STINGA

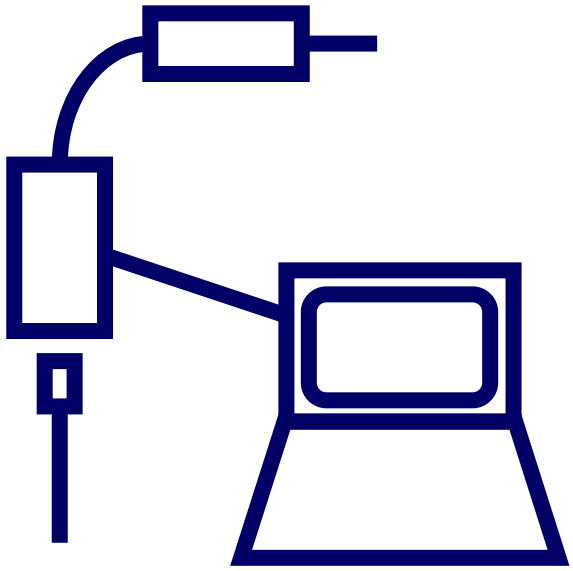
TEST INSTRUMENT TESTING SIGNALLING PROTOCOLS IN ATM TRANSIT NETWORKS

MEGACO

PNNI Signalling Routing

AINI

BICC



- Testing signalling protocols like Megaco/H.248, PNNI, AINI and BICC
- Protocol analysers and simulators
- Simulator Interworking
- PC based test instrument with STM-1 and E1/T1 interfaces
- Windows 2000/XP software based modules

UTEL SYSTEMS

Your customers will notice

STINGA TEST INSTRUMENT

OVERVIEW

Carriers and Network operators have started the process of implementing ATM technology in the core network. ATM will be a supplement to traditional E1/T1's and is the first step towards "Next Generation Networks". The new test instrument from Utel Systems addressing this technology is called STINGA (**S**ystem **T**est **I**nstrument for **N**ext **G**eneration networks - **A**TM technology). The STINGA test instrument is used for testing critical components in new ATM-based telecom networks, making it an efficient tool for both network operators and equipment manufacturers. The following features and protocols for both protocol analysing (monitoring) and protocol simulation are included:

- BICC/ISUP signalling
- Megaco/H.248 signalling
- PNNI signalling (and routing)
- AINI signalling

NEW CHALLENGES

The deployment of ATM technology in the core network enables the combination of data, voice and other multimedia applications in a single packet switching network. When introducing new technology, network operators are facing great costs and risk. The new STINGA test instrument from Utel Systems allows the operator to thoroughly test different components in an ATM-based core network such as Media Gateway Controllers (MGC)/Call Servers (CS) and Media Gateways (MGW).

BICC

BICC provides functional separation of call and bearer signalling protocols while allowing separate independent channels for call control signalling and for bearer transport over broadband backbone network. The BICC call control signalling protocol is based on SS7 Narrowband ISUP signalling, and the BICC software modules are supporting both BICC and ISUP simultaneously. Using the BICC-ISUP Simulator together with the PNNI Simulator makes it possible to test a complete call in the ATM network (ref. Figure 2).

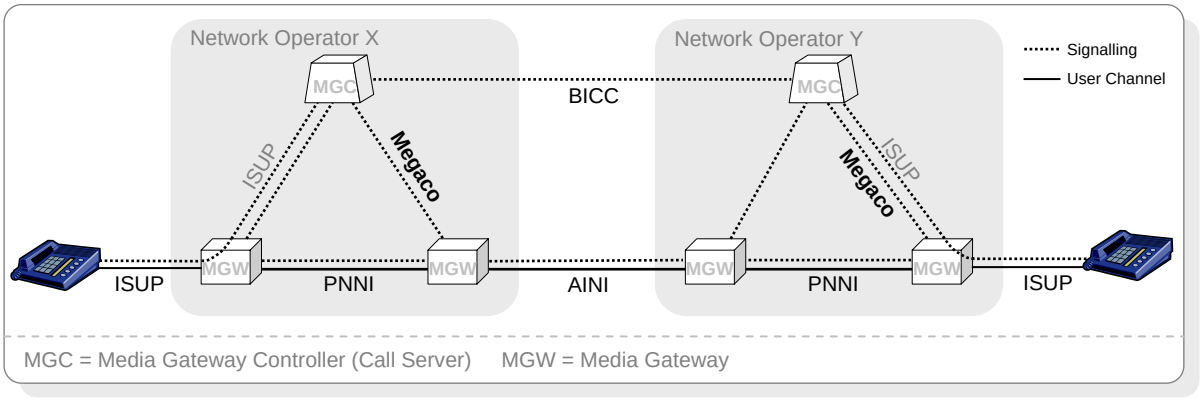


Figure 1: ATM is implemented in the core network and replaces the traditional exchanges. Media Gateway Controllers are handling the signalling, and Media Gateways are connecting the user channels when a call is established.

