

Landslide LTE Test Application

The Landslide LTE MME Test Application provides testing of the MME, or combined MME and SGSN, in both end-to-end and nodal configurations (see Figure 1). Landslide emulates the UEs and eNodeB accessing the LTE network, and optionally emulates SGSN, GGSN, and HSGW for I-RAT mobility testing. Landslide will also emulate the Internet or network host to which the subscribers will connect and pass data. In this configuration the LTE network core control and data plane performance can be validated and measured.

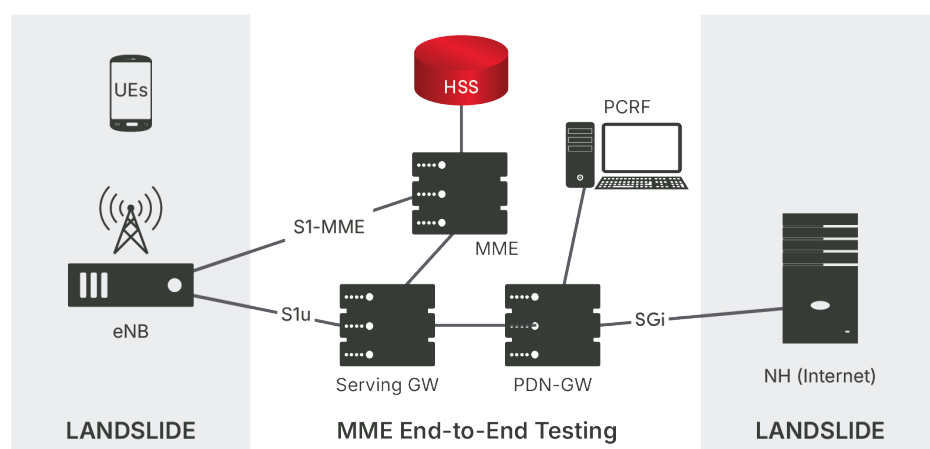


Figure 1. MME end-to-end test configuration

In the MME Nodal test configuration (see Figure 2), Landslide emulates the eNodeB, UEs and the Serving Gateway and adjacent GSM, UMTS and eHRPD nodes to isolate the Mobility Management Entity for control plane performance validation and benchmarking.

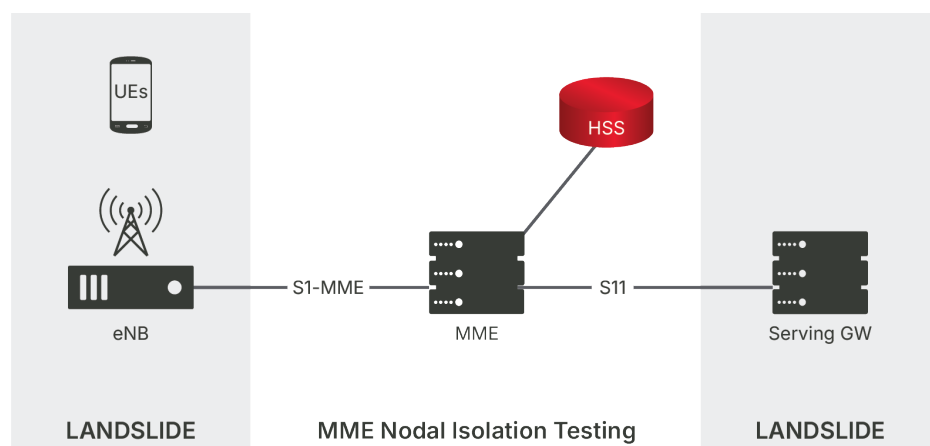


Figure 2. MME Nodal test configuration

Keysight Landslide LTE Test Application enables mobile service providers and the equipment vendors to test the performance of their LTE networks and devices. The system emulates mobile users and applications at scale ensuring networks are capable of keeping up with the massive amount of control traffic generated by millions of smartphones and deliver the bandwidth and quality of service necessary to deliver a broadband experience over the mobile network.

