

APCO International

The Association of Public-Safety Communications Officials - International



Alarm Monitoring
Company to Public
Safety Answering Point
(PSAP) Computer-Aided
Dispatch (CAD) External
Alarm Interface
Exchange

APCO/CSAA ANS
2.101.1-2008



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Alarm Monitoring Company to PSAP CAD External Alarm Interface Exchange

APCO/CSAA ANS 2.101.1-2008

Standard written by **The APCO/CSAA Alerts Working Team**

Approved January 5, 2009 by
APCO International Standards Development Committee (SDC)

Approved January 15, 2009 by
The American National Standards Institute (ANSI)

Abstract: This standard will provide detailed technical data to software providers who support CAD Systems or alarm monitoring applications concerning the common data elements and structure that shall be utilized when electronically transmitting a new alarm event from an alarm monitoring company to a PSAP. The standards package includes process flow examples that are necessary during the handoff of new events, new event responses, and updates to working events between the alarm monitoring company and the PSAP.

Keywords: 9-1-1, alarm, alarm monitoring, alarm monitoring software, burglar alarm transfer, central station, central station alarm, computer-aided dispatch (CAD), data transfer, data sharing, direct alarms, electronic alarms, emergencies, emergency, emergency data, emergency response, external alarm interface, external alarm data, fire alarm transfer, interoperability, medical alarm transfer, NIEM, public safety answering point (PSAP), public safety communications, technology and Telecommunicator.

APCO International

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Alarm Monitoring Company to PSAP CAD External Alarm Interface Exchange

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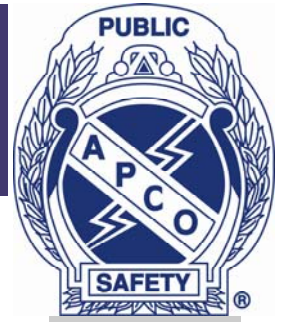
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Alarm Monitoring Company to PSAP CAD External Alarm Interface Exchange



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Alarm Monitoring Company to PSAP CAD External Alarm Interface Exchange

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At the time this standard received ANS designation, the APCO Standards Development Committee (SDC) and Consensus Body had the following membership:

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Alarm Monitoring Company to PSAP CAD External Alarm Interface Exchange



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Information Exchange Package Documentation (IEPD)

<i>Exchange Name</i>	External Alarm Interface Exchange
<i>Version</i>	3.0
<i>Date</i>	09-09-08
<i>Sponsoring Project or Initiative</i>	Public Safety Data Interoperability (PSDI) Project
<i>Funding Source(s)</i>	BJA
<i>Effort Managed By</i>	APCO International, IJIS Institute
<i>Standards Used</i>	NIEM 2.0
<i>Description Statement</i>	The purpose of this External Alarm Interface Exchange 3.0 documentation is to provide a standardized data exchange for the electronically transmitted alarm information between an Alarm Monitoring Company and a Public Safety Answering Point (PSAP).

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*Sections noted with an asterisk are offered for informational purposes only and not part of this American National Standard (ANS).

Overview*

Purpose

The purpose of the APCO/CSAA ANS 2.101.1-2008, also known as Alarm 3.0, documentation is to provide a standard data exchange for electronically transmitting information between an Alarm Monitoring Company and a Public Safety Answering Point (PSAP). There are three primary uses for this IEPD:

- Initial notification of an alarm event
- Bi-directional update of status between an alarm monitoring company and the PSAP
- Bi-directional update of other events between an alarm monitoring company and a PSAP

Versioning

<u>Date</u>	<u>Version</u>	<u>APCO ANS</u>
September 15, 2006	2.0 (GJXDM 3.0.3)	N/A
September 9, 2008	3.0 (NIEM 2.0)	N/A
January 15, 2009	Update of this overview document per APCO ANS process – grammatical issues only – no version number change	APCO/CSAA ANS 2.101.1-2008

Change Log (upgrade from 2.0 to 3.0)

1. Mappings were changed from the Global Justice Model (GJXDM) to the National Information Exchange Model (NIEM) 2.0.
2. Two elements were added based on lessons learned from implementing Alerts 2.0.
 - a. Building Sensor Details Text: free text field used to indicate information specific to a building sensor if available.
 - b. Source IP Address: used to verify and validate the source alarm monitoring company.
3. The name of the Information Exchange Package Document (IEPD) was updated for clarity (from External Alert to External Alarm).

Sponsor/Project

This effort to upgrade the External Alarm Exchange IEPD was sponsored by the Public Safety Data Interoperability (PSDI) Program, funded by the Bureau of Justice Assistance (BJA) and co-managed by APCO International and the IJIS Institute.

The overall PSDI Program is anticipated to encompass multiple projects, and is focused on advancing standards-based information sharing to support the emergency communications

domains – police, fire, and EMS – and other relevant homeland security domains. The goal of this project is to improve the real time information sharing capabilities in the emergency response environment. This includes development of high value information exchanges (IEPDs) related to Local Communication Centers/PSAPs.

The Project Committee is composed of 16 representatives from APCO International, Law Enforcement, Fire Services, EMS, Industry, Emergency Management, Transportation, and BJA. At the time of this writing, the committee members are:

Status	Name	Agency/Company	Role/Representing
Member	Bill Hobgood	City of Richmond VA	Communications
Member	Barbara Thornburg	NENA Committee Resource Manager (NENA)	Communications
Member	Art Meacham	Caddo Parish Communications District LA	Communications
Member	Jim Slater	MA Executive Office of Public Safety	Law Enforcement
Member	Dave Mulholland	United States Park Police	Law Enforcement
Member	Charles Werner	International Association of Fire Chiefs (IAFC)	Fire Services
Member	Jim Smalley	National Fire Protection Association (NFPA)	Fire Services
Member	Kevin McGinnis	National Association of State EMS Officials (NASEMSO)	Emergency Medical Services
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Member	Ernie Blair	Int'l Assoc of Emergency Managers (IAEM)	Emergency Management
Member	Jonathan Spanos, PhD	National Emergency Management Assoc. (NEMA)	Emergency Management
Member	Wayne Gisler	Harris County/Houston TranStar, Houston TX	Transportation
Member	Bill Kellett (Chair)	Microsoft	Industry
Member	David Finchum	BIO-key International	Industry
Member	Linda Hill	The Archer Group	Industry
Member	Alan Harker	Spillman Technologies	Industry
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IJIS PM	Scott Parker	IJIS Institute	Project Support

Sponsor

This project is funded by the Bureau of Justice Assistance's Edward Byrne Memorial Discretionary Grants Program. BJA is a component of the Office of Justice Programs of the U.S. Department of Justice. The mission of the BJA is to provide leadership and services in grant administration and criminal justice policy development to support local, state, and tribal justice strategies to achieve safer communities. One of the BJA's goals is to improve the functioning of the criminal justice system. To achieve these goals, BJA programs emphasize enhanced coordination and cooperation of federal, state, and local efforts.

(<http://www.ojp.usdoj.gov/BJA>)

Project Management

The IJIS Institute is a non-profit corporation funded mostly through grants from DOJ's Office of Justice Programs, Bureau of Justice Assistance (BJA). The Institute assists "national scope" efforts related to information sharing in justice and public safety. The Institute comprises a membership of approximately 200 companies active in supplying information technology products and services to justice and public safety agencies. The IJIS Institute achieves its mission of advancing information sharing through the development and endorsement of standards, and by providing assistance to local, tribal, and state agencies. (www.ijis.org)

The Association of Public-Safety Officials (APCO) International has a strong cadre of senior management executives, technical staff, and an enthusiastic committee structure that is perfectly positioned to support the IJIS Institute and affiliated organizations to undertake and successfully complete the objectives of this project. APCO has a long history of providing leadership in a myriad of public safety projects and initiatives. Through the 70-plus year history of APCO it has been at the forefront of projects dedicated to the safeguarding of our citizens and improving public safety communications. APCO's qualified staff champions projects with goals to standardize processes, procedures, and services. (www.apcointl.org)

Subcontractor

The IJIS Institute issued a Request for Proposal (RFP) to its membership for the technical work for this effort. It was awarded to Waterhole Software Inc. Waterhole created all the technical artifacts contained in the IEPD and contributed significantly to this overview document. (www.waterholesoftware.com)

Work Group

Special recognition should be given to the following persons who put forth much time and energy on this effort:

- Bill Hobgood, City of Richmond VA
- Aaron Gorrell, Waterhole Software
- Pam Petrow, Central Station Alarm Association (CSAA)
- Stephen Wisely, APCO International
- Scott Parker, IJIS Institute

Background/History

APCO International established the CAD-to-CAD Interconnectivity Project, Project 36, in August 2000 to explore the interconnectivity between different Computer Aided Dispatch (CAD) systems. In August 2004, APCO International encouraged the expansion and spin-off of Project 36 with the inclusion of voice and data exchange between PSAPs and third-party call center operators such as Central Station Alarm Association (CSAA) member companies. The APCO

International Board of Officers assigned the expanded version of this data exchange development program between PSAPs and CSAA member companies to a new Third Party Call Center Group, which included the CSAA.

APCO International and the CSAA formerly announced on January 4, 2005 a partnership to join forces to develop an exchange that will be consistently used by CAD providers and Central Station Alarm Companies for PSAPs to increase efficiency and decrease errors.

The first beta site selected for the initial test project to conduct tests between PSAPs and a Central Alarm Monitoring Station member company over the Internet was York County, Virginia, Department of Fire & Life Safety, Emergency Communications Division. Vector Security was selected as the CSAA member company to participate in the electronic alarm exchange. On October 22, 2004, the first data template was successfully completed following this collaboration. The XML standard was used for this initiative.

An Alerts Working Team was formed and met in Daytona Beach, Florida in February 2006 to begin the External Alert 2.0 IEPD development. This working team was formed by the IJIS Public Safety Technical Standards Committee (IPSTSC) to create external alerts and requests-for-service IEPDs using the GJXDM standard.

Following a two year development effort which included extensive testing, the Alarm Interface Exchange 2.0 between York County & Vector Security went live on July 15, 2006. The initial exchange included only Burglar and Hold-Up alarms. The exchange was conducted via the Internet with all necessary security in place at Vector Security and York County. A web service was implemented by GE Security. In order to protect the CAD System from vulnerability and exposure to the Internet, a middleware application was created to allow a server sitting on York County's demilitarized, also known as demarcation, zone (DMZ) to be responsible for all traffic between the CAD System and the alarm company. The average turn-around time from the time that the alarm company operator transmitted the alarm to the PSAP until the final Accept or Reject was 45 seconds. It is the policy that each alarm monitoring company operator would initiate a call to the PSAP if no response was received within 45 seconds.

The City of Richmond's Police Division of Emergency Communications authorized a development partnership with York County since both localities were using the same CAD System. This partnership included APCO and the CSAA. APCO and the CSAA were anxious to collect as much data as possible surrounding the outcome of the alarm exchange interface and requested that the City of Richmond participate in the pilot. The alarm interface exchange went live between the City of Richmond and Vector Security on August 4, 2006 using the business process flow described above. The initial phase of the pilot was so successful that Fire and Medical alarms became part of the pilot on October 24, 2006.

