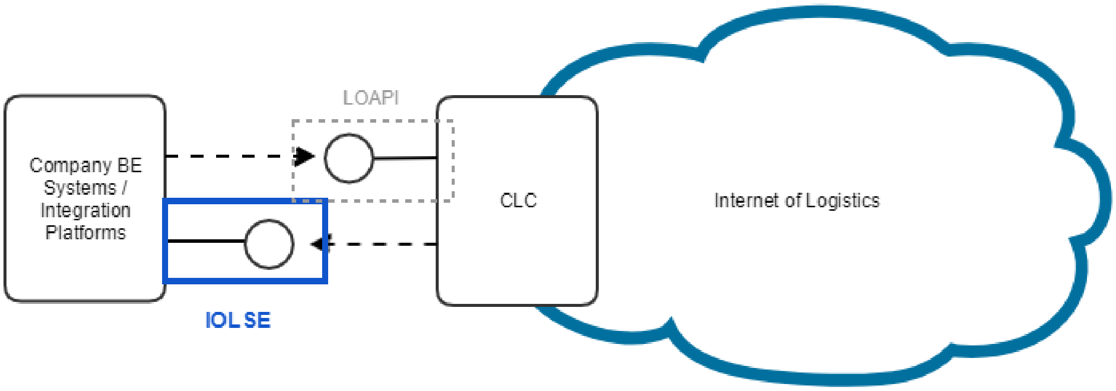
Subscribing and the Internet of Logistics Subscription Endpoint

Contents

Overview

It is important that companies within the Internet of Logistics (IoL) can receive data into their back-end systems in a near real time manner, as they would today if they had a B2B connection setup. However in comparison to the point to point B2B connections that are in place today or the hub and spoke business model that are also in place with data exchange companies, the IoL is proposing a publish and subscribe pattern to avoid point to point integrations and allow for a distributed network of Internet of Logistics compliant platforms. This document will first describe how the publish and subscribe model is intended to be implemented in the IoL. It will then go into detail to describe how companies will be identified and addressed within the IoL, how subscriptions will be setup and lastly it will describe the requirements of a IoL Subscription Endpoint (IOLSE) which a company must implement in order to receive information from the IoL.



Publish and Subscribe in the IoL

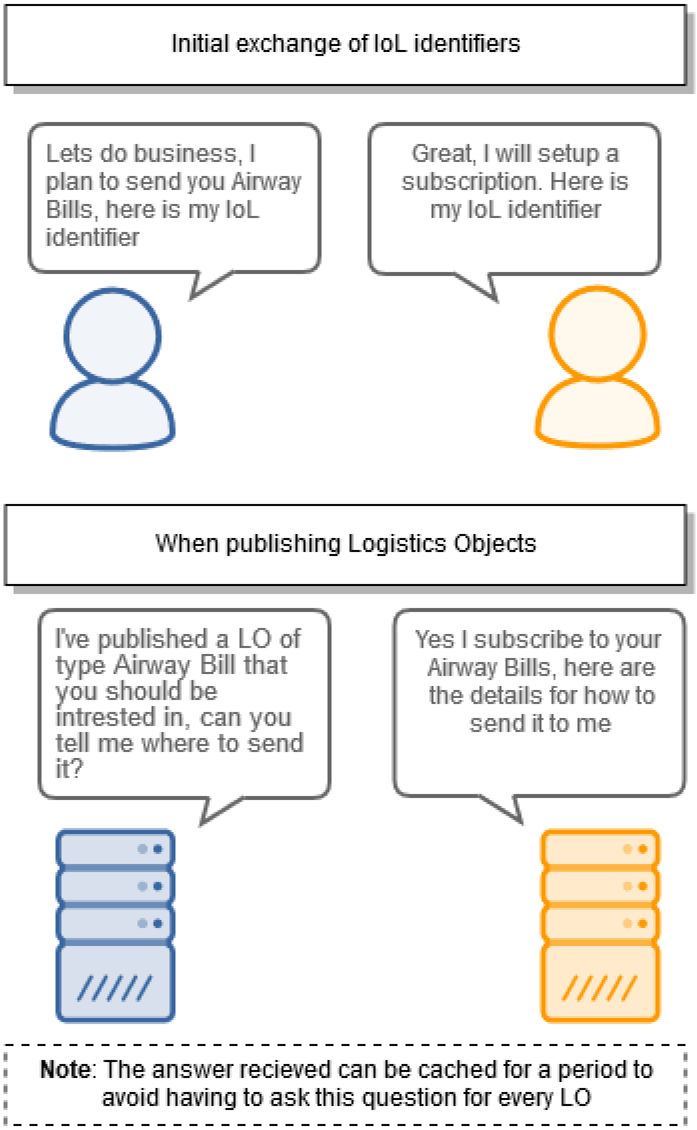
The following steps describe how publish and subscribe is proposed to be implemented in the IoL:

Step 1 - Publish to the IoL

The publish to the IoL occurs when a LO is created via the LO API. At this stage the LO is accessible via the LO API to authorized companies.

Step 2 - Retrieve Subscription information from companies that you want to give access to

The second step is retrieve the subscription information from the companies you want to give access to this Logistics Object. The way this is achieved is the company publishing the LO must check with each of the companies it wants to give access to whether they subscribe to these type of Logistics Objects. If they do, they provide the details where to push the logistics objects to. The precursor to this though is that the companies must exchange an address identifier (IoL Identifier) so that the machines can ask this question during operation.


Initial exchange of IoL identifiers
Lets do business, I plan to send you Airway Bills, here is my IoL identifier
Great, I will setup a subscription. Here is my IoL identifier
When publishing Logistics Objects
I've published a LO of type Airway Bill that you should be intrested in, can you tell me where to send it?
Yes I subscribe to your Airway Bills, here are the details for how to send it to me
Note: The answer recieved can be cached for a period to avoid having to ask this question for every LO

Step 3 - Push to the companies IOLSE

Once the subscription information is received the publisher would push the LO to the intended receiver using the details provided. If the receivers server was not available at the time then the publisher would need to queue and retry to publish the LO over a certain time period.

Addressing a Company in the IoL - The IoL Identifier

The IoL Identifier is a unique identifier for your company in the internet of logistics. It must be a URL that is unique to your company. An example of a IoL Identifier format is given below:

```
https:// {CLC Domain} / {license plate}
```

However it is more than just an identifier, it is also behaves as an address for the company that can be used to retrieve company and subscription information. Therefore it is the only piece information that needs to be stored in publishers BE system to address and share information with their partners.

The characteristics that make a URL an IoL Identifier are the following:

- **Company Information** - If you perform a GET request on the URL as an authenticated IOL user it will return basic company information in RDF.
- **Subscription Informatio**n - If you perform a GET request on the URL with a topic query parameter it will return subscription information if the company subscribes to the topic (i.e logistics object) from your company. Again the response would be in RDF.

The IoL Identifier is used in the following use cases in the IoL:

- **Access Token** - It is included in the Access token so that IoL participants can identifier the company the user belongs to
- **Logistics Objects** - Included in Logistics Objects to identify companies connected to it.
- **Authorization** - Included when giving companies access to Logistics Objects.
    - Note: Authorization to a Logistics Object can be implicitly given by including the IoL Identifer of a company in the Logistics Object or it can be explicitly given by using the PATCH request on the LOAPI.

Get Company Information

Retrieves basic company information

Request

HTTP Request type: **GET**

```
GET /CompanyB
Host: clc.ericsson.net
Authorization: mybearertokenbase64encoded
Accept: application/ld+json
```

HTTP Headers

The following HTTP header parameters MUST be present in the GET company information request:

Authorization	A valid Bearer Token
Accept	The content type that you want the HTTP response to be formatted in. Valid content types include: • **`application/x-turtle`** or `text/turtle (recommended)` • **`application/ld+json`** `(recommended)` • `application/rdf+xml` • `application/n-triples`

Response

Code	Description	Response Body
200	Request for company information is successful	DCF Company Model
401	Not authenticated in the Internet of Logistics or expired token	Error model
403	Not authorized to retrieve company information	Error model
406	Unsupported Accept Type	Error model

Get Subscription Information

Retrieves subscription information if the company subscribes to your topic

Request

HTTP Request type: **GET**

```
GET /CompanyB?topic=AirwayBill
Host: clc.ericsson.net
Authorization: mybearertokenbase64encoded
Accept: application/ld+json
```

