

TEN-155 Managed Bandwidth Service

Service definition

*Version 1
2 August 1999
(c) DANTE*

Abstract:

This document describes the TEN-155 Managed Bandwidth Service (MBS) as it is specified at the end of June 1999. As an operational service, the MBS will develop and change in a number of ways over its projected three-year lifetime and the detailed service specification will be modified from time to time as a consequence.

Table of Contents

1. [Introduction](#)
2. [Definition](#)
3. [Access to the service](#)
4. [Service Architecture](#)
5. [Service Management](#)

[APPENDIX A: TEN-155 Participant national research networks](#)

1. INTRODUCTION

This document describes the TEN-155 Managed Bandwidth Service (MBS) as it is specified at the end of January 1999. As an operational service, the MBS will develop and change in a number of ways over its projected three-year lifetime and the detailed service specification will be modified from time to time as a consequence. Up to date information on the MBS, including a copy of the latest service specification, will be available from <http://www.dante.net/mbs> for the duration of the Quantum project. More information about the QUANTUM project and the TEN-155 network can be found in <http://www.dante.net>.

2. DEFINITION

MBS enables connectivity among research projects in countries connected to TEN-155, the European Research Network. ATM connections between project members sites are established. Members of a project set themselves up as an organisational unit in order to request service. Projects identify a Group Network Manager (GNM) from amongst the members who will act as a single point of contact and take responsibility for co-ordination of the project's use of MBS.

ATM connections are defined by the capacity and Quality of Service requirements of the project, translating those into proper configuration information.

MBS allows the definition of Virtual Private Networks linking members of a project and supplying them with network resources defined as bandwidth requirements, lifetime of the established connections, traffic profile and a complete set of network parameters. Due to the importance of the operational IP service within the TEN-155 network, available resources with regard to bandwidth and the number of connections destined for MBS may be limited. However, once resources are allocated, they are guaranteed.

MBS may use existing network resources of those National Research Networks (NRN), connected to TEN-155. An initial limit of 10% to 20% of the existing bandwidth between the NRN and TEN-155 is expected to be used to cater for service requests. NRNs will make these resources available.

MBS is an end to end service. Its availability depends not only on the TEN-155 network but also on the NRN network infrastructure and the existing technical and human resources within the TEN-155 community.

3. ACCESS TO THE SERVICE

Potential users of MBS are:

- European organisations participating in EC co-funded research and development activities with sites in countries of a participating NRN.
- Universities and research organisations across Europe connected to a participating NRN.

Access to MBS is based on the establishment of ATM connections between network equipment belonging to or used by one of the project members and network equipment of the NRN or the TEN-155 network.

Connecting the European sites of a project means establishing international links which make use of resources of at least two different NRNs (national paths) as well as of the international TEN-155 backbone (international path).

Since NRNs are responsible for the national path, a representative (ATM Service Manager - ASM) must authorise the usage of the network for transit. For the international path DANTE is the responsible organisation acting on behalf of the TEN-155 consortium and will also co-ordinate interaction with ASMs for authorisation and other purposes.

If an NRN accepts a service request as part of a project but is not in a position to provide the required national path then connections may be established directly between network equipment belonging to the project and those of the TEN-155 network. In that scenario, national transit and access to the TEN-155 point of presence is the responsibility of the project. Whether or not the NRN is the provider of the national path, its ASM must accept access to the TEN-155 network by the project. Appendix A details the participant NRNs with information about their interfaces with TEN-155.

Figure 1 identifies the different network equipment involved (Routers, ATM switches) and the ATM links to be established when the connection is made directly to a TEN-155 port (located in the national TEN-155 Point of Presence) or when the NRN is used to provide transport between the project port and TEN-155 port. In this latter case the TEN-155 port acts as the demarcation point between the national and the international paths.

