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SOFTWARE FRAMEWORKS | WIRELESS

Altran Narrowband IoT Solution

As the number of devices that make up the Internet of Things (IoT) continues to grow exponentially, customers are looking for new network solutions that are highly scalable

Aricent is now Altran

What is Narrowband IoT?

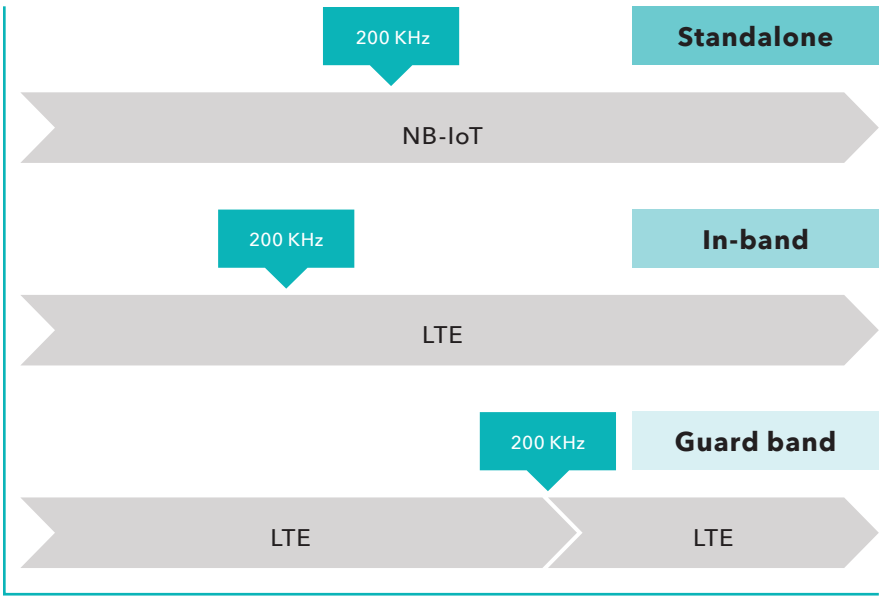
With the number of cellular devices reaching the billions globally, the Third Generation Partnership Project (3GPP) has been working to create standards for cellular networks that will allow service providers to keep up with today's connectivity demands. **Narrowband IoT (NB-IoT)** is a Low Power Wide Area Network (LPWAN) radio technology supporting the use of low-cost devices, long battery life, with the provision of excellent coverage and support for a massive number of devices in a cell – all rolled out as software on top of existing LTE infrastructure.

KEY FEATURES OF NB-IoT:

- Operable within 200kHz bandwidth in Standalone mode, In-band and Guardband (See Fig. 1)
- Like LTE, NB-IoT uses OFDMA in the downlink and SC-FDMA in the uplink
- The design of NB-IoT has fully adopted LTE numerology, using 15kHz subcarriers in the uplink and downlink, with an additional option for 3.75kHz subcarriers in the uplink to provide capacity in signal-strength-limited scenarios

Figure 1

NB-IoT Channel allocation



APPLICATIONS FOR NB-IoT:

- Smart metering (electricity, gas and water)
- Facility management services
- Intruder and fire alarms for homes & commercial properties
- Connected personal appliances measuring health parameters
- Tracking of persons, animals or objects
- Smart city infrastructure such as street lamps or dustbins
- Connected industrial appliances such as welding machines or air compressors

Altran eNB NB-IoT Offering

Altran's Narrowband IoT (NB IoT) solution enables and optimizes IoT devices for today's fastest long-range LTE networks. Our solution complies with all industry standards set by the 3GPP, making it easily interoperable with other vendor solutions, while adding value to our OEM and CSP clients by accelerating time to market.

Our IoT core solutions are virtualized, allowing customers to deploy in a standalone system as well as in cloud-based scalable solution. In addition to being highly scalable, it's also adaptable across different categories of IoT devices, including the NB-IoT deployments common for APAC regions, and CAT-M1 devices in the US. This is especially beneficial to our global customers, who need solutions adaptable for all regions.

Altran has leveraged exiting LTE Base release to implement the eNB feature in a phase wise manner on x86 based host release and integrated as well with intel Transcede L1 on T3K Soc. This feature is also integrated on x86 based L1 partner as well with supported contents as shown in Figure 2.

