

NETWORK CODING

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NETWORK CODING DEFINITION



Network Coding refers to the process that encodes the transmitted data and decodes it on arrival at its destination.

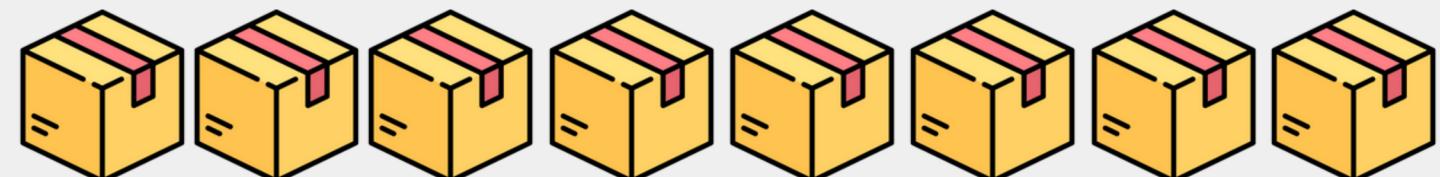


TRADITIONAL ALGORITHMS



NETWORK CODING

The **traditional** existing routing algorithm generally caches the arrival packets and data and foreword it using the concept of first-in, first-out (FIFO), in other words, using the queuing approach.



Network Coding is used and developed to make the network perform and work faster by merging the messages that have the same destination or receipt to be forwarded simultaneously, and these messages will be separated in the decoding process.



Network Coding Types

1

Random Linear Network Coding

2

Triangular Network Coding

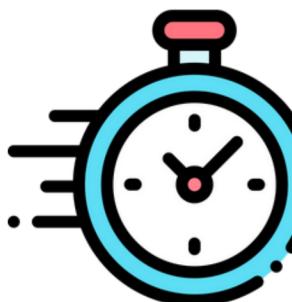
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Opportunistic Network Coding

Benefits of Network Coding

Benefits of Network Coding can be summarize at the following:

- Throughput



- Guaranteed Robustness



- Enhanced Security



- Automated Scalability



- Improved Network Resilience



Applications and Where We Use It

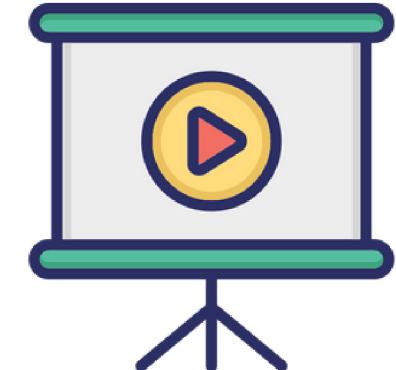
Network Coding Applications

🌟 Video, audio streaming, and conferencing

🌟 Software-defined wide-area networks

🌟 Wireless Mesh Networks (WMNs)

🌟 VOIP (voice over internet protocol)



Challenges and Limitations

While network encryption offers solutions to these challenges, it also presents its own set of challenges and limitations in wireless networks:

★ **Integration** of network coding into the existing network stack of wireless devices and infrastructure is a complex endeavor, requiring substantial modifications across different layers of the protocol stack.

★ **Effectively managing** interference from simultaneous transmissions and ensuring correct synchronization of nodes during encryption operations are ongoing challenges in wireless network encryption.

★ **Computational expenses** associated with network encryption operations may strain the resources of wireless devices with limited resources, which may affect their energy efficiency.

★ Ability to **scale** with the increase in the size of the network, which may reduce the capacity and efficiency of network encryption schemes.



THANK YOU