

 Product sheet

## E2E



## End-to-End Network Visibility and Optimisation

With E2ES, network operators can now measure and analyse the E2E (end-to-end) performance of their LTE networks in one integrated platform. By collecting realtime information from a variety of network elements (realtime S1, Gn, Gi message flows etc), E2ES filters, correlates, assembles and structures the data to provide an accurate picture of your network performance.

The E2ES system is used to capture key network data and signalling messages in various nodes e.g. X2, S1-Mme, S11, S1U, S5, S8, SGI etc. This network data can then be correlated with air interface data (from XCAL, P8E etc.) to provide a complete picture of end 2 end (end-to-end) service performance.

Air Interface



Performance



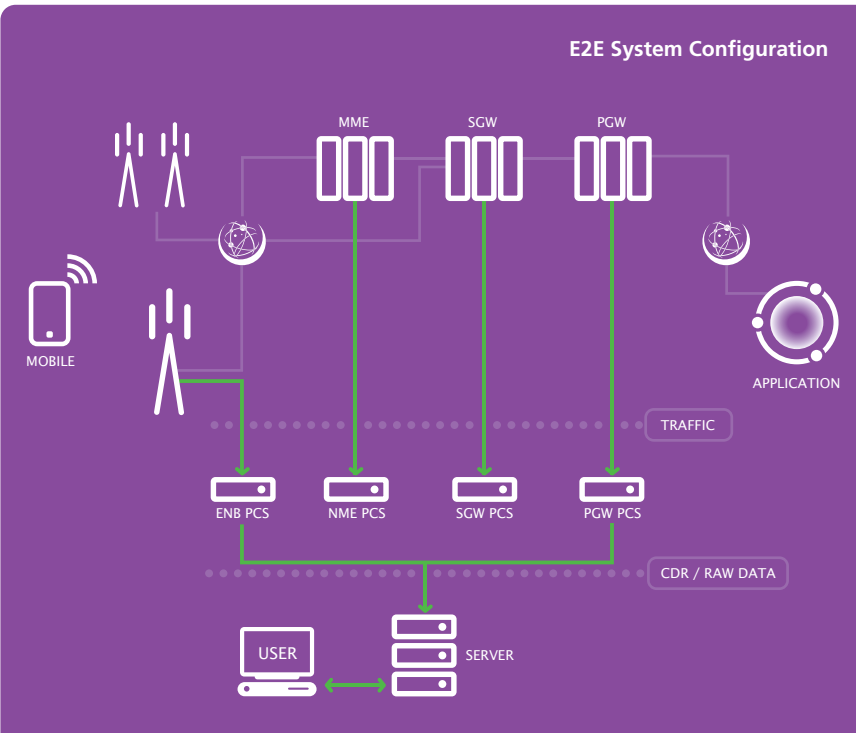
Optimisation



Customisation



E2E System Configuration



### Use E2E to

- Monitor end-to-end network performance for LTE network
- Perform synchronised analysis of the air interface, core and IP network e.g. to highlight where data packets were lost and find a reason and solution
- Reduce the cost of managing trouble tickets
- Improve throughput
- Localise network problems geographically
- Have a scalable platform and proven technology
- Minimise OPEX
- Reduce the need for drive testing

### For LTE

- Perform KPI analysis and mobile equipment user data protocol analysis
- Monitor and analyse both user-plane and control-plane information for each node (Uu, S1-MME, S1-U, X2-C, X2-U, SGI)
- Core network protocol analysis (S1, X2, SGI)
- Application server (Web, FTP, UDP) protocol analysis
- Measurement of transmission delays for each packet interval
- Measurement of data re-transmission and throughput
- Integrated analysis on the same time axis

### Key Features

- Synchronised end-to-end testing and network analysis based on call flow - smartphone, S1, SG1 etc
- L1, L2, L3, NAS, TCP, UDP, IP and APP protocol message analysis
- Rich analysis features such as end-to-end call trace and analysis, packet loss and root cause, application analysis (FTP, HTTP etc), root cause protocol analysis; realtime User Trace Flow Charts
- Packet viewer for higher-level protocol messages - Ethernet, IP, SCTP/UDP, GTP, HTTP, FTP etc
- Powerful geospatial visualisation, reporting and analysis
- Continuous network monitoring for each node, with alarm functions for troubleshooting and corrective action
- Sophisticated statistical reporting
- Easy to deploy and use (portable, 'plug and play' version of E2ES is also available)
- Future-proof and scalable

### E2E outcomes - Performance Management

Function	Detail	Note
Network General Surveillance	Call KPI Trend	Nationwide/local
KPI Monitoring	Call KPI	Attempts, Success, Drop
Fail Alarm	Fail Detect in Call Flow	
Call Type monitoring	Attach / Service Request (MO/MT) Paging / Detach / Tracking Area Update / Dedicated Bearer/ etc...	Node between systems
Data Traffic	S1-U Data Traffic(Rx/Tx) SGI Throughput(Downlink/Uplink)	
Data Service	HTTP / TCP / DNS / VoLTE Streaming/etc Service Status Monitoring	additional Vendor specific Data Service
Handover	X2 Handover, S1 Handover	
Traffic	HTTP / TCP/ UDP / Etc... Smart phone Applications Portal Site	A normal / Specific Service App. YouTube, Google, Apple...
A specific service	Top 50 Trend Surveillance	
DNS Query ~Answer	KPI	Attempt, Success, Res Time. Etc...
	Top Query Time / Top Source	
Data Trace (Real-time)	Data & Signaling Real time Trace	By IMSI, Mobile IP



# E2E

## End-to-End Network Visibility and Optimisation

### E2E outcomes

Function	Detail	Note
Call KPI	KPI Trend IMSI Base (User) Call Type, Fail Code Call Search / Call Flow Analysis / Packet Viewer	SPGW / MME / eNB / Cell
Fail Alarm	Group by Fail Cause Fail Code	SPGW / MME / eNB / Cell
Handover	X2 / S1 Handover Inter system HO	
Throughput	S1-U Data Traffic SGLI Data Traffic	
Service	UDP/TCP/ HTTP DNS VoLTE Service Streaming Worst Host	Protocol, HOST, Fail, etc.. VoIP, Video, IMS service,...
Interface	X2 / S1 / S11 / S6a / S13 / Gx / S101 / S2a / S6b / Gp PMIP / Sp / STa Protocol	
KPI Threshold Management	eNB KPI MME KPI SPGW KPI Data Traffic / Throughput KPI	Call (Attempt, Success, Drop,...) Call (Attempt, Success, Drop,...) Call (Attempt, Success, Drop,...) Up/Downlink
Defect	Defect (signaling/ Data service)	S/PGW, MME, eNB, Data Service

### E2E key features

	Function
C-Plane Signaling (1G/10G)	1. X2,S1,S11,S6a,S6b,S13,S10,S2a,Rx,Gx,Sp,Sta,Gp 2. Real time monitoring and capturing to a log file 3. xDR, cDR (KPIs)
U-Plane Data (1G/10G)	1. S1-u, SGI 2. Real time monitoring and capturing to a log file 3. xDR, cDR (KPIs)
End User Performance	1. Application layer level analysis 2. IP/TCP, HTTP, DNS, VoIP, IMS, MMS, Streaming, etc 3. xDR, cDR

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