

Ground Based LISP (GBL)

IETF100, Singapore

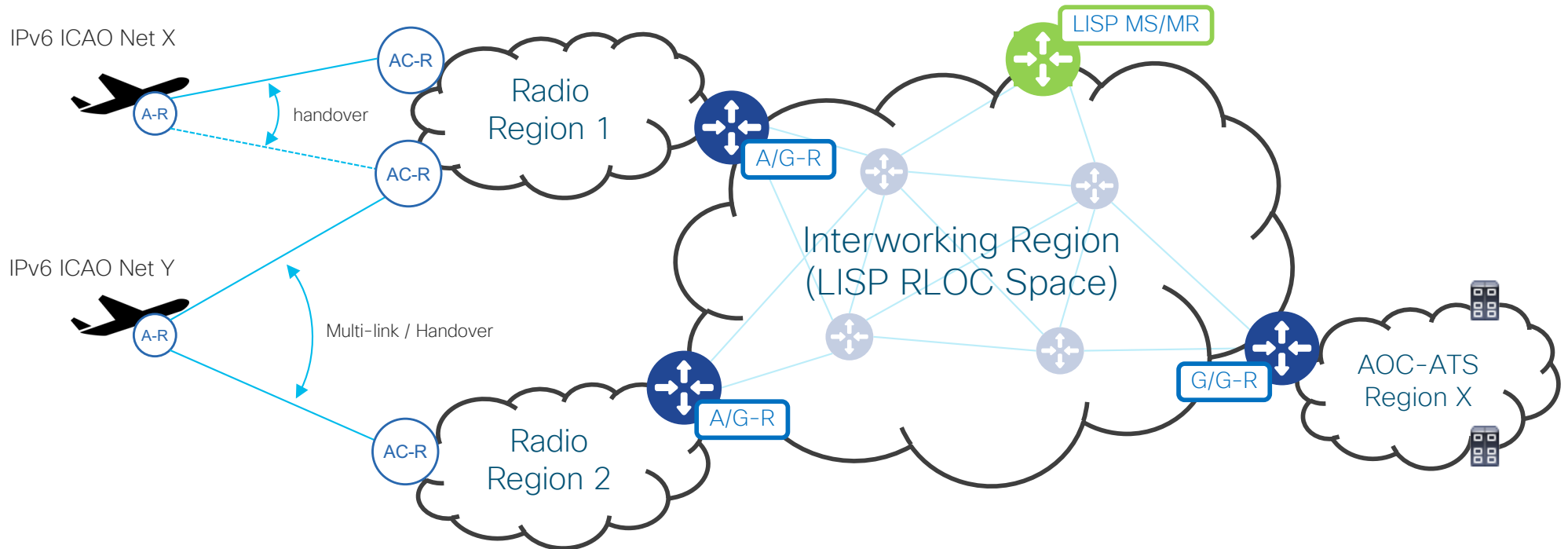
draft-haindl-ground-lisp-atn

November, 2017

Background

- Use of LISP to address the requirements of the worldwide Aeronautical Telecommunications Network with Internet Protocol Services (ATN/IPS)
- International Civil Aviation Organization (ICAO) is proposing to replace existing services with an IPv6 based infrastructure for Air Traffic Management (ATM).
- ATN/IPS handles Air Traffic Controllers (ATC) and Airline Operation Controllers (AOC)
- draft-haindl-ground-lisp-atn was presented at the ICAO IPS Mobility Sub-Group
- Builds on mechanisms defined in draft-ietf-lisp-eid-mobility

Ground Based LISP (GBL) - Reference Topology



AC-R: Access Ground Router
A-R: Airborne Router
A-E: Airborne End-system

A/G-R: Air/Ground Router (LISP XTR)
G/G-R: Ground/Ground Router (LISP XTR)
ATS-E: ATS End-system

