# ONAP / O-RAN / O-RAN-SC Collaboration
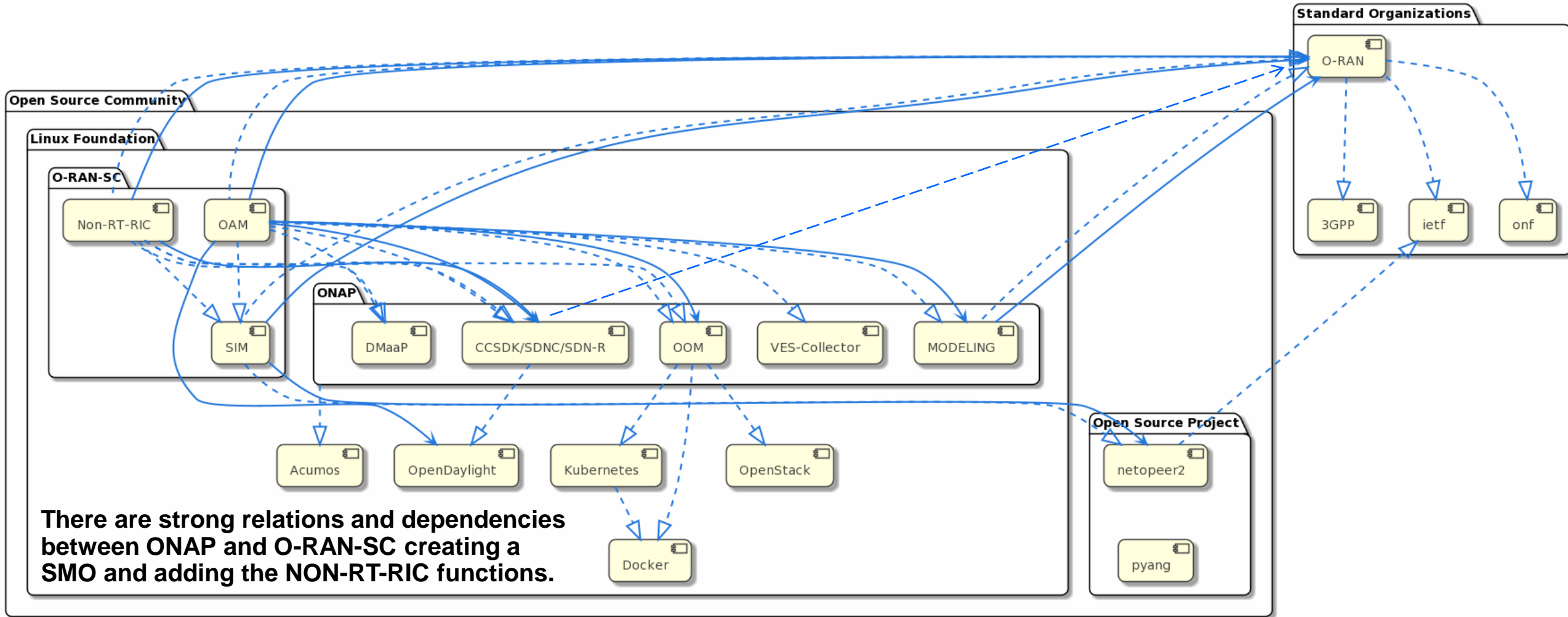
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# Closed loop: Open Software and Standardization

- The open-source community **uses** the specifications and documents of SDOs and produces software to provide functionality

- At the same time experience and trends are **feedback and contributed** to SDOs. In most of the cases it will lead to updates of existing specifications or triggers the creation of new specifications.

Relationship between
Open Source Community and Standard Organizations

**Open Source Community**

software

feedback

uses

**Standard Organizations**

specification

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# The Ecosystem (a simplified view ☺)



There are strong relations and dependencies between ONAP and O-RAN-SC creating a SMO and adding the NON-RT-RIC functions.

