ENVELOPE

Evaluation and validation of connected mobility in real open systems beyond 5GS

Edge Cloud - Traffic Influence API

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1 Introduction

This document specifies the Edge Cloud *Traffic Influence* API following CAMARA specification version 0.9.0-rc.1 (April 2025), see exact git commit for the YAML specification implemented here. This API is meant to be used with the CAMARA "Edge Application Management" API under definition in the CAMARA Edge Cloud repository, where different APIs are specified to deploy an application to a certain edge zone / cluster.

The objective of this API is to provide the optimal routing from the user device (e.g. a smartphone) to the optimal application instance deployed in a specific geographical location, installed in an Edge Cloud zone.

2 API Overview

API name	Description	Modules involved	Use Cases
Name of the API	Short summary of the API	List of 5GS or other modules interacting with this API	List of Use Cases using the API
Traffic Influence	Provides the optimal routing from the user Device to the optimal EAS instance in a specific geographical location, installed in an Edge Cloud Zone.	3GPP NEF, PCF, UE.	Use case Dt-UC5 from Dutch site.

3 Sequence Diagrams

3.1.1 Traffic Influence Devices

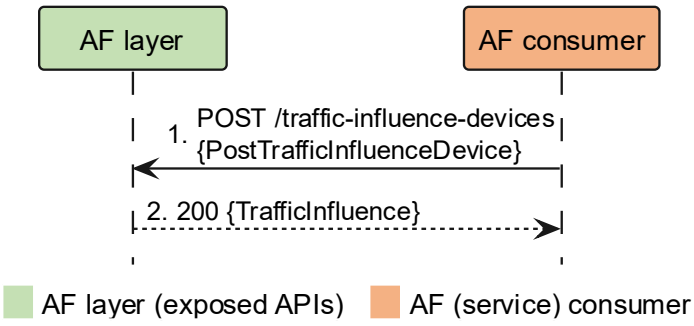

Figure 1 - Message flow for the **Traffic Influence Devices** API

The message flow procedure for the *Traffic Influence Devices* API is shown in Figure 1:

1. The AF consumer submits a request with body of type PostTrafficInfluenceDevice.
2. The AF layer confirms the request with the payload TrafficInfluence.

4 API definition

4.1 Resource structure

4.1.1 Resource URIs

The root of the resource URIs of this API shall be:

{apiRoot}/{apiName}/

where apiName is set to traffic-influence

The resource URI structure of this API is introduced in Figure 2.

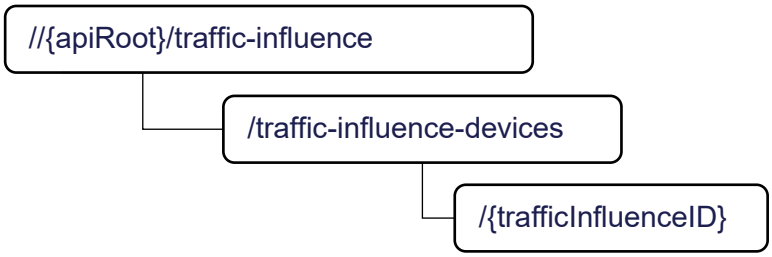

Figure 2 - Resource URI structure

Table 1 introduces an overview of the resources and of the methods.

Table 1 - Resources and methods overview

Resource name	Resource URI	HTTP method	Description
Traffic Influence Devices	/traffic-influence-devices	POST	Creates a new TrafficInfluence resource influencing the traffic toward local instances of the Application for a specific user.
Individual Traffic Influence resources	/traffic-influences/{trafficInfluenceID}	DELETE	Delete an existing TrafficInfluence resource

