IPv6 address plan and migration @ QMUL

Daniel Traynor, QMUL
HEPSYSMAN June 2017

Cluster layout

Private

10.1.0.0/16

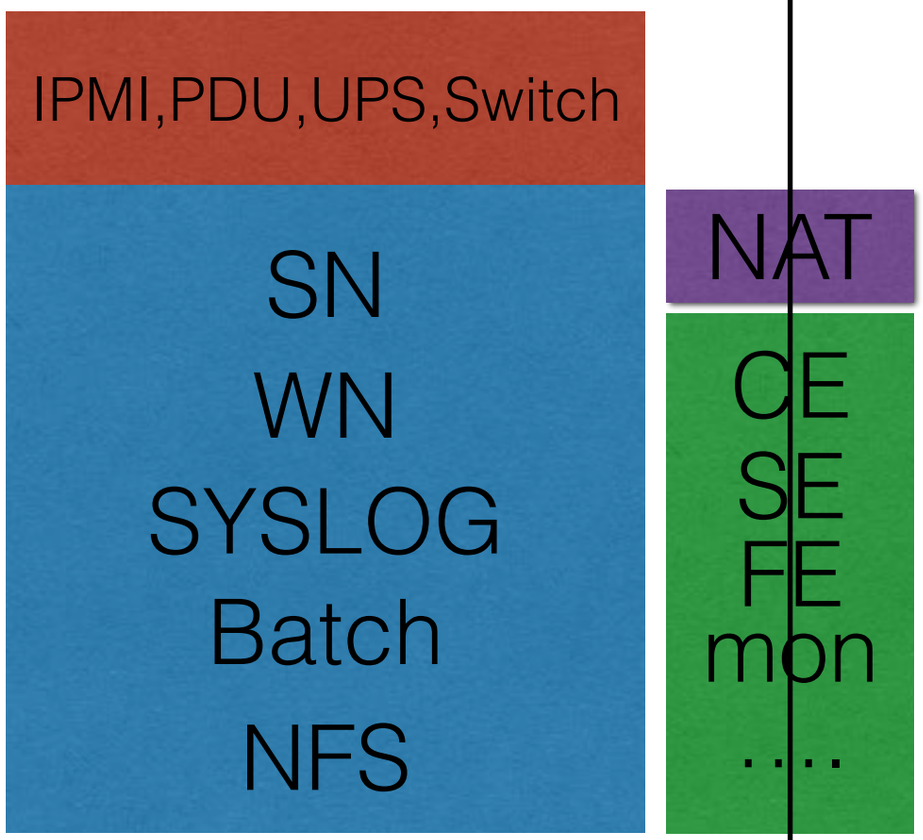
MTU 1500

Public

VLAN 842

194.36.10.0/24

MTU 1500



Step 1

Private

10.1.0.0/16

MTU 1500

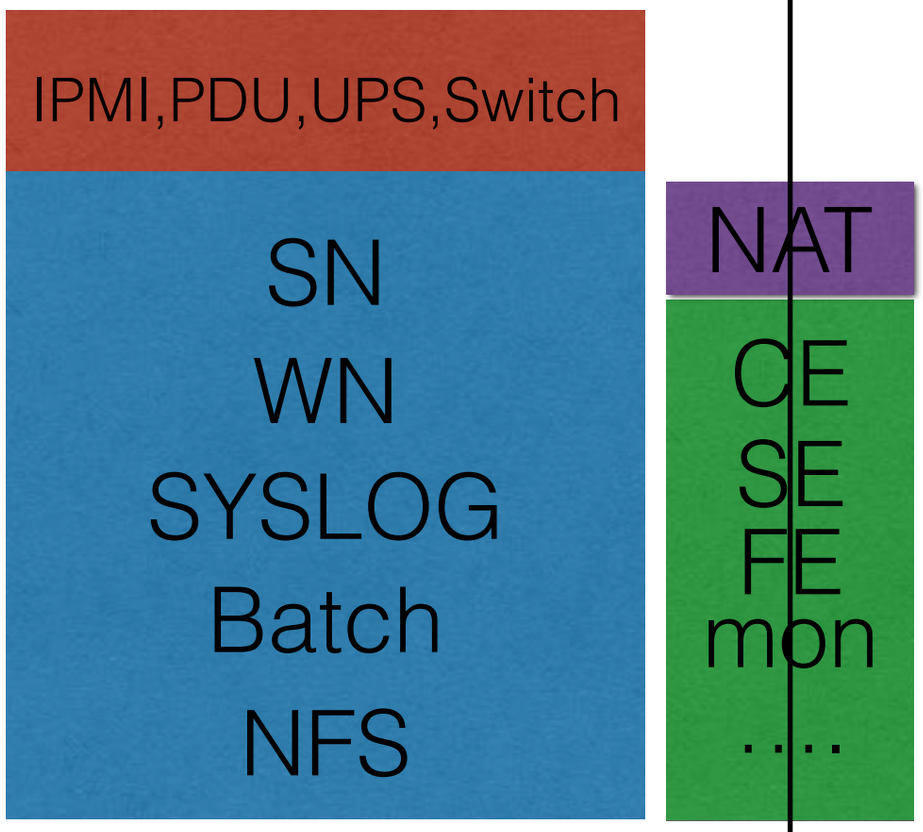
Public

VLAN 843

194.36.11.0/24

2a01:56c0:4033::/64

MTU 9000



step 2

Private

Public

OOB

VLAN 4001

10.129.64.0/18

MTU 1500

IPMI,PDU,UPS,Switch

SN

WN

SYSLOG

Batch

NFS

router

CE

SE

FE

mon

….

VLAN 4000

10.1.0.0/16

MTU 8192

VLAN 843

194.36.11.0/24

2a01:56c0:4033::/64

MTU 9000

step 3

Private

Public

OOB

VLAN 4001

10.129.64.0/18

MTU 1500

IPMI,PDU,UPS,Switch

SN

WN

SYSLOG

Batch

NFS

router

CE

SE

FE

mon

….

VLAN 843

194.36.11.0/24

2a01:56c0:4033::/64

VLAN 4000

10.129.32.0/19

2a01:56c0:4033:4000::/64

MTU 8192

Address Plan

2a01:56c0:4033:4000::/56	GridPP @ QMUL IPv6 Cluster Network/Management Allocation
2a01:56c0:4033:4000::/64	MTU 8192 Cluster Transfer Network (aggregate) - VLAN 4000
2a01:56c0:4033:4000::/124	VRRP and unicast addresses for router(s)
2a01:56c0:4033:4000::a81:2000/117	2032 assorted nodes
2a01:56c0:4033:4000::a81:2800/117	2048 storage nodes
2a01:56c0:4033:4000::a81:3000/117	2048 compute nodes
