

Beyond emergencies

How SIP-based notification systems can improve response, collaboration and resolution for a variety of business scenarios



Overview

Mass notification systems have become an indispensable communication tool for governments, businesses, universities and other organizations. Notification systems are triggered to mobilize emergency and healthcare workers when a disaster occurs. They are used to advise parents when school is cancelled, alert travelers to a flight delay or assemble a restoration team when an IT system crashes.

Organizations of every type and size can realize the benefits notification systems offer, from saving lives, to increasing efficiency, to improving business performance and profitability through greater collaboration. A variety of such systems are available today.

But which system to choose? Historically, notification systems have been built on time division multiplexing (TDM) telephony technology. They have been designed for either simple, one-way notification to a general audience or to address specific needs, such as medical emergency response, system status alerts for IT personnel and payment reminders for customers. Now, however, vendors are consolidating and expanding their portfolios to capture a broader swath of the notification market.

Meanwhile, technology convergence—the merging of communication networks, information technology systems and new media tools—is opening the door to richer, more interactive notification solutions. Technology breakthroughs, such as Session Initiation Protocol (SIP), are enabling the creation of Web-style services that both businesses and consumers are increasingly coming to expect.

The ability to mobilize people quickly when a safety or continuity issue arises is naturally the top priority for organizations considering a notification system acquisition or upgrade. But emerging technologies—in particular, notification solutions that integrate with enterprise communication systems—offer additional important capabilities, especially in today's difficult business climate. These solutions can help organizations and their people take the critical step from incident response to resolution more rapidly and seamlessly. They also offer more flexibility and functionality to adapt to future notification needs and address other business requirements. Together, these capabilities can lead to lower costs and better returns on system investment.

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The advantages of SIP

Like other forms of communication, notification systems are undergoing a transition from legacy TDM technology to Internet Protocol (IP), SIP-based technology. Making the transition can help organizations address three business priorities:

Cost savings—Reducing costs is a key driver of SIP deployment. SIP helps control the organization's toll costs, reduce personnel required to manage global networks and bring voice network efficiency closer to that of data networks where applicable, leveraging the enterprise IP network and thus avoiding additional telephony capacity upgrade costs.

Business agility—SIP communications networks support user movement based on the needs of the business. They allow organizations to expand and contract as quickly as required and sustain the momentum of business realignment, including mergers and acquisitions. SIP technology also helps organizations avoid becoming locked in by particular vendors or suppliers. For example, in a merger or acquisition situation, SIP serves as a platform for unifying media, modes, networks, devices, applications and real-time, actionable presence across a common infrastructure, regardless of the brand of devices or software involved. Newly integrated companies can embrace and extend their existing PBX systems from different vendors, for instance, to satisfy the needs of employees and customers, deliver consistent if not improved performance, and drive down overall costs.

User enablement—SIP systems acknowledge that different users have different needs and expectations, particularly the reared-with-technology millennial generation. Users expect instant access and rich functionality, without concern for the infrastructure needed to deliver them. SIP communications enable this type of functionality in a variety of settings. For example, a field technician working onsite could view a video stream on a laptop or hand-held device that details visually how to repair a complex valve in a piece of machinery or refinery.



Extending SIP's advantages to notification systems

Traditional TDM-based notification systems certainly offer a proven approach to transmitting urgent information and instructions in real time across an organization or response network. Features typically include:

- **Targeted communications**—frontline response coordination and control through tailored messages to specific individuals and groups according to roles, responsibilities and location.
- **Multichannel notification**—message broadcasts via landline, wireless phone, e-mail and short text messages (SMS).
- **Volume message delivery**—the ability to broadcast messages to many people quickly.
- **Detailed reporting**—compilation of data as an event unfolds for post-event analysis and reporting.

However, in addition to these time-tested features, SIP-based notification systems expand functionality significantly across several dimensions, including:

- **Added speed and capacity**—SIP-based systems enable rapid notification of many more people, because instead of being limited to an organization's existing traditional telephony

resources, SIP-enabled notification systems extend the reach to the IP network for extremely fast local area network communication with IP phones and other devices.

- **Extended integration and multichannel notification**—With SIP-based systems, organizations have the opportunity to use rich media, intelligence and presence capabilities to locate, inform and seek responses from the widest possible audience. SIP-based architectures encourage much more creative integration of third-party IP devices both as input to and output from the system. For example, video cameras upstream of the system can provide video feeds while IP-based public address systems, instant messaging applications, pagers, WiFi phones and other downstream applications can deliver those video streams. This gives recipients a real-time view of what is happening and can help speed their response.
- **Situational or context awareness**—SIP-based notification systems have rich capabilities for capturing and consolidating responses; polling recipients to determine their location and status; transferring personnel when they respond; and conferencing of multiple parties for real-time management of people and resources.

