

Bringing Business Intelligence to Public Safety

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1. Introduction

This white paper discusses the benefits of adapting the latest generation of business intelligence tools for use by public safety agencies and other organizations. It provides background information on business intelligence tools and processes, and discusses value-added enhancements that dramatically improve the use of these tools in conjunction with Intergraph®'s public safety solutions.

In day-to-day operations, our public safety customers are creating enormous amounts of data. For example, a computer-aided dispatch (CAD) system records vital emergency call information, such as time, location, and unit response. And, in related industries, utilities and communications solutions contain information about facilities, work crews, asset location, and customers.

While support systems such as CAD are critical and effective, they provide only one part of a comprehensive overview of your enterprise. To get a full view of the data that is available, users need to explore and expose relationships and trends, and analyze these trends using this real-time data. This method has proven very effective for increasing the success of almost all organizations that have deployed business intelligence toolsets.

Intergraph has already enabled our customers to easily and more cost-effectively deploy tools for superior reporting, but more importantly, business intelligence tools enhance crime prevention capabilities and organizational response. Real-world examples have shown that providing public safety personnel the ability to rapidly compare current situations with historical trends in an unbounded “what if” analysis environment produces amazing results. Of course, improvements in distribution methods and a broader interest in report consumption will increase the number of report “consumers,” while maintaining the proper access to sensitive and secure information.

This white paper will provide you with an overall understanding of the benefits and challenges involved in bringing business intelligence to public safety agencies.

2. Bringing Business Intelligence to Public Safety

When police departments need to compile information or reports, this often requires them to quickly access critical 9-1-1 dispatch call information. However, creating reports from the CAD system can take multiple steps each time to generate a report. Using business intelligence tools, the department can access and analyze critical data on 9-1-1 calls, run reports in just minutes with a single click, and monitor police department performance faster than ever before with easy-to-visualize dashboards and reports, as shown in Figure 1.



Figure 1: Dashboards help visualize the situation.

In today's economy, agencies must work smarter and manage resources more effectively. Using business intelligence tools, management can monitor performance and resource allocation quickly, easily, and in real time. Since the system is so easy to use, non-technical staff can analyze information more quickly on their own, making the entire organization much more productive.

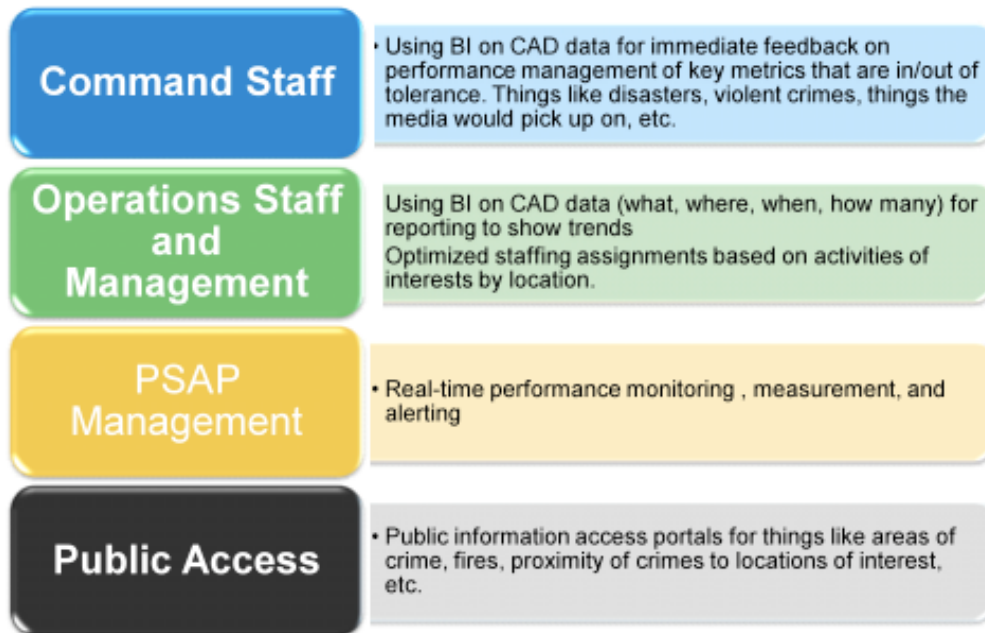


Figure 2: This image shows solution positioning by role.

Various personnel within the agency face different challenges. Command staff is faced with resource allocation and deployment challenges.

Operations and management personnel need help managing day-to-day field resources and can benefit from insight into recent activities, such as gang activities, violent crime, and drug trafficking. Public Safety Answering Points (PSAP) administrators need to track total response times of calls for service in order to ensure the PSAP and employees are meeting their key performance indicators. Availability of public access is beneficial to show where the problem areas are, what is going on in an area of interest, and the location of crimes, fires, or other incidents.

With Intergraph's Business Intelligence for Public Safety, users can see data in a quick and efficient manner that allows them to make timely decisions. Because command staff has access to accurate and comprehensive data, they are alerted immediately to a problem and can respond more effectively. They can then make decisions based on accurate historical and current information that gives them full situational awareness.

Agencies are challenged to manage limited resources and manpower, but can take advantage of their built-in data. Intergraph has worked with professionals in the field to create an "out of the box" list of reports so that you can begin analyzing your data today.

Business Intelligence for Public Safety provides the tools that allow command staff to utilize information in their day-to-day activities, and get data to the people who need it. Since Intergraph's secure Web interface allows you to set up who sees the data and what data can be used, you can share data while maintaining your high level of security and sensitivity.

These are some of the ways your entire organization can leverage business intelligence tools. (See Figure 2.) Wouldn't your agency benefit substantially from having a business intelligence solution?

2.1. Real-World Analysis of Complex Data

Most public safety agencies have mounds of data that is seldom used except for statistical comparisons and reporting. What if you could utilize both the existing and virtually untapped data to support both resource management and deployment? What if you could uncover actionable patterns or profiles of behavior? With Intergraph's Business Intelligence for Public Safety solution, you can achieve this and more, resulting in improved response times, balanced and optimized staffing, and a proactive plan for attacking nuisances before they become crimes.

