IETF95 Summary of summary slides of IETF94

Simplying assumption 1: 6tisch like has a PCE/JCE
- draft-pritikin-bootstrapping-keyinfrastructures-00
  - → draft-ietf-anima-bootstrapping-keyinfra-02

Term mapping
- JCE → ANIMA Registrar
- Joint Assistant → ANIMA “Proxy”

Simplying assumption 2: leverage 802.1AR work
- Fundamental to anima-bootstrapping

Challenge 1: how does the network authenticate?
- ANIMA bootstrap defines “ownership voucher”

Things left to Resolve

Goal of ANIMA bootstrap is to create Enrollment over Secure Transport (RFC7030)

VS

Goal of 6tisch bootstrap is to create secured CoAP/6top transport from JCE/PCE to new node

ANIMA accomodates HTTPS or DTLS/CoAP + Blockwise. Hard sell to make DTLS Mandatory to Implement.

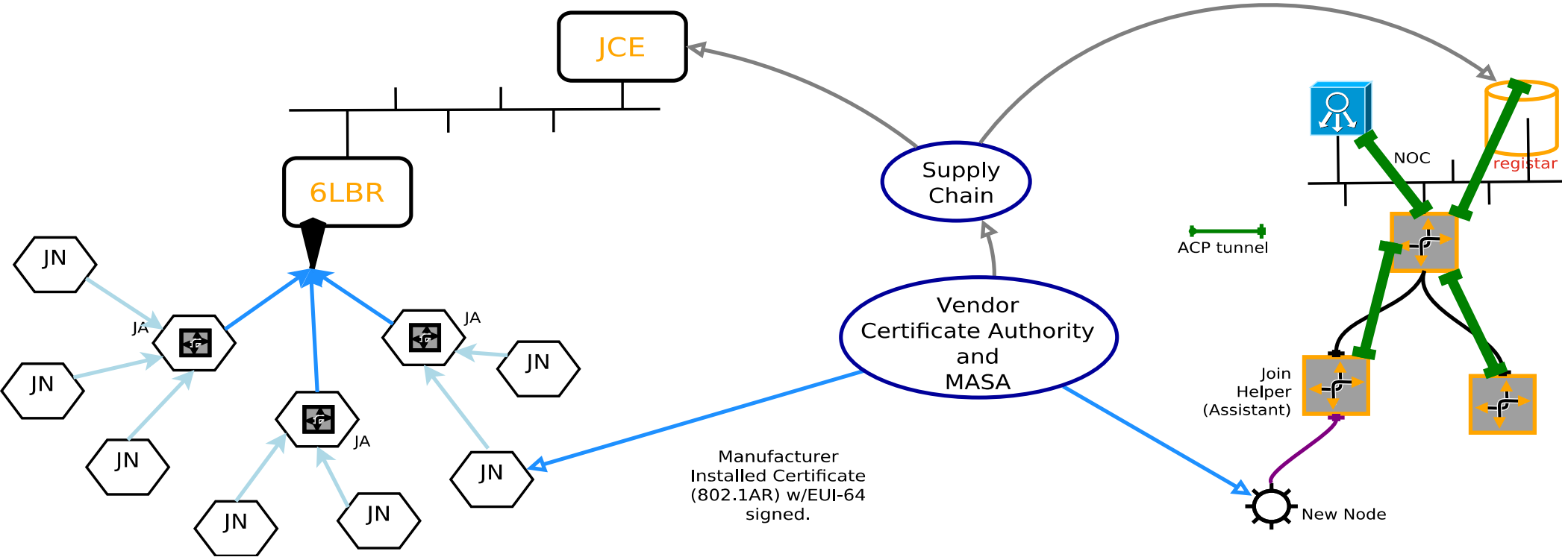
DTLS/CoAP only + 6top, blockwise may be controversial?

Join Problem

How to let random uninitialized, “drop shipped”, potentially malicious nodes into your network without destroying the network.

