Capsulated NATS

<draft-kuniaki-capsulated-nats-03.txt>

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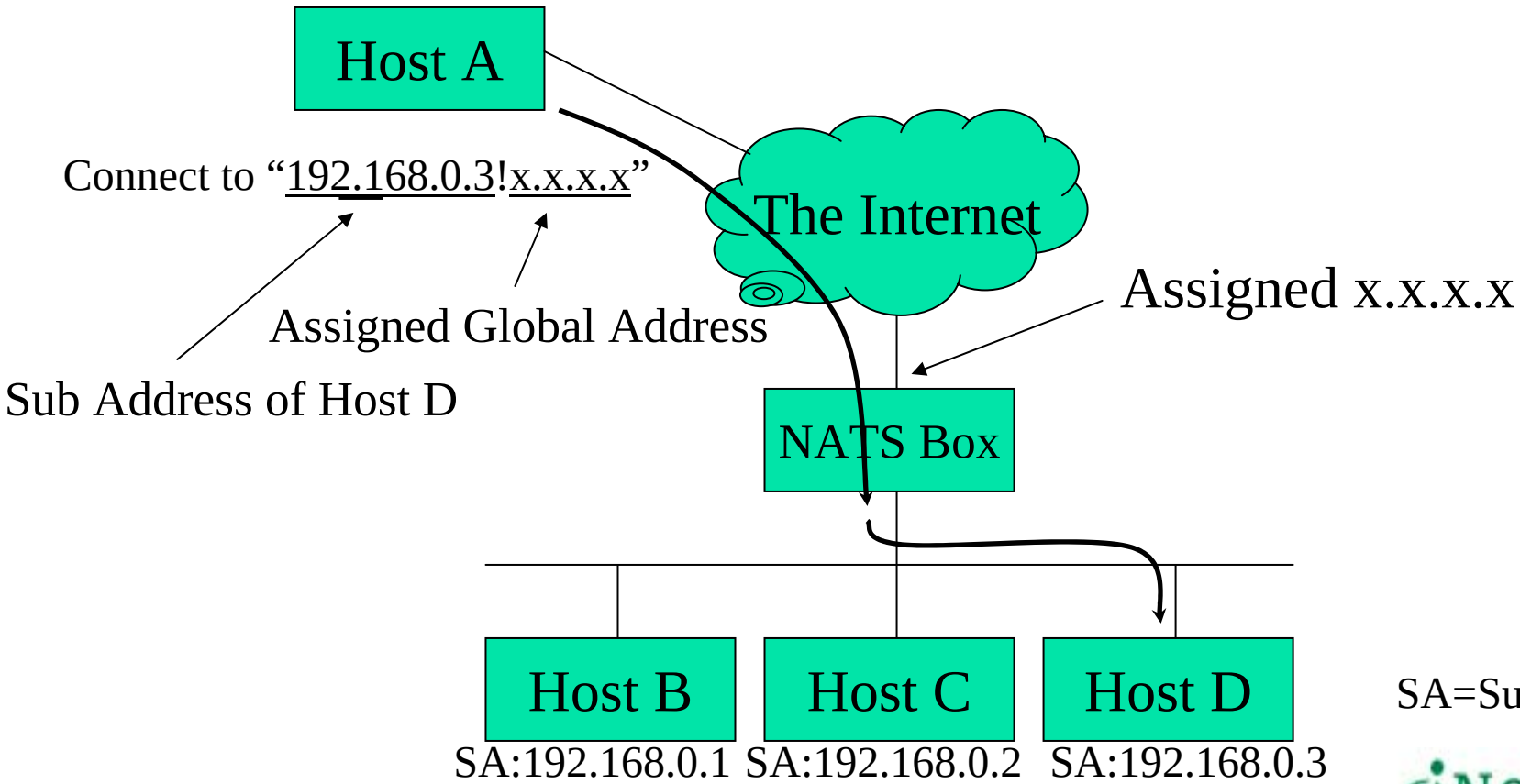
What is the NATS

- “Network Address Translation with Sub-Address”
- NATS defines additional 32bit space (which is called “sub-address”) for each IP address

Improvement of NAPT Problem

- Hosts located on the Internet can point exact hosts on NAT-separated private segments by an IP address and a sub-address pair.

