What is the longest route (by number of unique ASes) in the BGP RouteViews data?

The longest route (by number of unique ASes) in the BGP RouteViews data was in sequence 190567.

Q1 (5 points). If you search online for "AS number lookup" you will find several AS search services. Look up the ASes in this longest route to find their countries of origin. List these countries in order.

A1.

Tool Used: ASN WHOIS Lookup

1. NL
2. TJ
3. KG
4. AF
5. PK
6. AU
7. KZ
8. TJ
9. GB
10. US
11. AF
12. KG

Q2 (5 points). Why might such long BGP routes be a concern for network operators? Give at least 2 reasons.

A2.

The first reason why long BGP routes are a concern for network operators is the lack of guaranteed convergence/route flapping. A long route increases the chances of experiencing route flapping because longer routes expose the data to more ASes and Ases could become available/unavailable at any moment, causing recalculations in the best path for the data to traverse. A repeat in these calculations are costly, and a longer route exposes the data to higher chances of these prefixes going up or down, making it so that there is no guaranteed convergence for the data.

The second reason why long BGP routes are a concern for network operators are the different policies in each AS. These policies could disrupt the performance of the network by forcing certain paths to be untraversable. Additionally, the increase in ASes with differing policies introduces many more variables and in turn increases the complexity of the routing path. Additionally, these differing policies in the ASes can increase the instability in the network,

making the path between hosts less predictable, and that makes it hard to tell if the path would be able to converge properly.

Q3 (10 points). Construct the BGP table for all prefixes "owned" by AS 36992 (i.e., where the destination is in AS 36992). How many prefixes are there in this table? What is the range of prefix lengths in this table?

A3.

There are 287 prefixes in this table and the range of prefix lengths in this table is from 13 to 48. The csv file for the table has been included in the project folder under "part3".

Q4 (10 points). Now turn this single-destination-AS BGP table from Q3 into a routing table (see Table 14 here) as stored in the border router of AS12859. Use shortest path matching to break ties, if any. You may find it useful to implement this library: py-radix

Forwarding Table Example(in CSV):

Destination Prefix,Next Hop\n

a.b.c.d/24, w.x.y.z\n

a.b.c.d/32,a.b.c.d\n

A4.

The forwarding-table.csv file is under "part3".