

DNS Through Time: From Birth to Security and Filtering

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Historical background

- *Internet Governance*
- *IANA, Jon Postel*
- *IETF*

Cyberspace

The Three Layers of **Martin Libicki** (Cybersecurity Scholar)

Physical Layer: composed of the physical components of cyberspace (submarine cables, antennas, satellites, fiber optics, etc.);

Syntactic Layer: composed of protocols, rules, and the natural properties that govern the functioning and interaction of the various physical components of cyberspace;

Semantic Layer: the result of the interaction between the first two layers; this layer provides meaning and ensures the functionality and significance of the processes occurring in the lower layers.



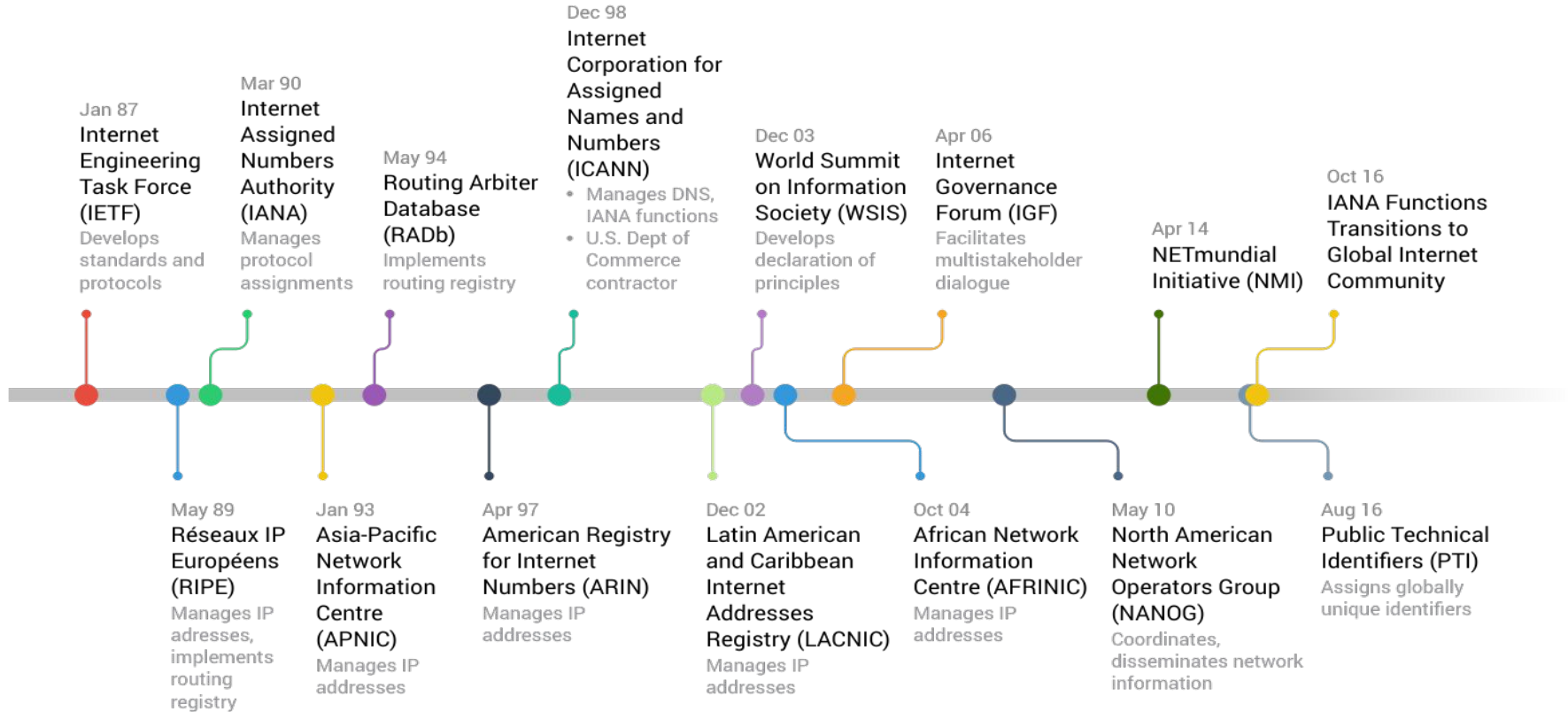
Internet Governance

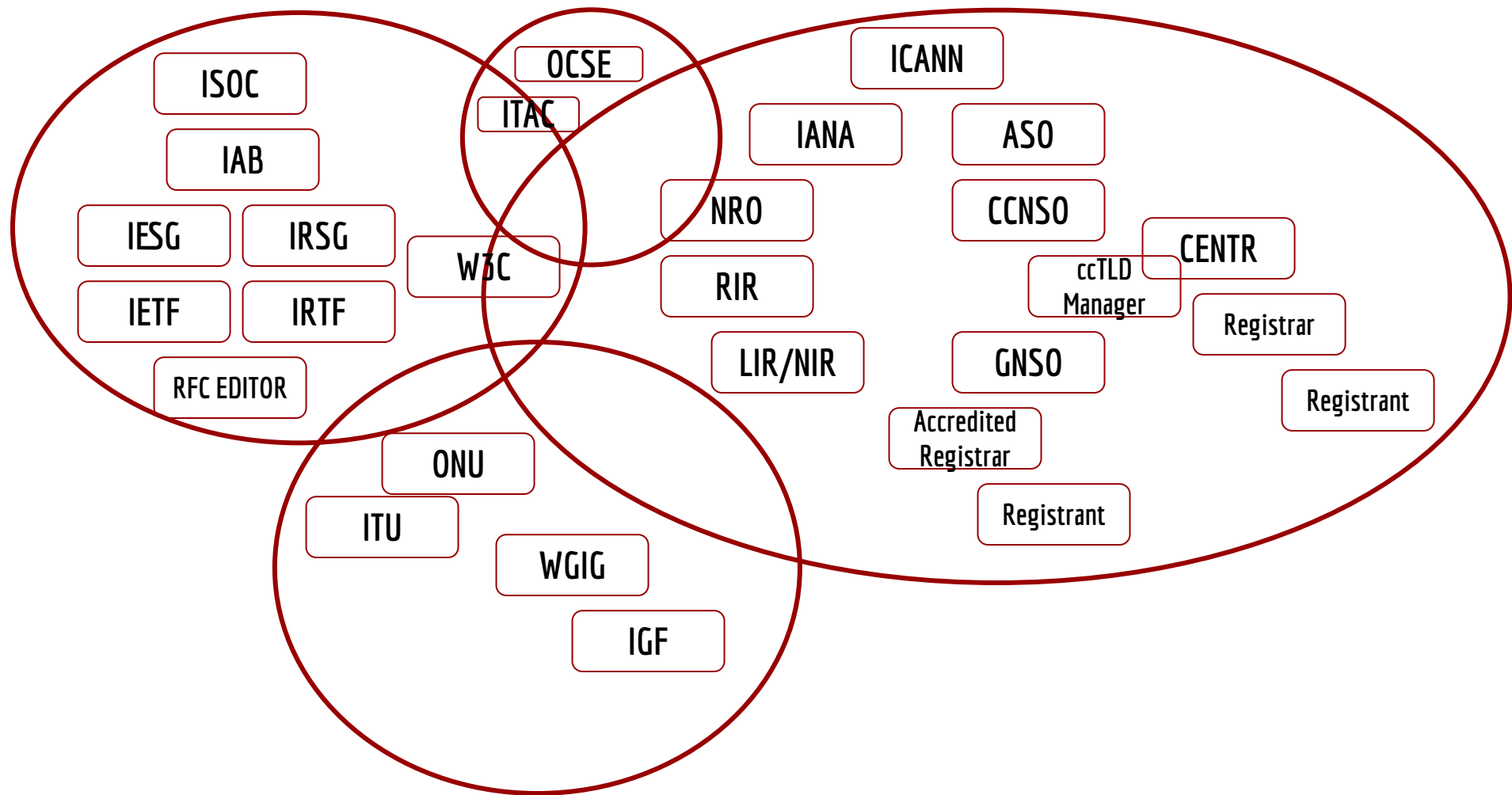
TUNIS AGENDA FOR THE INFORMATION SOCIETY

18 November 2005

34. A working definition of Internet governance is the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet.

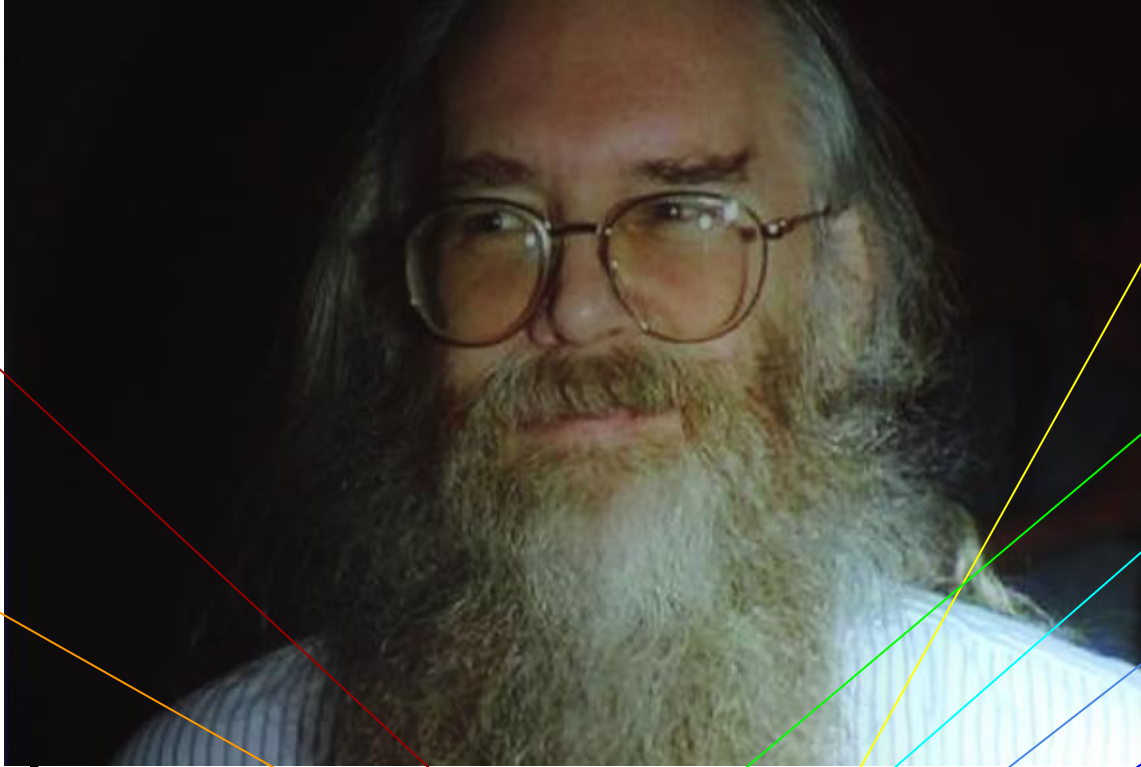
Internet governance timeline







spam
UDP
hostnames



telnet
SMTP
IP
ICMP
TCP

Jon Postel, Internet pioneer (1943-1998)

[RFC 77, 127, 128, 139, 145, 158, 165, 204, 229, 236, 268, 295, 317, 318, 322, 324, 328, 346, 347, 348, 349, 429, 433, 489, 516, 580, 587, 604, 640, 659, 661, 678, 690, 694, 706, 717, 718, 719, 730, 750, 753, 754, 755, 759, 760, 761, 762, 764, 765, 766, 767, 768, 769, 770, 774, 776, 777, **788**, 790, 791, 792, 793, 795, 796, **821**]





Jon Postel

RFC editor dal 1969

Numbering czar dal 1972

La legge di Postel (RFC 1122):

Be liberal in what you
accept, and conservative
in what you send

IN MEMORIAM

Dr. Jonathan B. Postel
August 3, 1943 - October 16, 1998

Executive Director and Founder, Internet Assigned Numbers Authority
Director, Computer Networks Division, Information Sciences Institute
RFC Editor; Trustee, Internet Society
Internet Networking Pioneer and Visionary

A memorial for Dr. Postel was held on November 5, 1998 at 11 a.m. in the Bovard Auditorium of the University of Southern California. The memorial service was webcast by USC.

[Eulogy by Vint Cerf: I Remember IANA RFC 2468](#)

[Eulogy by Daniel Farber: A Life Too Brief](#)

[Eulogy by Paul Vixie: Requiem for Jon Postel](#)

[Boardwatch \(12-98\)](#) Jon Postel Streamlines the Afterlife

[Wired \(11-5-98\)](#) A Wizard Rests in Peace

[Inter@ctive Week \(10-26\)](#) Jon Postel: Internet Architect and Caretaker

[New York Times \(10-18-98\)](#) Jon Postel, Who Helped Create the Internet, is Dead at 55

[Washington Post \(10-18\)](#) Jon Postel, Internet Pioneer, Dies at 55 after Heart Surgery

[Los Angeles Times \(10-18\)](#) Jon Postel, Influential Internet Pioneer, Dies

[Wired \(10-18-98\)](#) Net Mourns Passing of Giant

[San Jose Mercury News \(10-18\)](#) Internet Founding Father Dies

[C/Net \(10-19\)](#) IANA Chief Jon Postel Dies

[USC News Service \(10-19\)](#) Internet Pioneer Jon Postel Dies at 55

[Internet Week](#) [TechWeb \(10-19\)](#) Head of Internet Domain-Names Group Dies

[Internet News \(10-27\)](#) Postel Memorial Webcast Set for Nov. 5

[C/Net \(11-5\)](#) Postel Eulogized as Humble Genius



Photo by Peter Lothberg



[Dr. Jon Postel](#) was the Director of ISI's Computer Networks Division, based in Marina del Rey, California. He also held leadership positions in several Internet infrastructure activities. He was founder and head of the Internet Assigned Numbers Authority, RFC Editor, and chief administrator of the .US domain. He



ICANN84 Annual General Meeting

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84

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ICANN84 Annual General Meeting will be held in Dublin, Ireland at [The Convention Centre Dublin](#) from 23-30 October 2025.

