HTTP/QUIC Cross-Pollination

HTTP/QUIC Charter

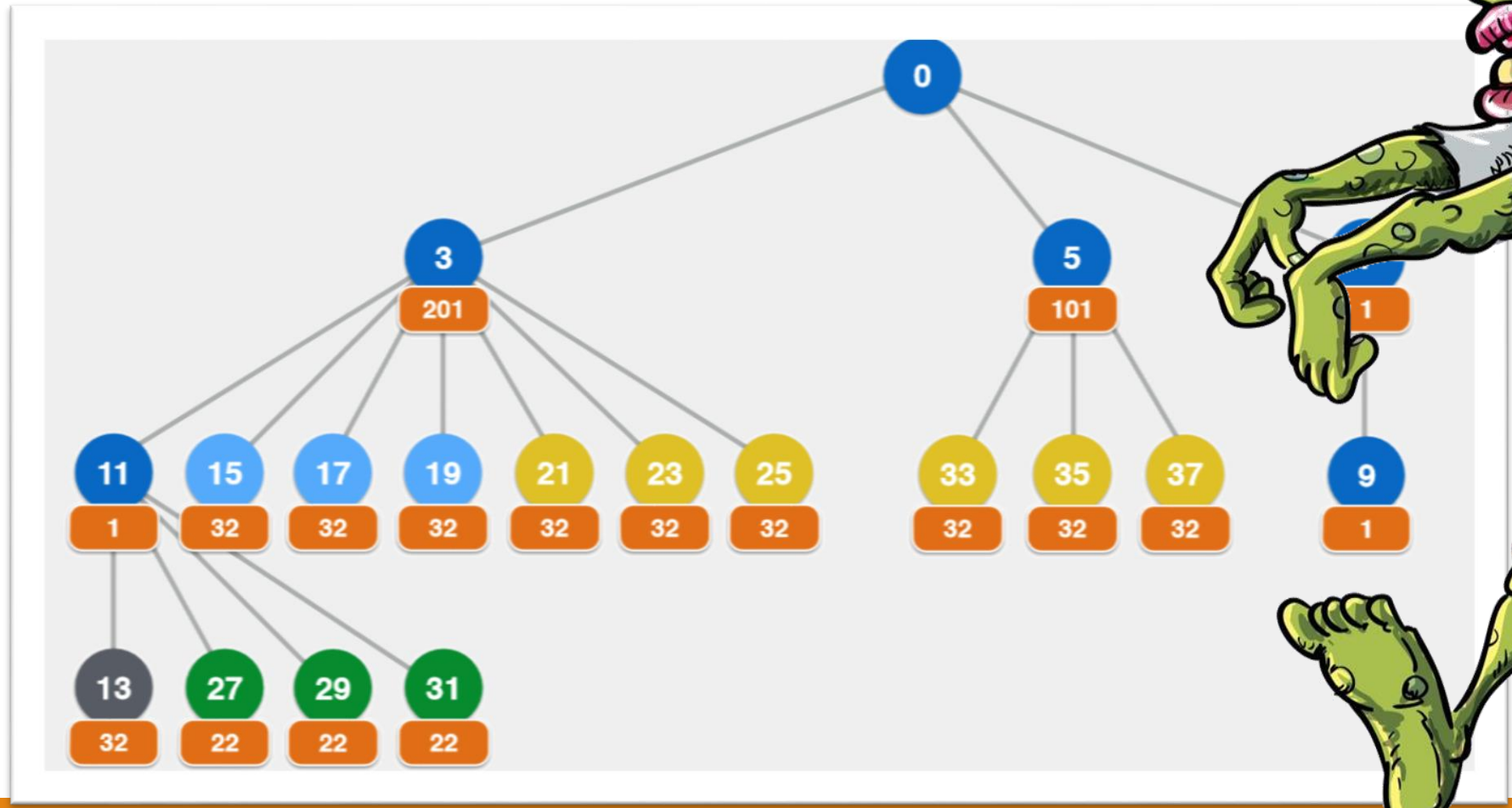
QUIC WG is chartered to

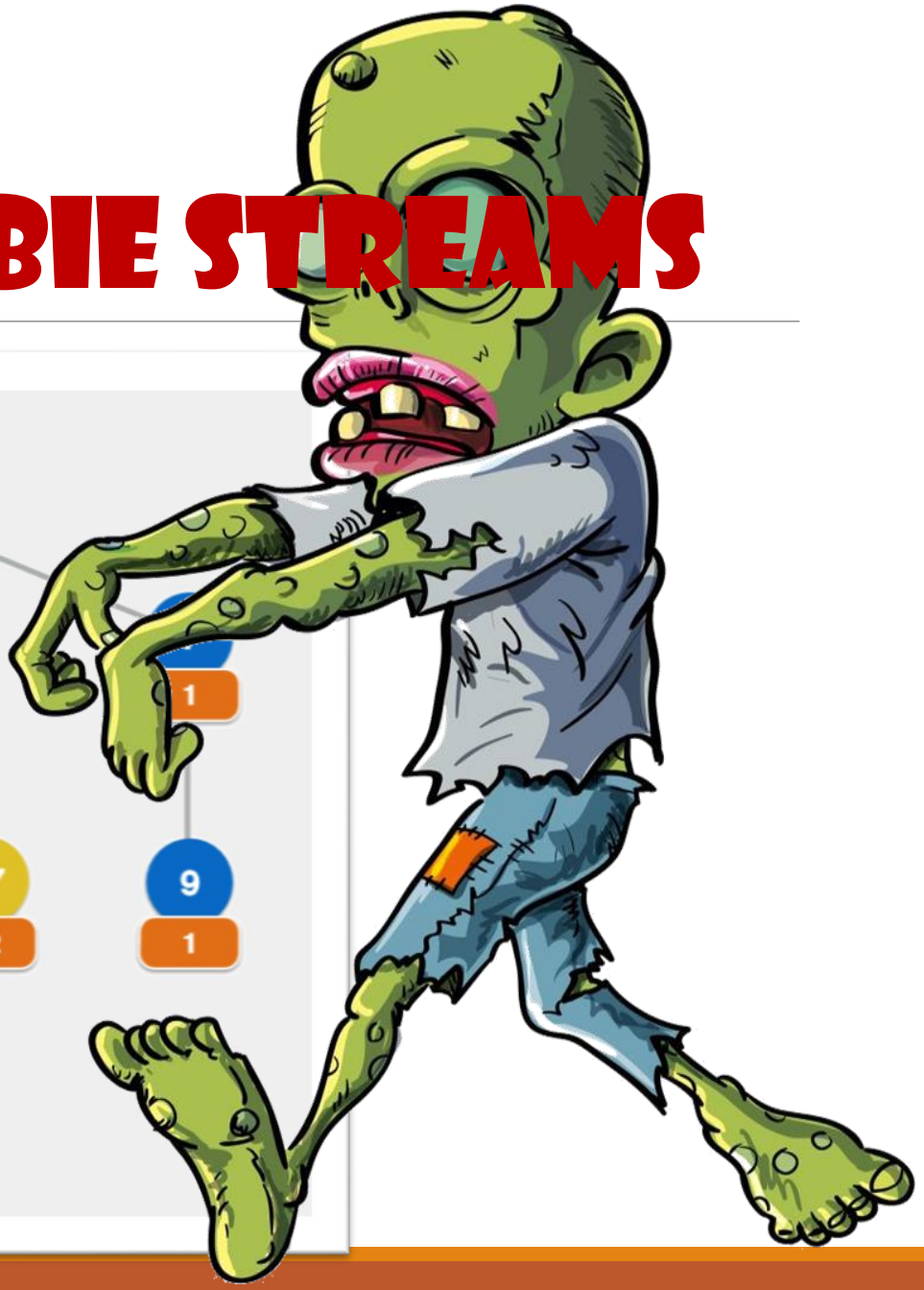
…describe mappings between… HTTP~~/2~~ semantics using QUIC, specifically with the goal of minimizing web latency using QUIC. This mapping will accommodate the extension mechanisms defined in the HTTP/2 specification.

Along the way, HTTP/QUIC has:

- adopted changes which might be beneficial to HTTP/2
- rejected some work as belonging to HTTPbis instead of QUIC

