



Vodafone Test Box - An Asterisk[®] based multi-technology traffic generator

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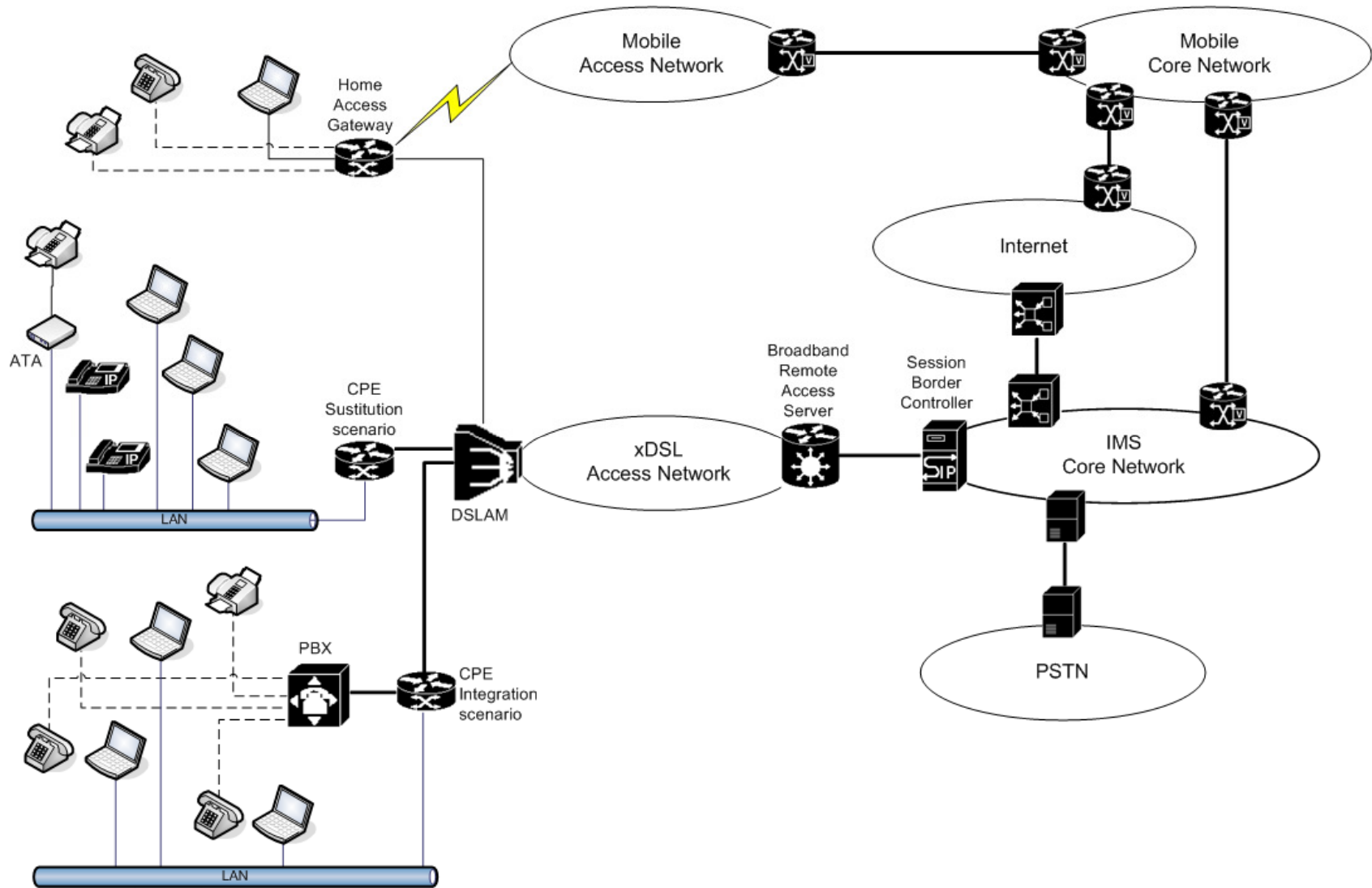
Agenda

- The overall project
- Network architecture
- The Customer Premise Equipment
- Project description
 - main requirements
 - HW architecture
 - SW architecture
 - Web Interface and Asterisk AGI
- Demos
- The way ahead

The overall project

- In May 2008 Vodafone Italy announced a new offer for residential and business users;
- based on DSL lines (wholesale or unbundling local loop) and on its own HSPA mobile network, Vodafone moves towards a complete convergence between fixed and mobile networks;
- the facility for project testing is the Vodafone Test Plant located in Milano;
- test Plant includes all network elements and tools needed for testing IMS, mobile and fixed networks services.

