February 2019
Version 1.7

Automatic Fire Alarm Service Provider Computer Interface Specification for Extended Alarm Protocol (XAP) Devices

For Fire and Emergency New Zealand

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Document history

Version	Status	Date	Comments
1.4	New	12 December 2008	New XAP version
1.5	Updated	March 2014	Reformatted and updated document
1.6	Updated	July 2017	References to FENZ removed and replaced with Fire and Emergency New Zealand (FENZ)
1.7	Updated	February 2019	Minor amendments to align specification to FENZ definitions and Agreement terms and conditions

Important note

No interface software should be produced without the inclusion of FENZ approved Application Programming Interface (API).

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List of terms and abbreviations

Term	Definition
Ack	Acknowledgement
AFAS	Automatic Fire Alarm System that includes the collection of equipment, software, transmission links, standards, specifications, protocols and processes necessary to transport messages between fire alarms and the Communications Centres
AFASP	Automatic Fire Alarm Service Provider [Contractor], providing Fire Alarm monitoring and transmission services as specified in the AFAS Code of Practice
AFASPCIS	Automatic Fire Alarm Service Provider Computer Interface Specification. The protocol specification, extended alarm protocol specification (XAP) and associated application programming interface specification, for the computer interface between the FENZ STSMHS Domain and the AFASP Domain System, as available on the FENZ public internet page, as amended from time to time
AFASP Domain System	A system under control of the Contractor that exchanges messages with the FENZ STSMHS domain, including the AFASP computer/server application, that conforms to the AFASP Computer Interface Specification
Agreement	Agreement for Automatic Fire Alarm Management, Monitoring and Transmission Services between the AFASP and FENZ
API	Application programming interface
Certified Fire Alarm	A Fire Alarm that has a Certificate of Compliance issued by a body accredited for Fire Alarm installation certification or a letter from a FENZ Area Manager authorising the connection of the Fire Alarm to the AFAS
Code of Practice	Code of Practice for Automatic Fire Alarm System document available on the FENZ public internet page, as amended from time to time
Contractor Interface	AFASP computer/server application that conforms to the Computer Interface Specification
DB	Database
FA	Fire alarm. An apparatus that performs specified fire-related functions in response to the operation of a sprinkler, detector, manual call point or other input, as defined in the relevant NZ standard, as amended from time to time, that is connected to the AFAS by the Contractor fire alarm
FENZ	means Fire and Emergency New Zealand or its appointed agent, as described in the Fire and Emergency New Zealand Act 2017: 1) FENZ is a Crown entity for the purposes of section 7 of the Crown Entities Act 2004. 2) The Crown Entities Act 2004 applies to FENZ except to the extent that this Act expressly provides otherwise.

Term	Definition
	FENZ is the same body as the New Zealand Fire Service Commission constituted under section 4 of the Fire Service Act 1975.
FENZ STSMHS Domain	means the STSMHS servers that route messages received from the Contractor and Fire Alarms to FENZ
FENZ STSMHS Domain Service Provider (STSMHSSP)	means the entity that supports and manages the STSMHS under a contract and service level agreement with FENZ
Fire Alarm	means an apparatus that performs specified fire related functions in response to the operation of a sprinkler, detector, manual call point or other input, as defined in the relevant Standards New Zealand standard, as amended from time to time, that is connected to the AFAS by the Contractor
IP	Internet protocol
ISO	International Standards Organisation
LAN	Local area network
LLA	Longitude, latitude and altitude
MHS	Message handling server
NZFS	New Zealand Fire Service Commission (all references in the document to NZFS are replaced with FENZ)
FENZ STSMHS Domain Contractor	The entity that supports and manages the STSMHS under a contract and service level agreement with FENZ
NZS	New Zealand standard
OSI	Open systems interconnection
Protected Premises (or Relevant Building)	means a building or part of a building that is: (a) fitted with one or more Fire Alarms; and (b) physically separate from other buildings at a given location (provided that, in determining whether or not a building is physically separate, common walls, walk ways and service tunnels must be ignored);
PtID	Point identification
RAM	Remote access software
Relevant Building	means a building or part of a building used for 1 or more of the following purposes: a) the gathering together, for any purpose, of 100 or more persons: b) providing employment facilities for 10 or more persons:

