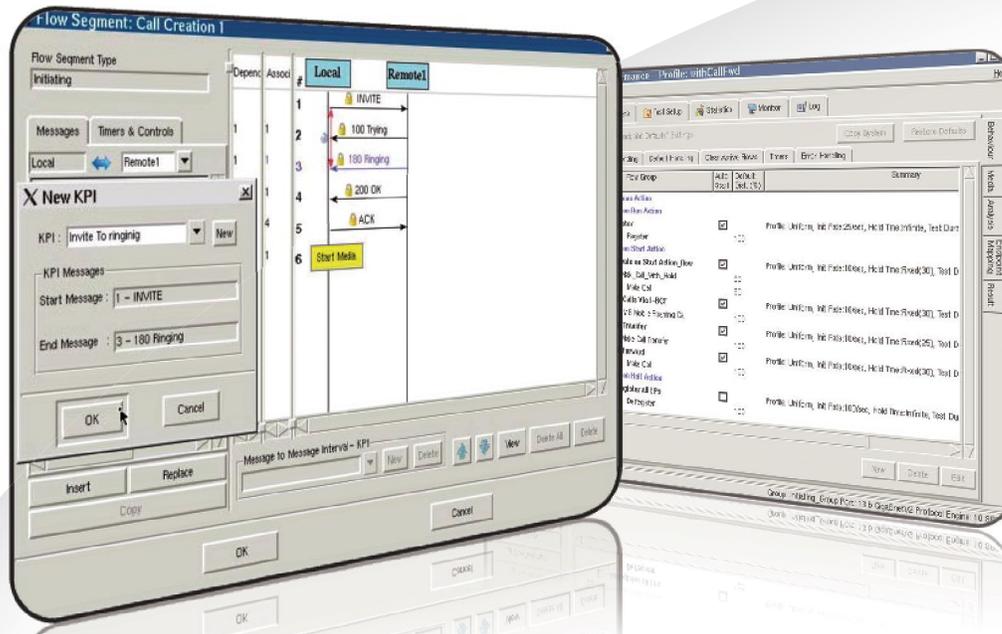


# sipFlex Test Suite

IMS AND VoIP NETWORK ELEMENT AND SERVICE TESTING



This easy-to-use test application provides comprehensive test capabilities to enable IMS and VoIP network and service testing during the various stages of development and deployment

## KEY FEATURES

Feature, negative, load, regression, interoperability and scalability testing

Negative and proprietary messages and call flow definition

IMS and Class-5 services simultaneous emulation

Large-scale and high-performance solution

IMS AKA with IPSec support

IKEv1, IKEv2

Media security with SRTP/SRTCP and IPSec

Device response latency measurements in real-time

Comprehensive media test capabilities

Testing of the following devices:

- › Security gateways
- › Session border controllers
- › P/I/S-CSCFs
- › Conference servers
- › Presence servers
- › VoIP proxy servers
- › Voice and video mail servers

Line-rate generation and analysis of RTP/SRTP streams

Generation and analysis of MSRP

Dual-port Gigabit Ethernet interface

Thousands of registrations per second

Thousands of calls per second (signaling and media)

## OVERVIEW

Next-generation networks are being deployed to enable network operators to provide differentiated services to their customers. These networks consist of several network elements that when interconnected, should provide a reliable and robust network infrastructure, supporting several feature-rich and high-quality services. Developing and deploying these networks present significant challenges to network equipment manufacturers, system integrators and network operators. These challenges include the ability to design and build against specifications that are evolving, get network elements from several vendors to interoperate, verify that the network will be able to support several types of IMS and VoIP services simultaneously and be robust under abnormal and normal network scenarios.

The sipFlex Test Suite is designed to alleviate all of these challenges with a single, very easy-to-use test application that provides comprehensive test capabilities to enable IMS and VoIP network and service testing during the various stages of development and deployment.