Improvement of NAPT Problem



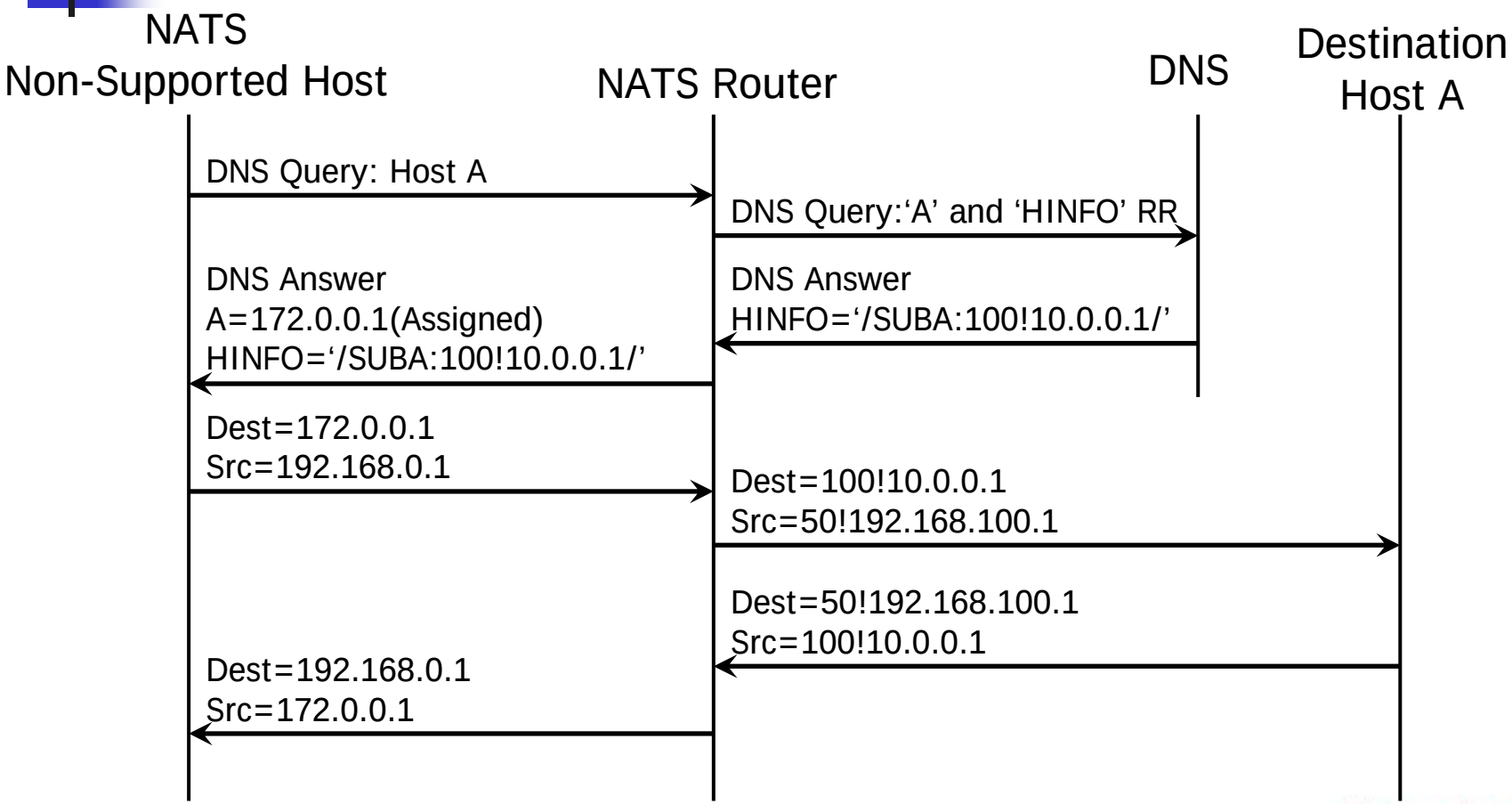
Advantages

- NATS does NOT need additional servers
  - STUN/TURN need STUN/TURN server
  - The server might transfer enormous traffic
  - It means that the server causes delay
- Client hosts don’t need to support this protocol
  - STUN/TURN client MUST support STUN/TURN protocol
- Servers, located behind NATS, can use a well-known ports, such as 80(http).

