Exploring Caddy + Let's Encrypt + HTTP/2 "Serve The Web Like It's 2016"

by Fernando Álvarez

GoMAD - Madrid Go UG - 16/03/2016

Summary

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- Who Am I

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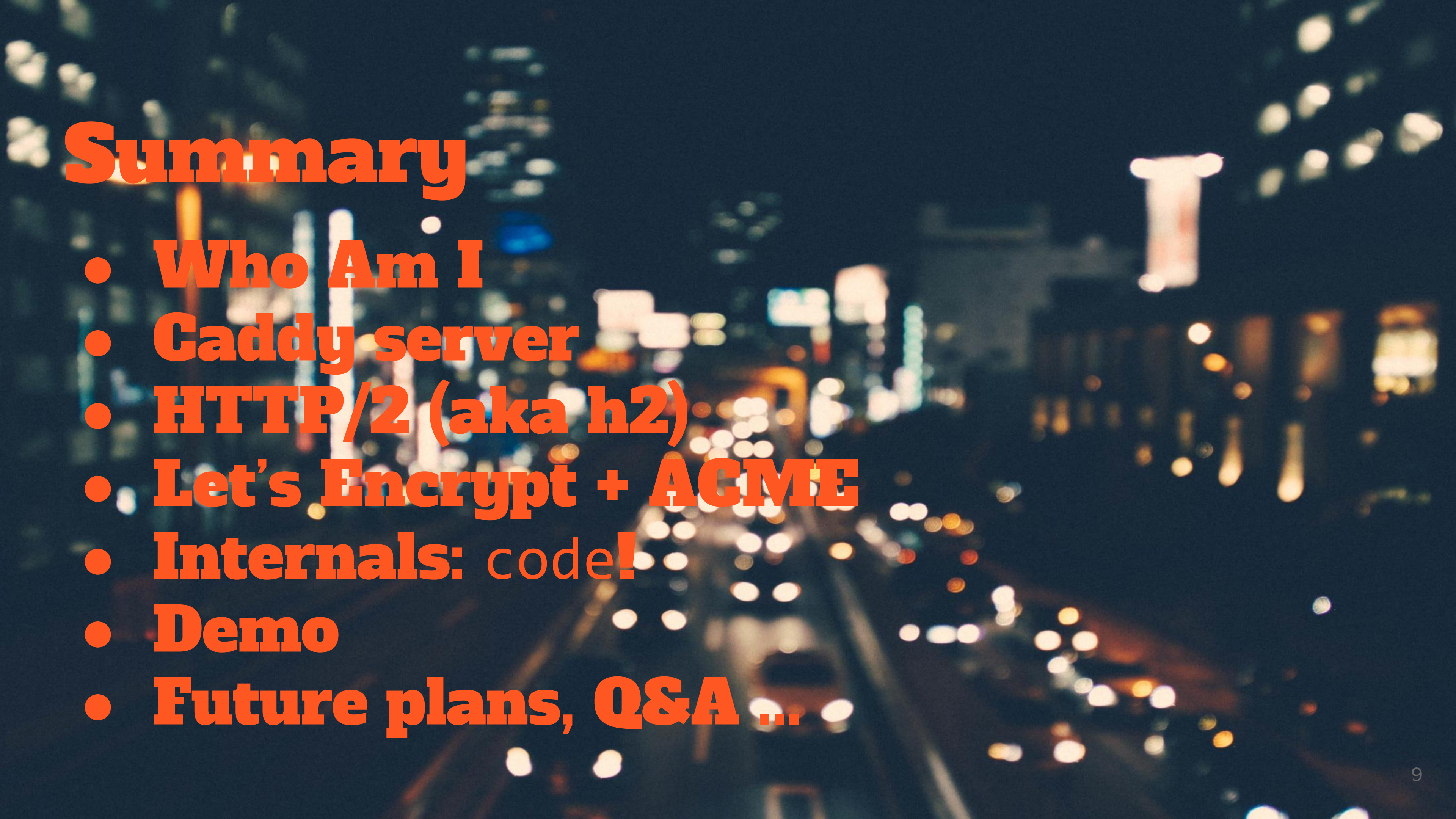

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- Who Am I
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- HTTP/2 (aka h2)
- Let's Encrypt + ACME
- Internals: code!
- Demo
- Future plans, Q&A ...

