Inter-domain Source Address Validation based on AS relationships: ARBIF

draft-rly-savnet-inter-domain-as-relationships

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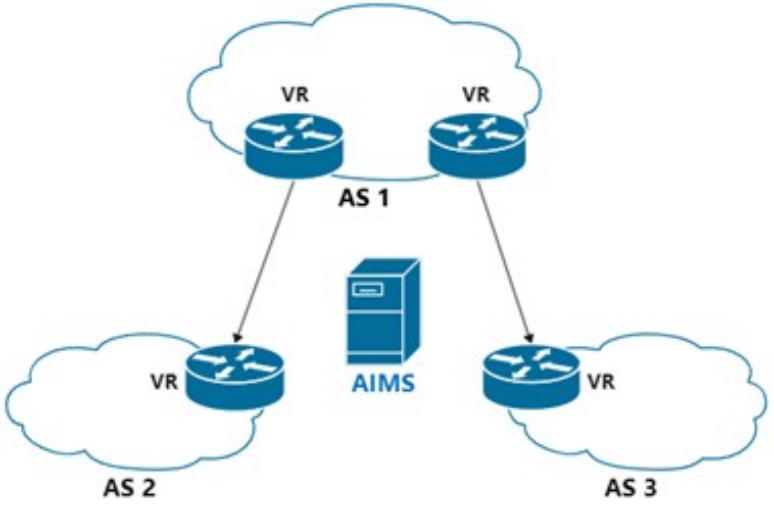
Introduction to ARBIF

- **Background**
  - Inter-domain Source address validation (SAV) is important in relieving IP spoofing. ARBIF is an inter-domain SAV scheme in SAVNET Working Group.
  - ARBIF uses AS relationships to abstract the inter-domain routing information.

- AS Relationship Based Inter-domain Filtering (**ARBIF**)
  - **Key Components:** Validation Router (VR), AS-IP Prefix Mapping Server (AIMS)
- ARBIF implementation has **2 key points** in data obtaining
  - How to obtain **neighboring AS relationships**?
  - How to obtain **IP prefixes** corresponding to some **ASes**?



Simulation Experiment

- **Simulation Environment:** In GNS 3
  - **VMware-workstation:** 17.5.2
  - **GNS3/GNS3 VM:** 2.2.54
  - **Ubuntu:** 24.04.2 LTS
  - **Routinator:** 0.14.2
  - **BIRD:** 2.14

- **Basic devices**: Ubuntu image in GNS3 Docker

Simulation Experiment

Key Question 1: How to obtain **neighboring AS relationships**?

- **Validation Routers**: BIRD in **Basic Devices**
  - **Implementation in ARBIF system:** Use BGP Roles to agree on AS relationships when establishing a BGP session. Querying ASPA objects when needed is a feasible alternative as it needs to query ROA objects.
  - **Experiment in GNS 3:** Install BIRD in Basic Devices to **act as VR**. Use modified BIRD with BGP roles. Receive RPKI objects from RP with RTRlib.

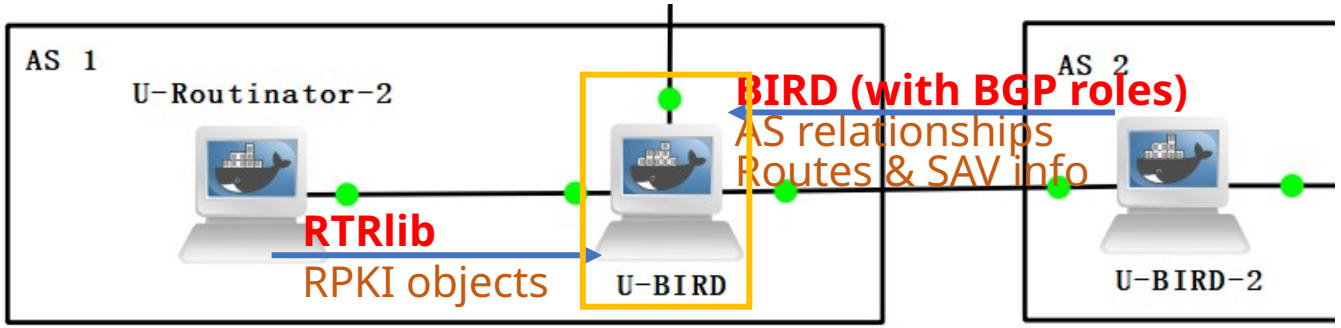


Image from GNS 3

Simulation Experiment

Key Question 2: How to obtain **IP prefixes** corresponding to some **ASes**?

- **Relying Party**: Routinator in **Basic Devices**
  - **Implementation in ARBIF system:** The Relying Party regularly synchronize RPKI objects. AIMS integrates ROA objects from RP, generates a mapping from ASNs to IP prefixes, and provides it to VRs for generating IP prefix SAV rules.
  - **Experiment in GNS 3:** Install Routinator in Basic Devices to **act as RP**. The AIMS function integrates obtained ROA objects.

