

Architecture for CASM

Coordinated Address Space Management

draft-li-casm-address-pool-management-architecture-00

draft-kumar-casm-requirements-and-framework-00

Chen Li, Chongfeng Xie(China Telecom),

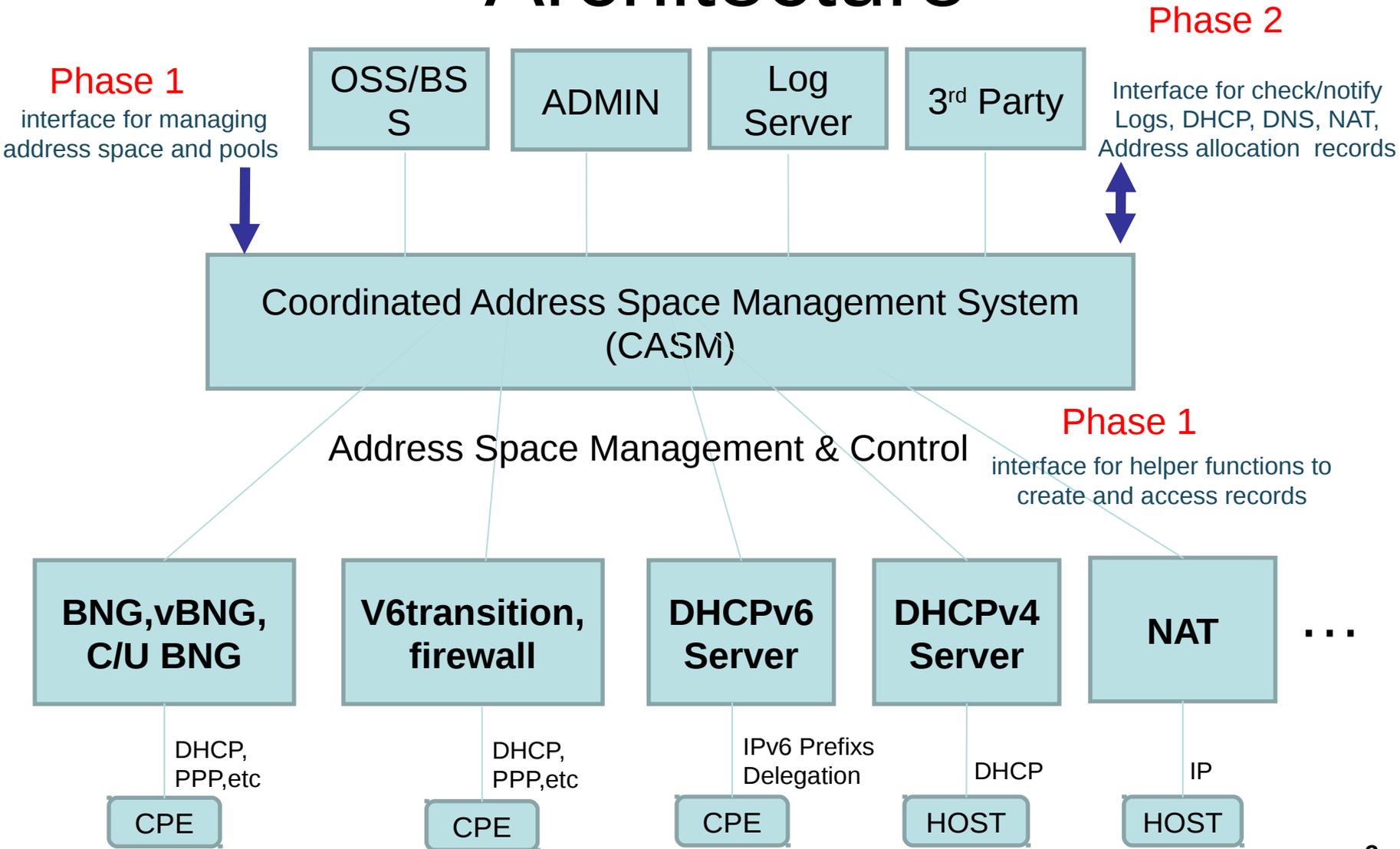
Jun Bi(Tsinghua University)

Weiping Xu(Huawei)

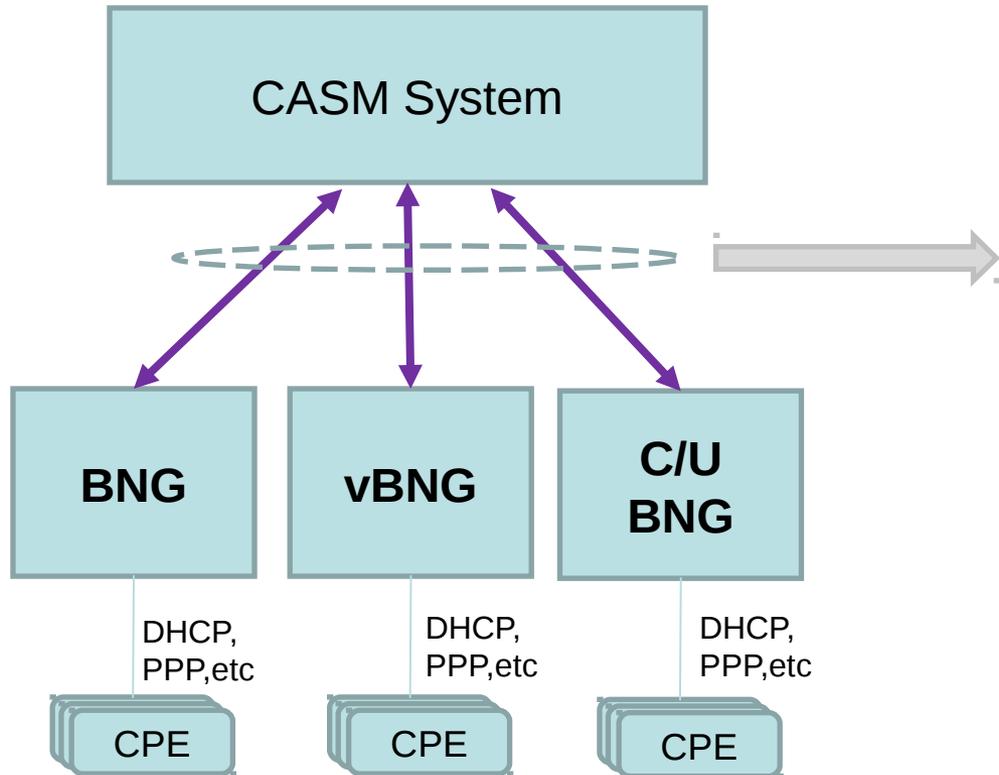
Rakesh Kumar, Anil Lohiya(Juniper)

