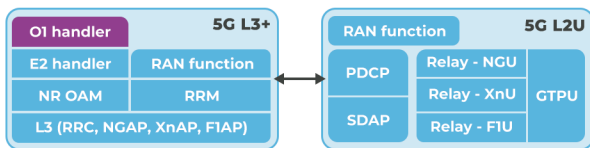# AWTG
CU & DU

Centralised Unit (CU)

The gNB is the central unit that manages the RRC and PDCP layers and consists of a CU and one or more DUs. The CU connects to DUs using Fs-C for the control plane and Fs-U for the user plane. It can support multiple DUs and gNBs. The O-RAN architecture provides flexibility in distributing protocol stacks between the CU and DUs based on midhaul capacity and network design.

5G L3+
O1 handler
E2 handler / RAN function
NR OAM / RRM
L3 (RRC, NGAP, XnAP, F1AP)

RAN function	5G L2U
PDCP / Relay - NGU	
SDAP / Relay - XnU	GTPU
Relay - F1U	

List of RIC vendors tested with the AWTG CU software VMware, CG.

List of DU vendors tested with the AWTG CU software Mavenir, Fujitsu, Radisys.

List of 5G Core vendors tested with the AWTG CU Software Affirmed, Mavenir, Spirent, Viavi, Amantya, Druid, Ericsson, Nokia, IPLook, Capgemini.

**Number of DUs/vDUs supported by the AWTG CU Software** 4 DUs per CU.

Minimum Hardware x86 Intel Xeon Gold 24 Cores CPU NIC: Intel 10GE (Quad) x1 TB SSD

Distribution Unit (DU)

This distributed unit, located near the RU, handles the RLC, MAC, and parts of the physical layer. It includes some eNB/gNB functions based on the functional split option and is controlled by the CU. The unit also optimizes network performance and reduces latency for end-users, ensuring efficient communication and service quality.

5G L2
O1 handler
E2 handler / RAN function
NR OAM / F1C / F1-U
RLC / MAC

L1 - L2

PHY
UPPER PHY
FH
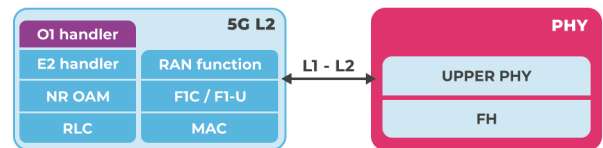
NIC/Hardware Acceleration Cards Required X810 NIC 10G for FH & transport (E810XXVDAG2P5), ACC100 Mount Bryce.

Compatible Sync LLS-C1, C2, C3, C4, compatible with DU LLS-C1/3 validated.

Tested Vendors for RU, CU, RIC MTI, Foxconn, Benetel, Fujitsu, Viavi O-RU.

Upper PHY Information based on x86 FlexRAN 22.11.

Fronthaul Category Supported 7.2A or 7.2B.

Number of Supported RUs 4.

Supported Scheduling Algorithms Round Robin & QoS.

Fault Management System Supported via O1 interface using Netconf/yang based.

Minimum Hardware x86 Intel Xeon Gold 24 Cores CPU, ACC100 Mount Bryce for FEC offload, NIC Intel E810 XXVDA4 (Quad), x1 TB SSD, x1 Intel Dual Port 10GbE BASE-T.

AWTG CU & DU Requirements

CU		DU
2,000 users at CU-CP.	**Number of connected users**	DU 512 users.
Includes any SPF required for the CU.	**COTS Hardware Versions**	Includes any SPF needed for the DU.
Varies by server model.	**Power Requirements**	Varies by server model.
XNAP, F1AP, NGAP, E2, O1.	**Supported Interfaces**	E2, F1, Fronthaul, O1.
Uses Kubernetes K8 PODs.	**Containerisation/Virtualisation**	Uses Kubernetes K8 PODs.
3GPP Release 15/16 (including CUPS).	**3GPP Compliance**	3GPP Release 15/16.
28.552 PM counters pegged.	**Monitored KPIs**	28.552 PM counters supported.
CU-UP 5Gbps, 512 bearers.	**Load Capacity**	DU Gbps, 512 UEs.
CU-UP 5Gbps 512 bearers, 4 CU-UP per CU-CP.	**Max UL/DL Throughput**	DU 5Gbps.