Landslide LTE Test Applications provide a comprehensive end-to-end test system that emulates millions of mobile data subscribers, all simultaneously accessing the LTE-enhanced packet core network or handing over between the LTE network and GSM, UTMS, or eHRPD networks. By emulating the key LTE packet data network elements and combining control plane and data plane simulation, the Landslide LTE Test Applications provide real-world emulation of millions of UEs in various stages of activation, deactivation and handovers between cells. Emulation takes place while sending and receiving real-world application data.

Applications

- Validate system scalability and identify capacity limits
- Measure control plane capacity
- Stress data plane performance
- Perform Intra-LTE and I-RAT mobility testing
- Characterize system before trial/delivery
- Identify performance ceilings
- Busy hour call attempt testing

The Landslide LTE Gateway test applications provide testing of Serving Gateways and PDN Gateways in both combined and nodal configurations. In the SGW Nodal test configuration (see Figure 3), Landslide emulates the MME, eNodeB, UEs and the PDN Gateway to isolate the Serving Gateway for control and data plane performance validation and benchmarking. Additionally, in this test configuration, the Landslide can emulate GSM, UMTS, and eHRPD access into the LTE SGW.

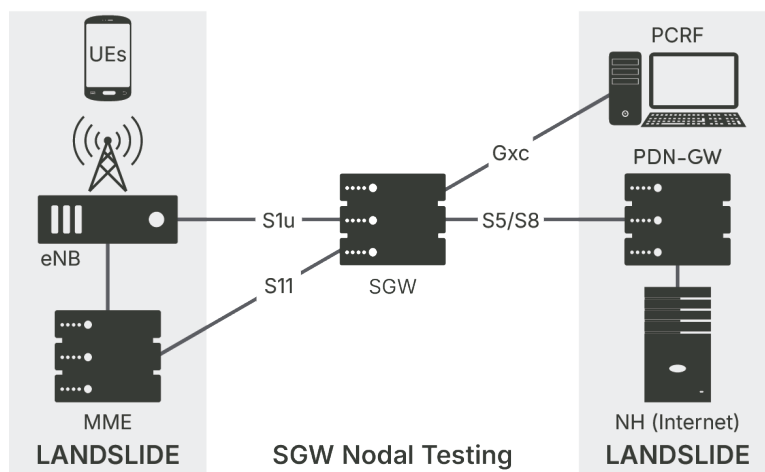


Figure 3. SGW Nodal test configuration

In the PDN GW Nodal test configuration (see Figure 4), Landslide emulates the SGW, MME, eNodeB, and UEs to isolate the PDN Gateway for control and data plane performance validation and benchmarking. Additionally, in this configuration, the Landslide can emulate non-3GPP access to the PDN GW (providing the S2a/S2b interface).

