

LTE UE Testing

Agenda



1 Application areas of TTCN-3

2 TTCN-3 for LTE Device Protocol Conformance

3 TTCN-3 for LTE Device Pre-IOT

Long Term Evolution (LTE) – A brief Introduction



About

- ✓ Latest standards in mobile network technology promoted by 3GPP
- ✓ Promises a competitive edge over other cellular technologies
- ✓ Designed to support High-speed data

Goals

- ✓ Increase Peak Data Rates (100Mbps in Downlink & 50 Mbps in Uplink)
- ✓ Improve Spectral Efficiency
- ✓ Increase Network Capacity
- ✓ Reduce Latency
- ✓ Better support for Mobility (up to 120 Km/hr)

Features

- ✓ Multiple Access Scheme based on OFDMA in Downlink
- ✓ MIMO technology for better data rate & performance
- ✓ Hybrid ARQ in MAC layer
- ✓ Bandwidth scalability
- ✓ Adaptive Modulation Techniques

LTE UE Testing Landscape



Market Segments

- Device Vendors
- Test and Measurement Vendors
- Protocol Stack Developers

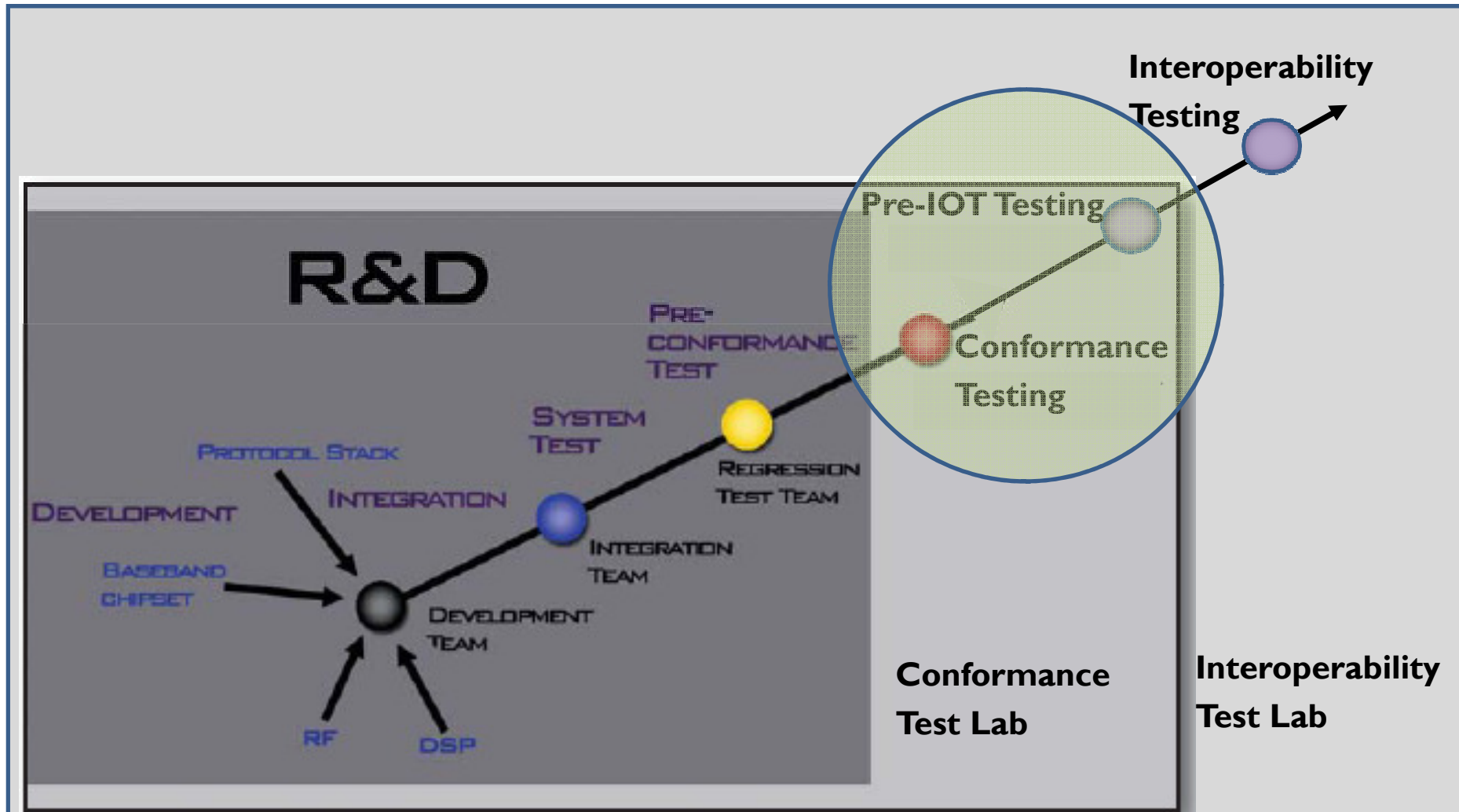


LTE Test Challenges

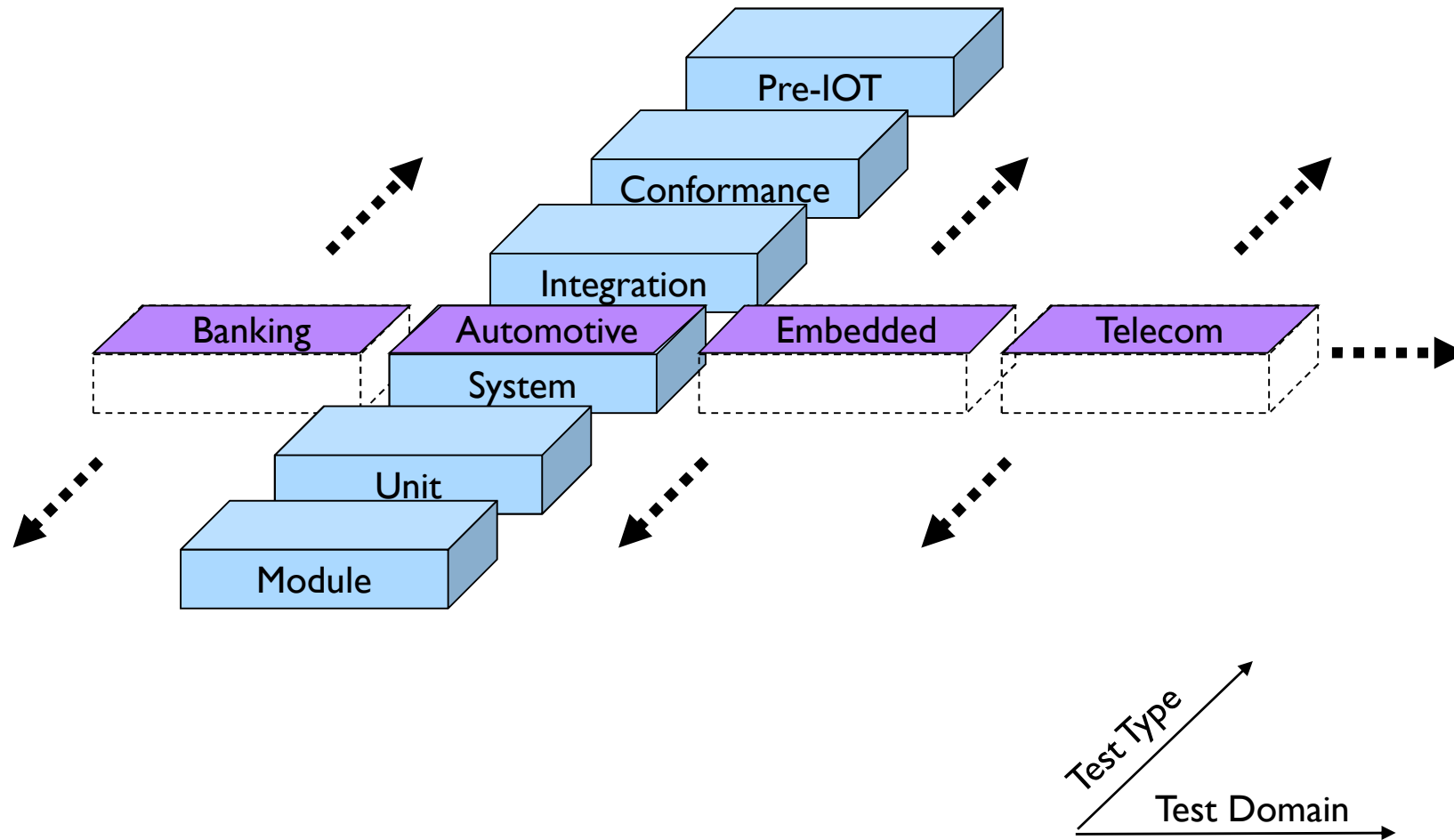
- Constantly evolving Protocol Specifications
- Frequently Changing Conformance Specifications
- Shorter Time to Market
- Testing Complexity is Very High



