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IoTRoam – Design and implementation of a Roaming IoT architecture by leveraging DNS

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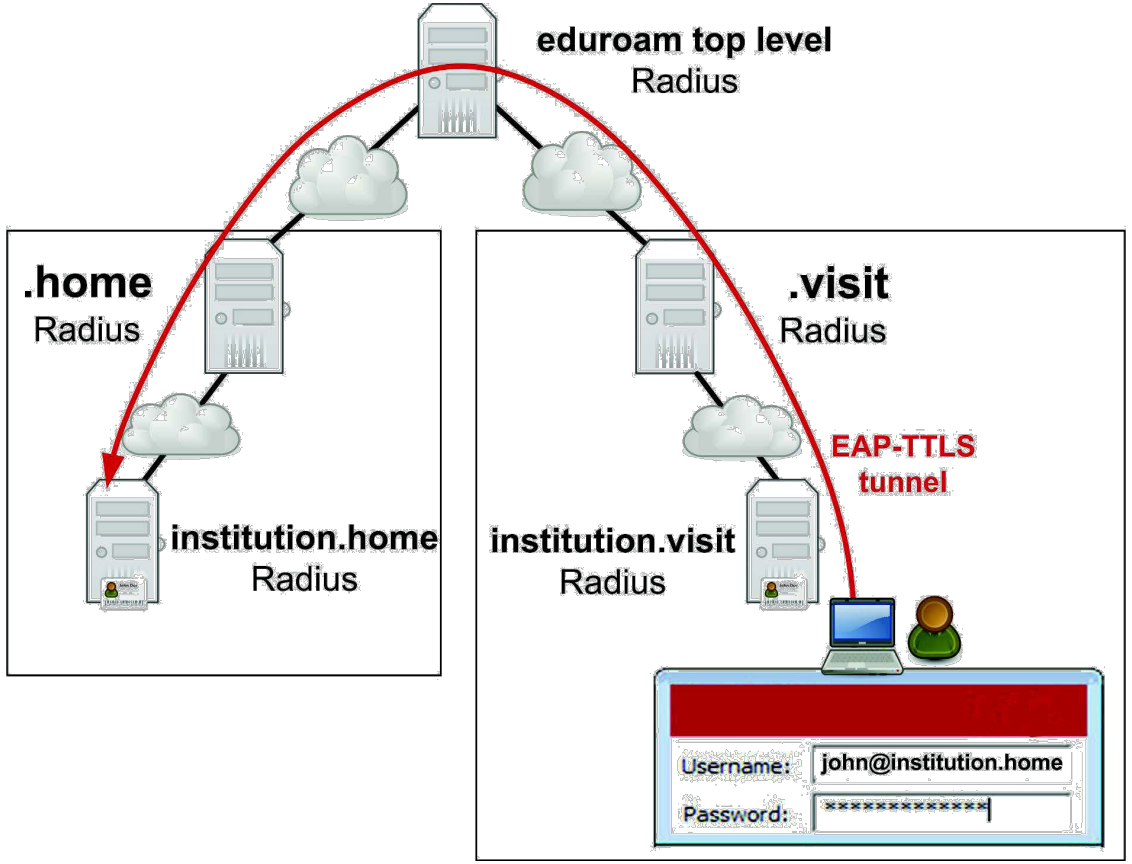
Presented at UbuntuNet 2022

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Motivation

- IoT is an extension of Internet with *Constrained* devices and networks
- Experiment by adapting *tested solutions* on the Internet to constrained IoT
- Using *Open* Internet Standards
- Operational feasibility is a *mandatory* requirement

