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# Converging Communications

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# IP convergence is a must for future communications

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**C**onverged communications, the notion of combining telecommunications and data services on a single IP network, has been around for a while but has had a spotty record so far in the federal government. As the demand for services expands to include such things as instant messaging, texting, social media and others, however, that diffidence will change.

It will happen not least because the coming era of unified communications (UC) — the integration of such things as voice, video, instant messaging and presence with other data traffic — can't happen in any cost-effective way without that IP convergence. And agencies are starting to bet their IT futures, and the way they communicate with one another and the public, on UC.

Converged communications 1.0, which focused on voice over IP, didn't have the level of adoption in government that people initially expected, said Bill Long, vice president of enterprise voice services at Level 3 Communications. But it was a vital stepping-stone to what will come in the next iteration.

"It laid the groundwork for where voice is seen today as just another application that can run on the IP network," he said. "Once people came to understand that, their mindset shifted, and they see now that other applications such as video and presence are the same kind of thing. And it's that which is unlocking the door for the next wave of converged communications."

There were security issues for many agencies when it came to figuring how to put voice, which has traditionally been carried on physically separate circuits, onto the same network that carried their data, said Scott Anderson, vice president of cloud strategy at Avaya Government Solutions. But that can be dealt with now by logically separating voice from other data traffic on separate virtual local-area networks even if those virtual networks are on the same physical network.

However, he said, policy and cost considerations are pushing agencies toward IP convergence.

"From a policy perspective, agencies are trying to support such things as telework and mobility, and they can't do that with the [central office exchange service] most have been relying on for their phone company service," he said. "To support [the new capabilities], they have to move to UC, which from a cost perspective requires that they migrate to a converged network."

That isn't to say everyone is moving to converged networks now. Some agencies are still grappling with how to transition away from legacy systems and toward the new environment, and although converging on IP networks offers cost savings down the road, it also needs at least some investment upfront, which is a problem for agencies that are under increasing budget pressures.

Nevertheless, many of the leading agencies are already far along in their convergence programs, according to Lauren Jones, a senior principal research analyst at Deltek. Their concern is no longer whether to merge voice and data on the network but how to do it to the best effect.

"There are still a lot of dedicated lines out there, for sure, but the direction is set and people are no longer questioning that," Jones said. "The main questions now are how to architect for converged communications, how to architect the data for it and how to architect the applications in order to take the greatest advantage of it."

Long agreed and said he believes it will still be a while before the market will provide solutions such as full business-to-business videoconferencing to government agencies. But the government shouldn't wait to begin planning how they will use those tools, he said.

"They've crossed that mental threshold to accepting



that communications will be just another application on the data network,” he said. “Now they need to be readying themselves for what will be coming in the next few years.” ▲



# Voice is still the core of converged communications

The focus in the first iteration of converged communications was almost wholly on how to get voice services onto IP networks. The goal was to capitalize on the cost savings that would be produced in moving away from pricey dedicated phone lines and because the telecommunications companies themselves, in building extensive IP backbones, were signaling their eventual move away from networks based on time-division multiplexing.

That's not the focus today. Now, converged communications is seen as the process underlying many new enterprise capabilities — from online collaboration to unified messaging and applications such as videoconferencing and the rapidly expanding universe of social media. Voice seems almost like an afterthought.

But that perception is a mistake, according to Scott Anderson, vice president of cloud strategy at Avaya Government Solutions. Most civilian agencies still see IP convergence as a replacement for central office exchange service communications, and they are still very much focused on basic voice services. Only over time are they looking to layer other IP-based applications on top of those voice-over-IP (VOIP) services.

“It's voice — and the ability to use voice in a telework environment or to use your personal phone in an agency setting — that is the primary driver for converged communications on the federal side — much more so, in most cases, than things such as videoconferencing,” Anderson said.

Even if the ultimate goal of converged communications is to build the infrastructure for unified communications (UC), IP telephony is seen as a core component and VOIP is considered an essential first step along that road. Even though descriptions of UC don't often highlight voice, most UC applications include it as a feature or as an alternative for users.

Some key government organizations are already well advanced in moving to an IP-based environment for voice. For example, the Defense Information Systems Agency, which expects to be a primary provider of UC services to military organizations, completed a network backbone upgrade for VOIP in 2011. Its goal is to have both IP-based voice and video enabled on its network for around 80 percent of its Defense Department customers by 2017.