With this new generation of systems, companies will be able to build on their fundamental emergency response capabilities and use these systems for many other purposes (see [sidebar](#), “Capitalizing on emerging notification capabilities”).

Issues in system selection

Advanced SIP-based notification systems support four key functions: notify, respond, collaborate and search. Generally, these are referred to as informational notification, polling notification (expects a response) and notification to conference. Non-SIP-based systems also support these basic types, but SIP offers the ability to incorporate new types of media and intelligence within the process—for example, video streaming, location-based services, real-time text and instant messaging, and presence capabilities.

Notifying targeted groups and providing a means for them to respond are time-tested notification system functions. In newer systems, collaboration capabilities enable teams to work together toward resolving situations and issues, while search, or presence, functionality tracks down who is available online and where they are, whether at a desk, at home or on the move with a cell phone.

In weighing the potential of SIP-based notification technology, organizations can benefit from considering some key factors:

Total cost of ownership

An organization may decide that basic notify and respond capabilities are all that it needs to fulfill notification requirements. Should collaboration be required later, a conference bridge can be established.

Conferencing is not free, however, and can quickly become a significant expense if used to assemble large teams on an ad-hoc basis. Costs could grow even faster with increasing use of video and other rich media tools. It is important to factor in these and other potential expenses when determining a notification approach.

Future-proofing the notification investment

Technology convergence is rapidly facilitating the integration of notification systems with related systems and applications. An example of this is connecting a video-camera surveillance system to a notification system, providing responders with an advanced view of the situation and conditions.

Convergence will also enable deployment of presence capabilities, rich media and other advanced features in the notification environment. The ability to capitalize on these opportunities as they unfold over the next several years will hinge on establishing an IP-centric, SIP-enabled communications framework. TDM-based notification systems don't have as much flexibility to support convergence.

Location is a good example. Whether it is for workforce optimization or emergency communications infrastructure, information—such as location—increasingly will be carried in the SIP call signal. In order to effectively treat the call, next-generation notification systems will need to be able to natively parse and process the SIP signal, no longer relying on TDM/computer-telephony integration (CTI) as many such systems do today.

IT integration

Alerting people that an emergency or issue exists and triggering them to action will always be a core notification-system purpose. Beyond that, there can be significant value in being able to communicate what is being done in response to the situation and accurately conveying which systems and business processes have been enabled and are affected.

CAPITALIZING ON EMERGING NOTIFICATION CAPABILITIES

From oil refineries to hospitals to supply chains, SIP-based notification solutions certainly offer powerful new tools for organizations to mobilize during emergencies. In addition, they can help address daily operational inefficiencies to extend the functional scope and value of the notification solution:

Oil production interruption. A defective valve disrupts the flow of oil in a refinery. As production is shut down, the notification system alerts a predefined group of people and connects them to a conference bridge to formulate a response plan. A technician is alerted to repair the valve, who not only receives a message to respond, but a visual illustration of the problem on a cell phone or video screen, accelerating repair and restoration.

Manufacturing inventory shortage. An inventory review determines that human error has led to missing critical third-party-supplied components required by a manufacturer. Local supply will soon be exhausted, halting production at a cost of millions of dollars a day. A cross-functional team is formed from procurement, manufacturing operations and vendor management, which collaborates and decides on a plan to redirect components earmarked for a different manufacturing location deemed to have excess inventory. To verify the plan's feasibility, the team leader uses a notification solution to poll the alternative manufacturing location and conference with key decision makers to ensure the decision is acceptable with all stakeholders. Once the decision has been made and the plan executed, the team leader issues a polling notification to confirm shipment redirection has taken place and is proceeding according to plan.

Incident response. In a healthcare environment where seconds can be the difference between life and death, quick response to critical patient incidents is extremely important. In such situations, even small delays in contacting the appropriate team can have adverse consequences. An effective notification solution must reach the right team members with the right information regardless of their location. A security event would require the closest security personnel. A patient duress event would require nursing staff, as well as a stretcher at the location. A SIP-based solution can alert and direct response team members to the incident location based on a combination of parameters, such as

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The ability to link systems in such a manner requires that a notification solution be “IT compliant.” It should adhere to service-oriented architecture (SOA), extensible markup language (XML), application programming interface (API) and related standards in order to connect seamlessly with enterprise resource planning, supply chain and other systems.

Hosted notification service or on-premise solution?