FEATURES AND BENEFITS

Feature	Customer benefit
PC based instrument	Highly portable and cost efficient technology.
All-in-one concept	Many applications I one instrument – both monitors and simulators.
Similar user interface	Easy-to-use applications and reduced training costs, easy to move between monitor and simulator applications.
Windows platform	Cost effective service, fast access to replacement units, familiar user interface.
Open script format	Content and order of any message or information element can be changed. The simulator can simulate any regular or irregular/incorrect protocol implementation.
Simulator interworking	Internal communication between the simulators. E.g. an incoming IAM to the BICC simulator can generate an outgoing SETUP from the PNNI simulator.
Remote control	Efficient use of central expert competence/know-how. Reduced travelling costs.
Same decoding format for monitor and simulator	Time efficient testing.

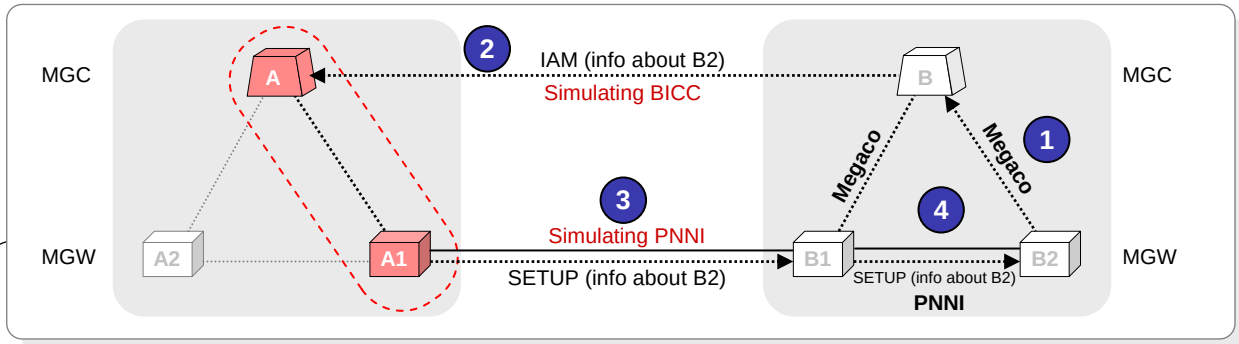


Figure 2:With the Utel Systems' STINGA simulators it is possible to test the PNNI and BICC protocols simultaneously without involving Megaco by simulating the MGC and MGW as one single unit. 1) A call is coming in to MGC B through MGW B2 (to a virtual user connected to MGW A1). 2) The call is analysed by MGC B and an IAM is sent to MGC A using BICC. 3) The simulator receives the IAM which trigger an outgoing SETUP to MGW B1 using PNNI. 4) The SETUP is received by MGW B1 and forwarded to MGW B2 using PNNI. A channel is then connected between MGW B2 and MGW A1.

MEGACO/H.248

Megaco/H.248 is a signalling standard for interfacing between MGW's and MGC's in ATM networks. The Megaco Simulator can simulate both the MGW and the MGC in such networks. A Message Builder (related to the protocol specification) is included with the Megaco Simulator to assist in the message building process. Messages built with this tool can be referred in the test script files used by the simulator.

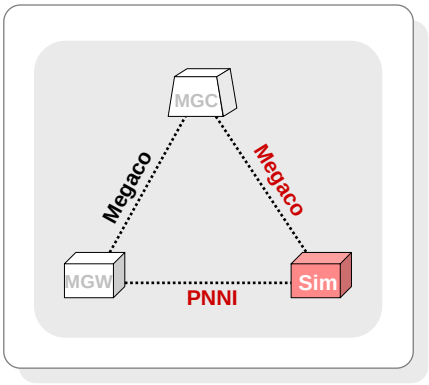


Figure 3: The STINGA instrument can simulate a MGW. Megaco is used to the MGC and PNNI to the MGW (simultaneously). The STINGA instrument can also simulate the MGC.

PNNI

PNNI includes a PNNI routing protocol and a PNNI signalling protocol. The PNNI Simulator is a PNNI signalling simulator, but the "Hello" protocol and the topology of the PNNI routing protocol are supported to get the test instrument registered as a node in the PNNI topology database.

