Communication Networks
Exercise 8

Routing project information

Introduction to this week’s exercise

Time to solve the exercise/ask questions
Project deadline is tomorrow at midnight

Make sure that you push your final config, report and declaration of originality to your GitLab repository

Late submissions are possible but will result in partial credits as described here: https://comm-net.ethz.ch/

Let us know via Slack or email if there are any problems
But don’t expect us to answer late at night
Fill out the declaration of originality

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<th>Group:</th>
<th>Student 1</th>
<th>Matriculation number</th>
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We hereby declare that the submitted project (configuration and report) is our own original work.

We confirm that we have read and understood the section on academic integrity in the project description and abide by it. Specifically, we, the above-mentioned group members, solely composed the report and the configuration without having taken any part from the work of others.

In the following, we list the main contributors for each task:

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Furthermore, we confirm that we understand that our work may be electronically checked for plagiarism with automated tools.

Signatures:

Student 1                      Student 2                      Student 3
Fill out the declaration of originality

Would allow us to detect severe problems, e.g. one student who did not work at all

Normally, every group member will get the same final grade
Important information to your report

Remove unrelated entries from e.g., print screens
Only show the relevant pieces

As long as we can easily understand what you want to express, we do not care about the report layout

If you cannot show something because of your neighbors, explain that in the report and we will accept it
Submission demo

Watch the recorded video!

The demo closely follows the instructions from the wiki ("1.1 General Instructions")
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Task 8.1: Putting Everything Together

Consider the ISP network composed of 5 routers (A, B, C, D, E) depicted in the figure below. Three of these routers, A, E, and D, are connected to routers located in neighboring ASes via eBGP. These neighboring routers are indicated by X, Y, and Z. Each of them advertises the same three distinct IP prefixes $p_1, p_2,$ and $p_3$.

The three tables in the figure indicate the Local-Preference (LP) associated to each external prefix by A, E, and D along with their corresponding AS-PATH length. For instance, A learns a route to $p_1$ from X with an AS-PATH length of 10 to which it associates a LP of 200. Internally, the ISP uses an iBGP full-mesh to distribute the BGP routes and OSPF as intra-domain routing protocol. The weight of each internal link is indicated next to it.

For each router and prefix, find the selected egress and next-hop.
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An ISP network which receives BGP routes for 3 external prefixes \( p_1, p_2, p_3 \) from 3 routers \( X, Y, Z \) in neighboring ASes.

For each router in the ISP, indicate the router ID of the selected egress (A, E, D) along with the router ID of the internal next-hop (A, B, C, D, E or direct) used to reach it. For that you can use the tables on the next page. You can assume that A, E and D use the next-hop-self configuration.

Follow the BGP decision algorithm!
Task 8.2: Traffic (not so much) Engineered

Remember, forwarding based on the longest-matching prefix
Explore different attack scenarios with various success and visibility
Task 8.3: BGP Hijack

For this exercise, assume that AS G (victim) always prefers its internal route to reach IPs in 20.0.0.0/22.

You will encounter the principle of AS path poisoning.
Abuse the BGP loop prevention mechanism, by adding specific ASes to the AS path.

AS path poisoning gives the hijacker some control over which ASes are/are not affected by the hijack.
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