

# IOX API

## Integration Document

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## API Specification:

The IOX API is an asynchronous instruction processor, instructions are added to a queue and the IOX Core application is responsible for processing these instructions. Once an instruction is processed the result will be **POSTED** to a webhook.

No unique path conventions to follow in the URL. API version, tenant identification and authorization details provided in request header (see below).

A specific API version can be requested in every call to the IOX API by assigning a version number to the 'api-version' key in the header. If omitted, IOX will assign the default version. The API versioning convention will follow a major.minor numbering system. E.g.: api-version: "1.0"

Additionally, a public key (Guid) used to identify the tenant should be included with every call to the IOX API. E.g.: tenant: "1AA1BBB6-82BB-42D4-81B7-4F31C69BD113"

All requests are served from api/external/

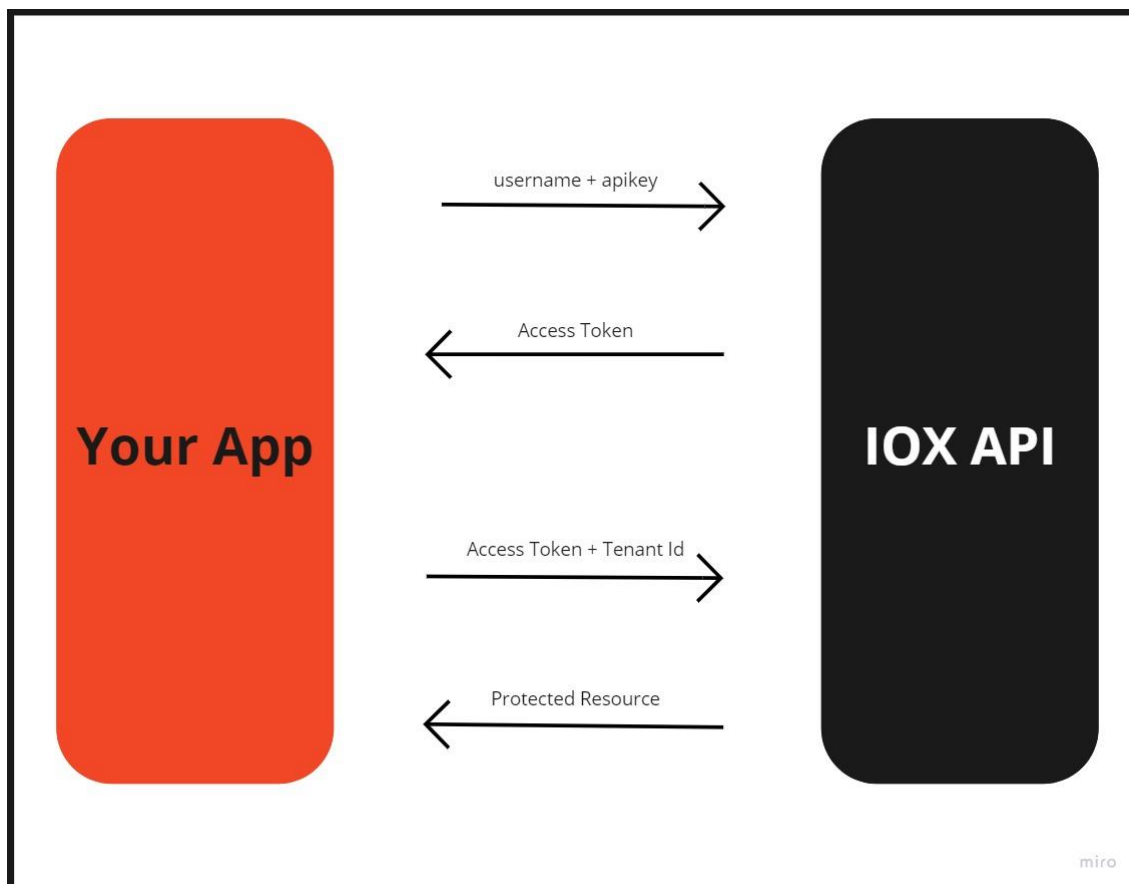
### Link to C# Sample application:

[https://github.com/iox-consulting/api\\_sample\\_app](https://github.com/iox-consulting/api_sample_app)

### Link to Test Environment for API:

<http://redocly.github.io/redoc/?url=https://stagingintegration.ioxfleet.co.za/swagger/v1/swagger.json>

### Authorization code flow:



### Requesting your token:

Post to the Request Token url (../api/ Auth/RequestToken)

Ensure the header has the following entries:

Content-Type: application/json  
api-version: 1.0

The body should contain a **username** and **apikey**. The token endpoint will verify all the parameters in the request, ensuring the username and apikey matches. If everything checks out, it will generate your token and return it in the response.

The access token expires after 120 minutes, to request a new token repeat the above-mentioned process.

### Call the API

Make calls against the IOX APIs by simply adding the following headers to your request:

Authorization: "Bearer " + access\_token  
tenant: tenantId

Once a request is made a new instruction is saved and a unique request reference will be returned in the response object.

#### Response Object:

Parameter	Data Type	Description
requestreference	String	Unique identifier for request (For further tracking during the request lifecycle)
status	String	Indicates the result of the request, either if it was successful or not. Possible values: Success Failed
errors	Array<ResponseError>	A collection of errors, if synchronous results of IOX API call, any possible validation errors caught before executing the instruction. If asynchronous, business logic errors while processing the instruction.
responseType	Int32	The following types can be returned: Instruction Status Update – 1 Account OTP - 3
result	Object	If Type is Account OTP result's type will be <b>AccountOTPResponse</b>

#### Response Error:

Parameter	Data Type	Description
code	Int32	Indicates pre-defined error code associated with an exception.
message	String	A detailed message of what went wrong.

## Possible API calls

1. Create Account - This request creates a new account

### Create Account Request

Parameter	Data type	Mandatory	Description
<b>referenceId</b>	String	Yes	A unique reference to this account, internal to the 3 <sup>rd</sup> party. This reference will be used to link individuals, vehicles and BRN to this account. A random string up to 20 characters
<b>isBusinessAccount</b>	Bool	Yes	Identifies account type True – Business Account False – Private Account
<b>accountName</b>	String	Yes	An account name
<b>accountEmail</b>	String	Yes	A contact email for the account
<b>accountContactNumber</b>	String	No	A contact number for the account
<b>companyRegistrationNumber</b>	String	Only if isBusinessAccount is true	Company registration number
<b>contactPersonFirstName</b>	String	Yes	Account contact person first name
<b>contactPersonLastName</b>	String	Yes	Account contact person last name
<b>brn</b>	Array<Brn>	No	A list of brns.
<b>vehicles</b>	Array<Vehicle>	No	A list of vehicles
<b>individuals</b>	Array<Individual>	Yes	A list of individuals
<b>departments</b>	Array<Department>	No	A list of departments

### BRN

Parameter	Data type	Mandatory	Description
<b>brnNumber</b>	String	Yes, if CreateAccountRequest's isBusinessAccount is true and brns array is not empty.	Business registration number for Enatis
<b>individualIdNumber</b>	String	Yes, if CreateAccountRequest's isBusinessAccount is true and brns array is not empty.	Proxy's identification number
<b>province</b>	String	No	