Voice doesn't get as much play these days because other things that have been added to the mix speak more directly to current government requirements and to the cost-cutting dilemma agencies find themselves in, said Lauren Jones, a senior principal research analyst at Deltek.

“We're hearing about these things more because they can help offset some of the effects of the budget constraints,” she said. “Voice is still the bread-and-butter foundation [for convergence], but it's understood to be a given so no one is talking about it.”

A potential problem with that, said Bill Long, vice president of enterprise voice services at Level 3 Communications, is that organizations might also think everything that needs to be considered in convergence as far as voice is concerned is taken care of. The reality is that voice is probably being used even more in a converged communications setting than when it was delivered over separate circuit-switched networks.

He likens it to the advent of word processing software on computers, which many people heralded as the beginning of the end for the use of paper in the office. As everyone now knows, it boosted the use of paper because people ended up printing out “a zillion PowerPoint documents,” he said.

“I don't think there are nearly as many voice minutes hitting the [public switched telephone network], but I do see more intra-company voice communications being conducted between people who are federated within



a UC platform,” he said. “So I don’t think voice is ever going to go away, but how it’s being delivered is changing, and agencies need to think about how to deal with that.” ▲



# The cloud will play a big part

**W**ith government agencies under a mandate to look for cloud-based answers to IT problems — the focus of the Obama administration’s cloud-first strategy — the question of whether the cloud could provide a solution for agency IP convergence requirements is one that’s bound to occupy a lot of attention.

And it will have an effect, said Richard Costello, a senior research analyst at IDC’s Enterprise Communications Infrastructure service. Just in the past year, many cloud vendors have been introducing unified communications (UC) offerings such as telephony, voice and video services.

“As new as they are, I think these are already having an impact on people looking at the cloud moving over to the telecommunications side of things,” Costello said. “I think the cloud will become a much bigger player in this area for the government as agencies face cuts in funding and ongoing budget constraints.”

To some extent, telephony in the cloud is a natural outgrowth of the way that telecommunications were offered in the past, said Kyra Kozemchak, a senior research analyst at Deltek. It was a hosted service that allowed users to buy communications “by the drink,” and so in many ways, those telecommunications companies were the original cloud providers.

That functionality has simply been moved onto IP networks so in many ways, she said, you could say that cloud-based communications offerings are already available.

Certain activities are more conducive to converged communications in the cloud than others, she pointed out. Moving supercomputer networks that are highly customized and deal with very specific kinds of data streams into the cloud would not make sense, so there are “some mission-centric types of capabilities that still need another option,” she said.

There are also questions about the cloud’s ability to deliver some of the services that agencies will be looking for in the future and expect converged

IP networks to deliver. Asynchronous applications such as e-mail and most collaboration tools work well in the cloud, for example, but things such as videoconferencing are bandwidth-intensive.

So is the cloud capable of delivering real-time services with the reliability that these applications require? Or is that still the responsibility of providers that can deliver dedicated services via an IP network designed for real-time capabilities?

It will likely need a lot more experience of agencies using the cloud before that can be decided. Just because you’ve migrated e-mail to the cloud doesn’t mean you’ve moved your communications to the cloud, said Ron Hayes, solutions architect at Avaya Government Solutions. Most agencies view the potential of the cloud as just one step up from what they are used to with central office exchange service, and that’s been very much locked into voice service.

Along those lines, then, more extensive use of the cloud by agencies could “unlock multimodal communications and give them true UC, if they choose to use it that way,” Hayes said.

The truth is that the cloud should be seen as complementary to what agencies are trying to do with converged communications because a big reason for using the cloud is that the network is already in place, said Scott Anderson, vice president of cloud strategy at Avaya Government Solutions. The communications carriers have spent the past few years building packet-switched networks using Multiprotocol Label Switching and redundant cores to be able to handle the data traffic that goes through the cloud.

“On the customer side, they need to have quality of service and other attributes configured so they can have the same modalities in the cloud that traverse their physical [converged] networks,” he said. “That means agency cloud experiences would in fact be more fruitful if they paid more attention to converged communications.” ▲



# A focus on security is essential to convergence

One of the issues that has held up broader application of voice over IP by government agencies has been a concern over the security of voice traffic running over IP networks. In the current security environment, where the threats are even more diverse, that concern also figures to be a potential brake on the development of converged communications.

