



TLEX InterCor IF2 Deployment Documentation v1.3.1

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1 Versioning

This document is using a versioning scheme that indicates the version of the IF2 specification and tracks the revisions of this document. This version scheme is <specification version major>.<specification version minor>.<document revision>. The first two version numbers (major and minor) indicate the version of the interface and only change when there is technical change in the described interface. Major version is only bumped when there is compatibility breaking change. Minor version is bumped on trivial, non breaking changes of the interface. The last version number indicates the revision of this document.

Version	Date	Author	State	Changes
0.1	19-04-2018	L. Rijneveld	Draft	
0.2	25-04-2018	L. Rijneveld	Draft	Added TLS root certificate information Added notes regarding MAP refPoint resolving in case of multiple intersections
0.3	27-04-2018	L. Rijneveld	Draft	Updated connectivity chapter with if2.tlex.eu public IP
1.0	01-05-2018	L. Rijneveld	Initial release	Added "Connection limit" paragraph to connectivity chapter
1.1	02-05-2018	L. Rijneveld	Minor release	Updated MAP and SPAT document references to "subWG NL profile" version 2.1
1.1.1	02-05-2018	L. Rijneveld	Revision	Renamed chapter "Version history" to "Versioning" and added version scheme details. Updated routing key "version" parts to "2_1" for MAP and SPAT, in conformance to "subWG NL profile" version bump
1.2.0	03-05-2018	L. Rijneveld	Minor Release	Reverted MAP and SPAT document references to version 1.2 (in conformance to InterCor specification) Updated routing key "version" parts to "1_2" for MAP and SPAT Added "Payloads" chapter
1.2.1	30-08-2018	L. Rijneveld	Draft	Added DENM and IVI
1.3.0	20-09-2018	L. Rijneveld	Minor Release	Specified DENM and IVI expiration message property Replaced DENM and IVI document references with "Dutch C-ITS Corridor Profile" reference
1.3.1	28-01-2020	R. van Buren	Minor release	Added nh virtual host information

2 Referenced documents

ID	Reference	Version	Date
[1]	InterCor Milestone 4 - Common set of upgraded specifications for Hybrid communications	1.0	01-03-2018
[2]	iVRI Overnamepunt specificatie	2.5	18-04-2018
[3]	MapData (MAP) PROFILE	1.2	29-06-2017
[4]	SPAT PROFILE	1.2	29-06-2017
[5]	Dutch C-ITS Corridor Profile	3.0	12-05-2017

