```
                          mwendt@localhost:~                                    —  □  ×

[mwendt@localhost ~]$ dig @192.168.134.177 umk.pl MX

; <<>> DiG 9.11.22-RedHat-9.11.22-1.fc31 <<>> @192.168.134.177 umk.pl MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 7213
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 3, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
; COOKIE: a2fef1249f95e28467b168f65fbb9a6ae922b4baf4b8f1c3 (good)
;; QUESTION SECTION:
;umk.pl.                                IN      MX

;; ANSWER SECTION:
umk.pl.                 10800   IN      MX      0 koala.uci.umk.pl.
umk.pl.                 10800   IN      MX      0 outgoing.umk.pl.

;; AUTHORITY SECTION:
umk.pl.                 86400   IN      NS      blackbox.uci.umk.pl.
umk.pl.                 86400   IN      NS      ns2.man.torun.pl.
umk.pl.                 86400   IN      NS      koala.uci.umk.pl.

;; ADDITIONAL SECTION:
koala.uci.umk.pl.       86400   IN      A       158.75.1.4
blackbox.uci.umk.pl.    86400   IN      A       158.75.1.5

;; Query time: 199 msec
;; SERVER: 192.168.134.177#53(192.168.134.177)
;; WHEN: Mon Nov 23 12:18:02 CET 2020
;; MSG SIZE  rcvd: 211

[mwendt@localhost ~]$ dig @8.8.8.8 umk.pl MX

; <<>> DiG 9.11.22-RedHat-9.11.22-1.fc31 <<>> @8.8.8.8 umk.pl MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 20253
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;umk.pl.                                IN      MX

;; ANSWER SECTION:
umk.pl.                 10777   IN      MX      0 koala.uci.umk.pl.
umk.pl.                 10777   IN      MX      0 outgoing.umk.pl.

;; Query time: 9 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Mon Nov 23 12:18:59 CET 2020
;; MSG SIZE  rcvd: 86

[mwendt@localhost ~]$
```

```
mwendt@localhost:~                                                    —  □  ✕

Activate the web console with: systemctl enable --now cockpit.socket

Last login: Wed Dec  2 13:40:32 2020 from 172.18.76.106
[mwendt@localhost ~]$ dig @192.168.134.177 mat.umk.pl NS

; <<>> DiG 9.11.22-RedHat-9.11.22-1.fc31 <<>> @192.168.134.177 mat.umk.pl NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 53809
;; flags: qr rd ra; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
; COOKIE: b4811b579c3f8e596fd0aec95fc8cbf7609dfb13aff06015 (good)
;; QUESTION SECTION:
;mat.umk.pl.                    IN      NS

;; ANSWER SECTION:
mat.umk.pl.             21600   IN      NS      marta.studmat.umk.pl.
mat.umk.pl.             21600   IN      NS      waldemar.mat.umk.pl.
mat.umk.pl.             21600   IN      NS      blackbox.uci.umk.pl.
mat.umk.pl.             21600   IN      NS      koala.uci.umk.pl.

;; ADDITIONAL SECTION:
blackbox.uci.umk.pl.    86400   IN      A       158.75.1.5
koala.uci.umk.pl.       86400   IN      A       158.75.1.4

;; Query time: 624 msec
;; SERVER: 192.168.134.177#53(192.168.134.177)
;; WHEN: Thu Dec 03 12:28:55 CET 2020
;; MSG SIZE  rcvd: 197

[mwendt@localhost ~]$ dig @8.8.8.8 mat.umk.pl NS

; <<>> DiG 9.11.22-RedHat-9.11.22-1.fc31 <<>> @8.8.8.8 mat.umk.pl NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 38227
;; flags: qr rd ra; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;mat.umk.pl.                    IN      NS

;; ANSWER SECTION:
mat.umk.pl.             21599   IN      NS      koala.uci.umk.pl.
mat.umk.pl.             21599   IN      NS      blackbox.uci.umk.pl.
mat.umk.pl.             21599   IN      NS      marta.studmat.umk.pl.
mat.umk.pl.             21599   IN      NS      waldemar.mat.umk.pl.

;; Query time: 18 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Thu Dec 03 12:29:16 CET 2020
;; MSG SIZE  rcvd: 137

[mwendt@localhost ~]$
```

```
[mwendt@localhost ~]$ ping www.domlab177.studmat.uni.torun.pl
PING domlab177.studmat.uni.torun.pl (192.168.134.177) 56(84) bytes of data.