Aircraft registration and ground-to-air traffic

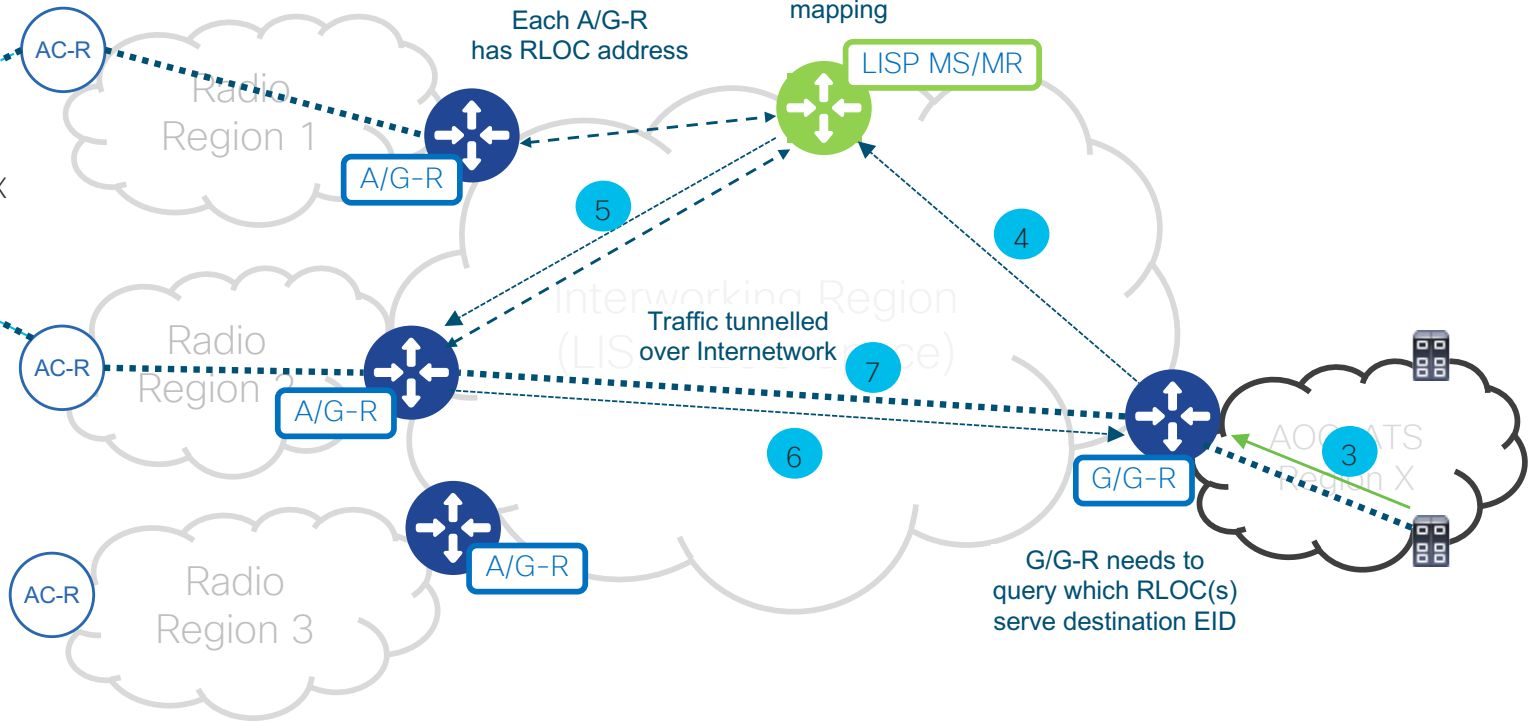
Aircraft attaches to one or more A/G Networks

A/G Network advertises reachability of the aircraft delegated prefix (EID)

1



IPv6 ICAO Net X



Each A/G-R has RLOC address

Mapping Server maintains RLOC-EID mapping

LISP MS/MR

Interworking Region (LISP MS/MR)

Traffic tunneled over Internet

AOC/ATS Region X

G/G-R needs to query which RLOC(s) serve destination EID

Aircraft preference and link QoS can be signalled over A/G Network (region 2 preferred)