Who Am I

Fernando Álvarez

- Madrid->Berlin->Madrid
- Infrastructure @ BeBanjo
- Go, Bash, Ruby, Docker, Chef
- Ubuntu @ Server & Desktop
- @fern4lvarez

Disclaimer

Caddy

https://caddyserver.com

Facts

- Web server written in Go
- Announced in April 2015
- Authored by Matt Holt, and more
- Active development, 0.8.2 as of now
- Releases for all main platforms
- Sustained by sponsors and donations

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- Releases for all main platforms
- Sustained by sponsors and donations
- *NOT* a replacement of nginx, etc.

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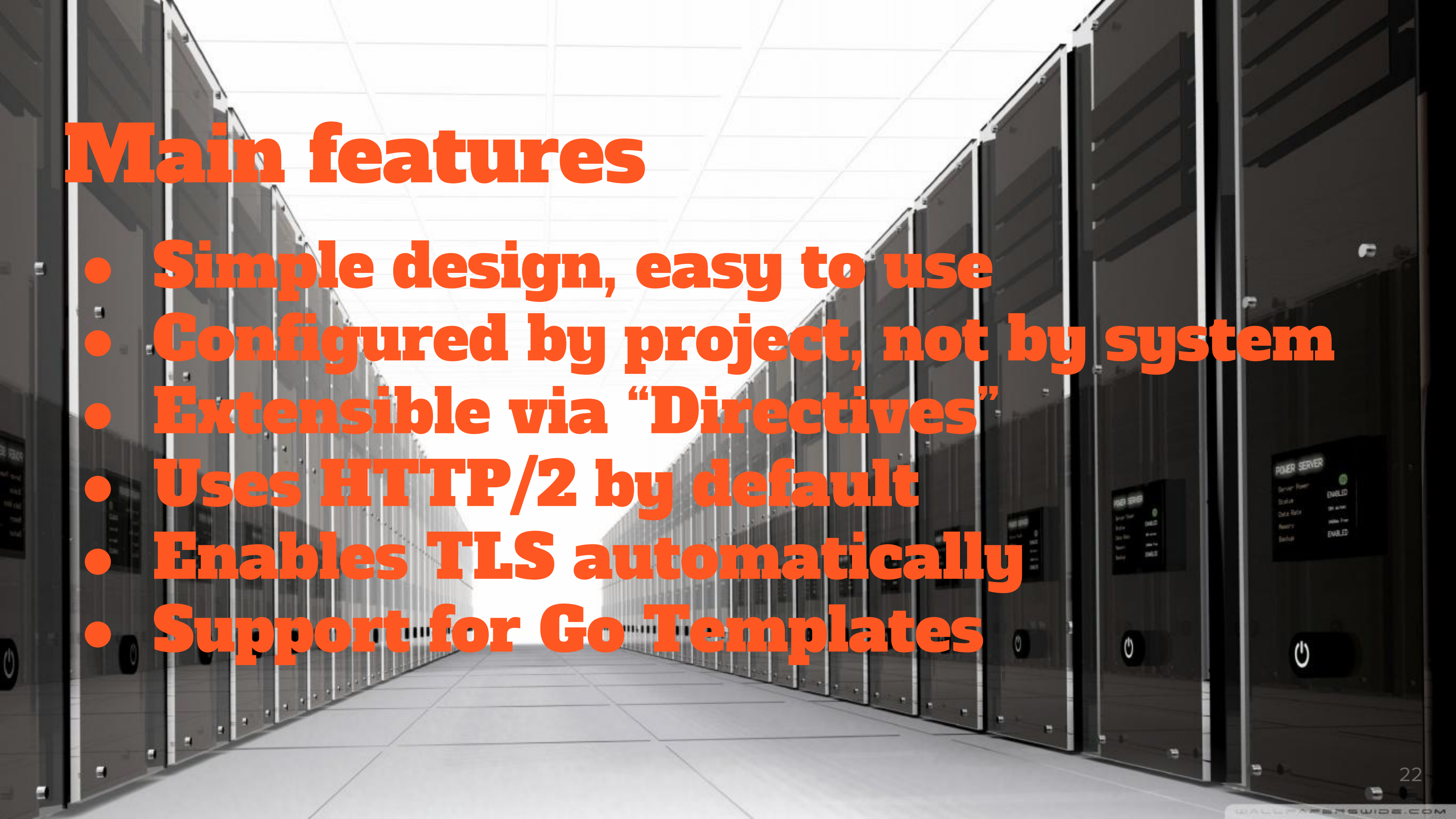

