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G. Huston
APNIC

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Proposed Changes to the Format of the IANA IPv6 Registry

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Abstract

This document proposes a revised format for the IANA IPv6 address registries. Rather than providing a formal definition of the format, it is described by giving examples of the (current as of preparation of this document) contents of the registries in the proposed format. The proposed format would bring the IANA IPv6 address registries into alignment with the current IPv6 Address Architecture specification, as well as update it to a more useful and generally accepted format.

1. Introduction

This document proposes a revised format for the IANA IPv6 address registries. The proposed format would bring the IANA IPv6 address registries into alignment with the current IPv6 Address Architecture specification, as well as update it to a more useful and generally accepted format.

The current (as of preparation of this document) IANA IPv6 registries [iana-ipv6-registry] [iana-ipv6-tla] are based on a now-deprecated address architecture that used the concept of Top Level Aggregation Identifiers (TLAs) and sub-TLAs. The current IPv6 Address Architecture [RFC3513] uses the terminology of Global Identifiers instead of TLAs and sub-TLAs.

2. IPv6 Address Registry

The proposed format for the IPv6 address registry is indicated by example, using the registry state that is current as of preparation of this document, in Figure 1. The registry explicitly notes which entity is placing a reservation on an address block and notes the defining RFC document for each allocation.

The proposed format of the registry is a title line, the date of the last change to the registry, the registry in a tabular format, notes and references.

The table uses 4 columns. Within the table, the first column contains an IPv6 address prefix, using a hexadecimal notation of the address prefix and a prefix length. There are no overlapping address blocks in the first column, and the set of address blocks in the registry spans the entire IPv6 address space. The second column denotes the current disposition of the address block, using notation derived from the defining RFC document. The third column contains a reference to the RFC that describes the current disposition of the address block. The fourth column uses numeric footnote notation to reference any additional text associated with the address block.

The notes in the registry may include a summary of previous disposition status values associated with an address block, as this summary is specifically not included in the registry table. The notes are numbered sequentially.

The reference section uses a conventional citation format. The references include documents referenced in the registry table and documents referenced in the notes.

INTERNET PROTOCOL VERSION 6 ADDRESS SPACE

[last updated 13 January 2005]

IPv6 Prefix	Allocation	Reference	Note
0000::/8	Reserved by IETF	RFC3513	[1]
0100::/8	Reserved by IETF	RFC3513	
0200::/7	Reserved by IETF	RFC4048	[2]
0400::/6	Reserved by IETF	RFC3513	
0800::/5	Reserved by IETF	RFC3513	
1000::/4	Reserved by IETF	RFC3513	
2000::/3	Global Unicast	RFC3513	[3]
4000::/3	Reserved by IETF	RFC3513	

6000::/3	Reserved by IETF	RFC3513	
8000::/3	Reserved by IETF	RFC3513	
A000::/3	Reserved by IETF	RFC3513	
C000::/3	Reserved by IETF	RFC3513	
E000::/4	Reserved by IETF	RFC3513	
F000::/5	Reserved by IETF	RFC3513	
F800::/6	Reserved by IETF	RFC3513	
FA00::/7	Reserved by IETF	RFC3513	
FC00::/7	Reserved by IETF	RFC3513	
FE00::/9	Reserved by IETF	RFC3513	
FE80::/10	Link Local Unicast	RFC3513	
FEC0::/10	Reserved by IETF	RFC3879	[4]
FF00::/8	Multicast	RFC3513	

Notes:

[0] The IPv6 address management function was formally delegated to IANA in December 1995 [RFC1881].

[1] The "unspecified address", the "loopback address", and the IPv6 Addresses with Embedded IPv4 Addresses are assigned out of the 0000::/8 address block.

[2] 0200::/7 was previously defined as an OSI NSAP-mapped prefix set [RFC1888]. This definition has been deprecated as of December 2004 [RFC4048].

[3] The IPv6 Unicast space encompasses the entire IPv6 address range with the exception of FF00::/8. [RFC3513] IANA unicast address assignments are currently limited to the IPv6 unicast address range of 2000::/3. IANA assignments from this block are registered in the IANA registry: iana-ipv6-unicast-address-assignments.

[4] FEC0::/10 was previously defined as a Site-Local scoped address prefix. This definition has been deprecated as of September 2004 [RFC3879].

References:

[RFC1881] The IAB and IESG, "IPv6 Address Allocation Management", RFC 1881, December 1995.

[RFC1888] J. Bound et al, "OSI NSAPs and IPv6", RFC 1888, August 1996.

