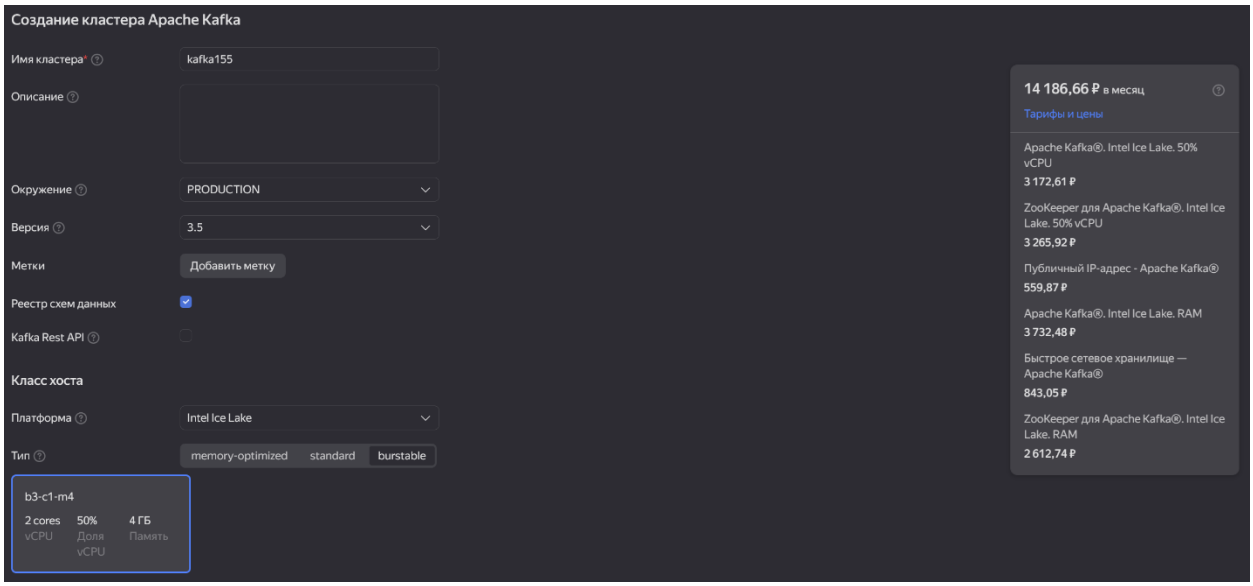
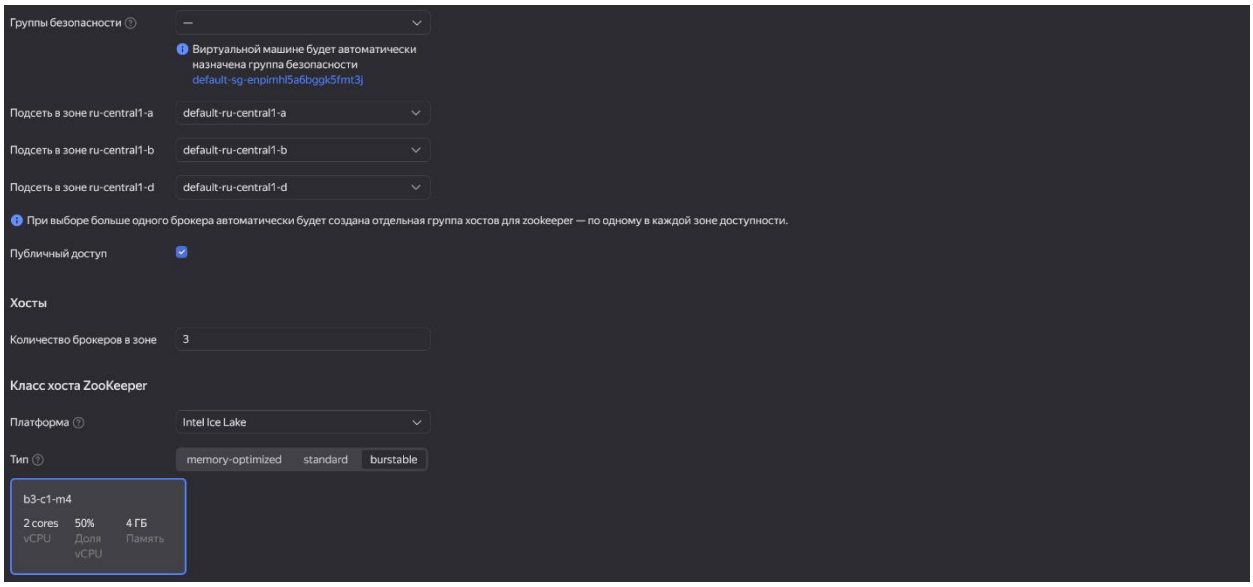
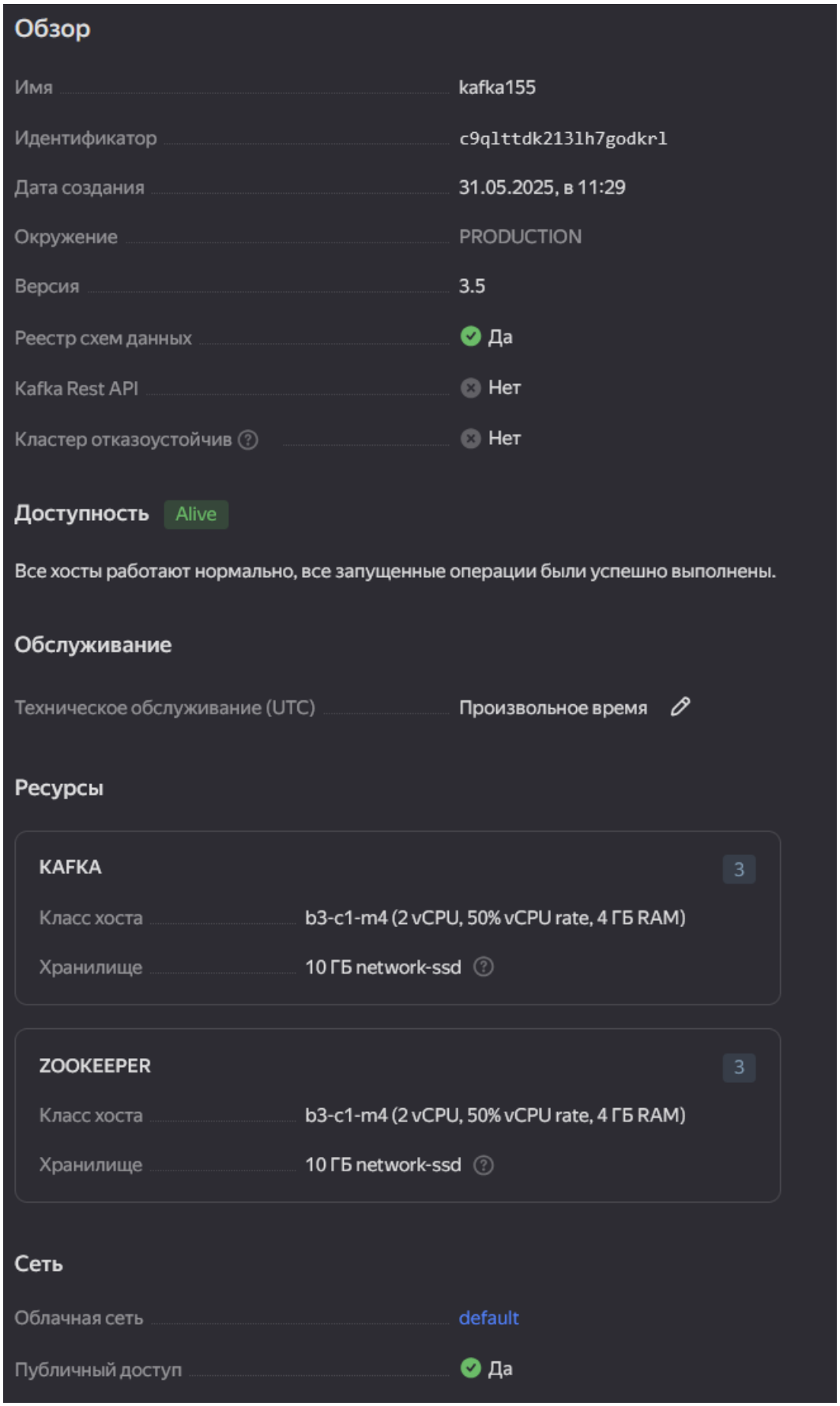
# Задание 1. Развёртывание и настройка Kafka-кластера в Yandex Cloud