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- Configured by project, not by system
- Extensible via "Directives"
- Uses HTTP/2 by default
- Enables TLS automatically
- Support for Go Templates

Use cases

- Serving static files
- Reverse proxy
- Load balancer
- TLS termination
- FastCGI server
- Blogging platform

Use cases

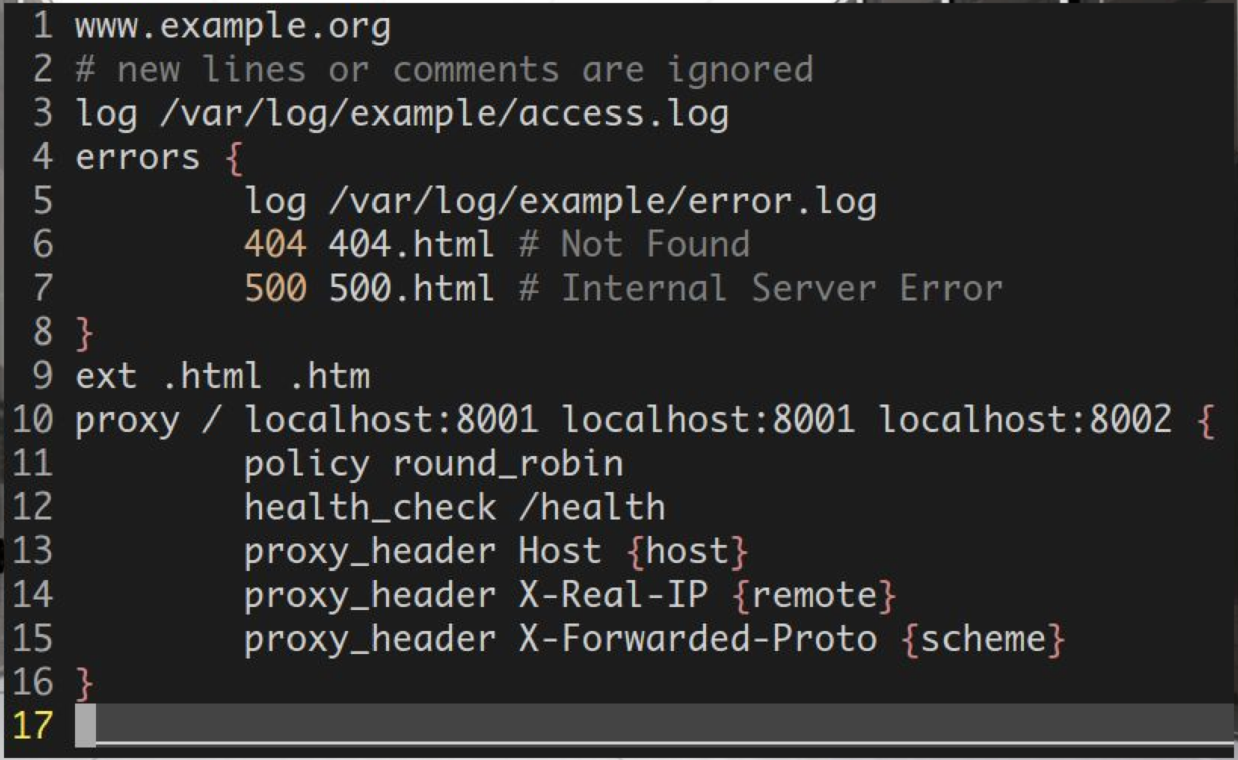
"Caddy aims to cover the 90% of the priorities and workflows of web developers and site owners in 2016"

