

Teredo Extensions

draft-thaler-v6ops-teredo-extensions-01.txt

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[MS-TERE]: Teredo Extensions

- Last IETF, URL for Microsoft doc posted to the list
 - <http://msdn2.microsoft.com/en-us/library/cc247482.aspx>
- This documented what Windows XP/Vista does
- It contains several things:
 - Security updates:
 - Now in draft-krishnan-v6ops-teredo-update
 - Support for more NAT types:
 - Now in **draft-thaler-v6ops-teredo-extensions**
 - Efficiency (server load) improvement:
 - Now in **draft-thaler-v6ops-teredo-extensions**

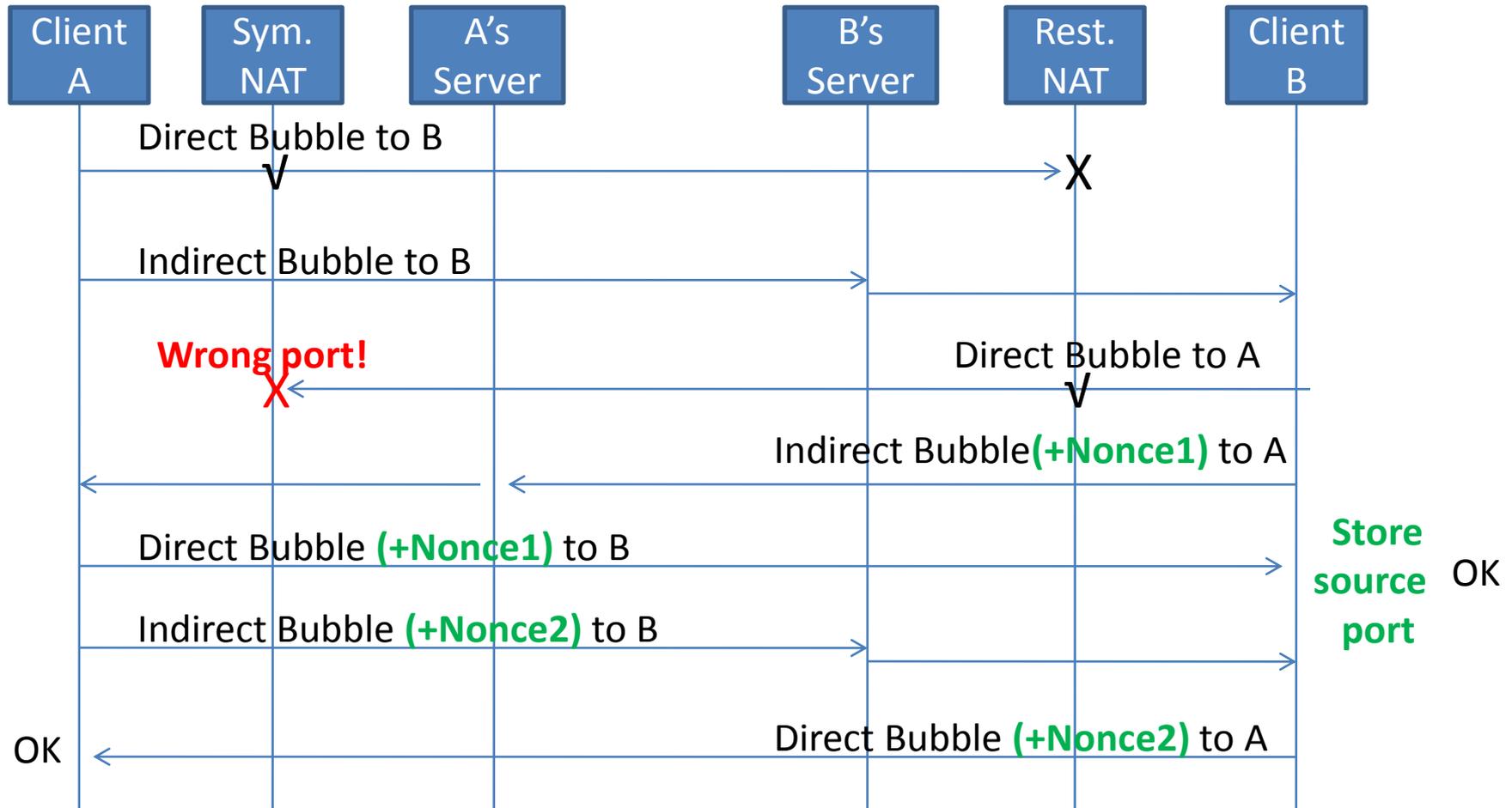
NAT Types

Dest NAT	Cone	Address Restricted	Port Restricted	Port Rest. +UPnP	Port Sym. +UPnP	Port Sym. (Port-Pres.)	Port. Sym. (Non-pres.)	Address Symmetric
Cone	√	√	√	√	1	1	1	1
Addr. Rest.	√	√	√	√	1	1	1	-
Port Rest.	√	√	√	√	-	1+3	-	-
Port rest + UPnP	√	√	√	√	1+2	-	-	-
Port sym. + UPnP	1	1	-	1+2	1+2	-	-	-
Port sym. (port-pres.)	1	1	1+3	-	-	1+3	-	-
Port sym. (non-pres.)	1	1	-	-	-	-	-	-
Addr. Sym.	1	-	-	-	-	-	-	-