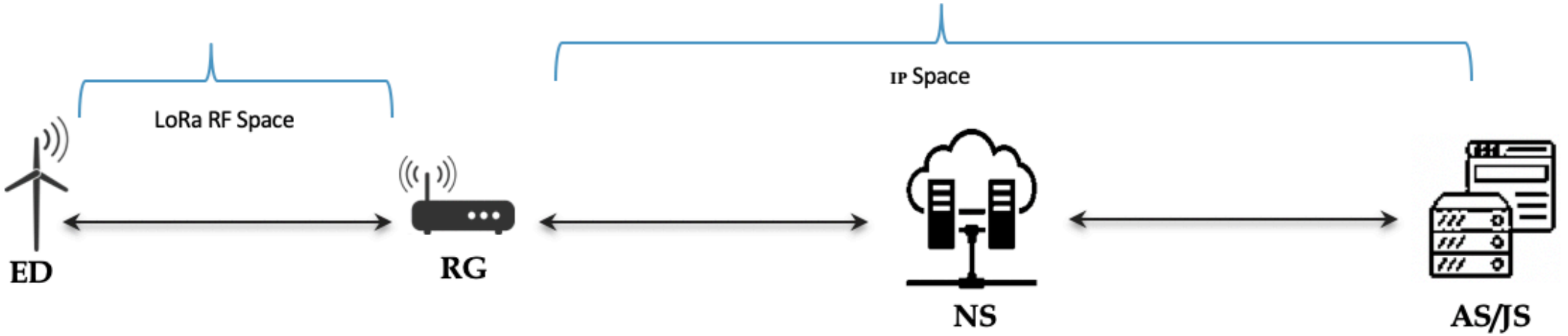
Eduroam example



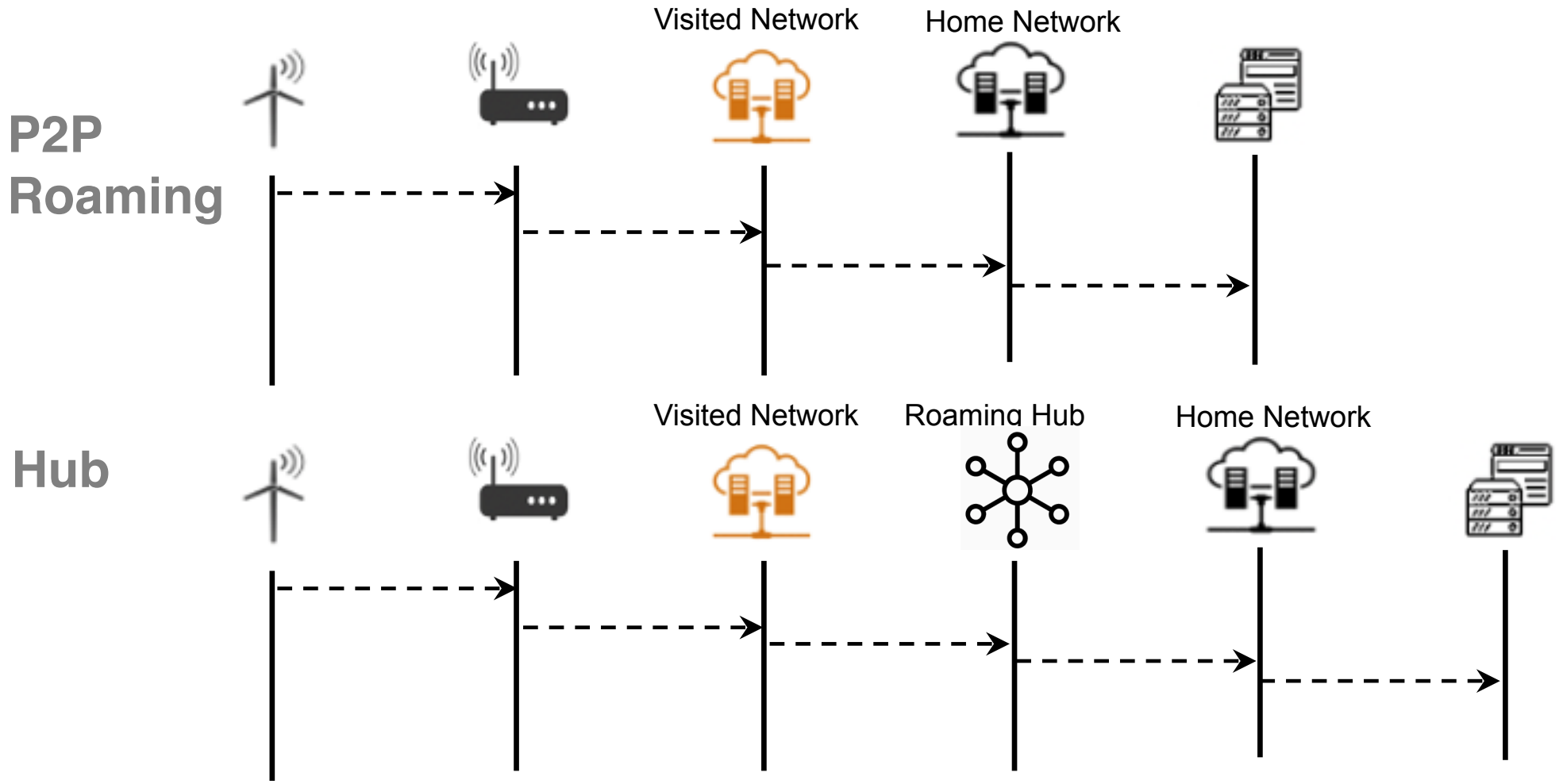
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- *Minimum* Out-of-band configurations
- *Dynamically* discover the appropriate networks
- *Support* for federated Identity providers
- *Support* for federated Certificate Authorities (CAs)