[RFC3513] R. Hinden and S. Deering, "IP Version 6 Addressing Architecture", RFC 3513, April 2003.

[RFC3879] C. Huitema and B. Carpenter, "Deprecating Site Local Addresses", RFC 3879, September 2004.

[RFC4048] B. Carpenter, "RFC 1888 Is Obsolete", RFC 4048, April 2005.

Figure 1

2.1. Notes on Proposed Format Changes to the Registry

- The textual preamble at the start of the registry has been removed, in deference to the use of standard IPv6 prefix notation in the registry.
- Binary prefix notation has been replaced by standard IPv6 prefix hexadecimal notation, and the fraction of address space column has been replaced with the reference to the relevant RFC that defines the disposition of the address block. Footnote references are also displayed in a consistent fashion.
- The terminology "Unassigned" has been replaced by the more precise phrase "Reserved by IETF", indicating the body that has the token to permit reassignment of the status of this address block.
- The "Formerly Site-Local" entry in the body of the registry has been replaced with an explicit reference to deprecation. A similar treatment is proposed for 0200::/8, although the RFC number for the deprecation document has yet to be assigned. There is a distinction drawn between the current status of a registry and the set of registry actions that have lead to the current state. The registry table describes the current status of the registry, while the text footnotes are used to describe the set of transactions leading to the current state, including any former states.
- Annotations that are references to footnotes are included in the registry in a separate column.
- The text commentary on unicast, multicast and anycast addresses has been removed, as there is no distinction between anycast and unicast addresses and multicast addresses are explicitly flagged in the registry.

- o A note and a corresponding reference to RFC1881 was added to record the formal delegation of the IPv6 address management function to IANA.

3. Global Unicast IPv6 Address Registry

The proposed registry format for Global Unicast IPv6 address block allocations is indicated by example, using the registry state that was current as of preparation of this document, in Figure 2. The registry notes the current allocations, and does not include any notation of intended future allocations or reservations. All address space not listed in this registry forms the IANA unallocated address pool, to be allocated by IANA as per the prevailing address allocation policies.

The proposed format of the registry is a title line, the date of the last change to the registry, the registry in a tabular format, notes and references.

The table uses 4 columns. Within the table, the first column is an IPv6 address prefix, using a hexadecimal notation of the address prefix and a prefix length. There are no overlapping address blocks in the first column. The entries here describe only IANA allocations of address blocks. Temporary IANA reservations for future allocations, allocation expansion windows and any other internal IANA states are not described in this registry. The second column describes the current disposition of the address block, by noting either the Regional Internet Registry (RIR) to whom the address block was assigned, or the intended use of the address block. The third column is the date of the IANA allocation, including the day of the month. The fourth column uses numeric footnote notation to reference any additional text associated with the address block.

The notes in the registry may include a summary of previous disposition status values associated with an address block, as this summary is specifically not included in the registry table. The notes are numbered sequentially.

The reference section uses a conventional citation format. The references include documents referenced in the registry table and documents referenced in the notes.

IPV6 GLOBAL UNICAST ADDRESS ASSIGNMENTS

[last updated 13 January 2005]

Global Unicast Prefix	Assignment	Date	Note
2001:0000::/23	IANA	01 Jul 99	[1]
2001:0200::/23	APNIC	01 Jul 99	
2001:0400::/23	ARIN	01 Jul 99	
2001:0600::/23	RIPE NCC	01 Jul 99	
2001:0800::/23	RIPE NCC	01 May 02	
2001:0A00::/23	RIPE NCC	02 Nov 02	
2001:0C00::/23	APNIC	01 May 02	[2]
2001:0E00::/23	APNIC	01 Jan 03	
2001:1200::/23	LACNIC	01 Nov 02	
2001:1400::/23	RIPE NCC	01 Feb 03	
2001:1600::/23	RIPE NCC	01 Jul 03	
2001:1800::/23	ARIN	01 Apr 03	
2001:1A00::/23	RIPE NCC	01 Jan 04	
2001:1C00::/22	RIPE NCC	01 May 04	
2001:2000::/20	RIPE NCC	01 May 04	
2001:3000::/21	RIPE NCC	01 May 04	
2001:3800::/22	RIPE NCC	01 May 04	
2001:4000::/23	RIPE NCC	11 Jun 04	
2001:4200::/23	ARIN	01 Jun 04	
2001:4400::/23	APNIC	11 Jun 04	
2001:4600::/23	RIPE NCC	17 Aug 04	
2001:4800::/23	ARIN	24 Aug 04	
2001:4A00::/23	RIPE NCC	15 Oct 04	
2001:4C00::/23	RIPE NCC	17 Dec 04	
2001:5000::/20	RIPE NCC	10 Sep 04	
2001:8000::/19	APNIC	30 Nov 04	
2001:A000::/20	APNIC	30 Nov 04	
2002::/16	6to4	01 Feb 01	[3]
2003:0000::/18	RIPE NCC	12 Jan 05	
3FFE::/16	6BONE	01 Dec 98	[4]

