IOX API

Integration Document

v1.0.0

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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"
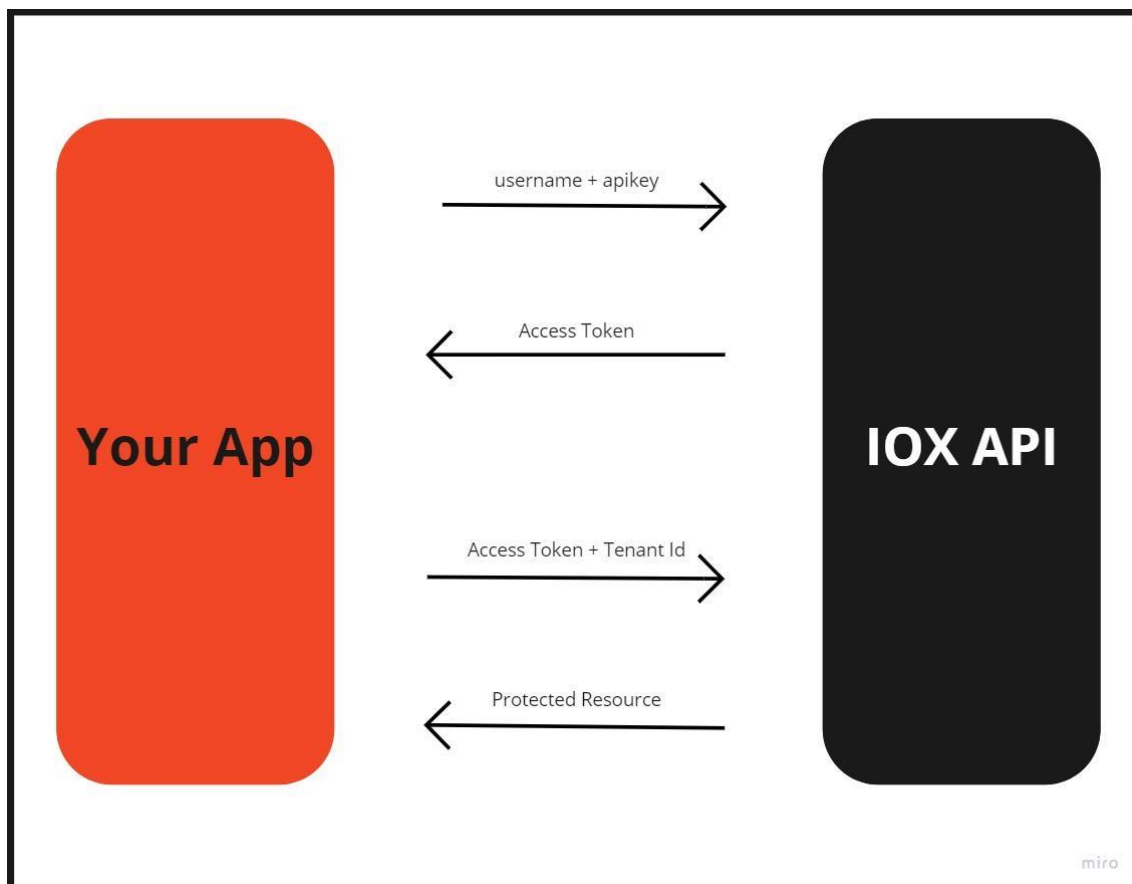
All requests are served from api/external/

Link to C# Sample application:
https://github.com/iox-consulting/api_sample_app
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 **AccountOTPResponse**

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

BRN

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

Vehicle

Field	Data type	Mandatory	Description
licenseNumber	String	Yes	The vehicle license plate number
vinNumber	String	Yes	Vehicle VIN number
vehicleRegisterNo	String	Yes	Veh. Register no on disk
engineNumber	String	No	The vehicle engine number
licenseDiscNumber	String	Yes	The license disc number as displayed on the license disc
licenseExpiryDate	DateTime	Yes	The expiry date as displayed on the license disc
categoryId	Int16	Yes	A vehicle category. If incorrect, the quoted renewal will fail once instruction is issued to renewal network. See possible values below (**Vehicle Categories**)
tare	Int32	Yes	The vehicle tare
make	String	No	The vehicle make
model	String	No	The vehicle model
colour	String	No	The vehicle colour
departmentName	String	No	Department name this vehicle will be linked to.
discImage	String	No	A base64 encoded string for the JPEG image of the current license disc.
Brn	String	Only if account's **isBusinessAccount** 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
individualIdNumber	String	Only If account's **isBussinessAccount** 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
idType	String	Yes	RSAID | Passport | TRN
idNumber	String	Yes	The individual identification number for the given IdType
driversLicenseImage	String	No	A base64 encoded string for the JPEG image of the individual driver's license.
firstname	String	Yes	The individual first name, as specified in the supplied ID
lastname	String	Yes	The individual last name, as specified in the supplied ID
initials	String	Yes	The individual's initials
driversLicenseNumber	String	No	The individual's driver license number
driversLicenseExpirtyDate	DateTime	No	The individual's driver license expiry date

Department

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

AccountInvite

Field	Data type	Mandatory	Description
firstName	String	Yes	First name of person to receive invite token.
lastName	String	Yes	Last name of person to receive invite token.
email	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
referenceId	String	Yes	A unique reference to this instruction.
accountReference	String	Yes	A unique reference to this account, internal to the 3rd party.