Term	Definition
	c) providing accommodation for 6 or more persons (other than in 3 or fewer household units): d) a place where hazardous substances are present in quantities exceeding the prescribed minimum amounts, whatever the purpose for which the building is used: e) providing an early childhood education and care centre (other than in a household unit): f) providing nursing, medical, or geriatric care (other than in a household unit): g) providing specialised care for persons with disabilities (other than in a household unit): h) providing accommodation for persons under lawful detention (not being persons serving a sentence of home detention or community detention, or serving a sentence of imprisonment on home detention, or on parole subject to residential restrictions imposed under section 15 of the Parole Act 2002): i) any other prescribed purpose.
Service Agent	Person engaged by the owner of protected premises or relevant building to maintain and repair the protected premises fire alarm
SMART	means the FENZ Spatial Mapping And Reporting Tools database and applications environment associated with the Station Management System, which manages data and information supporting FENZ AFAS Fire Alarm System Commissioning process as described in the AFAS Code of Practice
STS	Signal Transport System. Hardware, software, transmission links, and processes to transport messages between fire alarms and the STSMHS
STSMHS	Signal Transport System Message Handling System. The collection of servers, equipment and transmission links between the AFASP Domain System and the Communications Centres alarm interface servers (which transport messages from the FENZ STSMHS domain to the Communications Centres alarm terminals), as contracted to and managed by the STSMHSSP
STSMHSSP	Signal Transport System Message Handling System Service Provider
TCP/IP	Transmission control protocol
UDP	User datagram protocol
VPN	Virtual private network
WAN	Wide-area network
XAP	Extended alarm protocol

Term	Definition
XML	Extensible markup language. Markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable
XML schema	Describes the structure of an XML document
ZID	Zone identification

1. Overview of XAP Computer Interface Specification

1.1 Introduction

This document describes the Extended Alarm Protocol (XAP) specification for the computer interface between the Fire and Emergency New Zealand (FENZ) Automatic Fire Alarm Communications server operated by FENZ and the Automatic Fire Alarm Service Providers (AFASPs) wide area alarm network.

This document extends the basic (non-XAP) protocol defined in version 1.5 (and later) of the Automatic Fire Alarm Service Provider Computer Interface Specification document (PDF, 1MB) which can be found on the Automatic Fire Alarm Connection section of the FENZ website:

https://fireandemergency.nz/business-and-landlords/automatic-fire-alarm-connection/

All XAP devices and interfaces must conform to the basic protocol specified in that document.

2 XAP log data protocol

2.1 Log data protocol messages

2.1.1 XAP log data message

An XAP log data message is the same as the basic log data message, but with the addition of zone and (optionally) point information. Note that multiple zones and points can be reported on in a single XAP log data message.

A valid XAP log data message must include all fields with profile ‘Essential’.

2.1.2 XAP log data Ack

The XAP Log Data Ack is exactly the same as a basic log data Ack.

3 System data protocol

3.1 System data protocol messages

3.1.1 XAP system data message

An XAP system data message is the same as the basic log data message, but with the addition of zone and (optionally) point IDs. The zones or points being queried must be included in the XAP system data message.

The ZIDs of the zones being queried must be specified, but all other essential zone fields can be set to any valid value (usually set to ‘Unknown’), and are ignored by the AFASP.

If a point is being queried, then its parent’s ZID must be specified and the PtID must be specified. All other essential point and zone fields can be set to any valid value (usually set to ‘Unknown’), and are ignored by the AFASP.

Note that multiple zones and multiple points within a zone can be queried in a single XAP system data message.

3.1.2 XAP system data response

An XAP system data response message is sent by an AFASP server in response to an XAP system data message from the FENZ STSMHS domain. Upon receiving an XAP system data message from the FENZ STSMHS domain the AFASP server must send a related XAP system data response message to the FENZ STSMHS domain within 5 seconds.

The XAP system data response is the same as a basic system data response message, but with the addition of zone and optional point information.

If the original XAP system data message specifies one or more zones, then all information relating to the ZIDs must be returned in the response message. If the original XAP system data message specifies one or more points, then all information relating to the points and their zone parents must be returned in the response message.

A valid XAP system data response must include all fields with profile ‘Essential’.

4 XAP control data protocol

4.1 XAP control data protocol messages

4.1.1 XAP control data message

An XAP control data message is the same as a basic control data message with the addition of zone or point commands.

An XAP control data message is sent by an FENZ STSMHS domain when the FENZ subsystems want to control the mode/status of a fire alarm zone or point within the AFASP wide area alarm network. The system data message is uniquely identified by the unique sequence number and the Brigade ID.

