Adaptive DNS Privacy

draft-pauly-dprive-adaptive-dns-privacy-01

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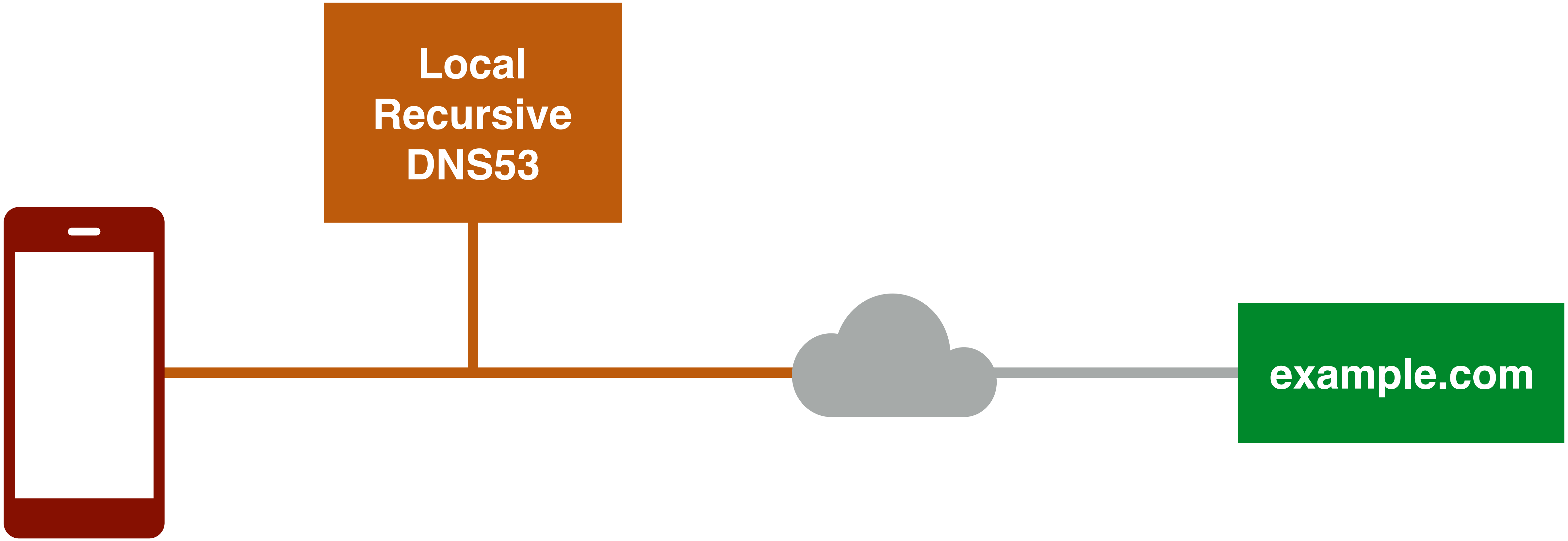
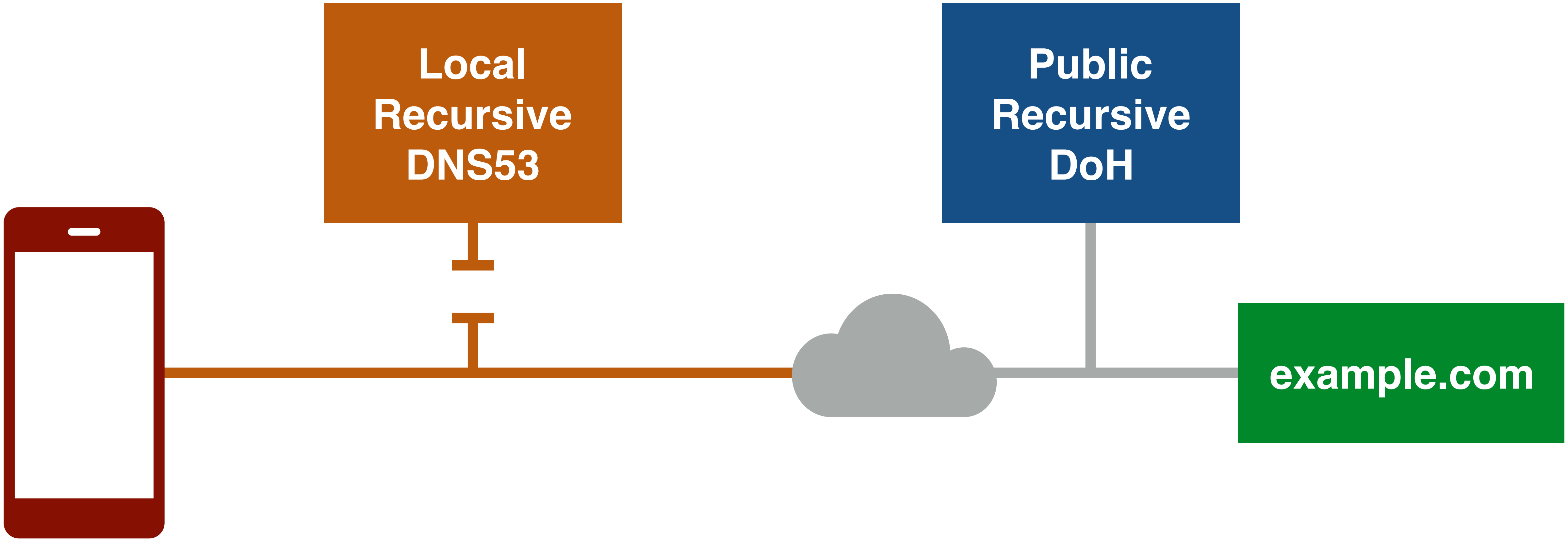
ABCD
IETF 106, November 2019, Singapore