Network Architecture



The Customer Premise Equipment

- CPE (HAG – Home Access Gateway for residential users) is the telecommunications equipment owned by an organization and located on its premises;
- it handles incoming and outgoing Voice, Data and Video traffic;
- two market segments: residential and business
- at least 4 new software releases every year for deployment of new services and bugs fixing;
- testing is at the same time a requirement and a time consuming activity that needs to be speed up.

HAG: main features

- Single brand, others are coming;
- uplink available via an ADSL/ADSL2/ADSL2+ modem or through the Internet Key (HSPA modem@7.2 mbit/sec);
- up to 8 PVCs supported; 2 PVCs used for Voice and Data; the network DHCP server assigns one IP address for each PVC;
- CPE WAN Management Protocol support (TR-069, TR-098, TR-104, TR-106, TR-111);
- an internal Analogue Telephone Adapter enables the A/D, D/A conversion needed by the VoIP service. ATA supports G.729, G.711 (for FAX and POS calls), VAD, Echo Canceller, CNG, PLC;
- home network management: 4 port FastEthernet 10/100BASE-T switch and a WiFi module (IEEE 802.11b and IEEE 802.11g);
- USB port for connecting USB printer, external HDD and pen drive;
- DHCP server, NAT/PAT, statefull firewall, denial of service, port forwarding, parental control, UPnP, Dynamic DNS;
- file sharing and printer sharing.

CPE: main features

- Two main brands, others are coming;
- two main scenarios: Substitution (all IP) or Integration (BRI or PRI interfaces for legacy PBX reuse);
- different product codes for different uplink;
- ISDN BRI for backup.

CPE testlist

The testlist covers the following areas:

- DSLAM and BRAS interoperability;
- CWMP for remote management;
- Web interface for local management;
- IMS network interoperability;
- SIP services: Voice, Fax and POS calls (codec management, fax tone detection, ...);
- Home networking;
- HSPA and ISDN backup.

Main requirements

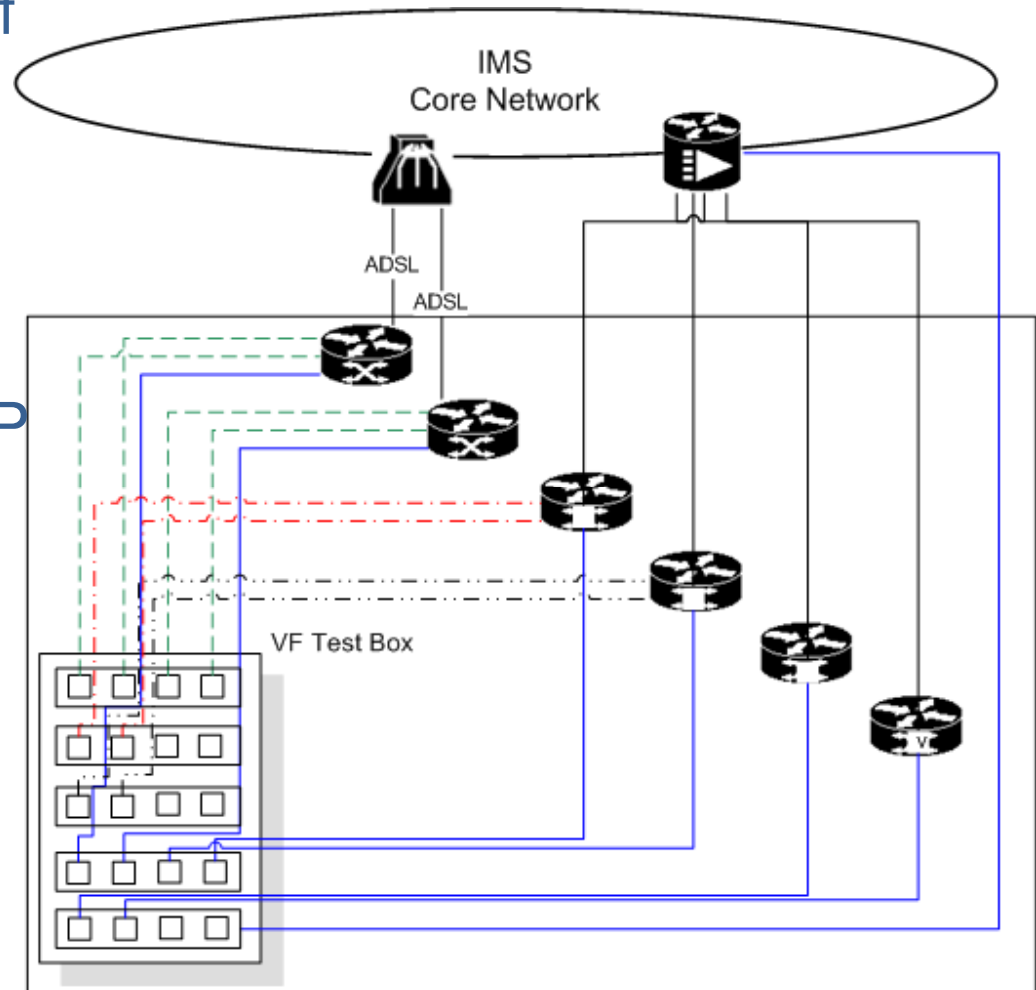
Main requirements for the Test Box are the following:

- Originate and terminate voice calls using different technology: analog, ISDN BRI/PRI, SS7 as well as VoIP;
- evaluate the quality of the speech using PESQ;
- generate FAX, POS and FAX over IP calls;
- test advanced call features like transfer, hold, call waiting ...
- generate IP stream in order to reproduce data traffic;
- provide an easy to use interface to simplify test script configuration and test run;
- support real time and historical reports;
- manage a database for test plant resources reservation;
- be a multi user system.

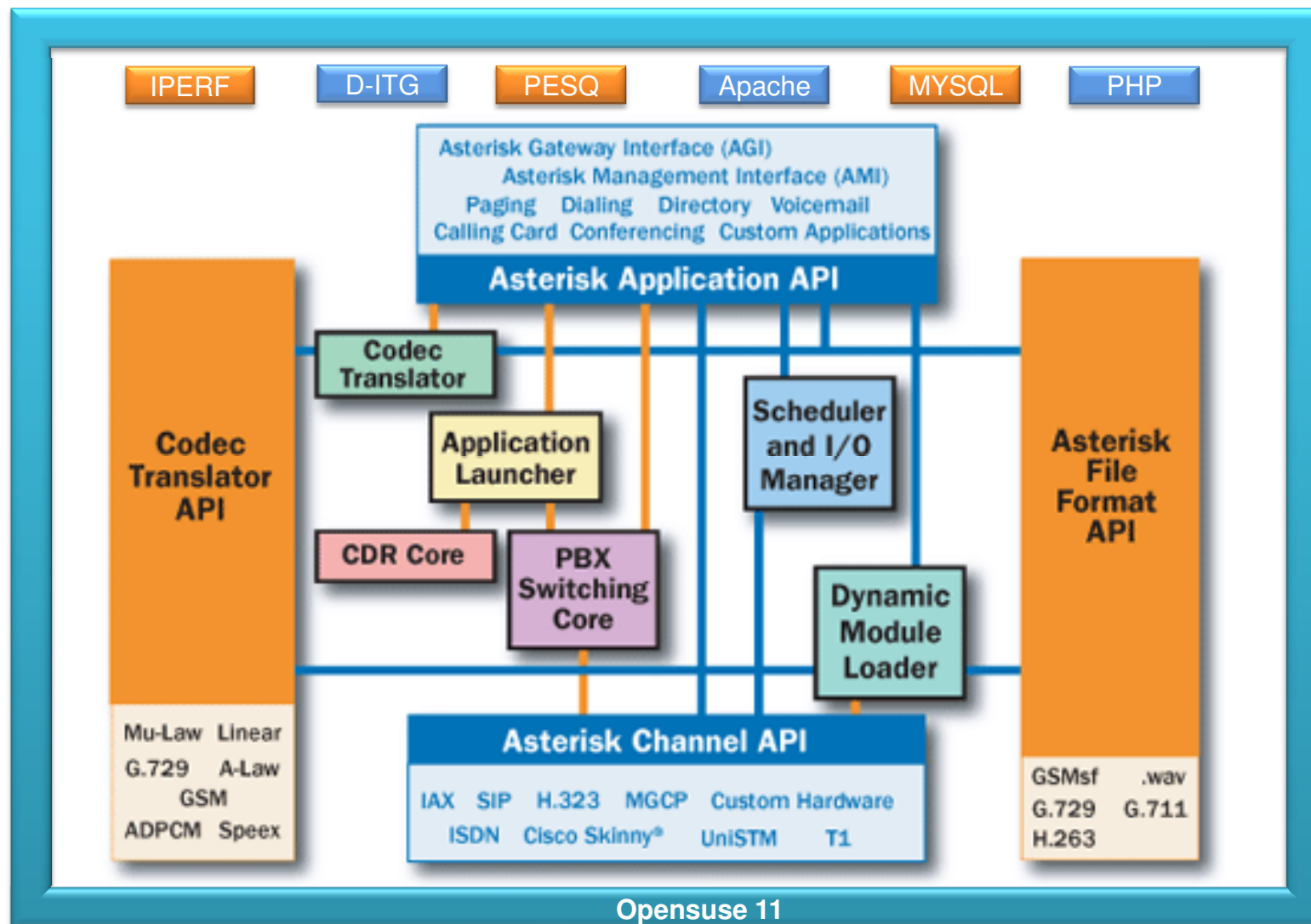
HW architecture

Test Box is composed of the following HW components:

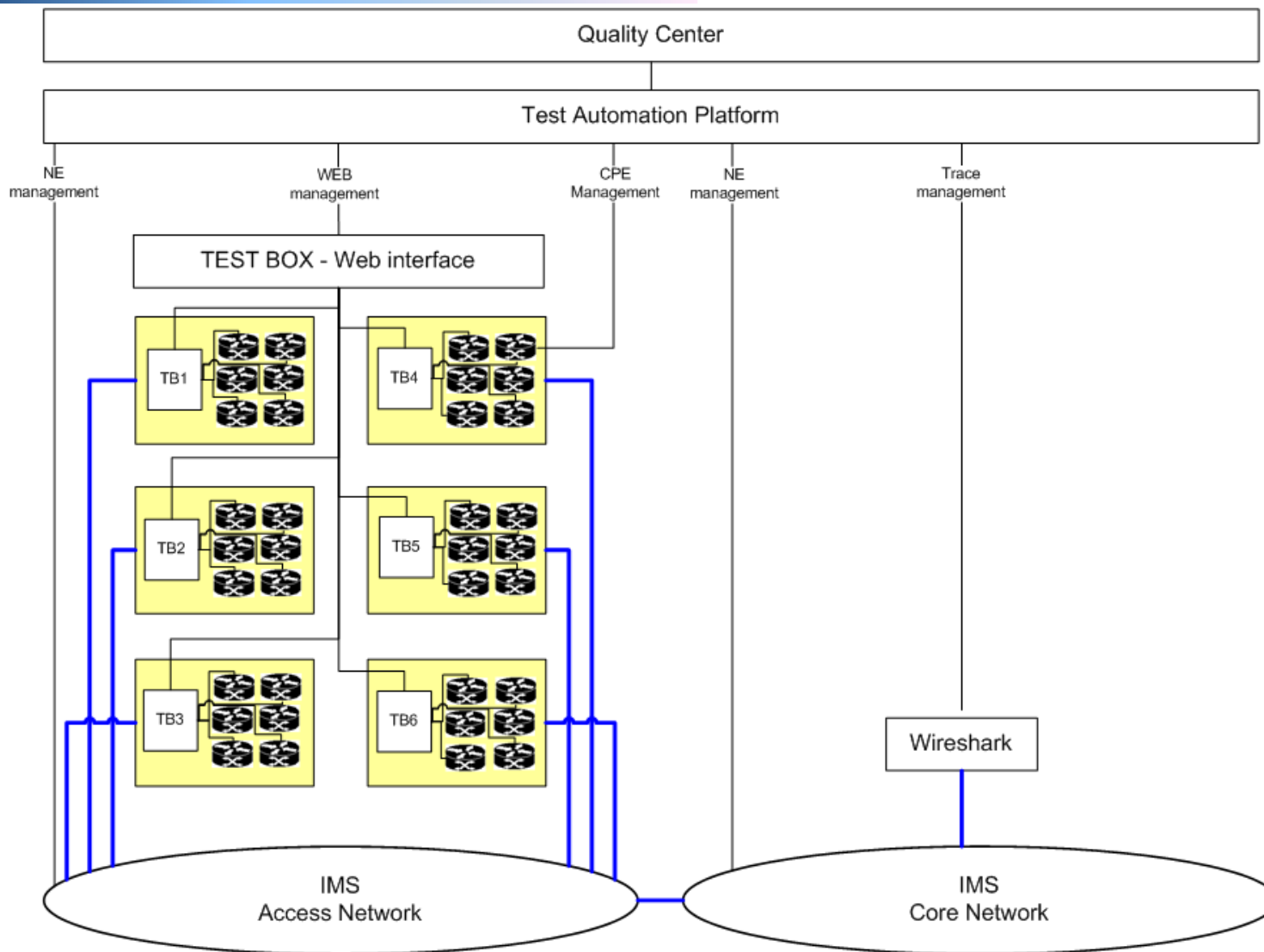
- 2U rackmount server from Supermicro
- N.1 Digium TDM 800P
 - 8 port FXS/FXO
- N.1 Digium B 410P
 - 4 port ISDN BRI
- N.1 Digium TE 420B
 - 4 port ISDN PRI
- N.2 Cavium NIC 4E
 - 4 port GB Ethernet