On September 11, 2007, the City of Richmond implemented a new Intergraph CAD System to replace the CAD system that had been written in-house and utilized for 27 years. Intergraph

was tasked to continue with the alarm interface exchange seamlessly. This endeavor was successful.

In the spring of 2007, discussions began with Nlets (the International Justice and Public Safety Network), APCO, the Virginia State Police, and Vector Security to study the feasibility of routing all alarm interface exchange transactions via a Virtual Private Network (VPN) arrangement between Vector Security and Nlets. Nlets has all of the necessary security in place and a private circuit to each state including the State of Virginia. All parties agreed to perform a proof of concept and the necessary security and network address translation (NAT) rules were put into place. On November 27, 2007, all alarm interface exchange traffic between Vector Security and the two Virginia PSAPs began being routed through Nlets and the State of Virginia switch.

On February 18, 2008, the External Alert 2.0 schema was implemented at the City of Richmond bringing the pilot to another milestone in achieving conformance with the Global Justice (GJXDM) model. GE Security implemented an enhancement to streamline the delivery of alarm data to the PSAP.

Because of the secure transmission path via Nlets and the State of Virginia switch, vulnerability and exposure to the Internet is no longer an issue. The middleware continues to facilitate traffic between the PSAPs and the alarm company, but no longer needs to reside on the DMZ. The new average turn-around time from the time that the alarm company operator transmitted the alarm to the PSAP until the final Accept or Reject is 15 seconds or less.

After being in operation for two years, over 4,500 alarm exchanges have been transmitted between Vector Security and the two Virginia PSAPs. The benefit resulting from these 4,500 exchanges include:

1. 4,500 fewer telephone calls to the two PSAPs, eliminating the need for the alarm monitoring company operator to converse with the PSAP calltaker.
2. Elimination of miscommunication between the alarm company operator and the PSAP calltaker.
3. A decrease in response times to alarm-related calls-for-service with an increase in law enforcement apprehensions made, fires more quickly extinguished, and lives saved.

The 2005 Alerts Working Team included the following participants:

Name	Agency/Company
Holly Barkwell-Holland	Fire Monitoring Technologies
Jerry Cowser	Vector Security
Pam Petrow	Vector Security
Bruce Weissmann	GE Security
Adam Eurich	Dice Corporation
Bill Cade	APCO/Comm Center & 9-1-1 Services
Martin Moody	APCO/Comm Center & 9-1-1 Services

Alan Harker	Spillman Technologies
Randy Syth	Sungard THE
Aaron Gorrell	URL Integration
Vivek Misra	URL Integration
Suzette McLeod	IJIS Institute
Neil Kurlander	Asynchronous Solutions
Heather Ruzbasan	IACP/LEITSC
Matt Snyder	IACP
Tom Steele	Delaware DHS
Alan Komenski	Bellevue, Washington
Stephen Wisely	Onondaga Co 911
Jim Cox	Port Orange Public Safety
David Wagner	

Development and Implementation Pilot Phase Participants:

Name	Agency/Company	Role
D. Terry Hall	York County Emergency Communications	York County Champion
Chief Stephen P. Kopczynski	York County/Fire & Life Safety	York County Sponsor
Chief Andre Parker	Richmond Police Department	City of Richmond Executive Sponsor (2004)
Chief Rodney Monroe	Richmond Police Department	City of Richmond Executive Sponsor (2005 – 2008)
Gene J. Doody	City of Richmond	Chief Information Officer
Capt. Linda D. Samuel	Richmond Police Department	City of Richmond Champion (2004 – 2007)
Capt. William C. Smith	Richmond Police Department	City of Richmond Champion (2007 - 2008)
Bruce Weissmann	GE Security	Former GE Security Project Manager (2004 – 2006)
Rick Denos	GE Security	Engineering Manager (2007 – 2008)
Bill Hobgood	City of Richmond, DIT	Project Manager for the PSAPs/Author of the Legacy CAD Systems
Jim Garner	City of Richmond, DIT	Senior Systems Engineer/Author of the Middleware
Mark Buckland	City of Richmond, DIT	Systems Developer
John Holtz	City of Richmond, DIT	Systems Developer
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Frank Minice	Nlets	Operations Director
Bonnie Locke	Nlets	Director of Program Management
Nathan Hieger	GE Security	Systems Developer

Capt. Thomas Turner	Virginia State Police	CJIS Division Commander
Lt. Patrick "Pete" Fagan	Virginia State Police	CJIS Representative

IEPD

Standards and Codes Utilized

- External Alert 2.0 was used as the baseline set of requirements.
- No code lists were created as part of this development effort

Logical Data Requirements Model

The logical domain model captures data requirements from a user perspective. It is meant to visually describe the data requirements of an IEPD. The model diagram is available in the Support Documentation folder ("Logical Model.jpg").

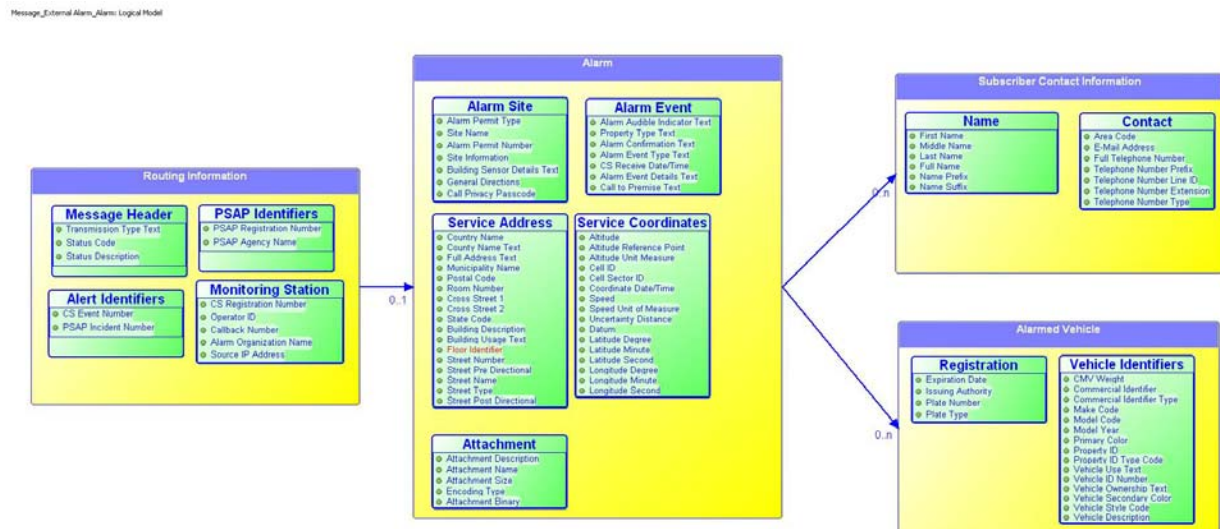


Figure 1 - Logical Data Requirements Model

Physical Data Requirements Model

The physical model organizes the information in the way that it will be implemented using a particular standard (NIEM 2.0). In essence, the physical model allows the implementer to not only communicate the physical structure of the IEPD, but also to plan for how they will map the data requirements to the prescribed standard. The diagram is available in the Supporting Documentation folder ("Physical Model.jpg").

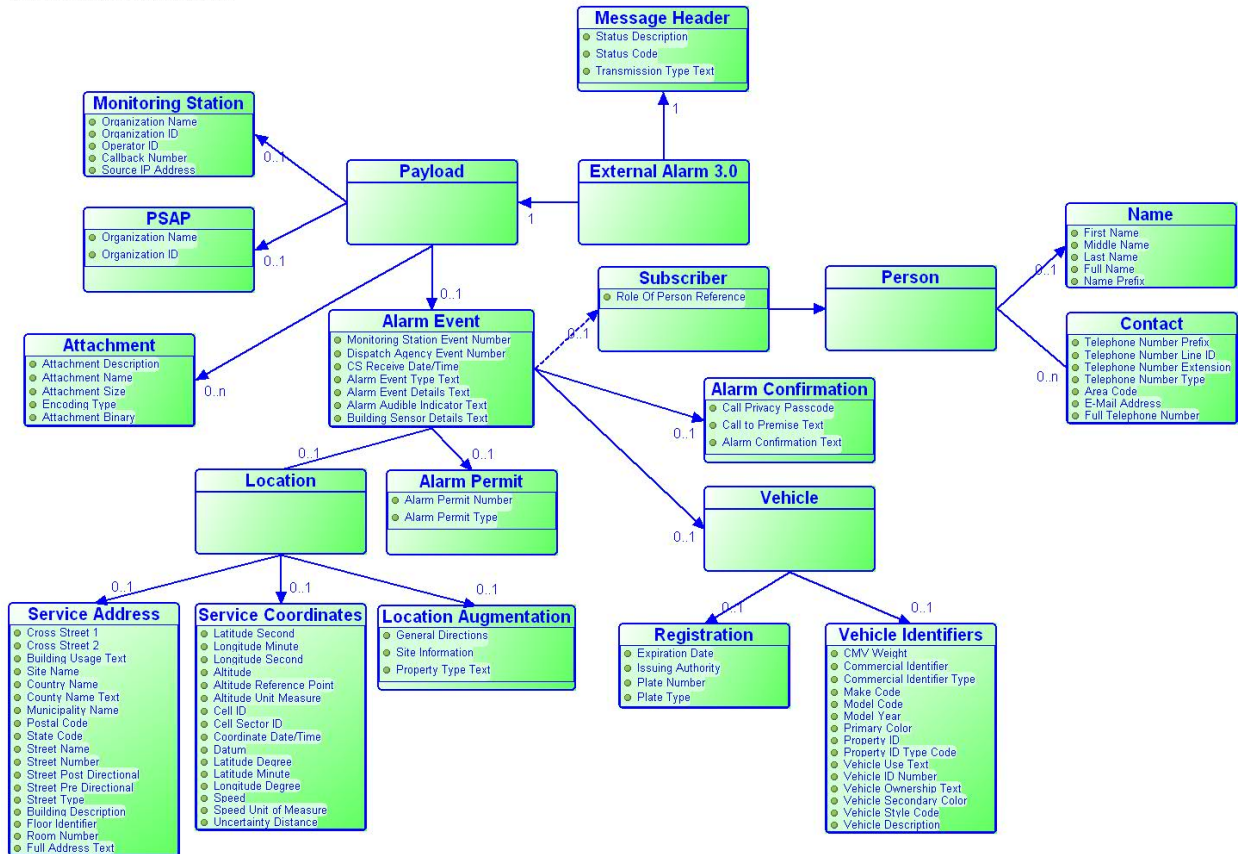


Figure 2 - Physical Data Requirements Model

Component Mapping Spreadsheet (CMT)

The CMT is a Microsoft Excel® file that cross-references the data requirements in the exchange to the specific elements within either NIEM or the locally extended file. The file is available in the Supporting Documentation folder ("External Alarm 3.0 Mappings.xls").

