



## SITE

SIGOS INTEGRATED TEST ENVIRONMENT



# Testing is our competence

Today, network operators are confronted with an extremely dynamic market and the challenges of keeping up with new technology, permanent surveillance of Service Level Agreements (SLA), reducing costs and maintaining customer satisfaction.

To fulfil these challenges regular tests are required. These tests however are both labour-intensive and extremely costly and for this reason are frequently neglected.



## **The solution is fully automated testing.**

SIGOS has developed an innovative product in the field of test automation, which permits easy, automated testing in various areas.

# **10 Reasons for SIGOS SITE**



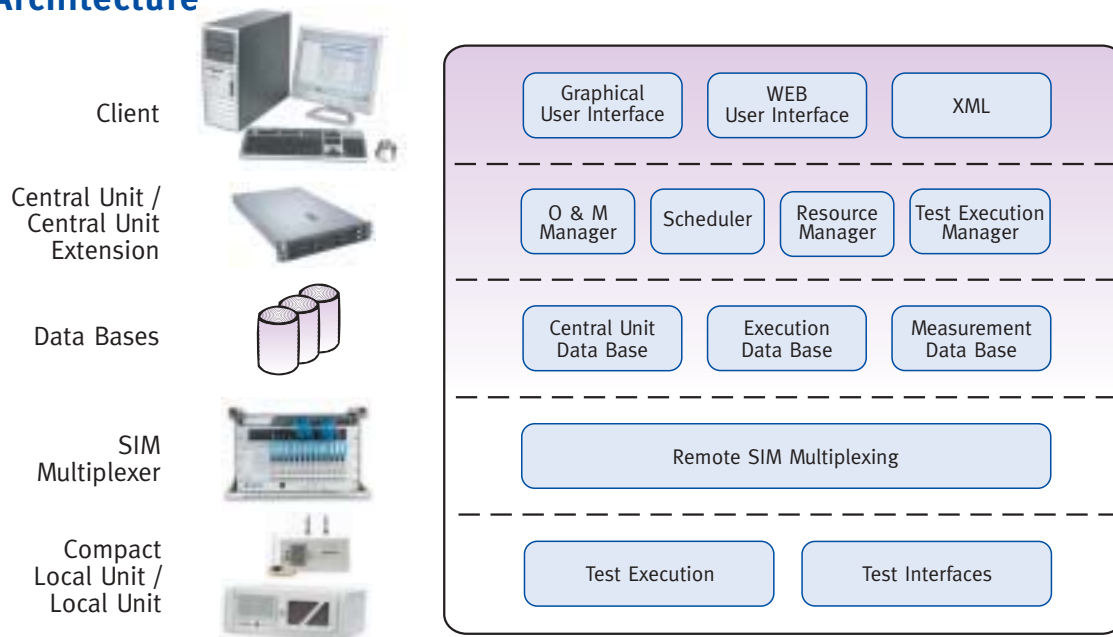
- 1 Automated Testing / Cost Savings**  
avoid time consuming and work intensive manual tests
- 2 Scalability**  
from small stand-alone to network-wide distributed systems
- 3 Central SIM Multiplexer**  
to use the same SIMs at various locations
- 4 Service Quality Management**  
measuring of service availability and quality
- 5 Reporting**  
management of reports
- 6 Web Interface**  
access to the system via Internet
- 7 Graphical User Interface**  
for simultaneous access of remote and local users
- 8 Open Interfaces**  
for seamless integration of existing tools
- 9 Customising**  
development environment to adapt tests to specific customer needs
- 10 Surveillance**  
continuous monitoring of service availability and network performance (KPIs)

## **SIGOS SITE improves service quality**

# SIGOS SITE Test System



## Architecture



## User Interface (UI)

The **graphical user interface** enables easy system operation and administration. Via an IP connection, the system can be used simultaneously by various parties. The graphical user interface is provided with a very user friendly drag & drop functionality to arrange, copy and edit test elements.

