

Convergence Improves Public Safety Communications

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Government officials, employees and volunteers need efficient communications to meet the challenges of prompt and effective responses to crime, natural disasters, accidents and terrorism. Governments must also meet ongoing responsibilities of crime and terror prevention and satisfy the demands and expectations for public services in a healthy and fair economic climate.

These challenges are made more complex by the diverse range of communication devices and the chaos caused by natural disasters and other large-scale emergencies.

Fortunately, new event alerting and notification solutions for the IP telephony platform are available to help unify communications and meet the needs of government organizations and their citizenry.

This white paper explores the challenges faced by governments in their efforts to meet the needs of the public and the advantages of interoperable, responsive and resilient IP telephony solutions that improve emergency response times, enhance the delivery and quality of services, foster educational excellence and facilitate economic development.

■ Market Challenges

Single-Mode Message Distribution

The market for alerting and notification solutions to meet emergency management needs is expansive, and current avenues used for notification distribution are diverse. Some of these methods include

- Bulk dialing
- Simple Message Service (SMS) solutions
- Two-way radio communications

While these solutions may fill the need for non-emergency messaging, single modes of message distribution used for alerts during a crisis can be slow and ineffective. They do not deliver effectively when lives are at stake.

Bulk Dialing

Using bulk dialing services alone as a method of alerting and notification requires that the message is distributed as it is entered into the system, resulting in all the phone numbers in the dialing tool being called. When saving seconds can save lives, this distribution method is too slow and cumbersome.

SMS

SMS offers some communication advantages:

- Available on most cell phones
- Conserves system resources during normal usage
- Can be delivered when the phone is busy

This mode of distribution has inherent weaknesses. Users can only send and receive messages via cell phones. Message size limitations, ranging between 140-160 characters, create a disadvantage, requiring that users send successive messages to convey longer messages. Although a succinct or pre-prepared text message, intended for a specific situation, may be effective, the character limit is fundamentally prohibitive.

Additionally, since text messaging is a point-to-point technology, messages are limited to being sent and received on single cell phones during normal usage; therefore, SMS is not a useful tool for alerting groups of responders to an emergency situation or informing or warning groups of people.

Vast numbers of text messages sent simultaneously to alert high populations may overburden wireless networks, tying up resources used by emergency responders and causing unacceptable delays during critical emergencies when lives depend on instant communication and quick action.

Finally, security issues may be inherent in SMS messaging. Hackers or spoofers may be able to send out counterfeit emergency alerts in the guise of a legitimate public safety organization or official.

“Recent events have shown that single mode communications are not enough. Event Alerting and notification is about timely actionable information to any device anywhere. Cistera is the leader in delivering on that vision”

GREG ROYAL
Executive Vice President
Cistera Networks

SMS messaging, as an event alerting and notification tool, may be useful for alerting key personnel during an emergency, or for locating displaced people afterward, but governments cannot rely on it as a sole means of communication during the height of an emergency. Two-Way Radio Communications

Another example of single mode messaging, two-way radio communication systems are limited to contact with radios on the same frequency and require the other party to have a compatible device. Compounding the problem, emergency radio system technology often varies within cities, counties, states and regions, potentially creating severe interoperability problems during a crisis, as evidenced during the terrorist attacks on the World Trade Center on September 11, 2001. Though two-way radios are an established cornerstone for public agencies and emergency operations throughout the world, proprietary technology has traditionally confined them to their own frequencies, restricting their effectiveness.

Disparity of Communication Devices

Each of the above solutions requires a single-mode notification system to alert groups of people. Although single-mode notification systems are useful for non-urgent, sequential delivery of alerts, these solutions are limited because, in the everyday world, people use diverse types of communication devices in many different ways. In emergency situations, these single-mode notification systems may simply be too slow and narrow in scope to provide actionable information. Recognizing the ongoing compatibility problem with two-way radio communication systems, for example, the United States Department of Homeland Security recently approved a \$65 million grant for the state of Texas to improve the interoperability of emergency radio systems statewide.

