

DriveX Halo Proposal Milestone Report

For IOTEX Review

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DRIVEX PROTOCOL

Technical Report for Milestone 1

Period of Performance

- 1 Month

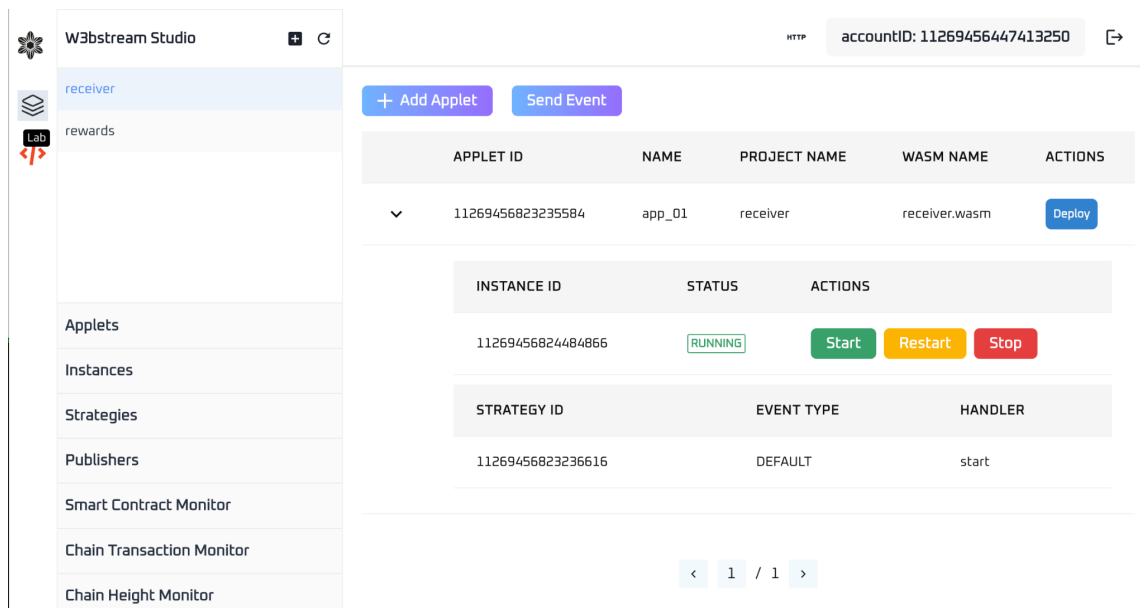
Deliverables

Dev team has successfully created a PoC using w3bstreaming from IoTEx in a lab environment. This prototype connects the in-vehicle gateway to blockchain and streams a testing set of real vehicle data.

- A w3bstreaming node docker has been successfully deployed on DriveX's Cloud and correctly connects to a Gateway device.
- A project (a WASM instance) has been initialized to create a data stream connecting DriveX gateway to the above w3bstream node.
- A w3bstreaming node is successfully running on DriveX's cloud and is connecting with IoTEx. Data was correctly received and stored on the w3bstreaming node. Node can be accessed at: <http://52.35.27.227:3000/>

Technical Details

1. Creation of a w3bstream project



The screenshot displays the W3bstream Studio interface. On the left, a sidebar contains navigation options: 'receiver', 'rewards', 'Applets', 'Instances', 'Strategies', 'Publishers', 'Smart Contract Monitor', 'Chain Transaction Monitor', and 'Chain Height Monitor'. The main area shows a project named 'receiver' with an 'Add Applet' and 'Send Event' button. Below this is a table of applets:

APPLET ID	NAME	PROJECT NAME	WASM NAME	ACTIONS
11269456823235584	app_01	receiver	receiver.wasm	<button>Deploy</button>

Below the applet table is a table of instances:

INSTANCE ID	STATUS	ACTIONS
11269456824484866	RUNNING	<button>Start</button> <button>Restart</button> <button>Stop</button>

At the bottom, there is a table of strategies:

STRATEGY ID	EVENT TYPE	HANDLER
11269456823236616	DEFAULT	start

The interface also shows an account ID: 11269456447413250 and a pagination indicator: < 1 / 1 >

Figure 1. DriveX Project has been created using W3bstream Studio

2. System Log for Data Receipt

```
{"@agent": "Go-http-client/1.1", "@cst": 2395, "@lv": "info", "@mtd": "POS", "@prj": "srv-applet-mgr", "@rmt": "222.95.131.106", "@status": 201, "@tag": "access", "@ts": "20230212-232049.717Z", "@url": "/srv-applet-mgr/v0/event/receiver", "msg": ""}
```

Figure 2. Screenshot for the log upon the W3bstream node receiving DriveX data.