Exchange Schema

File Type	Location	Description
NIEM 2.0 Schema Subset	/schema/niem/...	A subset of NIEM 2.0 that includes only those elements from NIEM that are required for this IEPD
Document Schema	/schema/apco-alarm/3.0/external-alarm.xsd	Contains the document root
Extension Schema	/schema/apco-alarm/3.0/external-alarm.xsd	The locally defined elements necessary to meet the business requirements identified in this IEPD
Wantlist	/schema/wantlist.xml	A list of elements and types used in NIEM 2.0
Instance Document	/schema/xml/...	Four sample instance documents demonstrating use of the IEPD are included. See the exchange information section below for detail on how each instance document corresponds to a particular scenario.
Stylesheet	/schema/xml/alarm_stylesheet.t.xsl	When used in conjunction with an instance document, a stylesheet represents the information in a way that is more meaningful to a subject matter expert.

Methodology*

Version 3.0 of the External Alarm Interface Exchange IEPD started by using the baseline requirements previously identified for the Alert 2.0 exchange. The following methodology was used in the development of the External Alarm Interface Exchange 3.0 IEPD:

1. Create initial logical data model based on Alert 2.0 requirements.
2. Meet with Subject Matter Experts (SMEs) to identify missing elements and clarify definitions of some elements.
3. Create physical model based on data requirements and specified standard.
4. Map elements identified in physical model and distribute mappings to SMEs for feedback.
5. Create Schema Subset based on mappings.
6. Create Document/Extension schema based on mappings.
7. Create XML Instance documents.
8. Create XSL Stylesheet.

Timeline*

1. June 2008: Received feedback from implementing organization regarding their use of Alarm 2.0 elements.
2. July 10, 2008: Met with SMEs to review their spreadsheet describing how they would use Alert 2.0 data elements for transmit information. Identified two additional elements as indicated in the change log above.
3. July 18, 2008: Meeting with SMEs to review logical data requirements model.
4. July 22, 2008: Finalize data requirements for Alarm 3.0 IEPD.
5. July 30, 2008: Mappings are distributed to the SME group and feedback is incorporated into the IEPD.
6. August 4, 2008: Initial IEPD completed – in review by SME Group.
7. August 27, 2008: IEPD completed.

Implementation Recommendations

1. Rules and procedures by which alarm monitoring companies may be required either by policy or local ordinance(s) to attempt contact with someone at the alarm site prior to the delivery of an electronic alarm exchange to the PSAP will not change and the process is unaffected by this IEPD.
2. Implementation sites should consider including the following performance measures to focus project goals and to measure implementation success.
 - a. Number of telephone calls from alarm monitoring companies to the PSAP (Is there a reduction?)
 - b. Overall processing time for alarm-based calls-for-service (Is there a reduction?)

- c. Number of errors in delivery and processing of alarm and calls-for-service by eliminating voice delivery and PSAP call taker CAD re-entry (Has the number decreased?)
 - d. Progress toward a standard for interfaces between alarm monitoring companies and PSAPs to reduce cross-agency and cross-provider data exchange development time and cost (Any measurable savings of time and cost?)
- 3. Alarms and requests-for-service will be transmitted to PSAPs per normal procedures even when a catastrophic event (e.g. hurricane) or mass alarming event (e.g. wind or electrical storm) makes a PSAP choose not to respond. This places the PSAPs in control of filtering requests and provides for historical information in its CAD or front-end processing engine.
- 4. Fusion Center and/or other Department of Homeland Security (DHS) information needs will be met via the CAD and or PSAP systems and processes. These needs will likely not be met directly by creating exchanges between the alarm monitoring companies and these DHS systems.
- 5. The Alarm Interface Exchange includes three primary message types:
 - a. New Alarm event
 - b. PSAP's Response to a New Alarm event
 - c. Update messages initiated by either entity to the other that provide additional information about the alarm event

This IEPD does not include any other message type within the scope of this project. For example, alarm operators and PSAP members cannot send each other a message unless there is an active event. All messages that reference an active event must be formulated using the Update message type.
- 6. Alarm monitoring companies will not take ownership of indicating high-risk or target locations since no standard criteria of what constitutes a high risk or target property currently exists. It is believed that most PSAPs and CAD Systems will provide such functionality and ownership. Asking alarm monitoring companies to add this information could cause a conflict-of-interest and would likely create confusion.
- 7. Some PSAPs may phase in functionality associated with automated alarm monitoring company exchanges into their CAD or front-end interface. For instance, the PSAP may initially wish to review every exchange and require calltaker 'acceptance' before CAD downloading and then begin to support automatic acceptance for certain types of alarms over time as trust and comfort builds. Note: the process of calltaker acceptance was bypassed at both of the Virginia pilot sites and optimized to reduce response times to the maximum degree possible. The by-passing of the calltaker action during this pilot proved highly successful while meeting the requirements of both PSAPs.
- 8. NENA standards will be utilized for addressing since these standards are typically utilized by PSAPs and CADs.
- 9. General implementation guidelines and suggestions:
 - a. Each participating alarm monitoring company should assign a liaison to coordinate implementation both internally and externally with the PSAP and the alarm monitoring software provider.

- b. Each participating PSAP should assign a liaison to coordinate implementation both internally and externally with the alarm monitoring company and the PSAP's CAD system provider.
 - c. Response plans that dictate which emergency services will respond to an event and how many First Responders will respond to an event are business decisions of the PSAP and not within the scope of this IEPD.
 - d. Once an exchange has been developed end-to-end by the CAD provider and the alarm monitoring software provider and is ready for testing, it is recommended that the alarm monitoring company trigger an Address Validation request for each alarm address within the PSAP's jurisdiction. This will facilitate the identification of problem addresses that need to be massaged or reassigned to a different PSAP.
 - e. Alarm monitoring companies should implement a procedure where the address for a new alarm subscriber is passed through the Address Validation process with the PSAP at the time that the alarm subscription is added to the alarm monitoring company's database.
 - f. Alarm monitoring companies must implement a procedure to call the PSAP if an acknowledgement is not returned from the PSAP within "x" number of seconds. This is a policy decision that should be established prior to the implementation of any new exchanges between an alarm monitoring company and a PSAP.
 - g. Whenever possible, alarm monitoring companies should include the latitude and longitude of the alarm site address in their alarm customer database so that the geo-coordinates are included in the electronic exchange delivery. CAD providers should configure the CAD systems to validate an address based on the following order:
 - i. By street address if a street address is present
 - ii. By geo-coordinates if geo-coordinates are present, and if no street address is present or if the street address cannot be validated
 - iii. By intersection if two cross-streets are provided, and if no street address is present and no geo-coordinates are present. This should be a rare situation.
 - h. The PSAP and the alarm monitoring company will decide on the event types that will be transmitted. A standard list of event types is provided in this IEPD.
 - i. The PSAP will work with the CAD system provider to decide how each data element sent by the alarm company will be mapped to the call-for-service record.
10. The following alarm or request-for-service exchange rejection reasons are recommended;
- a. Closed in CAD (for supplemental exchanges)
 - b. Invalid Address (where address data and/or geographic coordinates do not reconcile between systems)
 - c. Invalid Data (exchange contains erroneous data and/or does not contain required field elements). Reject responses from the PSAP should include the specific data element in error and the reason in detail why that data element is

being rejected as invalid. Examples may include but are not limited to the following:

- i. The Alarm Event Type Text is missing or not a valid type of alarm
 - ii. The Call to Premises Text field is missing and is a mandatory field
 - iii. The Monitoring Alarm Company Event Number is missing and is a mandatory field
 - iv. The Activity Category Text field is missing or not valid
 - v. The Alarm Monitoring Company Organization Name is missing and is a mandatory field
 - vi. The Alarm Monitoring Company Call Back Telephone Number is missing or not 10 digits and it is a mandatory field
 - d. Incorrect Jurisdiction (customer/location not covered by receiving PSAP)
 - e. Unauthorized Customer - Exceeded (for situations when business rules apply where the event location has exceeded false alarms)
 - f. Unauthorized Customer – No Permit (for situations when business rules apply where the jurisdiction maintains an alarm permit registry but no alarm permit can be found in the registry for the event location)
 - g. Diverted (where PSAP is not accepting certain alarm types, locations, etc? due to catastrophic event or other PSAP driven reason)
11. Alarms triggered based on Radio Frequency Identifier (RFID) data elements will require additional definition and research. These type alarms are not considered within scope of this Information Exchange Package (IEP) release.
12. Data elements such as Patient Name or Incarcerated Person Name may be included in free-text notes section versus having a pre-define field since RFID and Defibrillator Alarms are still evolving.
13. **(CRITICAL NOTE)** Once the initial new alarm record is sent by the Alarm Monitoring Company, all subsequent Update transmissions to the PSAP must utilize the element name <StatusDescriptionText>. Most PSAPs do NOT want certain fields updated automatically by an external source such as an update to the address. Automatic updates to an address could trigger a different response plan. Instead, this IEPD has provided a single thread for all Updates to be sent to the CAD system. It is expected that the CAD System will add the Update to the call-for-service as an additional Comment or Note that will be seen by the radio operator. It shall be the radio operator's responsibility to review each Comment sent as an Update message by the Alarm Monitoring Company and process the Update accordingly. Examples of an Update may include:
- a. A Request to Cancel the Event
 - b. An estimated time of arrival (ETA) for the key holder
 - c. An individual on the premises of the alarm site who has been contacted but does not know the proper pass code
 - d. A change to one or more data elements originally sent as a component within the new call event
 - e. Other note worthy items

14. While Telematics data transmission is not a primary purpose of this exchange, the exchange can support some basic Telematics data.

Supported Exchanges

Exchange Model

The Exchange Model diagram is located in the Supporting Documentation folder (“Exchange Model.jpg”).