Device Testing Life Cycle



Applicability of TTCN-3

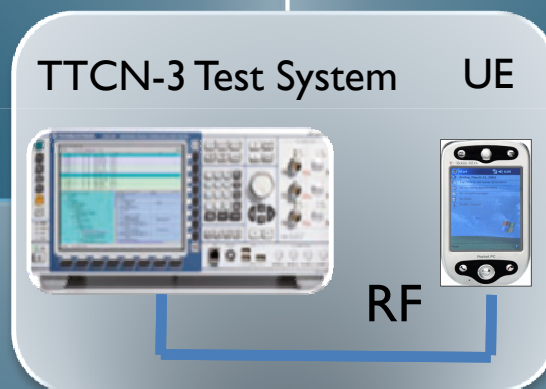


LTE Device Conformance Testing



Conformance Test Specifications are based on 3GPP requirements

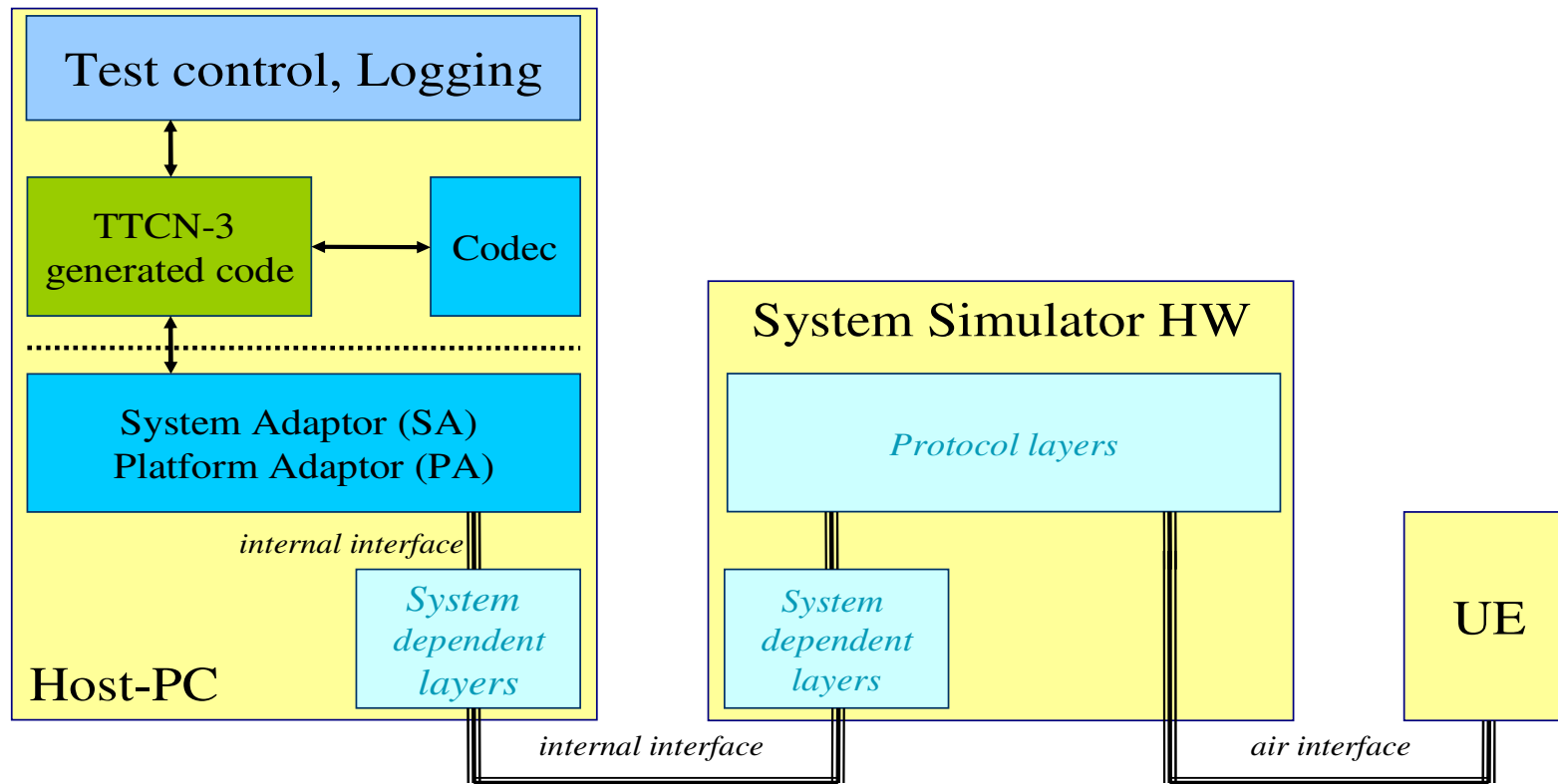
3GPP has defined the conformance test architecture



