

Projekt sieci i systemów korporacyjnej firmy telemarketingowej

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Wymagania Funkcjonalne

Ogólne

- ▶ Dostępność sieci w każdym pomieszczeniu firmy
 - ▶ sieć kablowa dla każdego stanowiska
 - ▶ sieć bezprzewodowa na sali konferencyjnej
 - ▶ sieć bezprzewodowa dla gości (konferencja)
- ▶ Wysoka dostępność systemów
- ▶ Zapewnienie redundantnej komunikacji między gałęziami sieci
- ▶ Możliwość zarządzania usługami dostarczonymi za pomocą technologii Docker
 - ▶ uruchomienie app1 + db1
- ▶ Możliwość zarządzania usługami dostarczonymi za pomocą wirtualizacji
 - ▶ uruchomienie app2 + db2

Wymagania Funkcjonalne (kont.)

Monitoring sieci

- ▶ Administrator ma dostęp do statystyk użytkowania systemów
- ▶ Administrator dostaje automatyczne powiadomienia przy dużych zmianach w pracy

Autoryzacja na poziomie sieci

- ▶ Użytkownik siadając do jakiegokolwiek biurka loguje się do sieci
- ▶ Ograniczenie dostępu do części sieci nieuprawnionym użytkownikom (zarząd, pracownik, administrator, gość konferencyjny)

Wymagania Funkcjonalne (kont.)

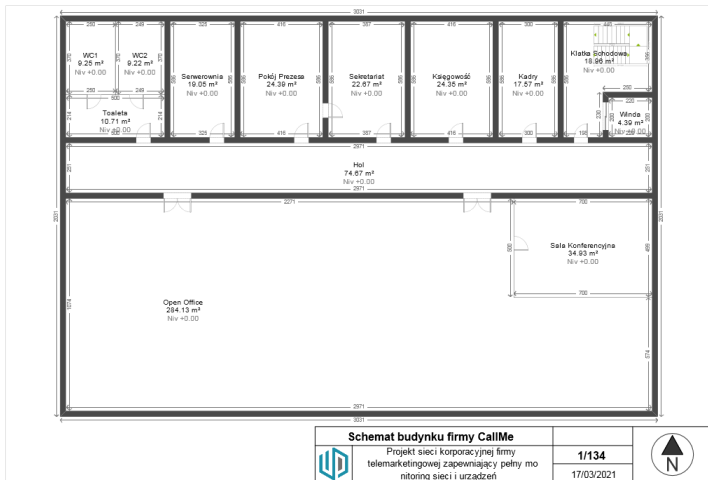
DHCP

- ▶ Usługa musi być redundantna
- ▶ Jeśli jeden serwer DHCP ulegnie awarii, drugi serwer zastpczy przejmuje jego zadania
- ▶ Adresy IP muszą być rozdzielane z określonej puli adresów.
- ▶ Serwer zastępczy (slave) nasłuchuje na odpowiednim interfejsie sieciowym, jeli nie otrzymuje odpowiedzi
- ▶ Od serwera podstawowego (master) zaczyna rozdawać hostom adresy.

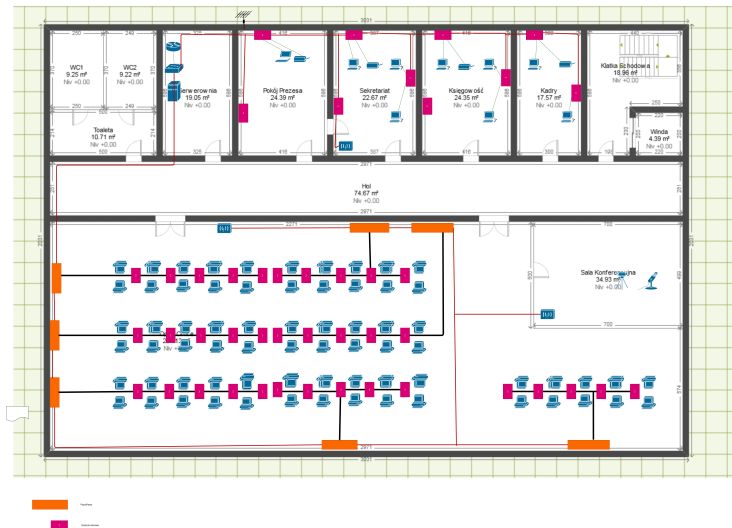
DNS

- ▶ Usługa musi umożliwia translację nazw domenowych na adresy IP jak i odwrotnie (strefy wyszukiwania wstecz i do przodu);