Disadvantage

- A few applications should change.
  - FTP
    - FTP port command contains IP address.
    - NATS recommends to replace IP address with hostname. However, this change depends on FTP protocol.
  - Other
    - An application which contains local IP address in payload should replace IP address with hostname.
    - NATS needs a “hack” in DNS resolution. Through this hack, hosts located behind NATS router can connect to other NATS supported hosts.

Basic flow(1) – DNS Hack



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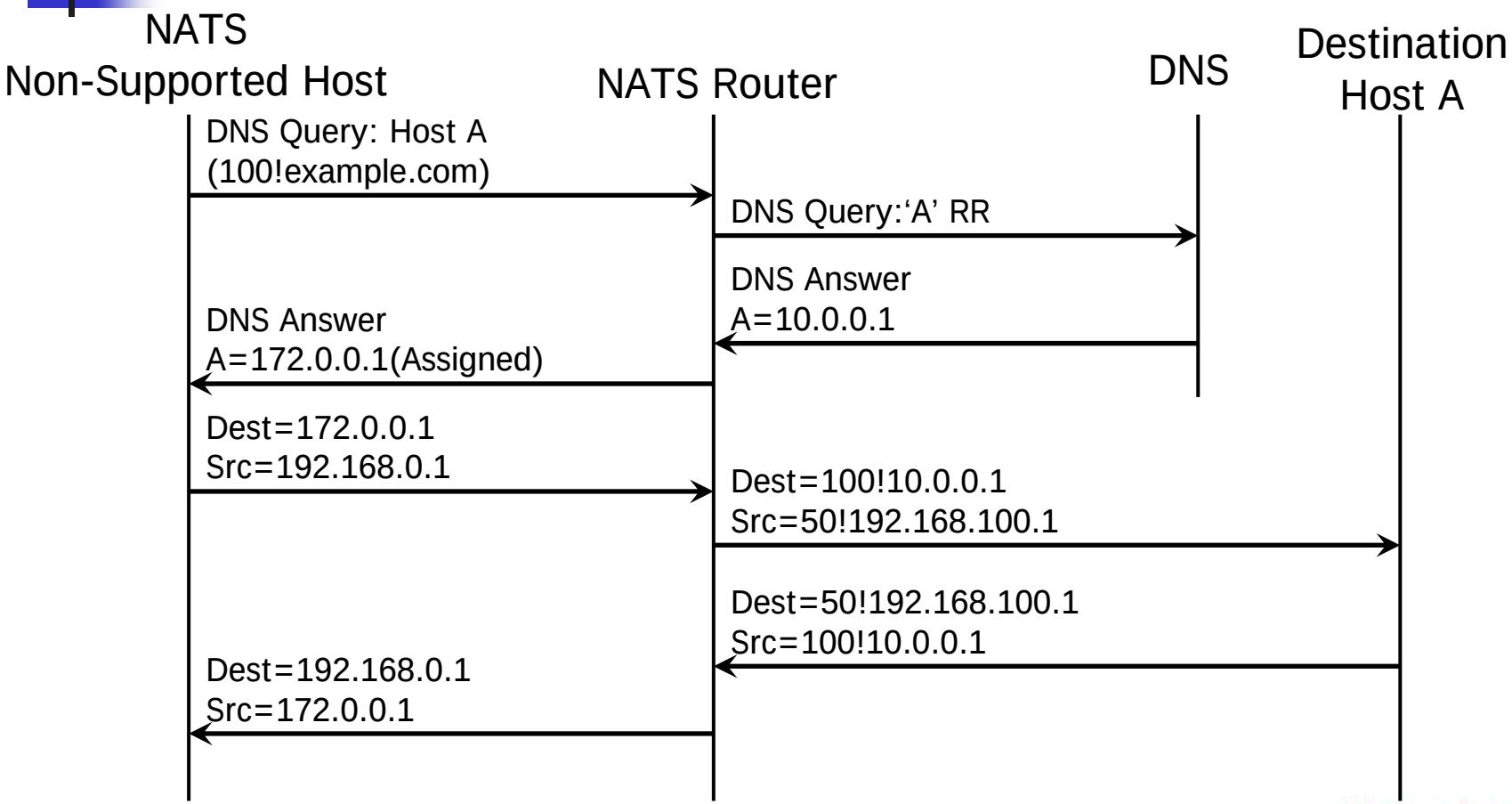
Basic flow(2) – DNS Hack