2

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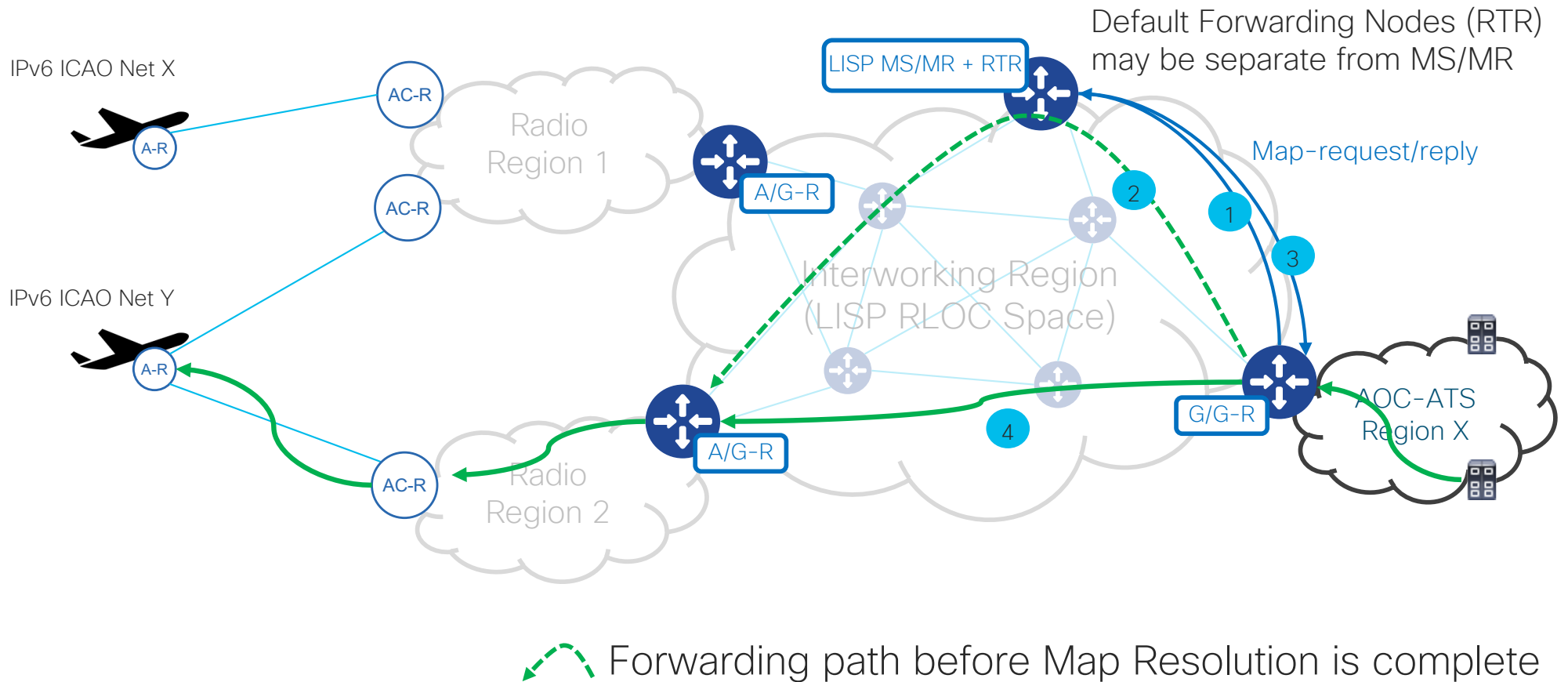
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