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**Integrated broadband cable telecommunication networks (CABLE); IPv6 Transition Technology Engineering and Operational Aspects; Part 2: NAT64**

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# Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Integrated broadband cable telecommunication networks (CABLE).

The present document is part 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [23].

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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# Introduction

Considering the depletion of IPv4 addresses, transition to IPv6 is required in order to enable continued growth of the customer base connected to cable networks and ensure service continuity for existing and new customers. High-quality connectivity to all kinds of IP-based services and networks is essential in today's business and private life.

The present document accommodates an urgent need in the industry to implement and integrate the IPv6 transition technologies as specified by ETSI TS 101 569-1 [1] into their cable networks. The choice of the technology implemented depends on factors such as the business needs, current deployed architectures and plans for cost effectively transition from IPv4 to IPv6.

Current global IPv4 address space was projected to be depleted around the middle of 2012; depletion for the operator was estimated around end 2012. As part of the resulting roll-out of IPv6 in the operator's network, specific measures had to be taken to allow a smooth transition and coexistence between IPv4 and IPv6. ETSI developed requirements to address transition from IPv4 to IPv6 specifying six transition technologies as given by ETSI TS 101 569-1 [1] that were at the time considered to be the most appropriate to assist cable operators to transition there cable networks to IPv6.

Since then the industry has acquired more experience with the technology options settling in the main for DS-Lite across the cable network market and NAT64 IPv6 transition technologies across the mobile market.

The objective of the present document is to define the operational and engineering requirements to enable engineers to implement a seamless transition of the cable networks to IPv6 with the application of the 6RD transition technology.

The present document is the final part of a companion of ETSI standards developed in 4 phases to provide the cable sector in particular cable operators engineering and operational staff a standardized approach when integrating one of the five IPv6 transition technologies, NAT64, DS-Lite, 464XLAT, 6RD and MAP-E.

The first phase assessed the different IPv6 transition technology options being defined by industry with recommendation for the most appropriate with consideration of current network architectures, ensuring adequate scale and a cost effective transition approach from IPv4 to IPv6 as the IPv4 addresses deplete. The objective being to examine the pros and cons of the IPv6 transition technologies and recommend the most cost effective solution that would enable the cable operators to minimize the cost of upgrades to their existing network plant whilst maintain continuity of services to their present and new added customers. The details of the study are given by ETSI TR 101 569 [2].

In the second phase an ETSI technical specification was developed to specify technical requirements for six transition technologies that industry were considering for use by Cable Operators depending on the current state of their deployed cable network architecture, service model requirements and their IPv6 transition strategy as the IPv4 addresses depleted. These six IPv6 transition technologies are specified by ETSI TS 101 569-1 [1], covering NAT64, DSLite, 6RD, NAT44, 464XLAT and MAP-E.

In the third phase ETSI developed a series of conformance test specifications to enable the compliance verification of the five IPv6 transition technologies, NAT64, DS-Lite, 464XLAT, 6RD and MAP-E that were specified during phase 2 standardization. The conformance tests are developed against the requirements given by the ETSI TS 101 569-1 [1]. The series of conformance tests developed for each of the four transition technologies, are as given by, ETSI TS 103 238 parts 1 [3] to 3 [5] respectively for NAT64; ETSI TS 103 239 parts 1 [6] to 3 [8] respectively for MAP-E; ETSI TS 103 241 parts 1 [9] to 3 [11] respectively for DS-Lite; ETSI TS 103 242 parts 1 [12] to 3 [14] respectively for XLAT and ETSI TS 103 243 parts 1 [15] to 3 [17] respectively for 6RD.

Phase 4 is the present project phase for development of technical specifications covering the operational and engineering requirements with the present document being part 2 of a multi-part series covering the IPv6 transition technology NAT64.

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# 1 Scope

The present document presents the engineering and operational requirements for the application of the IPv6 transition technology NAT64 as defined by ETSI TS 101 569-1 [1] (IPv6 Transition Requirements) implemented within an integrated broadband cable network end to end across its network domains.

The present document is part 2 of a multi-part series and presents the operational aspects of the IPv6 transition technology NAT64 across the cable network domains.

Only those elements of the network that have to be engineered to operate the IPv6 transition technology NAT64 are presented. Descriptions and interface details of network elements that do not change are already addressed by the relevant equipment cable standards and therefore this information is not included in the present document.

The conformity of the NAT64 implementation is relevant when assessing its implementation and operational requirements across the cable network to ensure the implementation is correctly engineered to conform to the requirements of the base standard ETSI TS 101 569-1 [1]. These conformance tests are not specified in the present document as they are already specified by ETSI TS 103 243 parts 1 [15] to 3 [17].

The operational aspects for the IPv6 transition technology NAT64 are considered when engineered end to end across the cable network domains:

- CPE Home Networking Domain
- Access Network Domain
- Core Network Domain
- Data Centre Domain
- DMZ Service Domain
- Transit and Peering Domain
- Management and Monitoring Domain
- Security Domain

The present document specifies the requirements to be considered when the defined IPv6 transition technology NAT64 is engineered across the cable network domains.

# 2 References

## 2.1 Normative references

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The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 101 569-1: "Integrated Broadband Cable Telecommunication Networks (CABLE); Cable Network Transition to IPv6; Part 1: IPv6 Transition Requirements".

[2] ETSI TR 101 569: "Access, Terminals, Transmission and Multiplexing (ATTM); Integrated Broadband Cable and Television Networks; Cable Network Transition to IPv6".