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Распределенные системы и сети

Урок 4. Распределённые системы

Домашнее задание

Прислать результаты выполненных запросов через Swagger UI и Postman.

Прислать скрипт на любом удобном языке программирования, где через API будут созданы 10 устройств (все переменные должны задаваться в коде, списком или массивом, но одной строкой), будет запрошена информация о 10 устройствах, будут обновлены имена 10 устройств, будут удалены 10 устройств.

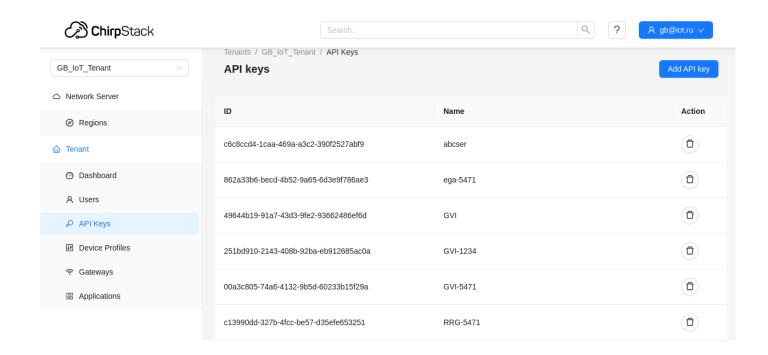
Желательно использовать Python через Google Collab. Для сдачи ДЗ студент должен предоставить преподавателю ссылку с доступом к блокноту с кодом (перед отправкой ДЗ проверьте, что ссылка открывается в приватном режиме браузера).