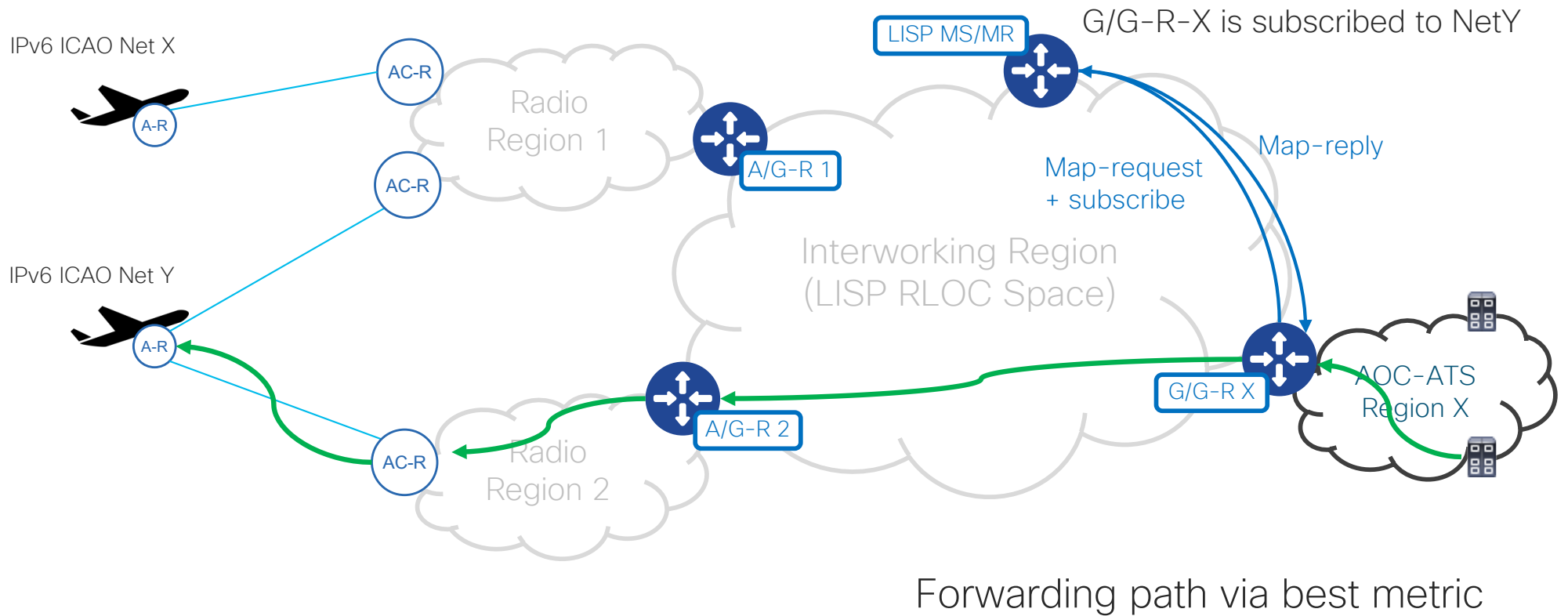
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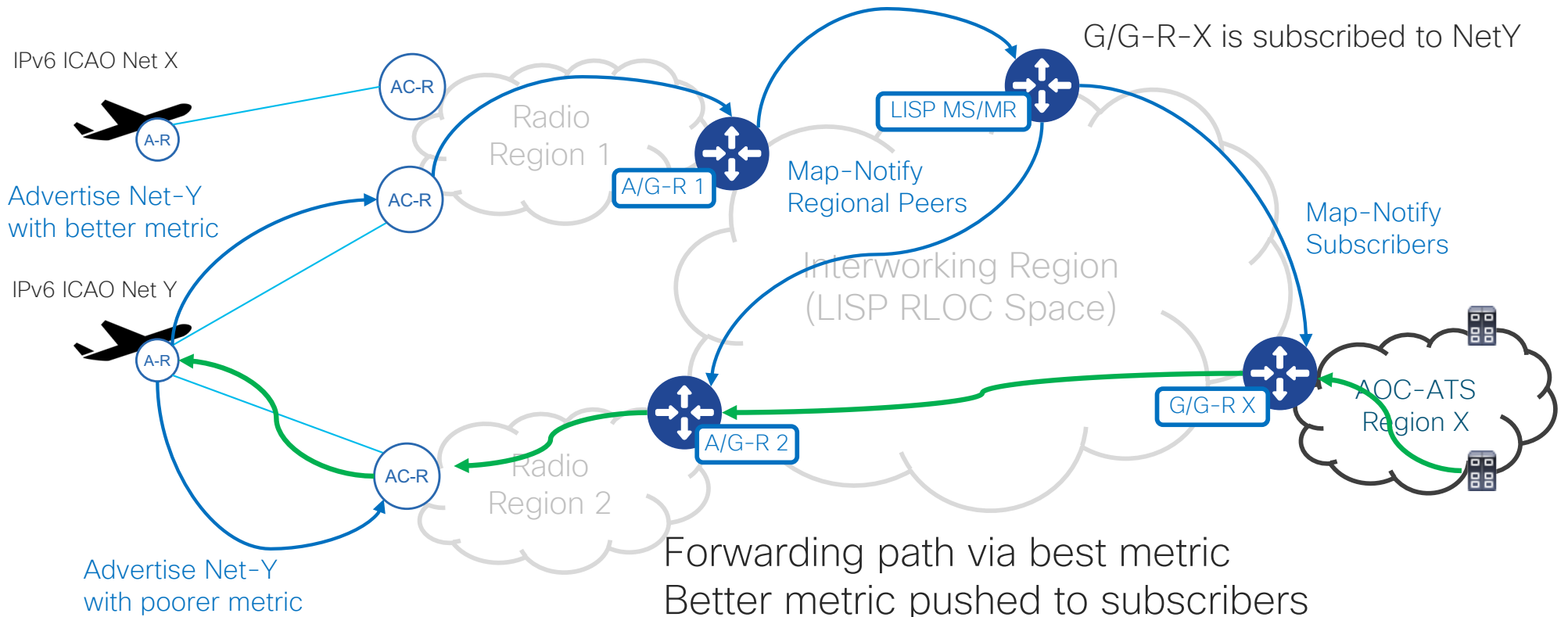
Default Forwarding Path