LoRaWAN Architecture – RF & IP Space



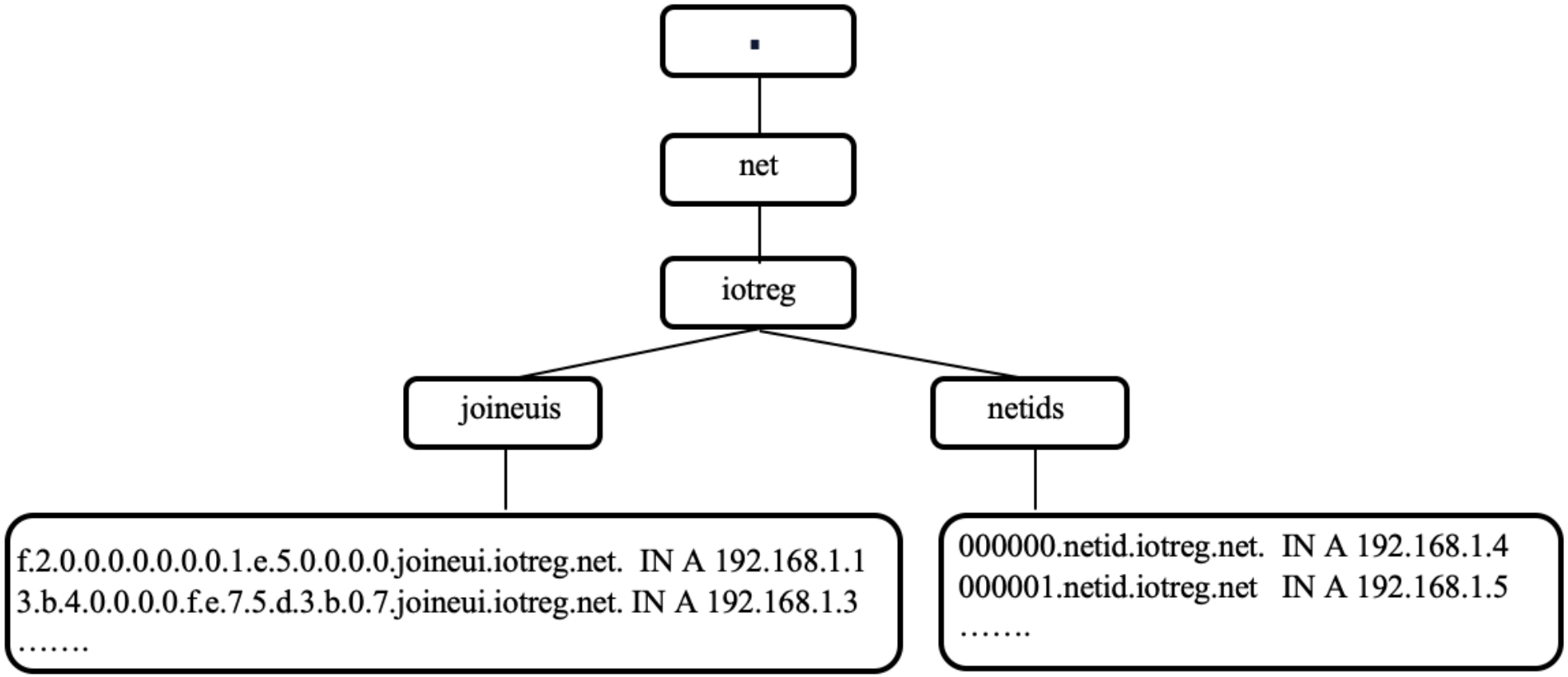
LoRaWAN existing Roaming possibilities – P2P & Hub