# ONAP<->O-RAN Collaboration: Updates since Jan 2021

- Continuation of discussions related to Network Slicing (RAN, and FH/MH Transport aspects

  o Regular meetings between ONAP and O-RAN community

  o Occasionally Transport folks are also invited for joint RAN <-> Transport meeting

  o Jointly identified 2 Closed Loop scenarios for Guilin release (1 with AI/ML), which is further refined in Honolulu

  o Expected to continue with first O-RAN Slicing specs expected later this year

- Continuing discussions regarding use of O-RAN yang models for 5G SON use case, and in general for any RAN use case in ONAP

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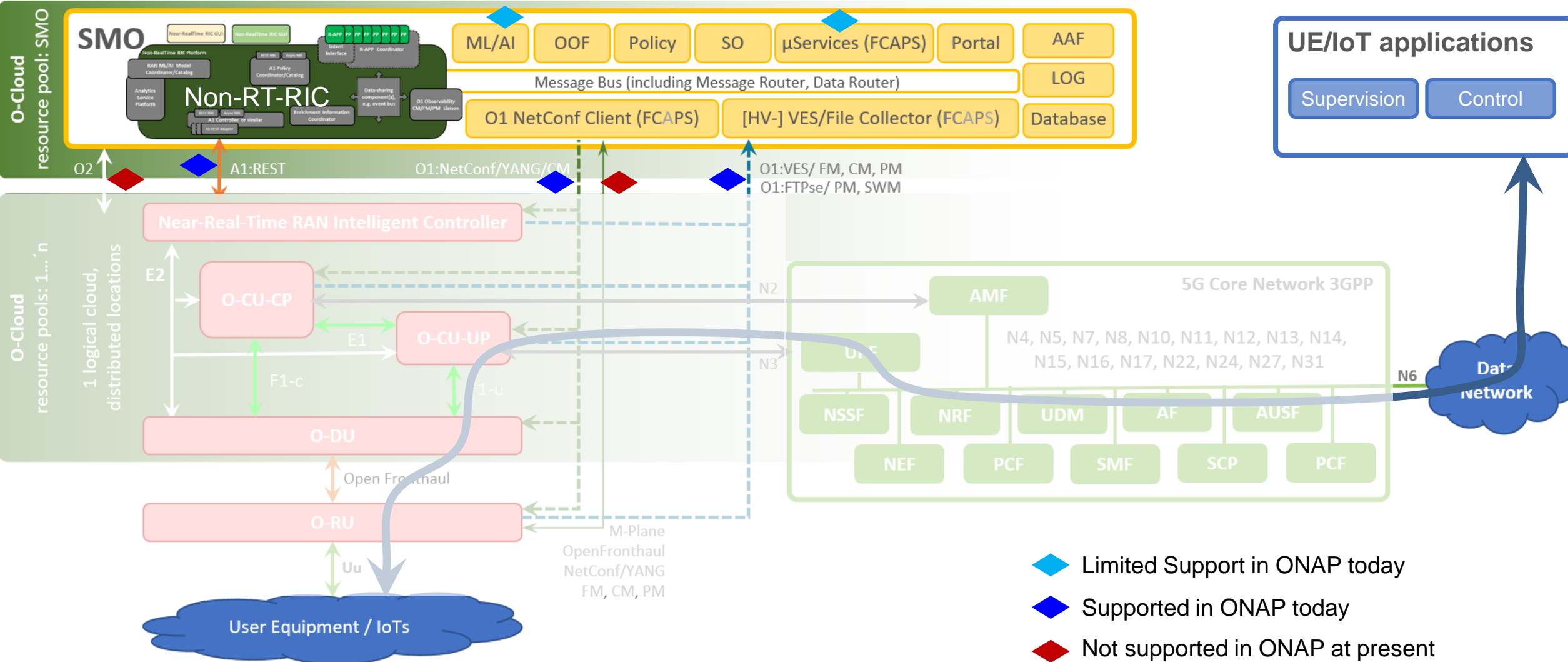# ONAP<->O-RAN-SC Collaboration: Updates since Jan 2021

- <u>Weekly calls on Wed</u> with ONAP members and O-RAN-SC PTLs
  - o Quick status update by O-RAN-SC PTLs
  - o Topics of common interest being discussed, including interfaces (O1, A1), modelling aspects, control loops, FM/PM reporting, yang models, <u>5G use cases</u>
  - o Functionality reuse and synergy is also in focus (e.g., simulators, SMO, Non-RT RIC, A1 adaptor) though only limited progress has been made so far
  - o Discussions on Modeling aspects (<u>Abstract Topology Model</u>)

- Sharing resources and teams OpenLab activities in <u>OWL</u> (since 2019)

- More formal interactions required at Requirements Sub-committee & ArchCom level

- For SMO, there hasn't been any formal discussion yet (to our knowledge) between ONAP and O-RAN-SC.

