

Virtualizing Open Text Fax Server with Real-time Fax over IP and Open Text Fax Gateway

Abstract

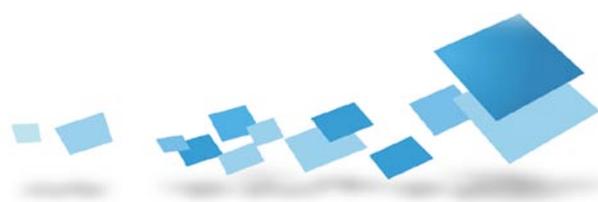
Computer virtualization is a revolutionary concept that provides organizations with a powerful, simple, and cost-effective alternative to traditional IT infrastructures. Open Text Fax Server, RightFax Edition offers a flexible and seamless integration with the industry leading hypervisor platforms – VMware ESX, VMware ESXi, and Microsoft Hyper-V..

This paper discusses the concept and benefits of virtualization of key systems and applications. It also presents a number of scenarios to help you achieve a unified and fully supported virtual IP Fax environment centered on Open Text Fax Server, T.38 real-time Fax over IP, and an Open Text Fax Gateway.



Contents

Virtualization Overview	3
Layers of a Virtual Fax Server	3
Server Consolidation Concept.....	4
Virtual Fax Server Requirements	5
Real-Time Fax over IP Overview	6
Benefits of FoIP	6
Fax Gateways – simple, scalable, flexible	8
Gateway Topologies	9
Legacy PBX Scenario.....	9
Small Office Scenario	10
Virtualization scenarios	11
Topologies	11
Simple Concept	11
Shared Services Model	11
Hybrid Model	12
Summary	13



Virtualization Overview

Among the many benefits of computer virtualization is the ability to consolidate multiple physical machines onto a single traditional server and do so in a remarkably expeditious fashion. The net result equals a significant reduction in expenditures (less hardware and energy costs) and a new centralized point of administration that streamlines server management and increases the agility and efficiency of your IT organization.

Achieving virtualization is neither costly nor difficult to implement. It requires only virtual machine software and a physical server that meets the requirements set by the VM software manufacturer. Some of the salient benefits of virtualization are as follows:

- Minimize server sprawl and IT infrastructure footprint
- Environmentally conscientious technology (less hardware equals less cost and lower power consumption)
- Streamlines server management and improves IT operational efficiency
- Rapid return on investment
- Enormously scalable and flexible, yet simple to implement
- Seamless interoperability with existing voice and data networks

Layers of a Virtual Fax Server

The layers of a virtual server are analogous to building blocks (figure 1). The base layer represents the host server - a traditional server - and the lone piece of required local hardware. It consists of a computer chassis and associated internals and an operating system supported by the virtual server platform. The remaining layers are software-based (table 1 and figure 1).

Table 1. Virtual server layers.

Virtual Server Layer	Description
Hypervisor layer	The application platform that allows for the creation and management of virtual machines. Installed on the operating system that resides at the base layer.
Virtual Machine Layer	The virtual machine created by the hypervisor platform. Represented by a virtual hard disk file.
Operating system Layer	The Windows Server OS that is installed within the VM and where Fax Server is installed.
Application layer	The most figurative of the layers described, it represents the Open Text Fax Server installation, which is on the Windows Server virtual machine (operating system layer).

