



# KIRA – Scalable Zero-Touch Routing

Roland Bless  
Institute of Telematics, KIT



# KIRA – Motivation

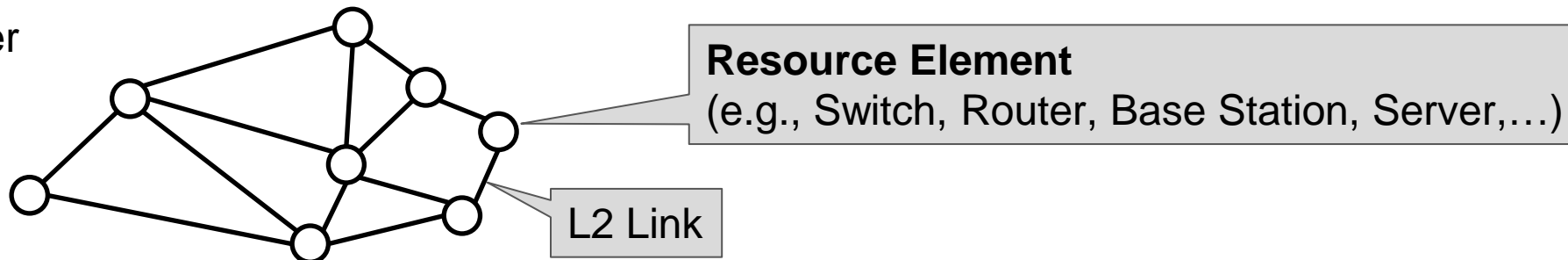
## ■ Goals

- **resilient control plane** connectivity
    - e.g., for SDN, NFV, VIM, AI-based Control, Intent-based NM, OAM, Quantum Internet Control Plane, ...
  - avoid circular dependencies
  - support for inband, out-of-band, hybrid management/control
  - guarantee controllability of every networked device (even virtual ones)
- 
- Existing solutions not scalable, zero-touch, or topology specific

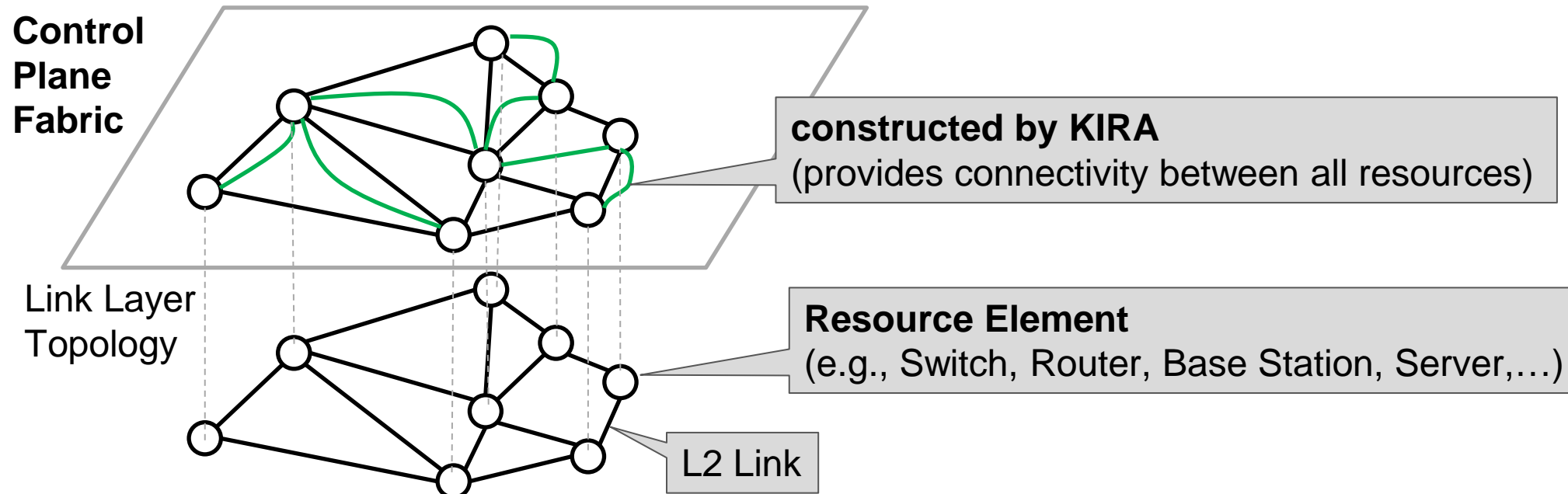
SDN: Software Defined Networking,  
NFV: Network Function Virtualization,  
VIM: Virtual Infrastructure Management,  
NM: Network Management,  
OAM: Operations Administration, and Maintenance