Figure 2

Altran eNB Key Features

Mode of Operation

FDD mode, Standalone mode

Features

- Single cell support
- Standalone Mode of Operation (200KHz bandwidth)
- Support for 64 Connected/Active UEs
- Single and Multi Tone UL transmission
- 15 KHz sub-carrier spacing in DL
- 3.75 KHz and 15 KHz sub-carrier spacing in UL
- Half Duplex-FDD (Type B)
- New Physical Channels support in UL and DL
- NPDCCH (DCI-N0 and N1)
- FAPI L1-L2 interface Compliance
- Support for only transmission (i.e. no retransmission support)
- Support for CE Level 0
- RLC AM mode with Status reporting enabled
- NPRACH format 1 supported
- UE Specific Search Space with aggregation level 1 and 2 supported
- Control Plane CIoT EPS optimization (PDN type IP only)
- SIB3-NB, SIB4-NB, SIB5-ND
- Connected mode DRX
- BLER based DL Link adaptation
- DL Code-rate validation
- KPI's Statistics
- Cell Re-configuration
- Paging
- Repetition number in Control and Data

Schedulers

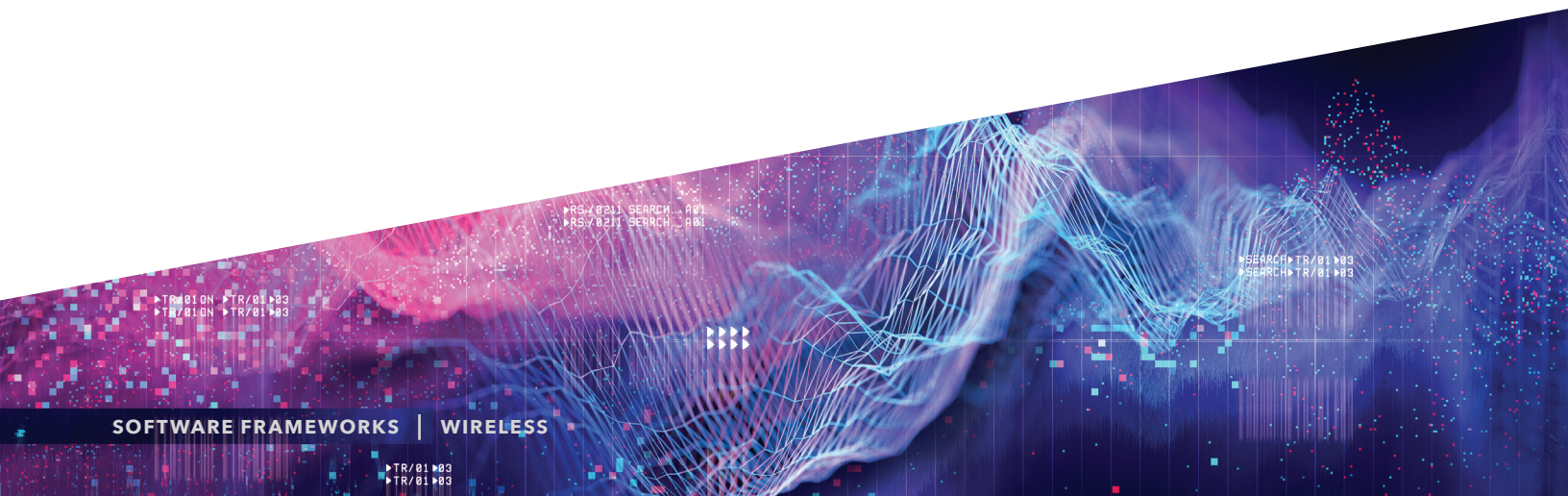
Round Robin scheduler

Integrity & Ciphering

- AS Integrity & Ciphering is not applicable for CP-CIoT EPS optimization

3GPP Release

Release 14

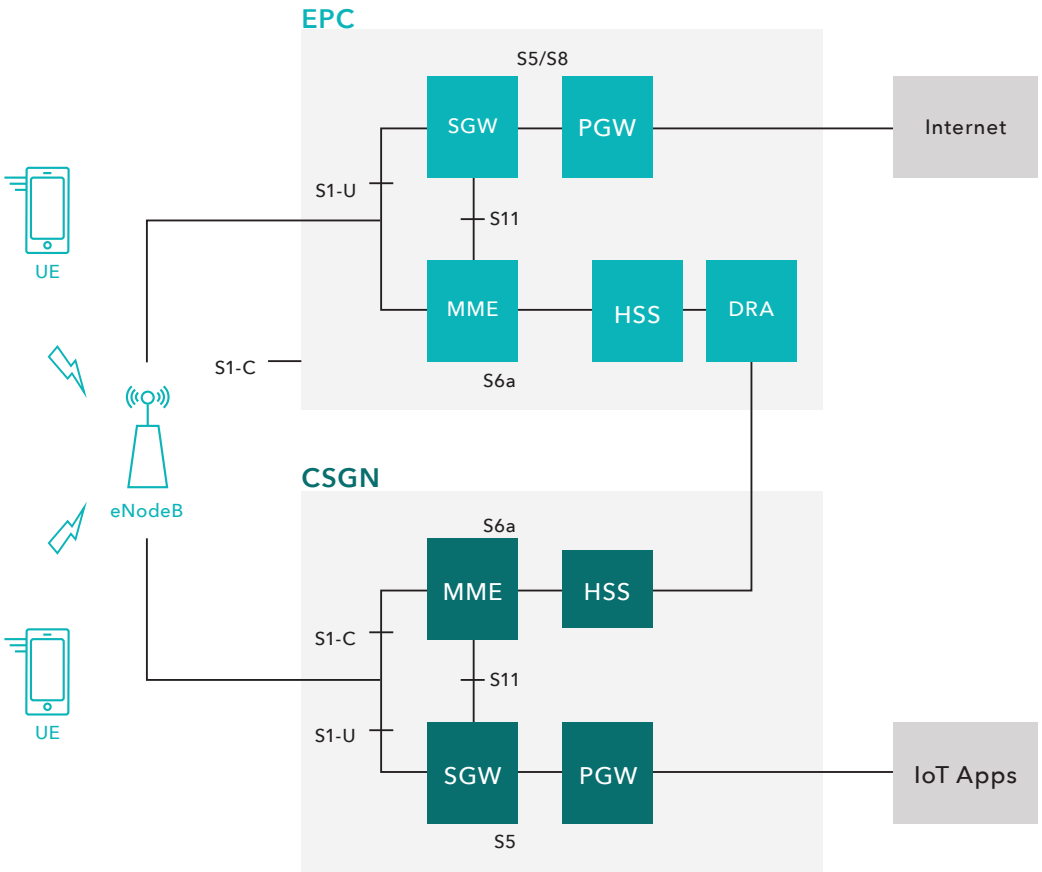


Altran C-SGN Offering for Core

Altran C-SGN (CIoT Serving Gateway Node) solution provides an optimized solution for cellular IoT to provide wide-area coverage, long battery life, low-cost devices, low deployment costs and support of massive IoT connections. C-SGN combines the MME, P-GW and S-GW functions to provide a highly optimized CIoT solution.

Figure 3

Altran IoT Core



SUPPORTED NB-IoT FEATURE LIST IN CORE

Features

- Capacity: 1M attached UEs
- UE Support: CAT-M, CAT-M1, Cat NB1
- High availability (1:1 Hot redundancy)
- FCAPS through Web based Element Management System and SNMP
- Support for IPv4 and IPv6
- Protocol Features
  - Control Plane Optimization - Data delivered to/from MME in NAS PDUs
  - Data delivery over SGi interface to application server or Service capability server (SCEF) from MME
  - PSM and e-DRX support
  - Data buffering for UEs that do not wake up
  - IP data Support, without IP header compression
  - Non-IP data Support
    - Packet set to defined destination (configured per APN)

3GPP Release

Release 13

Platform

Any COTS server with RHEL/Centos OS

Why Altran?

Altran works with original equipment manufacturers (OEMs) to develop and customize their LTE core for IoT. By customizing the LTE core to meet their specific needs, Altran can deliver significant business value, including:

ACCELERATING TIME-TO-MARKET

- Altran's ready-to-use, high-value, pre-integrated software stacks and frameworks reduces the OEM's R&D investment