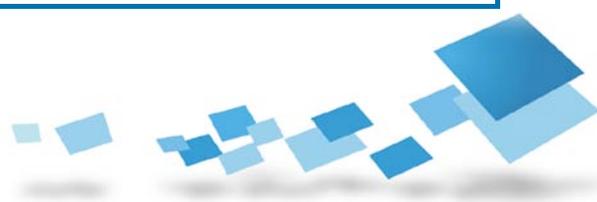
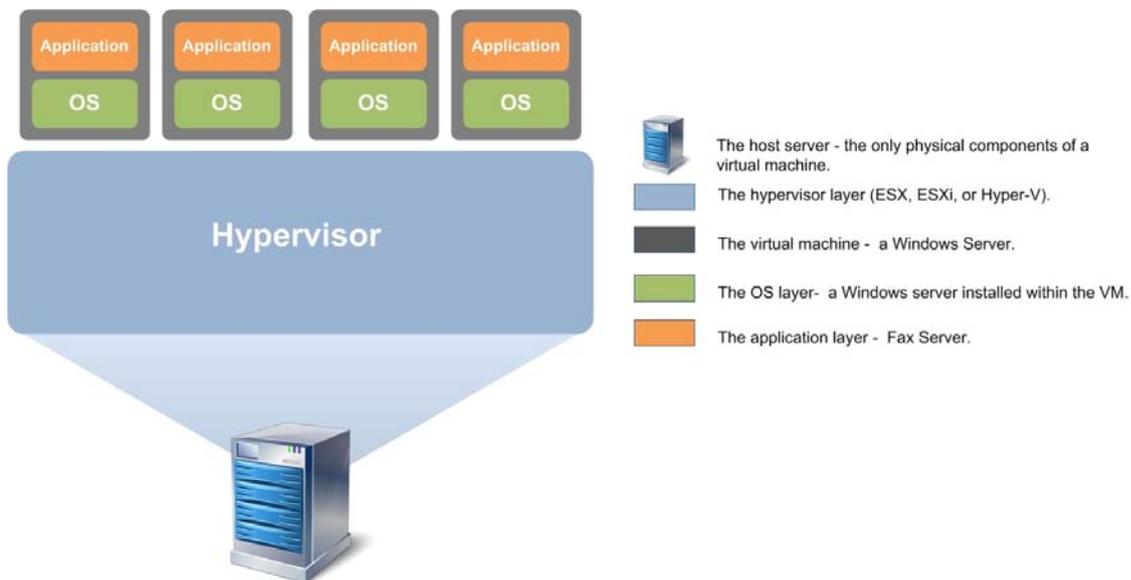


