

Going NUTSS with NAT URI SIP ICE and other TLAs

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CSE19 - NUTSS - p.101

NATs



NAT (^ˈnat) *n.*
A hardware device used to extend the Internet addresses already in use.

Everywhere – Home, Office, ISP, Wireless, ...

Annoying – Breaks TCP, UDP, FTP, ...

Persistent – Cannot be wished away, much to IETF's dismay

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NATs



gnat (^ˈnat) *n.*
Any of various small, biting, two-winged flies, such as a punkie or black fly.

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Not standardized – Every NAT has its own nuance

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Good – Keep me in business.

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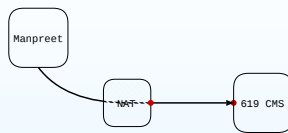
NAT problems



IP as identity

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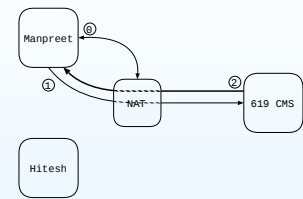
NAT problems



The evil Paul!

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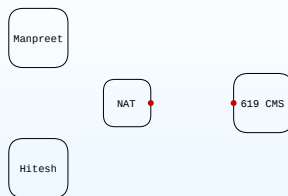
NAT problems



UPnP

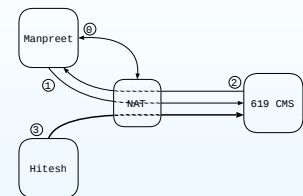
CS619 - NUTSS - p.30/21

NAT problems



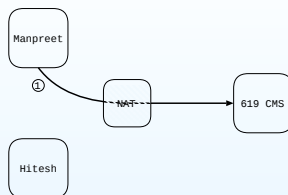
CS619 - NUTSS - p.30/21

UPnP problems



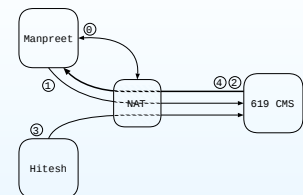
CS619 - NUTSS - p.40/21

NAT problems



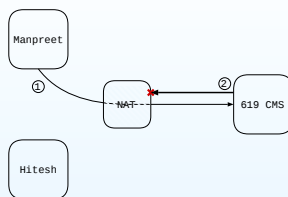
CS619 - NUTSS - p.30/21

UPnP problems



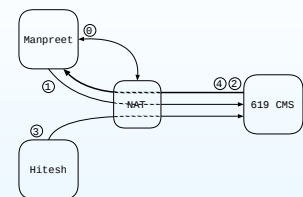
CS619 - NUTSS - p.40/21

NAT problems



CS619 - NUTSS - p.30/21

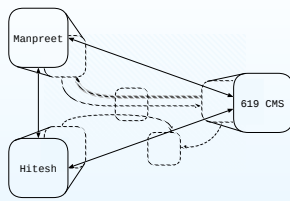
UPnP problems



- Dead on arrival
- Identity problem still exists
- Uses XML. Ewwwww!

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NUTSS

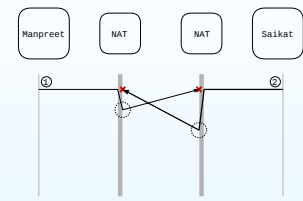


The good Paul!

- Fix the identity problem
- Integrate into existing architecture
- Fix the implicit trust issue