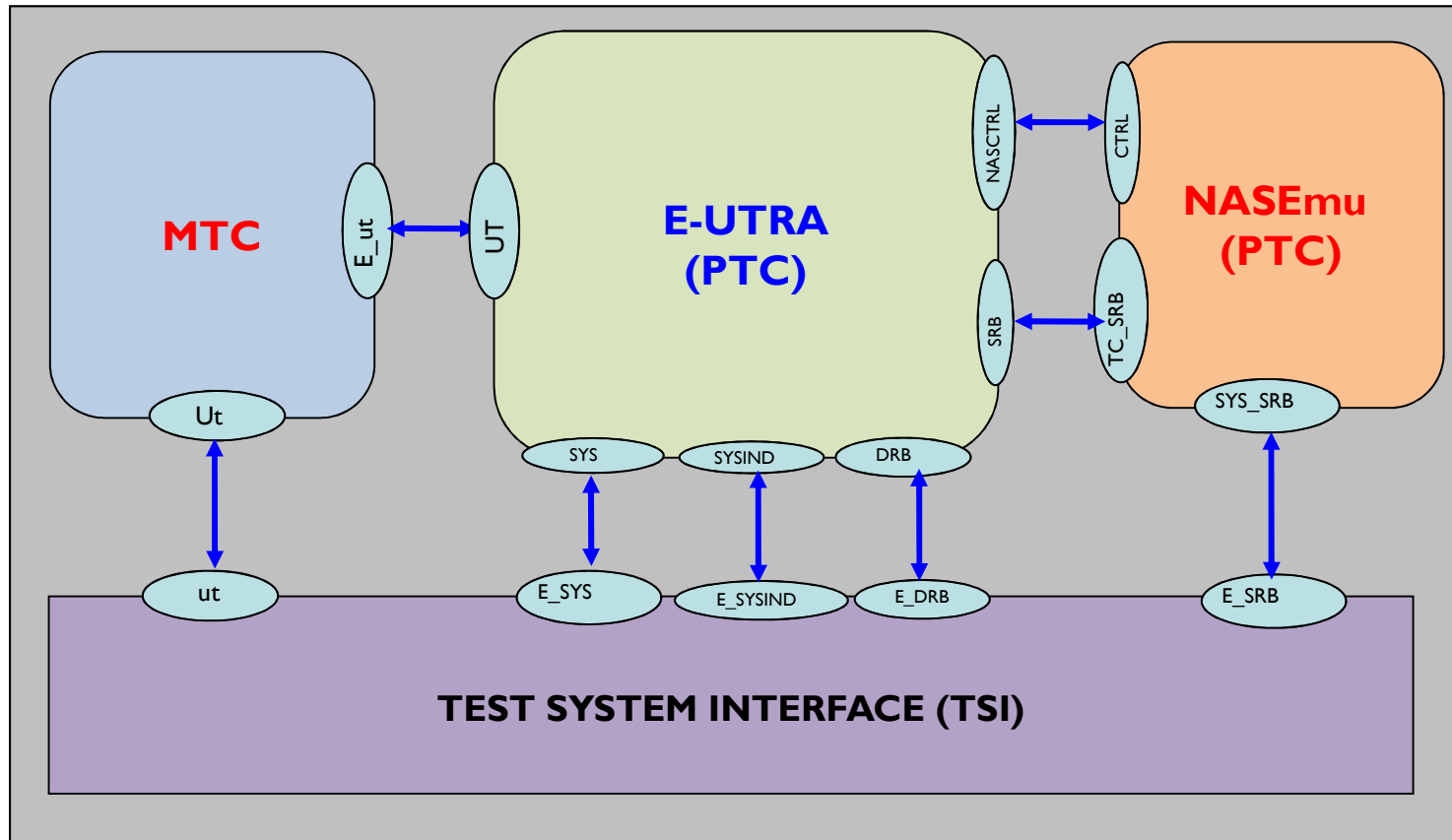
LTE UE GCF Certification is expected to start in 2010

3GPP has recommended TTCN-3 for Device Conformance Testing

UE Conformance Test Architecture – 3GPP Proposed



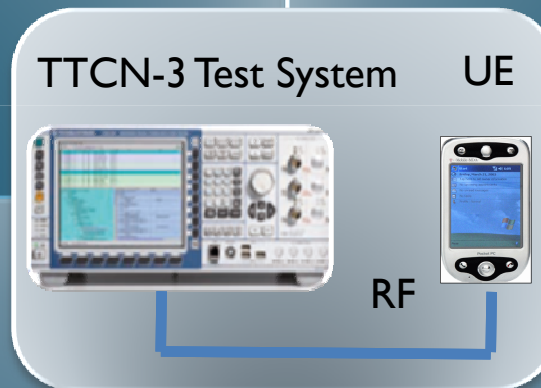
TTCN-3 Port Mappings defined by 3GPP



Pre-IOT Testing - Why is it Required?

