

# CoreDNS

*Cloud Native DNS*

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# What is CoreDNS?

- Cloud native, authoritative DNS server written in Go
  - *Not a recursive DNS server (yet...?)*
- Successor to SkyDNS2 for dynamic DNS-based service discovery
- Flexible, plugin-based, extensible request pipeline
- Started and led by Miek Gieben, SRE at Google
- Supported by Infoblox and soon to be used in its SaaS offerings
- Hosted as an inception project at CNCF



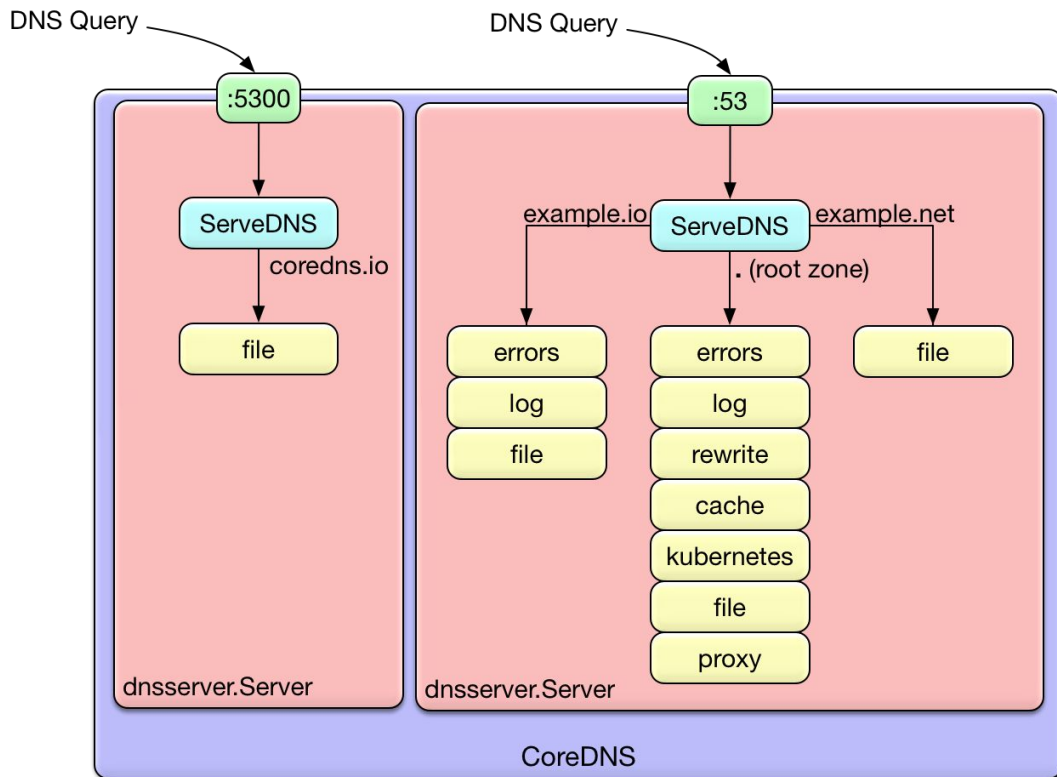
# Why CoreDNS?

- Need for a scalable, extensible, cloud native DNS server
  - A better SkyDNS than SkyDNS
- CoreDNS is easily extended to support different cloud native stacks
  - Most service discovery solutions tightly tied to orchestrators
- Unique features and integrations
  - Encrypted DNS over TLS, gRPC, or HTTPS
  - Integration with external policy servers
  - In-cluster Kubernetes DNS service discovery (kube-dns replacement)
  - Dynamic DNS-based service discovery backed by etcd
  - Many more...
- Modern, supportable, general-purpose authoritative DNS server



# Architecture

- Features are contained in independent plugins
  - Logging
  - Caching
  - Metrics
  - Many more..
- Queries routed based on zone
- Different plugin chains for different zones