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About

Schedule

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ICANN84 | Annual General Meeting

Mark your calendars for the October 25, 2025. Keep checking back for event registration, speaker announcements, and more details. Need answers ASAP? Reach out to our event planning team at kimberly.carlson@icann.org for info and more.



Antonio Prado - DNS Through Time: From Birth to Security and Filtering - 10 July 2025

[Home](#) > [Meetings](#)

IETF 123 Madrid

19 Jul 2025 - 25 Jul 2025

IETF 123 starts Saturday 19 July and runs through Friday afternoon, 25 July.

The [IETF Hackathon](#) and [IETF Codesprint](#) take place on the weekend. Events to help [new participants](#) get the most out of IETF meetings begin on Sunday afternoon. Participants should plan their travel accordingly. An [introduction to IETF meetings](#) provides an overview of how to prepare for and get the most out of sessions all week.

Key details

[Meeting Registration](#) ▾

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[Terms and conditions](#) | [Participant List](#) |
[Visa and LOI information](#)

[Participation Information](#) ▾

[Venue Information](#) ▾

[Venue and Hotels](#) | [Preferred Air Carrier](#) | [Childcare](#) |
[Floor plans](#) | [Participant wiki \(local information\)](#) |
[Meeting network and technology](#)

[Additional Events](#) ▾

Meetings

[IETF 123 Madrid](#)
[IETF 124 Montreal](#)
[IETF 125 Shenzhen](#)
[Upcoming meetings](#)
[Past meetings](#)
[Interim meetings](#)
[IETF Hackathons](#)
[Code Sprint](#)

ROUGH CONSENSUS (RFC 2418)

The Rough Consensus Process: it is not necessary for all participants to agree (although this is preferable), but the dominant viewpoint expressed within the IETF working group should prevail.

A general agreement should be sought, which typically emerges through a natural selection of the arguments presented by the working group members.

Ultimately, it is the working group chair who determines whether rough consensus has been reached.



Domain names

- *Hierarchies (root server)*
- *Registries (gTLD, ccTLD)*

ARPA, ccTLD, gTLD, grTLD, sTLD, tTLD



gTLD

.com
.net
.org
.info
...

neustar



ccTLD

.it
.eu
.de
.ch
.tv
...

Registro.it

.eu
Your European Identity

ARPA - Address and Routing Parameter Area

Infrastructure domain: ARPA

Infrastructure sub-domain:

as112.arpa, e164.arpa, home.arpa, in-addr.arpa,
ip6.arpa, in-addr-servers.arpa, ip6-servers.arpa,
ipv4only.arpa, iris.arpa, uri.arpa, urn.arpa

Generic Restricted TLD

.biz, .name, .pro

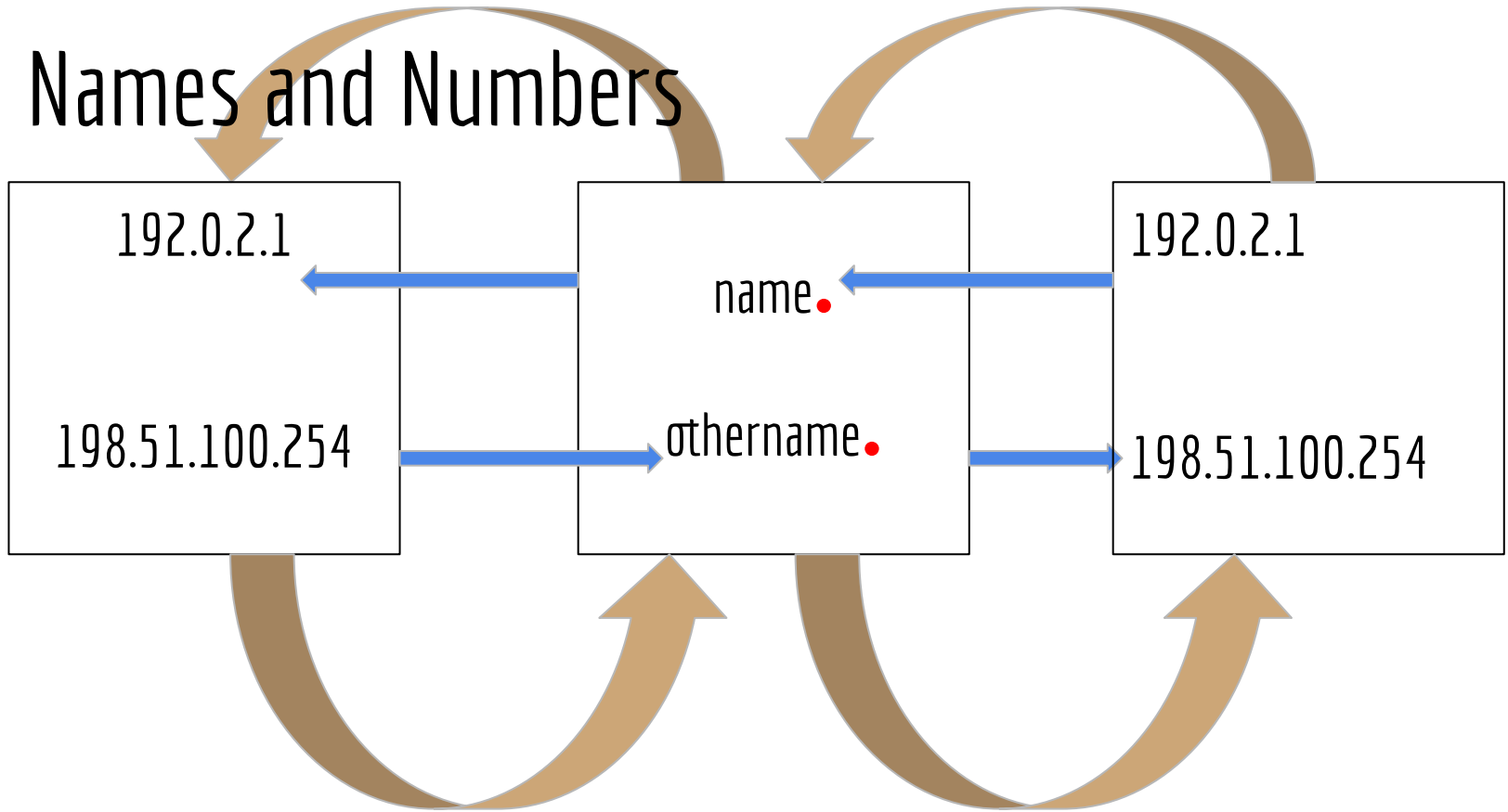
Sponsored TLD

.aero, .asia, .cat, .coop, .edu, .gov, .int,
.jobs, .mil, .mobi, .museum, .tel, .travel

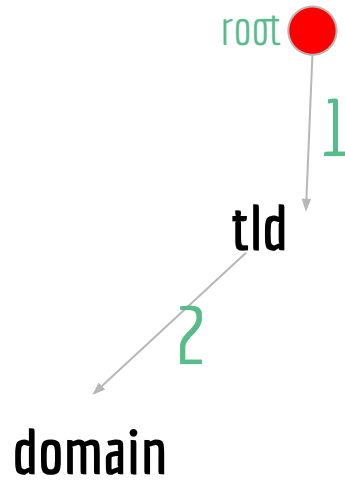
test TLD

.example, .invalid,
.localhost, .test

Names and Numbers



The root



www . domain . tld  root

3 2 1

1
tld.
2 domain.tld.
3 my.domain.tld.
4 like.my.domain.tld.
5 you.like.my.domain.tld.
6 so.you.like.my.domain.tld.
7 hey.so.you.like.my.domain.tld.

Root servers locations



As of 2024-11-17T20:55:07Z, the root server system consists of 1916 instances operated by the 12 independent root server operators.

TCP/UDP 53



[Paul_Mockapetris]



Paul Mockapetris, Internet pioneer

[RFC 822, 883, 973, **1034**, **1035**, 1101, 1183]

Number	Files	Title	Authors	Date	More Info	Status
RFC 1034 part of STD 13	ASCII , PDF , HTML , HTML with inline errata	Domain names - concepts and facilities	P.V. Mockapetris	November 1987	Errata , Obsoletes RFC 973 , RFC 882 , RFC 883 , Updated by RFC 1101 , RFC 1183 , RFC 1348 , RFC 1876 , RFC 1982 , RFC 2065 , RFC 2181 , RFC 2308 , RFC 2535 , RFC 4033 , RFC 4034 , RFC 4035 , RFC 4343 , RFC 4035 , RFC 4592 , RFC 5936 , RFC 8020 , RFC 8482 , RFC 8767	Internet Standard
RFC 974 part of STD 10	ASCII , PDF	Mail routing and the domain system	C. Partridge	January 1986	Obsoleted by RFC 2821	historic (changed from Internet Standard)
RFC 1035 part of STD 13	ASCII , PDF	Domain names - implementation and specification	P.V. Mockapetris	November 1987	Obsoletes RFC 973 , RFC 882 , RFC 883 , Updated by RFC 1101 , RFC 1183 , RFC 1348 , RFC 1876 , RFC 1982 , RFC 1995 , RFC 1996 , RFC 2065 , RFC 2136 , RFC 2181 , RFC 2137 , RFC 2308 , RFC 2535 , RFC 2673 , RFC 2845 , RFC 3425 , RFC 3658 , RFC 4033 , RFC 4034 , RFC 4035 , RFC 4343 , RFC 5936 , RFC 5966 , RFC 6604 , RFC 7766 , Errata	Internet Standard
RFC 1101	ASCII , PDF	DNS encoding of network names and other types	P.V. Mockapetris	April 1989	Updates RFC 1034 , RFC 1035	Unknown
RFC 1183	ASCII , PDF	New DNS RR Definitions	C.F. Everhart, L.A. Mamakos, R. Ullmann, P.V. Mockapetris	October 1990	Updates RFC 1034 , RFC 1035 , Updated by RFC 5395 , RFC 5864 , RFC 6195 , RFC 6895 , Errata	Experimental
RFC 1348	ASCII , PDF	DNS NSAP RRs	B. Manning	July 1992	Obsoleted by RFC 1637 , Updates RFC 1034 , RFC 1035	Experimental
RFC 1383	ASCII , PDF	An Experiment in DNS Based IP Routing	C. Huitema	December 1992		Experimental
RFC 1386	ASCII , PDF	The US Domain	A. Cooper, J. Postel	December 1992	Obsoleted by RFC 1480	Informational
RFC 1394	ASCII , PDF	Relationship of Telex Answerback Codes to Internet Domains	P. Robinson	January 1993		Informational

RFC Editor

1987

1993



1993

RFC 1401	ASCII, PDF	Correspondence between the IAB and DISA on the use of DNS	Internet Architecture Board	January 1993		Informational
RFC 1464	ASCII, PDF	Using the Domain Name System To Store Arbitrary String Attributes	R. Rosenbaum	May 1993	Errata	Experimental
RFC 1480	ASCII, PDF	The US Domain	A. Cooper, J. Postel	June 1993	Obsoletes RFC 1386	Informational
RFC 1535	ASCII, PDF	A Security Problem and Proposed Correction With Widely Deployed DNS Software	E. Gavron	October 1993	Errata	Informational
RFC 1536	ASCII, PDF	Common DNS Implementation Errors and Suggested Fixes	A. Kumar, J. Postel, C. Neuman, P. Danzig, S. Miller	October 1993		Informational
RFC 1537	ASCII, PDF	Common DNS Data File Configuration Errors	P. Beertema	October 1993	Obsoleted by RFC 1912	Informational
RFC 1591	ASCII, PDF	Domain Name System Structure and Delegation	J. Postel	March 1994		Informational
RFC 1611	ASCII, PDF	DNS Server MIB Extensions	R. Austein, J. Saperia	May 1994		Historic (changed from Proposed Standard October 2001)

1994

1994

RFC 1612	ASCII, PDF	DNS Resolver MIB Extensions	R. Austein, J. Saperia	May 1994		Historic (changed from Proposed Standard October 2001)
RFC 1637	ASCII, PDF	DNS NSAP Resource Records	B. Manning, R. Colella	June 1994	Obsoletes RFC 1348 , Obsoleted by RFC 1706	Experimental
RFC 1664	ASCII, PDF	Using the Internet DNS to Distribute RFC1327 Mail Address Mapping Tables	C. Allocchio, A. Bonito, B. Cole, S. Giordano, R. Hagens	August 1994	Obsoleted by RFC 2163	Experimental
RFC 1706	ASCII, PDF	DNS NSAP Resource Records	B. Manning, R. Colella	October 1994	Obsoletes RFC 1637	Informational
RFC 1712	ASCII, PDF	DNS Encoding of Geographical Location	C. Farrell, M. Schulze, S. Pleitner, D. Baldoni	November 1994	Errata	Experimental
RFC 1713 a.k.a. FYI 27	ASCII, PDF	Tools for DNS debugging	A. Romao	November 1994		Informational
RFC 1788	ASCII, PDF	ICMP Domain Name Messages	W. Simpson	April 1995	Obsoleted by RFC 6918	Historic (changed from Experimental February 2013)
RFC 1794	ASCII, PDF	DNS Support for Load Balancing	T. Brisco	April 1995		Informational