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# SMO – Current O-RAN-SC view

- **SMO-MVP "Minimum Viable Product"** (current)
  - A light-ware SMO instance mainly used for module testing. It should include O-RAN-SC simulators to show and validate the entire O-RAN functions *(Note: if appropriate, artifacts (code, doc) could move from Non-RT-RIC and OAM project to SMO)*

- **SMO-full** (future releases)
  - A full functional O-RAN-SC SMO instance as reference implementation for commercial products, including "one-click" deployment, geo-redundancy, ...)

Source: https://wiki.o-ran-sc.org/pages/viewpage.action?pageId=20875862

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# O-RAN-SC SMO Environment (draft)



Source: https://wiki.o-ran-sc.org/pages/viewpage.action?pageId=20875862

# SMO components and its mapping to existing open-source projects

| SMO component | Protocol | Category | O-RAN-SC | ONAP | others |
|---|---|---|---|---|---|
| A1 Policy Mgmt Service | REST / DMaaP | mandatory | Non-RT-RIC | CCSDK | |
| A1 Adaptor | RESTConf/YANG (Internal interface) | mandatory | Non-RT-RIC | CCSDK/SDNC | |
| A1 Control Panel | Web application | mandatory | (near-rt)RIC Dashboard NONRTRIC Control Panel | | |
| O1 NetConf/YANG termination | NetConf/YANG client | mandatory | (As per ONAP) | ODL/CCSDK/SDNC | ODL Apache Karaf |
| O1 VES termination | VES server | mandatory | (As per ONAP) | VES collector HV-VES collector | |
| O1 dashboard | Web application | preferred | | ODLUX | |
| Message bus | REST or Kafka | mandatory | (As per ONAP) | DMaaP | Apache Kafka |
| Persistent database | database cluster (no-sql, sql) | mandatory | (As per ONAP) | ElasticSearch for FCAPS mariaDB | ElasticSearch MariaDB Mongo DB MySQL |
| Service provisioning | | preferred | | SO | |
| Optimization | | preferred | | OOF | |
| Decision Policy | | preferred | | ONAP Policy Frmwk | |

# SMO components and its mapping to existing open-source projects

| SMO component | Protocol | Category | O-RAN-SC | ONAP | others |
|---|---|---|---|---|---|
| Data analytics | | preferred | | DCAE | Acumos Standalone uServices |
| Inventory | | preferred | | A&AI | ElasticSearch |
| Certification server | | preferred | | AAF | keystore |
| Logging | | preferred | | Elastic | ElasticSerach, Kibana |
| Logging dashboard | Web app | preferred | | Kibana | |
| PM file collection | | preferred | | DCAE-PMSH & DCAE-DFC | |
| Service Design | | to study | | SDC | |
| App / Control loop management | | to study | | CLAMP | |
| RAN & SMO Orchestration | | to study | OTF (tests only) | SO | |
| CM Database | | preferred | | CPS | |

Source: https://wiki.o-ran-sc.org/display/OAM/SMO+-+Service+Management+and+Orchestration