# What KIRA provides...

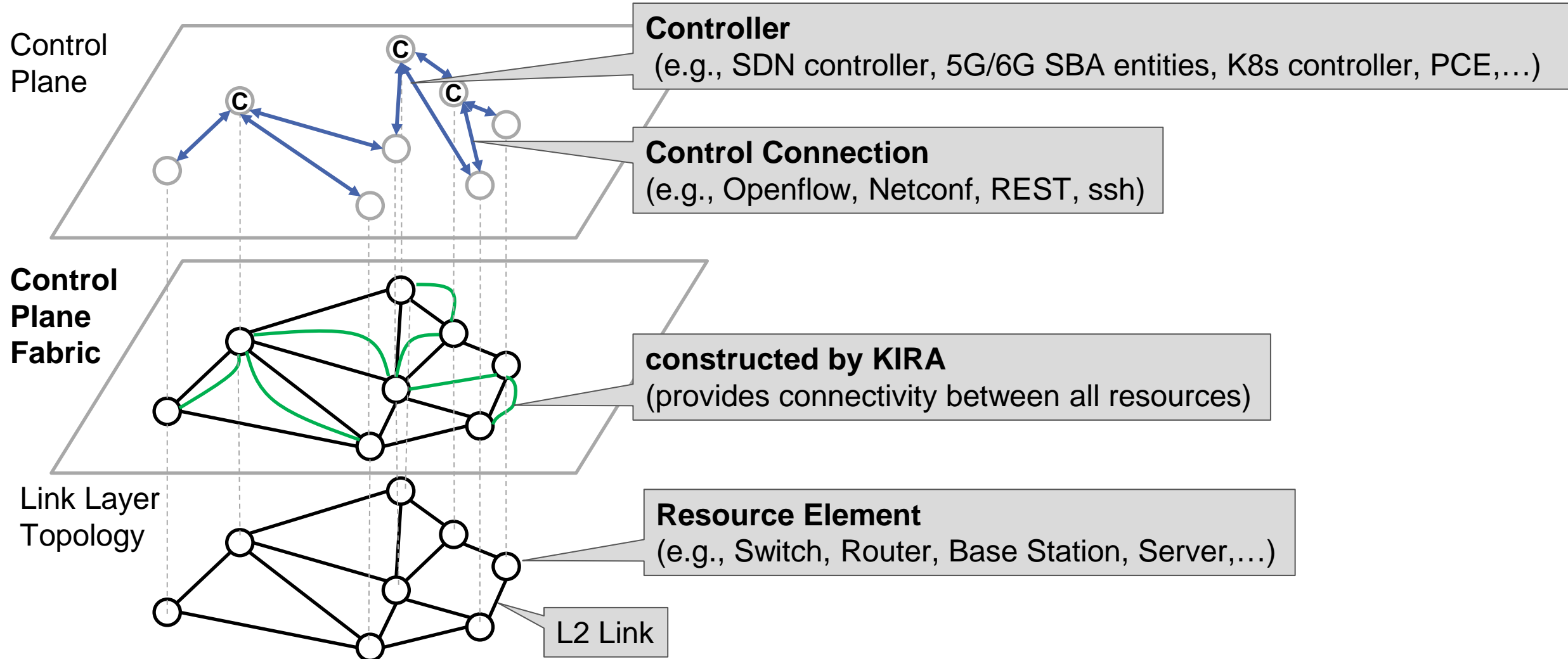
Link Layer  
