

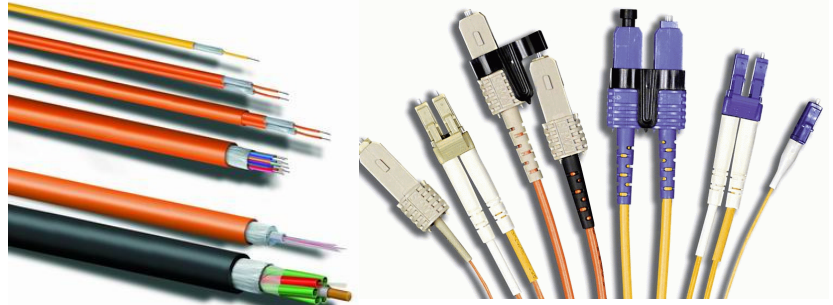
MUSE TEST SUITE for Full-Service End-to-End Analysis of Access (Task Force 4)



The demand for delivering high bandwidth multi-media applications to end users, via multiple service providers, network operators and technologies, has driven the world wide development of a new generation of access networks.

Key Features

- A wide range of “knowledge tools” for analyzing the strong and weak points of an access network.
- A single source of reference to relevant standards, methods, techniques and terminology.
- State-of-the-art.
- Wide scope: covers the full OSI stack and much more:
 - quality of service;
 - service connectivity;
 - network connectivity;
 - residential gateways;
 - management systems;
 - xDSL-based networks;
 - fibre-based networks.
- Offers both in-depth and explanatory information.
- Free download via www.ist-muse.eu



State-of-the-art access networks have to meet so many requirements that they have become very complex. To verify if these networks are adequate for their purpose, you cannot limit yourself to a set of isolated tests on individual devices. In those cases a full service end-to-end approach should be followed to test the system as a whole. So how to analyse the most relevant capabilities and shortcomings of such a system?

Answering this question becomes relevant, for instance, when someone needs to make migration decisions toward new network solutions. In such a case he/she wants to benchmark one solution against many alternatives. Usually, this starts with defining functional requirements, followed by the creation of RFI/RFQ documents.

But do those requirements address the problem as a whole and in sufficient detail? And how to find the most relevant selection criteria, how to identify which additional tests are needed, how to interpret these test results, and how to transform that into a well balanced evaluation of the offered solution? In those cases, you definitely could use some help.

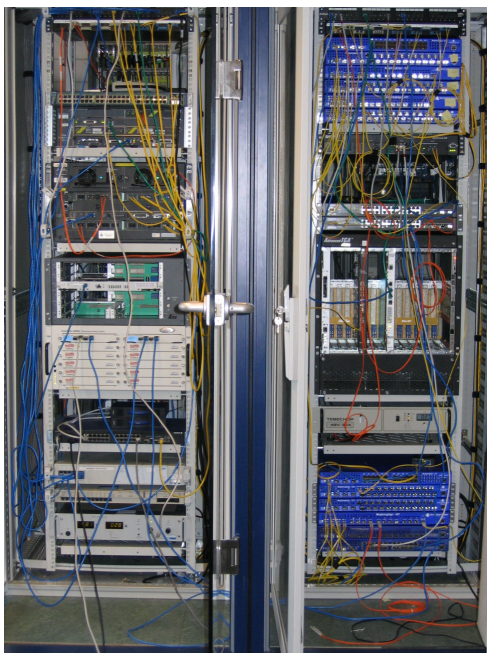
These answers are not obvious. If a system has to deliver services to end users via channels that are sometimes overloaded with other traffic, or via unreliable channels, the system may be adequate for downloading video files but inadequate for streaming video. This emphasises the need for a full-service end-to-end approach to evaluate a system.

The solution

Until the public release of the MUSE Test Suite, no single source of reference existed to analyse a system as a whole, from so many technological viewpoints. The guidance from this Test Suite offers you a holistic top-down view on what characteristics of a system are really relevant, and how you can identify them.

Some of the details can also be found in standards. This may be true for testing physical layer aspects of a system or for testing individual elements or sub systems. However, when higher layer characteristics are to be analysed, the required information becomes scarce or is not available. And since there are so many standards out there, where should one start?

