

# OPTINET

Smart Router Solution for Wi-Fi Optimization

COMPUTER COMMUNICATION  
BASED SOFTWARE DEVELOPMENT

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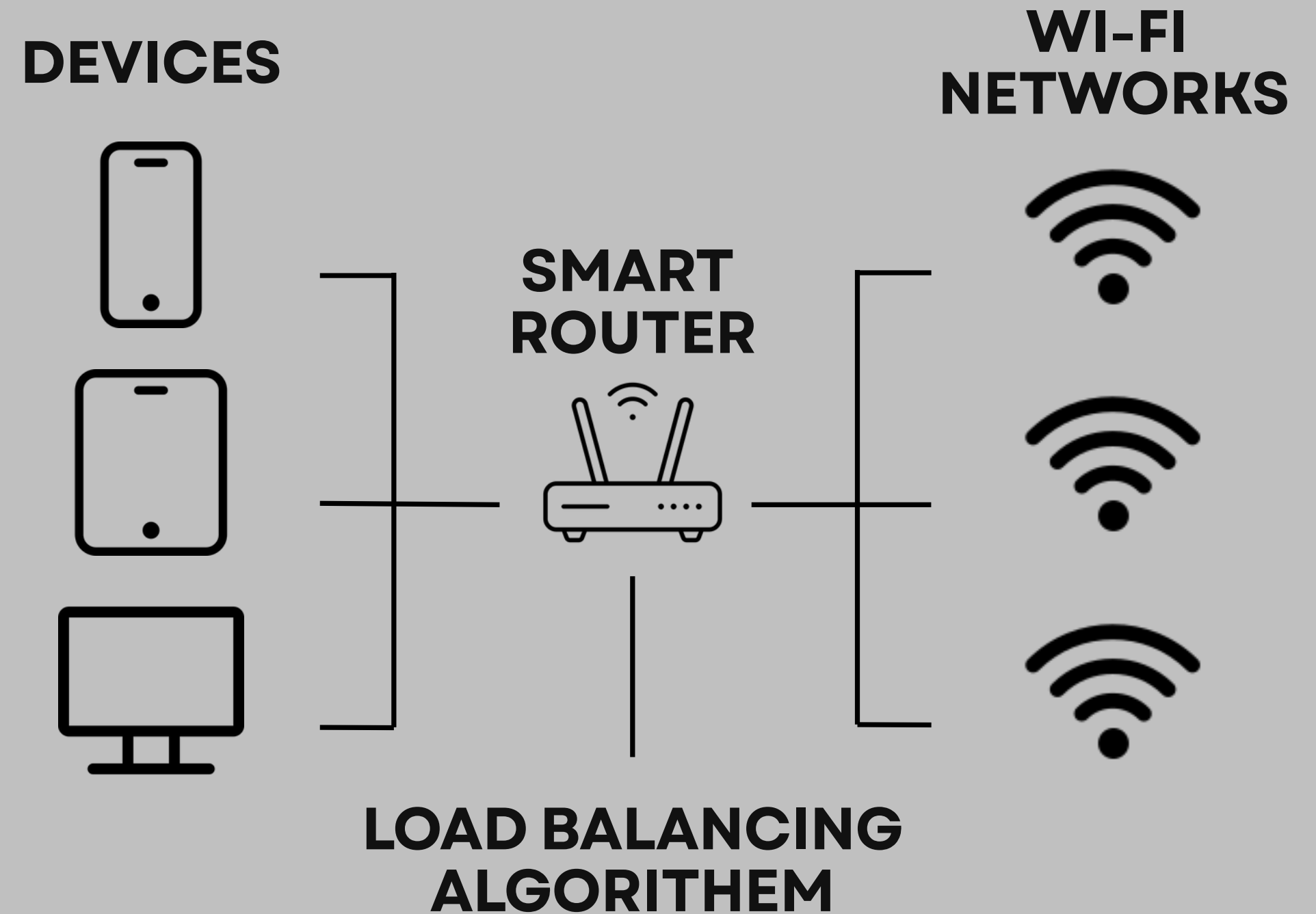
# THE PROBLEM

Some networks struggle to maintain performance and reliability, which can lead to slow speeds or even full network failures.

- Excessive Traffic Load – Too many users cause slow speeds and interruptions.
- Network Failures – Outages occur when routers can't handle the demand.

