MPTCP – Multipath TCP

WG Meeting

30th March 2017

Chicago, USA

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- Note taker
- Jabber
- Please say your name at the mike
- Please include "-mptcp-" in your draft names
- Blue Sheet!

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IETF-98 Agenda

- [15:20] WG Status Update [5 mins]
- WG Items
  - 6824bis updates [15 mins]
- Individual Drafts that might affect 6824bis
  - Securing MultiPath TCP - Olivier Bonaventure [15mins includes discussion]
  - Secure multipath key exchange over Multipath TCP - Costin Raiciu [15mins includes discussion]
- [16:10] Discussion on how to complete the bis [15mins]
- Other individual drafts
  - Channel bonding of low-rate links using MPTCP for Airborne Flight Research - Joseph Ishac [15 mins]
  - Performance Gain with SYN Duplication in MPTCP - Kien Nguyen [5 mins]
- [16:45] Proxy Discussion [35 mins]
  - Scenario, assumptions, criteria
- 17:20 – 17:40: Tea break [20 mins]
- Proxy discussion continues [50 mins]
  - Solution proposals at a high-level
- Wrap up – next steps, interim? … [10 mins]

WG Status Updates

- draft-ietf-mptcp-experience
  - RFC8041 has been published (Jan 2017)

- draft-ietf-mptcp-rfc6824bis
  - Will be discussed in the meeting

- Implementation news

Completing the bis

- From charter:
  - The working group now re-charters to progress various aspects of MPTCP. The primary goal of the working group is to create a bis version of the protocol document on the Standards track.
  - This develops the current Experimental document (item d above), incorporating experience from (for example) implementations, interoperability events, experiments, usage scenarios, protocol corner cases, and feedback from TCPM. There already exists a reference Linux implementation and other implementation and experimental activity is on-going and will continue during 2012, with the objective of progressing the protocol to Standards Track during 2013.
- Need to complete agreement on items raised by Alan & WG
- Need to have implementation before standards track – possible ways forward:-
  - Wait for implementation
  - Remove stuff not implemented
  - Go for EXPT instead of STDS
  - Some other option?

MPTCP Proxy activity for WG

- MPTCP is now seeing widespread deployment in networks to bond together two accesses, such as fixed and mobile broadband, by using an MPTCP-specific proxy or proxies. There are two scenarios.

- The first involves two proxies, one in the home gateway or Customer Premises Equipment and one in the network, both under the control of the operator.

- The other scenario involves an MPTCP-enabled smartphone, with LTE and WiFi, plus a proxy in the operator's network.

- The WG will analyse proposed solutions for both the single and dual proxy scenarios. The solution(s) may require changes to RFC6824bis, and may require a means of configuring set-up information in the proxy, which would be done in coordination with other IETF WGs such as DHC.

MPTCP Proxy activity for **Today**

- MPTCP is now seeing widespread deployment in networks to bond together two accesses, such as fixed and mobile broadband, by using an MPTCP-specific proxy or proxies. There are two scenarios

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The first involves two proxies, one in the home gateway or Customer Premises Equipment and one in the network, both under the control of the operator and assuming the network proxy is not on the default path.

- The other scenario involves an MPTCP-enabled smartphone, with LTE and WiFi, plus a proxy in the operator's network.

- The WG will analyse proposed solutions for both the single and dual proxy scenarios. The solution(s) may require changes to RFC6824bis, and may require a means of configuring set-up information in the proxy, which would be done in coordination with other IETF WGs such as DHC.
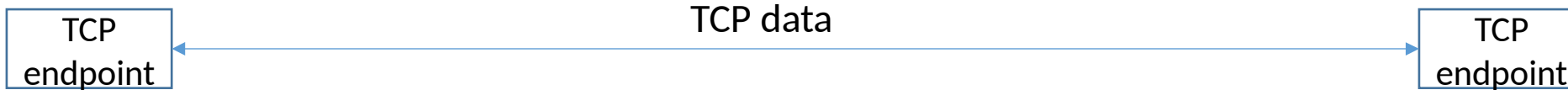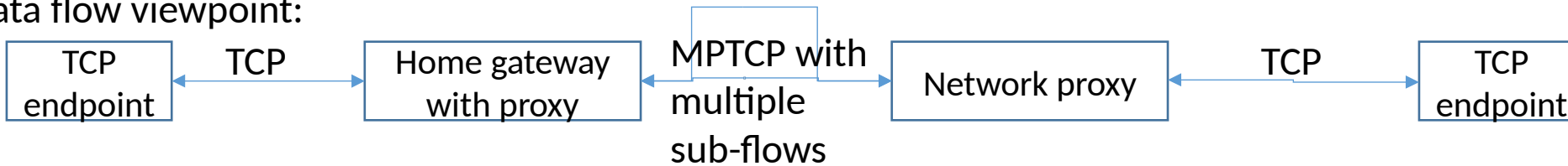
Framing the discussion

