Linux / UNIX: DNS Lookup Command

Posted By nixCraft <webmaster@cyberciti.biz> On November 8, 2010 @ 8:29 pm [5 Comments]

How do I perform dns lookup under Linux or UNIX or Apple OS X operating systems without using 3rd party web sites for troubleshooting DNS usage?

You can use any one of the following dns lookup utility under Linux / UNIX. You can skip all 3rd party websites and use the following to debug your dns servers and lookup issues:

[a] **host command** - DNS lookup utility.

[b] **dig command** - DNS lookup utility.

Both commands will allow you to get answer to various dns queries such as the IP address (A), mail exchanges (MX), name servers (NS), text annotations (TXT), or ANY (all) type.

host DNS Lookup Examples

host command is a simple utility for performing DNS lookups. It is normally used to convert names to IP addresses and vice versa. When no arguments or options are given, host command displays a short summary of its command line arguments and options. The syntax is as follows:

```
host example.com
host -t TYPE example.com
host -t a example.com
```

Task: Find Out the Domain IP

```
$ host -t a cyberciti.biz
```
Sample outputs:

```
cyberciti.biz has address 75.126.153.206
```

Task: Find Out the Domain Mail Server

```
$ host -t mx cyberciti.biz
```
Sample outputs:

```
cyberciti.biz mail is handled by 2 CYBERCITI.BIZ.S9A2.PSMTP.com.
cyberciti.biz mail is handled by 3 CYBERCITI.BIZ.S9B1.PSMTP.com.
cyberciti.biz mail is handled by 4 CYBERCITI.BIZ.S9B2.PSMTP.com.
cyberciti.biz mail is handled by 1 CYBERCITI.BIZ.S9A1.PSMTP.com.
```

Task: Find Out the Domain Name Servers

```
$ host -t ns cyberciti.biz
```
Sample outputs:

```
cyberciti.biz name server ns2.nixcraft.net.
cyberciti.biz name server ns1.nixcraft.net.
cyberciti.biz name server ns5.nixcraft.net.
cyberciti.biz name server ns4.nixcraft.net.
```

Task: Find Out the Domain TXT Recored (e.g., SPF)

```
$ host -t txt cyberciti.biz
```
Sample outputs:

```
cyberciti.biz descriptive text "v=spf1 a mx ip4:74.86.48.99 ip4:74.86.48.98 ip4:74.86.48.102 ip4:74.86.48.101 ip4:74.86.48.100 ip4:72.26.218.170 ip4:93.89.92.12 ip4:180.92.186.178 include:_spf.google.com -all"
```

Task: Find Out the Domain CNAME Record

```
$ host -t cname files.cyberciti.biz
```
Sample outputs:

```
files.cyberciti.biz is an alias for files.cyberciti.biz.edgesuite.net.
```

Task: Find Out the Domain SOA Record

```
$ host -t soa cyberciti.biz
```
Sample outputs:

```
cyberciti.biz has SOA record ns1.nixcraft.net. vivek.nixcraft.com. 2008072353 10800 3600 604800 3600
```

Task: Query Particular Name Server

Query ns2.nixcraft.net:
```
$ host cyberciti.biz ns2.nixcraft.net
```
Sample outputs:

```
Using domain server:
Name: ns2.nixcraft.net
Address: 75.126.168.152#53
Aliases:
cyberciti.biz has address 75.126.153.206
cyberciti.biz has IPv6 address 2607:f0d0:1002:51::4
cyberciti.biz mail is handled by 3 CYBERCITI.BIZ.S9B1.PSMTP.com.
cyberciti.biz mail is handled by 4 CYBERCITI.BIZ.S9B2.PSMTP.com.
cyberciti.biz mail is handled by 1 CYBERCITI.BIZ.S9A1.PSMTP.com.
cyberciti.biz mail is handled by 2 CYBERCITI.BIZ.S9A2.PSMTP.com.
```