SIMULATOR INTERWORKING

The simulator applications in the STINGA test instrument are interworking with each other in such a way that a signalling sequence in one simulator can trigger a signalling sequence in one of the other simulators. It is also possible to transfer vital parameters between the simulators and to distribute the user interfaces on different computers. The simulator agents will then be running on the same computer sharing the same hardware resources (the agents can alternatively be on other computers as a distributed system). As an example of simulator interworking the Megaco simulator can start a script in the PNNI simulator. Possible interworking configurations:

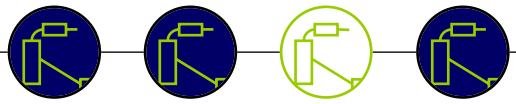
- BICC – ISUP
- BICC – PNNI/AINI
- Megaco – PNNI/AINI

PROTOCOL REFERENCES

The protocol decoding in the different software modules are related to the following specifications:

Software module	Protocol	Specification references
Megaco	Megaco/H.248	Ericsson 1/155 17-HSC 104 06/2 Uen
Simulator/Monitor	SSCOP	ITU-T Q.2100, Q.2110
PNNI	PNNI v1.0	ATM Forum: af-pnni-0055.000
Simulator/Monitor	PNNI v1.0 Errata and PICs	ATM Forum: af-pnni-0081.000
	AINI	ATM Forum: af-cs-0125.000
	UNI Signalling 4.0	ATM Forum: af-sig-0061.000
	SAAL (SSCOP and SSCF)	ITU-T Q.2100, Q.2110, Q.2130, Q.2140
BICC-ISUP Simulator	BICC	ITU-T Q.1901 06/2000
		ITU-T Q.765.6 06/2000 for messages and parameters
	MTP3	ITU-T "Blue and White book"
	MTP2	ITU-T "Blue and White book"

STINGA TEST INSTRUMENT



TECHNICAL SPECIFICATIONS

KEY FEATURES
- Monitoring and/or simulation on the same PC unit.
- Simulator Interworking (internal communication between the simulators).
- Simultaneously simulation of different protocols.

HARDWARE AND SPECIFICATIONS
- The instrument is delivered as a portable computer (9 kg) with with Windows 2000 or XP Professional.
- One or more ATM cards (optionally E1/T1) is included.
- External telephony handset can be included for listening in on voice channels (requires an E1/T1 card).

SOFTWARE MODULES
- Megaco Simulator including Megaco Message Builder
- Megaco & PNNI Monitor
- PNNI Simulator
- BICC-ISUP Simulator

SUPPORTED INTERFACES (BOARDS)
The following interface boards can be used in the instrument:
- **PIST-ATM**
  - 155 Mbps (full duplex) SONET/SDH, OC3/STM-1
  - Single mode (SMF) or multimode fiber (MMF)
  - AAL5 and AAL0
  - Wavelength: 1300nm
  - Sensitivity: -29dBm
  - Output Power: -15dBm
  - Synchronization: Free-running or Physical link (receive clock)
  - SC connectors
  - Half-length PCI board
- **PIST-ATM+**
  - 155 Mbps (full duplex) SONET/SDH, OC3/STM-1
  - Single mode (SMF) or multimode fiber (MMF)
  - AAL5, AAL1 and AAL0
  - H.100 Computer Telephony bus interface for connection with e.g. an E1/T1 adapter
  - Wavelength: 1300nm
  - Sensitivity: -31dBm
  - Output Power: -14dBm
  - Synchronization: Free-running or Physical link (receive clock)
  - SC connectors
  - Full-length PCI board
- **PIST-2MP, PIST-2MI or PIST-8MI**
  - PIST-2MP (PCMCIA): 2 E1/T1 (monitoring 1 E1/T1 link)
  - PIST-2MI (PCI): 2 E1/T1 (monitoring 1 E1/T1 link)
  - PIST-8MI (PCI): 8 E1/T1 (monitoring 4 E1/T1 links)
  - H.100 Computer Telephony bus interface for connection with e.g. an ATM adapter (only PCI)
  - DSP resources (4x80 MIPS to 1x1600 MIPS)
  - 4 analogue interfaces (Codecs) for handset connections (only PCI)

OPERATING ENVIRONMENT
The STINGA test instrument will work under normal working conditions within:
- Working temperature: 0 ºC to +40 ºC
- Storage temperature: - 15 ºC to +60 ºC

OPTIONAL PRODUCTS
- SMF-MMF Fiber converter
- Cables with different connectors (SC, ST, FC etc)
- Fiber split-cable: normally 90% - 10% or 80% - 20%

STANDARD CONFIGURATIONS
The different ATM boards are normally used together with the following software modules:

• Megaco Simulator:	1 PIST-ATM
• PNNI Simulator:	1 PIST-ATM
• BICC-ISUP Simulator:	1 PIST-ATM+ and/or 1 PIST-2MP/PIST-2MI/PIST-8MI
• Megaco and PNNI Monitor	2 PIST-ATM

MANUFACTURER
Utel Systems
Televeien 9, N-4879 Grimstad, Norway
Main Office: Tel: +47 3704 6192 • Fax: +47 3704 6191
Internet: www.utelsystems.com
E-mail: sales@utelsystems.com

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