



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.1311

(03/2002)

**SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE
AND INTERNET PROTOCOL ASPECTS**

Internet protocol aspects – Transport

**Network-based VPNs – Generic architecture and
service requirements**

ITU-T Recommendation Y.1311



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ITU-T Recommendation Y.1311

Network-based VPNs – Generic architecture and service requirements

Summary

This Recommendation specifies the generic architecture and service requirements that are applicable to the provision of Network-Based Virtual Private Networks by Network Service Providers.

ITU-T Rec. Y.1311 (03/2002)

Source

ITU-T Recommendation Y.1311 was prepared by ITU-T Study Group 13 (2001-2004) and approved under the WTSA Resolution 1 procedure on 16 March 2002.

FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Network-based VPNs – Generic architecture and service requirements

1 Scope and field of application

This Recommendation describes a number of generic architectural aspects and specifies a number of generic service requirements involved in the provision of network-based Virtual Private Networks (NB VPNs).

Network-based VPNs have a common set of requirements and are related through the use of a common set of mechanisms. This Recommendation describes NB VPN service definitions, framework and requirements.

The scope of this Recommendation covers the various core implementations of an NB VPN, as well as the services offered to the customer at the access interface.

The scope is also illustrated in Figure 1, which depicts the principles arrangement between services and implementation approaches:

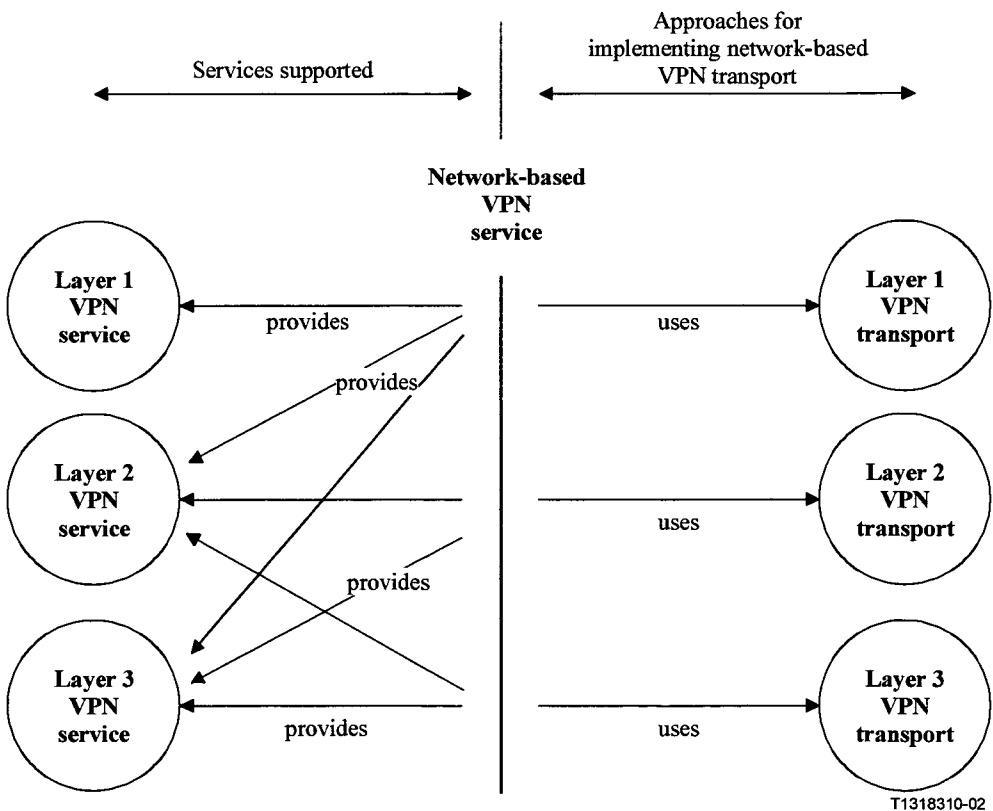


Figure 1/Y.1311 – General Scope

NOTE 1 – The examples shown above are non-exhaustive.

NOTE 2 – Not all combinations of elements shown in the figure are feasible, or are within the scope of this Recommendation.

Further explanation of the concepts shown in Figure 1, are contained in clauses 5 and 6.

2 References

2.1 Normative references

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated are valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T Recommendation Y.1241 (2001), *Support of IP-based services using IP transfer capabilities*.
- [2] ITU-T Recommendation Y.1311.1 (2001), *Network-based IP VPN over MPLS architecture*.

3 Terms and definitions

This Recommendation defines the following terms.

3.1 Network-based Virtual Private Network (NB VPN)

A network-based virtual private network is that part of a network which provides connectivity amongst a limited and specific subset of the total set of users served by the network provider. A VPN has the appearance of a network that is dedicated specifically to the users within the subset. This dedication is achieved through logical rather than physical means, hence the use of the word virtual. Users within a VPN cannot communicate, via the VPN provider, with users not included in the specific VPN subset and vice versa.

NOTE – The term "network based" is used to distinguish the network provider solutions described in this Recommendation from VPN solutions which are implemented solely through the use of customer equipment based solutions. Whenever the term "VPN" is used in this Recommendation it shall be taken to mean a "network-based VPN".

3.2 NB Layer 1 VPN

A network-based Layer 1 VPN is a NB VPN where the VPN service operates at layer 1 and provides optical or TDM connections between the customer devices belonging to the VPN, i.e. between a port on one customer device and a port on another customer device.

3.2.1 Optical VPN

A network-based optical VPN is a layer 1 VPN that uses optical interconnections between customer devices as the basis for providing the VPN facilities.

3.3 NB Layer 2 VPN

A network-based Layer 2 VPN is a NB VPN where the VPN service operates at layer 2 and provides a data link service between customer devices belonging to the VPN, e.g using IEEE 802, FR or ATM protocols.

3.4 NB Layer 3 VPN

A network-based Layer 3 VPN is a NB VPN where the VPN service operates at layer 3, and provides a layer 3 service between customer devices belonging to the VPN, e.g using IP protocols.

3.4.1 NB IP VPN

A network-based IP VPN is a network-based layer 3 VPN that uses IP addressing, IP forwarding and routing, and the IP protocol for control and data, and IP technology as the basis for providing the VPN facilities.

3.5 Virtual Services Network (VSN)

The Virtual Services Network is an abstract representation of the set of services that can be made available to a customer of an NB VPN. These services include services which enable the control, administration and management of the VPN.

3.6 Virtual Transport Network

The Virtual Transport Network is an abstract representation of the set of forms of implementation of an NB VPN.

4 Abbreviations and Acronyms

This Recommendation uses the following abbreviations.

ATM	Asynchronous Transfer Mode
CE	Customer Edge
FR	Frame Relay
GRE	Generic Routing Encapsulation
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IP	Internet Protocol
MPLS	Multiprotocol Label Switching
NB	Network Based
P	Provider
PE	Provider Edge
PPVPN	Provider Provisioned Virtual Private Network
QoS	Quality of Service
SLA	Service Level Agreement
TDM	Time Division Multiplex
VPN	Virtual Private Network
VSN	Virtual Service Network
VTN	Virtual Transport Network

5 Service definition

5.1 Introduction

This clause provides a generic functional definition of a "Network-based VPN" network service. Implementation issues as well as implementation-specific service aspects are out of scope of this part of Recommendation.