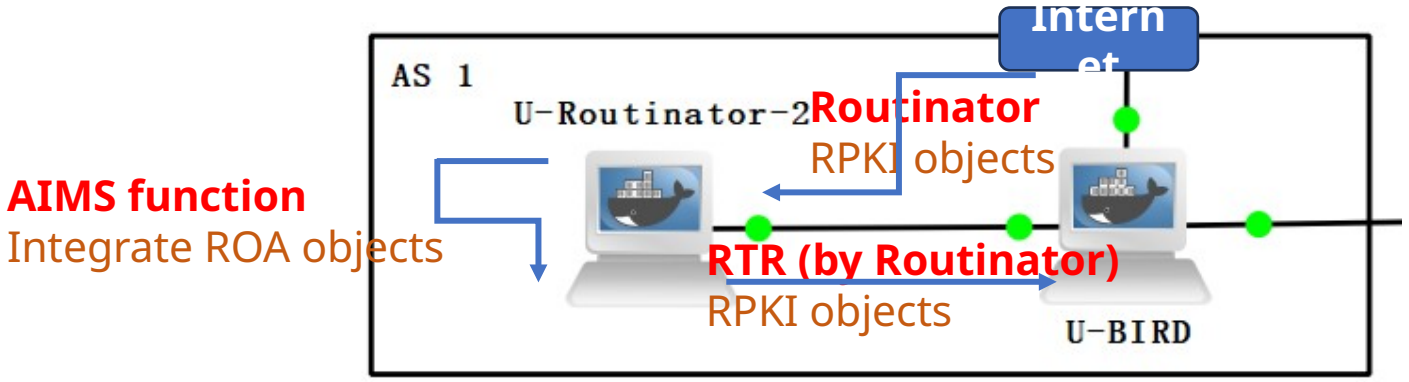
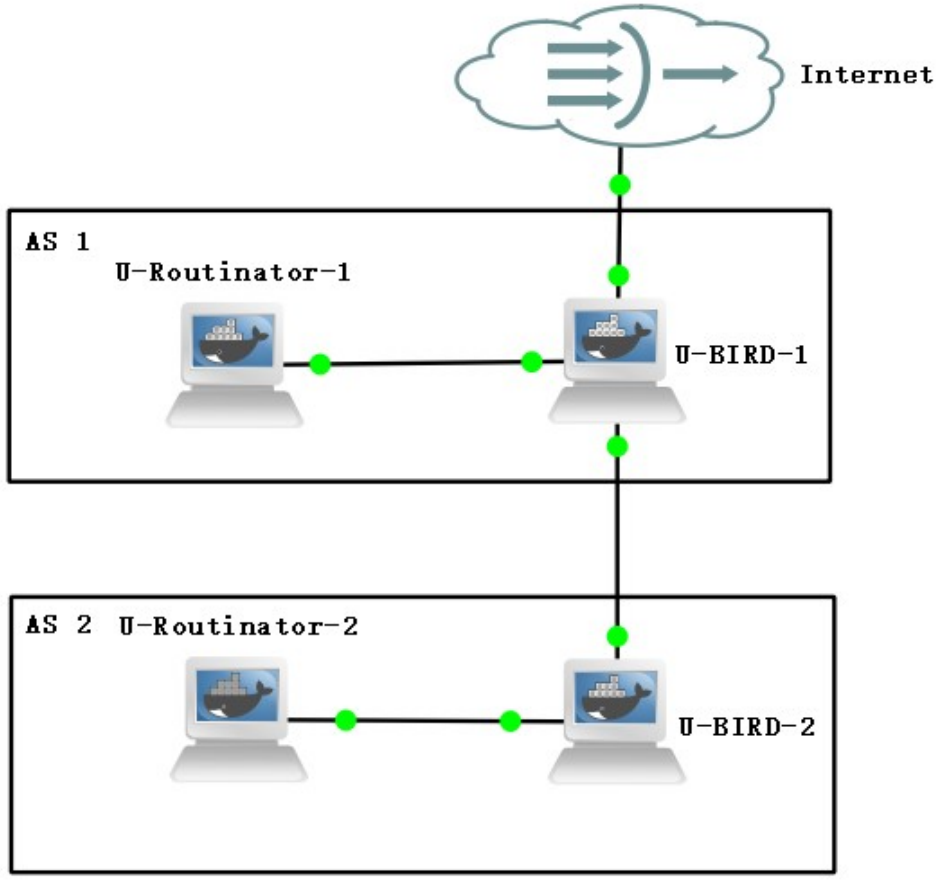


Image from GNS 3

Simulation Experiment

- **Experiment System in GNS 3**
  - A simple topology is used for test
  - VRs, RPs are implemented as introduced
- **Experience**
  - Routing security methods (like RPKI) provide much support for ARBIF
  - Modifications are still necessary due to different goals and data requirements.
- **Open Question**
  - We wonder are there solutions more consistent with ARBIF implementation?



Thank you!