



# AtlasIED Visual Paging Interface Specificaiton

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## Table of Contents

1 Introduction .....	3
1.1 Purpose .....	3
1.2 Scope .....	3
1.3 Definitions .....	3
2 REST Interface Server .....	4
2.1 Overview.....	4
2.2 REST Receiving XML Visual Paging Data .....	4
2.2.1 The <message> XML Element .....	5
2.2.2 The <field> XML Element .....	5
2.2.3 Example.....	6
2.3 REST: Receiving JSON Visual Paging Data .....	6
2.3.1 The “message” JSON Object .....	7
2.3.2 The “field” JSON Element .....	7
2.3.3 Example.....	8
3 MQTT .....	9
3.1 MQTT - Receiving XML Visual Paging Data.....	10
3.1.1 The <message> XML Element.....	10
3.1.2 The <field> XML Element.....	11
3.1.3 Example .....	12
3.2 MQTT - Receiving JSON Visual Paging Data .....	12
3.2.1 The “message” JSON Object .....	13
3.2.2 The “field” JSON Element .....	13
3.2.3 Example.....	14
4 MSMQ (Deprecated).....	15
4.1 MSMQ - Receiving XML Visual Paging Data .....	15
4.1.1 The <message> XML Element.....	16
4.1.2 The <field> XML Element.....	16
4.1.3 Example .....	17
5 IEDNet (Deprecated) .....	18
5.1 The IEDNet Message Format .....	18
5.2 Example .....	18

# 1 Introduction

## 1.1 Purpose

The purpose of this document is to define the transport protocols and data formats relating to visual paging. Specifically, this document is related to visual paging messages received from GCK and 1200ACS audio controllers when audio pages are made. AtlasIED will set up the transport protocol.

This document defines:

- Protocols Supported - This includes the protocol information that you will need to tell AtlasIED customer support before you can receive visual paging data.
- Data Format - This includes the format of the incoming data and how it looks so that you can write parsers to contextualize the data.

## 1.2 Scope

This document only describes the visual paging data and the protocols used to transmit it. The user is expected to filter out all other data received. No sending of data is required.

## 1.3 Definitions

This document uses the following definitions of AtlasIED products and services:

Product / Service	Definition
ACS	Announcement Control System (audio controller)
GCK	AtlasIED's current generation audio controller (GLOBALCOM ControlKom)
1200ACS	AtlasIED's previous generation of audio controller
Interface Server	The AtlasIED server that communicates visual paging data

## 2 REST Interface Server

### 2.1 Overview

The interface server can be configured to use a Representational State Transfer (REST) endpoint by AtlasIED. To configure the REST endpoint, tell AtlasIED:

- The endpoint you wish to use to receive data (HTTP or HTTPS) (for example, `http://192.168.55.35/myincomingervice/myincomingendpoint`)
- The type of data you wish to receive (XML or JSON)

Below is a Fiddler Everywhere example using "Postman" REST call using the POST method to send data to the endpoint.

**Note:** Postman is used as one example of a publicly available REST endpoint. There are many others available.



### 2.2 REST Receiving XML Visual Paging Data

This section defines the format of the messages received using the XML format.

A REST POST message is received whenever a page occurs on an ACS with a visual paging output. All POST visual paging messages use the following static XML container:

```

<?xml version="1.0" encoding="utf-8"?>
<iednet version="1.0" object_id="1200">
  <message id="2" >
    <field></field>
    ...
  </message>
</iednet>
  
```

**Note:** The XML declaration at the beginning of the data is always included in the data and uses "utf-8" by default. If you require other character encodings, please contact AtlasIED. XML received that does not have this static container should be discarded.

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### 2.2.1 The <message> XML Element

One <message> element is sent in every visual paging XML message. This element always includes the id="2" attribute for visual paging messages. The XML attributes for the <message> element are:

XML Attribute	Definition
message_number	An auto incremented id used to differentiate pages made from an ACS. When value reaches 9999, the counter starts back at 1 for the next page. Possible values: 1-9999.
ipaddress	This is the IP address of the originator of the message. Possible values: IPv4 IP Addresses

### 2.2.2 The <field> XML Element

The <field> element has these three XML attributes:

XML Attribute	Definition
field_num	A unique number for each <field> element in the message. Possible values: 1-11.
name	A unique name for each <field> element in the message. Either this or field_num can be used as a unique key for the field element. Possible values: string
type	Ignore, for internal use only.

