Bearers, Attachment Circuits & SAPs

draft-boro-opsawg-teas-common-ac
draft-boro-opsawg-teas-attachment-circuit
draft-boro-opsawg-ntw-attachment-circuit

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Mohamed Boucadair (Orange), Richard Roberts (Juniper), Oscar Gonzalez de Dios (Telefonica), Samier Barguil Giraldo (Nokia), Bo Wu (Huawei), Victor Lopez (Nokia), Ivan Bykov (Ribbon Communications), Qin Wu (Huawei), Ogaki Kenichi (KDDI), …

Background

- ***Service Attachment Points (SAPs)*** are network reference points where services can be (or are being) delivered to customers
  - SAPs may be provisioned ***prior or during the activation*** of a service instance
- SAPs may be ***multiservice or specific to a single service***
- SAPs are connected to customer devices (e.g., CEs, ASBRs, Network Functions, etc.) via logical constructs called: ***Attachment Circuits***
  - One or more ACs can be bound to the same SAP
  - The same AC can be terminated by one or more peer-SAPs
  - A SAP and a peer-SAP can share one or multiple ACs
- ACs are built over ***bearers***
  - Bearers may be wireless, wired, et.
  - Bearers can be seen as the required underlying connection for the provisioning of an attachment circuit
  - The same bearer can host one or multiple ACs

Some Observations

- Recent service models make ***hidden/inaccurate assumptions*** about the AC
  - This limits the applicability of these service models
- Some models ***overload*** some concepts set in the SAP model
  - E.g., pee-sap-id to identify a logical connection
- ***Lack of consistency***: the structure of the AC in some recent models is not aligned with the one used in existing RFCs
  - This deviation makes the mapping with ***network models difficult*** to achieve
  - E.g., L3SM and slicing may be provided over the same AC, but they don't have the same AC structure. Distinct logics to translate a slice service into L3NM will be needed, which is ***suboptimal***
- ***Lack of a standard programmatic interface*** to manage bearers and attachment circuits-as-a-service
- The SAP model ***does not expose the ACs*** that it terminates

