

How to modify NAT IP selection algorithm in deterministic NAT?

CGNAT has become an indispensable requirement for service providers due to depletion of IPv4 address and surge in usage of IP based devices like Mobile phones, Laptops, PCs, IP TVs, IP Cameras and many more. This increase in number of IP based devices leads to tracking the same number of translations at CGNAT device in service provider network. Deterministic NAT comes to rescue here, where service providers doesn't need to log every transaction during runtime. CGNAT logging is significantly reduced in Deterministic NAT as logging in this case happens at the time of configuration.

Let us have a quick recap of what is Deterministic NAT. It is a mode of CGNAT where mappings between the private client IP and public NAT IP is performed at the time of configuration. Because of this reason, logging of the NAT mappings are done at the time of configuration once and the need to log every transaction is eliminated. A block of IP address is allocated to subscribers using port blocks which can be used for different connections for the subscriber.

NAT IP Selection algorithms for deterministic NAT in NetScaler

NetScaler provides support for different NAT IP selection algorithms for deterministic NAT. This provides flexibility to service providers to have NAT IP selection to subscribers based on their need. NetScaler provides "Ports" and "IPAddr" allocation policies in Deterministic NAT to accommodate NAT IP selection algorithms.

NAT IP and PORT block allocation for Deterministic NAT can be controlled using the following policies.

PORTS Policy

In this case, port blocks from single NAT IP will be allocated to incoming subscribers sequentially. After all the blocks are exhausted in a NAT IP, port blocks from next NAT IP will be allocated and so on.

Ports Policy Example:

Client IPs:

Let 192.168.1.1, 192.168.1.2 and 192.168.1.3 be the Client IPs that are configured in NetScaler.

NAT IPs and PORT Blocks:

Let the NAT IP pool be 4.4.4.1, 4.4.4.2 and port blocks allocated with starting ports as PB1, PB2, .. PBn. for corresponding Client IPs, where PB2-PB1 = Port block size.

Note: NetScaler supports a minimum port block size of 256 and port blocks can be allocated in multiples of 256.

So the available port blocks are as follows,

4.4.4.1: PB1, PB2, PB3,.., PBn

4.4.4.2: PB1, PB2, PB3,.., PBn

During Deterministic NAT configuration, the Private client IP to Public NAT IP and port mapping is done as shown below,

192.168.1.1 => 4.4.4.1:PB1

192.168.1.2 => 4.4.4.1:PB2

192.168.1.3 => 4.4.4.1:PB3

In the above scenario, port blocks are allocated in round robin fashion in a NAT IP for clients and once the NAT IP is used up, the next NAT IP is allocated with port blocks allocated in the same manner.

IPADDRS Policy

In this case, one port block from each NAT IP will be allocated. Once all the NAT IPs (in the pool) are covered, second port block from each NAT IP will be allocated and so on.

IPAddr Policy Example:

Client IPs:

Let 192.168.1.1, 192.168.1.2 and 192.168.1.3 be the Client IPs that are configured in NetScaler.

NAT IPs and PORT Blocks:

Let the NAT IP pool be 4.4.4.1, 4.4.4.2 and Port blocks allocated with starting ports as PB1, PB2, .. PBn. for corresponding Client IPs , where PB2-PB1 = Port block size.

So the available port blocks are as follows,

4.4.4.1: PB1, PB2, PB3,.., PBn

4.4.4.2: PB1, PB2, PB3,.., PBn

IPADDRS Policy:

During Deterministic NAT configuration, the Private client IP to Public NAT IP and port mapping is done as shown below,

192.168.1.1 => 4.4.4.1:PB1

192.168.1.2 => 4.4.4.2:PB1

192.168.1.3 => 4.4.4.1:PB2

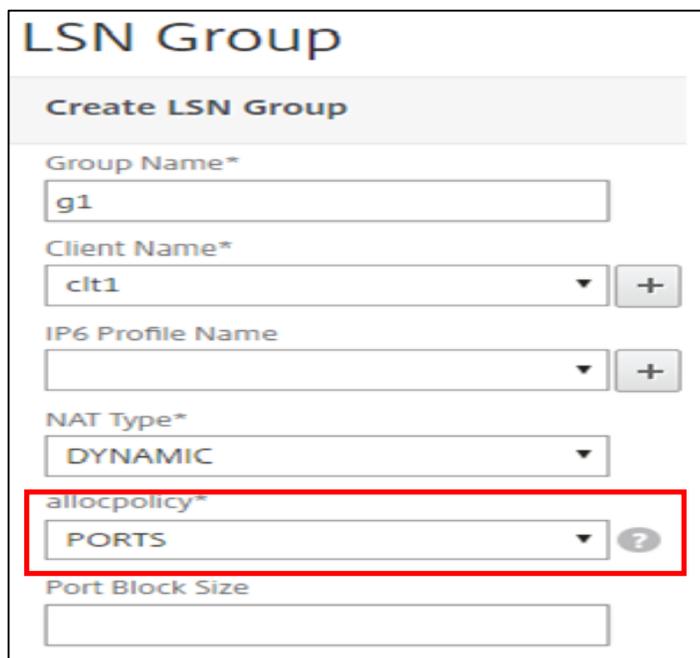
In the above scenario, IP addresses are allocated in round robin fashion with first port block(PB1). Once all the IP address in the pool is allocated to the clients with the first port block (PB1), the second port block (PB2) from NAT IPs (starting from first IP in NAT pool) are allocated in the same manner for the clients. This way, allocation is done for rest of the clients with the remaining port blocks.

[How to modify NAT IP selection algorithm for Deterministic NAT in NetScaler using Configuration Utility?](#)

To modify NAT IP selection algorithm for Deterministic NAT using configuration utility,

Navigate to System -> Large Scale NAT -> Groups -> Click "Edit"

Under allocpolicy, the NAT IP selection algorithm can be modified as shown below.



The screenshot shows the 'LSN Group' configuration utility. The 'Create LSN Group' section contains the following fields:

- Group Name*: g1
- Client Name*: clt1
- IP6 Profile Name: (empty)
- NAT Type*: DYNAMIC
- allocpolicy*: PORTS (highlighted with a red box)
- Port Block Size: (empty)

[How to modify NAT IP selection algorithm for Deterministic NAT in NetScaler using Command Prompt?](#)

In order to modify NAT IP selection algorithm for Deterministic NAT, the following commands has to be used.

```
>add lsn pool <pool name eg. p1> -nattype DETERMINISTIC
```

```
>bind lsn pool p1 <IP pool eg 4.4.4.1-4.4.4.2>
```

```
>add lsn client <client name eg. clt1>
```

```
>bind lsn client clt1 -network 192.168.1.1
```

```
>bind lsn client clt1 -network 192.168.1.2
```

```
>bind lsn client clt1 -network 192.168.1.3
```

```
>add lsn group grp1 -clientname clt1 -nattype DETERMINISTIC -allocPolicy <IPADDRS/PORTS> -  
portblocksize <port block size eg. 256> -logging ENABLED -sessionLogging ENABLED
```

```
>bind lsn group <group name eg. grp1> -poolname <pool name eg.p1>
```