4. Create Department – This request creates a new department

DepartmentRequest

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

7. Create / Update Nomination Driver

Nomination Target Request

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

Nomination Target Personal Details

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

Nomination Target Address Details

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

Nomination Target Document

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

Id Types

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

Document Types

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

8. Create / Update Vehicle

Vehicle Request

Field	Data type	Mandatory	Description
referenceId	String	Yes	A unique reference to this instruction, internal to the 3rd party.
accountReference	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference already be created.
licenseNumber	String	Yes	The vehicle license plate number
vinNumber	String	Yes	Vehicle VIN number
vehicleRegisterNo	String	Yes	Veh. Register no on disk
engineNumber	String	No	The vehicle engine number
licenseDiscNumber	String	Yes	The license disc number as displayed on the license disc
licenseExpiryDate	DateTime	Yes	The expiry date as displayed on the license disc
departmentName	String	No	The department this vehicle will be linked to.
categoryId	Int16	Yes	A vehicle category. If incorrect, the quoted renewal will fail once instruction is issued to renewal network. See possible values below
tare	Int32	Yes	The vehicle tare
make	String	No	The vehicle make
model	String	No	The vehicle model
colour	String	No	The vehicle colour
discImage	String	No	A base64 encoded string for the JPEG image of the current license disc.
Brn	String	Only if account's **isBusinessAccount** 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
individualIdNumber	String	Only If account's **isBussinessAccount** 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
referenceId	String	Yes	A unique reference to this instruction, internal to the 3rd party.
accountReference	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference has already been created.
vehicleReference	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
accountReference	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference has already been created.
vehicleReference	String	Yes	A unique reference to vehicle this reference is link to an account.
nominatedDriverReference	String	Yes	A unique reference to the nominated driver is linked to an account.

11. Create Dealer Stock License Instruction

Dealer Stock Request

Field	Data type	Mandatory	Description
referenceId	String	Yes	A unique reference to this instruction, internal to the 3rd party.
accountReference	String	Yes	A unique reference to the account this vehicle will be linked to. An account with this reference has already been created.
brnNumber	String	Yes	The business brn number.
vehicleRegisterNumber	String	Yes	Veh. Register number on disk.
preFilledNCODocumnet	String	Yes	Pre Filled NCO document as a base64 string with data as application/pdf.
vehiclePaidInFullLetterDocument	String	Yes	Vehicle paid in full letter as base64 string with data as application/pdf.

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
accountRef	String	A unique reference to an existing account.
newFineCount	Int32	Count of all new fines in a 24-hour period.

Possible Webhook Response

Instructions Error Types

Type	Code	Description
DUPLICATE_ID_NUMBE	11000	Id number already registered to another account.
INVALID_ID_NUMBER_PROVIDED	11001	Invalid id number provided
INVALID_ACCOUNT_REFERENCE_PROVIDED	11002	Invalid account reference provided
UNKNOWN	0	Can be try-catch error or non ambiguous error message.

1. Create Dealer Stock License Instruction

Dealer Stock Error Response

Message	Code
Duplicate request id	0
The Vehicle was not found	0
Multiple Vehicles with the same registration number ({vehicleRegisterNumber}) were found.	0
The vehicle is disabled	0
The BRN ({brnNumber}) is not linked to the specified vehicle ({vehicleRegisterNumber})	0
The BRN ({brnNumber}) does not have a linked proxy individual	0
The BRN ({brnNumber}) is not allocated to a Province	0
The required BRN ({brnNumber}) documents have not been uploaded	0
The required Company documents for account {accountReference} have not been uploaded	0
The owner account has not been configured for dealer stock instructions	0
A Dealer stock instruction for the vehicle is already being processed	0

Dealer Stock Status Update Response

Progress %	Status Id	Status Name	Additional Details
0	2	InstructionFailed	Fines blocking renewal OR Quoted renewal fee incorrect OR Not title holder OR Outstanding expired renewals OR Incorrect documentation OR Custom reason
30	0	InstructionCreated	
70	1	AgentAcceptedInstruction	
100	3	InstructionCompleted	

Dealer Stock Instructions To Licensing Error Response

Message	Code
The dealer stock instruction is linked to a private account or the owning BR Number has not been configured, which is not allowed	0
Could not create dealer stock instruction: {ReasonPhrase}	0
And try-catch error messages	0

Dealer Stock Completed Error Response

Message	Code
Unable to complete dealer stock: {Exception}	0