Use Case_External Alert_Process Model

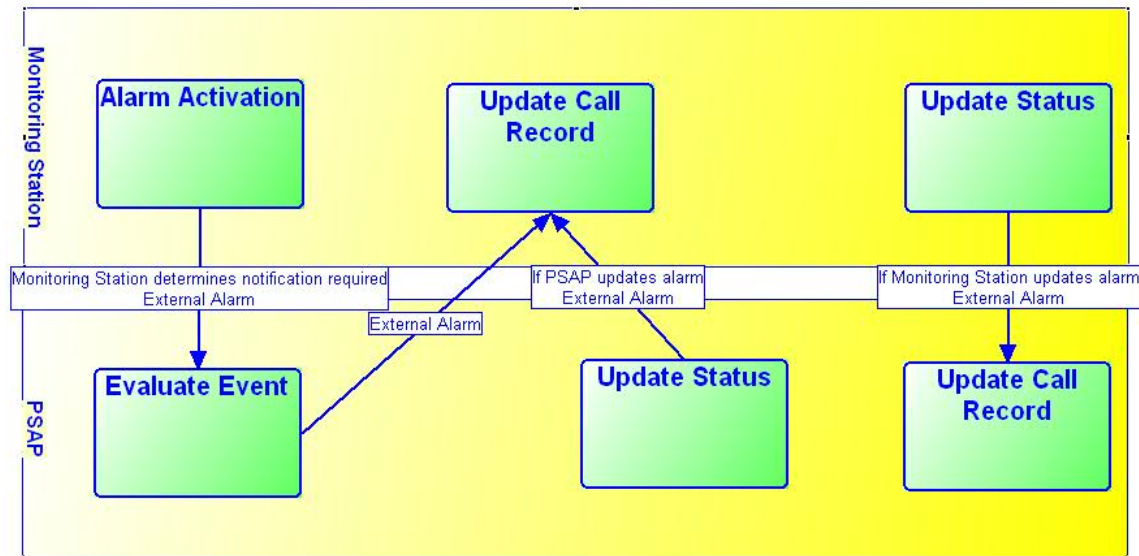


Figure 3 - External Alarm Process Model

Case Scenario Samples

1	Exchange	Medical Alert info
	Examples of Triggering Events	<ul style="list-style-type: none"> • Allergic Reaction • Breathing Problem • Burn • Chest Pain/Heart Problem • Choking • Diabetic Problem • Fall • Seizure • Other Life Threatening Problems
	Sample Scenario(s)	<p>An elderly person living alone subscribes to an alarm monitoring service and wears a device that allows the individual to trigger a signal to the alarm company when experiencing a life-threatening medical problem. The individual begins to experience chest pains (or encounters any one of the triggering events listed above) and activates the device. The alarm monitoring company receives a notification signal that a Medical Alarm has been activated. The software application and the associated database utilized by the alarm monitoring company indicates the proper 9-1-1 PSAP responsible for the dispatch of First Responder personnel to the premises address associated to the alarm. The alarm company operator initiates the electronic transmission of Medical Alert information to the correct 9-1-1 PSAP. Data transmitted to the 9-1-1 PSAP includes the alarm company's event number, address of the alarm subscriber, the type of alarm, detailed information about the premises, and detailed information about the individual that will assist First Responders in locating the premises and be familiar with the patient's history before their arrival. Upon receipt of this data, the 9-1-1 PSAP's Computer-Aided Dispatch (CAD) System validates the address within the PSAP's jurisdiction and creates a Call-for-Service. First Responders are immediately dispatched to the premises. Sensitive information about the individual typically will be sent to the First Responders' mobile data computer (MDC). The CAD System transmits an electronic acknowledgement to the alarm company that references the alarm company's event number and includes the PSAP's event number(s) and an indication that the Call-for-Service has been sent to the dispatch queue to be dispatched to Emergency First Responders. Additional information relating to the event may be originated by the alarm company or the PSAP and transmitted to the other entity electronically.</p>
	Sample Business Rule(s)	<ul style="list-style-type: none"> • Depending on governing laws of the jurisdiction affected, or operating procedures of the alarm company, the alarm company may attempt to reach someone at the premises before initiating the electronic exchange. • If an address cannot be validated and Latitude/Longitude coordinates are present in the data exchange, the CAD System will attempt to validate using geo-coordinates. • If the address and geo-coordinates (if present) cannot be validated, an electronic Rejection message will be returned by the PSAP to the alarm company. The alarm company operator is expected to take action according to alarm company procedures. • First Responders dispatched may include EMS plus a combination of Fire and/or Law Enforcement depending on local PSAP agency procedures, • Sensitive information about the individual typically may be sent to the First Responders' mobile data computer (MDC).

2	Exchange	Fire Alarm info
	Examples of Triggering Events	<ul style="list-style-type: none"> • Smoke/Heat Detector • Manual Pull Station • Sprinkler/Waterflow Detector
	Sample Scenario(s)	<p>A fire begins inside a structure and is spotted by an individual. The individual pulls the manual pull station to summon the fire department and sound an alarm for others to evacuate. A signal is transmitted to the alarm company.</p> <p>A fire begins inside a structure and causes the sprinkler system to activate. A sprinkler/waterflow activation signal is transmitted to the alarm company.</p> <p>A fire begins inside a structure and is sensed by a smoke or heat detector. A signal is transmitted to the alarm company.</p> <p>An alarm monitoring service receives a signal that a Fire Alarm has been activated via one of the trigger examples above. The software application and the associated database utilized by the alarm monitoring company indicates the proper 9-1-1 PSAP responsible for the dispatch of First Responder personnel to the premises address associated to the alarm. The alarm company operator initiates the electronic transmission of Fire Alarm information to the correct 9-1-1 PSAP. Data transmitted to the 9-1-1 PSAP includes the alarm company's event number, address of the alarm subscriber, the type of alarm including the triggering method, and detailed information about the premises including commercial versus residential, detailed directions, and hazardous materials stored at the facility, etc, that will assist First Responders in locating the premises and being familiar with any dangers that could be presented to the First Responders upon their arrival. Upon receipt of this data, the 9-1-1 PSAP's CAD System validates the address within the PSAP's jurisdiction and creates a Call-for-Service. First Responders are immediately dispatched to the premises. The CAD System transmits an electronic acknowledgement to the alarm company that references the alarm company's event number and includes the PSAP's event number(s) and an indication that the Call-for-Service has been sent to the dispatch queue to be dispatched to Emergency First Responders. Additional information relating to the event may be originated by the alarm company or the PSAP and transmitted to the other entity electronically. A notification from CAD to Traffic web sites and Intelligent Transportation Systems could be sent when the amount of responding fire apparatus is significant and traffic in the area of the emergency could be affected.</p>
	Sample Business Rule(s)	<ul style="list-style-type: none"> • Depending on governing laws of the jurisdiction affected, or operating procedures of the alarm company, the alarm company may attempt to reach someone at the premises if the premises type is RESIDENTIAL before initiating the electronic exchange. • If an address cannot be validated and Latitude/Longitude coordinates are present in the data exchange, the CAD System will attempt to validate using geo-coordinates. • If the address and geo-coordinates (if present) cannot be validated, an electronic Rejection message will be returned by the PSAP to the alarm company. The alarm company operator is expected to take action according to alarm company procedures. • First Responders dispatched may include Fire plus a combination of EMS and/or Law Enforcement depending on local PSAP agency procedures, Law enforcement could be typically dispatched for traffic and crowd control purposes.

3	Exchange	Gas Detector Alarm info
	Examples of Triggering Events	<ul style="list-style-type: none"> • Natural Gas Detector • Carbon Monoxide Detector
	Sample Scenario(s)	<p>A natural gas pipe breaks inside of a structure and triggers a natural gas detector alarm signal.</p> <p>The vent on a furnace becomes clogged, causes carbon monoxide to build up inside of a structure, and subsequently triggers a carbon monoxide alarm signal.</p> <p>An alarm monitoring service receives a signal that a Gas Detector Alarm has been activated via one of the trigger examples above. The software application and the associated database utilized by the alarm monitoring company indicates the proper 9-1-1 PSAP responsible for the dispatch of First Responder personnel to the premises address associated to the alarm. The alarm company operator initiates the electronic transmission of Gas Detector Alarm information to the correct 9-1-1 PSAP. Data transmitted to the 9-1-1 PSAP includes the alarm company's event number, address of the alarm subscriber, the type of alarm including the triggering method, and detailed information about the premises including commercial versus residential, detailed directions, and hazardous materials stored at the facility, etc., that will assist First Responders in locating the premises and being familiar with any dangers that could be presented to the First Responders upon their arrival. Upon receipt of this data, the 9-1-1 PSAP's CAD System validates the address within the PSAP's jurisdiction and creates a Call-for-Service. First Responders are immediately dispatched to the premises. The CAD System transmits an electronic acknowledgement to the alarm company that references the alarm company's event number and includes the PSAP's event number(s) and an indication that the Call-for-Service has been sent to the dispatch queue to be dispatched to Emergency First Responders. Additional information relating to the event may be originated by the alarm company or the PSAP and transmitted to the other entity electronically. A notification from CAD to Traffic web sites and Intelligent Transportation Systems could be sent when the amount of responding fire apparatus is significant and traffic in the area of the emergency could be affected.</p>
	Sample Business Rule(s)	<ul style="list-style-type: none"> • Depending on governing laws of the jurisdiction affected, or operating procedures of the alarm company, the alarm company may attempt to reach someone at the premises before initiating the electronic exchange. • If an address cannot be validated and Latitude/Longitude coordinates are present in the data exchange, the CAD System will attempt to validate using geo-coordinates. • If the address and geo-coordinates (if present) cannot be validated, an electronic Rejection message will be returned by the PSAP to the alarm company. The alarm company operator is expected to take action according to alarm company procedures. • First Responders dispatched may include Fire plus a combination of EMS and/or Law Enforcement depending on local PSAP agency procedures, Law enforcement could be typically dispatched for traffic and crowd control purposes.

4	Exchange	Burglar Alarm info
	Examples of Triggering Events	<ul style="list-style-type: none"> • Burglar Alarm • Tamper Alarm (Someone tampering with equipment)** • Restore Signal (Alarm Restored but no prior alarm received)** • Phone Line Failure (Someone has possibly cut phone line)** • Open/Close Signal (Someone disarming system without permission)** • Reset/Cancel (Someone disarming system without permission)** <p>** Not necessarily a triggering event in all instances and may result in a customer/contact only notification by the alarm company. The responses to these "supervisory" signals will vary greatly by alarm company and may result in the PSAP not being contacted dependent upon the outcome of the customer contact by the alarm company.</p>
	Sample Scenario(s)	<p>A residence is broken into and the suspect's movement is detected by a motion detector.</p> <p>Someone is attempting to disable the premises alarm equipment.</p> <p>The alarm company receives an alarm restore message but no prior alarm was received.</p> <p>Someone attempts to cut the telephone line.</p> <p>Someone attempts to disarm the alarm system without the proper security code.</p> <p>An alarm monitoring service receives a signal that an alarm has been activated via one of the trigger examples above. The software application and the associated database utilized by the alarm monitoring company indicates the proper 9-1-1 PSAP responsible for the dispatch of Law Enforcement First Responder personnel to the premises address associated to the alarm. The alarm company operator initiates the electronic transmission of Burglar Alarm information to the correct 9-1-1 PSAP. Data transmitted to the 9-1-1 PSAP includes the alarm company's event number, address of the alarm subscriber, the type of alarm including the triggering method (motion detector, glass breakage, etc) and specific location of the triggering device (rear door, front hall, etc), and detailed information about the premises including commercial versus residential, detailed directions, and hazardous materials stored at the facility, etc, that will assist Law Enforcement First Responders in locating the premises and being familiar with any dangers that could be presented to the First Responders upon their arrival. Upon receipt of this data, the 9-1-1 PSAP's CAD System validates the address within the PSAP's jurisdiction and creates a Call-for-Service. Law Enforcement First Responders are immediately dispatched to the premises. The CAD System transmits an electronic acknowledgement to the alarm company that references the alarm company's event number and includes the PSAP's event number(s) and an indication that the Call-for-Service has been sent to the dispatch queue to be dispatched to Law Enforcement First Responders. Additional information relating to the event may be originated by the alarm company or the PSAP and transmitted to the other entity electronically. Additional information may consist of a cancellation request from the alarm company, information about the key-holder from the alarm company, status changes by responding Law Enforcement officers, and situation found information as denoted by the Law Enforcement Officer(s) on scene.</p>
	Sample Business Rule(s)	<ul style="list-style-type: none"> • Depending on governing laws of the jurisdiction affected, or operating procedures of the alarm company, the alarm company may attempt to reach someone at the premises before initiating the electronic exchange. • If an address cannot be validated and Latitude/Longitude coordinates are present in the data exchange, the CAD System will attempt to validate using geo-coordinates. • If the address and geo-coordinates (if present) cannot be validated, an electronic Rejection message will be returned by the PSAP to the alarm company. The alarm company operator is expected to take action according to alarm company procedures.

