# Methodology for creating the IP table

## Sources

From previous test made, we know that the Autonomous System (AS) number of SpaceX is AS14593, so we can base our research on the IPv4 and IPv6 address belonging to this AS. Here are the two different sources from which data were taken:

- https://whois.ipip.net/AS14593
- https://ipinfo.io/AS14593

For each of the range present in this database, once you click on it, you have access to various information, including a whois record. Usually most information are available from this record (NetName, Continent, Country,…) but sometimes it can be obtained otherwise. Analysing the Netname can give information mostly on the location, and you can use the map on whois.ipip.net which indicates location of certain range of IP (however the source of this information is unknown.

## Creation of the table

To create this table, we start by looking at the list of each IP address. For each range of IP address in th original sources, we click on it and access the whois record.

First, we look at the NetName work sort of as identifier for each IP range. It usually start with "STARLINK-", followed by an 4 or 5 number ID which is unique to every IP range. After that, in most cases, we have the two letter itentifier of the country for the issued range but you can also have the presence of POP (Point of Presence), XX (maybe inter-continental link) or MC (Multi Carrier). Then there is an identification code for every city in which starlink has a POP/Gateway, for example London becomes LNDNGBR, New York NWYYNYX,… Here are few examples to understand various types of NetName :

- STARLINK-6110-VI-ATLAGAX1-IPV4 : Virgin Island IP address, closest to the POP of Atlanta in Georgia
- STARLINK-6735-US-DLLSTXX1-IPV6: Dallas, Texas, USA in IPv6
- STARLINK_10449_LGOSNGA1_IPV4 : Lagos, Nigerie in Africa
- STARLINK-8544-XX-TKYOJPN1-IPV4 : Tokyo, Japan in Asia

Second we added the address range such as indicated into the whois record, that is, using the "/" IPv4/v6 present in the record.

Third, we were able to fill the City/Country/Continent column. The city was indicated in two way, either from the NetName (such as LNDN for London), or from the map in whois.ipip.net that indicate a somewhat precise location for certain IP range. An example wuld be the Belgian case, 169.155.240.0 is said to be an IP with the net name "STARLINK_10811_FRNTDEU1_IPV4" while having the country in whois set as "BE" and the location on the map to Brussels. We assume it's address given by the POP of Frankfurt around it's area. The Continent was derived from the country as this is easy to guess. Record without city means that we were not sur of which country it was based at by just have the country and no indication on the map. If the country code was set to XX, then the country wasn't filled. If the NetName had MC or POP instead of the country code, the continent wasn't set but the country was set to the one present in the whois record.

The range utility has been added in order to note the utility of each IP we encounter in the proccess of analysing operation mode of the IP system in Starlink. For now it's mostly address that were given to Starlink user from various source. It remains unclear on why certain IP have been assigned to the user (some IP with Pool in their NetName have been used, some have more standart NetName). We can at least say that the attribution of the IP seems to correlate with the location of the range.

This process of analysing the record was repeated for every range as certain case are verry special. IPv6 was also model, even thought it contains way less range, since range are much bigger themselves. Some of the range have not been added since the whois record didn't hold any relevent information that could help at the identification of a range.

## Future improvement

An improvement to this table could be to fill every column, but that would require additional information on every range as well as information obout the utility of every range. That is expected to come as I move forward in my research.

It is also possible (case seen for IPv6 address in Australia) that some range are not present in the original sources, that will be added as time goes on and as I make more discovery.

The expected output is to have a comprehensive table that indicate the location, utility and NetName for a specific IP range.