National Institute of
Information and Communications Technology

A proposal for improving MPTCP initialization

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Outline

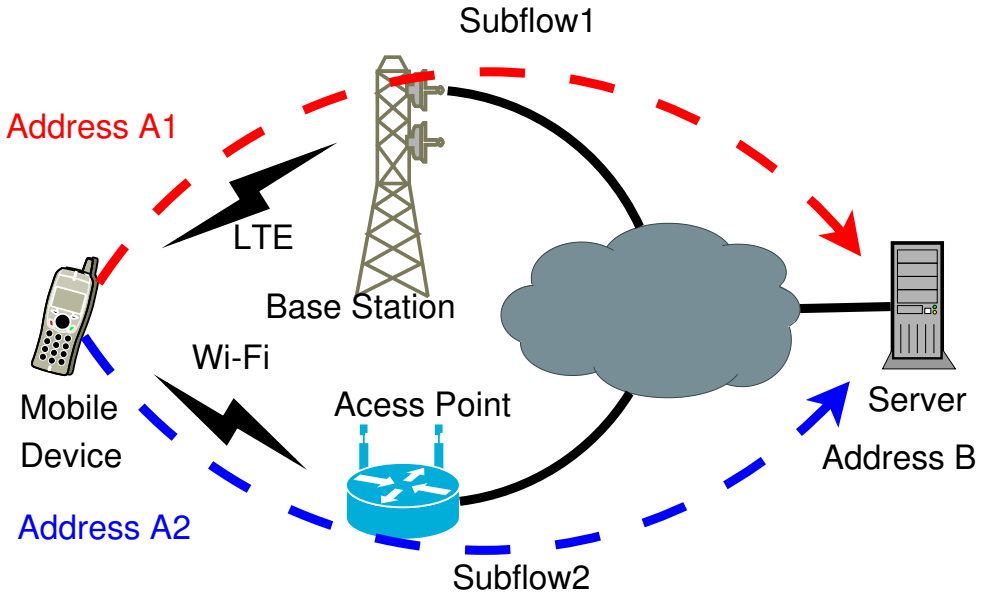
Introduction

Benefits of proposal

Realizing the proposal

Conclusion

MPTCP Initialization



Example use case: MPTCP on mobile device

Our proposal

- Duplicate control packets to improve the MPTCP initialization
- Expect more reliable and faster initialization

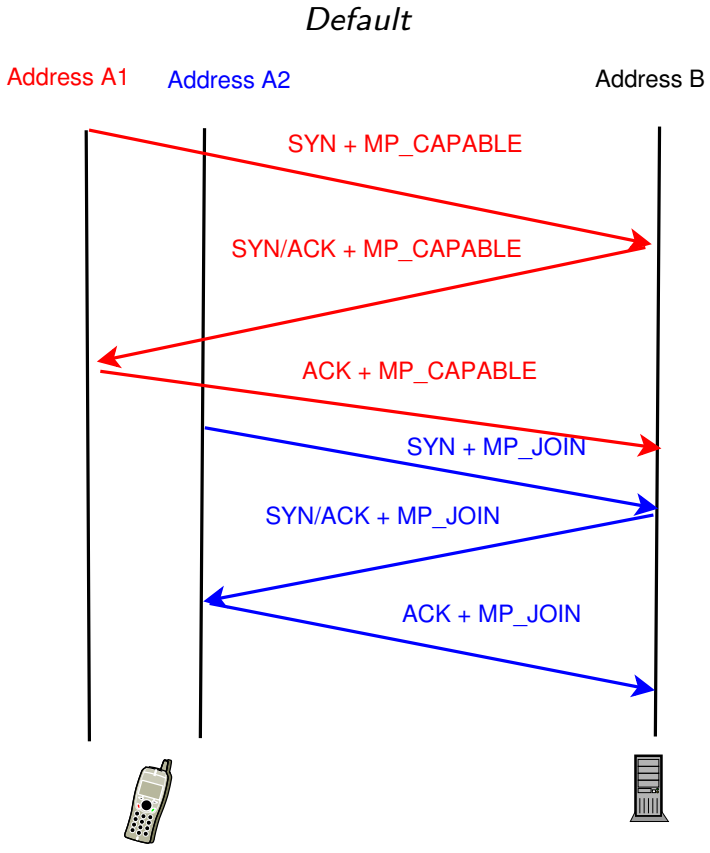
Current Initialization (i.e., Default)

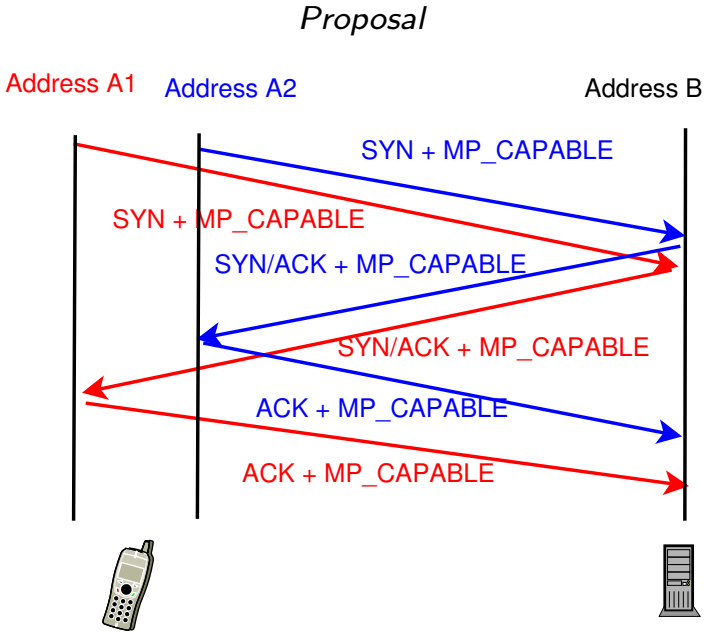
- Limitation in the selection of initialization path
- Have been proofed by theoretical analysis[1] and measurement[2]
- Duplication: a potential method for improvement

[1] Chen, Y. and D. Towsley, *"On bufferbloat and delay analysis of multipath TCP in wireless networks"*, IEEE/IFIP Networking, Trondheim, Norway p1-9, 2014.