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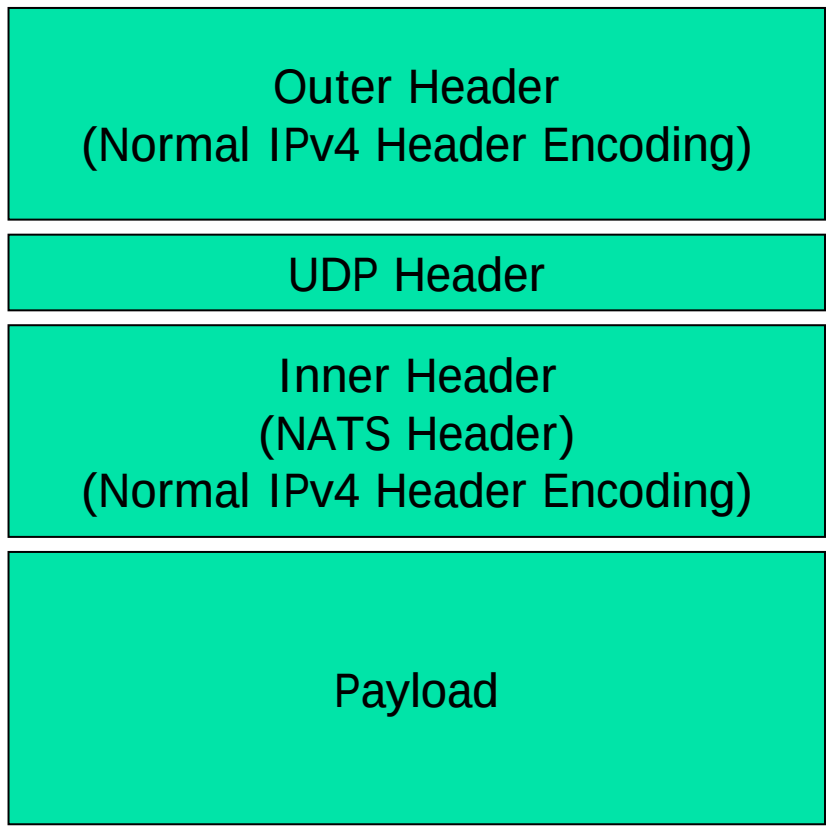
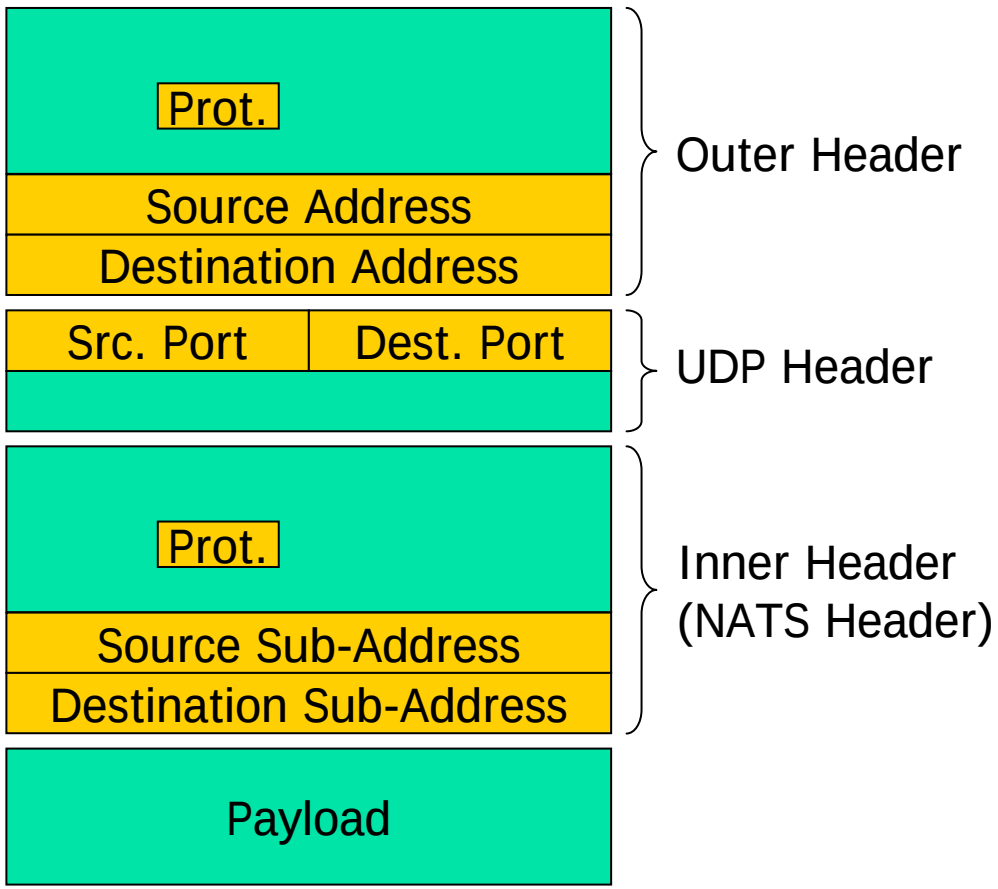
Packet Encoding

