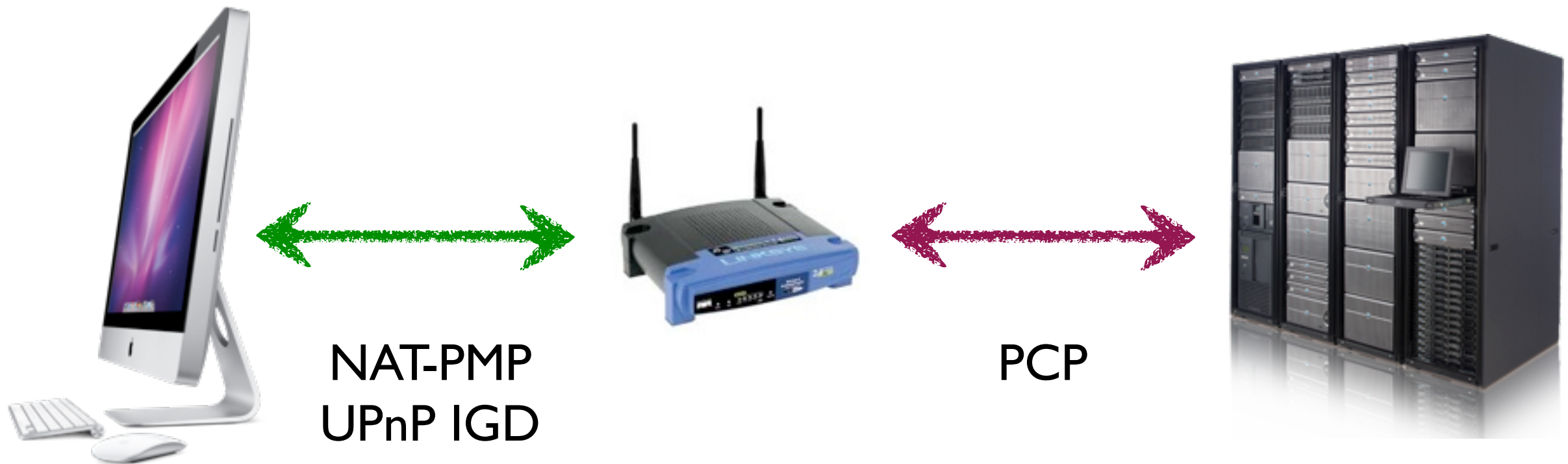# PCP Working Group

Thursday 11th November 2010

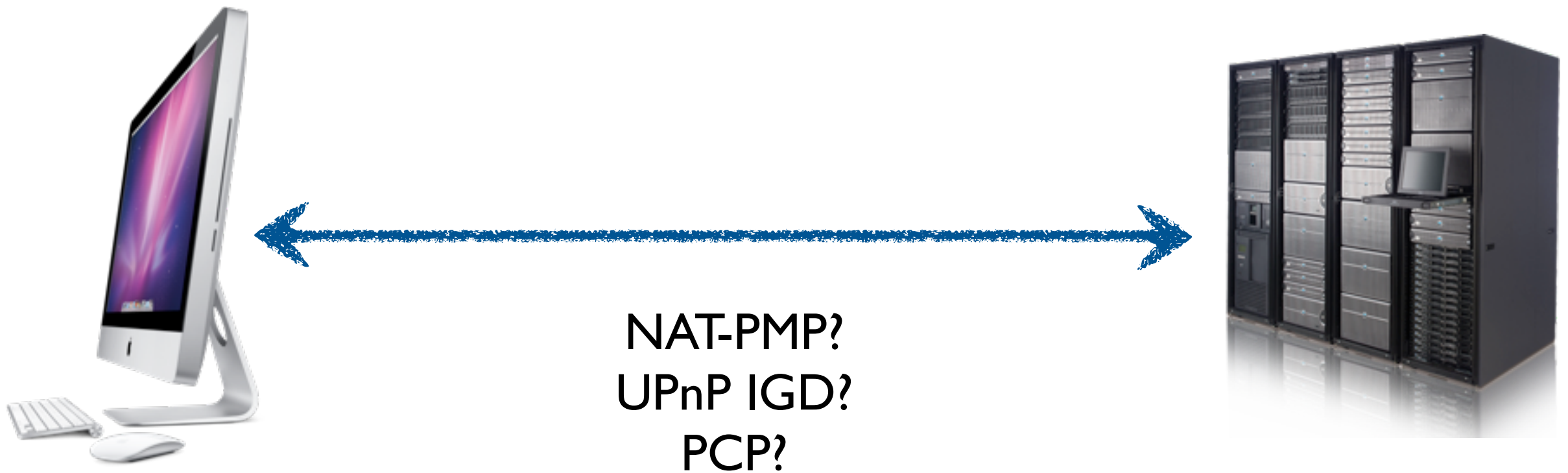Stuart Cheshire, Apple Inc.

PCP Design Principles

- One Protocol or Two?