## Vehicle

Field	Data type	Mandatory	Description
<b>licenseNumber</b>	String	Yes	The vehicle license plate number
<b>vinNumber</b>	String	Yes	Vehicle VIN number
<b>vehicleRegisterNo</b>	String	Yes	Veh. Register no on disk
<b>engineNumber</b>	String	No	The vehicle engine number
<b>licenseDiscNumber</b>	String	Yes	The license disc number as displayed on the license disc
<b>licenseExpiryDate</b>	DateTime	Yes	The expiry date as displayed on the license disc
<b>categoryId</b>	Int16	Yes	A vehicle category. If incorrect, the quoted renewal will fail once instruction is issued to renewal network. See possible values below ( <b>Vehicle Categories</b> )
<b>tare</b>	Int32	Yes	The vehicle tare
<b>make</b>	String	No	The vehicle make
<b>model</b>	String	No	The vehicle model
<b>colour</b>	String	No	The vehicle colour
<b>departmentName</b>	String	No	Department name this vehicle will be linked to.
<b>discImage</b>	String	No	A base64 encoded string for the JPEG image of the current license disc.
<b>Brn</b>	String	Only if account's <b>isBusinessAccount</b> is true and account's vehicles array is not empty. This brn should also be listed in account's brn array.	The business brn number
<b>individualIdNumber</b>	String	Only If account's <b>isBusinessAccount</b> is false and account's vehicle array is not empty. This id number should also be listed in account's individual array.	The owner's identification number

### Individual:

Field	Data type	Mandatory	Description
<b>idType</b>	String	Yes	RSAID   Passport   TRN
<b>idNumber</b>	String	Yes	The individual identification number for the given IdType
<b>driversLicenseImage</b>	String	No	A base64 encoded string for the JPEG image of the individual driver's license.
<b>firstname</b>	String	Yes	The individual first name, as specified in the supplied ID
<b>lastname</b>	String	Yes	The individual last name, as specified in the supplied ID
<b>initials</b>	String	Yes	The individual's initials
<b>driversLicenseNumber</b>	String	No	The individual's driver license number
<b>driversLicenseExpiryDate</b>	DateTime	No	The individual's driver license expiry date

### Department

Parameter	Data type	Mandatory	Description
<b>name</b>	String	Yes, if department array is not empty.	Department name

2. Send Account Email Invites – This request triggers account invites to be sent to the provided users.

### AccountInviteTokenRequest

Field	Data type	Mandatory	Description
<b>accountReference</b>	String	Yes	A unique reference to an existing account.
<b>referenceId</b>	String	Yes	A unique reference to this instruction, internal to the 3 <sup>rd</sup> party.
<b>accountInvites</b>	Array<AccountInvite>	Yes	At least one account invite should be present

### AccountInvite

Field	Data type	Mandatory	Description
<b>firstName</b>	String	Yes	First name of person to receive invite token.
<b>lastName</b>	String	Yes	Last name of person to receive invite token.
<b>email</b>	String	Yes	Email of person to receive invite token.

3. Request Account OTP -This request-requests an account OTP

*AccountOTPRequest*

Field	Data type	Mandatory	Description
<b>referenceId</b>	String	Yes	A unique reference to this instruction.
<b>accountReference</b>	String	Yes	A unique reference to this account, internal to the 3 <sup>rd</sup> party.

4. Create Department – This request creates a new department

*DepartmentRequest*

Field	Data type	Mandatory	Description
<b>name</b>	String	Yes	Department name
<b>referenceId</b>	String	Yes	A unique reference to this instruction, internal to the 3 <sup>rd</sup> party.
<b>accountReference</b>	String	Yes	A unique reference to the account this department will be linked to. An account with this reference already be created.

5. Create / Update BRN

*BRNRequest*

Field	Data type	Mandatory	Description
<b>brn</b>	String	Yes	Business Registration number for Enatis
<b>individualIdNumber</b>	String	Yes	Proxy's id number. An individual with this id number should already be created.
<b>referenceId</b>	String	Yes	A unique reference to this instruction, internal to the 3 <sup>rd</sup> party.
<b>accountReference</b>	String	Yes	A unique reference to the account this brn will be linked to. An account with this reference already be created.

