Deep Space IP

IETF 120, Vancouver, Canada

Marc Blanchet, marc.blanchet@viagenie.ca, July 2024

Agenda

- Administrativia

- Deep Space IP short introduction

- This week hackathon

- SCHC compression and fragmentation for deep space, Laurent Toutain

- SRv6 Based Store-Carry-and-Forward Networking for Deep Space, Yihan Zhu

- CoAP for deep space, Carles Gomez Montenegro

- Some Deep space simulation results, Marc Blanchet
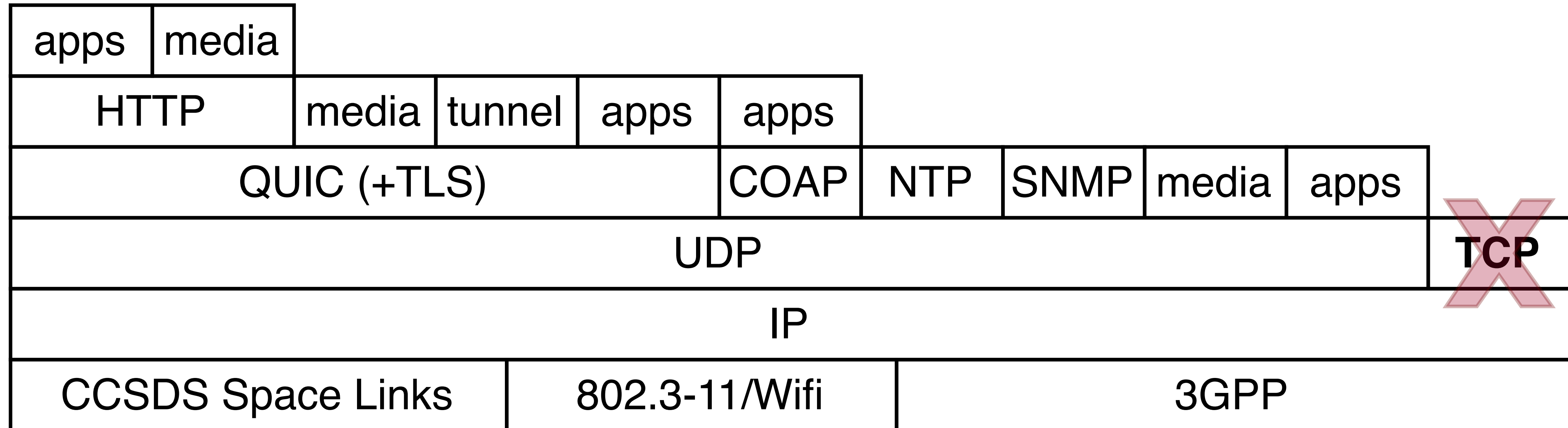
- Quinn Workbench, Adolfo Ochagavia

Administrativia

- Meeting under <u>IETF Note Well</u>

- Group Mailing list: deepspace@ietf.org

  - Subscribe at: <u>https://www.ietf.org/mailman/listinfo/deepspace</u>

- Group web site (using GitHub Pages):

  - <u>https://deepspaceip.github.io/</u>

  - Repo for slides, meeting notes, drafts, projects, issues, …

  - If interested in contributing, send me a note.

- QUIC in space Slack sub-channel under quicdev.slack.com main channel (send me a note if you want to join)

- This meeting remote access: <u>https://ietf.webex.com/meet/sidemeetingietf1</u>

What is Deep Space IP?

- Context: Deep space communications has specific characteristics, such as long delays and disruptions

- Goal: Using the Internet Protocol suite in deep space, as an alternative to the Bundle Protocol

- Work: Investigating how to profile the IP protocols and apps to make them work in deep space

- Key considerations:

  - IP forwarding: on an intermediate node facing intermittent connectivity, do not drop but instead store IP packets when there is no entry to destination in the forwarding table (same requirement as bundle storage in forwarders)

  - Transport profile (how to run QUIC in this context, but others too)

  - Network services: routing, network management, time distribution, …

  - Applications and Application protocols profiling (set larger timers…)

- More information in <u>draft-many-deepspace-ip-assessment/</u>

Deep Space IP Protocol Stack

apps	media				

HTTP	media	tunnel	apps	apps

QUIC (+TLS)	COAP	NTP	SNMP	media	apps

UDP	**TCP**

IP

CCSDS Space Links	802.3-11/Wifi	3GPP

News

- This week hackathon

  - We have been running our deep space IP simulation for QUIC using the Quinn QUIC stack, because Quinn exposes all the necessary transport parameters in its API

  - However, not every QUIC stack exposes these transport configuration parameters in their API.

  - Goal of the hackathon was to modify other QUIC stacks to expose other parameters and then do interop testing between QUIC stacks under the deep space scenario

  - QUIC stacks modified

    - Neqo

    - Aioquic

    - Cloudflare Quiche (not yet finished)

  - Interop testing worked (basic testing) between Quinn and Aioquic

  - Participants:

    - Kota Yatagai, Robin Mueller, Laurent Toutain, Marc Blanchet

  - Info will be posted on the group web site: https://deepspaceip.github.io

News (cont.)

- Various discussions happened since last IETF and during this IETF:

  - Update of draft-many-deepspace-ip-assessment coming

  - Netconf over QUIC is discussed in Netconf Thursday morning (same time as dtn). Looking for (netconf) working group adoption.

  - BGP over QUIC was discussed in IDR Monday. Looking for (idr) working group adoption.

  - Might consider L4S for network signalling

  - Might consider Messaging Layer Security (MLS) which has nice properties regarding key management

  - Might consider SCHC… « The scope of the (SCHC) Working Group is to extend the benefits of the RFC 8724 to … devices that may operate in Delay Tolerant mode. »