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Deploying IPv6 **Guidelines for ISPs on IPv6 Assignment to Customers**	1.2

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Abstract:

This document provides simple guidelines for Service Providers in order to facilitate the understanding of the correct assignment/allocation of IPv6 addresses/prefixes to customers.

Keywords:

Address, Allocation, Customers, Guidelines, IPv6, IPv6 Task Force, Prefix, RIRs.

Revision History

The following table describes the main changes done in the document since its creation.

Revision	Date	Description	Author (Organization)
v1.0	05/05/2004	Document Creation	Jordi Palet (Consulintel)
v1.1	06/05/2004	Document updated with new references	Jordi Palet (Consulintel)
v1.2	20/06/2004	Final review. No inputs received	Jordi Palet (Consulintel)

1. INTRODUCTION AND BACKGROUND

This document summarizes the information contained in the different documents (IETF, RIRs policies, etc.), regarding the practices for the delegation of IPv6 prefixes/addresses from ISPs to end Customers.

This document doesn't supersede what is already contained in the "Documents to Read" section, but instead provides a short summary and clarification of the relevant information and best practices.

The IPv6 address consists of 64 bits of "network number" and 64 bits of "host number".

Assuming that subnets come from the network part, providing a /48 to every subscriber doesn't represents a waste of address space. If we calculate the number of /48 prefixes contained in the Global Unicast Address prefix (001), is equal to 45 variable bits (2^{45}), which means 35.184.372.088.832 (35 trillion).

Is clear, consequently, that no shortage of /48 prefixes is foreseen, while the expectation that personal and/or networks is today no longer a fiction. Enterprise and individual subscribers expect to be able to connect to the network multiple always-on devices (fixed and mobile).

Considering the previous premises, is foreseen that the need for subneting is a required feature, for example in cases when separate networks are required because different departments or SOHO situations where the home and office network share the same access.

The conclusion is that in general, the subscriber doesn't longer require a single host address, but a site prefix.

While a possible solution could rely on renumbering and despite the effort done in the design of IPv6 to minimize the impact or this operation, renumbering has still non trivial effects that require some degree of manual/human intervention, and consequently should be avoided whenever feasible.

2. IPv6 ADDRESS/PREFIX ASSIGNMENT GUIDELINES

Today the default IPv6 address allocation policy for all the RIRs already provides a /32 to the ISPs (and consequently 65.535 /48 for their customers). In any case, bigger allocations are always possible and not restricted by the RIRs, when conveniently justified, considering factors as the customers base or future expectations.

In order to balance IPv6 address space conservation practices, network administration, deployment/growth expectations and the avoidance of renumbering and scaling inefficiencies, the ISPs should keep the following allocation practices described in the following table.

Prefix	General Case	Examples
/47	Very large subscribers	
/48	General case, except for very large subscribers	Home network subscribers (on-demand and always-on), SOHO, small and large enterprises
/64	When it is known that one and only one subnet is needed and for sure not required more in the future	Mobile networks (vehicles, mobile phones)
/128	When it is absolutely known that one and only one device is connecting	Single PCs (no additional need to subnet), dial-up cases

Allocation of several /32s to ISPs or several /48s to customers has always the inconvenience, among others, of increasing the routing tables, which should be considered. This means that whenever necessary or expected, bigger prefixes should be allocated with no restrictions.

3. DOCUMENTS TO READ

Document	URL
IAB/IESG Recommendations on IPv6 Address Allocations to Sites	ftp://ftp.rfc-editor.org/in-notes/rfc3177.txt
IPv6 Address Allocation and Assignment Policy (RIPE)	http://www.ripe.net/ripe/docs/ipv6policy.html
IPv6 Address Allocation and Assignment Policy (ARIN)	http://www.arin.net/policy/ipv6_policy.html
IPv6 Address Allocation and Assignment Policy (APNIC)	http://www.apnic.net/docs/policy/ipv6-address-policy.html
IPv6 Address Allocation and Assignment Policy (LACNIC)	http://lacnic.net/en/ipv6.html