

T.38 Fax over IP (FoIP)

Introduction

The benefits of migrating fax communications to the Internet are many and obvious:

- Enhanced disaster preparedness
- Simplified fax service deployment
- Less infrastructure complexity
- Capability to virtualize the fax infrastructure
- Least Cost Routing without the need for remote fax servers

In fact, over 70% of new fax ports/lines purchased are projected to be IP-based.

What exactly is T.38 FoIP? What are the challenges for making the transition to Internet-based faxing? What are the available options for its implementation?

What is Fax over IP (FoIP)?

T.38 is a protocol that describes how to send a fax in real time over a computer data network, i.e., a network that moves data in small packets. T.38 converts traditional fax data into an Internet-friendly format by packaging traditional T.30 fax signals and data as IP packets on the sending end and turning those IP packets back into T.30 signals and data on the receiving end. The T.38 protocol is needed because fax data cannot be sent over a computer data network in the same way as voice communication.

The latest generation of FoIP systems thus combines the benefits of traditional faxing with the cost savings of Internet transmission methods. The fax data makes all or most of the trip between sending and receiving devices on the packet-switched network, avoiding the long-distance phone lines of the circuit-switched telephone network.

What Are the Challenges of FoIP?

Because fax was designed for analog networks, it does not travel well over a Voice over IP (VoIP) network. Specifically, fax communication uses the signal differently than regular voice communication. When VoIP technologies digitize and compress analog voice communication, it is therefore optimized for voice, but not for fax, and the T.38 protocol is needed for successful real-time fax communication over a VoIP network.

Specifically, the T.38 fax protocol was created to describe the process for sending and receiving faxes in real-time over a packet network, and to provide the necessary error correction. T.38 is designed to preserve the traditional fax experience, and to allow faxes to be successfully sent and received by making adjustments for jitter, latency, and packet loss, which are inherent in all IP networks. Without T.38, fax devices, which are sensitive to timing, cannot reliably send and receive faxes over an IP network.

In addition, VoIP can use either of two call signaling standards: H.323 or Session Initiation Protocol (SIP). H.323, the oldest of the two standards, while originally developed as a standard for video conferencing, not voice, communications, actually led to the widespread deployment of VoIP world-wide and became the most widely deployed inter-carrier VoIP protocol.

SIP, on the other hand, was specifically defined as a protocol to enable end-to-end voice calls over the Internet, working in roughly the same way as other common protocols, such as HTTP or SMTP. SIP carries out the signaling by sending small messages, consisting of a header and a body.

While some industry analysts maintain SIP will inevitably replace the older H.323 standard, for now and the foreseeable future, both standards are here and coexisting, adding to the issues of integrating FoIP into a VoIP network, and emphasizing the need to work with an experienced FoIP vendor.

What are your Options for Implementing T.38 FoIP?

Perhaps the best way of understanding the different options for implementing T.38 FoIP is to illustrate them graphically and then explain each of the illustrations.

1. FoIP Implemented over a VoIP Network

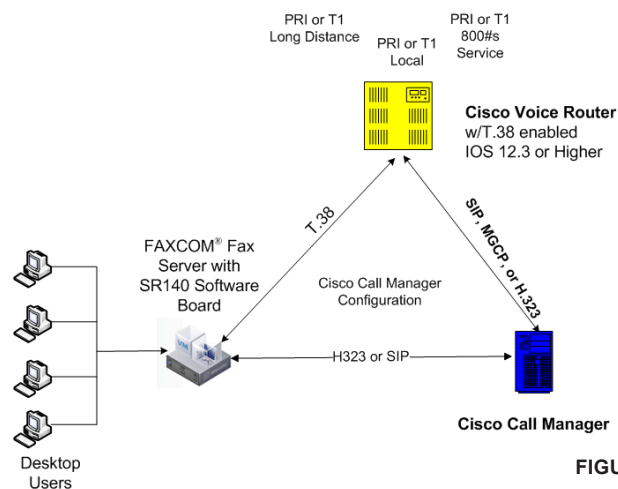


FIGURE 1

Figure 1 shows FoIP implemented over an existing VoIP network, where using the software-based FAXCOM fax server in combination with a media gateway enables the use of either the SIP or H.323 signaling standard. With this implementation, whereby the fax server is not connected to the PBX itself, but rather to a gateway, an enterprise can save money – since the maintenance costs of PBX connections are much higher than the maintenance costs of routers. (While PBX connection costs may be about \$200-\$300 per port, typically router costs are under \$100 per port.)

2. Software-based FoIP without VoIP or a PBX

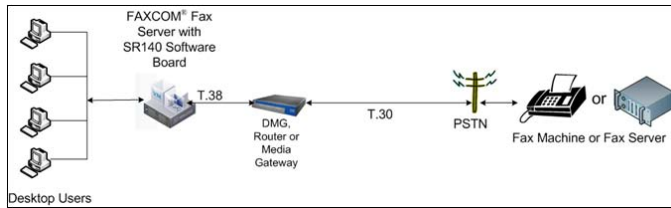


FIGURE 2

Figure 2 shows FoIP implemented with the Dialogic SR140 virtual software board combined with a media gateway. With this implementation, FoIP can be implemented without the need for a VoIP network. The merging of traditional telephony with an IP network is accomplished by the media gateway itself, which acts as a bidirectional bridge between the telephone networks, and sits between the fax server solution and the destination fax device.

In addition, this FoIP option works as a complete solution for any organization looking to lower fax costs and hardware dependencies by implementing both Virtualization and FoIP.

3. FoIP over a Wide Area Network

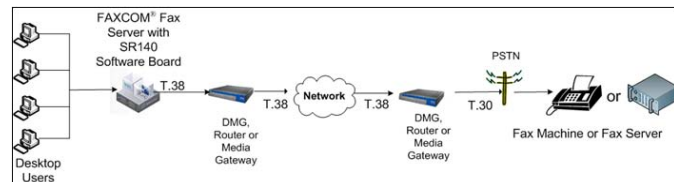


FIGURE 3

Figure 3 shows FoIP implemented over the Wide Area Network (WAN) of an international company. With this implementation, a single fax server is located at the home office and a media gateway or router is located at each location – the home office and the remote office. The T.38 protocol is used to move the faxes in real-time over the company's WAN, with the media gateway or router at the remote location turning those IP packets back into T.30 signals and data on the receiving end in order to make a local – and therefore inexpensive – call to the destination fax device over the telephone network.

The Need for Proven T.38 Expertise

Biscom, working closely with its partner, Dialogic, has a long history in both real-time PSTN and packet-based fax. This history has resulted in the specific configuration knowledge needed to assist organizations with configuring the integration of fax capabilities with multiple IP fax devices/PBX systems/gateways from multiple vendors: Cisco, Avaya, Quintum, Nortel, Alcatel-Lucent.

To that end, Biscom regularly tests new environments for interoperability and you are encouraged to contact Biscom – or visit the company's Web site – for a full list (with version numbers and supported call control protocols) of the IP PBX and media gateways with which it has tested and certified interoperability. In addition, Biscom can help you determine how best to implement FoIP: as a TR1034 board-based system or as an SR140 software-based system; through the use of a media gateway alone or through integration with your VoIP network.

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