Marc Blanchet(Viagenie)

Overall Address Management Architecture

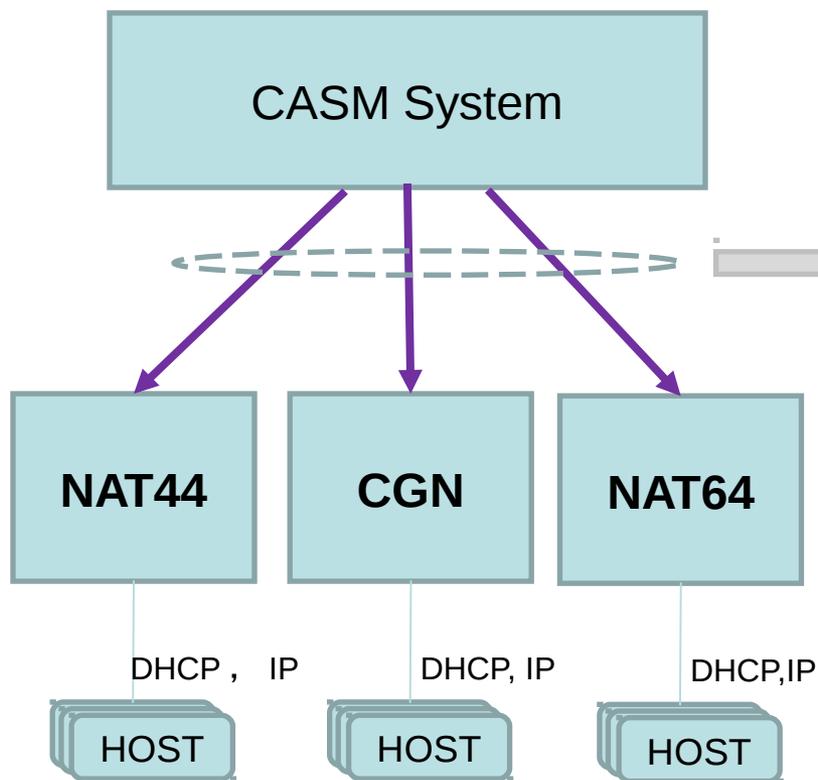


Workflow for BNG use case



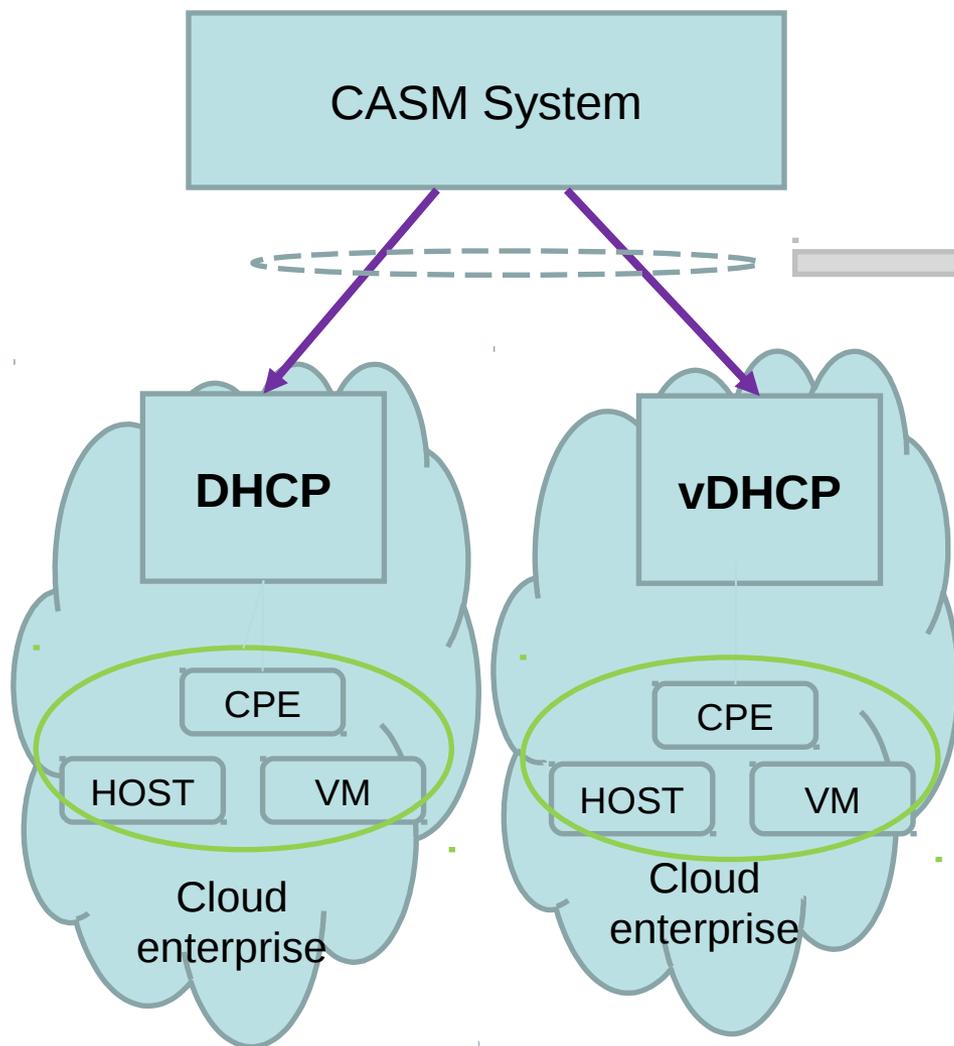
- Specify:
 - BNG initiates address pool request for desired sized of address.
 - Management System allocates address pool and reply the BNG
 - BNG issues an renew request if the lifetime is going to expire
 - BNG keeps monitoring and reports the current usage of the current address pool

