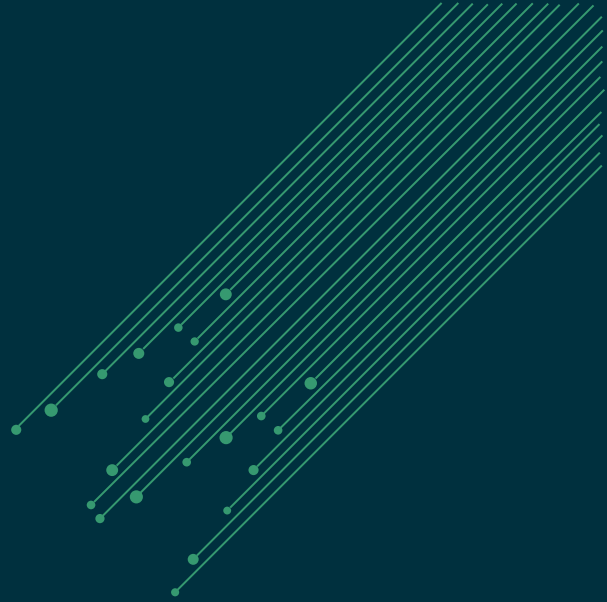




SIMNOVUS



HIGH SCALE UE+O-RU SIMULATOR

Datasheet

OVERVIEW

The O-RAN architecture disaggregates hardware and software, running RAN applications as cloud-native functions. Validation requires a new approach – software simulators, not proprietary hardware. The Simnovus software solution is designed for this new architecture.



Validate 5G Combined O-DU and O-CU

Comprehensive validation of the combined O-DU and O-CU over eCPRI-based 7.2x split fronthaul. Simulates multiple O-RUs and thousands of UEs with realistic traffic models. Intuitive web-based UI on COTS hardware enables quick ramp-up and parallel test beds.



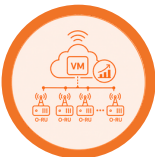
Eliminate Analog Issues

No need to procure or configure an O-RU. Traditional products lose time calibrating gain, power, attenuation, and carrier frequency offsets. Our solution removes these complexities completely – making signal fading, channel modeling, and handover configuration straightforward.



All-Inclusive Perpetual License

Own the capability outright – no recurring subscription fees. Simply choose the number of UEs required. Customers can spin up parallel test beds without large ongoing OpEx



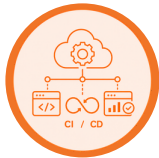
VM-based High-Scale O-RU Simulator

The software O-RU simulator that scales upto 10,000 UEs and 64 cells on standard COTS servers. No proprietary hardware, no RF chamber, no licensing math – a single server cluster replaces racks of traditional test equipment.



Hardware-grade Scale at Cloud-native Economics

32 ORUSIM VMs across 8 COTS servers deliver 64 cells and 128+ UEs per cell in a single test bed. Clone the setup in minutes to run parallel regression, performance, and stability workloads – coverage that rack-based simulators cannot match at comparable cost.



Cloud-native by Design, CI/CD by Default

Built for the same architecture O-RAN validates. VMs on any hypervisor, RESTful APIs for Jenkins, GitHub Actions, or ArgoCD – no test code required.

BUILT TO SCALE



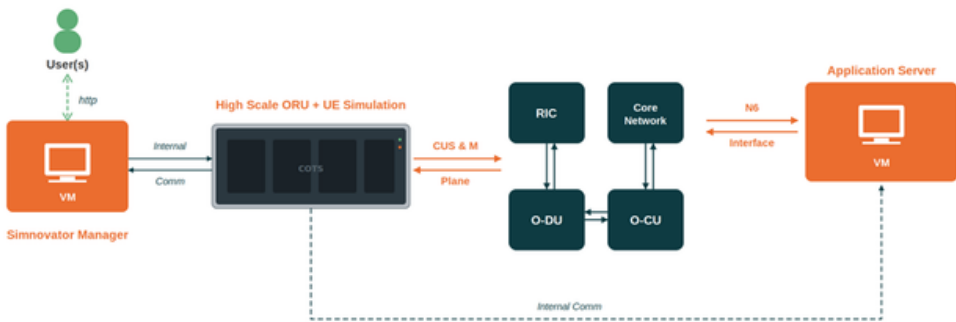
Scale Easily

Combine multiple licenses of the O-RU Simulator to validate higher capacity and performance. The same product covers both functional and performance validation across the life cycle.