There are always 11 <field> elements as children of a visual paging XML <message> element. Only two of those elements are useful for external visual paging interfaces. Those <field> elements have a "name" of:

- **Sign Zone List** – This is a list of the "sign zones" as set up in the audio controller, separated by the dash (-) character. These are sent out as a decimal format.

**Note:** It is also possible to send these fields out in a **hexadecimal** format. Contact AtlasIED for more information.

#### Example

```
<field field_num="9" name="sign zone list" type="bytelist">56-57-81-82</field>
```

- **Message Text** – The actual text associated with the page on the ACS. In XML format the message text is always wrapped in a CDATA tag to preserve any special character.

#### Example

```
<field field_num="11" name="message text" type="text"><![CDATA[Attention everyone, there is an emergency in the building. Please make your way to the nearest exit]]></field>
```

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### 2.2.3 Example

Below is an example of a no smoking audio page set up to page to sign zones 57, 58, and 79 in GCK, which has an IP address of "192.168.1.25" (ignore all the <field> elements that appear in gray):

```
<?xml version="1.0" encoding="utf-8"?>
<iednet version="1.0" object_id="1200">
  <message id="2" message_number="3937" ipaddress="192.168.1.25">
    <field field_num="1" name="priority" type="byte">0</field>
    <field field_num="2" name="panel number" type="byte">0</field>
    <field field_num="3" name="message id" type="word">0</field>
    <field field_num="4" name="message format" type="word">0</field>
    <field field_num="5" name="message hold time" type="word">180</field>
    <field field_num="6" name="text size" type="byte">0</field>
    <field field_num="7" name="routing" type="byte">0</field>
    <field field_num="8" name="number of zones" type="byte">3</field>
    <field field_num="9" name="sign zone list" type="bytelist">57-58-79</field>
    <field field_num="10" name="message length" type="word">113</field>
    <field field_num="11" name="message text" type="text"><![CDATA[Smoking
is permitted in designated areas only. Please refrain from smoking while walking
throughout the building.]]></field>
  </message>
</iednet>
```

### 2.3 REST: Receiving JSON Visual Paging Data

A REST POST message is received from the interface server whenever a page occurs on an ACS with a visual paging output. This section defines the format of the messages received using the JSON format.

All visual paging messages use the following static JSON container:

```
{ "iednet": {
  "version": "1.0",
  "object_id": "1200",
  "message": {
    "id": "2"
  }
  ...
}
}}
```

**Note:** JSON received not containing this static container should be discarded.

### 2.3.1 The “message” JSON Object

One “message” object is sent in every visual paging JSON message. This object always includes an id object of “2” for visual paging messages. The JSON objects owned by the “message” object are:

XML Attribute	Definition
message_number	An auto incremented id used to differentiate pages made from an ACS. When value reaches 9999, the counter starts back at 1 for the next page. Possible values: 1-9999.
ipaddress	This is the IP address of the originator of the message. Possible values: IPv4 IP Addresses

### 2.3.2 The “field” JSON Element

The “field” object owns these three JSON objects:

XML Attribute	Definition
field_num	A unique number for each <field> element in the message. Possible values: 1-11.
name	A unique name for each <field> element in the message. Either this or field_num can be used as a unique key for the field element. Possible values: string
type	Ignore, for internal use only.

There are always 11 “field” objects owned by a “message” object. Only two of those objects are useful. Those two “field” tags have a “name” of:

- **Sign Zone List** – This is a list of the “sign zones” as set up in the ACS, separated by the dash (-) character. These are sent as a decimal format.

**Note:** It is also possible to send these fields out in a **hexadecimal** format. Contact AtlasIED for more information.

#### Example

```
{"field_num": "9", "name": "sign zone list", "type": "bytelist", "text": "56-57-81-82"}
```

- **Message Text** – The actual text associated with the page on the ACS.