3. System Log for Data Storage

```
{"@applet": "receiver", "@lv": "info", "@namespace": "receiver", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230212-231455.308Z", "key": "@", "msg": "host.SetDB", "val": {"buses": [{"frames": [{"cycle": 0, "direction": "TX", "length": 8, "name": "ACCELEROMETER", "pdus": [{"id": "0x228", "length": 8, "name": "ACCELEROMETER", "signals": [{"bit-size": 15, "factor": 0.001, "max": 20, "min": -20, "name": "ACCEL_X", "start-bit": -8}, {"bit-size": 15, "max": 32767, "min": 0, "name": "ACCEL_Z", "start-bit": -24}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "RX", "length": 8, "name": "ACC_CONTROL", "pdus": [{"id": "0x343", "length": 8, "name": "ACC_CONTROL", "signals": [{"bit-size": 16, "factor": 0.001, "max": 20, "min": -20, "name": "ACCEL_CMD", "start-bit": -8}, {"bit-size": 8, "factor": 0.05, "max": 0, "min": 0, "name": "ACCEL_CMD_ALT", "start-bit": -40}, {"bit-size": 1, "name": "CANCEL_REQ", "start-bit": 24}, {"bit-size": 8, "max": 255, "min": 0, "name": "CHECKSUM", "start-bit": 56}, {"bit-size": 1, "name": "DISTANCE", "start-bit": 20}, {"bit-size": 1, "name": "MINI_CAR", "start-bit": 21}, {"bit-size": 1, "name": "PERMIT BRAKING", "start-bit": 30}, {"bit-size": 1, "name": "RELEASE_STANDSTILL", "start-bit": 31}, {"bit-size": 2, "max": 2, "min": 3, "name": "SET_ME_X01", "start-bit": 22}, {"bit-size": 4, "max": 15, "min": 0, "name": "SET_ME_X3", "start-bit": 16}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "RX", "length": 8, "name": "ACC_HUD", "pdus": [{"id": "0x411", "length": 8, "name": "ACC_HUD", "signals": [{"bit-size": 1, "name": "FCW", "start-bit": 4}, {"bit-size": 8, "max": 1, "min": 0, "name": "SET_ME_X10", "start-bit": 32}, {"bit-size": 8, "max": 1, "min": 0, "name": "SET_ME_X20", "start-bit": 8}, {"bit-size": 8, "max": 1, "min": 0, "name": "SET_ME_X80", "start-bit": 48}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "RX", "length": 8, "name": "BRAKE", "pdus": [{"id": "0x0A6", "length": 8, "name": "BRAKE", "signals": [{"bit-size": 8, "max": 255, "min": 0, "name": "BRAKE_AMOUNT", "start-bit": 0}, {"bit-size": 8, "max": 255, "min": 0, "name": "BRAKE_PEDAL", "start-bit": 16}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "TX", "length": 8, "name": "BRAKE_MODULE", "pdus": [{"id": "0x226", "length": 8, "name": "BRAKE_MODULE", "signals": [{"bit-size": 9, "max": 511, "min": 0, "name": "BRAKE_POSITION", "start-bit": 24}, {"bit-size": 1, "name": "BRAKE_PRESSED", "start-bit": 37}, {"bit-size": 9, "max": 511, "min": 0, "name": "BRAKE_PRESSURE", "start-bit": 8}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "RX", "length": 7, "name": "BRAKE_MODULE2", "pdus": [{"id": "0x230", "length": 7, "name": "BRAKE_MODULE2", "signals": [{"bit-size": 1, "name": "BRAKE_PRESSED", "start-bit": 26}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "RX", "length": 7, "name": "DSU_CRUISE", "pdus": [{"id": "0x365", "length": 7, "name": "DSU_CRUISE", "signals": [{"bit-size": 1, "name": "CANCEL_BTN", "start-bit": 1}, {"bit-size": 8, "factor": 100, "max": 0, "min": 0, "name": "CRUISE_REQUEST", "start-bit": -12800, "start-bit": -24}, {"bit-size": 8, "max": 0, "min": 0, "name": "LEAD_DISTANCE", "start-bit": 32}, {"bit-size": 1, "name": "MAIN_ON", "start-bit": 0}, {"bit-size": 1, "name": "RES_BTN", "start-bit": 3}, {"bit-size": 1, "name": "SET_BTN", "start-bit": 2}, {"bit-size": 8, "max": 0, "min": 0, "name": "SET_SPEED", "start-bit": 8}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "TX", "length": 8, "name": "ENGINE_RPM", "pdus": [{"id": "0x1C4", "length": 8, "name": "ENGINE_RPM", "signals": [{"bit-size": 16, "factor": 0.78125, "max": 0, "min": 0, "name": "RPM", "start-bit": -8}], "start": 0}], "protocol": "CAN"}, {"cycle": 0, "direction": "TX", "length": 8, "name": "EPS_STATUS", "pdus": [{"id": "0x262", "length": 8, "name": "EPS_STATUS", "signals": [{"bit-size": 8, "max": 255, "min": 0, "na
```