## Создаем кластер Apache Kafka

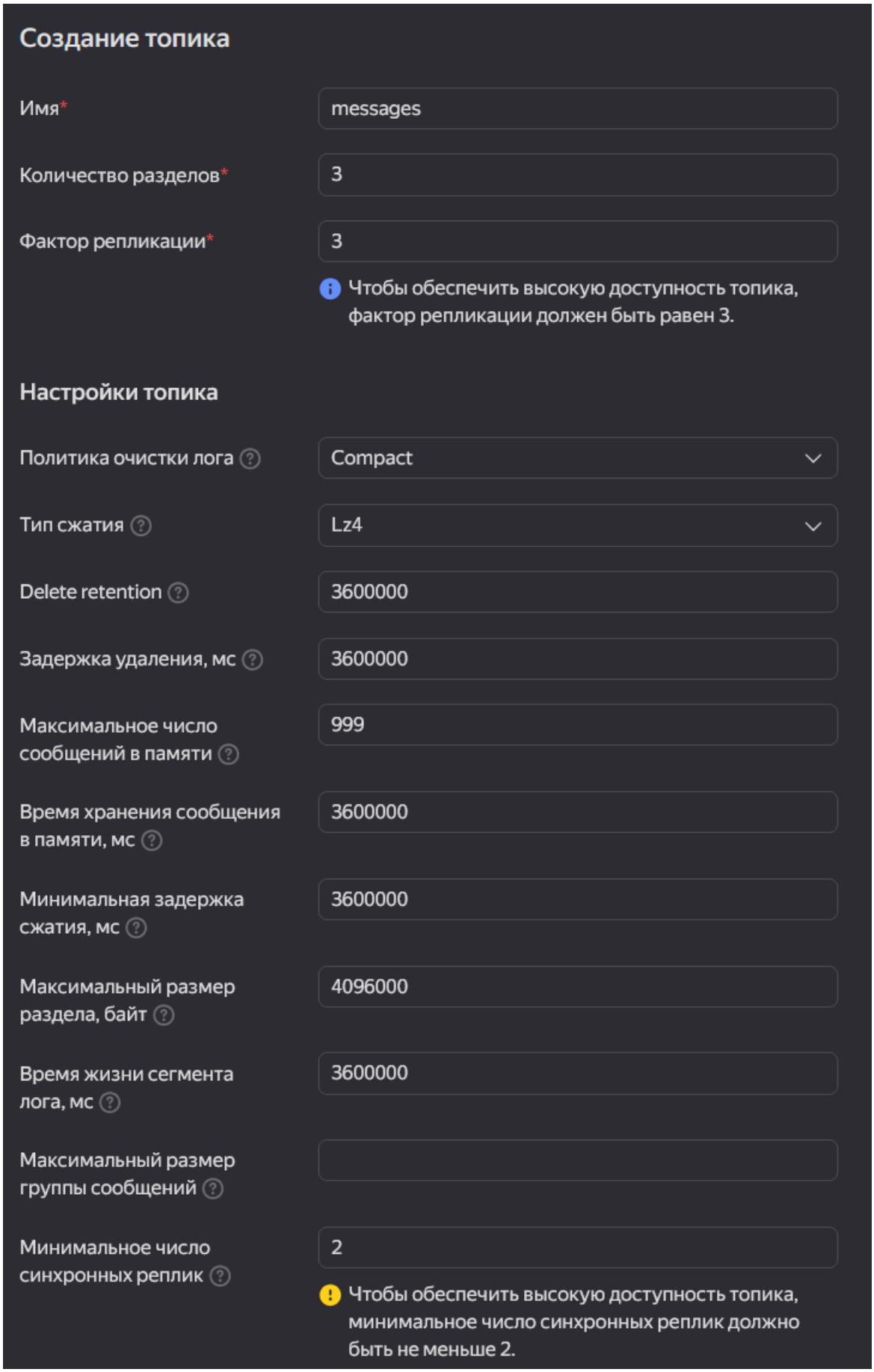


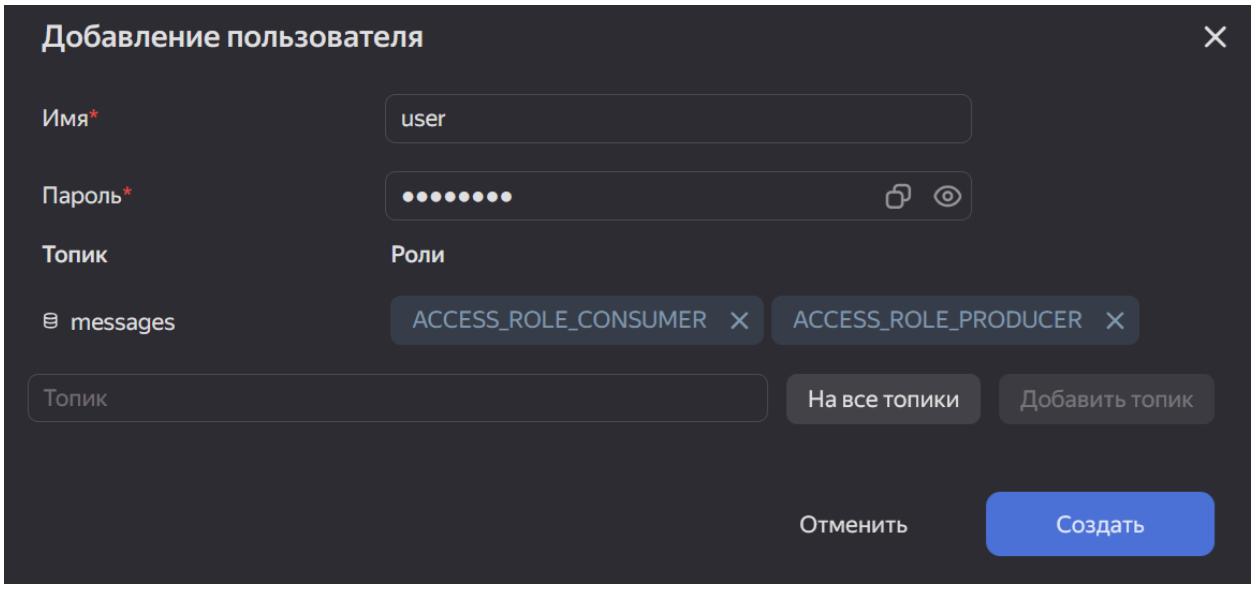
**Результат**


Обзор
Имя
kafka155
Идентификатор
c9qlttdk213lh7godkrl
Дата создания
31.05.2025, в 11:29
Окружение
PRODUCTION
Версия
3.5
Реестр схем данных
Да
Kafka Rest API
Нет
Кластер отказоустойчив
Нет
Доступность
Alive
Все хосты работают нормально, все запущенные операции были успешно выполнены.
Обслуживание
Техническое обслуживание (UTC)
Произвольное время
Ресурсы
KAFKA
3
Класс хоста
b3-c1-m4 (2 vCPU, 50% vCPU rate, 4 ГБ RAM)
Хранилище
10 ГБ network-ssd
ZOOKEEPER
3
Класс хоста
b3-c1-m4 (2 vCPU, 50% vCPU rate, 4 ГБ RAM)
Хранилище
10 ГБ network-ssd
Сеть
Облачная сеть
default
Публичный доступ
Да

