

# Intra-domain Source Address Validation (SAVNET) Architecture

Dan Li, Jianping Wu, **Lancheng Qin**, Nan Geng, Li Chen

November, 2024

# Background

- Intra-domain SAVNET architecture aims to achieve accurate SAV in an intra-domain network by an automatic way
  - ◆ Introduce the use of SAV-specific information and guide the development of future intra-domain SAV solutions
- Historical versions
  - ◆ draft-li-savnet-intra-domain-architecture-00, IETF 115 SAVNET WG
  - ◆ draft-li-savnet-intra-domain-architecture-01, IETF 116 SAVNET WG
  - ◆ draft-li-savnet-intra-domain-architecture-02, June 2023
  - ◆ draft-li-savnet-intra-domain-architecture-03, IETF 117 SAVNET WG
  - ◆ draft-li-savnet-intra-domain-architecture-04, Oct 2023
  - ◆ draft-li-savnet-intra-domain-architecture-05, IETF 118 SAVNET WG
  - ◆ draft-li-savnet-intra-domain-architecture-06, Jan 2024
  - ◆ draft-li-savnet-intra-domain-architecture-07, IETF 119 SAVNET WG
  - ◆ **draft-ietf-savnet-intra-domain-architecture-00, Apr 2024**
  - ◆ **draft-ietf-savnet-intra-domain-architecture-01, IETF 121 SAVNET WG**

# Main Update

□ Add a new Section 4 to discuss where to deploy intra-domain SAVNET

- ◆ The architecture should be general to include different future SAV solutions
- ◆ The architecture should mention necessary factors that should be considered by future SAV solutions
- ◆ The architecture should guide the solution towards being effective and efficient

## Table of Contents

1. Introduction . . . . .	3
1.1. Requirements Language . . . . .	4
2. Terminology . . . . .	4
3. Overview . . . . .	5
4. Where to deploy intra-domain SAV . . . . .	7
5. Roles of SAVNET Routers . . . . .	8
5.1. Source Entity . . . . .	8
5.2. Validation Entity . . . . .	8
5.3. SAV-specific Information Communication Mechanism . . . . .	9
6. SAV-related Information . . . . .	9
6.1. SAV-specific Information . . . . .	9
6.2. Routing Information . . . . .	10
7. SAV Rule Generation . . . . .	10
8. Use Cases . . . . .	12
8.1. Use Case 1: SAV at Host-facing or Customer-facing Routers . . . . .	12
8.2. Use Case 2: SAV at AS Border Routers . . . . .	13
9. Meeting the Design Requirements of Intra-domain SAVNET . . . . .	15
9.1. Accurate Validation . . . . .	15
9.2. Automatic Update . . . . .	15
9.3. Incremental/Partial Deployment . . . . .	15
9.4. Convergence . . . . .	17
9.5. Security . . . . .	17
10. Data-plane Considerations . . . . .	18
11. Manageability Considerations . . . . .	18
12. Privacy Considerations . . . . .	19
13. IANA Considerations . . . . .	19
14. Contributors . . . . .	19
15. Acknowledgements . . . . .	19
16. References . . . . .	19
16.1. Normative References . . . . .	19
16.2. Informative References . . . . .	20
Authors' Addresses . . . . .	21

