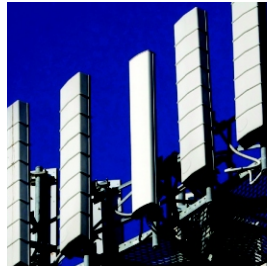


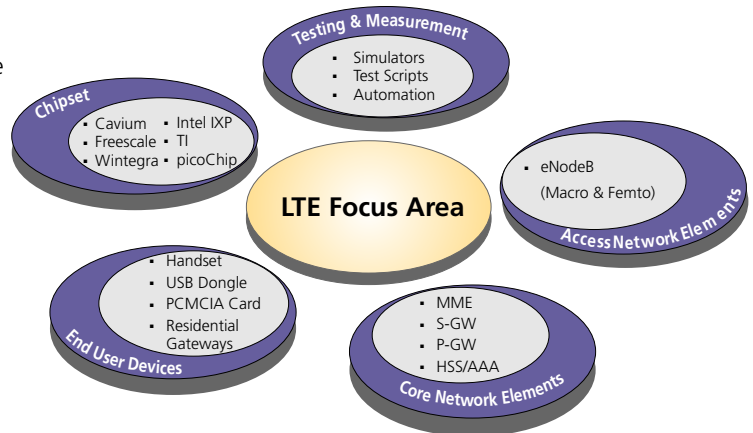
Product Engineering Services (PES) - Telecom

LTE Services & Solutions



L&T Infotech has a proven track record of developing, deploying and managing telecom technologies, products, applications and platforms for renowned telecom players across the globe. We provide R&D engineering services to semiconductor and telecom equipment vendors, application and managed services to telecom operators in emerging 4G technologies (WiMAX, LTE and xG-PHS), as well as currently deployed technologies like cdma2000 1x, and UMTS.

L&T Infotech has been actively working on Broadband Wireless Access (BWA) technologies since 2004 and we have a strong technical team with expertise in LTE. We have an enviable track record of executing several LTE specific customer engagements in diverse platforms (PowerQUICC, Wintegra, Cavium, Intel IXP, Freescale, picoChip) including those based on multi-core technologies. We contribute to and benefit from the work being done by various standard bodies like 3GPP, VoLGA Forum, NGMN Alliance, etc that are active in the LTE ecosystem.



Key Projects

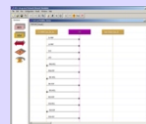
- Complete eNodeB Protocol Stack Development
- Implementation of LTE PDCP for a Tier-1 OEM
- RoHC for LTE for a fabless chipset vendor
- EPC Call Simulator (MME, S-GW, P-GW, HSS/AAA, eNodeB) for a Tier 1 OEM
- LTE Conformance Testing for S1-AP, GTPv2 (automation using TTCN-3 on TTWorkbench) for a Tier-1 OEM
- Building LTE PHY blocks on a well know DSP Platforms

Key Customer Benefits

- Skilled Resource Pool
- Deep Domain Expertise
- Flexible Business Models
- Reusable Components
- Assured Quality & Stability

ACCELERATOR

Integrated Network Element Simulator (INES)



INES is a comprehensive, message driven, stateless, conformance testing and test automation framework intended for module-wise testing of protocol stacks, without any dependency on hardware or physical layer.

Key Features::

- Powerful GUI based front-end using which test case of any complexity could be built, just like building a sequence chart
- Adapted to LTE, WiMAX and NGN

CASE STUDY

LTE UE Simulator Development

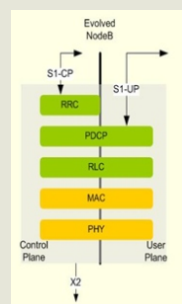
The UE Simulator was used to test the LTE eNodeB.

