A Profile of **Si**gned **S**AVNET-**P**eering **I**nformation (SiSPI) Object for Deploying Inter-domain SAVNET

draft-chen-sidrops-sispi-01

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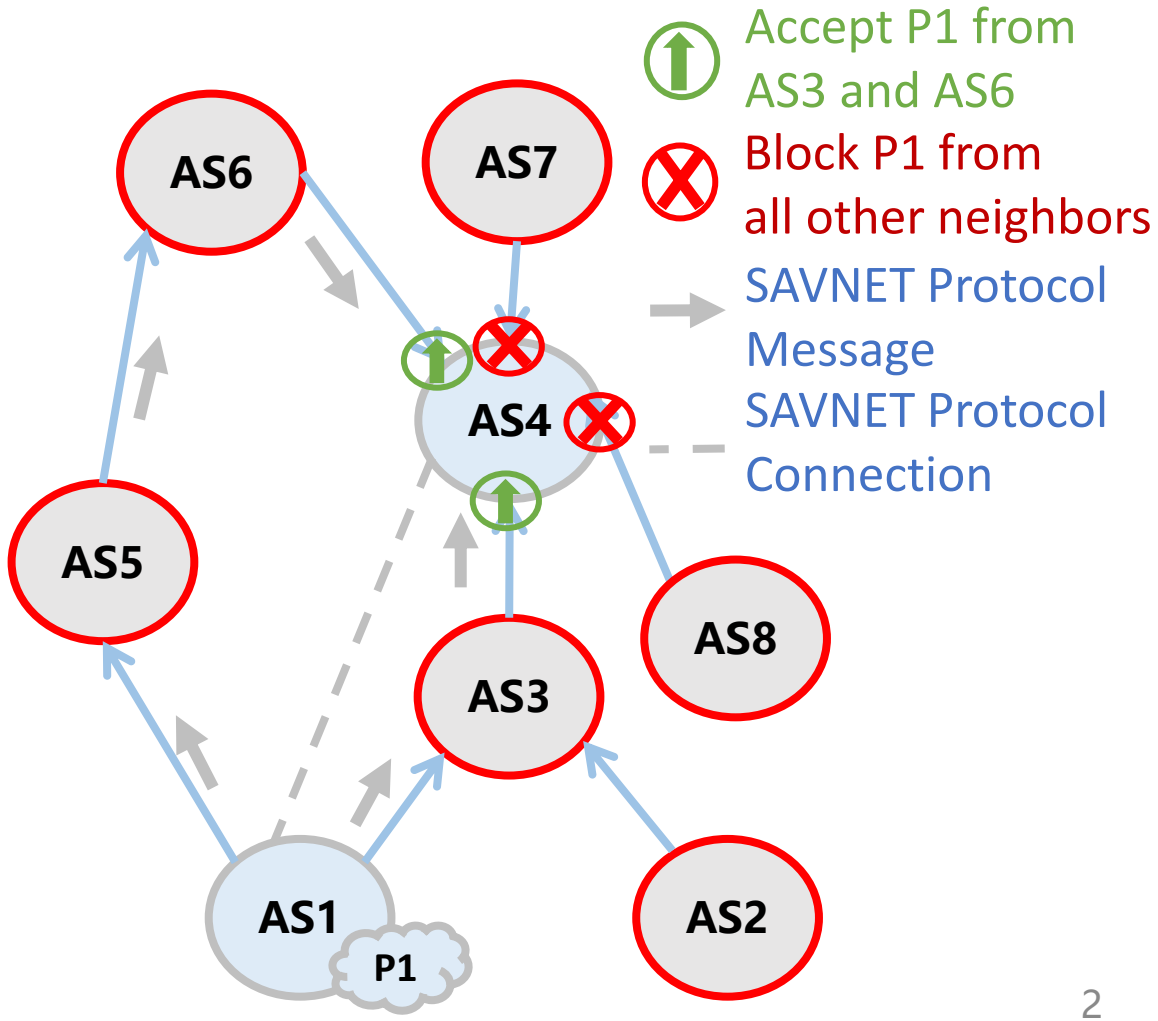
Background: SiSPI Object

- **SiSPI** proposes a public RPKI registry that contains all ASes which both deploy SAVNET and are willing to setup SAVNET peering relationships
  - A newly adopting AS can use this registry as a reference and pick appropriate ASes to setup SAVNET peering relationship.
  - RPKI is the most suitable choice.
- SiSPI is needed for automatic peering
  - SAVNET agents of the SAVNET-adopting ASes, such as AS 1 and AS 4, need to find and establish connections with other SAVNET agents to communicate SAV-specific information.
  - Automatic SAVNET peering can help reduce the operational overhead and accelerate the process of newly adopting ASes.