- NAT or Firewall?

- Simplicity

- Packet Isomorphism & Semantics

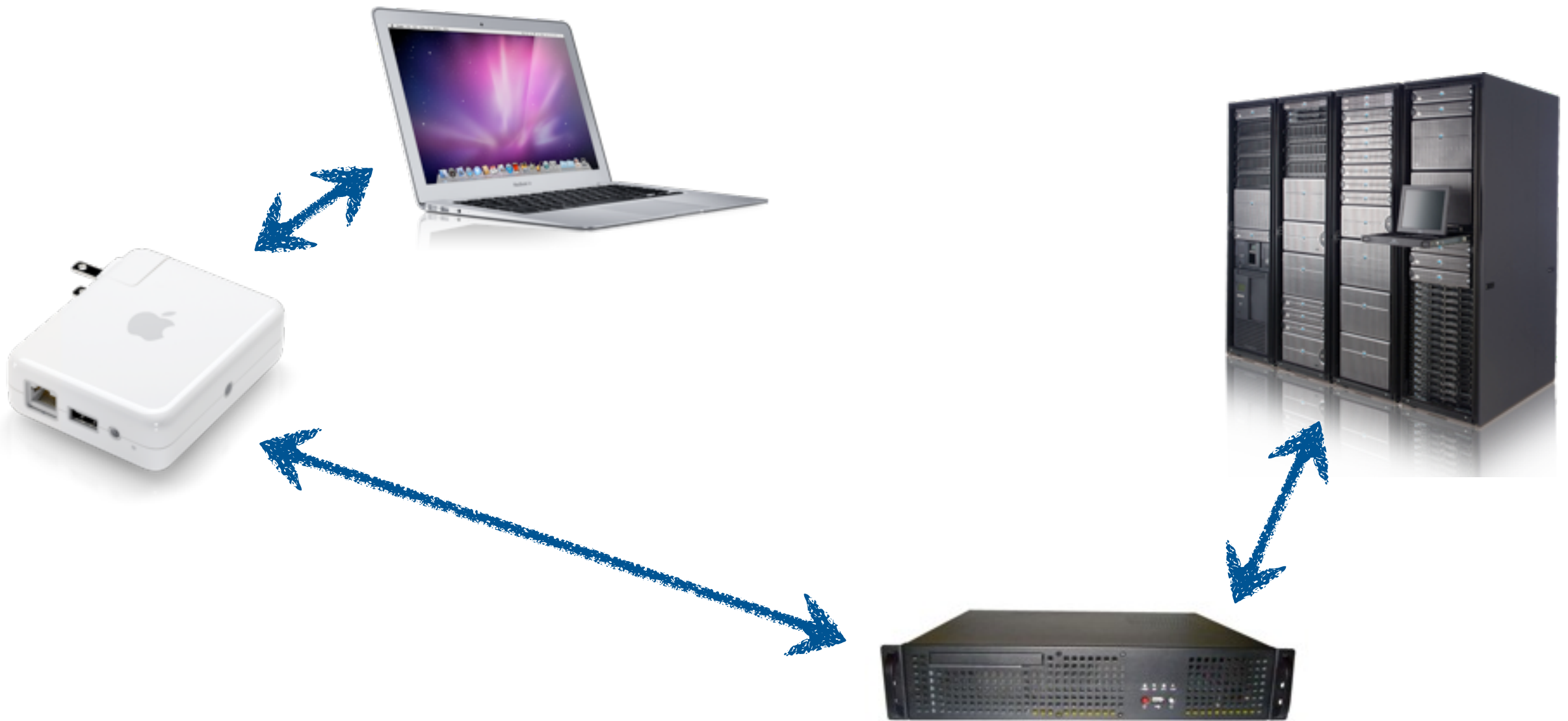- Unified Mapping Table

- ICE Equivalence

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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?

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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.

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Packet Isomorphism

- Request packet

- Renewal packet

- State recovery packet

- Retransmissions of any of the above

} All the same packet

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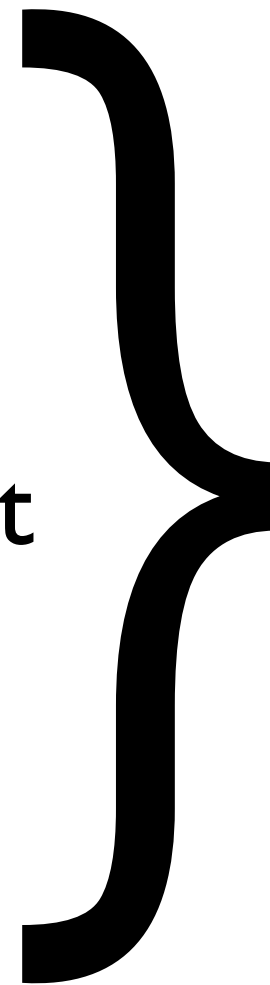
Request Semantics

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

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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)

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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)

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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

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