#### Example

```
{"field_num": "11", "name": "message text", "type": "text", "text": "Attention everyone, there is an emergency in the building. Please make your way to the nearest exit"}
```

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### 2.3.3 Example

Example of a no smoking audio page set up to page to sign zones 57, 58, and 79 in GCK and GCK has an IP address of "192.168.1.25" (ignore all "field" objects that appear in gray):

```
{
  "iednet": {
    "version": "1.0",
    "object_id": "1200",
    "message": {
      "id": "2",
      "message_number": "342",
      "ipaddress": "192.168.1.25",
      "field": [
        {"field_num": "1", "name": "priority", "type": "byte", "text": "0"},
        {"field_num": "2", "name": "panel number", "type": "byte", "text": "0"},
        {"field_num": "3", "name": "message id", "type": "word", "text": "0"},
        {"field_num": "4", "name": "message format", "type": "word", "text": "0"},
        {"field_num": "5", "name": "message hold time", "type": "word", "text": "180"},
        {"field_num": "6", "name": "text size", "type": "byte", "text": "0"},
        {"field_num": "7", "name": "routing", "type": "byte", "text": "0"},
        {"field_num": "8", "name": "number of zones", "type": "byte", "text": "3"},
        {"field_num": "9", "name": "sign zone list", "type": "bytelist",
          "text": "57-78-79"},
        {"field_num": "10", "name": "message length", "type": "word", "text": "113"},
        {"field_num": "11", "name": "message text", "type": "text",
          "text": "Smoking is permitted in designated areas only. Please refrain from
          smoking while walking throughout the building."},
      ]
    }
  }
}
```



### 3 MQTT

The interface server can be configured to use MQTT by AtlasIED. To configure, tell AtlasIED:

- Your preference for encrypted or non-encrypted data
  - Unencrypted TCP/IP (Port 1883)
  - Encrypted over SSL (Port 8883)
- The type of data you wish to receive (XML or JSON)
- If you wish to use a username and password
- A list of MQTT topics and the sign zones you wish to subscribe data for each:

#### Example

MOTT Topic	Sign Zone
\$SYS/firstfloor/lefthall	20,21,40
\$SYS/firstfloor/righthall	22,23,53
\$SYS/secondfloor	30,31,32,33,34

By default, all sign zones are sent using the same MQTT topic.

The following example shows how HiveMQ is used to test receiving visual paging messages via MQTT.

**Note:** HiveMQ is used as just one example of a publicly available MQTT broker. There are many others available.

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### 3.1 MQTT - Receiving XML Visual Paging Data

AtlasIED can configure the interface server to send visual paging data to the MQTT broker as XML. This section defines the format of the messages received using XML.

All XML visual paging messages use the following static container:

```

<?xml version="1.0" encoding="utf-8"?>
<iednet version="1.0" object_id="1200">
  <message id="2" >
    <field></field>
    ...
  </message>
</iednet>
```

Note that the XML declaration at the beginning of the data is always included in the data and uses "utf-8" by default. If you require other character encodings, please contact AtlasIED.

**Note:** XML received not containing this static container should be discarded.

#### 3.1.1 The <message> XML Element

One <message> element is sent in every visual paging XML message. This element always includes the id="2" attribute for visual paging messages. The XML attributes for the <message> element are:

XML Attribute	Definition
message_number	An auto incremented id used to differentiate pages made from an ACS. When value reaches 9999, the counter starts back at 1 for the next page. Possible values: 1-9999.
ipaddress	This is the IP address of the originator of the message. Possible values: IPv4 IP Addresses

### 3.1.2 The <field> XML Element

The <field> element has these three XML attributes:

XML Attribute	Definition
field_num	A unique number for each <field> element in the message. Possible values: 1-11.
name	A unique name for each <field> element in the message. Either this or field_num can be used as a unique key for the field element. Possible values: string
type	Ignore, for internal use only.

There are always 11 <field> elements as children of a visual paging XML <message> element. Only two of those elements are useful for external visual paging interfaces. Those <field> elements have a "name" of:

- **Sign Zone List** – This is a list of the "sign zones" as set up in the audio controller, separated by the dash (-) character. These are sent out as a decimal format.