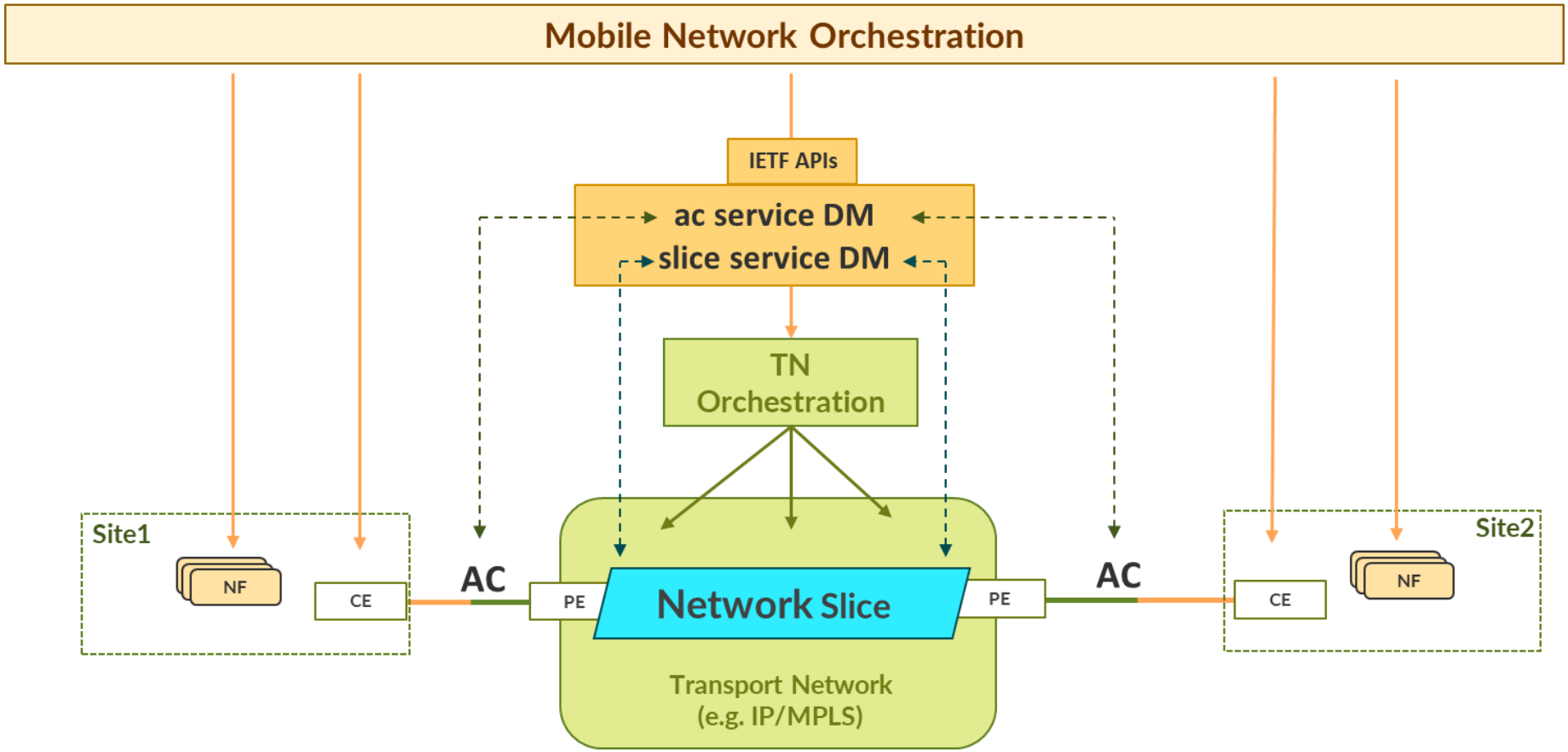
A Proposal

- Specify an AC library with reusable types, identities, and groupings: ***ac-common***
- Specify a model for managing ACs as a service: ***ac-svc***
  - Does ***not make any assumption about the internal structure*** or even the nature or the services that will be delivered over an AC
  - Accommodates both ***integrated and separate provisioning models***
    - Incudes ***reusable groupings*** for use by other service models
    - Exposes AC/bearer ***references*** that can be used in other service placement requests
  - Favor the approach of completely relying upon the AC service model ***instead of duplicating data nodes into specific modules*** of advanced services that are delivered over an AC
- Specify a network model for the AC management: ***ac-ntw***
  - Augments the SAP model with required AC data nodes
  - Network-view of ACs

Methodology

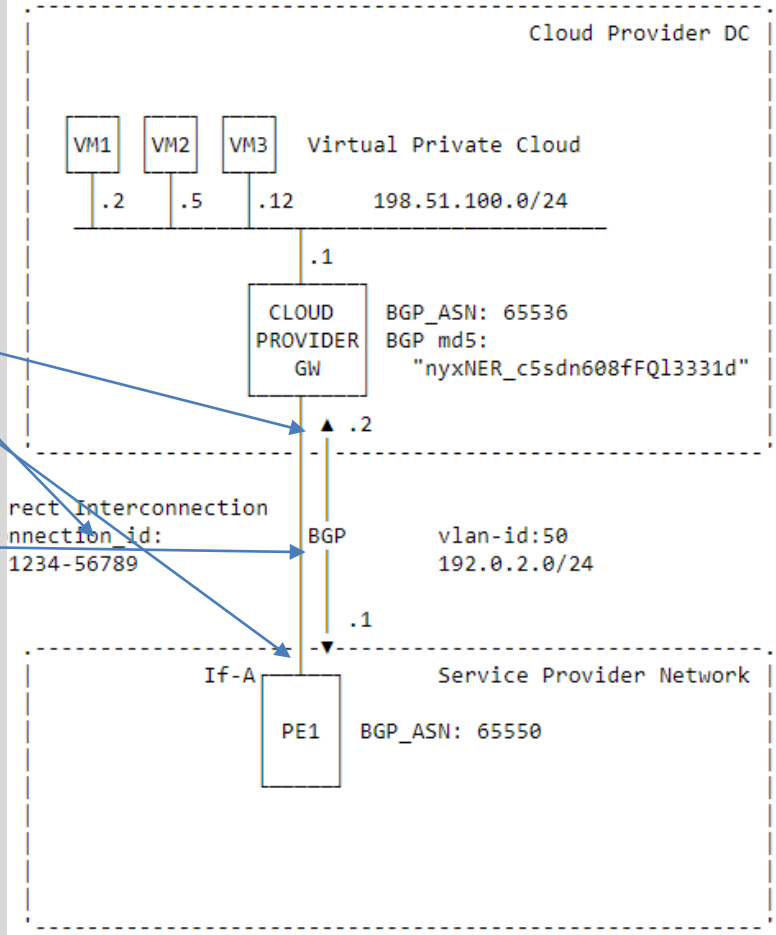
- ***Adhere*** as much as possible to the automation framework set in RFC 8969
  - Ease mappings between service/network models
  - Ease the mapping between network and device models
- ***Leverage*** L3SM (RFC 8299), VPN Common (RFC 9181), L3NM (RFC9182), L2NM (RFC9192), and SAP (draft-ietf-opsawg-sap)
- ***Adjust*** the structure as appropriate to accommodate cloud-specific deployments

