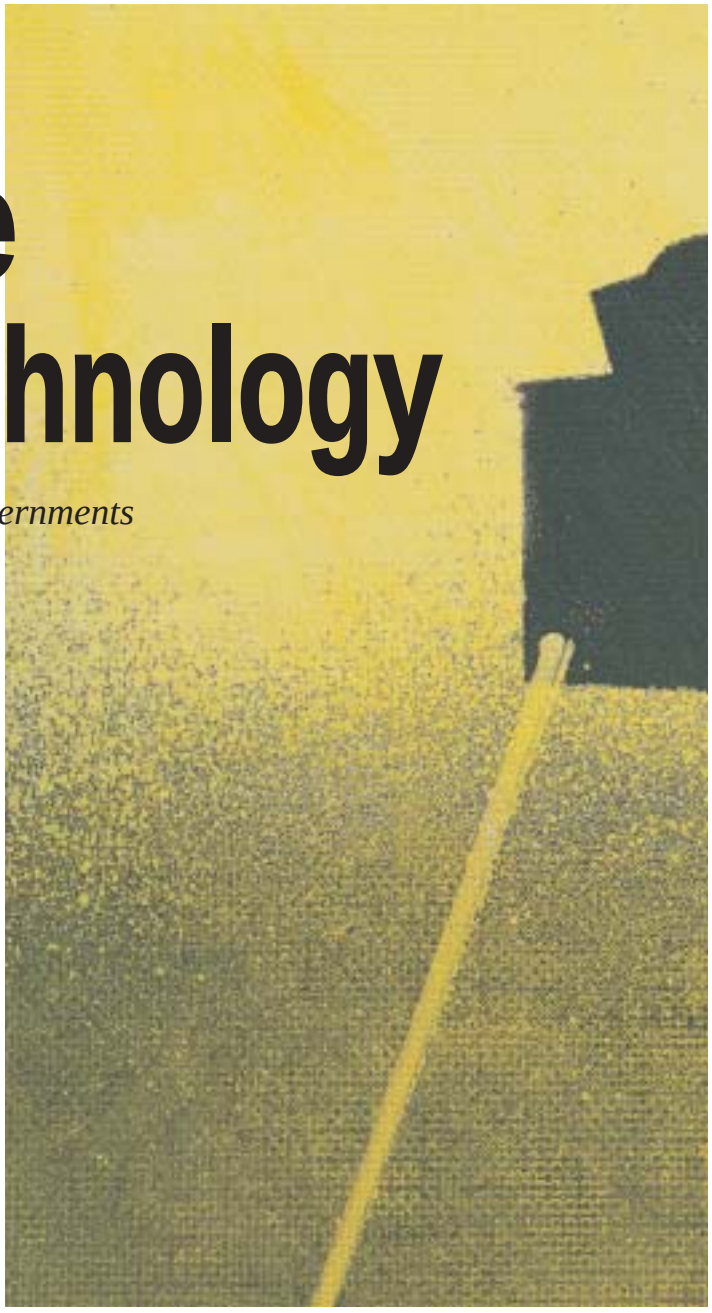
States and the 'stateless' technology

Use of Internet telephone calls on the rise in state governments

BY WAYNE HALL



Until recently most of the justification for "Internet calls," referred to as Voice-over-Internet Protocol, or VoIP in the telecommunications industry, came down to savings. After all, a free phone call sounded pretty good. But for state government network managers, the technology was not much more than a curiosity. Voice quality, reliability and a lack of technical standards made it problematic at best and career-ending at worst.

Still, testing in state government has continued because for all the potential problems, streaming IP, whether it carries voice or video, provides what amounts to the Holy Grail of networking: the potential to consolidate voice, data and video on a single infrastructure, lower the cost of voice communications, and provide an infinitely flexible network.

As the technology has matured, more organizations are moving beyond testing to use streaming VoIP to carry voice traffic – and not just between major telecommunications facilities, but all the way to the desktop. In fact, the technology appears to have crossed the acceptance gap – from "early adopters" to an "early majority" as described by Geoffrey Moore's frequently referenced book on technology, *Crossing the Chasm*.

Furthermore, most surveys of communications managers now show that up to two-thirds of them are either deploying VoIP or are planning to do so within the next couple of years. Again, this rate of acceptance goes well beyond the early adopter phase.