Workflow for public IP address pool (NAT/CGN) use case



- Specify:
 - Allocate the public IP address pools on NAT device
 - Release the free public IP address pools
 - Public IP address pool, port-set, translation policy configuration,
- General properties
 - Private and public IP address
 - NAT mapping rules (static or dynamic mapping)

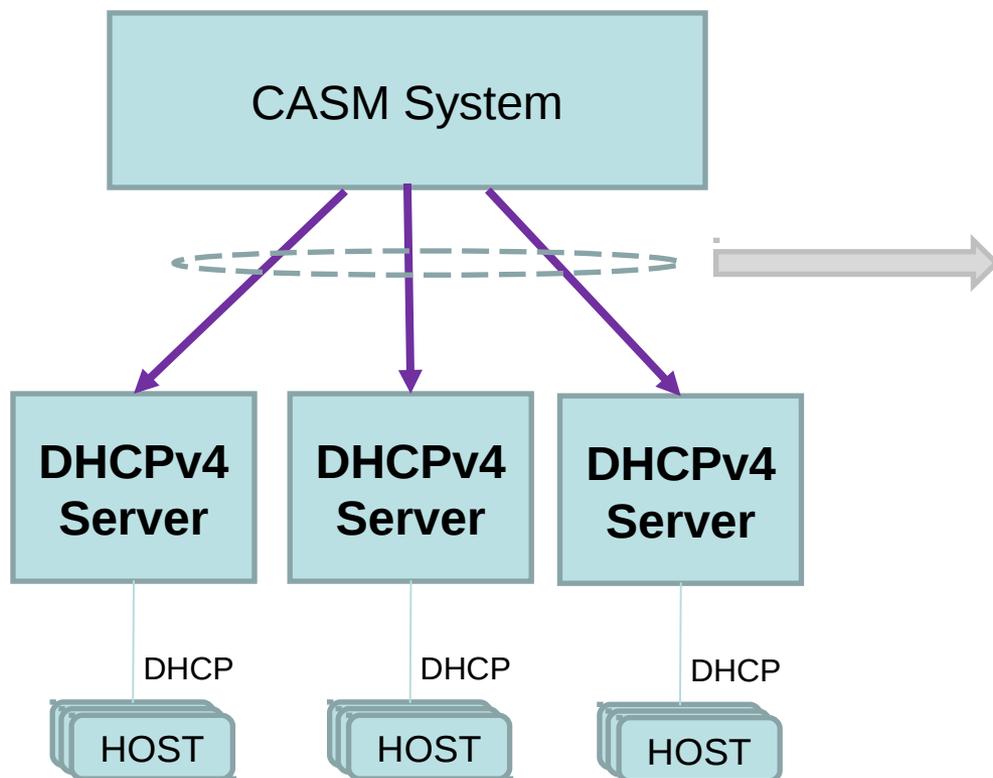
Workflow for cloud enterprise use case



- Specify:
 - Management System configure the IP address pool on the (v)DHCP for LAN side of CPE.
 - Management System configure the IP address pool on the (v)DHCP for WAN side of CPE.
 - Management System configure the IP address pool of (v)DHCP for VM in DC

