Business VoIP Buyers Guide

So you've heard the hype. Perhaps you've decided that it makes sense to consider a move to VoIP (of some kind). ..**you're not alone:**

The 2011 version of a regular survey by market research firm Infonetra showed that 27 percent of the 700 companies surveyed are already using VoIP and another 50 percent are planning to deploy it in the next two years.

Why are businesses flocking to adopt this new technology? And how do you determine if the time is right for your business?

The purpose of this white paper is to provide a roadmap for businesses to understand and assess their VoIP options. The roadmap lays out the primary drivers behind a business' decision to move to VoIP, the basics of the technology, the considerations you should be aware of before embarking on a VoIP project, and the types of implementations that your business might undertake.

Armed with this information, the reader will gain the ability to decide if and when the time is right to start a VoIP evaluation and how to go about it in an educated matter. With the plethora of options and entry points available today, that time is most likely now.

This paper follows some basic steps in the evaluation process:

- Understanding why business VoIP has become so popular - Business Drivers
- Cost analysis
- Basic and brief VoIP technology overview
- Planning considerations - common areas of challenge
- Available deployment options and a comparison of strengths and weaknesses

There are inserts and callouts along the way as well as simple illustrative diagrams to help explain things and keep them simple yet informative.

VoIP Business Drivers

Whereas the residential VoIP market has clearly been driven by price, features and benefits are clearly driving the business market.

Three major categories of VoIP Features and Benefits will be explored in the following section:

- Productivity
- Mobility
- Disaster Recovery / Business Continuity

We wouldn't be realistic if we didn't take cost into consideration as a business driver (or least a "decision justifier"). The above sections are followed up by a discussion on VoIP cost reduction and analysis on Total Cost of Ownership.

More

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Productivity

Frost & Sullivan claims that productivity and efficiency benefits are viewed as key drivers for VoIP adoption by nearly 30% of respondents in mid-sized businesses in North America. But what are these benefits and why are they driving this quick adoption?

Some of the most commonly reported productivity enhancing VoIP features are as follows:

Find me / Follow me

Generally controlled by individual end-users, Find me / Follow me allows for call routing based on the user's desire or availability. As an example, a user can set their extension to ring their desk phone two times before attempting to reach the user on their cell phone or at their home number or both.

This is commonly called "sequential ring". "Simultaneous ring" is also available where all designated numbers are dialed at the same time.

Application Control and Integration

Application control and integration enables users to control their individual settings, voicemail and handset options from a typical web browser. Application integration allows users to initiate and accept calls from inside of applications that are already familiar to them such as Internet Explorer and Outlook. Users "click" to dial these telephone numbers for seamless integration and maximum ease of use.

Softphone Application

Softphones, sometimes called soft clients, allow users to treat their PC as a phone handset, using it to dial and control calls. The user interface is generally through a headset or other device plugged into a mobile laptop or PC. The softphone then acts as a duplicate extension of the user's regular office phone regardless of where they are, providing all of the functionality of their office system while on the road.

According to Infonetics Research, the number of seats for hosted business VoIP services is on track to more than double between 2012 and 2016.
- Infonetics Research[1]

The actual ring to number remains hidden to the calling party at all times for either application. This and similar features are typically controlled via a web browser application.

Anywhere Phone Number Mobility / Fixed Mobile Convergence

Similar to Find me / Follow me, this functionality incorporates the ability to take your office telephone number anywhere with you with via the above process or with another VoIP handset or softphone. Outbound calls on the softphone or VoIP phone will show the appearance of coming from the office regardless of where the user is located. With this option, organizations can actually have a distributed workforce working at home or on the road and still appear to be in one office with all of the same functionality.

Unified Messaging (UM)

UM is generally considered as the merger of voicemail, email and fax, delivered to one email inbox. Voicemails come in as an .mp3 file and users "click" to hear voicemails through the audio on their PCs as well as to call back selected parties in any particular order. Voicemail .mp3 files can be forwarded in email and saved for future reference.