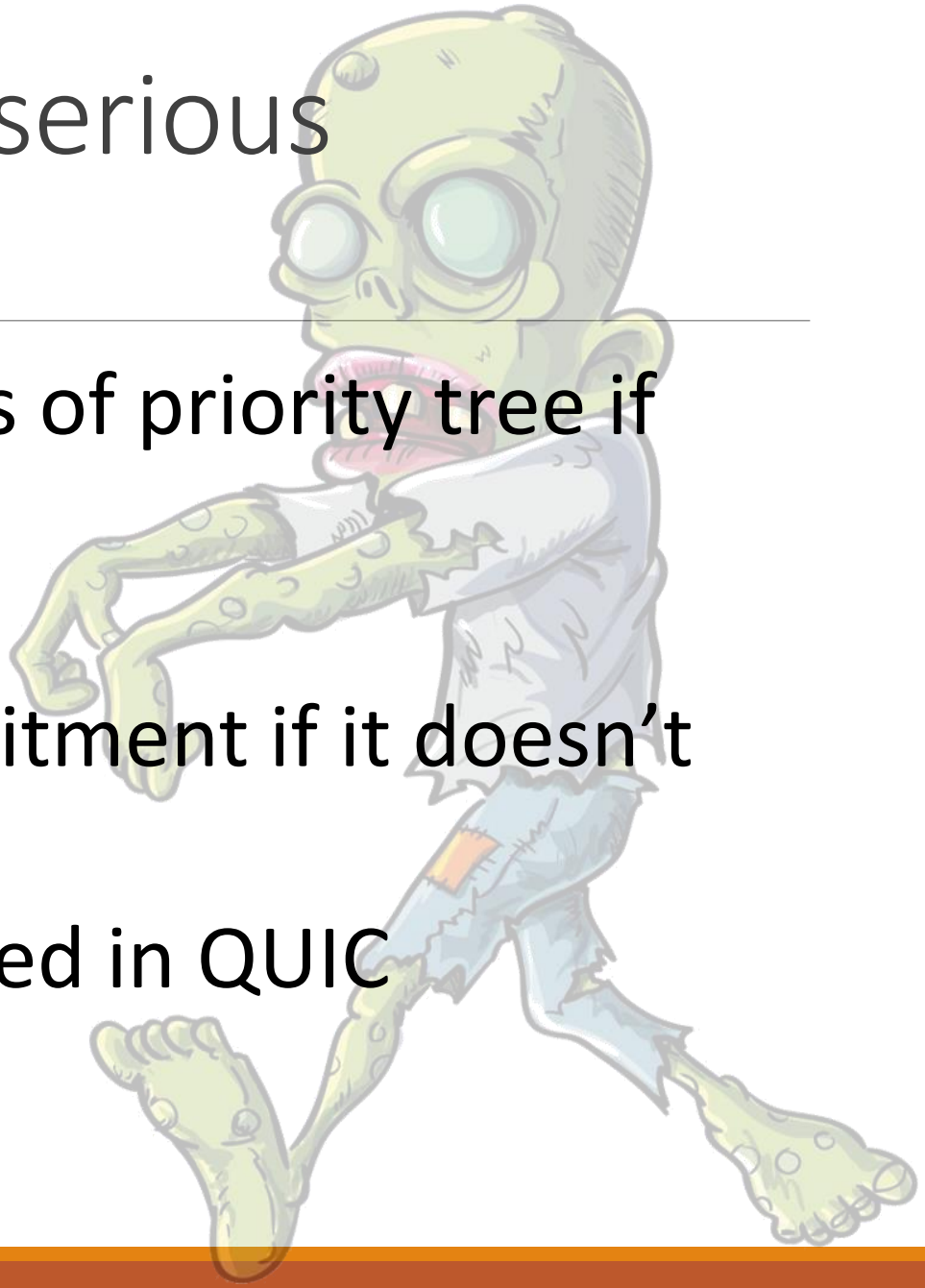
ATTACK OF THE ZOMBIE STREAMS





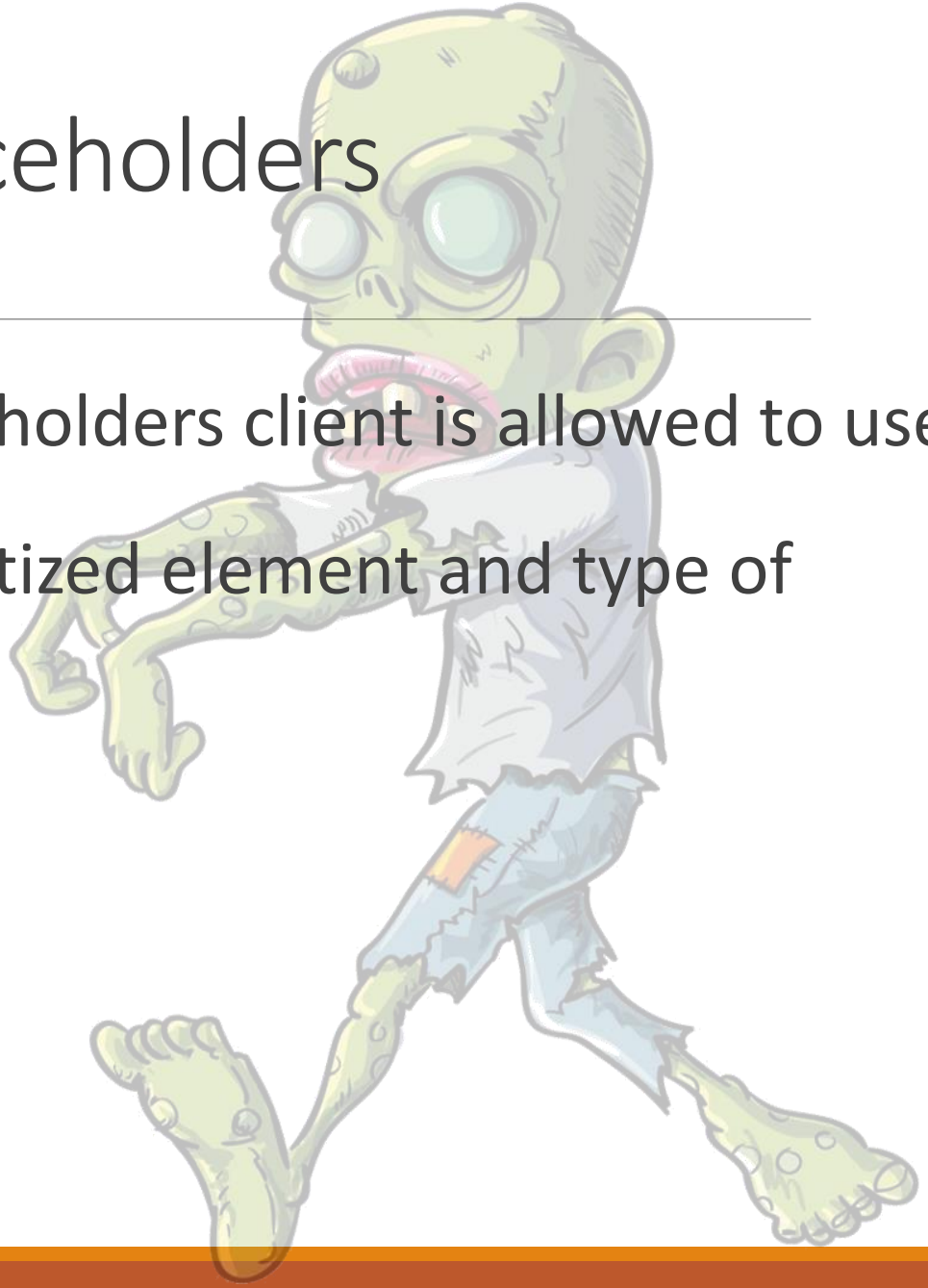
The HTTP/2 method has serious drawbacks…

- Inconsistent client/server views of priority tree if server prunes dead streams
- Unbounded server state commitment if it doesn’t
- Streams can’t be implicitly closed in QUIC