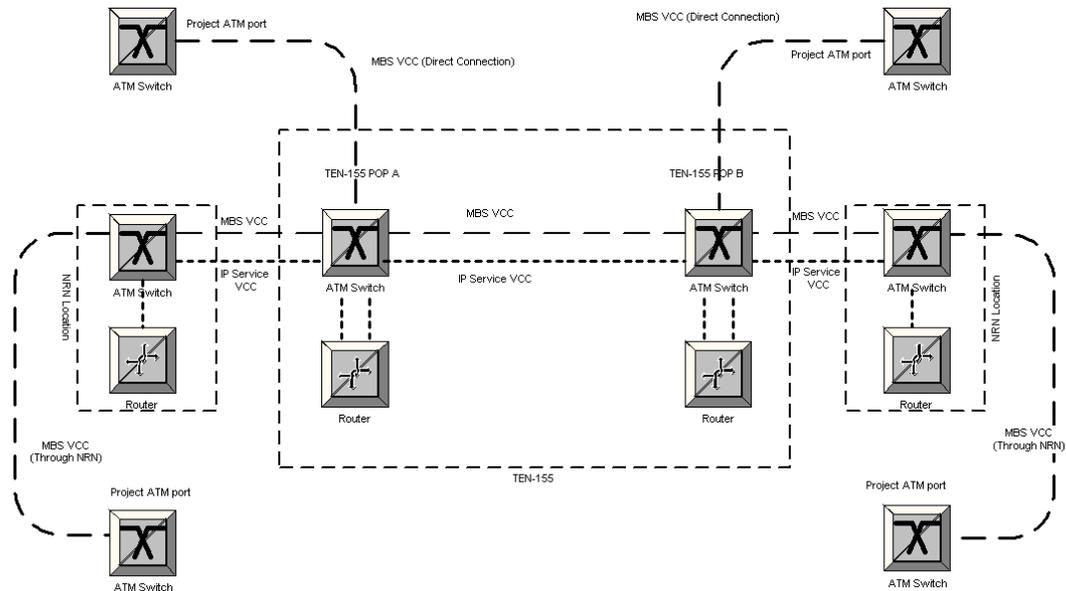


Figure 1

If the connection is established between the NRN and the project, the type of interface and the software/hardware specifications depend on the existing and available equipment deployed by the NRN. Technical issues should be solved in a case by case basis.

If the connection is established directly between projects and the TEN-155 network, the project is responsible for providing the necessary resources for access, including an installation charge to cover costs of deploying extra ports. The demarcation point is the patch panel to which the TEN-155 ATM switch is connected; DANTE is responsible for the connection of the patch panel and the switch. For the direct links, the following interfaces are supported:

- E3 (electrical, G.703)
- T3 (electrical, G.703)
- E1 (electrical, G.703)

Subject to the general limits specified below, the maximum capacity of a link is around 30Mbit/s in the best conditions. In principle, links with capacities of any value up to this maximum can be established.

Overall limits to allocated resources exist to prevent network "hogging". These initial limits, subject to revision during the evolution of MBS, are implemented by restricting total usage between TEN-155 user access ports to:

- No more than 10 concurrent VCC/VPC through any TEN-155 user access port.
- Routing the connections based on network engineering judgement, bearing in mind the bandwidth available and usage patterns.
- The maximum amount of bandwidth allocated at any one time at any NRN access port shall be no more than 30% of the access capacity.

These constraints between TEN-155 PoPs will mean that all projects connecting at a PoP will have to work within the overall limitation at the PoP at any given time.

4. SERVICE ARCHITECTURE

The definition of the end to end connection depends on the availability of the requested options all along the path through several different administrative domains between end points. This means that available options for connections depend on the ATM service implemented or used in the NRN providing part of the resources Support for the following elements has been built into the backbone:

A.- Depending on how the connection is established and released:

- - Permanent connections (PVC), established by the network operations centre by using network management tools.
- - Switched connections (SVC), established by user ATM equipment using signalling (available during 1999).

B.- Depending on the duration of the connection (PVCs only):

- - Scheduled occasionally, start time and end time known.
- - Permanent static, start time known, end time open.
- - Permanent periodic, start date for period known, end of service date open, time pattern specified with periods of connection availability on a daily basis, weekly, etc.