# SMO: Collaboration between ONAP & O-RAN-SC

| | Current | Target |
|---|---|---|
| **Architecture** | • Reuse of ONAP components for O-RAN-SC PoCs<br>• No formal collaboration | • Formal interaction at Architecture Sub-committee and Requirement Sub-committee level.<br>  *e.g.: PNF onboarding using NETCONF call home -> SDN-R converts into VES:pnfRegistration*<br>• Inputs from O-RAN-SC for new ONAP component/functional requirements.<br>  *e.g.: A1 Policy Functions in ONAP CCSDK, SMO Service exposure to rApps, O-RAN UE topology, etc.*<br>• More flexible ONAP (interim/custom) "releases" to support component reuse and avoid issue of release cadence mismatches *(& vice versa).* |
| **Interfaces** | • O1 alignment – VES format requirement<br>• O1 alignment – 3GPP yang for CM (use case driven)<br>• A1 alignment – Common A1 Adaptor | • No major change needed except some guidelines to ONAP requirements/use cases involving interaction with (O-)RAN network functions<br>• For FH M-Plane and O2, interactions have yet to start |
| **Modelling** | • Recently started with Abstract Topology Model | • Closer alignment needed especially when using ONAP components for SMO functions.<br>  *e.g.: DCAE collectors, DMaaP settings, CCSDK interfaces (NETCONF, RESTCONF RFC8040)*<br>• Joint discussions needed with Modelling and use case teams of both communities.<br>  *e.g.: Abstract Topology Model – across technologies and SDOs:* |
| **Rqmts and use cases** | • No real collaboration as such except perhaps A1-related work as of now.<br>• Perception of "loss of control" and "long turnaround" of functional requirements from OSC to ONAP then back to OSC. | • Start discussing potential "joint" use cases resulting in e2e demos being realized.<br>  *e.g.: PCI resolution, CNF onboarding, RAN Slicing, QoS assurance, Traffic steering*<br>• Streamlined process to inject O-RAN-SC requirement for ONAP functions *(specs, features)* pre-M1 in ONAP release cycle<br>• This could also be a trigger/motivation for greater collaboration across the above tracks.<br>  *e.g.: interfacing with Acumos* |

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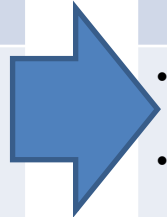
# SMO: Proposed steps for better alignment

| Forum | ONAP | O-RAN-SC | Frequency |
|---|---|---|---|
| **Requirements Sub-committee** | • Present potential SMO requirements from O-RAN-SC and how it can leverage existing ONAP functionality<br>• Input for new ONAP features/use cases leading to joint PoCs/Demos with O-RAN-SC<br>• Dedicated proactive check-ins to/from ONAP & O-RAN-SC prior to M0/M1 milestones to ensure alignment, reuse of functionality, requirements exchange | | Bi-monthly |
| **Architecture Sub-committee** | Discuss/present SMO architecture, ensure alignment in ONAP where-ever feasible, and differences reconciled (bi-monthly?) | | Bi-monthly |
| **Modelling Sub-committee** | Share common models particularly those relevant to O1/A1 (and in future O2) interfaces, and aligned functionality (e.g., Network Slicing) | | Monthly |
| **Use cases/requirements** | Weekly ONAP/O-RAN/O-RAN-SC discussion calls | | On need basis |
| | Use case realization calls with O-RAN-SC participants invited | SMO meetings with ONAP participants invited | On need basis (or) bi-monthly? |
| **Info sharing sessions** | LFN vF2F | O-RAN PlugFest | |
| | Dedicated periodic info-sharing sessions | | Quarterly? |

# Request to ONAP TSC

## O-RAN-SC

- Request a community alignment discussion with O-RAN-SC TOC
    - *Identify blockers/challenges to alignment in SMO/OAM areas.*
- Request O-RAN-SC-SC TOC for a 'Single Point of Contact' to collaborate with ONAP and regularly report to/from O-RAN-SC
- Add checks in ONAP M0/M1 milestones to ensure alignment & reuse of functionality for (O)RAN use cases/requirements
- Discuss further joint use case – implementation, testing and demo: e.g.:
    - Overall definition and governance
    - How will we ensure alignment of timelines for testing.
    - Who will "own" the test cases – specification & execution.
    - *Will such a use case be demonstrated in OWL, which is used by both ONAP & OSC?*

## O-RAN

- Request for a formal SPOC from O-RAN Alliance
- Other aspects to be discussed further (e.g., Closed Loop alignment with ETSI ZSM, etc.)

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# Questions, comments, suggestions, feedback???

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Thank You!