Notes:

[0] The assignable Global Unicast Address space is defined in [RFC3513] as being the address block defined by the prefix 2000::/3. All address space in this block not listed in the table above is reserved by IANA for future allocation.

[1] The prefix assigned to the IANA, 2001:0000::/23, is for assignment for testing, experimental and trial usage by IANA [RFC2928].

[2] 2001:0DB8::/32 has been assigned as a NON-ROUTABLE range to be used for documentation purposes [RFC3849].

[3] 2002::/16 is reserved for use in 6to4 deployments [RFC3056]

[4] 3FFE::/16 is an experimental allocation to the 6BONE [RFC2471]. This prefix will be returned to the unassigned address pool on the 6th June 2006 [RFC3701].

References:

[RFC2471] R. Hinden, R. Fink and J. Postel, "IPv6 Testing Address Allocation", RFC 2471, December 1998.

[RFC2928] R. Hinden, S. Deering, R. Fink and T. Hain, "Initial IPv6 Sub-TLA ID Assignments", RFC 2928, September 2000.

[RFC3056] B. Carpenter and K. Moore, "Connection of IPv6 Domains via IPv4 Clouds", RFC 3056, February 2001.

[RFC3513] R. Hinden and S. Deering, "Internet Protocol Version 6 (IPv6) Addressing Architecture", RFC 3513, April 2003.

[RFC3701] R. Fink and R. Hinden, "6bone (IPv6 Testing Address Allocation) Phaseout", RFC 3701, March 2004.

[RFC3849] G. Huston, A. Lord, A and P. Smith, "IPv6 Address Prefix Reserved for Documentation", RFC 3849, July 2004.

Figure 2

3.1. Notes on Proposed Format Changes to the Registry

- The current registry name "iana-ipv6-tla-assignments" should be changed to "iana-ipv6-unicast-address-assignments".
- The title of the registry has been altered to remove the reference to "TOP LEVEL AGGREGATION IDENTIFIER".
- The TLA and Sub-TLA identifier assignments have been rolled into a single set of address prefixes and their assignment.
- The text commentary at the start of the registry contents has been removed.
- Binary value notation of the address prefixes has been removed.
- Further commentary on assignments, such as the planned phaseout of the 6BONE, is placed in a footnote.
- The registry continuation lines using ellipsis notation have been removed.
- Only assigned addresses are listed. All unassigned addresses, marked in the original IANA registry with the assignment note of "(future assignment)" have been removed, as has the entry marked "reserved *)".
- Address assignments are listed using prefix size notation of the actual allocation, rather than reporting the allocation in sub-units of /23 prefixes.
- The date of the IANA action includes the day of the month as well as the month and year.

4. IANA Considerations

IANA is advised to adopt these formats for the IPv6 address registry and the IPv6 Global Unicast address registry.

5. Security Considerations

Security of the Internet’s routing system relies on the ability to authenticate an assertion of unique control of an address block. Measures to authenticate such assertions rely on validation that the address block forms part of an existing allocated address block, and that there is a trustable reference from the IANA address registry to the RIR, and a trustable reference from the RIR’s registry to a Local Internet Registry or end-user Internet Service Provider.

The proposed format for the IANA registry is a small step towards the creation of a registry that can be used as a trust point for commencing a chain of address validation. Consideration should be given to IANA registry publication formats that are machine parseable, and also the use of file signatures and associated certificate mechanisms to allow applications to confirm that the registry contents are current, and that they have been published by the IANA.

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7. References

7.1. Normative References

[RFC3513] Hinden, R. and S. Deering, "Internet Protocol Version 6 (IPv6) Addressing Architecture", RFC 3513, April 2003.

7.2. Informative References

[iana-ipv6-registry] IANA, "IANA IPv6 Address Registry", December 2004.

[iana-ipv6-tla] IANA, "IANA Registry of IPv6 Top Level Aggregation Identifier Assignments", December 2004.

Author's Address

Geoff Huston
Asia Pacific Network Information Centre

EMail: gih@apnic.net
URI: http://www.apnic.net

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