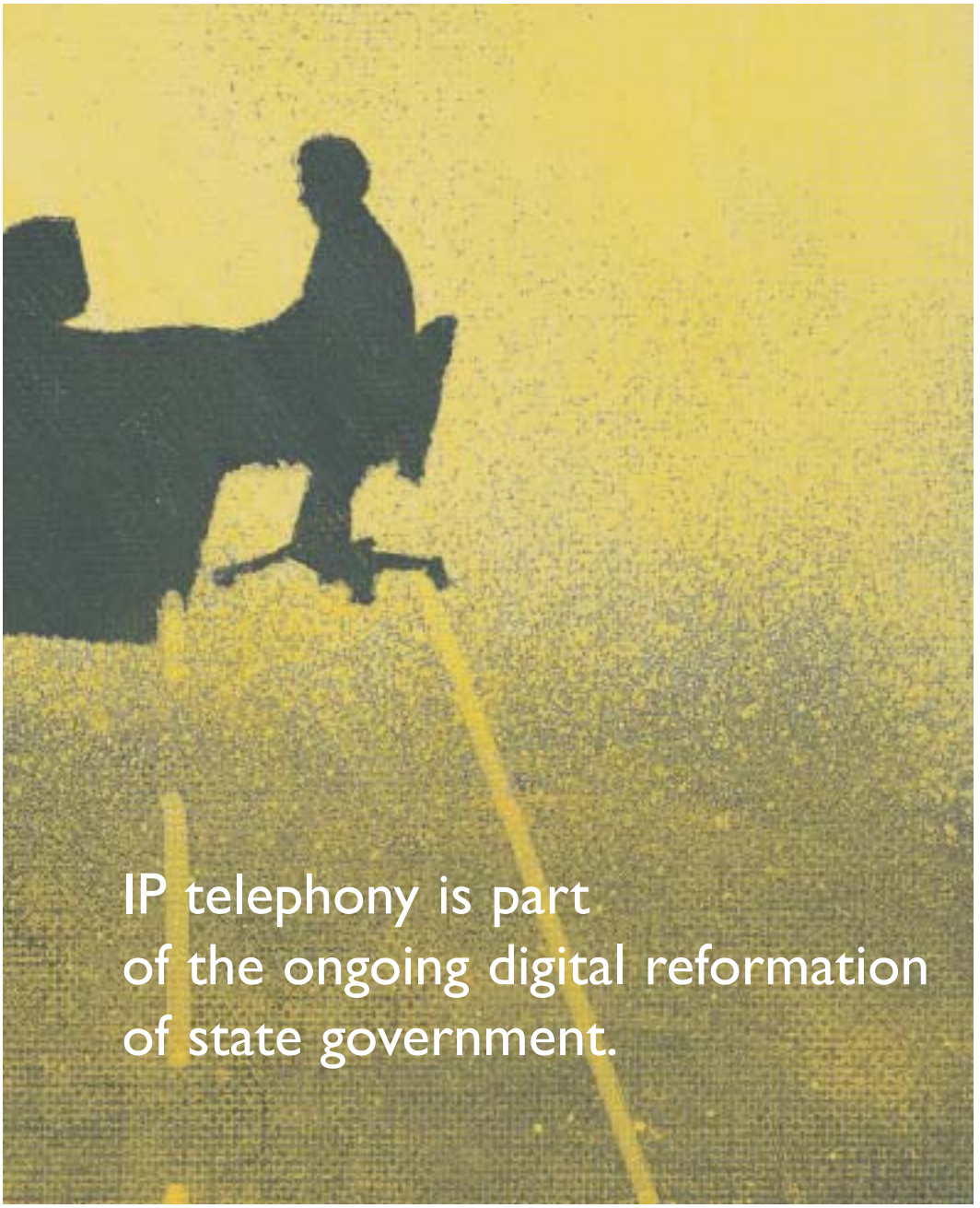
> Two-thirds of communication managers are either deploying VoIP or plan to do so within the next couple of years.

One measure of the emerging acceptance of VoIP as an everyday technology is the focus on return on investment studies, which estimate savings when using IP voice in specific situations. Unlike early adopters, who don't mind making it work, the "early majority" doesn't want to debug the technology in order to benefit from it. Corporations that loathe spending money on technologies that will not enhance the bottom line are now clearly measuring the possibilities in dollars and cents.

VoIP proponents usually cite as benefits the savings from a converged network and increased employee productivity. In addition, costs associated with telephone moves, adds and changes, collectively referred to as "MACs," are reduced because VoIP telephony, when fully implemented, makes it easier to manage network devices such as phones.

The very nature of communications today makes a wide implementation of any technology difficult simply because it must work with so much other technology. More and more devices such as wireless phones are software-driven; they are "intelligent" in the sense that they can do more than deliver a dial tone. They can send, store, retrieve and manipulate digital information.

As these devices proliferate, "network intelligence" is said to be pushed "to the



edges." This contrasts with the telecommunications network of 20 or 30 years ago when Ma Bell kept a tight hold on the technology. In those days, a phone was not much more than a sophisticated version of the tin can on the end of a wire. The brains behind the network resided nearer the center of the voice network in the Bell switches and communications facilities.

Using the analogy of a desktop computer, making the network work with peripheral devices like personal digital assistants and digital phones can be problematic. In theory, managing a phone in an IP environment is not so different from managing any other data device attached to the computer.

In practice, of course, it's different. State networks cross agencies, departments and bureaus, many with their own hardware and software – and all with unique communications needs. Add in the element of the unknown in the form of local "hotspots" for wireless networking, and the management difficulty is increased exponentially.

