Diameter NAT Control Application
(draft-brockners-diameter-nat-control-00.txt)
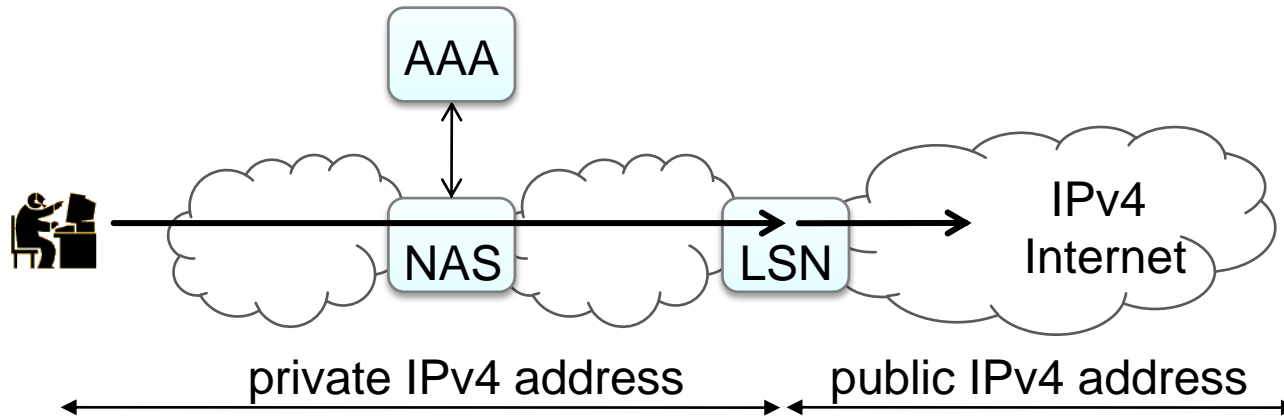
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Diameter NAT Control Application (DNCA)
Problem Statement/Motivation

- **Completion of global IPv4 address space**
  - SP introduce Large Scale NAT (LSN) devices as one response

- **Per-subscriber service portfolio impacted by LSN**
  - Customization: Define/control/parameterize NAT on a per subscriber basis (expand per-subscriber parameters / authorization data)
  - Operations: Integrate with existing AAA environment
  - Regulatory: Subscriber tracability – provide global IP-address/port used by a subscriber at any given point in time

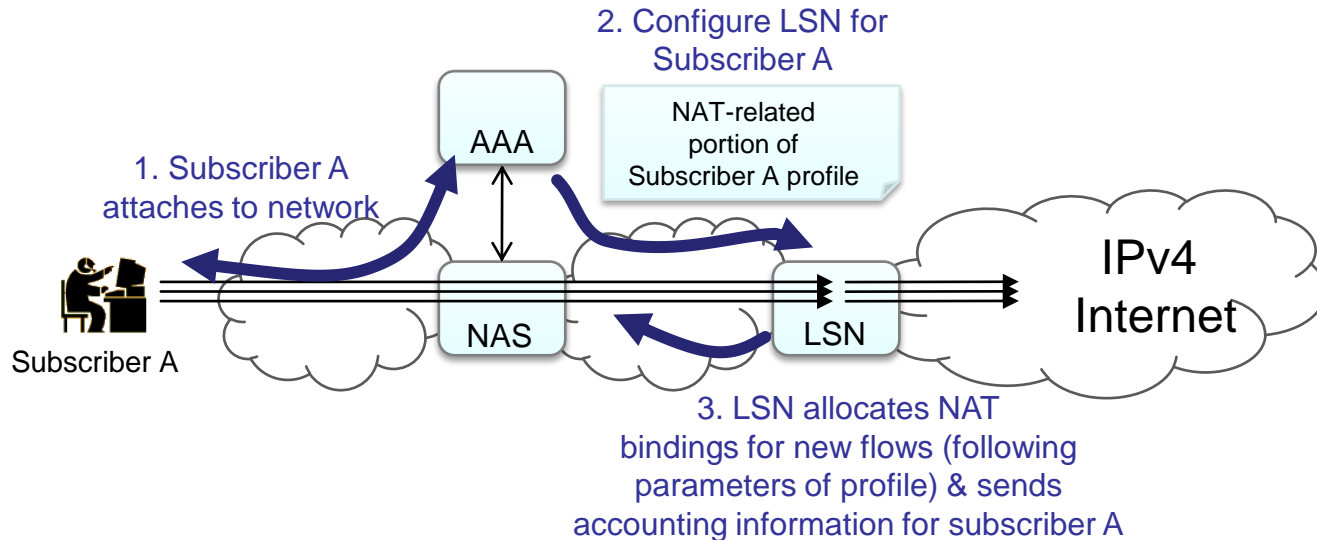# Diameter NAT Control Application (DNCA)
Solution Characteristics

A **Support 2-types of NAT Control**

A1 Per flow NAT-Binding Control:
At least portions of the binding (e.g. internal/external address) are not controlled by the device performing NAT, but another entity (e.g. SIP-server, AAA-server, etc.)