Topology



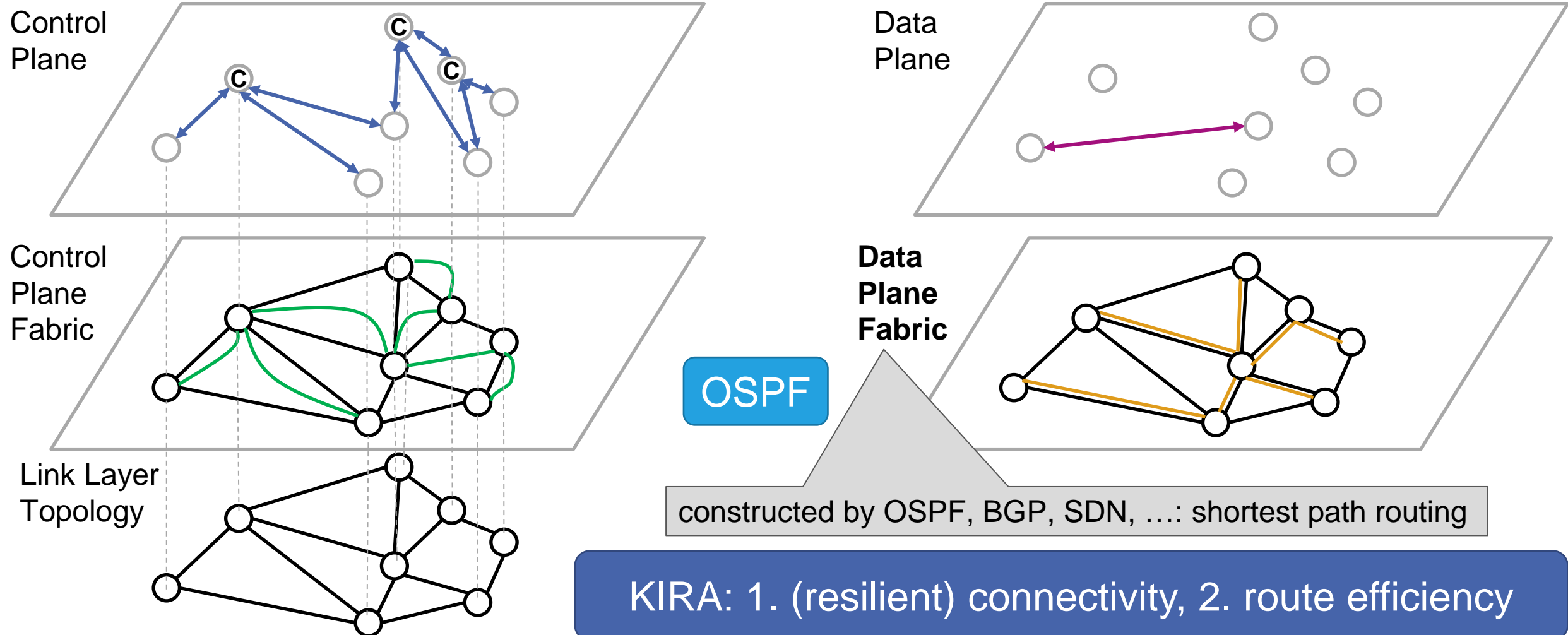
