Node-H

5G RAN Software Product Description

5G RAN Software Suite

Deployment specialist brings 5G to market

Carrier-grade RAN solutions for rapid deployment

Node-H has a proven track record of wide-scale deployments at senior operators, and works closely with end-to-end eco-system vendors so that operators can source complete or disaggregated solutions for their Radio Access Network.

The Node-H 5G carrier-grade software is suitable for Microcells, Picocells or any class of small cells – Enterprise or Residential, standalone or virtualized.

Node-H brings deep technical know-how to solving real-world issues which has allowed carriers worldwide to deploy millions of cells based on Node-H software.

By working closely with technology partners, Node-H supports end-to-end and disaggregated solutions with different gateways and management systems.

A technology platform

Node-H's LTE and UMTS software suites are widely deployed at operators. This complements the 5G offering to provide a full portfolio of RAN technologies.

Together with its hardware partners, Node-H can offer turnkey disaggregated cells supporting the most popular uses cases, or provide a near-turnkey foundation for a project to rapidly address a vertical market use case.

The 5G Software Suite supports Centralized Unit (CU) and Distributed Unit (DU), with a clear Control-Plane (CP) and User Plane (UP) split that can be configured in various ways to build 5G RAN technology in the form of a Microcell, Picocell or any type of small cell.

Node-H software follows the standards-based 3GPP architecture, as well as O-RAN and Small Cells Forum defined interfaces, to support interoperability with other vendors. Node-H has focused much effort on interoperability, having integrated Node-H based cells with infrastructure from all of the major network equipment vendors, and received the Chairman's Award from the Small Cell Forum for work on Interoperability.
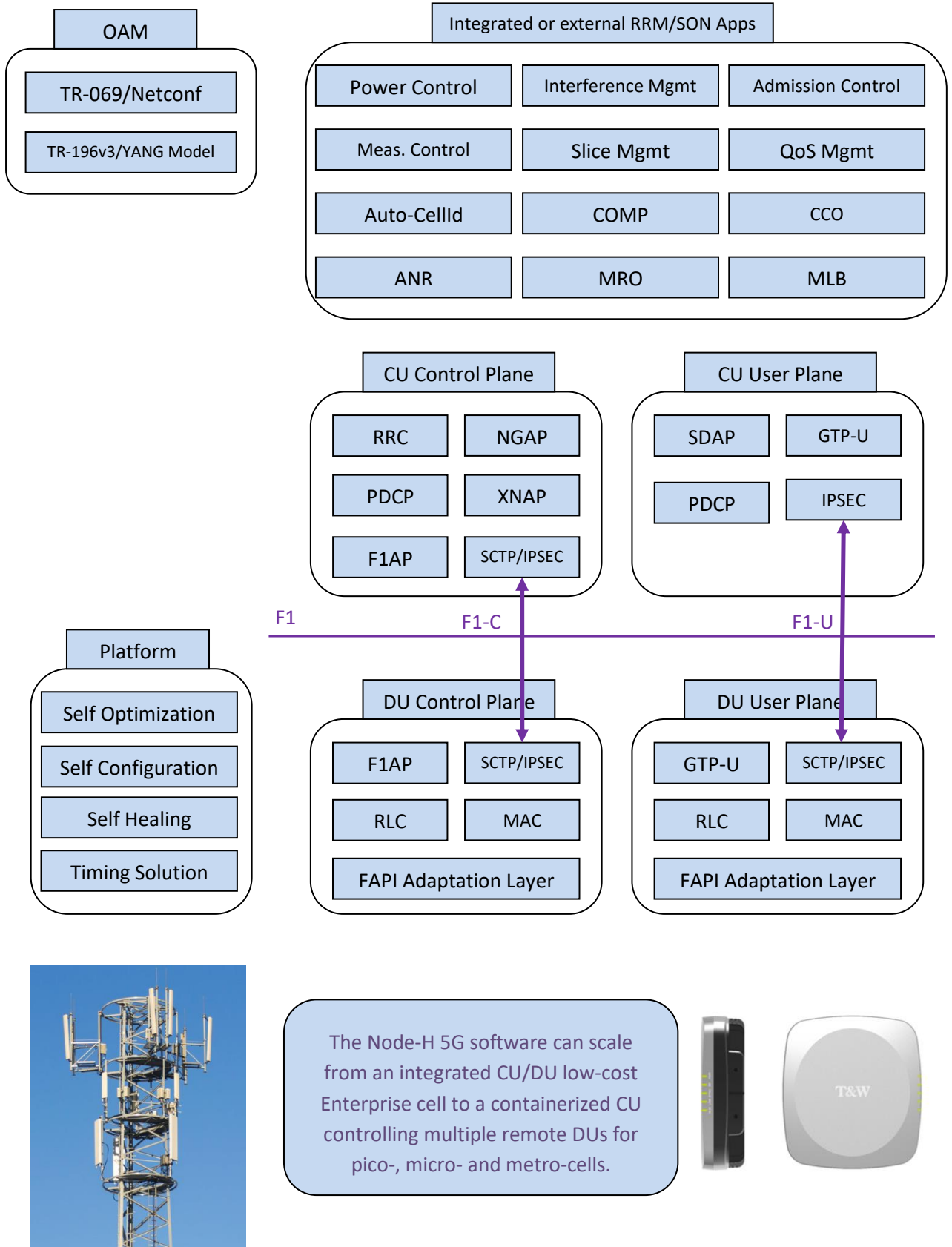
Choose Node-H because…

Node-H has a uniquely experienced team of specialists who cover all of the major technologies required to implement complete RAN solutions.