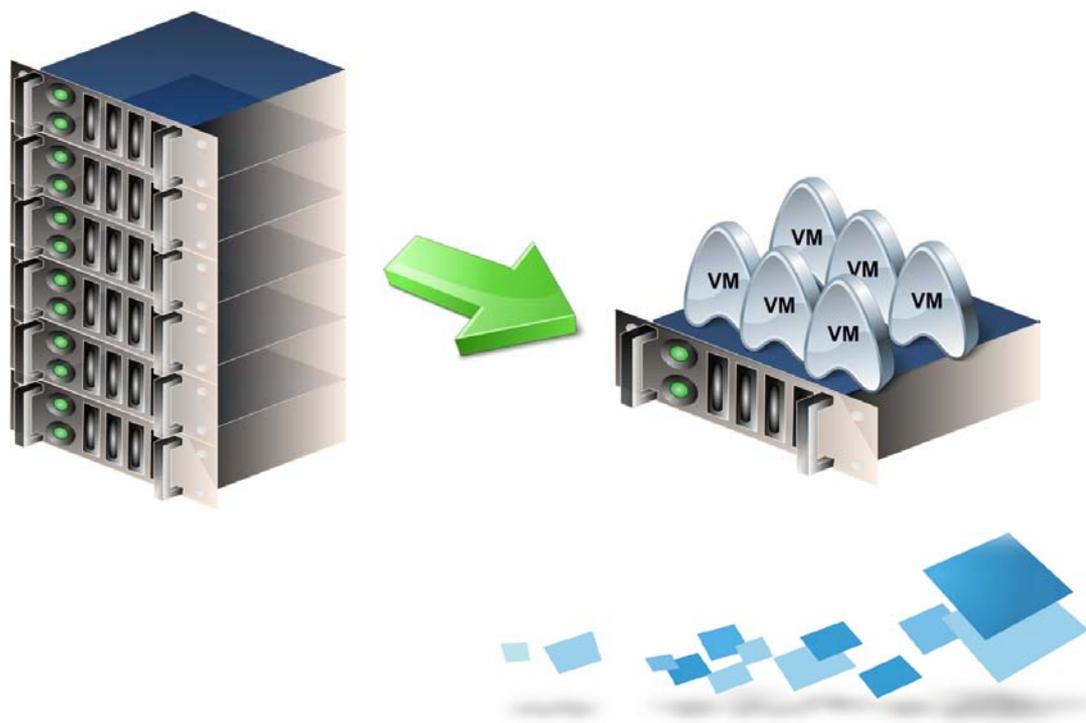
Figure 1. Virtual server components



Server Consolidation Concept

Below, a conceptual graphic demonstrating how a single physical server can support many virtual servers. Only the VM platform and the 'horsepower' of the host server govern or otherwise limit the total number of virtual servers. High performance servers and those with specialized CPUs (e.g., AMD-V and Intel VT-x) that optimize virtual machine performance promise to make virtualization an elegantly simple solution to the rampant problem of server sprawl.

Figure 2. A consolidated virtual server environment



The concept of consolidation and server virtualization as a whole is made possible by one of the great technologies of our time – virtual hard disks. A virtual hard disk is:

- A vendor-specific file such as .VHD or .VMDK
- Emulates a physical hard disk and contain what is normally found on a physical hard disk
- This architecture is responsible for the concept of server virtualization as we know it today

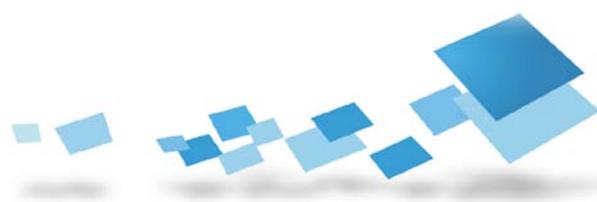
Figure 3. Virtual hard disks – the architecture responsible for server virtualization



Virtual Fax Server Requirements

In general, a virtual server behaves like a traditional server, which in turn provides substantial interoperability and compatibility with third party applications. Open Text Fax Server supports VMware ESX and ESXi server 3.0.1 or later and Microsoft Hyper-V. Virtual fax servers must reside on platforms that meet the minimum requirements as documented by virtualization software vendors.

Open Text recommends dedicating a virtual machine to each fax server. No virtual fax server may contain fax board hardware. Sending and receiving fax documents requires FoIP or dialing rules to route faxes to and from a physical server that contains one or more fax boards – i.e., a Remote DocTransport.

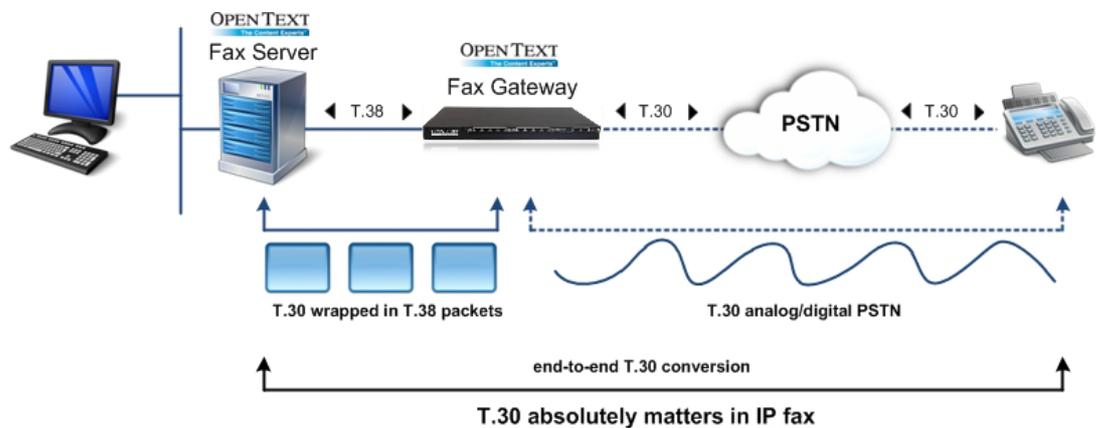


Real-Time Fax over IP Overview

Real-time FoIP is based on the International Telecommunications Union (ITU) standard T.38, which describes the technical features necessary to transfer facsimile documents in real-time between two standard Group 3 facsimile terminals over the Internet or other networks using IP protocols. T.38 is the preferred FoIP protocol as it aligns with the behavior of faxes over the PSTN. As with the T.30 standard (what fax machines use), the IP fax transmission is handled like a traditional fax call and an end-to-end communication is established.