4.1.2 XAP control data response

An XAP control data response message is sent by an AFASP server in response to a XAP control data message from the FENZ STSMHS domain. It is the same as a basic control data response, but with the addition of zone and optional point response information.

A valid response must include all fields with profile ‘Essential’.

5 XAP alarm data specification

The XAP Alarm data specification extends the basic alarm data specification defined in the FENZ AFASP Computer Interface Specification document (PDF, 1MB), with zone and optional point fields.

5.1 XAP alarm data structure overview

Below is the list of fields required by the AFASP and FENZ when sending XAP log, system or control data. The Log data format shall be used for all new, repeats and unacknowledged fire alarm and fire alarm state change of state messages of fire alarms managed by the AFASP. System data from the AFASP sent to the FENZ STSMHS domain uses the same alarm data structure and processes to communicate reports and updated information. Control data from FENZ sent to the AFASP also uses the same alarm data structure to communicate command and control functions.

The data is grouped into the following categories:

Header information	For message identification and message handling.
Site-related information	Information related to a site (e.g. hospital complex). A site is comprised of one or more areas.
Area-related information	Information related to a specific automatic fire alarm. FENZ assigns a unique identification number to each fire alarm. An area comprises one or more zones. For more information about zones.
Zone-related information	Information related to a specific zone. A zone is comprised of one or more points.
Point-related information	Information related to a specific point (e.g. detector).

5.2 Alarm data field structure detail

Because fire protection equipment has varying technical capabilities and associated feature sets (legacy systems), the data fields listed below have different profiles. Refer to the data profile table in section 6.1.

Messages must include all fields with profile ‘Essential’, and those requested fields that are necessary to process the data action. Whether fields with profiles ‘Essential**’ or ‘Optional**’ may, must or must not be included in a data message depends on whether specified conditions are met. These conditions are defined in section 6. They are also included in the data schema.

Optional fields that do not contain data must be marked with the value “Unknown” or “NA” if non-applicable, otherwise an “error” data event will be generated by the recipient server. Optional fields will not generate other errors.

For precise detail regarding field specifications described below, including ownership and/or authoritative data source, refer to the alarm data schema document which is available on request from FENZ.

5.2.1 Zone-related information

If a message includes field 'ZID', then this message must also include all fields in this section (5.2.1) with profile 'Essential*', and may include all fields in this section (5.2.1) with profile 'Optional**'. If a message does not include field 'ZID', then this message must not include any of the fields in this section (5.2.1).

5.2.1.1 Zone ID

Fire alarm zone identification, as assigned by AFASP.

Field name	Field type	Field size	Attributes	Profile	Data source
ZID	Text	8	Duplicates ok	Optional	AFASP

5.2.1.2 Zone description

Zone description for zone identification.

Field name	Field type	Field size	Attributes	Profile	Data source
ZDescription	Text	48	Duplicates ok	Essential**	AFASP

5.2.1.3 Zone type

Zone equipment type description. See the Zone point types table in section 6.2 for valid entries.

Field name	Field type	Field size	Attributes	Profile	Data source
Ztype	Text	16	Duplicates ok	Essential**	AFASP

5.2.1.4 Zone mode summary

Summary mode of the fire alarm zone. See the Modes table in section 7.8 of the FENZ AFASP Computer Interface Specification document (PDF, 1MB) for valid entries, and section 6.4 of that document for rules for mode and status summaries.

Field name	Field type	Field size	Attributes	Profile	Data source
Zmode	Text	12	Duplicates ok	Essential**	AFASP

5.2.1.5 Zone status summary

Summary status of the fire alarm zone. See the Status table in section 7.9 of the FENZ AFASP Computer Interface Specification document (PDF, 1MB) for valid entries, and section 6.4 of that document for rules for mode and status summaries.

Field name	Field type	Field size	Attributes	Profile	Data source
Zstatus	Text	12	Duplicates ok	Essential**	AFASP

5.2.1.6 Zone LLA Co-ordinates

Fire alarm zone longitude, latitude and altitude co-ordinates (in that order, separated by a colon, ':') presented in the decimal degree format. This should be a GPS reading obtained from the zone main entrance.

Field name	Field type	Field size	Attributes	Profile	Data source
ZLLA	Text	32	Duplicates ok	Optional**	AFASP

5.2.2 Point-related information

If a message includes field 'PtID', then this message must also include all fields in this section (5.2.2) with profile 'Essential*', and may include all fields in this section (5.2.2) with profile 'Optional**'. If a message does not include field 'PtID', then this message must not include any of the fields in this section (5.2.2).