Status Quo DNS



Public Recursive



How can clients discover encrypted DNS resolvers?

How can networks advertise local policy?

How can clients choose the right resolvers to use?

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How can clients discover encrypted DNS resolvers?

- Hard-coded or configured policy
- Bootstrapping off of HTTP connections
- **Using records in the DNS**

  Proposal uses Service Binding (SVCB/HTTPSSVC) records to indicate DoH URIs

  DNSSEC signing can prove that the owner of a name designated a specific DoH service

Choice of Protocol

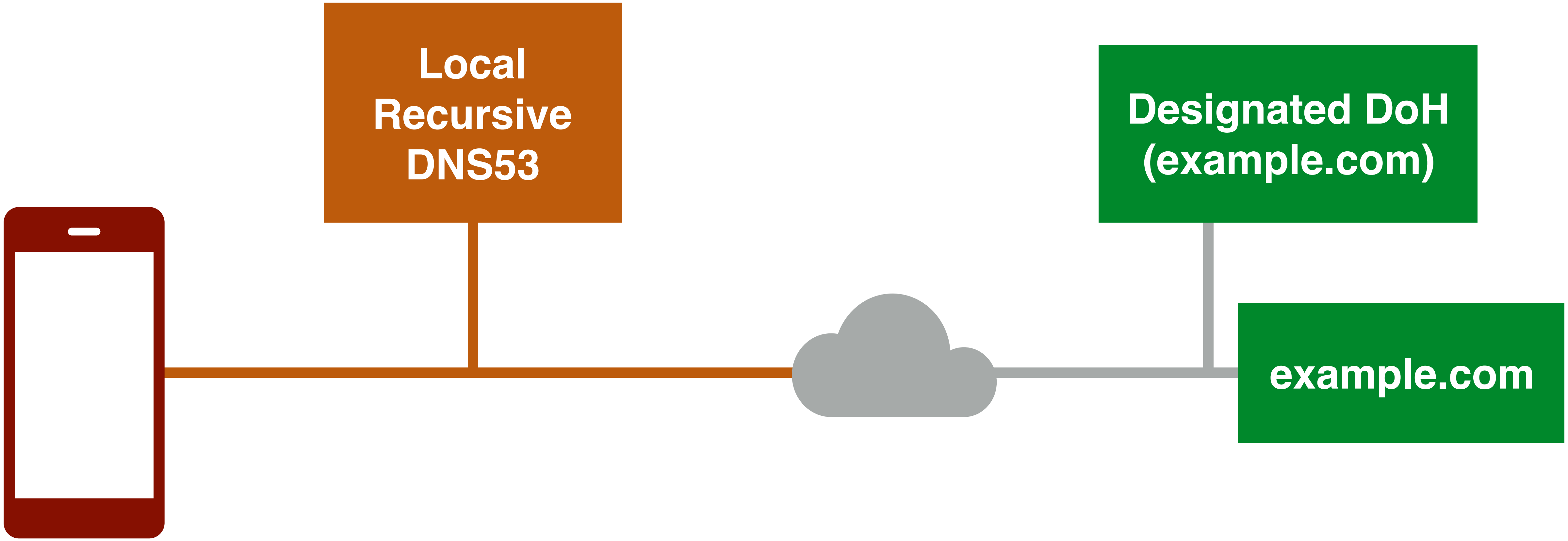
Encrypting DNS traffic is clearly beneficial for privacy and security

DoT and **DoH** both provide encryption

DoH provides additionally:

- Ability to multiplex DNS with other traffic
- More direct transition to QUIC
- Ability to proxy requests

Designated DNS Server



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How can networks advertise local policy?

