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CoreDNS Deep Dive



Agenda



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- Plugins
- Hidden Primary
- Jumping into code
- Outlook
- Contributing
- Questions



CoreDNS



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Plugins



Plugin types

- External plugin:
 - Maintained externally
 - Link through coredns.io
- CoreDNS subproject:
 - Separate repo under CoreDNS organization
 - Issue and PR tracking outside the core repo
- Core plugin (CoreDNS repo)
 - More selective in quality
 - CoreDNS repo (incl. OWNERS)





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Hidden Primary



Hidden Primary

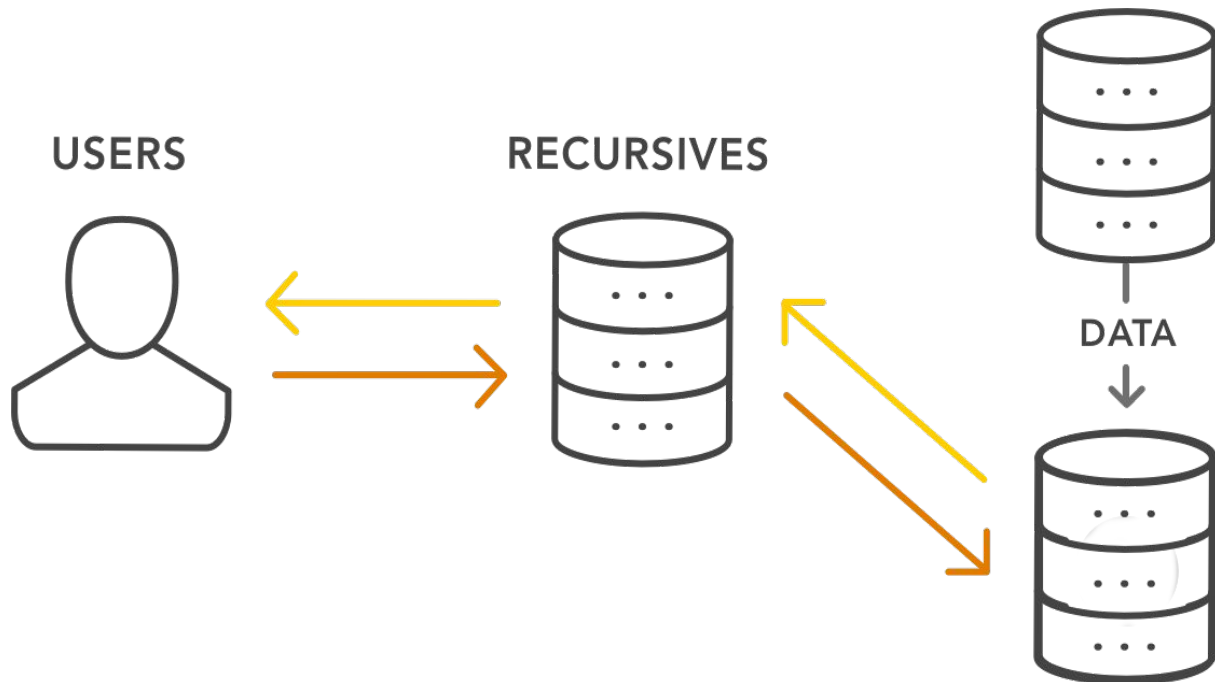


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HIDDEN Primary

On the side of the customer, outside the delegation

SECONDARY

Receives updates, just like a normal primary-secondary



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Recap: SOA



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```
example.com 3600 IN SOA ns.example.com. domains.example.com. (  