Further, the integrated **web user interface** enables users to set up test calls from any location via Internet access. The **XML interface** is used as integration interface for SITE, e.g. an XML Push URL.



## Scheduler, Dynamic Resource Management, O&M Manager



SITE can **schedule** test cases at any time. Tests that are to be performed regularly may be repeated periodically.

To avoid a conflict of existing resources, an intelligent **resource management** system controls access to interfaces and SIM cards, thus assuring smooth operation and maximum test parallelism.

The **O&M manager** checks system components regularly and generates an alarm (SNMP-Trap) in the event of failure.

A system alarm is also triggered if a specified number of failed test cases is exceeded.

The possibility to integrate Central Unit Extensions in SITE additionally to the Central Unit allows a high number of parallel running tests without impact on the performance.



# SIGOS SITE Test System

## Central Data Bases

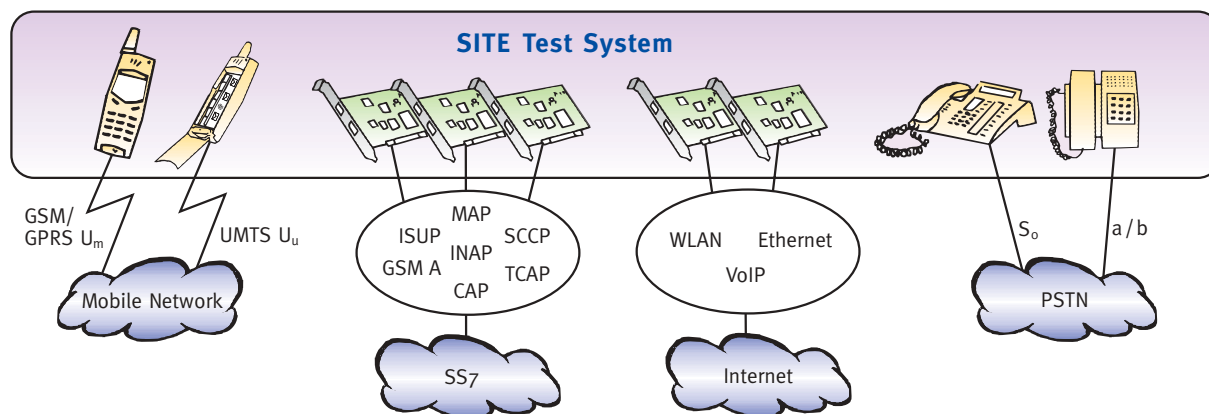
required for test execution and results of test runs that have already been performed. The database is furthermore aware of the status of the entire SITE hardware, from the individual test units and attached test interfaces to SIM card information. The SQL-based database assures maximum flexibility due to numerous import and export function features. Statistical evaluations may be easily drawn up on the basis of the numerous records of test runs generated.

## Test Sequences

Combining test cases in a sequence reduces the resource consuming location updates significantly. Depending on the test arrangements, more than twice as much test cases can be performed with the same number of test interfaces.

## Test Interfaces

SITE supports GSM/GPRS  $U_m$ , UMTS  $U_u$ , ISDN  $S_o$ , PSTN  $a/b$ , GSM A, ISUP, WLAN and SIGOS is about to integrate GSM-R, CDMA 2000, EDGE, HSCSD, Gb,  $I_u$ , Trace Mobiles.



## Test Case Development

SITE provides large libraries of test cases for the main network services in various settings. To offer the users an additional wide variety of options SITE provides with its Test Case Development Environment\* the possibility to create own test cases with the assembly of various test steps via an user friendly drag and drop mechanism.

## Control Structures

A big step to a higher density of tests in SITE is the introduction of control structures like FOREACH, WHILE and REPEAT. E.g. WHILE executes underlying parts of the test definition tree while a condition is true. Control Structures are used to build dynamic sequences.