Figure 3. Screenshot for the log upon the W3bstream node storing DriveX data.

4. Screen Video Capture for the whole data streaming process

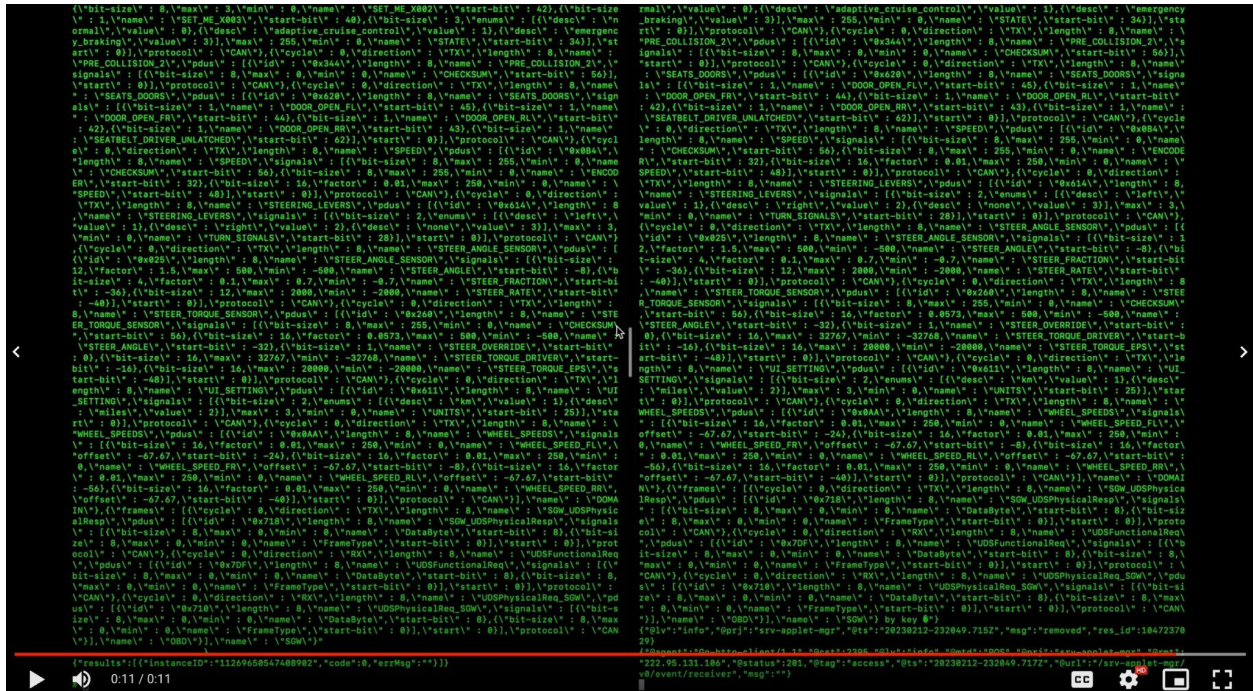


Figure 4. Left video pane is the driveX gateway live log; Right video is the log for W3bstream Node. It clearly shows the in-vehicle data has been successfully streamed to (and stored in) a node https://drive.google.com/drive/folders/1c8Nkds8nTw26O9OnB_FbOLP_U0CO80TT

5. DriveX In-vehicle Gateway

DriveX Protocol dev team has successfully installed a gateway in the testing vehicle to connect to IoTEx blockchain and streams a testing set of real vehicle data. The testing was performed live, in a testing vehicle in Santa Clara, CA as of 2022 Feb 14. To our best knowledge, this is the first Blockchain-defined-vehicle prototype in a pre-product condition.