1995

1996

RFC 1876	ASCII, PDF	A Means for Expressing Location Information in the Domain Name System	C. Davis, P. Vixie, T. Goodwin, I. Dickinson	January 1996	Updates RFC 1034 , RFC 1035	Experimental
RFC 1886	ASCII, PDF	DNS Extensions to support IP version 6	S. Thomson, C. Huitema	December 1995	Obsoleted by RFC 3596 , Updated by RFC 2874 , RFC 3152	Proposed Standard
RFC 1912	ASCII, PDF	Common DNS Operational and Configuration Errors	D. Barr	February 1996	Obsoletes RFC 1537	Informational
RFC 1982	ASCII, PDF	Serial Number Arithmetic	R. Elz, R. Bush	August 1996	Updates RFC 1034 , RFC 1035	Proposed Standard
RFC 1995	ASCII, PDF	Incremental Zone Transfer in DNS	M. Ohta	August 1996	Updates RFC 1035 , Errata	Proposed Standard
RFC 1996	ASCII, PDF	A Mechanism for Prompt Notification of Zone Changes (DNS NOTIFY)	P. Vixie	August 1996	Updates RFC 1035	Proposed Standard
RFC 2052	ASCII, PDF	A DNS RR for specifying the location of services (DNS SRV)	A. Gulbrandsen, P. Vixie	October 1996	Obsoleted by RFC 2782	Experimental
RFC 2055	ASCII, PDF	Domain Name System Security Extensions	D. Eastlake 3rd, C. Kaufman	January 1997	Obsoleted by RFC 2535 , Updates RFC 1034 , RFC 1035	Proposed Standard
RFC 2136	ASCII, PDF	Dynamic Updates in the Domain Name System (DNS UPDATE)	P. Vixie, Ed., S. Thomson, Y. Rekhter, J. Bound	April 1997	Updates RFC 1035 , Updated by RFC 3007 , RFC 4035 , RFC 4033 , RFC 4034 , Errata	Proposed Standard
RFC 2137	ASCII, PDF	Secure Domain Name System Dynamic Update	D. Eastlake 3rd	April 1997	Obsoleted by RFC 3007 , Updates RFC 1035	Proposed Standard
RFC 2163	ASCII, PDF	Using the Internet DNS to Distribute MIXER Conformant Global Address Mapping (MCGAM)	C. Allocchio	January 1998	Obsoletes RFC 1664 , Updated by RFC 3597	Proposed Standard

1998

RFC 2181	ASCII, PDF	Clarifications to the DNS Specification	R. Elz, R. Bush	July 1997	Updates RFC 1034 , RFC 1035 , RFC 1123 , Updated by RFC 4035 , RFC 2535 , RFC 4343 , RFC 4033 , RFC 4034 , RFC 5452	Proposed Standard
RFC 2182 a.k.a. BCP 16	ASCII, PDF	Selection and Operation of Secondary DNS Servers	R. Elz, R. Bush, S. Bradner, M. Patton	July 1997	Errata	Best Current Practice
RFC 2219 a.k.a. BCP 17	ASCII, PDF	Use of DNS Aliases for Network Services	M. Hamilton, R. Wright	October 1997		Best Current Practice
RFC 2230	ASCII, PDF	Key Exchange Delegation Record for the DNS	R. Atkinson	November 1997		Informational
RFC 2240	ASCII, PDF	A Legal Basis for Domain Name Allocation	O. Vaughan	November 1997	Obsoleted by RFC 2352	Informational
RFC 2247	ASCII, PDF	Using Domains in LDAP/X.500 Distinguished Names	S. Kille, M. Wahl, A. Grimstad, R. Huber, S. Sataluri	January 1998	Updated by RFC 4519 , RFC 4524	Proposed Standard
RFC 2308	ASCII, PDF	Negative Caching of DNS Queries (DNS NCACHE)	M. Andrews	March 1998	Updates RFC 1034 , RFC 1035 , Updated by RFC 4035 , RFC 4033 , RFC 4034 , RFC 6604 , RFC 8020 , Errata	Proposed Standard
RFC 2345	ASCII, PDF	Domain Names and Company Name Retrieval	J. Klensin, T. Wolf, G. Oglesby	May 1998		Experimental
RFC 2352	ASCII, PDF	A Convention For Using Legal Names as Domain Names	O. Vaughan	May 1998	Obsoletes RFC 2240	Informational
RFC 2517	ASCII, PDF	Building Directories from DNS: Experiences from WWWSeeker	R. Moats, R. Huber	February 1999		Informational

RFC Editor

1997

1999

1999

RFC 2535	ASCII, PDF	Domain Name System Security Extensions	D. Eastlake 3rd	March 1999	Obsoletes RFC 2065 , Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 2181 , RFC 1035 , RFC 1034 , Updated by RFC 2931 , RFC 3007 , RFC 3008 , RFC 3090 , RFC 3226 , RFC 3445 , RFC 3597 , RFC 3655 , RFC 3658 , RFC 3755 , RFC 3757 , RFC 3845	Proposed Standard
RFC 2536	ASCII, PDF	DSA KEYS and SIGs in the Domain Name System (DNS)	D. Eastlake 3rd	March 1999	Updated by RFC 6944	Proposed Standard
RFC 2537	ASCII, PDF	RSA/MD5 KEYS and SIGs in the Domain Name System (DNS)	D. Eastlake 3rd	March 1999	Obsoleted by RFC 3110	Proposed Standard
RFC 2538	ASCII, PDF	Storing Certificates in the Domain Name System (DNS)	D. Eastlake 3rd, O. Gudmundsson	March 1999	Obsoleted by RFC 4398	Proposed Standard
RFC 2539	ASCII, PDF	Storage of Diffie-Hellman Keys in the Domain Name System (DNS)	D. Eastlake 3rd	March 1999	Updated by RFC 6944	Proposed Standard
RFC 2540	ASCII, PDF	Detached Domain Name System (DNS) Information	D. Eastlake 3rd	March 1999		Experimental
RFC 2541	ASCII, PDF	DNS Security Operational Considerations	D. Eastlake 3rd	March 1999	Obsoleted by RFC 4641	Informational
RFC 2606 a.k.a. BCP 32	ASCII, PDF	Reserved Top Level DNS Names	D. Eastlake 3rd, A. Panitz	June 1999	Updated by RFC 6761	Best Current Practice
RFC 2671	ASCII, PDF	Extension Mechanisms for DNS (EDNS0)	P. Vixie	August 1999	Obsoleted by RFC 6891	Proposed Standard
RFC 2672	ASCII, PDF	Non-Terminal DNS Name Redirection	M. Crawford	August 1999	Obsoleted by RFC 6672 , Updated by RFC 4592 , RFC 6604	Proposed Standard

1999

RFC 2673	ASCII, PDF	Binary Labels in the Domain Name System	M. Crawford	August 1999	Obsoleted by RFC 6891 , Updates RFC 1035 , Updated by RFC 3363 , RFC 3364 , Errata	Historic (changed from Proposed Standard August 1999)
RFC 2694	ASCII, PDF	DNS extensions to Network Address Translators (DNS_ALG)	P. Srisuresh, G. Tsirtsis, P. Akkiraju, A. Heffernan	September 1999		Informational
RFC 2782	ASCII, PDF	A DNS RR for specifying the location of services (DNS SRV)	A. Gulbrandsen, P. Vixie, L. Esibov	February 2000	Obsoletes RFC 2052 , Updated by RFC 6335 , Errata	Proposed Standard
RFC 2826	ASCII, PDF	IAB Technical Comment on the Unique DNS Root	Internet Architecture Board	May 2000	Errata	Informational
RFC 2845	ASCII, PDF	Secret Key Transaction Authentication for DNS (TSIG)	P. Vixie, O. Gudmundsson, D. Eastlake 3rd, B. Wellington	May 2000	Updates RFC 1035 , Updated by RFC 3645 , RFC 4635 , RFC 6895	Proposed Standard
RFC 2874	ASCII, PDF	DNS Extensions to Support IPv6 Address Aggregation and Renumbering	M. Crawford, C. Huitema	July 2000	Updates RFC 1886 , Updated by RFC 3152 , RFC 3226 , RFC 3363 , RFC 3364	Historic (changed from Proposed Standard January 2012)
RFC 2915	ASCII, PDF	The Naming Authority Pointer (NAPTR) DNS Resource Record	M. Mealling, R. Daniel	September 2000	Obsoleted by RFC 3401 , RFC 3402 , RFC 3403 , RFC 3404 , Updates RFC 2168	Proposed Standard
RFC 2916	ASCII, PDF	E.164 number and DNS	P. Faltstrom	September 2000	Obsoleted by RFC 3761 , Errata	Proposed Standard
RFC 2929	ASCII, PDF	Domain Name System (DNS) IANA Considerations	D. Eastlake 3rd, E. Brunner-Williams, B. Manning	September 2000	Obsoleted by RFC 5395	Best Current Practice

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1999

2000

2000

2001

RFC 2930	ASCII, PDF	Secret Key Establishment for DNS (TKEY RR)	D. Eastlake 3rd	September 2000	Updated by RFC 6895	Proposed Standard
RFC 2931	ASCII, PDF	DNS Request and Transaction Signatures (SIG(0)s)	D. Eastlake 3rd	September 2000	Updates RFC 2535	Proposed Standard
RFC 3007	ASCII, PDF	Secure Domain Name System (DNS) Dynamic Update	B. Wellington	November 2000	Obsoletes RFC 2137 , Updates RFC 2535 , RFC 2136	Proposed Standard
RFC 3008	ASCII, PDF	Domain Name System Security (DNSSEC) Signing Authority	B. Wellington	November 2000	Obsoleted by RFC 4035 , RFC 4033 , RFC 4034 , Updates RFC 2535 , Updated by RFC 3658	Proposed Standard
RFC 3026	ASCII, PDF	Liaison to IETF/ISOC on ENUM	R. Blane	January 2001		Informational
RFC 3071	ASCII, PDF	Reflections on the DNS, RFC 1591, and Categories of Domains	J. Klensin	February 2001		Informational
RFC 3088	ASCII, PDF	OpenLDAP Root Service An experimental LDAP referral service	K. Zeilenga	April 2001		Experimental
RFC 3090	ASCII, PDF	DNS Security Extension Clarification on Zone Status	E. Lewis	March 2001	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 2535 , Updated by RFC 3658	Proposed Standard
RFC 3110	ASCII, PDF	RSA/SHA-1 SIGs and RSA KEYS in the Domain Name System (DNS)	D. Eastlake 3rd	May 2001	Obsoletes RFC 2537 , Updated by RFC 6944 , Errata	Proposed Standard
RFC 3123	ASCII, PDF	A DNS RR Type for Lists of Address Prefixes (APL RR)	P. Koch	June 2001		Experimental
RFC 3130	ASCII, PDF	Notes from the State-Of-The-Technology: DNSSEC	E. Lewis	June 2001		Informational

RFC 3152 a.k.a. BCP 49	ASCII , PDF	Delegation of IP6.ARPA	R. Bush	August 2001	Obsoleted by RFC 3596 , Updates RFC 2874 , RFC 2772 , RFC 2766 , RFC 2553 , RFC 1886	Best Current Practice
RFC 3172 a.k.a. BCP 52	ASCII , PDF	Management Guidelines & Operational Requirements for the Address and Routing Parameter Area Domain ("arpa")	G. Huston, Ed.	September 2001		Best Current Practice
RFC 3197	ASCII , PDF	Applicability Statement for DNS MIB Extensions	R. Austein	November 2001		Informational
RFC 3225	ASCII , PDF	Indicating Resolver Support of DNSSEC	D. Conrad	December 2001	Updated by RFC 4033 , RFC 4034 , RFC 4035	Proposed Standard
RFC 3226	ASCII , PDF	DNSSEC and IPv6 A6 aware server/resolver message size requirements	O. Gudmundsson	December 2001	Updates RFC 2535 , RFC 2874 , Updated by RFC 4033 , RFC 4034 , RFC 4035 , Errata	Proposed Standard
RFC 3258	ASCII , PDF	Distributing Authoritative Name Servers via Shared Unicast Addresses	T. Hardie	April 2002		Informational
RFC 3363	ASCII , PDF	Representing Internet Protocol version 6 (IPv6) Addresses in the Domain Name System (DNS)	R. Bush, A. Durand, B. Fink, O. Gudmundsson, T. Hain	August 2002	Updates RFC 2673 , RFC 2874 , Updated by RFC 6672 , Errata	Informational
RFC 3364	ASCII , PDF	Tradeoffs in Domain Name System (DNS) Support for Internet Protocol version 6 (IPv6)	R. Austein	August 2002	Updates RFC 2673 , RFC 2874 , Errata	Informational
RFC 3397	ASCII , PDF	Dynamic Host Configuration Protocol (DHCP) Domain Search Option	B. Aboba, S. Cheshire	November 2002		Proposed Standard

RFC Editor

2001

2002

2002

2003

RFC 3403	ASCII, PDF	Dynamic Delegation Discovery System (DDDS) Part Three: The Domain Name System (DNS) Database	M. Mealling	October 2002	Obsoletes RFC 2915 , RFC 2168 , Errata	Proposed Standard
RFC 3425	ASCII, PDF	Obsoleting IQUERY	D. Lawrence	November 2002	Updates RFC 1035	Proposed Standard
RFC 3445	ASCII, PDF	Limiting the Scope of the KEY Resource Record (RR)	D. Massey, S. Rose	December 2002	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 2535 , Errata	Proposed Standard
RFC 3467	ASCII, PDF	Role of the Domain Name System (DNS)	J. Klensin	February 2003		Informational
RFC 3596 a.k.a. STD 88	ASCII, PDF	DNS Extensions to Support IP Version 6	S. Thomson, C. Huitema, V. Ksinant, M. Souissi	October 2003	Obsoletes RFC 3152 , RFC 1886	Internet Standard (changed from Draft Standard May 2017)
RFC 3597	ASCII, PDF	Handling of Unknown DNS Resource Record (RR) Types	A. Gustafsson	September 2003	Updates RFC 2163 , RFC 2535 , Updated by RFC 4033 , RFC 4034 , RFC 4035 , RFC 5395 , RFC 6195 , RFC 6895 , Errata	Proposed Standard
RFC 3645	ASCII, PDF	Generic Security Service Algorithm for Secret Key Transaction Authentication for DNS (GSS-TSIG)	S. Kwan, P. Garg, J. Gilroy, L. Esibov, J. Westhead, R. Hall	October 2003	Updates RFC 2845	Proposed Standard
RFC 3646	ASCII, PDF	DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)	R. Droms, Ed.	December 2003		Proposed Standard
RFC 3655	ASCII, PDF	Redefinition of DNS Authenticated Data (AD) bit	B. Wellington, O. Gudmundsson	November 2003	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 2535	Proposed Standard