2a01:56c0:4033:4000::a81:3800/117	Reserved for expansion of 2a01:56c0:4033:4000::a81:3000/117

There is an option to do the same for the OOB network

Device Addressing

The numbering scheme is based around the fact that the following bits in the legacy IP and IPv6 allocations are fixed:

10.129.x.x, 2a01:568:4033::x:x:x:x:x

Legacy IP addresses are assigned based on VLAN and device/purpose and is expected to be done bottom-up

(i.e. assign 10.129.0.1 first, 10.129.0.2 next, 10.129.255.254 last, etc).

For a real-world addressing example, assume the following nodes:

sn01 = 10.129.40.1

cn01 = 10.129.48.1

They each get the first address out of the specific pools intended for this purpose.

Once the IPv4 addresses are known, the following equation will provide you with the IPv6 equivalent:

2a01:56c0:4033:<VLAN ID in decimal>::<first two legacy IP octets in hexadecimal>:<last two legacy IP octets in hexadec

So, you get:

sn01 = 2a01:56c0:4033:4000::a81:2801

cn01 = 2a01:56c0:4033:4000::a81:3001

Alternatively, you can also use 'dotted quad notation' to express the IPv4 address as the last 32-bits of the IPv6 address:

sn01 = 2a01:56c0:4033:4000::10.129.40.1

cn01 = 2a01:56c0:4033:4000::10.129.48.1