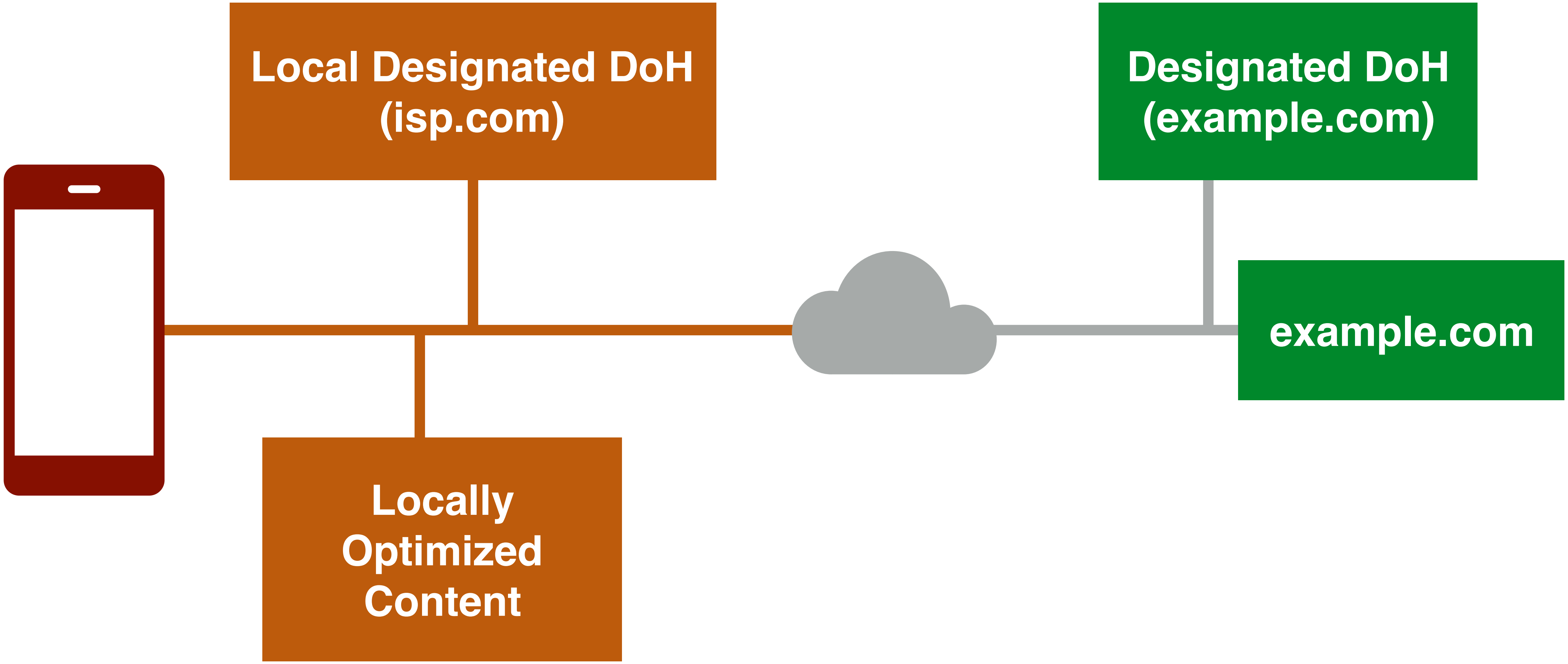
- Canary DNS domains
- DHCP/RA options
- **Provisioning Domain Options**

  Indicate filtering rules

  Indicate walled garden/captive

  Define domains that designate the local resolver to optimize results

Local Designated DNS Server



Network-Based Filtering

PvD configuration can specify filtering policy

Partial/optional filtering:

```
{
   "identifier": "myhome.net",
   "dnsZones": [ "myisp.com", "myhome.net" ],
   "requireDNSFiltering": false,
   "dnsFilteredZones": [ "sensitivedomain.net" ]
}
```