- 802.1x/EAP/PANA has this “solved” for initialized nodes which know which network they want to join; need to be per-provisioned with certificates.
  - needs EAP-TLS to make this work, which then includes new layers of fragmentation. This code is used once.
  - PANA/1x authenticator function scales with number of nodes attempting to join, is subject to DoS attack, defending against may be too expensive for constrained nodes
  - 1x function for ANIMA **ACP** bootstrap may interfere with 1x function being provided by routers/switches for end-hosts!
- The goal is to provision new nodes with certificates, at which point “traditional” methods may be used to join network.

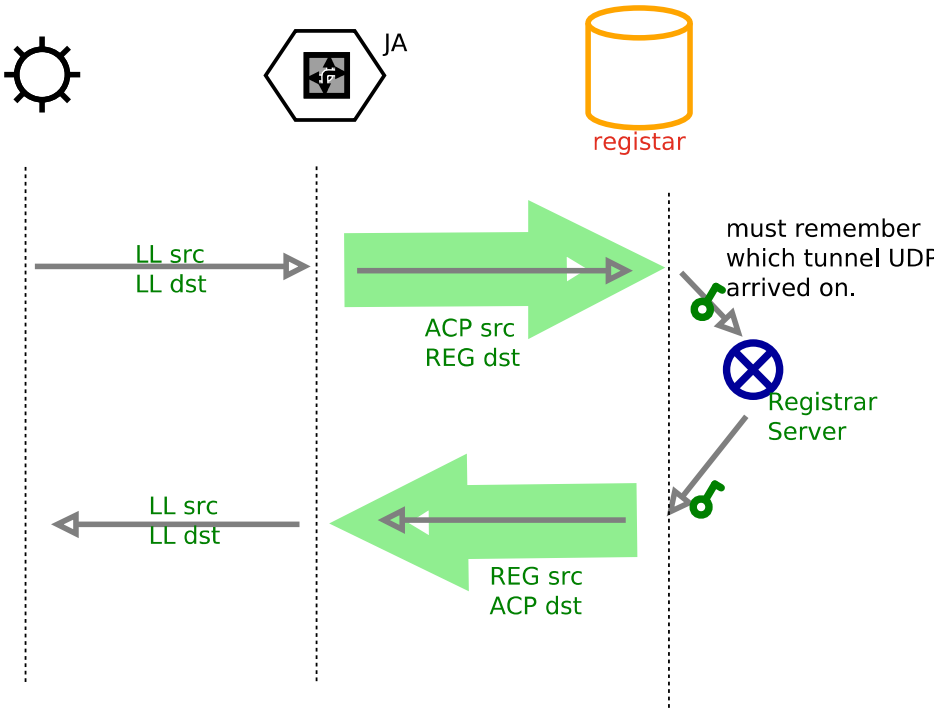
Network Diagram



Both 6tisch/LLN and ANIMA share Manufacturer Installed Certificates (“MIC”), and have a supply chain relationship with network operator via which Ownership Vouchers can be communicated.

New Node /Registrar communications

- New Node ↔ Proxy use Link Local addresses.
- Communication is CoAP/DTLS over UDP
  - (or HTTPS/TCP)
- Proxy ↔ Registrar communication is forwarded (D)TLS traffic; proxy is uninvolved in security.
  - Proxy is neither trusted, nor needs to be truthworthy
- Green Encapsulation arrow can be implemented in different ways



Proxy/Join Assistant proxy methods

HTTPS

1. Via circuit proxy (process per connection), or HTTP proxy.
2. Via NAT66 of link-layer enrollment addresses to ACP ULA address
3. Stateless IPIP encapsulation of link-local traffic to registar

Brian Carpenter was visibly ill

CoAP/DTLS

1. UDP circuit proxy
2. NAT66 of link-layer to ACP ULA address
3. Stateless IPIP encapsulation of link-local traffic to registrar
   a) Essentially this is routing-dispatch IPIP encapsulation

Least amount of new Code for constrained Devices, highest Resistance to DoS Costs some bandwidth

See draft-richardson-anima-state-for-joinrouter-00: Considerations for stateful vs stateless join router in ANIMA bootstrap, for longer discussion

Funny Icons for other slides