# OUR SOLUTION

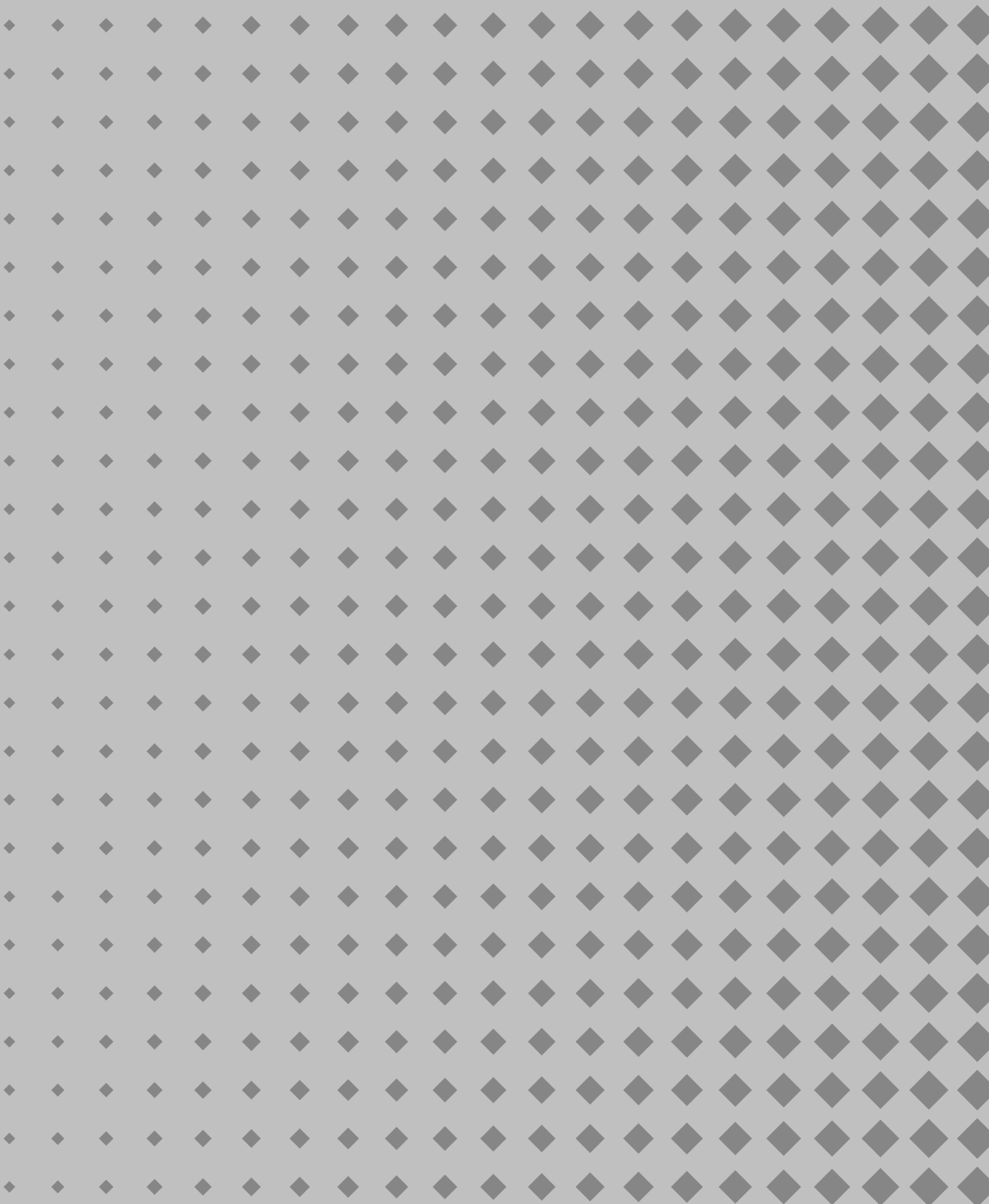
- Smart cooperation between private nearby networks
- Central smart router as coordinator
- Automatic backup