IOT Test Scenarios are based on “Field Trial Guidelines” published by GSMA & 3GPP

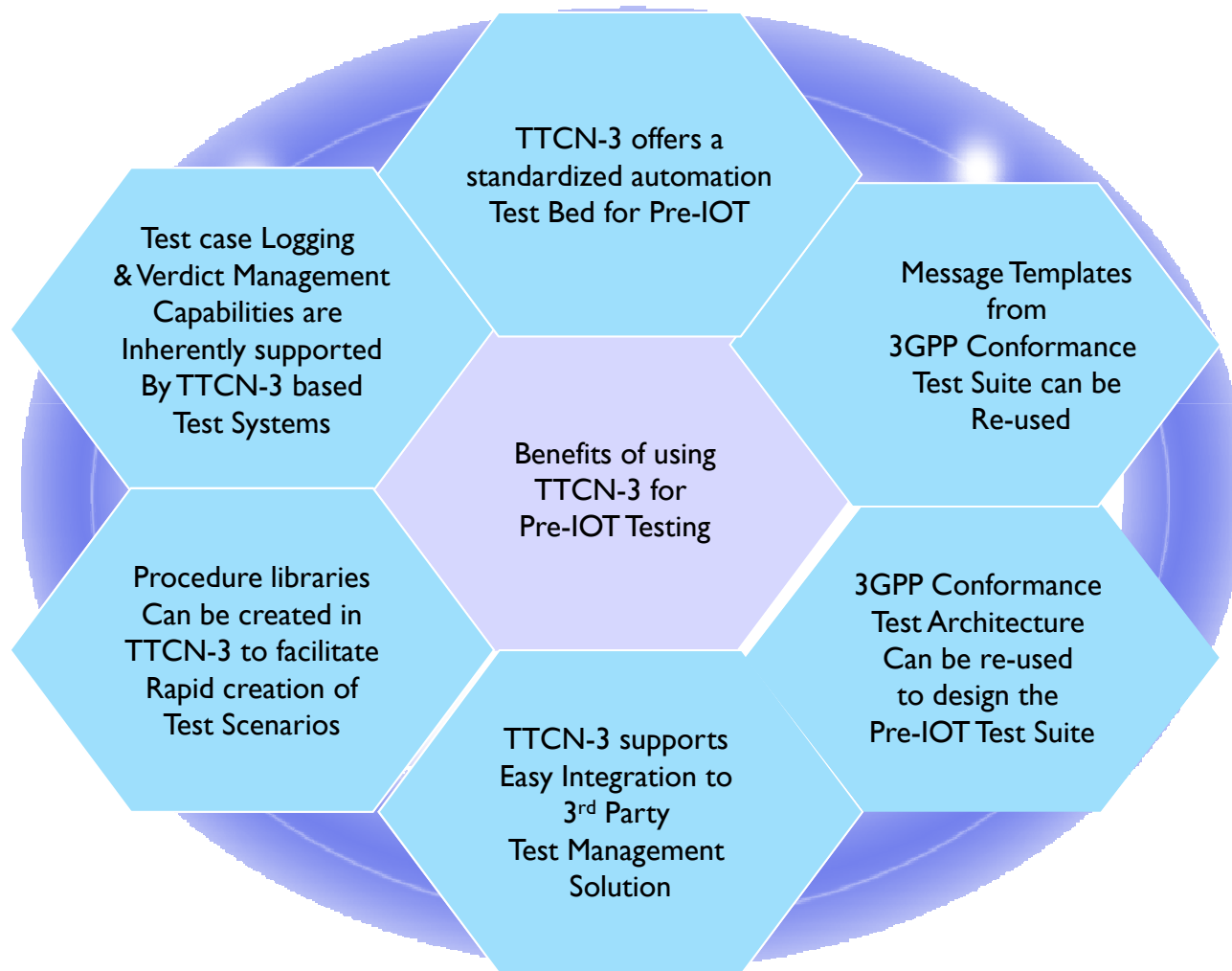
Fixing defects found from failures in live network (IOT) are extremely expensive and time consuming