## KEY TEST FEATURES

### IMS Network Cloud Routing Emulation

- › Emulates IMS network cloud consisting of two or more elements in the IMS network  
Example: UE→PCSCF, UE→PCSCF→ICSCF, UE→PCSCF→ICSCF→SCSCF, UE→PCSCF→ICSCF→SCSCF→IBCF

### IMS and VoIP Feature Testing

- › Tests Class-5 services at high rates and scale  
Example: Call forward, call transfer, call hold, 3PCC, presence, conference and instant message
- › Creates traffic consisting of a mixture of features so as to simulate real-world subscriber behavior  
Example: Generation of thousands of calls per second with the following mix of services: 30 % basic calls, 20 % call hold, 20 % call forward, 10 % three-way conference, 10 % 3PCC, 10 % call transfer—while 50 % of the registered subscribers are subscribing to presence services—publishing, subscribing to and updating presence information

### Security Testing—IMS AKA, IPSec, IKE, SRTP and TLS

- › Determines the capacity of simultaneous security tunnels supported by the network or device under test
- › Determines the tunnel establishment and tears down rate of secure tunnels
- › Emulates IMS AKA registrations at high rate along with IPSec tunnels with P-CSCF
- › Establishes IPSec tunnels with security gateways using IKEv1 and IKEv2
- › Uses static or dynamic IPSec
- › Customizable IPSec/AKA parameters
- › Establishes TLS session for all endpoints

### Call Completion Rates and Causes of Failure Simulation

- › Simulates call completion rates by simulating user response behavior  
Example: 70 % of calls are responded to normally, 20 % of users are busy, 10 % of users do not answer (keep ringing), 5 % of calls are redirected and 1% of calls are responded to with a user-selected error

## Message Floods

- › Simulates any SIP message flood consisting of one or more SIP messages
- › Simulates registration floods
- › Mixes several streams of message floods simultaneously
- › Analyzes the impact of message floods on call/service completion rates and network/device response latency

## Key Performance Indicators Measurements

- › Measures user-defined intervals within each call flow
- › Measures network/device response latency under load
- › Hardware-based time stamping allows for accurate measurements even under load
- › Collects and presents response latency in real-time

## Default Protocol Behavior Customization

- › Customizable default (spec-defined) protocol behavior  
Example: Handling of re-invites, clearing calls, subscriptions, publications and protocol errors

## Protocol Timers Customization

- › User-configurable timer values for all protocol timers
- › Customizable application behavior once timer has expired  
Example: Do not refresh registration and generate a call once registration has expired

## Media Security

- › Secures media streams with SRTP/SRTCP and IPSec/IKEv2
- › Key negotiation through SDP security description (RFC 4568)

## COMPREHENSIVE MEDIA TEST CAPABILITIES

- › Negotiates and transmits several codecs simultaneously
- › Negotiates one codec but generate another type with higher bandwidth to test the theft of service protection function of the device under test
- › Detects in real-time and at line speed whether the device under test is penalizing RTP streams that do not conform to their negotiated codecs/bandwidth
- › Verifies path for every established stream to verify whether:
  - › Media was detected
  - › Media packets were misrouted
  - › RTP codec received was not as negotiated
  - › ToS/DSCP value for received packets was not as expected
- › Measures quality of service (QoS) for delay, loss, inter arrival jitter, mean opinion score (MOS) and perceptual evaluation of speech quality (PESQ) with user-defined thresholds
- › Provides records for each call that fail the path verification test or exceed the QoS thresholds
- › Up to 15 statistics views for 15 combinations of codec, VLAN and ToS values
- › User-defined wave files and packetization intervals
- › Tests rogue media
- › DTMF in SIP info and RFC 2833
- › Messaging using MSRP

## Automation and Troubleshooting

- › TCL command line interface
- › Built-in Ethereal monitor for each Ethernet port
- › Detailed call records for user-defined thresholds violation