5	Exchange	Hold-up/Panic/Duress Alarm (Robbery in progress) info
	Examples of Triggering Events	<ul style="list-style-type: none"> • Hold-up Alarm • Panic/Duress Alarm
	Sample Scenario(s)	<p>A jewelry store is being robbed and a store employee manages to trigger a push button signaling device to initiate a Hold-up alarm.</p> <p>A home invasion occurs and the homeowner manages to trigger a signaling device to initiate a Panic/Duress alarm.</p> <p>An alarm monitoring service receives a signal that an alarm has been activated via one of the trigger examples above. The software application and the associated database utilized by the alarm monitoring company indicates the proper 9-1-1 PSAP responsible for the dispatch of Law Enforcement First Responder personnel to the premises address associated to the alarm. The alarm company operator initiates the electronic transmission of alarm information to the correct 9-1-1 PSAP. Data transmitted to the 9-1-1 PSAP includes the alarm company's event number, address of the alarm subscriber, the type of alarm, and detailed information about the premises including commercial versus residential, detailed directions, and hazardous materials stored at the facility, etc, that will assist Law Enforcement First Responders in locating the premises and being familiar with any dangers that could be presented to the First Responders upon their arrival. Upon receipt of this data, the 9-1-1 PSAP's CAD System validates the address within the PSAP's jurisdiction and creates a Call-for-Service. Law Enforcement First Responders are immediately dispatched to the premises. The CAD System transmits an electronic acknowledgement to the alarm company that references the alarm company's event number and includes the PSAP's event number(s) and an indication that the Call-for-Service has been sent to the dispatch queue to be dispatched to Law Enforcement First Responders. Additional information relating to the event may be originated by the alarm company or the PSAP and transmitted to the other entity electronically. Additional information may consist of a cancellation request from the alarm company, additional details concerning the event from the alarm company, status changes by responding Law Enforcement officers, and situation found information as denoted by the Law Enforcement Officer(s) on scene.</p>
	Sample Business Rule(s)	<ul style="list-style-type: none"> • Depending on governing laws of the jurisdiction affected, or operating procedures of the alarm company, the alarm company may attempt to reach someone at the premises before initiating the electronic exchange. • If an address cannot be validated and Latitude/Longitude coordinates are present in the data exchange, the CAD System will attempt to validate using geo-coordinates. • If the address and geo-coordinates (if present) cannot be validated, an electronic Rejection message will be returned by the PSAP to the alarm company. The alarm company operator is expected to take action according to alarm company procedures. • PSAPs generally will treat an alarm notification as a "Hold-up" Alarm if the premises type is Commercial. Otherwise the event type is generally treated as a "Panic/Duress" alarm when the premises type is residential.

Exchange Detail

ID	Exchange Description	Representative Instance
1	The Alarm Monitoring Company receives an alarm notification and may attempt to make contact with someone at the alarm site if required (depending on alarm type, local laws, business process rules, etc). If the Alarm Monitoring Company operator determines that the PSAP must be notified, the operator will initiate an External Alarm Interface Exchange to the PSAP. Upon receipt of the new alarm transaction, the PSAP's middleware application responds to the transaction with an "ACK" character at the IP level and then passes the new alarm data to the CAD System. If the message is truncated or mal-formed, the middleware application returns a "NACK" character, also known as "NAK" to the alarm service.	/schema/xml/scenario1_new_alarm.xml
2	Upon receipt of new alarm data by the PSAP, the PSAP's CAD system takes ownership of the data and is responsible for the attempt to process the new alarm data as a call-for-service. The CAD will attempt to validate the address provided and ensure that mandatory elements have been provided. If this process is successful and the criterion to generate a call-for-service has been met, the CAD will assemble a call-for-service record and then generate an "Accept" response to be passed back to the Alarm Monitoring Company. The operator who triggered the alarm exchange to the PSAP receives the "Accept" response from the PSAP within seconds of the original transmission and is aware that a call-for-service has been placed in the pending call queue for dispatch to Public Safety personnel. The middleware application at the PSAP that sends this "Accept" message to the alarm service expects nothing in return.	/schema/xml/scenario2_accepted.xml
3	Upon receipt of new alarm data by the PSAP, the PSAP's CAD system takes ownership of the data and is responsible for the attempt to process the new alarm data as a call-for-service. The CAD will attempt to validate the address provided and ensure that mandatory elements have been provided. If this process is not successful and/or the criterion to generate a call-for-service has not been met, the CAD will generate a "Reject" response to be passed back to the Alarm Monitoring Company. CAD Systems may also be programmed to "Reject" all new alarm events when the PSAP is overwhelmed such as a hurricane situation and is refusing all alarm event requests. The operator who triggered the alarm exchange to the PSAP receives the "Reject" response from the PSAP within seconds of the original transmission and is aware that the requested call-for-service has been rejected by the PSAP and the reason why. The operator will invoke backup procedures, identify the reason for the rejection, and take appropriate action by calling the PSAP via telephone. The middleware application at the PSAP that sends this "Reject" message to the alarm service expects nothing in return.	/schema/xml/scenario3_rejected.xml
4	As various statuses change during the event at the PSAP level, the CAD System may send an Update transaction to the Alarm Monitoring Company. Examples that can trigger an Update message at the PSAP level may optionally include: (1) the Dispatch of First Responders to the alarm site, (2) Arrival of First Responders at the alarm site, (3) Clearing of First Responders from the alarm event including a disposition (if any), and (4) any notes added by the radio operator or field personnel during the course of the event. The middleware application at the PSAP that sends this "Update" message to the alarm service expects nothing in return.	/schema/xml/scenario4_update_from_psap.xml
5	After the initial new alarm event has been triggered by the Alarm Monitoring Company and Accepted by the PSAP, the Alarm Monitoring Company may encounter additional information related to the event that must be shared with the PSAP. The Alarm Monitoring Company operator can send additional information to the PSAP in the form of an Update message. Examples of an Update may include: (1) a Request to Cancel the Event, (2) an estimated time of arrival (ETA) for the key holder, (3) an individual on the premises of the alarm site who has been contacted but does not know the proper pass code, (4) a change to one or more data elements originally sent as a component within the new call event, and (5) other note worthies. Note: All Updates including changes to one or more data elements must utilize the element name <StatusDescriptionText> as demonstrated in the example scenario instance to hold the Updated information. Most PSAPs do NOT want certain fields updated automatically by an external source such as an update to the address. Automatic updates to an address could trigger a different response plan. Instead, this IEPD has provided a single thread for all Updates to be sent to the CAD system. It is expected that the CAD System will add the Update to the call-for-service as an additional Comment or Note that will be seen by the radio operator. It shall be the radio operator's responsibility to review each Comment sent as an Update message by the Alarm Monitoring Company and process the Update accordingly. Upon receipt of the Update message from the Alarm Monitoring Company, the PSAP's middleware application responds to the transaction with an "ACK" character at the IP level and then passes the Update message to the CAD System. If the message is truncated or mal-formed, the middleware application returns a "NACK" character, also known as "NAK" to the alarm service. The CAD System must assemble an Update Response message using the same format as the Update message but with an indicator in the Status field of "UPD Accept" or "UPD Reject" to indicate that the CAD has either Accepted or Rejected the Update. The middleware application at the PSAP that sends this "Update Response" message to the alarm service expects nothing in return.	/schema/xml/scenario5_update_from_alarm.xml
6	For future implementation consideration, Building Sensor alerts sent via a Common Alert Protocol (CAP) message can be accommodated with this IEPD.	/schema/xml/scenario1_new_alarm.xml

XML Validation*

The image below is a screen print indicating that Altova XML Spy 2007 was used to ensure that the IEPD met XML validation requirements.