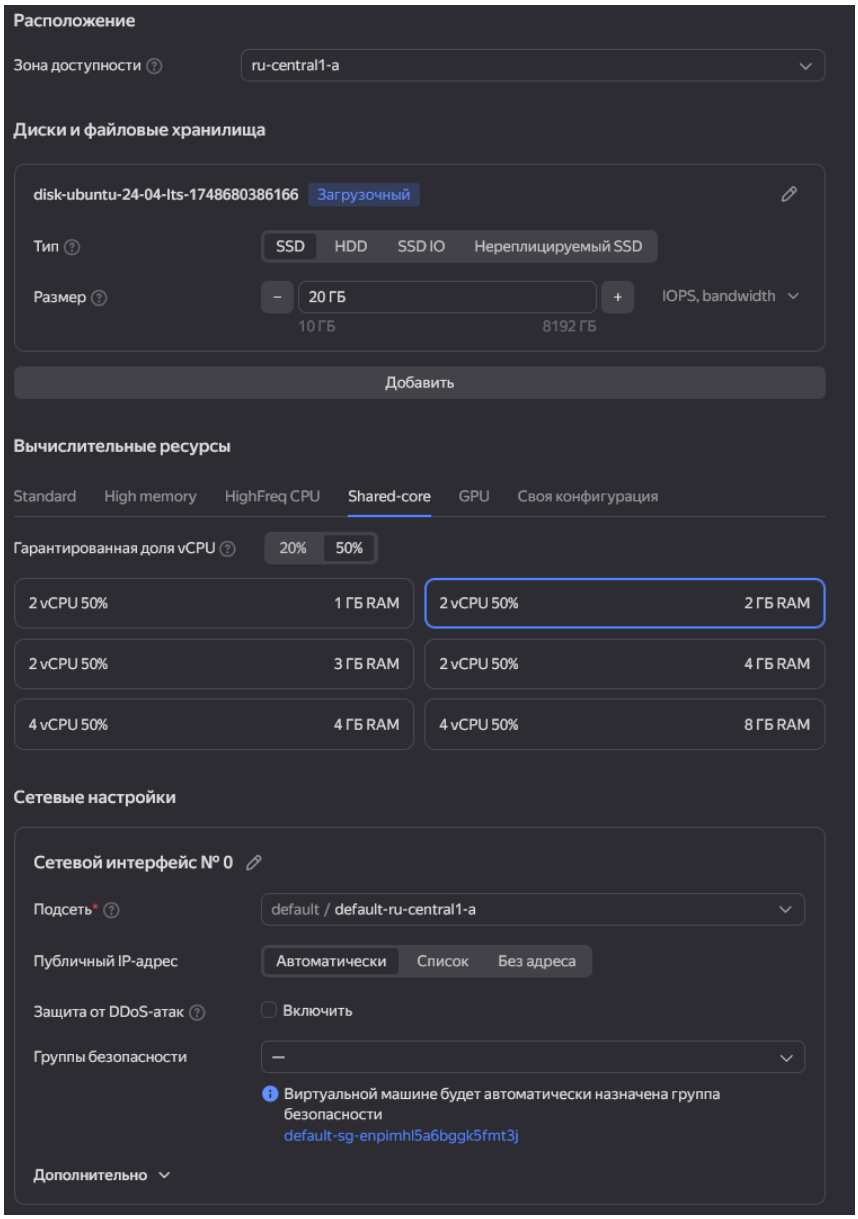
**Создаем топик**



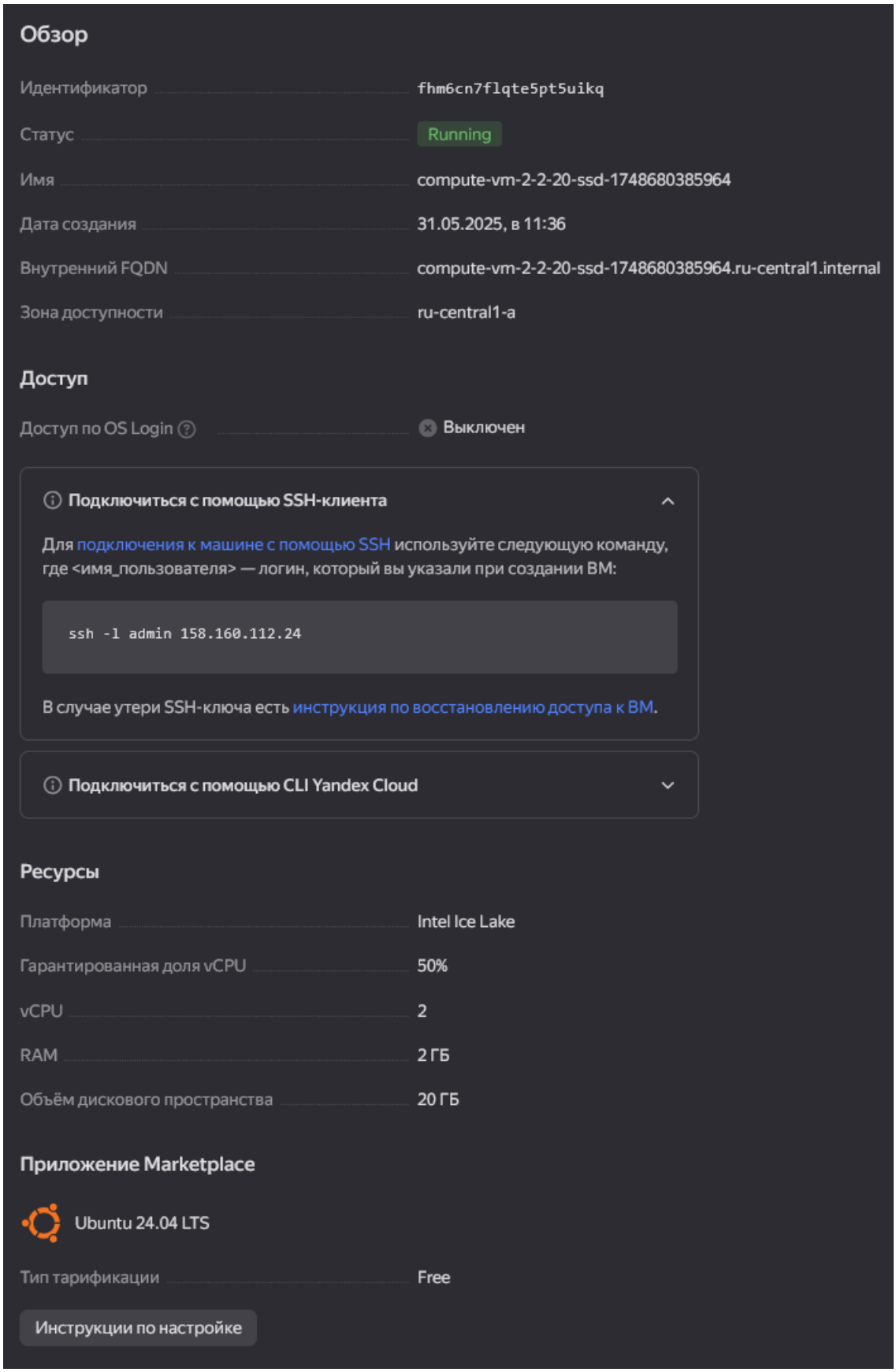
## Добавляем пользователя




## Создаем виртуальную машину



**Результат**


Обзор
Идентификатор
fhm6cn7flqte5pt5uikq
Статус
Running
Имя
compute-vm-2-2-20-ssd-1748680385964
Дата создания
31.05.2025, в 11:36
Внутренний FQDN
compute-vm-2-2-20-ssd-1748680385964.ru-central1.internal
Зона доступности
ru-central1-a
Доступ
Доступ по OS Login
Выключен
Подключиться с помощью SSH-клиента
Для подключения к машине с помощью SSH используйте следующую команду, где <имя_пользователя> — логин, который вы указали при создании ВМ:
ssh -l admin 158.160.112.24
В случае утери SSH-ключа есть инструкция по восстановлению доступа к ВМ.
Подключиться с помощью CLI Yandex Cloud
Ресурсы
Платформа
Intel Ice Lake
Гарантированная доля vCPU
50%
vCPU
2
RAM
2 ГБ
Объём дискового пространства
20 ГБ
Приложение Marketplace
Ubuntu 24.04 LTS
Тип тарификации
Free
Инструкции по настройке

### Код consumer.py

```
from confluent_kafka import Consumer

def error_callback(err):
    print('Something went wrong: {}'.format(err))

params = {
    'bootstrap.servers': 'rc1a-8t16iat3t9agp431.mdb.yandexcloud.net,rc1a-
geuf5nhqn8p6q1af.mdb.yandexcloud.net,rc1a-tdjhj4jbfeqri3ip.mdb.yandexcloud.net:9091',
    'security.protocol': 'SASL_SSL',
    'ssl.ca.location': '/usr/local/share/ca-
certificates/Yandex/YandexInternalRootCA.crt',
    'sasl.mechanism': 'SCRAM-SHA-512',
    'sasl.username': 'user',
    'sasl.password': '12345678',
    'group.id': 'test-consumer1',
    'auto.offset.reset': 'earliest',
    'enable.auto.commit': False,
    'error_cb': error_callback,
    'debug': 'all',
}

c = Consumer(params)
c.subscribe(['messages'])

while True:
    msg = c.poll(timeout=3.0)
    if msg:
        val = msg.value().decode()
        print(val)
```

### Код producer.py

```
from confluent_kafka import Producer

def error_callback(err):
    print('Something went wrong: {}'.format(err))

params = {
    'bootstrap.servers': 'rc1a-8t16iat3t9agp431.mdb.yandexcloud.net,rc1a-
geuf5nhqn8p6q1af.mdb.yandexcloud.net,rc1a-tdjhj4jbfeqri3ip.mdb.yandexcloud.net:9091',
    'security.protocol': 'SASL_SSL',
    'ssl.ca.location': '/usr/local/share/ca-
certificates/Yandex/YandexInternalRootCA.crt',
    'sasl.mechanism': 'SCRAM-SHA-512',
    'sasl.username': 'user',
    'sasl.password': '12345678',
    'error_cb': error_callback,
}

p = Producer(params)
p.produce('messages', 'some payload1')
p.flush(10)
```

