Penultimate Private Address Support through RFC2344
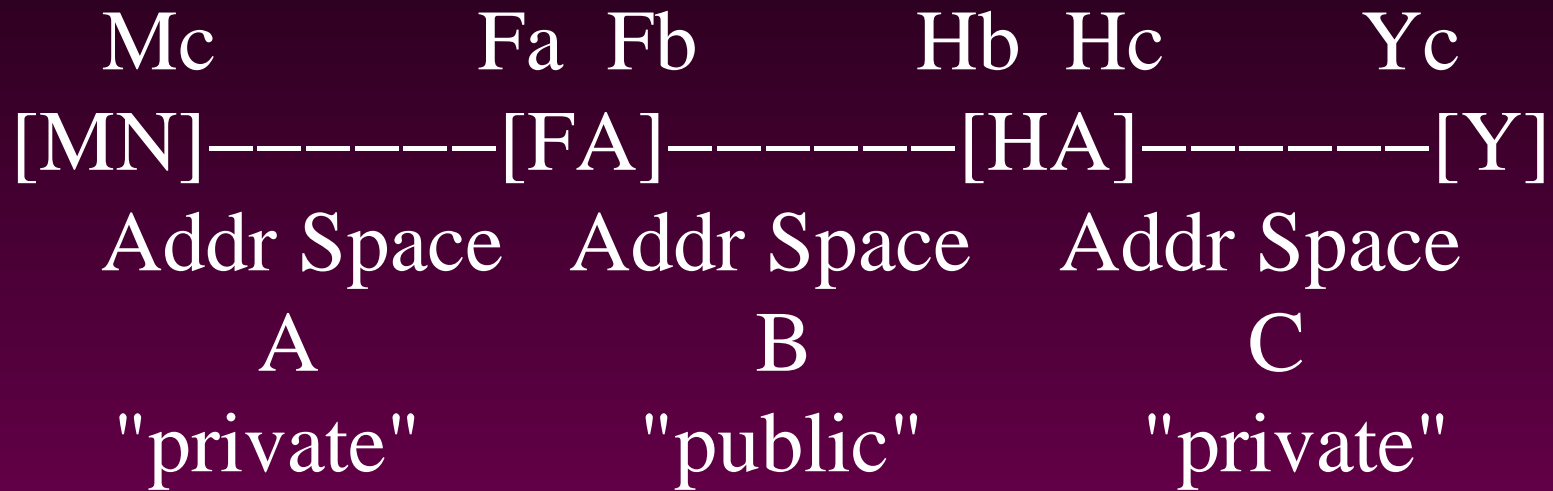
Probable Issues and Possible Solutions

A work in progress
by
Steven M. Glass
Sun Microsystems

Reverse Tunneling in Accordance with RFC2344

* FA sets T–bit, advertises address on that link as CoA

* MN sets T–bit, uses advertised CoA, and HA addr on it's home link in reg. Req.

* FA uses CoA and HA as tunnel endpoints

* HA uses CoA and HA as tunnel endpoints

What if...

```
   Mc          Fa  Fb          Hb  Hc          Yc
[MN]–––––––[FA]–––––––[HA]–––––––[Y]
  Addr Space    Addr Space    Addr Space
       A             B             C
  "private"      "public"      "private"
```