## Modularity & Scalability

The modularity and scalability of SITE permits optimum system adaptation to customer requirements. Portable and Stand Alone Systems for implementation in test laboratories are just as possible as is the extension to distributed systems to cover entire live networks. The test system may be upgraded as required by new applications, functions and test interfaces.





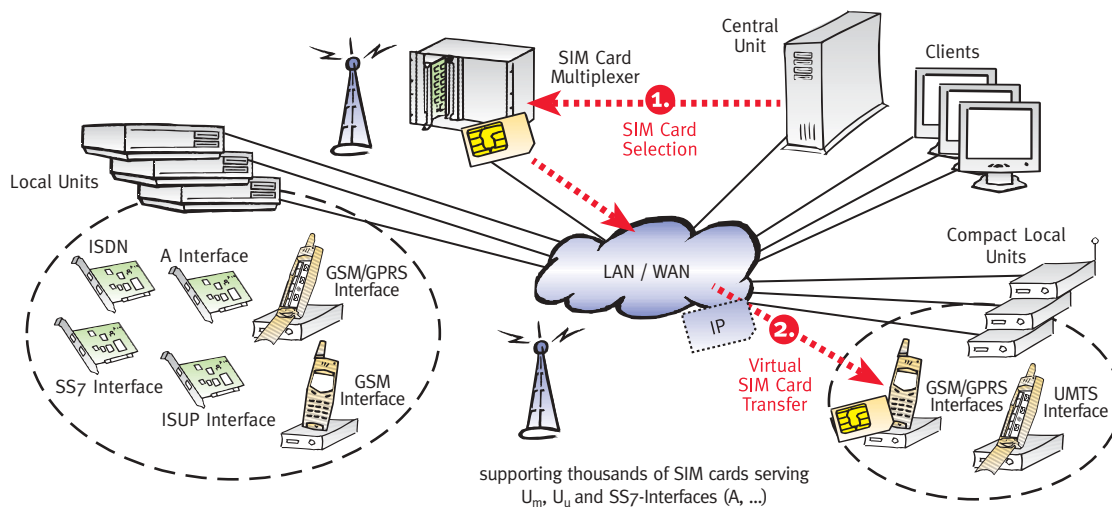
## Open System

SITE is an open system and may be easily integrated into existing test environments. Existing equipment may be directly linked to SITE and controlled and monitored via the system interface.

Moreover, current software updates, configuration modifications or problem clearance may be performed quickly and reliably by the SIGOS support team via remote access.

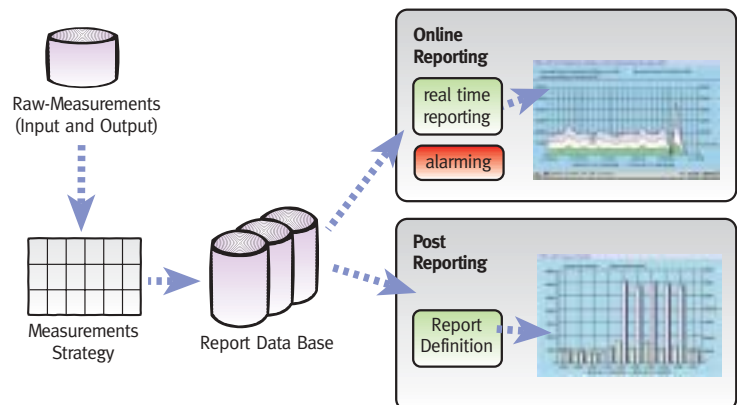
## SIM Multiplexing

SITE can handle thousands of SIM and USIM cards in cascade-style SIM card boards. The subscriber information of a SIM card is read out by the system and transmitted via a LAN/WAN network to any test location required. Each card may be virtually transmitted to any location without even a single card having to be moved physically.