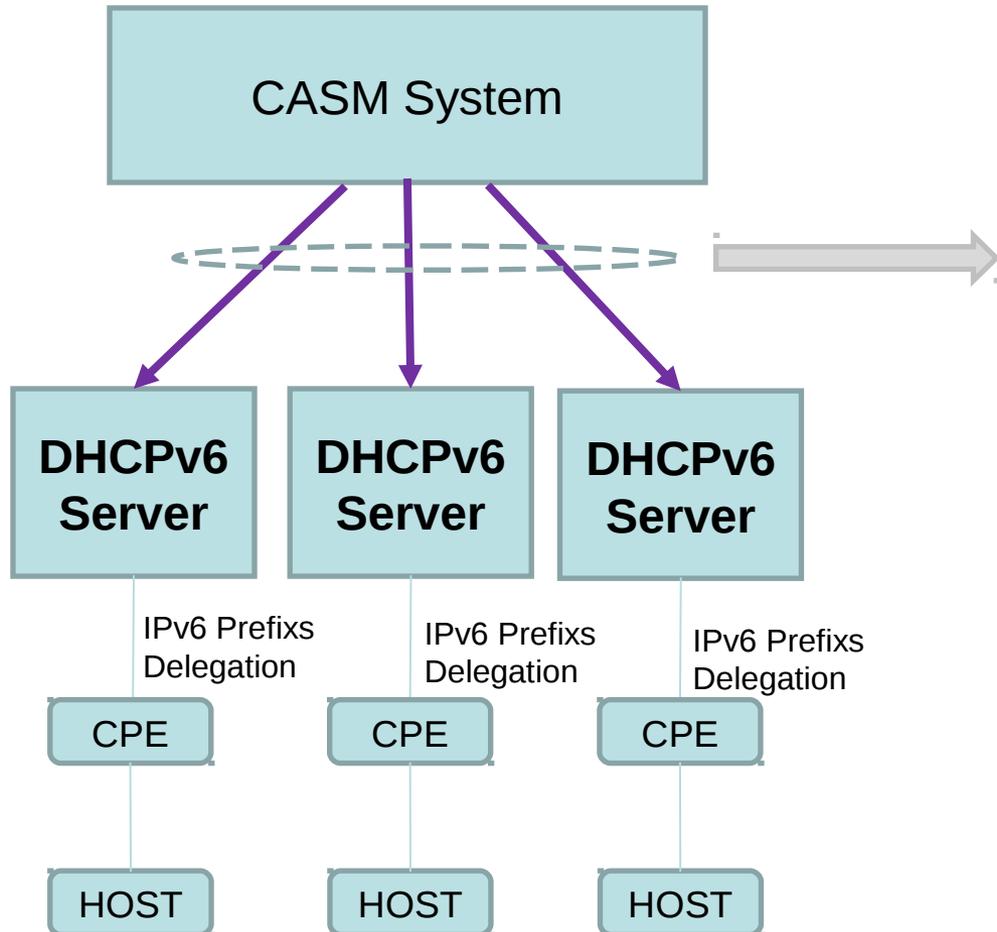
To manage the public IP address resource effectively and avoid the manual configuration mechanism

Workflow for DHCPv4 use case



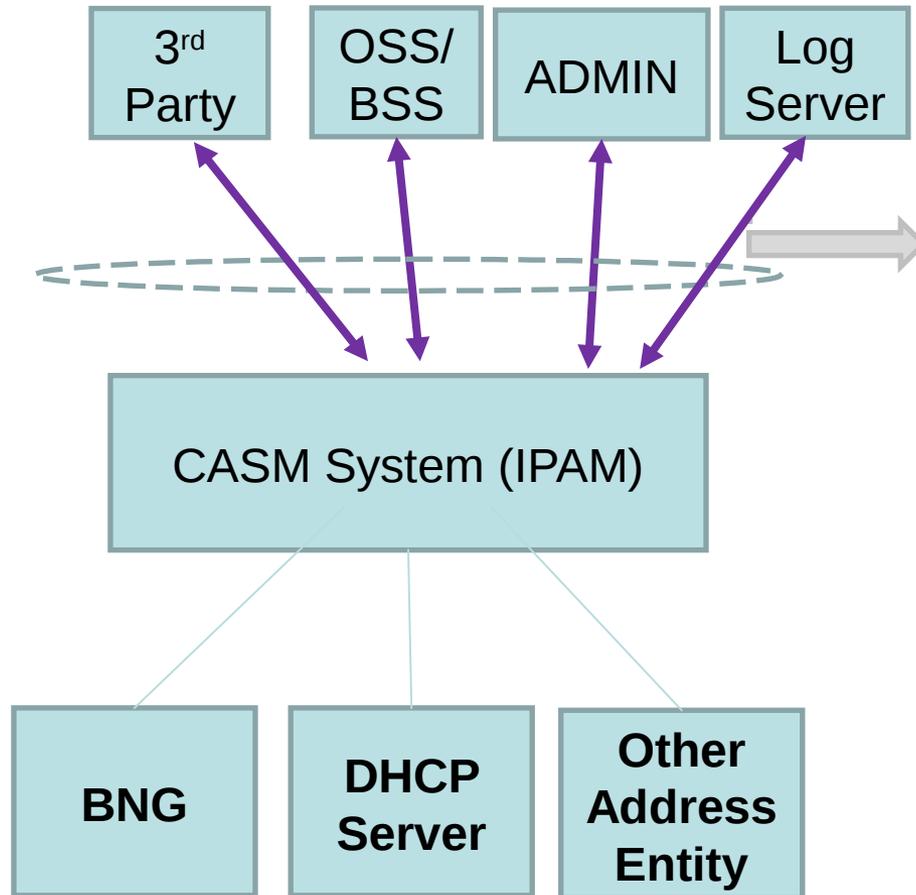
- Specify:
 - An address Space management system used to initialize multiple address pools on DHCP servers for HOSTS
 - Configure DHCP statically, if the DHCP server is ever replaced, the new server must be configured with the same old pool.

Workflow for DHCPv6 delegation use case



- Specify:
 - Management System configure the IPv6 prefixs for CPE on DHCPv6 server
 - The DHCPv6 Server then assign the corresponding IPv6 prefix to CPE.