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=1 ttl=64 time=0.032 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=2 ttl=64 time=0.047 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=3 ttl=64 time=0.061 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=4 ttl=64 time=0.068 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=5 ttl=64 time=0.049 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=6 ttl=64 time=0.049 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=7 ttl=64 time=0.054 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=8 ttl=64 time=0.062 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=9 ttl=64 time=0.066 ms
^C
--- domlab177.studmat.uni.torun.pl ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8232ms
rtt min/avg/max/mdev = 0.032/0.054/0.068/0.010 ms
[mwendt@localhost ~]$ cat /etc/resolv.conf
# Generated by NetworkManager
search mat.umk.pl
#nameserver 158.75.2.7
#nameserver 158.75.112.2
nameserver 192.168.134.177
[mwendt@localhost ~]$
[mwendt@localhost ~]$ sudo cat /etc/named/primary/domlab177.studmat.uni.torun.pl
[sudo] password for mwendt:
$TTL     603900
@       IN      SOA     ns.domlab177.studmat.uni.torun.pl. root.domlab177.studmat.uni.torun.pl. (
        20201119
        8M
        2M
        30M
        10M
)
@       IN      NS      ns.domlab177.studmat.uni.torun.pl.
ns      IN      A       192.168.134.177
@ IN MX 10 mail.domlab177.studmat.uni.torun.pl.
$GENERATE 1-254 lab${0,3}.domlab177.studmat.uni.torun.pl. IN A 192.168.134.$
@ IN A 192.168.134.177
@ IN TXT "v=spf1 mx ip4:192.168.134.177 ip4:192.168.134.177 -all"
www IN CNAME domlab177.studmat.uni.torun.pl.
mail IN CNAME domlab177.studmat.uni.torun.pl.
[mwendt@localhost ~]$
```

```
   mwendt@localhost:~                                                    ─  □  ✕

[mwendt@localhost ~]$ dig @192.168.134.177 -x 192.168.134.177

; <<>> DiG 9.11.22-RedHat-9.11.22-1.fc31 <<>> @192.168.134.177 -x 192.168.134.177
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 23747
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 2

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
; COOKIE: d64125f1c162bfd960a77d495fbbad7b6af9f3ed8a52ffe4 (good)
;; QUESTION SECTION:
;177.134.168.192.in-addr.arpa.    IN      PTR

;; ANSWER SECTION:
177.134.168.192.in-addr.arpa. 603900 IN PTR     lab177.domlab177.studmat.uni.torun.pl.

;; AUTHORITY SECTION:
134.168.192.in-addr.arpa. 603900 IN     NS      ns.domlab177.studmat.uni.torun.pl.

;; ADDITIONAL SECTION:
ns.domlab177.studmat.uni.torun.pl. 603900 IN A  192.168.134.177

;; Query time: 0 msec
;; SERVER: 192.168.134.177#53(192.168.134.177)
;; WHEN: Mon Nov 23 13:39:23 CET 2020
;; MSG SIZE  rcvd: 169

[mwendt@localhost ~]$ █
```

```
[mwendt@localhost ~]$ ping www.domlab177.studmat.uni.torun.pl
PING domlab177.studmat.uni.torun.pl (192.168.134.177) 56(84) bytes of data.
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=1 ttl=64 time=0.073 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=2 ttl=64 time=0.045 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=3 ttl=64 time=0.047 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=4 ttl=64 time=0.042 ms
64 bytes from lab177.domlab177.studmat.uni.torun.pl (192.168.134.177): icmp_seq=5 ttl=64 time=0.069 ms
^C
--- domlab177.studmat.uni.torun.pl ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4102ms
rtt min/avg/max/mdev = 0.042/0.055/0.073/0.013 ms
[mwendt@localhost ~]$ ping www.domlab205.studmat.uni.torun.pl
PING domlab205.studmat.uni.torun.pl (192.168.134.205) 56(84) bytes of data.