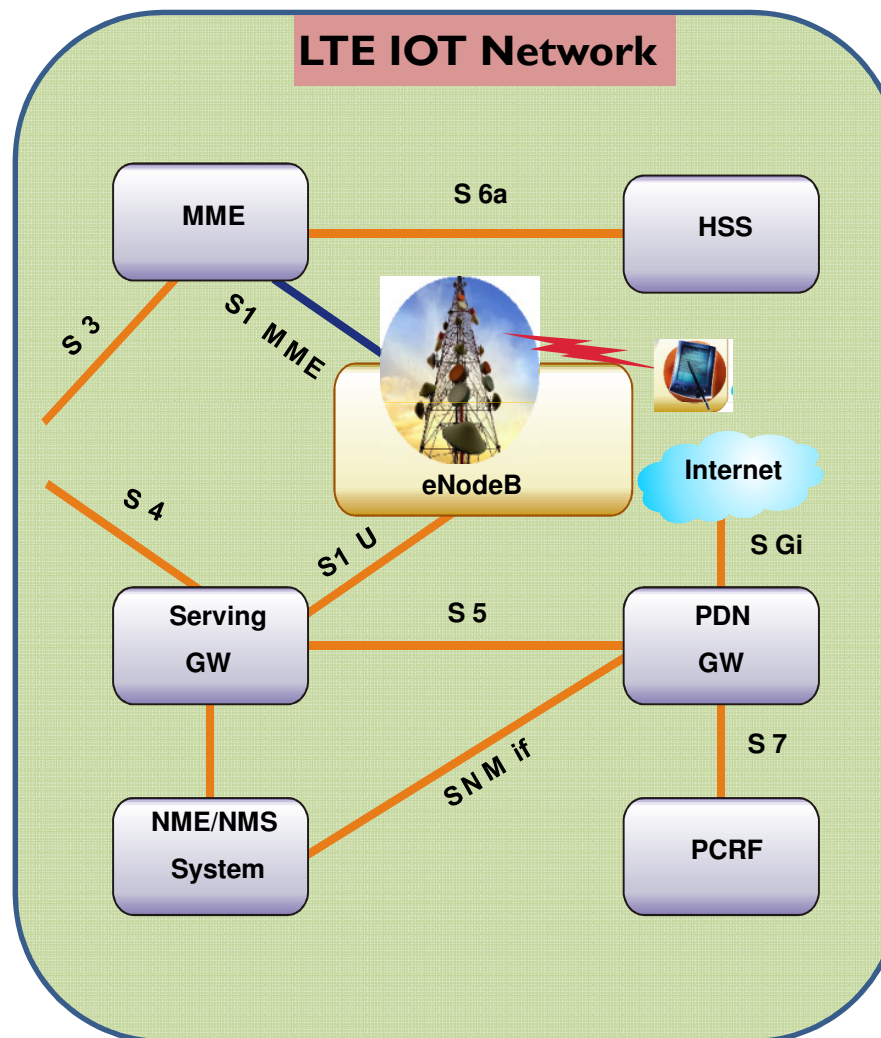
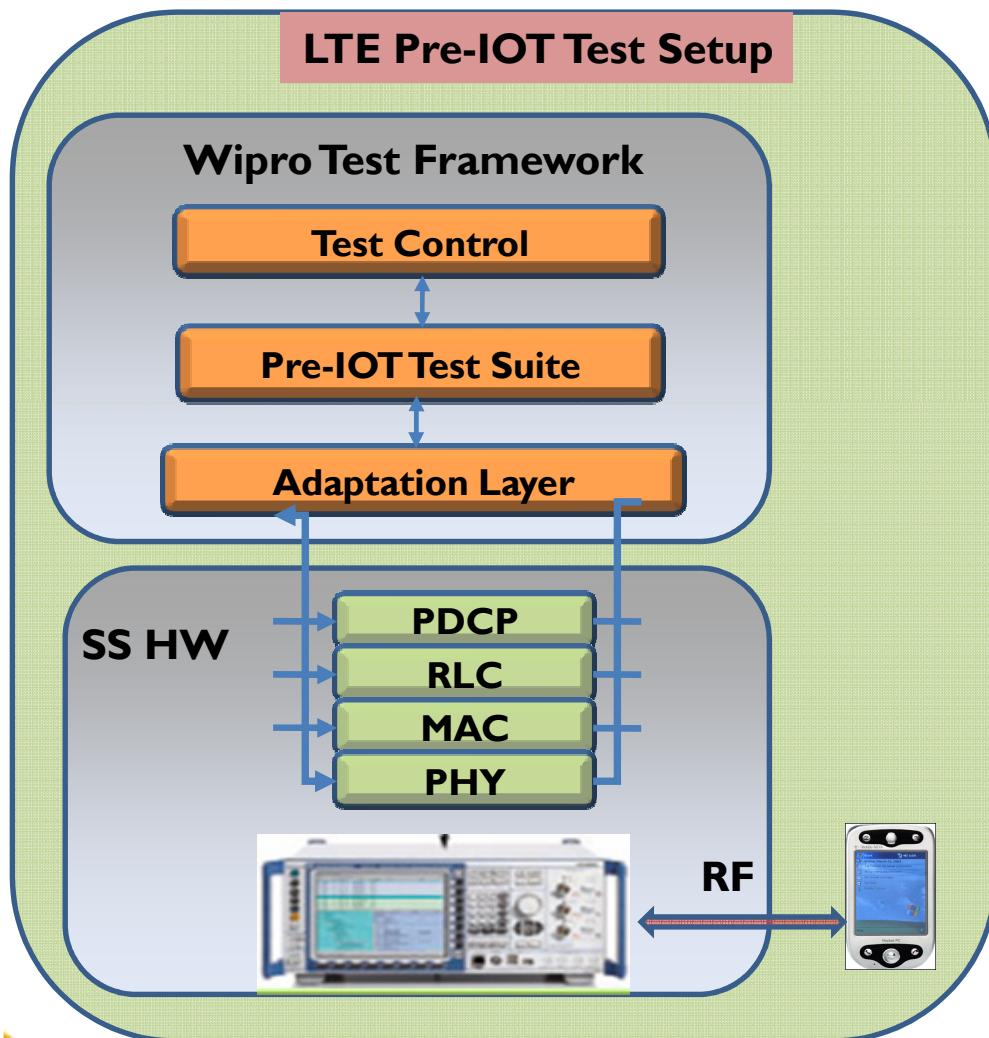
While IOT is performed in a manual test environment
Pre-IOT Testing can be completely automated

