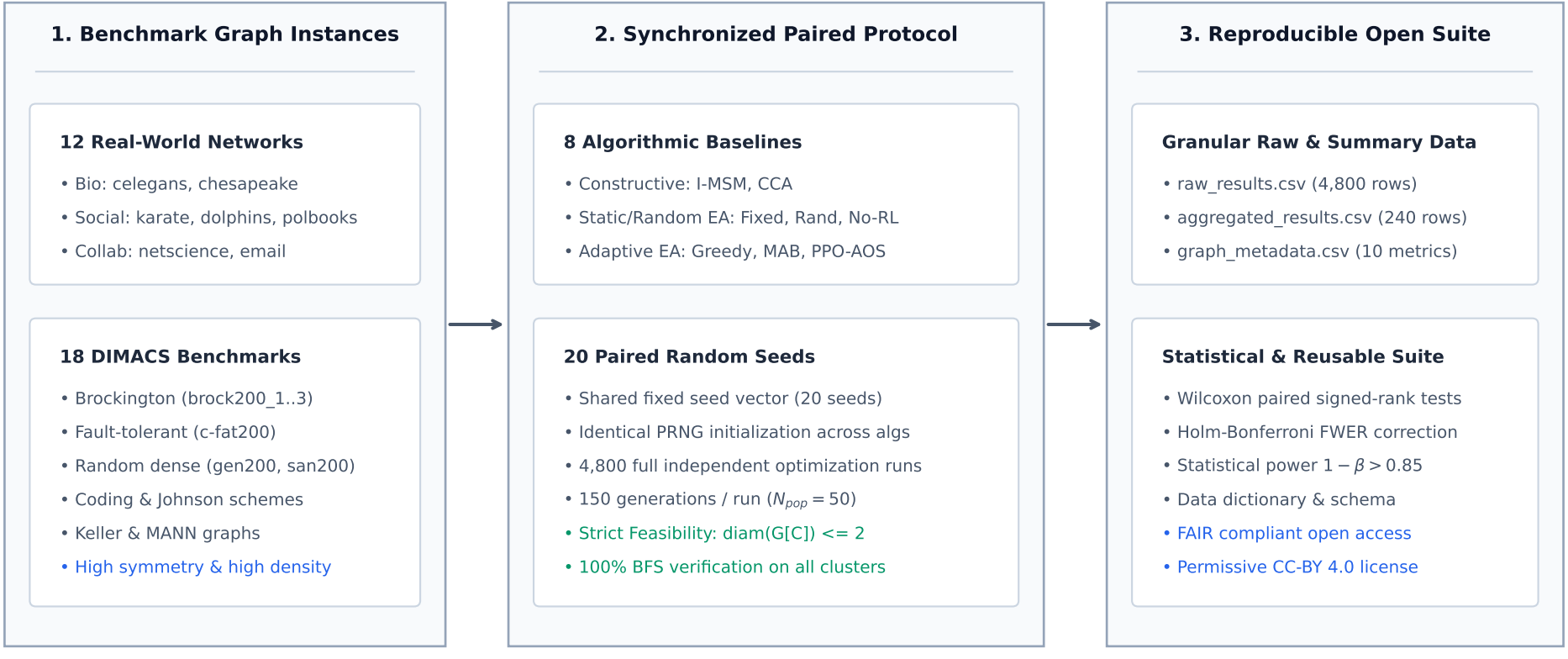

1. Benchmark Graph Instances
12 Real-World Networks
• Bio: celegans, chesapeake
• Social: karate, dolphins, polbooks
• Collab: netscience, email
18 DIMACS Benchmarks
• Brockington (brock200_1..3)
• Fault-tolerant (c-fat200)
• Random dense (gen200, san200)
• Coding & Johnson schemes
• Keller & MANN graphs
• High symmetry & high density
2. Synchronized Paired Protocol
8 Algorithmic Baselines
• Constructive: I-MSM, CCA
• Static/Random EA: Fixed, Rand, No-RL
• Adaptive EA: Greedy, MAB, PPO-AOS
20 Paired Random Seeds
• Shared fixed seed vector (20 seeds)
• Identical PRNG initialization across algs
• 4,800 full independent optimization runs
• 150 generations / run ($N_{pop} = 50$)
• Strict Feasibility: diam(G[C]) <= 2
• 100% BFS verification on all clusters
3. Reproducible Open Suite
Granular Raw & Summary Data
• raw_results.csv (4,800 rows)
• aggregated_results.csv (240 rows)
• graph_metadata.csv (10 metrics)
Statistical & Reusable Suite
• Wilcoxon paired signed-rank tests
• Holm-Bonferroni FWER correction
• Statistical power $1 - \beta > 0.85$
• Data dictionary & schema
• FAIR compliant open access
• Permissive CC-BY 4.0 license