## 6. Create / Update Individual

### Individual Request

Field	Data type	Mandatory	Description
<b>referenceId</b>	String	Yes	A unique reference to this instruction, internal to the 3 <sup>rd</sup> party.
<b>accountReference</b>	String	Yes	A unique reference to the account this individual will be linked to. An account with this reference already be created.
<b>idType</b>	String	Yes	RSAID   Passport   TRN
<b>idNumber</b>	String	Yes	The individual identification number for the given IdType
<b>driversLicenseImage</b>	String	No	A base64 encoded string for the JPEG image of the individual driver's license.
<b>firstname</b>	String	Yes	The individual first name, as specified in the supplied ID
<b>lastname</b>	String	Yes	The individual last name, as specified in the supplied ID
<b>initials</b>	String	Yes	The individual's initials
<b>driversLicenseNumber</b>	String	No	The individual's driver license number
<b>driversLicenseExpiryDate</b>	DateTime	No	The individual's driver license expiry date

## 7. Create / Update Nomination Driver

### Nomination Target Request

Field	Data type	Mandatory	Description
<b>referenceId</b>	String	Yes	A unique reference to this instruction, internal to the 3 <sup>rd</sup> party.
<b>accountReference</b>	String	Yes	A unique reference to the account this brn will be linked to. An account with this reference already be created.
<b>personalDetails</b>	NominationTargetPersonalDetails	Yes	Nomination Target personal details
<b>addressDetails</b>	NominationTargetAddressDetails	Yes	Nomination Target address details
<b>Documents</b>	Array<NominationTargetDocument>	Yes	Nomination Target document (At least 1)

### Nomination Target Personal Details

Field	Data type	Mandatory	Description
<b>initials</b>	String	Yes	Person Initials
<b>FullName</b>	String	Yes	Person Fullname
<b>surname</b>	String	Yes	Person Surname
<b>idNumber</b>	String	Yes	Person IdNumber / Passport
<b>gender</b>	String	Yes	Person Gender
<b>idType</b>	String	Yes	Person Id Type
<b>countryOfIssue</b>	String	Yes	Id document's country of issue
<b>contactNumber</b>	String	No	Person Contact Number
<b>email</b>	String	No	Person Email Address



### *Nomination Target Address Details*

Field	Data type	Mandatory	Description
<b>streetNo</b>	String	Yes	Address street no
<b>streetName</b>	String	Yes	Address street name
<b>suburb</b>	String	No	Address suburb
<b>city</b>	String	Yes	Address city
<b>postalCode</b>	String	Yes	Address Postal code
<b>country</b>	String	Yes	Address country

### *Nomination Target Document*

Field	Data type	Mandatory	Description
<b>documentBase64String</b>	String	Yes	Base 64 string of document
<b>documentType</b>	Int	Yes	Document type
<b>expiryDate</b>	DateTime	No	Expiry date of document

### *Id Types*

Id	Description
<b>1</b>	South African ID
<b>2</b>	Foreign Id
<b>3</b>	Passport
<b>4</b>	Traffic Register Number
<b>5</b>	Driver's License

### *Document Types*

Id	Description
<b>1</b>	Driver's License
<b>2</b>	Passport Document
<b>3</b>	South African ID
<b>4</b>	Foreign ID

## 8. Create / Update Vehicle

### Vehicle Request

Field	Data type	Mandatory	Description
<b>referenceId</b>	String	Yes	A unique reference to this instruction, internal to the 3 <sup>rd</sup> party.
<b>accountReference</b>	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference already be created.
<b>licenseNumber</b>	String	Yes	The vehicle license plate number
<b>vinNumber</b>	String	Yes	Vehicle VIN number
<b>vehicleRegisterNo</b>	String	Yes	Veh. Register no on disk
<b>engineNumber</b>	String	No	The vehicle engine number
<b>licenseDiscNumber</b>	String	Yes	The license disc number as displayed on the license disc
<b>licenseExpiryDate</b>	DateTime	Yes	The expiry date as displayed on the license disc
<b>departmentName</b>	String	No	The department this vehicle will be linked to.
<b>categoryId</b>	Int16	Yes	A vehicle category. If incorrect, the quoted renewal will fail once instruction is issued to renewal network. See possible values below
<b>tare</b>	Int32	Yes	The vehicle tare
<b>make</b>	String	No	The vehicle make
<b>model</b>	String	No	The vehicle model
<b>colour</b>	String	No	The vehicle colour
<b>disclImage</b>	String	No	A base64 encoded string for the JPEG image of the current license disc.
<b>Brn</b>	String	Only if account's <b>isBusinessAccount</b> is true and account's vehicles array is not empty. This brn should also be listed in account's brn array.	The business brn number
<b>individualIdNumber</b>	String	Only If account's <b>isBusinessAccount</b> is false and account's vehicle array is not empty. This id number should also be listed in account's individual array.	The owner's identification number