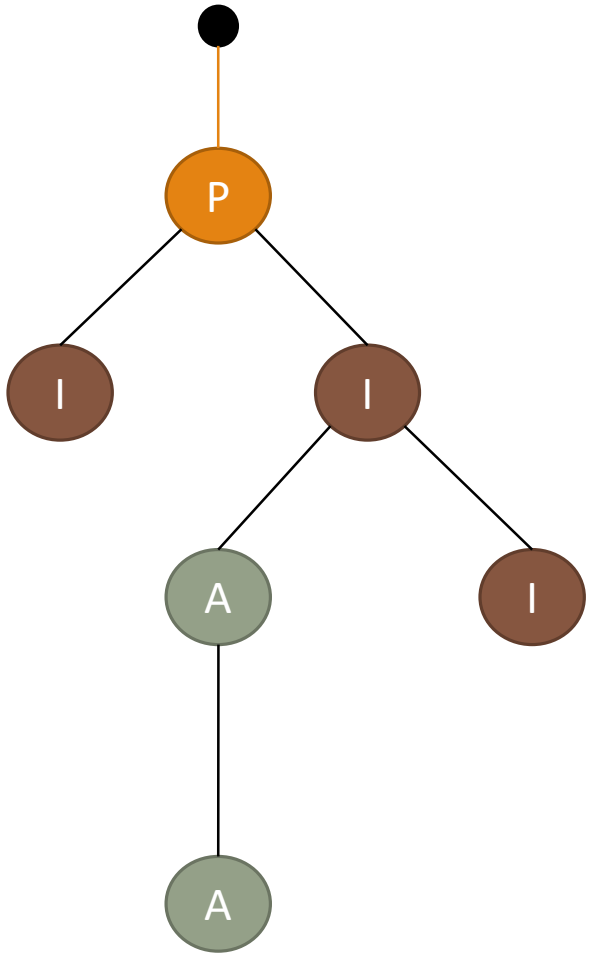
HTTP/QUIC has introduced Placeholders

- Server setting decides how many placeholders client is allowed to use
- PRIORITY frame indicates type of prioritized element and type of dependency
  - Request
  - Push
  - Placeholder
  - Root of tree
    - (0 is a valid request stream in QUIC)
- Permits more aggressive pruning



