

Network Security Introduction

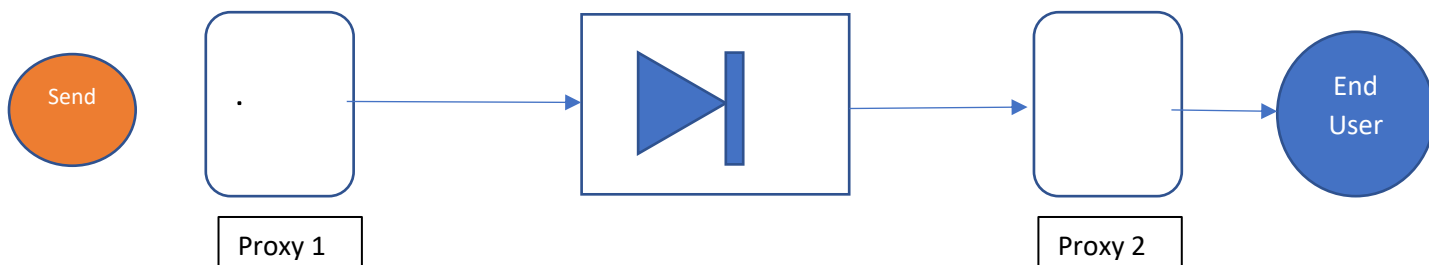
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Exercise 1 Develop Network Diode

Network diode is a unidirectional network communication device that enables the safe, one-way transfer of data between segmented networks. Data diode design maintains physical and electrical separation of source and destination networks, establishing a non-routable, completely closed one-way data transfer between networks. Data diodes effectively eliminate external points of entry to the sending system, preventing intruders and contagious elements from infiltrating the network. Securing all a network's data outflow with data diodes makes it impossible for an insecure or hostile network to pass along malware, access your system, or accidentally make harmful changes.

Data diodes allow companies to send process data in real time to information management systems for use in financial, customer service, and management decisions — without compromising the security of their networks. This protects valuable information and network infrastructure from theft, destruction, tampering, and human error, mitigating potential loss of thousands of dollars and countless hours of work.



- Network Diode ensures the network is not exploited from outside the network.
- Data can get out!!

Task:

- Develop unidirectional Diode in any language you want. You can use containers or virtual machines.
- Each VM is a part of the network.
- The network flow:

- a. Select a file (hash it is using md5)
- b. Send it to proxy 1 using TCP.
- c. Define a unidirectional communication from proxy-1 to the network diode and from the network diode to proxy-2. What protocol can you use? (it is easy)
- d. The end user gets the file from Proxy 2 using TCP.
- e. User 2 check md5

What to submit:

Note the assignment worth 40% of the final course grade. You must receive at least 60 to pass.

1. Your code (70 points) with a word document with video capture of how the solution works.
2. Document with Console snapshot of the file, md5 and the output in the end user console md5. The console should have a progress bar and how many bits you transferred.

The document should include your algorithm, architecture, and how you built the solution. (2

Questions:

- a. What are the different diode types? (10 points) How did you implement your own diode. How it works in the communication level.
- b. What problems can occur due to the unidirectional data flow? What are the drawbacks? (5 points)
- c. What is air-gapped (5 points)
- d. Our solution is unidirectional. Our users want to get telemetry data but still want a high level of security. Can you propose a method to protect the organization while limiting the exfiltration from it? Please suggest a solution. (10 points)

Note: Sharing only git is not allowed and will not be evaluated. Full submission in Model.

Do not copy from other students!

