Towards achieving testbed federation: Services for the benefit of SMEs

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Company Profile

Company profile

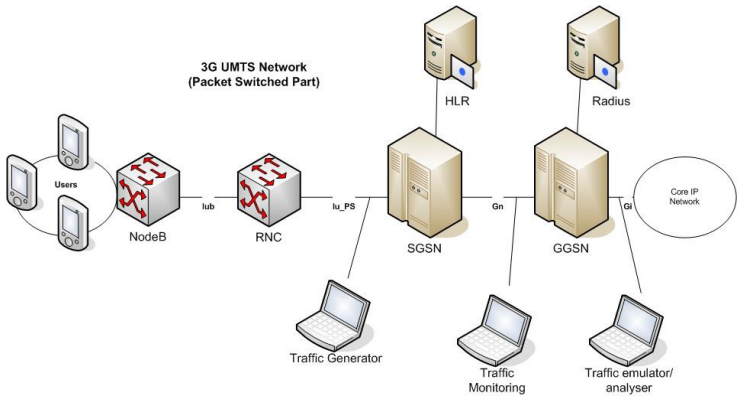
- ✓ APEX Concepts and Solutions AG was established in 1997 with the main objective to design and develop test equipment for specialised testing applications.
- ✓ **Main activity areas include:**
  - Design and development of traffic simulators and emulators for UMTS and fixed IP networks.
  - Planning of traffic experiments based on requirements of the industry (manufacturers, service/network operators).
  - Design of integrated testing solutions for UMTS and IP networks, including VoIP and IMS infrastructures.
  - Design and realisatiuon of testing cases for customized testing applications (e.g. implementation of localized communication buses, e.g. CAN, firewire, etc)
- ✓ **Main Customers:**
  - Siemens AG (Germany, Austria)
  - B/S/H AG (Worldwide)

Activities related to network testing

Traffic generation/analysis of UMTS networks

Services:

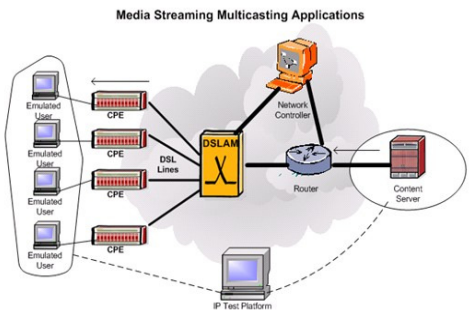
- C-plane and U-plane traffic generation, simulating user behavior
- C-plane traffic generation, emulating network's response to user requests.
- Real time traffic analysis and statistics generation for C-, U-planes.
- Monitoring of U-plane and C-plane traffic

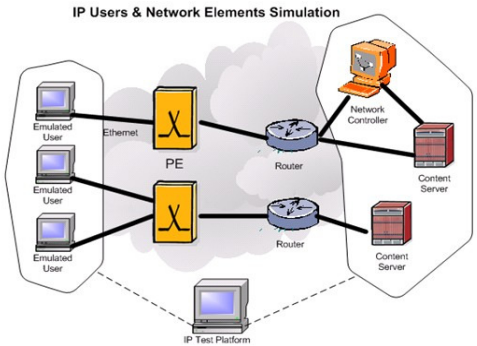


Testing of fixed IP networks

Services:

- User traffic simulation and analysis.
- Emulation of content (Server side).
- Extraction of statistics.





Generic testing services

Based on user requirements APEX offers the following services:

- Description of testing scenarios and generation of test suits.
- Simulation of user behavior via implementation of traffic profiles, per users and user groups.
- Generation of user traffic through hardware implemented user applications (e.g. FTP, conversational services, SMS, etc).
- Real time extraction of statistics on the circulated traffic.

High level testing services

- Characterization of networks concerning the capability to sustain:
  - user traffic (performance evaluation) under controllable traffic conditions (e.g. streaming applications, stress load conditions, etc).
  - in parallel numbers of users (stress test of C-plane) submitting service activation requests.
- Tracing of network malfunctions:
  - Data losses
  - Erroneous signaling procedures
  - Protocol encapsulation errors
- We receive testing requests from network equipment manufacturers and perform testing of the above services on real platforms:
  - Siemens in Munich (former COM department)
  - Siemens in ULM (former ICM department)

Contingencies related to network testing

Contingencies related to network testing

- **Erroneous calculation of statistics can be caused by:**
  - malfunctions of the protocol analyzer unit
  - erroneous protocol implementation
  - buffers over-, under-flow
- **Protocol incompatibilities can be caused by:**
  - erroneous protocol implementation
  - wrong protocol versions
  - different data encapsulation and protocol identifiers (e.g. headers, CRCs, etc)
- **Performance evaluation insufficiencies can be caused by:**
  - Malfunction in the operation of the traffic analyzer
    - slow in incoming data parsing
    - limited processing capacity (e.g. analysis of data traffic up to 10Mbps).
- **Physical layer incompatibilities**
  - Clock mismatches
  - Erroneous data encoding/decoding
  - Erroneous physical layer identifiers set up.

Needs of SMEs from a federated testbed

Test equipment manufacturers

- **Existence of testbed**
- **Test equipment certification**
  - To date SMEs certify their equipment on customer platforms, which in most cases are experimental.
  - Using a real platform test equipment manufacturers can test the performance and compatibility of their equipment against several important aspects, including:
    - capacity of performing traffic analysis
    - characterization of the performance of traffic generators (maximum rates, protocols, etc)
    - characterization of protocol oriented functions, such as u- and c-plane traffic generators/analyzers
    - overall testing of testing modes, such as stress (load) test, simulation, emulation, monitoring, traffic analysis
    - certification of equipment against testing modes, supported functions and protocols.
- **Low cost access**
  - SMEs usually have tight investment plans for product development. Therefore low (or no) cost access on the services of the test network is of vital importance for the final product and its commercialization process.

Network components manufacturers

- **Existence of testbed**
- **Certification of the operation of network components:**
  - SMEs usually do not have access on real networks and acceptance tests of their products is conducted on customer platforms, which in most cases are incomplete and experimental in the services they support.
  - Due to the lack of a real network, developed components, such as terminals, protocol processors, etc, are certified against the operation that is of the interest of the customer and not against the requirements of the end-user.
  - Access of SMEs to the latest technology communication platforms and standards is only possible through the customer (communication equipment industry).
- **Low cost access**
  - SMEs usually have tight investment plans for product development. Therefore low (or no) cost access on the services of the test network is of vital importance for the final product and its commercialization process.

Benefits of SMEs when using federated testbeds

Benefits

- **A federated tested may offer to SMEs the following benefits:**
  - Low cost access on a real network to be used for certifying operation of their components (test equipment or communication equipment).
  - Independency from the requirements of the client, thus better tested (quality) products.
  - Help SMEs to become more competitive by allowing them to make products addressing widely applicable end-user requirements (not customer specific).
  - Improve technological excellence of SMEs and their contribution to future developments in network technologies, by ensuring them access on latest technology networks.
  - Strengthen competiveness of SMEs by allowing them to conceive on their own innovative services, terminals, components and test their operation on real networks.

Thank You!