

# Zone file

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A Domain Name System (DNS) **zone file** is a text file that describes a DNS zone. A DNS zone is a subset, often a single domain, of the hierarchical domain name structure of the DNS. The zone file contains mappings between domain names and IP addresses and other resources, organized in the form of text representations of resource records (RR). A zone file may be either a DNS master file, authoritatively describing a zone, or it may be used to list the contents of a DNS cache. <sup>[1]</sup>

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## File format

The format of a zone file is defined in RFC 1035 (section 5) and RFC 1034 (section 3.6.1). This format was originally used by the Berkeley Internet Name Domain (BIND) software package, but has been widely adopted by other DNS server software – though some of them (e.g. NSD, PowerDNS) are using the zone files only as a starting point to compile them into database format, see also Microsoft DNS with Active Directory-database integration.

A zone file is a sequence of entries for *resource records*. Each line is a text description that defines a single resource record (RR). The description consists of several fields separated by white space (spaces or tabs) as follows:

name	ttl	record class	record type	record data
------	-----	--------------	-------------	-------------

The *name* field may be left blank. If so, the record inherits the field from the previous record.

The field *ttl* (*time-to-live*) specifies the time after which a domain name client must discard the record and perform a new resolution operation to obtain fresh information. If ttl is not specified, the global TTL specified at the top of the zone file is used.

The field *record class* indicates the namespace of the record information. The most commonly used namespace is that of the Internet, indicated by parameter *IN*, but others exist and are in use, e.g., *CHAOS*.

The field *record type* is an abbreviation for the type of information stored in the last field, *record data*. The type also provides the name of each record. For example, an *address record*, having the identifier *A* for IPv4 and *AAAA* for IPv6, maps the domain name from the first field to an IP address in the record data, and a *mail exchanger* record (*MX*) specifies the Simple Mail Transfer Protocol (SMTP) mail host for a domain.

The field *record data* may consist of one or more information elements, depending on the requirements of each record type. For example, an address record only requires an address, while a mail exchanger record requires a priority and a domain name. Such information elements are separated by white space.

Resource records may occur in any order in a zone file, with some exceptions. For formatting convenience, resource records may span several lines by enclosing in parentheses a set of parameters that spans several lines, but belongs to the same record. The file may contain comment text by preceding such text with a semicolon, either at the beginning of a line, or after the last field on any line, or on a blank line. Comments end at the end of a line. The zone file may contain any number of blank lines with or without comments.

The zone file may also contain various directives that are marked with a keyword starting with the dollar sign character. The most notable is the *\$ORIGIN* keyword, which specifies the starting point for the zone in the DNS hierarchy. If this keyword is omitted from a zone file, the origin is inferred by the server software from the reference to the zone file in its server configuration.

An example of a zone file for the domain *example.com* is the following:

```
$ORIGIN example.com.      ; designates the start of this zone file in the namespace
$TTL 1h                  ; default expiration time of all resource records without their own TTL value
example.com. IN SOA      ns.example.com. username.example.com. ( 2007120710 1d 2h 4w 1h )
example.com. IN NS       ns                ; ns.example.com is a nameserver for example.com
example.com. IN NS       ns.somewhere.example. ; ns.somewhere.example is a backup nameserver for example.com
example.com. IN MX       10 mail.example.com. ; mail.example.com is the mailserver for example.com
@              IN MX      20 mail2.example.com. ; equivalent to above line, "@" represents zone origin
@              IN MX      50 mail3              ; equivalent to above line, but using a relative host name
example.com. IN A         192.0.2.1             ; IPv4 address for example.com
              IN AAAA     2001:db8:10::1        ; IPv6 address for example.com
ns            IN A         192.0.2.2             ; IPv4 address for ns.example.com
              IN AAAA     2001:db8:10::2        ; IPv6 address for ns.example.com
www           IN CNAME     example.com.          ; www.example.com is an alias for example.com
wwwtest       IN CNAME     www                  ; wwwtest.example.com is another alias for www.example.com
mail          IN A         192.0.2.3             ; IPv4 address for mail.example.com
mail2         IN A         192.0.2.4             ; IPv4 address for mail2.example.com
mail3         IN A         192.0.2.5             ; IPv4 address for mail3.example.com
```

As a minimum, the zone file must specify the *Start of Authority* (SOA) record with the name of the authoritative master name server for the zone and the email address of someone responsible for management of the name server. The parameters of the SOA record also specify a list of timing and expiration parameters (serial number, slave refresh period, slave retry time, slave expiration time, and the maximum time to cache the record). Some DNS server software, such as BIND, also requires at least one additional name server record. The email address in the SOA RR has the @ symbol replaced by a period. In the zone file, host names that do not end in a period are relative to the origin. For example, in the example above, *www* refers to *www.example.com*, and *example.com.* is *example.com*, and not *example.com.example.com*. Names ending with a full stop (or point) are said to be fully qualified domain names.

A zone file is referenced by the configuration file of the name server software such as bind, typically by a statement such as:

```
zone "example.com" { type master; file "/var/named/db.example.com"; };
```

## Root zone and top-level domains

The zone files for the DNS root zone and for the set of top-level domains contain resource records only for the authoritative domain name servers for each domain name.

Some server software automatically configures resource records for specially recognized domains or hostnames, such as localhost, but a customized zone master file may be used.

```

$ORIGIN localhost.
@ 1D IN SOA  @  root 1999010100 3h 15m 1w 1d
@ 1D IN NS   @
@ 1D IN A    127.0.0.1
@ 1D IN AAAA ::1

```

```
;; reverse zone file for 127.0.0.1 and ::1
$TTL 3W
@ 3W IN SOA      localhost. root.localhost. 1999010100 3h 15m 1w 1d
@ 3W IN NS       localhost.
1 3W IN PTR      localhost.
```

```
zone "0.0.0.0.in-addr.arpa" IN { type master; file "r.local"; };  
zone "0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.ip6.arpa" IN { type master; file "r.local"; };
```

## See also

- ## References

- Categories: Domain name system

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