Autonomic IP to Access Control Group Mapping

draft-yizhou-anima-ip-to-access-control-groups

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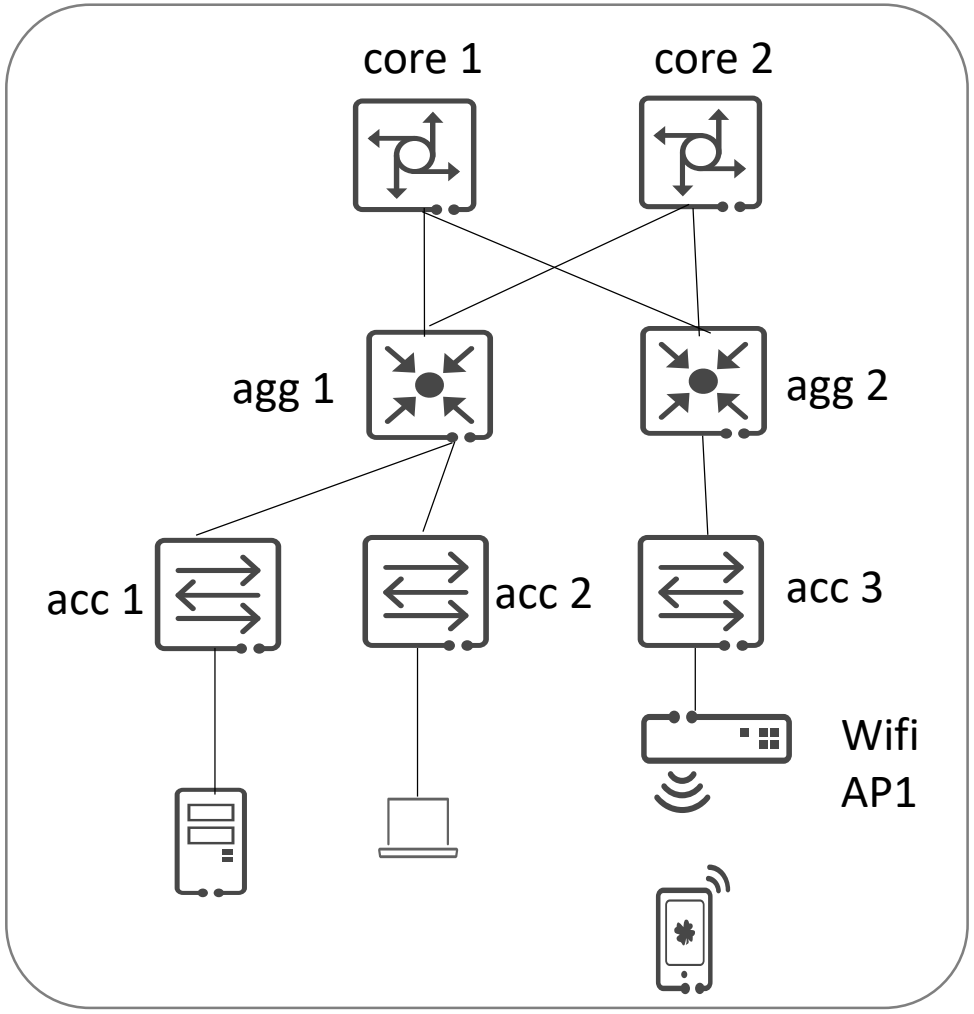
IETF111

Usage scenarios – background of group based policy

- Traditional (pre-known VLAN/subnet + ACL) based access control is relatively static in the campus network
  - Tie the same group of hosts by assuming they are accessing from a pre-assigned switch/ports/VLAN/subnet --- not any more.
  - Most provisioning uses pre-assigned IP/prefix as source/destination IP in matching rule, like in ACL or prioritized forwarding at the exit point --- a big burden of provision and maintenance when an end host IP/prefix is not known upfront.

- Group based policy is being widely used as a replacement
  - Groups and rules based on groups can be provisioned in advance and irrespective of end user's IP/prefix
  - Require the policy execution point to locally have IP/prefix to access control group mapping info to check against the data packet.