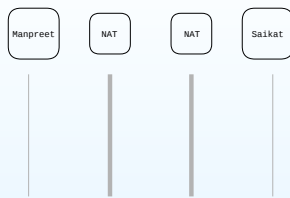
CSE19 - NUTSS - p.5a/21

NAT problems



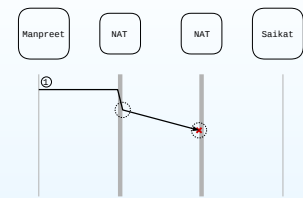
CSE19 - NUTSS - p.6a/21

NAT problems



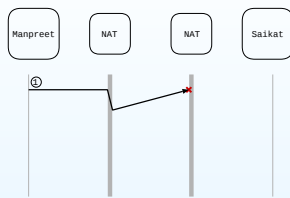
CSE19 - NUTSS - p.6a/21

NAT problems



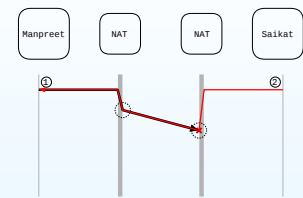
CSE19 - NUTSS - p.6a/21

NAT problems



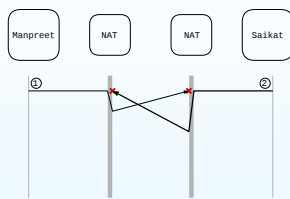
CSE19 - NUTSS - p.6a/21

NAT problems



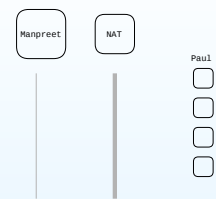
CSE19 - NUTSS - p.6a/21

NAT problems



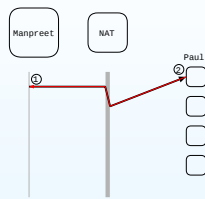
CSE19 - NUTSS - p.6a/21

Port Prediction



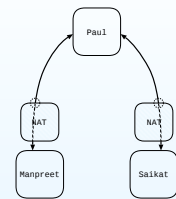
CSE19 - NUTSS - p.7a/21

Port Prediction



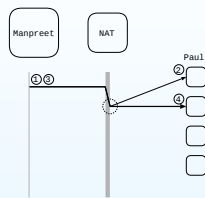
CSE19 - NUTSS - p.7021

STUN



CSE19 - NUTSS - p.8021

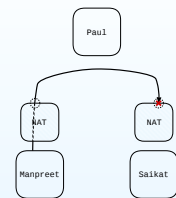
Port Prediction



Cone NAT

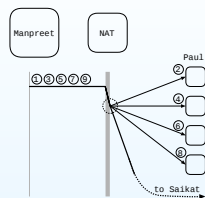
CSE19 - NUTSS - p.7021

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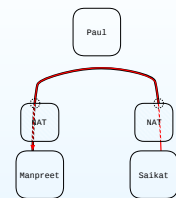
CSE19 - NUTSS - p.8021

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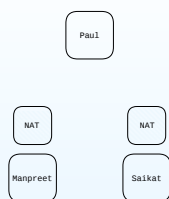
CSE19 - NUTSS - p.7021

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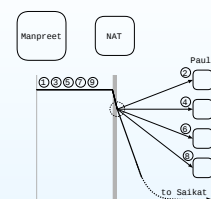
CSE19 - NUTSS - p.8021

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CSE19 - NUTSS - p.8021

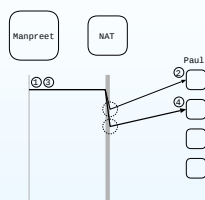
Port Prediction Problems



Cone NAT

CSE19 - NUTSS - p.9021

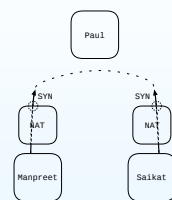
Port Prediction Problems



Symmetric NAT

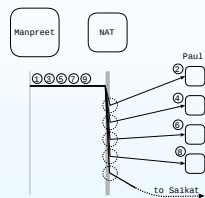
CS619 - NUTSS - p.9b2f

STUNT



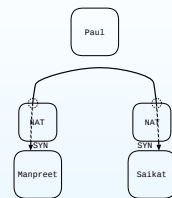
CS619 - NUTSS - p.11a2f

Port Prediction Problems



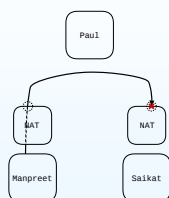
CS619 - NUTSS - p.9b2f

STUNT



CS619 - NUTSS - p.11a2f

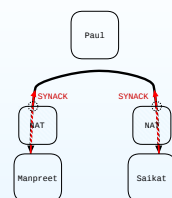
STUN Problems



No TCP!

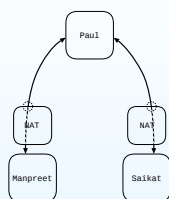
CS619 - NUTSS - p.10a2f

STUNT



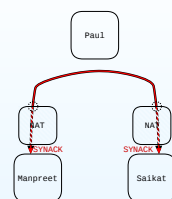
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STUNT