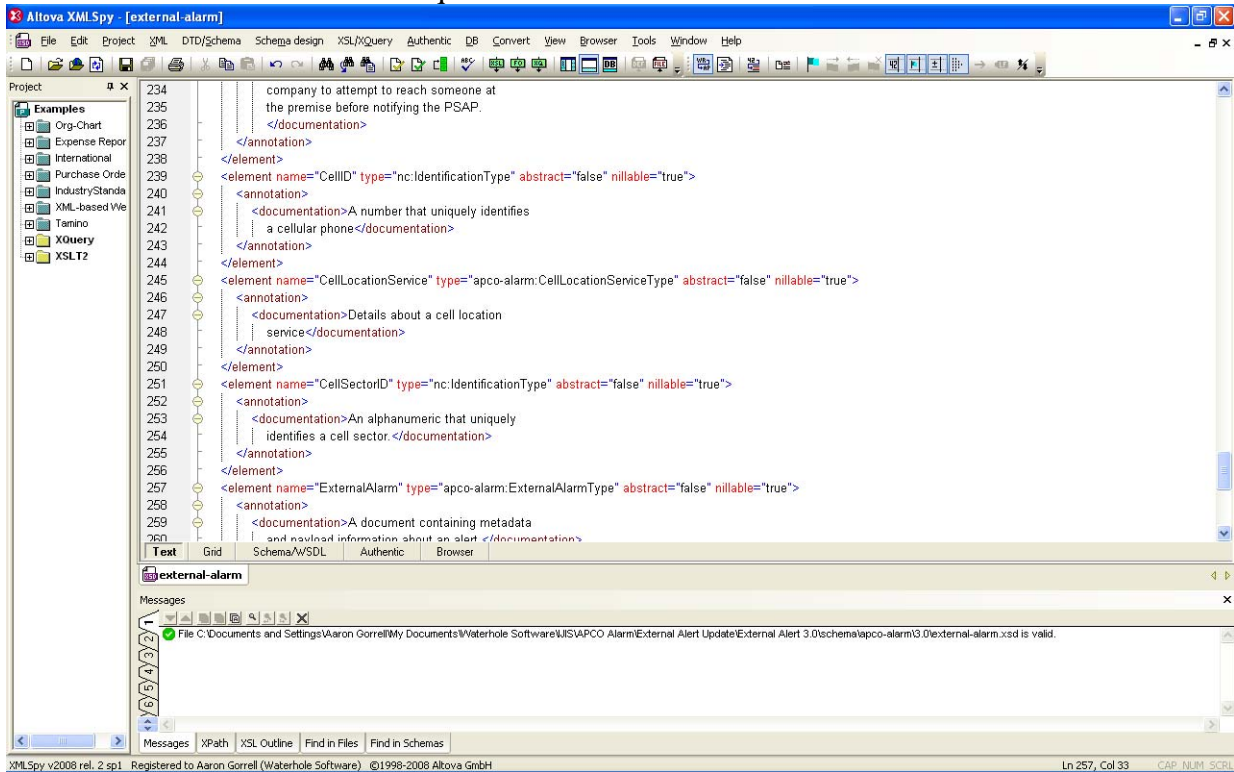
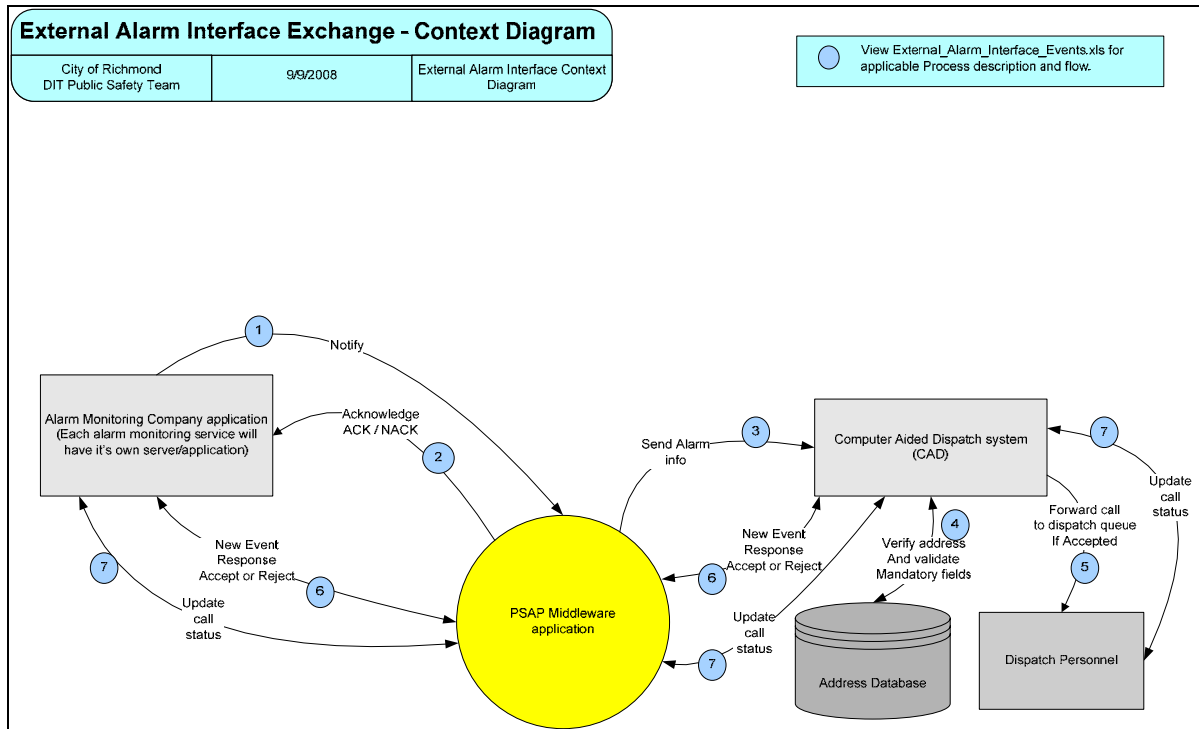


Figure 4 - Validation Screen Image

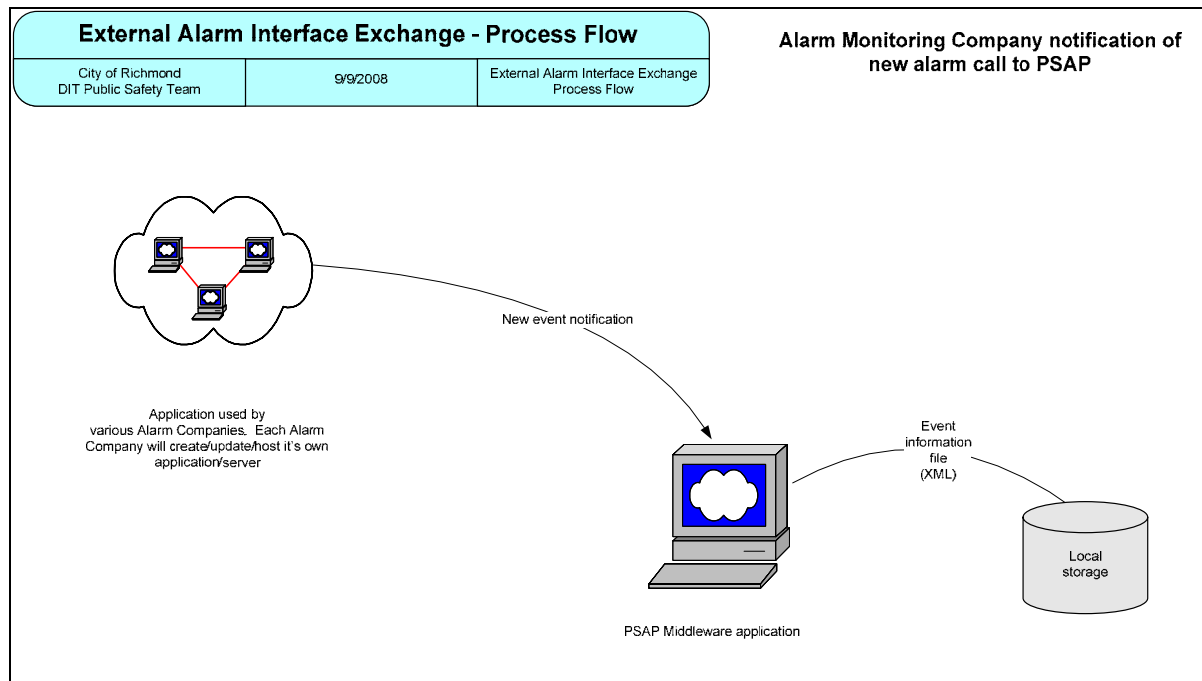
Appendix 1: City of Richmond's Context and Process Flow Diagrams*

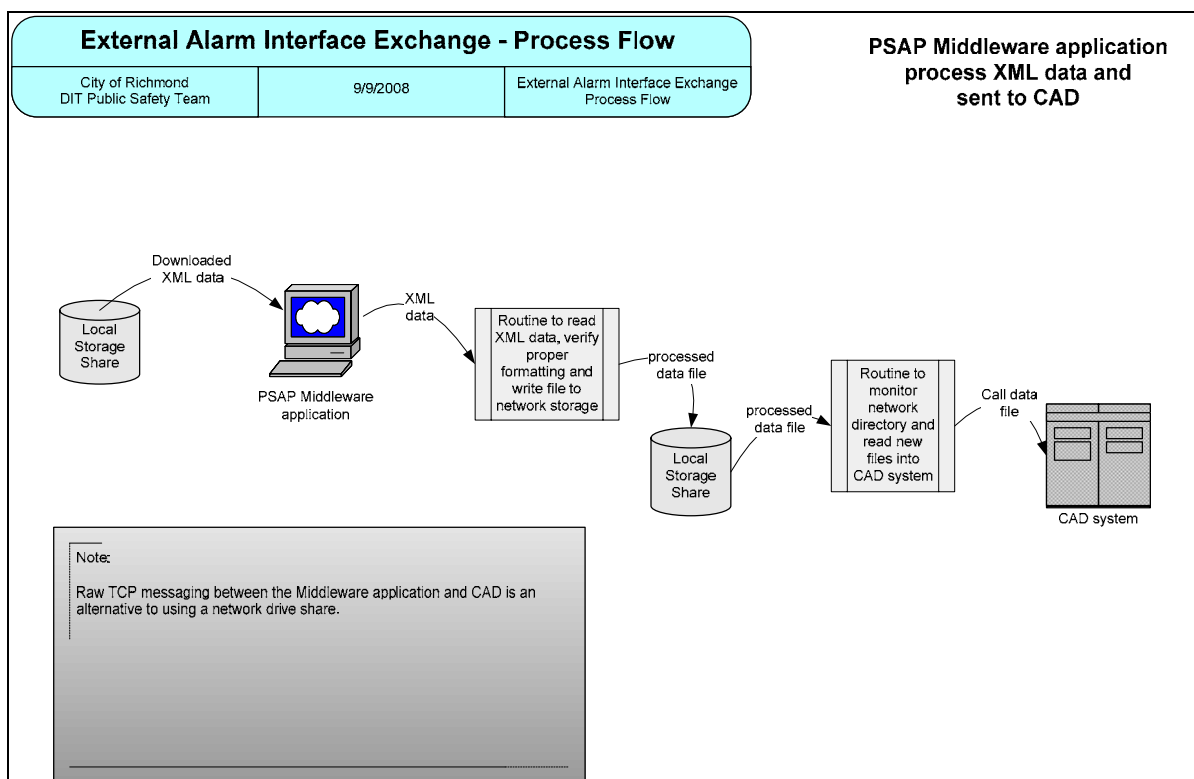
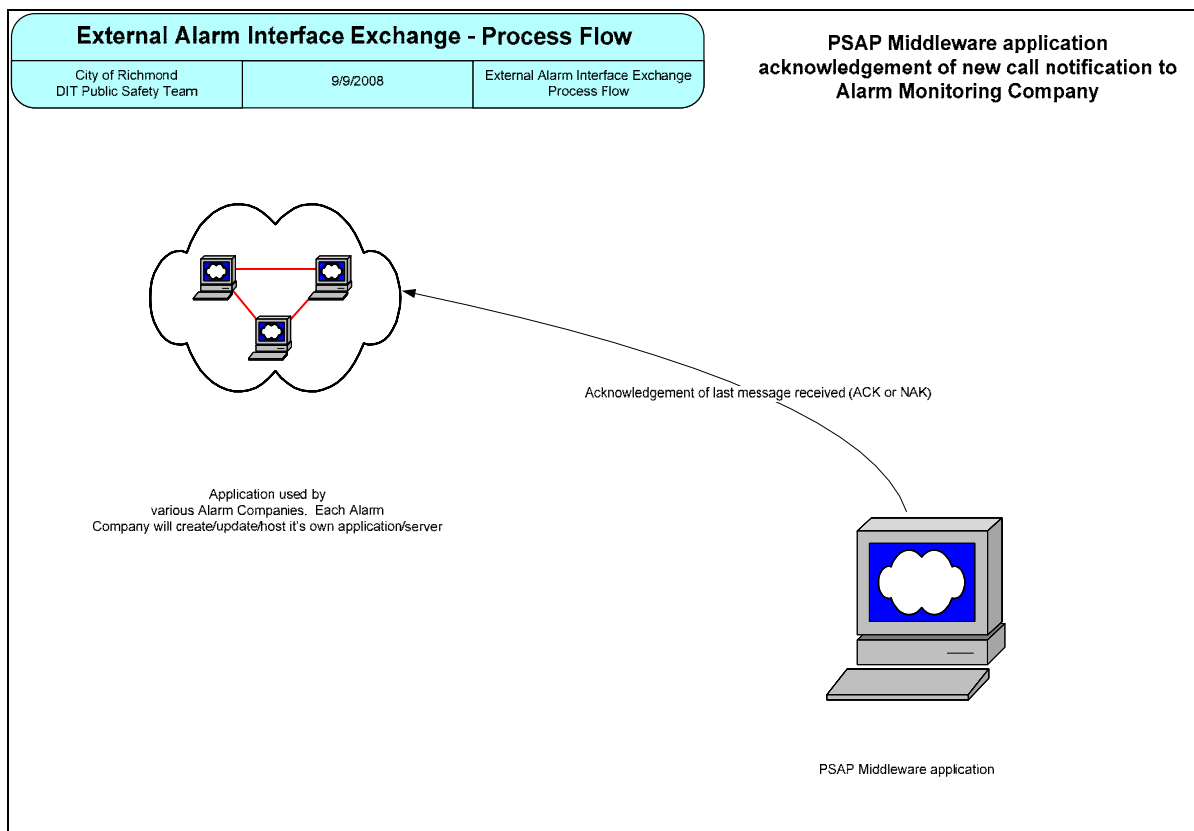
These diagrams were developed by the City of Richmond during their implementation of the External Alarm Interface Exchange and are provided here as supporting documentation.