2.2. Creating Actionable Information from Data

Getting data across systems is only part of the answer. It's what you do with the data that matters. For example, command staff might use business intelligence to quickly deploy resources more effectively and efficiently throughout a jurisdiction by week, area, or weather conditions in order to reduce crime or make more arrests. A fire department might use business intelligence to access and understand historical data, resulting in more effective decision-making and enhanced departmental performance.

Various scenarios lend themselves to business intelligence analysis. For example, how should resource deployment be adjusted to react to an influx of displaced people caused by a disaster in a neighboring city or county? Do you have appropriate resources in place to deal with additional incidents such as more domestic disputes, or the need for more emergency medical services responses?

Whatever the case may be, ad hoc analysis, along with easy-to-understand reports and charts to support it, can drive actionable intelligence and response for all aspects of incident management within and among public safety agencies. Our enterprise-class tools improve overall decision-making, enable resource allocation planning and justification, facilitate trend-spotting and analysis, and make possible a host of reporting and analysis functions tailored for the individual needs of end-users. Customers can even embed custom reports directly inside industry-standard documents, such as Microsoft® Word, Excel®, or PowerPoint®.

3. How is a Business Intelligence System Useful for Public Safety Personnel?

Historically, software applications are created to solve a specific need. Developers must make choices based on priority and criticality of the task at hand, which often defines the trade-offs inherent in any complex solution. For instance, response times and reliability of information obtained from a computer-aided dispatch system are far more important than ease or speed of generating dynamic reports from that same database. Therefore, the design of a CAD system includes some tables where reliability or use dictated duplicate data, but also includes tables that do not contain “all available data” because access response time is critical. In this example, Intergraph’s I/CAD database contains extremely useful information for the task at hand, but isn’t efficiently structured for a different use or for analysis. The Business Intelligence for Public Safety solution unlocks the power of the information already contained in the I/CAD operational database and places it in the hands of those who need it for immediate operational decisions, staffing and budget analysis, and strategy development.

3.1. Tying Information Sources Together

These types of useful, but isolated, sources of information exist in almost all software applications that include databases as part of the solution. Since the creation of computers, end-users have been faced with an ever-growing amount of isolated information. Combining and accessing that information can facilitate far superior decision-making. This need has created the demand for business intelligence systems.

Large commercial enterprises such as Toyota, Cisco, PepsiCo, Air France, American Red Cross, FedEx, and some government agencies such as police departments, fire departments, departments of transportation, federal agencies, and many others gained immediate and dramatic successes from the adoption of business intelligence systems from vendors such as Business Objects. These business intelligence systems provide historical, current, and potential future views of business operations, most often using data that has been gathered into a data warehouse to support reporting, interactive “slice-and-dice” analysis, graphical visualization, and statistical data mining or drilldowns. Deploying business intelligence systems enables end-users to improve operational efficiency, eliminate mistakes caused by poorly informed decision makers, and provide management with broader, more accurate forecasting of trends and potential outcomes. See Figure 3 for an illustration of how business intelligence integrates organizational data.

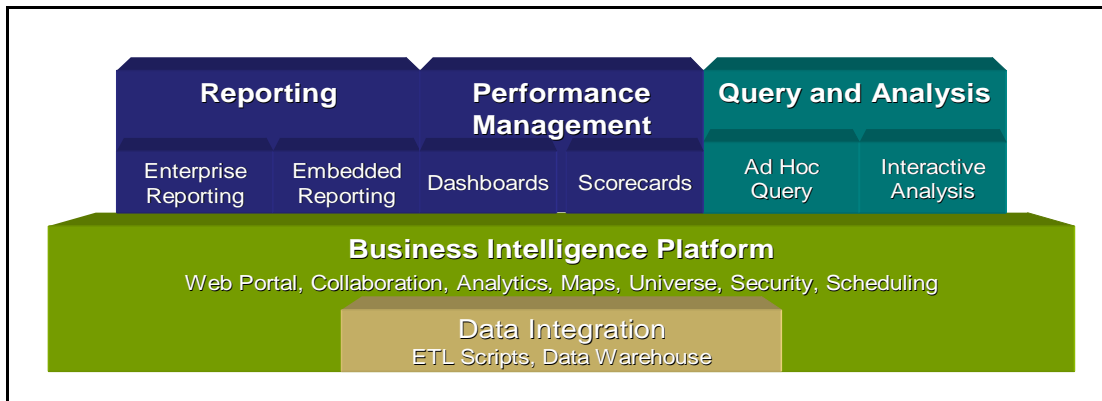


Figure 3: Data integration provides the foundation for Intergraph’s Business Intelligence for Public Safety solution.

3.2. Adapting Business Intelligence to Public Safety

Public safety agencies' need for improved visibility into their data is really no different from the needs of the massive enterprises that drove the creation and improvement of business intelligence systems. We receive periodic feedback from customers who are always seeking ways to improve the visibility and reporting capabilities of our various application-populated databases. To respond to that need, we developed the Intergraph application suite, Business Intelligence for Public Safety, which combines application-specific information with the best business intelligence building blocks and infrastructure, obtained from Business Objects. This combination enhances both types of tools with unique value-added benefits and provides a pre-packaged commercial off-the-shelf (COTS) business intelligence solution for public safety agencies.

3.2.1 Adding Value to Business Intelligence with a Packaged Solution

Creating the Intergraph application suite, Business Intelligence for Public Safety, took significant labor-years of development and in-depth infrastructure knowledge. Essentially, every information source had its own data definitions and Intergraph's was no exception. For instance, database table attribute names were never intended or expected to be manipulated or seen by a customer, so they are not very intuitive. In order to use this data, agencies require job-specific terminology. (See Figure 4.)

