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Europe 2026



CoreDNS

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When DNS Blinks

Scaling and Hardening CoreDNS in Critical Cloud Infrastructure

Yong Tang, John Belamaric



- Flexible DNS server written in Go
- Focus on service discovery
- Plugin based architecture, easily extended
- Default DNS server in Kubernetes
- Supports DNS, DNS over TLS, gRPC, QUIC, HTTP/3
- AWS Route53, Azure DNS, Google Cloud DNS



- **436** Contributors (Big Thanks!)
- **13,960+** Stars
- **38** Public Adopters
- **29** Maintainers
- New maintainer 2025: @thevilledev (*Ville Vesilehto*)



Releases Since KubeCon EU 2025



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- 1.12.1 - 1.14.3
 - **1.14.2** Released March 5, 2026
- New plugins:
 - **nomad** - HashiCorp nomad support (**1.13.0**)
 - **DoH3** - DNS over HTTP/3 support (**1.13.2**)
 - **proxyproto** - Reserves client IP behind load balancers (**1.14.2**)
- New features:
 - Multiplexed connections + connection pooling
 - API rate limiting (Kubernetes plugin)



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Releases Since KubeCon EU 2024



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- Security:

- **CVE-2025-47950**: DoQ Memory Exhaustion via Stream Amplification
- **CVE-2025-58063**: DNS Cache Pinning via etcd Lease ID Confusion
- **CVE-2025-58063**: CoreDNS Loop Plugin DoS
- **CVE-2025-58063**: CoreDNS ACL Bypass
- **CVE-2026-32936, CVE-2026-33190, CVE-2026-32934, CVE-2026-33489**: *To be released with 1.14.3*



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AWS DNS Incident - Oct 2025

The Cloud's Single Point of Failure

- **Critical Infra**: DNS serves as "address book" for service discovery.
- **Root Cause**: Latent race condition in internal DNS automation.
- **Incident Trigger**: Accidental deletion of DNS record in DynamoDB.
- **Cascade**: IAM & EC2 failed; could not resolve database endpoints.
- **Retry Storm**: Millions of IoT devices (Alexa/Ring) flooded network.
- **Economic Toll**: \$1.1B+ loss; 15-hour outage; \$75M per hour.
- **2026 Mandate**: Static Stability (DNS caching) & Multi-Region failover.