- Solution gives some of benefits of MPTCP (resource pooling, resilience) for endpoints that don't understand MPTCP

- Only TCP traffic considered

- Proxies are under control of operator

- Open for solution proposals. First step is to analyse proposals and reach consensus on <u>one</u> we go ahead with designing in detail
  - Please describe them as a protocol model (RFC4101)
  - Please spell out your assumptions
  - The solution we choose may be in scope of our WG (or not) and may require a re-charter (or not) – don't worry
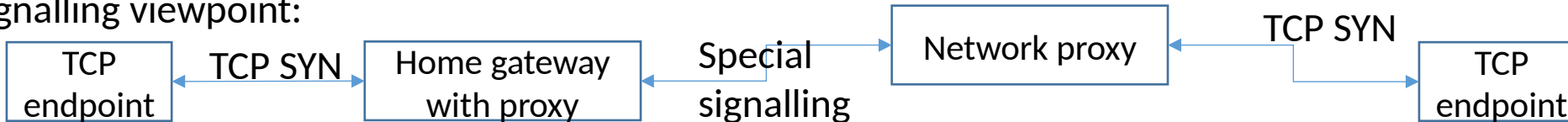
Framing the discussion

Application viewpoint:

| TCP endpoint | ←————————— TCP data —————————→ | TCP endpoint |

Data flow viewpoint:

| TCP endpoint | ←— TCP —→ | Home gateway with proxy | ←— MPTCP with multiple sub-flows —→ | Network proxy | ←— TCP —→ | TCP endpoint |

Signalling viewpoint:

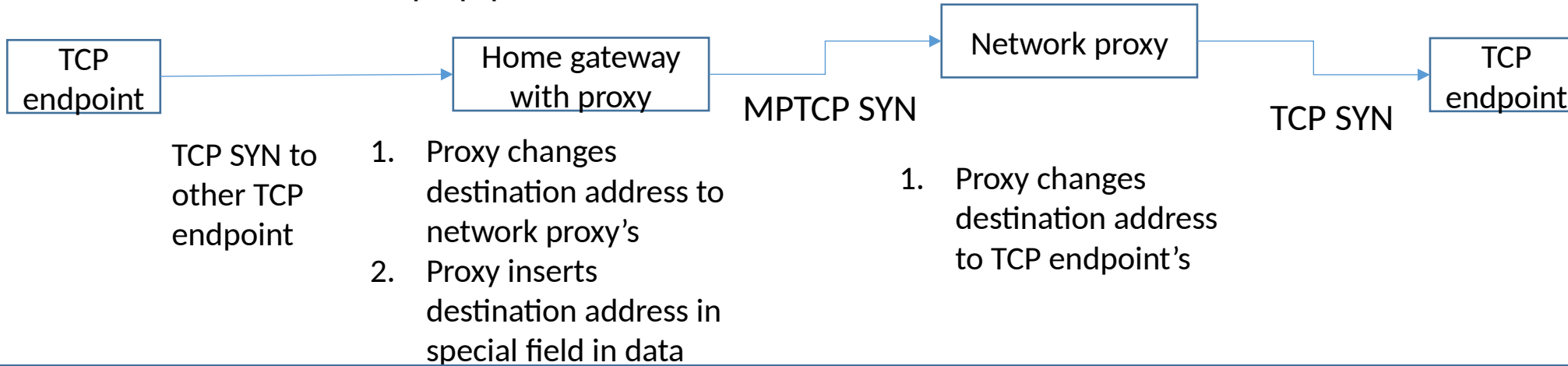| TCP endpoint | ←— TCP SYN —→ | Home gateway with proxy | ←— Special signalling — | Network proxy | ←— TCP SYN — | TCP endpoint |