C.- Depending on the ATM type of connection:

- - Virtual Channel Connections (VCC), the minimum element able to transport cells. Every ATM connection is composed of at least one VCC.
- - Virtual Path Connections (VPC), identifier of a set of VCCs. VPCs are only available for PVCs.

D.- Depending on the number of end points:

- - Point to point, one source, one end point.
- - Point to Multipoint, one source, many end points. (available during 1999).

E.- Depending on the requested transfer capability (with specifications according to standards ITU I.371, ITU I.356)

- - Deterministic Bit Ratio (DBR) with QoS-1, traffic parameter: Peak Cell Rate (PCR)
- - Statistical Bit Rate (SBR2 or SBR3) with QoS-3, traffic parameters: Peak Cell Rate (PCR) and

Sustained Cell Rate (SCR).

- - Available Bit Rate (ABR) with QoS-3, traffic parameters: Peak Cell Rate (PCR) and Minimum Cell Rate (MCR). This transfer capability is expected to be available during 1999.

5. SERVICE MANAGEMENT

The primary channel of communication is between the GNM and DANTE. DANTE will contact the ASMs of the NRNs involved and will stay in constant contact with the GNM, as the single contact point to the project.

Organisations participating in a project must identify a Group Network Manager whose role is the co-ordination of all the members in the project with respect to their use of MBS and communication with DANTE. Activities to be performed by the GNM are detailed in the MBS procedures.

To make the initial request the Group Network Manager sends a minimum set of information aimed to help evaluating the project feasibility, the amount of resources needed and a cost estimation in case additional equipment or resources are necessary. Web forms or electronic mail will be used as tools for request submission and tracking.

Initial contacts with ASMs to determine necessary and available resources (human and technical) to connect a project member are established by DANTE. The coordination will be limited in those cases where a similar service to the TEN-155 MBS exists nationally and national procedures require the project to contact the NRN directly. Since national connectivity is an NRN dependent issue and different in each country, detailed information about the project maybe be required for participants in different countries. The Group Network Manager is responsible for information gathering within the project.

Once the project feasibility has been verified, necessary arrangements may be made directly between ASMs and the Group Network Manager according to defined operational procedures to implement the connection of each site with the NRN port. In case of difficulties, the GNM-DANTE channel remains the priority means of communication.

The result of the service request process is an activity plan to be performed by the involved parties, identifying action points, resources, timelines and costs. This plan must be accepted by all parties and is the definition of the project. Contracts between the project and some parties may be signed as consequence of different policies in resource allocation.

Once the project is running, service management is done by the TEN-155 ATM Network Operations Centre (ATM NOC). Change management and fault resolution are co-ordinated from here, following established procedures. The Group Network Manager is the interface between the project and the MBS help desk which is part of the ATM NOC function. In case of national paths, change management and fault resolution are provided by the respective NRN Network Operations Centre co-ordinated as necessary by the ATM NOC. There is an escalation path to DANTE for all operational issues which cannot be solved quickly.

APPENDIX A

TEN-155 PARTICIPANT NATIONAL RESEARCH NETWORKS

Country	NRN	POP Location	Access Speed	Type of Access
Austria	ACOnet	Vienna	155 Mbps	ATM
Belgium	BELNET	Brussels	34 Mbps	ATM
Switzerland	SWITCH/ CERN	Geneva	155 Mbps	ATM
Czech Republic	CESNET	Prague	34 Mbps	ATM
Germany	DFN	Frankfurt	155 Mbps	ATM
Spain	RedIRIS	Madrid	34 Mbps	ATM
France	RENATER	Paris	155 Mbps	ATM
Greece	GRNET	Athens	34 Mbps	ATM
Hungary	HUNGARNET	Budapest	34 Mbps	ATM
Italy	GARR	Milan	155 Mbps	ATM
Luxembourg	RESTENA	Luxembourg	10Mbps	ATM
The Netherlands	SURFnet	Amsterdam	155Mbps	ATM
Portugal	RCCN	Lisbon	10Mbps	ATM
Sweden	NORDUnet	Stockholm	155Mbps	IP
Slovenia	ARNES	Ljubljana	34Mbps	ATM
United Kingdom	UKERNA	London	155Mbps	ATM