Sample Usage: O-RAN

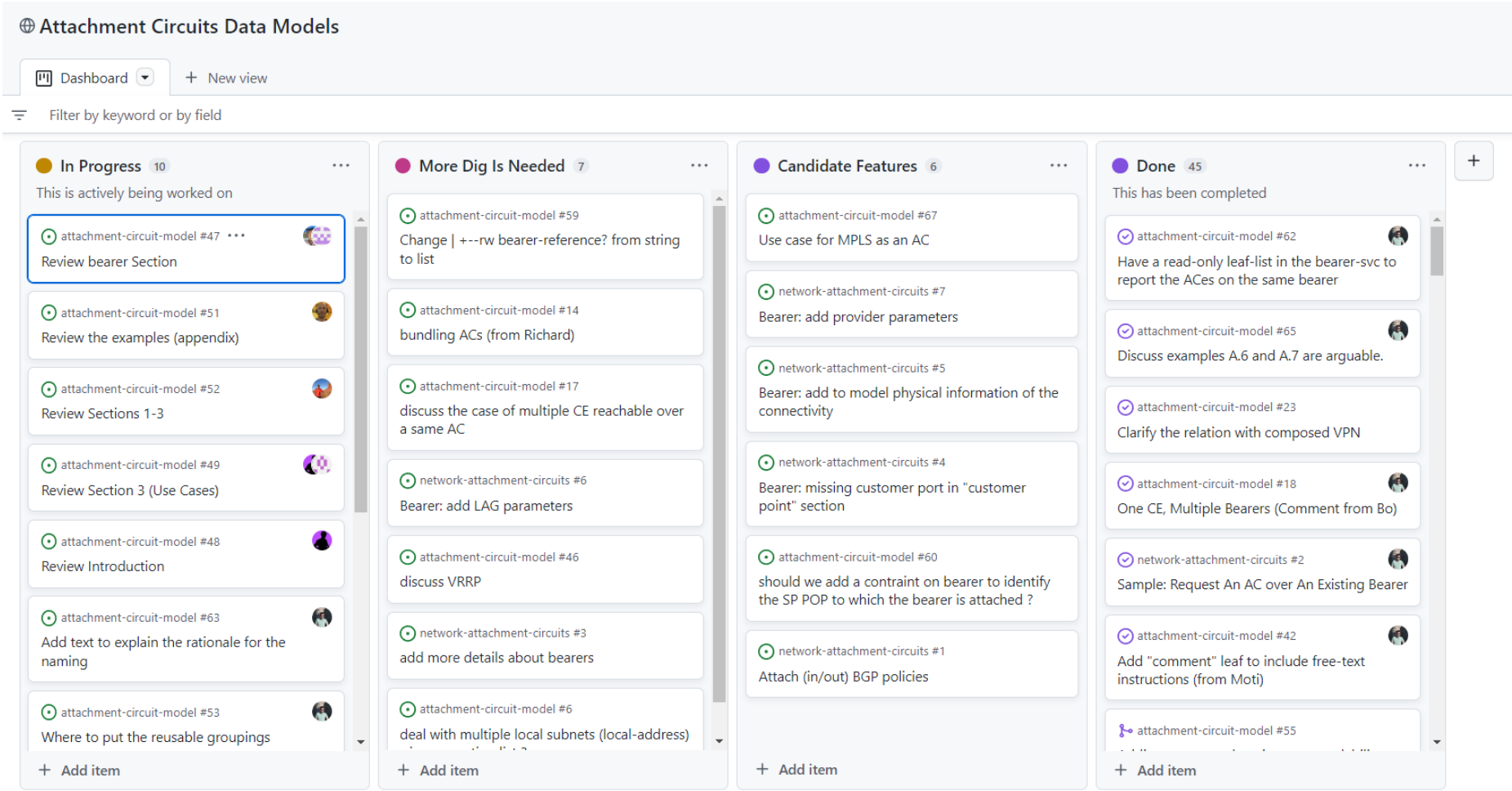


Sample Usage: Cloud


```
{
   "ietf-ac-svc:attachment-circuits": {
     "ac": [
       {
         "name": "ac--BXT-DC-customer-VPC-foo",
         "description": "Connection to Cloud Provider",
         "requested-start": "2023-12-12T05:00:00.00Z",
         "l2-connection": {
           "bearer-reference": "1243-56789"
         },
         "ip-connection": {
           "ipv4": {
             "local-address": "192.0.2.1",
             "prefix-length": 24,
             "address": [
               {
                 "address-id": "1",
                 "customer-address": "192.0.2.2"
               }
             ]
           }
         },
         "routing-protocols": {
           "routing-protocol": [
             {
               "id": "1",
               "type": "ietf-vpn-common:bgp-routing",
               "bgp": {
                 "neighbor": [
                   {
                     "id": "1",
                     "peer-as": 65536,
                     "authentication": {
                       "keying-material": {
                         "md5-keychain" : "nyxNER_c5sdn608fFQl3331d"
                       }
                     }
                   }
                 ]
               }
             }
           ]
         }
       }
     ]
   }
}
```

Work Status


Attachment Circuits Data Models
Dashboard
New view
Filter by keyword or by field
In Progress 10
This is actively being worked on
attachment-circuit-model #47
Review bearer Section
attachment-circuit-model #51
Review the examples (appendix)
attachment-circuit-model #52
Review Sections 1-3
attachment-circuit-model #49
Review Section 3 (Use Cases)
attachment-circuit-model #48
Review Introduction
attachment-circuit-model #63
Add text to explain the rationale for the naming
attachment-circuit-model #53
