Integrate with ixicare via WebSocket protocol

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Introduction

The purpose of this document is to describe the communication scheme between the ixicare SAAS services and 3rd-party external services that need to be aware of ixicare events, such as alerts, location of devices, etc... It describes the format of the exchanged messages, the sequence of the messages, the various data types and the timings of the messages.

The document shall not provide specific instructions about the implementation of the protocol on the various services, but shall define the frameworks and propose candidate libraries to be used.

Transport layer

The interface is based on socket.io over websockets. You can find detailed information about socket.io here: https://socket.io

```
https://dx.svc.ixicare.com/ws?site_uuid=<site-uuid>
```

ixicare will provide the list of supported site UUIDs.

After the 3rd-party service establishes a connection and promotes the connection to socket.io, it must register to topic “**alerts**”, as the ixicare service will send the downlink alert messages to that topic. The topic **“heartbeats**” is used for the downlink heartbeat events.

When the 3rd-party service sends a socket.io alert update uplink message it must send it to the topic “**alerts**”.

Message retention

The ixicare service will retain the Alert events for at least 24 hours, if the interested 3rd-party service is not connected to ixicare. Upon connection, the ixicare service will send all the stored events, but will report only the latest status of the events, so if an alert has been resolved, the ixicare service will only send the resolution event.

Connection security

The connection will be established using TLS 1.2 or above, with **wss** protocol.

ixicare shall provide a token for each of the supported sites, so the websocket connection request must have the **Authorization header** set to:

```
Authorization: Bearer <token>
```

If the token is missing, the ixicare service will return a **401 Unauthorised** status code.

Frame format

Alert event (downlink)


```
{
    "version": "1.0.0",
    "type": "ALERT",
    "device": {
        "id": "00:02:04:06:08:0A",
        "phone_number": "+3281000000",
        "battery_level": 90,
        "last_update": 1698505520
    },
    "alert": {
        "id": "4da86f15-16be-49f8-9430-3b3ca0585819",
        "type": "PANIC_BUTTON",
        "status": "OPEN",
        "timestamp": 1698505526
    },
    "user": {
        "id": "4dffdfa4-f11c-4c64-9140-931accea4f6e",
        "name": "John Smith"
    },
    "location": {
        "indoor": {
            "floor": "Floor 1",
            "zone": "1.16 Bedroom",
            "zone_id": "9780e244-1e48-4669-9f47-20d63f453fde",
            "last_update": 1698505520
        },
        "outdoor": {
            "latitude": 56.823279418945,
            "longitude": 22.162609863281,
            "last_update": 1698505520
        }
    }
}
```


When the ixicare backend receives an alert from one of the site devices, it propagates an “Alert event” message to the registered external service.

The message fields are:

version

The protocol version of the message. It can be used to define the appropriate parser of the messages.

type
The message type.

device
id
The MAC address of the device that raised the alert

phone_number [OPTIONAL]
The phone number of the device, if known.

battery_level
The battery level of the device as a percentage.
It supports float values between 0-100.

last_update
The epoch of the last reported device information.

alert
id
The unique ID of the alert in ixicare's system.
The format of the ID is UUID4.

type
The type of the alert.
Supported types (in priority order from the most critical to the least critical) are:
- MAN_DOWN
- GEOFENCING
- PANIC_BUTTON
- CRITICAL_BATTERY

The type of an alert may be escalated, if a more critical event occurs while the alert is active. In this case, ixicare shall broadcast the new alert message, with the escalated type.

status
The status of the alert.
Supported values are:
- OPEN
- ACCEPTED, when a member of the staff allocates the alert
- RESOLVED, when a member of the staff resolves the alert
- CANCELLED, when the alert is cancelled on the device

The alert allocation step is not mandatory, it's used to help coordination between the members of the staff. When someone accepts the alert, he/she becomes

responsible for its resolution and the rest of the staff can stop receiving updates about the alert.

timestamp
The epoch of the alert (number of seconds that have elapsed since January 1, 1970 UTC).

user [OPTIONAL]
id
The unique ID of the user associated with the alert, in ixicare's system.

name
The registered name of the user.

location [OPTIONAL]
The location contains an indoor and/or an outdoor object, depending on the whereabouts, configuration and type of the device.
Currently, only the **IXI PRO** supports an outdoor location.