# DEMO

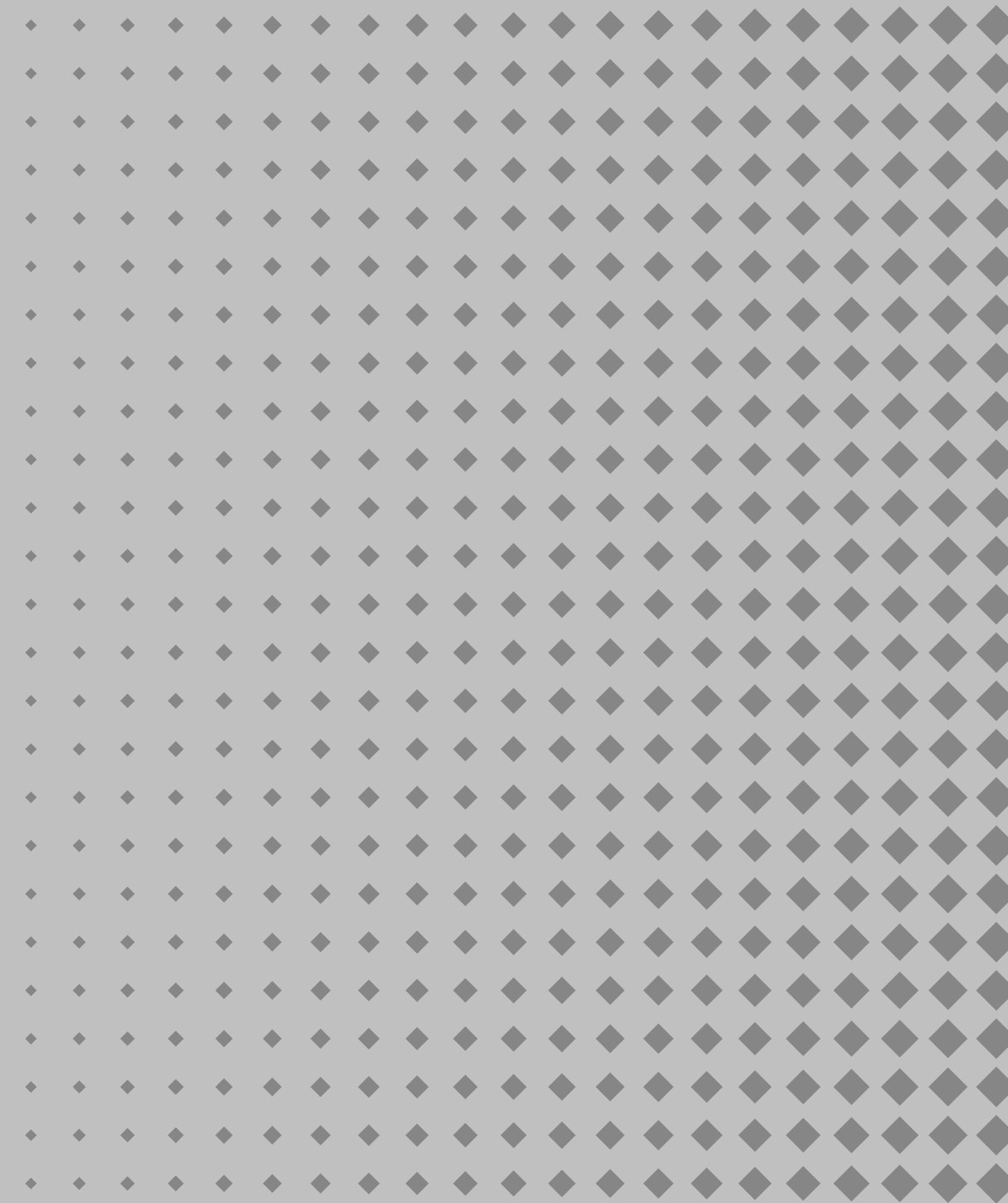
Front Simulation

Load Balancing Simulation



# SYSTEM ARCHITECTURE

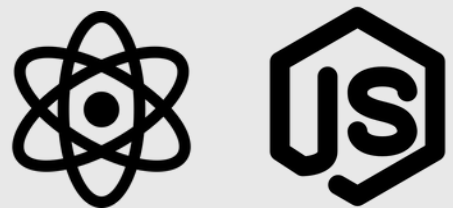
- Smart Central Router – Manages all networks, predicts load, reroutes users, and enforces rules.
- Private Networks – Provide internet access to individuals and communicate with the central router.
- User Devices – Connect to the router and are seamlessly directed to the best network for uninterrupted service.