AWS DNS Incident - Oct 2025

The Cloud's Single Point of Failure

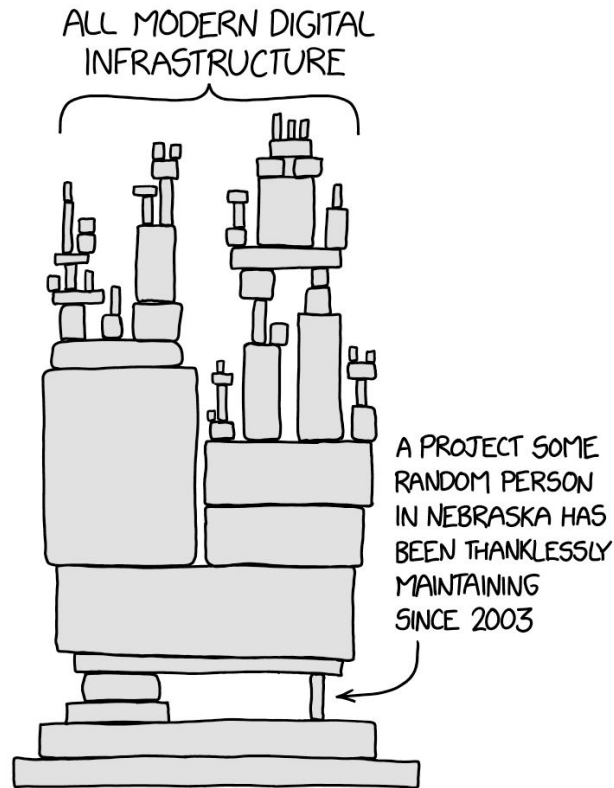
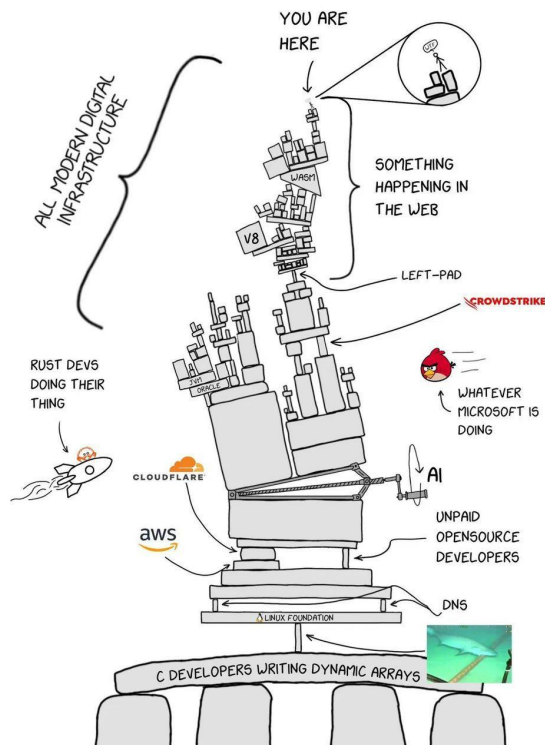
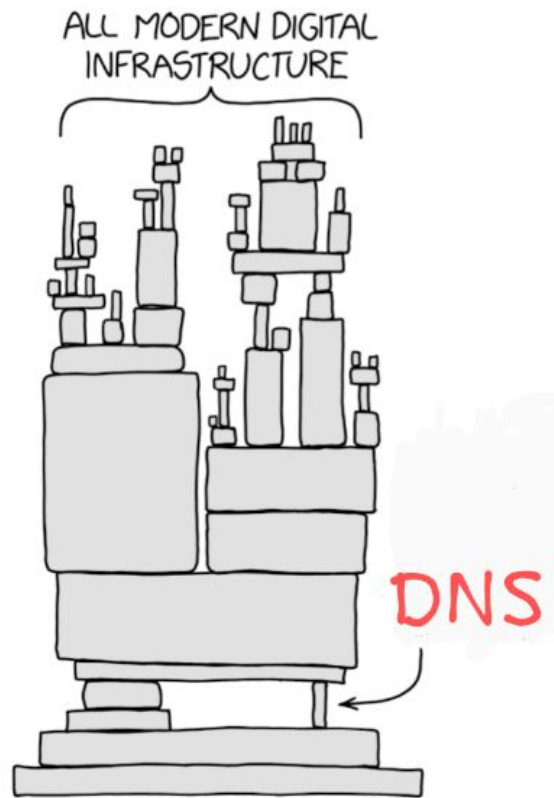


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CoreDNS: Resilience

- **Prefetch**: Proactively refresh popular records at 20% TTL remaining.
- **Lameduck**: Set 10s delay to prevent dropped queries on restarts.
- **Serve Stale**: Enable `serve_stale` for 1hr to survive upstream outages.
- **Multi-Provider**: Forward to independent upstreams (e.g., Google + Cloudflare).
- **Negative Caching**: Cache NXDOMAIN for 5s to block retry storms.



CoreDNS: Scalability & Performance



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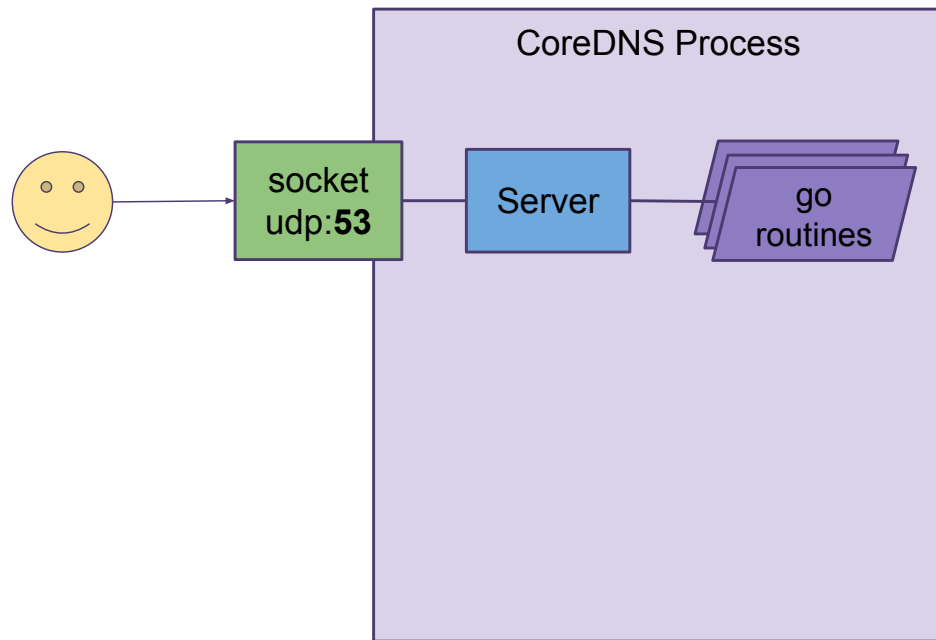
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- **Multi-Socket Plugin:** Utilize multiset to handle high-concurrency UDP traffic across multiple CPU cores.
- **NodeLocal DNSCache:** DaemonSet to bypass kernel bottlenecks.
- **Cache Capacity:** Increase success cache to 10,000+ entries.
- **Proportional Autoscaling:** Scale replicas based on node/core count, not just CPU.
- **Performance Tuning:** Lower ndots to 2 and use FQDNs (trailing dots) to skip search paths.