Figure 5 (a). W3bstream node connected to a DriveX gateway in the lab



Figure 5 (b). W3bstream node connected to a DriveX gateway in a testing vehicle.

Technical Report for Milestone 2:

Period of Performance

- 1 Month

Deliverables

DriveX mission is to solve the 95% problem of mobility:

- Cars are wastefully parked 95% of each day
- But accessing a car you don't own is hard, offline, web2

In this demo, we aim at 100% decentralized carsharing experience and remove transactional friction points.

DriveX dev team has successfully developed and demonstrated a w3bstream project connecting the real data in a DriveX Gen 2 gateway in a vehicle to IoT blockchain and minted ERC20 and ERC 721 tokens based on real vehicle data.

- 1) Successfully triggered ERC20 tokens transfer based on fundamental driving data such as distance
- 2) Successfully triggered ERC721 token transfer based on fundamental driving data such as location
- 3) Successfully dispensed FT and NFT tokens to a driver's wallet

Technical Details

1. ERC20

```
18.0.0", "@status": 281, "@tag": "access", "@ts": "20230228-234718.529Z", "@url": "/srv-applet-mgr/v0/event/test", "msg": ""},
{"@agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/109.0.0.0 Safari/537.36", "@cat": 5, "@lv": "warning", "@md": "DET", "@prj": "srv-applet-mgr", "@rnt": "172.18.0.0", "@status": 481, "@tag": "access", "@ts": "20230228-234806.132Z", "@url": "/srv-applet-mgr/v0/project", "msg": "{\"key\": \"InvalidToken\", \"code\": 40399002, \"msg\": \"\", \"desc\": \"token is expired by 27626.11396772s\", \"cmdb\": \"\", \"id\": \"\", \"sources\": [\"/srv-applet-mgr/\", \"fields\": null]}\""},
{"@agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/109.0.0.0 Safari/537.36", "@cat": 1, "@lv": "info", "@md": "PUT", "@prj": "srv-applet-mgr", "@rnt": "172.18.0.0", "@status": 289, "@tag": "access", "@ts": "20230228-234807.101Z", "@url": "/srv-applet-mgr/v0/login", "msg": ""},
{"@lv": "info", "@prj": "srv-applet-mgr", "@ts": "20230228-234811.131Z", "event_type": "ANY", "msg": "matched strategies: 1, \"project_name\": \"test\""},
{"@lv": "info", "@prj": "srv-applet-mgr", "@ts": "20230228-234811.132Z", "msg": "", "subject": "HandleEvent", "task_id": "HandleEvent:11271238902677504:;"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.132Z", "msg": "start received: 733702267"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.132Z", "msg": "receive message: {\\example1\\\": \"This is an example payload1\\\"}"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.498Z", "msg": "wasm trap: wasm_unreachable instruction executed\\nasm backtrace:\\n 0: 0x2f6f - \\u003cunknown\\u003eruntime.runtimePanic\\n 1: 0x141e - \\u003cunknown\\u003eruntime.nllPanic\\n 2: 0x5922 - \\u003cunknown\\u003einterface{Error:func(){}(basic:string)}Error$invoke\\n 3: 0x1416 - \\u003cunknown\\u003e$start\\n\""},
{"@lv": "info", "@prj": "srv-applet-mgr", "@ts": "20230228-234811.501Z", "event_type": "ANY", "msg": "matched strategies: 1, \"project_name\": \"test\""},
{"@lv": "info", "@prj": "srv-applet-mgr", "@ts": "20230228-234811.501Z", "msg": "", "subject": "HandleEvent", "task_id": "HandleEvent:11271238902677504:;"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.502Z", "msg": "start received: 1191724613"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.502Z", "msg": "receive message: {\\example2\\\": \"This is an example payload2\\\"}"},
{"@app": "app_01", "@lv": "error", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.862Z", "msg": "known transaction"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.863Z", "msg": "tx:"},
{"@app": "app_01", "@lv": "info", "@prj": "srv-applet-mgr", "@src": "wasm", "@ts": "20230228-234811.863Z", "msg": "err:sent tx failed"},
{"@agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/109.0.0.0 Safari/537.36", "@cat": 735, "@lv": "info", "@md": "POS", "@prj": "srv-applet-mgr", "@rnt": "172.18.0.0", "@status": 1291, "@tag": "access", "@ts": "20230228-234811.864Z", "@url": "/srv-applet-mgr/v0/event/test", "msg": ""}
```

