CDNI Working Group
IETF 117

Named Footprints
Motivation

- New dCDN use cases emerged that require advanced footprint capabilities
  - Distinct access networks under common dCDN management
  - Differentiated CDN layers (edge and “last-mile” cache layers)
  - CDN requirements by geography (e.g. GDPR)

- These use cases call require
  - Footprints to be used in metadata inside and outside of FCI (e.g. in configuration, logging, cache management) in a consistent manner
  - Complex footprint definition logic
  - Support for dynamically changing footprints
Proposed Changes

- Extend FCI to advertise referenceable named footprint objects
  - Footprints accessible via both common advertisement and individually
  - Hierarchical advertisement
  - Namespace support
  - Client-side caching support

- CDNI operation changes to include retrieval and periodic refreshment of footprint advertisements

- Add two new footprint types
  - “named” footprint type references the FCI advertisement
  - “expr” footprint uses CDNI MEL expressions to define a footprint

- Change complex footprint types to specify an optional datasource ("asn", "country" and "subdivisioncode")
GET /OC/FCI/footprints
GET /OC/FCI/footprints/<namespace>/
GET /OC/FCI/footprints/<namespace>//<footprint>
“Named” footprint type

Footprint definition in the form of footprint URI, published via FCI

```json
{
    "generic-metadata-type": "MI.PrivateFeatureList",
    "generic-metadata-value": {
        "feature": {
            "feature-oid": "Broadpeak",
            "feature-type": "S4Streaming",
            "feature-value": {
                "footprint": {
                    "footprint-type": "named",
                    "footprint-value": "https://os.dcdn.com/FCI/footprints/live/us"
                }
            }
        }
    }
}
```
Explicit hierarchy defined in the advertisement to mix and match footprint types
Parent footprint includes all children footprints
Footprint is NOT sum of all children footprints
Unambiguous endpoint matching within each namespace
Footprint Definitions Caching

- Each footprint definition comes with expiration attribute
- uCDN bootstraps by retrieving and caching all footprint resource definitions
- uCDN refreshes footprints as they expire
- uCDN may skip refreshing footprint definitions that it’s not using
Extending MEL to support "endpoint" variables

- ep.asn
- ep.ipv4addr
- ep.ipv6addr
- ep.country
- ep.subdivision

```json
{
  "footprint-type": "expr",
  "footprint-value": "$ep.country == "us" and not $ep.ipv4addr ipmatch ('10.1.1/24' or '10.1.2.0/24')"
}
{
  "footprint-type": "expr",
  "footprint-value": "$ep.asn = 1234 or ($ep.ipv4addr ipmatch "192.168.1/24") or ($ep.ipv6addr ipmatch "2001:db8:3333:4444/48")"
}
{
  "footprint-type": "expr",
  "footprint-value": "$ep.country == "us" and not $ep.subdivision="us-ny"
}
```
Namespaces

- Namespaces allow dCDN to advertise different footprint breakdowns, to accommodate different types of traffic
  - For example, dCDN with edge layer that handles VOD traffic only
- Endpoint resolves to footprint unambiguously within each namespace
- Offer support for “coverage” and “resource” footprint
THANKS!