A fax server that sends or receives faxes using T.38 looks just like any other non-FoIP fax device to its partner. The two end points establish a session, send and verify the transmission of one or more pages and then complete the session with active confirmations from both sides. The difference with a FoIP-enabled server is that the first part of the communication session from the server to the network traverses an IP network rather than traveling directly over the PSTN. If the partner device is directly addressable on the same network, the session can use T.38 for the entire transmission; however, if the telephone line separates the devices, the IP switch manages the “unwrapping” of T.38 packets into standard T.30 fax transmissions over the PSTN.

Figure 4. T.38 real-time fax workflow



Benefits of FoIP

Organizations that are adopting an IP telephony environment may further streamline their messaging infrastructure and enhance the benefits of their existing fax server by enabling it to support FoIP. Some of the benefits include:

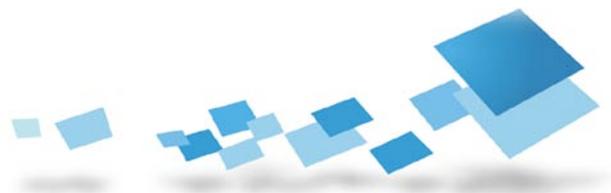
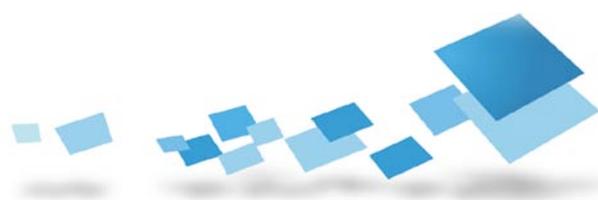


Table 2. FoIP benefits

Benefit	
Leverage VoIP Investment	<ul style="list-style-type: none"> Utilize existing VoIP equipment and management to deploy fax Reduce maintenance costs by consolidating voice, fax, and data on a single network
Cost savings	<ul style="list-style-type: none"> Eliminate fax machines and associate expenses (phone lines, paper, long distance charges, etc.) Total Cost of Ownership (TCO) savings due to network consolidation Lower labor costs by automating labor-intensive business processes that involve generating, sending and receiving invoices, purchase orders, loan applications, order confirmations, and other transactional documents Lower energy costs using software-enabled FoIP in virtual environments; fewer physical servers and fax boards Leverage existing VM infrastructure or support enterprise server virtualization initiatives with 100% software solutions enabled by Fax Gateways
Efficiency	<ul style="list-style-type: none"> Bolster efficiencies associated with managing consolidated network equipment that supports VoIP and FoIP
Flexibility	<ul style="list-style-type: none"> Use software-only solutions, boarded, or hybrid FOIP solutions depending on an organization’s needs Scale fax server with additional channels, capacity, and integrations to meet evolving document delivery needs
Interoperability & Compatibility	<ul style="list-style-type: none"> Push consistent fax solution throughout the entire network including remote locations Strengthen investments made on IP equipment that interoperate with the fax server Minimize downtimes
Virtualization	<ul style="list-style-type: none"> Software-based FoIP solutions inherently support and facilitate virtualization Increases interoperability, centralization, and optimizes hardware resources