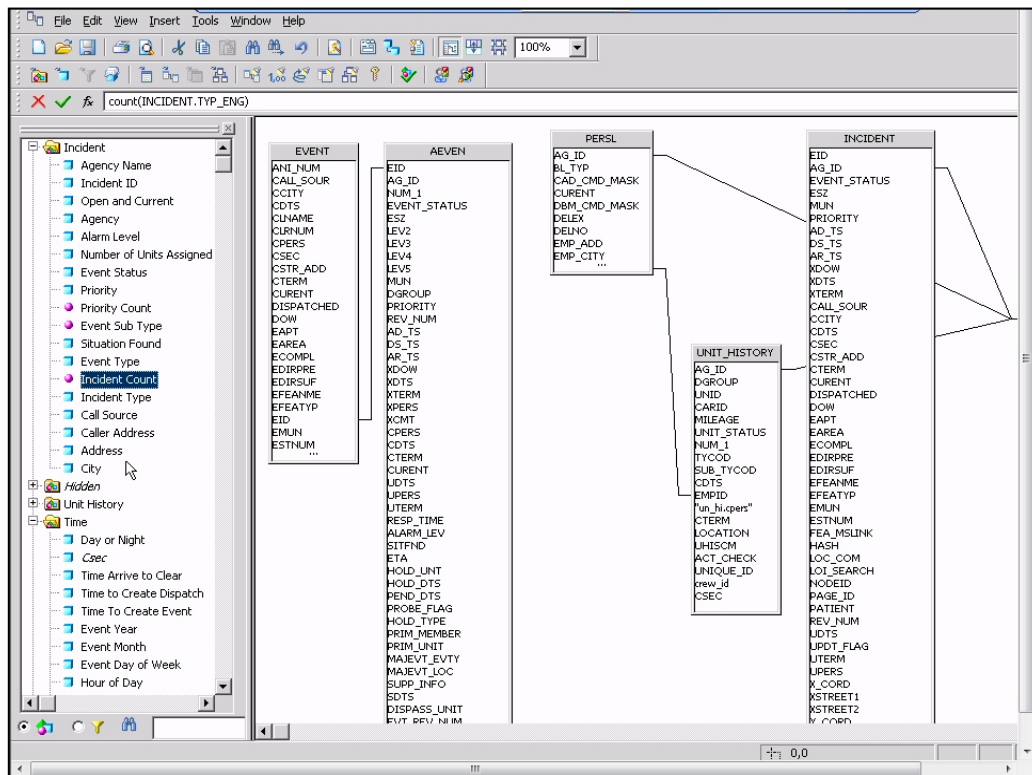


Figure 4: Everyday terminology relates to database definitions.

Our first value-added process was to pull together the most knowledgeable Intergraph software architects of all the relevant internal database designs, along with experienced Business Objects consultants, and ask them to work together for more than a year. Together they created the underlying custom programs, database definitions, and extraction scripts and timings required to create a data warehouse specific to our applications, while reliably extracting and posting ongoing transactions at specified intervals without impacting the performance of the I/CAD application.

3.2.2 Adding Value with a Pre-configured Data Warehouse

Our second value-added effort involved a process called ETL. ETL is used to Extract, Transform, and Load data from the I/CAD database to create the required Intergraph data warehouse. To provide near-real-time information without impacting ongoing use and response time of CAD users, both Intergraph scientists and Business Objects consultants had to work together to determine how and when the ongoing ETL process should be performed. This ETL process is actually performed twice, with the first phase creating a “landing zone” for the raw data, and the second phase completing the creation of the data warehouse. (See Section 3.5 for additional information.) The created data warehouse also uses a database and has its own defined structure and relationships, called a schema. Intergraph’s data warehouse schema is optimized for ease of query and overall query performance. It is both a repository used by the Business Intelligence analysis tools, as well as a common location for improved data sharing for other enterprise applications, such as I/Incident Analyst, which has been enhanced to use this data warehouse for input and information analysis. (See Figure 5.)

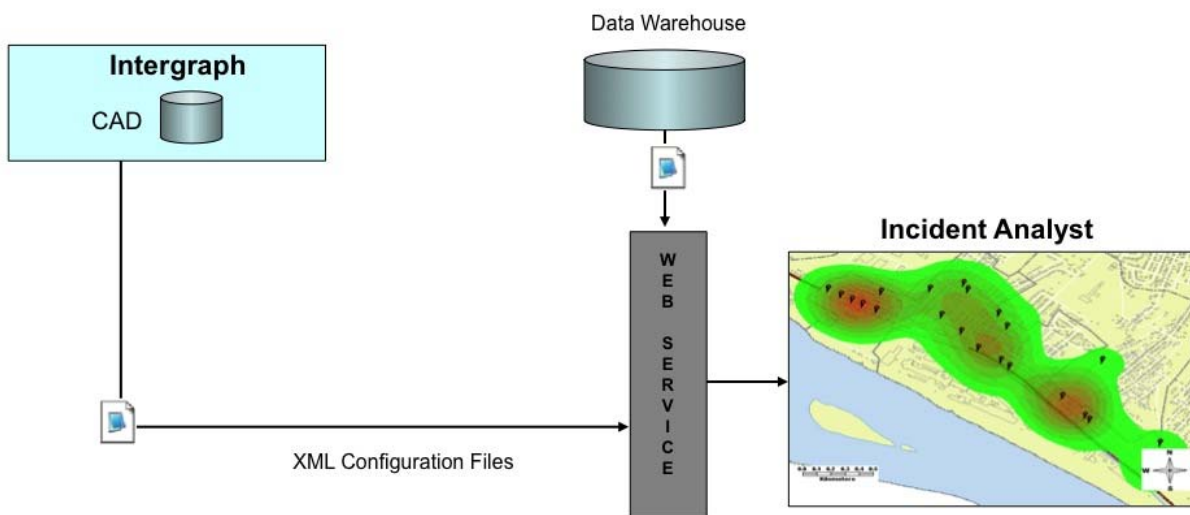


Figure 5: I/Incident Analyst integrates with the data warehouse.