No-Script Automation

Automation is built to accelerate CI/CD. Pre-packaged automation libraries, auto-generated scripts from the web UI, and a comprehensive set of RESTful APIs – no manual scripting required.



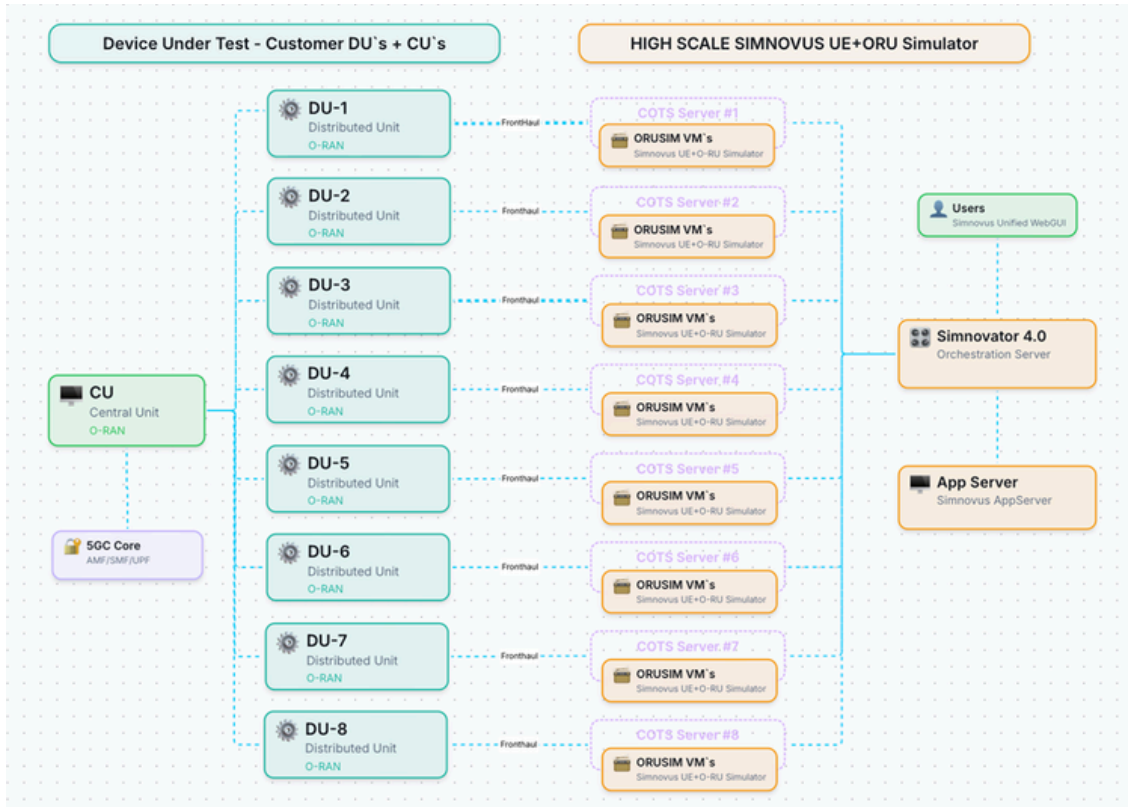
Validation of combined O-DU, O-CU

HIGH SCALE UE+ORU SIM DEPLOYMENT

The Simnovus O-RU Simulator scales horizontally by combining multiple physical units on COTS hardware. Below is an example of 8-server deployment validated by Simnovus.

COTS ORUSIM Server	Rack-mount COTS server	Number of servers per rack	8
Number of cells	64+	Max Parallel Users	Upto 32
Bandwidth per cell	100 MHz	Antenna config	4DL & 2UL
Throughput / cell	~1450+ Mbps DL 220 Mbps UL	Traffic Type	UDP, TCP, FTP, VoNR, ViNR, Ping, RTSP

**1K UE/cell supported; currently validated at 128 UE/cell in this deployment.*



Note

Please contact Simnovus for detailed specifications of the COTS servers used in this deployment. Current benchmarking uses 128+ UEs/cell; higher UE counts per cell can be validated on request.

FEATURE SUMMARY

Software on COTS	Simulates multiple O-RUs and hundreds of UEs; scales up horizontally, quickly and efficiently.
All Digital Interfaces	Abstracts the radio interface with O-RU emulation.
Multi-Purpose	Functional, interoperability, and performance testing of the combined O-DU and O-CU.
Multi-Topology	Validates combined O-DU and O-CU in wrap-around or end-to-end (E2E) configuration.
Realistic Scenarios	Generates realistic traffic patterns towards the combined O-DU and O-CU.
Advanced Troubleshooting	Multi-layer logging and multi-level statistics with correlation.