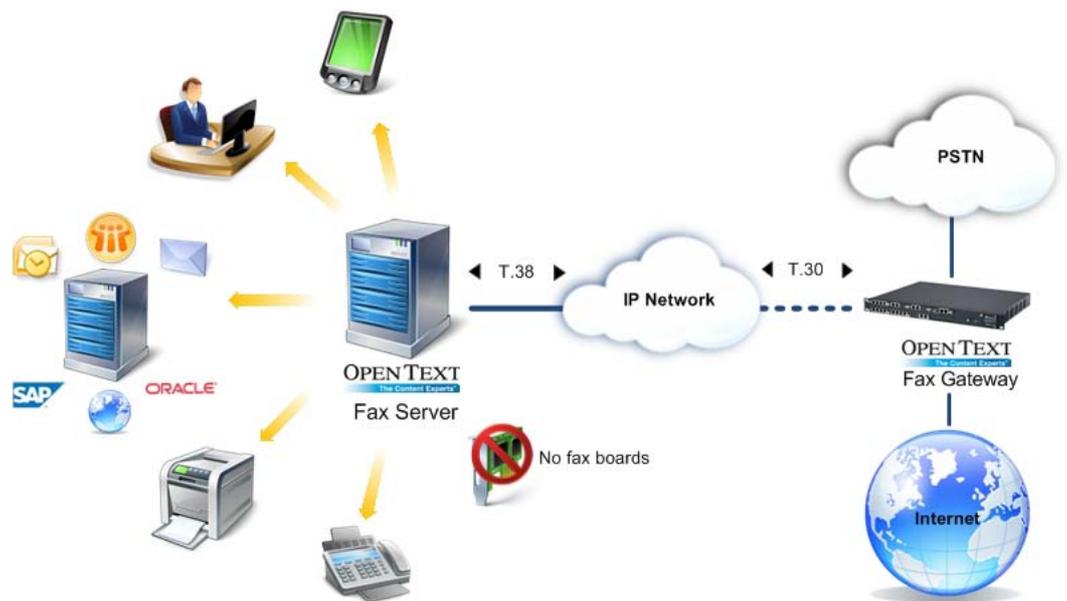


Fax Gateways – simple, scalable, flexible

T.38 is the main driver of today’s advancements in IP faxing and is the protocol of choice for organizations seeking to reap the benefits of real-time fax communications. T.38 protocol support is built into almost every leading manufacturer of IP routers, IP-PBXs or media gateways. All real-time T.38 software-based FoIP solutions require a media gateway. Open Text Fax Gateways meet this need by providing an interface between T.38 SR-140 FoIP enabled Open Text Fax Servers and a broad range of legacy communications systems, including TDM, PBX, key systems and dedicated PSTN trunk circuits.

The flexible and scalable architecture of the Open Text Fax Gateway products offer an alternative to traditional fax boards and Remote DocTransport computers, even if your network does not include a VoIP infrastructure. Since Open Text Fax Gateways are IP devices and bridge the gap between telephony and IP communications, the ability to deploy real-time software-based FoIP does not depend on or require a VoIP network and thus minimizes or prevents operating expenses and inherently encourages virtualization.