Aggressive Pruning

Active = open or recently closed
Inactive = closed >1 RTT ago



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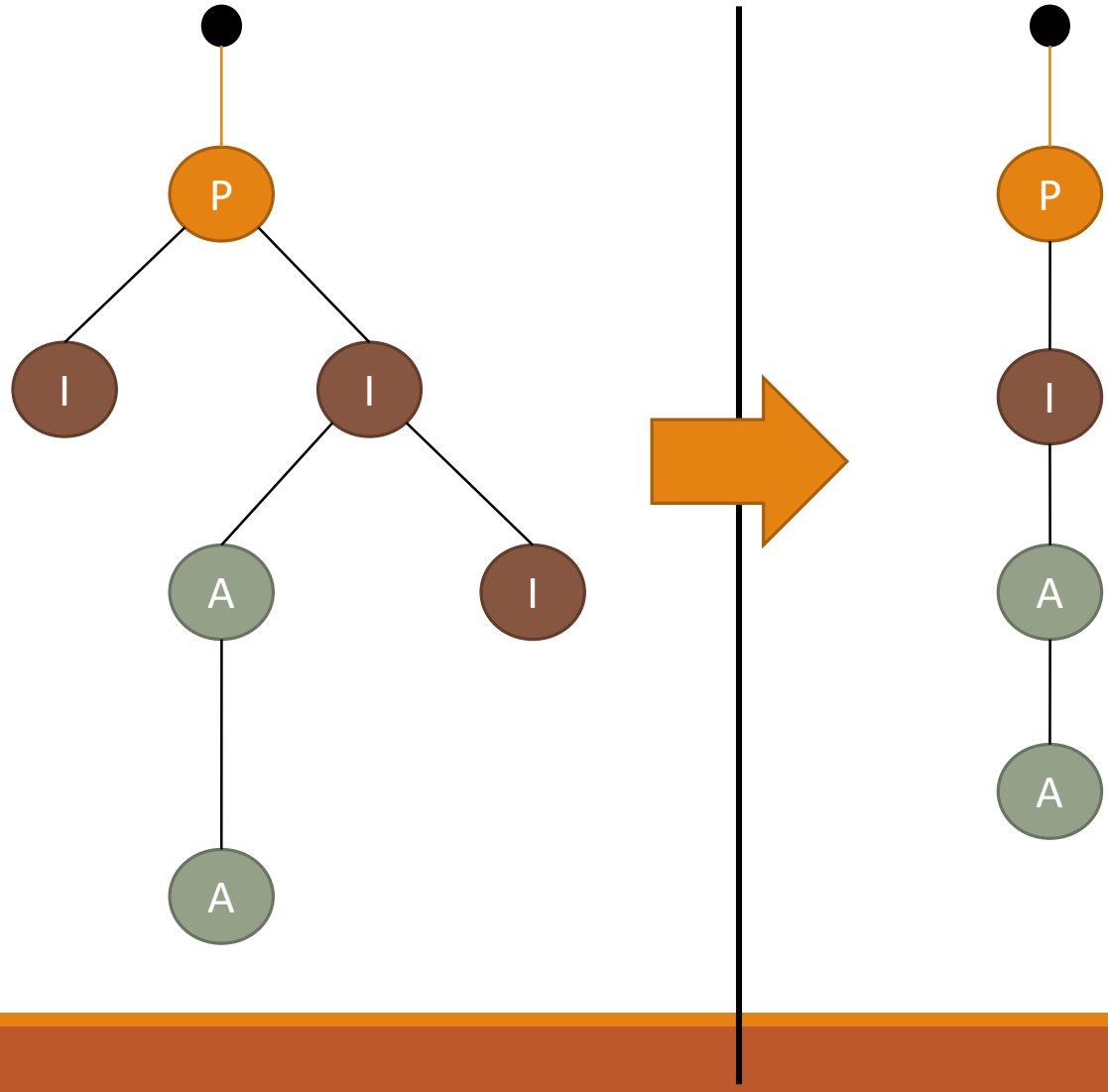