Workflow for IPAM user case



- **Managing address pool :**
 - Private and Public IP address
 - Allocation schemes (map addresses to requirements)
 - Allocation priorities (order in which pools are considered)
 - Lease duration for each pool
 - Pool fragmentation rules (how pool can be sub-divided)
- **General properties:**
 - Multi-tenancy, Authentication, Security
 - Query available and allocated resources
 - Notification when a resource depletion threshold is reached

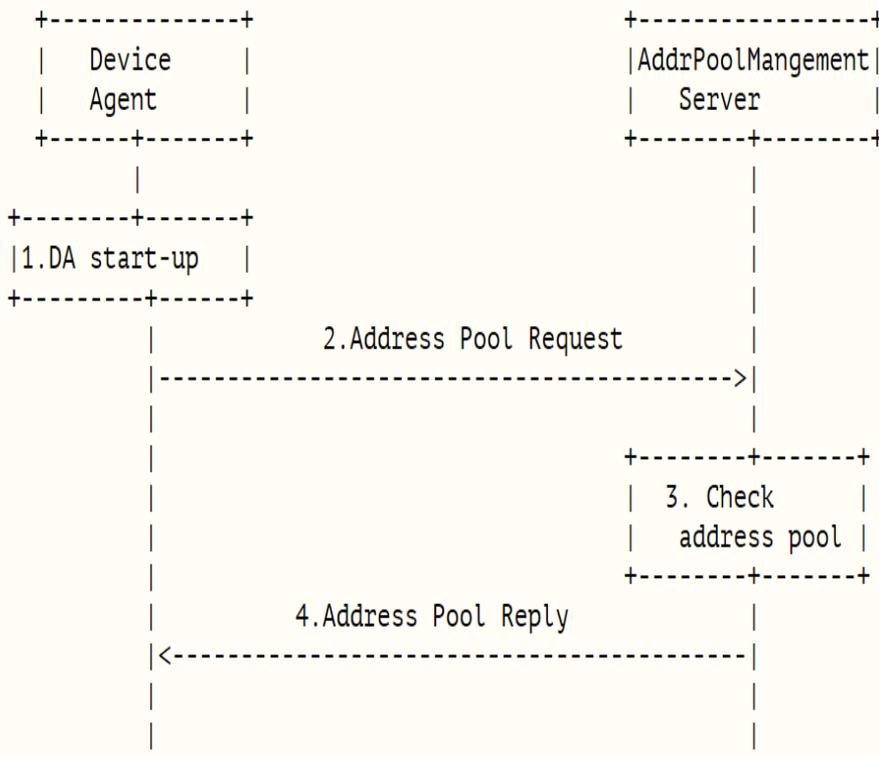
Q&A

- For discussion
 - Divide into Phase 1 & 2?
 - Other questions?