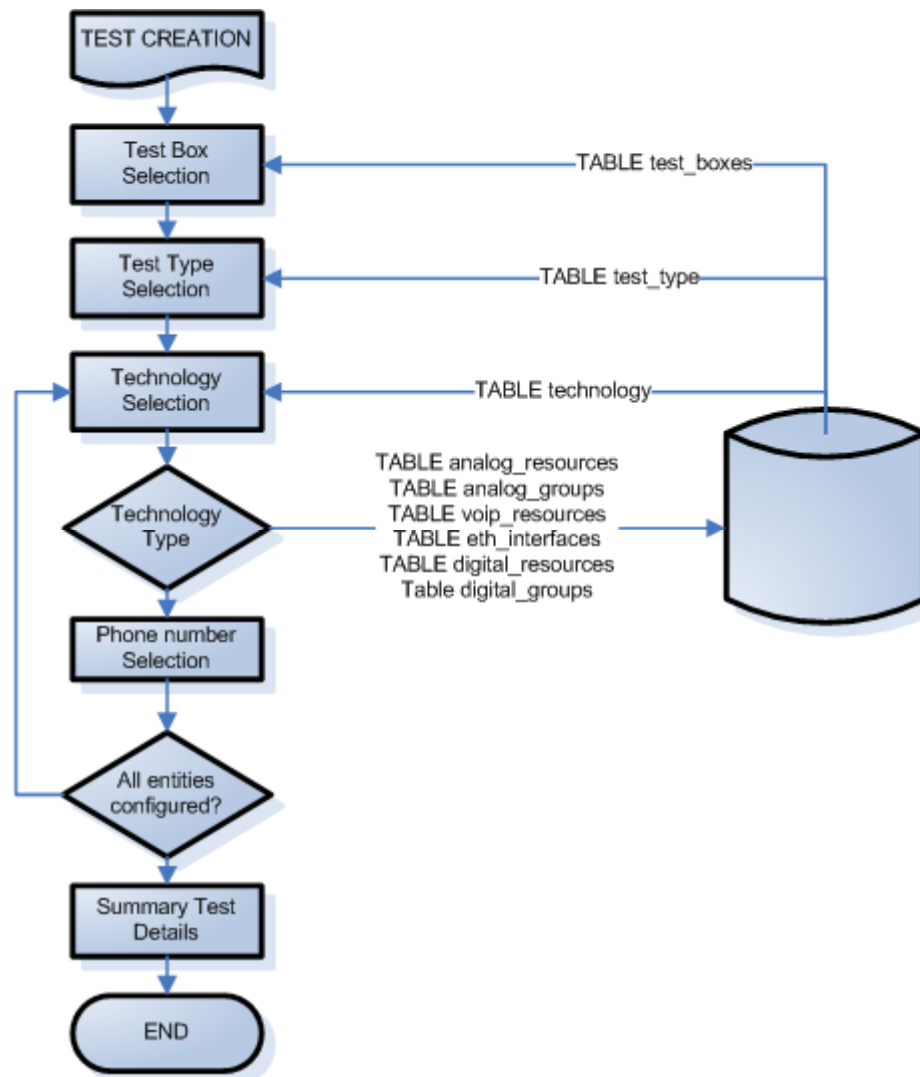
SW architecture



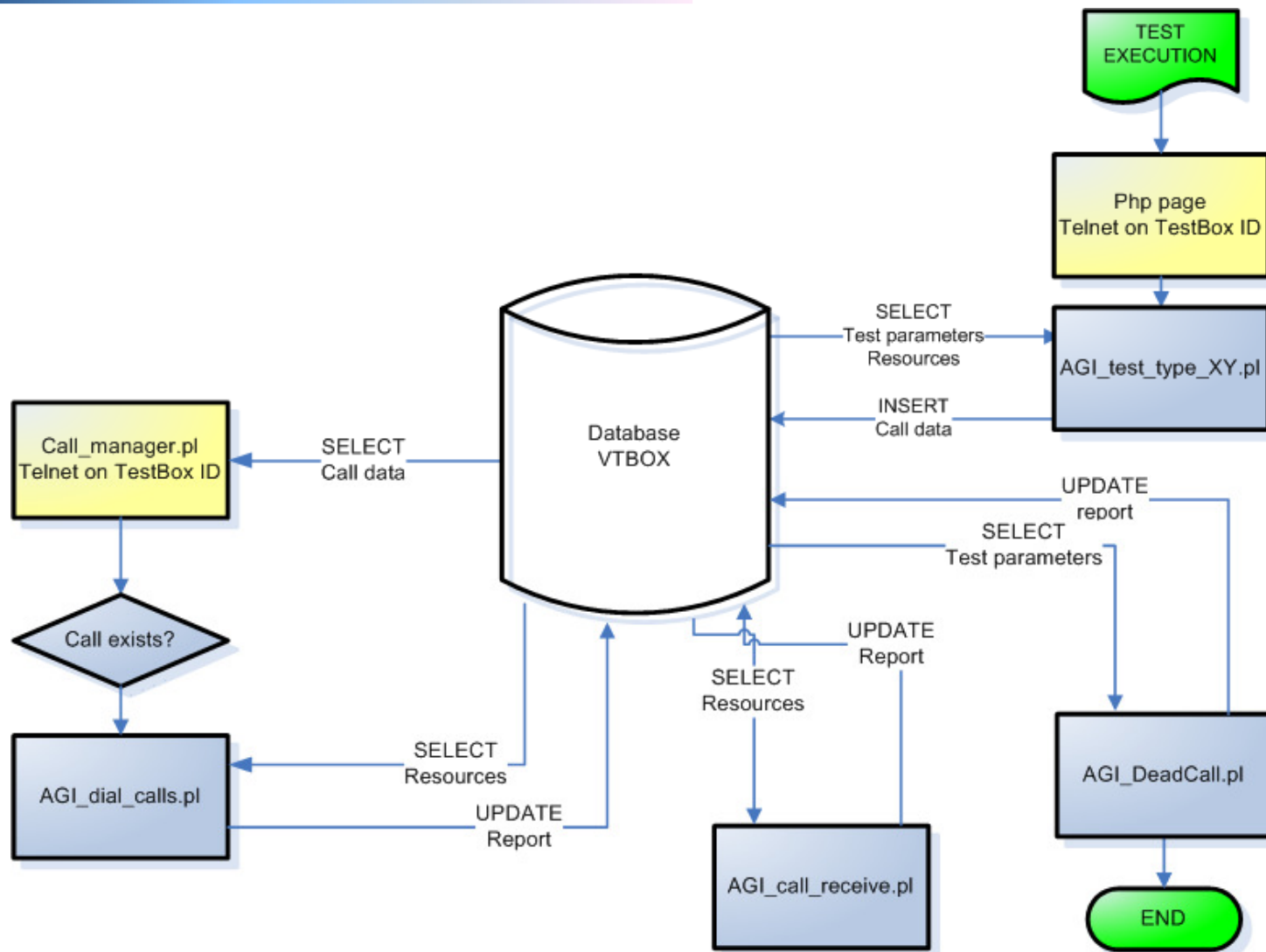
Test Plant



Test creation flowchart



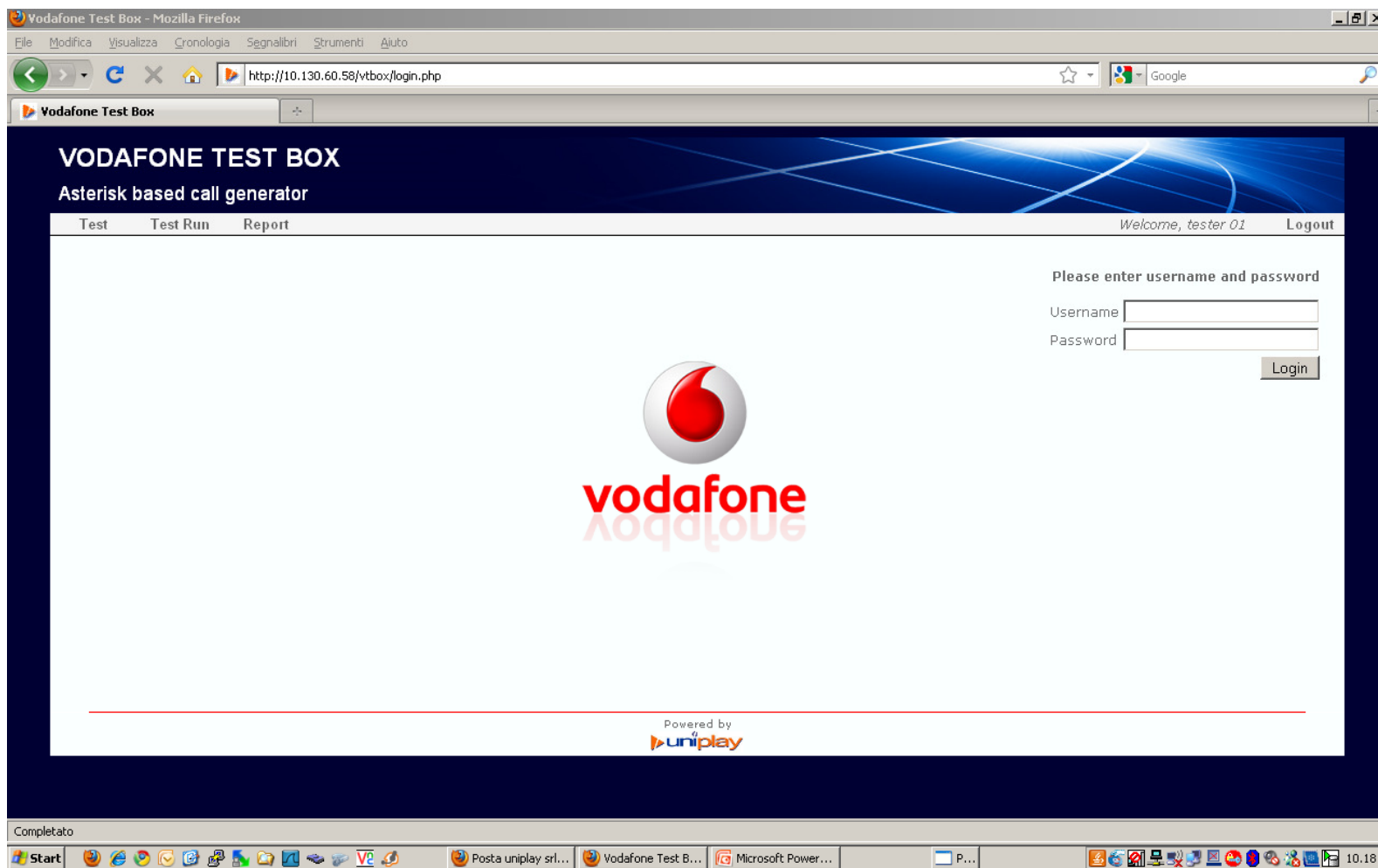
Test execution flowchart



Live demos

- System provisioning (admin only)
 - test box definition;
 - cards configuration;
 - resources configuration;
 - users management;
- Test creation;
- Test run creation and resources allocation;
- Reports.

Recorded demo



The way ahead

Next release of the Test Box has to:

- include the availability of SS7 hardware and software for origination/termination of fixed/mobile calls;
- manage the IP traffic generators configuration, test execution and reporting via the web interface;
- add new agi for advanced call features testing;
- Add support for video streaming test

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