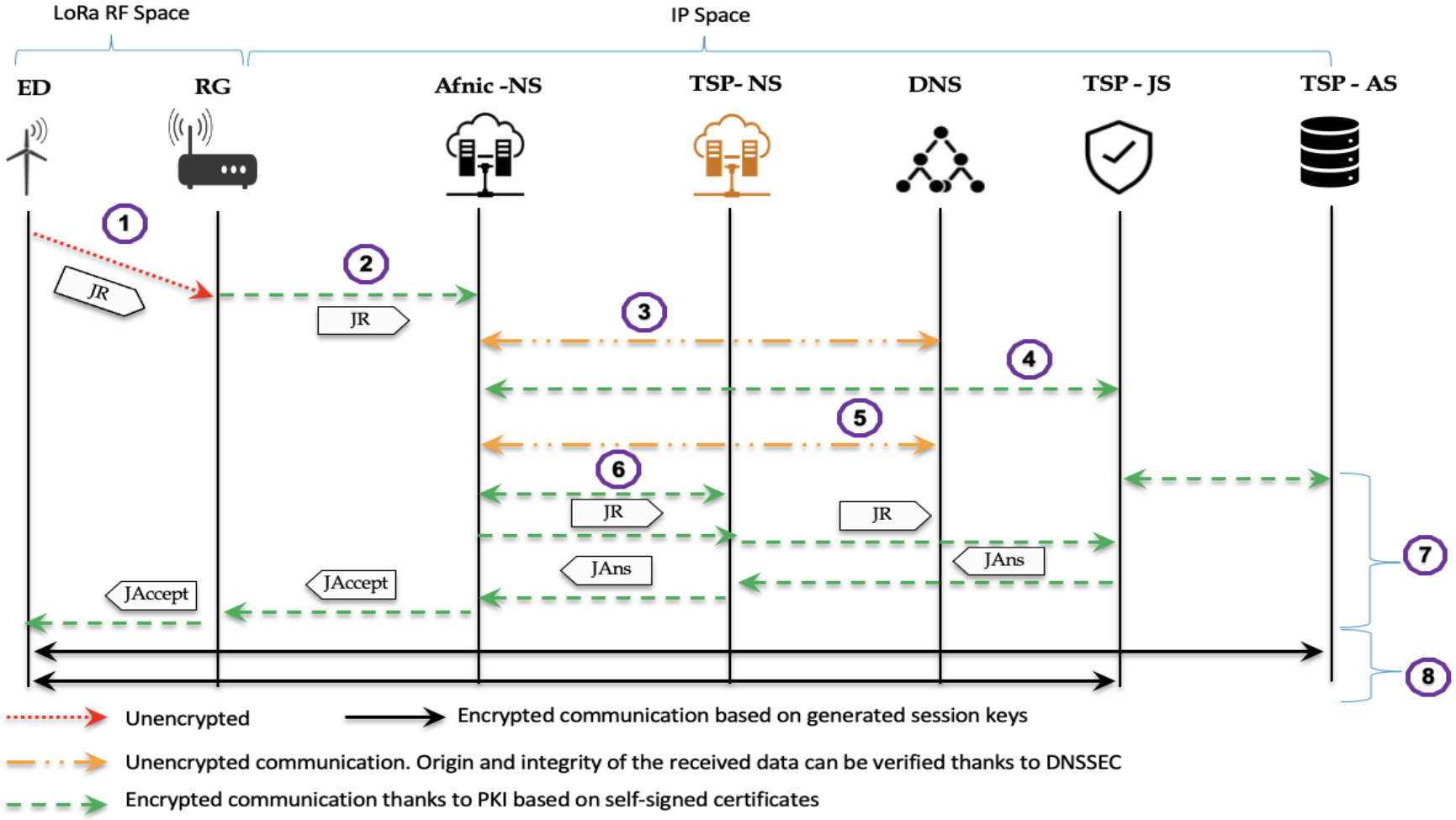
Issues – Required Configuration Parameters for roaming

Peer Net-ID
Roaming Policy
Peer's channel plan
Peer's fNS URL
Peer's sNS URL
Peer's NS IP address
Peer JS URL
Peer JS IP Address
Peer JS Http Credentials

