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Resilient Blockchain-Based Machine Learning

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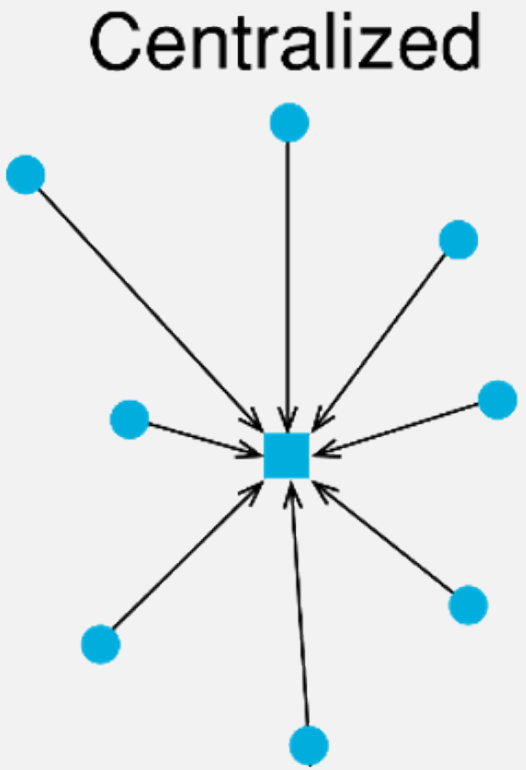
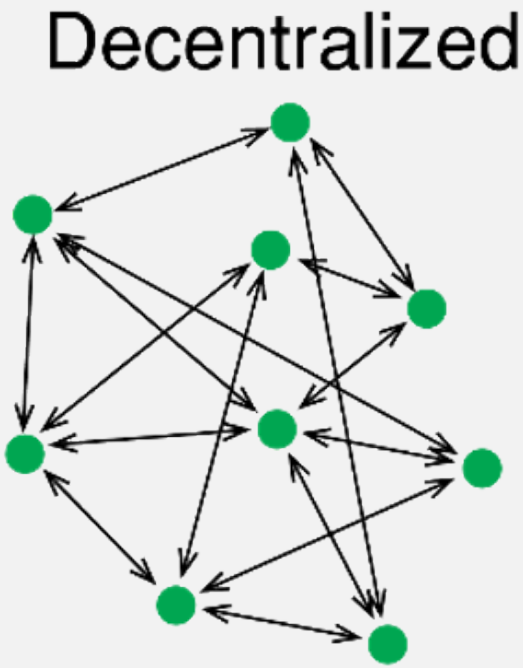
Project Overview

- Decentralized security concepts are on the rise
- Centralized edge computing techniques may contain a single point of failure
  - This means the entire system can fail from a the central node malfunctioning
- Working an LDRD exploring security focused machine learning algorithms on a blockchain
  - This presents less options for a single point of failure attack
  - Attackers will need majority control of the system to affect network communication
  - Increases resilience of whole system





Distributed Ledger Technology - Overview

- Distributed ledger technology (DLT) allows for Byzantine fault-tolerant decentralized computing
  - Each time a node sends data to another, all nodes in the system will receive this value and a majority will need to agree before adding this data to its ledger or reject it

- End result is a system that only permits data into its ledger that has been approved by the majority

Objectives

- Work with private-permission blockchains using MultiChain
  - Implemented custom filters on private blockchain that apply to all or specified transactions
  - Applied custom permissions to nodes in blockchain
    - Admin nodes can grant or revoke permissions from user nodes
    - Admin nodes can also issue new assets for transaction exchange

Conclusion

- By implementing security focused machine learning algorithms on a blockchain, our system will be less vulnerable to total failure, and still have the power to process data on multiple nodes
- Our next steps are to implement MultiChain in FireWheel

Questions?

Thank you