Figure 5. A complete FoIP solution offering



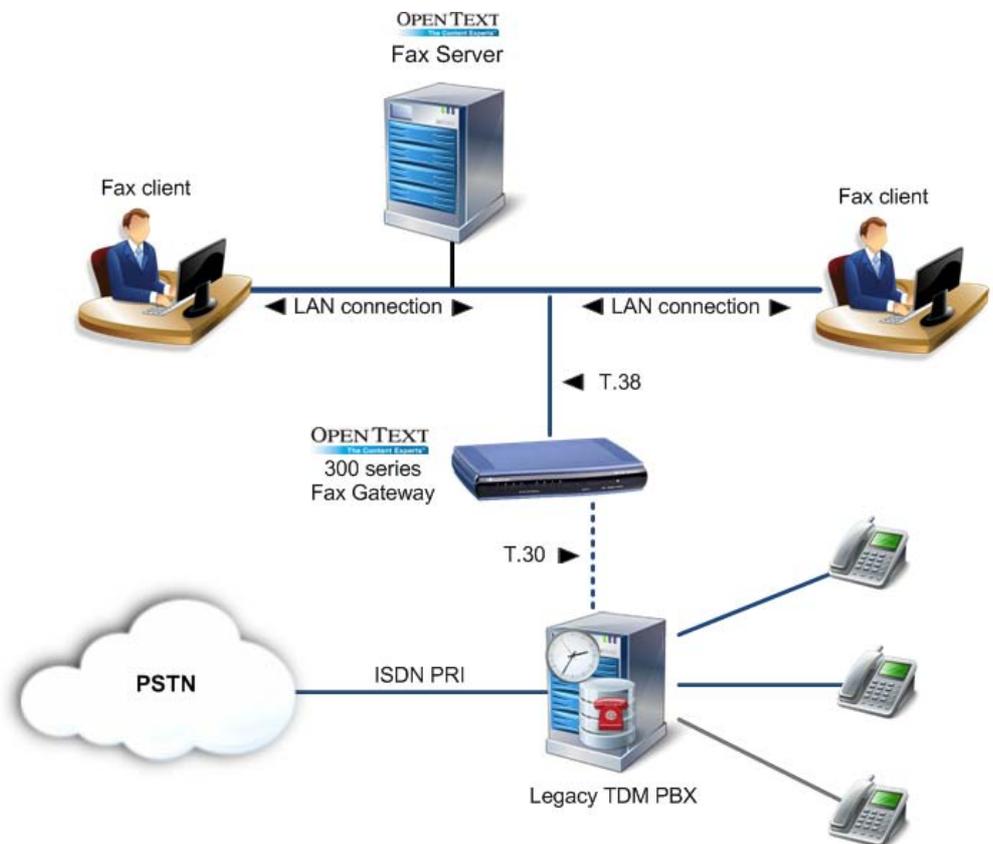
Gateway Topologies

Each of the following diagrams depicts a general scenario and represents a small portion of the many possibilities that exist with a flexible virtual IP-based Fax Server. Each scenario requires at least one Open Text Fax Server, SR140 FoIP software, and an Open Text Fax Gateway.

Legacy PBX Scenario

Environments using a standard (non-IP) PBX who want to leverage the virtualization and extensible features of FoIP can use Open Text Fax Gateways can route FoIP based faxes between Fax Server and the legacy PBX.

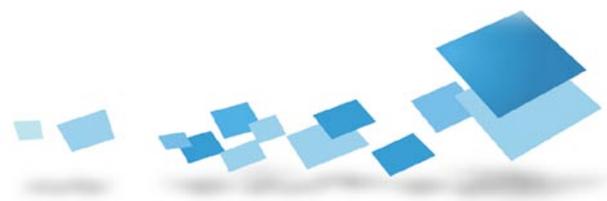
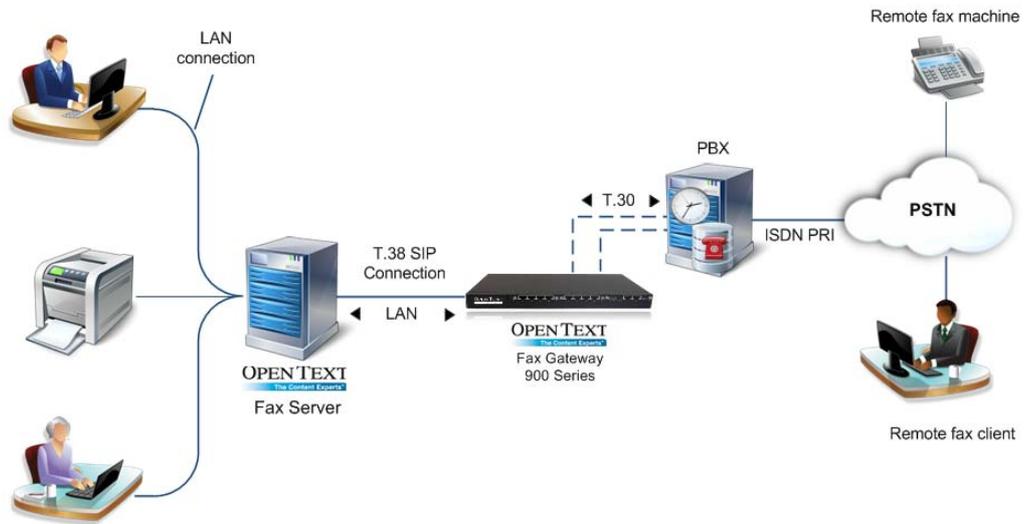
Figure 6. Legacy PBX scenario



Small Office Scenario

The use of a scalable modular gateway provides a simple and convenient upgrade path for small up and coming companies. In the small office diagram below, the use of FXS and FXO ports, demonstrate the flexibility and simplicity of a modular gateway.

