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PROJECT

How TIP is bringing
market-ready Open RAN
solutions together

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TIP’s test and validation program, and industry alignment, can accelerate development and adoption of commercial, carrier-ready solutions.

Open RAN solutions are designed to give operators optionality in their choice of suppliers across the value chain.

By disaggregating the different functions of the network, operators can deploy networks made up of solutions from different vendors within the technology stack. This gives them several benefits. They can access solutions that they feel are best of breed or best suit their purpose, without having to buy all parts of the solution from the same vendor. Similarly, they can update and upgrade software and hardware independently, instead of being dependent on the upgrade roadmap of just one, integrated vendor.

Vendor optionality also means that they are not dependent on the supply chain, and pricing, of just one or two vendors, and this avoids a potential strategic weakness that has many governments worried.

TIP Chair and Network Architecture Director, Vodafone, Santiago Tenorio, speaking at TIP’s FYUZ event in 2022, told the conference, “Open RAN is all about optionality in the supply chain. The number of players in the market had decreased to a level that is not healthy any more, with only two or three players to choose from. That’s not enough competition; but it’s not just about price. It is about innovation and investment. Open RAN brings optionality, in a particular way and it’s not just about adding another vendor. Open RAN gives a way for many more companies to challenge and bring innovation much more quickly. It will mean companies are much more incentivised to bring innovation into the field.”

FROM: Single-vendor, fully integrated RAN

TO: Multi-vendor, disaggregated interoperable RAN

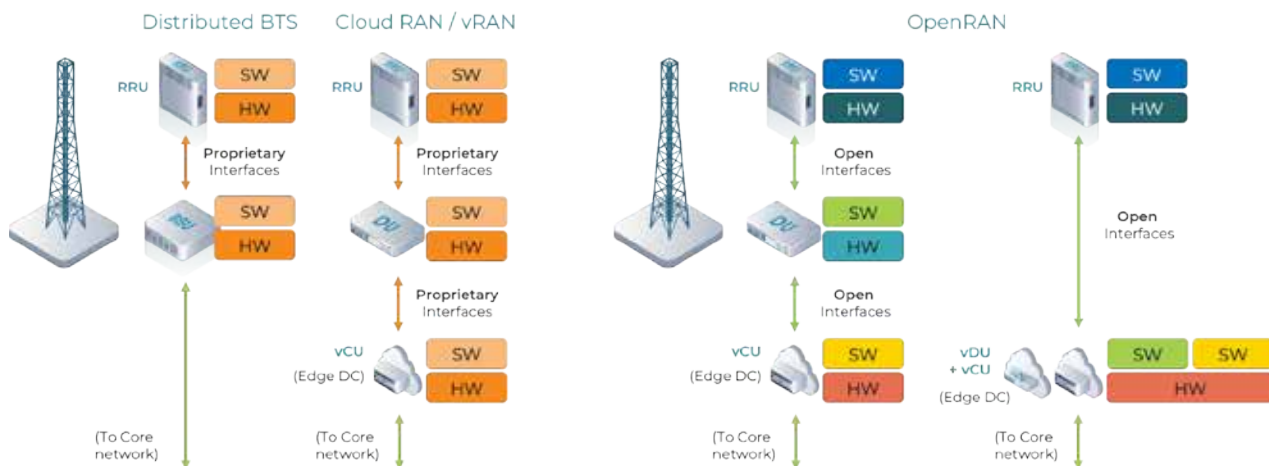


Figure 1: Open RAN architecture

The Deployment Challenge

So the potential benefits of building a network made up of disaggregated, open solution are easily articulated and understood. However, with the commercial momentum building up and more Open RAN players entering the sector there has been an associated challenge for operators, which is that disaggregated systems made up of hardware and software elements from many different providers need to be trusted as they are integrated into deployable solutions.

The traditional approach for an operator to do this is to take a product from a vendor or systems integrator into a lab, simulate a network around it and then test it for conformance and performance. Then the product is slowly put through field trials and live pilots until the operator feels it has a road-worthy solution.

The problem with taking this approach to Open RAN or other disaggregated solutions is that the operator needs to test not just the performance of the overall system, but it needs to act as the system integrator as well, verifying all the elements of the system and all the interfaces between them.

Additionally, each operator has to go through the test, validation and integration process for this for all the vendors they engage with, whilst every vendor has to go through the same, often duplicated, processes at every operator. That is a huge replication and duplication of process that takes up time and resource.

Although the aim of Open RAN is to bring more innovation into the field, the testing and integration process has become a real task for operators, many of whom are calling for more help in integrating Open RAN systems, and in accessing market-ready solutions that meet their requirements

What operators are asking for are Open RAN solutions that have been validated to meet their operational requirements, and that can be integrated with other elements within their network architecture without operators re-testing every element from first principles.

