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VERAE TIME × ZAPIER

BENCH

site/packages/verae-nats-cluster/BENCH.md

NATS cluster message speed

Run **20260912T045131Z** (UTC). Client: LXC **510** `verae-px-worker` (`10.10.10.20`), not a nats-* server. Servers: `nats-a/b/c` on `10.10.10.21-23` (`vmbr1` only).

Client URL:

```
nats://10.10.10.21:4222,nats://10.10.10.22:4222,nats://10.10.10.23:4222
```

Method

- **Core NATS** is fire-and-forget pub/sub (`nats bench`). No disk, no replica ack.
- **JetStream** uses **file** storage and **replicas=3** (same as product streams). The unique stream `benchstream` is deleted between JS loads.
- Throughput is **msgs/sec** from nats CLI **0.1.6** (`--no-progress --csv`). Its min/avg/max are publisher **rate spread**, not delay.
- **Ping** delay: one publisher, sequential publish-then-wait. This is one-message round-trip through the cluster.
- **Flood** delay: N publishers dump the whole batch, then the subscriber drains. This is **queueing under burst**, not wire RTT.
- Probe: `scripts/latency.mjs` (two connections, header timestamp).

Throughput

Run	Mode	Aggregate msgs/s	Pub msgs/s	Pub MB/s	Sub msgs/s	Sub MB/s
core-1p1s-50k-128	core pub/sub	1,200,836	791,094	96.57	747,461	91.24
core-4p4s-100k-128	core pub/sub	1,521,256	316,312	38.61	1,299,634	158.65
core-4p4s-50k-1k	core pub/sub	630,460	247,747	241.94	510,216	498.26
core-8p8s-200k-128	core pub/sub	2,007,937	333,957	40.77	1,790,736	218.60
js-1p-20k-128-r3	jetstream r=3 file	—	16,155	1.97	—	—
js-2p2s-20k-128-r3	jetstream r=3 file	21,861	10,965	1.34	10,942	1.34
js-4p-20k-1k-r3	jetstream r=3 file	—	13,493	13.18	—	—
js-4p-50k-128-r3	jetstream r=3 file	—	16,607	2.03	—	—

Round-trip delay

Run	Kind	Count	Pubs	Size	min	avg	p50	p90
lat-ping-1k-128	ping (sequential RTT)	1000	1	128 B	0.254ms	0.307ms	0.286ms	0.332ms
lat-1p-5k-128	flood (burst queueing)	5000	1	128 B	149.279ms	238.626ms	248.752ms	274.314ms
lat-4p-5k-1k	flood (burst queueing)	5000	4	1024 B	155.101ms	211.706ms	217.579ms	223.268ms
lat-4p-10k-128	flood (burst queueing)	10000	4	128 B	174.174ms	263.186ms	266.672ms	299.073ms
lat-8p-20k-128	flood (burst queueing)	20000	8	128 B	304.586ms	453.749ms	466.296ms	499.924ms

What the numbers mean

Product job/event/archive traffic is **JetStream r=3 file**. On this three-LXC stand that is about **16k durable 128 B pubs/s** (about **13k** at 1 KiB). Core NATS is an upper bound for non-durable fan-out: about **0.7–2.0M msgs/s** aggregate at 128 B, or **~630k msgs/s (~616 MB/s)** at 1 KiB with 4 publishers.

A quiet request-reply is **~0.3 ms** average, **p99 < 1 ms**. Flood rows in the **150–500 ms** band are the subscriber catching up after a burst, which is what a job-events mailbox sees if publishers outrun consumers.

Re-run on NS1: `bash scripts/bench.sh`. Raw logs/CSVs are under `results/<utc>/`.