Figure 1(a). Screenshot of the system log for successfully transfer a given amount of ERC20 token to the driver's wallet.

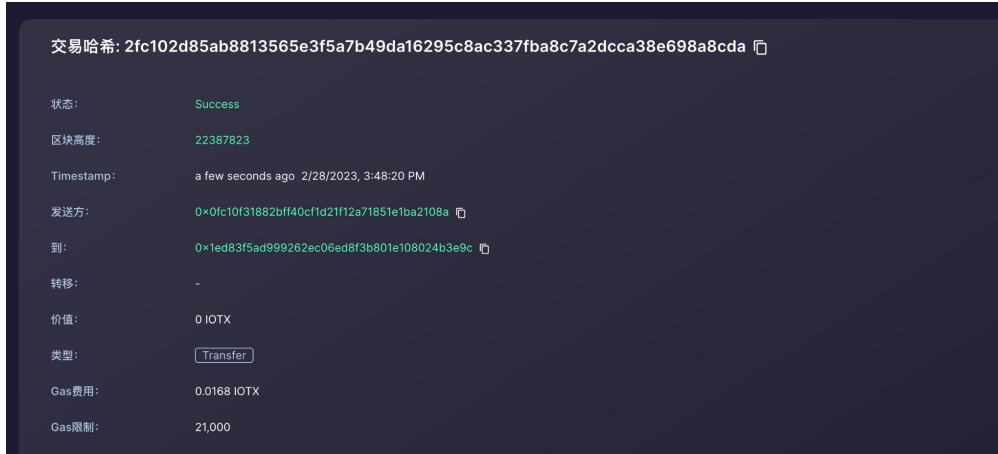


Figure 1(b). Screenshot of the tx hash.

2. ERC 721

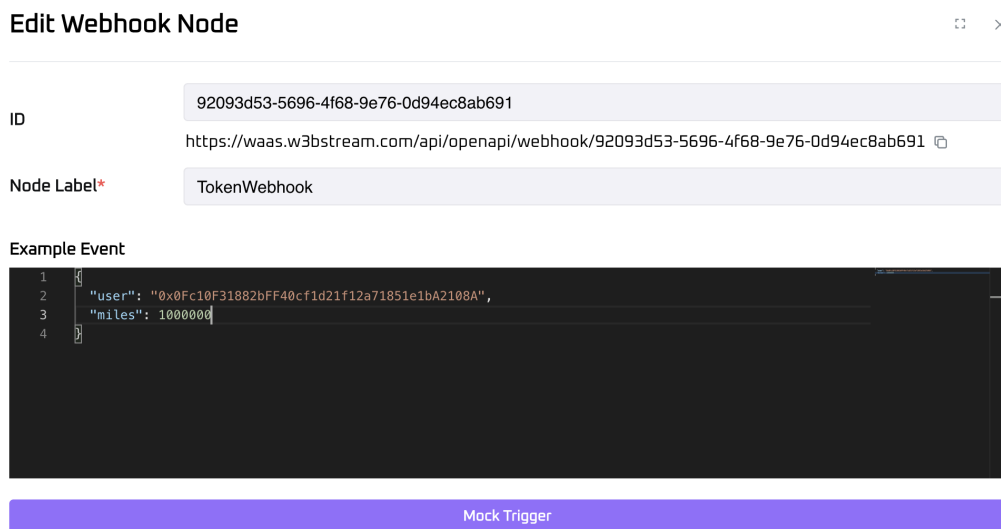


Figure 2(a). Sourcecode for w2bstream webhook

Edit Code Node



Node Label*

Code

SDK Document

Code

```
1  const { user , miles } = ctx.input.body
2  sdk.log({level:"debug", msg:'mint token with user: ${user}'})
3
4  if(miles >=10000) {
5      sdk.mintNFT({
6          id:user,
7          receiver:user,
8          chainId:4690,
9          contract_address:"0x4d90a4Ec761dBeFD43965Cff56C33533e32457fd
10     })
11 }
12
13 return ctx
```