The MUSE Test Suite was designed specifically to address such challenges: what to test and how to test. It is a comprehensive document that provides you with a holistic system view on testing and to evaluate the capabilities of access systems. It describes a wide range of test objectives in significant detail, and guides the reader through state-of-the art views and many standards (when appropriate).



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Contents

A test suite in two parts:

- Part 1, is on test objectives, and identifies what to test (over 300 pages).
- Part 2, is on test methods, and identifies how to test (over 375 pages).

The first part provides lots of guidance to explain the network characteristics that should be analysed, and to summarize what information is already available in various standards. It outlines several classification and description models of access networks from different perspectives (the well-known OSI layer model can cover only a limited set of functionalities). It summarizes a variety of service requirements as well as to introduce the various chapters on testing. The second part discusses detailed test procedures and methods to analyze the characteristics identified in part 1.

Quality of service

A reference for the assessment of the QoS for various services, as perceived by users. The first part describes which aspects should be tested when assessing the performance of VoIP, Streaming Video, Videoconference, Interactive Gaming and web browsing. The second part discusses, in detail, tests for obtaining the perceived QoS for these services.

Service connectivity

A top-down view on connectivity, starting from a service point of view. Multiple classes of services are described and for each class an example service (e.g. high speed internet, multicast streaming, VoIP) has been used to show how service testing can be done from the service down to the network layer. Of course, this chapter is not exhaustive on all services.

Network connectivity

A bottom-up view on connectivity, starting from the architecture. It describes relevant tests and standards for the network layer and upward. It concentrates on functionality and performance tests without detailing on specific test procedures; it excludes the physical layer.

As it is focused specifically on the MUSE architecture, it is a lot more specific than the chapters on service connectivity.

Connectivity testing of RGW's

A reference for network and higher layer tests on residential gateways. It identifies detailed objectives for testing IGMP, IGMP proxy, DHCP and PPPoE functionality and conformance. These objectives are based on requirements gathered from DSL-forum and IETF.

The second part describes the test procedures in more detail, as they were used and verified while implementing an automatic test suite on residential gateways.

Management testing

A detailed mapping of the TMN management functions described in ITU-T M.3400, into an exhaustive list of requirements. The readers are made familiar with the TMN model and its management functions, so that they can understand why MUSE has chosen TMN as its reference model for testing Management systems

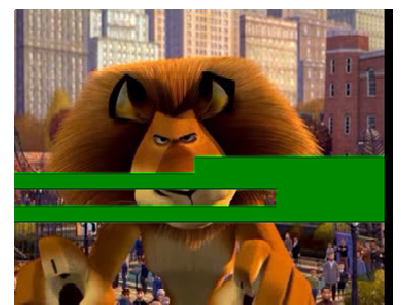


xDSL specific testing

A comprehensive overview on the xDSL subjects that are really relevant, plus the motivation why. It covers all flavours of xDSL, and gives an up-to-date guidance through the huge amount of available tests in standards (ITU, DSLF, ETSI). Part two refers to existing standard tests and concentrates on describing missing details. Furthermore, it adds methods on recent topics, such as means for loop qualification (DELT/SELT), mitigating impulsive noise, and protecting legacy systems (PSD shaping).

Fibre specific testing

A top-down view on testing of generic system aspects that is characteristic to fibre-based access networks. It concentrates on optical signals and on the performance of an access system as a whole (leaving tests for underlying optical components out of scope). Systems are differentiated with respect to their interfaces (analogue, digital, framed digital) and topologies (point-to-point, point-to-multipoint). Test methodologies are identified for each of them. Specifically, it covers tools and procedures available to measure relevant physical layer parameters, referencing appropriate standards.



Block errors in video streams



MUSE is a European consortium of vendors, operators and universities, active from January 2004-March 2008. The aim is cooperation on research and development of future, low cost, multi-service access networks.

MUSE is partly funded from the FP6 programme of the European Commission and this Test Suite is one of its deliverables (DTF4.4).

More information on MUSE and on obtaining this Test Suite can be found on the MUSE website:

www.ist-muse.eu

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