Matt Holt, creator of Caddy

Caddyfile

```
www.example.org
basicauth / user password
proxy / localhost:8080
```

Caddyfile



```
www.example.org
# new lines or comments are ignored
log /var/log/example/access.log
errors {
        log /var/log/example/error.log
        404 404.html # Not Found
        500 500.html # Internal Server Error
}
ext .html .htm
proxy / localhost:8001 localhost:8001 localhost:8002 {
        policy round_robin
        health_check /health
        proxy_header Host {host}
        proxy_header X-Real-IP {remote}
        proxy_header X-Forwarded-Proto {scheme}
}

```

Directives

basicauth, bind, browse, cors, errors, ext, fastcgi, git, gzip, header, hugo, import, internal, ipfilter, jsonp, log, mailout, markdown, mime, prometheus, proxy, redir, rewrite, root, search, shutdown, startup, templates, tls, websocket

HTTP/2

https://http2.github.io/

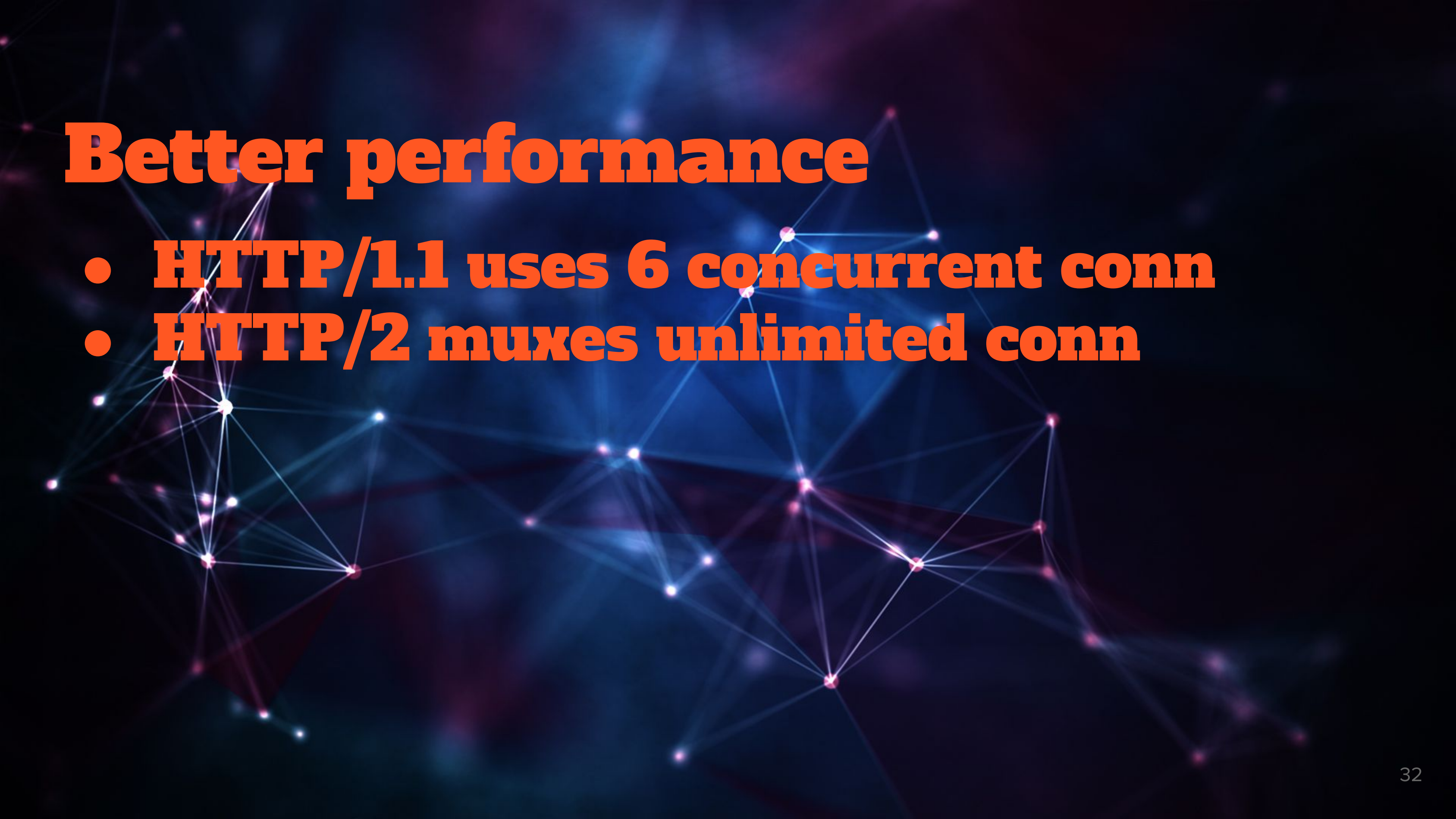
History

- HTTP/0.9 (1991)
- HTTP/1.0 (1996)
- HTTP/1.1 (1999)
- SPDY (2012)
- HTTP/2 (2015)

What's new?

Compatible with HTTP/1.1

- HTTP/2 contains HTTP/1.1
- "It works!"