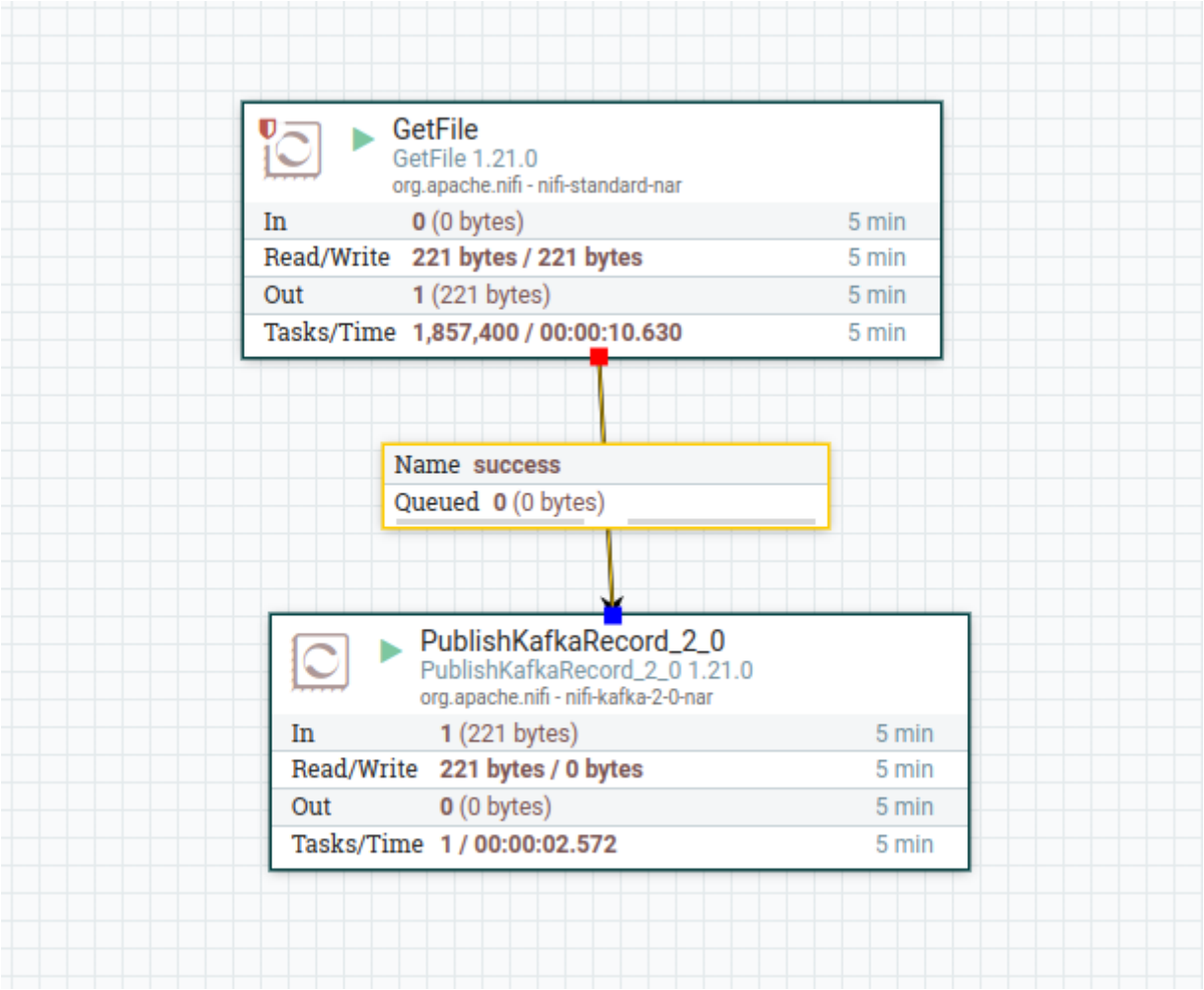
### Результат

## Задание 2. Интеграция Kafka с внешними системами (Apache NiFi / Hadoop)

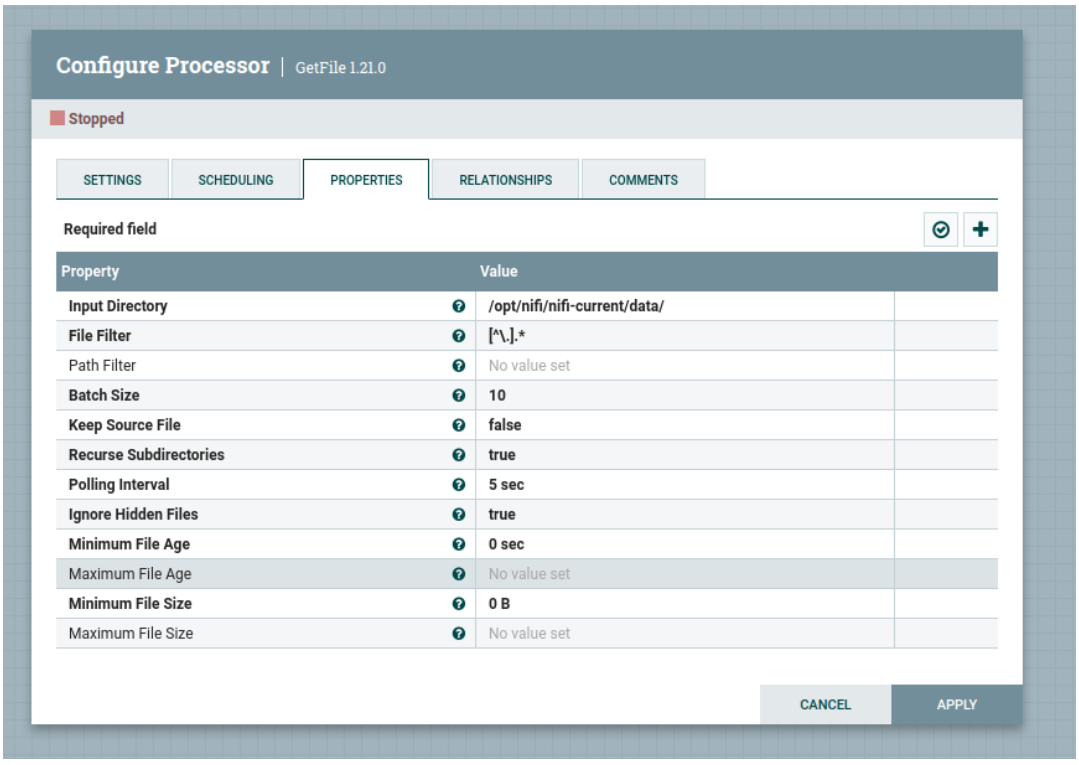
### Установка Nifi

```
sudo apt update
sudo apt upgrade
sudo apt install unzip openjdk-21-jdk
wget https://dlcdn.apache.org/nifi/2.4.0/nifi-2.4.0-bin.zip
unzip nifi-2.4.0-bin.zip
rm nifi-2.4.0-bin.zip
mv nifi-2.4.0/ nifi/

sudo micro /etc/bash.bashrc
source /etc/bash.bashrc
echo $JAVA_HOME
cd nifi/bin/
micro ../conf/nifi.properties
bash nifi.sh start
tail ../logs/nifi-app.log

nifi.properties:

nifi.web.http.host=0.0.0.0
nifi.web.http.port=8484
nifi.web.https.host=
nifi.web.https.port=
nifi.security.keystore=
nifi.security.keystoreType=
nifi.security.keystorePasswd=
nifi.security.keyPasswd=
nifi.security.truststore=
nifi.security.truststoreType=
nifi.security.truststorePasswd=
nifi.security.user.login.identity.provider=
nifi.security.allow.anonymous.authentication=true
```