OK

Figure 2(b) Source code on w3bstream node

2023-03-03 15:08:43 Response



```
{
  "chainId": 4690,
  "receiver": "0x0Fc10F31882bFF40cf1d21f12a71851e1bA2108A",
  "contract_address": "0x4d90a4Ec761dBeFD43965Cff56C33533e32457fd"
}
```

Figure 2(c) Tx hash for DriveX ERC721


```
{
  "env": null,
  "req": {
    "url": "/webhook/92093d53-5696-4f68-9e76-0d94ec8ab691",
    "body": {
      "id": "92093d53-5696-4f68-9e76-0d94ec8ab691",
      "user": "0x0Fc10F31882bFF40cf1d21f12a71851e1bA2108A",
      "miles": 1000000
    },
    "query": {
      "trpc": [
        "webhook",
        "92093d53-5696-4f68-9e76-0d94ec8ab691"
      ]
    },
    "method": "POST",
    "headers": {"host": "w3bstream-saas.onrender.com", "user-agent": "Mozilla/5.0 (Macin"},
  },
  "res": {
    "sdk": {
      "env": {}
    },
    "input": {
      "url": "/webhook/92093d53-5696-4f68-9e76-0d94ec8ab691",
      "body": {
        "id": "92093d53-5696-4f68-9e76-0d94ec8ab691",
        "user": "0x0Fc10F31882bFF40cf1d21f12a71851e1bA2108A",
        "miles": 1000000
      },
      "method": "POST"
```

```

"method": "POST",
"headers": {
  "host": "w3bstream-saas.onrender.com",
  "accept": "application/json, text/plain, */*",
  "cf-ray": "7a258aed635c3081-SEA",
  "cookie": "_ga=GA1.1.1134750913.1674614802; _hjSessionUser_3226722=eyJpZCI6IjNjNTdhY",
  "origin": "https://waas.w3bstream.com",
  "referer": "https://waas.w3bstream.com/flow/132",
  "cdn-loop": "cloudflare; subreqs=1",
  "priority": "u=1",
  "cf-ew-via": "15",
  "cf-worker": "onrender.com",
  "sec-ch-ua": "\\\"Chromium\\\";v=\\\"110\\\", \\\"Not A(Brand\\\";v=\\\"24\\\", \\\"Google Chrome\\\";v=\\",
  "cf-visitor": "{\\\"scheme\\\":\\\"https\\\"}",
  "user-agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (K",
  "cf-ipcountry": "CA",
  "content-type": "application/json",
  "authorization": "Bearer eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMDE3ODQxMzI",
  "content-length": "113",
  "sec-fetch-dest": "empty",
  "sec-fetch-mode": "cors",
  "sec-fetch-site": "same-origin",
  "true-client-ip": "184.69.137.242",
  "accept-encoding": "gzip",
  "accept-language": "zh-CN,zh;q=0.9,en;q=0.8,zh-TW;q=0.7,ja;q=0.6",
  "x-forwarded-for": "184.69.137.242, 172.71.146.158, 172.71.146.158",
  "x-request-start": "1677884919915210",
  "cf-connecting-ip": "184.69.137.242",
  "sec-ch-ua-mobile": "?0",
  "x-forwarded-host": "w3bstream-saas.onrender.com",
  "x-forwarded-proto": "https",
  "sec-ch-ua-platform": "\\\"macOS\\\""}
}
}

```

```

},
"logs": [
  {
    "msg": "mint token with user: 0x0Fc10F31882bFF40cf1d21f12a71851e1bA2108A",
    "level": "debug"
  }
],
"err_msg": "",
"execution_time": "3ms"
}

```

Figure 2(d) system log at DriveX Gateway for the whole process