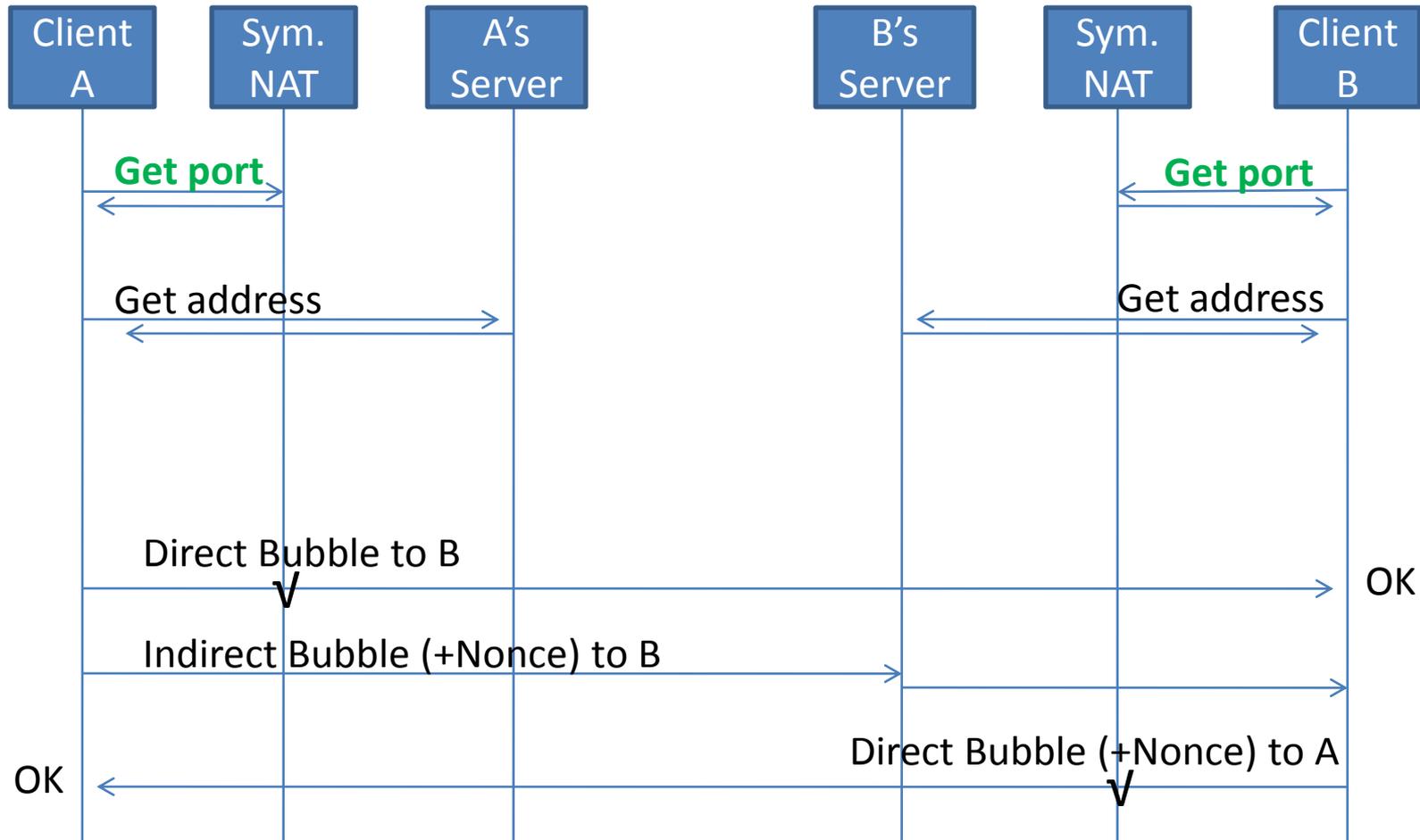
Some statistics on NAT types

- Based on a study in August 2007 on NAT types:
 - ~85% chance a direct connection between two peers would fail
 - ~36% chance a Teredo connection would fail
 - ~16% chance a Teredo+extensions connection would fail
 - With a bit more work, this could get still better
- For multiparty apps, inverse network effect means even worse percentage
- Doesn't requires **data** to flow through some server
- Can get 100% if you use a data relay protocol but more expensive to host such relays
 - Goal is to optimize for peer-to-peer to minimize cost