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Multisocket Plugin



- Internal structure “Server” handles a given port
- Dispatches requests to go routines



Multisocket Plugin

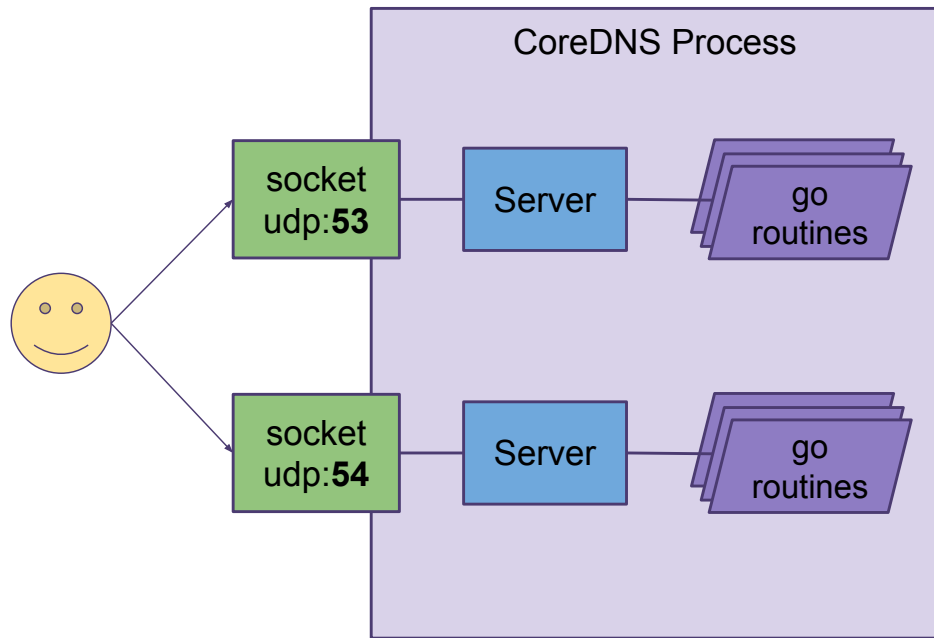


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- What happens if we split traffic across ports?
- Aggregate QPS goes up!
- But we can't really force users to use two different ports