Complete filtering:

```
{
   "identifier": "myschool.net",
   "dnsZones": [ "myschool.net" ],
   "requireDNSFiltering": true,
   "dnsFilteredZones": [ "." ]
}
```

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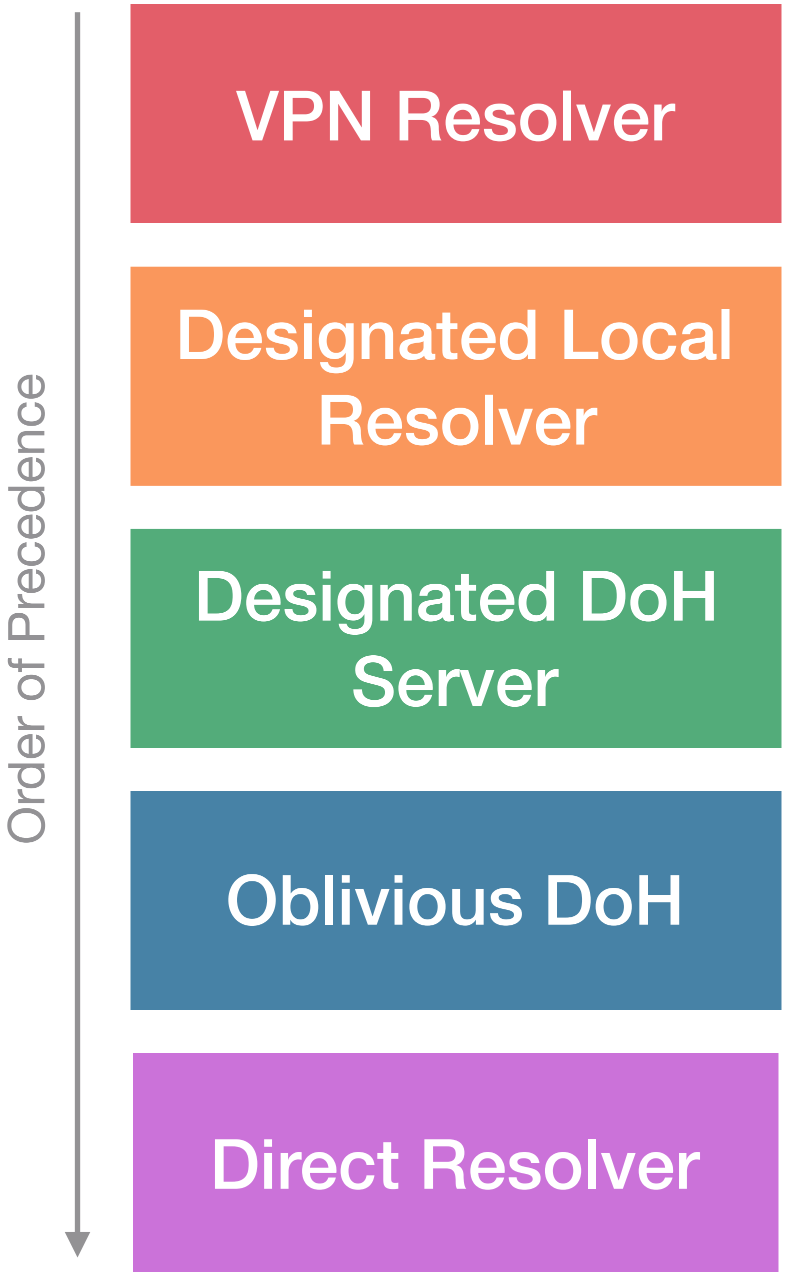
Client Resolution Algorithm