Where to put the reusable groupings
Add item
More Dig Is Needed 7
attachment-circuit-model #59
Change | +--rw bearer-reference? from string to list
attachment-circuit-model #14
bundling ACs (from Richard)
attachment-circuit-model #17
discuss the case of multiple CE reachable over a same AC
network-attachment-circuits #6
Bearer: add LAG parameters
attachment-circuit-model #46
discuss VRRP
network-attachment-circuits #3
add more details about bearers
attachment-circuit-model #6
deal with multiple local subnets (local-address)
Add item
Candidate Features 6
attachment-circuit-model #67
Use case for MPLS as an AC
network-attachment-circuits #7
Bearer: add provider parameters
network-attachment-circuits #5
Bearer: add to model physical information of the connectivity
network-attachment-circuits #4
Bearer: missing customer port in "customer point" section
attachment-circuit-model #60
should we add a contraint on bearer to identify the SP POP to which the bearer is attached ?
network-attachment-circuits #1
Attach (in/out) BGP policies
Add item
Done 45
This has been completed
attachment-circuit-model #62
Have a read-only leaf-list in the bearer-svc to report the ACes on the same bearer
attachment-circuit-model #65
Discuss examples A.6 and A.7 are arguable.
attachment-circuit-model #23
Clarify the relation with composed VPN
attachment-circuit-model #18
One CE, Multiple Bearers (Comment from Bo)
network-attachment-circuits #2
Sample: Request An AC over An Existing Bearer
attachment-circuit-model #42
Add "comment" leaf to include free-text instructions (from Moti)
attachment-circuit-model #55
Add item

Next Steps

- Request WG Adoption
  - Used/referred to by other SDOs (O-RAN, for example)

- Commit to report and seek reviews from other WGs, such as teas for the specific slice service
  - Sync how to glue slice-services to attachment circuits/bearers