4.2 Data Model

4.2.1 TrafficInfluence

Field	Data Type	Cardinality	Description
trafficInfluenceID	string	0..1	Identifier for the Traffic Influence resource. This parameter is returned by the API and it is used to update it (e.g., modify or delete the TrafficInfluence resource).
apiConsumerId	string	1	Unique Identifier of the TI API Consumer.
appId	string (uuid)	1	A globally unique identifier associated with the application. OP generates this identifier when the application is submitted over NBI.
appInstanceId	string (uuid)	0..1	A globally unique identifier associated with a running instance of an application. OP generates this identifier.
edgeCloudRegion	string	0..1	Human readable name of the geographical Edge Cloud Region of the Edge Cloud. Defined by the Edge Cloud Provider.
edgeCloudZoneId	string (uuid)	0..1	Unique identifier created by the Edge Cloud Platform to identify an Edge Cloud Zone within an Edge Cloud
state	string	0..1	Reports the state of the TrafficInfluence resource. When first invoked, the resource is 'ordered'. When the platforms prepares the resource, it is 'created'. When the new routing is enabled in the network, the state is 'active'. If an error occurs in the resource creation or in its activation, the state is 'error'. When the DELETE method is invoked the state is 'deletion in progress'. After the resource is deleted (as a consequence of the previous invokation of the DELETE method) the state is 'deleted'. Enum: [ordered, created, active, error, deletion in progress, deleted]
sourceTrafficFilters	structure (inlined)	0..1	Public source port used by the device for flows to which the requested traffic influence should apply. Traffic influence will be applied to the flow between "sourcePort" and the

			Application Server address and port specified in "destinationTrafficFilters".
→ **sourcePort**	integer	0..1	minimum: 0 maximum: 65535 TCP or UDP port number
destinationTrafficFilters	structure (inlined)	0..1	Identifies the destination IP packet filters. To be used when it is needed a traffic flow towards a specific EAS interface identified by a protocol and a port. Also the Protocol (e.g. TCP or UDP) can be specified.
→ **destinationPort**	integer	0..1	minimum: 0 maximum: 65535 TCP or UDP port number
→ **destinationProtocol**	string	0..1	The protocol for the influenced flow, e.g., UDP or TCP.
notificationUri	string	0..1	Defines the callback URI which should be notified in asynchronous way when the state for the requested resources changes (i.e. ordered to activated)
notificationAuthToken	string	0..1	Authentication token for callback API

4.2.2 PostTrafficInfluenceDevice

Field	Data Type	Cardinality	Description
apiConsumerId	string	1	Unique Identifier of the TI API Consumer.
appId	string (uuid)	1	A globally unique identifier associated with the application. OP generates this identifier when the application is submitted over NBI.
appInstanceId	string (uuid)	0..1	A globally unique identifier associated with a running instance of an application. OP generates this identifier.
edgeCloudRegion	string	0..1	Human readable name of the geographical Edge Cloud Region of the Edge Cloud. Defined by the Edge Cloud Provider.
edgeCloudZoneId	string (uuid)	0..1	Unique identifier created by the Edge Cloud Platform to identify an Edge Cloud Zone within an Edge Cloud
sourceTrafficFilters	structure (inlined)	0..1	Public source port used by the device for flows to which the requested traffic influence should apply. Traffic influence will be applied to the flow between "sourcePort" and the Application Server address and port specified in "destinationTrafficFilters".
→ **sourcePort**	integer	0..1	minimum: 0 maximum: 65535 TCP or UDP port number

destinationTrafficFilters	structure (inlined)	0..1	Identifies the destination IP packet filters. To be used when it is needed a traffic flow towards a specific EAS interface identified by a protocol and a port. Also the Protocol (e.g. TCP or UDP) can be specified.
→ **destinationPort**	integer	0..1	minimum: 0 maximum: 65535 TCP or UDP port number
→ **destinationProtocol**	string	0..1	The protocol for the influenced flow, e.g., UDP or TCP.
notificationUri	string	0..1	Defines the callback URI which should be notified in asynchronous way when the state for the requested resources changes (i.e. ordered to activated)
notificationAuthToken	string	0..1	Authentication token for callback API
device	Device	0..1	Identifier of end-user equipment able to connect to a mobile network. Examples of devices include smartphones or IoT sensors/actuators.
notificationSink	NotificationSink	0..1	Notification server that receives events from Traffic Influence API