# SYSTEM ARCHITECTURE

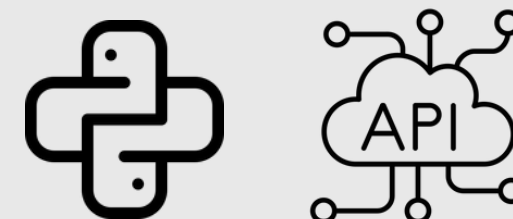
## Frontend

- Displays live data from routers
- Helps users visualize network status, traffic loads, and backup activity in a clear, user-friendly interface
- Built with: React (JavaScript/TypeScript) frontend & Node.js backend



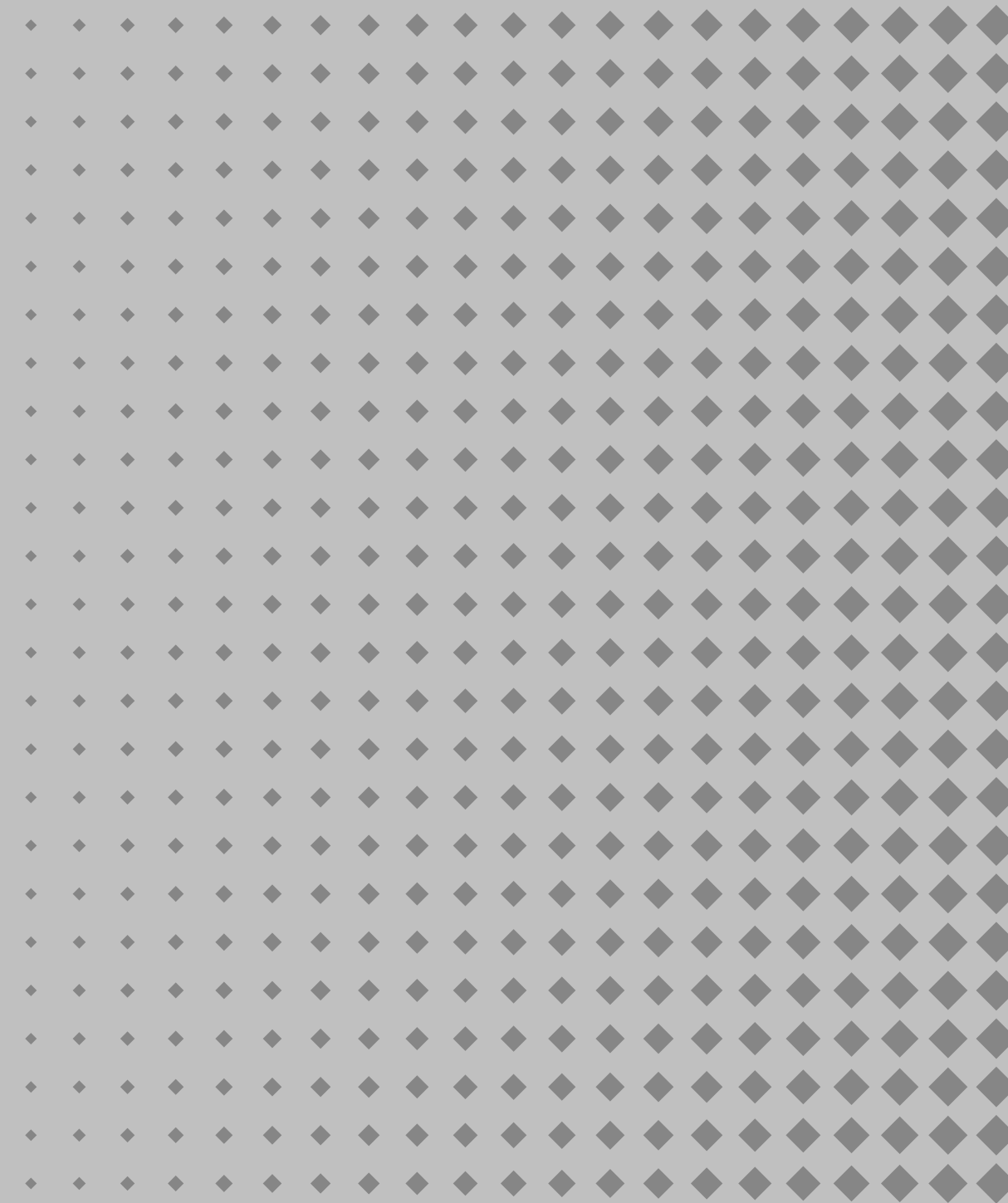
## Load Balancing Algorithm

- Manages multiple Wi-Fi uplinks
- Intelligently assigns clients to the best available uplink based on latency, current load, and traffic
- Implemented in: Python using Flask REST API