This is what TIP Is delivering with the Community Labs.

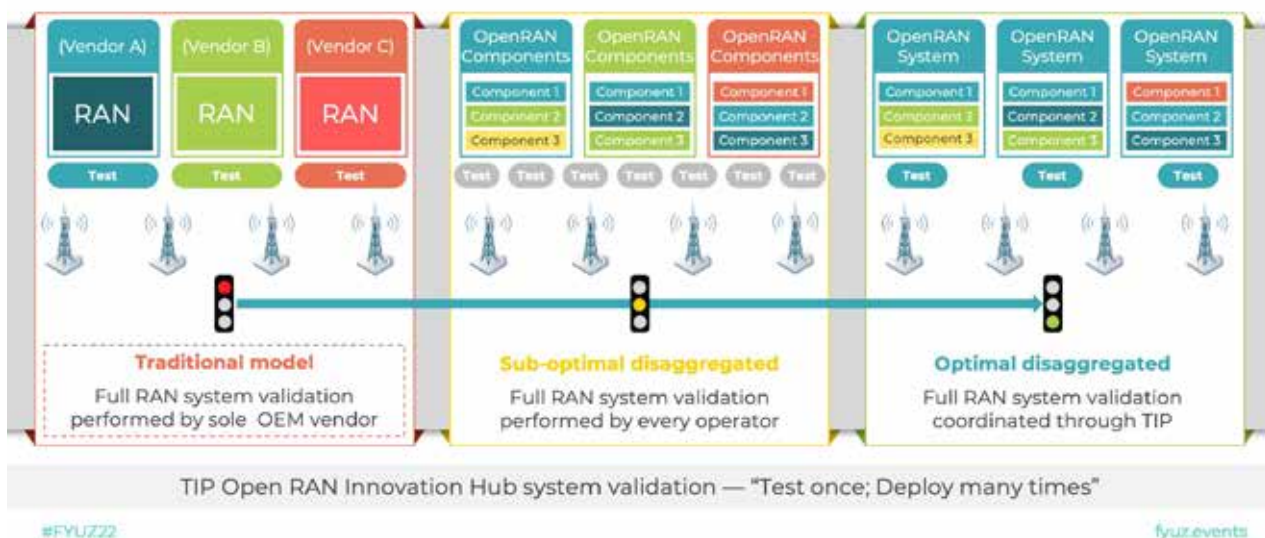


Figure 2: Drive Delivery Efficiency with the Open RAN Innovation Hub

Validating Market-Ready Products

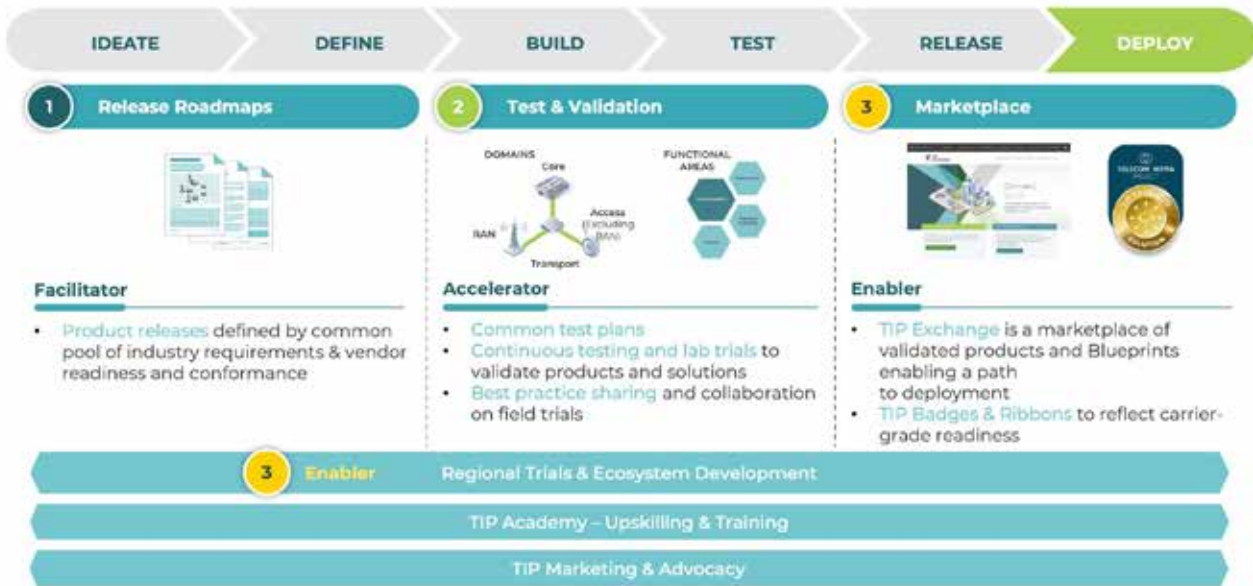


Figure 3: TIP: Ecosystem, productization and commercialization

One of the key work items for TIP’s Open RAN group in 2022 and into 2023 has been to try to resolve this issue – how to bring products to market that meet operator use cases, and retain the flexibility of choice that operators expect from Open RAN.