Pre-IOT Testing is carried out in a Network Simulation Environment

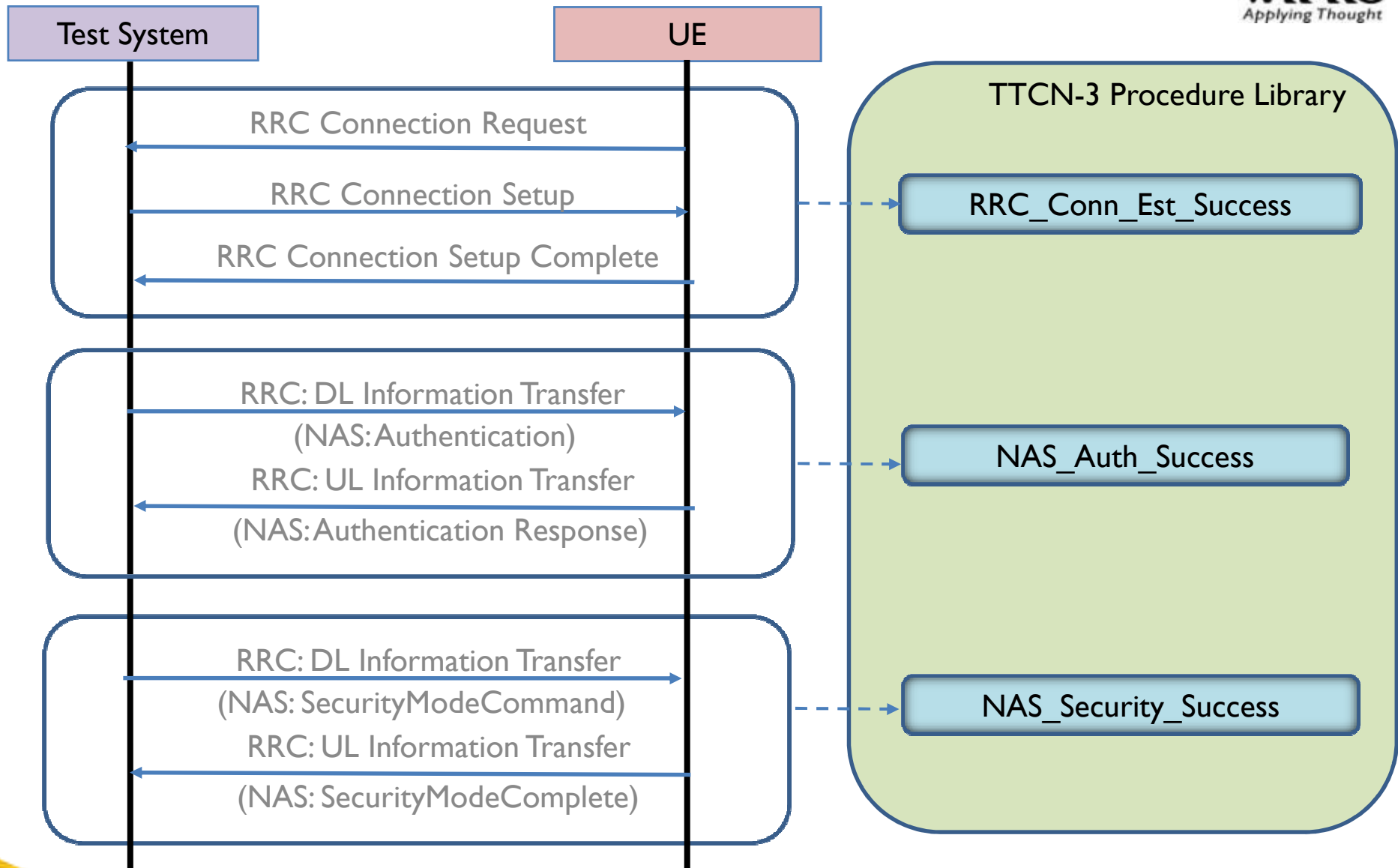
Applicability of TTCN-3 to Pre-IOT Testing



