PCP Working Group

Thursday 11th November 2010

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PCP Design Principles

• One Protocol or Two?
• NAT or Firewall?
• Simplicity
• Packet Isomorphism & Semantics
• Unified Mapping Table
• ICE Equivalence
One Protocol or Two?

NAT-PMP
UPnP IGD

PCP

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One Protocol or Two?

NAT-PMP?
UPnP IGD?
PCP?

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Or Three?
Or Four?
NAT or Firewall?

• Port Control operations may be the same...
• But “fail safe” behaviour may be opposite
• Is letting inbound traffic reach a host:
  • A Good Thing?
  • A Bad Thing?
Simplicity

A protocol design is complete not when you can’t think of any more things to add, but when you’ve removed everything you can and you can’t see how to remove any more.
Packet Isomorphism

- Request packet
- Renewal packet
- State recovery packet
- Retransmissions of any of the above

All the same packet

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Request Semantics

Request/Renewal/Recovery/Retransmission all mean exactly the same thing:
I’d like a mapping for the specified internal address:port

NAT action same in all cases:
Make new mapping if necessary
If mapping already exists, return that
Reply Semantics

Request/Renewal/Recovery/Retransmission all get reply in same format:

Either:

Confirmation

(ia:ip ⇔ ea:ep mapping now exists)

Or:

Error

(code saying why ia:ip can’t have a mapping)
Unified Mapping Table

- One mapping table
- Multiple ways of accessing it:
  - Implicitly, by sending outbound packet
  - Explicitly, via PCP
  - Explicitly, via management interface (e.g. web)
ICE Equivalence

• ICE is our competitor

• If outgoing packet makes a mapping, then PCP should work just as reliably

• If we put restrictions on PCP, developers will continue using ICE