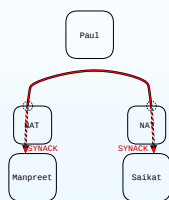
CS619 - NUTSS - p.11a2f

STUNT



CS619 - NUTSS - p.11a2f

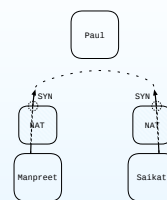
STUNT Problems



1. Tight synchronization needed.
2. Micro\$oft Windows doesn't implement TCP spec correctly.

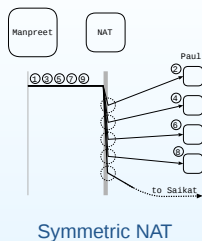
CS619 - NUTSS - p.12a/2f

STUNT



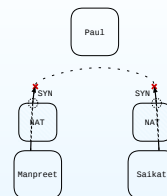
CS619 - NUTSS - p.14a/2f

Port Prediction Problems



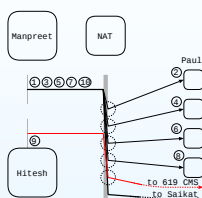
CS619 - NUTSS - p.13a/2f

STUNT



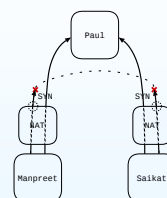
CS619 - NUTSS - p.14b/2f

Port Prediction Problems



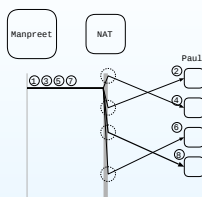
CS619 - NUTSS - p.13b/2f

STUNT



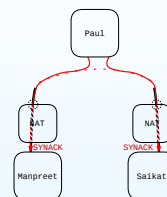
CS619 - NUTSS - p.14c/2f

Port Prediction Problems



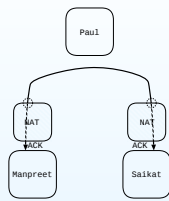
CS619 - NUTSS - p.13c/2f

STUNT



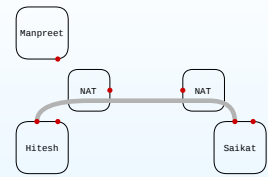
CS619 - NUTSS - p.14d/2f

STUNT



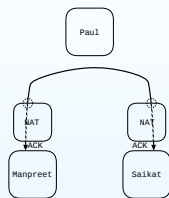
CS619 - NUTSS - p.14e/21

Tunnels



CS619 - NUTSS - p.17a/21

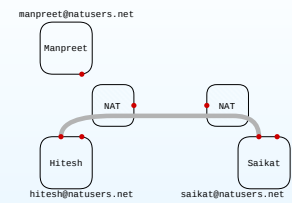
STUNT Problems



1. Spoofing requirement
2. ICMP packet
3. NAT ICMP/SEQ# behaviour

CS619 - NUTSS - p.15a/21

URI

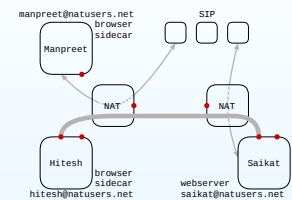


CS619 - NUTSS - p.18a/21

Solution to these problems

CS619 - NUTSS - p.16a/21

ICE



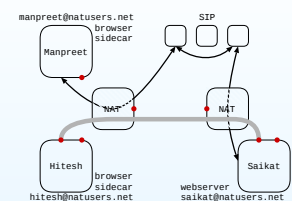
CS619 - NUTSS - p.19a/21

Solution to these problems

Future work

CS619 - NUTSS - p.18b/21

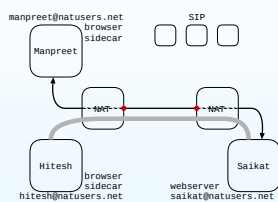
ICE



1. Manpreet: Manpreet's browser here. Need a file from Saikat's webserver. I can be reached at IP_A , IP_B .
2. Saikat: Sure. I can be reached at IP_1 , IP_2 , IP_3 . Try IPv4 to IP_1
3. Manpreet: Timeout. IPv4 to IP_1 didn't work.

CS619 - NUTSS - p.19b/21

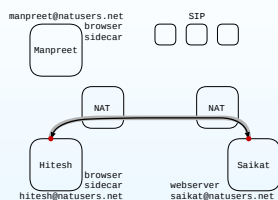
ICE



1. Saikat: Try STUNT to IP₂
2. Manpreet: Success
3. Saikat: Enjoy. Bye.

CS639 – NUTSS – p.19a/21

ICE



CS639 – NUTSS – p.19a/21

let's go NUTSS

- N – NAT
- U – URI
- T – Tunnels
- S – SIP
- S – STUNT

CS639 – NUTSS – p.20a/21

let's go NUTSS

- N – NAT
- U – URI
- T – Tunnels
- S – SIP
- S – STUNT

Network Address Translation for Universal Resource Identifier objects over Tunnels negotiated by the Session Initiation Protocol and Simple Traversal of User Datagram Protocol through Network Address Translation devices and Transmission Control Protocol too!

CS639 – NUTSS – p.20a/21