

**5G • Innovation  
Transformation**

A New Generation  
of Intelligent  
Communication Solutions

**PEGATRON** **5G**   
和 碩 聯 合 科 技

**產品型錄**

5G O-RAN brochure



**Navigate the Future Faster**

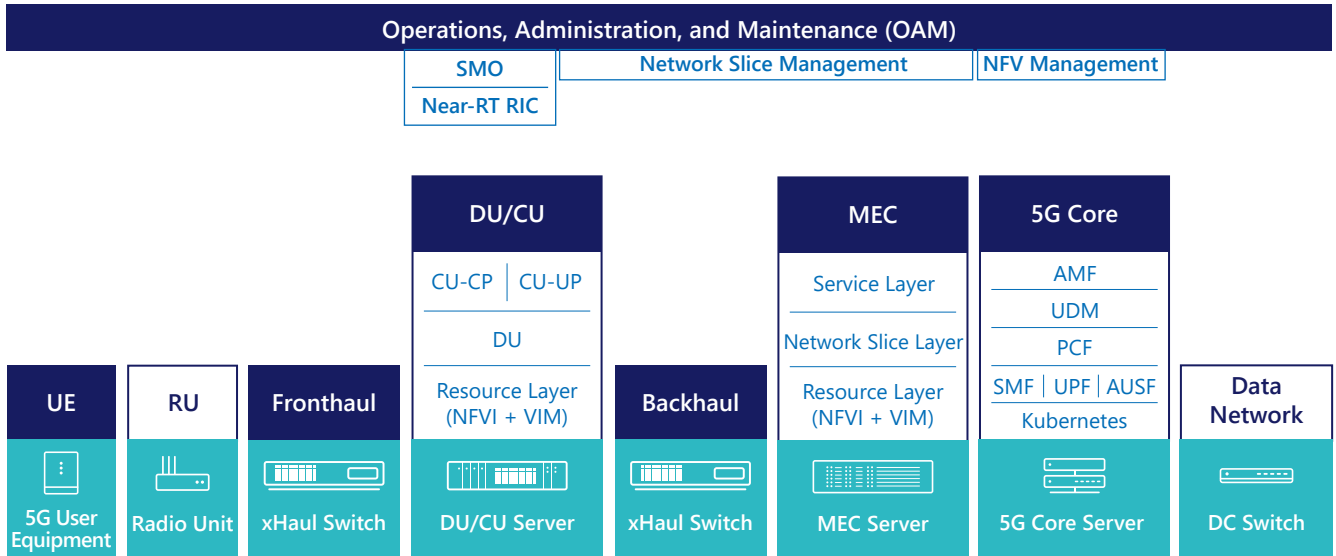
## PEGATRON 5G O-RAN

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- Infrastructure Solution for 5G New Radio Network ————— 03/04
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# PEGATRON 5G Private Network



## 5G New Radio Open vRAN Architecture



## Infrastructure Solution for 5G New Radio Network



User Equipment



Open Virtual Radio Access Network



5G xHaul Transport Network

### 5G CPE

- 3GPP Rel.15
- NSA/SA, Sub-6 GHz
- NR TDD/FDD, n77/n78/n79

### Multi-network camera

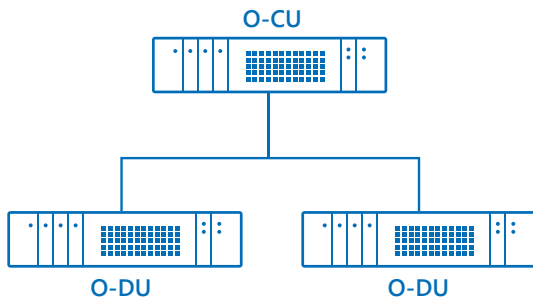
- Wi-Fi 802.11 a/b/g/n Dual Band 1x1
- Bluetooth 5.0
- 5G NR Sub-6 GHz + mmWave

- 3GPP and O-RAN Compliant
- Cloud-Native Base Platform and Standards-Based Open Interface
- Containerized RAN Virtualization
- Support for RIC/MEC/OAM Functions
- x86 Hardware Platform

- SRv6
- MACsec
- IEEE 802.1CM TSN for Fronthaul
- Embedded GPS Module
- IEEE 1588v2 T-TC, T-BC Class C
- I/O 4x 1G RJ45  
8x 1G SFP  
6x 10G/25G SFP28



PEGATRON Open vRAN solution provides cellular connectivity for 5G New Radio Stand Alone. The system is designed for 5G private network use cases and compliant with 3GPP Release 15 and O-RAN Standards.



