

# Raspberry Pi Network Mapper



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## Abstract

The goal of this project is to port a network mapper developed at LLNL to the raspberry pi 3, and set it up so it can be simply plugged in and forgotten about until it is picked back up.

This involved both getting the mapper to run on new architecture, as well as automating the system to run by itself, and to rerun the scans periodically to detect changes in the network.

The result is a box no less than 3.4 inches long, that only requires being plugged in with an ethernet cord to begin its work.

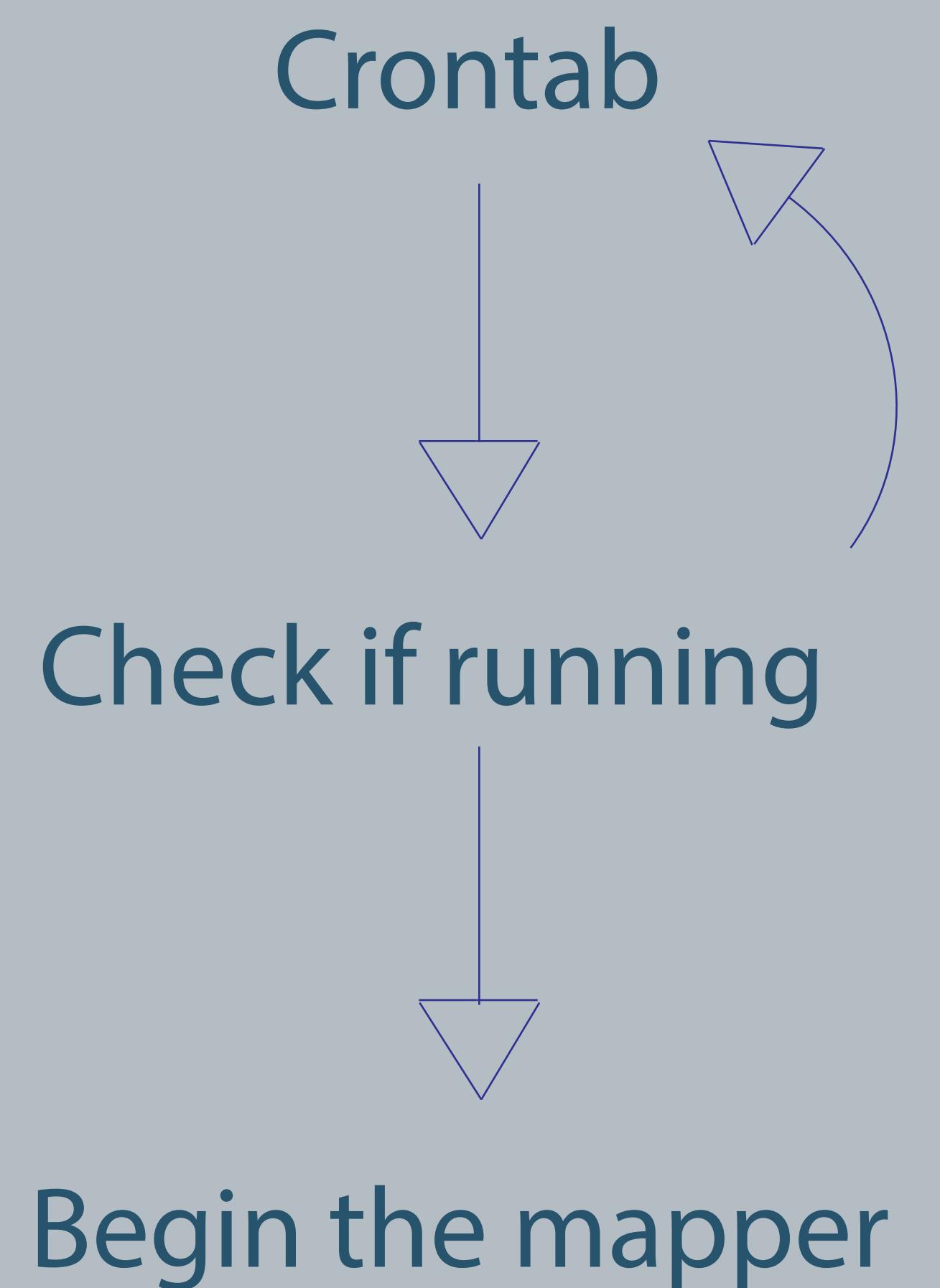
## The conversion

NeMS had been made to run on an x86-64 version of Centos 7, and therefore all the included packages where designed with that in mind.

The Pi3 has a ARMv8 architecture, and the version of Centos for it has a slightly different file system, so to get NeMS working, I had to build the majority of the packages from source, and edit the installation scripts and NeMS itself to point to different directories.

## NeMS

The Network Mapping System developed by LLNL scans an entire network, and then creates a detailed visualization of the findings. My project contains only the scanning portion of NeMS, allowing the data to be retrieved and put into the visualization software later.



## Scripts

The two main scripts I added were made to collect all the mapped data and prepare for a new scan, and to automatically begin mapping.

The first script deletes the file that saves the mappers state, removes the address to scan, and moves the results to an archive.

The second script checks if the mapper is running, and if it isn't it uses its assigned IP address to begin mapping that subnet. This script is in the users crontab, and is set to run automatically on startup and after the previous map has ended, constantly scanning.

## Why the Pi

The Raspberry Pi is a very small four core computer that is powered off of 5 volts. The main advantages of running NeMS on a Pi is how portable and discrete, and cheap the system is. The largest drawback is the severe lack of processing power, which makes the scans much slower



## Power over Ethernet

Because the Raspberry Pi operates on only 5 volts, and draws a maximum of 2 amps, it is easily able to be powered over ethernet where PoE is available, which has become the standard in recent years.

This greatly increases the versility of the mapper, only requiring an ethernet connection to begin scanning.