## Reporting / Alarming

Reporting is a fully integrated feature in SITE; SITE Reporting enables user to create, view and forward reports which have been generated of the report data base measurements (KPIs). These reports can be defined by the SITE user over an easy drag and drop functionality. Different alarm levels can be specified in these reports and the alarms can be defined and released by different service alarm features e.g. aggregation and threshold. Alarms can be forwarded to the desired destination via SNMP, SMS and E-mail. The reports can be illustrated in different ways e.g. by chart, histogram, pie chart as well as by Geographical Information System\* (GIS) and to be viewed over the SITE user interface or with an HTML browser.



### Your benefits

- ▶ Automated testing: avoid time and money consuming manual tests
- ▶ Increase reliability of the GSM network → ARPU
- ▶ Increase customer satisfaction
- ▶ SQM: monitoring and measuring of service availability and quality → Ensuring of KPIs and SLAs
- ▶ Scalable architecture: from stand alone to widely distributed systems
- ▶ Central SIM Multiplexing → No "SIM card traveling"
- ▶ Quick detection of problems thanks to parallel testing at any time



## End2End /Service Testing

Any new important service option offered to the mobile customer can be quickly included into the application portfolio. The recent addition of WLAN access testing via SIM / SMS authorisation shows how complex test scenarios can be easily supported by the SITE solution.

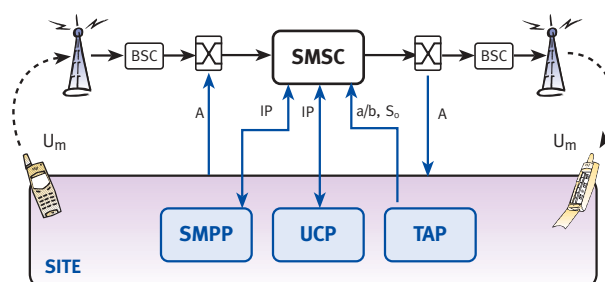
Basic Calls, B-Channel Check,  
Location Update

The high revenue circuit switched functions are a vital service to be maintained. Mobile to mobile, or mobile to PSTN in both MO and MT formats require that core network configuration data is correctly maintained during infrastructure growth or changes. Basic calls for prepaid subscribers, which make up the majority of most mobile networks customer base, typically involve complex intelligent network support and interaction with a “hot billing” credit database.

Call Forwarding, Call Waiting, Call Barring,  
Call Hold, CLIP/CLIR

MO, MT, TAP, SMPP, UCP

SMS is vital to the revenue stream of mobile operators. The basic functionality for MO and MT, as well as extensive services supported by SMS, need to be carefully maintained.



## Data Rates, Internet Protocols, HTTP, FTP

The high ARPU business customers and multi-media users depend on GPRS fast connectivity and high speed services. The complexity of GPRS attach, context activation and test of End2End connectivity is fully tested by this SITE application.

Inbound/Outbound Tests,  
IREG 24, 26, 27, 29, IR 32, IR 35, IR 60

Today's mobile subscribers expect roaming service availability worldwide. The high revenue inbound roaming traffic and the customer satisfaction factor for outbound roaming, require careful maintenance via an automated testing program. The SIM multiplexing technology allows for both testing of multiple partners SIM cards in the home network, and the possibility to test for outbound functionality in distant countries.

#### **WAP (1.0, 2.0)**

WML Decoding, Follow Links, E-mail, check of content and performance

Although the WAP technology has overcome its initial difficulties, the introduction of new WAP portals can endanger its reliability. SITE WAP Applications will prevent breakdowns in operation and help you reinforce customers trust in WAP services. As WAP applications are often frequently updated, an automated regression test provides confidence of service availability and correct functionality.

#### **INTERACTIVE VOICE**

Prompt recognition and comparison, IVR free testing

IVR services belong to our daily and future life; this is why SIGOS has designed an easy to use IVR tester able to cope even with the most sophisticated speech menus.

SITE provides with the generation of detailed CDRs for all the test scenarios of different services the bases for succeeding Revenue Assurance processes like CDR comparison, metering verifications and billing verifications. Those processes like CDR comparison play an important role for network operators, on one hand to avoid discontent customers and on the other hand to avoid significant losses and to comply with legal regulations. SIGOS offers with SITE comfortable tools for automated CDR generation and CDR comparison.