64 bytes from lab205.domlab177.studmat.uni.torun.pl (192.168.134.205): icmp_seq=1 ttl=64 time=0.238 ms
64 bytes from lab205.domlab177.studmat.uni.torun.pl (192.168.134.205): icmp_seq=2 ttl=64 time=0.424 ms
64 bytes from lab205.domlab177.studmat.uni.torun.pl (192.168.134.205): icmp_seq=3 ttl=64 time=0.418 ms
64 bytes from lab205.domlab177.studmat.uni.torun.pl (192.168.134.205): icmp_seq=4 ttl=64 time=0.397 ms
64 bytes from lab205.domlab177.studmat.uni.torun.pl (192.168.134.205): icmp_seq=5 ttl=64 time=0.391 ms
^C
--- domlab205.studmat.uni.torun.pl ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4097ms
rtt min/avg/max/mdev = 0.238/0.373/0.424/0.068 ms
[mwendt@localhost ~]$ sudo cat /etc/named/primary/domlab177.studmat.uni.torun.pl
[sudo] password for mwendt:
$TTL     603900
@        IN        SOA      ns.domlab177.studmat.uni.torun.pl. root.domlab177.studmat.uni.torun.pl. (
         20201119
         8M
         2M
         30M
         10M
)
@        IN        NS       ns.domlab177.studmat.uni.torun.pl.
ns       IN        A        192.168.134.177
@ IN MX 10 mail.domlab177.studmat.uni.torun.pl.
$GENERATE 1-254 lab${0,3}.domlab177.studmat.uni.torun.pl. IN A 192.168.134.$
@ IN A 192.168.134.177
@ IN TXT "v=spf1 mx ip4:192.168.134.177 ip4:192.168.134.177 -all"
www IN CNAME domlab177.studmat.uni.torun.pl.
mail IN CNAME domlab177.studmat.uni.torun.pl.
[mwendt@localhost ~]$
```

```
root@localhost:/var/named                                                    —  □  ✕

zone 1.0.0.127.in-addr.arpa/IN: loaded serial 0
zone 134.168.192.in-addr.arpa/IN: loaded serial 20201119
zone domlab177.studmat.uni.torun.pl/IN: domlab177.studmat.uni.torun.pl/MX 'mail.domlab177.studmat.uni.
torun.pl' is a CNAME (illegal)
zone domlab177.studmat.uni.torun.pl/IN: loaded serial 20201119
zone localhost.localdomain/IN: loaded serial 0
zone localhost/IN: loaded serial 0
zone 1.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.ip6.arpa/IN: loaded serial 0
all zones loaded
running
network unreachable resolving './DNSKEY/IN': 2001:7fd::1#53
network unreachable resolving './NS/IN': 2001:7fd::1#53
network unreachable resolving './DNSKEY/IN': 2001:500:a8::e#53
network unreachable resolving './NS/IN': 2001:500:a8::e#53
network unreachable resolving './DNSKEY/IN': 2001:500:2f::f#53
network unreachable resolving './NS/IN': 2001:500:2f::f#53
network unreachable resolving './DNSKEY/IN': 2001:500:12::d0d#53
network unreachable resolving './NS/IN': 2001:500:12::d0d#53
network unreachable resolving './DNSKEY/IN': 2001:7fe::53#53
network unreachable resolving './NS/IN': 2001:7fe::53#53
network unreachable resolving './DNSKEY/IN': 2001:503:ba3e::2:30#53
network unreachable resolving './NS/IN': 2001:503:ba3e::2:30#53
network unreachable resolving './DNSKEY/IN': 2001:500:9f::42#53
network unreachable resolving './NS/IN': 2001:500:9f::42#53
network unreachable resolving './DNSKEY/IN': 2001:dc3::35#53
network unreachable resolving './NS/IN': 2001:dc3::35#53
network unreachable resolving './DNSKEY/IN': 2001:500:1::53#53
network unreachable resolving './NS/IN': 2001:500:1::53#53
network unreachable resolving './DNSKEY/IN': 2001:500:200::b#53
network unreachable resolving './NS/IN': 2001:500:200::b#53
network unreachable resolving './DNSKEY/IN': 2001:500:2d::d#53
network unreachable resolving './NS/IN': 2001:500:2d::d#53
zone domlab180.studmat.uni.torun.pl/IN: Transfer started.
network unreachable resolving './DNSKEY/IN': 2001:500:2::c#53
network unreachable resolving './NS/IN': 2001:500:2::c#53
network unreachable resolving './DNSKEY/IN': 2001:503:c27::2:30#53
network unreachable resolving './NS/IN': 2001:503:c27::2:30#53
transfer of 'domlab180.studmat.uni.torun.pl/IN' from 192.168.134.180#53: connected using 192.168.134.1
77#41599
transfer of 'domlab180.studmat.uni.torun.pl/IN' from 192.168.134.180#53: failed while receiving respon
ses: REFUSED
transfer of 'domlab180.studmat.uni.torun.pl/IN' from 192.168.134.180#53: Transfer status: REFUSED
transfer of 'domlab180.studmat.uni.torun.pl/IN' from 192.168.134.180#53: Transfer completed: 0 message
s, 0 records, 0 bytes, 0.001 secs (0 bytes/sec)
managed-keys-zone: Key 20326 for zone . acceptance timer complete: key now trusted
resolver priming query complete
zone domlab205.studmat.uni.torun.pl/IN: Transfer started.
