Systems & Network Training

Essential ORAN

A 1 day training course

Save on expenses. This course is also available on your premises.

Description

This course is designed to give students a technical introduction to the technologies and architectures involved in the Open-Radio Access Network (O-RAN) environment. Beginning with an architectural review, we then dive into the interfaces and components, examining possible deployment scenarios and use cases. We will investigate Cloud control functionality, transmission options and White Box Hardware solutions at a high-level, bringing together an overview of slicing technologies and solutions with interface explanations and typical flow diagrams.

Key outcomes

By the end of the course delegates will be able to:

- ✔ Assess and list the components of an O-RAN environment
- ✔ Describe and list the interfaces of an O-RAN environment
- ✔ Explain how and why the Near-RT RIC and Non-RT RIC communicate
- ✔ Explain the importance of the A1 interface
- ✔ Demonstrate knowledge of the protocols used with the A1 interface
- ✔ Describe the O-RAN architectural options
- ✔ Explore supporting Telco Cloud architecture and virtualization

Training approach

This structured course uses Instructor Led Training to provide the best possible learning experience. Small class sizes ensure students benefit from our engaging and interactive style of teaching with delegates encouraged to ask questions throughout the course. Quizzes follow each major section allowing checking of learning.

Details

Who will benefit?
Those working in networking and telecommunications

Prerequisites
5G Essentials

Duration: 1 days

Customer rating:

Generic training	Small class sizes	Hands On training	Our courseware	Customise your course
Generic training complements product specific courses covering the complete picture of all relevant devices including the protocols “on the wire”.	We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.	The majority of our courses use hands on sessions to reinforce the theory.	We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.	Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.
“*Friendly environment with expert teaching that teaches the why before the how.*” G.C. Fasthosts	*“Excellent course. The small class size was a great benefit...”* M.B. IBM	*“Not many courses have practice added to it. Normally just the theoretical stuff is covered.”* J.W. Vodafone	*“Comprehensive materials that made the course easy to follow and will be used as a reference point.”* V.B. Rockwell Collins	*“I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on.”* S.R. Qinetiq

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Course content

The evolution of RAN
RAN architecture evolution
Main components of a mobile network
Layers of the protocol stack of a 3GPP mobile network
4G/LTE RAN
4.5G RAN architecture
The 5G RAN
The Case for Open RAN
6G and the road ahead

O-RAN overview
Multi-vendor Open RAN ecosystem
Intelligent applications in Near-RT RIC
RAN programmability
Open RAN architecture
Open RAN cloudification and virtualisation
RAN intelligence,
Fronthaul interface and open transport

O-RAN architecture overview
An informal view of the ORAN functions
Centralised Unit Control Plane & User Plane (CU-CP and CU-UP)
Distributed Unit function (DU)
Radio Unit function (RU)
Evolved NodeB
RAN Intelligent Controller (RIC)
Service Management & Orchestration (SMO) functions
Interfaces
Near-RT RIC architecture
Standard functional architecture principles
E2 interface
Non-RT RIC architecture
A1 interface
SMO architecture

Cloudification and virtualisation
Virtualisation trends
Openness and disaggregation with vRAN
Cloud deployment scenarios
On premise, far edge, edge and central deployments
Unwinding the RAN monolith
Orchestration, management and automation

RAN intelligence
Background on Machine Learning
ML-Driven intelligence for Non-RT and Near-RT RIC
RIC use cases

The fronthaul interface
The lower-layer split RAN
Lower layer split options
Option 8 Split - CPRI & eCPRI
Option 6 Split - FAPI & nFAPI
Option 7 Split - ORAN Alliance Open fronthaul
Key features
Fronthaul compression - Fixed point compression

Open transport
Xhaul transport networks
Fronthaul requirements
Midhaul requirements
Backhaul requirements
Synchronisation requirements
WDM solutions
Packet switched solutions
Management and control architecture
Synchronisation solutions

ORAN security
Zero trust principles
Threats to ORAN
Protecting ORAN
Securing the O-Cloud
ORAN software
ORAN Software Community (OSC)
SMO framework
Open Network Automation Platform (ONAP)

ORAN deployments
Network architecture and components
Antenna
ORAN - RU
ORAN DU
ORAN CU
RAN Intelligent Controller
Traditional vs ORAN
Typical ORAN deployment
DU deployments
CU deployments
Network management