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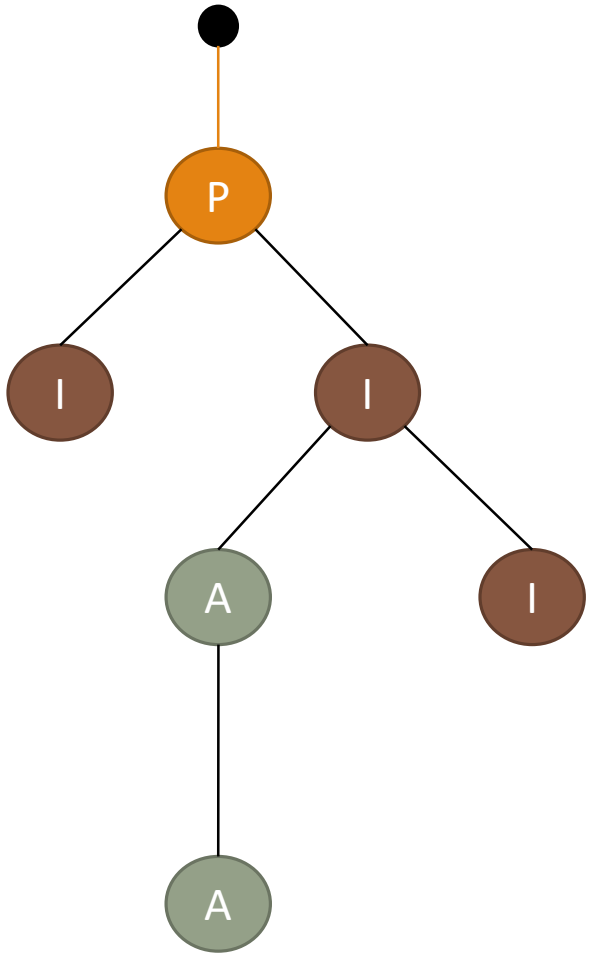