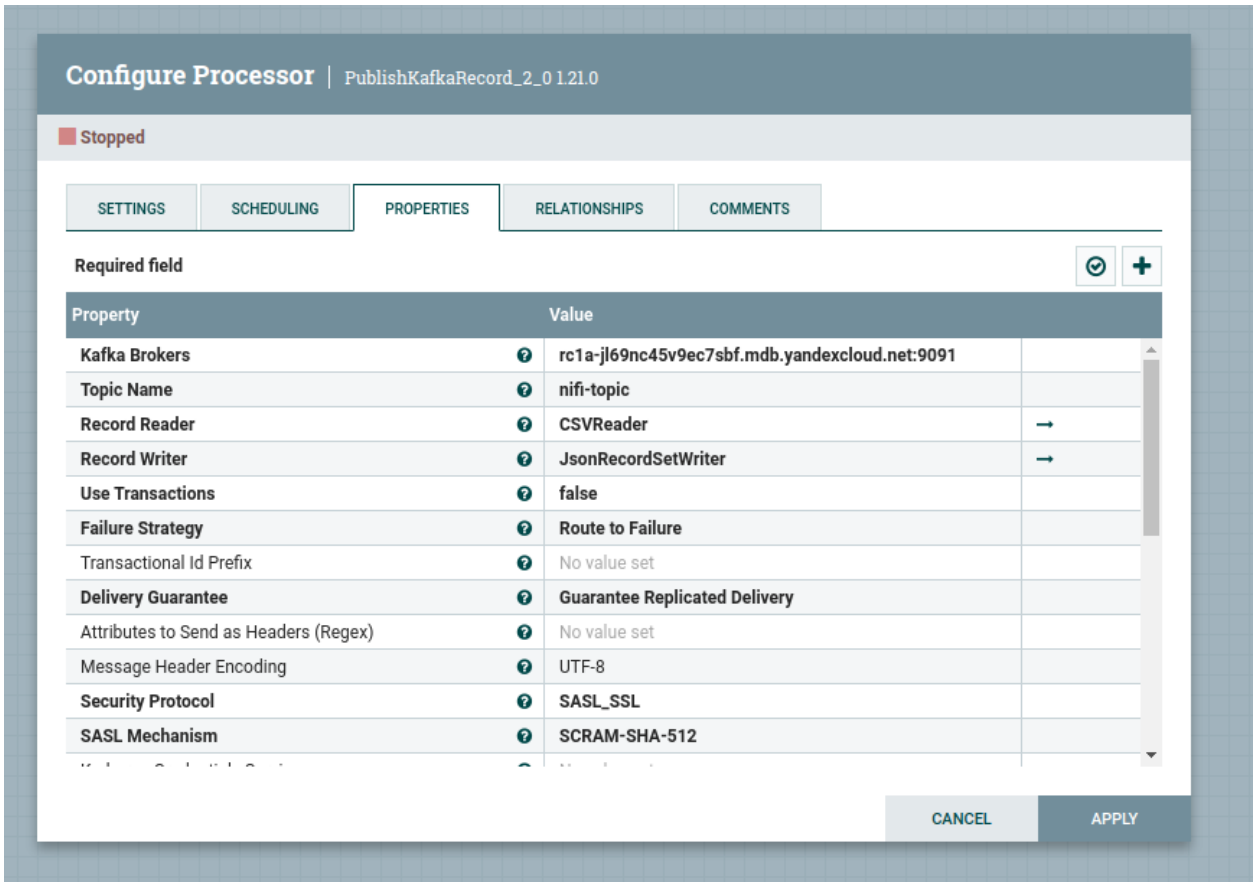
## Настроим Ni-Fi на чтение CSV файла и передачу в topic Kafka




## Конфигурация GetFile

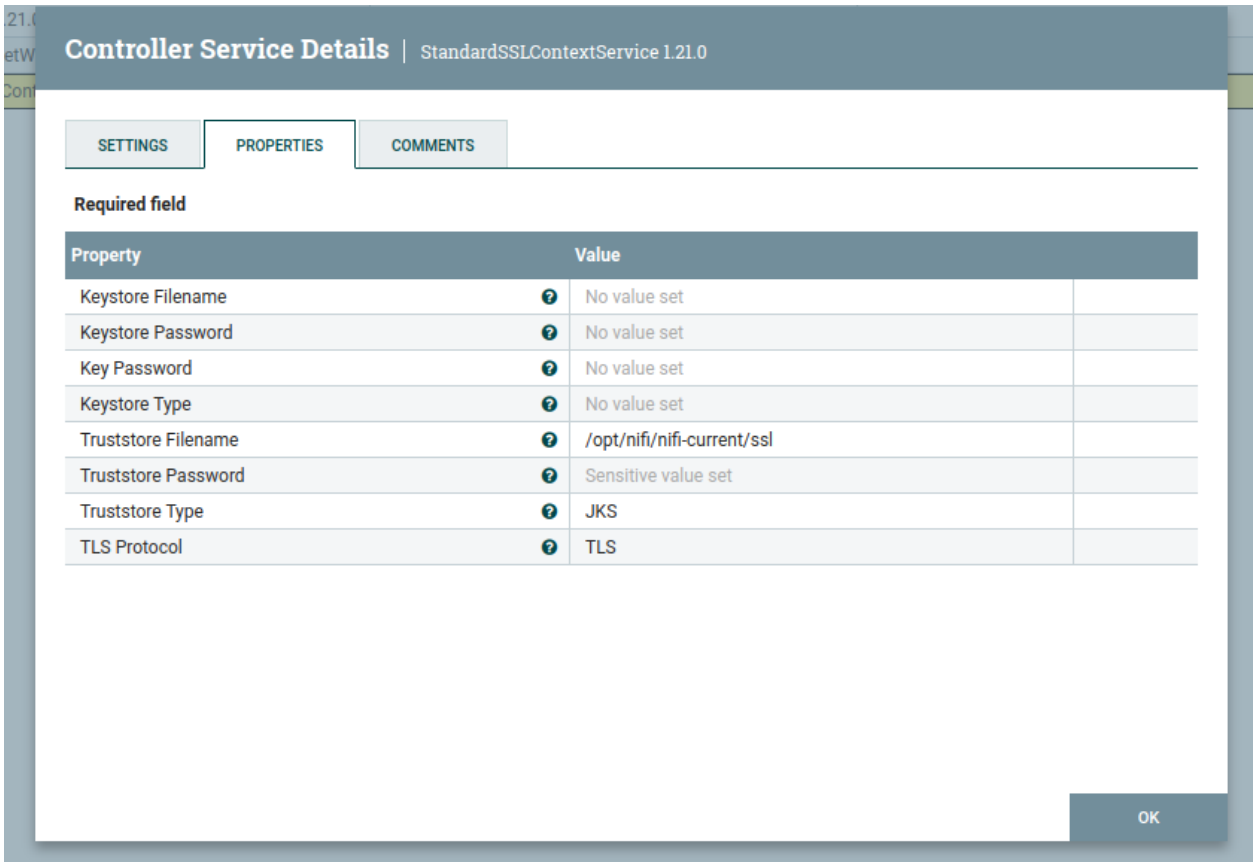


## Конфигурация PublishKafkaRecord




## Конфигурация Controller Service

## Конфигурация SSL CONTEXT




## Файл с данными

```
id,name,age,email
1,Екатерина,21,kate@yandex.ru
2,Никита,26,nikita@yandex.ru
3,Майя,21,maya@yandex.ru
4,Алексей,26,alex@yandex.ru
5,Илья,25,ilya@yandex.ru
6,Виктория,22,vika@yandex.ru
```

