Path Aware Networking Research Group: Ways Forward

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What is path-aware networking?

- An internetworking architecture is *path aware* if the network:
  - explicitly exposes information about the paths to the endpoints, and
  - allows endpoints to have control over the paths over which their traffic will be sent.
- The current Internet architecture is not path-aware, but IETF technolgies (and others) could be used to build a path-aware Internet.

Why path-aware networking?

- Ability to expand multi-path transport beyond multiply-connected devices.
- Exploration of alternate architectures for routing, and the trustworthiness of routing information.
- Experimentation with cooperative signaling as a question of path properties and path selection.

What we've done so far

- We have a (possibly not yet well defined) vision of endpoint participation in network paths selection in the Internet.
- We have a set of open research questions (refined after our Singapore meeting)
- We have an interesting venue for discussion of topics related to the endpoint control of path selection.
- We have apparent interest in these questions/discussions but little energy so far for answering them.

Open research questions

- How to define and represent the properties of paths?
  - *Path selection properties* are a feature of the proposed TAPS architecture.
- How to give endpoints access to trustworthy information about path properties?
- How to give endpoints control over paths selected for given traffic, in a way the network can trust?
- How can interfaces to the transport and application layers support the use of path awareness?
  - This question is also being partially addressed in TAPS.

More open research questions (slightly more science-fiction)

- How should transport-layer and higher layer protocols be redesigned to work most effectively over a path-aware networking layer?
- How is path awareness (in terms of vocabulary and interfaces) different when applied to tunnel and overlay endpoints?
- How can a path aware network in a path aware internetwork be effectively operated, given control inputs from the network administrator as well as from the endpoints?
- How can the incentives of network operators and end-users be aligned to realize the vision of path aware networking?

What next?

- Some path properties are related to transport-layer signaling efforts: please contribute to draft-dawkins-dont-do-this.
- We're still exploring the space of technologies and questions to tackle: another session or two like this could be useful.
- Increasing energy in the RG: focus on a single question per meeting cycle? Are there other questions to consider?