    2018120406 ; serial  
    5m        ; refresh  
    5m        ; retry  
    1w        ; expire  
    12h      ) ; minimum (negative caching)
```



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Git based DNS

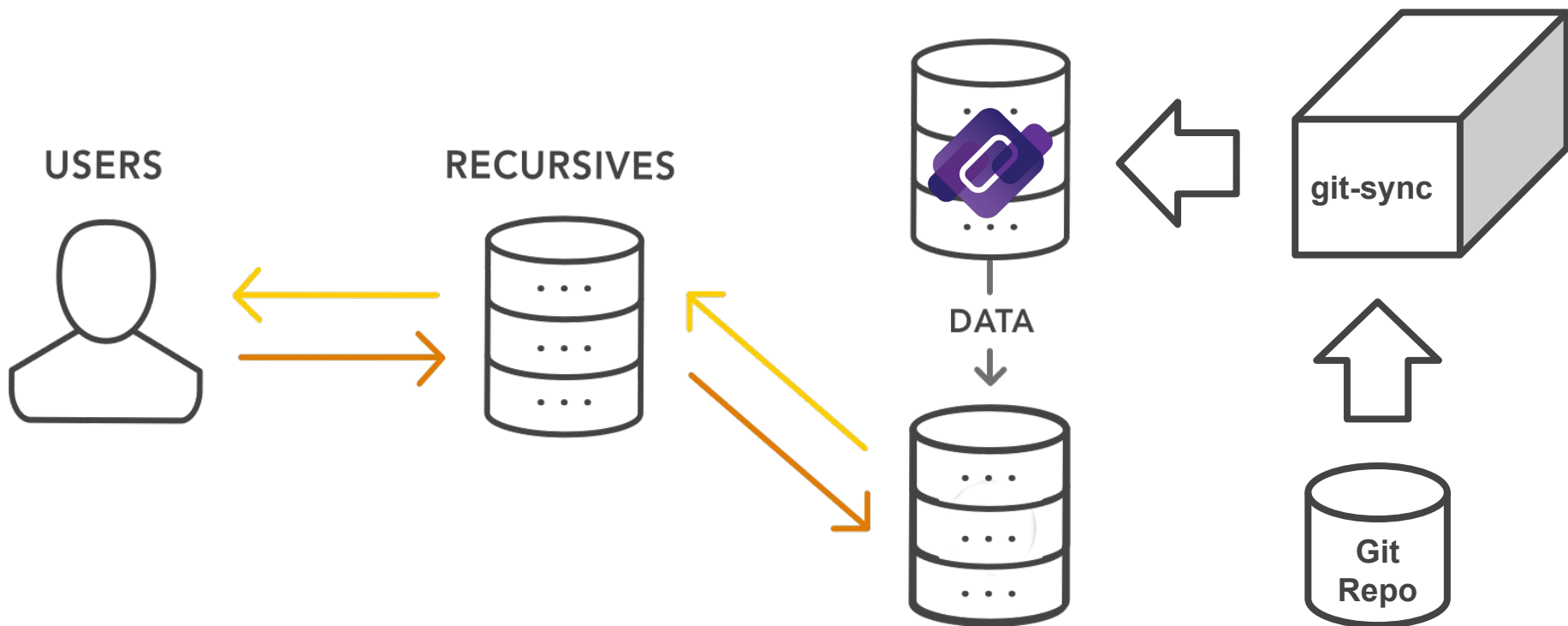


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Jumping into Code



Demo Plugin



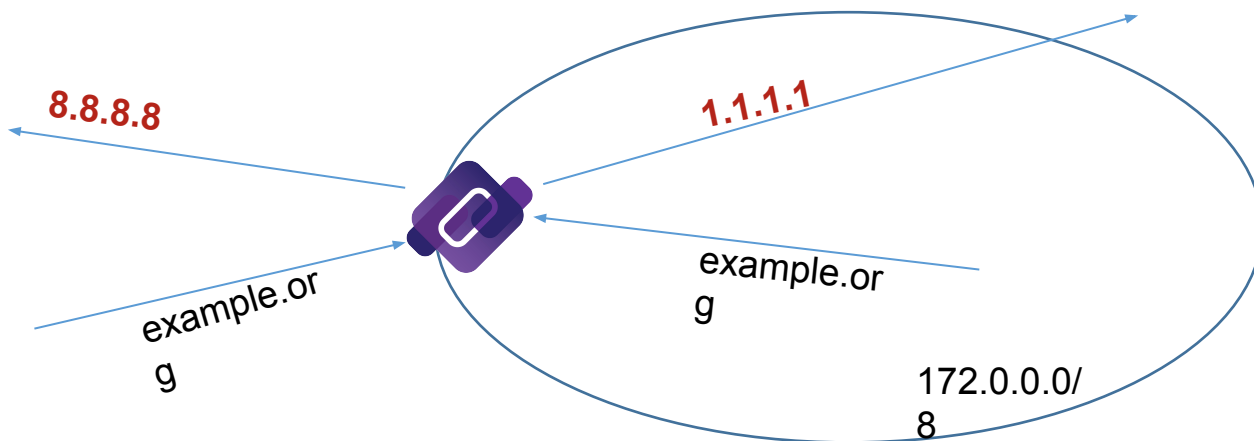
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- <https://github.com/coredns/demo>
- Source IP based service discovery
 - Returns **"1.1.1.1"** for 172.0.0.0/8 or 127.0.0.0/8
 - Returns **"8.8.8.8"** otherwise



Three Functions



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setup.go

init()

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

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 chain

Demo Plugin: Setup



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```
func init() {
    caddy.RegisterPlugin("demo", caddy.Plugin{
        ServerType: "dns",
        Action:      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
}
```



