



SCION

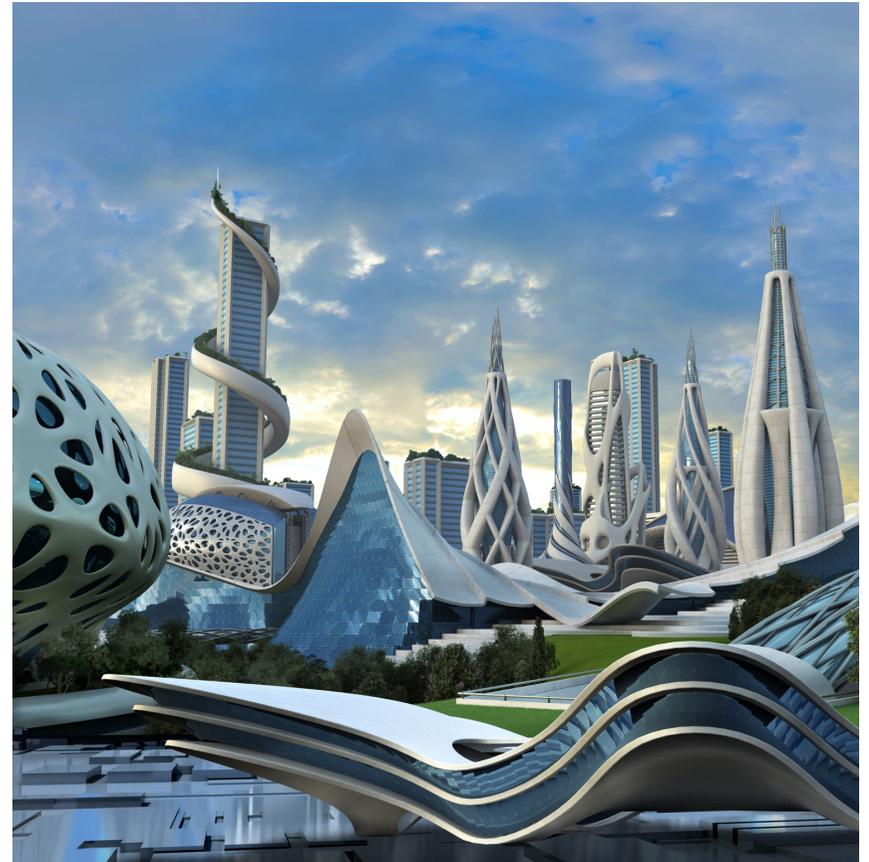
SCALABILITY, CONTROL, AND ISOLATION
ON NEXT-GENERATION NETWORKS

The Role of RIRs and LIRs in SCION

Adrian Perrig, Network Security Group, ETH

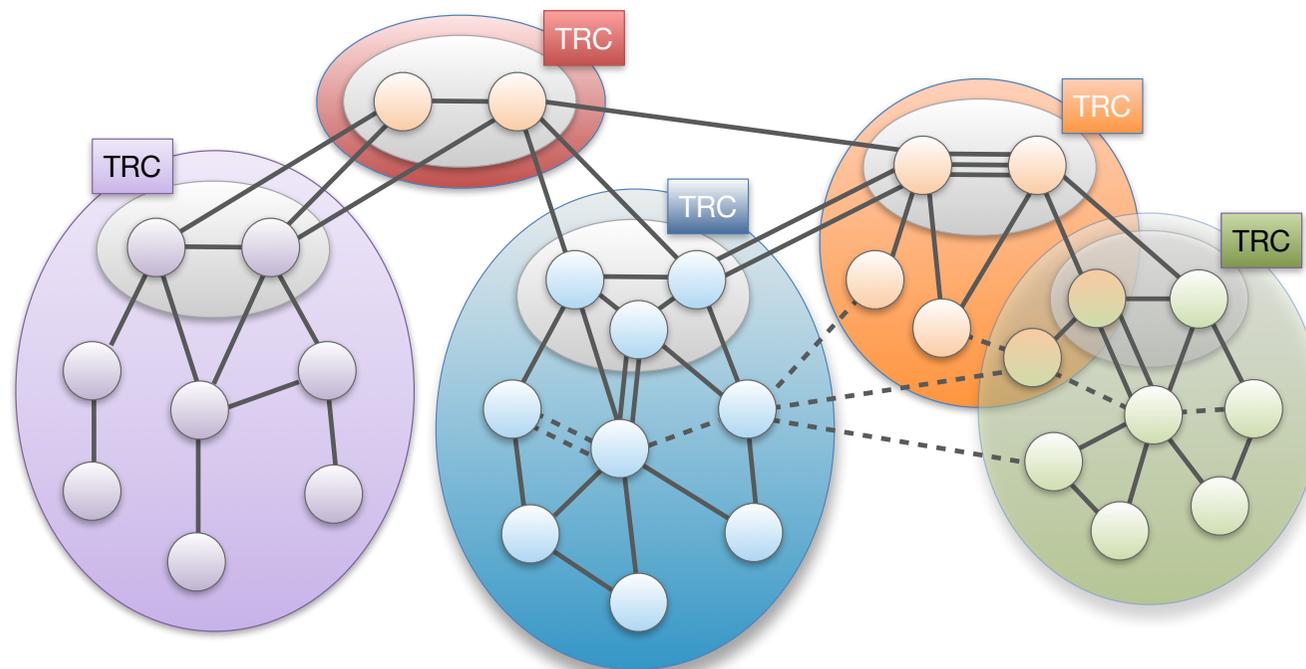
SCION Architecture Principles

- Stateless packet forwarding (no inconsistent forwarding state)
- “Instant convergence” routing
- Path-aware networking
- Multi-path communication
- High security through design and formal verification