## Vehicle Categories

Id	Description
1	Motorcycle/Motor tricycle/Motor quadracycle
2	Light passenger vehicle (less than 12 persons)
3	Heavy passenger vehicle (12 or more persons)
4	Light load vehicle (GVM 3 500 kg or less)
5	Heavy load vehicle (GVM > 3 500 kg, not to draw)
6	Special class vehicle
7	Heavy load vehicle (GVM > 3 500 kg, equipped to draw)
8	Tractor used on public roads
9	Breakdown vehicle

### Setting up an endpoint for the webhook

Once the IOX Core application has processed your instruction an instruction response will be posted to the endpoint you configured.

Post to the Setup endpoint URL (../api/ endpoint/SetupEndpoint)

Ensure the header has the following entries:

Content-Type: application/json  
api-version: 1.0  
Authorization: "Bearer" + access\_token  
Tenant: tenantId

The body should contain an **url** and **sharedkey**. An endpoint will be configured, and the shared key will be returned in the response object. You will use this shared key in the endpoint HMAC Authentication explained below.

**HMAC authentication** is used in the webhook process to verify that a request is coming from the IOX API and that the request has not been tampered with in transit. This is achieved by including a HMAC hash and Nonce in the request's header.

Headers:

Nonce: "8256019327"  
HMAC: "3a9805afa6ec3850b80273c61a06a11702c38b868cc986e8d981b4a63d2356f2"

The sharedkey used to configure the endpoint will be used in the HMAC generation process. Append the Nonce at the end of the payload body, generate a new HMACSHA256 hash using the shared key, if the generated HMAC matches the HMAC in the header the request has not been tampered with. (Look at the `iox_sample_app/SignatureVerifier.cs` to see a working example of this process)

## 9. Activate / Deactivate Vehicle

### Vehicle Request

Field	Data Type	Mandatory	Description
<b>referenceid</b>	String	Yes	A unique reference to this instruction, internal to the 3rd party.
<b>accountReference</b>	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference already be created.
<b>vehicleReference</b>	String	Yes	A unique reference to vehicle this reference is link to an account.

## 10. Link Nominated Driver to Vehicle

### Vehicle Request

Field	Data Type	Mandatory	Description
<b>accountReference</b>	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference already be created.
<b>vehicleReference</b>	String	Yes	A unique reference to vehicle this reference is link to an account.
<b>nominatedDriverReference</b>	String	Yes	A unique reference to nominated driver this reference is link to an account.

### Receiving webhook requests locally:

1. Download ngrok (<https://ngrok.com/download>)
2. Run ngrok.exe
3. In the command line window run ngrok http **PORT\_YOUR\_APPLICATION\_IS\_LISTENING\_ON**  
(This port will be exposed by ngrok).
4. Use the URL and append "endpoint/response" to the ngrok URL.  
(e.g. <https://66fcf8608ec6.ngrok.io/endpoint/response>)
5. Follow the steps mentioned above (**Setting up an endpoint for the webhook**) and use the new ngrok URL.

You will now be able to receive instructions from the IOX API in your local environment.

### Automated webhooks:

#### *Account new fine count webhook*

Every day at 2am an automated webhook request will POST a ResponseObject with a result of type NewFineCountResponse to your configured endpoint.

#### *New Fine Count Response*

Field	Data type	Description
<b>accountRef</b>	String	A unique reference to an existing account.
<b>newFineCount</b>	Int32	Count of all new fines in a 24-hour period.