

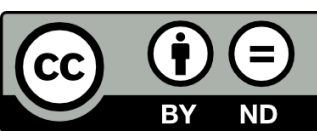


University  
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# How the Internet is Changing

A Personal View

Colin Perkins





# The Internet We Had

Numerous application layer protocols

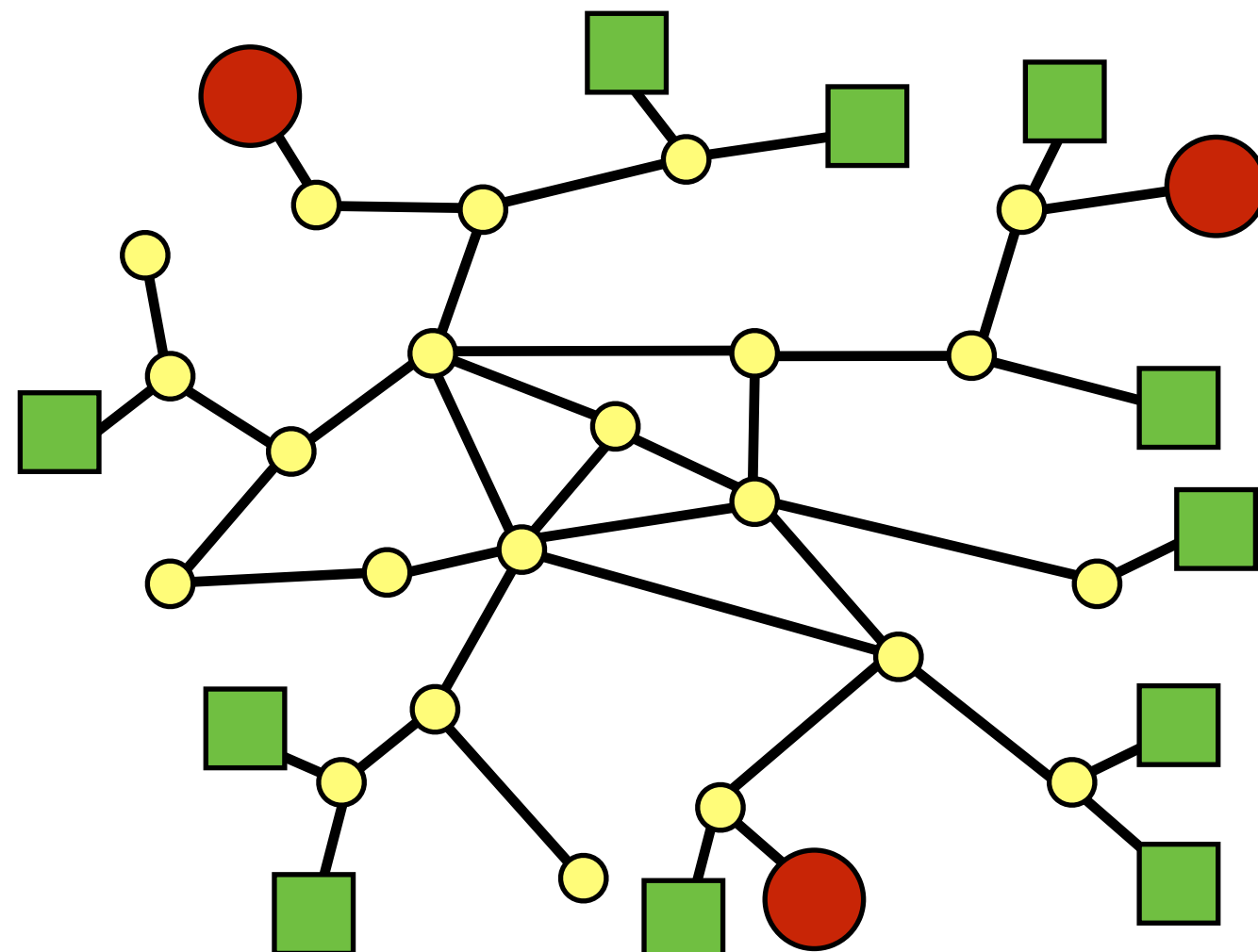
MQTT  
HTTP  
IMAP  
Jabber  
SMTP  
RTSP  
SIP

www.example.com

## TCP/IPv4

- Insecure DNS
- Insecure data transport
- Lacking privacy
- Useful but vulnerable to attack

