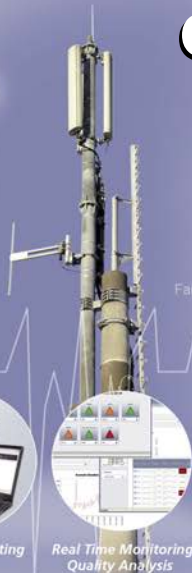




uncover the experience of your customer



PS Attach POP Context Activation



Unattended Probe Units



Probe Unit and Resource Management



In Device Testing



Real Time Monitoring Quality Analysis



XMASS - new generation test system

Enterprise Mobile Quality of Service Platform

XMASS Operational Area

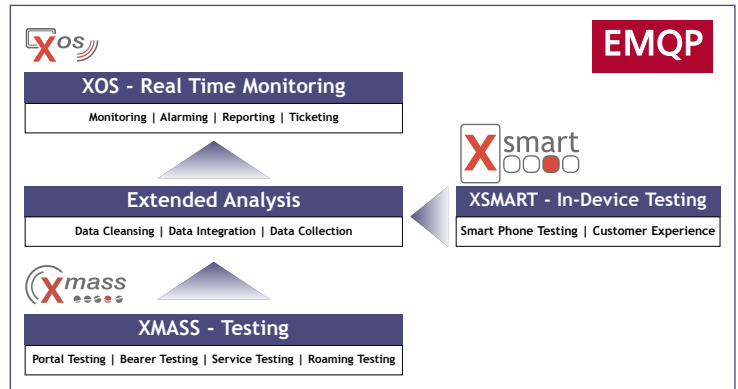
- Network Testing for GSM, GPRS, EDGE, UMTS, HSPA, LTE, CDMA2000, WiMax, LAN/DSL
- Service Testing for voice, messaging, data, VOIP and video services
- Portal Testing for WAP, HTTP and cross service portals
- Video and Voice Quality with PESQ, POLQA and PEVQ
- Roaming Testing for IREG, TADIG and GRQ
- On Device Testing for Smart Phones
- Drive Testing for Service Quality and Coverage

The liberalization of the telecommunications branch has led to the fast growth of services. Both the quality and the variety of services have profited as a result. From day to day the offering will be bigger and more complex.

An operator's network, which is made up of manufacturers of mobile devices, network providers, service providers, content providers, portal providers, is built up in order to deliver a service as fast as possible to the end customer.

In doing so, new heterogeneous infrastructures are emerging to support the data creation and transfer to the end customer. The new task to be solved is coordinating these systems and achieving trouble free communication. Otherwise the services, irrelevant of how good they are, will never reach the end customer. Result - customer satisfaction sinks, time to market will be increased, profits decline.

Pixip.net Enterprise Mobile Quality of Service Platform (EMQP) makes it possible to test these complex services, inside of a heterogeneous environment, with possible errors and performance problems being detected quickly.



EMQP architecture overview

Operational area

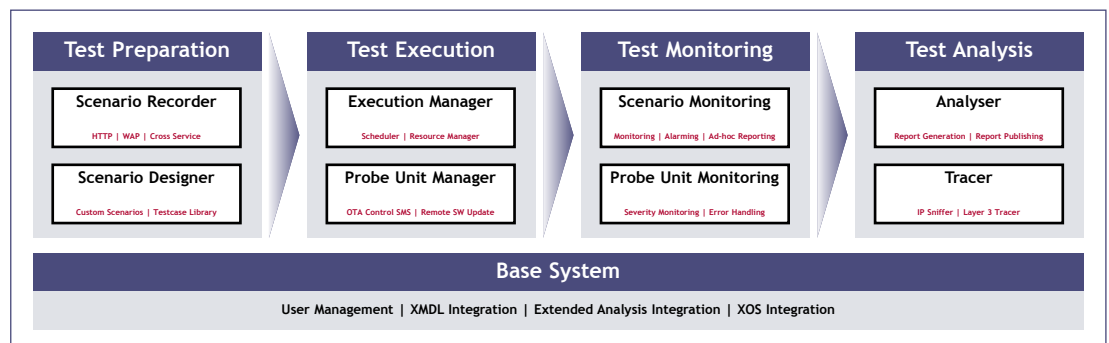
- **Bearer Testing** for GSM, GPRS, EDGE, UMTS, HSPA, LTE, CDMA2000, WiMax, LAN/DSL
- **Service Testing** for voice, messaging, data and video services
- **Portal Testing** for WAP, HTTP and cross service portals
- **Video and Voice Quality** with PESQ/POLQA and PEVQ
- **Roaming Testing** for IREG, TADIG and GRQ
- **On Device Testing** for Smart phones

System Architecture

This flexible test system opens up wholly new perspectives and possibilities in testing.

