

An Abstract Application Layer  
Interface to Transport Services  
**draft-trammell-taps-interface-01**

Brian Trammell

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# Interface Design Principles (§3)

## (a review)

We set out to define a ***single interface*** to a variety of transport protocols to be used in a variety of application design patterns, to enable applications written to a single API to make use of multiple transport protocols in terms of the features they provide, providing:

- explicit support for ***security properties*** as first-order transport features;
- ***asynchronous*** connection, transmission, and reception;
- support for ***multistreaming and multipath*** transport protocols; and
- ***atomic transmission of data***, using application-assisted framing and deframing where necessary.

# Interface Diagram (as of -01)

**Properties** (related to Send() properties)

Require()      Prefer()      Ignore()      Avoid()      Prohibit()  
Security parameters

Preconnection

Clone()

Initiate() → Ready<>  
Listen() → CReceived<>  
Rendezvous() → RDone<>  
Stop() → Stopped<>

Endpoints

Local

Remote

Connection

Clone() → Connection Group

Send(MCtx, EOM) →  
    Sent<>, Expired<>  
Receive() →  
    Received<Data/Metadata>  
    ReceivedPartial<>

Close() → Closed<>  
Abort() → Aborted<>

# (non-editorial) changes since -00

- #201 Restructure Transport Properties
- #200 Rework Partial Sends and Receives
- #198 Message Receive Metadata
- #195 Ordering of API Events
- #181 Rework Interface Types
- #171 Batching Sends

# #201 Transport Parameters Rework

- All of the various ways to configure stacks (pre-selection, post-selection, and per-send) are related, but were spread throughout the document
- New approach: group all (non-security) parameters into into Properties (new §12), attempt to reclassify them.
  - Note: the authors ***do not think we have this right yet***, but we do think it's less intentionally confusing than it was.
  - Definitely needs reordering (order is kind of random)
  - May need new / renamed axes / classifications.
- Preferences still expressed using Require(), Prefer(), Avoid(), Prohibit(); send properties are bound to MessageContext passed on Send().

# #201: current property "axes"

- Data type  
Boolean / Enumeration / Integer / Preference
- Scope  
Preconnection / Connection / Message
- Classification

Affected Aspects		Path & Protocol Selection	Protocol Operation	Control Flow
Level of Abstraction	Immediate	Selection Property	Protocol Property	Control Property
	Interpreted	Intent		

# Properties (1/3)

	Type	Dep.	Select	protocol/ control prop.	
				post- Select	per- Send
12.3.1. Final	bool				✓/?
12.3.2. Reliable Message Transfer	pref		✓		
12.3.3. Configure Reliability Per Message	pref		✓		
12.3.4. Reliable Transfer (Message)	bool	↑			✓
12.3.5. Preservation of Data Ordering	pref		✓		
12.3.6. Ordered	bool	↑			✓
12.3.7. Direction of communication	enum		?	?	
12.3.8. 0-RTT Establishment w/Idem.	pref		✓		
12.3.9. Idempotent	bool	↑			✓
12.3.10. Multistream in Group	pref		✓		
12.3.11. Excessive RTX Notification	pref		✓		
12.3.12. Exc. RTX Notification Threshold	int	↑	✓	✓	

# Properties (2/3)

	Type	Dep.	Select	protocol/ control prop.	
				post- Select	per- Send
12.3.13. Soft Error Notification	pref		✓		
12.3.14. Checksum Coverage Control	pref		✓		
12.3.15. Checksum Coverage Length	int	↑			✓
12.3.16. Recv Checksum Requirement	int		✓	✓	
12.3.17. Interface Instance / Type	(enum,pref)		✓		
12.3.18. PvD Instance / Type	(enum,pref)		✓		
12.3.19. Capacity Profile (intent)	enum		✓	✓	✓
12.3.20. Congestion Control	pref		✓		
12.3.21. Niceness	int			✓	✓
12.3.22. Abort Timeout	int		✓		
12.3.23. Connection Group TX Scheduler	enum		✓	✓	



# Properties (3/3)

	Type	Dep.	Select	protocol/ control prop.	
				post- Select	per- Send
12.3.24. Max Idempotent Send Size	int			r/o	
12.3.25. Max No-Frag Send Size	int			r/o	
12.3.26. Max (non-partial?) Send Size	int			r/o	
12.3.27. Max (non-partial?) Recv Size	int			r/o	
12.3.28. PR Send Lifetime	int	12.3.3.			✓

# Some Observations from the Editor (+discussion)

- Calling these axes is a little misleading: they're not orthogonal
- We have only six distinct kinds of thing:
  - Preference used for selection, scoped to preconnection, read-only after connection.
  - Property used to control how messages are sent, scoped to message (boolean or integer, usually linked to selection preference).
  - Property used to control protocol operation, scoped to preconnection + connection (usually integer, e.g. sizes/timeouts), possibly also usable for selection.
  - Property used to inspect protocol operation, scoped to connection, read-only (usually integer, e.g. buffer size).
  - Enumeration/preference tuples for selecting interface/PvD.
  - Intents, which can influence selection, configuration, scheduling, etc. at a higher level.

