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## Introduction: Rationale for a New Version of IP

IP version 6 is a new IP protocol designed to replace IP version 4, the Internet protocol that is predominantly deployed and extensively used throughout the world. IPv4 has proven to be robust, easily implemented, and interoperable, and has stood the test of scaling an internetwork to a global utility the size of the Internet today. However, the initial design did not anticipate the following conditions:

- Exponential growth of the Internet and the impending exhaustion of the IPv4 address space
- Ability of Internet backbone routers to maintain large routing tables
- Need for simpler autoconfiguration and renumbering
- Requirement for security at the IP level
- Need for better support for real-time delivery of data

## Evolution of Internet Protocol Version 6

The original proposal for IPv6 proposed is in RFC 1752, The Recommendation for the IP Next Generation Protocol was the Simple Internet Protocol Plus (SIPP) with a larger (128 bit) address space. Following that proposal, the IETF started a working group and the first specification came in late 1995 with RFC 1883, Internet Protocol, Version 6 (IPv6) Specification. RFC 2460, Internet Protocol, Version 6 (IPv6) Specification obsoletes RFC 1883 and is the present standard for IPv6.

IPv6 quadruples the number of network address bits from 32 bits (in IPv4) to 128 bits, which provides more than enough globally unique IP addresses for every network device on the planet. The use of globally unique IPv6 addresses simplifies the mechanisms used for reachability and end-to-end security for network devices, functionality that is crucial to the applications and services that are driving the demand for the addresses.

## Features and Benefits of Using IPv6

In addition to meeting the anticipated future demand for globally unique IP addresses, IPv6 provides the following benefits:

- Larger address space for global reachability and scalability
- Simplified header format for efficient packet handling
- Hierarchical network architecture for routing efficiency
- Support for widely deployed routing protocols
- Autoconfiguration and plug-and-play support
- Enhanced support for Mobile IP and Mobile Computing Devices
- Increased number of multicast addresses

Details and figures that describe IPv6 formats, simplified packet header, address types, as well as additional information is available at: <http://www.cisco.com/web/solutions/netsys/ipv6/knowledgebase/index.html>

## For More Information

- [Cisco IPv6 Knowledge Base Portal](#)
- [IPv6 - Cisco Systems](#)
- [Cisco Support Community: IPv6 Integration and Testing](#)
- [IPv6 on DocWiki](#)
- [Wikipedia: IPv6](#)