Key Contributions:

- Component development for LTE UE: VoIP Packet Generator, NAS, RRC, PDCP, RLC
- Tunneling of Uu interface messages over IP to test LTE MAC and above layers without any dependency on PHY
- Negative testing through message customization enabled higher test coverage

CASE STUDY

LTE eNodeB Component Development



Key Contributions:

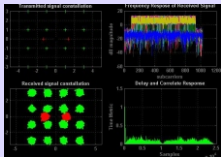
eNodeB Data Plane and Control Plane Platform Independent Implementation.

Components include:

- PDCP
- RLC (TM, UM & AM modes)
- MAC
- RRC
- Interfaces S1 & X1

ACCELERATOR

Wireless PHY Simulator (WiSim)



WiSim is a physical layer simulator capable of end-to-end link level simulation for WiMAX and LTE.

Supporting both OFDMA and SC-

FDMA, WiSim helps in characterizing and comparing all physical layer elements (including receiver algorithms) under different channel conditions. WiSim supports tradeoff analysis between implementations with differing complexities. It supports both SISO and MIMO configurations.

About L&T Infotech

L&T Infotech, a wholly-owned subsidiary of the \$8.5 Billion Larsen & Toubro group, is a provider of IT & Technology solutions and services to global clients across industry segments encompassing Telecom, Manufacturing, Banking, Finance, Securities, Insurance, Energy & Petrochemicals. L&T Infotech delivers high fidelity solutions based on time-tested institutionalized processes and a deep-rooted belief that quality is a cost-saver. Accredited with the prestigious SEI CMMi LEVEL 5 certification, its motto is **"Quality Drives Productivity"**.

L&T Infotech's vision is to provide world-class services to clients in its areas of focus, offering solutions that are based on business and technology insights.

Quality Certifications



Analyst Accolades

- Selected in the Leaders category in **"The 2009 Global Outsourcing 100 service providers list"**
- Selected in the **Deloitte Technology Fast 500 Asia Pacific Award** for the second consecutive year
- Selected among the **Global Services top 100 innovative service providers of the year 2009** and ranked **5th in "Best Performers: IT Services"**

LTE Offerings	Relevant Expertise
Protocol stack development	<ul style="list-style-type: none"> Knowledge of 3GPP Rel 8 and associated Standards Experience in protocol stack development and stack adaptation across LTE, WiMAX, CDMA
Stack Integration, Porting and Optimization across various platforms	<ul style="list-style-type: none"> Experience in porting across various hardware (including multicore) platforms including Cavium, TI, Freescale, picoChip, etc
Femtocell development	<ul style="list-style-type: none"> Experience in Femtocell product development Experience in proprietary Self-Organizing-Networks (SON) solutions
Simulator Development for proving LTE solutions	<ul style="list-style-type: none"> Experience in development of Simulators for all components of EPC In-house development of conformance test framework
Test Automation and Test Script development	<ul style="list-style-type: none"> Experience in Test automation suite development and test chain optimization Exposure to scripting languages such as TTCN-3, Perl, etc.
Integration and System Testing	<ul style="list-style-type: none"> Well versed with various Test & Measurement equipments like Air Sniffers, Interface probes, SA, VSA, Traffic Generator, Noise Generator, etc.
Management solutions	<ul style="list-style-type: none"> Expertise in development of OAM&P frameworks and various management interfaces like SNMP, CORBA, etc. Experience in development of NMS & EMS solutions for WiMAX, CDMA, etc.

Product Engineering Services (PES) - Telecom

The Product Engineering Services Group at L&T Infotech has a proven track record of developing and deploying telecom technologies, products, applications and platforms for renowned telecom players across the globe. We provide software and hardware engineering services to leading OEMs, ODMs, chipset vendors, Telecom carriers and ISVs. We support clients in the areas of chip design, hardware design, firmware, middleware, software engineering, applications & content all the way from design, development to deployment.

Our Telecom Domain Expertise spans across

- Infrastructure
- Mobile Devices
- Entertainment Products
- Computing & Data Networking
- Test & Validation
- VLSI Design
- Hardware & Platform