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Assignment 3

Brief Summary:

In this assignment we explored a Crossfire Attack simulation, and were able to achieve some link degradation in a simulated attack. Our network topology consisted of 4 legitimate users and 9 bots attempting to congest critical links on the way to a web server. During our simulation using varying degrees of traffic rates from bots and users, we achieved a maximum degradation of 20%, indicating that over 20% of legitimate traffic to the server was dropped.

Part 4 Writeup:

1) The three target links are labeled in the TCL code. The first one is from router 10 to router 15. The second one is router 9 to router 15 and the third one is router 11 to router 15.
2) a) Bot 3 , 4 and 5 are going to communicate with decoy 1. Bots 1,2,9 are going to decoy 2.Bots 6,7,8 are going to decoy 3
   b) We tried a couple of various rates at which they are going to communicate with the decoy server. At 800kb we were able to manage the drop rate of 20%.

Part 6 Writeup:

We developed our own Python code to interpret the tracefile results, and included it in the upload to canvas. With our data rates from bots and users, we were able to achieve 20% degradation, as user packets were dropped 20% of the time. Since user traffic was only ever routed to the WebServer (Node 29 in our topology), we were easily able to parse the trace information using the Level 3 address, of 29.0, and then checking the action the packet took, either “d” for drop or “r” for received.

User traffic had 1460 of 7122 packets dropped in transit due to the link degradation. Higher degradation could have been achieved if either user or bot traffic was higher. The users and bots both initiated traffic at time = 0, so the saturation of the network was complete in less than a second, with steadily dropped user and bot packets as a result.

Python Output:

Traffic Analysis:
User Drop Percentage: 0.2
Bot Drop Percentage: 0.21
Total Trace Size: 462791
User Traffic Size: 24303
Total Received User Traffic Size: 7122
Total Dropped User Traffic Size: 1460

Conclusion:

After adjusting bots bit rates and seeing the impact, we are sure that more degradation to the traffic paths could be achieved. This could be done by decreasing the network link capacities, or increasing the bot or user traffic flow. However, the target links were congested to the point that many packets were dropped, seeming to indicate that user traffic would be significantly impacted.