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Demo Plugin: ServeDNS Part 1



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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)
    ...
}
```



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Demo Plugin: ServeDNS Part 2

```
func (p Demo) ServeDNS(ctx context.Context, w dns.ResponseWriter, r *dns.Msg) (int,
error) {
    rr := new(dns.A)
    rr.Hdr = dns.RR_Header{Name: qname, Rrtype: dns.TypeA, Class: dns.ClassINET}
    rr.A = net.ParseIP(reply).To4()
    answers = append(answers, rr)
    m := new(dns.Msg)
    m.SetReply(r)
    m.Authoritative = true
    m.Answer = answers

    w.WriteMsg(m)
    return dns.RcodeSuccess, nil
}
```



Demo Plugin: Corefile



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



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Demo Plugin: Build



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```
# add demo:demo to plugin.cfg
# build with docker, if you don't have your go env
# setup already (golang:1.11)
$ docker run --rm -i -t -v \
    $PWD:/go/src/github.com/coredns/coredns \
    -w /go/src/github.com/coredns/coredns \
    golang:1.11 make
# configure Corefile and run coredns
$ ./coredns
$
```



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Outlook



Metadata, Rewrites and Logging

- Metadata plugin
- Enables plugins to publish data about a request
- Currently metadata is consumed by rewrite and log
- Future
 - Template plugin to consume metadata
 - Firewall plugin to consume metadata
 - Kubernetes plugin as a metadata.Provider



Roadmap



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- Upcoming plugins
 - Firewall
 - Kubernetes external zones
 - Response Rate Limiting (new contributor volunteered)
- Kubernetes + metadata
- External policy engine integrations
- Directly writable API
- Performance optimizations (especially GRPC)
- New external plugins (ideas?)



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Contributing



Contributions Welcome



- Github: <https://github.com/coredns/coredns>
- Slack: #coredns on <https://slack.cncf.io>
- Used in production? Add yourself to **ADOPTERS.md**
- Contribute documentation, code or external plugins



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Questions



Questions



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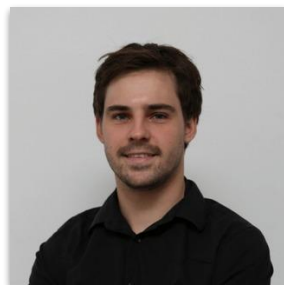


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Thank You

Open for questions



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