Capsule Extensibility Guidance

draft-pardue-capsule-ext-guidance/

Lucas Pardue

IETF 121, Dublin
2024-11-04

Capsule protocol - RFC 9297

- We shipped the capsule protocol in August 2022 RFC 9297
- Initial usecase DATAGRAM capsules
- Other uses emerging -
  - WebTransport capsules
  - CONNECT-IP
  - WRAP_UP (?)
  - Private capsules that'll never be standardized
- Exercising capsule extensibility has revealed small gaps in the language of RFC 9297

1. Unknown capsule types

Endpoints that receive a Capsule with an unknown Capsule Type MUST silently drop that Capsule and skip over it to parse the next Capsule.

What does **endpoint** actually mean?

A proxy that supports CONNECT-UDP and CONNECT-IP must "know" the capsule types. If it knows a capsule is not expected on a specific use of the capsule protocol, what should it do?

2. Negotiating usage of new types

Silent dropping of unknown capsules is useful for extensibility. However, some use cases might benefit from active negotiation.

No single answer here, so provide guidance e.g.:

- Capsule protocol is end-to-end. SETTINGS is not suitable when intermediaries are in the mix
- Upgrade tokens are end-to-end but complicate negotiation for H2/H3
- Headers are (always) an option, but have some documented caveats

3. Error codes!!!1!

RFC 9297 defined H3_DATAGRAM_ERROR for **DATAGRAMS in HTTP/3**

But we said "Datagram or Capsule Protocol parse error", which is annoying in hindsight

There is no generic capsule protocol error - people are reusing H3_DATAGRAM_ERROR and its confusing

Solution: register a generic code in H2 and H3

WE HAVE AN ERROR CODE FOR THE CAPSULE PROTOCOL
BE HONEST
WE HAVE AN ERROR CODE FOR DATAGRAM OR CAPSULE PROTOCOL PARSE ERROR
AND WHAT'S IT CALLED?
H3_DATAGRAM_ERROR
THANK YOU
imgflip.com

Adoption?

- We have a chance to improve RFC 9297 in a timeframe that helps active IETF drafts here and in other WGs
- We can wordsmith once adopted into WG
- Most interested in identifying any other gaps before we publish somethin