- Sovereignty and transparency for trust roots



Isolation Domain (ISD): Sovereignty & Scalability

- Isolation Domain (ISD): grouping of Autonomous Systems (AS)
- ISD core: ASes that manage the ISD and provide global connectivity
- Core AS: AS that is part of ISD core



SCION Overview in One Slide



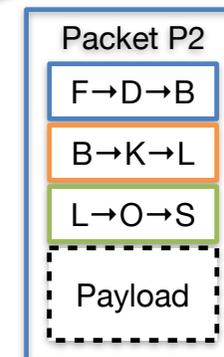
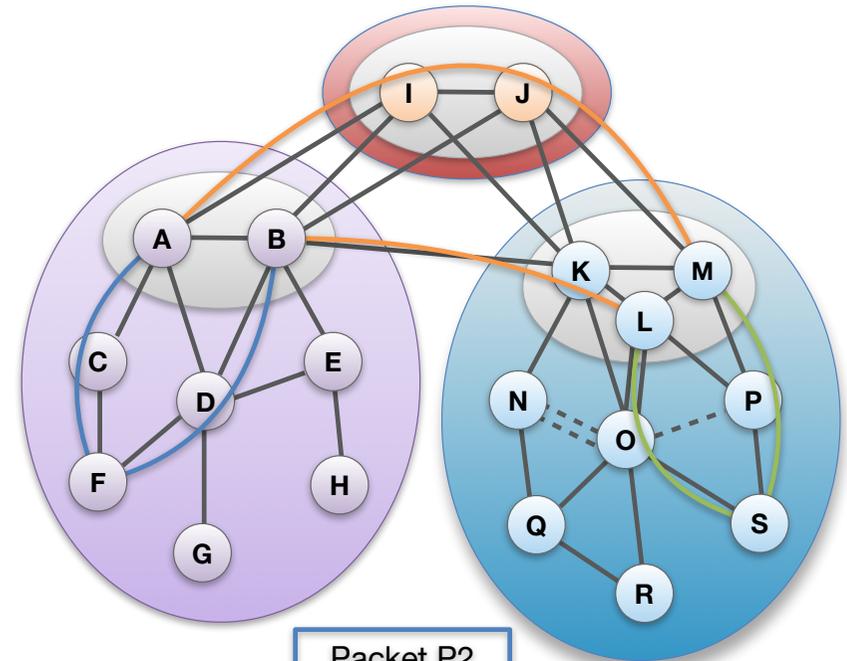
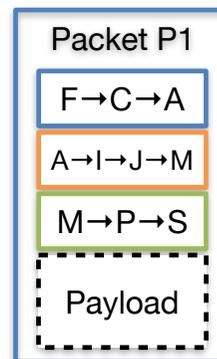
Path-based Network Architecture