3.2.3 Adding Value with Reporting Universe Using Operational Terms

Through the use of an Intergraph-provided semantic layer called a reporting universe, which transforms table and field names with difficult-to-understand descriptors, end-users will be able to access information in the data warehouse using common industry terms, without having to understand the underlying database structures. Business intelligence consultants define a semantic layer as a software layer that insulates end-users from the complexities of a database structure and presents them with easy-to-

understand operational terms from which they can intuitively build their own dynamic, custom queries – without having to understand any complex database languages or determine which oddly abbreviated attribute name contains the information they seek. This value-added semantic layer maps data from the warehouse into a Reporting Universe using layman or job-specific terminology such as “incident,” “incident type,” “response time,” “witness,” and “offender.” (See Figure 6.)

Furthermore, values stored in similar-looking fields might be saved in unique formats specific to the use of that data, such as a date or elapsed time field. For example, the “Elapsed Time in Seconds” field may exist in several different applications. But, how it was stored and formatted can be an issue when integrating these information silos into a useful data warehouse that traditional business intelligence solutions can easily and rapidly access and manipulate.

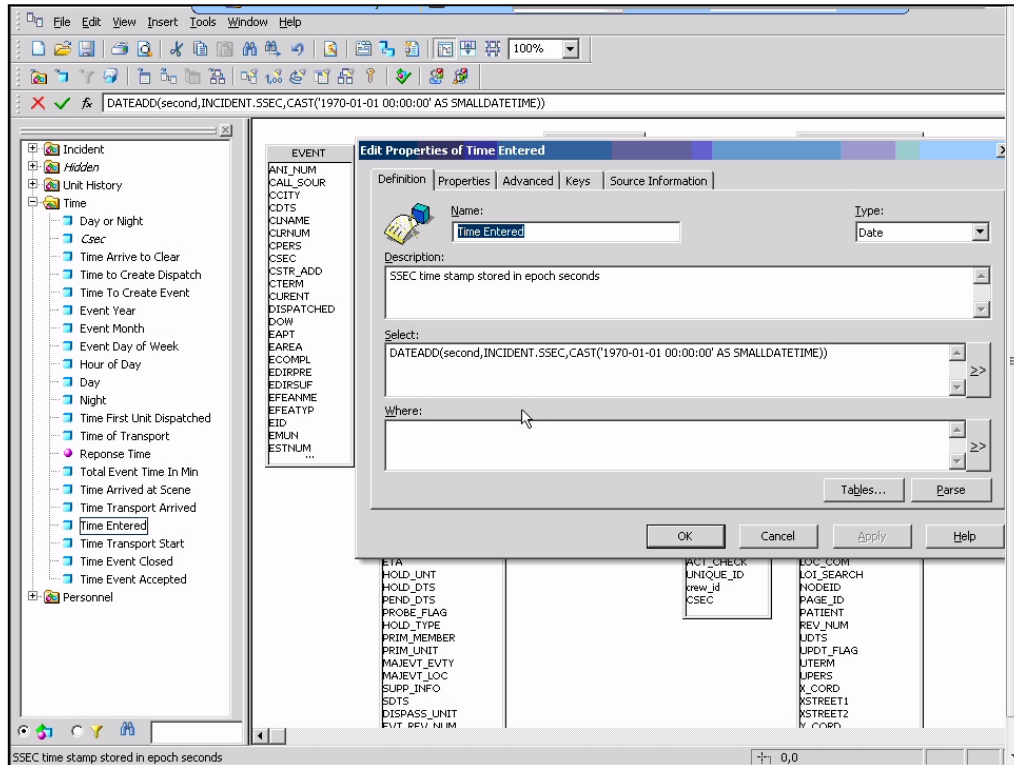


Figure 6: Defining the "Time Entered" operational term adds data flexibility.

3.3. Too Much Information To Be an Asset

It probably comes as no surprise to public safety personnel that “information is an asset.” However, information is made up of useful data culled from an ever-growing data collection process. Data are likely the only public safety asset that isn’t limited; in fact, it can grow and reproduce almost without limit, often mutating in the process if a copy is being migrated or input into another system for processing or other use.

How can you effectively collect and responsibly analyze all this data to create actionable information? Your best start is to analyze current values and historical trends, using the same tools and methods that financial and business experts have used throughout the past decade to run multi-billion dollar enterprises – business intelligence programs combined with a unique data warehouse. Traditionally, while you have always used query and reporting tools to generate informational reports that summarize the current status, you likely haven’t been able to maintain and keep all the operational data generated by these systems, except archived on backup tapes. Being able to dynamically and rapidly combine

immense amounts of operational data with historical trends gives you the ability and visual information to make decisions, forecast likely occurrences, and take immediate preventive action.

3.4. Fast Response; Limited Exploration

Why not just use or create more reports from the existing systems you own? Operational and transaction databases generally don't maintain or track all transactions going backward in time. They periodically summarize data and only maintain historical values for a limited time, such as a monthly or annual report that doesn't keep the daily information used to create it. Even when some historical values are stored, the level of detail and amount stored in a canned report is usually quite limited, and may not allow you to drill down further. This limits your ability to create "what if" scenarios for exploring a potential trend or series of occurrences that do not initially appear related. Though operational systems can provide the most current information, these values may not be appropriate for tracking and analyzing trends over time.

Consider, for example, analyzing your own household expenses and savings. Your checkbook can provide only the balance at a specific moment in time, just prior to writing a check, for instance. But you would need to analyze these balances each month over some time period to determine your true savings rate or trend. You can compare this to accessing a data warehouse that has combined information from various silos to visualize trends or patterns you can act upon. When an analyst uses a data warehouse that has defined the common intersections and appropriate relationships among data from disparate systems, he or she is comparing "apples to apples." When an analyst directly accesses two or more application databases for analysis purposes, he or she is often comparing "apples to oranges."