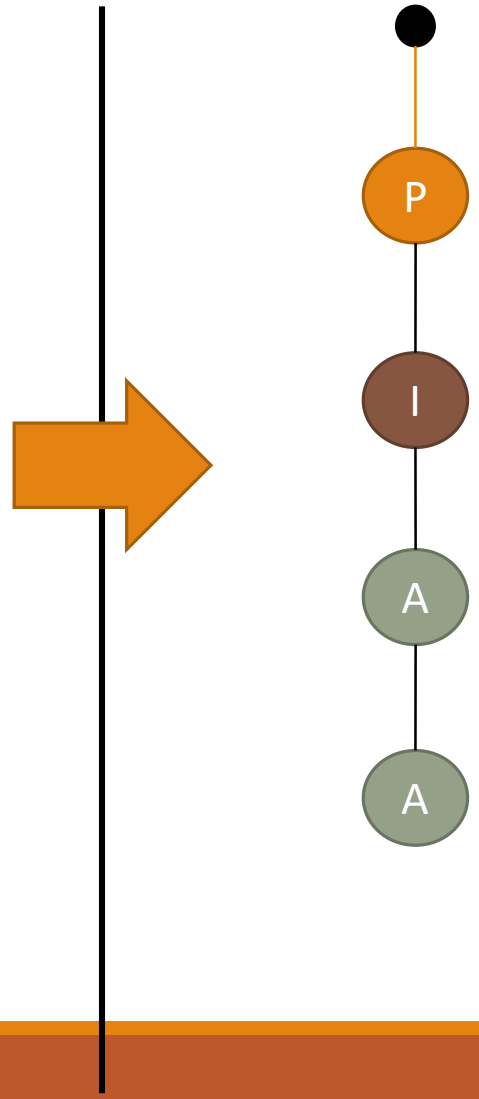
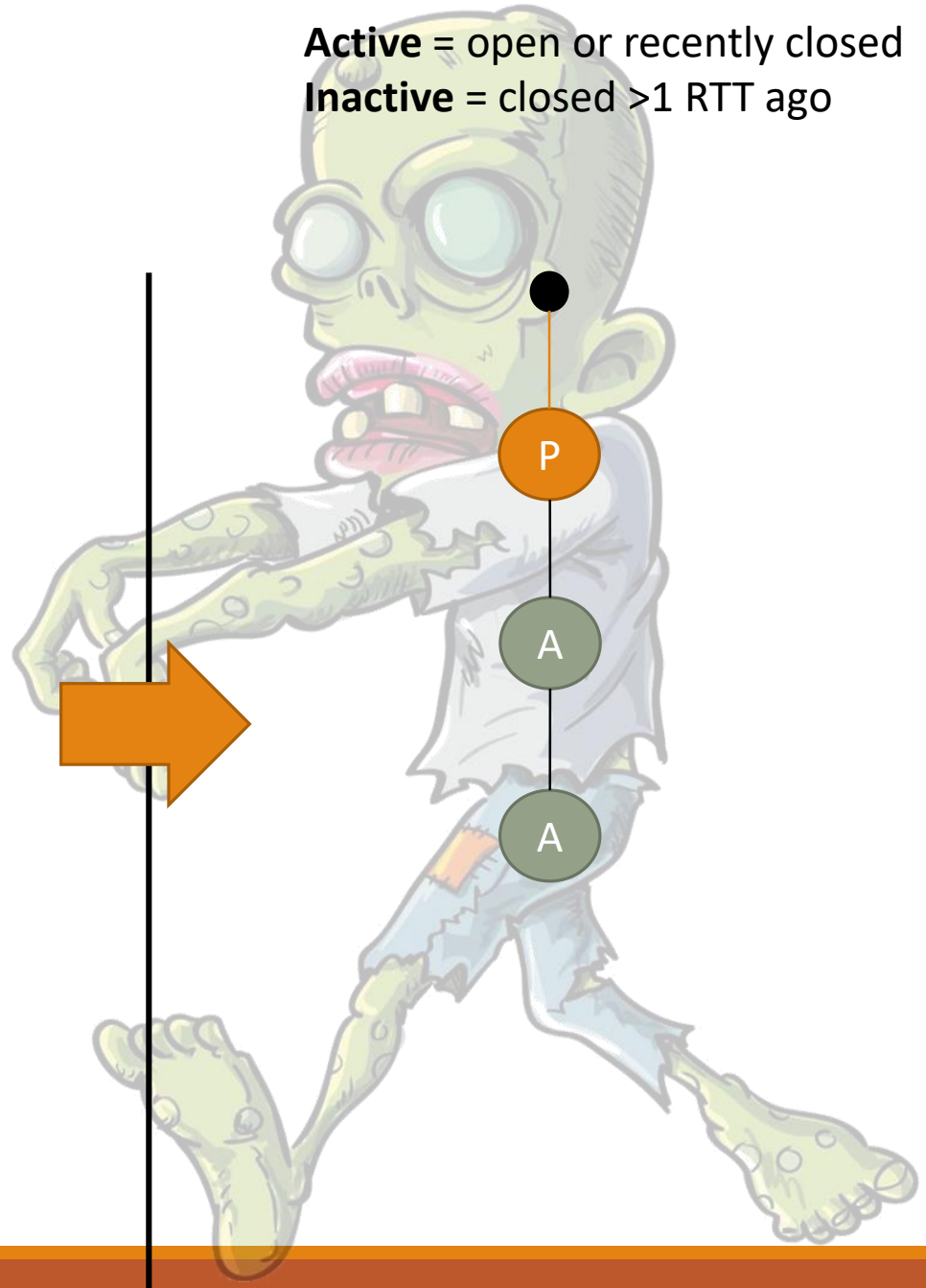
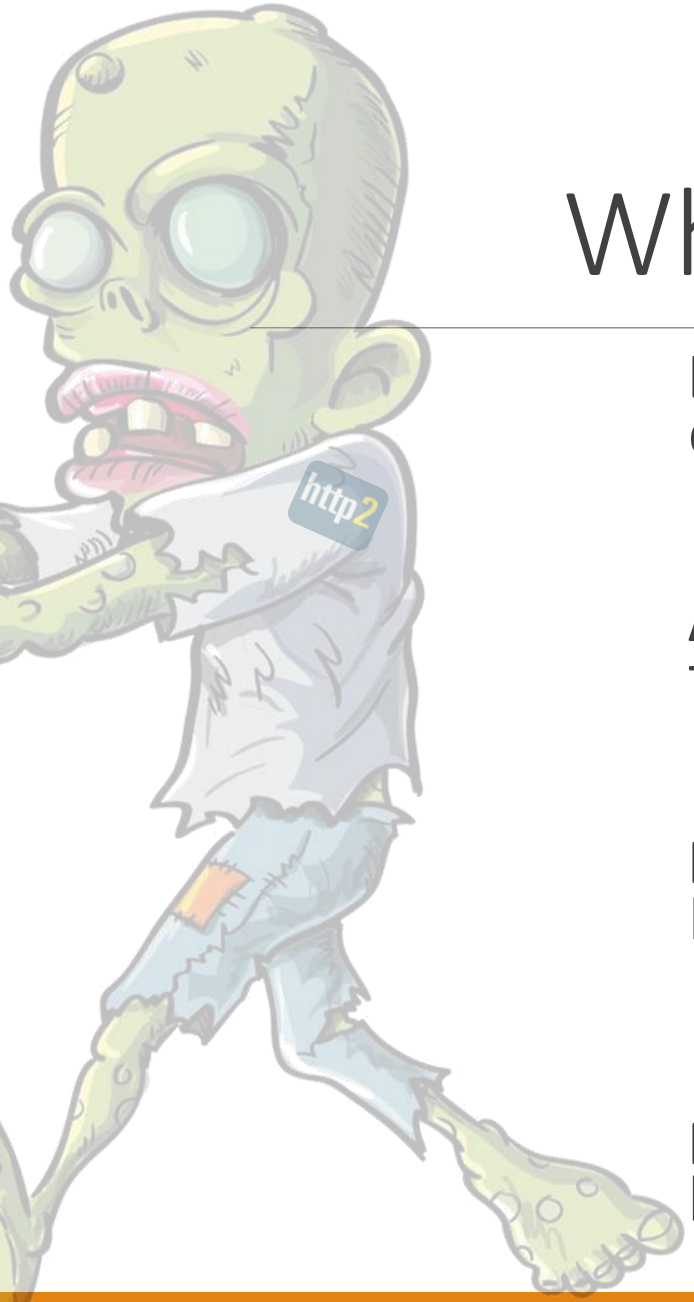