# Where to Deploy Intra-domain SAVNET

---

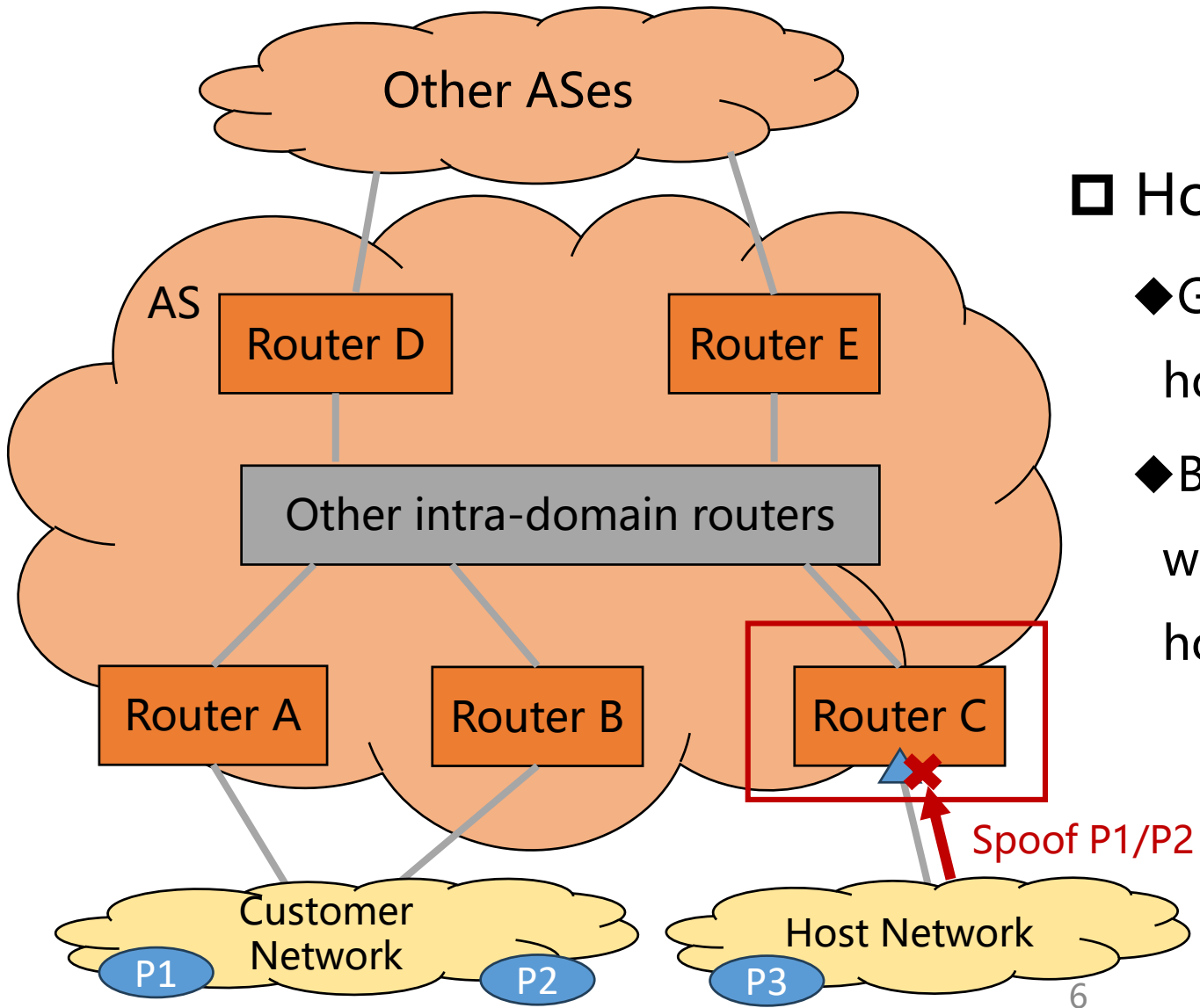
- To reduce deployment overhead and redundant validation, it is **not necessary** to **deploy** intra-domain SAV **on all intra-domain routers**
- Future solutions should **specify which routers deploy intra-domain SAV**
  - ◆ **Provide incremental benefits** when those routers incrementally deploy intra-domain SAV
- To this end, this section provides some key recommendations and considerations that should be considered by future solutions

# Where to Deploy Intra-domain SAVNET

---

- Host-facing routers, customer-facing routers, and AS border routers are vantage points to implement intra-domain SAV
  - ◆ These routers are closer to the source and thus will be more effective in identifying and discarding source-spoofed data packets
  - ◆ They can clearly determine the directionality of specific source prefixes based on network topology