Single-mode systems are intrinsically problematic as reliable emergency alerting and notification tools. In reality, people use multiple modes of message delivery. Analog, cellular and digital phones, push-to-talk radios, email and SMS are common ways to distribute directives and correspond across an organization. If everyone used the same tools, tuned to identical frequencies, and the viability and redundancy of the infrastructure could be ensured (even in the face of destructive or disruptive disasters), the limitations of single-mode systems could be minimized. But this diversity of devices, protocols and methods, offering multiple avenues of interchange, demands a solution for unifying communications.

■ **Creating Timely and Actionable Information**

For government officials, employees, volunteers and the general public, clear, efficient and timely alerting and notification during an emergency or disaster is vital—and it often makes the tenuous difference between life and death.

Recent events, such as Hurricane Katrina and the Virginia Tech tragedy, illustrate the difficulty faced by emergency responders and have put pressure on government officials to develop comprehensive solutions through unified communications. September 11th, 2001, is a continual reminder that any breakdown in alerting and notification, whether within or between governmental agencies, can multiply public risk.

Complicating this complex picture, potentially clouded by chaos, is a wide variety of communication devices. Depending on the jurisdiction, government agencies may be using a combination of traditional land lines, IP telephony, wireless phones and two-way radios.

During an emergency, speed is vital, but with so many disparate ways to exchange information, and no standardization of protocol, public officials, dispatchers and emergency responders must talk to each other in the most efficient ways possible. Messages must be sent quickly, configured to minimize lost time, maximize accuracy and ensure delivery to the correct recipients.

Government organizations need fast, reliable and flexible communications for alerting, notification and mobilization of emergency responders, officials and other key personnel during crises, conflicts, accidents, criminal acts and disasters that threaten lives.

In addition to the acute and chronic needs of public protection and emergency response, citizens require and expect government agencies to provide efficient everyday services and to foster a free, robust and fair economic environment that favors development and protection of natural beauty and resources.

Government organizations need event alerting and notification solutions that are reliable, easy to use, scalable and easily managed. Given market demands and the communication challenges faced by government organizations, it is reasonable to look for and implement a cost-effective, unified solution that works across multiple avenues of message distribution.

■ Trends In Telephony

Following private sector trends, recent statistics show that government organizations are implementing IP telephony systems to reduce costs and increase productivity and communications. A 2005 survey by Computerworld¹ found that more than 30% of government organizations polled have implemented or were in the process of implementing IP telephony systems. About 42% were researching, testing or evaluating IP telephony systems. Only 27% had no current plans for implementing IP telephony systems.

Defense and Public Safety

Defense organizations were once stalwart bastions of proprietary, standalone communication systems. As with other government organizations though, including public safety agencies, defense organizations are now embracing interoperability and the development of network-based systems, using convergence technologies to speed up communications and accessibility. Public safety agencies are increasingly relying on IP telephony to enhance interagency collaboration and productivity and cut costs.

National and Civilian Agencies

National and civilian agencies are moving to IP telephony solutions to streamline operations, improve efficiency, control costs and increase collaboration to meet objectives and requirements for providing services.

The Evolution of Communication

Throughout the decade of the 90s and early 2000s, emergency communication systems evolved quickly, with Internet protocol becoming the obvious system of the future. During Hurricane Katrina, local and state officials, as well as the Red Cross, turned to IP-based solutions to keep communications lines open. But, out of necessity, officials and responders relied on more than just on their VoIP services for communication: text messaging, email, web-based information, two-way radios and other methods of communication were instrumental in keeping people connected and informed.

As statistics show, IP telephony represents the present and future for many government organizations, across all levels. But other methods of message distribution are here to stay, and, as during Katrina, text messaging, email, radio and other communication avenues must be integrated into the IP telephony networks to achieve unified messaging and fully resolve the alerting and notification issues faced by public service officials—during emergencies and in the everyday provision of government services.

Government organizations must converge their communications into a reliable, proven IP telephony platform.

■ The Convergence Solution

Clear communication is vital to any government organization—whether sending an announcement to a group of employees or responding to an emergency. Government organizations, increasingly moving toward IP telephony systems, need to implement alerting and notification solutions that ensure a unified response in the face of an emergency or disaster. Single-mode methods of message distribution alone are inefficient and unreliable. Multi-mode systems of messaging dramatically increase the efficacy of alerting and notification efforts.