Node-H co-operates with key semiconductor partners to deliver solution on the latest SoC designs in a timely manner. The ability to exploit the cost savings of the SoC allows RAN technologies to reach the price point needed for ubiquitous deployment of 5G via small cells.

Node-H integrates its system software, including a comprehensive security solution, management software, SON and RRM, scheduler and L2/L3 protocols, with T&W's hardware design to deliver a ready-to-deploy solution with the lowest Total Cost of Ownership.

5G gNB Application

OAM
TR-069/Netconf
TR-196v3/YANG Model

Integrated or external RRM/SON Apps

Power Control	Interference Mgmt	Admission Control
Meas. Control	Slice Mgmt	QoS Mgmt
Auto-CellId	COMP	CCO
ANR	MRO	MLB

CU Control Plane

RRC	NGAP
PDCP	XNAP
F1AP	SCTP/IPSEC

CU User Plane

SDAP	GTP-U
PDCP	IPSEC

F1   F1-C   F1-U

Platform
Self Optimization
Self Configuration
Self Healing
Timing Solution

DU Control Plane

F1AP	SCTP/IPSEC
RLC	MAC
FAPI Adaptation Layer	

DU User Plane

GTP-U	SCTP/IPSEC
RLC	MAC
FAPI Adaptation Layer	

The Node-H 5G software can scale from an integrated CU/DU low-cost Enterprise cell to a containerized CU controlling multiple remote DUs for pico-, micro- and metro-cells.

Features

NSA and SA Architectures	Node-H supports 5G used in the architectures • Option 2 – NR Standalone • Option 3 – ENDC via ePC
Carrier Bandwidth	Up to 100MHz in Sub-6GHz, 400MHz in mmWave, including carrier aggregation.
Flexible Numerology	0, 1 or 2 in sub-6, 3 or 4 in mmWave.
Power Management	Cell automatically selects power level based on surrounding cells and configuration, including 5G CCO.
F1 CU-DU split	Option 2 split allowing CU location on or off integrated cell, and integration with other-vendor CU or DU.
Voice Calls and Quality of Service	5G VoNR in accordance with 5QI.
SON/RRM/Interference Management	Integrated SON/RRM for standalone product which can alternatively be linked to RIC and nrt-RIC for features such as AutoCell-Id, ANR, Admission control, Interference Mgmt., CCO, MRO, MLB, with self-config, optimization and healing. Transition to O-RAN management of these and other features over A1 and E2 protocols and service models.
Beam Management	SSBurst, CSI-RS, Beam tracking, sweeping and failure recovery.
Mobility	Measurements allow the cell to support 5G inter and intra Cell handovers, as well as handovers to and from 4G.
Network slicing	Multiple slices with network resource isolation.
Operations and Maintenance	The solution implements the SCF defined 5G 'TR-196v3', transitioning to O-RAN management over A1 and E2 protocols and service models over Netconf/YANG as this becomes available.
Security	Trusted platform fully secure start-up and code-signing. Ciphering with hardware acceleration, Signaling integrity checking. IPSEC uses hardware acceleration, IKE v2 key management, AES, certificate-based security.
Timing Solution	The timing solution support GNSS and network listen functions. Synchronized cells provide time-sync for other cells in the same sub-net.

Items are subject to change

Protocol compliance

3GPP Standards (rel16)

TS 38.300 5G; NR; Overall Description; Stage-2
TS 38.321 5G; NR; Medium Access Control (MAC)
TS 38.322 5G; NR; Radio Link Control (RLC)
TS 38.323 5G; NR; Packet Data Convergence Protocol (PDCP)
TS 38.331 5G; NR; Radio Resource Control (RRC)
TS 38.401 5G; NG-RAN; Architecture Description
TS 38.413 5G; NG RAN; NG Application Protocol (NGAP)
TS 38.423 5G; NG RAN; Xn Application Protocol (XnAP)
TS 38.425 5G; NG RAN; NR User Plane Protocol
TS 38.473 5G; NG RAN; F1 Application Protocol (F1AP)
TS 38.474 5G; NG RAN; F1 Data Transport
TS 37.324 5G; NR; Service Data Adaptation Protocol (SDAP)

Small Cell Forum, O-RAN, IETF

SCF 222 5G FAPI
SCF 223 P19 RF Control
SCF 224 Network Monitor Mode
SCF 225 5G nFAPI
SCF 5G 'TR-196v3' Management
O-RAN-WG1-O-RAN Architecture Description
O-RAN A1 interface: Application Protocol Version
O-RAN Near-RT RIC Architecture
O-RAN Near-RT RIC E2 Application Protocol
IPv4/V6   – IETF RFC 791/2460
UDP   – IETF RFC 768
SCTP   – IETF RFC 4960