HTTP Headers

The following HTTP header parameters MUST be present in the GET subscription information request:

Authorization	A valid Bearer Token
Accept	The content type that you want the HTTP response to be formatted in. Valid content types include: • **`application/x-turtle`** or `text/turtle (recommended)` • **`application/ld+json`** `(recommended)` • `application/rdf+xml` • `application/n-triples`

Response

Code	**Description**	**Response Body**
200	Request for subscription information is successful	DCF Subscription Model
204	Request has been successful but the company does not subscribe	No response body
401	Not authenticated in the Internet of Logistics or expired token	Error model
403	Not authorized to retrieve company information	Error model
406	Unsupported Accept Type	Error model

Subscriptions

In order to receive information from the IoL you must setup a subscription in CLC. The subscription information includes:

- The IOL Identifier of the company you want to subscribe to
- The Logistics Object type that you want to subscribe to
- The endpoint address of your IOLSE where you want to receive logistics objects. See requirements of your endpoint below.
- The content type you want to receive (JSON-LD or Turtle).
- Either a secret or API Key that ensures that only companies with this subscription information can post to your endpoint.
- You must also specify if you want to receive updates on that logistics object.

Subscription Model

```
{
    "@context": {
        "dcf": {
            "@id": "http://tcfassociation.com/schema/"
        }
    },
    "@id": "https://clc.ericsson.net/mySubscriptionToYourAirwayBill",
    "@type": "http://tcfassociation.com/schema/Subscription",
    "dcf:subscribedTo": "https://yourCLC.net/yourCompany",
    "dcf:subscriptionSecret": "C89583BA9B1FEEAB25F715A3BA2F3",
    "dcf:topic": "http://tcfassociation.com/schema/ShippersInstruction",
    "dcf:topicContentType": "application/ld+json",
    "dcf:topicEndPoint": "https://myIOLSEforSI",
    "dcf:statusSub": {
        "@id": "https://clc.ericsson.net
/mySubscriptionToYourAirwayBillStatusUpdates",
        "@type": "http://tcfassociation.com/schema/Subscription",
        "dcf:subscribeToStatusUpdates": "true",
        "dcf:subscriptionSecret": "C89583BA9B1FEEAB25F715A3BA2F3",
        "dcf:topicContentType": "application/ld+json",
        "dcf:topicEndPoint": "https://myIOLSEforSU"
    }
}
```

IOLSE_

The IoL Subscription endpoint is the last component required to receive data in the IoL. It's key difference to previously discussed APIs in the IoL is that is not exposed by CLC, it is an endpoint exposed by a company who wants tor receive information from the IoL. To develop an IOLSE the following requirements must be met:

- MUST support HTTP 1.1
- MUST support TLS 1.2
- MUST support the POST request on the end point.
- MUST expect an RDF body in the POST request. Note only the content types that you specify in the subscription request need to be supported.
- MUST respond with a 2XX response when it receives the Logistics Object.
- MUST verify either the HMAC signature or API key to ensure only authorized requests are processed.
    - The HMAC (https://tools.ietf.org/html/rfc6151) signature (in the header property X-Hub-Signature) with a shared subscription secret can be used to authorise the request. If the signature does not match, subscribers must locally ignore the message as invalid. Subscribers may still acknowledge this request with a 2xx response code in order to be able to process the message asynchronously and/or prevent brute-force attempts of the signature.
    - The API key (x-api-key) can also be used to authorize requests to the subscription endpoint.

The IOLSE can also expect to receive the following HTTP Headers:

Header	Description	Expected

URI-resource	The ID of the resource being sent to the IOLSE. The top level URI. Background: As RDF can come in any order of triples it is not always trivial to determine the top level resource ID. This header will inform the IOLSE of the top level resource URI	Yes, always
Orig-Request-Method	The HTTP request method that was used that generated this message to the IOLSE. Values here are the typical HTTP/REST verbs e.g. POST, PATCH	Yes, always
X-Hub-Signature	If a secret has been provided in the subscription, a HMAC signature would be present in this header	Optional, dependant on Subscription
x-api-key	If an API key is provided in the subscription, the API key would be provided in this header	Optional, dependant on subscription