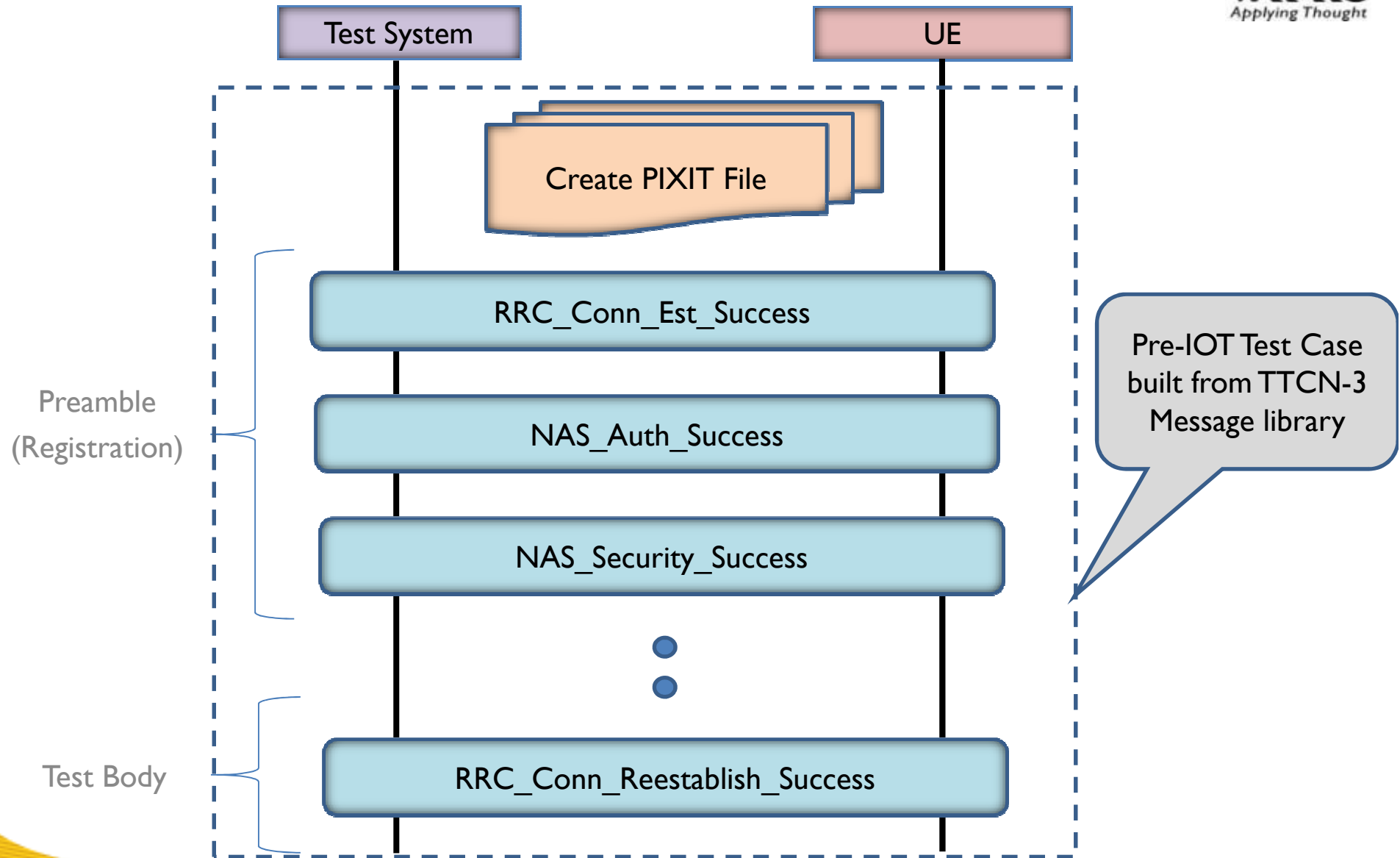
TTCN-3 for Device Pre-IOT

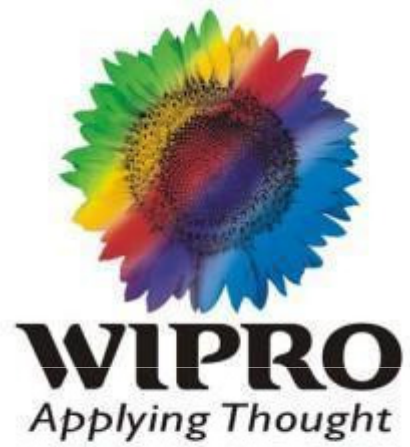


Building TTCN-3 Message Library



Building Test Case from TTCN-3 Message Library





Thank You

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