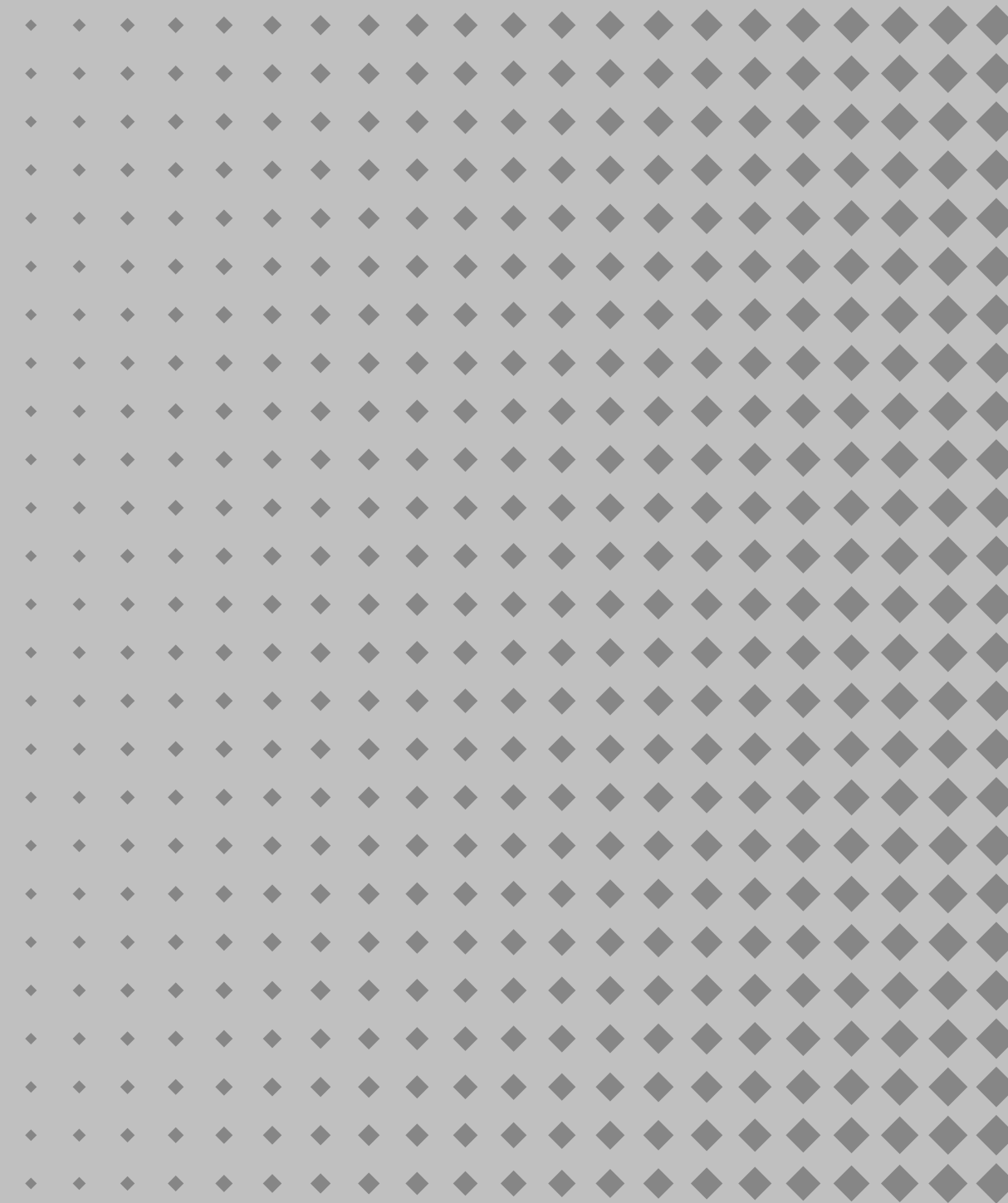
# OTHER APPROACHES

- Mesh Networks – Great for single homes, but don't support cooperation between separate networks.
- Cellular Backup– Keeps users online, but is costly and impractical for heavy use.
- Hardware Upgrades – Help locally, but don't fix large-scale issues.



# WHAT'S NEXT?

- AI-based traffic analysis for smarter decision-making.
- Detailed visual dashboards with real-time graphs and trends.
- Admin panel with advanced control and monitoring tools



# CONCLUSION

Our solution ensures smart, resilient connectivity by dynamically routing users based on real-time network conditions. If a local network fails, users stay connected via automatic backup from nearby networks. Traffic is balanced across multiple network sources for fast and stable internet,