## Consumer

```
from confluent_kafka import Consumer

if __name__ == "__main__":
    consumer_conf = {
        "bootstrap.servers": "rc1a-jl69nc45v9ec7sbf.mdb.yandexcloud.net:9091,rc1b-
qpk8n48l9cfktnsp.mdb.yandexcloud.net:9091,rc1d-loi78vj6a7rhiov0.mdb.yandexcloud.net:9091",
        "group.id": "nifi-consumer-group",
        "auto.offset.reset": "earliest",
        "enable.auto.commit": True,
        "session.timeout.ms": 6000,
    }

    consumer = Consumer(consumer_conf)
    consumer.subscribe(["nifi-topic"])

    try:
        while True:
            msg = consumer.poll(0.1)
            if msg is None:
                continue
            if msg.error():
                print(f"Ошибка: {msg.error()}")
                continue
```

```
            value = msg.value().decode("utf-8")
            print(
                f"Получено сообщение: {value=}, "
                f"partition={msg.partition()}, offset={msg.offset()}"
            )
    finally:
        consumer.close()
```

### Логи консьюмера

### Логи работы Ni-Fi

```
2025-08-14 14:12:32,528 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository
Successfully checkpointed FlowFile Repository with 0 records in 0 milliseconds
2025-08-14T14:12:43.707097358Z 2025-08-14 14:12:43,234 INFO [NiFi Web Server-33]
o.a.n.c.s.StandardProcessScheduler Starting GetFile[id=9a2282ae-0195-1000-9a21-b48a38cd198d]
2025-08-14T14:12:43.707129838Z 2025-08-14 14:12:43,234 INFO [NiFi Web Server-33]
o.a.n.controller.StandardProcessorNode Starting GetFile[id=9a2282ae-0195-1000-9a21-
b48a38cd198d]
2025-08-14T14:12:43.707135118Z 2025-08-14 14:12:43,239 INFO [NiFi Web Server-45]
o.a.n.c.s.StandardProcessScheduler Starting PublishKafkaRecord_2_0[id=9a23e646-0195-1000-f2d4-
dc3d5d1bb016]
2025-08-14T14:12:43.707139736Z 2025-08-14 14:12:43,239 INFO [NiFi Web Server-45]
o.a.n.controller.StandardProcessorNode Starting PublishKafkaRecord_2_0[id=9a23e646-0195-1000-
f2d4-dc3d5d1bb016]
2025-08-14T14:12:43.707143914Z 2025-08-14 14:12:43,245 INFO [Timer-Driven Process Thread-1]
o.a.n.c.s.TimerDrivenSchedulingAgent Scheduled PublishKafkaRecord_2_0[id=9a23e646-0195-1000-
f2d4-dc3d5d1bb016] to run with 1 threads
2025-08-14T14:12:43.707148362Z 2025-08-14 14:12:43,245 INFO [Timer-Driven Process Thread-6]
o.a.n.c.s.TimerDrivenSchedulingAgent Scheduled GetFile[id=9a2282ae-0195-1000-9a21-
b48a38cd198d] to run with 1 threads
2025-08-14T14:12:43.707152670Z 2025-08-14 14:12:43,328 INFO [Timer-Driven Process Thread-2]
o.a.k.clients.producer.ProducerConfig ProducerConfig values:
2025-08-14T14:12:43.707182014Z      acks = all
2025-08-14T14:12:43.707185962Z      batch.size = 16384
2025-08-14T14:12:43.707187825Z      bootstrap.servers = [rc1a-
jl69nc45v9ec7sbf.mdb.yandexcloud.net:9091]
2025-08-14T14:12:43.707189649Z      buffer.memory = 33554432
2025-08-14T14:12:43.707191452Z      client.id =
2025-08-14T14:12:43.707193075Z      compression.type = none
2025-08-14T14:12:43.707194748Z      connections.max.idle.ms = 540000
2025-08-14T14:12:43.707196371Z      enable.idempotence = false
2025-08-14T14:12:43.707198054Z      interceptor.classes = []
2025-08-14T14:12:43.707199647Z      key.serializer = class
org.apache.kafka.common.serialization.ByteArraySerializer
2025-08-14T14:12:43.707201350Z      linger.ms = 0
2025-08-14T14:12:43.707202943Z      max.block.ms = 5000
2025-08-14T14:12:43.707204546Z      max.in.flight.requests.per.connection = 5
```

```
2025-08-14T14:12:43.707206199Z      max.request.size = 1048576
2025-08-14T14:12:43.707207832Z      metadata.max.age.ms = 300000
2025-08-14T14:12:43.707209435Z      metric.reporters = []
2025-08-14T14:12:43.707211028Z      metrics.num.samples = 2
2025-08-14T14:12:43.707212721Z      metrics.recording.level = INFO
2025-08-14T14:12:43.707214334Z      metrics.sample.window.ms = 30000
2025-08-14T14:12:43.707215947Z      partitioner.class = class
org.apache.kafka.clients.producer.internals.DefaultPartitioner
2025-08-14T14:12:43.707217590Z      receive.buffer.bytes = 32768
2025-08-14T14:12:43.707219193Z      reconnect.backoff.max.ms = 1000
2025-08-14T14:12:43.707220816Z      reconnect.backoff.ms = 50