Example topology 1 – simple case



Two Terms:

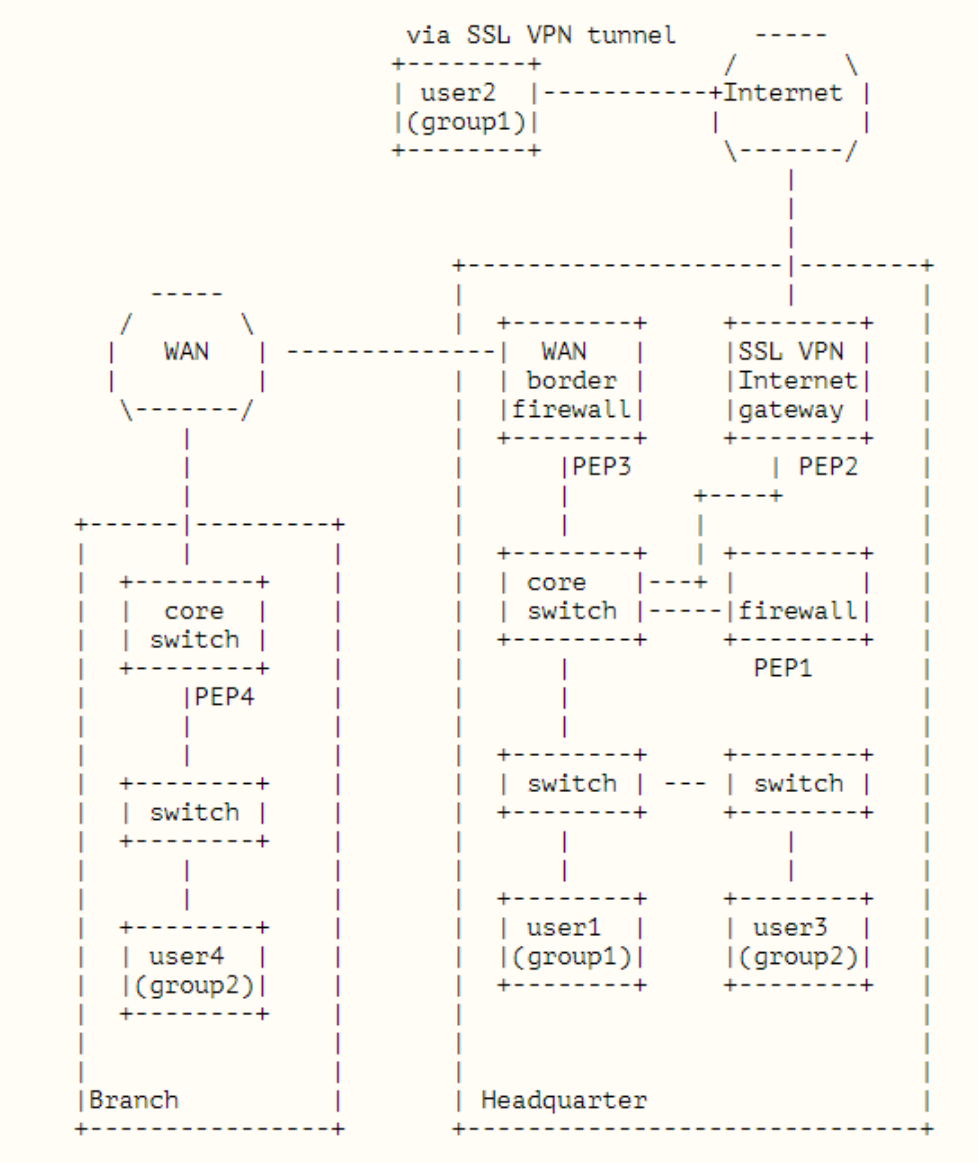
- PEP: Policy Enforcement Point.
  - Places to put PEP vary: scale, simplicity, single/dual homed uplink, L2/L3 topology, node capability….
  - Highly centralized: only at core layer
  - Highly distributed: at every access switches