Notification systems fall broadly into one of two categories: hosted solutions provided by a service provider, and on-premise solutions that live within an organization’s communications infrastructure.

A hosted solution is often a good approach for smaller organizations seeking to deploy a simple notification system. Users can easily access the solution remotely, and the service provider takes care of system operations and maintenance. It can be more cost-effective because the hosting service amortizes its capital equipment costs across a broad customer base and is able to gain efficiency in operating costs. There are security, integration and other cost implications of this approach, however, which may make on-premise solutions more attractive, especially to larger, more decentralized organizations.

Security and privacy

To perform a message notification broadcast to a group of recipients, a notification system needs an up-to-date list and profile of recipients to whom it will broadcast. This is typically accomplished through either a central recipient database managed by the notification system or through an open API that allows third-party calling systems to pass recipient information to the notification system.

In a hosted service, this recipient list and profile information is either pre-populated with the service provider (hosting agent) in advance of the broadcast request or passed to the hosted notification system at the time of broadcast request. For many organizations, publishing such confidential and

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skills, proximity and availability. Such a solution can also track the movement of personnel as they respond to the incident and log times for future analysis. This automated and simplified process can help a hospital become more efficient and achieve improved patient outcomes.

Hospital nurse response time. When a patient uses a nurse call-button to request assistance, how does the hospital ensure that the right nurse responds? Oftentimes, it’s the closest nurse to the patient’s room who answers the call. Moreover, when a nurse is paged using a public-address-type system, there is no streamlined method for notifying other nurses that the page was received and is being handled. A SIP-based notification solution can provide the closed-loop network that allows the nursing staff to receive and respond to urgent patient needs and help alleviate long wait-times for patients.

Community notification. A city or town uses a notification solution to alert residents that next week’s garbage pickup will be delayed by a day. Similarly, a municipal or regional utility notifies residents of the impending threat of water shortages. Increasingly, governments and public agencies are relying on notification systems as fast, reliable ways to get the word out to their constituents for health, safety and convenience.

Educational uses. Universities, colleges, elementary schools and high schools already use notification systems to notify staff, faculty, students and parents of shutdowns due to emergency situations, such as widespread illness or safety issues. With SIP-based systems, additional media, such as video and a broader array of voice and text messages, can be applied in these emergency situations. Plus, the system can be used for day-to-day administrative tasks, such as notifying students of tuition due dates and automatically reaching out to parents if payments aren’t made on time so the family can avoid late fees and penalties.

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potentially sensitive information outside of the organization's security network can impose an unacceptable security risk and prove incompatible with policies and obligations the organization has in place serving its customers, employees and community members.

Similarly, if the recipient list and profile information is passed to the hosted notification system at the time of broadcast request, complex security policies and procedures need to be enforced to ensure against the possibility of a third party interjecting into the data stream and performing a "man in the middle" type attack. Again, this can be an unacceptable security risk for many organizations.

With an on-premise approach, these security and privacy risks are mitigated because the list and profiles of the intended recipients stay within the organization.

Systems integration issues

Notification systems can have many different applications. As the organization adopts these capabilities, they inevitably need to be integrated with other business processes, third-party systems and media assets. This introduces inherent complexity and cost, and it raises questions about security risks, threats and compliance. In a hosted environment, all these factors are exacerbated by the fact that the solution resides outside the organization. An on-premise approach

significantly reduces the integration effort, costs and security risks by keeping them under one roof.

Total cost of ownership

With hosted notification solutions, usage fees are typically bundled under a one-year to three-year subscription plan. These fees are built around the primary cost drivers of the solution, software use, ongoing operation of the software and systems, and specific required mediums of communications, such as voice-calling or SMS.

Frequently overlooked in such a packaged offering is the fact that the bundled costs can include sunken investment, in part or in whole. For example, some portion of the fees for the hosted solution no doubt will cover trunk capacity for the service provider—a redundant cost for the company paying the fees since it will still have to pay for its own trunk lines as part of its ongoing enterprise communications. Similarly, the hosted notification solution may include conferencing or messaging capabilities—again, included in the bundled fees—that the client company already has in its enterprise communications network. This can create additional duplication of costs. With an on-premise notification solution, this investment overlap can be avoided and existing investments in technology can be fully leveraged.

Meeting notification needs today and tomorrow

Whether the situation is a health crisis, a safety issue or a business interruption, taking appropriate action requires that an organization be able to rapidly notify people, assess whether they can respond and provide them with the tools they need for collaborative action. By capitalizing on technologies emerging now and in the months ahead, organizations can be better prepared to deal with emergencies and issues quickly and effectively.

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About Avaya

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