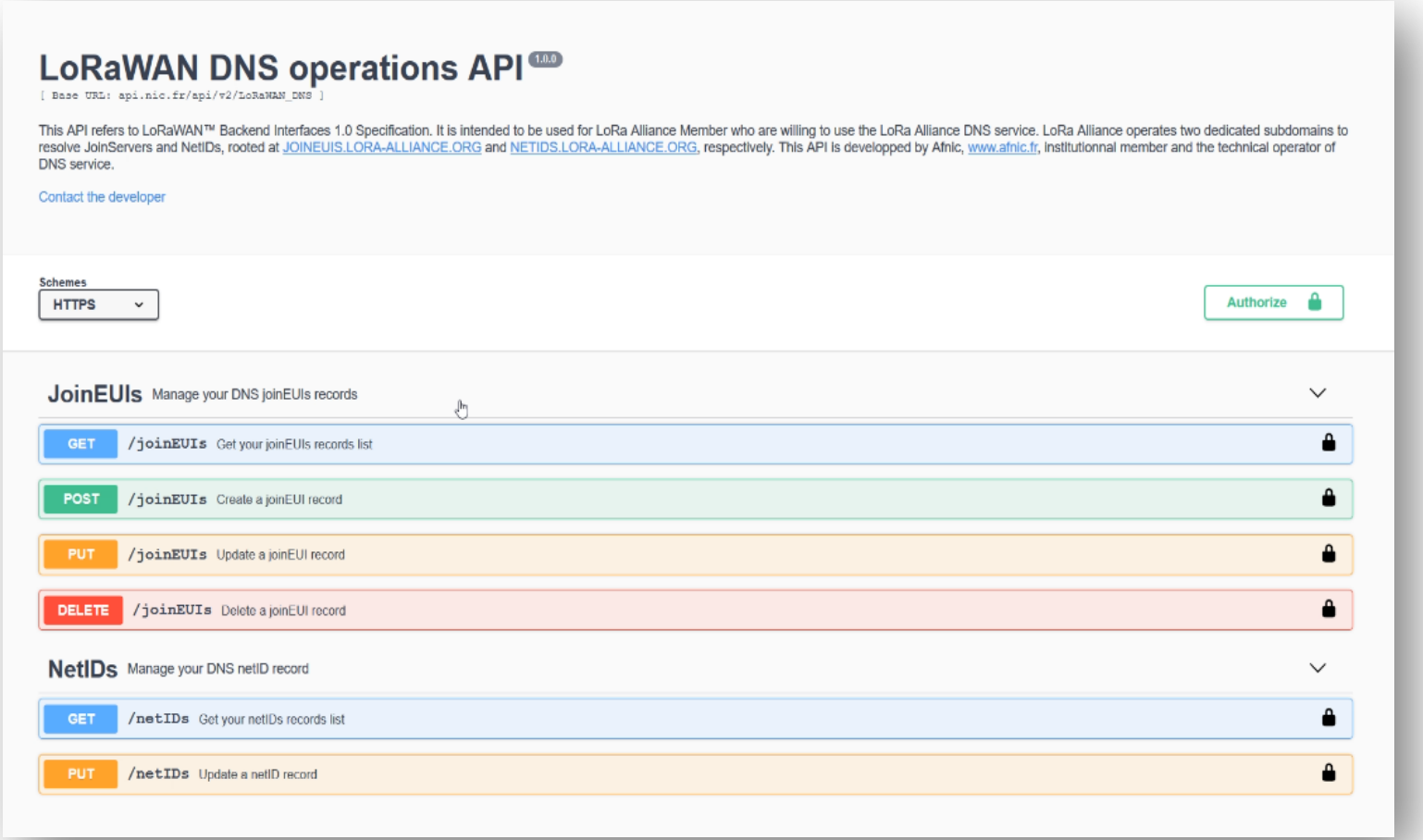
Dynamic discovery – Using DNS for roaming



