Holden Rohrer, Holden Watson, and Nithya Jayakumar
2019 Oct 21
Applied Combinatorics–Math 3012
Livshyts

Part 3: Final Report
Topic: Distributed Systems Integrity and Correctness

1 Distributed Networks' History

Distributed networking describes a number of protocols, systems, and technologies. The most popular amongst them is "the internet," to the extent it can be described as a single entity. It originates in very centralized institutions: MIT and DARPA, who invented packet switching, a way of transferring data across a group of nodes [POTENTIAL SUBTOPIC?][1][2]. Packet switching was the birth of the internet, and as such is a central theme of our project.

The way that packets (any information transferred across any protocol) maintain their correctness, or proving that the data is untampered, and the way that computers connect to eachother will be explored in this paper. Additionally, we have included some Python programs as proofs-of-concept for some concepts discussed, such as RSA and routing. Execution instructions for those and source code has been included in the appendix.

---

[1] *https://networkencyclopedia.com/packet-switching/*
[2] *https://www.internetsociety.org/internet/history-internet/brief-history-internet/*

2 Appendix

These programs, `rsa.py` and `bridges.py` need to be run with Python3, so install that as suggested by *https://www.python.org/downloads/*. The package manager `pip` is also necessary for installation of third party graphics libraries such as `NetworkX`. Install that as described here: *https://pip.pypa.io/en/stable-/installing/*.

Now that those tools are available, run the following shell commands to install relevant libraries:

```
$ pip install networkx
```

Each file should be executable with "`python3 $filename`".