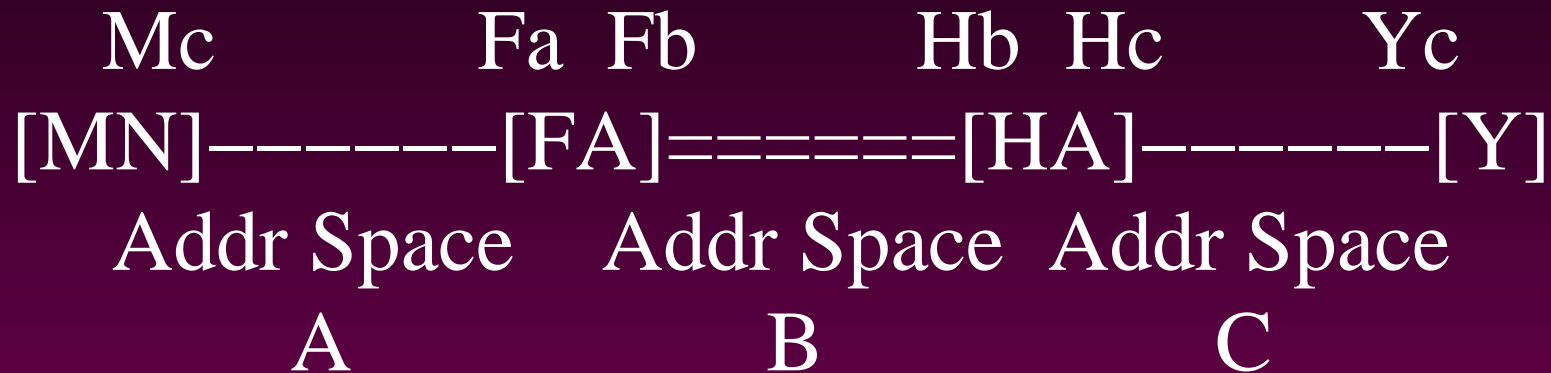Simplest Case
("Public to the Penultimate Hop")

Problems...

* Address Fa isn't reachable from addr Hb, so FA MUST NOT advertise Fa (else the forward tunnel will fail).

* Address Hc isn't reachable from addr Fb, so MN MUST NOT use Hc (=>R.T. fails)

* FA can't reach the Hc interface; before all that registration will fail with (most likely) code 80: home network unreachable!

Brute Force Solution

* The Agent Advertisement already allows for multipe addresses, so why not use them?

* FA can simply put the necessary addresses in the Agent Advertisement extension ("zero or more care–of addresses" field)

* Immediate problem: how does MN differentiate between them?

A More Elegant Solution?

What we want:

```
Mc              Fa  Fb          Hb  Hc          Yc
[MN]––––––[FA]======[HA]––––––[Y]
  Addr Space    Addr Space  Addr Space
      A              B            C
```

FA advertises Fb on link Fa
(HA advertises Hb on link Hc)
MN uses Hb as it's home address

Complications...

* MN doesn't care what CoA is advertised.

* FA doesn't care what HA addr is used.

* BUT...

    * Additional "relay" reqs. on agents (undoc'd).

    * How will MN know when it's home?

    * How will MN know if it roams to a different subnet on this FA?!?

A Closer Look...

* There are two addresses in each advert:

    * Move detection between FA interfaces:

        * IPsrc addr is Fa, CoA is Fb – MN uses **IPsrc**.

    * Move detection to the home subnet:

        * IPsrc address is Hc, 'CoA' is Hb – MN uses **CoA**. (This is a problem: CoA tells MN when it's in the home domain, but not when it's on its HOME link!)

    * Away use IPsrc, at home use CoA!?! –><–

Consistency Problem...
...or "Attention to Detail"?

* What does the MN look at?
    * CoA tells the MN which "domain", IPsrc addr tells the MN where it is in that domain.
    * Examine CoA: am I in my home domain?
        * No – use CoA and register with my public HA addr.
        * Yes – examine IPsrc addr: from my home subnet?
            * No – Use local HA addr as home agent address to register.
            * Yes – OK, I'm home!
    * If CoA = Ipsrc –> reduces to known solution.

To Support and Be Supported in Disparate Address Spaces...

* MN's MUST use IPsrc addr, and CoA to do move detection.

* MN's MUST know 'public' HA address.

* Agents MUST advertise publicly routable addresses.

* Agents MUST forward datagrams from bound MN's between internal interfaces...

Where Does This Leave Us?

* Still don't know if this is do–able from FA/HA side (but is it at least promising?).

* Requires MN behavior different from that described in RFC2002[bis].

* We're going to need new terminology to describe it – e.g. domains are now divided into discrete "mobility domains", MN has a public HAaddr, and a link HAaddr, etc.