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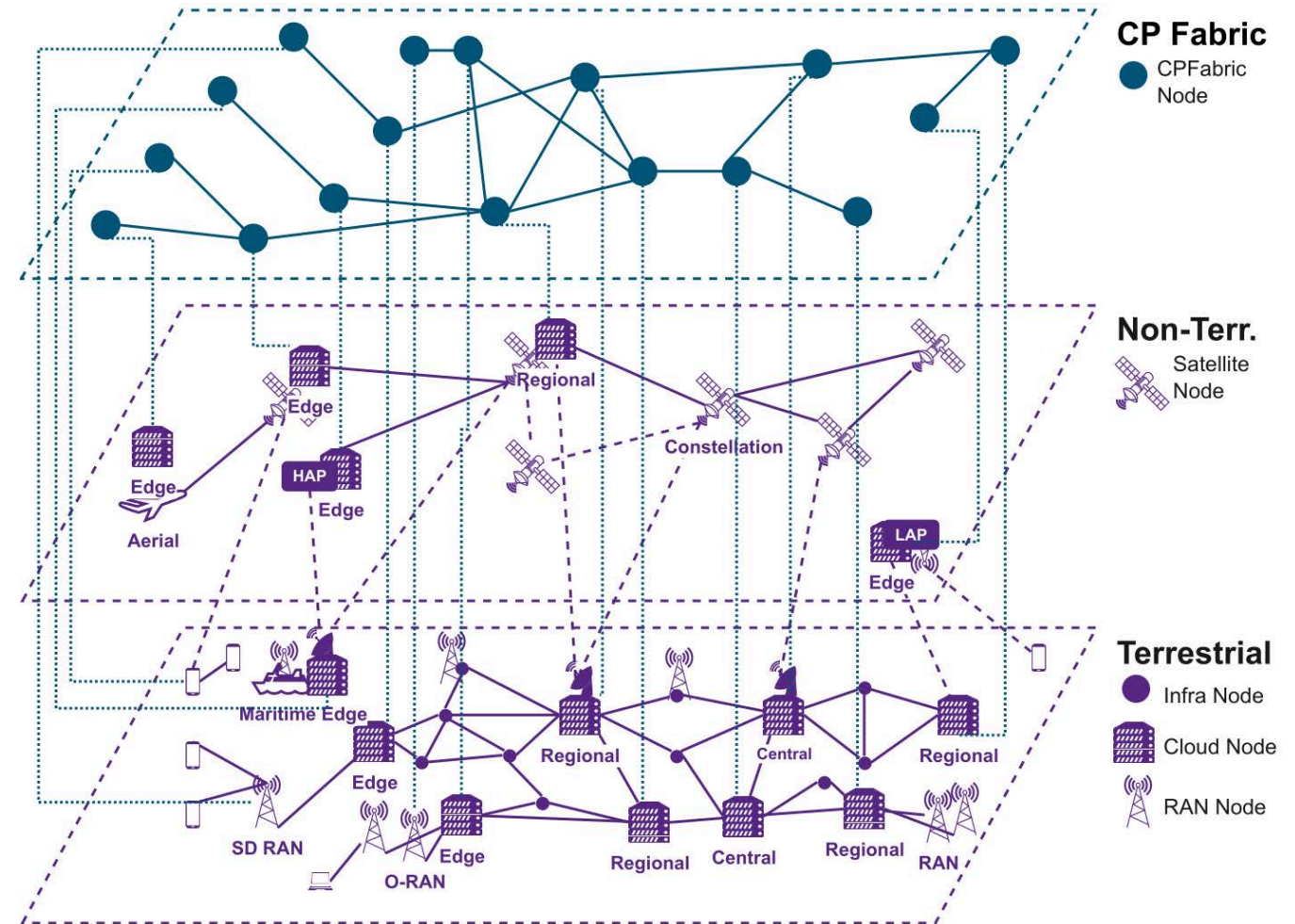