TIP’s Test and Validation process outlines a framework for ensuring the technical readiness of open and disaggregated connectivity solutions. TIP starts by defining release roadmaps that meet a common pool of industry requirements on features such as coverage, capacity, power requirements. This is work that has commonly been done individually by operators, but one of TIP’s key aims is to lessen the burden on operators by aggregating those requirements into working blueprints. Vendors have better information with which to plan their own roadmaps and design products. Operators have more influence on vendor roadmaps.

Products are then put through TIP’s ecosystem to test them in labs and field trials, with best practice sharing of results between participants. Finally, solutions and products are then put into TIP Exchange, which is a marketplace of validated products and blueprints, an online platform that presents products according to their use case description, interoperability and integration.



Figure 4: TIP Test & Validation Plan

A bronze badge indicates that a product is compliant with TIP requirements, and is ready for an RFI. A silver badge indicates that the product or solution has been validated in a controller environment. A gold badge is awarded to solutions that are validated to be “commercial grade”, and are ready for an RFQ, based on the TIP defined criteria.

This process delivers trusted products that have been validated to meet operators' own requirements, greatly reducing the test and validation load on the individual operator.

As TIP's Chair Tenorio explained, “Technical specifications are essential but not enough. Operators still have to define questions on output power, how many bands to support, the baseband architecture; a lot of variants. If all operators answer these in an uncoordinated way, then Open RAN will never happen, nobody reaches economies of scale. So the first thing TIP does is connect suppliers and operators, and operators among themselves, to harmonize requirements. Once we have that we can do testing, certification, systems integration.”

Multiple test plans have been released to the community to support OpenRAN Test & Validation, including:

- Outdoor Macro Blueprint Test Plan Release 2.0, supporting validation of various OpenRAN architectures, distributed or centralized, with 4G, 5G NSA and 5G SA
- RU Product Test Plan Release 2.0
- Indoor Small Cell Field Trial Test Plan Release 1.0
- ROMA 2.0 Test Plan Release 1
- ROMA Test Plan Development Workgroup led by Viavi will have Test Plan Release 2 ready for review Oct. 21
- ROMA kicked off Requirement on Interface between CD/CT and Network function orchestration work group led by Amdocs
- The OpenRAN Outdoor Macro and small cell subgroups continue to conduct multiple test and validation efforts following TIP test plans and resulting in a rich set of contributions to the community, including multiple outdoor and small cell blueprints awarded with TIP Silver badges and comprehensive test reports.
- The Outdoor subgroup completed OpenRAN 5G NSA Blueprint test validation with Airtel per TIP's outdoor macro blueprint test plan. The validated blueprint was awarded with Silver Badge by TIP TVC and the corresponding test report was published.
- The indoor subgroup completed an OpenRAN indoor small cell field trial with China Unicom following TIP's indoor small cell field trial test plan.
- Silver badge testing for OpenRAN 2.0 Traffic Steering use case was initiated at the TIP MPK community Lab. Three additional vendor submissions for OpenRAN 2.0 testing have been received.
- ARI-5G (sponsored by UK DCMS) was kicked off in London on August 30, 31st with 7 project partners including BT. The project will complete by the end of March 2024 and demonstrate four RIA use cases. Lab entry at BT Adastral Park commenced on 1-Oct-2022.
- OpenRAN ROMA subgroup has successfully launched OpenRAN orchestration and automation test environment. [Click link for more info](#)
- Middle east operators established the region's first Open RAN centralized test lab in collaboration with TIP and Intel.

Trust Between Ecosystems

While O-RAN defines technical specifications, TIP's work has been to outline end products that meet specific commercial use cases that operators need. For example, it might define a blueprint of the typical power profile, number of antennas, bandwidth and frequency support of a semi-rural Open RAN Radio Unit.

