AALYRIA

CONNECTIVITY EVERYWHERE

Outernet Council Federation Interconnect API
IETF 123 // July, 2025

Motivation

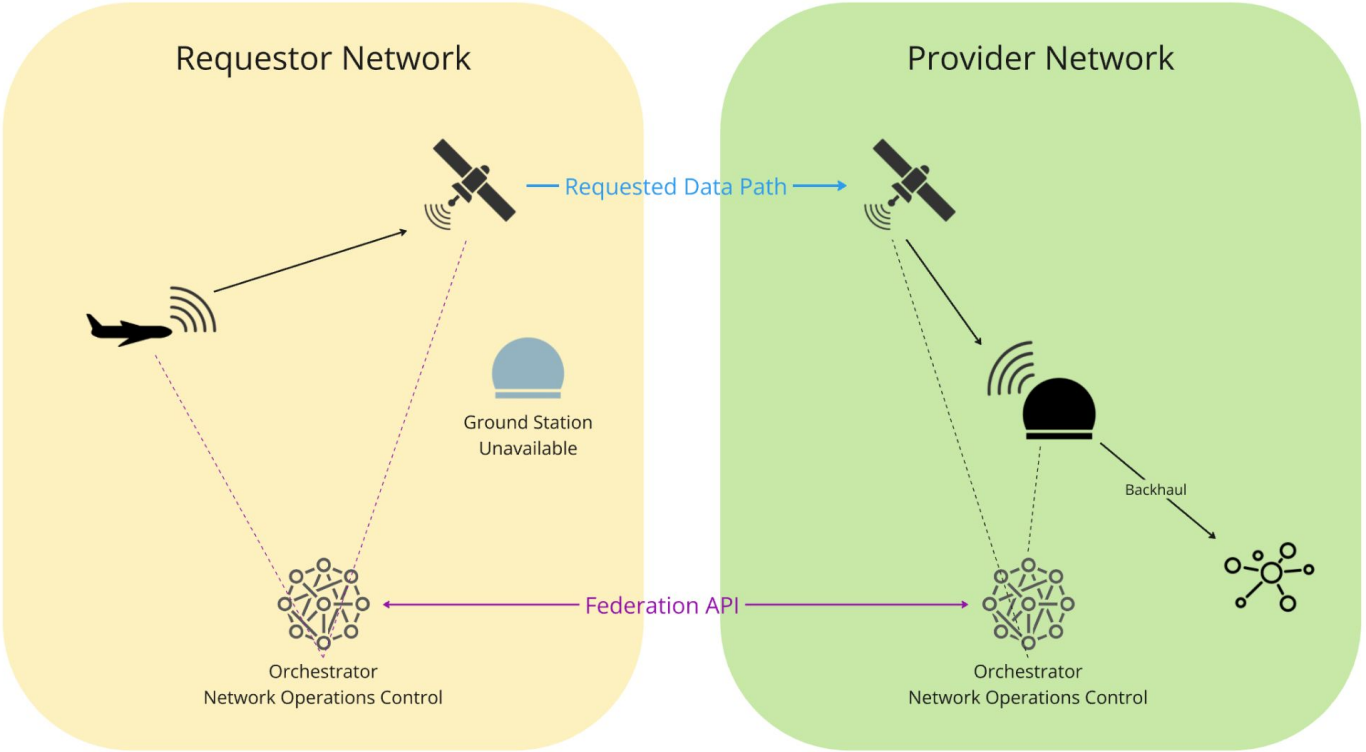
Networks with steerable beams present new, dynamic interconnection opportunities. Networks with **moving** steerable beams: even moreso!

- Orbital constellations may use infrastructure from other networks, e.g.:
  - 3rd party ground stations
  - other on-orbit assets
- Significant pre-planning may be required
- But dynamically building Bearers and Attachment Circuits can allow infrastructure to interconnect at orbital speeds

Federation Interconnect API

Aalyria together with the Outernet Council are developing a Federation Interconnect API.

- Outernet Council is a 501(c)(6) non-profit organization
  - develops open, neutrally governed APIs
  - goal: interoperability between space networks
- API is network-orchestrator-*to*-network-orchestrator
- inspired by the ACaaS draft and its friends
- gRPC v1alpha version available on GitHub


Requestor Network
Provider Network
Requested Data Path
Ground Station
Unavailable
Backhaul
Federation API
Orchestrator
Network Operations Control
Orchestrator
Network Operations Control

Very Rough Overview

1. `CreateTransceiver(...)`
    - Creates a transceiver resource representing a client-operated wireless transceiver. Creation of the transceiver allows the connectivity service provider to begin creating the transceiver's **contact windows**.

Very Rough Overview

1. `CreateTransceiver(...)`
2. `ListContactWindows(...)`
    - Returns intervals over which a client transceiver could feasibly connect to the service provider's network and utilize connectivity services.
    - contains all required PHY-later parameters to point an aperture and close a link

Very Rough Overview

1. `CreateTransceiver(...)`
2. `ListContactWindows(...)`
3. `CreateBearer(...)`
    - Creates a bearer using chosen contact window parameters.
    - A bearer defines the physical connection necessary to create attachment circuits (data links) between client operated hardware and the provider's network.

Very Rough Overview

1. `CreateTransceiver(...)`
2. `ListContactWindows(...)`
3. `CreateBearer(...)`
4. `CreateAttachmentCircuit(...)`
    - Creates an an attachment circuit over the given bearer.
    - Specifies required L2 and/or L3 service parameters.

Very Rough Overview

1. `CreateTransceiver(...)`
2. `ListContactWindows(...)`
3. `CreateBearer(...)`
4. `CreateAttachmentCircuit(...)`
5. `goto 2 || 3`

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