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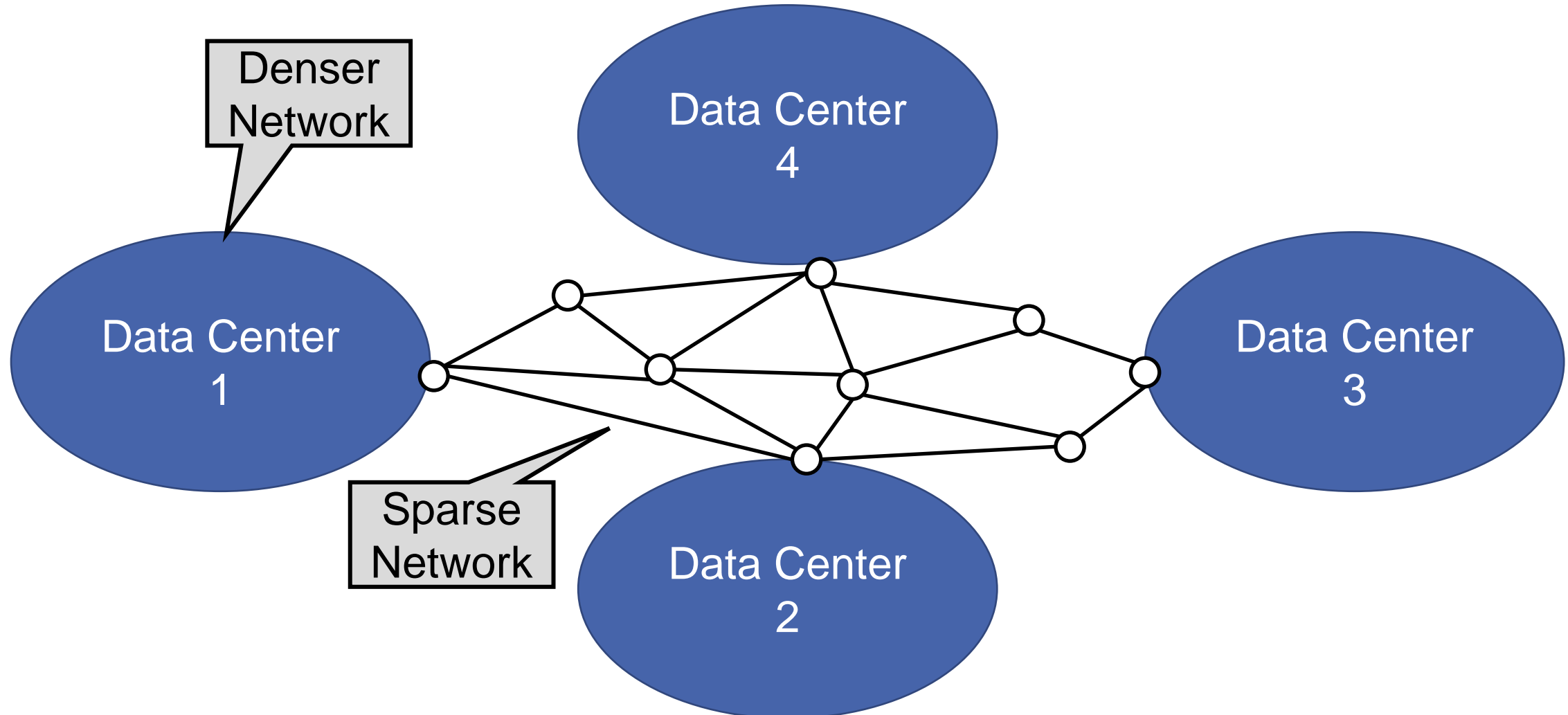


