# Whitepaper

The benefits of software based PBX

Why your next Phone System should be software based and running on a mainstream operating system

This whitepaper explains the benefits of having a software based phone system. Why it makes sense to move away from proprietary solutions and from appliance based solutions, based on custom distributions of Linux, to go straight to a real software based solution, running on a mainstream, commercially supported operating system.

Introduction

The PBX business is clearly fast asleep…
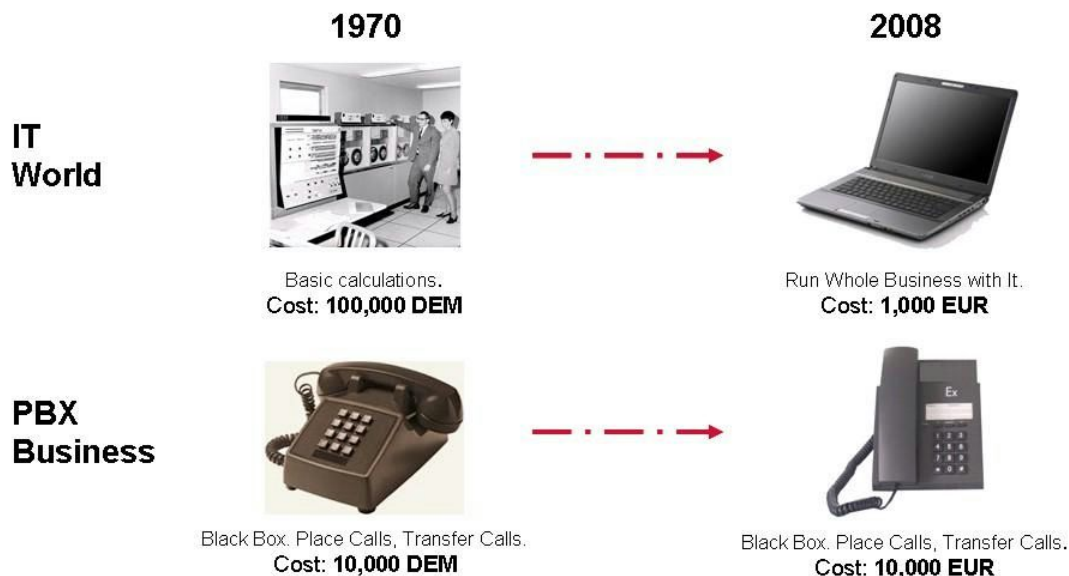
You don't need a time machine in the traditional PBX vendor world. The phone system of 1970 is the phone system of today. They look and do almost the same. This is very different from what has been happening in the IT business over the last 40 years, where we have seen lots of progress and a reduction in cost.

Clearly the PBX business has a lot to catch up on. It desperately needs to innovate, and it is software solutions that can make that happen.

Software based PBX

The lack of progress and innovation in the PBX industry has been largely caused by the fact that the traditional PBXs run on a proprietary and limited operating system, which has only archaic development tools. A software PBX will leverage the latest operating system features and modern development environments, allowing developers to reuse features in the operating system and quickly add new functionalities to the PBX.

A PBX must run on a mainstream OS, not an appliance

A key point is that a software PBX must run on a mainstream operating system that is commercially supported and maintained, guaranteeing regular OS updates supporting the latest hardware, and most importantly security updates for vulnerabilities found. Administrators need to get away from black boxes and take control of their phone system.

Windows or Linux?

The choice of Windows or Linux will largely depend on your IT infrastructure and the experience of your administrations. Clearly your PBX should not demand additional skills from your team or require you to buy additional hardware or support agreements with operating system vendors.

If your IT department relies on Windows and knows Windows, choose a Windows based solution. If you use Linux, then a Linux solution will suit you best. Do not let the PBX features or price override your choice of operating system. Your PBX should be just another server application, which can be run on the same servers and with the same network management tools that you use today. There should be no need to learn a new black box.

Key considerations why you must go for a mainstream operating system that you know:

Applying OS patches

Operating systems need to have patches applied on a regular basis. If administrators have chosen a PBX that runs on an operating system they are familiar with then they will be able to easily apply these patches. Windows administrators will struggle to apply sometimes problematic Linux patches.

The worst choice is a so called appliance which takes a custom version of Linux and bundles in the open source PBX. These custom versions of Linux do not receive regular security patches, leaving your phone system vulnerable to attack.

Upgrading is easier

Upgrading to a new version of your PBX is a simple process if you are familiar with the underlying operating system: On Windows it's a matter of downloading the updates and having them applied automatically. Upgrades will be done in a matter of 510 minutes. This is often not the case on appliances or other open source based systems, which will cost you a lot of additional administration and down time.

Monitoring your PBX

With a PBX running your choice of operating system you can use familiar controls for services, logging etc. to check that your system is up and running. Your PBX will expose critical administration information such as:

- Monitor status, processor and memory usage of services.
- Restart services automatically if needed.
- Monitor the number of calls, registered phones & ports via performance counters.

● Check for critical system events such as failed registrations via the event logs.