XMASS is a very flexible and open system based on open technology standards such as XML, SOAP and JAVA. The system's centralized, web-based structure cuts support costs significantly.

In addition, the software's use of plug-in technology means it can be dynamically expanded at any time. XMASS is a very flexible and open system based on open technology standards such as XML, SOAP.



Xmass covers whole test chain by their component



Wide range of usage options

There are a wide range of usage options with respect to Xmass due to its modern and flexible architecture. Xmass covers a wide range of requirements due to its independent modules and the selection of test devices on offer.

Network Testing

Provides you with reliable information about the quality and performance of your network. Xmass covers a wide range of network technologies Like GSM, GPRS, EDGE, UMTS, HSPA, LTE, WiMAX, CDMA2000, LAN/DSL with possibility to extend that in a simple way.

Voice Quality

Determine the quality of your voice services with the aid of standard procedures like PESQ and POLQA.

Video Quality

Determine the quality of your video services with the aid of standard procedures like PEVQ MOS.

Roaming Testing

Xmass offers Roaming Packet with predefined Inbound / Outbound tests based on IREG, TADIG and GRQ Specifications.

In-Device Testing

PIXIP.NET offers Smart Phone Test Client for On Device Testing. Adapted for:

- Friendly Customer Testing
- Customer Experience Management
- Customer Trouble shooting

Service Testing

Monitor your voice, data and video services via relevant KPIs like duration, throughput or success rate. Xmass covers following service tests as single test or in combination with eachother:

- Voice Services - Basic/Supplementary Call, IVR, VOIP (SIP), MOS/PESQ/POLQA
- Data Services - WAP, HTTP, FTP, Ping, DNS, etc.
- Messaging Services - SMS, Email, MMS, PTT
- Video Services

Portal Testing

Portal Testing Component is suited for testing of:

- LBS Services
- SMS Info Services
- Video Streaming
- Music Download
- Games Download
- Logo Download
- Ring tone Download
- IMS Service

by simulating different mobiles. Portal Testing Packet includes

- Device Profile Management
- Predefined Tests like Portal Scan
- Portal Scenario Recorder

Streaming Services

Monitor your streaming services like video service or music service and combine that with oder basic services.

..and much more using testcase library

Available Test Procedures:

- Stationary Distributed Testing
- Unattended Testing
- On Demand Testing
- Drive Testing
- Indoor Testing
- Outdoor Testing
- In-Device Testing



Only a few clicks to results

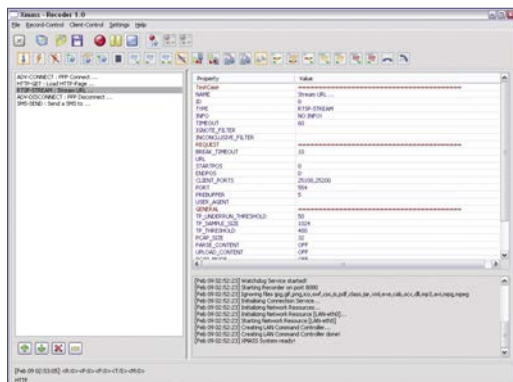
Scenario Designer

Available Test Modules:

- GSM
- GPRS
- EDGE
- UMTS
- HSPA
- LTE
- CDMA2000
- WiMax
- LAN/DSL
- Basic Call
- Supplementary Call
- IVR
- VMS
- Voice Quality (MOS, PESQ, POLQA)
- HTTP(S)
- WAP 1/2
- FTP
- PING
- DNS
- TCP/UDP
- Video Streaming
- E-Mail
- Video Quality (PEVQ)
- Video Telephony
- PTT/C
- VOIP (SIP)
- LBS
- VAS
- Music download
- Logo download
- Ring tones download
- Inbound Roaming
- Outbound Roaming
- IREG, TADIG, GRQ
- Revenue Assurance
- SIM-Box Detection

Pixip.net offers both a Web based Designer and Full Client Designer. Full client is java based thus platform independent. The Designer contains functionality for the following tasks:

- Test case administration
- Scenario creation and administration
- Parameter Definition
- Export und Import of Scenarios
- Campaign Preparation



XMASS Stand alone Designer / Recorder

Testcase Library

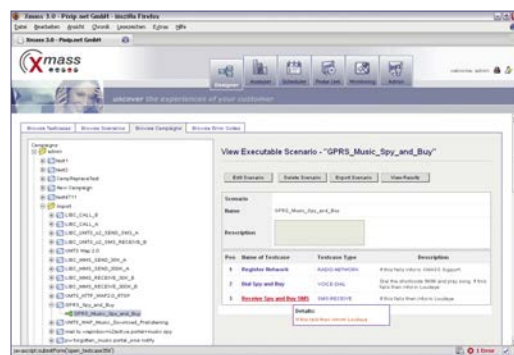
Using designer it is possible to create different test scenarios based on building block principal. Every test scenario could be defined as scenario template and so made available for other users.

It is also possible to exchange scenario templates between different Xmass Servers.

In this way is it possible to create Xmass scenario library. A part of these scenarios are already included.

There are two kinds of scenario libraries:

- Single Device Test scenario Library - to be executed on single device for data service testing like HTTP download, WAP download, etc.
- AB Test scenario Library - to be executed on two devices for messaging tests like SMS, MMS, Email.



XMASS Designer

Rapid Scenario Designer

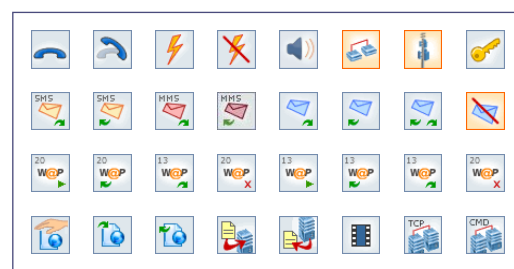
XMASS RSD offers support for simple scenario creation. Main area of using is portal testing and value added services. Output is XMDL Scenario. This component is part of Xmass Standalone Edition and available on every single test channel.

Custom Scenarios

The most of tests are same for all mobile providers. Basic Call, SMS MO MT, MMS MO MT... are some of them. In the area of Portal Testing this tests can be very variable. Music Shop is an example for complex cross-service. This service consists of:

- Voice service
- SMS Service
- And WAP service

Xmass offer the possibility to create custom scenarios by combination of single test case modules.



XMASS Testcase Library



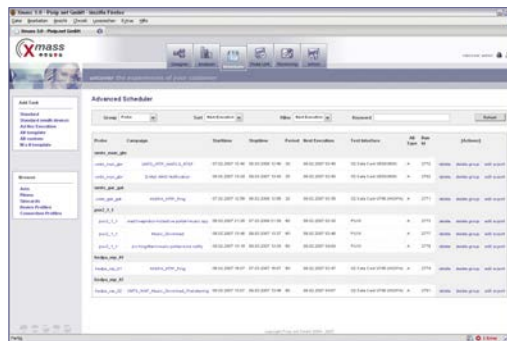
Keep control - whole the time

Test Scheduler

The scheduler offers the following functionality for following tasks:

- automatic execution
- once off execution
- periodic execution

Resource Manager controls test execution regarding probe unit occupation.



XMASS Scheduler for automated Execution

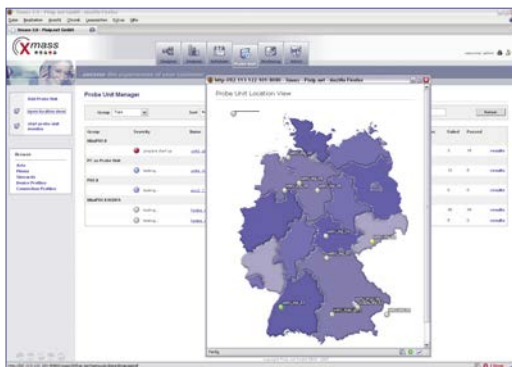
XMASS Components

- Scenario Recorder
- Scenario Designer
- Execution Manager
- Probe Unit Manager
- Scenario Monitoring
- Probe Unit Monitoring
- Analyser
- Tracer

Probe Unit Manager

Probe Unit Manager enables monitoring and controlling of remote probe units.