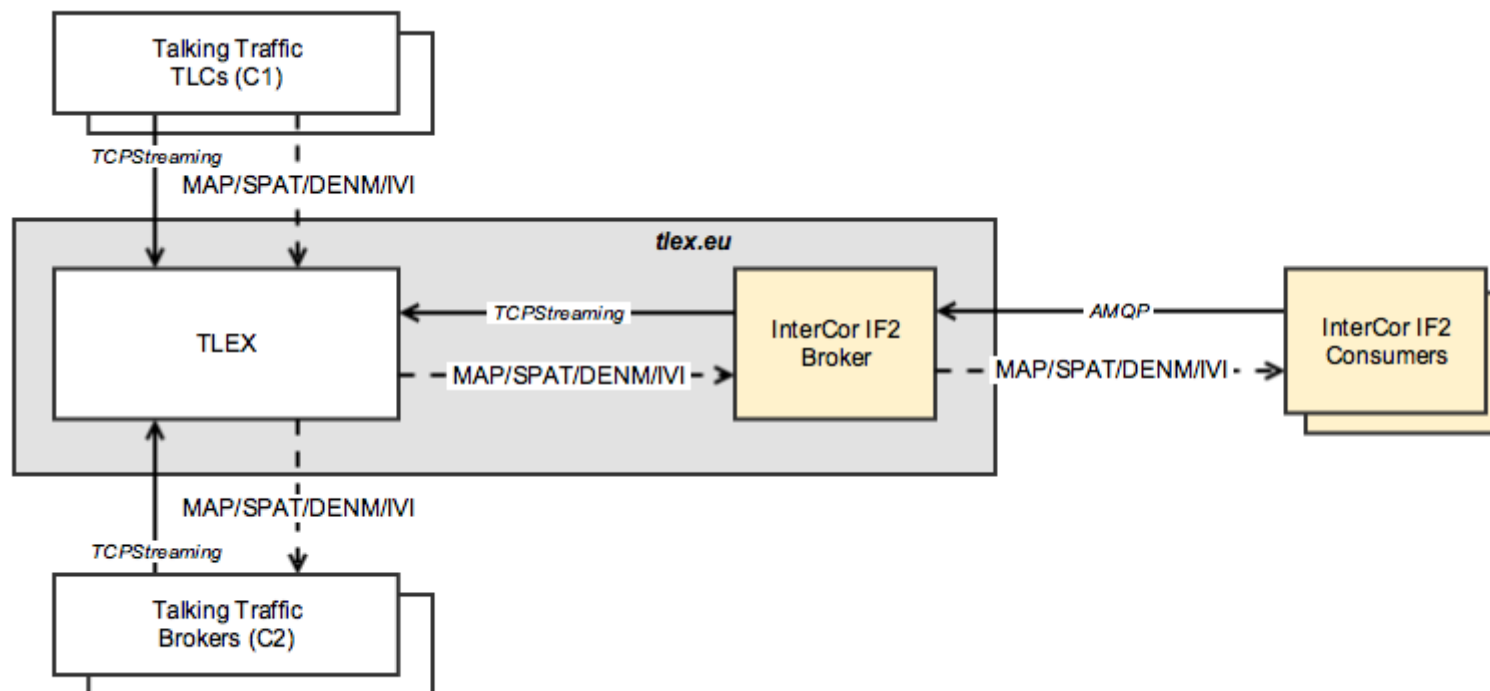
3 Acronyms and abbreviations

Acronym/Abbreviation	Description
TLEX	TLC Exchange platform / iVRI overnamepunt

4 Introduction

This document describes the deployment specific details of the TLEX InterCor IF2 implementation.

5 Overview



6 Payloads

The TLEX InterCor IF2 AMQP Broker is payload agnostic. Payloads (MAP, SPAT, DENM and IVI messages) received from TLEX are published "as is" to IF2 consumers. The actual validity and conformance to the specified MAP/SPAT/DENM/IVI baseline 1.2 is not asserted by IF2. It is the responsibility of the payload originator (road side unit) to publish the payloads in conformance to MAP/SPAT/DENM/IVI baseline 1.2.

7 Implementation details

7.1 Connectivity

The TLEX InterCor IF2 AMQP Broker can be reached at:

FQDN	IP	TCP port
if2.tlex.eu	5.39.169.108	5671

7.1.1 IP Whitelisting

AMQP connections over the public internet are only possible from whitelisted IP addresses. IP address whitelisting can be requested by creating a TLEX support ticket (<https://tlex.freshdesk.com/support/login>).

7.1.2 Encryption

Only TLS encrypted AMQP connections are supported. The server certificate will be signed by a certificate chain based on the "COMODO RSA Certification Authority" root certificate (<https://support.comodo.com/index.php?/Knowledgebase/Article/View/969/108/root-comodo-rsa-certification-authority-sha-2>).

7.1.3 Authentication

AMQP connections are authenticated by AMQP "PLAIN" authentication. Username and password can be requested by creating a TLEX support ticket (<https://tlex.freshdesk.com/support/login>).

7.1.4 Connection limit

In order to safe guard operational limits the IF2 broker deployment will enforce a connection limit per virtual host. It will not be possible to establish new AMQP connections once this limit has been reached. Since this limit is not per account, a rogue consumer implementation could saturate the limit and prevent other consumers to connect. Therefor we urge consumers to take extra care in their implementation and prevent accidental buildup of AMQP connections. The following "fair use" policy is in affect for consumers:

AMQP virtual host	Maximum number of concurrent AMQP connections per account
test	2
nh	2

7.2 Virtual hosts

AMQP virtual host	Related TLEX domain
test	production
nh	production

7.3 Exchanges

Name	Description
MAP	Exchange on which MAP payloads will be published
SPAT	Exchange on which SPAT payloads will be published
DENM	Exchange on which DENM payloads will be published
IVI	Exchange on which IVI payloads will be published

7.4 Queues

As described in the InterCor IF2 specification (ref [1]), queues should be created by the clients as non-durable, exclusive and auto-delete. Additionally clients must also configure the queue maximum length and should configure their maximum message time-to-live. In order to safe guard operational limits the IF2 broker deployment will additionally enforce upper limits for queue parameters.