**Note:** It is also possible to send these fields out in a **hexadecimal** format. Contact AtlasIED for more information.

#### Example

```
<field field_num="9" name="sign zone list" type="bytelist">56-57-81-82</field>
```

- **Message Text** – The actual text associated with the page on the ACS. In XML format the message text is always wrapped in a CDATA tag to preserve any special character.

#### Example

```
<field field_num="11" name="message text" type="text"><![CDATA[Attention everyone, there is an emergency in the building. Please make your way to the nearest exit]]></field>
```

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### 3.1.3 Example

Below is an example of a no smoking audio page set up to page to sign zones 57, 58, and 79 in GCK, which has an IP address of "192.168.1.25" (ignore all the <field> elements that appear in gray):

```
<?xml version="1.0" encoding="utf-8"?>
<iednet version="1.0" object_id="1200">
  <message id="2" message_number="3937" ipaddress="192.168.1.25">
    <field field_num="1" name="priority" type="byte">0</field>
    <field field_num="2" name="panel number" type="byte">0</field>
    <field field_num="3" name="message id" type="word">0</field>
    <field field_num="4" name="message format" type="word">0</field>
    <field field_num="5" name="message hold time" type="word">180</field>
    <field field_num="6" name="text size" type="byte">0</field>
    <field field_num="7" name="routing" type="byte">0</field>
    <field field_num="8" name="number of zones" type="byte">3</field>
    <field field_num="9" name="sign zone list" type="bytelist">57-58-79</field>
    <field field_num="10" name="message length" type="word">113</field>
    <field field_num="11" name="message text" type="text"><![CDATA[Smoking
is permitted in designated areas only. Please refrain from smoking while walking
throughout the building.]]></field>
  </message>
</iednet>
```

### 3.2 MQTT - Receiving JSON Visual Paging Data

AtlasIED can configure the interface server to send visual paging data to the MQTT broker as JSON. This section defines the format of the messages received using the JSON format.

All visual paging messages use the following static JSON container:

```
{
  "iednet": {
    "version": "1.0",
    "object_id": "1200",
    "message": {
      "id": "2"
    }
  }
}
```

**Note:** JSON received not containing this static container should be discarded.

### 3.2.1 The “message” JSON Object

One “message” object is sent in every visual paging JSON message. This object always includes an id object of “2” for visual paging messages. The JSON objects owned by the “message” object are:

JSON Object Name	Definition
message_number	An auto incremented id used to differentiate pages made from an ACS. When value reaches 9999, the counter starts back at 1 for the next page. Possible values: 1-9999.
ipaddress	This is the IP address of the originator of the message. Possible values: IPv4 IP Addresses

### 3.2.2 The “field” JSON Element

The “field” object owns these three JSON objects:

XML Attribute	Definition
field_num	A unique number for each <field> element in the message. Possible values: 1-11.
name	A unique name for each <field> element in the message. Either this or field_num can be used as a unique key for the field element. Possible values: string
type	Ignore, for internal use only.

There are always 11 “field” objects owned by a “message” object. Only two of those objects are useful. Those two “field” tags have a “name” of:

- **Sign Zone List** – This is a list of the “sign zones” as set up in the ACS, separated by the dash (-) character. These are sent as a decimal format.

**Note:** It is also possible to send these fields out in a **hexadecimal** format. Contact AtlasIED for more information.

#### Example

```
{"field_num": "9", "name": "sign zone list", "type": "bytelist", "text": "56-57-81-82"}
```

- **Message Text** – The actual text associated with the page on the ACS.