4.2.3 Device

Field	Data Type	Cardinality	Description
phoneNumber	string	0..1	A public identifier addressing a telephone subscription. In mobile networks it corresponds to the MSISDN (Mobile Station International Subscriber Directory Number). In order to be globally unique it has to be formatted in international format, according to E.164 standard, prefixed with '+'. pattern: ^\+[1-9][0-9]{4,14}$ example: +123456789
networkAccessIdentifier	string	0..1	A public identifier addressing a subscription in a mobile network. In 3GPP terminology, it corresponds to the GPSI formatted with the External Identifier ({Local Identifier}@{Domain Identifier}). Unlike the telephone number, the network access identifier is not subjected to portability ruling in force, and is individually managed by each operator.
ipv4Address	structure (inlined)	0..1	In this implementation, the device is identified by the IP addressed assigned by the telco operator network.
→ **publicAddress**	string	0..1	A single IPv4 address with no subnet mask
→ **privateAddress**	string	0..1	A single IPv4 address with no subnet mask

publicPort	integer	0..1	minimum: 0 maximum: 65535 TCP or UDP port number
ipv6Address	string	0..1	The device should be identified by the observed IPv6 address, or by any single IPv6 address from within the subnet allocated to the device (e.g. adding ::0 to the /64 prefix).

4.2.4 NotificationSink

Field	Data Type	Cardinality	Description
sink	string	1	https callback address where the notification must be POST-ed
sinkCredentials	structure (inlined)	0..1	Sink credential provides authorization information necessary to enable delivery of events to a target
→ **credentialtype**	string	0..1	Type of the credential - MUST be set to **ACCESSTOKEN** for now
→ **accessToken**	string	0..1	Access Token granting access to the POST operation to create notification
→ **accessTokenExpireUtc**	string	0..1	An absolute UTC instant at which the access token shall be considered expired.
→ **accessTokenType**	string	0..1	Type of access token - MUST be set to **bearer** for now

4.2.5 ErrorInfo

Field	Data Type	Cardinality	Description
status	integer	1	HTTP status code returned along with this error response
code	string	1	Code given to this error
message	string	1	Detailed error description

4.3 API operations

In this ENVELOPE implementation, the following sub-set of CAMARA Traffic Influence API endpoints are supported.

4.3.1 Resource: Traffic Influence Devices

Resource URI: {apiRoot}/traffic-influence/traffic-influence-devices

4.3.1.1 Resource methods

4.3.1.1.1 POST – Create Traffic Influence Device resource

Creates a new TrafficInfluence resource influencing the traffic toward local instances of the Application for a specific user.

Parameters:

Name	Data Type	Cardinality	Notes
x-correlator	string	0..1	Correlation id for the different services

Request body	Data type	Cardinality	Notes
	PostTrafficInfluenceDevice	1	

Response body	Data type	Cardinality	Response Codes	Notes
	TrafficInfluence	1	200/201	Application created successfully
	ErrorInfo	0..1	400	Problem with the client request
	ErrorInfo	0..1	401	Authentication problem with the client request
	ErrorInfo	0..1	403	Client does not have sufficient permission
	ErrorInfo	0..1	422	Validation Error
	ErrorInfo	0..1	500	Internal server error
	ErrorInfo	0..1	503	Service unavailable
	ErrorInfo	0..1	504	Connection timeout

4.3.2 Resource: Individual Application

Resource URI: {apiRoot}/edge-application-management/apps/{appId}

4.3.2.1 Resource methods

4.3.2.1.1 DELETE – Delete TrafficInfluence resource

Delete an existing TrafficInfluence resource. The notification will be sent via Cloud Event with the information already available in the TrafficInfluence resource identified by "trafficInfluenceID".

Parameters:

Name	Data Type	Cardinality	Notes
x-correlator	string	0..1	Correlation id for the different services
trafficInfluenceID	string	1	Identifier of the specific TrafficInfluence resource to be retrieved, modified or deleted. It is the value used to fill trafficInfluenceID parameter.

Request body: No request body

	Data type	Cardinality	Response Codes	Notes
Response body		1	202	Request accepted
		1	204	Resource deleted
	ErrorInfo	0..1	400	Bad request
	ErrorInfo	0..1	401	Authentication problem with the client request
	ErrorInfo	0..1	403	Client does not have sufficient permission
	ErrorInfo	0..1	404	Not found
	ErrorInfo	0..1	422	Validation error
	ErrorInfo	0..1	500	Internal server error
	ErrorInfo	0..1	503	Service unavailable
	ErrorInfo	0..1	504	Connection timeout