# #200 Partial Send and Receive

- API is organized around atomic write/read of messages
  - (using application-supplied deframing when the underlying transport doesn't do framing, see §8.4)
- But sometimes you have a message (or a real stream) that won't fit into a buffer.
- Solution: partial read/write
  - Introduce optional EOM parameter to `Send()`; calls with `EOM = false` → still writing to a partial message identified by a given `MessageContext`.
  - `ReceivedPartial<>` event fires when a partial message is received.
- Partial read/write boundaries are not preserved.

# Open issue: API for idempotent Send on establishment (#112 / #124)

- How does the application tell the stack that it wants to send some 0RTT data?
  - Some tradeoffs here, but mainly a bikeshed.
- Option 1: as in #124, hold any data sent until an explicit `Connection.Start()` call.
  - `Send()` before `Start()` is 0RTT if idempotent.
  - `Start()` is always required, even if you don't know what 0RTT is.
- Option 3: 0RTT behavior is implied by 0RTT selection properties.
  - When `Initiate()` is called and selects a 0RTT-capable stack, the actual initiation is delayed slightly to wait for the first `Send()`, which is 0RTT if idempotent.
  - Note this makes racing 0RTT-capable and 0RTT-incapable stacks impossible.
- Option 3.5: as 3, but with a `Preconnection.InitiateNow()` to override the wait-for-`Send()` behavior (e.g. for application protocols where the server sends first)
- Option 5: Add `Preconnection.Send()`, which initiates with 0RTT data.

# Next steps

There are still some open issues:  
[github.com/taps-api/drafts/issues](https://github.com/taps-api/drafts/issues)

Filters

is:issue is:open label:API

Labels

Milestones

New Issue

Clear current search query, filters, and sorts

20 Open

72 Closed

Author

Labels

Projects

Milestones

Assignee

Sort

Clones and entanglement

API

#202 opened 15 days ago by gorryfair

ietf-02

5

Adjust status once it's clear...

API

#192 opened on Jun 4 by mwelzl

3

What is the point of the "Closing" state?

API

discuss

#182 opened on May 27 by ttpauly

ietf-01 (Montreal)

17

Privacy considerations section

API

Implementation

#177 opened on May 16 by britram

Dealing with threads and concurrency

API

Implementation

#160 opened on Mar 28 by adventureloop

3

API needs a way to cancel Preconnection.Listen()

API

Implementation

ready for text

#157 opened on Mar 22 by JonathanLennox

API needs a way to know that Close() or Abort() are done

API

Implementation

ready for text

#156 opened on Mar 22 by JonathanLennox

1

Need relative ordering of API events

API

Implementation

ready for text

#155 opened on Mar 22 by JonathanLennox

1

Add Delivered event

API

#151 opened on Mar 21 by britram

7

Add Unidirectional Streams for Multicast / Source and Sink support

API

Implementation

discuss

help wanted

#150 opened on Mar 21 by britram

2

"application's expectation of the dominating traffic pattern for"

API

#142 opened on Mar 11 by gorryfair

ietf-01 (Montreal)

8

API: How to specify idempotent data?

API

discuss

#112 opened on Feb 27 by csperrins

22

Evaluate the applicability of §6.3 to ICE-like protocols

API

#103 opened on Feb 27 by britram

ietf-01 (Montreal)

2

Be explicit about when name resolution occurs

API

#102 opened on Feb 27 by britram

1

API Section 5.2: Discuss types of Intents we want to standardise

API

#60 opened on Feb 21 by gorryfair

12

Section 5.2.3 - Can the communicated Intents be profiles of abstract intents?

API

discuss

#59 opened on Feb 21 by gorryfair

3

API section 5.1 no example of the "transport-agnostic" mode

API

#56 opened on Feb 21 by gorryfair

1

Do we need to make state storage explicit in the architecture and API?

API

Architecture

#45 opened on Feb 14 by britram

ietf-02

5

Path Selection Properties vs. Connection Migration and Multipath

API

#38 opened on Feb 12 by philsbm

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16

Make some choices about §5.2.1 Transport Selection Parameters

API

discuss

#37 opened on Feb 12 by britram

7