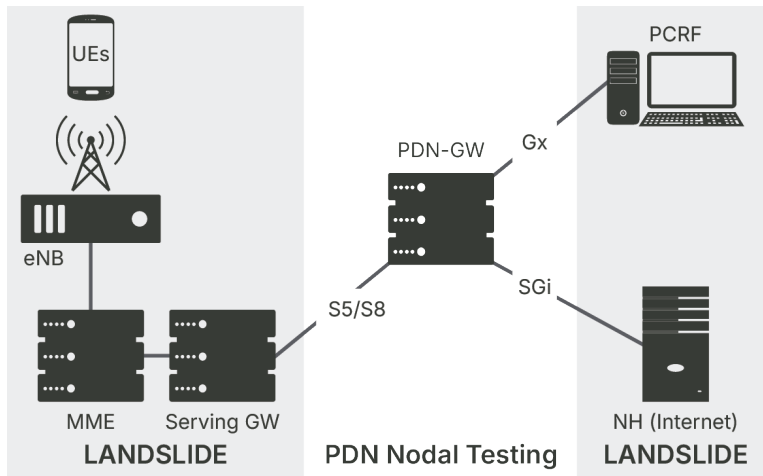


Figure 4. PDN Nodal test configuration

Features and Benefits

- TCL Interface allows the user to control/monitor the Landslide from a higher-level management system, thus making it possible to compile specific test reports for both the emulation (Landslide) and the device under test
- Realistic, real-world simulations that allow equipment vendors to accurately specify the performance characteristics of their equipment under real-world conditions
- Simultaneous control and user plane that allow service providers to measure the performance of their network and to validate new features and services in the lab
- Unmatched scalability allows the user to simulate subscriber loads ranging from a small rural town to the largest metropolitan city
- Standard Web browser interface means no need to load software onto user equipment
- Emulation of multiple network elements allows the user to test in a variety of network topologies which provides more effective utilization of lab equipment and reduces capital expenditure and ongoing support costs associated with a test lab
- Automation control allows the user to run many test cases simultaneously or serially on multiple Landslide test servers, creating real-world scenarios for heavy load and long duration stability tests
- MME Nodal Testing allows the user to isolate the MME in a “nodal” configuration to specifically test the performance and scalability of the MME itself
- Intra-LTE Mobility—Landslide provides the ability to test virtually all Inter-LTE mobility scenarios
- Inter-Technology/I-RAT Mobility—Landslide provides the ability to test virtual all handover scenarios between LTE and GSM, UMTS, and eHRPD networks. Landslide can emulate or allow a real SGSN or HSGW for this testing.

- SGW Nodal—The user can isolate the SGW in a “nodal” configuration to specifically test the performance and scalability of the SGW itself
- PDN GW Nodal—The user can isolate the PDN GW in a “nodal” configuration to specifically test the performance and scalability of the PDN GW itself
- End-to-end testing allows the user to test the entire LTE core
- With Landslide’s LTE Gateway Functional Test Option, the user has the capability to edit message headers and add/modify/delete message IEs for GTPv2 messages. Both methods can be used to generate error conditions.
- Landslide also offers a PCRF Node Emulator that can be used in cases where a real PCRF is not available. The PCRF emulator supports the Gx and Gxx interfaces for LTE.

Technical Specifications

- Test activities
 - Capacity test
 - Session loading
 - Command mode/Command mode sequencer
 - Session loading with mobility (MME and SGW Nodal)
 - Intra-LTE mobility scenarios
 - Inter-technology/I-RAT including SRVCC with luCS
- Mobility scenarios
 - Landslide manager
 - Up to 125 user accounts
 - Up to 48 simultaneous users
 - Up to 32 Landslide test servers
- Landslide test server
 - 1 million UEs with Extreme Capacity License
 - Up to 11 bearers per subscriber
 - More than 12 Gbps of bearer traffic
 - Activate/deactivate rates up to 6,000 sessions per second
 - Up to 3 simultaneous users per test server
 - Emulate up to 2,000 eNBs and 2,000 serving gateways
- Landslide Test Server Ethernet ports
 - Quad-port, 10/100/1000Base-T NIC
 - Quad-port, 10/100/100Base-SX multi-mode NIC
 - Single-port 10 gigabit XF SR multi-mode NIC

- Referenced standards
 - Support for R7- R11 3GPP standards
 - 3GPP TS 23.401 General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access
 - 3GPP TS 24.301 Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3
 - 3GPP TS 36.413 Evolved Universal Terrestrial Radio Access (E-UTRA) and E-UTRAN; S1 Application Protocol (S1AP)
 - 3GPP TS 23.402 Architecture enhancements for non-3GPP accesses
 - 3GPP TS 29.274 Tunnelling Protocol for control plane (GTPv2-C)
 - 3GPP TS 29.275 Proxy Mobile IPv6 (PMIPv6) based Mobility and Tunneling protocols
 - 3GPP TS 29.281 General Packet Radio System (GPRS) Tunneling



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