# Use Case – 6G Control Plane

- Non-terrestrial Networks (Drones, Satellites)  
→ dynamic and mobile
- Nomadic Networks  
→ autonomous, self-organizing control plane
- $10^7$  of base stations in China in a single provider network  
→ scalability



# DC + Network



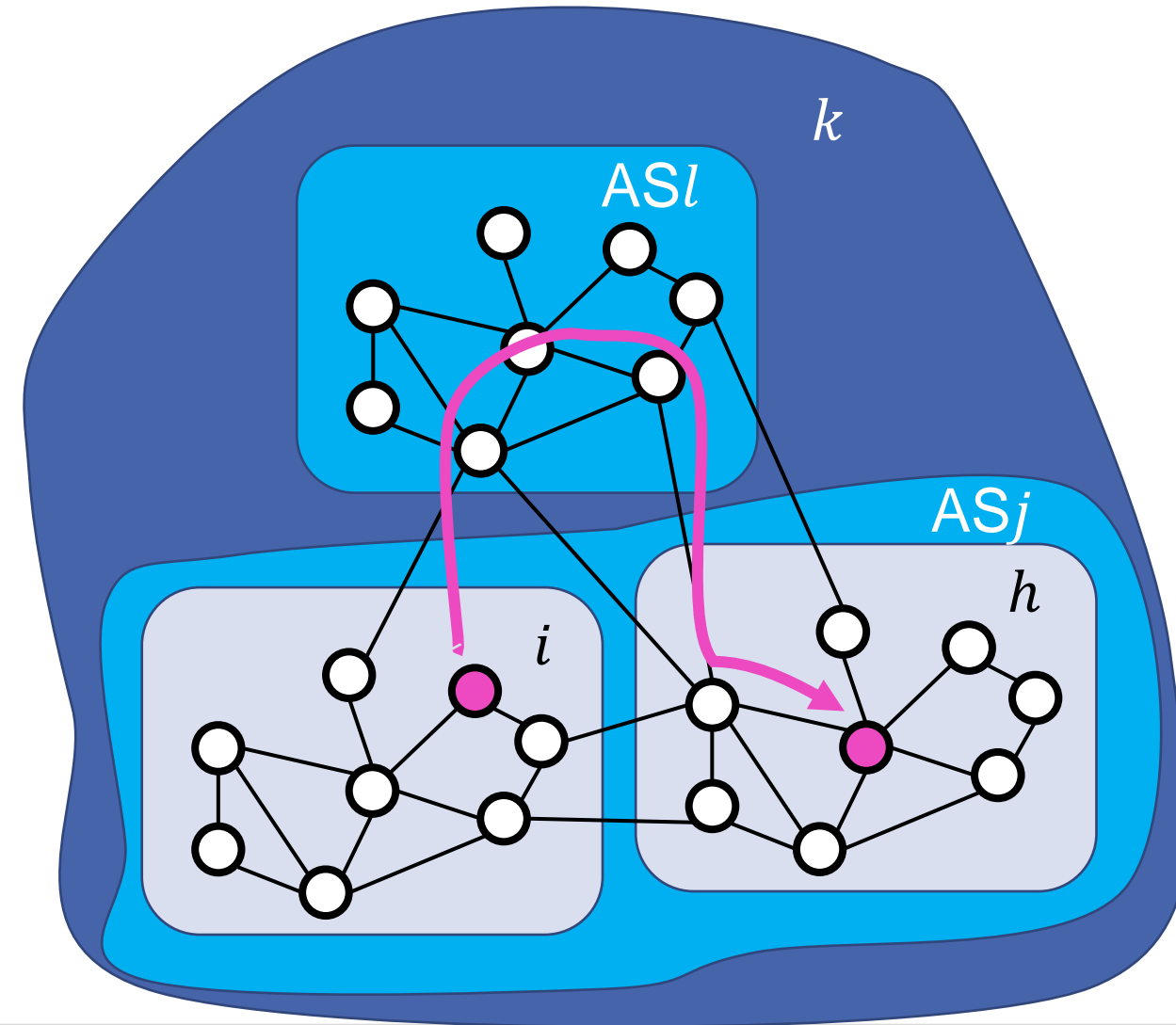


# Mobility

- KIRA uses IDs as topological independent addresses
  - Should work out-of-the-box, but...optimizations possible
- **End-system mode** is more lightweight, so end-system mobility will also cause no churn in the routing system
- **Satellite Networks** → not investigated yet
- **(Mobile) Ad-hoc Networks** → not investigated yet