2025-08-14T14:12:43.707222399Z      request.timeout.ms = 30000
2025-08-14T14:12:43.707223992Z      retries = 0
2025-08-14T14:12:43.707225575Z      retry.backoff.ms = 100
2025-08-14T14:12:43.707227148Z      sasl.client.callback.handler.class = null
2025-08-14T14:12:43.707228751Z      sasl.jaas.config = [hidden]
2025-08-14T14:12:43.707231546Z      sasl.kerberos.kinit.cmd = /usr/bin/kinit
2025-08-14T14:12:43.707233249Z      sasl.kerberos.min.time.before.relogin = 60000
2025-08-14T14:12:43.707234943Z      sasl.kerberos.service.name = null
2025-08-14T14:12:43.707236566Z      sasl.kerberos.ticket.renew.jitter = 0.05
2025-08-14T14:12:43.707238259Z      sasl.kerberos.ticket.renew.window.factor = 0.8
2025-08-14T14:12:43.707239882Z      sasl.login.callback.handler.class = null
2025-08-14T14:12:43.707241515Z      sasl.login.class = null
2025-08-14T14:12:43.707243128Z      sasl.login.refresh.buffer.seconds = 300
2025-08-14T14:12:43.707247836Z      sasl.login.refresh.min.period.seconds = 60
2025-08-14T14:12:43.707249520Z      sasl.login.refresh.window.factor = 0.8
2025-08-14T14:12:43.707251163Z      sasl.login.refresh.window.jitter = 0.05
2025-08-14T14:12:43.707252836Z      sasl.mechanism = SCRAM-SHA-512
2025-08-14T14:12:43.707254419Z      security.protocol = SASL_SSL
2025-08-14T14:12:43.707256192Z      send.buffer.bytes = 131072
2025-08-14T14:12:43.707258817Z      ssl.cipher.suites = null
2025-08-14T14:12:43.707261532Z      ssl.enabled.protocols = [TLSv1.2, TLSv1.1, TLSv1]
2025-08-14T14:12:43.707264307Z      ssl.endpoint.identification.algorithm = https
2025-08-14T14:12:43.707321613Z      ssl.key.password = null
2025-08-14T14:12:43.707364683Z      ssl.keymanager.algorithm = SunX509
2025-08-14T14:12:43.707391933Z      ssl.keystore.location = null
2025-08-14T14:12:43.707407532Z      ssl.keystore.password = null
2025-08-14T14:12:43.707428080Z      ssl.keystore.type = JKS
2025-08-14T14:12:43.707446545Z      ssl.protocol = TLS
2025-08-14T14:12:43.707466582Z      ssl.provider = null
2025-08-14T14:12:43.707499132Z      ssl.secure.random.implementation = null
2025-08-14T14:12:43.707542963Z      ssl.trustmanager.algorithm = PKIX
2025-08-14T14:12:43.707570003Z      ssl.truststore.location = /opt/nifi/nifi-current/ssl
2025-08-14T14:12:43.707598466Z      ssl.truststore.password = [hidden]
2025-08-14T14:12:43.707630976Z      ssl.truststore.type = JKS
2025-08-14T14:12:43.707650272Z      transaction.timeout.ms = 60000
2025-08-14T14:12:43.707667985Z      transactional.id = null
2025-08-14T14:12:43.707690567Z      value.serializer = class
org.apache.kafka.common.serialization.ByteArraySerializer
2025-08-14T14:12:43.707709812Z
2025-08-14T14:12:43.707728226Z 2025-08-14 14:12:43,468 INFO [Timer-Driven Process Thread-2]
o.a.k.c.s.authenticator.AbstractLogin Successfully logged in.
2025-08-14T14:12:43.707748514Z 2025-08-14 14:12:43,486 INFO [Timer-Driven Process Thread-2]
o.a.kafka.common.utils.AppInfoParser Kafka version : 2.0.0
2025-08-14T14:12:43.707766658Z 2025-08-14 14:12:43,486 INFO [Timer-Driven Process Thread-2]
o.a.kafka.common.utils.AppInfoParser Kafka commitId : 3402a8361b734732
2025-08-14T14:12:43.707778690Z 2025-08-14 14:12:43,660 INFO [Flow Service Tasks Thread-2]
o.a.nifi.controller.StandardFlowService Saved flow controller
org.apache.nifi.controller.FlowController@503ea6d8 // Another save pending = false
2025-08-14T14:12:44.707184370Z 2025-08-14 14:12:44,056 INFO [kafka-producer-network-thread |
producer-1] org.apache.kafka.clients.Metadata Cluster ID: 6YNmvyuiQOa4SGUKah7u_A
2025-08-14T14:12:52.707881298Z 2025-08-14 14:12:52,528 INFO [pool-7-thread-1]
o.a.n.c.r.WriteAheadFlowFileRepository Initiating checkpoint of FlowFile Repository
2025-08-14T14:12:52.707910682Z 2025-08-14 14:12:52,541 INFO [pool-7-thread-1]
o.a.n.wali.SequentialAccessWriteAheadLog Checkpointed Write-Ahead Log with 0 Records and 0
Swap Files in 13 milliseconds (Stop-the-world time = 8 milliseconds), max Transaction ID 1
2025-08-14T14:12:52.707929627Z 2025-08-14 14:12:52,541 INFO [pool-7-thread-1]
o.a.n.c.r.WriteAheadFlowFileRepository Successfully checkpointed FlowFile Repository with 0
records in 13 milliseconds
```