- NATS uses “IP in IP tunneling” like encoding.
  - ‘Like’ means that NATS uses UDP encoding. However, “IP in IP” uses transport layer protocol.



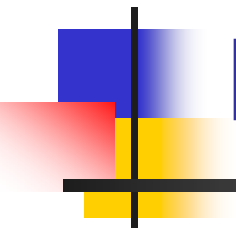
Detail of Header information



- Protocol Number is UDP.
- Source/Destination Address is ideally IPv4 Global Address.

- UDP Port Number is undefined
  - It will be assigned by IANA
- Src/Dest Port number is used a same port number ideally.

- Protocol Number depends on payload.
- Src/Dest sub-address ideally is same as local network IP address.
  - The IP addresses are used private IPv4 addresses ideally.



NATS Additional Functions

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GET I/F Address

- This function is used for getting IP address from NATS router.
  - This function provides environment that NATS hosts can get global IP address which is assigned a WAN interface of NATS router.

NATS Support Confirmation

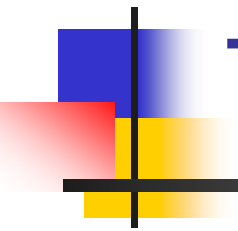
- This function provides a environment for discovering NATS supported hosts in local network.
  - Ideally, NATS routers cannot know what the hosts support NATS functions or not.
  - Normally, NATS routers transfer packets after it decoding NATS packet to normal IP packet.
  - If the hosts support NATS functions, NATS router should transfer NATS packet without decoding.

Implementation

- Linux
  - Implementer: Mr.Watanabe (DML)
  - Distribution Method: RPM/SRPM
  - Test code will be released soon
- Products
  - SEIL (IIJ)
  - Tentative firmware will be released

Contact

- Author
  - Kuniaki KONDO
  - kuniaki@nats-project.org
- Documents
  - Draft-kuniaki-nats-02.txt
  - Draft-kuniaki-capsulated-nats-02.txt
- Mailing List
  - nats@nats-project.org
    - If you want to join it, Please send a e-mail to nats-ctl@nats-priject.org which is contained “subscribe <your name>” in mail body.



Thank you

Any Questions?

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