Conferencing and Collaboration

Browser based "click through" user set up and control for audio, web and/or video conferencing including document sharing and on-screen collaboration.

No need for additional hardware, software and conference scheduling. While many users do immediately find this

More

compelling, this will be one of the major drivers in future applications.

The above features and benefits result in productivity and performance gains. While these potential gains are difficult to deny, they are somewhat difficult to specifically quantify in a financial business case for making a move to VoIP. Many business owners and financial decision makers cling to the belief that if users do not have features, or are not asking for them, that there is no financial benefit in investing in them. Along with many other technology decisions, that thought process is clearly changing. Decision makers are now asking "how can I enable my employees and partners to do more and be more productive with new technologies?" Productivity and convenience features are evaluated first and then rationalized with cost analysis.

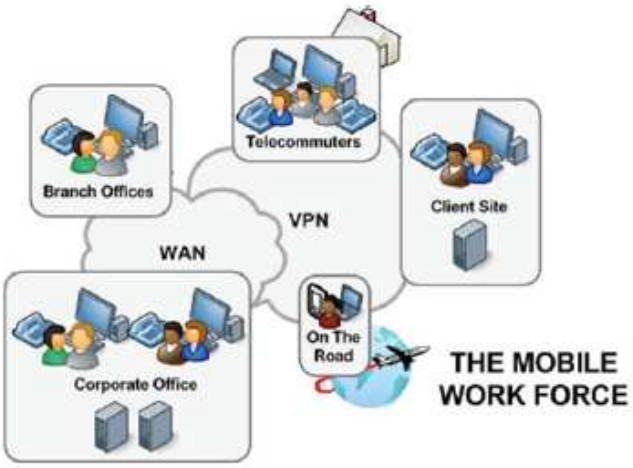
Mobility

According to an updated forecast from International Data Corporation (IDC), the Americas region – which includes the United States, Canada, and Latin America – will see the number of mobile workers grow from 182.5 million in 2010 to 212.1 million in 2015. North America has the largest number of mobile workers in this region, with 75% of the workforce mobile in 2010. Stacy Crook, senior research analyst for IDC's Mobile Enterprise Research program says, "Our forecast shows that the worldwide mobile worker population will increase from just over 1 billion in 2010 to more than 1.3 billion by 2015."
- IDC [2]

Migration to the mobile office is an inevitable event in the future of every business. Businesses can choose to fight the trend or embrace its hold on the American worker. Employees look forward to a future of flexible work hours, flexible locations and the convenience of ubiquitous access to business applications. Businesses who embrace this trend can look forward to a distributed but very engaged work force with more productive time throughout the day. This trend will certainly continue with the anticipated workforce proliferation of "echo boomers" – a younger workforce who will become major drivers of new applications and work styles.

Because VoIP is delivered over IP (Internet Protocol), phone system features can be extended to any location with an Internet connection or WAN connection back to the host. As a result, small offices and home users can have the same features as users at the headquarters (or large corporations!) without the expense of local PBX equipment.

Call center operations can utilize remote workers or contractors in a single unified call center operation. In essence, the business can operate virtually and more productively. How far the business takes the "virtual" office is limited only by their imagination and commitment. The productivity enhancing features discussed above are what enable easy mobility of the workforce.



Disaster Recovery and Business Continuity

It's safe to say that over the last decade, increased geo-political and geo-physical events are disrupting the workforce more frequently while pressure from corporate compliance regulations have increased. This has resulted in increased business interest in disaster recovery and business continuity plans. While many businesses have some form of DR plan for their data operations, they may not have fully vetted plans for the continued operation of their voice services in the event of a disaster. This is the fundamental difference between Disaster Recovery and Business Continuity. Since most PBXs reside at the customer premise, an on-site disaster or simple carrier outage effecting either the PBX equipment itself or voice connectivity into the premise, effectively disconnects that location from the rest of the world. Customers and vendors

calling that location are met, unceremoniously, with a "fast busy". While it is true that many voice carriers provide line forwarding options, a manual operation must be requested by the business and executed by the carrier for this to take place. In addition, while this plan may temporarily relieve the "fast busy" issue, it does not provide for continued operation and availability of voice services to employees should the disaster last for any period of time. A single day without the use of their extension can effectively render information workers and salespeople completely useless. Depending on the size of your operation, that cost can range from several thousand dollars to several million.