Queue parameter	Upper limit
x-expires	1000
x-max-length	1000
x-max-length-bytes	1048576
x-message-ttl	60000

7.5 Routing keys

InterCor IF2 specification (ref [1]) describes the following routing key:


<message type>.<message version>.<provider>.<subtype id>.{quadtree path}

7.5.1 MAP routing key

Key part	Implementation	Example value
message type	Static "MAP"	MAP
message version	Static "1_2" (MAP PROFILE version)	1_2
provider	TLEX "tlcIdentifier"	79ad00f0
subtype id	Static "MAP"	MAP
quad tree path	quad tree path based on MAP refPoint <i>MapData.IntersectionGeometry.RefPoint</i>  If MAP defines multiple intersections the refPoint of the first intersection is used	1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

Example: MAP.1_2.79ad00f0.MAP.1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

7.5.2 SPAT routing key

Key part	Implementation	Example value
message type	Static "SPAT"	SPAT
message version	Static "1_2" (SPAT PROFILE version)	1_2
provider	TLEX "tlcIdentifier"	79ad00f0
subtype id	Static "SPAT"	SPAT
quad tree path	quad tree path based on "last known" MAP refPoint <i>MapData.IntersectionGeometry.RefPoint</i>  If MAP defines multiple intersections the refPoint of the first intersection is used	1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1


Example: SPAT.1_2.79ad00f0.SPAT.1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

7.5.3 DENM routing key

Key part	Implementation	Example value
message type	Static "DENM"	DENM
message version	Static "1_2" (DENM PROFILE version)	1_2
provider	TLEX "tlcIdentifier"	79ad00f0
subtype id	Static "DENM"	DENM
quad tree path	quad tree path based on DENM event position <i>DecentralizedEnvironmentalNotificationMessage.ManagementContainer.EventPosition</i>	1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

Example: DENM.1_2.79ad00f0.DENM.1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

7.5.4 IVI routing key

Key part	Implementation	Example value
message type	Static "IVI"	IVI
message version	Static "1_2" (IVI PROFILE version)	1_2
provider	TLEX "tlcIdentifier"	79ad00f0
subtype id	Static "IVI"	IVI
quad tree path	quad tree path based on IVI reference position <i>IviStructure.GeographicLocationContainer.ReferencePosition</i>  If IVI defines multiple geographic location containers, the reference position of the first container is used	1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

Example: IVI.1_2.79ad00f0.IVI.1.2.0.2.0.3.0.2.0.0.2.0.3.2.0.1.0.1

7.6 Message properties

InterCor IF2 specification (ref [1]) describes the following message properties: "ttl", "lat", "lon". Since the AMQP message model defines predefined "fields" and user definable headers, the following table describes how these properties are implemented:

Property	Implementation
ttl	As AMQP message "expiration" field Time-To-Live in milliseconds Always 60 seconds for MAP, DENM and IVI Always 10 seconds for SPAT
lat	As AMQP message header "lat" MAP refPoint latitude for MAP and SPAT (same as used for quad tree path) DENM event location latitude for DENM (same as used for quad tree path) IVI reference position latitude for IVI (same as used for quad tree path)
lon	As AMQP message header "lon" MAP refPoint longitude for MAP and SPAT (same as used for quad tree path) DENM event location longitude for DENM (same as used for quad tree path) IVI reference position longitude for IVI (same as used for quad tree path)

7.7 Message republishing

Message type / exchange	Republish interval	Remarks
MAP	60 seconds	If a new MAP is published the republishing of the previous MAP is cancelled
SPAT	<no republishing>	
DENM	<no republishing>	
IVI	<no republishing>	