Misapplied security can also badly affect VOIP performance because quality of service is fundamental to its operation. If not configured correctly, firewalls can delay or block call setups, for example, and encryption can introduce latency and garble-producing jitter.

The National Institute of Standards and Technology lays out the pros and cons of VOIP in its Special Publication 800-58, the document that forms the baseline security requirements for VOIP for all federal agencies.

“VOIP has a very different architecture than traditional circuit-based telephony, and these differences result in significant security issues,” the NIST document states. “Administrators may mistakenly assume that since digitized voice travels in packets, they can simply plug VOIP components into their already-secured networks and remain secure. However, the process is not that simple.”

One of the biggest barriers in any early discussion with agencies about VOIP and converged communications is the use of IP, said Bill Long, vice president of enterprise voice services at Level 3 Communications. They see it as voice running over the public Internet, and they have to be convinced that it is voice actually running over a private IP connection. Only after that can you talk about the tools you can use with VOIP and tricks that were never possible with time-division multiplexing.

That fear, mistaken or not, led to policies at many agencies that forbade IP voice communications. Even today, said Ron Hayes, solutions architect at Avaya Government Solutions, he runs into roadblocks because agencies still have a physical separation between voice networks and their data networks, which makes it difficult to have any meaningful

discussion about such things as unified communications.

The answer is for voice and other data networks to be logically separated on the converged IP network, but convincing agencies of that solution is still an uphill battle in many cases, though there are some early glimmers of hope. Security-conscious intelligence agencies have begun to converge their networks using logically separated virtual local-area networks, said Scott Anderson, vice president of cloud strategy at Avaya Government Solutions.

“However, they’re doing that on the classified side first because that is already physically separated from the [public switched telephone network],” he said. “They are only now getting to the point where they are evaluating doing the same for the unclassified network.”

The latest version of NIST’s SP 800-58 holds out hope for broader adoption of VOIP in government because it now includes the security requirements of the Defense Department and intelligence agencies, which it previously didn’t. ▲

## NIST’s VOIP security recommendations

1. Develop an appropriate network architecture that includes logically different networks for voice and data, a mechanism to allow voice-over-IP traffic through firewalls, stateful packet filters, remote access security, and encryption at the router rather than endpoints to ensure performance.
2. Ensure that the organization has examined and can acceptably manage and mitigate the risks to its information, system operations and continuity of essential operations when deploying VOIP.
3. Give special consideration to Enhanced 911 emergency services communications.
4. Be aware of physical control requirements and deploy accordingly.
5. Ensure that sufficient backup power is available.
6. Use VOIP-ready firewalls and other appropriate mechanisms.
7. If practical, do not use softphone systems, which implement VOIP via software on an ordinary PC.
8. If mobile units are integrated with the VOIP system, use Wi-Fi Protected Access security.
9. Carefully review statutory requirements regarding privacy and record retention with competent legal advisers.



# DOD plans base the future on IP convergence

The Defense Department is one of the government agencies furthest along in planning for converged communications, and it has made IP convergence a fundamental requirement for the kind of unified communications (UC) capabilities it expects to deliver across the enterprise, including to warfighters in the field, over the next decade or so.

It laid out what it expects that future to be in the DOD Information Architecture Plan 2010-2012, published in May 2010, and what the road will be like in getting there.

“One of the major challenges facing the DOD today is transforming from its legacy of system-specific infrastructures to a shared infrastructure that can deliver capabilities at varying levels to consumers and providers of the DOD’s data and services,” according to the plan. The goal is to transform DOD’s Global Information Grid infrastructure into a more dynamic, adaptable and shared environment, and “migration from non-IP and circuit-switched networks...is an integral piece of the DOD’s migration to a converged IP network.”

The unified capabilities this IP convergence will deliver were spelled out in DOD’s Cloud Computing Strategy, published in July this year. They are to:

- Migrate legacy voice, video and data collaboration services to “everything over IP.”
- Standardize and consolidate component IP convergence efforts across DOD to reduce costs and streamline management.
- Enhance wireless and mobility support.
- Provide real-time collaboration with assured, integrated voice, video and data services.

