

# Experimental Congestion Control & the IETF/IRTF

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# Where are we?

- lots and lots of promising congestion control research
  - for fat paths, but also other scenarios
  - some schemes useful on an Internet-wide scale
- potential for benefit is usually demonstrated
  - papers, etc.
- potential for bad interactions is less well investigated
  - because it's hard & boring :-)
- metrics & scenarios for comparing schemes are unclear
  - which TCP variant is “the best” and what does that mean?

# Where do we want to go?

- we'd all like to evolve TCP forward
  - TCP = Internet-wide congestion control standard
  - safe in all environments, performs OK in many
- standard  $\approx$  agreed-upon social contract for CC
  - "how we all use the shared resource we communicate over"
- safe  $\approx$  prevents congestion collapse, some fairness
- an "evolved TCP" needs to be a safe standard
  - not safe  $\rightarrow$  Internet melts down
  - not standard  $\rightarrow$  interactions between different CC (safe?)  
potential for arms race  
hard enough to get one variant right

# Why is there an issue?

- interest in new CC features for major TCP stacks
  - some new CC has already leaked out onto the Internet
  - some stacks move beyond RFC mechanisms
- we don't know what major stacks do anymore
  - insufficient documentation, insufficient review
- is this safe? what is safe?
  - optimistic view: "well, the Internet hasn't melted yet"
  - pessimistic view: "but we don't know if it will stay this way"
- the IETF is the originator and maintainer of TCP
  - we want to provide the venue for evolving it

# IETF/IRTF involvement

- encourage the proposers and implementers of new CC to participate in the IETF/IRTF
- two types of proposals, two types of documents
  - (1) document current stack behavior
    - “we’d like you to know, this is what our stack does”
  - (2) proposals for eventual standardization
    - “we think this may eventually become a recommended mechanism, and would like people to experiment with it”

# (1) Document current stacks

- goal: documentation to inform the community
  - subsets of RFCs implemented or ignored & why
  - which additional mechanisms implemented & why
- existing examples
  - deployed TCP reactions to ICMP soft errors
  - FreeBSD: SYN cookie extensions
- future examples?
  - Linux: delayed-ACK suppression during slow-start
  - Vista: impact of enabling ECN, window-scaling, etc.
- vessel: Internet Drafts intended for Informational RFC, published out of the TSV area

# (2) Experimental specifications

- goal: mechanisms that may eventually progress onto the standards track
  - “we think this may eventually become a recommended mechanism, and would like people to experiment with it...”
    - “...on the global Internet”
    - “...in scenarios that are restricted in the following ways...”
- vessel: Internet Drafts intended for Experimental RFC
  - technical specification to guide implementers
  - discussion & data in preparation of community consensus
  - Sally’s BCP draft has some guidelines

# Approach for (2)

- work split between IETF & IRTF
- bring individual Internet Draft to ICCRG first
  - IETF will redirect
  - RFC Editor may want to do similarly
- **ICCRG reviews draft & existing body of work**
  - “is this safe for limited, experimental use?”
  - on the Internet, or in restricted environments
- after ICCRG consensus, send draft & review to TSV area
- if adopted, publish Experimental RFC out of the TSV area
  - current idea is to tack this work item onto the charter of TCPM

# And eventually...

- assume we have a number of such Experimental RFCs
- we'd eventually like to move one (several?) towards STD
  - “the IETF recommends you implement this”
- need to gather experience with them & need to evaluate them
  - related IRTF TMRG draft: draft-irtf-tmrg-metrics
- how? there is research left to be done
  - the IETF is not a research organization - but the IRTF is
- ICCRG coordinates this effort
  - results feed into a follow-on TSV area effort

# Comments?