In some cases, the current location of a device may not be available right away when an alert is raised (depending on the outdoors coverage). Location updates will be provided in subsequent heartbeat messages.

indoor
floor
The floor name of the zone

zone
The zone name

zone_id
The zone id in ixicare's system in UUID4 format

last_update
The epoch of the last reported location.

outdoor
latitude
The GPS latitude of the latest reported location

longitude
The GPS longitude of the latest reported location

last_update [optional on devices with older firmware versions]
The epoch of the last reported location.

Alert update (uplink)

```
{
    "version": "1.0.0",
    "type": "ALERT",
    "device_id":"00:02:04:06:08:0A",
    "alert": {
        "id": "4da86f15-16be-49f8-9430-3b3ca0585819",
        "action": "RESOLVE"
    }
}
```

When an alert is active, it is possible to allocate the alert or resolve it by sending an uplink “Alert update” message.

The message fields are:

version
The protocol version of the message. It can be used to define the appropriate parser of the messages.

type
The message type.

device_id
The MAC address of the device that raised the alert

alert

id
The unique ID of the alert in ixicare’s system.
The format of the ID is UUID4.

action
The action to perform.
Supported values are:

- ACCEPT
- RESOLVE

Alert update response (downlink)

```
{
    "version": "1.0.0",
    "type": "ALERT",
    "device_id":"00:02:04:06:08:0A",
    "alert": {
        "id": "4da86f15-16be-49f8-9430-3b3ca0585819",
        "action": "RESOLVE",
    },
    "result": "FAILURE",
    "error": "Invalid action"
}
```

When the 3rd-party service sends an Alert update, the ixicare service will reply asynchronously with the result of the update command.

The message fields are:

version
The protocol version of the message. It can be used to define the appropriate parser of the messages.

type
The message type.

device_id
The MAC address of the device that raised the alert

alert
id
The unique ID of the alert in ixicare's system.
The format of the ID is UUID4.

action
The action to perform.
Supported values are:
- ACCEPT
- RESOLVE

result
The result of the Alert update command.
Supported values are:
- SUCCESS
- FAILURE

error [OPTIONAL]

If the result of the Alert update command is “**FAILURE**”, this field will contain a brief description of the error that occurred.

Heartbeat event (downlink)


```
{
    "version": "1.0.0",
    "type": "HEARTBEAT",
    "device": {
        "id": "00:02:04:06:08:0A",
        "phone_number": "+3281000000",
        "battery_level": 90,
        "last_update": 1698505520
    },
    "location": {
        "indoor": {
            "floor": "Floor 1",
            "zone": "1.16 Bedroom",
            "zone_id": "9780e244-1e48-4669-9f47-20d63f453fde",
            "last_update": 1698505520
        },
        "outdoor": {
            "latitude": 56.823279418945,
            "longitude": 22.162609863281,
            "last_update": 1698505520
        }
    }
}
```


The heartbeat event will send the last known device information and the last known location. The location and device information can have different last_update times. Both the device information and location information can have changed once, changed multiple types or not have changed since the last heartbeat. The data will always be the latest known information. Use the last_update fields to check the actual age of this data.

The message fields are:

version
The protocol version of the message. It can be used to define the appropriate parser of the messages.

type
The message type.

device
id
The MAC address of the device that raised the alert.

phone_number [OPTIONAL]

The phone number of the device, if known.

battery_level
The battery level of the device as a percentage.
It supports float values between 0-100.

last_update
The epoch of the last reported device information.

location
The location contains an indoor or/and an outdoor object, depending on the whereabouts and type of the device.
Currently, only the **IXI PRO** supports an outdoor location.

indoor
floor
The floor name of the zone

zone
The zone name

zone_id
The zone id in ixicare's system in UUID4 format

last_update [optional on devices with older firmware versions]
The epoch of the last reported location

outdoor
latitude
The GPS latitude of the latest reported location

longitude
The GPS longitude of the latest reported location

last_update [optional on devices with older firmware versions]
The epoch of the last reported location

Appendix A

JSON schemas of the messages.

Alert event

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "object",
  "properties": {
    "version": {
      "type": "string"
    },
    "type": {
      "type": "string",
      "enum": [
        "ALERT"
      ]
    },
    "device": {
      "type": "object",
      "properties": {
        "id": {
          "type": "string"
        },
        "phone_number": {
          "type": "string"
        },
        "battery_level": {
          "type": "number"
        },
        "last_update": {
          "type": "number"
        }
      },
      "required": [
        "id",
        "battery_level",
        "last_update"
      ]
    },
    "alert": {
      "type": "object",
      "properties": {
        "id": {
```