What do we want in HTTP/2?

Leave priorities alone – let HTTP/QUIC be different

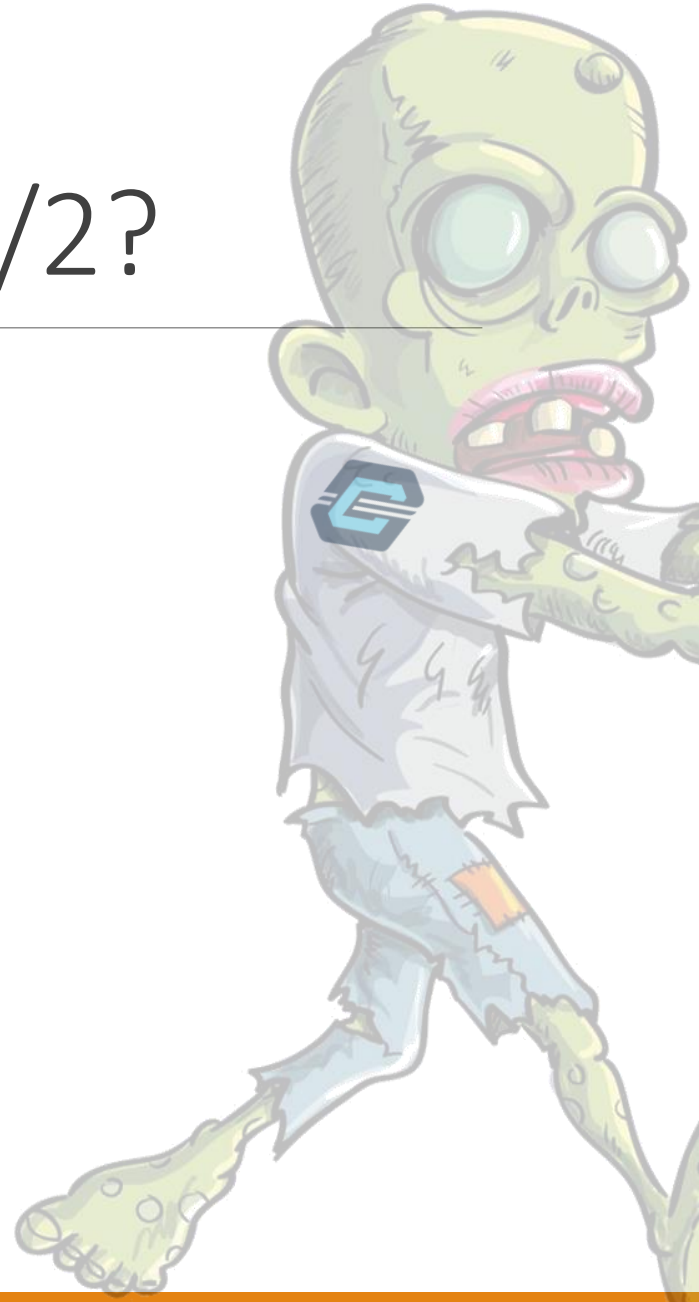
Adopt HTTP/QUIC scheme as an extension to HTTP/2

Define something better in a hurry and ask HTTP/QUIC to adopt it

- We do know some of these folks….

Diverge further by defining something better more slowly

- Recommend an extension to HTTP/QUIC later



ALTSVC and ORIGIN

RFC 7838 defines Alternative Services

- Header for any HTTP version
- Frame for HTTP/2

RFC 8336 defines ORIGIN frame

HTTP/QUIC is not porting all existing HTTP/2 extensions

- Ensuring that equivalent extension mechanisms exist
- Recommending that code points be assigned so as not to conflict with HTTP/2 uses

There is a draft (albeit expired) for ALTSVC

Nothing yet for ORIGIN, but it would be super simple.

GREASE in HTTP/2

Inspired by TLS 1.3, QUIC has followed the idea of greasing where possible

- Enforce “Ignore what you don’t understand and keep going” by occasionally sending nonsense
- Avoid catastrophe by reserving some values specifically for use as nonsense

HTTP/QUIC greases:

- Frame types: all types `0xb + (0x1f * N)` are reserved
- Settings: all settings `0x?a?a` are reserved

Recommends use of GREASE frame types for padding

Should HTTP/2 reserve these code points as well?