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Multisocket Plugin

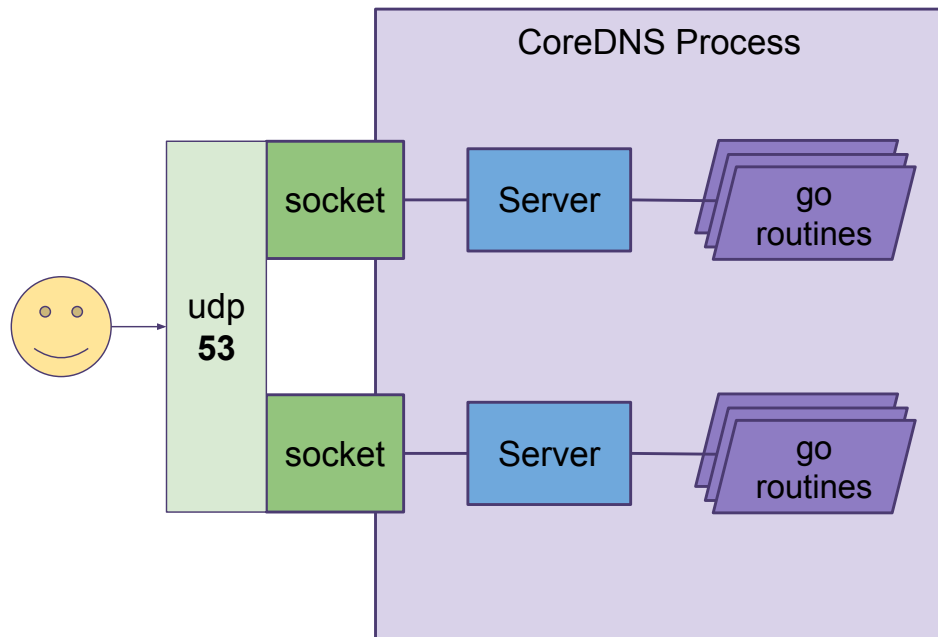


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- `SO_REUSEPORT`
- Multiple sockets on the same port
- Kernel distributes packets across the sockets
- Internal changes to create multiple servers for a port (one per socket)



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Multisocket Plugin



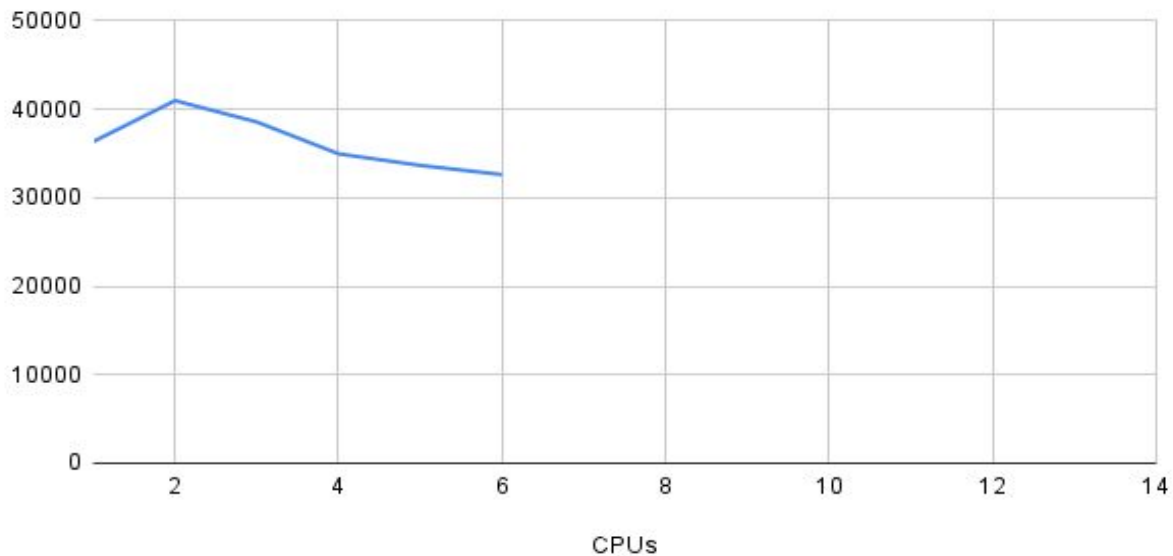
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Cache QPS



