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Deep Dive CoreDNS

Miek Gieben, Yong Tang

Speakers

- Miek Gieben
 - GitHub: **miekg**
 - Project Lead: CoreDNS
- Yong Tang
 - GitHub: **yongtang**
 - Maintainer: CoreDNS



CoreDNS



Agenda



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- Introduction
- Project Update
- Service Discovery with DNS
- Show case small plugin
- CoreDNS Community
- Q & A



- 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, DNS over gRPC
- Support AWS Route53, Azure DNS, Google Cloud DNS sync up



Project Updates

- 1.8.0 – 1.8.4
 - 1.8.0 Released October 22, 2020
 - New plugins: **transfer**, **local**, **minimal**
 - **transfer** unifies all zone transfer code
 - **local** answer “local” queries
 - **minimal** provide minimal answers
 - Backwards incompatible changes
 - In **transfer** and **dnstap**
 - New upstream features in kubernetes plugin
 - *endpointslices*



Service Discovery with DNS



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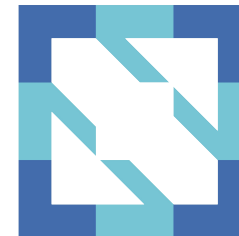
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- DNS is a nice indirection
- Maximum flexibility
- Easy and simple to change
- Distributed in nature, scales to Internet
- Pervasive in IT infrastructure



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DNS Service



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- Simple and critical
- Public-facing and internal
- Diversified source of information
 - Kubernetes, cloud vendors, IT infrastructure, etc.
- Misleading “100%” SLA from all cloud vendors
 - DNS services by cloud vendors are not expensive
 - Service credit refund almost none when uptime is not meet



Demo Plugin in Go



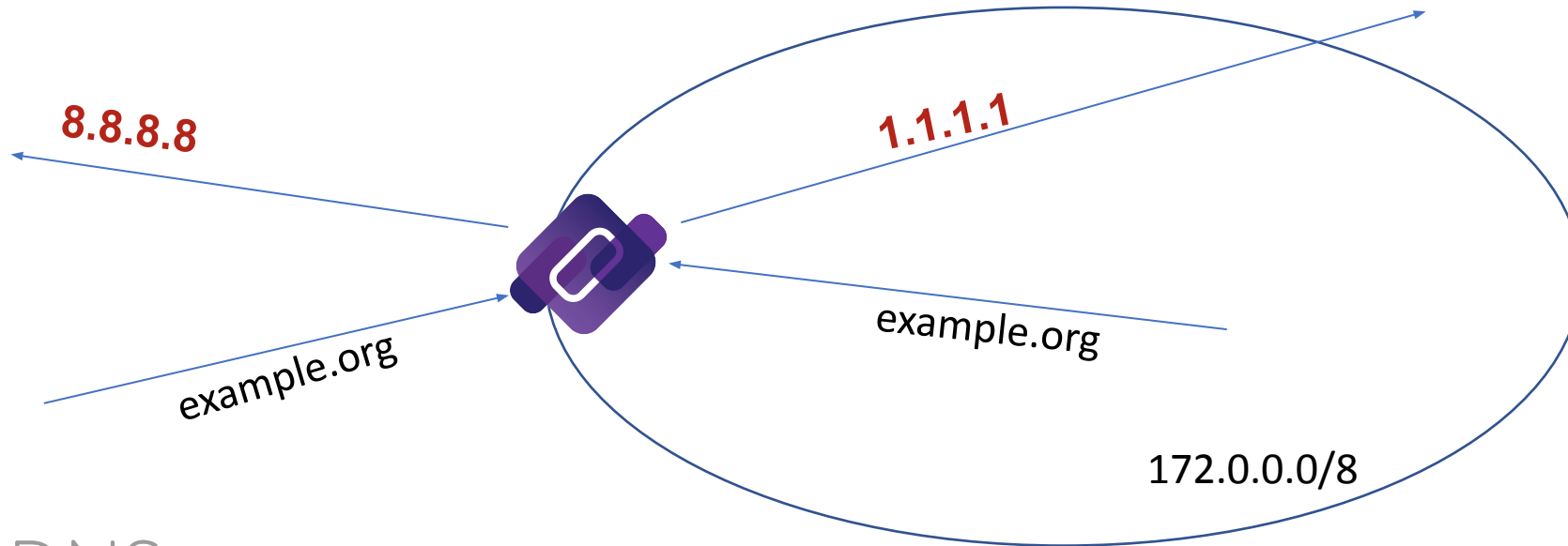
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- Source IP based service discovery
 - Returns **"1.1.1.1"** for 172.0.0.0/8 or 127.0.0.0/8
 - Returns **"8.8.8.8"** otherwise