- Network proxy not on default path
- Objective of signalling is to get one TCP endpoint's address to the 'other' proxy
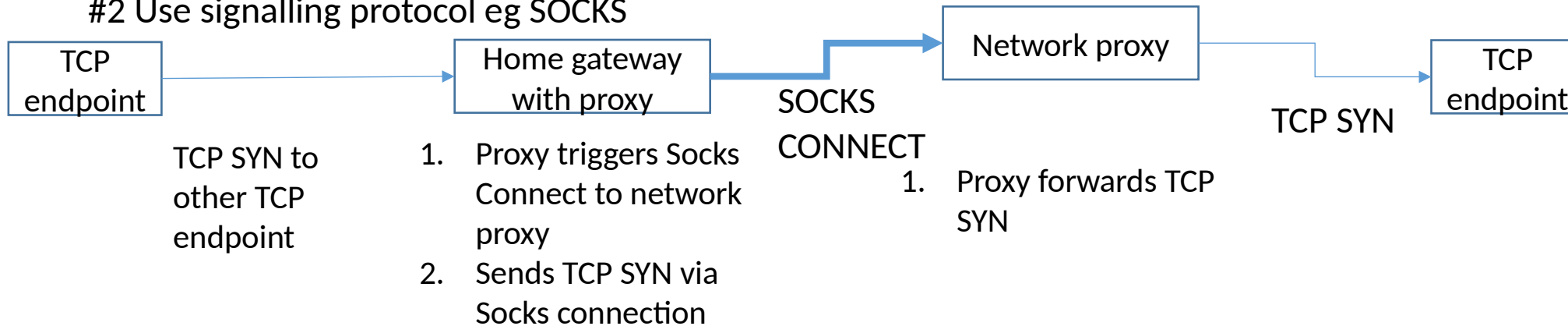
Framing the discussion: assumptions & criteria

- The two proxies are assumed to know about each other (address, security…)

- The endpoints are assumed to have no direct influence on, or knowledge of, the MPTCP segment

- Potential criteria for comparing solutions – list follows
    - We don't propose to run a formal requirements phase

- Prefer solution where the proxies are simple to operate and where the assumptions and requirements imposed on the operator's network are simple to meet
    - Home gateways /CPE are simple devices
    - Network proxy – limit operator's worry about scaling of network proxy

- Limit the set-up time
    - Arguably MPTCP is most interesting for long-running flows, so 0 RTT set-up not critical
    - Arguably most flows are short, so 0 RTT is not critical

- Limit the amount of overhead on data traffic (processing overhead, data overhead, buffering …

- A session can be initiated from either end (both need to be explained)

- Application level encryption may be in use

- Operator wants Policy control of which TCP connections get the MPTCP treatment (at the home gateway &/or the network proxy)

- Don't interfere with normal MPTCP (both endpoints MPTCP enabled)

Sketch of Proposals mentioned so far

#1 Draft-boucadair-mptcp-plain-mode – embed in MPTCP data

TCP endpoint → Home gateway with proxy —MPTCP SYN→ Network proxy —TCP SYN→ TCP endpoint

TCP SYN to other TCP endpoint

1. Proxy changes destination address to network proxy's
2. Proxy inserts destination address in special field in data

1. Proxy changes destination address to TCP endpoint's

#2 Use signalling protocol eg SOCKS

TCP endpoint → Home gateway with proxy —SOCKS CONNECT→ Network proxy —TCP SYN→ TCP endpoint

TCP SYN to other TCP endpoint

1. Proxy triggers Socks Connect to network proxy
2. Sends TCP SYN via Socks connection

1. Proxy forwards TCP SYN

#3 Treat as a routing problem
Ensure network proxy IS on path (eg source routing) and then use a method where network proxy is on path

Next steps

- Agreement on how to progress rfc6824bis
- Reaching consensus on Two-ended proxy with network proxy not on default path
- Interim?
- Working with other IETF activity?
- Next proxy scenario (two-ended proxy with network proxy on default path or smartphone scenario?)