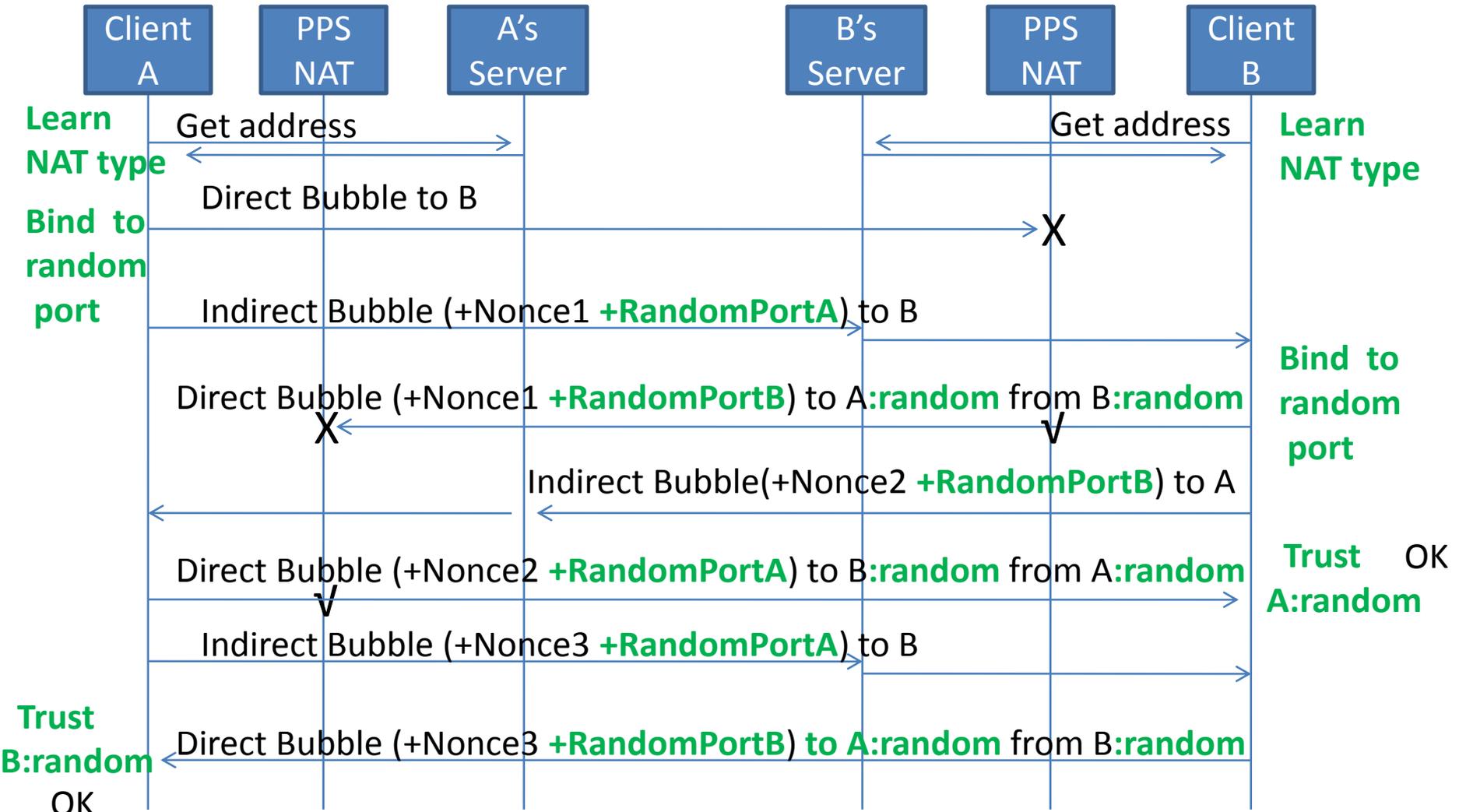
1) Symmetric NAT Example



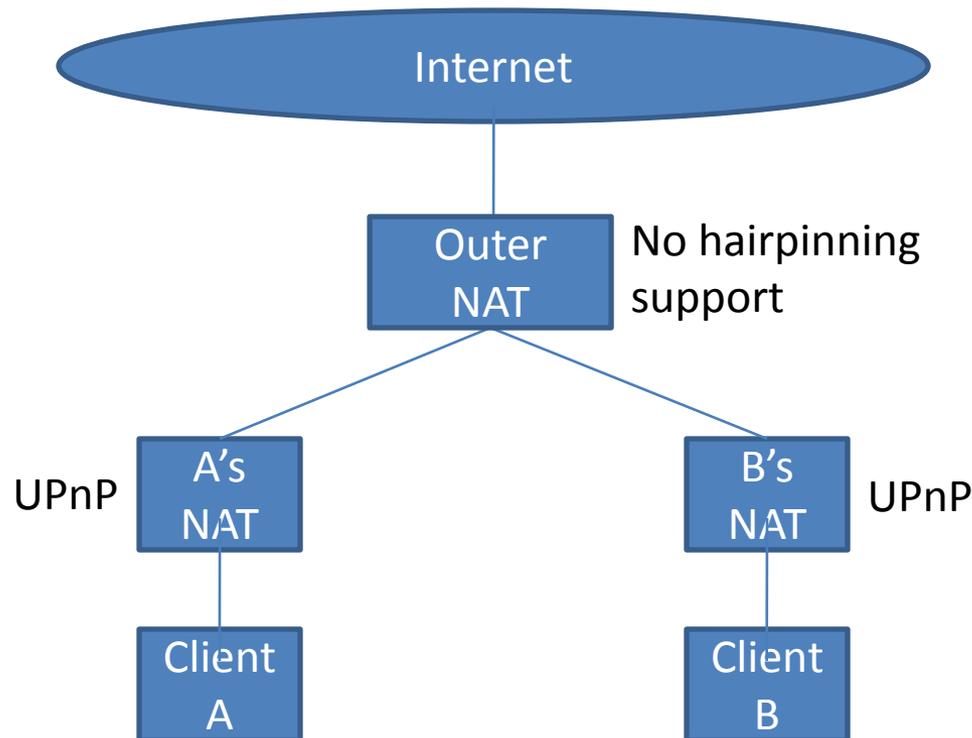
