CONVERGENCE

Just the fax, officer

Software, IP platform reduce the complexity, costs of sheriff's office analog system.

The Vanderburgh County Sheriff's Office in Evansville, Ind., recently moved into a new physical plant, with a new voice-over-Internet-protocol (VoIP) network. Although fax is critical to its operations, staff was still using traditional fax machines. The fax technology the sheriff's office had been using was typical of legacy TDM fax machines. The office had 15 stand-alone fax machines, and for each one they paid for paper, ink, service contracts and a dedicated analog phone line.
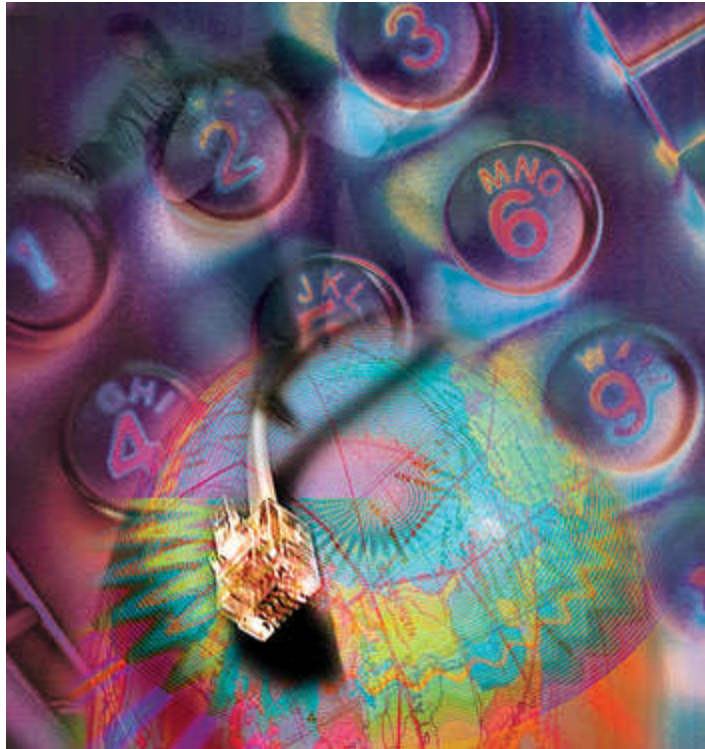
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The fax machines also presented serious operational issues for security, privacy, productivity and accountability. To eliminate the cost of consumables, streamline operations, tighten security and drive accountability, Greg Selby, IS manager for the sheriff's office, decided to implement a fax server.

Selby understood the benefits of a traditional TDM fax server, but was concerned whether he could implement a fax server that would integrate into the office's new Cisco IP communications network. He not only wanted to capture the benefits of a fax server, but also realized that if he deployed an IP-based solution, he could put everything–voice, data and fax–on a single IP network, which would reduce the complexity and overall costs to manage the new fax server. Plus, he could eliminate the dedicated analog fax lines.

The sheriff's office teamed with TransOptions Messaging to deploy a software fax-over-IP (FoIP) solution that works seamlessly with its existing gateway, the 2800 series router from Cisco. The resulting FoIP

solution, Selby says, has improved productivity and has made fax transmissions more secure. He now also can archive and index all information about every fax transmission, along with the fax image itself.

Faxing, like voice communications, is a real-time, synchronous process, which makes timing the arrival of fax signals possible. IP is an asynchronous process, however, with data in the communication stream broken into packets. Faxing over an asynchronous network–where delay, jitter and packet loss commonly occur–can increase transmission failures.

Packets arriving at irregular intervals or out of order is a condition known as jitter. A jitter buffer briefly delays packets so that it can re-introduce a regular pace into the packet stream and ensure that packets are in the right order. Jitter buffering is made possible when a time stamp is added to each packet, so the proper packet order can always be determined.

Although jitter buffers are advantageous, they also introduce delay. Packet loss can occur in any packet network, and typically if three consecutive packets are lost, a fax transmission fails. To account for packet loss, redundant packet streams are required. If the original packet stream loses a packet, it can be replaced by the corresponding packet from the redundant stream.

To address the challenges of sending faxes in real time over an IP network, something that resolves the delay, jitter and packet loss issues is needed, and T.38 is the solution. T.38 is not susceptible to delay because it uses no analog demodulator, and T.38 rectifies packet loss by sending redundant packets that keep the connection with the receiving fax machine alive.

For any fax solution, IP or TDM, a robust T.30 implementation is critical. T.30 is a fax handshake protocol that describes the procedure for establishing and managing communication between two fax devices. T.30 is always required to communicate with legacy TDM fax devices, so any fax solution, TDM or IP, needs T.30. T.30 has been implemented in many different ways by different vendors, however, so choosing a vendor whose T.30 implementation can communicate with all the other T.30 variants out there is important.

Because T.30 was designed for circuit-switched networks, it cannot correct the delay, jitter and packet loss inherent in packet networks. While T.38 is required to implement FoIP with the reliability of TDM fax, a strong T.30 implementation is also required for reliable fax communication around the world.

Based on these needs, the sheriff office's team finally agreed that the ideal solution was a combination of FaxCore software and Cantata's Brooktrout SR140 intelligent fax platform. Cantata had already qualified the SR140 as interoperable with the Cisco gateway, and Cantata's T.30 stack has been refined to ensure that it interworks smoothly with any T.30 variant it encounters.

Because the fax platform is software only, the sheriff's office does not need to buy backup fax hardware or advance replacement contracts, or have to change out its hardware whenever a bus standard changes. If the host server fails, staff can simply reinstall the software from a CD and re-activate the license key. The sheriff's office also liked the FaxCore product's ability to archive, index and otherwise manage every fax going in and out of the office.

During deployment, the team had to make sure existing services remained functional throughout the installation. Selby did not want to disconnect telephone communication to and from the sheriff's office. To his relief, no significant problems were encountered and, start to finish, the installation took less than three hours.

Prior to using the FoIP system, the sheriff's office had been paying for 15 dedicated fax lines, but now fax shares the same circuits as voice through the gateway. Not only have the dedicated fax lines been eliminated, but IT staff no longer deals with the complexity and cost of managing two sets of network technologies.

Currently, the team is in the process of sharing the benefits of the FoIP solution with the county's detective unit and the Indiana Department of Corrections. "There are as many as 200 personnel at the state's Department of Corrections who can benefit from the FoIP solution," Selby says.

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