Task: Display All Information About Domain Records and Zone

You need to pass the -a (all) option and asking host command to make a query of type ANY:
```
$ host -a cyberciti.biz
```
OR
```
$ host -t any cyberciti.biz
```
Sample outputs:

```
Trying "cyberciti.biz"
;; Truncated, retrying in TCP mode.
Trying "cyberciti.biz"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 34079
;; flags: qr rd ra; QUERY: 1, ANSWER: 14, AUTHORITY: 0, ADDITIONAL: 0
;; QUESTION SECTION:
;cyberciti.biz.		IN ANY
;; ANSWER SECTION:
cyberciti.biz.	3423 IN AAAA 2607:f0d0:1002:51::4
cyberciti.biz.	3600 IN SOA ns1.nixcraft.net. vivek.nixcraft.com. 2008072353 10800 3600 604800 3600
cyberciti.biz.	3600 IN TXT "v=spf1 a mx ip4:74.86.48.99 ip4:74.86.48.98 ip4:74.86.48.102 ip4:74.86.48.101 ip4:74.86.48.100 ip4:72.26.218.170 ip4:93.89.92.12 ip4:180.92.186.178 include:_spf.google.com -all"
cyberciti.biz.	3600 IN MX 2 CYBERCITI.BIZ.S9A2.PSMTP.com.
cyberciti.biz.	3600 IN MX 3 CYBERCITI.BIZ.S9B1.PSMTP.com.
cyberciti.biz.	3600 IN MX 4 CYBERCITI.BIZ.S9B2.PSMTP.com.
cyberciti.biz.	3600 IN MX 1 CYBERCITI.BIZ.S9A1.PSMTP.com.
cyberciti.biz.	2805 IN A 75.126.153.206
cyberciti.biz.	3423 IN NS ns2.nixcraft.net.
cyberciti.biz.	3423 IN NS ns5.nixcraft.net.
cyberciti.biz.	3423 IN NS ns1.nixcraft.net.
cyberciti.biz.	3423 IN NS ns4.nixcraft.net.
cyberciti.biz.	84092 IN RRSIG NSEC 8 2 86400 20101125013720 20101026010313 50568 biz. OjDv09mccTZR2bYC14D57QcnNEkBq6bNEs20ExsI6NC2sI9pmiKLnq+w UnCYxWMnkMi7WNXwIhhUWtNhV48X3wJGj1Mufrhq8Mn025JIcRE6UJF2 y12TTZHHE0UJV6HSkw1sac3X1ZKXLi/oSvE/IXTsdj2SckPh+pMlaieQ jAA=
cyberciti.biz.	84092 IN NSEC CYBERCITIZEN.biz. NS RRSIG NSEC
Received 749 bytes from 192.168.1.254#53 in 0.1 ms
```

Task: Use IPv6 Query Transport

Test your dns lookup using IPv6 query transport (you must have IPV6 based connectivity including IPv6 enabled resolving name servers):

```
$ host -6 cyberciti.biz
$ host -6 -a cyberciti.biz
$ host -6 cyberciti.biz ns1.nixcraft.net
$ host -6 -t ns cyberciti.biz ns3.nixcraft.net
```

Sample outputs:

```
Using domain server:
Name: ns3.nixcraft.net
Address: 2001:48c8:10:1::2#53
Aliases:
cyberciti.biz name server ns2.nixcraft.net.
cyberciti.biz name server ns4.nixcraft.net.
cyberciti.biz name server ns5.nixcraft.net.
cyberciti.biz name server ns1.nixcraft.net.
```

Task: Reverse IP Lookup

Type the command:
```
$ host {IP-Address-Here}
$ host 75.126.153.206
```
Sample outputs:

```
206.153.126.75.in-addr.arpa domain name pointer www.cyberciti.biz.
```

Task: Get TTL Information

Type the command as follows:
```
$ host -v -t {TYPE} {example.com}
$ host -v -t a cyberciti.biz
$ host -v -t a i.hexindia.net
```
Sample outputs:

```
Trying "cyberciti.biz"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 17431
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 4, ADDITIONAL: 7
;; QUESTION SECTION:
;cyberciti.biz.		IN A
;; ANSWER SECTION:
cyberciti.biz.	1866 IN A 75.126.153.206
;; AUTHORITY SECTION:
cyberciti.biz.	3850 IN NS NS1.NIXCRAFT.NET.
cyberciti.biz.	3850 IN NS NS4.NIXCRAFT.NET.
cyberciti.biz.	3850 IN NS NS5.NIXCRAFT.NET.
cyberciti.biz.	3850 IN NS NS2.NIXCRAFT.NET.
;; ADDITIONAL SECTION:
NS1.NIXCRAFT.NET. 85669 IN A 72.26.218.170
```

```
NS1.NIXCRAFT.NET. 85689 IN AAAA 2001:48c8:7::2
NS2.NIXCRAFT.NET. 85669 IN A 75.126.168.152
NS2.NIXCRAFT.NET. 85669 IN AAAA 2607:f0d0:1002:51::3
NS4.NIXCRAFT.NET. 85669 IN A 93.89.92.12
NS4.NIXCRAFT.NET. 85669 IN AAAA 2a01:348:0:15:5d59:50c:0:1
NS5.NIXCRAFT.NET. 85669 IN AAAA 2001:48c8:10:1::2
Received 291 bytes from 10.0.80.11#53 in 2 ms
```

If you run the same command again, you'll notice that the TTL number (1866) reduced.

dig DNS Lookup Examples

dig (domain information groper) or host command is a flexible tool for interrogating DNS name servers. It performs DNS lookups and displays the answers that are returned from the name server(s) that were queried. Most DNS administrators use dig to troubleshoot DNS problems because of its flexibility, ease of use and clarity of output. hos dns lookup tool have less functionality than dig.

Examples

```
dig @{ns1.example.com} {example.com}
dig @{ns1.example.com} {example.com} {TYPE}
dig cyberciti.biz a
dig cyberciti.biz mx
dig cyberciti.biz ns
dig cyberciti.biz txt
dig @ns1.nixcraft.net cyberciti.biz a
```

Task: Trace Usage

See how domains are resolved using root servers i.e. turn on tracing of the delegation path from the root name servers for the name being looked up. When tracing is enabled, dig makes iterative queries to resolve the name being looked up. It will follow referrals from the root servers, showing the answer from each server that was used to resolve the lookup:
```
$ dig +trace cyberciti.biz
```
Sample outputs:

```
 <<>> DiG 9.3.6-P1-RedHat-9.3.6-4.P1.el5_4.2 <<>> +trace cyberciti.biz
;; global options:  printcmd
.    41219 IN NS b.root-servers.net.
.    41219 IN NS e.root-servers.net.
.    41219 IN NS i.root-servers.net.
.    41219 IN NS d.root-servers.net.
.    41219 IN NS g.root-servers.net.
.    41219 IN NS k.root-servers.net.
.    41219 IN NS l.root-servers.net.
.    41219 IN NS c.root-servers.net.
.    41219 IN NS m.root-servers.net.
.    41219 IN NS a.root-servers.net.
.    41219 IN NS h.root-servers.net.
.    41219 IN NS j.root-servers.net.
.    41219 IN NS f.root-servers.net.
;; Received 436 bytes from 10.0.80.11#53(10.0.80.11) in 2 ms
biz.    172800 IN NS h.gtld.biz.
biz.    172800 IN NS c.gtld.biz.
biz.    172800 IN NS e.gtld.biz.
biz.    172800 IN NS b.gtld.biz.
biz.    172800 IN NS g.gtld.biz.
biz.    172800 IN NS a.gtld.biz.
biz.    172800 IN NS f.gtld.biz.
;; Received 316 bytes from 192.228.79.201#53(b.root-servers.net) in 34 ms
cyberciti.biz.  7200 IN NS NS5.NIXCRAFT.NET.
cyberciti.biz.  7200 IN NS NS1.NIXCRAFT.NET.
cyberciti.biz.  7200 IN NS NS2.NIXCRAFT.NET.
cyberciti.biz.  7200 IN NS NS4.NIXCRAFT.NET.
;; Received 115 bytes from 2001:503:8028:ffff:ffff:ffff:ffff:ff7e#53(h.gtld.biz) in 23 ms
cyberciti.biz.  3600 IN A 75.126.153.206
cyberciti.biz.  3600 IN NS ns4.nixcraft.net.
cyberciti.biz.  3600 IN NS ns5.nixcraft.net.
cyberciti.biz.  3600 IN NS ns1.nixcraft.net.
cyberciti.biz.  3600 IN NS ns2.nixcraft.net.
;; Received 307 bytes from 2001:48c8:10:1::2#53(NS5.NIXCRAFT.NET) in 222 ms
```

Task: Get Only Short Answer

A quick way to just get the answer is to type the following command:
```
$ dig +short cyberciti.biz
```
Sample outputs:

```
75.126.153.206
```

Task: Display All Records

```
$ dig +noall +answer cyberciti.biz any
```
Sample outputs:

```
cyberciti.biz.  3490 IN A 75.126.153.206
cyberciti.biz.  2733 IN NS NS2.NIXCRAFT.NET.
cyberciti.biz.  2733 IN NS NS1.NIXCRAFT.NET.
cyberciti.biz.  2733 IN NS NS4.NIXCRAFT.NET.
cyberciti.biz.  2733 IN NS NS5.NIXCRAFT.NET.
cyberciti.biz.  85668 IN RRSIG NSEC 8 2 86400 20101125013720 20101026010313 50568 biz. OjDv09mccTZR2bYC14D57QcnNEkBq6bNEa20ExsI6NC2sI9pmiKLnq+w UnCYxWMnkMi7WNXwIhhUWtNhV48X3wJGj1Mufrhq8MnO25JIcRE6UJF2 y12TTZHHE0UJV6HSkw1sac3X1ZKXLi/oSvE/IXTsdj2SckPh+pMlaieQ jAA=
cyberciti.biz.  85668 IN NSEC CYBERCITIZEN.biz. NS RRSIG NSEC
```

Task: Reverse IP Lookup

Type the following command:
```
$ dig -x +short {IP-Address-here}
$ dig -x 75.126.153.206 +short
```
Sample outputs

```
www.cyberciti.biz.
```

Task: Find Domain SOA Record

```
$ dig +nssearch cyberciti.biz
```
Sample outputs:

```
SOA ns1.nixcraft.net. vivek.nixcraft.com. 2008072353 10800 3600 604800 3600 from server ns5.nixcraft.net in 81 ms.
SOA ns1.nixcraft.net. vivek.nixcraft.com. 2008072353 10800 3600 604800 3600 from server ns4.nixcraft.net in 216 ms.
SOA ns1.nixcraft.net. vivek.nixcraft.com. 2008072353 10800 3600 604800 3600 from server ns1.nixcraft.net in 347 ms.
SOA ns1.nixcraft.net. vivek.nixcraft.com. 2008072353 10800 3600 604800 3600 from server ns2.nixcraft.net in 316 ms.
```

Task: Find Out TTL Value Using dig

```
$ dig +nocmd +noall +answer { TYPE} {example.com}
$ dig +nocmd +noall +answer a cyberciti.biz
```
Sample outputs:

```
cyberciti.biz.  1642 IN A 75.126.153.206
```

Run again, enter:
```
$ dig +nocmd +noall +answer a cyberciti.biz
```
Sample outputs:

```
cyberciti.biz.  1629 IN A 75.126.153.206
```

See also:

See man page for more information:
```
man dig
man host
```

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