KEY BENEFITS

Enables Parallel Testbeds	Software on COTS enables parallel test beds to accelerate validation.
Simplifies Test Setup	Digital interfaces remove lab setup complexities – no radio equipment needed.
No Expensive Capex	Perpetual license unlocks broad coverage without recurring commitments.
Quick Ramp-up	Packaged tests and intuitive workflows ensure fast and robust validation.
100% Automation on Day 1	Packaged scripts and RESTful APIs enable out-of-the-box CI/CD.
2x Faster Troubleshooting	Comprehensive multi-layer logging and multi-level statistics.

UE+O-RU SIMULATOR SPECIFICATIONS

WG4 ORAN Specifications	O-RAN Fronthaul CUS-Plane spec v7.0 O-RAN Open Fronthaul M-Plane spec v7.0 (Hierarchical) O-RAN Fronthaul IOT spec v6.0
Simulated UEs	Up to 1000
eCPRI Specifications	v2.0
Fronthaul Split	7.2a
Test Configuration	Cat-A O-RU • Frequency Range 1 • FDD and TDD Up to 100 MHz • SCS: 15, 30 and 60 kHz Number of antennas: up to 4 x 4 MIMO
3GPP Release	Rel.17
M-Plane	Hierarchical model • NETCONF with SSHv2 • JSON-based static config
M-Plane Procedures	Start-up installation • O-RU to O-DU interface mgmt • SW mgmt • Configuration mgmt • Performance mgmt (YANG notification) • Fault mgmt • Synchronisation mgmt

UE+O-RU SIMULATOR SPECIFICATIONS

S-Plane	Transport Sync: LLS-C1, LLS-C2, LLS-C3 PTP telecom profiles: ITU-T G.8275.1 & G.8275.2
C & U-Plane	Section type 0, 1 and 3 • Programmable static-bit-width fixed point IQ (16 bits) Block-floating point compression • Static U-Plane IQ format & compression header eCPRI with concatenation
CUS-Plane IoT Profile	A.2.1.1 NR TDD IOT Profile 1 – NR-TDD-FRI-CAT-A-NoBF
UE Categories	5G
5G Deployment Modes	SA
Handovers	Inter/intra-frequency, inter-duplex
QAM	QPSK, 16 QAM, 64 QAM, 256 QAM
Channel Emulation	AWGN, 3GPP channel models (AWGN, EPA, EVA, ETU, TDL: A/B/C)
Power Control	UL Power Control, PHR, TPC
Dual Stack UE	Supported

UE+O-RU SIMULATOR SPECIFICATIONS

VoLTE / VoNR / ViLTE / ViNR	Supported with per-UE MOS calculation
Other Application Traffic	Fixed payload UDP and TCP data, FTP, ICMP PING
Automation	RESTful APIs
Statistics	Comprehensive counters and KPIs per specification Global, per-RU, per-Antenna, per-UE • Separate UL/DL counters for C and U plane
Logging	UE Logs: All layers (L1, L2, L3), SIP • Fronthaul: C-plane, U-plane, M-plane
Miscellaneous	VLAN support • Data flow separation by VLAN ID / MAC • UL Traffic Management via C-Plane
UE Procedures	Cell detection • Attach & detach • UL/DL traffic with handover

FUNCTIONAL OVERVIEW

A single browser-based workflow covers the entire validation lifecycle — from test design through execution, live monitoring, and post-run analysis. No client install, no scripting required, and a fully documented REST API for CI/CD automation.

Intuitive Web Interface

Web GUI with no client install. Upgrade once on the server; all users access the latest version through any modern browser.

Pre-packaged Test Library

Ready-to-run test cases for common O-RAN scenarios — attach, throughput, handover, VoNR, RedCap — so new users get productive on day one.

Flexible Data Export

Export results as CSV, JSON, or via RESTful API. Integrate directly into CI/CD pipelines, log analytics platforms, or custom dashboards.

