

Prague requirements survey
based on [draft-ietf-tsvwg-ecn-l4s-id-12](#)
updates in [draft-ietf-tsvwg-ecn-l4s-id-14](#)

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Survey for Prague Congestion Controls

- Goal: are Prague requirements feasible/realizable and supported by a broad community (allows several different CCs)?
- Template provided:
 - List of all normative requirements
 - List of 3 performance improvement suggestions (no normative text)
- Targeting Congestion Control developers having a Prague CC, or that plan to support L4S using the L4S-ID ECT(1)
- 2 questions asked:

<p>Compliant / Partially Compliant / Non-compliant</p> <p>Explain at what level you (plan to) meet the requirement</p>	<p>Any description/limitations/remarks/explanation related to evaluation, implementation and plans (will implement or will not implement) can be explained here. Any expected or experienced issues and any objections/disagreements to the requirement can be explained and colored appropriately here.</p>
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Multiple responses received

3 were publicly shared:

- Linux TCP-Prague by L4Steam
- SCReAM by Ingemar Johansson
- GeforceNow by NVIDIA

→ Listed in <https://l4steam.github.io/#prague-requirements-compliance>

Other responses shared privately:

→ consolidated summary available at:

https://l4steam.github.io/PragueReqs/Prague_requirements_consolidated.pdf

Compliant/supported or planned by all

Requirements:

- An L4S sender **MUST** set the ECN field to ECT(1) → OS APIs and Kernels need to support it
- **MUST NOT** set ECT(1) unless it complies with ...
- A sender that sets ECT(1) **SHOULD** implement a scalable congestion control
- **MUST** provide feedback of the extent of CE marking ... → Some remaining concerns with Accurate ECN → tcpm
- **MUST** reduce RTT bias ... → Also, more throughput is planned for longer RTTs
- **SHOULD** detect loss by counting in time-based units ...

Non-Normative performance suggestions:

- Setting ECT(1) in TCP Control Packets and Retransmissions
- Faster than Additive Increase
- Faster Convergence at Flow Start

Actions on the draft:

→ OK after minor clarifications

Strong objections on documentation-only reqs

- The specification **MUST** describe in detail ...
 - The specification **MUST** define, quantify and justify burst limit approach ...
- Are these documentation requirements really needed?
 - How can it be enforced?
 - May not be possible (proprietary).

Actions on the draft:

→ These requirements have been removed

Needs experimental data

- **SHOULD** scale down to fractional congestion window ...
 - **Not all convinced if it will be a problem on the Internet, and might not implement**
 - **Multiple research implementations exist; others support it or plan to implement**
- Not a safety issue, but would prevent extra latency on L4S-only queues and drop on Coupled-AQMs
- **Propose: Keep SHOULD. Develop further during experiment as needed.**

Actions on the draft:

- Updated based on discussions on the mailing list (further refinement/clarifications)

Needs experimental data

- **MUST** implement monitoring to detect non_L4S ECN AQM...
 - Is detection itself required?
 - Robust detection scheme needs real deployment experience.
 - Combination with delay-based control could minimize potential issues
 - Develop during experiment as needed.
 - **SHOULD** be capable to automatically fall back ...
 - **MUST** be capable of being replaced (operator action) by a Classic congestion control ...
 - Is “replace” required or can it disable L4S part to reduce to Classic response only
 - On active flows or new flows
- If L4S Operational guidelines draft is adopted, these requirements will need to be aligned with it.

Actions on the draft:

→ Todo: further refinement/clarifications

Compliant (to intent) by all: Needs Clarification

- **MUST** react to packet loss in a way that will coexist safely with a TCP Reno congestion control [RFC5681] ...
 - Not clear what it means "coexist safely with a TCP Reno congestion control"
 - Don't want to be as degraded as Reno for long RTTs
- Seeking input from WG on correct wording for this requirement e.g. RFC5033
- Discussion started on the mailing list

Balance between openness to innovations and guidance/recommendations

- keep open during experiment, not the mechanism but the result is important
- Practical example in TCP-Prague CC draft

Conclusion

- Strong objections against “MUST document” → all removed
- Develop during experiment to determine need and get real live data:
 - Scaling down to fractional windows
 - Classic ECN bottleneck detection → align with L4S-ops if adopted
- Others already have implementations, or req’s are seen as feasible and are planned to be implemented
- Other inputs are still welcome (public or private)

Backup

All agreed: Compliant or planned

An L4S sender MUST set the ECN field to ECT(1)	<ul style="list-style-type: none">- Compliant or planned- OS APIs and Kernels need to support it (can RFC8311 be used to justify API updates)	None, OK as is
A sender that sets ECT(1) SHOULD implement a scalable congestion control	<ul style="list-style-type: none">- Compliant or planned- More clarification needed to align marking rate to throughput	Improve informative text for rate convergence of long flows
MUST eliminate RTT ...	<ul style="list-style-type: none">- Compliant or planned- Also for longer RTTs more throughput is planned	None, OK as is
SHOULD detect loss by counting in time-based units ...	<ul style="list-style-type: none">- Compliant or planned	None, OK as is
MUST NOT set ECT(1) unless it complies with following ...	<ul style="list-style-type: none">- Compliant to this requirement- Comments were on referred requirements	None, OK as is

All agreed (non-normative): Supported or planned

Setting ECT(1) in TCP Control Packets and Retransmissions	- Supported or planned	RTP/RTCP clarifications will be added
Faster than Additive Increase	- Supported or planned	None, OK as is
Faster Convergence at Flow Start	- Research code exists and planned	None, OK as is

Questioned and Strong objections

The specification MUST describe in detail ...	<ul style="list-style-type: none">- Is this requirement really needed?- How can it be enforced?- May not be possible (proprietary).	This requirement is removed
SHOULD scale down to fractional congestion window ...	<ul style="list-style-type: none">- Multiple research codes exist- Not all convinced if this is needed, others support it and plan to implement- Develop during experiment as needed.	Keep SHOULD. The need for this requirement should be observed during the experiment
limit bursts ... The specification MUST define, quantify and justify its approach ...	<ul style="list-style-type: none">- Normative requirement is mainly documentation related, see above- Can more clear guidelines be given?	The normative MUST is removed. Warning text still present.

Clarification needed

<p>MUST provide feedback of the extent of CE marking ...</p>	<ul style="list-style-type: none">- Compliant- Clarification needed for feedback timing and RTT requirements- Some remaining concerns with Accurate ECN	<ul style="list-style-type: none">- Appropriate feedback timing depends on the proprietary protocol and needs to be tuned to it- Remaining concerns about Accurate ECN needs to be dealt with in tcpm.
<p>MUST react to packet loss in a way that will coexist safely with a TCP Reno congestion control [RFC5681] ...</p>	<ul style="list-style-type: none">- Compliant to the intent- Not clear what it means "coexist safely with a TCP Reno congestion control"- Don't want to be as degraded as Reno for long RTTs	<ul style="list-style-type: none">- Seeking input from WG on clarification to this requirement e.g. RFC5033
<p>MUST implement monitoring to detect non_L4S ECN AQM...</p> <p>SHOULD be capable to automatically fall back ...</p> <p>MUST be capable of being replaced by a Classic congestion control ...</p>	<ul style="list-style-type: none">- Robust detection scheme needs real deployment experience.- Develop during experiment as needed.- Combination with delay-based control could minimize potential issues- Clarification: is detection itself required?	<ul style="list-style-type: none">- If L4S Operational guidelines draft is adopted, these requirements will need to be aligned with it