Решение

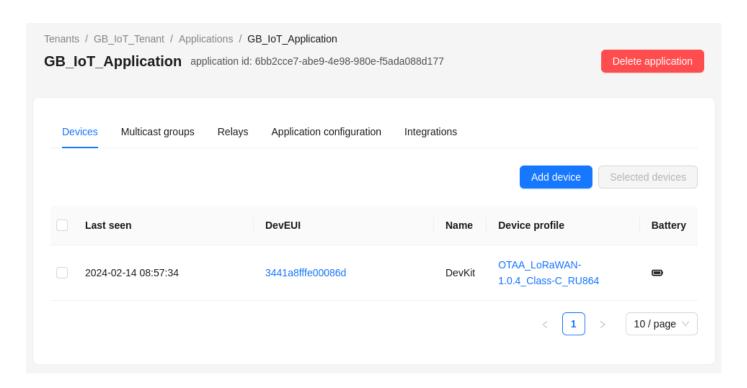
Взаимодействие через браузер

ChirpStack

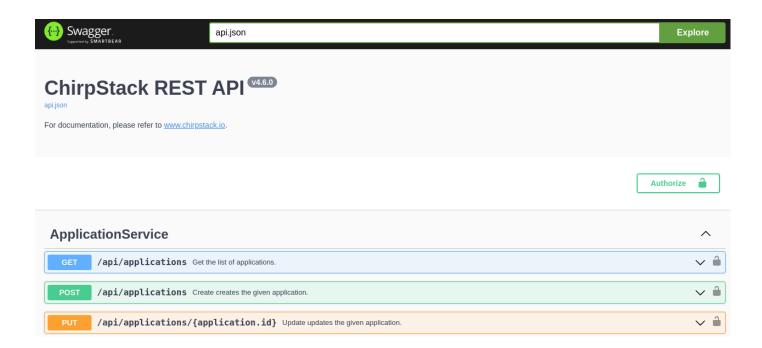
Создание API-token



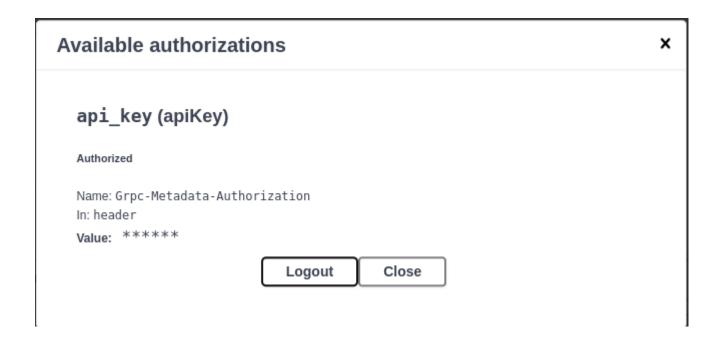
Applications



ChirpStack API



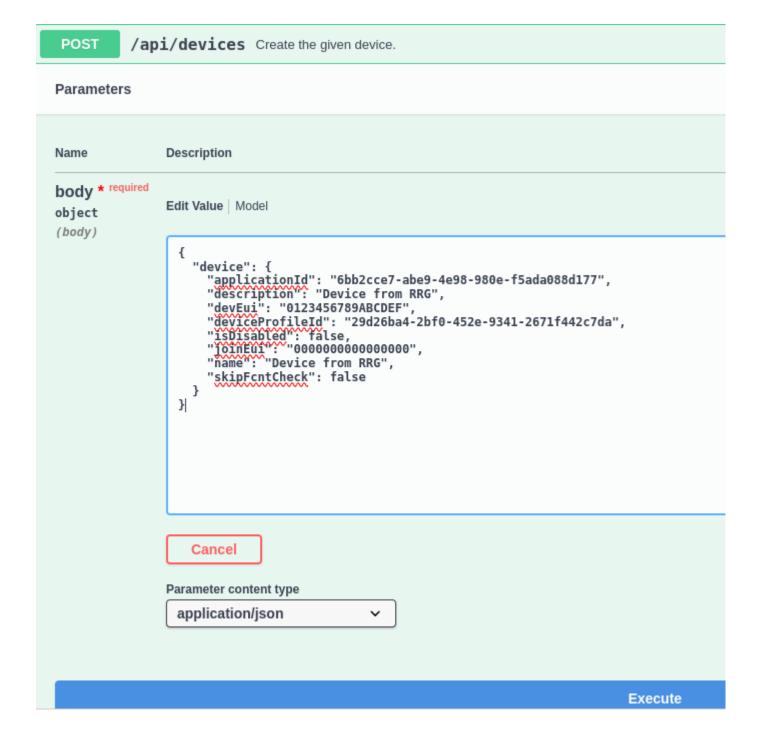
Bearer token



DeviceService GET /api/devices Get the list of devices. **Parameters** Description Name limit Max number of devices to return in the result-set. integer(\$int64) (query) 5 offset Offset in the result-set (for pagination). integer(\$int64) (query) offset search If set, the given string will be used to search on name (optional). string (query) search applicationId Application ID (UUID) to filter devices on. string (query) 6bb2cce7-abe9-4e98-980e-f5ada088d177

```
Responses
Curl
 curl -X 'GET' \
     'https://chirpstack-api.iotserv.ru/api/devices?limit=5&applicationId=6bb2cce7-abe9-4e98-980e-f5ada088d177' \
-H 'accept: application/json' \
-H 'Grpc-Metadata-Authorization: Bearer eyJ0eXAiOiJKVlQiLCJhbGciOiJIUzIlNiJ9.eyJhdWQiOiJjaGlycHN0YWNrIiwiaXNzI
Request URL
  https://chirpstack-api.iotserv.ru/api/devices?limit=5&applicationId=6bb2cce7-abe9-4e98-980e-f5ada088d177
Server response
Code
                        Details
200
                        Response body
                              "totalCount": 1,
"result": [
                                     "devEui": "3441a8fffe00086d",
"createdAt": "2024-01-17T10:50:58.793954Z",
"updatedAt": "2024-01-17T10:50:58.793954Z",
"lastSeenAt": "2024-02-14T08:57:34.178648Z",
"name": "DevKit",
"description": "LoRaWAN DevKit",
"deviceProfileId": "29d26ba4-2bf0-452e-9341-2671f442c7da",
"deviceProfileName": "OTAA_LoRaWAN-1.0.4_Class-C_RU864",
"deviceStatus": {
                                      "deviceStatus": {
                                          "margin": 6,
"externalPowerSource": false,
"batteryLevel": 100
                           1 } }
```

POST



Application id

```
Tenants / GB_IoT_Tenant / Applications / GB_IoT_Application

GB_IoT_Application application id: 6bb2cce7-abe9-4e98-980e-f5ada088d177
```

Device profile id

```
Tenants / GB_IoT_Tenant / Device profiles / OTAA_LoRaWAN-1.0.4_Class-C_RU864

OTAA_LoRaWAN-1.0.4_Class-C_RU864 device profile id: 29d26ba4-2bf0-452e-9341-2671f442c7da
```