RFC 3658	ASCII , PDF	Delegation Signer (DS) Resource Record (RR)	O. Gudmundsson	December 2003	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 3090 , RFC 3008 , RFC 2535 , RFC 1035 , Updated by RFC 3755	Proposed Standard
RFC 3681 a.k.a. BCP 80	ASCII , PDF	Delegation of E.F.F.3.IP6.ARPA	R. Bush, R. Fink	January 2004		Best Current Practice
RFC 3755	ASCII , PDF	Legacy Resolver Compatibility for Delegation Signer (DS)	S. Weiler	May 2004	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 3658 , RFC 2535 , Updated by RFC 3757 , RFC 3845	Proposed Standard
RFC 3757	ASCII , PDF	Domain Name System KEY (DNSKEY) Resource Record (RR) Secure Entry Point (SEP) Flag	O. Kolkman, J. Schlyter, E. Lewis	April 2004	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 3755 , RFC 2535 , Errata	Proposed Standard
RFC 3832	ASCII , PDF	Remote Service Discovery in the Service Location Protocol (SLP) via DNS SRV	W. Zhao, H. Schulzrinne, E. Guttman, C. Bisdikian, W. Jerome	July 2004		Experimental
RFC 3833	ASCII , PDF	Threat Analysis of the Domain Name System (DNS)	D. Atkins, R. Austein	August 2004		Informational
RFC 3845	ASCII , PDF	DNS Security (DNSSEC) NextSECure (NSEC) RDATA Format	J. Schlyter, Ed.	August 2004	Obsoleted by RFC 4033 , RFC 4034 , RFC 4035 , Updates RFC 3755 , RFC 2535	Proposed Standard
RFC 3901 a.k.a. BCP 91	ASCII , PDF	DNS IPv6 Transport Operational Guidelines	A. Durand, J. Ihren	September 2004		Best Current Practice
RFC 3915	ASCII , PDF	Domain Registry Grace Period Mapping for the Extensible Provisioning Protocol (EPP)	S. Hollenbeck	September 2004		Proposed Standard

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RFC 4025	ASCII , PDF	A Method for Storing IPsec Keying Material in DNS	M. Richardson	March 2005		Proposed Standard
RFC 4027	ASCII , PDF	Domain Name System Media Types	S. Josefsson	April 2005		Informational
RFC 4033	ASCII , PDF	DNS Security Introduction and Requirements	R. Arends, R. Austein, M. Larson, D. Massey, S. Rose	March 2005	Obsoletes RFC 2535 , RFC 3008 , RFC 3090 , RFC 3445 , RFC 3655 , RFC 3658 , RFC 3755 , RFC 3757 , RFC 3845 , Updates RFC 1034 , RFC 1035 , RFC 2136 , RFC 2181 , RFC 2308 , RFC 3225 , RFC 3597 , RFC 3226 , Updated by RFC 6014 , RFC 6840 , Errata	Proposed Standard
RFC 4034	ASCII , PDF	Resource Records for the DNS Security Extensions	R. Arends, R. Austein, M. Larson, D. Massey, S. Rose	March 2005	Obsoletes RFC 2535 , RFC 3008 , RFC 3090 , RFC 3445 , RFC 3655 , RFC 3658 , RFC 3755 , RFC 3757 , RFC 3845 , Updates RFC 1034 , RFC 1035 , RFC 2136 , RFC 2181 , RFC 2308 , RFC 3225 , RFC 3597 , RFC 3226 , Updated by RFC 4470 , RFC 6014 , RFC 6840 , RFC 6944 , Errata	Proposed Standard
RFC 4035	ASCII , PDF	Protocol Modifications for the DNS Security Extensions	R. Arends, R. Austein, M. Larson, D. Massey, S. Rose	March 2005	Obsoletes RFC 2535 , RFC 3008 , RFC 3090 , RFC 3445 , RFC 3655 , RFC 3658 , RFC 3755 , RFC 3757 , RFC 3845 , Updates RFC 1034 , RFC 1035 , RFC 2136 , RFC 2181 , RFC 2308 , RFC 3225 , RFC 3597 , RFC 3226 , Updated by RFC 4470 , RFC 6014 , RFC 6840 , RFC 8198 , Errata	Proposed Standard
RFC 4074	ASCII , PDF	Common Misbehavior Against DNS Queries for IPv6 Addresses	Y. Morishita, T. Jinmei	May 2005		Informational
RFC 4143	ASCII , PDF	Facsimile Using Internet Mail (IFAX) Service of ENUM	K. Toyoda, D. Crocker	November 2005	Updated by RFC 6118 , Errata	Proposed Standard
RFC 4159 a.k.a. BCP 109	ASCII , PDF	Deprecation of "ip6.int"	G. Huston	August 2005		Best Current Practice

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RFC 4183	ASCII, PDF	A Suggested Scheme for DNS Resolution of Networks and Gateways	E. Warnicke	September 2005		Informational
RFC 4185	ASCII, PDF	National and Local Characters for DNS Top Level Domain (TLD) Names	J. Klensin	October 2005		Informational
RFC 4255	ASCII, PDF	Using DNS to Securely Publish Secure Shell (SSH) Key Fingerprints	J. Schlyter, W. Griffin	January 2006	Errata	Proposed Standard
RFC 4310	ASCII, PDF	Domain Name System (DNS) Security Extensions Mapping for the Extensible Provisioning Protocol (EPP)	S. Hollenbeck	December 2005	Obsoleted by RFC 5910	Proposed Standard
RFC 4322	ASCII, PDF	Opportunistic Encryption using the Internet Key Exchange (IKE)	M. Richardson, D.H. Redelmeier	December 2005	Errata	Informational
RFC 4339	ASCII, PDF	IPv6 Host Configuration of DNS Server Information Approaches	J. Jeong, Ed.	February 2006	Errata	Informational
RFC 4343	ASCII, PDF	Domain Name System (DNS) Case Insensitivity Clarification	D. Eastlake 3rd	January 2006	Updates RFC 1034 , RFC 1035 , RFC 2181 , Errata	Proposed Standard
RFC 4367	ASCII, PDF	What's in a Name: False Assumptions about DNS Names	J. Rosenberg, Ed., IAB	February 2006	Errata	Informational
RFC 4386	ASCII, PDF	Internet X.509 Public Key Infrastructure Repository Locator Service	S. Boeyen, P. Hallam-Baker	February 2006		Experimental

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RFC 4398	ASCII, PDF	Storing Certificates in the Domain Name System (DNS)	S. Josefsson	March 2006	Obsoletes RFC 2538 , Updated by RFC 6944 , Errata	Proposed Standard
RFC 4431	ASCII, PDF	The DNSSEC Lookaside Validation (DLV) DNS Resource Record	M. Andrews, S. Weiler	February 2006		Informational
RFC 4470	ASCII, PDF	Minimally Covering NSEC Records and DNSSEC On-line Signing	S. Weiler, J. Ihren	April 2006	Updates RFC 4035 , RFC 4034 , Errata	Proposed Standard
RFC 4471	ASCII, PDF	Derivation of DNS Name Predecessor and Successor	G. Sisson, B. Laurie	September 2006		Experimental
RFC 4472	ASCII, PDF	Operational Considerations and Issues with IPv6 DNS	A. Durand, J. Ihren, P. Savola	April 2006		Informational
RFC 4501	ASCII, PDF	Domain Name System Uniform Resource Identifiers	S. Josefsson	May 2006	Errata	Proposed Standard
RFC 4509	ASCII, PDF	Use of SHA-256 in DNSSEC Delegation Signer (DS) Resource Records (RRs)	W. Hardaker	May 2006	Errata	Proposed Standard
RFC 4635	ASCII, PDF	HMAC SHA (Hashed Message Authentication Code, Secure Hash Algorithm) TSIG Algorithm Identifiers	D. Eastlake 3rd	August 2006	Updates RFC 2845 , Errata	Proposed Standard
RFC 4641	ASCII, PDF	DNSSEC Operational Practices	O. Kolkman, R. Gieben	September 2006	Obsoletes RFC 2541 , Obsoleted by RFC 6781 , Errata	Informational
RFC 4690	ASCII, PDF	Review and Recommendations for Internationalized Domain Names (IDNs)	J. Klensin, P. Faltstrom, C. Karp, IAB	September 2006	Errata	Informational

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RFC 4697 a.k.a. BCP 123	ASCII , PDF	Observed DNS Resolution Misbehavior	M. Larson, P. Barber	October 2006		Best Current Practice
RFC 4701	ASCII , PDF	A DNS Resource Record (RR) for Encoding Dynamic Host Configuration Protocol (DHCP) Information (DHCID RR)	M. Stapp, T. Lemon, A. Gustafsson	October 2006	Updated by RFC 5494 , Errata	Proposed Standard
RFC 4702	ASCII , PDF	The Dynamic Host Configuration Protocol (DHCP) Client Fully Qualified Domain Name (FQDN) Option	M. Stapp, B. Volz, Y. Rekhter	October 2006		Proposed Standard
RFC 4703	ASCII , PDF	Resolution of Fully Qualified Domain Name (FQDN) Conflicts among Dynamic Host Configuration Protocol (DHCP) Clients	M. Stapp, B. Volz	October 2006		Proposed Standard
RFC 4704	ASCII , PDF	The Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Client Fully Qualified Domain Name (FQDN) Option	B. Volz	October 2006		Proposed Standard
RFC 4759	ASCII , PDF	The ENUM Dip Indicator Parameter for the "tel" URI	R. Stastny, R. Shockey, L. Conroy	December 2006		Proposed Standard
RFC 4870	ASCII , PDF	Domain-Based Email Authentication Using Public Keys Advertised in the DNS (DomainKeys)	M. Delany	May 2007	Obsoleted by RFC 4871	Historic
RFC 4892	ASCII , PDF	Requirements for a Mechanism Identifying a Name Server Instance	S. Woolf, D. Conrad	June 2007		Informational

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RFC 4956	ASCII , PDF	DNS Security (DNSSEC) Opt-In	R. Arends, M. Koster, D. Blacka	July 2007	Errata	Experimental
RFC 4986	ASCII , PDF	Requirements Related to DNS Security (DNSSEC) Trust Anchor Rollover	H. Eland, R. Mundy, S. Crocker, S. Krishnaswamy	August 2007		Informational
RFC 5001	ASCII , PDF	DNS Name Server Identifier (NSID) Option	R. Austein	August 2007		Proposed Standard
RFC 5006	ASCII , PDF	IPv6 Router Advertisement Option for DNS Configuration	J. Jeong, Ed., S. Park, L. Beloeil, S. Madanapalli	September 2007	Obsoleted by RFC 6106	Experimental
RFC 5011 a.k.a. STD 74	ASCII , PDF	Automated Updates of DNS Security (DNSSEC) Trust Anchors	M. StJohns	September 2007		Internet Standard (changed from Proposed Standard January 2013)
RFC 5074	ASCII , PDF	DNSSEC Lookaside Validation (DLV)	S. Weiler	November 2007		Informational
RFC 5155	ASCII , PDF	DNS Security (DNSSEC) Hashed Authenticated Denial of Existence	B. Laurie, G. Sisson, R. Arends, D. Blacka	March 2008	Updated by RFC 6840 , RFC 6944 , Errata	Proposed Standard
RFC 5158	ASCII , PDF	6to4 Reverse DNS Delegation Specification	G. Huston	March 2008	Errata	Informational
RFC 5205	ASCII , PDF	Host Identity Protocol (HIP) Domain Name System (DNS) Extensions	P. Nikander, J. Laganier	April 2008	Obsoleted by RFC 8005	Experimental

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RFC 5395	ASCII, PDF	Domain Name System (DNS) IANA Considerations	D. Eastlake 3rd	November 2008	Obsoletes RFC 2929 , Obsoleted by RFC 6195 , Updates RFC 1183 , RFC 3597 , Errata	Best Current Practice
RFC 5452	ASCII, PDF	Measures for Making DNS More Resilient against Forged Answers	A. Hubert, R. van Mook	January 2009	Updates RFC 2181	Proposed Standard
RFC 5483	ASCII, PDF	ENUM Implementation Issues and Experiences	L. Conroy, K. Fujiwara	March 2009		Informational
RFC 5507	ASCII, PDF	Design Choices When Expanding the DNS	IAB, P. Faltstrom, Ed., R. Austein, Ed., P. Koch, Ed.	April 2009		Informational
RFC 5509	ASCII, PDF	Internet Assigned Numbers Authority (IANA) Registration of Instant Messaging and Presence DNS SRV RRs for the Session Initiation Protocol (SIP)	S. Loreto	April 2009		Proposed Standard
RFC 5625 a.k.a. BCP 152	ASCII, PDF	DNS Proxy Implementation Guidelines	R. Bellis	August 2009		Best Current Practice
RFC 5679	ASCII, PDF	Locating IEEE 802.21 Mobility Services Using DNS	G. Bajko	December 2009		Proposed Standard
RFC 5702	ASCII, PDF	Use of SHA-2 Algorithms with RSA in DNSKEY and RRSIG Resource Records for DNSSEC	J. Jansen	October 2009	Updated by RFC 6944	Proposed Standard