Approached from the top down, state communications networks must be configured to work together. All the devices must be known, secured and powered. Small wonder that state chief information officers and information technology agencies are developing "enterprise architectures" that can describe the entire network and its many relationships.

Part of the answer to successful VoIP telephony rollouts may lie with enabling technologies such as Multiprotocol Label Switching, or MPLS. This development is important because VoIP networks are "stateless" or "connectionless."

In existing circuit-switched networks, an open voice connection is maintained end-to-end. There is literally a clear starting and ending point to each call.

In the IP or packet-based network, however, the voice call is chopped into fragments, or packets. Each packet contains a map to the ultimate destination, but does not necessarily travel the same route to get there. So when the packets are reassembled at the other end – when the conversation is reconstructed – packets that are missing or arrive out of order manifest themselves as "jitter," "latency," or just nonsense to human ears and eyes. MPLS provides a more traditional connection-oriented environment that enables more management of packet networks.

VoIP networking is desirable because the transmission of data in the form of e-mail, file transfers and other information that has been digitally converted has overtaken voice communication in volume. Rather than try to use the old voice network built on copper for data communication, which would be technically very difficult, it makes more sense to extend the digital revolution to voice calls by transferring the telephone call onto a modern network.

IP telephony, like the development of personal computers and e-mail, is part of the ongoing digital reformation of state government. This reformation cannot happen unless state employees are included. Despite its promise, technology cannot be the only answer.

NASTD members increasingly find themselves in converged organizations, which have led to more professional dialogue between managers traditionally engaged in the separate disciplines of voice and data communications.

Anecdotal evidence gathered from NASTD meetings shows that state government communications agencies, which have traditionally been responsible for connecting state government agencies across town and between every corner of the state, are increasingly responsible for local area networks, or LANs, as well. The LAN is where the vast majority of day-to-day networking between computers in the same office takes place.

Continued on page 38

States and the 'stateless' technology Continued from page 22

Since IP calls are completed on LANS, a closer working relationship between staffs with responsibility for them is important. *Network World* suggested as much in an October 2002 article, "Rules for a Successful VoIP Rollout: to support your converged network, you need converged staffers."

Sharp managers also will take seriously the concerns of some tenured voice managers, who may believe that VoIP will put them out of business. Nothing could be further from the truth. Voice managers adhere to call completion standards and reliability that data managers can only hope to approach. Both camps must be included.

Like all large enterprises, state government is good at making plans. When managing the transition of large VoIP telephony rollouts, planning is crucial.

NASTD members in states such as Mississippi have developed guidelines and checklists to enable such transitions. Mississippi's "customer checklist for transitioning to VoIP," for example, covers all the areas important to a successful implementation – estimating savings, evaluating the LAN for suitability and securing the new IP implementation.

The agency has also identified some of the policy issues that must be addressed. These include estimating the cost of moving to VoIP, the scale of the deployment, an inventory of the current infrastructure and its suitability for VoIP, methods for resolving technical issues, training staff – and the training of agency clients – in the use of the technology, and a timetable for the transition.

This spring, Jack Ries, an information technology planner from Minnesota, conducted an IP telephony survey of his peers. In all, a total of 39 state responded.

Regarding the status of implementation, Ries found that:

- 23 states are in the process of implementing IP telephony and/or VoIP, mostly as a pilot or proof of concept;
- eight states have no activity yet, but have plans to do something in the next year or two;
- five states have no activity yet, but might or are considering their options;
- three states have no activity yet and have no immediate plans so far.

Regarding cost savings:

- 24 states indicated that the cost savings were unknown;
- eight states reported there were cost savings;
- seven states reported there were no cost savings.

— Wayne Hall is technology program manager for NASTD—The Association for Telecommunications and Technology Professionals Serving State Government, an affiliate of The Council of State Governments.

Glossary

- **VoIP** – "Voice-over-IP" refers to the delivery of voice communications using Internet Protocol, or "IP." It is sometimes referred to as "**IP Telephony**."
- **IP** – is the method or protocol by which data is sent from one computer or digital device to another on the Internet.
- **Protocol** – Refers to the agreed upon set of rules used by end points in a communications network to exchange information or data.
- A **"stateless network"** – is a network that does not maintain an end-to-end connection, or circuit, for the duration of the transmission. Information is instead exchanged in packets. Each packet includes the ultimate destination for that packet. Individual packets may travel different routes to reach that point. The call is completed when the packets are reassembled into a conversation at end point. The Internet is a "stateless network."

Budgets are bruised, but still strong Continued from page 26

many ups and downs along the way. Finally, waste spending grew rapidly during the 1990s but has fallen off in recent years.

— R. Steven Brown is the executive director of ECOS and has led research efforts on state environmental spending since 1986. Michael Kiefer is an ECOS research associate.

Chart 2. State spending on air, water and waste management, 1986-2003