transfer of 'domlab205.studmat.uni.torun.pl/IN' from 192.168.134.205#53: connected using 192.168.134.1
77#52913
zone domlab205.studmat.uni.torun.pl/IN: transferred serial 20201119
transfer of 'domlab205.studmat.uni.torun.pl/IN' from 192.168.134.205#53: Transfer status: success
transfer of 'domlab205.studmat.uni.torun.pl/IN' from 192.168.134.205#53: Transfer completed: 1 message
s, 263 records, 6028 bytes, 0.006 secs (1004666 bytes/sec)
[root@localhost named]# █
```

transfer odczytujemy z:
var/named/data/named.run

```
[root@localhost mwendt]# ls -R /etc/named
/etc/named:
primary  slaves

/etc/named/primary:
192.db  domlab177.studmat.uni.torun.pl

/etc/named/slaves:
domlab205.studmat.uni.torun.pl   <--- plik stref od innego serwera
[root@localhost mwendt]#
```

```
[root@192 named]# ls -R
.:
primary  slaves

./primary:
192.db  domlab205.studmat.uni.torun.pl

./slaves:
domlab177.studmat.uni.torun.pl    <--- plik stref z mojego serwera
[root@192 named]# 
```

```
[root@localhost etc]# cat named.conf
options {
        listen-on port 53 { any; };
        listen-on-v6 port 53 { any; };
        directory       "/var/named";
        dump-file       "/var/named/data/cache_dump.db";
        statistics-file "/var/named/data/named_stats.txt";
        memstatistics-file "/var/named/data/named_mem_stats.txt";
        secroots-file   "/var/named/data/named.secroots";
        recursing-file  "/var/named/data/named.recursing";
        allow-query     { any; };
        allow-transfer  { any; };
        recursion yes;
        dnssec-enable yes;
        dnssec-validation yes;
        managed-keys-directory "/var/named/dynamic";
        pid-file "/run/named/named.pid";
        session-keyfile "/run/named/session.key";
        include "/etc/crypto-policies/back-ends/bind.config";
};
logging {
        channel default_debug {
                file "data/named.run";
                severity dynamic;
        };
};
zone "domlab177.studmat.uni.torun.pl" IN {
    type master;
    file "/etc/named/primary/domlab177.studmat.uni.torun.pl";
};
zone "domlab205.studmat.uni.torun.pl" IN {
    type slave;
    masters { 192.168.134.205; };
    file "/etc/named/slaves/domlab205.studmat.uni.torun.pl";       odebrane pliki stref znajdują się w:
};                                                                 /etc/named/slaves
zone "domlab180.studmat.uni.torun.pl" IN {
    type slave;
    masters { 192.168.134.180; };
    file "/etc/named/slaves/domlab180.studmat.uni.torun.pl";
};
zone "134.168.192.in-addr.arpa" IN {
    type master;
    file "/etc/named/primary/192.db";
};
zone "." IN {
        type hint;
        file "named.ca";
};
include "/etc/named.rfc1912.zones";
include "/etc/named.root.key";
[root@localhost etc]#
```

```
[root@localhost named]# dig domlab177.studmat.uni.torun.pl MX

; <<>> DiG 9.11.22-RedHat-9.11.22-1.fc31 <<>> domlab177.studmat.uni.torun.pl MX
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 4223
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 2

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
; COOKIE: 295289267d1cc36c62c8cc0c5fc68692880e6a670575755f (good)
;; QUESTION SECTION:
;domlab177.studmat.uni.torun.pl.            IN      MX

;; ANSWER SECTION:
domlab177.studmat.uni.torun.pl. 603900 IN MX     10 mail.domlab177.studmat.uni.torun.pl.

;; AUTHORITY SECTION:
domlab177.studmat.uni.torun.pl. 603900 IN NS     ns.domlab177.studmat.uni.torun.pl.

;; ADDITIONAL SECTION:
ns.domlab177.studmat.uni.torun.pl. 603900 IN A  192.168.134.177

;; Query time: 0 msec
;; SERVER: 192.168.134.177#53(192.168.134.177)
;; WHEN: Tue Dec 01 19:08:18 CET 2020
;; MSG SIZE  rcvd: 141

[root@localhost named]#
[root@localhost named]#
[root@localhost named]#
```