# Portability Check
Protocol: ENUM

Interface information

tyntec's Global Number Portability resolves number portability by obtaining data directly from local number portability databases and live network information from across the globe.

Global Number Portability is available with the ENUM API, which is a protocol that uses the Internet DNS system to translate E.164 (i.e. ordinary) telephone numbers into IP addresses. It is based on UDP communication by default, which in general means that there's no guaranteed package delivery.

This is the overview of the workflow for querying portability information:
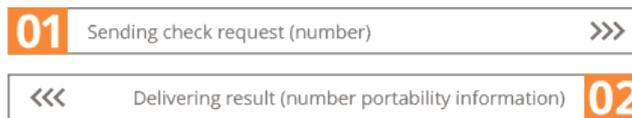
Here are a few specifics of the ENUM API:

- No username or password has to be transmitted.
- The authentication is based on your IP. We recommend a VPN connection to increase the connection security.
- There is no unique identifier (like the message ID used by other tyntec products). The identification of individual queries is based on the phone number queried, the IP the query came from and the query timestamp.
- tyntec can customize the maximum time used before a result is returned (timeout parameter). If tyntec does not get a response within this timeframe, you will get an error response.

Connection steps

Communication parameters

The following are the parameters for the communication:

- The record type is NAPTR
- The domain is e164.arpa
- The IP and the port can be found in the Products section in my tyntec

The most important parameters for each request are the unique id, which is used as the reference for the response, and the MSISDN that is queried. The MSISDN needs to be transformed using the following steps:

1. Check that the E.164 number is written in its full form, including the country code. Example: +1-51-45868291
2. Remove all non-digit characters, with the exception of the leading "+". Example: +15145868291
3. Remove all characters, with the exception of the digits. Example: 15145868291
4. Put dots (".") between each digit. Example: 1.5.1.4.5.8.6.8.2.9.1
5. Reverse the order of the digits. Example: 1.9.2.8.6.8.5.4.1.5.1
6. Append the string „.e164.arpa" to the end. Example: 1.9.2.8.6.8.5.4.1.5.1.e164.arpa

An example for such a request can be sent using e.g. the dig command:

```
dig @78.110.226.74 IN NAPTR 1.9.2.8.6.8.5.4.1.5.1.e164.arpa
```

The result would look like this:

```
;; ->>HEADER<<- opcode="" query="" status:="" noerror="" id:="" 43692="" flags:="" rd="" qd:="" 1="" an:="" 0="" au:="" ad:="" questions:=""
9="" 2="" 8="" 6="" 5="" 4="" e164="" arpa="" type="NAPTR," class="IN" answers:="" authority="" records:="" additional="" pre=""><!----><!---
-->
```

Successful query

If the query is successful, a NAPTR record will be returned. The result will be in the answer section, returned as a tel URI in the format tel:+msisdn

The following is an example of a successful response:

```
1.9.2.8.6.8.5.4.1.5.1.e164.arpa. 60 IN NAPTR 10 100 "u" "E2U+tel" "!^.*!tel=+15145868291;mcc=302;mnc=11;ttid=4345;t=2;e=0!"
```

Here is the explanation of the parameters:

- mcc: Subscription network Mobile Country Code (based on IMSI)
- mnc: Subscription network Mobile Network Code (based on IMSI)
- ttid: tyntec operator ID of the subscription network (based on IMSI)
- t: Network type (1= Fixed, 2= GSM, 3= GSM/CDMA, 4= MVNO GSM, 5= CDMA, 6= MVNO CDMA, 7= Satellite, 8= iDen, 9= iDen/GSM)
- e: SS7 network error code. This value is provided if it is available to tyntec. A value different than zero does not indicate a failed query. The error code parameter can be interpreted according to the error code documentation that tyntec provides.

Unsuccessful query

If the system is not able to return a result for the query, a NAPTR record will not be returned. Instead, the request will be returned with an error code in the status element that is returned, e.g.:

```
;; ->>HEADER<<- opcode: QUERY, status: NOTZONE, id: 43692
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available
;; QUESTION SECTION:
;1.9.2.8.6.8.5.4.1.5.1.e164.arpa. IN NAPTR
;; Query time: 352 msec
```

There are cases in which no result can be returned.

The following list shows these cases, accompanied by the returned status:

- The MSISDN format is invalid: REFUSED
- The request could not be authenticated: NOTAUTH
- The number does not exist or is not a callable MSISDN (e.g. it is a Global Title): NOTZONE
- The request could not be processed in time: BADTIME

Features

Feature	Activation	Functionality
Multiple ENUM accounts	Default	ENUM is not using a username/password combination for authentication. Therefore, using multiple ENUM services requires a special query format. Option 1: You have one ENUM account for Global Number Portability and another one for Global Number Verification. The format is .gnp.e164.arpa and .gnv.e164.arpa respectively. Example Global Number Portability: 1.9.2.8.6.8.5.4.1.5.1.gnp.e164.arpa Example Global Number Verification: 1.9.2.8.6.8.5.4.1.5.1.gnv.e164.arpa Option 2: You have several ENUM accounts for Global Number Portability and / or several for Global Number Verification. The format is <account_name>.e164.arpa. You can get the account_name from your Business Center account. Example Global Number Portability: 1.9.2.8.6.8.5.4.1.5.1.account12345.e164.arpa
Result Adjustment	On request	tyntec is able to adjust the results by adding an additional "0" when the query returns a 5-digit result, and therefore have only 6-digit results.