- Cloud-native based platform.
- Configurable for MEC/OAM functions.
- Faster time-to-market with CI/CD adapting to customer requirements.
- Deploying Network Function Virtualization Infrastructure (NFVI) in O-RAN based cloud.
- Enhance high availability and further provide Flexible, Fast and Customizable Services for various application scenarios.

**Distributed Unit (O-DU)**

|           |  |
|-----------|--|
| Interface | <ul style="list-style-type: none"> <li>■ F1AP / O1 / E2</li> </ul>   |
| Capacity  | <ul style="list-style-type: none"> <li>■ Current Active UE: 32</li> <li>■ Max. Downlink Throughput: 1.2Gbps</li> <li>■ Max. Uplink Throughput: 150Mbps</li> </ul>  |
| Features  | <ul style="list-style-type: none"> <li>■ Duplex Mode: TDD</li> <li>■ MIMO Layers DL: 4, UL: 2</li> <li>■ Modulation DL: QPSK, 16QAM, 64QAM, 256QAM</li> <li>■ Modulation UL: BPSK, QPSK, 16QAM, 64QAM</li> <li>■ Users per TTI: 8UEs / TTI</li> <li>■ Synchronization: IEEE1588v2</li> </ul> |

**Centralized Unit (O-CU)**

|           |  |
|-----------|--|
| Interface | <ul style="list-style-type: none"> <li>■ Control Plane – RRC / NGAP / XnAP / E1AP / F1AP / O1 / E2</li> <li>■ User Plane – SDAP/PDCP/GTP-U/NRUP/PDU Session User Plane Protocol</li> </ul> |
| Capacity  | <ul style="list-style-type: none"> <li>■ Supports number of DU: 2</li> <li>■ Supports number of cells: 4 and configurable</li> </ul>   |
| Features  | <ul style="list-style-type: none"> <li>■ Control Plane, User Plane, Mobility, QoS, PDCP</li> </ul>   |

**Radio Unit (O-RU)**

|                       |   |
|-----------------------|---|
| Frequency / Bandwidth | <ul style="list-style-type: none"> <li>■ 5G New Radio Stand Alone Mode, TDD Mode</li> <li>■ Band Support: N78 / N79, Up to 100MHz, 30KHz</li> </ul> |
| Modulation            | <ul style="list-style-type: none"> <li>■ Downlink: 256 / 64 / 32 / 16 QAM and QPSK</li> <li>■ Uplink: 64 / 32 / 16 QAM and QPSK</li> </ul>          |
| Output Power / ANT    | <ul style="list-style-type: none"> <li>■ 24dBm per Antenna Chain</li> <li>■ 4T4R</li> </ul>   |



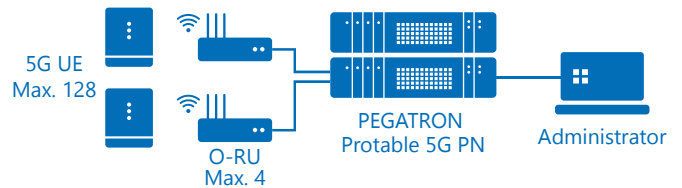
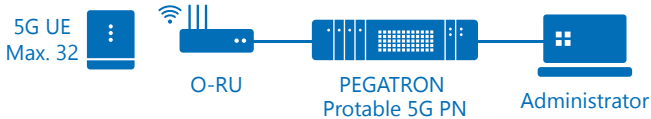
## 5G Private Network Solution

- Compliant with 3GPP and O-RAN structure by using x86 based server to compose 5G network system includes 5G core, gNB ,and PTP L3 switch.
- Built-in Pegatron customized RAN software and Service Management and Orchestration (SMO) system.

### 5G Private Network - Portable



### 5G Private Network - Premium



#### Product Description

|                         |   |
|-------------------------|---|
| <b>Max. UE</b>          | 32 Active (Supports : 1 cell)   |
| <b>Band</b>             | FR1: N78, N79   |
| <b>Ant. MIMO</b>        | 2T2R, DL 2 Layers, UL 2Layers   |
| <b>Profile</b>          | <ul style="list-style-type: none"> <li>DL Centric 7:3, 4:1</li> <li>UL Centric 2:3, 3:7, 1:4</li> </ul>   |
| <b>GPS Grand Master</b> | <ul style="list-style-type: none"> <li>1588v2 PTP protocol support</li> <li>PTP to sync-E and sync-E to PTP conversion</li> </ul>   |
| <b>OAM</b>              | <ol style="list-style-type: none"> <li>Private network topology</li> <li>UE management including list, usage and QoS profile</li> <li>Network slicing management</li> <li>Northbound interface for higher level management</li> </ol> |
| <b>5GC</b>              | AMF, SMF, UPF   |
| <b>Dimension</b>        | 540mm x 590mm x 120mm   |