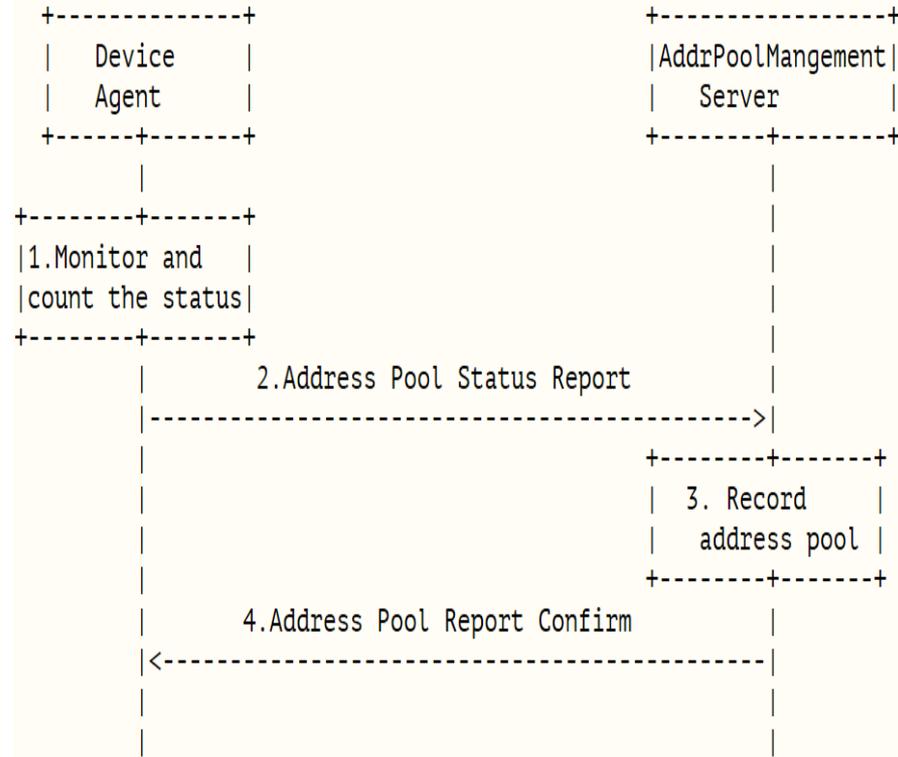
The following pages are backup
slides

A typical case of Detail procedure for BNG use case

- Initial Address Pool Configuration

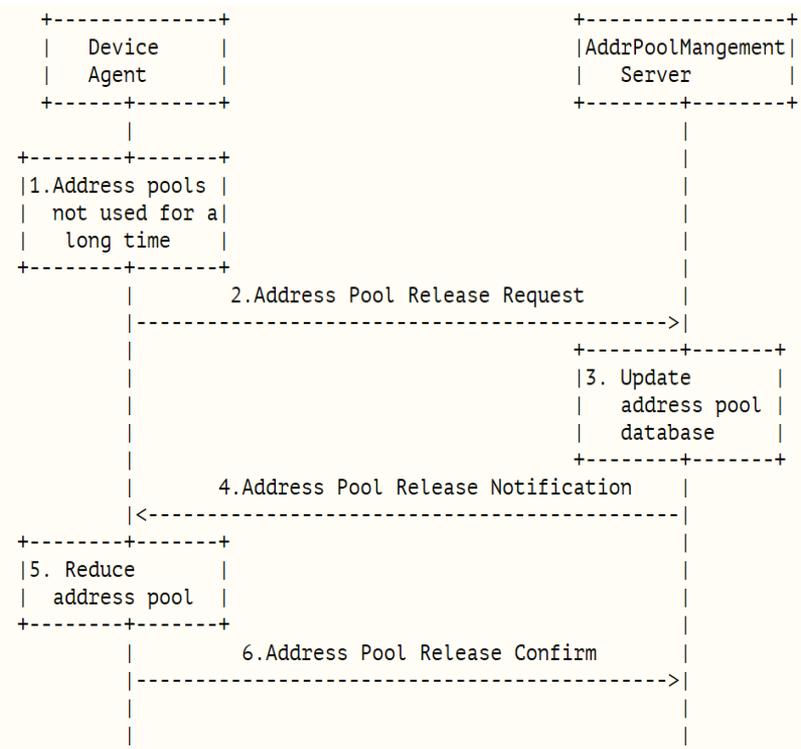
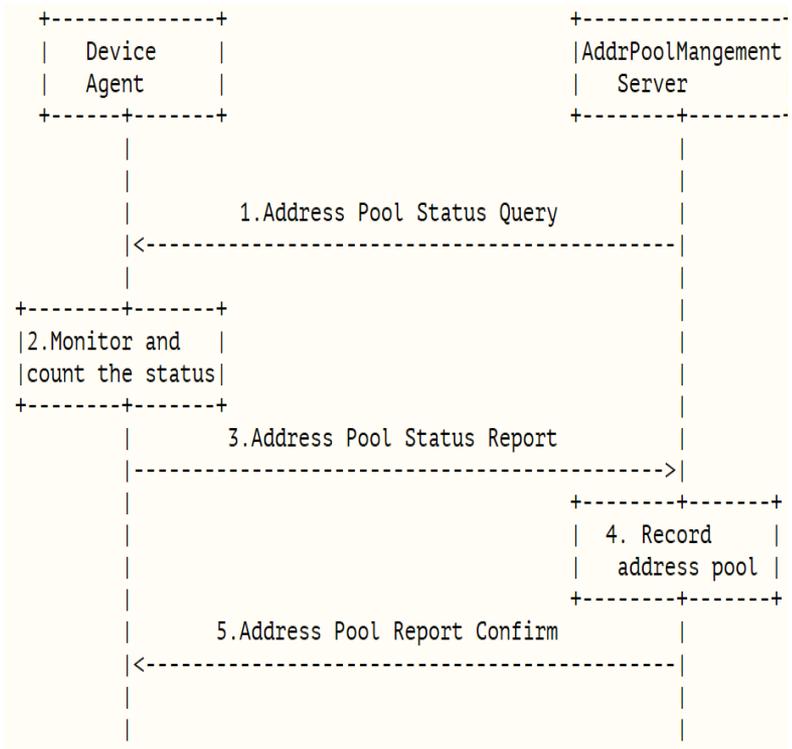