A2 Per endpoint NAT-Parameter Control:
Define the parameters that control the operation of a NAT-gateway on a per-subscriber/per-endpoint basis (e.g. maximum number of NAT-bindings allowed for an endpoint, address-pools NAT-addresses get assigned from)

B **Per-subscriber/per-endpoint accounting** of NAT-bindings, integrated with existing accounting infrastructure (i.e. internal and external address(es) mappings become part of the accounting records)

C **Diameter based protocol** to ensure seamless integration with existing Authentication, Authorization, Accounting and Control infrastructure

D **Operation within the SP-trust domain** (i.e. no direct protocol interaction with the user)

Diameter NAT Control Application (DNCA)
Example for A2: Per-Endpoint NAT-Parameter Control

2. Configure LSN for Subscriber A

NAT-related portion of Subscriber A profile

AAA

1. Subscriber A attaches to network

NAS

LSN

IPv4 Internet

Subscriber A

3. LSN allocates NAT bindings for new flows (following parameters of profile) & sends accounting information for subscriber A

Profile: *Subscriber A*

- Bandwidth: 1Mbps upstream, 16Mbps downstream
- Monthly quota: 8 Gbyte
- Maximum number of NAT-bindings: 100
- External NAT-address pool: Residential-Users (= 134.95/16)
- Fixed NAT-bindings: 10.3.4.5 – 134.95.166.20
- Accounting: Include NAT-binding information

Why create a new Diameter Application for NAT Control?

Some existing protcols with NAT control capabilities	A1	A2	B	C	D
MIDCOM (RFC 5189)†, SIMCO (RFC 4540)	✓				✓
ETSI Ia (ETSI ES 283 018)‡	✓				✓
ETSI Gq' (ETSI TS 183 017)‡	✓			✓	✓
ITU Rs‡ (ITU-T Q.3321)	✓			✓	✓
ITU Rw‡ (ITU-T Q.3303.3, RFC 5431)	✓			✓	✓
UPnP IGD, Bonjour NAT-PMP, NAT-PMP relay*, NSLP**	✓				
Diameter NAT Control Application (DNCA)	✓	✓	✓	✓	✓

* draft-woodyatt-spnatpmp-appl
** draft-ietf-nsis-nslp-natfw
‡ NAT Control only a subset of interface capabilities
† On MIDCOM see also: RFC 4097 (MIDCOM protocol eval.):
  "A general assessment might be that Diameter meets and exceeds MIDCOM architectural requirements

Diameter NAT Control Application (DNCA):
Deployment Example

Session Setup

(1) Endpoint attaches to the network

(2) Request to AAA-Server to retrieve authorization data for endpoint

(3) Reply from AAA-Server with authorization data, including parameters for LSN, e.g.

    Maximum number of bindings allowed for endpoint

    Address-pool to be used

    Fixed bindings to be pre-established for endpoint

(4) Session establishment from DNCA-Manager to DNCA-Agent, incl. NAT configuration data for session

(5)/(6) Session setup completes

Operation: Endpoint accesses Internet, LSN allocates bindings

(a) Accounting information on allocated bindings

(b) NAS combines accounting information received from DNCA client with local accounting information for endpoint and reports to AAA server

(I): Session Setup

(II): Operation
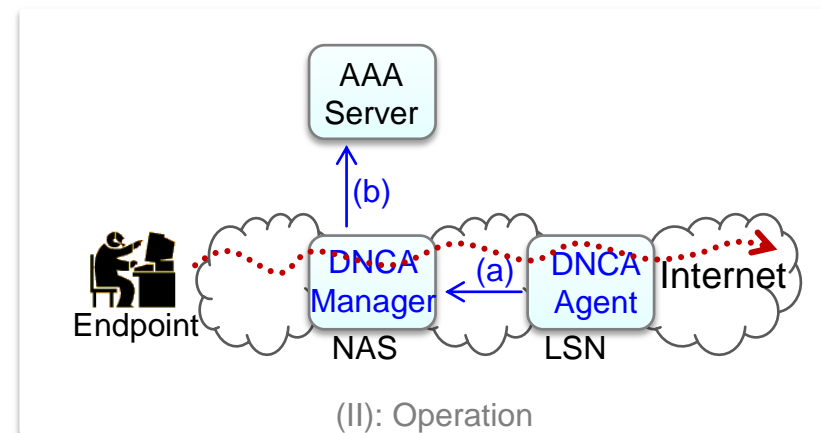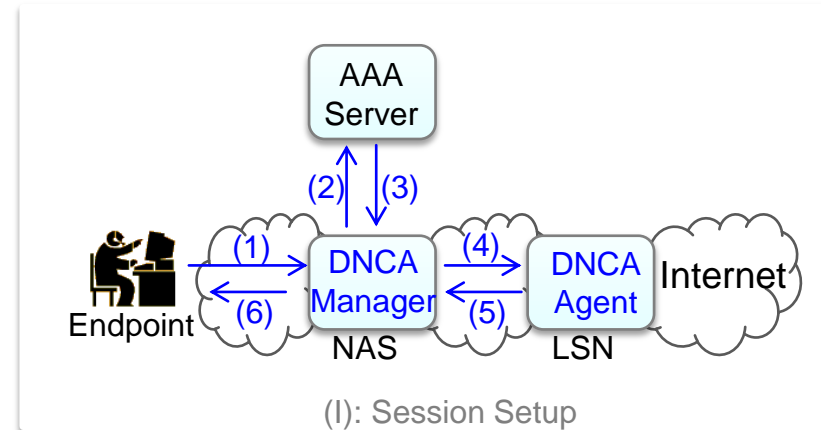
Next Steps

- Authors appreciate feedback from the WG
- Add NAT Control to new DIME WG charter?