Simplified Test Configurations

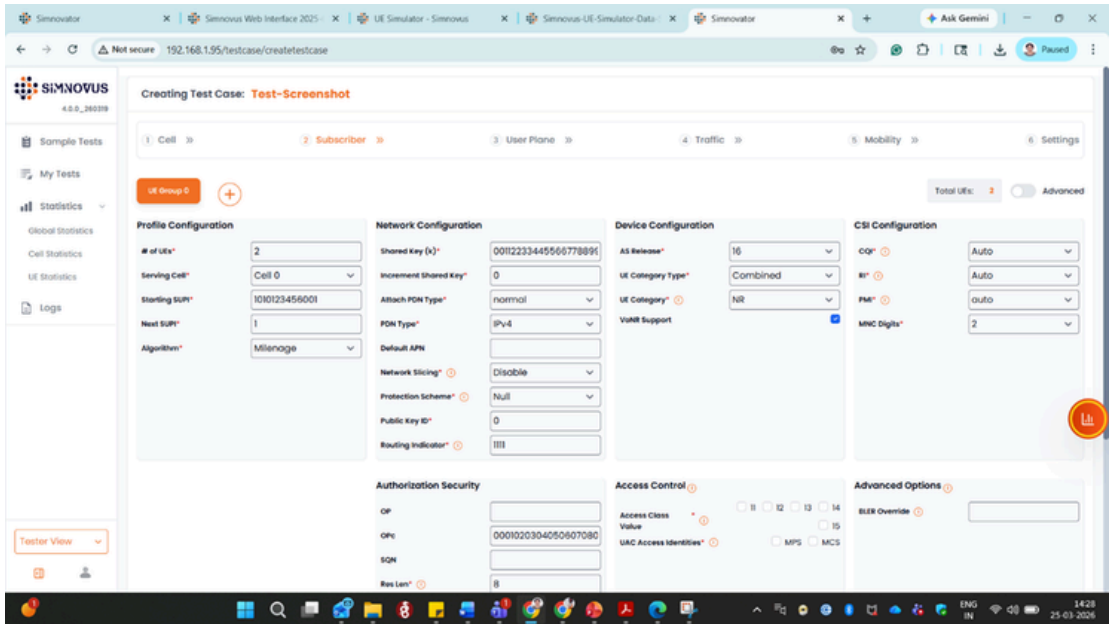
Step-by-step wizard to generate complex test profiles in minutes. Edit pre-packaged tests for custom validations with mobility and channel models.

Real-time Monitoring

Live KPI dashboards during execution. Track attach progress, throughput, packet rates, and fronthaul counters as the test runs — no waiting for post-processing.

Concurrent Multi-user Access

Multiple engineers can work on shared test cases simultaneously. Tester, Developer, and Admin roles keep test assets organised across teams.



Generate complex test profiles in minutes with the step-by-step test creation wizard.

EXTENSIVE STATISTICS

Drill down from global KPIs all the way to per-O-RU, per-cell, per-UE, and per-eAxC levels. Compare UL and DL side-by-side and zoom into any time window for root-cause analysis.

Per-cell, Per-UE Drill-down

Expand any KPI to inspect per-UE IMSI, EMM/RRC state, PCI, RSRP, SNR, MCS (DL/UL), bitrate, position, MOS, RTP packets, jitter, and RTT. Operators can select columns on demand and filter by UE state to zero in on specific sessions.

UE ID	IMSI	EMM State	PCI	RRC State	RSRP (dBm)	SNR (dB)	MCS (DL)	MCS (UL)	Bitrate (DL) Mbps
1	30299240000201	power off	232	disconnected	-58.3	75.1	27	26.4	
2	30299240000202	power off	232	disconnected	-58.3	75.1	27	25.9	
3	30299240000203	power off	232	disconnected	-58.3	75.1	27	26	
4	30299240000204	power off	232	disconnected	-58.3	75.1	27	25.9	
5	30299240000205	power off	232	disconnected	-58.3	75.1	27	25.9	
6	30299240000206	power off	232	disconnected	-58.3	75.1	27	25.9	
7	30299240000207	power off	232	disconnected	-58.3	75.1	27	26.5	
8	30299240000208	power off	232	disconnected	-58.3	75.1	27	26.1	
9	30299240000209	power off	232	disconnected	-58.3	75.1	27	26.4	
10	30299240000210	power off	232	disconnected	-58.3	75.1	27	26	
11	30299240000211	power off	232	disconnected	-58.3	75.1	27	25.7	
12	30299240000212	power off	232	disconnected	-58.3	75.1	27	26.6	
13	30299240000213	power off	232	disconnected	-58.3	75.1	27	26	

Unified Global Statistics

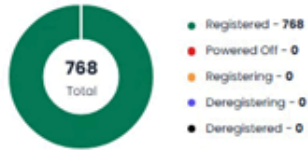
A single pane of glass aggregates UE summary (NAS and RRC state), throughput, and packet counts across every simulated cell. Whether the deployment runs 1 cell or 64, every active session is visible in one view – validating large-scale attach procedures and traffic at a glance, without switching between per-cell or per-UE screens.