- Address Pool Status Report

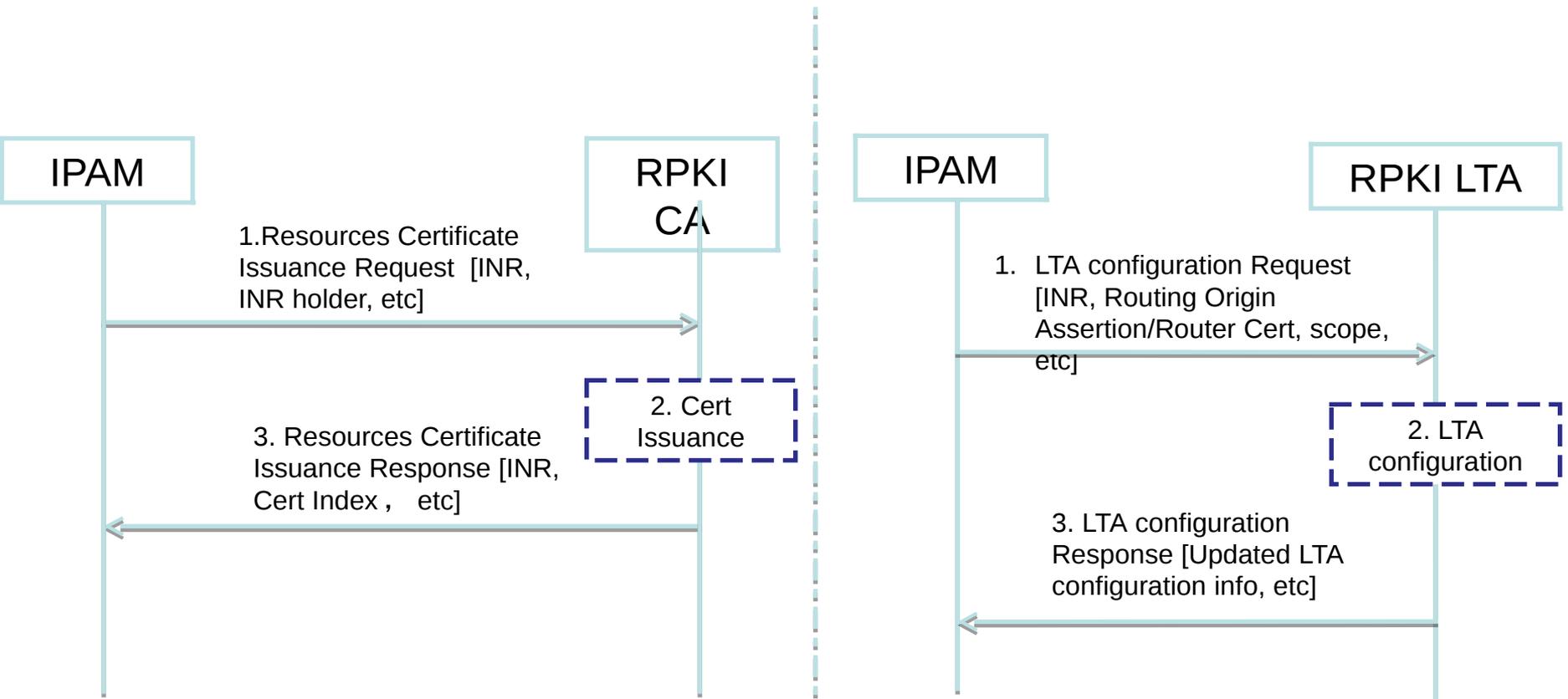


A typical case of detail procedure for BNG use case

- Address Pool Status Query
- Address Pool Release



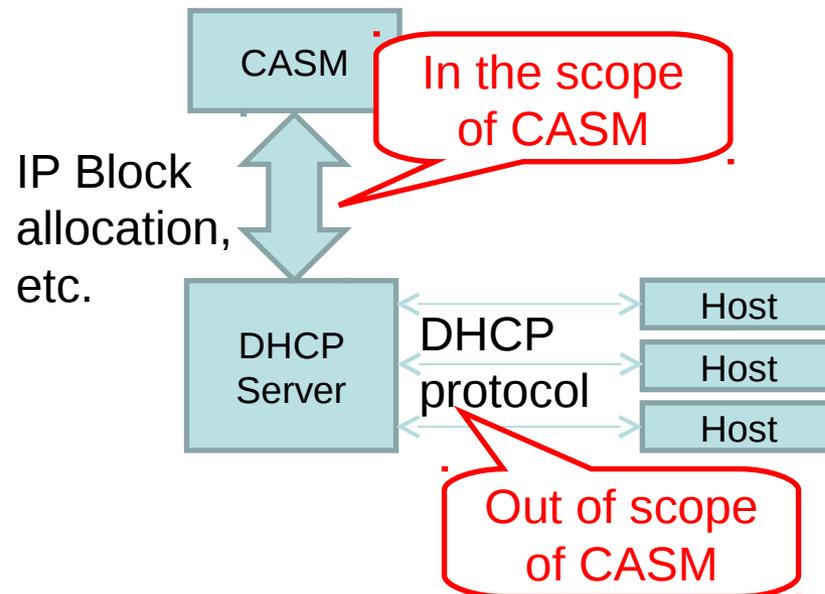
A typical case of detail procedure for RPKI use case



INR: Internet Number Resource
LTA: Local Trust Anchor

Q&A

- Clarify the relationship vs DHCP?
 - DHCP protocol is used between DHCP server and client, it was used for DHCP server dynamically distributing network configuration parameters, such as IP address, to the DHCP client. It's out of scope of CASM. Before DHCP server can distribute IP address to client, It must acquire IP address blocks from which to allocate IP address. It can get these blocks from CASM system. That's in the scope.



Q&A

- Clarify the relationship vs Anima?
- Response from Chongfeng
 - Firstly, ANIMA is a self-managing in AUTONOMIC networking environment, the configurations to network elements are mainly done by the network elements themselves. While in CASM, in order to make the task easier, we propose the use centralized server or platform to do the configuration task, of course, the server may be distributed physically.
 - Secondly, they have different use case, more than 3 years ago, I had a long talk with Dr. Jiang Sheng in Beijing, and propose that the IP RAN may be a suitable use case to ANIMA, although the name did n't exist yet. the primary use case for CASM is the address pool configuration for broadband IP network, CT has implemented the whole system based on the current CASM drafts, and 3 vendors have joined the field test last year. The field trial prove this approach can solve the issues we are concerned with

Q&A

- Clarify the relationship vs Anima?

5.8.1 Fundamental Concepts of Autonomic Addressing *[Difference] The fundamental Concepts between CASM and ANIMA are different. Please see the following derivation from draft-ietf-anima-autonomic-control-plane.*

- Usage: Autonomic addresses are exclusively used for self- management functions inside a trusted domain. **They are not used for user traffic.** Communications with entities outside the trusted domain use another address space, for example normally managed routable address space. *[Difference] The CASM address used for user traffic mostly. For example, address will be used for user traffic at BNG user case.*
- Separation: Autonomic address space is used separately from user address space and other address realms. This supports the robustness requirement.
- Loopback-only: **Only loopback interfaces of autonomic nodes carry a routable address;** all other interfaces exclusively use IPv6 link local for autonomic functions. The usage of IPv6 link local addressing is discussed in [RFC7404]. *[Difference] Not limit to loopback in CASM.*
- Use-ULA: **For loopback interfaces of autonomic nodes, we use Unique Local Addresses (ULA),** as specified in [RFC4193]. An alternative scheme was discussed, using assigned ULA addressing. *[Difference] Address has no such limitation in CASM.*
- No external connectivity: **They do not provide access to the Internet.** If a node requires further reaching connectivity, **it should use another, traditionally managed address scheme** in parallel. *[Difference] The scope of anima doesn't including the internet accessing case, and get rid of such case, and need another address scheme. The CASM is one type of such address schemes.*
- Addresses in the ACP are permanent, and do **not support temporary addresses** as defined in [RFC4941]. *[Difference] The CASM provide dynamic address assignment capability.*
- **Autonomic functions do not require IPv4:** Autonomic functions and autonomic service agents are new concepts. They can be exclusively built on IPv6 from day one. There is no need for backward compatibility. *[Difference] The CASM must deal with the IPv4 address issue in traditional network.*