3.5. Reporting Live from the Data Warehouse

Another critical reason that prevents better reporting and analysis of operational systems is the performance impact to existing systems that you rely on for more important functions. Running queries or reports against the database used by an online application can negatively impact the performance and user response time of an application, such as I/CAD. Performance and response time in a CAD environment would always take precedence over a requested analysis or scheduled report generation. Therefore, business intelligence systems offload the query to an environment where the database can be optimized for analysis, reporting, and interactive, dynamic "what if" investigations, without impacting the performance of the live CAD application. There will typically be two or three additional databases deployed with Intergraph's Business Intelligence for Public Safety:

- The Landing Zone is a staging area that pulls and replicates raw database data from the operational systems. New transactions and updates are pulled at appropriate times and refreshed on the Landing Zone. This database has administration-level access only and requires either the Oracle or Microsoft SQL Standard database.
- The Data Warehouse is a middle stage where data is massaged and transformed into a schema and structure more appropriate for reporting and other relational-type queries. Main access is by administration-level users, with rare access by power users with unique skills and needs. This warehouse is also used by I/Incident Analyst. The data warehouse requires either the Oracle or Microsoft SQL Enterprise database. However, many situations exist where the Landing Zone and Data Warehouse can be combined onto one physical server, but it must be running the Enterprise edition of the database engine.
- The Universe is the final stage, and is actually accessed by the largest majority of users, whether performing ad hoc queries, running periodic reports, or merely monitoring high-level information from a visual dashboard display on their desktop computers. At this stage, the Universe provides operational terminology much more familiar to end-users, defines roles and privileges of user accounts, and controls the appropriate security access to the data. (See Figure 7.)

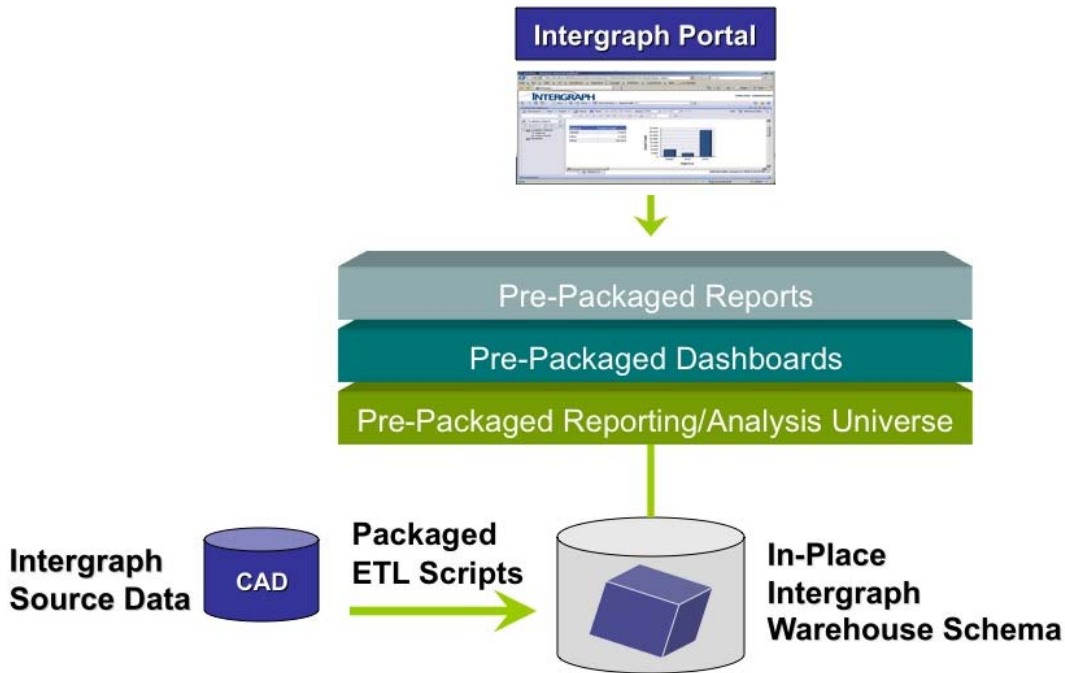


Figure 7: This image illustrates the information sources, data warehouse, universe, and Web portal.

3.5.1 Software and Hardware Deployment

When deploying a business intelligence solution, customers need to purchase additional hardware along with our new suite of Business Intelligence tools for Public Safety applications. However, we believe the majority of servers required by our customer base will be low-cost units, and potentially only a few units will need to be deployed in the first few years of adoption.

One database may be used for a Landing Zone, where the data will initially be placed just after extracting it from the operational systems. The data in the Landing Zone is created from a straightforward replication to reduce performance impacts on the operational systems, and has not been cleansed or optimized in any way. It is essentially just the Extract and Load portion of the ETL process. Additionally, ongoing incremental updates “at the table level” will continually be migrated to the Landing Zone. How and when to obtain and load these incremental updates without impacting response time is another Intergraph value-add effort customers can obtain only by purchasing the Intergraph Web Report Viewer for Public Safety.

The Landing Zone will be used during a second, and more complex, ETL process to organize and optimize the data for reporting and analysis, as well as re-locating it to a data warehouse. This process significantly uses the CPU- and memory-intensive “Transform” function within ETL.

Now that the data warehouse exists, a final variation of the data must be created that involves adding and merging the existing data into the semantic layer. This merger adds the high-level operational terminology much more familiar and useful to our public safety customers and their personnel. Additionally, all reports

– whether ad hoc or pre-defined – along with any dynamic interactive queries, will be generated against this final variation of data, called the Reporting Universe.

3.5.2 Adding Value to the Universe

A pre-configured Intergraph Web portal is included in the solution, allowing immediate access to information by a wide variety of users. These users can self-serve the information they need and drill down into information without assistance from the IT staff. Information access will be safely controlled, honoring users’ data-access restrictions.

Intergraph Web Report Viewer for Public Safety includes more than a dozen pre-defined CAD Reports, and a high-level dashboard. The reports provided consist of traditional presentation-quality reports, as well as reports that deliver advanced, interactive intelligence, allowing users to drill down into the report data for more detailed analysis. See Figure 8 for a list of pre-configured CAD reports.

CAD Reports in Business Intelligence Solution	
Report Category	Report Name
Employee Activity	Logged on Duty Position
	Officer Activity
	Employee Workload
Calls for Service	Call Statistics
	Demand Analysis
Incident/Events	Case Number
	Event Demand
	Event Register
	Event Detail
	Event Handling Time
	Event Response Time
	Events by Location
Hospital Diversion	Diversion History
Unverified Locations	Unverified Location
Call Center Dashboard	CAD Call Center Dashboard
Unit Activity	Unit Activity

Figure 8: This table shows the pre-configured CAD reports available in Intergraph’s Business Intelligence for Public Safety solution.