Unified Global Statistics

Test Cases: NEW-AS-CELLS

UE Summary

NAS State



RRC State



KPIs

Throughput



Packets (per sec)



Tester View

Testcase: NEW-AS-CELLS34-12BUE... Simulator: oru2

Executed Duration 33 mins 15 secs / 1 hr
Aborted

Unified Global Statistics – one view across all cells, all UEs.

Fronthaul Counters and KPIs

Complete O-RAN fronthaul observability: per-plane counters for U-plane (DL/UL), C-plane (DL/UL), and S-plane, indexed by eAxC ID and section type. Total, on-time, early, late, and sequence-ID error packets are reported at cell granularity to catch timing and transport issues early. Per-cell throughput and packet-rate trend charts surface short-duration anomalies.

SIMNOVUS 4.8.0_260408

Test Case: NEW-AS-CELL334-IGUE- **Execution Time:** 04/20/2026, 01:27:58 - 04/20/2026, 02:01:19 **INCOMPLETE** **View** **Export**

Sample Tests

My Tests

Statistics

- Global Statistics
- Cell Statistics**
- UE Statistics
- Unified Statistics

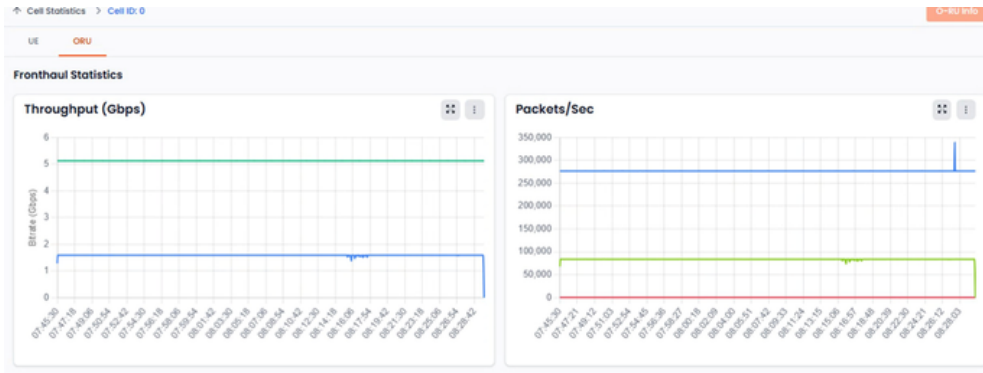
Logs

Tester View

Fronthaul Counters & KPIs

PLANE	SARC ID	SECTION TYPE	TOTAL PACKETS	ON-TIME PACKETS	EARLY PACKETS	LATE PACKETS	SEQUENCE ID ERROR
U-Plane(DL)	32	1	62400	62380	0	20	0
	33	1	62400	62276	0	24	0
	34	1	62400	62370	0	30	0
	35	1	62400	62370	0	30	0
C-Plane(DL)	32	1	4800	4795	0	4	0
	33	1	4800	4795	0	4	0
	34	1	4800	4795	0	4	0
	35	1	4800	4795	0	4	0
C-Plane(UL)	32	1	1800	1800	0	0	0
	33	1	1800	1800	0	0	0
	34	1	1800	1800	0	0	0
	35	1	1800	1800	0	0	0

Per-cell fronthaul throughput and packets/sec over time.



SYSTEM REQUIREMENTS

- The Simnovus solution runs on COTS hardware or virtualized environments.
- Components: Manager (GUI + controller), O-RU Simulator (UEs + O-RUs), App Server (UP traffic termination).
- Fronthaul NIC must support SR-IOV – recommended: Broadcom 57504 10/25GbE SFP28 OCP 3.0.

SYSTEM SPECIFICATIONS

UE+O-RU Simulator 2-socket rack server CPU: AMD EPYC Cores: 128+ per CPU RAM: 300 GB+ (DDR5) NIC: Broadcom 57504 10/25GbE SFP28 Disk: 1 TB OS: Ubuntu 24.04	Manager Virtual Machine Cores: 8 or more RAM: 16 GB+ NIC: 1 x 1GbE or 10GbE Disk: 500 GB+ OS: Ubuntu 24.04+	App Server Virtual Machine RAM: 16 GB+ NICs: 1 x 10GbE + 1 x 1GbE Disk: 500 GB+ OS: Ubuntu 24.04+
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ORDERING INFORMATION

Perpetual License – 10,000 UE capacity

All features unlocked. App Server software included. Get started today – contact sales@simnovus.com.



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