

Hub and Spoke Approach to Computer-Aided Dispatch

1 Introduction

Intergraph's hub and spoke approach to computer-aided dispatch (CAD) provides an alternative to a standalone independent system. This solution enables installations to share information on a common platform and create a state of interoperability between the various participating individual U.S. Army installations' Directorates of Emergency Service (DES), regionally and Army wide. This white paper provides an overview of our approach, identifies some of its advantage, and provides examples of where it is successfully working today.

2 Intergraph Incident Management Solution Overview

Intergraph's Incident Management solution is a standards-based approach that integrates E911 and security information into a geospatially aware, role-based Common Operating Picture (COP) for emergency management in the context of public safety and security. When a critical incident occurs, public safety dispatchers must respond quickly and efficiently to coordinate response and allocate critical resources. Whether it's a medical emergency, fire, or other crisis, dispatching systems must meet the complex demands of an incident as it unfolds. Intergraph's Incident Management solution provides call center and communications center operators, as well as officers in the field, with the tools they need to answer all types of calls, create and update incident details, and manage multiple resources through real-time interaction of live incident data.

Multi-agency and multi-jurisdiction capabilities are provided with Intergraph's Incident Management solution, enabling security, police, fire, and EMS personnel to work together to secure assets, mitigate security threats, protect lives, and make fast, effective emergency decisions. Dispatchers receiving E911, Wireless 911, and PBX 911 calls, as well as SMS text messages, can import critical information into the Incident Management solution, greatly reducing response times and increasing accuracy by automating key call-taker and dispatcher tasks. Using Intergraph's Incident Management solution, installation emergency managers can rest assured that their front line assets (Police, Fire, and EMS) are more effective and efficient, enhancing and helping to preserve both public and responder safety. Integrated into Intergraph's Incident Management solution are several crucial components:

- Computer-aided dispatch system
- Mobile data terminals
- Smartphones
- Records management system
- Security interfaces to technologies such as alarms, closed circuit television (CCTV), intrusion detection system (IDS), etc.

The geospatially based Incident Management system provides for graphical representation of events and areas of interest, real-time status of emergency response assets, and on-screen access to standard operating procedures (SOPs). This ensures essential real-time communication between the emergency operations command center and responders in the field.

The Incident Management system provides interoperability between installations and local municipalities as well as interfaces to fire alarms, automated vehicle location (AVL), mobile data

terminals, CCTV systems, paging, radio, mass notification systems, installation security systems, and external crime databases. Integrating incident management and physical security information management (PSIM) into one system results in a complete set of tools to manage the life cycle of an incident management event (prepare, prevent, detect, assess, respond, and recover). The COP becomes the geospatial canvas for situational awareness for the first responders, the Emergency Operations Center (EOC), and higher commands.

3 System Security and Design

A secure environment for emergency operations is crucial and the Intergraph Incident Management solution is highly secure with Mission Assurance Category (MAC) 1 accreditation. This is of utmost importance for today's systems and our solution is capable of providing the necessary security measures. Many of Intergraph's software products have received Army Certification of Networthiness (CoN) certifications, with newer software versions currently undergoing the certification process.

The Incident Management solution architecture is a network-centric decision support system. The system architecture links technologies and systems via Intergraph's commercial off-the-shelf (COTS)-based incident management software modules to support emergency management requirements. The operating system for all servers, workstations, and personal computers is Windows-based, and the database is structured using an Oracle or Microsoft SQL Server Relational Database Management Server (RDBMS).

The Intergraph platform is developed to support the sharing of information between installations regionally and Army-wide through interoperability with a regional hub-spoke architecture. Intergraph also offers cloud-based, hosted solutions in markets and areas where these solutions make sense for our customers. Our technology investments enable us to leverage cloud models and view cloud computing from a holistic perspective. The Intergraph Incident Management solution is comprised of a suite of products to meet these goals, for desktop, web-based and mobile users.