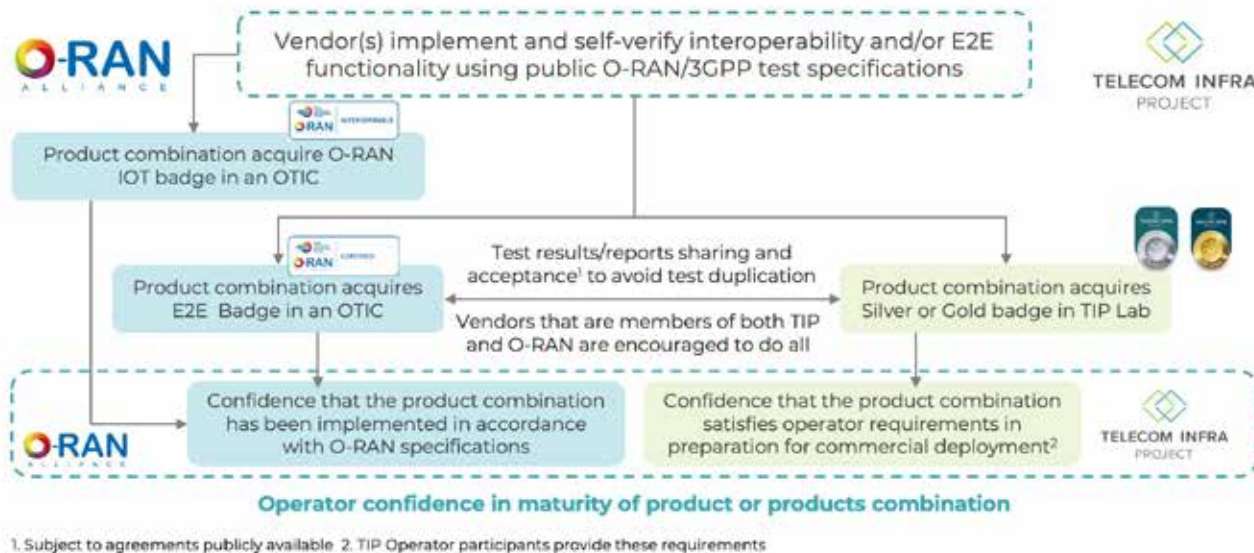


Figure 5: Recommended Path(s) for Products Combination Testing

In TIP's product requirements process, a product is also badged by TIP depending on its level of market maturity – bronze, silver, gold. Members of both TIP and O-RAN are encouraged to commit to both processes. This means that any product coming through the system will give operators confidence that it has O-RAN specification compliance, but also that it has the maturity to meet TIP's operator-defined use case requirements.

This can act in concert in a process of continuous alignment, with operator-driven use cases and deployment scenarios being crafted by TIP working groups into TIP Blueprints. O-RAN then prioritizes the features within these blueprints to produce specifications and minimum viable product roadmaps, which are then tested in TIP labs for their market readiness.

Operator Support

Of course, such a process will stand or fall on operator willingness to accept and trust the certification and badging process. The aim of the process is to produce products that are, as near as can be, deployment ready. There is little point in operators taking these solutions and then submitting them to a duplicative test and certification process. They must be able to trust in the systems that TIP has in place, and then really only concern themselves with the finer tuning of performance optimization and system integration.

David Hutton, Chief Engineer, TIP, said at FYUZ, **“With a TIP stamp of approval, MNOs get confidence that the product is going to work. We are putting together a complete system solution as blueprints, to prove a level of maturity, to promote and accelerate time to market.”**

“It represents 80-90% of the baseline testing that operators perform, and so that reduces their load, saves time and resources. Operators can concentrate on their more finely tuned testing – the 10% they need to do - with the baseline testing being certified by O-RAN and TIP.”

At FYUZ, Orange and NTT DoCoMo both welcomed the harmonized approach. Atoosa Hatefi, Director of Innovation in Radio, Orange, said, “This collaboration is a great milestone. By unifying test labs and having mutually recognised certification badging, we can help save time and avoid redundant testing. Overall it will help the activation of end products in the field.”

NTT DoCoMo’s Sadayuki Abeta, Head of Open RAN Solutions, said, “We are full steam ahead and this testing framework is really where the rubber hits the road. How do we really get test lifecycle management of Open RAN to serve our needs? We already have the specifications, and now we are going commercial we need more testing, and we think O-RAN and TIP are very important for this”

Hatefi added, “If there is a good combination based on real requirements, I think it will cover 90% of the testing requirement. Of course there will be some additional tests needing to be done in operators’ labs on specific tuning, but this represents only a small portion. A pre-validated and verified system will be useful.”

One further aspect of alignment is recognition that product badges will only go so far. Once products are deployed, then operators still have to deal with the issue of who is accountable if issues arise. Additionally, in a cloud native network, continuous integration and deployment of software updates will also need to be integrated into an ongoing testing framework – and that is something that both groups are also considering.



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Figure 6: Open RAN Deployments in 2022

Conclusion

TIP and O-RAN have identified a clear requirement coming from operators. Operators want carrier-grade solutions that give them a low integration and testing overhead. The industry also cannot support a multi-track approach to testing and validation. For vendors and operators, TIP and ORAN's harmonized approach presents a way to meet both these challenges, and increase the availability of Open RAN solutions.