The "virtual" nature of some VoIP systems provides options to address this problem. While different types of VoIP implementations can address this issue with different levels of effectiveness (see VoIP Implementation Options), nearly all VoIP implementations offer some form of disaster recovery - from shared configuration between IP PBXs at multiple locations to Network-based options that do not reside at any of the businesses' sites. In addition, the mobility features discussed above can also be considered a Business Continuity benefit. Quite simply, if a location is unavailable for a period of time, employees can simply go home, taking their phone or using a soft client to remain productive and available at their extension without the rest of the world even knowing there was an issue.

Lower Total Cost of Ownership (TCO)

TCO is an often overused and misunderstood concept. Many financial decision makers consider TCO as a soft or sunk cost argument towards making an expensive technology decision. And while a poorly formed argument can surely seem that way, VoIP can offer a truly quantifiable TCO that is generally equal to or lower than the traditional TDM alternative.

TCO calculations can vary greatly based on the type of implementation (Traditional vs IP PBX, on site vs Hosted PBX). These variations will be explained later in this paper. So let's start with the general TCO of a PBX (VoIP vs Legacy PBX technologies).

The general TCO of a PBX includes the following components:

- Purchase price of the system (lease or buy)
- Installation cost of the system
- Maintenance Costs (generally an annual contract of approximately 15-20% of the purchase price)
- MACs (Moves, Adds and Changes) – the process of adding or deleting a line, setting up a new user or feature, moving someone, etc. (roughly $125 one-time per MAC)
- Monthly telecommunications costs – Local, Long distance, etc.
- Internal costs – staff time managing the solution, waiting for MACs,
- training, etc.
- Soft / Productivity Increases (not included)

While system and installation costs are similar, there are several key areas where VoIP will provide a better TCO than Legacy PBXs:

The first area of dramatic cost savings is in the cost of MACs (Moves, Adds and Changes). Depending on the size of an operation, MACs can be a large and inconsistently occurring expense. However, an IP telephone's network address is tied to the device itself, not the port it plugs into (like a traditional handset). As a result, VoIP handsets can be moved from location to location, and the user's extension and features will follow them—whether the user has moved to a different office location or taken their phone home. Users can move themselves or use a designated non-technical contact instead of calling their PBX vendor, waiting and then paying for them to "hardwire" the new changes. At an average cost of $125 per MAC, this can add up very quickly in most businesses.

The second area of cost savings is in monthly telecommunications services cost. There are two primary

reasons. First, the delivery of voice over IP allows for a converged delivery of voice (local and long distance services), Internet access and possibly WAN services. Since all services are IP based, carriers offer consolidated services over fewer physical connections to service VoIP endpoints. Depending on your local configuration and your carrier's capabilities, this alone can have a dramatic effect on monthly costs. Second, businesses with multiple locations can experience reductions in usage between locations by moving those packets over the company's Wide Area Network (WAN) effectively eliminating carrier per minute charges for communicating from site to site.

Some providers may also "bundle" telecommunications, Internet and VoIP PBX services and fees into one package. This enables the business to consolidate many variable expenses into one. While we won't automatically say this enables lower TCO as there are many variables, we will say that this current trend and commonly available products do indicate so.