## Real-Time Signaling Statistics

- › Provides results in tabular and graphical formats
- › Summary and detail statistics per entire system or per group of endpoints
- › Signaling statistics per group of endpoints or per flow
- › Registrations: successful and unsuccessful registrations with and without authentications
- › Calls: successful and unsuccessful calls with and without media
- › Session-timer: refreshed, requested, in-progress, successful and unsuccessful
- › Event-notification: subscriptions, subscription state and reason code
- › Messages: incoming, outgoing and retransmitted
- › Errors: incoming and outgoing errors count
- › TCP or SCTP connections: active, attempted, successful, unsuccessful and retransmitted
- › User-defined customizable statistics view; displays focused statistics from any category in a convenient single view
- › TLS connection states: handshake records and errors
- › IPSec security associations: active, added, deleted and expired

## Real-Time Media Statistics

- › Analyzes performance for each individual media/codec type
- › Measures quality of service (QoS) for delay, loss, inter arrival jitter, mean opinion score (MOS) and perceptual evaluation of speech quality (PESQ) with user-defined thresholds
- › Validates path of RTP/SRTP and RTCP/SRTCP packet, detecting teardown time, misrouted, unexpected or multiple codecs
- › RTP DTMF and signaling DTMF sessions active or failed and the reason for failure
- › Validates MSRP message transmission and reception

PERFORMANCE AND SCALE PER PLATFORM		
Platform	QualityAssurer QA-604	InterWatch R14
Unique endpoints/IP addresses	2 048 000	2 560 000
RTP/SRTP streams	128 000	320 000
TLS sessions	512 000	640 000
IPSec sessions	256 000	320 000
Unique MAC addresses	2 048 000	2 560 000
Unique default gateways	2 048 000	2 560 000
Registrations per second	14 400	18 000
Calls per second	3400	4250

## PROTOCOL SPECIFICATIONS

### Transport

- › TCP, UDP, SCTP

### Network

- › IPv4, IPv6

### SIP

- › RFC 3261, RFC 3262, RFC 3265, RFC 2976, RFC 3515, RFC 4028, RFC 3311, RFC 3325, RFC 3891, RFC 3903, RFC 3608, RFC 3428

### IMS

- › 3GPP TS 24.229
- › 3GPP TS 33.203
- › 3GPP TS 33.210
- › Gm, Mw, Mr, Mg, ISC interfaces

### Security Protocols

- › TLS
- › IPSec
- › IKEv1, IKEv2
- › SRTP

### MSRP

- › RFC 4975

### RTP/RTCP

- › RFC 1889, RFC 1890, RFC 2190, RFC 3388, RFC 3551, RFC 3267

### Audio/Video

- › ITU-T G.711 (PCMU, PCMA)
- › ITU-T G.721
- › ITU-T G.722
- › ITU-T G.723
- › ITU-T G.726
- › ITU-T G.728
- › ITU-T G.729
- › AMR
- › AMR-WB
- › ILBC
- › H.264
- › H.263
- › EVRC, EVRC-B
- › GSM-EFR, GSM-FR, GSM-HR

### DTMF

- › RFC 2833

### Voice and Video Quality Analysis

- › ITU-T G.107 E-model
- › ITU-T P.800.1 mean opinion score (MOS)
- › ITU-T rec. P.862 (PESQ)

## ORDERING INFORMATION

For ordering information, please contact [isales@EXFO.com](mailto:isales@EXFO.com)

EXFO Headquarters > Tel.: +1 418 683-0211 | Toll-free: +1 800 663-3936 (USA and Canada) | Fax: +1 418 683-2170 | [info@EXFO.com](mailto:info@EXFO.com) | [www.EXFO.com](http://www.EXFO.com)

EXFO serves over 2000 customers in more than 100 countries. To find your local office contact details, please go to [www.EXFO.com/contact](http://www.EXFO.com/contact).

EXFO is certified ISO 9001 and attests to the quality of these products. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit [www.EXFO.com/recycle](http://www.EXFO.com/recycle). **Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.**

For the most recent version of this spec sheet, please go to the EXFO website at [www.EXFO.com/specs](http://www.EXFO.com/specs).

In case of discrepancy, the Web version takes precedence over any printed literature.