#### Example

```
{"field_num": "11", "name": "message text", "type": "text", "text": "Attention everyone, there is an emergency in the building. Please make your way to the nearest exit"}
```

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### 3.2.3 Example

Example of a no smoking audio page set up to page to sign zones 57, 58, and 79 in GCK and GCK has an IP address of "192.168.1.25" (ignore all "field" objects that appear in gray):

```
{
  "iednet": {
    "version": "1.0",
    "object_id": "1200",
    "message": {
      "id": "2",
      "message_number": "342",
      "ipaddress": "192.168.1.25",
      "field": [
        {"field_num": "1", "name": "priority", "type": "byte", "text": "0"},
        {"field_num": "2", "name": "panel number", "type": "byte", "text": "0"},
        {"field_num": "3", "name": "message id", "type": "word", "text": "0"},
        {"field_num": "4", "name": "message format", "type": "word", "text": "0"},
        {"field_num": "5", "name": "message hold time", "type": "word", "text": "180"},
        {"field_num": "6", "name": "text size", "type": "byte", "text": "0"},
        {"field_num": "7", "name": "routing", "type": "byte", "text": "0"},
        {"field_num": "8", "name": "number of zones", "type": "byte", "text": "3"},
        {"field_num": "9", "name": "sign zone list", "type": "bytelist",
          "text": "57-78-79"},
        {"field_num": "10", "name": "message length", "type": "word", "text": "113"},
        {"field_num": "11", "name": "message text", "type": "text",
          "text": "Smoking is permitted in designated areas only. Please refrain from
          smoking while walking throughout the building."},
      ]
    }
  }
}
```

## 4 MSMQ (Deprecated)

Microsoft Message Queueing (MSMQ) is a message queuing implementation developed by Microsoft and is available on all current Microsoft operating systems. While it is widely available, it has been largely abandoned by Microsoft since their last 6.3 release in October 2014. It is also not included in their current .Net Core strategy. The MSMQ interface listed below is not actively maintained/updated by AtlasIED. While MSMQ can be configured for use with the ACS, it is not recommended and may not be offered in the future.

Once configured by AtlasIED, visual paging messages are located on the interface server's MSMQ.

Below is the default queue address on the interface server:

```
DIRECT=TCP:[INTERFACE SERVER IP]private$visual_paging_output
```

MSMQ ports are standard and do not change. They are listed here for reference:

- TCP Port 1801
- UDP Port 1801
- RPC Port 135, 2101\*, 2103\*, 2105\*. \*If Port is in use, port is incremented by 11.

For more information about MSMQ ports it uses:

[https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2008-r2-and-2008/cc725576\(v=ws.10\)](https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2008-r2-and-2008/cc725576(v=ws.10))

General information on Microsoft Message Queueing can be found here:

[https://docs.microsoft.com/en-us/previous-versions/windows/desktop/msmq/ms711472\(v=vs.85\)](https://docs.microsoft.com/en-us/previous-versions/windows/desktop/msmq/ms711472(v=vs.85))

**Note:** The documents linked above are no longer being maintained by Microsoft.

Visual paging messages arriving on MSMQ use UTF-8 by default. If you require other character encodings, please contact AtlasIED.

### 4.1 MSMQ - Receiving XML Visual Paging Data

The MSMQ interface server writes to the queue on its local machine. The MSMQ interface contains XML only. JSON is not supported. All XML visual paging messages use the following static container:

All XML visual paging messages use the following static container:

```
<?xml version="1.0" encoding="utf-8"?>
<iednet version="1.0" object_id="1200">
  <message id="2" >
    <field></field>
    ...
  </message>
</iednet>
```

Note that the XML declaration at the beginning of the data is always included in the data and uses "utf-8" by default. If you require other character encodings, please contact AtlasIED.

**Note:** XML received not containing this static container should be discarded.

#### 4.1.1 The <message> XML Element

One <message> element is sent in every visual paging XML message. This element always includes the id="2" attribute for visual paging messages. The XML attributes for the <message> element are:

XML Attribute	Definition
message_number	An auto incremented id used to differentiate pages made from an ACS. When value reaches 9999, the counter starts back at 1 for the next page. Possible values: 1-9999.
ipaddress	This is the IP address of the originator of the message. Possible values: IPv4 IP Addresses

#### 4.1.2 The <field> XML Element

The <field> element has three XML attributes as follows:

XML Attribute	Definition
field_num	A unique number for each <field> element in the message. Possible values: 1-11.
name	A unique name for each <field> element in the message. Either this or field_num can be used as a unique key for the field element. Possible values: string
type	Ignore, for internal use only.