Optimized Multi-link mobility (1)

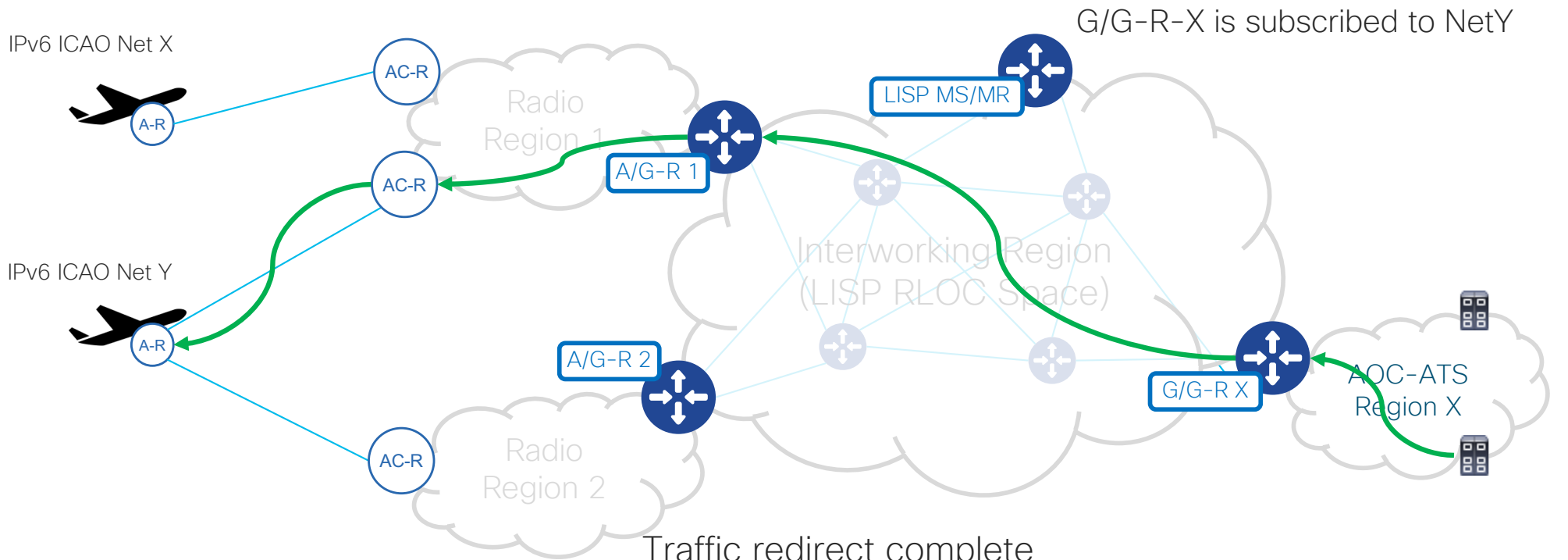


Optimized Multi-link mobility (2)



Forwarding path via best metric
Better metric pushed to subscribers
Regional Peers are notified
Only subscribers and regional peers are updated

Optimized Multi-link mobility (3)



G/G-R-X is subscribed to NetY

IPv6 ICAO Net X

IPv6 ICAO Net Y

Radio Region 1

Radio Region 2

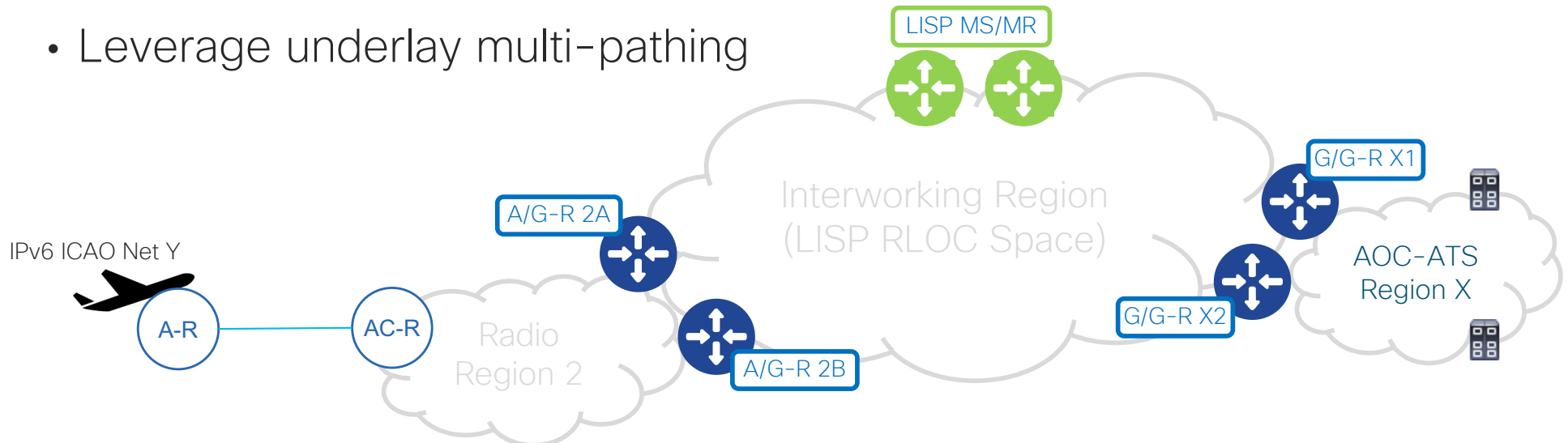
Interworking Region (LISP RLOC Space)

AOC-ATS Region X

Traffic redirect complete
Signaled only relevant Routers
Seamless Convergence (direct subscriber cache update)
Direct Connectivity (no anchor points)

High Availability

- Resilient Map-Servers based on parallel registrations
- Resilient G/G and A/G Routers
- Mobility without anchor points isolates mobile end-point fate from anchor point fate
- Leverage underlay multi-pathing



Security

- Control Plane message exchange can be secured as specified in ietf-lisp-sec
- Data Plane traffic may be secured as specified in RFC8061
- DoS Mitigation:
 - Control Plane rate limiting
 - Scoping of IP addresses to regions (domestic aircraft)

Next Steps

- Looking for comments from LISP WG