A Short Introduction to the O-RAN Software Community (OSC)
What is O-RAN Software Community?

• An open-source project collaborated by O-RAN Alliance and the Linux Foundation established in 2019
• Mission: to support the creation of open software for the RAN and develop reference software with the O-RAN Alliance’s open architecture and specifications.
• Standard Apache 2 license for Open-Source software contributions.
• Releases every 6 months, 8 completed releases so far
Technical Oversight Committee (TOC)

- Responsible for all technical oversight of the open source Project.
- 12 TOC members appointed by the Technical Steering Committee of O-RAN Alliance (the “TSC”)

<table>
<thead>
<tr>
<th>Company</th>
<th>Name</th>
<th>Alternate</th>
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</thead>
<tbody>
<tr>
<td>AT&amp;T</td>
<td>David Kinsey Co-Chair</td>
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<td>China Mobile</td>
<td>Jinri Huang Co-Chair</td>
<td>James Li</td>
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<td>Deutsche Telekom</td>
<td>Jakub Nový</td>
<td>Ondřej Hudousek</td>
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<td>NTT DOCOMO</td>
<td>Masahiro Fujii</td>
<td>Minami Ishii</td>
</tr>
<tr>
<td>Orange</td>
<td>Julien Boudani</td>
<td></td>
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<tr>
<td>TIM</td>
<td>Andrea Buldorini</td>
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<tr>
<td>Ericsson</td>
<td>John-Paul Lane</td>
<td>John Keeney</td>
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<tr>
<td>Nokia</td>
<td>Arunkumar Halebid</td>
<td>Thoralf Czichy</td>
</tr>
<tr>
<td>Radisys</td>
<td>Ganesh Shenbagaraman</td>
<td>Ankit Barve</td>
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<tr>
<td>Samsung</td>
<td>Avinash Bhat</td>
<td>Peter Moonki Hong</td>
</tr>
<tr>
<td>Viavi Solutions</td>
<td>Ultan Kelly</td>
<td>Baruch Friedman</td>
</tr>
<tr>
<td>Wind River</td>
<td>Jackie Huang</td>
<td>Jon Zhang</td>
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Grow the community of developers contributing code and also growing the community of companies running O-RAN SC instances, via focus on these areas: Release functionality, WG activities, Policies

RSAC co-chairs: David Kinsey (AT&T), Rittwik Jana (Google)
<table>
<thead>
<tr>
<th>Project Key</th>
<th>Project Name</th>
<th>Description</th>
<th>Project Technical Lead (Affiliation)</th>
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<tbody>
<tr>
<td>AIMLFW</td>
<td>AI/ML Framework</td>
<td>AI/ML workflow implementation for O-RAN environment.</td>
<td>Joseph Thaliath (Samsung)</td>
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<tr>
<td>DOC</td>
<td>Documentation</td>
<td>Documentation on contributions and O-RAN SC contents.</td>
<td>Weichen Ni (CMCC)</td>
</tr>
<tr>
<td>INF</td>
<td>Infrastructure</td>
<td>Infrastructure and O-Cloud implementation</td>
<td>Jackie Huang (Wind River)</td>
</tr>
<tr>
<td>INT</td>
<td>Integration and Testing</td>
<td>Integration and interoperability tests for release, end to end and use case testing.</td>
<td>James Li (CMCC)</td>
</tr>
<tr>
<td>NONRTRIC</td>
<td>Non-RealTime RIC (RAN Intelligent Controller)</td>
<td>To support non-real-time radio resource management, higher layer procedure optimization, policy optimization in RAN, and providing guidance, parameters, policies and AI/ML models to support the operation of near-RealTime RIC functions in the RAN to achieve higher-level non-real-time objectives.</td>
<td>John Keeney (Ericsson)</td>
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<tr>
<td>OAM</td>
<td>Operations and Maintenance</td>
<td>Provides reference implementation according to the O-RAN OAM documents.</td>
<td>Martin Skorupski (Highstreet)</td>
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<td>OCU</td>
<td>O-RAN Central Unit</td>
<td>Essentially idle at the moment. Utilize a commercial CU binary from Radisys.</td>
<td>Su Gu (CMCC)</td>
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<td>ODUHIGH</td>
<td>O-RAN Distributed Unit High Layers</td>
<td>Focus on initial L2 functional blocks based on seed code contributions.</td>
<td>Ankit Barve (Radisys)</td>
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<tr>
<td>ODULOW</td>
<td>O-RAN Distributed Unit Low Layers</td>
<td>Utilize Intel FlexRAN.</td>
<td>Luis Farias (Intel)</td>
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<tr>
<td>RIC</td>
<td>Near Realtime RAN Intelligent Controller</td>
<td>RIC Platform to support xAPPs with limited support for O1, A1, and E2 interfaces.</td>
<td>Thoralf Czichy (Nokia)</td>
</tr>
<tr>
<td>RICAPP</td>
<td>RIC Applications</td>
<td>Open source sample xAPPs and platform applications that can be used for integration, testing, and demonstrations.</td>
<td>Sunil Singh (HCL)</td>
</tr>
<tr>
<td>SIM</td>
<td>Simulations</td>
<td>Simulators used for testing O-RAN NF interfaces.</td>
<td>Alex Stancu (Highstreet)</td>
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<tr>
<td>SMO</td>
<td>Service Management and Orchestration (SMO)</td>
<td>To integrate different software artifacts of existing open-source projects creating a fully functional open-source Service Management and Orchestration</td>
<td>Seshu Kumar Mudiganti (Wind River)</td>
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</table>
O-RAN SC Releases

