Knight Foundation School of Computing and Information Sciences

Florida International University

Spring 2022 Senior Design Project

Network Outage Call Home

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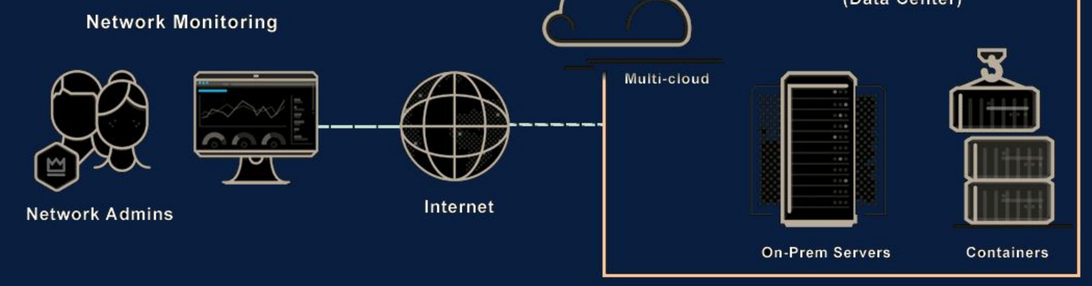


PROBLEM

As a network administrator at an MSP (managed service provider), I expect that the hardware agent I've deployed as a point of presence on the network is intelligent enough to utilize all communication technologies available to it.

CURRENT SYSTEM

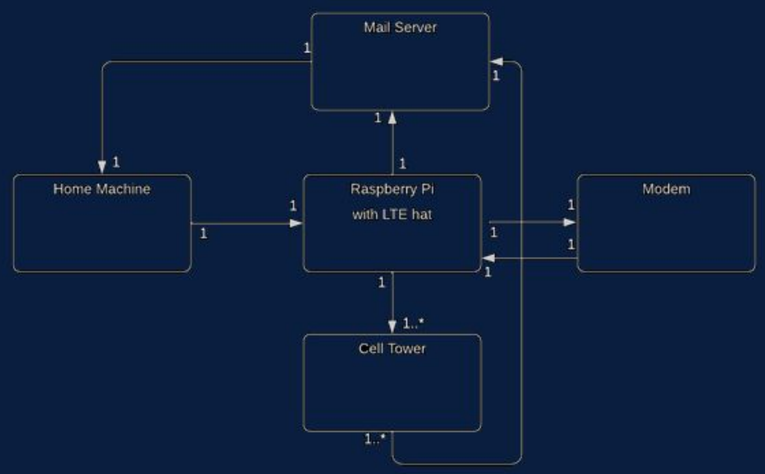
The currently employed system is able to send out an alert via wifi, ethernet, or GSM network whenever the device loses connectivity to the Wifi network.

REQUIREMENTS

Hardware:
- Arduino R3 (Early Design)
- Raspberry Pi 3
- Sixfab 4G/LTE Base Hat
- Sixfab IoT simcard

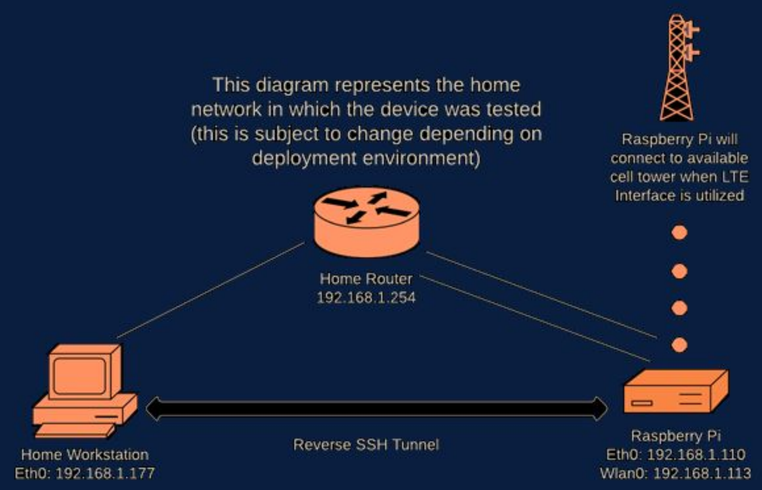
Software:
- Python 3.10.4
- Visual Studio Code
- Raspberry Pi OS
- Raspberry Pi Terminal

SYSTEM DESIGN



The diagram above represents the layout of a successfully deployed device

OBJECT DESIGN



IMPLEMENTATION

- **Python 3 - Primary scripting language used for device tests**
- **Raspberry Pi OS - The operating system deployed on the raspberry pi device.**
- **VNC Viewer - Software that allowed multiple users to access the device remotely in order to work on development.**

VERIFICATION

```
ping: connect: Network is unreachable
To: mbeal006@fiu.edu
From: mikephonehome@gmail.com
Subject: Python Test
Network outage detected
Down
```

SUMMARY

- **If the connection for both Wi-Fi and ethernet are lost or the device detects an internet interruption, the device's communication fallback and utilize its cellular capacity.**
- **If the internet connection is reestablished, the device will resume using ethernet and Wi-Fi.**

REFERENCES

- Reverse SSH Tunneling - From Start to End - JFrog Connect (formerly Upswift)
- Raspberry Pi Documentation
- The Python Standard Library - Python 3.10.4 documentation

ACKNOWLEDGEMENT
The material presented in this poster is based upon the work supported by Kaseya
We thank Ryan Hutcheson for his/their assistance and mentorship that we received throughout the senior design project.

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