[2] Chen, Y., Lim, Y., Gibbens, R., Nahum, E., and D. Towsley, *"A measurement-based study of MultiPath TCP performance over wireless network"*, IEEE Internet measurement conference p110-117, 2013.

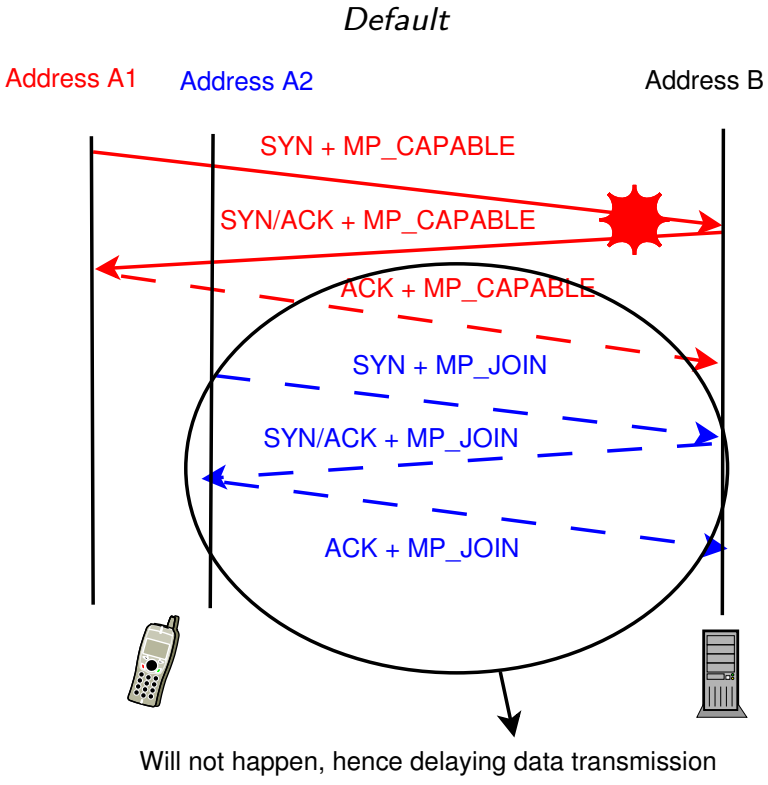
In a normal case (i.e., without loss)

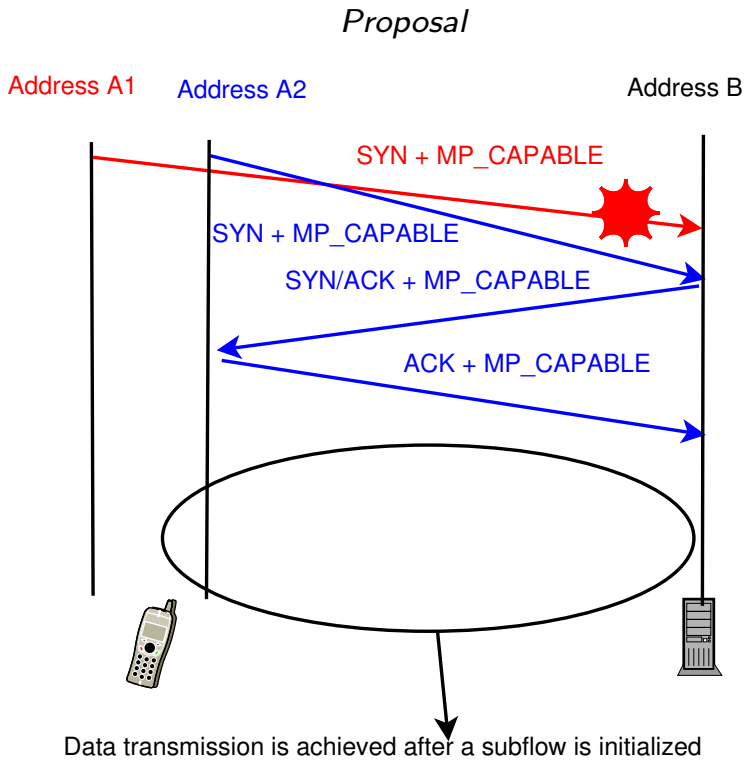




- *Default:* Sequencing initializations (e.g., subflow1 then subflow2)
- *Proposal:* Concurrent initializations, hence shortening MPTCP initialization time

In a case of loss SYN or SYN/ACK





- *Default:* waiting for TCP_SYN_RETRIES and TCP_SYNACK_RETRIES for retries of sending SYN or SYN/ACK
- *Proposal:* data transmission starts after the first successful subflow initialization

Modifying sending process

- A subflow can be uniquely determined by $(IP_{src}, IP_{dst}, Port_{src}, Port_{dst})$
- Two SYN packets, which share $(IP_{dst}, Port_{src}, Port_{dst})$, belong to a MPTCP connection
- A sender needs to be equipped the ability of sending the two SYNs

Conclusion

- We propose an enhancement of the MPTCP's initialization by duplicating SYNs via different paths
- The proposal potentially improves resilience and shortens initialization time
- The proposal requires a modification in the sending processes

Thank You & Questions?

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