Demo Plugin: Functions

setup.go

init()

- Performs one-time initializations, register the setup function with coredns

setup(c *caddy.Controller) error

- Parses the configuration from the file and captures it in a struct
- Adds the handler to the Config object (represents a stanza)
- Called once for each use of the plugin in the Corefile

demo.go

ServeDNS(context.Context, dns.ResponseWriter, *dns.Msg) (int, error)

- Processes the DNS request and returns a response, or passes it down the plugin chain



Demo Plugin: Setup



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```
func init() { plugin.Register("demo",setup) }

func setup(c *caddy.Controller) error {
    c.Next() // 'demo'
    if c.NextArg() {
        return plugin.Error("demo", c.ArgErr())
    }
    dnsserver.GetConfig(c).AddPlugin(func(next plugin.Handler) plugin.Handler {
        return Demo{}
    })
    return nil
}
```



Demo Plugin: ServeDNS



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```
// ServeDNS implements the plugin.Handler.ServeDNS.
```

```
func (p Demo) ServeDNS(ctx context.Context, w dns.ResponseWriter, r *dns.Msg) (int, error) {  
    state := request.Request{W: w, Req: r}  
    qname := state.Name()  
    reply := "8.8.8.8"  
    if strings.HasPrefix(state.IP(), "172.") || strings.HasPrefix(state.IP(), "127.") {  
        reply = "1.1.1.1"  
    }  
    fmt.Printf("Received query %s from %s, expected to reply %s\n", qname, state.IP(), reply)  
    ...  
}
```



Demo Plugin: Corefile



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```
.:1053 {  
    # By default all plugins  
    # are disabled initially,  
    # unless enabled explicitly  
    #  
    demo  
}
```



Demo Plugin: Build



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```
$  
$ # add demo:demo to plugin.cfg  
$  
$ # build with docker (golang:1.16)  
$ docker run --rm -i -t -v \  
$     $PWD:/v -w /v golang:1.16 sh -c 'make gen && make'  
$  
$ # configure Corefile and run coredns  
$  
$ ./coredns
```

<https://github.com/coredns/demo>

<https://coredns.io/explugins/demo>



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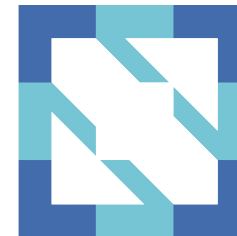


CoreDNS Community

- 307 Contributors (Big Thanks!)
- 26 Maintainers
- 32 Public Adopters
- 8000+ Stars



CoreDNS



LFX by Linux Foundation

- 2019: Palash Nigam (palash25)
 - *Google CloudDNS plugin*
- 2020: Jayesh Sharma (wjayesh)
 - *CoreDNS Healthcheck on Kubernetes*
- 2021: Chin Zhi Wei (chinzhiweiblack)
 - *ACME support (ongoing)*



- 2017: Varyoo (varyoo)
 - *DNStap plugin*
- 2018: Jiacheng Xu (jiachengxu)
 - *idetcd plugin*
- 2019: An Xiao (ihac)
 - *ACL plugin for Access Control*
- 2020: Chanakya Ekbote (cekbote)
 - *ML-based DNS threat detection*

CoreDNS Community

- Star CoreDNS in GitHub:
 - <https://github.com/coredns/coredns>
- Add the name to *ADOPTERS.md*
- Participate in GitHub or Slack discussions
 - Slack: **#coredns** on <https://slack.cncf.io>
- Create a PR to become a contributor
- Become a maintainer
 - One significant merged pull request
 - Sponsored by one current maintainer





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THANK YOU



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