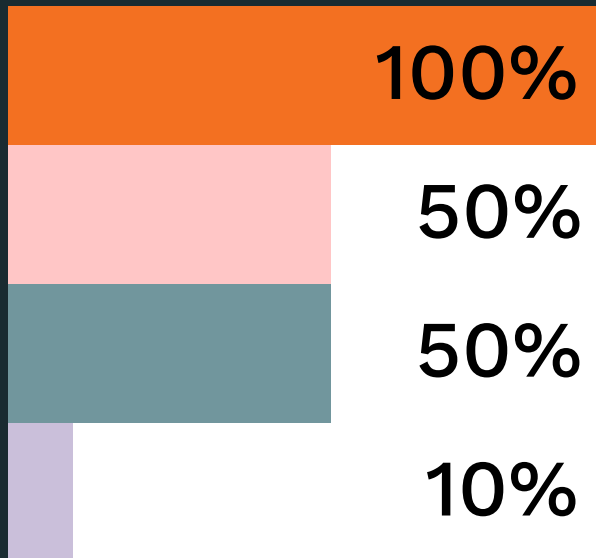


STATUS

# 52.5%

Sections of project and progress bars. All tasks are divided among team members.



## *Digital Twin Simulation and Multicast Optimization for Software-Defined Optical Networks in Financial Exchanges*

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LITERATURE REVIEW

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SIMULATION & DESIGN

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MULTICAST ALGORITHM

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FAIRNESS MECHANISM

## CHALLENGES

01

## LITERATURE

Papers totaled 37 pages to review. Had to consolidate notes somehow, used markdown files. Delegate and design project architecture.

## FUTURE DEVELOPMENT PLANS

## TOPOLOGY

An 8-node ring topology mimics a small-scale optical backbone, with high-bandwidth links (e.g., 10 Gbps) and low latency (e.g., 1 ms) to simulate optical properties.

02

## SIMULATION

Installing Mininet and Ryu SDN Controller packages. Reading documentation. Debugging.

## DIGITAL TWIN

A Python script queries Mininet via OpenFlow to track network state (e.g., bandwidth usage, queue lengths), serving as the digital twin for real-time monitoring and optimization.

03

## MULTICAST

Efficient VM hedging and Hold-And-Release Implementation to achieve effective throughput optimization.

## MULTICAST

Adapt Jasper's multicast tree algorithm, coded in Python, to distribute financial data fairly across nodes, tested with iperf-generated traffic.

04

## FAIRNESS

Conducting evaluation by following processes in literature. How to recreate a live exchange trading network congestion?

## TESTING

Synthetic financial traffic (e.g., stock updates) is injected, and CloudEx and DBO mechanisms are simulated for comparison, measuring latency, jitter, and fairness.