



## Environment Sensing

Humidity /  
Temperature

Intel Lab Traces

Log-Normal  
Shadowing



## Skeleton & CH Election

Residual Energy  
Counter

Principal-Axis  
Backbone

Deterministic  
Rotation



## CAS Decision Engine



EMA scoring:  
Energy · Radius ·  
Density · Fairness

Direct Chain Two-Hop



## Gateway & Safety Plane

Scoring · Redundant  
Uplinks · Safety  
Override · Jain  
Fairness



## End-to-End Delivery

End-to-End PDR

Energy  
Consumption

Lifetime (FND)



## Diagnostics & Reproducibility

Welch t-tests

Bootstrap CI

JSON Manifests

←----- State Update & Fairness Feedback Loop -----→