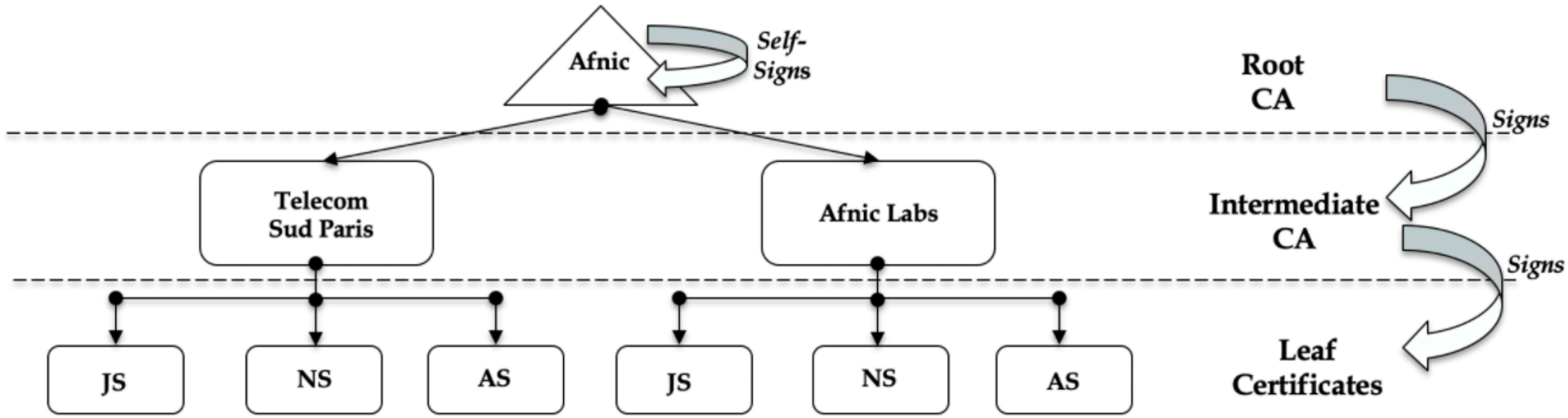
Passive Roaming message flow



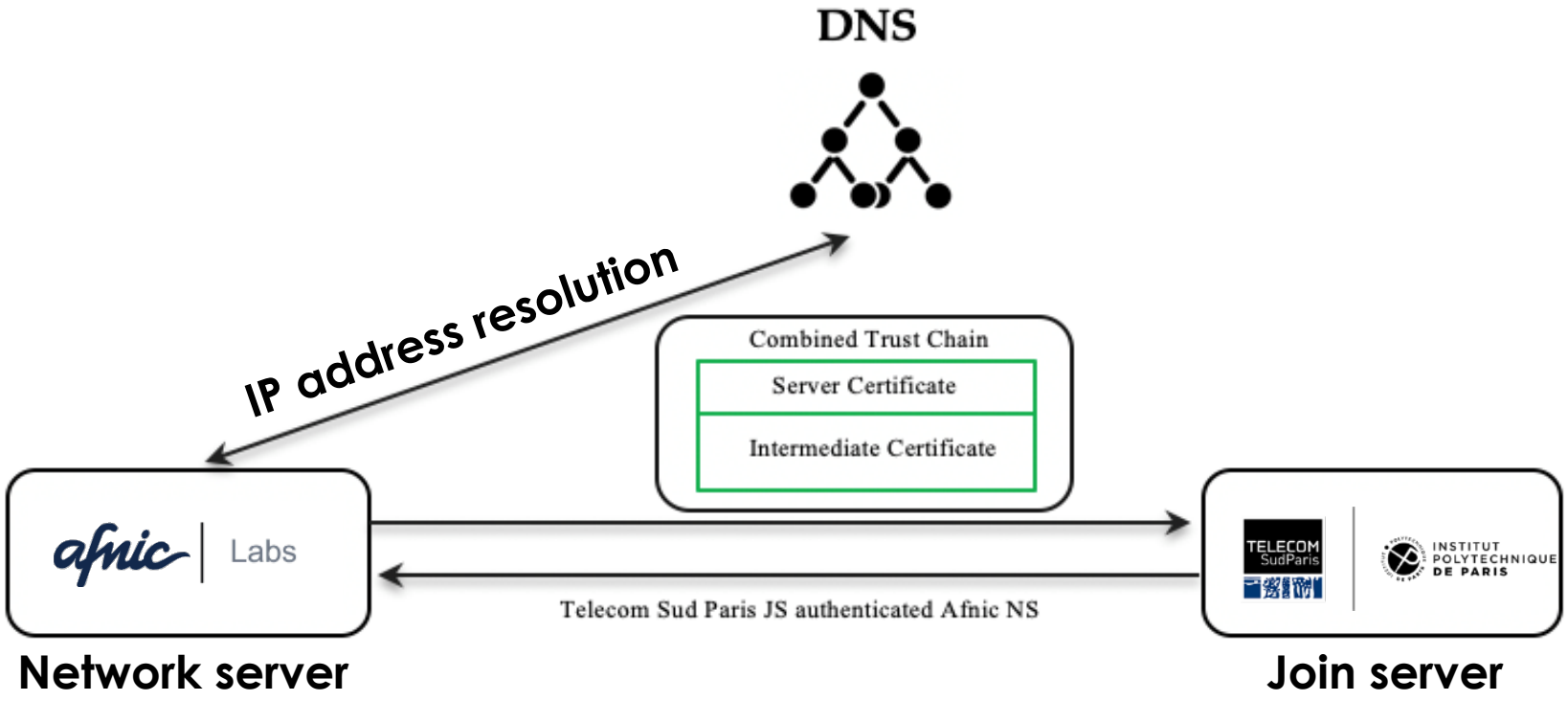
afnic | Labs DNS Provisioning PoC



IoTRoam – Certificate Provisioning

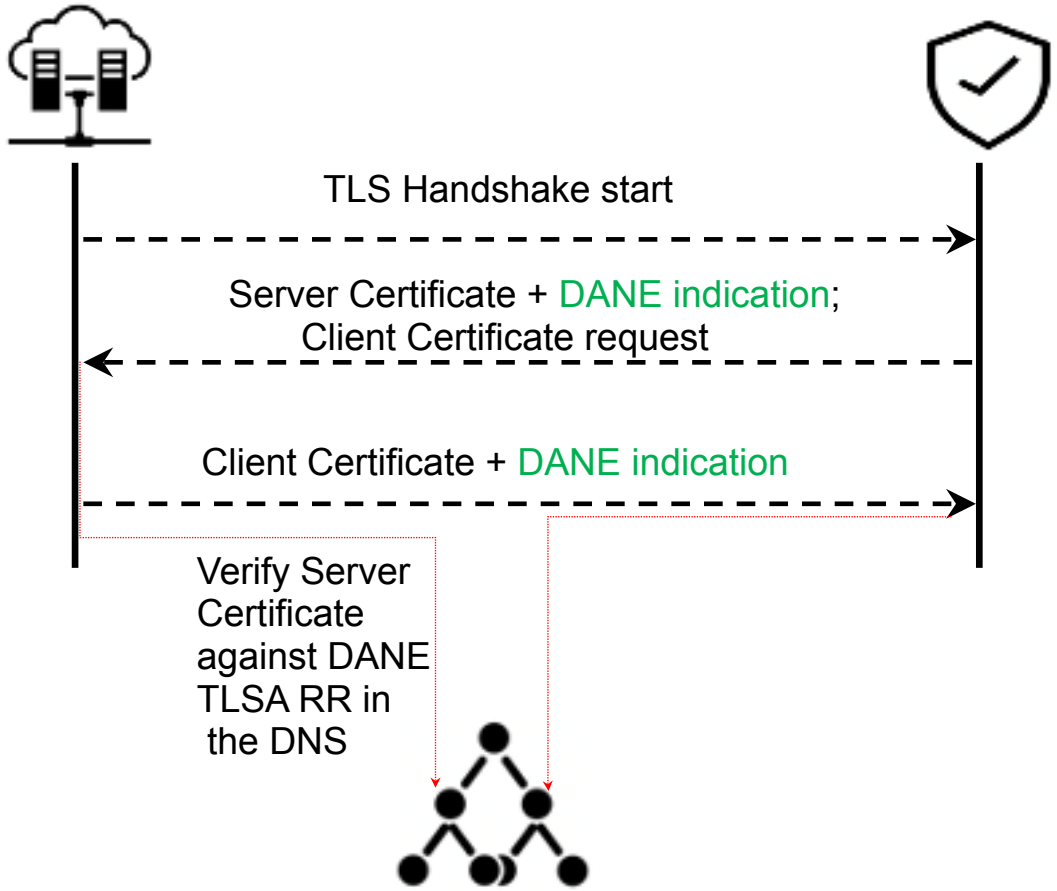


IoTRoam – Certificate Validation

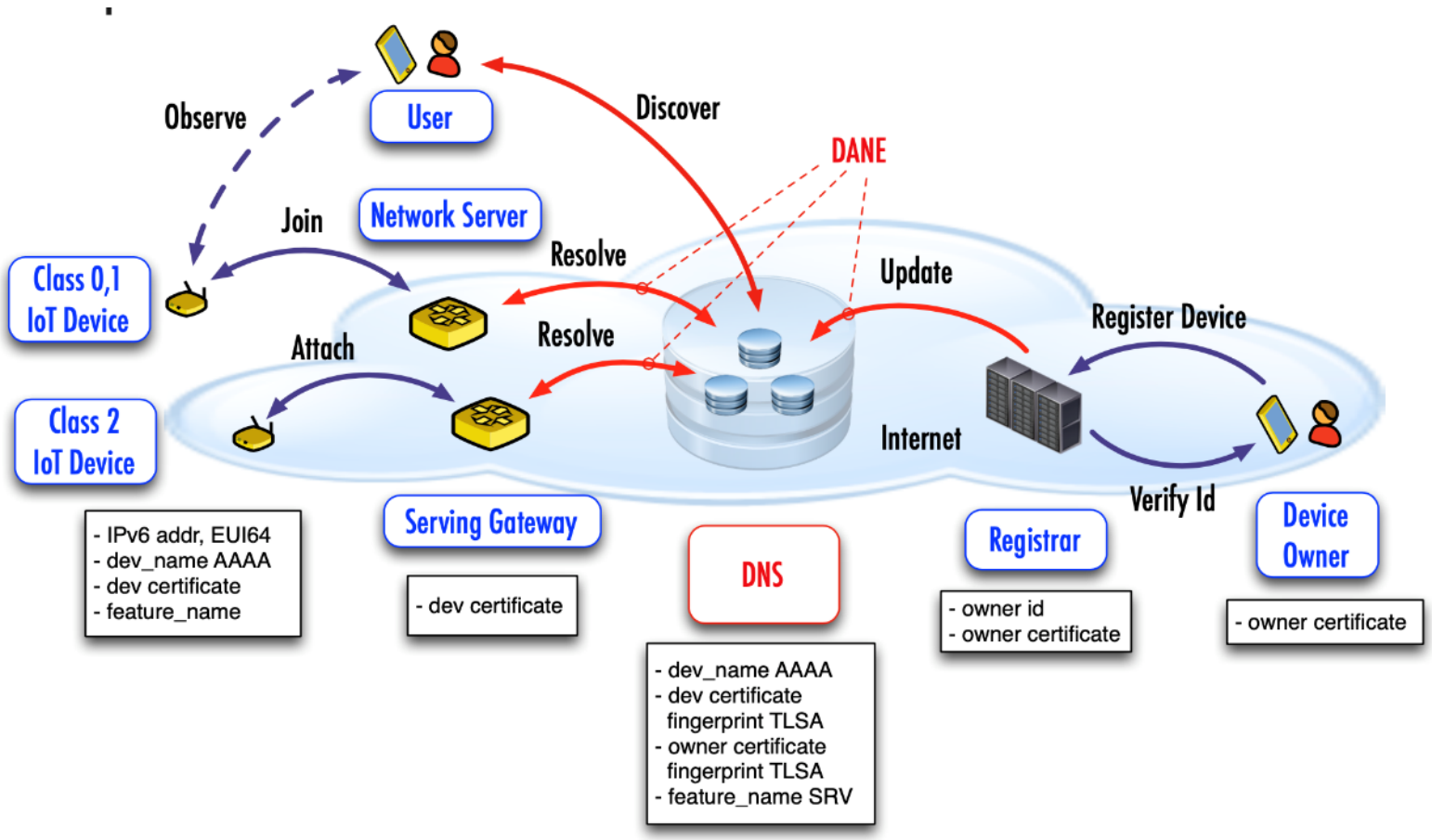


Using DANE Client Authentication – Federated CA's