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RFC 5864	ASCII, PDF	DNS SRV Resource Records for AFS	R. Allbery	April 2010	Updates RFC 1183 , Errata	Proposed Standard
RFC 5892	ASCII, PDF	The Unicode Code Points and Internationalized Domain Names for Applications (IDNA)	P. Faltstrom, Ed.	August 2010	Errata	Proposed Standard
RFC 5910	ASCII, PDF	Domain Name System (DNS) Security Extensions Mapping for the Extensible Provisioning Protocol (EPP)	J. Gould, S. Hollenbeck	May 2010	Obsoletes RFC 4310 , Errata	Proposed Standard
RFC 5933	ASCII, PDF	Use of GOST Signature Algorithms in DNSKEY and RRSIG Resource Records for DNSSEC	V. Dolmatov, Ed., A. Chuprina, I. Ustinov	July 2010	Updated by RFC 6944	Proposed Standard
RFC 5936	ASCII, PDF	DNS Zone Transfer Protocol (AXFR)	E. Lewis, A. Hoenes, Ed.	June 2010	Updates RFC 1034 , RFC 1035	Proposed Standard
RFC 5966	ASCII, PDF	DNS Transport over TCP - Implementation Requirements	R. Bellis	August 2010	Obsoleted by RFC 7766 , Updates RFC 1035 , RFC 1123	Proposed Standard
RFC 6014	ASCII, PDF	Cryptographic Algorithm Identifier Allocation for DNSSEC	P. Hoffman	November 2010	Updates RFC 4033 , RFC 4034 , RFC 4035	Proposed Standard
RFC 6097	ASCII, PDF	Local Mobility Anchor (LMA) Discovery for Proxy Mobile IPv6	J. Korhonen, V. Devarapalli	February 2011		Informational
RFC 6106	ASCII, PDF	IPv6 Router Advertisement Options for DNS Configuration	J. Jeong, S. Park, L. Beloeil, S. Madanapalli	November 2010	Obsoletes RFC 5006 , Obsoleted by RFC 8106 , Errata	Proposed Standard

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RFC 6116	ASCII, PDF	The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)	S. Bradner, L. Conroy, K. Fujiwara	March 2011	Obsoletes RFC 3761	Proposed Standard
RFC 6147	ASCII, PDF	DNS64: DNS Extensions for Network Address Translation from IPv6 Clients to IPv4 Servers	M. Bagnulo, A. Sullivan, P. Matthews, I. van Beijnum	April 2011	Errata	Proposed Standard
RFC 6168	ASCII, PDF	Requirements for Management of Name Servers for the DNS	W. Hardaker	May 2011		Informational
RFC 6186	ASCII, PDF	Use of SRV Records for Locating Email Submission/Access Services	C. Daboo	March 2011	Updates RFC 1939 , RFC 3501	Proposed Standard
RFC 6195	ASCII, PDF	Domain Name System (DNS) IANA Considerations	D. Eastlake 3rd	March 2011	Obsoletes RFC 5395 , Obsoleted by RFC 6895 , Updates RFC 1183 , RFC 3597	Best Current Practice
RFC 6303 part of BCP 163	ASCII, PDF	Locally Served DNS Zones	M. Andrews	July 2011		Best Current Practice
RFC 6304	ASCII, PDF	AS112 Nameserver Operations	J. Abley, W. Maton	July 2011	Obsoleted by RFC 7534	Informational
RFC 6382 a.k.a. BCP 169	ASCII, PDF	Unique Origin Autonomous System Numbers (ASNs) per Node for Globally Anycasted Services	D. McPherson, R. Donnelly, F. Scalzo	October 2011		Best Current Practice
RFC 6394	ASCII, PDF	Use Cases and Requirements for DNS-Based Authentication of Named Entities (DANE)	R. Barnes	October 2011		Informational
RFC 6418	ASCII, PDF	Multiple Interfaces and Provisioning Domains Problem	M. Blanchet, P. Seite	November 2011	Errata	Informational

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RFC 6452	ASCII, PDF	Points and Internationalized Domain Names for Applications (IDNA) - Unicode 6.0	P. Faltstrom, Ed., P. Hoffman, Ed.	November 2011		Proposed Standard
RFC 6471	ASCII, PDF	Overview of Best Email DNS-Based List (DNSBL) Operational Practices	C. Lewis, M. Sergeant	January 2012		Informational
RFC 6535	ASCII, PDF	Dual-Stack Hosts Using "Bump-in-the-Host" (BIH)	B. Huang, H. Deng, T. Savolainen	February 2012	Obsoletes RFC 2767 , RFC 3338 , Errata	Proposed Standard
RFC 6594	ASCII, PDF	Use of the SHA-256 Algorithm with RSA, Digital Signature Algorithm (DSA), and Elliptic Curve DSA (ECDSA) in SSHFP Resource Records	O. Sury	April 2012		Proposed Standard
RFC 6604	ASCII, PDF	xNAME RCODE and Status Bits Clarification	D. Eastlake 3rd	April 2012	Updates RFC 1035 , RFC 2308 , RFC 2672	Proposed Standard
RFC 6605	ASCII, PDF	Elliptic Curve Digital Signature Algorithm (DSA) for DNSSEC	P. Hoffman, W.C.A. Wijngaards	April 2012		Proposed Standard
RFC 6641	ASCII, PDF	Using DNS SRV to Specify a Global File Namespace with NFS Version 4	C. Everhart, W. Adamson, J. Zhang	June 2012		Proposed Standard
RFC 6672	ASCII, PDF	DNAME Redirection in the DNS	S. Rose, W. Wijngaards	June 2012	Obsoletes RFC 2672 , Updates RFC 3363	Proposed Standard
RFC 6698	ASCII, PDF	The DNS-Based Authentication of Named Entities (DANE) Transport Layer Security (TLS) Protocol: TLSA	P. Hoffman, J. Schlyter	August 2012	Updated by RFC 7218 , RFC 7671 , Errata	Proposed Standard

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RFC 6731	ASCII, PDF	Improved Recursive DNS Server Selection for Multi-Interfaced Nodes	T. Savolainen, J. Kato, T. Lemon	December 2012		Proposed Standard
RFC 6742	ASCII, PDF	DNS Resource Records for the Identifier-Locator Network Protocol (ILNP)	RJ Atkinson, SN Bhatti, S. Rose	November 2012	Errata	Experimental
RFC 6762	ASCII, PDF	Multicast DNS	S. Cheshire, M. Krochmal	February 2013	Errata	Proposed Standard
RFC 6763	ASCII, PDF	DNS-Based Service Discovery	S. Cheshire, M. Krochmal	February 2013		Proposed Standard
RFC 6781	ASCII, PDF	DNSSEC Operational Practices, Version 2	O. Kolkman, W. Mekking, R. Gieben	December 2012	Obsoletes RFC 4641 , Errata	Informational
RFC 6804	ASCII, PDF	DISCOVER: Supporting Multicast DNS Queries	B. Manning	November 2012		Historic
RFC 6840	ASCII, PDF	Clarifications and Implementation Notes for DNS Security (DNSSEC)	S. Weiler, Ed., D. Blacka, Ed.	February 2013	Updates RFC 4033 , RFC 4034 , RFC 4035 , RFC 5155 , Errata	Proposed Standard
RFC 6841	ASCII, PDF	A Framework for DNSSEC Policies and DNSSEC Practice Statements	F. Ljunggren, AM. Eklund Lowinder, T. Okubo	January 2013		Informational
RFC 6844	ASCII, PDF	DNS Certification Authority Authorization (CAA) Resource Record	P. Hallam-Baker, R. Stradling	January 2013	Errata	Proposed Standard
RFC 6889	ASCII, PDF	Analysis of Stateful 64 Translation	R. Penno, T. Saxena, M. Boucadair, S. Sivakumar	April 2013		Informational

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RFC 6895 a.k.a. BCP 42	ASCII , PDF	Domain Name System (DNS) IANA Considerations	D. Eastlake 3rd	April 2013	Obsoletes RFC 6195 , Updates RFC 1183 , RFC 2845 , RFC 2930 , RFC 3597	Best Current Practice
RFC 6912	ASCII , PDF	Principles for Unicode Code Point Inclusion in Labels in the DNS	A. Sullivan, D. Thaler, J. Klensin, O. Kolkman	April 2013		Informational
RFC 6927	ASCII , PDF	Variants in Second-Level Names Registered in Top-Level Domains	J. Levine, P. Hoffman	May 2013		Informational
RFC 6944	ASCII , PDF	Applicability Statement: DNS Security (DNSSEC) DNSKEY Algorithm Implementation Status	S. Rose	April 2013	Updates RFC 2536 , RFC 2539 , RFC 3110 , RFC 4034 , RFC 4398 , RFC 5155 , RFC 5702 , RFC 5933 , Errata	Proposed Standard
RFC 6950	ASCII , PDF	Architectural Considerations on Application Features in the DNS	J. Peterson, O. Kolkman, H. Tschofenig, B. Aboba	October 2013		Informational
RFC 6975	ASCII , PDF	Signaling Cryptographic Algorithm Understanding in DNS Security Extensions (DNSSEC)	S. Crocker, S. Rose	July 2013		Proposed Standard
RFC 7043	ASCII , PDF	Resource Records for EUI-48 and EUI-64 Addresses in the DNS	J. Abley	October 2013		Informational
RFC 7050	ASCII , PDF	Discovery of the IPv6 Prefix Used for IPv6 Address Synthesis	T. Savolainen, J. Korhonen, D. Wing	November 2013	Errata	Proposed Standard

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RFC 7085	ASCII , PDF	Top-Level Domains That Are Already Dotless	J. Levine, P. Hoffman	December 2013		Informational
RFC 7129	ASCII , PDF	Authenticated Denial of Existence in the DNS	R. Gieben, W. Mekking	February 2014		Informational
RFC 7216	ASCII , PDF	Location Information Server (LIS) Discovery Using IP Addresses and Reverse DNS	M. Thomson, R. Bellis	April 2014		Proposed Standard
RFC 7218	ASCII , PDF	Adding Acronyms to Simplify Conversations about DNS-Based Authentication of Named Entities (DANE)	O. Gudmundsson	April 2014	Updates RFC 6698	Proposed Standard
RFC 7250	ASCII , PDF	Using Raw Public Keys in Transport Layer Security (TLS) and Datagram Transport Layer Security (DTLS)	P. Wouters, Ed., H. Tschofenig, Ed., J. Gilmore, S. Weiler, T. Kivinen	June 2014	Errata	Proposed Standard
RFC 7314	ASCII , PDF	Extension Mechanisms for DNS (EDNS) EXPIRE Option	M. Andrews	July 2014		Experimental
RFC 7344	ASCII , PDF	Automating DNSSEC Delegation Trust Maintenance	W. Kumari, O. Gudmundsson, G. Barwood	September 2014	Updated by RFC 8078	Proposed Standard (changed from Informational March 2017)
RFC 7393	ASCII , PDF	Using the Port Control Protocol (PCP) to Update Dynamic DNS	X. Deng, M. Boucadair, Q. Zhao, J. Huang, C.	November 2014		Informational

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RFC 7505	ASCII, PDF	A "Null MX" No Service Resource Record for Domains That Accept No Mail	J. Levine, M. Delany	June 2015		Proposed Standard
RFC 7534	ASCII, PDF	AS112 Nameserver Operations	J. Abley, W. Sotomayor	May 2015	Obsoletes RFC 6304	Informational
RFC 7535	ASCII, PDF	AS112 Redirection Using DNAME	J. Abley, B. Dickson, W. Kumari, G. Michaelson	May 2015		Informational
RFC 7553	ASCII, PDF	The Uniform Resource Identifier (URI) DNS Resource Record	P. Faltstrom, O. Kolkman	June 2015		Informational
RFC 7558	ASCII, PDF	Requirements for Scalable DNS-Based Service Discovery (DNS-SD) / Multicast DNS (mDNS) Extensions	K. Lynn, S. Cheshire, M. Blanchet, D. Migault	July 2015		Informational
RFC 7583	ASCII, PDF	DNSSEC Key Rollover Timing Considerations	S. Morris, J. Ihren, J. Dickinson, W. Mekking	October 2015		Informational
RFC 7585	ASCII, PDF	Dynamic Peer Discovery for RADIUS/TLS and RADIUS/DTLS Based on the Network Access Identifier (NAI)	S. Winter, M. McCauley	October 2015	Errata	Experimental
RFC 7626	ASCII, PDF	DNS Privacy Considerations	S. Bortzmeyer	August 2015		Informational
RFC 7646	ASCII, PDF	Definition and Use of DNSSEC Negative Trust Anchors	P. Ebersman, W. Kumari, C. Griffiths, J. Livingood, R. M...	September 2015		Informational