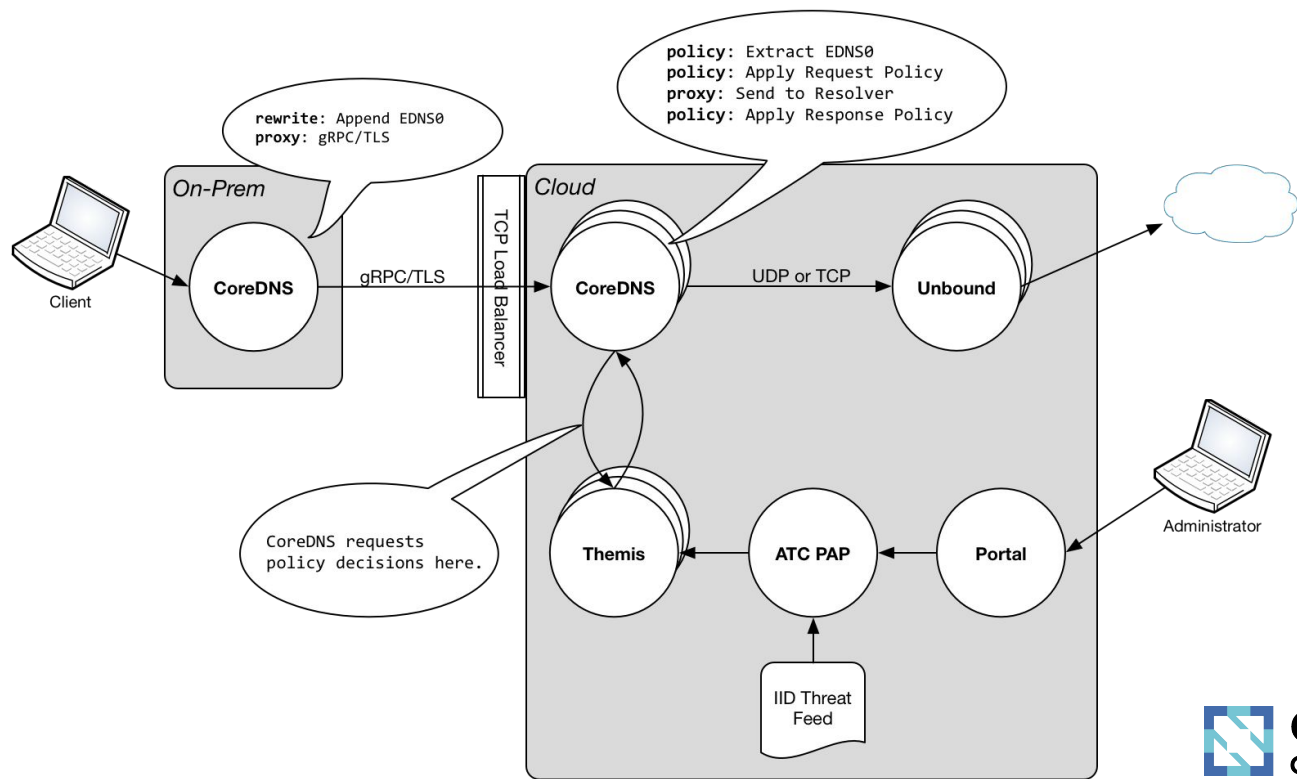


# Plugins

- Request Manipulators
  - Cache (positive and negative)
  - Distributed Tracing ([OpenTracing](#))
  - DNSSEC
  - DNS Tap (from our GSoC student!)
  - Health
  - Load Balancer
  - Logging
  - Metrics ([Prometheus](#))
  - Policy integration (out-of-tree with [Themis](#))
  - Proxy (including over gRPC/TLS)
  - Rewrite (including EDNS0)
  - Secondary Server
  - And more...
- Backends
  - File (ordinary zone file)
  - Auto (files in a directory - great with [git-sync!](#))
  - Etcd (SkyDNS replacement)
  - Kubernetes (Kube-DNS replacement)
  - Hosts (/etc/hosts style files)
  - Consul (WIP)
  - Whoami
  - Other needs...?



# CoreDNS Policy Use Case - ActiveTrust Cloud



# CoreDNS in Kubernetes

- Drop-in replacement for kube-dns for in-cluster DNS, with improvements!
  - Simpler with fewer moving parts (single executable and process)
  - Verified pod IPs for secure use of wildcard certificates
  - Customizable DNS entries in and out of the cluster domain
  - Experimental server-side search path to reduce query volume
- Federation DNS provider
  - Only on-prem alternative to Route53 and Google Cloud DNS
  - Uses etcd plugin to serve federation records
  - Proposed alternate zero-touch federated DNS with or without federation control plane



# Future Plans

- Zero-touch DNSSEC
- DNS Tap Support
- gRPC-based service discovery with push
- Service Registry API (write to etcd or other backend)
- Multi-cluster service discovery without the federation control plane
- Built-in policy plugin
- Policy integration with [OpenPolicyAgent](#)
- What the community needs!
  - Extensibility is a key feature
- Website redesign





# More Information

- Web <https://coredns.io>
- GitHub <https://github.com/coredns>
- Slack [#coredns](https://slack.cncf.io)
- Mailing List [coredns-discuss](https://groups.google.com/a/coredns.io/discuss)
- Twitter [@corednsio](https://twitter.com/corednsio)
- Docker Hub [coredns/coredns](https://hub.docker.com/coredns/coredns)