Order of Precedence

VPN Resolver

Names belonging to a VPN or enterprise

Resolve “internal.example.net” with internal VPN server

Designated Local Resolver

Names with a local DoH designation

Resolve “wifi-router.home” with local server

Designated DoH Server

Names with an known designated DoH server

Resolve “google.com” with Google server

Oblivious DoH

Other privacy-sensitive user traffic names

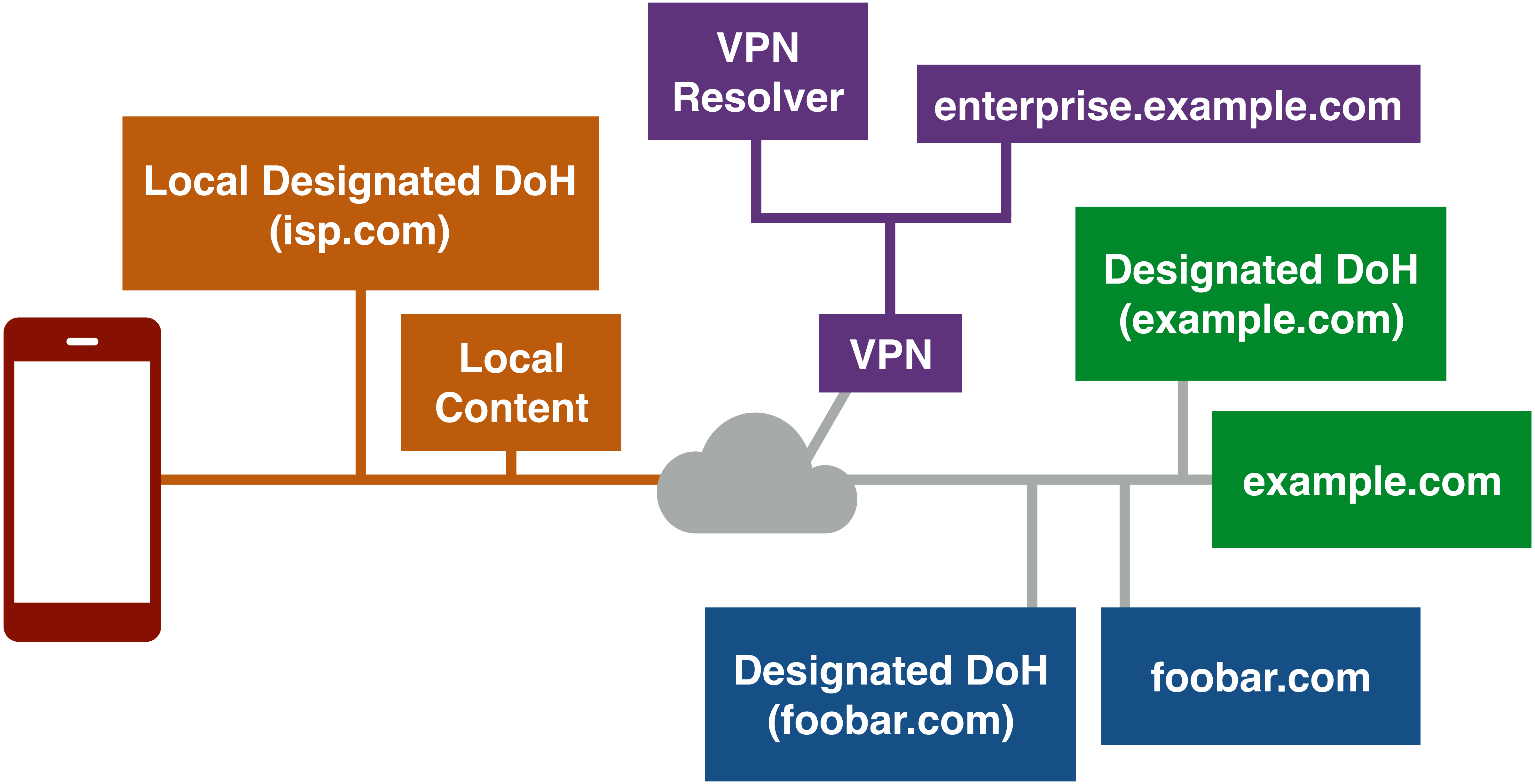
Resolve “example.com” with proxying between multiple servers

Direct Resolver

Default & bootstrapping system traffic

Lookup initial setup names and captive portals locally

Many Designated DNS Servers


VPN Resolver
enterprise.example.com
Local Designated DoH (isp.com)
Local Content
VPN
Designated DoH (example.com)
example.com
Designated DoH (foobar.com)
foobar.com

Bootstrapping

If the local network is trusted, Designated DoH servers are discovered using local queries

Otherwise, the resolver can use **Oblivious DoH** to proxy queries between different public resolvers without revealing client data to public resolvers

Come to DPRIVE for more details!

Get involved!

Draft Issues and PRs

https://github.com/tfpauly/draft-pauly-adaptive-dns-privacy

Oblivious DoH Library

https://github.com/chris-wood/odoh

Sample Proxy/Target

https://github.com/chris-wood/odoh-server