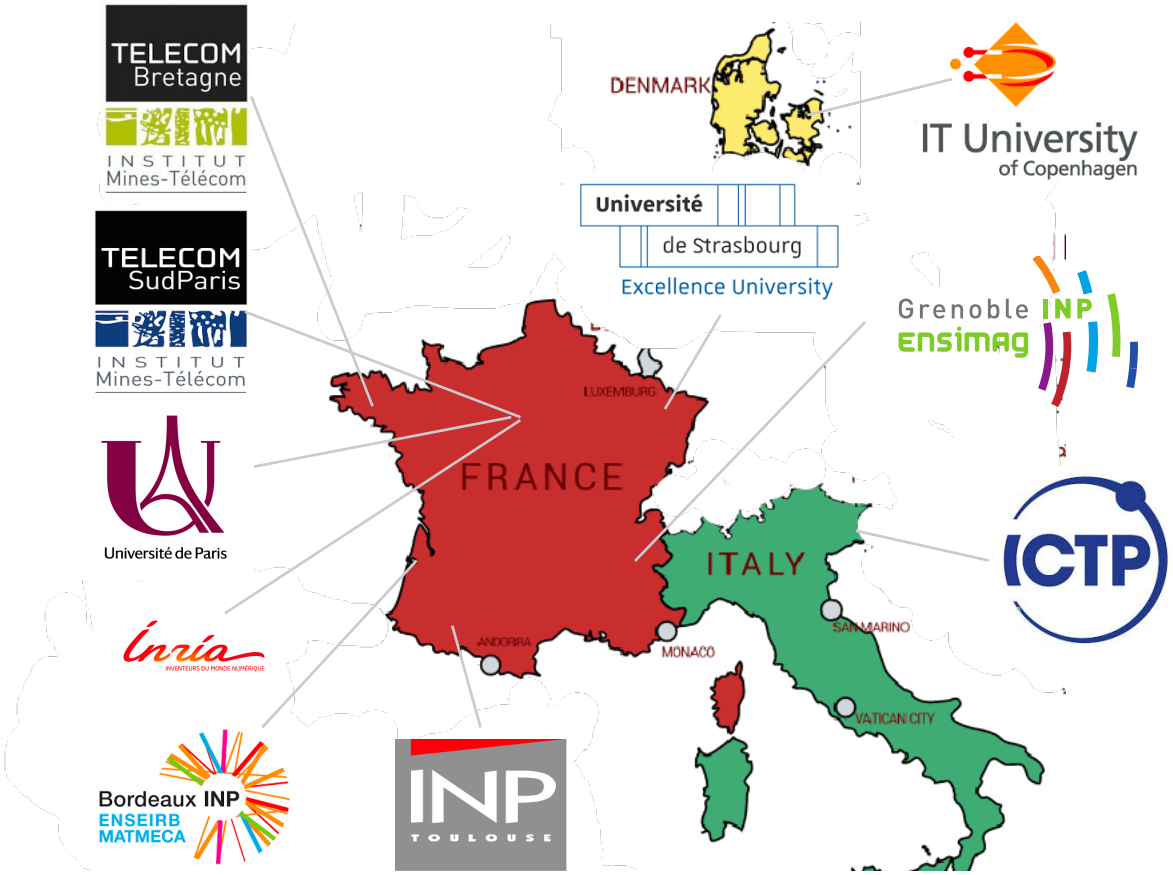
Enables using self-signed certificate with multiple Root CA's



DiNS Project



Institutions who have expressed Interest



IoTRoam Advantages

- No out of band configuration for NS/JS/AS authentication
- Authentication using port 443. Hence no worry about firewall settings
- Scalable: Ready for billions of devices as the platform uses the classical DNS and TLS infrastructure that has been operationally tested in the Internet
- No cost involved – Self-Signed Certificates and Open DNS infrastructure
- For more info : ***https://github.com/AFNIC/IoTRoam-Tutorial/***
- To participate in testing the Roaming Platform; contact ***Sandoche.Balakrichenan@afnic.fr***