Note that many of these reports are designed and customized by Intergraph for both static “read-only” use as well as dynamic, interactive use. This dual-use capability is one of the many features that customers can also duplicate in their report creations. In simple terms, these reports are “aware” of the

environment in which they reside. If a customer has purchased only Intergraph Web Report Viewer for Public Safety, they can use these custom reports as delivered. However, if a customer has also purchased Web Intelligence, these same reports recognize that additional functionality is available and auto-enable themselves to show and use interactive features, such as pull-down menus for “incident type” or “unit number” variables. Web Intelligence also enables the ad hoc query capability. See Figure 9 for an example of our solutions query and analysis capabilities.

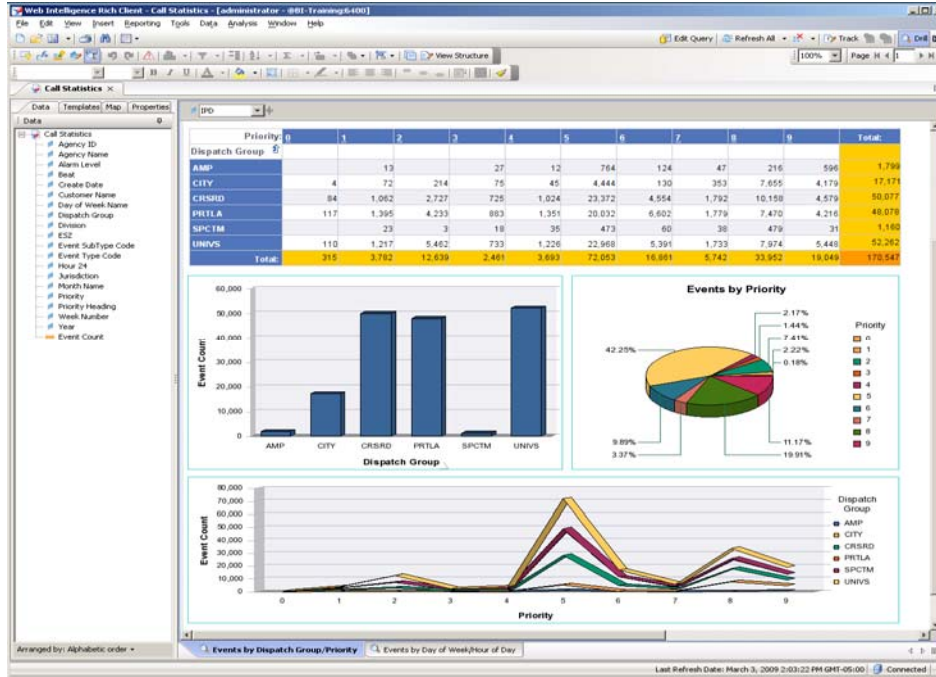


Figure 9: Business Intelligence for Public Safety provides powerful tools for data query and analysis.

3.5.3 Adding Value with Role-based Security

One final point is related to security and data access. Maintaining proper privileges to prevent unauthorized access to secure information is a critical aspect of any public safety database system and is especially important when providing a tool that unleashes the ability to drill down and across previously isolated informational “walls.” We carefully investigated all available business intelligence platforms before selecting one that could enhance security access, while still allowing assigned personnel the ability to interactively perform dynamic “what if” analysis of the appropriate data contained within this Universe. Additional value-add efforts were required to define and maintain row-level access rights between these new business intelligence applications and data created by applications. Report distribution and role-based security controls use the same access rules from these applications.

3.6. What Products Comprise Intergraph's Business Intelligence for Public Safety?

Several products make up the Intergraph Business Intelligence for Public Safety application suite. A block diagram of each product, along with a brief description of what is provided, is shown in Figure 10 to help you visualize how each product relates to the benefits described in this paper.

See Figure 12 for the workstation and server components included in the Business Intelligence solution.

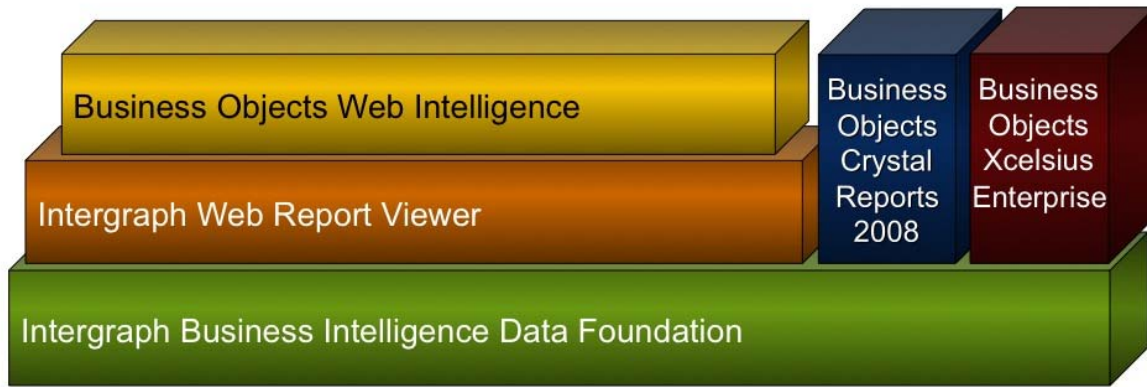


Figure 10: Intergraph's Business Intelligence for Public Safety solution includes the products shown.