4 The Hub and Spoke Approach to Public Safety Overview

Fundamentally, the hub and spoke concept is when a central, or hub, installation is implemented where all primary server equipment and software reside. These central servers are maintained and managed for the benefit of both the hub installation and regional, or spoke installations. The spoke installations on the system are connected to the hub installation by a high-speed network. This allows all spoke installations to receive the benefit of being connected to the hub installation and have the ability to interact with other installations within the system. This design greatly increases the shared information between all installations on a common platform while reducing the need for each installation to maintain its own independent system.

5 Advantages of the Hub and Spoke Approach

There are several advantages to employing Intergraph's hub and spoke approach to public safety. This approach enables the Army to:

- *Share a common computer platform across many differing installations.* While each installation will have their own operational environment, they also share data and systems with other installations. This results in better interaction between installations in critical situations and provides overall cost benefits to the Army. Regional commanders can access with proper credentials live incident and unit data for each installation through a common web portal.
- *Provide cost savings through shared automated systems procurement and operations.* Installations receive the benefit of the buying power of the combined group versus an individual installation purchase. This savings can extend to ongoing maintenance issues as well thus lowering the lifecycle cost of the system.
- *Improve officer safety through the timely communication from surrounding installations (especially important in multi-agency response situations).* In the event of a national emergency, such as a coordinated terrorist attack or natural disaster, this advantage proves invaluable to response model planning and execution.
- *Create continuity of operations (COOP) sites capability for involved installations with multiple dispatch centers at the regional agencies backing each other up in case of a failure.*
- *Create efficient agency- and system-wide data collection and analysis capabilities.*
- *Improve the coordination and management of mutual aid events because units from different installations are on the same system.*
- *Improve the efficiency of training personnel from all participating agencies.* Intergraph develops a common training facility to be shared by all agencies and used by all. Individuals from one agency can be used to train personnel from the other agencies using a common training outline.

6 Regional Benefits

There are a number of benefits to consolidating operations of multiple installations in a region through the hub and spoke approach. These benefits can be placed into three broad categories: Operational, Technical, and Financial.

Operational Benefits

Operational benefits of the hub and spoke approach include efficiencies associated with installation consolidation. Instead of every installation having duplicate computer systems and the required staff to maintain them, the hub site houses the main server (the CAD primary and secondary server). Operationally, each spoke installation can maintain its independence and autonomy, as well as operate their own call-taking and dispatch operations. Call-taking can also occur at the hub agency while dispatch occurs at the spoke installation. High-speed redundant data lines or wireless links effortlessly connect these sites.

Operationally, all spoke sites can have different response plans than the hub installation. Or, if there is agreement, all installations can use the same response plans. This facilitates seamless thought processes, as well as operational processes for all participating installations.

In the past, one of the impediments to data sharing was the objection to an installation having the ability to access any and all of another installation data. With Intergraph's configurations, permissions can be set so other agencies can see as much or as little as the host installation

desires. This is especially necessary for sensitive report information remaining under the complete control of the originating installation. This concept expands to use of the map, allowing a user to select the installation icons (vehicle and calls for service) they wish to see and track. Each installation can have a high level of individual control over its operational policies yet still be connected regionally to nearby agencies and reap the benefits of the multi-agency environment.

The hub and spoke approach handles calls for service occurring on jurisdictional borders more effectively, as each site can see each other's responding units. This greatly facilitates mutual and automatic assistance. Officers in patrol vehicles can also see where other mobile units are positioned and can transmit messages to these units. The transmissions are much more secure than voice traffic, which anyone can monitor with a scanner.

Technical Benefits

The hub and spoke approach also provides technical benefits, such as expert personnel resources at the hub installation that assist the system operations of all regional agencies. Generally, smaller spoke installation sites are likely to have fewer information technology (IT) resources to support function-rich systems. Expertise and training is thus spread across more installations with fewer overall staff. For example, a larger installation can have a full-time geographical information system (GIS) staff that supports the needs of all installations as they refine and use the map on a regional basis. Installations can handle all technical issues associated with the running and maintaining of a computer system more efficiently through a central site group as opposed to several disparate individual IT groups.