An effective alerting and notification solution must combine communication tools, methods and protocols.

Benefits of Converged Communications

What are the benefits of converging communications as an alerting and notification solution, and how can this overcome the problems faced by government organizations?

Communication is the cornerstone of a connected community—one that connects citizens, employees, community-based organizations and governments. Combining technologies into a single, easily managed platform

- Improves emergency response times
- Improves collaboration, productivity and public protection
- Enhances effectiveness, efficiency and quality of service
- Saves costs, increases economic and educational development and allows for greater investment in the community

The many benefits of a converged communication solution can be summed up in greater safety and satisfaction of the public. As citizens' expectations of their state/provincial and local governments evolve, studies show that increased effectiveness and speed-of-services top the list of expectations, followed by expansion of services to meet demands and accommodate a wider range of needs.

In consideration of the public need, governments must

- Defend against physical and network attacks
- Work within strict budgets that require them to do more with less
- Meet public needs for fast response times and high availability of public servants
- Stimulate economic development
- Increase service effectiveness by reaching more citizens
- Improve citizen safety
- Foster educational excellence

Any solution, therefore, must

- Be secure, reliable and cost effective
- Provide multiple ways to send messages quickly and easily
- Integrate any number of communication devices, including IP phones, analog phones, wireless phones and two-way radios
- Link data and voice with any of these communication devices
- Instantly transmit text or voice messages, live or prerecorded, to a select group—or to an entire organization
- Be easily manageable via a web interface

How is it possible to combine single-mode methods of message distribution into an easily manageable IP telephony interface? One that allows communication across disparate communication devices, targeted delivery of text and voice messages and other aspects of a complete event alerting and notification solution?

■ Multi-Mode Event Alerting and Notification Solutions

Cistera Networks recognizes the need to integrate and unify government communications. In response, Cistera has developed the first Enterprise Application Platform for IP Communications that fully addresses the need to use multi-messaging modes in emergency situations. Cistera's Event Alerting and Notification (EAN) solutions enhance the ability of organizations to deliver actionable information quickly and reliably. Cistera's unique multi-mode communication platform combines IP, mobile and analog phones, as well as two-way radios, providing a powerful solution to meet the needs of progressive government organizations.

Cistera has developed a unique approach to how governments can view and ultimately deploy an EAN solution—using IP as the core glue to bind these systems together.

This comprehensive EAN solution provides many key benefits, including:

- **Improved public safety**—Cistera solutions provide government and public safety agencies greater operational and situational awareness to make good decisions and deliver actionable information, while securing critical networks.
- **Increased service effectiveness**—Governments can dramatically improve existing employee and citizen services by providing online access, allowing agencies to automate, consolidate and eliminate resource-consuming processes, while offering innovative new services.
- **Robust economic development**—Governments can foster a thriving community by providing equal access to important community and business resources, partnerships, information and opportunities.

Cistera Application Engines for EAN

Cistera is the leading provider of EAN solutions for IP telephony. Cistera's EAN solutions are based on a number of core application engines that reside on the Cistera Convergence Server (CCS). Each engine works independently, and in tandem, to provide a flexible yet comprehensive feature set that solves real world problems for government organizations.

Cistera's EAN solution for government organizations consists of four key application engines:

- **RapidBroadcast™ Enhanced**—Broadcasting and notification for IP phones
- **LMRConnect™**—Two-way radio integration for push-to-talk, bridging and recording
- **QuickConnect™**—Broadcasting and notification for cellular and analog phones

Cistera RapidBroadcast Enhanced

RapidBroadcast Enhanced is the preeminent broadcasting solution for IP telephony. It is an advanced, full-featured messaging service that links data and voice with communication devices and allows IP phones to be grouped together for broadcasting and notification.

RapidBroadcast Enhanced can instantly transmit text or voice messages or schedule pre-recorded broadcasts to an entire organization through IP phones or external overhead speakers. Easy to configure and administer, *RapidBroadcast Enhanced*, and the entire suite of Cistera Networks applications, is managed via a web-based interface. Features include Whisper, intercom, paging, text messaging and numerous others.

