### Document Clarification

**Implicit/Explicit & Outbound/Inbound**

<table>
<thead>
<tr>
<th>Implicit</th>
<th>Side-effect of other traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit</td>
<td>Explicit PCP signaling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outbound</th>
<th>Internal Client calls connect()</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound</td>
<td>Internal Client calls listen()</td>
</tr>
</tbody>
</table>

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

**Implicit/Explicit & Outbound/Inbound**

<table>
<thead>
<tr>
<th>Mapping Type</th>
<th>How We Describe It</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional SYN-initiated</td>
<td>Implicit Dynamic Outbound</td>
</tr>
<tr>
<td>PCP PEER</td>
<td>Explicit Dynamic Outbound</td>
</tr>
<tr>
<td>Conventional Manual</td>
<td>Static Inbound</td>
</tr>
<tr>
<td>PCP MAP</td>
<td>Explicit Dynamic Inbound</td>
</tr>
</tbody>
</table>
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 $\frac{1}{256}$ of elapsed time

• Proposal: Add explanation of reasoning
  – This allows one clock to be to $\frac{1}{512}$ fast while other clock is $\frac{1}{512}$ 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?