Figure 7. Small office situation



Virtualization scenarios

Topologies

The diagrams below depict but a few of the possible virtual Fax Server scenarios. Each requires Open Text Fax Server: RightFax Edition, an Open Text Fax Gateway, SR140 real-time FoIP software, and a supported virtual server hypervisor.

Simple Concept

The diagram below depicts a simple, virtualized IP-based Fax Server deployment. Real-time software based FoIP is achieved with SR140 and an Open Text Fax Gateway. A virtual SQL server stores the Fax Server database while a third virtual machine houses the Fax Server images files.

Figure 8. Simple virtual Fax Server concept



Shared Services Model

The diagram below depicts a fully virtualized Shared Services collective. The fax servers all share a single SQL database and fax data repository via the High-Availability architecture facilitated by the Shared Services Module. Virtual collectives also support virtual SQL Servers, as well as SAN and NAS storage centers. This architecture can be geographically dispersed to allow for site level redundancy.

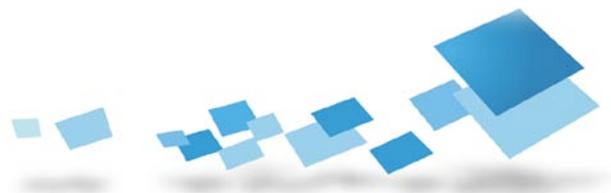


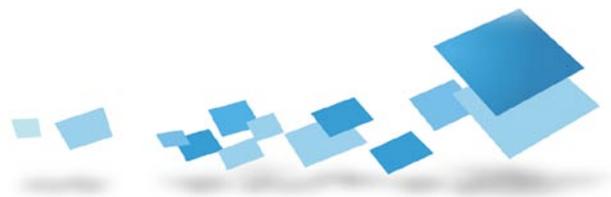
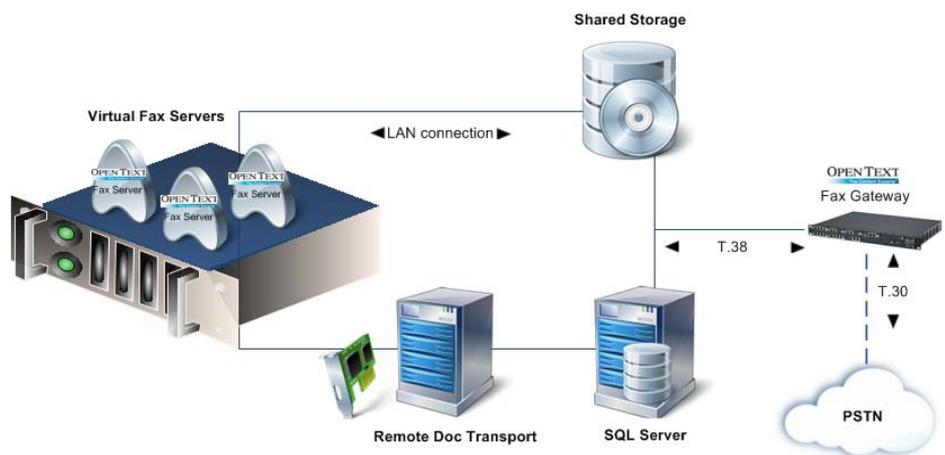
Figure 9. Virtual Fax Server collective



Hybrid Model

This model depicts a mixed virtual and hardware-based environment consisting of a virtualized Shared Services Collective, and a chassis-based Remote Doc Transport server (containing a legacy fax board). Dialing rules route faxes between the virtual servers and the Remote Doc Transport. Each of the virtual servers can be configured to use the legacy system, the FoIP Gateway, or both. This scenario could also include a traditional Fax Server computer (with or without a fax board) with no loss in functionality.

Figure 10. Virtual Fax Server hybrid situation



Summary

Software driven FoIP solutions provide many advantages, especially for those companies with virtualization strategies or those that are standardizing on an all IP infrastructure. Virtual Open Text Fax Servers use less hardware, which maximizes existing infrastructures, reduces capital expenditures by eliminating the need for dedicated CPU hardware and fax boards, and increased IT administration efficiencies by centralizing management of all virtual applications.

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