The latest version of the already proven *RapidBroadcast* application engine, *RapidBroadcast Enhanced* includes advanced PSTN Paging and Panic capabilities.

PSTN Paging allows remote users to access the *RapidBroadcast* engine by dialing into the IP phone network, selecting a group and broadcasting a page to the selected group. Paging options include sending the page live or recording the page for preview purposes and then sending it (the PSTN page must be sent immediately; it cannot be stored for later delivery).

The Panic capability of *RapidBroadcast Enhanced* allows messages to be sent until all users have acknowledged receipt, ensuring automated delivery of the message to all intended recipients.

Key benefits of *RapidBroadcast Enhanced* include

- Integrated overhead paging through Cistera *ZoneController™*
- One-button panic delivery, allowing identification of where the broadcast was initiated
- Intuitive, web-based template manager for creating messages
- Forced code authorization for secure access
- Flexible group administration
- Configurable forced acknowledgement receipt
- Send and receipt record logging
- Integration with Cistera *CallCenterRecord™* or *QuickRecord* for automatic 911 recording
- Soft key configurations for one-button paging
- One-button intercom capabilities
- Integration with Cistera *PresenceManager™* for Do Not Disturb functionality
- PSTN Paging allows remote access for broadcasting pages
- Panic capability ensures automated delivery of messages until all recipients have acknowledged receipt

Cistera LMRConnect

Two-way radios are a communications cornerstone for public agencies, emergency operations and businesses around the world; however, until today, proprietary technology confined push-to-talk radios to their own networks—keeping them well-separated from convergence with IP telephony. Recognizing the need to integrate, Cistera Networks has created *LMRConnect*—bringing land mobile radios (LMR) into the IP telephone network.

LMRConnect allows instantaneous connectivity from IP phones and analog Phones to multiple disparate two-way radio systems. Using the latest radio over IP (RoIP) technology, multiple communications devices can be both instantly alerted or bound together in a conference bridge.

Key benefits of *LMRConnect* include

- Multi-frequency bridging
- Predefined bridging groups
- Bridging IP phones with push-to-talk radios
- Multicast recording capability over wide area networks (WAN)

Cistera QuickConnect

Cistera *QuickConnect* is the premier engine for the delivery of event alerting and notification for cellular and analog phones. As part of Cistera's Event Alerting and Notification (EAN) solution, *QuickConnect* extends the popular *RapidBroadcast* application engine to launch notifications beyond IP phones, overhead paging systems and two-way radios to now include all communica-

“The power of Cistera’s application services was a key differentiator for us when we were selecting an IP communications platform. Tactically, the services allow us to disseminate important information city-wide at unprecedented speeds, which makes a real difference during emergency situations when seconds count. ”

JOHN FINDLEY
IT Director
City of Opelika, AL

tion devices. As an outbound dialing engine, *QuickConnect* can manage communications in a variety of scenarios, mixing IP phones and analog phones together quickly in multicast conferences. When combined with Cistera *QuickConference™*, key personnel can quickly build both “meetme” and conference bridges to solve collaboration issues.

Key *QuickConnect* benefits include

- Manage calls based on your organizations’ needs
- Eliminate manual dialing and improve efficiency with automated redialing
- Generate mass emergency messages, saving time and improving public safety

■ Case Study

Following is a real-world example of a government organization using the Cistera *LMRConnect* to integrate two-way radios. With this solution, the district’s emergency operations administrator was able to link all radio frequencies and IP telephones, eliminating the limitations of designated frequencies, improving communications and enhancing the performance of emergency responders.

District of Squamish, British Columbia

The District of Squamish in British Columbia selected the Cistera solution to facilitate communications between emergency responders. Squamish, located between Vancouver and Whistler, and considered the outdoor recreation capital of Canada, needed a way for the Emergency Operations Centre to coordinate responses of ambulance, fire, public works, SAR teams and police. They added the *LMRConnect* and Cistera’s broadcasting application *RapidBroadcast* to their deployment of a Cisco *CallManager IPT* solution so that, on an as-needed basis, the emergency operations center could immediately enable communications between all responders.