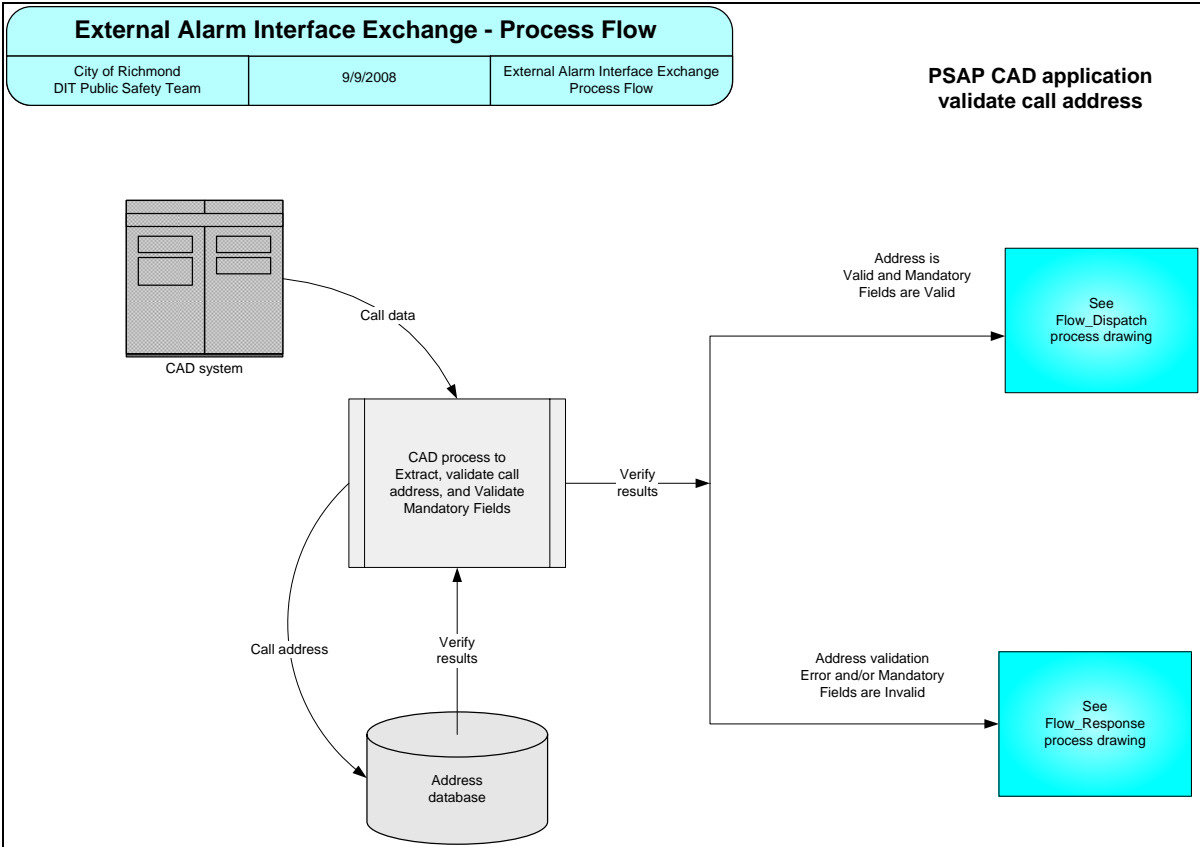


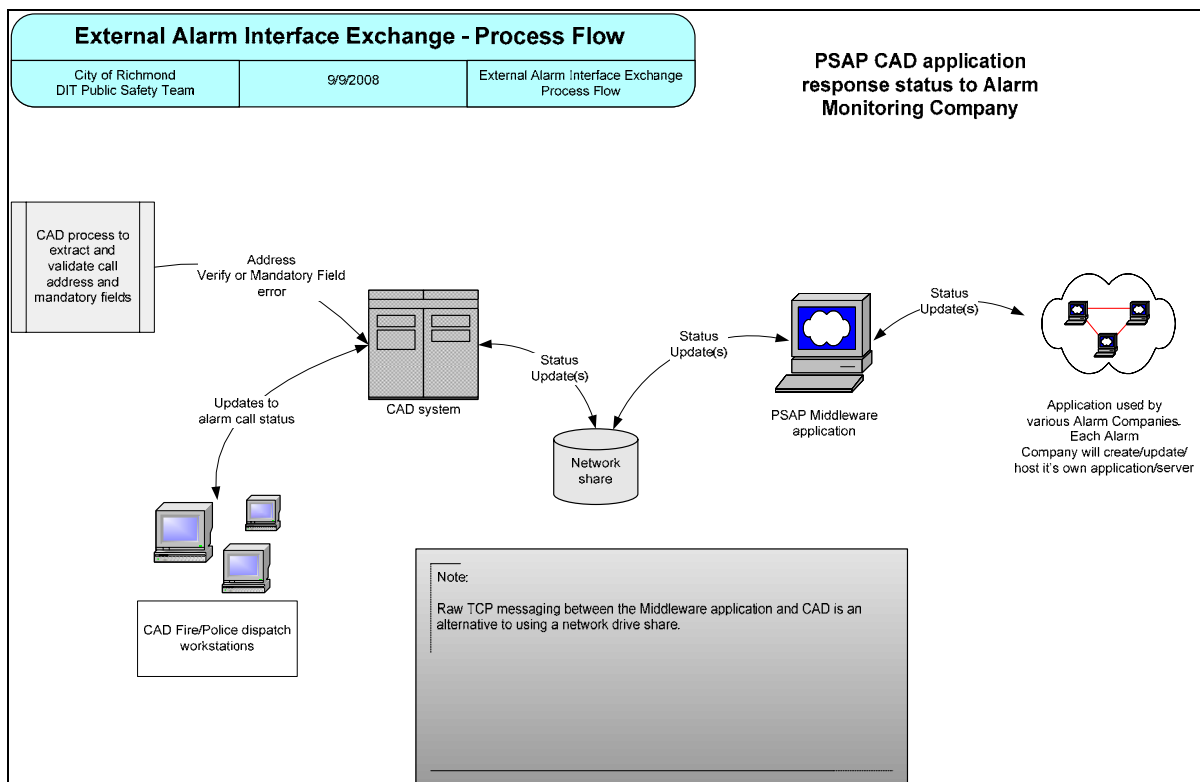
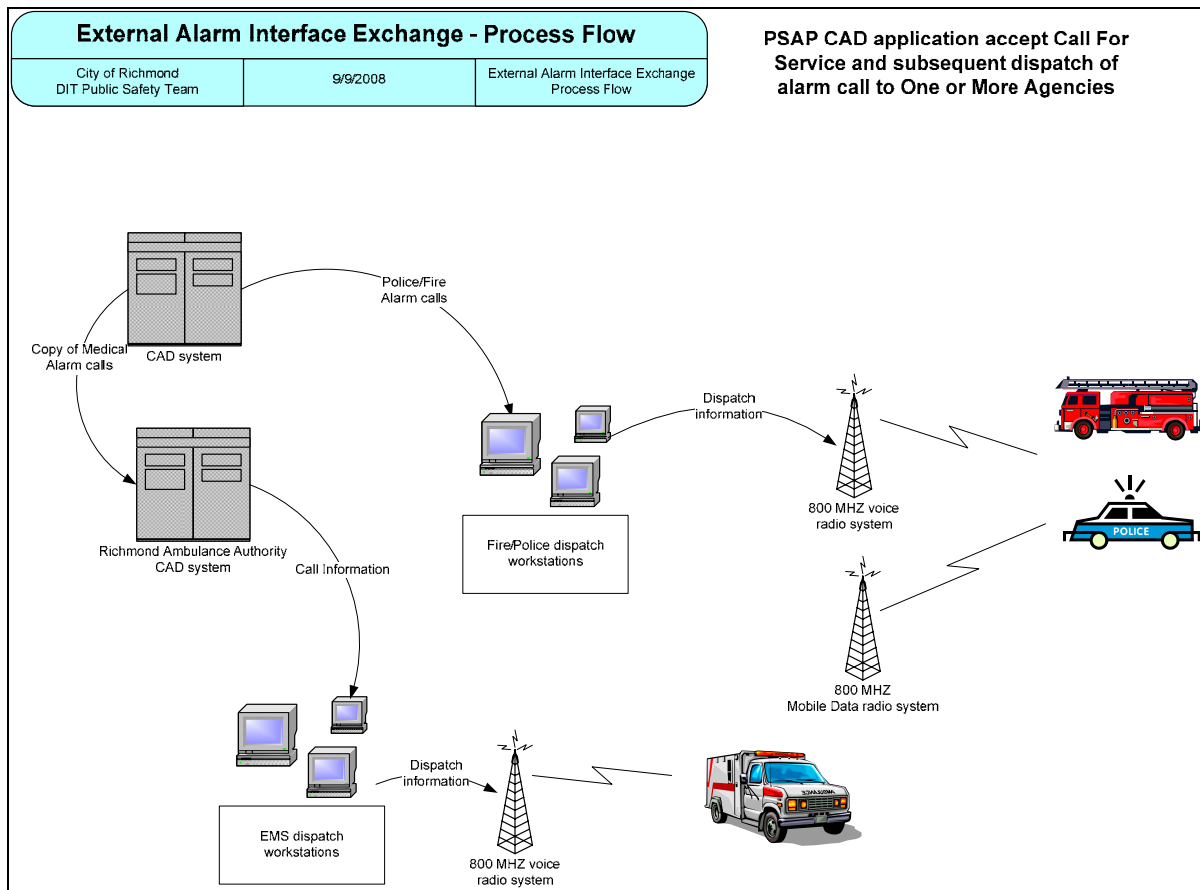
Process Number	EVENTS/PROCESSES
1	Notify PSAP of new alarm call
1.1	Send event information to PSAP Middleware application
2	Acknowledge new call notification
2.1	Send acknowledgement for new call notification (ACK/NACK)
3	PSAP Middleware Application Process XML data and sends to CAD
3.1	Middleware parses XML fields to validate format but Does Not Alter the Data
3.2	XML file is forwarded to CAD System
4	Verify Call Address and Validate Mandatory fields
4.1	CAD processes file and extracts call address
4.2	CAD verifies call address against address database
4.3	If address does not verify, or if one or more mandatory fields are missing, send status update to Alarm Company (Process 6)
5	Forward call to Dispatch Queue(s)
5.1	CAD makes call data available to dispatch personnel
5.2	Dispatch personnel review call
5.3	Dispatch personnel dispatch call to appropriate agencies and first responder personnel
6	New Event response
6.1	CAD generates a status indicating if the New Event was accepted as a valid event and if so generates a new CAD event
6.2	CAD sends details of new CAD event (if valid) or reason for rejection to PSAP Middleware application
6.3	PSAP Middleware application sends New Event status to the appropriate Alarm Monitoring Company
7	Update Call Status (Originates from CAD or the Alarm Company)
7.1	CAD generates status updates based either dispatcher/field unit input OR the Alarm Monitoring Company provides