Relationships of AS4 and its neighbors: any one of c2p, p2c, or p2p



Comments on Version 00

- Comments on SiSPI object identifier (OID)
  - "1.2.840.113549.1.9.16.1.52" should be "1.2.840.113549.1.9.16.1.52 (suggested)" until the codepoint has been allocated (Amanda).
- Comments on SiSPI eContent
  - Extend the object to cover both IPv4 and IPv6 address families (Yangfei Guo).
  - Extend the object from only one address to a list of addresses. An AS can have many SAVNET agents (Yangfei Guo).
- Comments on SAVNET peering establishment algorithm using SiSPI
  - Illustrate the exact algorithms of Section 6 Using the SiSPI object (Ben).
  - Illustrate the appropriate amount of information needed for a newly adopting AS (Ben).
  - ASPA is not bidirectional (Ben).

Main Updates of Version 01

- Revise the SiSPI Content Type Section
  - “1.2.840.113549.1.9.16.1.52” ➔ “1.2.840.113549.1.9.16.1.52 (suggested)” .
- Revise the SiSPI eContent Section
  - Revise the ASN.1 module to cover both IPv4 and IPv6 address families and include a list of IP addresses for an AS.
- Revise the Using SiSPI Section
  - Revise the considerations for establishing SAVNET-peering relationships using SiSPI.
  - Add the detailed procedure for establishing SAVNET-peering relationships with BGP announcements, ASPA objects, and SiSPI.
- Add a new Newly SAVNET-adopting ASes Section

SiSPI Object eContent

- The eContent of a SiSPI object is formally defined by the ASN.1 module:

```
SAVNETAttestation ::= SEQUENCE {
  version [0]   INTEGER DEFAULT 0,
  asID          ASID,
  addresses     SEQUENCE OF IPFamilyAddresses }

ASID ::= INTEGER (0..4294967295)
IPFamilyAddresses ::= SEQUENCE {
  IPFamily ADDRESS-FAMILY.&afi ({AddressFamilySet}),
  IPAddresses ADDRESS-FAMILY.&ip ({AddressFamilySet}{@addressFamily}) }

ADDRESS-FAMILY ::= CLASS {
     &afi          OCTET STRING (SIZE(2)) UNIQUE,
     &IP
   } WITH SYNTAX { AFI &afi IP &ip }

AddressFamilySet ADDRESS-FAMILY ::= { addressFamilyIPv4 | addressFamilyIPv6 }

addressFamilyIPv4 ADDRESS-FAMILY ::= { AFI afi-IPv4 IP IPv4ip }
addressFamilyIPv6 ADDRESS-FAMILY ::= { AFI afi-IPv6 IP IPv6ip }

afi-IPv4 OCTET STRING ::= '0001'H
afi-IPv6 OCTET STRING ::= '0002'H

IPv4ip ::= SEQUENCE (SIZE(1..MAX)) OF ipAddress{ub-IPv4}
IPv6ip ::= SEQUENCE (SIZE(1..MAX)) OF ipAddress{ub-IPv6}

ub-IPv4 INTEGER ::= 32
ub-IPv6 INTEGER ::= 128

ipAddress {INTEGER: ub} ::= BIT STRING (SIZE(0..ub))
```

The **asID** field contains the AS number that has deployed SAVNET and can perform SAV on the data plane.

The **addresses** field contains a SEQUENCE of **IPFamilyAddresses**, which stores the routers' IP addresses within the AS whose ID is asID.

The **IPFamilyAddresses** field contains the instance of **IPFamily** and the instance of **IPAddresses**.

The **IPFamily** field contains an OCTET STRING which is either '0001' H (IPv4) or '0002' H (IPv6).

The **IPAddresses** field contains a SEQUENCE of ipAddress instances.

The **ipAddress** element is length bounded by ADDRESS-FAMILY and its type is a BIT STRING.

Establishing SAVNET Peering Relationship Using SiSPI

Based on the BGP announcements, ASPA objects, and SiSPI, an AS can find the candidate ASes to establish SAVNET peering relationships according to the following procedure:

1. Peering Candidates Determination
   a. Identify all ASes that appears on the preferred AS paths to various destinations and rank them according their frequency in an descending order.
2. SiSPI Objects Utilization
   a. Retrieve SiSPI objects and obtain all the candidate ASes which deploy SAVNET from the AS set found in Step 1.
3. Peering Candidates Selection
   a. From the candidate ASes obtained in Step 2, select the peering candidates based on their rankings.
   b. Stop the selection process until no more candidate ASes or the number of candidates exceeds 4000[1].
4. Peering Establishment
   a. Establish SAVNET peering relationships with the candidate ASes selected by Step 3.

[1]https://community.juniper.net/discussion/maximum-number-of-bgp-sessions

Newly Adopting ASes

Registering SiSPI

- The newly SAVNET-adopting ASes need to register the SiSPI object proactively to help other SAVNET-adopting ASes find it and establish SAVNET peering relationships, as well as using the SiSPI objects to establish SAVNET peering relationships with other SAVNET-adopting ASes.
- To register SiSPI, the newly SAVNET-adopting ASes should share their information as described by SiSPI eContent.

Establishing SAVNET peering relationships

- To establish SAVNET peering relationships with other SAVNET-adopting ASes, the newly SAVNET-adopting ASes should collect BGP announcements, ASPA objects, and SiSPI objects, and run the SAVNET peering establishment procedure.

Thanks!

- Any comments?