

Reference: KPN-ETN-IP Verification of Concept (VoC) – Equipment Testing Report

The Hague, Netherlands, March-August 2012

1 Short Description of the Customer

KPN, the leading telecommunications and ICT service provider in the Netherlands, offers business customers complete telecommunications and IT solutions. KPN provides wholesale network services to third parties and operates an efficient IP-based infrastructure with global scale in international wholesale through iBasis. Furthermore, KPN Corporate Market offers global IT services and is the Benelux market leader in the area of infrastructure and network related IT solutions.

In 2011, KPN served 44.5 Million customers, of which 36.6 Million were in wireless services, 4 million in wire-line voice, 2.5 Million in broadband Internet and 1.4 Million in TV.

<http://www.kpn.com>

2 Project Goals

KPN was looking to upgrade central components of its domestic residential and business wire-line network infrastructure servicing residential, business and mobile customers. Specifically, the Metro Core router (MC) and Broadband Network Gateway (BNG) roles were designed to be integrated into a single device type. KPN commissioned the European Advanced Networking Test Center (EANTC) to validate compliance of a vendor solution with the new KPN design; including a Verification of Concept ("VoC") testing campaign prior to KPN's purchasing decision.

3 Course of Action

KPN assigned EANTC to create a comprehensive test plan based on KPN's detailed design and technical requirements compliancy list. EANTC collaborated with KPN engineers to review the network design and KPN's request for proposal. As a result, EANTC created a 190-page test plan describing 31 test scenarios. After the review and signing off, EANTC prepared for the tests by creating tester configuration and specialized scripts in KPN's lab in The Hague.

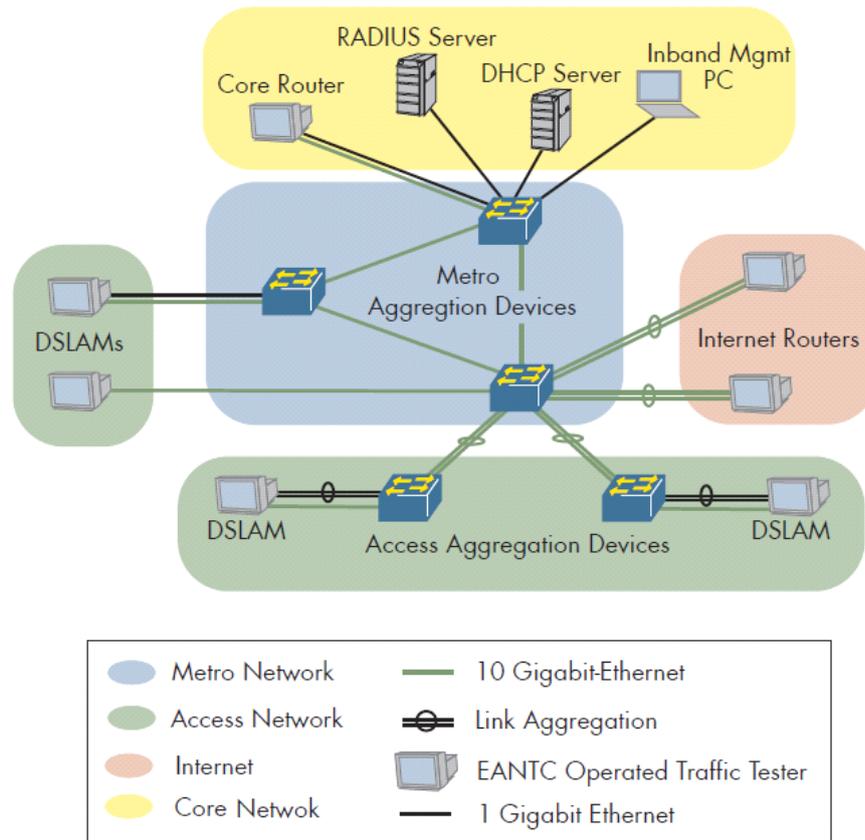
KPN commissioned EANTC to conduct a turn-key verification of concept test. EANTC was responsible for the test execution, scheduling, and risk management jointly with the vendor under test. EANTC contributed to weekly KPN steering committee reports and was responsible for detailed documentation at the end of the project. Multiple EANTC test teams worked at KPN and vendor locations in parallel to complete all tests within a two-month timeline required by customer.

In a pre-staging phase, EANTC ran a sub-set of the test cases to give the vendor the opportunity to identify configuration issues or hardware defects. Whenever needed at various stages, EANTC reported on issues to KPN project and program management and recommended a course of action. During the formal test, we monitored and documented the test bed configuration continually. EANTC condensed more than seven Gigabytes of configuration and test results data into a 260-page report, including a high-level management summary.

4 Test Scenario

The test scenarios focused on integrated Ethernet, residential and IP based services functionality, and extensive scalability and Quality of Service testing. EANTC emulated customers at the scale of a complete geographical region, emulating a real deployment scenario in the lab.

KPN Ethernet-IP Future Network Under Test



5 Customer Benefits

- Independent Consultancy**
 Network design and equipment upgrades are crucial for service providers such as KPN, strongly influencing the future service levels and competitive differentiation. Therefore, a professional, vendor-independent, reproducible evaluation of vendor solutions is essential. EANTC supported KPN by providing unbiased and accurate results.
- Save Internal Resources**
 Once the test plan had been finalized, KPN engineers were relieved from active participation in the project. Based on the customer request, EANTC acted as an advocate for the service provider during the test execution. KPN was able to use internal network planning and quality assurance resources efficiently to accelerate other parts of the project rollout.

- Greatly Reduce Deployment Risk By Validating The Complete Design In The Lab
EANTC contributed its extensive experience in advanced service provider testing methodology to this project. By emulating the complete network and subscribers attached to the new access components under test, EANTC was able to provide KPN with an accurate lab scenario anticipating the rollout without the risk of testing in a production environment. This provided KPN not only with a live preview of the new network design, but also helped the network designers to gain peace of mind – deploying the new solution in the real network had already been trialed in the protected environment of the lab before any customers were involved.
- Relationship with Test Equipment Vendor
EANTC has used its premium relationship to Ixia, the test equipment vendor chosen for this engagement, to provide the required test equipment at the location of the test in time and was able to resolve any support questions within a short time.
- Maintain Project Schedule
EANTC provided two teams of experienced test engineers supported by a technical lead engineer and managed by an EANTC project manager to this project. Each engineer had more than three years of testing experience with similar service provider scenarios and using the same Ixia test equipment. EANTC's technical lead and project manager have conducted Ethernet/IP/MPLS testing projects with many service providers and almost all relevant vendors in the industry.