Control Plane - Routing

- ❖ **Constructs** and **Disseminates** Path Segments

Data Plane - Packet forwarding

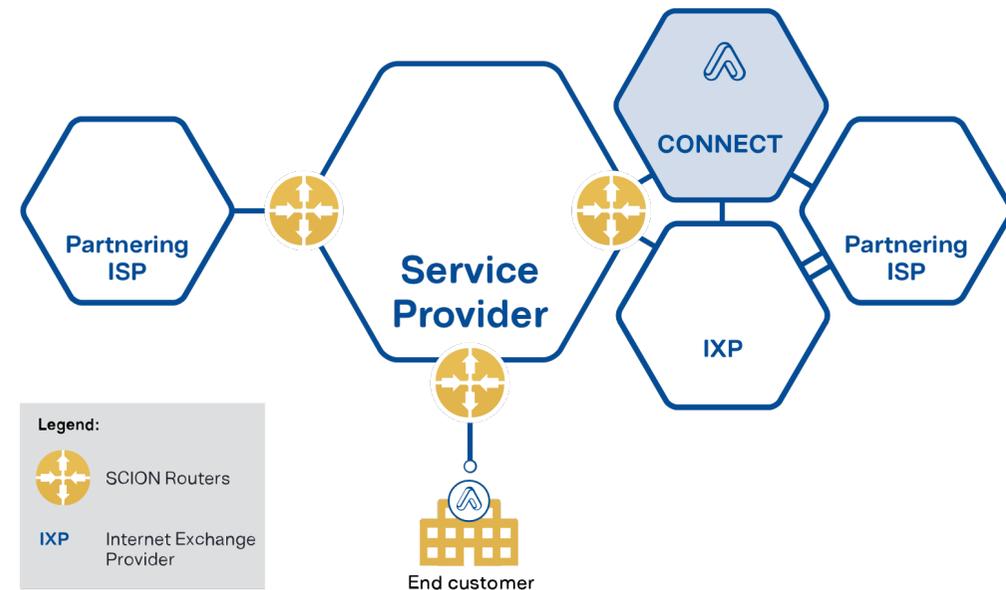
- ❖ **Combine** Path Segments to Path
- ❖ Packets contain Path
- ❖ Routers forward packets based on Path
 - ▶ Simple routers, stateless operation



SCION

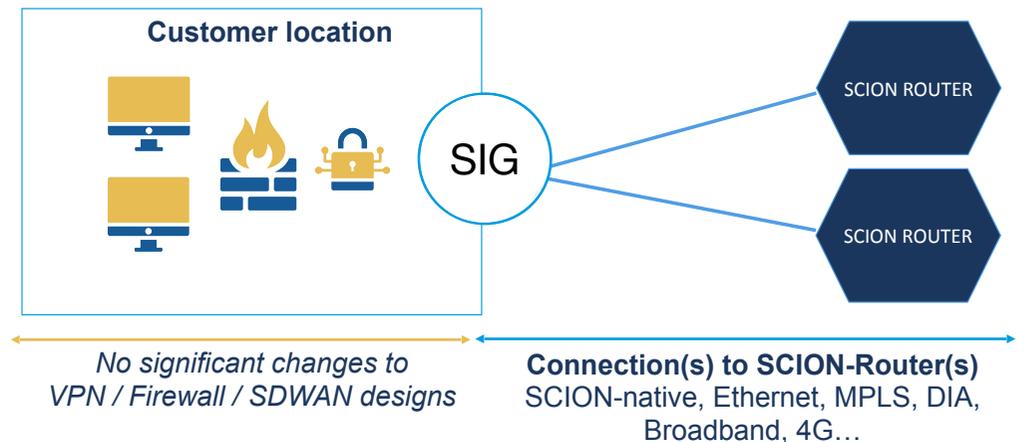
How to Deploy SCION: ISP

- CORE Routers are set up at the borders of an ISP
 - to peer with other SCION-enabled networks
 - to collect customer accesses
- No change to the internal network infrastructure of an ISP needed!