There are always 11 "field" objects owned by a "message" object. Only two of those objects are useful. Those two "field" tags have a "name" of:

- **Sign Zone List** – This is a list of the "sign zones" as set up in the audio controller, separated by the dash (-) character. These are sent out as a decimal format.

**Note:** It is also possible to send these fields out in a **hexadecimal** format. Contact AtlasIED for more information.

#### Example

```
<field field_num="9" name="sign zone list" type="bytelist">56-57-81-82</field>
```

- **Message Text** – The actual text associated with the page on the ACS. In XML format the message text is always wrapped in a CDATA tag to preserve any special character.

#### Example

```
<field field_num="11" name="message text" type="text"><![CDATA[Attention everyone, there is an emergency in the building. Please make your way to the nearest exit]]></field>
```

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### 4.1.3 Example

Example of a no smoking audio page set up to page to sign zones 57, 58, and 79 in GCK where GCK has an IP address of "192.168.1.25". All greyed out <field> elements can be ignored:

```
<?xml version="1.0" encoding="utf-8"?>
<iednet version="1.0" object_id="1200">
  <message id="2" message_number="3937" ipaddress="192.168.1.25">
    <field field_num="1" name="priority" type="byte">0</field>
    <field field_num="2" name="panel number" type="byte">0</field>
    <field field_num="3" name="message id" type="word">0</field>
    <field field_num="4" name="message format" type="word">0</field>
    <field field_num="5" name="message hold time" type="word">180</field>
    <field field_num="6" name="text size" type="byte">0</field>
    <field field_num="7" name="routing" type="byte">0</field>
    <field field_num="8" name="number of zones" type="byte">3</field>
    <field field_num="9" name="sign zone list" type="bytelist">57-58-79</field>
    <field field_num="10" name="message length" type="word">113</field>
    <field field_num="11" name="message text" type="text"><![CDATA[Smoking
is permitted in designated areas only. Please refrain from smoking while walking
throughout the building.]]></field>
  </message>
</iednet>
```

## 5 IEDNet (Deprecated)

IEDNet is an older proprietary format based upon UDP. The information for receiving an IEDNet message is included here for legacy reasons as many third-party systems that exist today have been using this protocol for many years. The IEDNet interface listed below is not actively maintained or updated by AtlasIED. While IEDNet can be configured for use with the ACS, it is not recommended for use and may not be offered in the future.

IEDNet messages are received directly from the ACS and must be filtered. The ACS sends IEDNet UDP packets from port 3049 to port 3048 on the client. IEDNet does not use JSON or XML. It is restricted to a small format datagram for UDP usage.

One IEDNet UDP network message is received whenever a page occurs on an ACS with a visual paging output. This section defines the format of the messages received.

### 5.1 The IEDNet Message Format

The IEDNet message format for visual paging is as follows:

Field Number	Definition	Content
1	A unique header which should be checked against every time to ensure other IEDNet messages are filtered out.	44454400120200
2	An auto incremented id used to differentiate pages made from an AtlasIED audio controller. When value reaches 9999, the counter starts back at 1 for the next page. Possible values: 1-9999.	word
3	Internal use only.	10 bytes
4	Number of bytes in field 5.	byte
5	List of sign zones as set up in of sign zones for this page as set up in the audio controller.	x bytes (defined in field 4)
6	Number of bytes in field 7.	word
7	This is the text to display in ASCII format. ( <b>Note:</b> <i>If international character sets are to be displayed, this field will be encoded in UTF-8 format.</i> )	x bytes (defined in field 6)

### 5.2 Example

Example of an emergency audio page set up to page to sign zones 1-8 in GCK and GCK has an IP address of "192.168.1.25". All greyed out "field" objects can be ignored:

The image shows a Wireshark packet capture of an IEDNet UDP message. The packet is an Internet Protocol Version 4 (IP) packet with source IP 192.168.1.25 and destination IP 192.168.1.255. The transport protocol is UDP, with source port 3049 and destination port 3048. The data field contains 288 bytes of data, which is the IEDNet message body. Red boxes and arrows highlight the source IP and port, the destination port, and the start of the message body.

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