



# Ablation Studies and Scalability Benchmarks

This section quantifies the contribution of individual defense components and characterizes performance scaling with agent count and message volume.

**Reproducibility:** *Ablation data from scripts/run\_ablation.py → output/data/ablation\_results.json. Scalability data from scripts/run\_colony\_benchmarks.py → output/data/colony\_results.json.*

## Defense Component Contributions

Ablation Study: Defense Component Contribution