DevEUI

```
Curl
 curl -X 'POST' \
    'https://chirpstack-api.iotserv.ru/api/devices' \
    -H 'accept: application/json' \
    -H 'Grpc-Metadata-Authorization: Bearer eyJ0eXAi0iJKV1QiLCJhbGci0iJ
    -H 'Content-Type: application/json' \
    -d '
    "device": {
      "applicationId": "6bb2cce7-abe9-4e98-980e-f5ada088d177", "description": "Device from RRG",
      "devEui": "0123456789ABCDEF",
      "deviceProfileId": "29d26ba4-2bf0-452e-9341-2671f442c7da",
      "isDisabled": false,
"joinEui": "00000000000000000",
"name": "Device from RRG",
"skipFcntCheck": false
Request URL
 https://chirpstack-api.iotserv.ru/api/devices
Server response
Code
                Details
200
                Response body
                 {}
                Response headers
                   content-length: 2
                   content-type: application/json
                   date: Sat,17 Feb 2024 10:48:29 GMT
                   grpc-metadata-content-type: application/grpc
grpc-metadata-date: Sat,17 Feb 2024 10:48:29 GMT
grpc-metadata-x-log-dev_eui: 0123456789ABCDEF
grpc-metadata-x-log-is_disabled: false
                   server: nginx
                   x-http-version: HTTP/2.0
```

Result

```
Tenants / GB_IoT_Tenant / Applications / GB_IoT_Application

GB_IoT_Application application id: 6bb2cce7-abe9-4e98-980e-f5ada088d177

Devices Multicast groups Relays Application configuration Integrations
```

Last seen	DevEUI	Name	Device profile
Never	0123456789abcdef	Device from RRG	OTAA_LoRaWAN-

```
Responses
Curl
 curl -X 'PUT' \
    'https://chirpstack-api.iotserv.ru/api/devices/0123456789abcdef' \
    -H 'accept: application/json' \
-H 'Grpc-Metadata-Authorization: Bearer eyJ0eXAi0iJKV1QiLCJhbGci0iJIUz
    -H 'Content-Type: application/json' \
    -d '{
   "device": {
   "applicationId": "6bb2cce7-abe9-4e98-980e-f5ada088d177",
   "deviceProfileId": "29d26ba4-2bf0-452e-9341-2671f442c7da",
       "name": "Device from RRG UPDATED"
Request URL
  https://chirpstack-api.iotserv.ru/api/devices/0123456789abcdef
Server response
Code
                Details
200
                Response body
                  {}
                Response headers
                    content-length: 2
                    content-type: application/json
                    date: Sat,17 Feb 2024 11:07:14 GMT
                   grpc-metadata-content-type: application/grpc
grpc-metadata-date: Sat,17 Feb 2024 11:07:14 GMT
grpc-metadata-x-log-dev_eui: 0123456789abcdef
grpc-metadata-x-log-is_disabled: false
                    server: nginx
                    x-http-version: HTTP/2.0
```

```
Responses
Curl
 curl -X 'PUT' \
   'https://chirpstack-api.iotserv.ru/api/devices/0123456789abcdef' \
   -H 'accept: application/json' \
-H 'Grpc-Metadata-Authorization: Bearer eyJ0eXAi0iJKV1QiLCJhbGci0iJIUz
   -H 'Content-Type: application/json' \
   -d '{
   "device": {
     "applicationId": "6bb2cce7-abe9-4e98-980e-f5ada088d177",
     "deviceProfileId": "29d26ba4-2bf0-452e-9341-2671f442c7da",
     "name": "Device from RRG UPDATED"
Request URL
 https://chirpstack-api.iotserv.ru/api/devices/0123456789abcdef
Server response
Code
             Details
200
             Response body
              {}
             Response headers
                content-length: 2
                content-type: application/json
               date: Sat, 17 Feb 2024 11:07:14 GMT
               grpc-metadata-content-type: application/grpc
grpc-metadata-date: Sat,17 Feb 2024 11:07:14 GMT
               grpc-metadata-x-log-dev_eui: 0123456789abcdef
                grpc-metadata-x-log-is_disabled: false
               server: nginx
                x-http-version: HTTP/2.0
```