# KIRA – Domain Scope

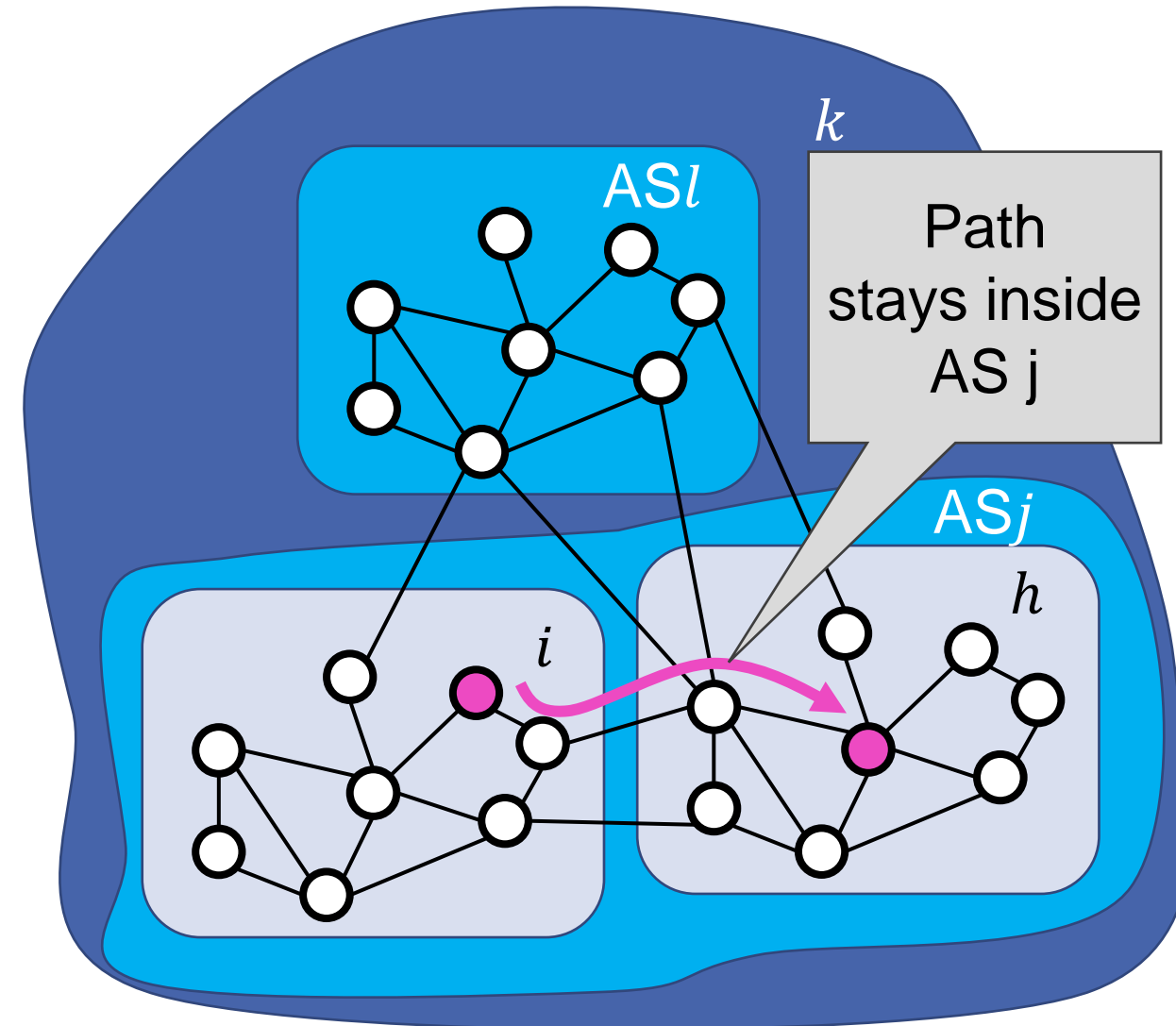
- Domain Scopes
  - Global, Organizational, Topological
  - KIRA nodes keep their NodeID!



