**M) Blockchain and scaling the enterprise networks**

**Project Description:** Blockchain deployments include public, private, and consortium blockchains, depending on who can join the Blockchain. While private blockchains are typically owned and managed by a single entity, public blockchains scale the Internet while providing a secure mechanism to log the transactions in a decentralized ledger. Public blockchain implementations such as Ethereum allow multiple domains/organizations to communicate and collaborate without trusting the other participants of the overlay network.

Blockchain has been used in cryptocurrency and various decentralized workloads. The smart contracts that execute as part of the Blockchain allow such decentralized executions without establishing trust between the code and the execution environment/node.

This project looks into how blockchain architectures help scale enterprise networks in a wide area network, allowing wide area networks composed of multiple organizations or administrative units. Better network monitoring capabilities are presented as a use case for Blockchain (<https://www.blockchain-council.org/blockchain/uses-of-blockchain-for-network-engineers/>).

# Project plan

Brian / Ashton meeting (Connor not in class?)

Programming language to use: Python

Share workloads: two networks want to utilize each other's networks to communicate. Develop one network, then another one, and link the networks using blockchain then maybe have a way to visualize what blockchain does with network communication.

Project report rough draft

Since we are covering breadth and depth, make sure to have a larger Introduction than the usual research papers - to position your contribution in the overall Computer Networks CSCE A365 landscape. A well positioned introduction also makes yourself better understood among your peers when you present your work in the final presentation.

You may have sections: Introduction, Background, Methods, Architecture (Solution Architecture), Implementation (Prototype Implementation), Evaluation (Preliminary Assessment), Results, Discussion, Related Work, and Conclusion. Of course, not all the sections. That will be chaos! Choose an appropriate subset.

For example: [**Introduction**, **Methods**, **Results**, and **Discussion**] or [**Introduction**, **Background**, **Solution Architecture, Prototype Implementation, Preliminary Assessment, Related Work,** and **Conclusion**]. Choose the sections appropriately based on the type of your project (research heavy? coding/implementation heavy? Evaluation heavy? application/survey type?).

**Connor:** Introduction and background to blockchain, history of blockchain and how it works in general (include various ways it’s been implemented)

**Ashton:** Solution Architecture and (what our coding project is going to do, and how it’s going to do it).

**Brian:** Adding relevant research articles, talk about in depth application of blockchain with ISP networks. (Related work)

## [Rough Draft](https://docs.google.com/document/u/1/d/1WXO3UOuLftcB8scIzmoMsBps8ewWIwKxErn-v0ChnrM/edit)

### **Introduction:**

* Bitcoin concepts in early days and nowadays

### **Background:**

### **Solution Architecture:**

### **Related Work / Citation**

# **Blockchain Adoption for Monitoring and Management of Enterprise Networks**

<https://ieeexplore.ieee.org/abstract/document/8614960>

**Summary**

The paper linked above essentially explores how a blockchain might be used in order to monitor updates to individual nodes in a network.  Essentially, an admin updates a node or group of nodes configuration and adds these updates to a block along with some additional information, the block is then added to the chain.  The affected block then receives the update to the chain and decrypts the contents of the block.  The node then sees that it’s the affected device, downloads the update, and creates a new block saying whether the update was successful or not along with some other record keeping information.

**Blockchain Functionality Breakdown & Possible Uses**

Nofer, M., Gomber, P., Hinz, O., & Schiereck, D. (2017). Blockchain. *Business & Information Systems Engineering, 59*(3), 183-187. <https://doi.org/10.1007/s12599-017-0467-3>

<https://www.proquest.com/docview/1899626399?pq-origsite=summon&parentSessionId=klnJX8w4T8EdEM15u9M1dfhsiKWotJsFSF5NG0KG0E0%3D>

M. Di Pierro, "What Is the Blockchain?," in *Computing in Science & Engineering*, vol. 19, no. 5, pp. 92-95, 2017, doi: 10.1109/MCSE.2017.3421554.

Abstract: Blockchain is a new technology, based on hashing, which is at the foundation of the platforms for trading cryptocurrencies and executing smart contracts. This article reviews the basic ideas of this technology and provides a sample minimalist implementation in Python.

URL: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8024092&isnumber=8024090>

GeeksforGeeks. “History of Blockchain.” *GeeksforGeeks*, 6 Oct. 2023, www.geeksforgeeks.org/history-of-blockchain. Accessed 8 Oct. 2023.

Abstract: History of blockchain & Evolution throughout the years.

Marr, Bernard. “A Very Brief History of Blockchain Technology Everyone Should Read.” *Forbes*, 16 Feb. 2018, www.forbes.com/sites/bernardmarr/2018/02/16/a-very-brief-history-of-blockchain-technology-everyone-should-read/?sh=5bc41b9e7bc4.