“Adding the Cistera products for linking two-radios to our Cisco IP phone system seemed to be the next logical step to leverage the power and flexibility of IPT,” said Garry Broeckling, Chief Technology Officer for the District of Squamish. “Not only does this set-up allow us to coordinate and link radio traffic throughout the district, we have found in some cases we were able to use Cisco phones instead of adding the expensive radios in stationary sites.”

Cistera has many customers in the government sector that have benefited from integrated solutions that support multiple disparate devices and environments.

■ Conclusion

In this white paper, we have explored the communication challenges faced by governments in their efforts to meet the needs of the public. We have discussed the problems associated with relying on single-mode message delivery, the confusion created by the explosion of disparate communication devices and the growing trend of government organizations to implement IP telephony systems.

We have also outlined the advantages of interoperable, responsive, and resilient communication solutions that improve safety and emergency response, enhance the speed and quality of services, and enhance educational excellence and economic development.

While the implementation of IP telephony brings many advantages to government organizations and to the public they serve, reliable, efficient, cost-effective and easily managed Event Alerting and Notification (EAN) solutions are required to unify, organize and improve all types of messaging applications, methods and devices, from digital to radio to analog, especially during emergencies and disasters.

Cistera Network’s EAN solutions enhance the delivery of actionable information quickly and reliably, combining IP, mobile and analog phones, as well as two-way radios, to provide a comprehensive solution that meets the needs of forward-thinking government organizations.

About Cistera Networks

**Cistera
Networks™**

www.cistera.com



6509 Windcrest Rd, Suite 160
Plano TX 75024
Phone: (972) 381-4699
Toll Free: 1-866-965-8646
Facsimile: (972) 381-4635
<http://www.cistera.com>

Cistera is a leading global provider of enterprise and small business communications solutions and services. The company focuses on blending powerful application infrastructure to deliver the benefits of voice, video and data convergence to the user. Cistera's broad portfolio of Convergence Servers and application solutions provide advanced voice, video and data communications platforms and applications for customer contact management, event notification and alerting, recording and monitoring and collaborative solutions.

The Award Winning Cistera Convergence Server™ (CCS) is the leading platform for the delivery of Enterprise Application Engines for IP Communications. The CCS delivers enterprise scalability and performance all the way to the desktop and the phone. Couple that with a Unified Administration for the lowest Total Cost of Ownership (TCO).

Based on open standards and a proven server technology foundation, the Cistera Convergence Server enables customers to create a robust and scalable environment that is flexible enough to adapt to their changing needs over time. The CCS platform scales up to support organizations with thousands of users and scales down for offices with fewer than one hundred users, making it a viable alternative for a broad range of organizations.

Cistera Networks makes Application Driven Telephony a reality by setting the new standard in advanced IP phone application platforms and engines for the Enterprise VoIP Telephony environment. The Cistera ConvergenceServer™ (CCS) uses the industry-leading Cistera Enterprise Platform for IPT to provide Unified Application Administration as well as Fault and Performance Management for enterprise IPT Application deployments. Cistera provides next-generation solutions for numerous vertical markets including education, finance, healthcare and government. Cistera Networks maximizes IP phone capabilities -- taking the communications platform to an entirely new level.

Cistera focuses on three core application services solution sets:

- Event Alerting and Notification
- Quality Assurance and Management
- Unified Communications

Glossary

Cistera Networks describes our core platform as "Enterprise Application Platform for IP Communications". On that platform we have a number of tools and engines that provide application services, both fixed function and individual configurations for clients.

Application Platform for IP Communications – platform that provides core underlying components that allow application services to exist. They are Security, Provisioning, Fault and Performance Management and Billing (OSS & BSS services)

Application Services – Feature function that manifests itself in the hands of the user

Application Engine – Function specific software component that reside on the Application Platform

Application Services Layer – Software and hardware layer where application services are provisioned within the

To learn more about Cistera Networks and Enterprise Application Platforms and Engines for IP Communications please visit us online at <http://www.cistera.com>, call us at 1-866-965-8646 or email info@cistera.com