- AAP: Access Authentication Point.
  - Responsible for its attaching end users.
  - Places to put AAP also vary
  - Obtain the IP address/prefix information, e.g. via DHCP snooping, proxy, prefix-delegation, configs
  - Obtain the group (ID) information, e.g. via 802.1x+AAA
  - Keep the (IP, group) bindings

Requirement: PEPs get IP to group info from AAP

- PEP and AAP on different nodes
- PEP requires full set info (src, dest) while each AAP may only have a subset of info for its responsible end hosts

Example topology 2 – more complex case



- PEPs are located at different places
- Specific traffic can be directed to certain PEP, e.g. PEP1 is for intra HQ traffic.
- More complex group definition and policy enforcement rules

- **Requirement: PEPs get IP to group info from AAP**

Proposal: define new GRASP objective

- To distribute IP address/prefix to access control group IDs mapping info from AAP to PEP

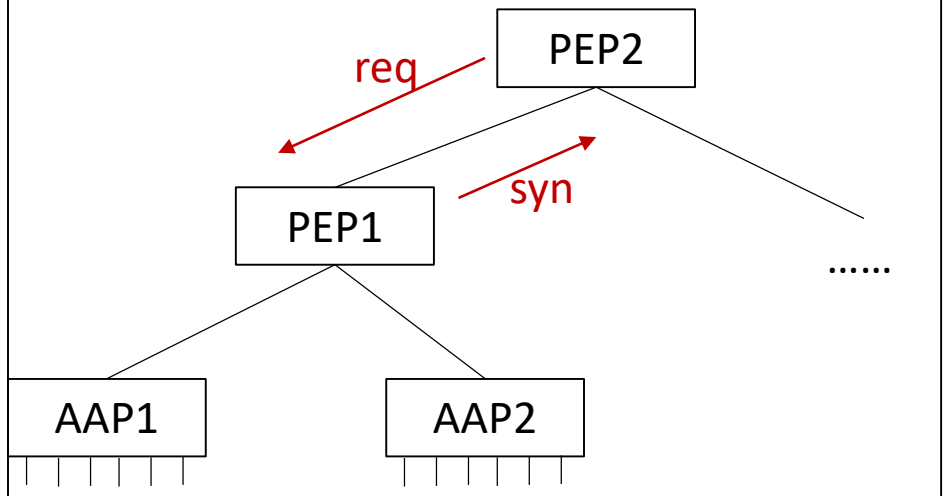
```
objective = ["IPAddressToAccessControlGroups",
             objective-flags, loop-count,
             [ip-address-or-prefix, *group-id]]

group-id = uint

; copied from draft-ietf-cbor-network-addresses, RFC YYYY TBD:

ip-address-or-prefix = ipv6-address-or-prefix/ipv4-address-or-prefix

ipv6-address-or-prefix = #6.54(ipv6-address / ipv6-prefix)
ipv4-address-or-prefix = #6.52(ipv4-address / ipv4-prefix)

ipv6-prefix = [ipv6-prefix-length, ipv6-prefix-bytes]
ipv4-prefix = [ipv4-prefix-length, ipv4-prefix-bytes]

ipv6-prefix-length = 0..128
ipv4-prefix-length = 0..32

ipv6-prefix-bytes = bytes .size (uint .le 16)
ipv4-prefix-bytes = bytes .size (uint .le 4)

ipv6-address = bytes .size 16
ipv4-address = bytes .size 4
```

Procedures

- Providing Node: AAP
  - Send unsolicited Synchronization to PEP upon a new/updated/withdrawn binding
  - Send Synchronization as a response to the Request
- Requesting node: PEP
  - Send a Request for binding info when the source or destination group is either unavailable from data packet directly or no hitting entry from local stored info
  - May send Request periodically or voluntarily, e.g. before local entry timeout, re-booting…

To be discussed

- Can PEP1 respond PEP2?



If the responding node can be PEP, PEP is usually not the owner of the binding info.

- Inconsistent info may occur?
- Add a parameter like “confidence level”?
- PEP decides if request should be further passed down?

Next Steps

- Revise the document based on the comments
- Suggestions are welcome to the mailing list or to me (liyizhou@huawei.com)