#### Product Description

|                         |   |
|-------------------------|---|
| <b>Max. UE</b>          | 128 Active (Supports : 4 cell)  |
| <b>Band</b>             | FR1: N78, N79   |
| <b>Ant. MIMO</b>        | 4T4R, DL 4 Layers, UL 2Layers   |
| <b>Profile</b>          | <ul style="list-style-type: none"> <li>DL Centric 7:3, 4:1</li> <li>UL Centric 2:3, 3:7, 1:4</li> </ul>   |
| <b>GPS Grand Master</b> | <ul style="list-style-type: none"> <li>1588v2 PTP protocol support</li> <li>PTP to sync-E and sync-E to PTP conversion</li> </ul>   |
| <b>OAM</b>              | <ol style="list-style-type: none"> <li>Private network topology</li> <li>UE management including list, usage and QoS profile</li> <li>Network slicing management</li> <li>Northbound interface for higher level management</li> </ol> |
| <b>5GC</b>              | AMF, SMF, UPF   |
| <b>PTP switch</b>       | <ul style="list-style-type: none"> <li>4x1G RJ45</li> <li>8x1G SFP</li> <li>6x10G/25G SFP28</li> </ul>  |
| <b>Dimension</b>        | 560mm x 580mm x 360mm   |



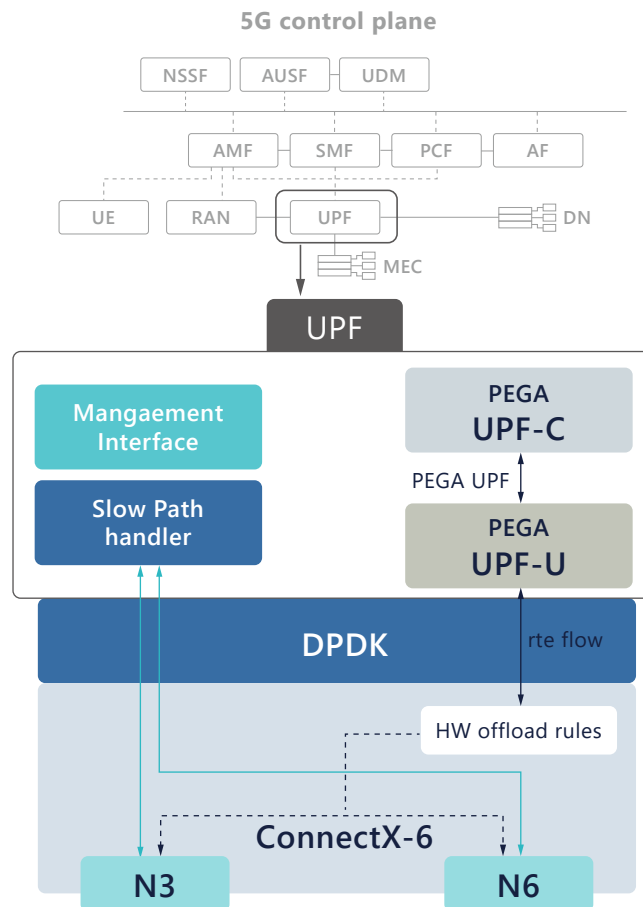
## Pegatron 5G User Plane Function (UPF) Solution

Pegatron’s User Plane Function (UPF) handles the User Plane traffic between the RAN (Radio Access Network) and the DN (Data Network). This UPF can be either co-located with the Core Network or deployed at the edge aggregated point. Pegatron’s UPF is cloud based and fully leverages the SmartNIC card’s capability to offload traffic consumption on the CPU and minimize hardware resources. Pegatron UPF with scalable and configurable hardware can be deployed to various scenarios in a 5G private network.

### UPF Architecture Layers

- Management layer: Provides configuration management interface and OAM processes
- UPF-C layer: Handles PFCP sessions and parsing the relative IEs (PDR/FAR/QER/BAR/SDF/MAR/URR). Translates these rules to the UPF-U layer.
- UPF-U layer: Performs GTPU encap/decap, traffic offload IP filtering and metering control
- Slow path layer: Processes the packets are not suitable using traffic hardware offloading (fast path)

### How this works



## 5G UPF Server / 5G MEC Server



- Supports Intel Xeon E-2300 and 10th Gen Intel Pentium® series processors
- 1U Rackmount with single 400W PSU
- 4 DIMM slots (2DPC), supports DDR4 ECC/ non-ECC UDIMM, up to 32GB/DIMM
- 1 FH PCIe4.0 x16
- 1 M.2 (PCIe3.0 x2 or SATA 6Gb/s)
- Remote Management (IPMI)