Ranging over into the "soft" cost side of TCO, businesses need to consider the internal costs related to managing the PBX solution. While many firms simply outsource all work related to their PBX, there is always some degree of on-site management. In mid-sized businesses, there may be an individual or team of individuals managing the Legacy PBX solution. This knowledge is generally not required in other areas of the business. VoIP systems are obviously IP-based, and as such easily fold in the domain of the IT department. A converged architecture allows for maximum utilization of available resources, and limits the businesses' dependence on specialized, and not always necessary, PBX skill sets.

Lastly, certain types of VoIP implementations can offer TCO advantages in the areas of purchase, installation costs and ongoing maintenance. This will be explored further in the VoIP implementation options section.

VoIP Technology Overview

Definition

VoIP is the transport of packetized voice traffic on an IP (public or private) transport facility with or without other types of data. The voice signal is sampled, compressed and encapsulated into IP data packets to allow it to be switched or routed along with other data packets across the LAN or WAN.

CODECs

CODECs (Compressor/De-compressor) convert audio signals into a digital format and compress for transmission. The most commonly used CODEC standards for VoIP transmission are G.711 and G.729

G.711

- 64K (standard) compression algorithm for encoded speech
- Total bandwidth required with overhead = 93 Kbps

G.729a

- Compresses 8kHz audio signals and encodes them for transmission at 8 Kbps
- Total bandwidth required with overhead = 28.8 Kbps
- This level of voice compression allows for over subscription and greater service efficiencies

Enterprises have reported saving more than 40 percent on their long distance costs by packetizing their wide area voice traffic.
- Gartner [3]

Either CODEC provides for a significantly more efficient network infrastructure than traditional TDM networks. By "packetizing" voice into streams of 28.8kbps to 93kbps, voice conversations can travel the same network utilized for Internet and WAN traffic, eliminating traditional POTS lines, PRI or voice tie lines and allowing for more efficient use of available bandwidth.

- To avoid the problems of jitter, packet loss and delay – a thorough network assessment should be performed to ensure there is sufficient bandwidth (LAN and WAN) and control for the introduction of IP voice.
- Pay particular attention to links where traffic transitions from LAN to WAN
- Conduct a complete network inventory and understand the current bandwidth consumption of existing applications and services as well as future calling traffic patterns

Always give precedence to voice packets on the network for timely delivery (for more information on packet prioritization, known as QOS (Quality of Service), please refer to the EvolveIP Whitepaper: End to End Service Level Management in the Wide Area Network.

Security

With legacy TDM, voice systems weren't affected by IP related threats. Because VoIP is implemented on the IP network, using IP standards, it is subject to the same security vulnerabilities as the rest of your businesses' IP-based systems such as servers, routers, switches, firewalls and databases. In addition to the normal security threats, here are some typical VoIP affected threats:

- Invasion of privacy through eavesdropping on conversations
- High-jacking of VoIP service for unauthorized use
- Malicious attacks – Denial of Service (this can now disrupt voice services)
- The good news is that there are no significant VoIP specific protections that need to be put in place other than an effective organizational security policy that includes VoIP centric systems and services along with legacy IP based systems. There are no substitutes for a fully encompassing approach to security policy implementation and enforcement.
- A solid, defense-in-depth security policy will cover the security needs of VoIP (for more information on Defense in Depth, see the EvolveIP whitepaper: Defense in Depth through Managed Security Services).

This paper also covers SIP – the primary standard for VoIP enablement and implementation and how the collective standards and development communities are further mitigating VoIP security concerns.

Power

- Traditional POTS (Plain Old Telephone Service) lines in small office and home offices provide inline power to telephone handsets. Larger offices with actual telephone systems and handsets also get inline power. Since VoIP handsets are connected to Ethernet instead of POTS, power must be provided via alternate means. One option is to add an adapter to plug the phones into a standard power outlet, which is susceptible to power outages like legacy PBXs. The second and more desirable option is to replace the Ethernet switching to the end points with POE (Power over Ethernet) switches which provide inline power over standard Ethernet lines similar to traditional POTS. These switches can then be backed up with an on-site UPS (Uninterruptable Power Supply) to ensure continued use of phones in the event of a power outage.

Failover Options

- In the event of a primary local access line outage (T1, Fiber), failover options are often limited to IP-based services. Since the intelligence of the PBX is located at the business location, a loss of connectivity to the site can render IP-handsets useless. Careful consideration must be given to a POTS line or Internet Access redundancy policy. This consideration is also important in a legacy PBX environment. There is no failover disadvantage with using VoIP, if it is effectively planned for.

E911

- When a 911 call is made via the PSTN (Public Switched Telephone Network), there is address information that is transmitted to a local PSAP (Public Safety Answering Point) so that emergency services can locate the caller.
- Due to the "virtual and possibly mobile" nature of a VoIP end-point (handset or soft client), calls are technically not originated from a "physical" location, complicating the transmission of address information to the PSAP in the event of a 911 call.
- Due to regulations surrounding this, VoIP PBXs and Service provider stations, must be "registered" to a location so that they can be "logically" mapped to a "physical" address which can be transmitted to the PSAP in the event of a 911 call.
- Due to regulations surrounding this, VoIP PBXs and Service provider stations, must be "registered" to a

- location so that they can be "logically" mapped to a "physical" address which can be transmitted to the PSAP.
- Companies evaluating any VoIP implementation should understand this consideration and discuss options with their service provider or integrator.

Mobility

Mobility has already been demonstrated as one of the primary drivers for businesses considering VoIP, however, the mobility capabilities of the end-points differ based on the various options of VoIP implementation. Businesses should discuss both long and short term mobility objectives before planning their implementation and plan for effective policy and administration.

Quality

SOHO (Small Office / Home Office) and Consumer-oriented VoIP offerings (Skype, Vonage) generally use the Public Internet for transport of voice packets back to the service provider. In any situation where voice packets traverse the Internet, Quality cannot be assured. Businesses should understand the implications of Internet-based transport and discuss it with their service provider or integrator (for more information on packet prioritization, known as QOS (Quality of Service) in the WAN, please refer to the EvolveIP Whitepaper: End to End Service Level Management.

While these considerations should be taken seriously, they should not be looked at as reasons to shy away from a VoIP implementation. A well planned and executed VoIP strategy can deliver call quality ratings similar to or better than traditional TDM implementations.

Implementation Options

Now that we have discussed overall VoIP benefits and considerations, it is helpful to understand the types of procurement and deployment options and their relative strengths and weaknesses. Listed below are three types of potential implementations as well as their advantages and disadvantages.

Purchased IP PBX

In this legacy scenario, the customer purchases or leases the IP phone system and handsets from a PBX Vendor. Voice and/or Internet services are contracted separately.

Advantages:

- Benefits of implementing an IP PBX system
- Allows for separate negotiation of voice and/or Internet services per location (although some may consider this a negative)
- It's tried, tested and "safe"

Disadvantages:

- Customer may still have to incur PBX maintenance fees, software patches, MACs, etc.
- Services may not be bundled in and the customer may still have to deal with multiple vendors.
- Mobility options may be limited based on system and provider offering and rely on users connecting to the host site to access service.
- Implementation of PBX is dedicated to the customer and depending on configuration, may be a single point of failure.
- A full data network (not tied to voice infrastructure) is generally required between sites for multi-location deployments.
- Capital expenditure on a swiftly depreciating asset increases the TCO.
- Limited Disaster Recovery and Business Continuity options

Managed IP PBX

This is simply a different pricing option on above the typical IP PBX deployment. In this scenario, the customer pays a monthly fee for an on-site PBX and handsets from a service provider rather than the standard lease/buy/maintenance option. Voice and/or Internet services may or may not be bundled in.

Advantages:

- Benefits of implementing an IP PBX system
- Customer controls the timing and roll-out of new PBX features
- Possibly lower operating costs and lower TCO over
- legacy options