2) UPnP-Enabled Symmetric NAT



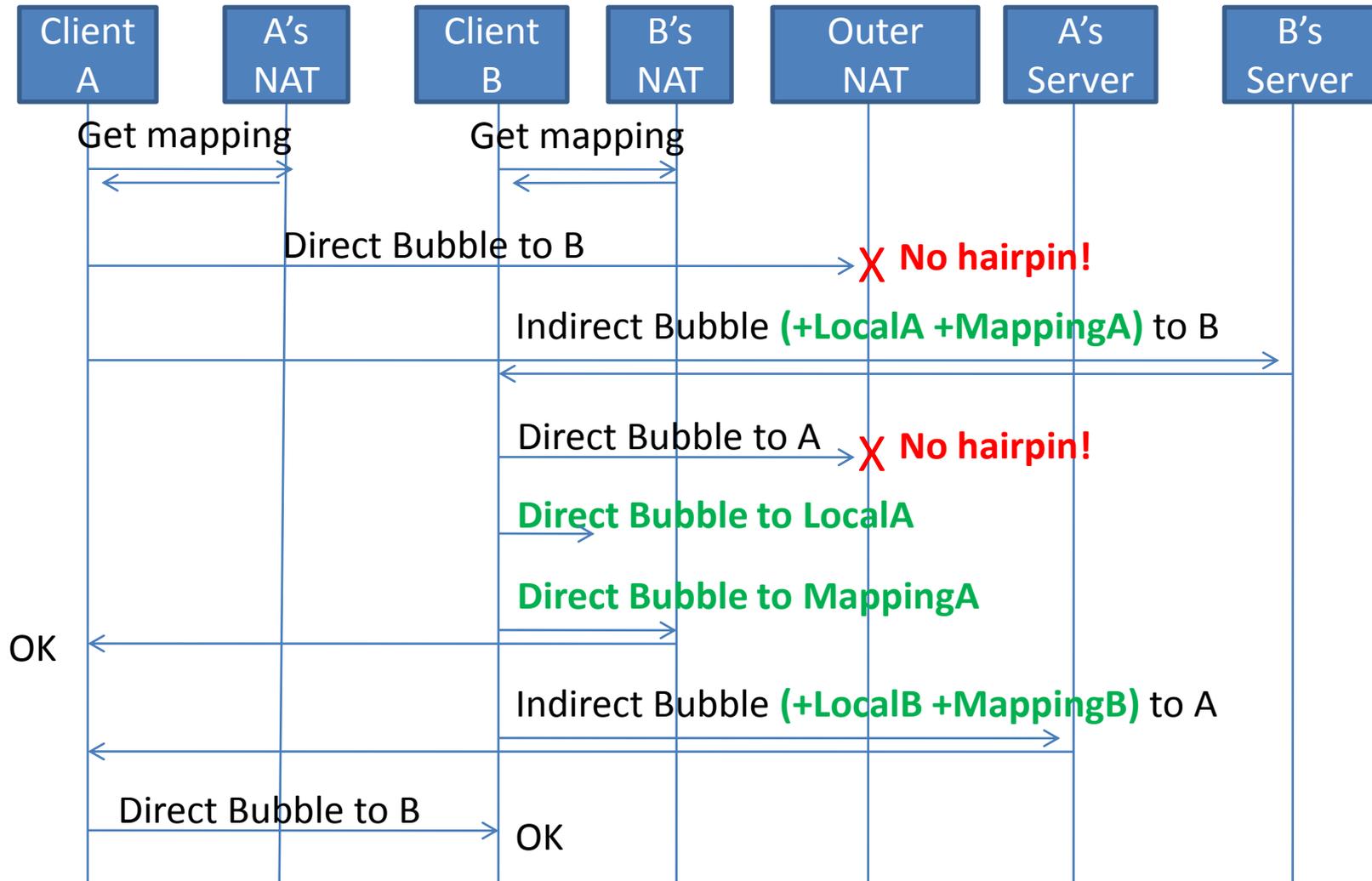
3) Port-Preserving Symmetric NAT



4) Hairpinning Example



4) Hairpinning Example (cont.)



5) Server Load Reduction