2025-08-14T14:13:11.709816613Z 2025-08-14 14:13:10,996 INFO [Cleanup Archive for default] o.a.n.c.repository.FileSystemRepository Successfully deleted 0 files (0 bytes) from archive
2025-08-14T14:13:11.709845727Z 2025-08-14 14:13:10,996 INFO [Cleanup Archive for default] o.a.n.c.repository.FileSystemRepository Archive cleanup completed for container default; will now allow writing to this container. Bytes used = 283.02 GB, bytes free = 654.31 GB, capacity = 937.33 GB
2025-08-14T14:13:12.709899935Z 2025-08-14 14:13:12,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Initiating checkpoint of FlowFile Repository
2025-08-14T14:13:12.709923078Z 2025-08-14 14:13:12,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Successfully checkpointed FlowFile Repository with 0 records in 0 milliseconds
2025-08-14T14:13:32.711655931Z 2025-08-14 14:13:32,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Initiating checkpoint of FlowFile Repository
2025-08-14T14:13:32.711687019Z 2025-08-14 14:13:32,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Successfully checkpointed FlowFile Repository with 0 records in 0 milliseconds
2025-08-14T14:13:52.713500836Z 2025-08-14 14:13:52,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Initiating checkpoint of FlowFile Repository
2025-08-14T14:13:52.713553894Z 2025-08-14 14:13:52,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Successfully checkpointed FlowFile Repository with 0 records in 0 milliseconds
2025-08-14T14:14:11.715967575Z 2025-08-14 14:14:10,999 INFO [Cleanup Archive for default] o.a.n.c.repository.FileSystemRepository Successfully deleted 0 files (0 bytes) from archive
2025-08-14T14:14:11.715999063Z 2025-08-14 14:14:10,999 INFO [Cleanup Archive for default] o.a.n.c.repository.FileSystemRepository Archive cleanup completed for container default; will now allow writing to this container. Bytes used = 283.01 GB, bytes free = 654.33 GB, capacity = 937.33 GB
2025-08-14T14:14:11.716003141Z 2025-08-14 14:14:11,080 INFO [Write-Ahead Local State Provider Maintenance] org.wali.MinimalLockingWriteAheadLog org.wali.MinimalLockingWriteAheadLog@71986020 checkpointed with 2 Records and 0 Swap Files in 17 milliseconds (Stop-the-world time = 1 milliseconds, Clear Edit Logs time = 1 millis), max Transaction ID 1
2025-08-14T14:14:12.716041673Z 2025-08-14 14:14:12,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Initiating checkpoint of FlowFile Repository
2025-08-14T14:14:12.716064405Z 2025-08-14 14:14:12,542 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Successfully checkpointed FlowFile Repository with 0 records in 0 milliseconds
2025-08-14T14:14:32.717950059Z 2025-08-14 14:14:32,543 INFO [pool-7-thread-1] o.a.n.c.r.WriteAheadFlowFileRepository Initiating checkpoint of FlowFile Repository