- “I” – Energy Saving
- “H” – SMO Integration
- “G” – AI/ML Framework
- "F" - O-cloud
- "E" – Network Slicing
- "D" - Closed Loop Processing
- Cherry - Application Life Cycle Management (LCM) & Traffic Steering
- Bronze - End-to-End RAN communications
- Amber - Initial RAN Elements
O-RAN SC Stats

20.48M
Lines Of Code Changed

7.85K
Commits

AT&T Services, Inc.
Ericsson Software Technology
Nokia Corporation
Wind River Systems, Inc.
Radisys Corporation
highstreet technologies GmbH
Samsung Electronics Co. Ltd.
The Linux Foundation
HCL Technologies Ltd.
China Mobile Communication Company Ltd
Others

188
Contributors

18
No Of Sub Projects

114
Repositories

Commit made across all maintained repositories.

Individuals actively contributing to project.

RedStructuredText
C++
Java
Python
Go
Shell
Unknown programming lan.
YAML
C, C++, Objective-C
C

Number Of Files
O-RAN SC Open Labs

- North America East Coast Lab (New Jersey, maintained by AT&T):
  - Full compute, storage and networking support. Allow public access and resource sharing.
  - Implemented 3 O-Cloud resource pools (Simplex with one server; Duplex with two servers; Duplex+ with more than 2+ servers)
  - In progress to acquire RU emulators and RICTest tools
- North America West Coast Lab (California, maintained by China Mobile Technology (USA) Inc.):
  - Software centric and focused on RIC, SMO and xApp testing.
  - Building an automated CI/CD pipeline with the XTesting framework.
  - Test automation with POWDER to run integration and pairwise tests
- Asian Pacific Lab (Taiwan, maintained by National Taiwan University of Science and Technology):
  - In progress to duplicate the full set up of the East Coast Lab, a joint effort from NTUST, NYCU, ChungHwa Telecom, and Auray.
  - Focus on O-DU integration and security tests.
  - Contributing to the Energy Saving use case. Work with Viavi to generate synthetic data
With 3 OSC open labs it allows to share the resources (servers, emulator hardware) for the community to support the development of OSC software, make integration and thorough evaluation easier and more efficient.
Collaboration with Other Open Sources

Upstream projects:
• ONAP
• Yocoto
• StarlingX

Collaboration:
• Open Air Interfaces (OAI)
• ONAP
• Nephio
• Energy Saving use case, starting from simple cell on/off, with a rApp running AI/ML algorithm based on usage data
• End-to-end orchestration NF
• Establish an E2E call session with OSC components (UE <-> RAN <-> CORE <-> OTT)
• Lab interconnection
• Super Wireless RAN Blueprint (AWRBP) initial validation
Thank You!