

Document Clarification

Implicit/Explicit & Outbound/Inbound

Implicit	Side-effect of other traffic
Explicit	Explicit PCP signaling

Outbound	Internal Client calls connect()
Inbound	Internal Client calls listen()

- Note: All mappings are bidirectional
 - Outbound/Inbound terminology refers loosely to “primary” reason mapping was created

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Mapping Type

How We Describe It

Conventional SYN-initiated	Implicit Dynamic Outbound
PCP PEER	Explicit Dynamic Outbound
Conventional Manual	Static Inbound
PCP MAP	Explicit Dynamic Inbound

Document Clarification

Interaction of PCP requests and outbound traffic

- Confusion
 - Can PEER delete an implicit (SYN-created) mapping?
 - Can FIN delete an explicit (PEER-created) mapping?
- Proposal:
 - Mapping remains as long as
 - *either* last outbound traffic was within keepalive window
 - *or* last PEER renewal has not yet expired
 - FIN/RST behavior unchanged
 - PEER request may not set remaining time to less than the existing remaining time due to outbound traffic

Document Justification

Timing Tolerances

- Document currently states allowable timing error of up to $1/256$ of elapsed time
- Proposal: Add explanation of reasoning
 - This allows one clock to be to $1/512$ fast while other clock is $1/512$ slow
 - i.e. clock error of 1953ppm, or 168 seconds per day
 - NTP spec considers clock error of 500ppm (43 seconds per day) to be unreasonable
 - Therefore, not unrealistic to require accuracy of 1953ppm or better

Document Addition

Rapid Recovery

- On reboot or loss of state, multicast a “time check” on all interfaces on which the NAT/Firewall may have unknown prior clients
- “Time check” benign if no actual state loss has occurred:
 - “It’s 9:15am on 18th November 2011”
 - Okay, close enough
 - “It’s 12:02am on 1st January 1970”
 - Um... you just rebooted, didn’t you?