This information will be published in different ways depending on the operating system. You do not want to have to setup different monitoring systems or familiarize yourself with different interfaces just to manage your PBX. Monitor your PBX using your existing network monitoring solution and knowledge.

Fault tolerance through easy backup of your PBX

Software based also means that you can easily backup your whole PBX. In the event of a hardware failure, you can restore your phone system on to another machine in a matter of minutes using the inbuilt backup function. If you are running your PBX virtually, you can use the Hyper V or VMware Backup function to save a complete copy of your PBX to disk.

If you are running a proprietary black box solution or a hardware appliance PBX, you will be without a
PBX until you can get a physical replacement which will probably require reconfiguration.

Leverage your existing server hardware

Because modern servers have ample processing power, a software based PBX can run on an existing server with other applications, saving on hardware cost, energy consumption and administration costs. No need for a dedicated machine or a low performance appliance. Optionally, using Hyper V or VMware you can also virtualize your PBX and separate it from other apps, without requiring a separate server.

Low resource usage

Modern day hardware can easily support PBX hardware requirements. The table below shows the processor and memory usage of a busy Windows Server for handling 16 continuous calls: Low processor and memory usage means it can be run safely on an existing Windows server that is running other applications.

Machine Specs	Intel Core 2 Duo CPU, E 4500 @ 2.20 GHz, 4 Gb of RAM, 50 Gb Hard disk SATA and a 100Mbps Network connection
Operating system	Windows Server 2012 R2
Other applications installed	IIS, Exchange Server and Active Directory
Simulated Exchange load (using Exchange Load Simulator)	25 users making heavy use of Exchange (Sending mail, scheduling meetings, checking inbox etc)
Processor time used by Exchange Server	1015%
3CX Phone System	v12

3CX simulated call load	16 simultaneous calls continuously.
Call rate	0.5 calls/second equalling 2000 calls per hour.
Processor usage of all 3CX Services	Less than 15% CPU.

Total Memory usage of all 3CX services	300 megabytes
Peak processor usage	3040%

Virtualize

Alternatively you can run your PBX as a virtual instance using HyperV or Vmware. HyperV or VMware are great virtualization platforms with superior I/O performance which allow you to virtualize your PBX, even for larger installations. In the case of HyperV you might not incur additional license costs depending on your version of Windows Server.

Easy to scale

Because your PBX is running on a modern server, it's easy to scale compared to a traditional PBX or an appliance. Modern server hardware will allow you to add almost unlimited extensions, lines and functions because servers have ample processing power.

Appliances on the other hand are limited by the number of telephony ports and by their limited processing power and memory. Your appliance will run out of steam as soon as you start adding more lines, phones, and making use of more processor intensive functions such as conferencing. Before you know it you will need to discard your old appliance and buy a new 'bigger' appliance.

On Site support and replacements

An important advantage is that you can work with a leading server hardware vendor of your choice. Dell, HP, IBM/Lenovo and other server vendors offer the best server hardware at reasonable prices and with worldwide on site support. This is not the case with PBX appliances from smaller vendors can they offer worldwide service and replacements within certain time frames?

Easy Integration with other applications

Another major advantage of a software based PBX that is running the same operating system as your other server applications is that it integrates easily with your other business applications and uses the same API's. It's no longer a black box sitting in the corner refusing to talk to the rest of your network. And with this integration we can gain features and thus productivity. For example:

Integrate with mail or database server

A PBX running on the same OS or using similar APIs will easily talk to other key servers such as the mail server or database server. For example, one could automatically match a caller ID to a customer name by querying the database for the customer name based on the phone number. Anybody within the company will immediately see the customer name and be able to serve customers quicker whilst improving customer service!

Integrate with CRM system

By integrating your phone system with a CRM system a company can improve productivity greatly. Know who is calling and log calls with customers for reporting and customer service purposes. A windows based PBX will easily talk to CRM systems such as Microsoft Outlook, Microsoft Dynamics, Navision or even Salesforce.com.

Integrate with your User Directory

Software based PBX will allow you to connect with your User Directory of choice. A Windows based PBX will easily integrate Active Directory whilst a Linux solution will use LDAP to connect with your user directory. This will ensure that user data is not duplicated and always up to date, saving valuable administration time and ensuring user data is correct and synchronised.

Conclusion

A software based PBX delivers great advantages to your company, providing you go for a PBX
running on an operating system you know and use. It
will offer you:

- Easy installation & management
- Ability to leverage your existing Server Hardware
- Fault tolerance via easy backup and restore
- Integration with your existing business apps

About 3CX

3CX is an international developer of telecommunications software, headquartered in Europe with offices in the UK, USA, Germany, Cyprus, Malta, Australia and Hong Kong. It

is a Microsoft Gold Certified partner and is backed by an experienced management and development team. Its product, 3CX Phone System for Windows, has earned Windows Server 2003 Certification and has received numerous awards, including The Windowsnetworking.com Gold Award, the Communications Solutions 2007 Award, the Windows IT Pro magazine 2008 Editor's Best Award and a Best Buy Award by Computer Shopper Magazine, all in recognition to the company's commitment to innovation and quality.