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RFC 7671	ASCII , PDF	The DNS-Based Authentication of Named Entities (DANE) Protocol: Updates and Operational Guidance	V. Dukhovni, W. Hardaker	October 2015	Updates RFC 6698	Proposed Standard
RFC 7672	ASCII , PDF	SMTP Security via Opportunistic DNS-Based Authentication of Named Entities (DANE) Transport Layer Security (TLS)	V. Dukhovni, W. Hardaker	October 2015		Proposed Standard
RFC 7673	ASCII , PDF	Using DNS-Based Authentication of Named Entities (DANE) TLSA Records with SRV Records	T. Finch, M. Miller, P. Saint-Andre	October 2015		Proposed Standard
RFC 7719	ASCII , PDF	DNS Terminology	P. Hoffman, A. Sullivan, K. Fujiwara	December 2015	Errata	Informational
RFC 7720 a.k.a. BCP 40	ASCII , PDF	DNS Root Name Service Protocol and Deployment Requirements	M. Blanchet, L-J. Liman	December 2015	Obsoletes RFC 2870	Best Current Practice
RFC 7745	ASCII , PDF	XML Schemas for Reverse DNS Management	T. Manderson	January 2016		Informational
RFC 7766	ASCII , PDF	DNS Transport over TCP - Implementation Requirements	J. Dickinson, S. Dickinson, R. Bellis, A. Mankin, D. Wessels	March 2016	Obsoletes RFC 5966 , Updates RFC 1035 , RFC 1123	Proposed Standard
RFC 7793 part of BCP 163	ASCII , PDF	Adding 100.64.0.0/10 Prefixes to the IPv4 Locally-Served DNS Zones Registry	M. Andrews	May 2016		Best Current Practice
RFC 7816	ASCII , PDF	DNS Query Name Minimisation to Improve Privacy	S. Bortzmeyer	March 2016	Errata	Experimental

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RFC 7830	ASCII, PDF	The EDNS(0) Padding Option	A. Mayrhofer	May 2016		Proposed Standard
RFC 7858	ASCII, PDF	Specification for DNS over Transport Layer Security (TLS)	Z. Hu, L. Zhu, J. Heidemann, A. Mankin, D. Wessels, P. Hoffman	May 2016		Proposed Standard
RFC 7871	ASCII, PDF	Client Subnet in DNS Queries	C. Contavalli, W. van der Gaast, D. Lawrence, W. Kumari	May 2016	Errata	Informational
RFC 7873	ASCII, PDF	Domain Name System (DNS) Cookies	D. Eastlake 3rd, M. Andrews	May 2016		Proposed Standard
RFC 7901	ASCII, PDF	CHAIN Query Requests in DNS	P. Wouters	June 2016		Experimental
RFC 7929	ASCII, PDF	DNS-Based Authentication of Named Entities (DANE) Bindings for OpenPGP	P. Wouters	August 2016	Errata	Experimental
RFC 7958	ASCII, PDF	DNSSEC Trust Anchor Publication for the Root Zone	J. Abley, J. Schlyter, G. Bailey, P. Hoffman	August 2016		Informational
RFC 7975	ASCII, PDF	Request Routing Redirection Interface for Content Delivery Network (CDN) Interconnection	B. Niven-Jenkins, Ed., R. van Brandenburg, Ed.	October 2016		Proposed Standard
RFC 7984	ASCII, PDF	Locating Session Initiation Protocol (SIP) Servers in a	O. Johansson, G. Salgueiro, V. Gurbani, D.	September 2016	Updates RFC 3263	Proposed Standard

2016

RFC 8005	ASCII, PDF	Host Identity Protocol (HIP) Domain Name System (DNS) Extension	J. Laganier	October 2016	Obsoletes RFC 5205	Proposed Standard
RFC 8006	ASCII, PDF	Content Delivery Network Interconnection (CDNI) Metadata	B. Niven-Jenkins, R. Murray, M. Caulfield, K. Ma	December 2016	Errata	Proposed Standard
RFC 8027 a.k.a. BCP 207	ASCII, PDF	DNSSEC Roadblock Avoidance	W. Hardaker, O. Gudmundsson, S. Krishnaswamy	November 2016	Errata	Best Current Practice
RFC 8078	ASCII, PDF	Managing DS Records from the Parent via CDS/CDNSKEY	O. Gudmundsson, P. Wouters	March 2017	Updates RFC 7344 , Errata	Proposed Standard
RFC 8080	ASCII, PDF	Edwards-Curve Digital Security Algorithm (EdDSA) for DNSSEC	O. Sury, R. Edmonds	February 2017	Errata	Proposed Standard
RFC 8094	ASCII, PDF	DNS over Datagram Transport Layer Security (DTLS)	T. Reddy, D. Wing, P. Patil	February 2017		Experimental
RFC 8106	ASCII, PDF	IPv6 Router Advertisement Options for DNS Configuration	J. Jeong, S. Park, L. Beloeil, S. Madanapalli	March 2017	Obsoletes RFC 6106	Proposed Standard
RFC 8109 a.k.a. BCP 209	ASCII, PDF	Initializing a DNS Resolver with Priming Queries	P. Koch, M. Larson, P. Hoffman	March 2017		Best Current Practice
RFC 8145	ASCII, PDF	Signaling Trust Anchor Knowledge in DNS Security Extensions (DNSSEC)	D. Wessels, W. Kumari, P. Hoffman	April 2017		Proposed Standard
RFC 8162	ASCII, PDF	Using Secure DNS to Associate Certificates with Domain Names for S/MIME	P. Hoffman, J. Schlyter	May 2017		Experimental

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2016

2017

RFC 8198	ASCII, PDF, HTML	Aggressive Use of DNSSEC-Validated Cache	K. Fujiwara, A. Kato, W. Kumari	July 2017	Updates RFC 4035	Proposed Standard
RFC 8219	ASCII, PDF, HTML	Benchmarking Methodology for IPv6 Transition Technologies	M. Georgescu, L. Pislaru, G. Lencse	August 2017		Informational
RFC 8222	ASCII, PDF, HTML	Selecting Labels for Use with Conventional DNS and Other Resolution Systems in DNS-Based Service Discovery	A. Sullivan	September 2017		Informational
RFC 8305	ASCII, PDF, HTML	Happy Eyeballs Version 2: Better Connectivity Using Concurrency	D. Schinazi, T. Pauly	December 2017	Obsoletes RFC 6555	Proposed Standard
RFC 8310	ASCII, PDF, HTML	Usage Profiles for DNS over TLS and DNS over DTLS	S. Dickinson, D. Gillmor, T. Reddy	March 2018	Updates RFC 7858	Proposed Standard
RFC 8324	ASCII, PDF, HTML, HTML with inline errata	DNS Privacy, Authorization, Special Uses, Encoding, Characters, Matching, and Root Structure: Time for Another Look?	J. Klensin	February 2018	Errata	Informational
RFC 8427	ASCII, PDF, HTML, HTML with inline errata	Representing DNS Messages in JSON	P. Hoffman	July 2018	Errata	Informational
RFC 8467	ASCII, PDF, HTML	Padding Policies for Extension Mechanisms for DNS (EDNS(0))	A. Mayrhofer	October 2018		Experimental
RFC 8482	ASCII, PDF, HTML	Providing Minimal-Sized Responses to DNS Queries That Have QTYPE=ANY	J. Abley, O. Gudmundsson, M. Majkowski, E. Hunt	January 2019	Updates RFC 1034 , RFC 1035	Proposed Standard
RFC 8483	ASCII, PDF, HTML	Yeti DNS Testbed	L. Song, Ed., D. Liu, P. Vixie, A. Kato, S. Kerr	October 2018		Informational
RFC 8484	ASCII, PDF, HTML	DNS Queries over HTTPS (DoH)	P. Hoffman, P. McManus	October 2018	Errata	Proposed Standard
RFC 8490	ASCII, PDF, HTML	DNS Stateful Operations	R. Bellis, S. Cheshire, J. Dickinson, S. Dickinson, T. Lemon, T.	March 2019	Updates RFC 1035 , RFC 7766	Proposed Standard

RFC 8499 a.k.a. BCP 219	ASCII , PDF , HTML	DNS Terminology	P. Hoffman, A. Sullivan, K. Fujiwara	January 2019	Obsoletes RFC 7719 , Updates RFC 2308	Best Current Practice
RFC 8501	ASCII , PDF , HTML	Reverse DNS in IPv6 for Internet Service Providers	L. Howard	November 2018		Informational
RFC 8509	ASCII , PDF , HTML	A Root Key Trust Anchor Sentinel for DNSSEC	G. Huston, J. Damas, W. Kumari	December 2018		Proposed Standard
RFC 8552 part of BCP 222	ASCII , PDF , HTML	Scoped Interpretation of DNS Resource Records through "Underscored" Naming of Attribute Leaves	D. Crocker	March 2019	Errata	Best Current Practice
RFC 8553 part of BCP 222	ASCII , PDF , HTML	DNS Attrleaf Changes: Fixing Specifications That Use Underscored Node Names	D. Crocker	March 2019	Updates RFC 2782 , RFC 3263 , RFC 3529 , RFC 3620 , RFC 3832 , RFC 3887 , RFC 3958 , RFC 4120 , RFC 4227 , RFC 4386 , RFC 4387 , RFC 4976 , RFC 5026 , RFC 5328 , RFC 5389 , RFC 5415 , RFC 5518 , RFC 5555 , RFC 5617 , RFC 5679 , RFC 5766 , RFC 5780 , RFC 5804 , RFC 5864 , RFC 5928 , RFC 6120 , RFC 6186 , RFC 6376 , RFC 6733 , RFC 6763 , RFC 7208 , RFC 7489 , RFC 8145	Best Current Practice
RFC 8567	ASCII , PDF , HTML	Customer Management DNS Resource Records	E. Rye, R. Beverly	1 April 2019		Informational
RFC 8586	ASCII , PDF , HTML	Loop Detection in Content Delivery Networks (CDNs)	S. Ludin, M. Nottingham, N. Sullivan	April 2019	Errata	Proposed Standard
RFC 8598	ASCII , PDF , HTML	Split DNS Configuration for the Internet Key Exchange Protocol Version 2 (IKEv2)	T. Pauly, P. Wouters	May 2019		Proposed Standard
RFC 8618	ASCII , PDF , HTML	Compacted-DNS (C-DNS): A Format for DNS Packet Capture	J. Dickinson, J. Hague, S. Dickinson, T. Manderson, J. Bond	September 2019		Proposed Standard
RFC 8624	ASCII , PDF , HTML	Algorithm Implementation Requirements and Usage Guidance for DNSSEC	P. Wouters, O. Sury	June 2019	Errata , Obsoletes RFC 6944	Proposed Standard
RFC 8659	HTML , TEXT , PDF , XML	DNS Certification Authority Authorization (CAA) Resource Record	P. Hallam-Baker, R. Stradling, J. Hoffman-Andrews	November 2019	Errata , Obsoletes RFC 6844	Proposed Standard
RFC 8683	HTML , TEXT , PDF , XML	Additional Deployment Guidelines for NAT64/464XLAT in Operator and Enterprise Networks	J. Palet Martinez	November 2019		Informational
RFC 8749	HTML , TEXT , PDF , XML	Moving DNSSEC Lookaside Validation (DLV) to Historic Status	W. Mekking, D. Mahoney	March 2020	Updates RFC 6698 , RFC 6840	Proposed Standard

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2019

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RFC 8764	HTML , TEXT , PDF , XML	Apple's DNS Long-Lived Queries Protocol	S. Cheshire, M. Krochmal	June 2020		Informational
RFC 8765	HTML , TEXT , PDF , XML	DNS Push Notifications	T. Pusateri, S. Cheshire	June 2020		Proposed Standard
RFC 8766	HTML , TEXT , PDF , XML	Discovery Proxy for Multicast DNS-Based Service Discovery	S. Cheshire	June 2020		Proposed Standard
RFC 8767	HTML , TEXT , PDF , XML	Serving Stale Data to Improve DNS Resiliency	D. Lawrence, W. Kumari, P. Sood	March 2020	Updates RFC 1034 , RFC 1035 , RFC 2181	Proposed Standard
RFC 8777	HTML , TEXT , PDF , XML , HTML with inline errata	DNS Reverse IP Automatic Multicast Tunneling (AMT) Discovery	J. Holland	April 2020	Errata , Updates RFC 7450	Proposed Standard
RFC 8806	HTML , TEXT , PDF , XML	Running a Root Server Local to a Resolver	W. Kumari, P. Hoffman	June 2020	Obsoletes RFC 7706	Informational
RFC 8880	HTML , TEXT , PDF , XML	Special Use Domain Name 'ipv4only.arpa'	S. Cheshire, D. Schinazi	August 2020	Updates RFC 7050	Proposed Standard
RFC 8882	HTML , TEXT , PDF , XML	DNS-Based Service Discovery (DNS-SD) Privacy and Security Requirements	C. Huitema, D. Kaiser	September 2020		Informational
RFC 8901	HTML , TEXT , PDF , XML	Multi-Signer DNSSEC Models	S. Huque, P. Aras, J. Dickinson, J. Vcelak, D. Blacka	September 2020		Informational
RFC 8904	HTML , TEXT , PDF , XML	DNS Whitelist (DNSWL) Email Authentication Method Extension	A. Vesely	September 2020		Informational
RFC 8906 a.k.a. BCP 231	HTML , TEXT , PDF , XML	A Common Operational Problem in DNS Servers: Failure to Communicate	M. Andrews, R. Bellis	September 2020		Best Current Practice
RFC 8914	HTML , TEXT , PDF , XML	Extended DNS Errors	W. Kumari, E. Hunt, R. Arends, W. Hardaker, D. Lawrence	October 2020		Proposed Standard