Result

```
Tenants / GB_IoT_Tenant / Applications / GB_IoT_Application
```

GB_loT_Application application id: 6bb2cce7-abe9-4e98-980e-f5ada088d177

Devices Multicast groups Relays Application configuration Integrations

Ac

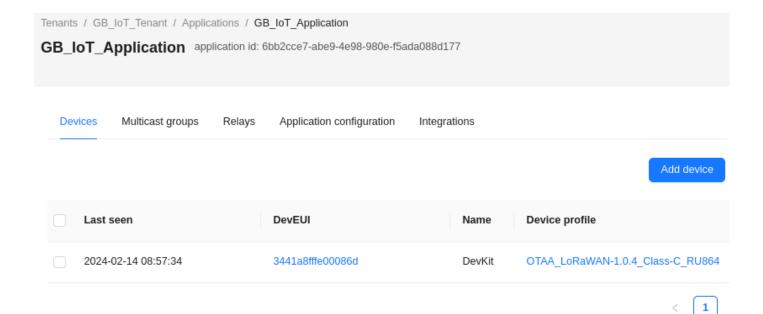
Last seen	DevEUI	Name	Device profile
Never	0123456789abcdef	Device from RRG UPDATED	OTAA_LoRaWA C_RU864

DELETE

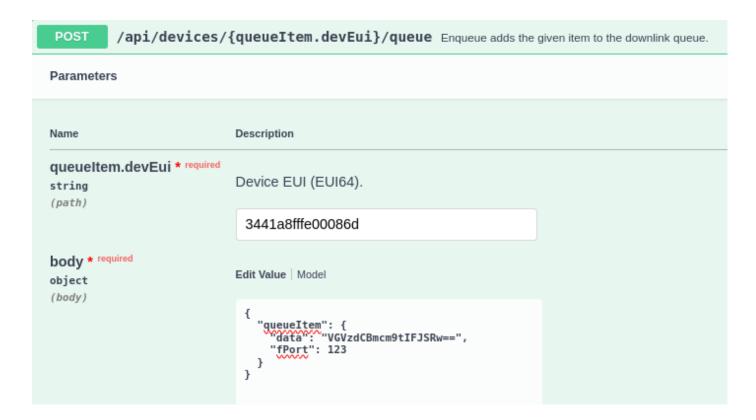


```
Responses
Curl
 curl -X 'DELETE' \
    'https://chirpstack-api.iotserv.ru/api/devices/0123456789ABCDEF' \
   -H 'accept: application/json' \
-H 'Grpc-Metadata-Authorization: Bearer eyJθeXAiOiJKVlQiLCJhbGciOiJI
Request URL
  https://chirpstack-api.iotserv.ru/api/devices/0123456789ABCDEF
Server response
Code
                Details
200
                Response body
                 {}
                Response headers
                   content-length: 2
                   content-type: application/json
date: Sat,17 Feb 2024 11:15:32 GMT
                   grpc-metadata-content-type: application/grpc
grpc-metadata-date: Sat,17 Feb 2024 11:15:32 GMT
grpc-metadata-x-log-dev_eui: 0123456789ABCDEF
                   server: nginx
                   x-http-version: HTTP/2.0
```

