

Multi-Flow Real time Transport Protocol

draft-narayanan-mrtp-00.txt

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The logo graphic consists of a vertical black line intersecting a horizontal black line. To the left of the intersection, there are three overlapping squares: a yellow one at the top, a red one to the left, and a blue one at the bottom. The text 'MRTTP' is positioned to the right of the vertical line, in a blue, sans-serif font.

MRTTP

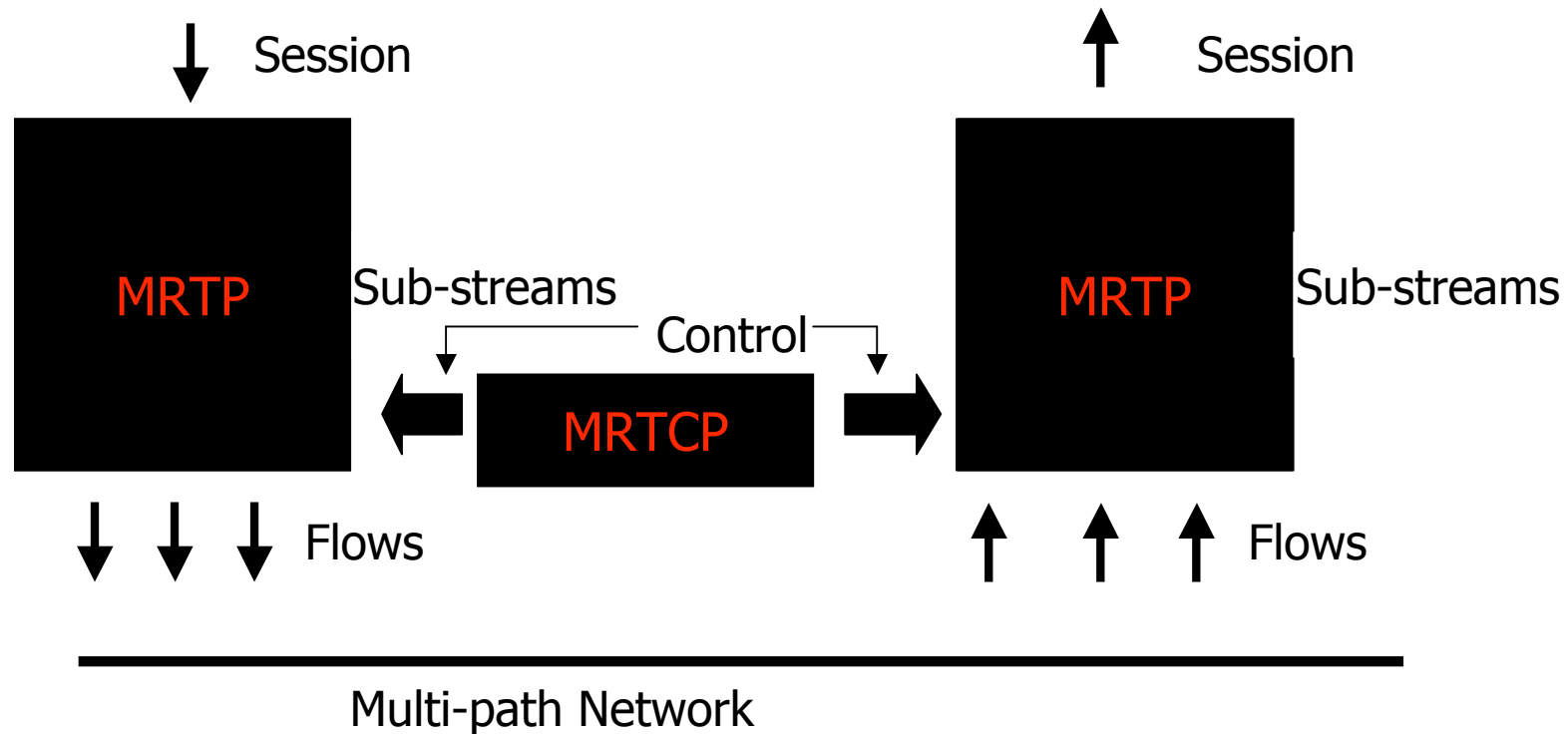
- Multi-flow Real-time Transport Protocol
 - Partition and transmit real time data using multiple flows (using multiple paths).



Advantages of multipath transmission of real-time data

- Improves reliability of data transmission over channels characterized by high data loss
 - Wireless networks are prime beneficiaries
 - Mesh structure and frequent topology changes of ad hoc networks provide suitable environment for multipath transport
 - Search and rescue operations
- Energy conservation using load balancing for wireless devices.
- Improves overall bandwidth availability to a data stream
- Improves resilience to attacks in security applications
 - Man-In-The middle attacks
- Required for multiple description coded (MDC) content transport
 - Multiple paths carry multiple descriptions
 - Provides for graceful presentation quality adaptation upon path failure
 - Enables a potential wireline P2P video application
- Improves queueing delays and delay variation experienced by transmitted traffic
 - Shown by a number of experimental studies and theoretical models
- Improved traffic characteristics (correlations within critical time scale (CTS) of a system)
 - Traffic partitioning is shown to decrease SRD within CTS of the queue
- IEEE 802.11s – wireless standard for Mesh Networks

Protocol Overview





Protocol Overview

- Four main components:
 - Session Establishment
 - Establish three way mapping: Session – Flows – Sub-streams (IDs, port-numbers etc.)
 - Data transmission
 - Identify mapping – which session?, which flow? And which sub-stream?
 - Reporting
 - Both Flow based reporting and session based reporting
 - Default partitioning



Why new protocol?

- RTP/RTCP:
 - Could be used for multipath transport of real-time data (e.g., the meta-RTP protocol in [Gogate'02], but with high complexity in managing a bunch of independent RTP flows and traffic splitting/reassembly)
 - MRTP/MRTCP are specially designed for using multiple paths for better performance
 - It would be nice to relieve the application of such burden on multipath transport, by aggregating related functions into an application independent protocol
 - Some improvements: flexible (and more timely) feedback, authentication headers, etc.
- SCTP:
 - Has the multi-homing and multi-streaming feature
 - But implemented in the system kernel, not flexible for diverse and emerging multimedia applications (e.g., fields are fixed, no support for profiles and extension headers)
 - No support for real-time applications: e.g., time-stamping and QoS feedback
- In summary, MRTP/MRTCP is:
 - A natural evolution of RTP/RTCP for exploiting the benefits of multipath transport for real-time media (compatible with RTP/RTCP)
 - Complementary to SCTP to support multimedia applications



What Next?

- Is this interesting? and useful?
- We think both ;-)
- What next?
- More information @:
 - <http://128.238.38.41/mrtp/>
 - <http://theater.poly.edu/mrtp/>



Design Issues

- New built in session establishment protocol? Or use existing?
- Flow to path mapping?
- Default partitioning
- ...