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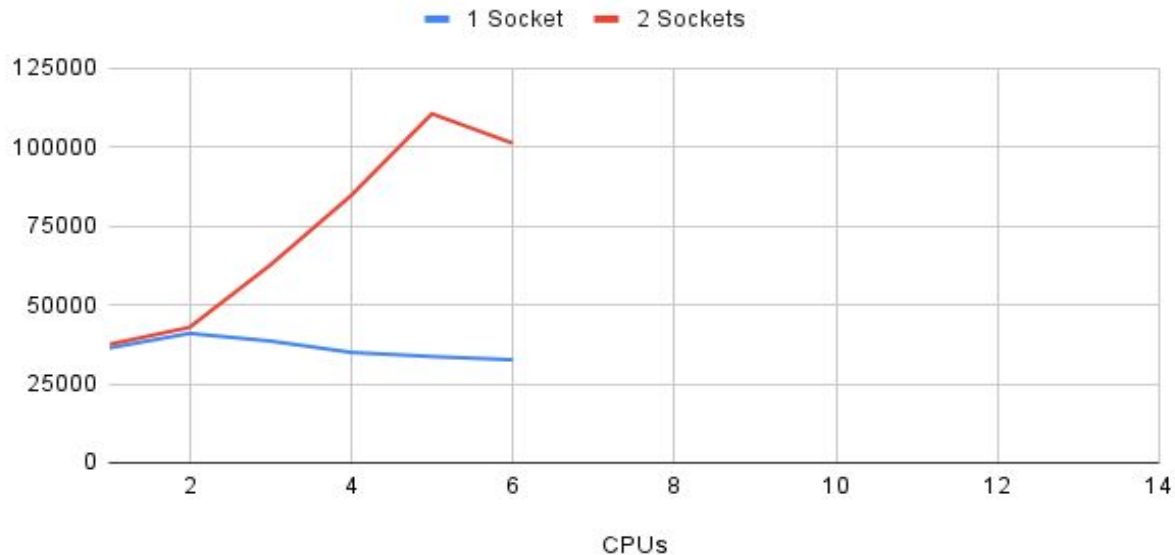
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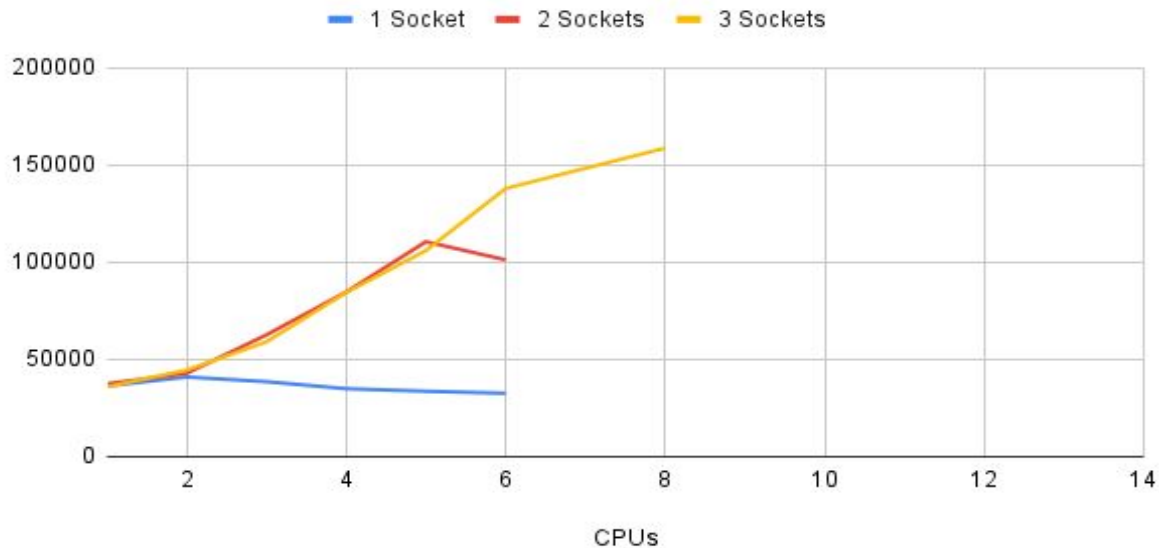
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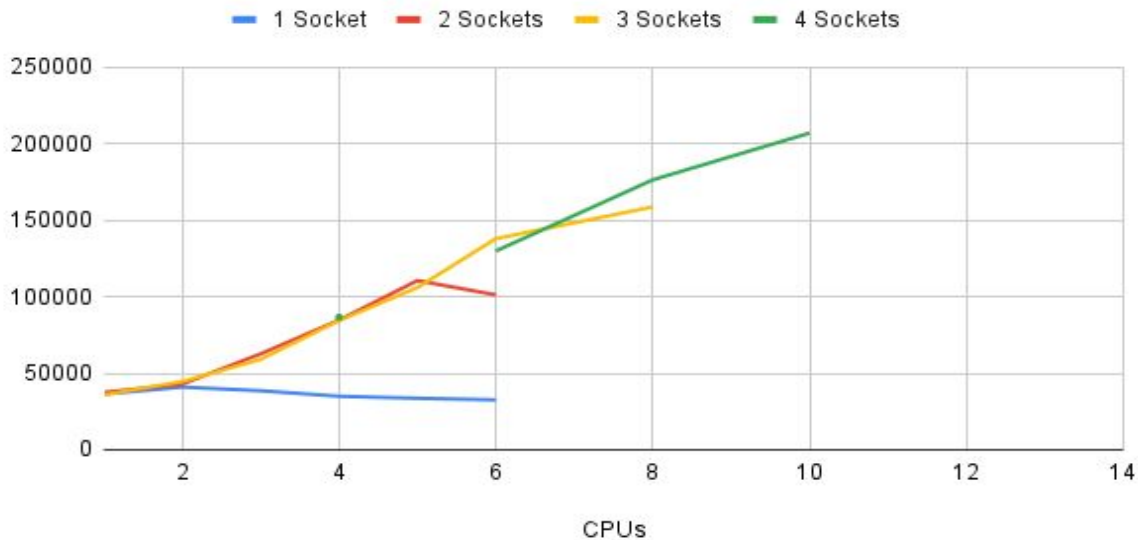
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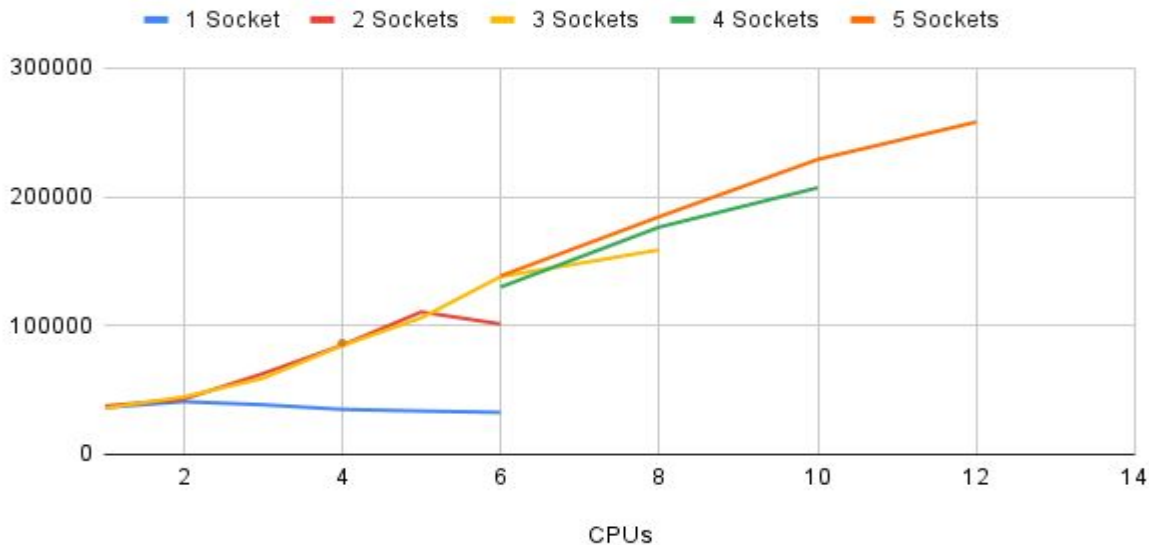
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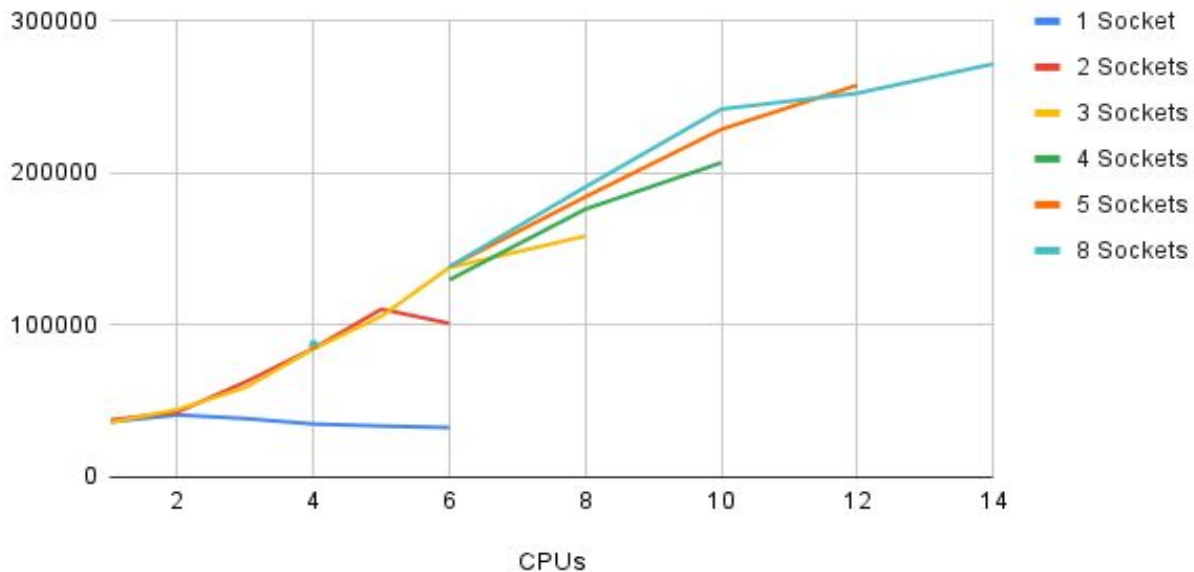