- 2nd Gen Intel Xeon Scalable Processor 2 sockets, Up to 28 cores, Max TDP 205W
- 2U Short-Rack, 456mm x 446mm x 87mm with 800W
- 16 DIMM sockets, DDR-4 @ 2933MHz
- 5x PCIe GEN3 x8 Low-Profile
- 1x PCIe GEN3 x16 FHFL Dual width for GPGPU
- Internal 1x M.2 (SATA), 1xM.2(PCIe)
- TPM 2.0, IPMI2.0

### User Plane Function (UPF)

#### General features

- Support Multiple DNNs
- Dynamic IPv4 address allocation by SMF/UPF
- Static IP address allocation by UPF
- Management Interface
- NETCONF, RESTful and CLI
- H/W offloading for packet filtering, GTPU encap/decap, metering and steering
- DPDK for slow path

#### Deployment

- K8s cluster or standalone host
- 1:1 redundancy (Q3, 2022)

#### 3GPP

- PFCP Association Setup Procedure
- PFCP session establishment/modification/deletion
- Support PDS, FAR, QER and SDF
- Multiple QoS flows per PDU Session (GBR / Non-GBR)
- Session-AMBR enforcement
- Usage Reporting Rule (URR)
- Support of PDI optimized signaling (R16)
- Support Network Slicing
- Header enrichment



# Highly Integrated Compute Scalability & Network Connectivity Edge Computing Platform

Optimized Scalable, No Compromise In Networking Connectivity & Cyber Security - Intel Xeon-D Edge Computing Server Platform

## 100GbE Networking

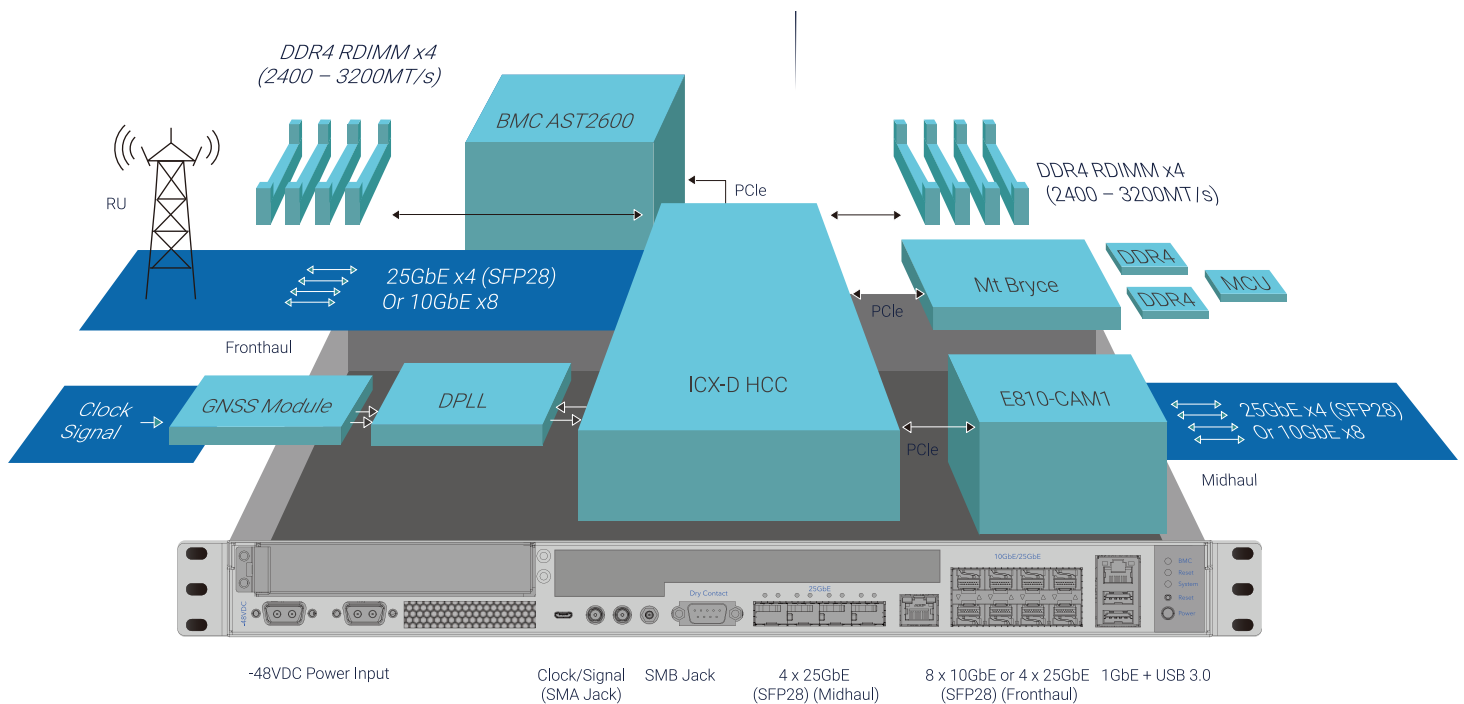
- 100Gbps full line-rate packet processing and built-in FPGA-based accelerator, No compromise in networking connectivity.