Diverse network of networks





# The Internet We (Nearly) Have

Numerous applications

## HTTPS

www.example.com

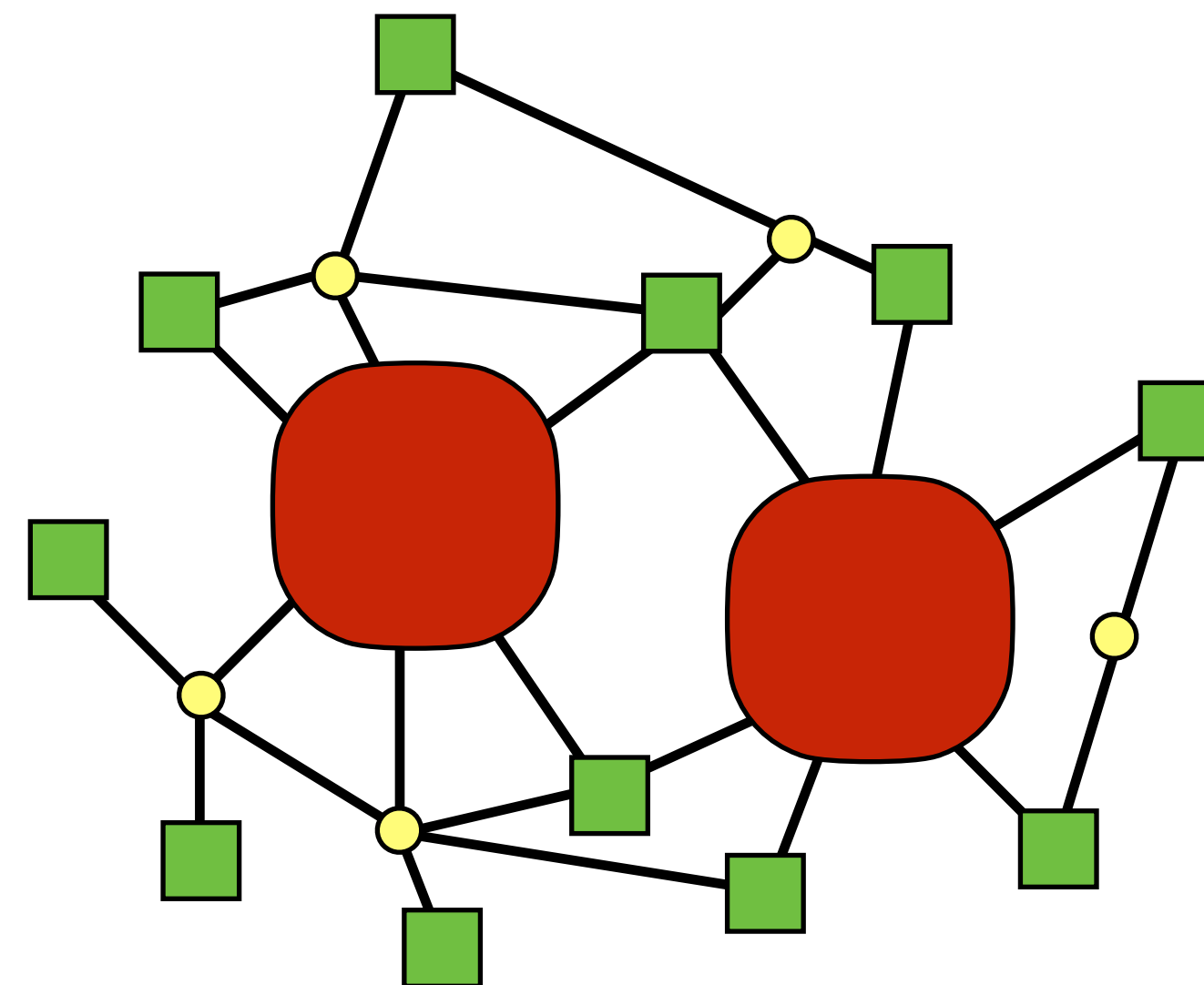
## QUIC/IPv6

Secure DNS

Secure data transport

Increasingly private – provided your threat model aligns with that of the hypergiants

Hypergiants and eyeball networks





# Positives

- The protocols have evolved, but we still have a (mostly) common global infrastructure
- Performance has massively improved
- Security and privacy have improved
  
- The Internet infrastructure proved flexible and secure enough to support society during COVID lockdowns, home working, etc.
- We have a massively flexible global infrastructure that's essential to operation of society – we **need** to keep that available



# Challenges

- Managing centralisation
  - Hypergiants have too much power; barriers to entry are high
- Managing fragmentation
  - How to increase diversity of provision without splintering the network?
  - **There is strong value in common infrastructure**
  - This **does not** mean the same rules about content, moderation, etc., need apply everywhere; these largely relate to applications running on the Internet, not to the Internet infrastructure
- Balancing these issues while maintaining security and privacy
  - Hypergiants have too much visibility into data, but interoperability requirements introduce security challenges
  - No known way to safely protect against “bad” actors while permitting access for “good” actors



# Out of Scope

- Blockchain and Web3
- Content moderation and taming social media
- AI, Chat GPT, etc.
- **Many significant challenges in this space** – but largely relating to applications that run on the Internet, rather than to the Internet infrastructure where IETF/IRTF work
  - (AI also has applications to managing the infrastructure)