There are several commands to control probe units:



XMASS Probe Unit Manager / Monitor

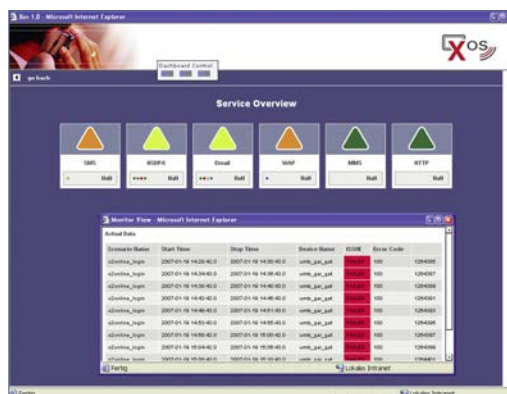
OTA Controlling

- **Start** to make device ready for testing
- **Stop** to stop test execution on single device
- **Get network status** to get the actual network data in the device environment
- **Update client** to update test client SW
- **Update time** to synchronize on probes
- **Reboot** to reboot the test device
- **Reset** to reset the test definition
- **Remote access** to prepare remote access on a single test device

Real Time Monitoring

XMASS contains the LITE Version of XOS for Testresult Monitoring. XOS concept provides monitors (KPI) and monitor groups (KQI). Monitor Group value is calculated based on included monitors (KPI value).

- **Flexible Data Visualisation**
XSL, Java-Script, Flash Technology
- **Flexible Alarming**
SMS, Email, JMX, SNMP, JMS, SOAP, etc.
- **Flexible Thresholding**
Java-Script, Python-Script
- **Integrated Ticketing**
- **Business Objects Integration**
- **BIRT Integration**



XOS Monitoring View



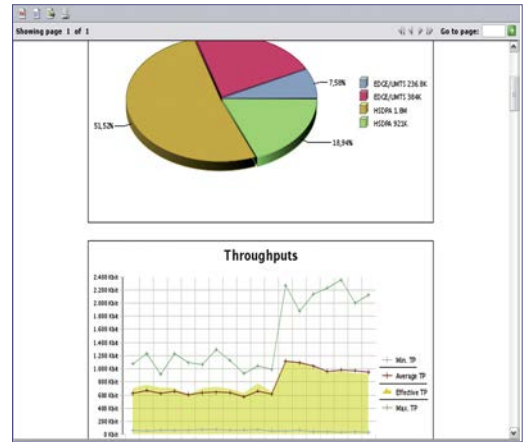
Ad-hoc Reporting

XMASS Provides a very powerful built-in Reporting Environment for analysis and reporting of live data results.

There are large counts of parameterizable standard reports available to be used for Ad-hoc Reporting.

Main features of the Reporting Environment are:

- Cross-platform (Windows, Linux, Mac)
- Web based access
- WYSIWYG Report Editor
- Extended Charting
- Export as HTML, PDF, MS Word, CSV
- Drill-Down and cross linking
- Scripting inside reports
- JDBC and several additional data sources like XML, flat files, etc. available



XMASS Analyser Screen

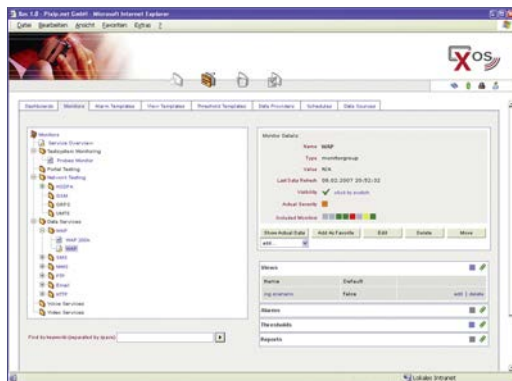
Extended Analysis includes:

- ETL Tool
- Web based Reporting
- Report Archiving
- Long time analysis
- Interface to Revenue Assurance System
- Different Technology Interfaces
- Different RDMBS Interfaces

Extended Analysis

Main features of Extended Analysis are:

- Embedded BO Data Integrator
- Predefined libraries of reports for different KPI's
- Consolidation of data from various systems over ETL process (XML, flat files, RDMS, ...)
- Real time and post process analysis
- Filter based view (different point of view)
- Drill down functionality
- Combination of test results with data from various systems like ERP, CRM, Billing,...
- Web based reporting



XOS Main Screen

KPI / KQI Reporting

Alongside the real-time analysis including traces, the data will also be analysed offline - on a daily basis, weekly basis or monthly basis.