## Robust Platform

- Support TPM 2.0
- Built-in hardware crypto engine

## Scalability

- Up to 20 Cores, good for scalable NFV
- Reduce Cost Investment



## FEATURES

- Based on Intel Xeon-D Platform Solution
- All front access I/O
- Ethernet ports all on front panel
  - ▶ Fronthaul side: 4 x 25GbE/10GbE, or 8 x 10GbE, with 8 x SFP28 connector
  - ▶ Midhaul side: 4 x 25GbE, with 4 x SFP28 connector
- IEEE 1588 and SyncE for all Ethernet ports (10GbE/25GbE)
- On-board Mount Bryce (eASIC) solution for FEC accelerator
- 8 x DDR4 RDIMM (2400 MT/s – 3200MT/s)
- 2 x M.2 SSD (dual boot drive)
- 1 x PCIe4.0 x8 expansion slot on front panel
- Support TPM2.0
- With option of built-in “Intel QAT” support for CU
- Power Supply: Dual -48VDC redundant power input





## Pegatron Xhaul Transport Products

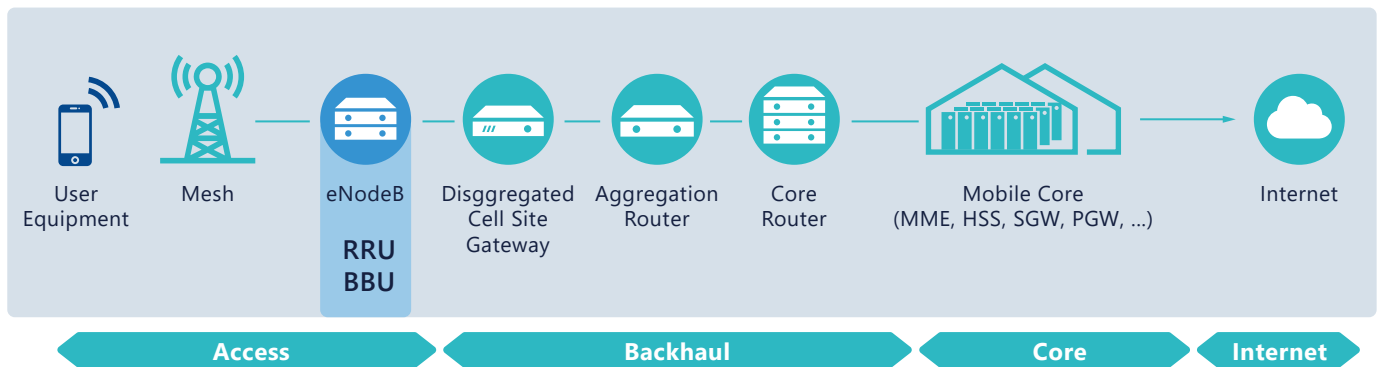


DM2118-B



DM6218-B

### How this works



| Model Name            | • DM2118-B                              | • DM6218-B                           |
|-----------------------|---|--------------------------------------|
| Ethernet Ports        | 4x 1G RJ45, 8x 1G SFP, 6x 10G/25G SFP28 | 16x 10G/25G SFP28, 2x 40/100G QSFP28 |
| Time Synchronization  | IEEE 1588v2                             | IEEE 1588v2                          |
| GNSS                  | Embedded GPS module                     | Embedded GPS module                  |
| TSN                   | IEEE 802.1CM                            | IEEE 802.1CM                         |
| Power Supply          | 110V/220V AC & 48VDC                    | 110V/220V AC & 48VDC                 |
| Dimensions            | 440(W)x 250(D)x44mm(H)                  | 440(W)x 250(D)x44mm(H)               |
| Operating Temperature | -40°C to 65°C (-40°F to 149°F)          | -40°C to 65°C (-40°F to 149°F)       |



For more information:

