dig DNS lookups

START HERE

`dig <name>`
Look up A records

`dig -x <ip>`
Reverse lookup

`dig +short <name>`
Just the answer

`dig +trace <name>`
Follow delegation from root

`dig <name> MX`
Ask for a record type

`dig +noall +answer <name>`
Answer section only

`dig @<server> <name>`
Ask a specific server

`dig <name> ANY`
Ask for everything

Your machine dig → `query` → **Resolver** @server or resolv.conf → `+trace skips it` → **Root / TLD** delegations → `refers to` → **Authoritative** the final answer

CONCEPTS

dig talks to the DNS server directly and ignores /etc/hosts, so it can differ from what your applications resolve.

Options starting with + change a query; options starting with - change dig itself. Order is free: name, type and @server may come anywhere.

BASIC QUERIES

`dig <name>`
Query A records

`dig <name> <type>`
Query a record type

`dig -t <type> <name>`
Same, with the type as a flag

`dig <name> AAAA`
IPv6 address

`dig <name> MX`
Mail servers

`dig <name> NS`
Name servers of a zone

`dig <name> TXT`
Text records (SPF, verification)

`dig <name> CNAME`
Alias target

`dig <name> SOA`
Zone start of authority and serial

`dig <name> SRV`
Service location records

`dig <name> CAA`
Certificate authority restrictions

`dig <name> ANY`
Request all types

Many servers answer ANY minimally or refuse it, so do not trust it as a full listing.

`dig <name1> <name2>`
Several lookups in one run

CHOOSE THE SERVER

`dig @<server> <name>`
Ask this resolver or server

`dig @1.1.1.1 <name>`
Use a public resolver

`dig @<ns> <name> +norecurse`
Ask without recursion

`dig -p <port> @<server> <name>`
Non-standard port

`dig -4 <name>`
Use IPv4 transport only

CHOOSE THE SERVER (cont.)

`dig -6 <name>`
Use IPv6 transport only

`dig -b <addr> <name>`
Bind to a source address

`dig +tcp <name>`
Query over TCP

`dig +tls @<server> <name>`
DNS over TLS

`dig +https @<server> <name>`
DNS over HTTPS

`dig +nsid @<server> <name>`
Ask the server to identify itself

OUTPUT CONTROL

`dig +short <name>`
Print only the answer data

`dig +noall +answer <name>`
Answer section only, with TTLs

`dig +noall +answer +ttlunits <name>`
TTLs as 1h30m style

`dig +nocmd <name>`
Hide the command banner

`dig +nocomments <name>`
Hide section comments

`dig +nostats <name>`
Hide the timing footer

`dig +multiline <name> SOA`
Expand records over lines

`dig +yaml <name>`
Machine readable YAML output

`dig +identify +short <name>`
Show which server answered

`dig +noall +authority <name>`
Authority section only

`dig +noall +additional <name>`
Additional section only

`dig +short -x <ip>`
Reverse lookup, name only

REVERSE AND TRACING

`dig -x <ip>`
Reverse (PTR) lookup

`dig +trace <name>`
Walk from the root servers down

Uses its own iterative lookups, so it ignores your resolver's cache.

`dig +trace +nodnssec <name>`
Trace without DNSSEC records

REVERSE AND TRACING (cont.)

`dig +nssearch <zone>`
Ask every authoritative server for the SOA

`dig NS <zone> +short`
List the zone's name servers

DNSSEC AND EDNS

`dig +dnssec <name>`
Request signatures (RRSIG)

`dig <name> DNSKEY +dnssec`
Zone signing keys

`dig <name> DS`
Delegation signer from the parent

`dig +cd <name>`
Skip validation (checking disabled)

`dig +subnet=<ip>/<len> <name>`
Send an EDNS client subnet

`dig +cookie <name>`
Send a DNS cookie

TIMING AND RELIABILITY

`dig +timeout=<sec> <name>`
Per-try timeout (default 5)

`dig +tries=<n> <name>`
UDP attempts (default 3)

`dig +fail <name>`
Do not try next server on SERVFAIL

`dig +ignore <name>`
Do not retry over TCP on truncation

`dig +search <name>`
Apply resolv.conf search domains

Off by default; dig does not append search domains unless asked.

BATCH AND CONFIG

`dig -f <file>`
Run lookups listed in a file

Each line is written like a command line: name, type, options.

`dig -r <name>`
Ignore ~/.digrc

`dig -v`
Print dig's version

~/.digrc defaults

```
# one line, read on every run
(-r skips it)
+noall +answer
```

Batch file

```
# queries.txt
example.com A
example.com MX +short
-x 8.8.8.8
```

READING THE OUTPUT

Header flags

Item	Meaning
`status: NOERROR`	Query succeeded (answer may be empty)
`status: NXDOMAIN`	Name does not exist
`status: SERVFAIL`	Server could not answer
`status: REFUSED`	Server will not answer you
`flags: qr`	This is a response
`flags: aa`	Authoritative answer
`flags: rd ra`	Recursion asked / available
`flags: ad`	DNSSEC validated
`flags: tc`	Truncated, retry over TCP

Answer line

Field	Example
`name`	`example.com.`
`TTL (seconds)`	`300`
`class`	`IN`
`type`	`A`
`data`	`93.184.216.34`

NOERROR with an empty answer means the name exists but has no record of that type. NXDOMAIN means the name does not exist at all.

A falling TTL on repeated queries to a resolver shows the answer comes from its cache.

RECIPES

Compare resolvers

```
for s in 1.1.1.1 8.8.8.8
9.9.9.9; do
  echo "$s: $(dig +short @$s
<name>)"
done
```

Check each authoritative server

```
for ns in $(dig +short NS
<zone>); do
  dig +short @$ns SOA <zone>
done
# differing serials mean zone
replication lag
```

Debug a flaky lookup

```
dig +tries=1 +timeout=2
+norecurse @<server> <name>
dig +trace <name> | tail -20
```

Bulk reverse lookups

```
while read ip; do
  echo "$ip $(dig +short -x
$ip)"
done < ips.txt
```