

Autoscaling Strategy Comparison - Absolute Metrics

| Strategy | Infrastructure Power (W) | Workload Power (W) | Power per Replica (W) | Power per Node (W) | Median Response Time (s) | 95th Percentile (s) | Warm-up Avg (s) | Total Replicas | Unique Nodes Used | Avg Replicas/Node | Max Replicas/Node | Scale Up Actions | Scale Down Actions | Total Scaling Actions | Scheduling Events | Consolidation Factor | Scheduling Success Rate |
|------------|--------------------------|--------------------|-----------------------|--------------------|--------------------------|---------------------|-----------------|----------------|-------------------|-------------------|-------------------|------------------|--------------------|-----------------------|-------------------|----------------------|-------------------------|
| Kubernetes | 519.4 | 6577.5 | 3.22 | 4.36 | 1121.01 | 4485.887 | 10310.931 | 2040 | 39 | 52.3 | 228 | 401 | 1064 | 1465 | 1254 | 2.72 | 1.0 |
| HPST | 435.1 | 8885.9 | 3.64 | 3.66 | 1052.111 | 4909.099 | 4262.024 | 2443 | 119 | 20.5 | 66 | 558 | 311 | 869 | 2445 | 1.07 | 0.706 |
| LPLT | 544.8 | 2649.9 | 2.99 | 4.58 | 1180.832 | 4909.099 | 11809.096 | 885 | 46 | 19.2 | 193 | 175 | 482 | 657 | 576 | 1.0 | 1.0 |

Strategy Performance Comparisons (%)

| Strategy | Infrastructure Power Δ (%) | Workload Efficiency Δ (%) | Response Time Δ (%) | Cold Start Δ (%) |
|--------------|----------------------------|---------------------------|---------------------|------------------|
| K8S vs HPST | -16.2 | 13.0 | -6.1 | -58.7 |
| K8S vs LPLT | 4.9 | -7.1 | 5.3 | 14.5 |
| HPST vs LPLT | -20.1 | 21.7 | -10.9 | -63.9 |

Performance Rankings by Category

□ STRATEGY RANKINGS SUMMARY

Energy Efficiency (W/replica):

1. LPLT (2.99) 2. K8S (3.22) 3. HPST (3.64)

Infrastructure Power:

1. HPST (435.1W) 2. K8S (519.4W) 3. LPLT (544.8W)

Response Time:

1. HPST (1052s) 2. K8S (1121s) 3. LPLT (1181s)

Cold Start Performance:

1. HPST (4262s) 2. K8S (10311s) 3. LPLT (11809s)

Resource Utilization:

1. K8S (52.3 rep/node) 2. LPLT (19.2) 3. HPST (20.5)

Scaling Stability:

1. LPLT (657 actions) 2. HPST (869) 3. K8S (1465)