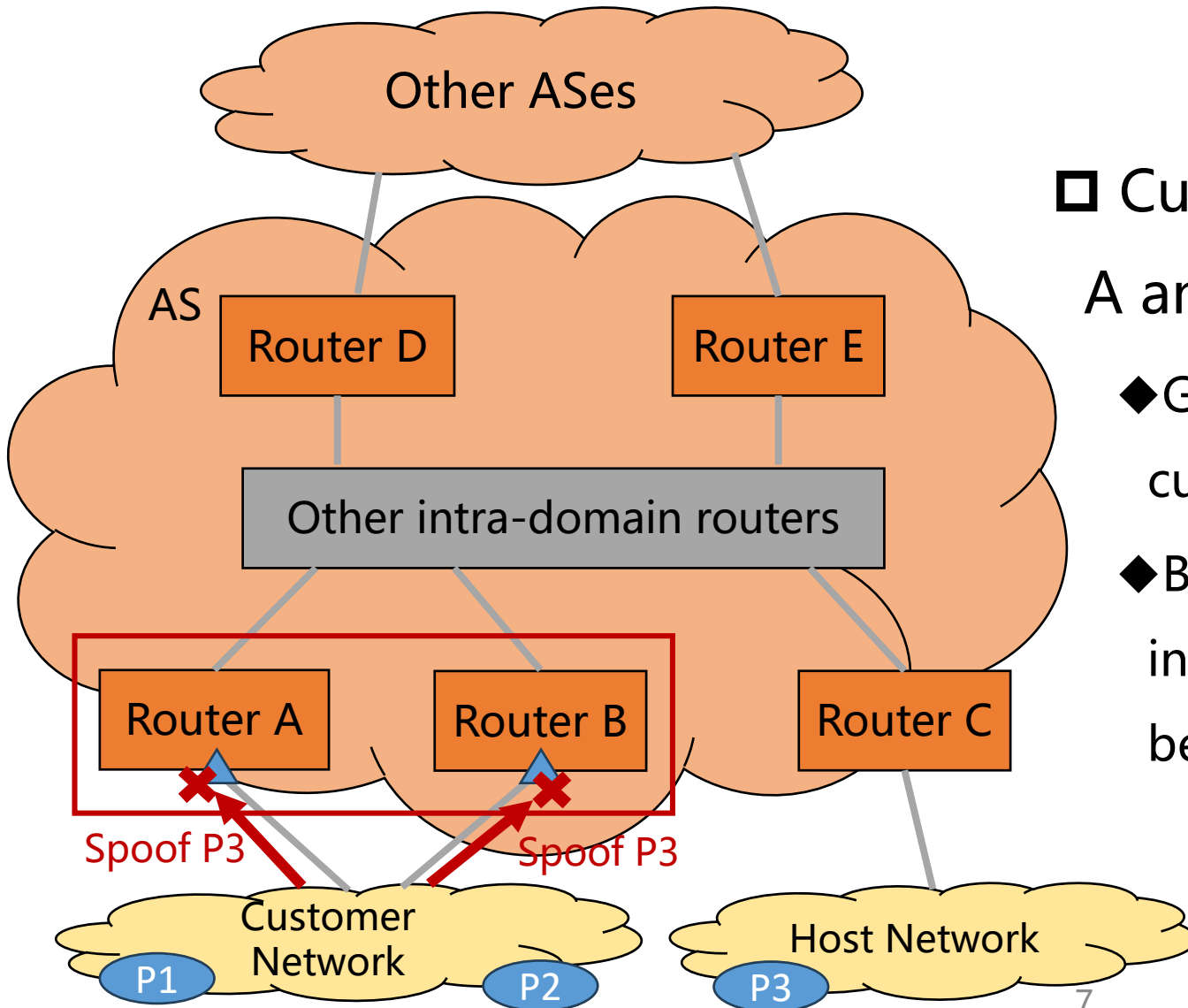
# Where to Deploy Intra-domain SAVNET



## □ Host-facing router (e.g., Router C)

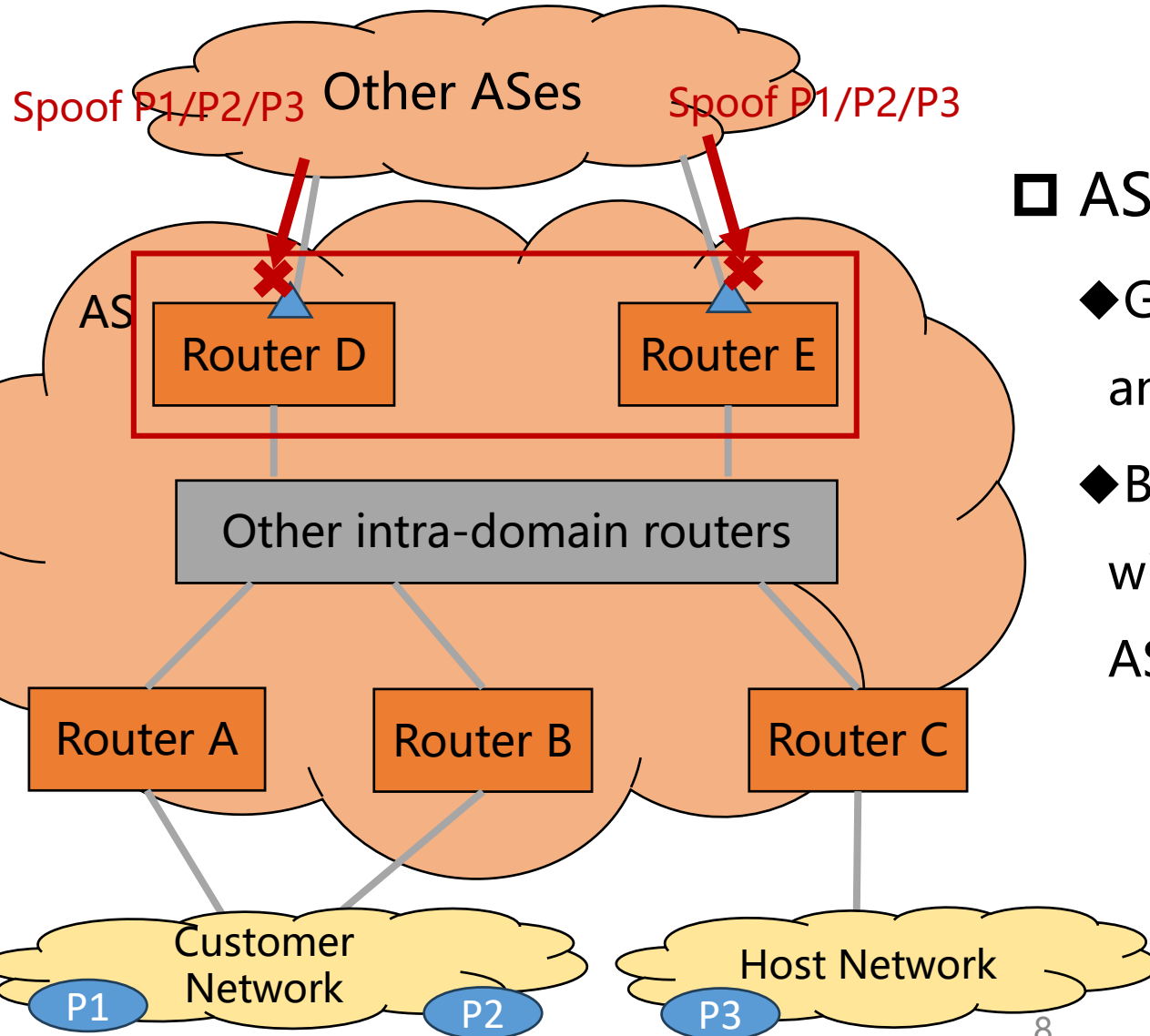
- ◆ Generate SAV rules on interfaces facing the host network
- ◆ Block data packets received at those interfaces with source addresses not belonging to the host network

# Where to Deploy Intra-domain SAVNET



- ❑ Customer-facing router (e.g., Routers A and B)
  - ◆ Generate SAV rules on interfaces facing the customer network
  - ◆ Block data packets received at those interfaces with source addresses not belonging to the customer network

# Where to Deploy Intra-domain SAVNET



- AS border router (e.g., Routers D and E)
  - ◆ Generate SAV rules on interfaces facing another AS
  - ◆ Block data packets received at those interfaces with source addresses belonging to the local AS



# Where to Deploy Intra-domain SAVNET

- Implementing **SAV on other inner routers or inner interfaces** should be **more complicated** because many factors will affect the forwarding path from the source to these routers
  - ◆ For example, Traffic Engineering (TE) or Fast Reroute (FRR) is commonly used in an intra-domain network to control the forwarding decisions of routers
- If a solution decides to implement SAV on other inner routers or inner interfaces,
  - ◆ It MUST take **all factors that will affect forwarding** into consideration to ensure the accuracy of SAV rules
  - ◆ It MUST **avoid improper block** problems and MUST have **less improper permit problems than existing uRPF-like mechanisms**

# Open Discussion

---

- ❑ Has this architecture included future possible SAV solutions?
- ❑ Has these mentioned considerations covered the necessary factors to be considered by different SAV solutions?
- ❑ Any questions?

---

**Thanks!**