The following are the product names, additional details, and required dependencies of the application suite:

- Intergraph Reporting and Analysis Data Foundation for Public Safety is the core platform that contains the tools for creating the unique Intergraph ETL scripts needed for creating the reporting data warehouse.
 - The ETL is used to Extract, Transform, and Load data from the I/CAD database to create the required Intergraph data warehouse.
 - The ETL process is performed in multiple stages, with the first stage copying information from the live system, and the second stage completing the creation of the data warehouse. Subsequently, the data warehouse is mapped into an in-memory representation called a reporting universe.
 - The created data warehouse provides a database that has its own defined structure and relationships, called a schema. Intergraph's data warehouse schema is optimized for ease of query and overall query performance, and acts as both a repository used by the business intelligence analysis tools and a common location for improved data sharing for other enterprise applications. I/Incident Analyst has been enhanced to use the same data warehouse.
- Intergraph Web Report Viewer for Public Safety is the core business intelligence platform that comprises the majority of the tools and unique Intergraph customizations that provide the core benefits derived from applying business intelligence capabilities to public safety information. Intergraph Web Report Viewer for Public Safety offers you:

- Preconfigured reports and dashboards for I/CAD data. Intergraph value-added capabilities, such as public safety-specific pre-generated reports and visual at-a-glance dashboards are intended for high-level monitoring of incidents, response times, and other key performance indicators (KPI).
- Intergraph Landing Zone and Data Warehouse are available, along with the preconfigured database ETL scripts, to initially create and maintain them in near real-time.
- Preconfigured Universe enables Web reporting and ad hoc queries (includes the operational terminology and context-aware semantic layer).
- Intergraph preconfigured Business Objects InfoView Web Portal provides Web-based access to reports and information. The reports are designed to give rapid insight to users via an easy-to-use, drag-and-drop Web browser interface. Using the operational terminology you use on a daily basis, you can access and synchronize data from multiple sources, create custom views or formulas, and use variables within a single report. Role-based security controls and report distribution tools are based on access rules from the I/CAD application and ensure that distribution of information abides by defined compliance rules and privacy.
- Business Objects Live Office enables the delivery of up-to-date information from within Microsoft Word documents, Excel spreadsheets, and PowerPoint presentations. With Live Office, you no longer waste valuable time cutting and pasting formatted content from one environment to another. Plus, the ability to confidently and securely present up-to-the-minute information helps avoid damaging presentation mistakes.
- Business Objects' highest-end platform, called Business Objects Enterprise Premium (BOE Premium), ensures optimal benefits.
- Business Objects Data Integrator runtime product, combined with Intergraph's value-added ETL scripts, simplifies and accelerates data extraction, transformation, and loading to and from packaged applications, such as I/CAD, mainframe systems, real-time message queues, and relational databases. Essentially, Data Integrator extracts data from source systems and transforms it into a format that Business Intelligence tools can use.
- Pre-requisites include Oracle Enterprise or Microsoft SQL Server Enterprise database.

Intergraph delivers Web Intelligence preconfigured in order to enable users to adjust existing reports to provide the answers and visualization of data they are seeking. The new reports most frequently requested from IT departments are typically variations of existing ones. Web Intelligence enables users to access and format information to suit their needs with an easy-to-use, drag-and-drop Web interface. It provides the dynamic, interactive power of Business Intelligence analysis capabilities, such as ad hoc queries and drilldowns performed during "what if" explorations and other non-structured analysis or reporting. These capabilities can release personnel from the previous query restraints inherent within structured point-solution databases. Web Intelligence offers significant benefits:

- Web Intelligence is a user-friendly, interactive, Web-based ad hoc query and reporting environment for performing "what if" scenarios and creating reports. (See Figure 12.)
- Intergraph preconfigured Web Intelligence reports are the core online query and analysis tools designed to analyze scenarios using self-service ad hoc analytics and reporting. With a few mouse-clicks, you can create a query from scratch, format the information retrieved, and easily analyze it to understand underlying trends and root causes – all without needing to understand SQL or other database intricacies. Additional capabilities will be added prior to product release.
- The Intergraph-created reports provided in Intergraph's Web Report Viewer for Public Safety contain special features and capabilities that are only enabled and accessed after installing Web Intelligence. Incorporating these interactive capabilities and features, which can be used "as-is" or easily modified by users of Web Intelligence, significantly enhances the usefulness of the canned reports.

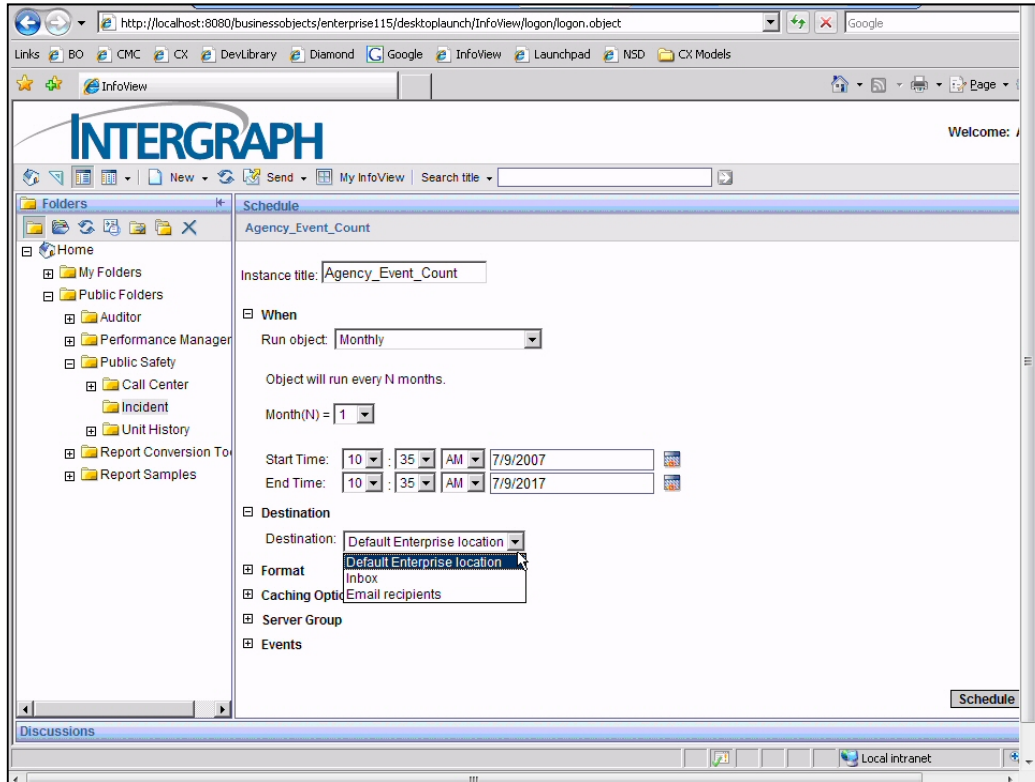


Figure 11: "Canned" reports become interactive with Web Intelligence.