```
          "type": "string",
          "format": "uuid"
        },
        "type": {
          "type": "string",
          "enum": [
            "PANIC_BUTTON",
            "MAN_DOWN",
            "GEOFENCING",
            "CRITICAL_BATTERY"
          ]
        },
        "status": {
          "type": "string",
          "enum": [
            "OPEN",
            "ACCEPTED",
            "RESOLVED",
            "CANCELLED"
          ]
        },
        "timestamp": {
          "type": "number"
        }
      },
      "required": [
        "id",
        "type",
        "status",
        "timestamp"
      ]
    },
    "user": {
      "type": "object",
      "properties": {
        "name": {
          "type": "string"
        },
        "id": {
          "type": "string",
          "format": "uuid"
        }
      },
      "required": [
        "id",
        "name"
```

```
      ]
    },
    "location": {
      "type": "object",
      "properties": {
        "indoor": {
          "type": "object",
          "properties": {
            "floor": {
              "type": "string"
            },
            "zone": {
              "type": "string"
            },
            "zone_id": {
              "type": "string",
              "format": "uuid"
            },
            "last_update": {
              "type": "number"
            }
          },
          "required": [
            "floor",
            "zone",
            "zone_id",
            "last_update"
          ]
        },
        "outdoor": {
          "type": "object",
          "properties": {
            "latitude": {
              "type": "number"
            },
            "longitude": {
              "type": "number"
            },
            "last_update": {
              "type": "number"
            }
          },
          "required": [
            "latitude",
            "longitude"
          ]
```

```
        }
      },
      "minProperties": 1,
      "maxProperties": 2
    }
  },
  "required": [
    "version",
    "type",
    "device",
    "alert"
  ]
}
```

Alert update

```
{
    "$schema": "http://json-schema.org/draft-07/schema#",
    "type": "object",
    "properties": {
        "version": {
            "type": "string"
        },
        "type": {
            "type": "string",
            "enum": [
                "ALERT"
            ]
        },
        "device_id": {
            "type": "string"
        },
        "alert": {
            "type": "object",
            "properties": {
                "id": {
                    "type": "string",
                    "format": "uuid"
                },
                "action": {
                    "type": "string",
                    "enum": [
                        "ACCEPT",
```

```
                        "RESOLVE"
                    ]
                }
            },
            "required": [
                "id",
                "action"
            ]
        }
    },
    "required": [
        "version",
        "type",
        "device_id",
        "alert"
    ]
}
```

Alert update response

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "object",
  "properties": {
    "version": {
      "type": "string"
    },
    "type": {
      "type": "string",
      "enum": [
        "ALERT"
      ]
    },
    "device_id": {
      "type": "string"
    },
    "alert": {
      "type": "object",
      "properties": {
        "id": {
          "type": "string",
          "format": "uuid"
        },
```

```
        "action": {
          "type": "string",
          "enum": [
            "ACCEPT",
            "RESOLVE"
          ]
        }
      },
      "required": [
        "id",
        "action"
      ]
    },
    "result": {
      "type": "string",
      "enum": [
        "SUCCESS",
        "FAILURE"
      ]
    },
    "error": {
      "type": "string"
    }
  },
  "required": [
    "version",
    "type",
    "device_id",
    "alert",
    "result"
  ]
}
```

Heartbeat event

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "object",
  "properties": {
    "version": {
      "type": "string"
    },
    "type": {
      "type": "string",
```

```
      "enum": [
        "LOCATION"
      ]
    },
    "device": {
      "type": "object",
      "properties": {
        "id": {
          "type": "string"
        },
        "phone_number": {
          "type": "string"
        },
        "battery_level": {
          "type": "number"
        },
        "last_update": {
          "type": "number"
        }
      },
      "required": [
        "id",
        "battery_level",
        "last_update"
      ]
    },
    "location": {
      "type": "object",
      "properties": {
        "indoor": {
          "type": "object",
          "properties": {
            "floor": {
              "type": "string"
            },
            "zone": {
              "type": "string"
            },
            "zone_id": {
              "type": "string",
              "format": "uuid"
            },
            "last_update": {
              "type": "number"
            }
          },
```

```
          "required": [
            "floor",
            "zone",
            "zone_id",
            "last_update"
          ]
        },
        "outdoor": {
          "type": "object",
          "properties": {
            "latitude": {
              "type": "number"
            },
            "longitude": {
              "type": "number"
            },
            "last_update": {
              "type": "number"
            }
          },
          "required": [
            "latitude",
            "longitude"
          ]
        }
      },
      "minProperties": 1,
      "maxProperties": 2
    }
  },
  "required": [
    "version",
    "type",
    "device",
    "location"
  ]
}
```