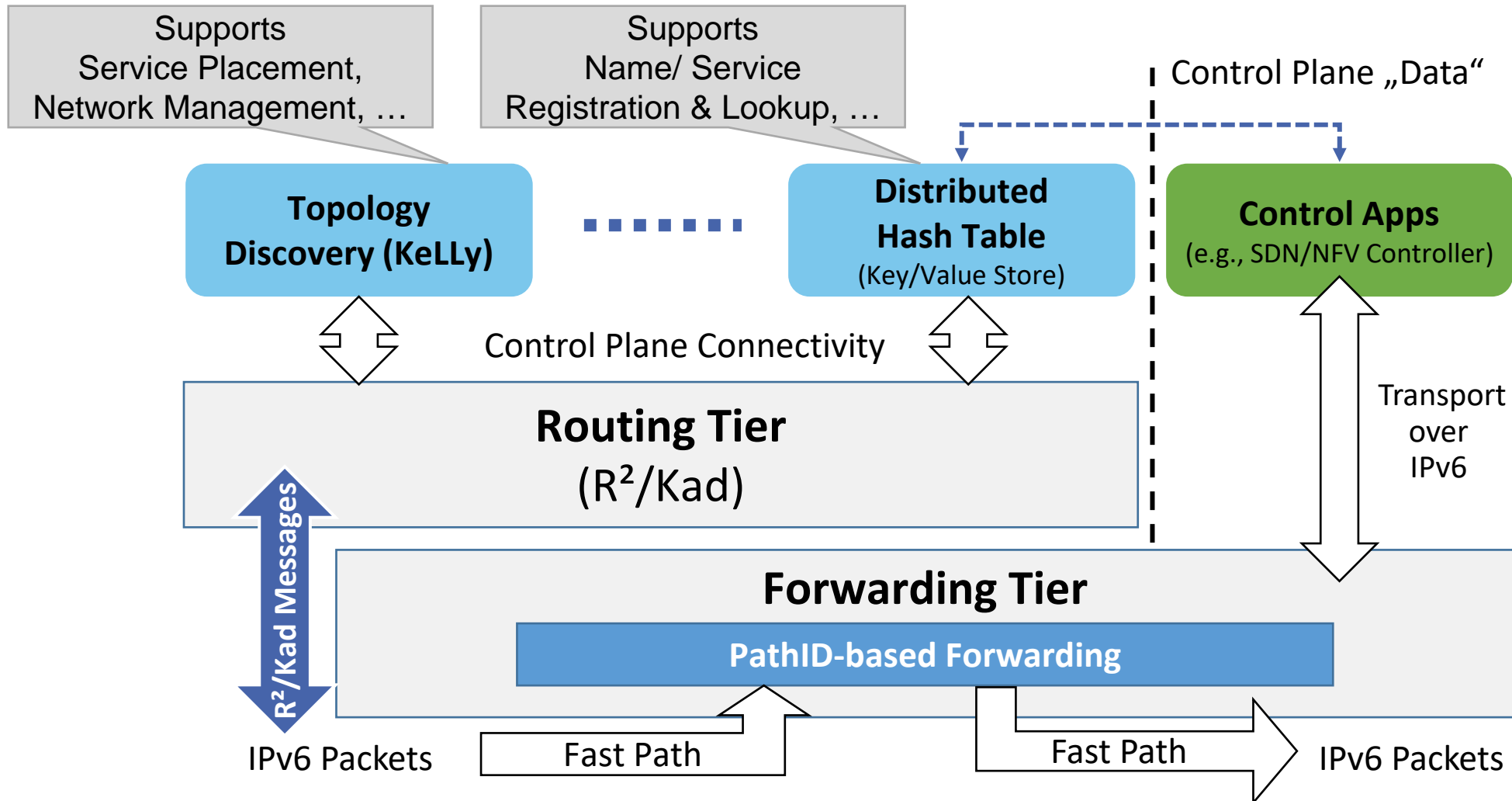
# KIRA – Domain Scope

## ■ Domain Scopes

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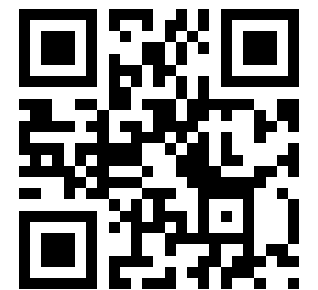


# Architecture



# Ready for Standardization...

- First Internet-Draft  
<https://datatracker.ietf.org/doc/draft-bleess-rtgwg-kira/>
  - Update will follow
- **Running Code** (going to be released soon)
  - Large Scale Simulations
  - SDN-based Application for Ryu SDN Controller (Python)
    - Forwarding Tier uses OpenvSwitch
  - Native Routing Daemon Linux (Rust)
    - Forwarding Tier uses nftables
- Want IETF expertise
  - WG Draft?
  - BOF?



<https://s.kit.edu/KIRA>