- Crystal Reports 2008 is a powerful desktop reporting solution that helps you design, explore, visualize, and deliver reports on paper, via the Web, or embedded in enterprise applications. While Web Intelligence provides the most powerful ad hoc interactive data mining environment, Crystal Reports 2008 is the right product for creating those periodic pixel-perfect reports with stunning visualizations where interpretation of the data, and therefore the decisions that follow, must be obvious and correct. Crystal Reports 2008 offers these benefits:
 - Crystal Reports 2008 is an intuitive reporting solution that helps users create flexible, feature-rich, and dependable reports. Crystal Reports is the de facto reporting standard with more than 500 independent software vendors, such as Microsoft, SAP, BEA, Oracle/PeopleSoft, and IBM, embedding support in their applications.
 - Intergraph's I/Incident Analyst provides an intuitive, user-friendly tool for analyzing incident activity with a geographical orientation. All incidents have a positional characteristic and I/Incident Analyst can quickly collate them and create maps that help crime analysts spot trends in frequency, geography, time of day, and more. I/Incident Analyst can help identify areas of abnormal frequency or determine whether a change in procedures and resource deployments resulted in a desired change of activity. These tools include pin mapping, hot-spot mapping, incident count, journey to incident (or recovery) distances, and many other visualization methods related to this type of analysis. These tools allow users to make quick decisions, create intelligence products that detect spatial patterns, and effectively deploy resources to improve response. I/Incident Analyst accesses its information from the Intergraph data warehouse (created by Intergraph Web Report Viewer for Public Safety), as well as other data sources you can configure.

Name	Capability	Client Software
Client Workstation	Access, manage, and create business intelligence documents	<ul style="list-style-type: none"> • Internet Explorer • Crystal Reports (optional)

Server Name	Server Capability	Server Software
Web	<ul style="list-style-type: none"> • Manages web portal access • Access to BI documents 	<ul style="list-style-type: none"> • Internet Information Services (IIS)
Application	<ul style="list-style-type: none"> • Business Intelligence core • Aggregate, format, render data 	<ul style="list-style-type: none"> • Business Objects Enterprise • Web Intelligence (optional)
Repository	<ul style="list-style-type: none"> • Central reports library 	<ul style="list-style-type: none"> • Oracle Application One or SQL Server (equivalent)
Warehouse	<ul style="list-style-type: none"> • Optimized data for reporting 	<ul style="list-style-type: none"> • Oracle or SQL Enterprise DB
ETL	<ul style="list-style-type: none"> • Data transform from source to warehouse 	<ul style="list-style-type: none"> • Data Integrator Runtime

Figure 12: This chart shows the workstation and server components included in the Business Intelligence solution.

3.7. What About Integration of Other Information Sources?

Other information sources can be brought into the data warehouse by using the included BOE Premium capabilities. The Business Objects license Intergraph provides allows the inclusion and manipulation of additional data stores, as long as they are used in conjunction with any data created by an Intergraph application.

Intergraph's Implementation and Consulting Services group is available for consulting and implementing the access, inclusion, and integration of other databases and data repositories into the Business Intelligence for Public Safety application.

4. Conclusion

Timely, reliable data is the basis for sound decision-making. Integrating the vast amounts of data created and maintained by public safety agencies can provide superior decision-making, trend analysis, and pre-planned resource allocation, making your operations more efficient and your community safer.

As illustrated in this paper, operational and analytical systems complement each other. With the introduction of Business Intelligence for Public Safety, agencies can now quickly and easily deploy tailored analytical tools for improved decision-making, trend analysis, and forecasting that rely on the collection of time-stamped data values from multiple sources in a data warehouse. For operational purposes, better reports and decisions also stem from consolidating current data values from multiple operational systems. Our Business Intelligence application suite does not impact these different systems adversely, and more users are able to accomplish their own tasks, reducing demand on IT resources.

In summary, public safety agencies stand to benefit from the adoption of proven, enterprise-class Business Intelligence tools in the following ways:

- Full situational awareness enables superior decision-making ability, based on accurate current *and* historical information.
- The deployment of resources based on real-time, accurate information allows mitigation of problems early on, and gives users the information needed to proactively attack nuisances before they become crimes – saving lives and minimizing ongoing damage.
- Performance monitoring with real-time dashboards and widgets improves personnel management and makes performance optimization recommendations, reducing escalations and improving response times.
- Budget planning with actual staff requirements and workloads facilitates accurate presentation of staff and other resource requirements. This supports maintaining, or even increasing, funding levels to meet service obligations.
- The ability to explore emerging situations and compare them to historical trends, allows command staff and operational supervisors to understand and address them proactively to avoid making “the same mistakes.”
- The ability to have quick and easy access to massive amounts of data and select data elements from Intergraph’s pre-configured reporting universe and data warehouse, let you easily self-serve information without the need for assistance from an IT specialist.
- Giving many more information consumers secure access to the information they need, along with the ability to perform ad hoc queries, creates efficiencies and other advantages to “sister” organizations.
- Making important historical data available and accessible reduces the negative media typically created when journalists uncover historical information that should have been considered. This increases public confidence, since many citizens do not understand the reporting challenges agencies face.
- The ability to access reports and perform ad hoc analysis from a secure self-service Web portal provides flexibility and data security.

Intergraph’s Business Intelligence for Public Safety helps agencies and other organizations deliver and use timely, accurate, and trusted information. Through the ability to explore, transform, and deliver information in unique and dynamic ways, Business Intelligence for Public Safety gives your organization the power to see the data you need to do your job securely, safely, and efficiently.

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