Services: North America – Total Addressable Market – 2011, and 4) Collaboration Services: Europe – Total Addressable Market – 2011. We used the market size in 2011 and the current market penetration in 2011 to compute the average usage per user for unattended audio conferencing and web conferencing.

^{xxi} The average cost for audio conferencing per enabled user in Europe is nearly double that in North America while web conferencing charges are only slightly higher in Europe. For these calculations, we’ve averaged the costs per enabled user between the two regions.

^{xxii} A more aggressive figure would be to bring 80% of audio and web conferencing in-house. We are aware of organizations that have done so. Our calculations are thus fairly conservative, and the real savings could be significantly higher.

^{xxiii} Sprint in North America offers this service. Other network providers are considering it. There are a few in Europe who also provide this capability. As more and more enterprises demand such an offering, other providers will offer it with lower per plan mobile phone charges in exchange for most or all of the mobile phone contracts in a large enterprise.

^{xxiv} A media gateway controller, or MGC, is a network element that controls calls between the mobile provider's network and another network, such as the PSTN or an enterprise's own MPLS network

^{xxv} Source for CO2 emission data is the US EPA publication on commuter travel:

http://www.epa.gov/climateleaders/documents/resources/commute_travel_product.pdf.