

# Local v5 Nuts node with Ngrok

This documentation only applies to use cases requiring the Nuts gRPC network (did:nuts DIDs). If your use cases uses did:web DIDs (v6 functionality), you can use the development Docker image. Refer to the [Docker documentation](#) for more information.

Ideally a Nuts node runs in a data center or cloud environment with a fixed IP address behind a ngress proxy. During development this is not always practical and there exists a need for running a Nuts node locally on for instance a laptop behind a NAT.

In order for the node to receive requests, private transactions and synchronize with other nodes, it must be reachable by external nodes. For this you can use the handy service [ngrok](#). Ngrok describes itself as follows:

“ ngrok is a simplified API-first ingress-as-a-service that adds connectivity, security, and observability to your apps in one line

## 1. Setup ngrok

To get started with ngrok, you can follow [this tutorial](#)

Once you have an account and access token setup, add the following lines to your ngrok configuration:

```
tunnels:
  grpc:
    proto: tcp
    addr: 5555
  n2n:
    proto: tcp
    addr: 1323
```

This informs the ngrok application to create 2 tunnels, each forwarding tcp traffic to respectively port `5555` for `grpc` traffic and `1323` for `http` traffic.

When you start ngrok with this config, the output will look something like this:

Session Status	online
Account	OrgName (Plan: Free)
Version	3.2.2
Region	Europe (eu)
Latency	15ms
Web Interface	http://127.0.0.1:4040
Forwarding	tcp://0.tcp.eu.ngrok.io:16077 -> localhost:5555
Forwarding	tcp://7.tcp.eu.ngrok.io:18593 -> localhost:1323
Connections	ttnl  opn  rt1  rt5  p50  p90

## 2. Certificates

Your node needs certificates for these endpoints to join a network.

For more information, read the [official documentation](#).

Since ngrok uses the `tcp.eu.ngrok.io` path, you can generate a certificate for the ngrok domains and `stable` network with the following command:

```
$ ./issue-cert.sh stable '*.tcp.eu.ngrok.io'
```

Now, copy the resulting files to a location accessible for your node and add the following section to your `nuts.yaml` config file:

```
tls:
  certfile: "*.tcp.eu.ngrok.io-stable.pem"
  certkeyfile: "*.tcp.eu.ngrok.io-stable.key"
  truststorefile: ./truststore-stable.pem
```

## 3. Endpoint configuration

Your node needs to broadcast these endpoints to other nodes in order for them to connect to you.

You need to setup a vendor DID document. See step 3 in the [official docs](#). For the `NutsComm` service you will use the tunnel url which maps to port `5555`. The url will become `grpc://0.tcp.eu.ngrok.io:16077` in our example.

When a service uses oauth you must configure an oauth endpoint. Following our example, that would become: `http://7.tcp.eu.ngrok.io:18593/n2n/auth/v1/accesstoken`.

An example of the vendor DID document service section with a `test-service` would look like this:

```
{
  "id": "did:nuts:FJ2WaKNaf6jKZ9tgJoNCmQKh3xoe9vFEBzj59WSkmSEV",
  ...
  "service": [
    {
      "id":
"did:nuts:FJ2WaKNaf6jKZ9tgJoNCmQKh3xoe9vFEBzj59WSkmSEV#AYQhYmNeYdoNthAiyAZ9ufAM54DF2ZqJmzGrTi4dm6nT",
      "serviceEndpoint": "grpc://0.tcp.eu.ngrok.io:16077",
      "type": "NutsComm"
    },
    {
      "id":
"did:nuts:FJ2WaKNaf6jKZ9tgJoNCmQKh3xoe9vFEBzj59WSkmSEV#DtUY29HzYR1H2UofLXVJ3ru6TAxYY59NiBqSyfTAeM5Y",
      "serviceEndpoint": "http://7.tcp.eu.ngrok.io:18593/n2n/auth/v1/accesstoken",
      "type": "oauth"
    },
    {
      "id":
"did:nuts:FJ2WaKNaf6jKZ9tgJoNCmQKh3xoe9vFEBzj59WSkmSEV#7jbTfYq8vjVwvhJt6Nayxzk1ki4xx1Bw1MwhebLoDxau",
      "serviceEndpoint": {
        "oauth":
"did:nuts:FJ2WaKNaf6jKZ9tgJoNCmQKh3xoe9vFEBzj59WSkmSEV/serviceEndpoint?type=oauth"
      },
      "type": "test-service"
    }
  ]
}
```

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