Xmass contains many predefined KPI reports. Furthermore, it is possible to extend these or indeed to create new reports on the basis of the Business Objects universe.

Predefined KPI reports are easily extended or modified. Adding new columns or changing the visual appearance is quickly done inside of the Business Object designer.

- Automated scheduled reporting
- Web based access portal
- Personalized report access
- Automated archiving
- Full text search engine support
- Event based messaging
- Automated publishing
- E-Mail report distribution
- BO Universum



Wide range of probe units

Flexible Probe Units

Along side the various test modules; Xmass also offers a range of test appliances that are suited to various testing scenarios.

Xmass can be very flexible deployed due to the various test devices and portable Xmass clients. Xmass can perform, among others, the following tests

- Regular distributed tests for the purpose of monitoring (i.e. SLA)
- On Demand Tests - verification tests
- Goal orientated short tests - (Walk/Drive)
- Standalone Tests (no connection to server)
- On Device Tests (commercial devices)
- Load tests

In addition to test features of probe units, there are other very important features for stability of tests execution and simplification of using.

- multi level watchdog functionality
- OTA Update
- Backup functionality
- SMS Control possibility - SMSC Interface
- OTA Remote Access

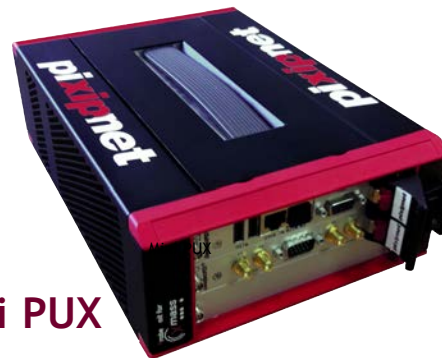


PUX IV

PUX IV

Probe Unit for Xmass IV is a stable test device with built in watch dog functionality.

PUX IV is very well suited to distributed, continual testing, on demand testing and mass testing. PUX IV can be equipped with up to 8 test channels and provides Test Interfaces for 2G, 3G, 4G, LAN and DSL.



Mini PUX

Mini Probe Unit for Xmass is a light weight (versatile and stackable) and stable test appliance with built in watch dog functionality. It is suited for both continual, distributed testing and on demand testing as well as for selective short tests and mass tests. MiniPUX is equipped with an Xmass Test Client and has the various test interfaces for 2G, 3G, 4G and LAN. Using USB connectors, it is possible to conduct tests for additional interfaces.

In-Device Testing

Through In-device testing (usage of commercial devices for test purposes) PIXIP.NET has made a giant Step in the direction of real customer experience. As a result costs are reduced and mass testing is made possible.

- create either simple or complex test scenarios remotely.
- The Tests can be started by the participants at any time "on demand". Simply push the start button.
- The Test results contain specific, non-personalised information. The Test results can be displayed on Maps and Reports.



EMQP provides a real customer experience management platform

Mini PUX Features

- Designed for unattended continuous stationary testing
- Exchangable Hardware with PUX IV
- 2 Modems
- Test Interfaces for 2G, 3G, 4G, LAN and DSL
- Optional SIM-Farm for up to 20 SIMs
- 25(D) x 18(W) x 9(H) cm
- SIM-Multiplexer ready
- GPS Ready
- Rear-Connectors for LAN
- Long MTBF (5 years)

PUX IV Features

- Designed for unattended continuous stationary testing
- Up to 8 Highly stable test channels
- 2 Modems per Channel
- Test Interfaces for 2G, 3G, 4G, LAN and DSL
- Optional SIM-Farm for up to 20 SIMs per channel
- Rack mount 19 inch chassis, 3u height, 42 cm depth
- Built in DSL Router with Auto-Connect functionality and Firewall with NAT
- Built in DHCP Server
- SIM-Multiplexer ready
- GPS Ready
- Redundant Power Supply
- Rear-Connectors for LAN
- Long MTBF (5 years)

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PS Attach

POIP Context Activation

Failure Ratio

Connect Duration

Error Code 4550

Data Throughput

Unattended Probe Units

Probe Unit and Resource Management

In Device Testing

Real Time Monitoring Quality Analysis

Voice VAS

WAP

Games

Video

LBS

SMS

inter

inte