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```
+ ----------------------------------------------+
|                 Length (24)                   |
+---------------+---------------+---------------+
|   Type (8)    |   Flags (8)   |
+-+-------------+---------------+-------------------------------+
|R|                 Stream Identifier (31)                      |
+=+=============================================================+
|                   Frame Payload (0...)                      ...
+---------------------------------------------------------------+
```

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- Binary protocol
- Uses frames as entity on the wire
- Header compression using HPACK
- Server push

TLS only!

- Fallbacks to HTTP/1.1 when no TLS

HTTP/2 and Go

- github.com/bradfitz/http2
- golang.org/x/net/http2
- net/http (go1.6)

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- net/http (go1.6)
- Used by default! (by Caddy too)
- Thank you, Brad Fitzpatrick!

Let's Encrypt

https://letsencrypt.org/

No one likes...

- Get certificates via impossible forms
- Receive validation emails
- .csr? .crt? bundle? chain?
- Complex server configuration
- Deal with expired certificates
- Pay overpriced costs

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- EFF, Mozilla, IdenTrust, Akamai…
- Make certificates management easy
- Automate installation, renewal, etc.
- Beta phase
- Certificates lifetime of 90 days
- No support for wildcard certs

ACME

Automated Certificate Management Environment
https://letsencrypt.github.io/acme-spec/

ACME

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- Automate interactions with CA

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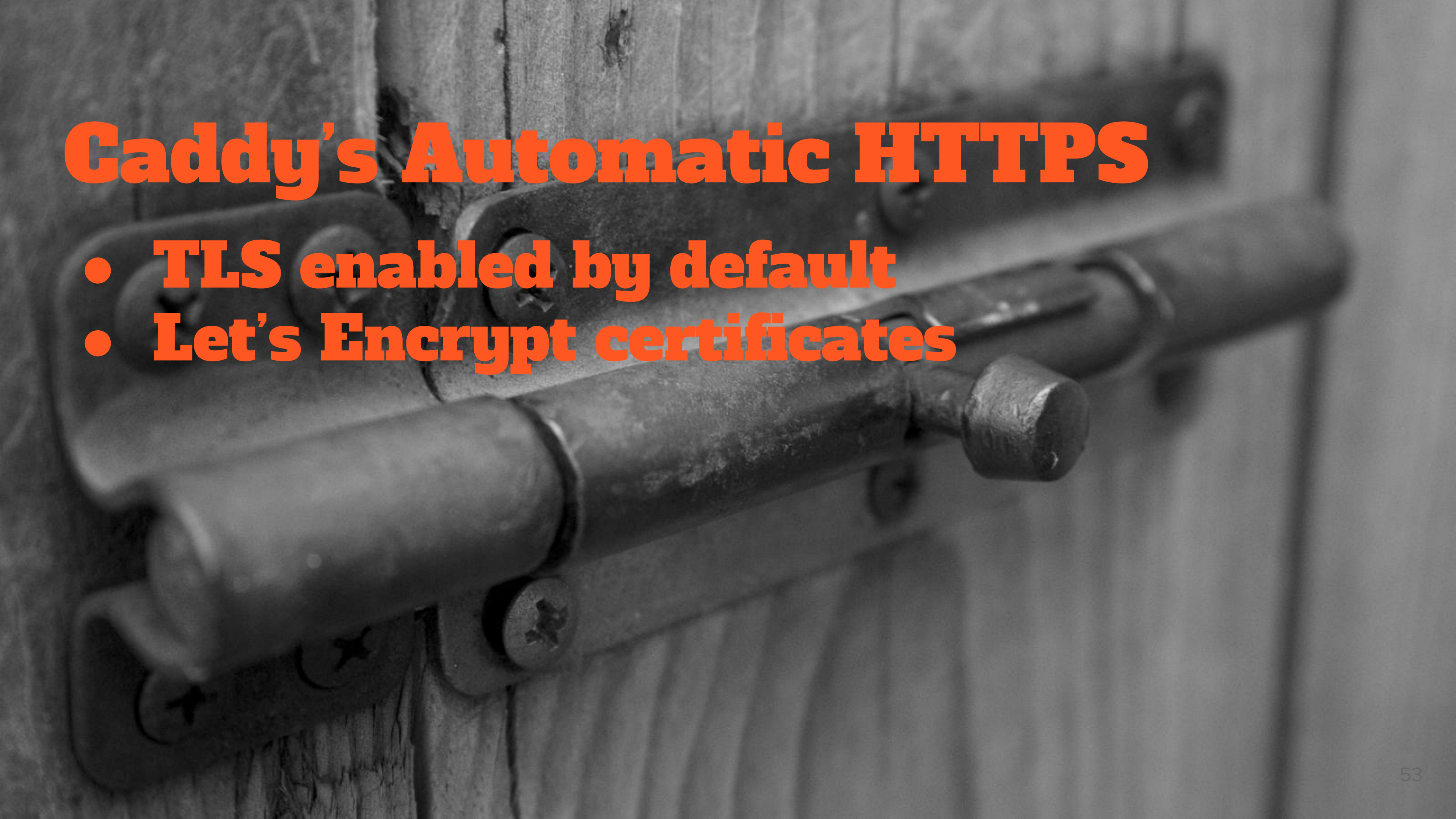
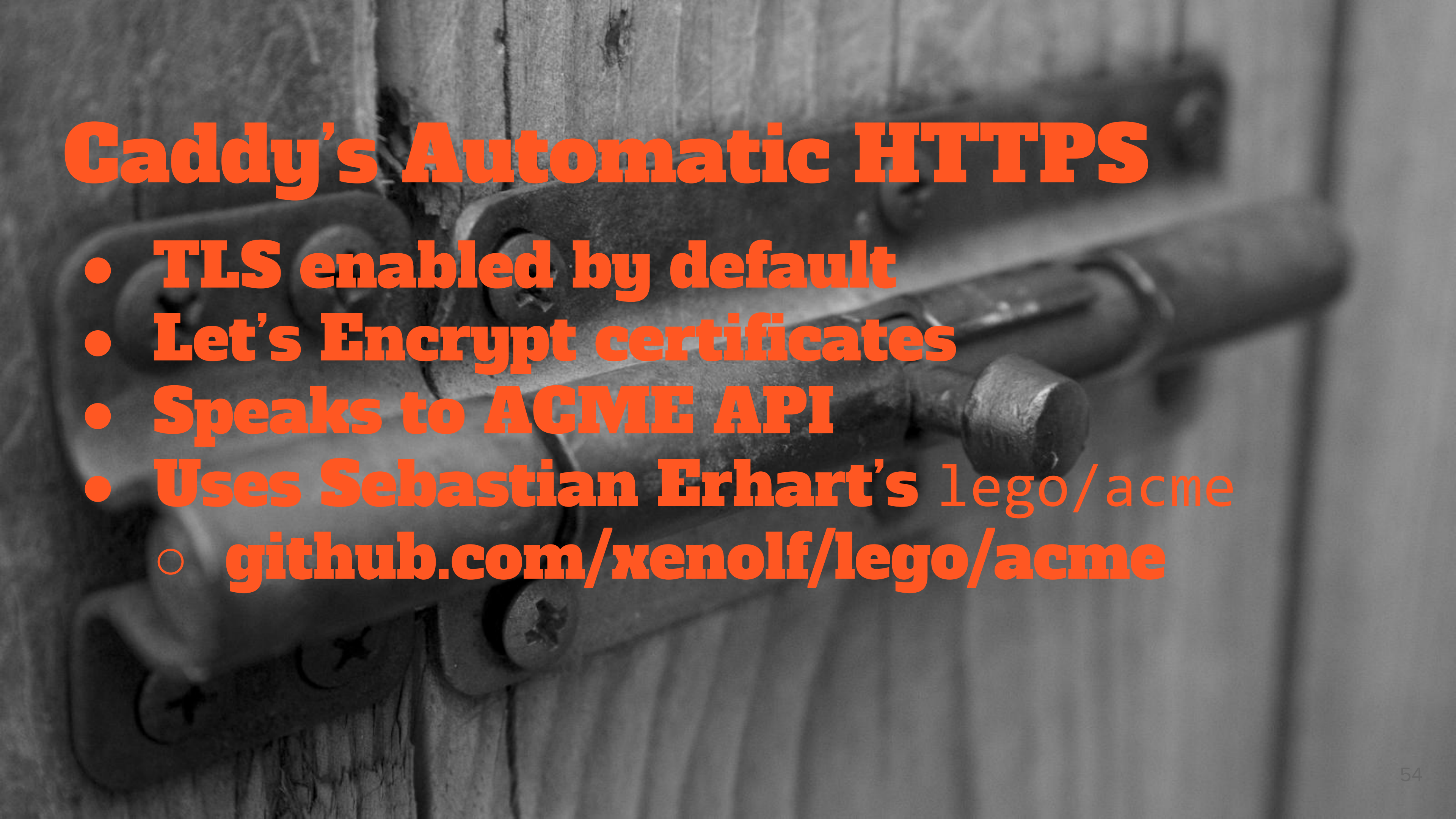
- REST API



Caddy's Automatic HTTPS

- TLS enabled by default
- Let's Encrypt certificates



Caddy's Automatic HTTPS

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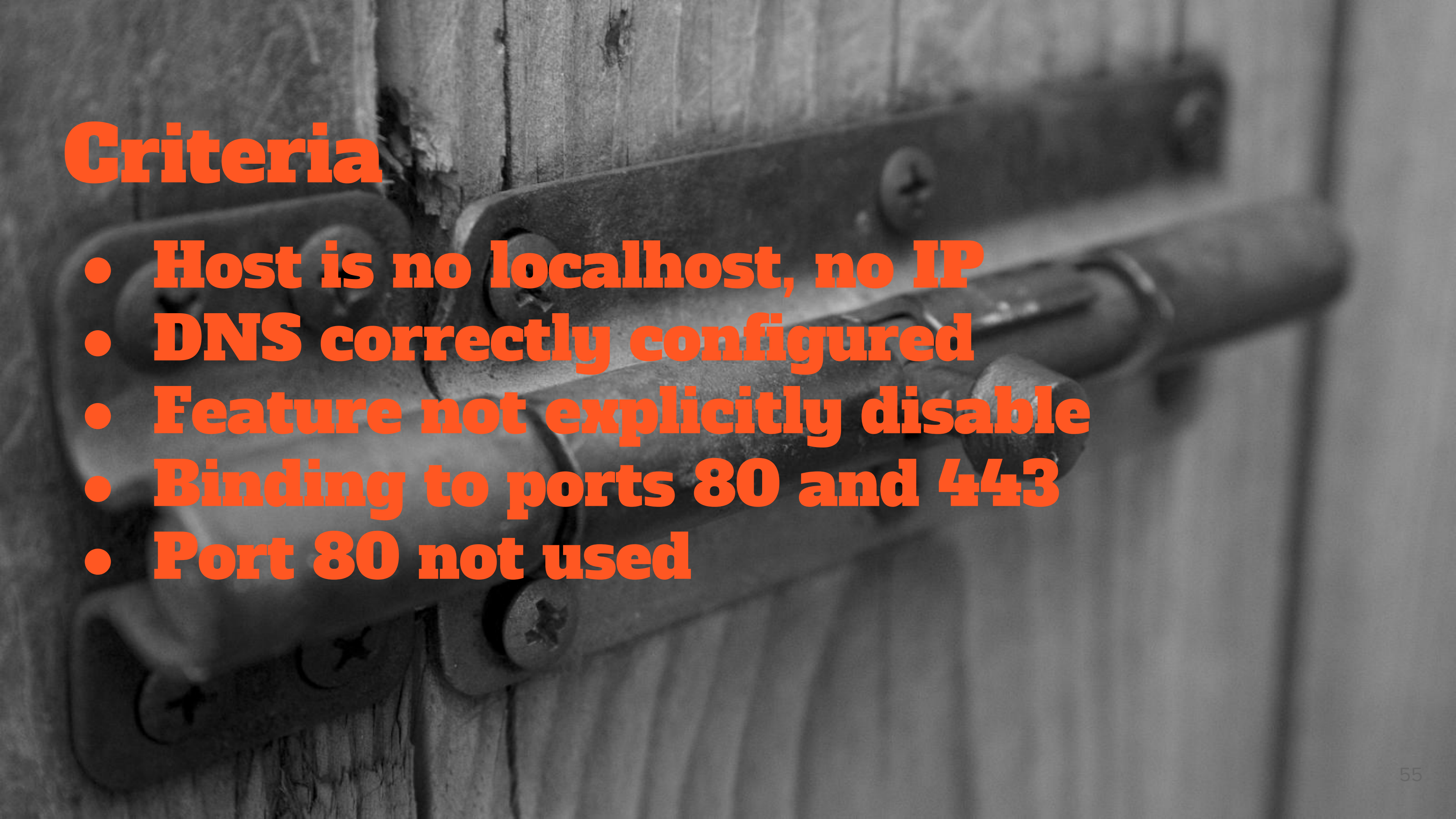
- Let's Encrypt certificates
- Speaks to ACME API
- Uses Sebastian Erhart's `lego/acme`
  - github.com/xenolf/lego/acme



Criteria

- Host is no localhost, no IP
- DNS correctly configured
- Feature not explicitly disable
- Binding to ports 80 and 443
- Port 80 not used

Caddy vs nginx

http://www.cyberciti.biz/faq/how-to-configure-nginx-with-free-lets-encrypt-ssl-certificate-on-debian-or-ubuntu-linux/

Caddy vs nginx

```
⇒ echo my.host.name > Caddyfile
⇒ caddy -agree -email=my@host.name
```

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- github.com/mholt/caddy
- Server startup + TLS activation
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- Web server

Demo

Future plans

- Self-signed certificates
- Limit of conn per upstream on proxy
- Change config via API

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- Self-signed certificates
- Limit of conn per upstream on proxy
- Change config via API
- Ask Caddy on Twitter! @caddyserver

Thank you

Questions?