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2020

2020

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2020

RFC 8932 a.k.a. BCP 232	HTML , TEXT , PDF , XML	Recommendations for DNS Privacy Service Operators	S. Dickinson, B. Overeinder, R. van Rijswijk-Daj, A. Mankin	October 2020	Errata	Best Current Practice
RFC 8945 a.k.a. STD 93	HTML , TEXT , PDF , XML	Secret Key Transaction Authentication for DNS (TSIG)	F. Dupont, S. Morris, P. Vixie, D. Eastlake 3rd, O. Gudmundsson, B. Wellington	November 2020	Obsoletes RFC 2845 , RFC 4635	Internet Standard
RFC 8976	HTML , TEXT , PDF , XML	Message Digest for DNS Zones	D. Wessels, P. Barber, M. Weinberg, W. Kumari, W. Hardaker	February 2021	Errata	Proposed Standard
RFC 9038	HTML , TEXT , PDF , XML	Interoperable Domain Name System (DNS) Server Cookies	O. Sury, W. Toorop, D. Eastlake 3rd, M. Andrews	April 2021	Updates RFC 7873	Proposed Standard
RFC 9076	HTML , TEXT , PDF , XML	DNS Privacy Considerations	T. Wicinski, Ed.	July 2021	Obsoletes RFC 7626	Informational
RFC 9077	HTML , TEXT , PDF , XML	NSEC and NSEC3: TTLs and Aggressive Use	P. van Dijk	July 2021	Updates RFC 4034 , RFC 4035 , RFC 5155 , RFC 8198	Proposed Standard
RFC 9102	HTML , TEXT , PDF , XML , HTML with inline errata	TLS DNSSEC Chain Extension	V. Dukhovni, S. Huque, W. Toorop, P. Wouters, M. Shore	August 2021	Errata	Experimental
RFC 9103	HTML , TEXT , PDF , XML	DNS Zone Transfer over TLS	W. Toorop, S. Dickinson, S. Sahib, P. Aras, A. Mankin	August 2021	Updates RFC 1995 , RFC 5936 , RFC 7766	Proposed Standard
RFC 9108	HTML , TEXT , PDF , XML	YANG Types for DNS Classes and Resource Record Types	L. Lhotka, P. Špaček	September 2021		Proposed Standard
RFC 9120	HTML , TEXT , PDF , XML	Nameservers for the Address and Routing Parameter Area ("arpa") Domain	K. Davies, J. Arkko	October 2021	Updates RFC 3172	Informational
RFC 9156	HTML , TEXT , PDF , XML	DNS Query Name Minimisation to Improve Privacy	S. Bortzmeyer, R. Dolmans, P. Hoffman	November 2021	Obsoletes RFC 7816	Proposed Standard
RFC 9157	HTML , TEXT , PDF , XML	Revised IANA Considerations for DNSSEC	P. Hoffman	December 2021	Updates RFC 5155 , RFC 6014 , RFC 8624	Proposed Standard
RFC 9199	HTML , TEXT , PDF , XML	Considerations for Large Authoritative DNS Server Operators	G. Moura, W. Hardaker, J. Heidemann, M. Davids	March 2022		Informational
RFC 9210 a.k.a. BCP 235	HTML , TEXT , PDF , XML	DNS Transport over TCP - Operational Requirements	J. Kristoff, D. Wessels	March 2022	Updates RFC 1123 , RFC 1536	Best Current Practice
RFC 9224 part of STD 95	HTML , TEXT , PDF , XML	Finding the Authoritative Registration Data Access Protocol (RDAP) Service	M. Blanchet	March 2022	Obsoletes RFC 7484	Internet Standard

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RFC 9230	HTML , TEXT , PDF , XML	Oblivious DNS over HTTPS	E. Kinnear, P. McManus, T. Pauly, T. Verma, C.A. Wood	June 2022	Errata	Experimental
RFC 9250	HTML , TEXT , PDF , XML	DNS over Dedicated QUIC Connections	C. Huitema, S. Dickinson, A. Mankin	May 2022		Proposed Standard
RFC 9267	HTML , TEXT , PDF , XML	Common Implementation Anti-Patterns Related to Domain Name System (DNS) Resource Record (RR) Processing	S. Dashevskiy, D. dos Santos, J. Wetzels, A. Amri	July 2022		Informational
RFC 9276 a.k.a. BCP 236	HTML , TEXT , PDF , XML , HTML with inline errata	Guidance for NSEC3 Parameter Settings	W. Hardaker, V. Dukhovni	August 2022	Errata , Updates RFC 5155	Best Current Practice
RFC 9313	HTML , TEXT , PDF , XML	Pros and Cons of IPv6 Transition Technologies for IPv4-as-a-Service (IPv4aaS)	G. Lencse, J. Palet Martinez, L. Howard, R. Patterson, I. Farrer	October 2022		Informational
RFC 9364 a.k.a. BCP 237	HTML , TEXT , PDF , XML	DNS Security Extensions (DNSSEC)	P. Hoffman	February 2023		Best Current Practice
RFC 9432	HTML , TEXT , PDF , XML	DNS Catalog Zones	P. van Dijk, L. Peltan, O. Surý, W. Toorop, C.R. Monshouwer, P. Thomassen, A. Sargsyan	July 2023		Proposed Standard
RFC 9445	HTML , TEXT , PDF , XML	RADIUS Extensions for DHCP-Configured Services	M. Boucadair, T. Reddy.K, A. DeKok	August 2023	Updates RFC 4014	Proposed Standard
RFC 9460	HTML , TEXT , PDF , XML	Service Binding and Parameter Specification via the DNS (SVCB and HTTPS Resource Records)	B. Schwartz, M. Bishop, E. Nygren	November 2023		Proposed Standard

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RFC 9461	HTML , TEXT , PDF , XML	Service Binding Mapping for DNS Servers	B. Schwartz	November 2023		Proposed Standard
RFC 9462	HTML , TEXT , PDF , XML	Discovery of Designated Resolvers	T. Pauly, E. Kinnear, C. A. Wood, P. McManus, T. Jensen	November 2023		Proposed Standard
RFC 9463	HTML , TEXT , PDF , XML , HTML with inline errata	DHCP and Router Advertisement Options for the Discovery of Network-designated Resolvers (DNR)	M. Boucadair, Ed., T. Reddy.K, Ed., D. Wing, N. Cook, T. Jensen	November 2023	Errata	Proposed Standard
RFC 9464	HTML , TEXT , PDF , XML	Internet Key Exchange Protocol Version 2 (IKEv2) Configuration for Encrypted DNS	M. Boucadair, T. Reddy.K, D. Wing, V. Smyslov	November 2023		Proposed Standard
RFC 9471	HTML , TEXT , PDF , XML	DNS Glue Requirements in Referral Responses	M. Andrews, S. Huque, P. Wouters, D. Wessels	September 2023	Updates RFC 1034	Proposed Standard
RFC 9520	HTML , TEXT , PDF , XML	Negative Caching of DNS Resolution Failures	D. Wessels, W. Carroll, M. Thomas	December 2023	Updates RFC 2308 , RFC 4035 , RFC 4697	Proposed Standard
RFC 9526	HTML , TEXT , PDF , XML , HTML with inline errata	Simple Provisioning of Public Names for Residential Networks	D. Migault, R. Weber, M. Richardson, R. Hunter	January 2024	Errata	Experimental
RFC 9527	HTML , TEXT , PDF , XML	DHCPv6 Options for the Homenet Naming Authority	D. Migault, R. Weber, T. Mrugalski	January 2024		Proposed Standard
RFC 9539	HTML , TEXT , PDF , XML , HTML with inline errata	Unilateral Opportunistic Deployment of Encrypted Recursive-to-Authoritative DNS	D. K. Gillmor, Ed., J. Salazar, Ed., P. Hoffman, Ed.	February 2024	Errata	Experimental
RFC 9540	HTML , TEXT , PDF , XML	Discovery of Oblivious Services via Service Binding Records	T. Pauly, T. Reddy.K	February 2024		Proposed Standard

2024

2024

RFC 9558	HTML , TEXT , PDF , XML	Use of GOST 2012 Signature Algorithms in DNSKEY and RRSIG Resource Records for DNSSEC	B. Makarenko, V. Dolmatov, Ed.	April 2024		Informational
RFC 9563	HTML , TEXT , PDF , XML	SM2 Digital Signature Algorithm for DNSSEC	C. Zhang, Y. Liu, F. Leng, Q. Zhao, Z. He	December 2024		Informational
RFC 9567	HTML , TEXT , PDF , XML	DNS Error Reporting	R. Arends, M. Larson	April 2024		Proposed Standard
RFC 9606	HTML , TEXT , PDF , XML	DNS Resolver Information	T. Reddy,K, M. Boucadair	June 2024	Errata	Proposed Standard
RFC 9615	HTML , TEXT , PDF , XML , HTML with inline errata	Automatic DNSSEC Bootstrapping Using Authenticated Signals from the Zone's Operator	P. Thomassen, N. Wisiol	July 2024	Errata , Updates RFC 7344 , RFC 8078	Proposed Standard
RFC 9619	HTML , TEXT , PDF , XML	In the DNS, QDCOUNT Is (Usually) One	R. Bellis, J. Abley	July 2024	Updates RFC 1035	Proposed Standard
RFC 9660	HTML , TEXT , PDF , XML	The DNS Zone Version (ZONEVERSION) Option	H. Salgado, M. Vergara, D. Wessels	October 2024		Proposed Standard
RFC 9704	HTML , TEXT , PDF , XML	Establishing Local DNS Authority in Validated Split-Horizon Environments	T. Reddy,K, D. Wing, K. Smith, B. Schwartz	January 2025		Proposed Standard
RFC 9715	HTML , TEXT , PDF , XML	IP Fragmentation Avoidance in DNS over UDP	K. Fujiwara, P. Vixie	January 2025		Informational
RFC 9718	HTML , TEXT , PDF , XML	DNSSEC Trust Anchor Publication for the Root Zone	J. Abley, J. Schlyter, G. Bailey, P. Hoffman	January 2025	Obsoletes RFC 7958	Informational

2025



Protocol

- *Domain name space e Resource Records*
- *Name servers*
- *Resolvers*

Three Core Components of DNS

Domain name space e Resource Records

Name Servers

The server software that stores information about the hierarchical structure and the corresponding data set

The software that fetches data from name servers when clients make requests

Resolvers

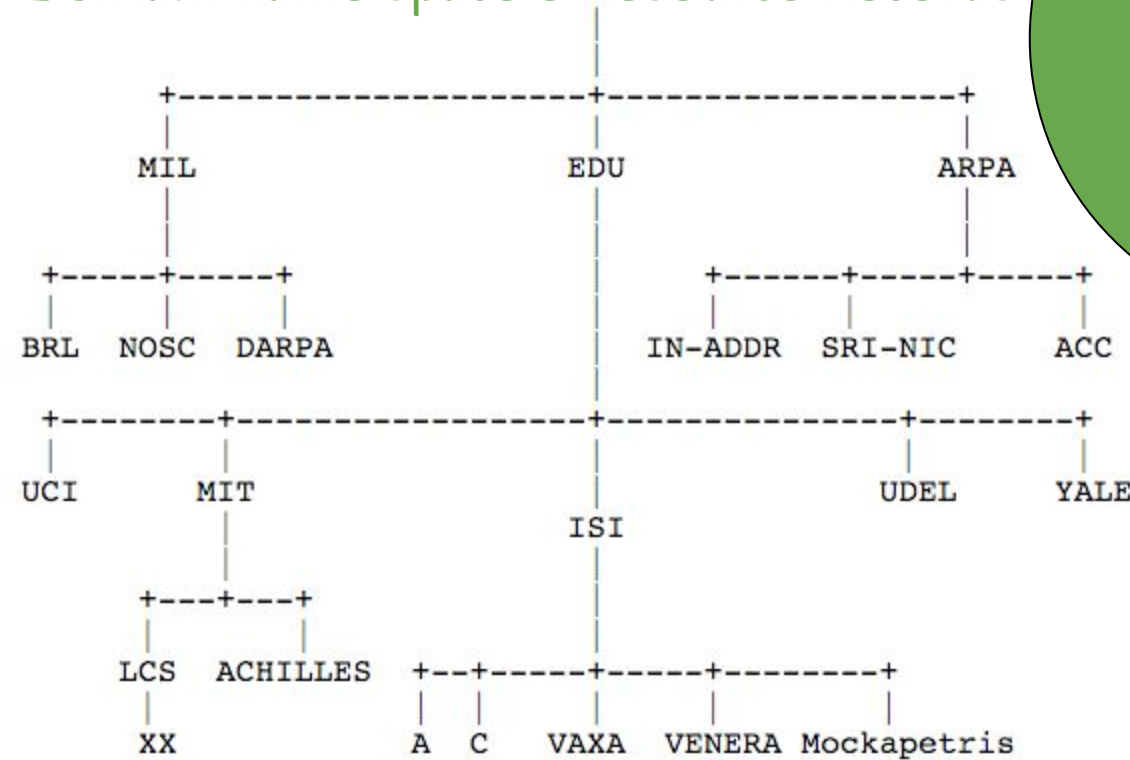
Elements of a Hierarchical Naming System with Data Associated with Each Name

[RFC 1034](#)
November 1987

Three Core Components of DNS

Domain name space e Resource Records

Elements of a Hierarchical Naming System with Data Associated with Each Name



[RFC 1034](#)

November 1987

Three Core Components of DNS

Domain name space e Resource Records

CLASS IN - internet
CH - chaos
(HS - hesiod) ← RFC2929
A - host address
CNAME - host alias
HINFO - host information

TYPE MX - mail exchanger
NS - authoritative name server
PTR - pointer to a section of the domain
SOA - source of authority
TXT - text

TTL Time To Live, durata di un Resource Record

Elements of a
Hierarchical Naming
System with Data
Associated with Each
Name

[RFC 1034](#)

Novembre 1987

Three Core Components of DNS

Domain name space e Resource Records (RR)

A	host IPv4 address	NSEC	DNSSEC not existence(RFC4034)
AAAA	host IPv6 address	PTR	pointer to CNAME (reverse zone)
CAA	authorized certification authorities(RFC8659)	RRSIG	Resource Record signature(RFC4034)
CERT	certificate in the DNS (RFC4398)	SMIMEA	domain→certificate for sender auth
CNAME	map a domain	SOA	source of authority
DNAME	map more domains	SPF	sender policy framework (obsoleted, now TXT)
DNSKEY	DNSSEC public key (RFC4034)	SRV	more servers for a domain with weight and priority
DS	delegation signer DNSSEC (RFC4034)	SSHFP	ssh public key in the DNS (RFC4225)
HINFO	historically host info. Today RFC8482	TLSA	for standard DANE (RFC6698)
LOC	host location (RFC1876)	TXT	text also on multiple lines
MX	mail exchanger (with priority)	URI	map host on domain (RFC7553)
NS	name server		