5.2.2.1 Point ID

Fire alarm point identification, assigned by AFASP.

Field name	Field type	Field size	Attributes	Profile	Data source
PtID	Text	8	Duplicates ok	Optional	AFASP

5.2.2.2 Point description

Point description for point identification.

Field name	Field type	Field size	Attributes	Profile	Data source
PtDescription	Text	48	Duplicates ok	Optional**	AFASP

5.2.2.3 Point type

Point equipment type. See the Zone point types table in section 6.2 for valid entries.

Field name	Field type	Field size	Attributes	Profile	Data source
PtType	Text	16	Duplicates ok	Essential**	AFASP

5.2.2.4 Point mode

Mode of the fire alarm point. See the Modes table in section 7.8 of the FENZ AFASP Computer Interface Specification document (PDF, 1MB) for valid entries.

Field name	Field type	Field size	Attributes	Profile	Data source
PtMode	Select text	12	Duplicates ok	Essential**	AFASP

5.2.2.5 Point status

Status of the fire alarm point. See the Status table in section 7.9 of the FENZ AFASP Computer Interface Specification document (PDF, 1MB) for valid entries.

Field name	Field type	Field size	Attributes	Profile	Data source
PtStatus	Text	12	Duplicates ok	Essential**	AFASP

5.2.2.6 Point level

For data events from points that can forward analogue values related to the point level (e.g. temperature), with these analogue values corresponding to numeric values from 0 to 100. 0 would relate to the lower limit and 100 to the upper limit of the range covered by the point. If the point cannot forward analogue values, then this field must not be included in the message.

Field name	Field type	Field size	Attributes	Profile	Data source
PtLevel	General Number	4	Duplicates ok	Optional**	AFASP

5.2.2.7 Point rate

For data events from points that can forward analogue values related to the rate of point level change (e.g. temperature change per second), with these analogue values corresponding to numeric values from 0 to 100. These numeric values relate to a change of the point level within a time period of 1 second. 0 relates to no change. 100 relates to a change from lower limit to upper limit of the range covered by the point within 1 second, and (-100) to a change from upper limit to lower limit of the range covered by the point within 1 second. If the point cannot forward analogue values, then this field must not be included in the message.

Field name	Field type	Field size	Attributes	Profile	Data source
PtRate	General Number	5	Duplicates ok	Optional**	AFASP

5.2.2.8 Point LLA Co-ordinates

Fire alarm point longitude, latitude and altitude co-ordinates (in that order, separated by a colon, ‘:’) presented in the decimal degrees’ format. This should be a GPS reading obtained from the point location.

Field name	Field type	Field size	Attributes	Profile	Data source
PtLLA	Text	32	Duplicates ok	Optional**	AFASP

5.3 Rules for mode and status summaries

The status summary and mode summary information of a parent element (site, zone or area) is determined by the states and modes of the child elements (areas, zones or points) related to that parent element. Refer to section 6.4 of the FENZ AFASP Computer Interface Specification document (PDF, 1MB) for rules for how these are summarised from child elements.

6 Select alarm data parameters

6.1 Data profile

Select text	Description
Essential	Fields with profile ‘Essential’ are necessary for any message to be processed. They must be included in every data message.
Essential**	Fields with profile ‘Essential**’ must be included in a data message if specified conditions are met.
Optional	Fields with profile ‘Optional’ contain data that could optionally be sent to FENZ.
Optional**	Fields with profile ‘Optional**’ may or must not to be included in a data message depending on specified conditions.

6.2 Zone point types

Select text	Description
Heat	Heat detector
Gas	Flammable gas detector
Call point	Manual call point
Smoke	Smoke detector
Sprinkler	Sprinkler detector
Flame	Flame detector
Unknown	AFASP database has not determined the equipment type

7 Alarmdata.xsd file, API

To assist development programmers in the design specification for the AFASP application, a programming interface (API) document will be supplied to qualified applicants on request to FENZ.

The alarmdata.xsd file defines both the basic and XAP protocol messages.

8 Change control

Version	Date	Page, Section	Change description
1.4	12 Dec 2008	All	First release of XAP version
1.5	March 2014	All	Reformatted and updated document Section 5 – XAP alarm data specification unchanged Section 6 – Select alarm data parameters unchanged
1.6	July 2017	All	References to NZFS removed and replaced with Fire and Emergency New Zealand (FENZ)
1.7	February 2019	Various	Minor amendments to align specification to FENZ definitions and Agreement terms and conditions