



Impact of Mobility on Discovery in COIN

<https://tools.ietf.org/html/draft-defoy-coinrg-mobile-discovery-00>

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Discovery and Mobility

- Mobile devices can be service / data / resource consumers or providers in COIN scenarios (distributed, dynamic). For example:
 - Mobile devices can generate video or data streams that are processed at the edge
 - Mobile devices can be used as edge computing platforms, as studied in ETSI [1]
- This draft discusses some challenges on discovery, associated with wireless mobility, to provide input to the current work on discovery in COIN RG

Scalability

- A first set of challenges is related to scalability
 - Need to keep wireless resource usage low per mobile device, when they change AP
 - Additionally:
 - Multicast is expensive on wireless networks
 - In dense areas, mobile devices changing APs can generate a constant level of traffic related to discovery
- Examples of mechanisms dealing with scalability
 - Pre-attachment discovery in 802.11aq
 - APs provide a list of hashed service names to mobile devices. Mobile devices can even send requests to services through the AP.
 - Edge computing discovery in 5G
 - A mobile device provides some information to a discovery service in the control plane (edge configuration server [2]). Request includes application client type, e.g. v2x, expected location, requested QoS. The discovery service provisions the next stage discovery server (edge enabler server) on the mobile device, e.g. including data network name and a URI. Then the mobile device can select an edge enabler server and connect to it over a data plane connection.

Multiple Interfaces/Networks

- A mobile device needs to determine which network interface or data network to use for initial discovery or when relocating
 - The mobile device may need to choose between connections not yet established
- Among common strategies:
 - For centralized discovery in a managed network, a control plane server can tell which data network to use.
 - For distributed discovery we can use passive and active discovery methods
 - Passive discovery methods
 - Provisioning domains
 - Router advertisements
 - DHCP signaling
 - Those methods may need the data plane connection to be up (e.g. unless discovery information could be provided earlier, e.g. by deploying provisioning domains using policy rules)
 - Active discovery methods
 - DNS-SD, mDNS
 - Those methods may be used as a second step or concurrently over multiple interfaces/networks

Service Continuity

- Service continuity needs to be maintained when a provider or consumer moves to a new location
 - Discovery can impact service level, especially for real-time services
 - For example: losing frames when processing a video stream from a mobile device at the edge
- Strategies for edge service continuity:
 - 1. Re-connect to a service instance already in use (using same address directly or after “re-discovering” the same instance), and either migrate the connection or use multipath
 - 2. Discover a new instance (and use it concurrently or as a replacement to the first instance)
- Could the discovery process help inform this choice of strategy?

Conclusion

- As a starting point for a discussion, w/r to discovery work in COIN we could:
 - Consider mobility related requirements among others for data/service discovery in COIN
 - Support centralized and distributed schemes, control plane and data plane-based solutions
 - Leverage or extend existing standard solutions to reduce mobile network resource usage for discovery