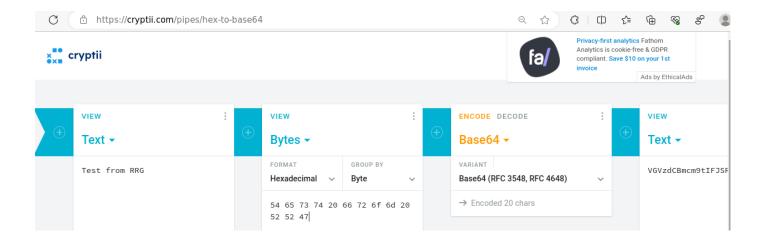
Result



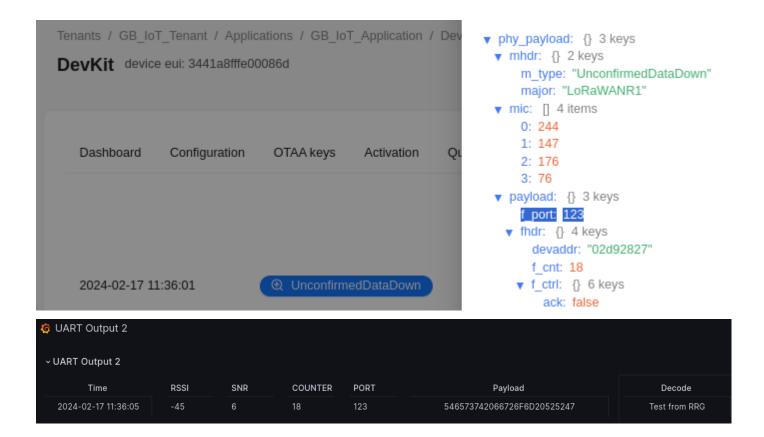
POST Queue to real device



Data to Base64



```
Responses
Curl
 curl -X 'POST' \
   'https://chirpstack-api.iotserv.ru/api/devices/3441a8fffe00086d/queue' \
   -H 'accept: application/json' \
-H 'Grpc-Metadata-Authorization: Bearer eyJ0eXAi0iJKV1QiLCJhbGci0iJIUzI1NiJ9.ey
   -H 'Content-Type: application/json' \
   -d '{
   "queueItem": {
     "data": "VGVzdCBmcm9tIFJSRw==",
"fPort": 123
Request URL
 https://chirpstack-api.iotserv.ru/api/devices/3441a8fffe00086d/queue
Server response
Code
              Details
200
              Response body
                  "id": "5a67671b-02df-4cc7-b8bd-c07aa37df87a"
              Response headers
                 content-length: 45
                 content-type: application/json
                 date: Sat,17 Feb 2024 11:36:00 GMT
                 grpc-metadata-content-type: application/grpc
grpc-metadata-date: Sat,17 Feb 2024 11:36:00 GMT
grpc-metadata-x-log-dev_eui: 3441a8fffe00086d
                 server: nginx
                 x-http-version: HTTP/2.0
```



Взаимодействие с помощью Python

Создание 10 устройств

```
import requests
import json

token="eyJ0eXAi0iJKV1QiLCJhbGci0iJIUzI1NiJ9.eyJhdWQi0iJjaGlycHN0YWNrIiwiaXNz
IjoiY2hpcnBzdGFjayIsInN1Yi16ImMxMzk5MGRkLTMyN2ItNGZjYy1iZTU3LWQzNWVmZTY1MzI1
MSIsInR5cC16ImtleSJ9.irLcZ138B8-UTrYhWZG-gFXwvsDMheqz8uiozaOyGzs"
url = 'https://chirpstack-api.iotserv.ru/api/devices'
applicationId = "6bb2cce7-abe9-4e98-980e-f5ada088d177"
deviceProfileId = "29d26ba4-2bf0-452e-9341-2671f442c7da"
devQuantity = 10
devicesList = [f"{i:02d}23456789ABCDEF" for i in range(devQuantity)]
```

```
def create(url, token, applicationId, deviceProfileId, name, devEui):
   headers = {
      'accept': 'application/json',
      'Grpc-Metadata-Authorization': f'Bearer {token}',
      'Content-Type': 'application/json',
}
```

```
data = {
        "device": {
            "applicationId": applicationId,
            "description": name,
            "devEui": devEui,
            "deviceProfileId": deviceProfileId,
            "isDisabled": False,
            "joinEui": "0000000000000000",
            "name": name,
            "skipFcntCheck": False
        }
    }
    return requests.post(url, json=data, headers=headers)
for i in range(len(devicesList)):
  print(create(url, token, applicationId, deviceProfileId, f"RRG Device
{i:02d}", devicesList[i]))
```

Запрос информации о 10 устройствах

```
def info(url, token, applicationId, limits):
    headers = {
        'accept': 'application/json',
        'Grpc-Metadata-Authorization': f'Bearer {token}',
    }
    params = {
        'limit': limits,
        'applicationId': applicationId
    }
    response = requests.get(url, headers=headers, params=params)
    return response.json()

print(json.dumps(info(url, token, applicationId, devQuantity+1), indent=4))
```

Обновить имена 10 устройств

```
def update(url, token, applicationId, deviceProfileId, newName, devEui):
    headers = {
        'accept': 'application/json',
        'Grpc-Metadata-Authorization': f'Bearer {token}',
        'Content-Type': 'application/json',
}
data = {
    "device": {
        "applicationId": applicationId,
        "deviceProfileId": deviceProfileId,
```

```
"name": newName,
        "description": newName
}

put_url = f"{url}/{devEui}"
    return requests.put(put_url, json=data, headers=headers)

for i in range(len(devicesList)):
    print(update(url, token, applicationId, deviceProfileId, f"RRG Device
{i:02d} UPDATED", devicesList[i]))

print(json.dumps(info(url, token, applicationId, devQuantity+1), indent=4))
```

Удаление 10 устройств

```
def delete(url, token, devEui):
    headers = {
        'accept': 'application/json',
        'Grpc-Metadata-Authorization': f'Bearer {token}',
    }
    return requests.delete(f"{url}/{devEui}", headers=headers)

for i in range(len(devicesList)):
    print(delete(url, token, devicesList[i]))
```