ORAN specifications where AWTG CU & DU is complaint to

O-RAN.WG5.IOT.0-v05.00	O-RAN.WG3.E2AP-v02.00	O-RAN.WG5.MP.0-v02.00
O-RAN.WG3.E2GAP-v02.00	O-RAN-WG3.E2SM-v02.00	O-RAN.WG5.IOT.0-v05.00
O-RAN-WG3.E2SM-KPM- v02.00	O-RAN-WG3.E2SM-RC-v01.00	O-RAN.WG1.O1-Interface-v04.00

While the specified minimum hardware requirement is an x86 Intel Xeon Gold 24 cores CPU for both the DU & CU, it is important to note that for deployments involving x4 RUs, the actual minimum CPU requirement is 32 cores.

The outlined configuration serves as a general baseline, but specific client requirements, especially for higher capacity deployments, may necessitate hardware specifications beyond those listed. Additionally, other CPU types may be deployed depending on the use case and required performance SLA.

Clients are advised to consult with our technical team to ensure their deployment configurations meet the necessary performance and scalability criteria.

AWTG CU & DU features

Standards Support
AWTG CU & DU supports the 3GPP Rel-15 with Rel-16 roadmap using O-RAN architecture.

Scalability
Designed to scale capacity based on user throughput and available processing cores.

xApp Integration
Compatible with O-RAN defined & proprietary E2SM, supporting integration of xApps with RIC, CU & DU.

Development Process
Implements CI/CD for efficient AWTG CU & DU software development.

Interface Flexibility
Supports various 3GPP interfaces, including options for distributed or integrated AWTG CU & DU and multiple RAN splits (2, 6, 7.x, 8).

Reference Solution
Provides a pre-integrated AWTG CU & DU with partner's Radio Units, validated in end-to-end setups for key scenarios and capacity.

Roadmap for Future Releases
Established roadmap to support upcoming 3GPP releases, new features, O-RAN use cases, and interfaces.

AWTG RU Eco System

AWTG L2/L3 SW
Intel Xeon x86 uArch

(SPR-EE, IceLake, Cascadelake, Skylake)

NXP SOC (LX2160, 2088/2, LS1046)

(ARM uArch)

ARM SOC

Octasic ARM uArch

Marvell ARM uArch

PHY SW
Intel FlexRAN L1
Phluido PHY L1
Nvidia PHY L1
ITRI PHY L1
Vicinity PHY L1
Qualcomm PHY L1
ArrayCom PHY L1
CommAgility PHY L1
Synergy PHY L1
Picocom PHY L1
Octasic PHY L1

Core NW
AWTG core

Nokia, Ericsson, Intel-FlexCore, Astri, Iplook, open-NGC, Affirmed

ODM Partner
Supermicro, Dell ,

Foxconn / Asus

Advantech, HPE

CIG, Arcadyan, Askey

T&W, Foxconn

Compal, Alpha/Delta

UE/Test UE
AWTG UESim (for PHY by-pass)
Samsung - S20, S21, S22, Tab
Oneplus - Nord, CE, 9pro, 10
HTC U20
Huawei xMate 20, 30, P40, X55 CPE
LG V50; QC x55
Viavi TM500, TMLite
Simnovous TestUE

RU Partner
Foxconn (Sub-6GHz)

Benetel (Sub-6GHz)

ITR/ALPHA (Sub-6GHz)

Viavi oRU (Sub-6GHz, mmW)

WNC* (Sub-6GHz)

Baicells (Sub-6GHz)

Qualcomm (mmWave)

Ankiton (Sub-6GHz)

Octasic SOC + RF (Sub6-GHz)

CommScope (mmWave)

MTI (B3, FDD)

SDR (B210)

ADI (Sub-6GHz)

LiteON* (Sub-6GHz)

SDR (N310)

CIG (Sub-6GHz)

Vaitel (Sub-6GHz)

Cablefree (Sub-6GHz)