Delivering these capabilities to warfighters is a major goal of DOD’s new Joint Information Environment, which seeks to get better and more accurate situational

awareness to warfighters so they can successfully complete their missions. It will also support the vision that Secretary of Defense Leon Panetta has laid out for a future U.S. defense strategy that will be based on an agile, flexible and innovative joint force that will be able to deploy quickly to hot spots anywhere in the world.

That IP convergence won’t come about easily or without a lot of effort because most military communications still travel over decades-old time-division multiplexing circuits. But UC pilot programs have already begun to lay the groundwork for the move to IP networks.

The Air Force, for example, has begun a five-year UC transformation program with a goal of getting some 20 percent of its users onto a UC platform within the first year. It has already held two month-long experiments to see how UC can help base personnel and those in operational environments do their jobs better.

The Army IT Agency, which provides IT services to the Pentagon and other DOD organizations, announced in early 2012 that it had begun a pilot program to see whether UC could help in its four-year strategic plan.

The military’s focus on a future network-centric battlefield requires these kinds of capabilities as well as a broader transformation to its communications environment. The DOD Information Architecture Plan makes that clear by describing what its network will look like in the future.

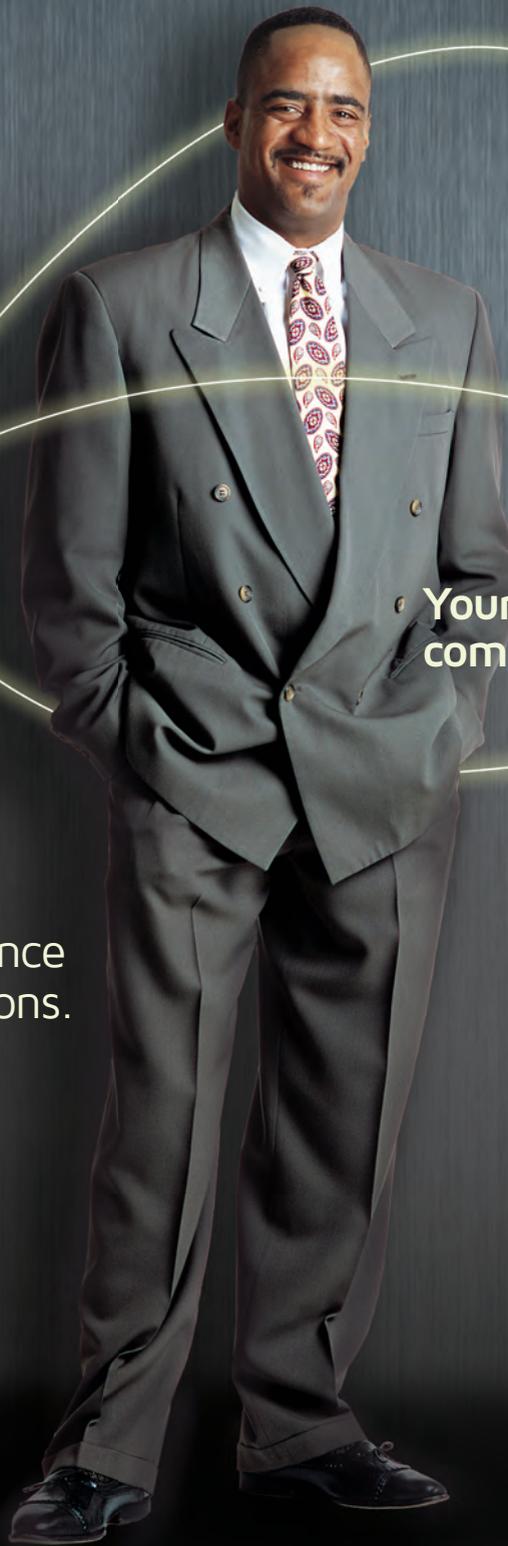
“To support mission needs, DOD wired and wireless transmission capabilities must be sufficiently sized, reliable, available and flexible to accommodate even bandwidth-constrained users at the tactical edge,” the plan states. “In parallel, switching and routing capabilities will enable DOD to interface common or disparate communications media or networks, in order to move data and information end-to-end across multiple transmission media.”

However, the plan states that the strategy will require



DOD and its mission partners to be “persistently connected to the DOD’s IP information environment.” In other words, DOD’s plan depends on an end-to-end IP-based communications environment. ▲

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