Three Core Components of DNS

Domain name space e Resource Records

Elements of a
Hierarchical Naming
System with Data
Associated with Each
Name

XX.LCS.MIT.EDU.	IN	A	10.0.0.44
	CH	A	MIT.EDU. 2420
ISI.EDU.	MX	10	VENERA.ISI.EDU.
	MX	10	VAXA.ISI.EDU.
VENERA.ISI.EDU.	A		128.9.0.32
	A		10.1.0.52
VAXA.ISI.EDU.	A		10.2.0.27
	A		128.9.0.33

[RFC 1034](#)

November 1987

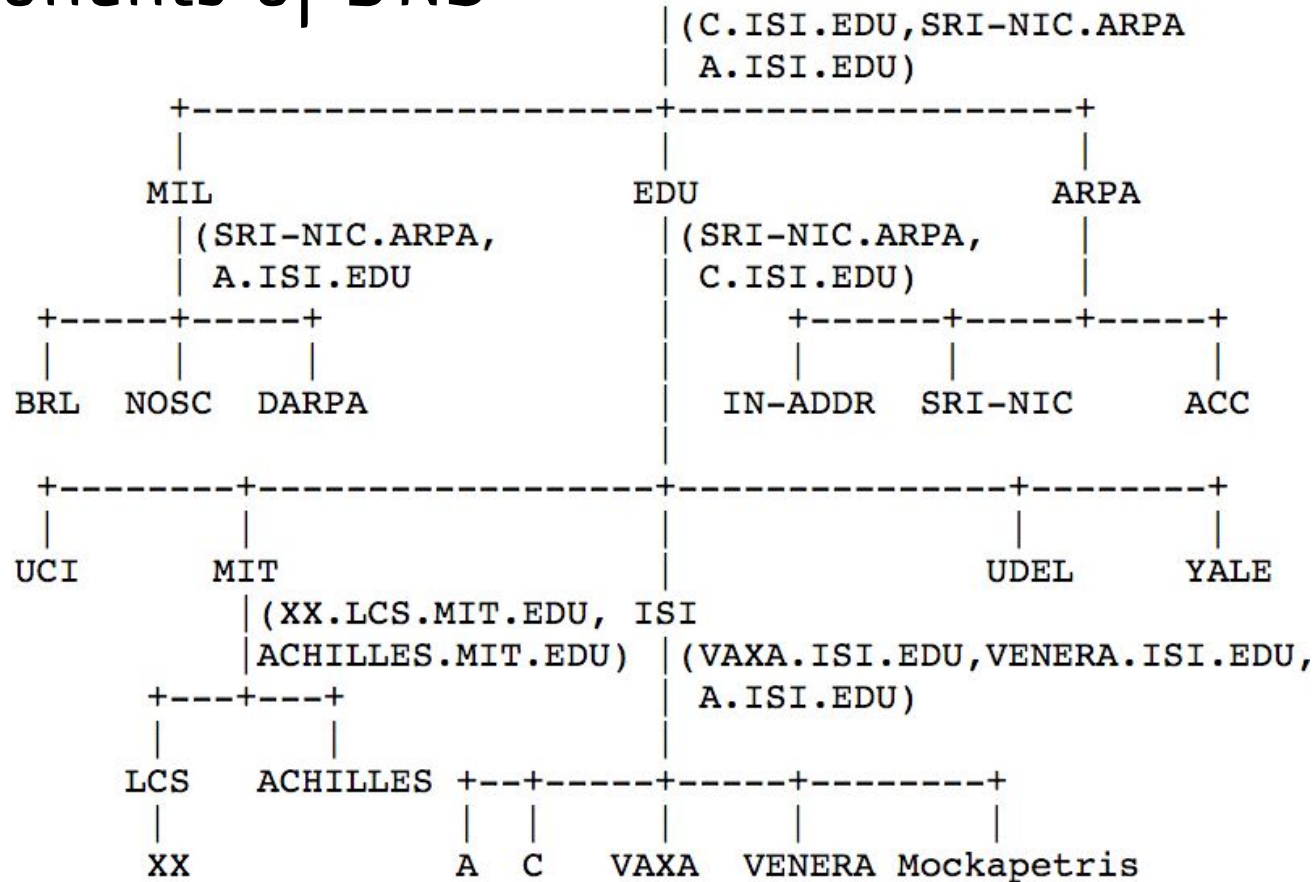
Three Core Components of DNS

[RFC 1034](#)

November 1987

Name Servers

The server software that stores information about the hierarchical structure and the corresponding data set



Three Core Components of DNS

RFC 1034

November 1987

Name Servers

The server software that stores information about the hierarchical structure and the corresponding data set

```
.      IN      SOA      SRI-NIC.ARPA. HOSTMASTER.SRI-NIC.ARPA. (
      870611      ;serial
      1800      ;refresh every 30 min
      300      ;retry every 5 min
      604800      ;expire after a week
      86400)      ;minimum of a day

      NS      A.ISI.EDU.
      NS      C.ISI.EDU.
      NS      SRI-NIC.ARPA.

MIL.    86400      NS      SRI-NIC.ARPA.
      86400      NS      A.ISI.EDU.

EDU.    86400      NS      SRI-NIC.ARPA.
      86400      NS      C.ISI.EDU.

SRI-NIC.ARPA.  A      26.0.0.73
      A      10.0.0.51
      MX     0 SRI-NIC.ARPA.
      HINFO   DEC-2060 TOPS20

ACC.ARPA.  A      26.6.0.65
      HINFO   PDP-11/70 UNIX
      MX     10 ACC.ARPA.

USC-ISIC.ARPA. CNAME   C.ISI.EDU.
```

Three Core Components of DNS

Header	OPCODE=QUERY	
Question	QNAME=ISI.EDU., QCLASS=IN, QTYPE=MX	
Answer	<empty>	
Authority	<empty>	
Additional	<empty>	

The software that
fetches data from
name servers when
clients make requests

Resolvers

[RFC 1034](#)

November 1987

Three Core Components of DNS

Header	OPCODE=QUERY, RESPONSE, AA			
Question	QNAME=ISI.EDU., QCLASS=IN, QTYPE=MX			
Answer	ISI.EDU.	MX 10 VENERA.ISI.EDU. MX 20 VAXA.ISI.EDU.		
Authority	<empty>			
Additional	VAXA.ISI.EDU.	172800	A	10.2.0.
		172800	A	128.9.
	VENERA.ISI.EDU.	172800	A	10.1.0.
		172800	A	128.9.

The software that fetches data from name servers when clients make requests

The software that
fetches data from
name servers when
clients make requests

Resolvers

[RFC 1034](#)

November 1987

IN-ADDR.ARPA e IP6.ARPA (Address and Routing Parameter Area)

Special infrastructure TLDs for mapping IP addresses (IPv4 and IPv6) to hostnames (number-to-name resolution)

Address numbers ^{4 3 2 1} **10. 2. 0. 52** can be seen in the following domain name:

^{1 2 3 4}
52.0.2.10.IN-ADDR.ARPA.

Address numbers **2001:db8::10:2:0:52** can be seen in the following domain name:

2.5.0.0.0.0.0.2.0.0.0.0.1.0.0.0.0.0.0.0.0.0.0.8.b.d.0.1.0.0.2.IP6.ARPA.

RFC 2826 IAB Technical Comment on the Unique DNS Root, maggio 2000

To remain a global network, the Internet requires the existence of a globally unique public name space. The DNS name space is a hierarchical name space derived from a single, globally unique root. This is a technical constraint inherent in the design of the DNS. Therefore it is not technically feasible for there to be more than one root in the public DNS. That one root must be supported by a set of coordinated root servers administered by a unique naming authority.

RFC 2826 IAB Technical Comment on the Unique DNS Root, maggio 2000

The requirement for uniqueness within a domain further implies that there be some mechanism to prevent name conflicts within a domain. In DNS this is accomplished by assigning a single owner or maintainer to every domain, including the root domain, who is responsible for ensuring that each sub-domain of that domain has the proper records associated with it. This is a technical requirement, not a policy choice.



DNS between Security and Privacy

- *DNS over TLS*
- *DNS over HTTPS*

https://dnsprivacy.org

WELCOME TO THE DNS PRIVACY PROJECT

Quick Start Links

[> DNS Privacy](#)[> For Users](#)[> For Operators](#)[> DNS Privacy Workshop](#)

This site is the home of a collaborative open project to promote, implement and deploy DNS Privacy. The goals of this project include:

- (1) Raising awareness of the issue of DNS Privacy
- (2) Empowering users to take advantage of DNS Privacy tools and resources (client applications, DNS Privacy resolvers)
- (3) Evolving the DNS to support DNS Privacy and in particular developing new DNS Protocol standards
- (4) Working towards full support for DNS Privacy in a range of Open Source DNS implementations including: `getdns`, Unbound, NSD, BIND, PowerDNS and Knot (Auth and Resolver)
- (5) Co-ordinating deployment of DNS Privacy services and documenting operational practices

Among the many contributors to this project are Sinodun IT, NLnet Labs, SalesForce, Surfnet, NLnet Foundation, OTF, Stephane Bortzmeyer and No Mountain Software.



sinodun

**NLnet
Labs**



**OPEN
TECHNOLOGY
FUND**



DNS Privacy Project

Q Search... X

Home

1. The Problem

2. The Solutions

3. Current Work

4. IETF DNS Privacy Tutorial

5. Public Resolvers

6. Test Servers

7. DNS Privacy Clients

8. DNS Privacy Daemon - Stubby

9. Implementation Status

10. Running a DNS Privacy server

11. Encrypted Zone Transfer

12. DNS Privacy Reference Material



PRIVACY

RFC 7626

- QNAME and source IP (and maybe source port)
- Cache of resolvers
- Eavesdropping on the Cable, Authoritative Servers, and Recursive Resolvers

PRIVACY

Strict Privacy

In other words, privacy is a functional requirement: without it, the system won't work. It relies on an authenticated and encrypted connection.

PRIVACY

Opportunistic privacy

In other words, privacy is not required for the system to function, but it is preferred when available.

DoT, DNS over TLS

RFC 7858

Preventing Query Surveillance — Promoting Privacy

TCP 853

DoT, DNS over TLS

TCP → Handshake TLS

Over the encrypted channel, the client sends a query and the server responds. Ideally, both should reuse the same TCP session for subsequent messages, to reduce the overhead of establishing new connections.

DTLS, DNS over Datagram TLS

RFC 8094 (experimental)

Preventing Query Surveillance — Promoting Privacy

UDP 853

DTLS, DNS over Datagram TLS

UDP → Handshake TLS

Once the DTLS handshake is successfully completed, the connection is encrypted and protected against eavesdropping. Encryption also provides, to some extent, assurance of data integrity. However, to achieve stronger protection against attackers attempting to impersonate a legitimate server, it is essential that the server itself is authenticated.

DoH, DNS over HTTPS

RFC 8484

Queries and responses via HTTP URIs over TLS (i.e., HTTPS)

Transport follows the rules of the HTTP protocol: the client formats a query according to a predefined model and sends it to the server using either the GET or POST method.

TCP 443

DoH, DNS over HTTPS

RFC 8484

The server is required to support at least HTTP/2.

Privacy is ensured through encryption and server authentication

Security depends on the robustness of the underlying TLS protocol.

DNSSEC

Problem:

DNS responses may be tampered with or originate from a malicious (poisoned) source.

Solution:

Apply digital signatures to the data to ensure authenticity and integrity.

Cryptography

Public-key cryptography. For each domain name (zone), there exists a key pair: a public key and a private key. On one side, the zone administrator uses the private key (kept secret and securely stored) to sign the domain-related data and generate digital signatures. On the other side, the public key is published within the zone itself, so that anyone can freely access it and use it to verify the authenticity of the DNS data.

RESOLVER

The resolver queries the public key found in the zone and uses it to verify whether the DNS data is consistent with the signatures, also present in the zone, that were previously generated by the zone administrator using their private key. The resolver can return two types of responses to the user: Positive, if the verification of the signed data succeeds with the public key; Negative, if the verification fails — raising a reasonable suspicion that some kind of attack may be underway.

ISPs at the Crossroads of Cybersecurity and Censorship

Italy: The Current Landscape

Censorship is the suppression of **speech**, public communication, or other **information**. This may be done on the basis that such material is considered objectionable, harmful, sensitive, or "inconvenient".^{[2][3][4]} Censorship can be conducted by **governments**^[5] and private institutions.^[6] When an individual such as an author or other creator engages in censorship of their own works or speech, it is referred to as **self-censorship**. General censorship occurs in a variety of different media, including speech, books, music, films, and other arts, **the press**, radio, television, and the Internet for a variety of claimed reasons including **national security**, to control **obscenity**, **pornography**, and **hate speech**, to protect children or other vulnerable groups, to promote or restrict political or religious views, and to prevent **slander** and **libel**. Specific rules and regulations regarding censorship vary between **legal jurisdictions** and/or private organizations.

Censorship: Two Contexts of Implementation

Content Publication

*Prevent the content from being made
available online (or take it down if it has
already been published)*

Content Consumption

*Impose restrictions on Internet users to block
access to censored content*

Why Censorship?

Collective Interests

*such as the fight against child
pornography*

Individual Interests

*such as the protection of
copyright*

Techniques of Censorship

DNS

*Redirecting to a Dedicated
Explanatory Landing Page*

ROUTING

IP Blackholing Based on Blocklists



Questions?