Good connectivity to the hub installation is critical to the success of the hub and spoke configuration. Reliable, resilient, and redundant networks are mandatory!

Financial Benefits

Financial benefits are the underpinning of the entire concept of the Intergraph Incident Management hub and spoke solution. Spoke installations are able to enjoy a Tier 1 level system they would unlikely be able to afford within a restrained budget environment. Costs for the server and the support personnel can be shared in a number of ways so organizations on every level save money over stand-alone operations. In most instances, spoke sites will save a significant amount of the cost of a new Tier 1 system through participation with the hub installation. Small sites can save the cost of a new system while obtaining enormous functional benefits. Spoke installations can also utilize the same interfaces the hub sites use. For example, the state National Crime Information Center (NCIC) interface and paging can employ the same wireless mobile infrastructure. Additionally, the cost of training can be optimized through combined installation training. The hub and spoke approach is designed to regionalize a service area and create a state of interoperability between the various participating installations.

7 Customer Stories

Below are examples of two Intergraph customers who have successfully implemented the hub and spoke approach of our Incident Management solution in different ways. The first highlights Overland Park, Kansas. The city of Overland Park started with a single agency, the Overland Park Police Department, and has added other cities as spoke installations as they were ready to join with Overland Park.

The second example, Sonoma County, California, assembled a group of agencies needing a new interoperable system and formed a consortium. In each example, there is a hub site and connections to the other cities through the hub agency.

Overland Park, Kansas

The city of Overland Park, Kansas, is one of the early adopters of the Intergraph hub and spoke configuration. Located in Johnson County, a suburb of Kansas City, Kansas, and Kansas City, Missouri, Overland Park has a daytime population estimated at 455,000. Each city in Johnson County has its own police department and the larger cities have their own dispatch centers. To improve communications between the various law enforcement agencies in the area, Overland Park partnered with Intergraph to integrate their public safety systems.

Intergraph first conducted an initial needs-assessment and analysis of funding avenues. The Overland Park Police Department was chosen to serve as the hub agency of the configuration and implemented Intergraph's suite of public safety products – including CAD, Records Management System (RMS), mobile with automated vehicle location (AVL), and field reporting. Today, participating agencies in this project include the city of Olathe, Johnson County Sheriff's Office, and the city of Leawood. As a result of Intergraph's configuration, Overland Park and the surrounding areas saved funding dollars through integrated, shared systems and can now communicate critical information faster and more efficiently.

Sonoma County, California

Another successful hub and spoke solution site is in Sonoma County, California. Sonoma County encompasses more than 1,600 square miles and is home to almost 500,000 residents. The majority of these residents – 68 percent – live within the city limits of the nine cities in Sonoma County. Before adopting the solution, Sonoma County and eight participating cities employed a variety of decade-old, disparate CAD and RMS systems, as well as manual dispatch cards systems. Needing a better way to share information, coordinate crime suppression activities between jurisdictions, and address the interoperability data issues countywide, Sonoma County selected Intergraph from more than 75 vendors. The Sonoma County Information Systems Department is the hub of the configuration, with the Sonoma County Sheriff, Santa Rosa Police Department, and seven smaller cities successfully sharing CAD, RMS, and mobile applications.

8 Conclusion

Using the hub and spoke approach, the Intergraph Incident Management solution enables customers to be more efficient and cost effective meeting their emergency management mission. With these tools, government agencies, departments, and directorates create an environment of seamless and complete communication allowing for fast and accurate decisions.

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ABOUT INTERGRAPH GOVERNMENT SOLUTIONS

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data and infuse the world with intelligence to make processes and infrastructures better, safer, and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

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