Q&A

- Clarify the relationship vs Anima?
- Goal: Anima is “dedicated to how to make IPv6 prefix management at the edges of large-scale networks as autonomic as possible”; while CASM is focusing on the *address managed by device*, instead of the *address of device*
- Interface : ANIMA1 interface between Nes, CASM interface is from CASM system to other devices

draft-ietf-anima-prefix-management-03

3.3. Interaction with other devices

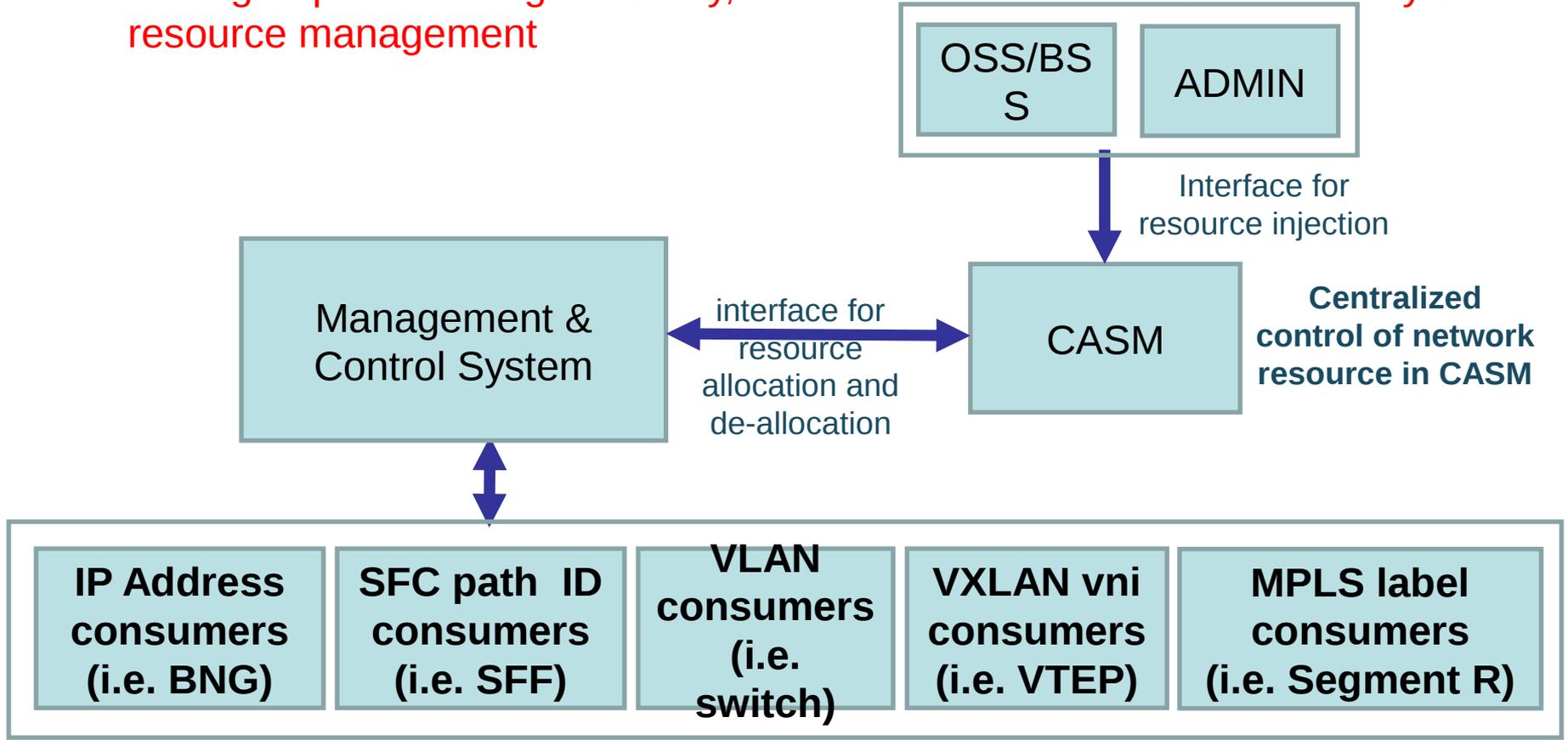
3.3.1. Information needed from other devices

This section identifies those of the above parameters that need external information from neighbor devices (including the upstream devices). In many cases, two-way dialogue with neighbor devices is needed to set or optimize them.

- o Identity of a trust anchor.
- o The device will need to discover a device, from which it can acquire IPv6 address space.
- o The initial prefix length for each device role, particularly for its own downstream devices.
- o The default value of the IPv6 prefix length may be overridden by a non-default value.
- o The device will need to request and acquire IPv6 prefix that is assigned to this device and its downstream devices.
- o The device may respond to prefix delegation request from its downstream devices.
- o The device may require to be assigned more IPv6 address space, if it used up its assigned IPv6 address space.

Q&A

- Only consider IP address? how about ID (SFC , VLAN , VXLAN , MPLS) ?
- If the group decide to go this way, an extended architecture for a variety of resource management



Q&A

- Why there is the demand of interoperable interface.
 - IPAM need to integrated with other system, e.g., in Openstack Neutron need integrate IPAM , so that IPAM could provide address subnet service for it. In another case, CASM will integrated with the system beyond it , e.g., Orchestration interact with IPAM , to provide addresses respectively different enterprises
 - Another example is , when ISP changes IPAM vendor, the new vendor should follow the same interface as old one, so that no need to change other devices