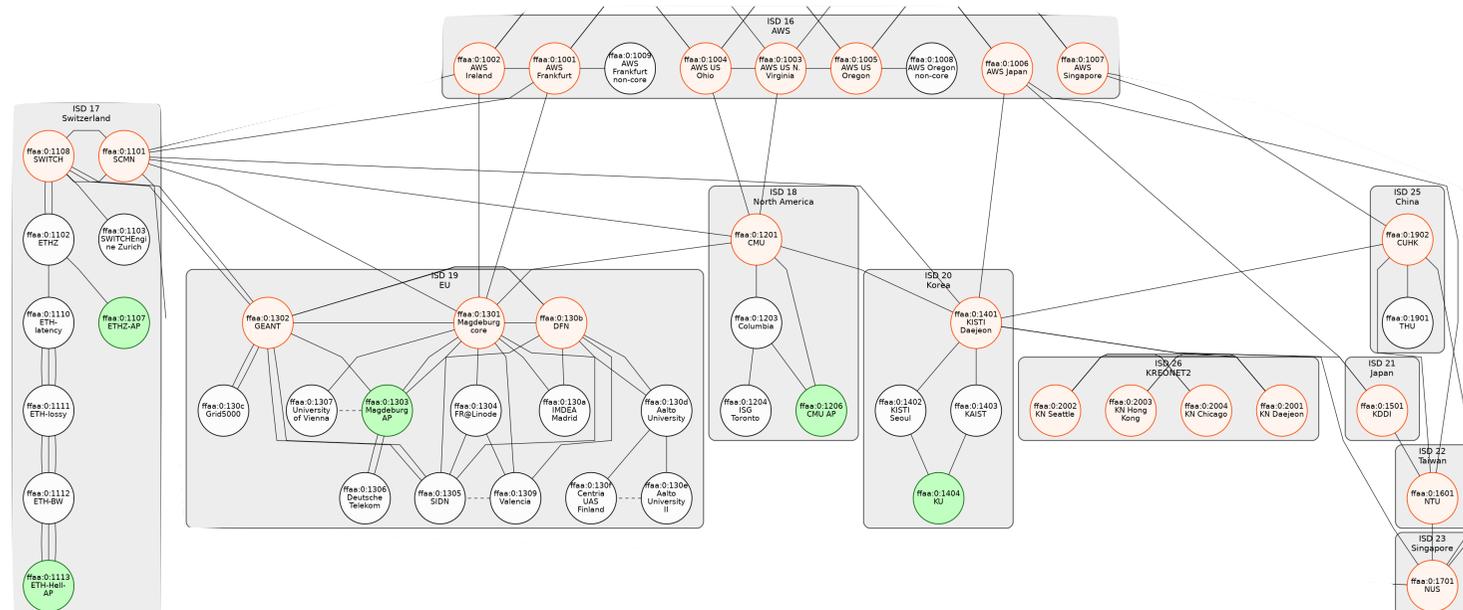
How to Deploy SCION: End Domain

- SCION IP Gateway (SIG) enables seamless integration of SCION capabilities in end-domain networks
- No upgrades of end hosts or applications needed



SCIONLab

- Global SCION research testbed: <https://www.scionlab.org>
- Collaboration with David Hausheer's team at University of Magdeburg
- Open to everyone: create and connect your own AS within minutes
- ISPs: Swisscom, SWITCH, KDDI, GEANT, DFN
- Deployed 35+ permanent ASes worldwide, 600+ user ASes
 - Contact us to become an infrastructure AS, we can provide HW
- Kwon et al., "SCIONLab: A Next-Generation Internet Testbed", ICNP 2020



Global Availability of Native SCION Connectivity

- Native SCION (BGP-free) connectivity: no reliance / dependency on BGP communication
- SCION deploying ISP's networks are reaching global data centers and IXPs, offering native SCION connectivity
- ISPs: Swisscom, Sunrise, SWITCH, + others joining soon
- IXPs: SwissIX offers SCION peering, + others joining soon
- Bank deployment: 4 major Swiss banks, some in production use
- Anapaya Connect: native SCION connectivity to 100+ data centers in 10+ countries