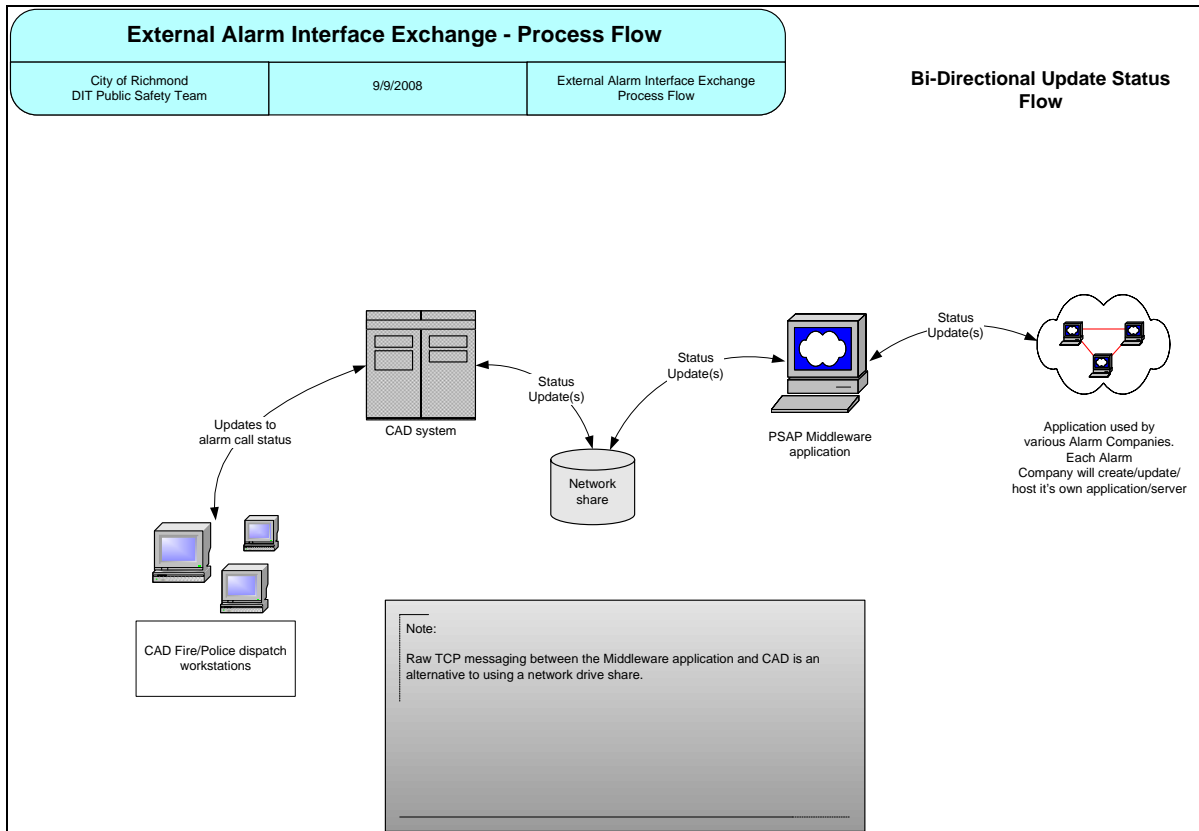
	additional information about the event to the PSAP
7.2	CAD sends status update to the PSAP Middleware Application or the Alarm Monitoring Application sends a status update to the PSAP middleware application
7.3	The PSAP's Middleware Application forwards the update to the CAD System if the originator of the message is the Alarm Monitoring Company, or will send the update to the Alarm Monitoring Company if the originator of the message is the PSAP
7.4	Upon receipt of an Update message from the Alarm Monitoring Company via the Middleware Application, the CAD System will send an Update Acknowledgement to the Alarm Monitoring Company via the Middleware application











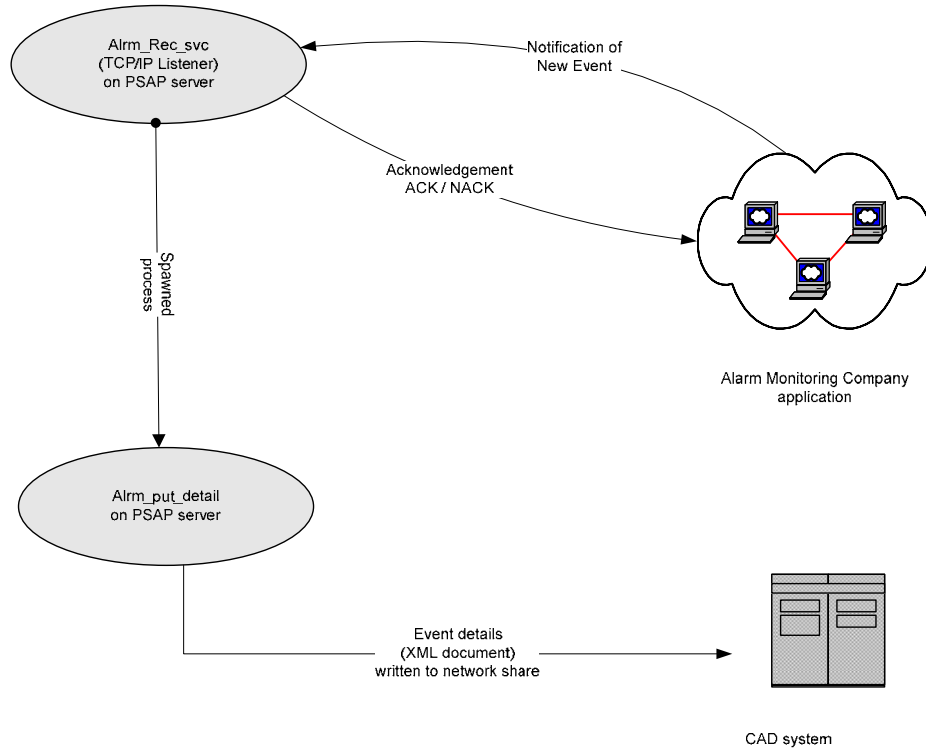
External Alarm Interface Exchange - Process Flow

City of Richmond
Safety Team

9/9/2008

External Alarm Interface
Middleware Application
Response Service

PSAP Middleware Application (PERL) – Notification of New Event



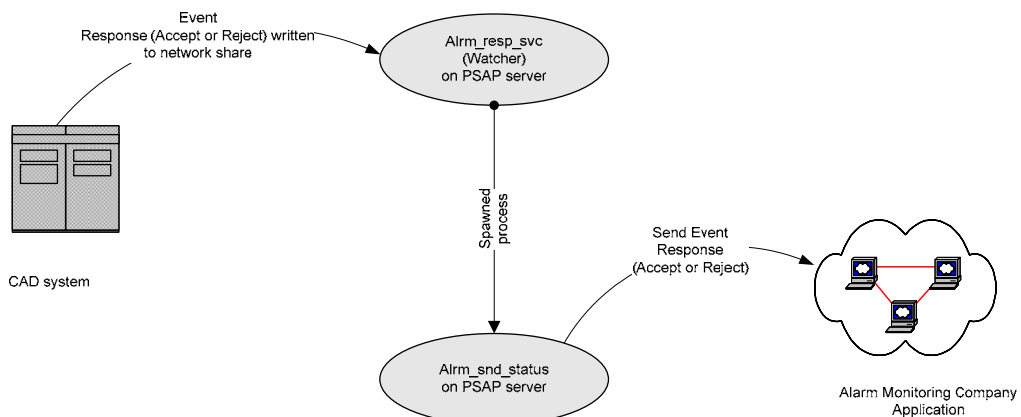
External Alarm Interface Exchange - Process Flow

City of Richmond
DIT Public Safety Team

9/9/2008

External_Alarm_Interface
_Middleware_Application_
_Response_Service.vsd

PSAP Middleware Application (PERL) – New Event Status Response



Appendix 2: Glossary

APCO	Association of Public-Safety Communications Officials International
BJA.....	Bureau of Justice Assistance
CAD.....	Computer-Aided Dispatch
CMT	Component Mapping Spreadsheet
CSAA.....	Central Station Alarm Association
DMZ.....	A demilitarized (also known as demarcation) zone, based on military usage of the term but more appropriately known as a demarcation zone or perimeter network, is a physical or logical subnetwork that contains and exposes an organization's external services to a larger, untrusted network, usually the Internet. The purpose of a DMZ is to add an additional layer of security to an organization's Local Area Network (LAN); an external attacker only has access to equipment in the DMZ, rather than the whole of the network
DOJ	Department of Justice
EMS	Emergency Medical Services
ETA	Estimated Time of Arrival
GJXDM.....	Global Justice XML Data Model
IEPD	Information Exchange Package Documentation
IJIS	IJIS Institute
MDC	Mobile Data Computer
NENA	National Emergency Number Association
NIEM.....	National Information Exchange Model
Nlets	International Justice and Public Safety Network
PSAP	Public Safety Answering Point
PSDI	Public Safety Data Interoperability project
RFID	Radio Frequency IDentification
SME	Subject Matter Expert
XML	eXtensible Markup Language
XSL.....	Extensible Stylesheet Language (a technical artifact within the IEPD)

Alarm Monitoring Company to PSAP CAD External Alarm Interface Exchange



Notes



APCO International

The Association of Public-Safety Communications Officials - International

351 N. Williamson Blvd, Daytona Beach, FL 32114 USA

www.apcointl.org