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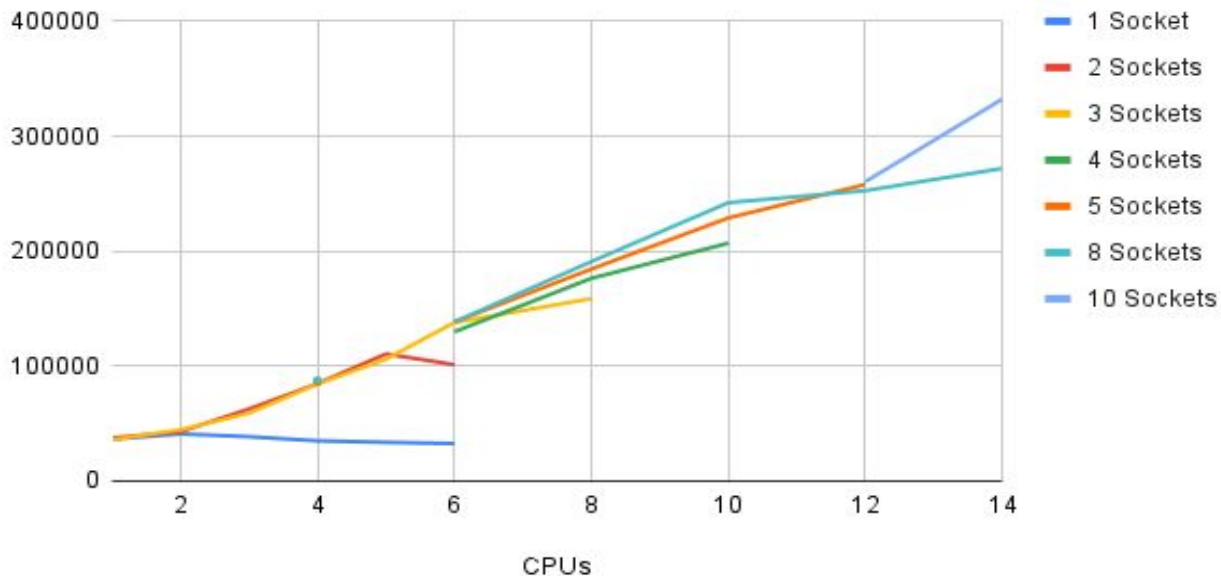
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Cache QPS



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Multisocket Plugin



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- Released in **1.12.0**
- Requires SO_REUSEPORT
- Config
 - **multisocket [NUM]**
- Default NUM == GOMAXPROCS
- May see better performance in specific scenarios with different NUM
 - But GOMAXPROCS is a good default



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Contribute to CoreDNS



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- Star CoreDNS in GitHub:
 - <https://github.com/coredns/coredns>
- Add name to ADOPTERS.MD
- Becomes a contributor:
 - Create a pull request for features or bugs
 - Find security vulnerabilities and file a CVE
- Becomes a maintainer:
 - One significant pull request
 - Sponsored by one current maintainer



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THANK YOU



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