#### **PREPAID SIM CARD RECHARGING**

Voucher Management, Voucher Recharging

Subscribers expect correctness of voucher recharging. SITE offers this application to provide operators with a tool to verify this service. This application consists of the voucher management and the recharging mechanism which can be used as a standard test case as well as a SITE O&M job in order to ensure the operational availability of prepaid SIM cards in the SITE SIM Multiplexer.

#### **FUTURE APPLICATIONS**

SIGOS always keeps pace with the latest telecommunication developments, e.g. 3G services, 3G location based services, Video Telephony, Drive and Walk Service Tests, E-Wallet Services, Traffic Telematics, etc..

#### **STREAMING**

Due to higher bandwidths the use of real-time multimedia applications in the wireless/mobile community will dramatically increase. To ensure the mobile customer enjoys a positive experience, the streaming data transfer has to be tested with SITE Streaming, which uses the industry standard RTP and RTSP protocols.

#### **WLAN**

The number of worldwide Wireless LAN (WLAN) hot spots supported by the mobile network operators will grow enormously in the next few years. The existing customer SIM card will be the preferred (and secure) identification and authentication module. SITE WLAN tests the availability of Wireless LAN hot spots, and the access.

#### **WEB BROWSING, IP TESTS**

A very powerful extension for network test systems is the availability of a web browsing function. This extension is fully integrated with the SITE system. SITE tests are able to simulate the behaviour of a real web user in front of an internet browser in combination with mobile subscribers. This application can be used with either GSM or WLAN connectivity.

#### **VOICE QUALITY**

Voice service is and will remain the key indicator for quality in a mobile network. This is recognised by subscribers and operators alike. Not only the availability of the service such as answer ratios and dropped calls are of interest but also specifically the quality of the voice connections. This is why SITE supports voice quality testing according to the PESQ algorithm - recommended in the ITU-T P.862 standard.

#### **MMS**

MO, MT, Legacy SMS, E-mail

MMS is a new and promising technology, but to ensure its success it is vital to offer as quickly as possible a high quality of services. In addition to the required GPRS connectivity, the additional network elements which support MMS are checked by an End2End test process.



### **Global Roaming Test Service (GRTS)**

For outbound roaming testing SIGOS offers the Global Roaming Test Service. GRTS allows mobile network operators to activate their own SIM cards via the Internet in mobile test stations in remote countries, and verify that all services are available for their roaming customers. For more details and if interested, please contact us at [www.sigos.de](http://www.sigos.de).



## SITE Protocol Tests

SITE is a flexible solution, which offers an extensive library of available test cases, which fit with the majority of services defined in the GSM standards and popular implementations of other additional network features. These tests allow for the End2End functionality to be tested. However, it may be necessary for a network operator to examine the detailed signalling protocols that support their services, or implement a non-standard interconnection between internal network nodes or external network operators.

### CORE Network Testing

Our SIGOS Professional Services Team offers you core network protocol tests on various core network interfaces in GSM, GPRS, UMTS and IN environments which are available with the test system SITE. Protocol tests are needed to analyse the network's behaviour in detail and to reach a high degree of interoperability between networks and network components. SIGOS engineers have developed test applications on SITE and have supported various network operators and vendors with its integration tests.

#### **IN/CAMEL TESTS**

for SSP and SCP on CAP or INAP

#### **ISUP INTERCONNECTION, CONFORMANCE**

ITU-T Q.784 & Q.788  
ETSI ETS 300 356-31/32/33 Basic Calls  
ETSI ETS 300 356-34/35/36 Suppl. Services

#### **MAP**

HLR and VLR Test Suite, specified by SIGOS

#### **SS7**

for SCCP, TCAP and ISUP

#### **GSM – A (BSSAP)**

for testing of MSCs