- Leveraging our team of experienced LTE consultants and engineers participating in the development of end-to-end solution, from design to product rollout, streamlines the development process and reduces development time

REDUCING RISK THROUGH FEATURE-RICH AND CARRIER-GRADE OFFERINGS

- Altran provides a strong feature set that includes most commercial-grade features available or in the product roadmap
- Ensure compliance to the latest 3GPP R10 (June '11) specifications with backward compatibility
- Offload offerings (HeNB Gateway in Femto and ePDG/SaMOG in Wi-Fi deployments)
- Interop credentials with top Tier-1 OEM eUTRAN and EPC nodes

BUILT-IN FLEXIBILITY FOR FASTER MARKET RESPONSE

- Altran delivers highly customizable solutions to ensure customers meet their business objectives
- We participate in demonstrations and trials with OEM customers around the world
- Our flexible engagement models reduce investment risk and maintain the technology supremacy needed to gain market share.
- Deep expertise and experience with over 60 LTE clients for Altran's LTE offerings and professional services

AVAILABILITY ON GENERIC PLATFORMS

- Altran's core solution can run on any commercial off-the-shelf (COTS) hardware—single/multi-core or single/multi-blade system on a server or ATCA/ATCA chassis—or any proprietary hardware running on Linux
- We ensure the customer incurs zero or minimal hardware integration expense

Find out more about what our software frameworks and solutions can do for your company.

Get in touch to set up a call or meeting with an Altran expert today: **NAmarketing@Altran.com**

You can work with a company that develops software for today. Or you can work with one that develops software for tomorrow.

About Altran
Altran ranks as the undisputed global leader in Engineering and R&D services (ER&D), following its acquisition of Aricent. The company offers clients an unmatched value proposition to address their transformation and innovation needs. Altran works alongside its clients, from initial concept through industrialization, to invent the products and services of tomorrow.

For over 30 years, the company has provided expertise in aerospace, automotive, defense, energy, finance, life sciences, railway, and telecommunications. The Aricent acquisition extends this leadership to semiconductors, digital experience, and design innovation. Combined, Altran and Aricent generated revenues of €2.9 billion in 2017, with some 45,000 employees in more than 30 countries.

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Aricent is now Altran