Plan bundynku

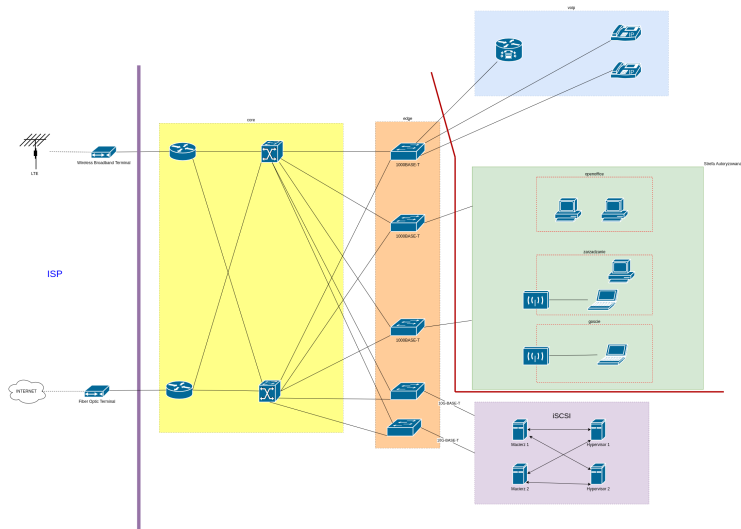


Plan fizyczny sieci

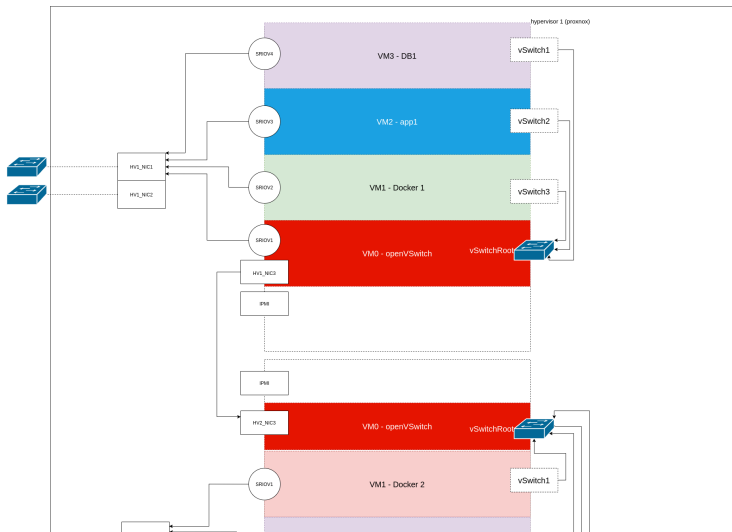


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Plan logiczny sieci



Architektura serwerowa

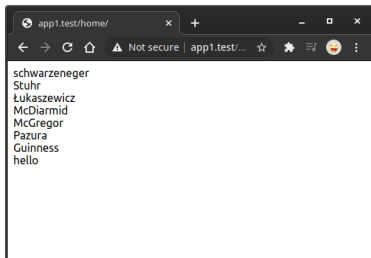


App1

```
<?php
$host = '192.168.200.132';
$db = 'lab3'; $user = 'admin'; $pass = 'pwsz';
$port = '3306'; $charset = 'utf8';
$options = [
    \PDO::ATTR_ERRMODE            => \PDO::ERRMODE_EXCEPTION,
    \PDO::ATTR_DEFAULT_FETCH_MODE => \PDO::FETCH_ASSOC,
    \PDO::ATTR_EMULATE_PREPARES   => false,
];
$dsn = "mysql:host=$host;dbname=$db;charset=$charset;port=$port";
try {
    $pdo = new \PDO($dsn, $user, $pass, $options);
} catch (\PDOException $e) {
    throw new \PDOException($e->getMessage(), (int)$e->getCode());
}
$stmt = $pdo->query("SELECT * FROM aktorzy");
while ($row = $stmt->fetch()) {
    echo $row['nazwisko']."<br />\n";
}
?>
```

App1 + db1

App1



App1

```
# systemctl status apache2.service
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2021-05-18 18:04:56 UTC; 19h ago
     Docs: https://httpd.apache.org/docs/4.x/
    Main PID: 1002 (apache2)
      Tasks: 1 (limit: 2340)
        Memory: 22.1M
          CGroup: /system.slice/apache2.service
                  └─ 1002 /usr/sbin/apache2 -k start
                   1003 /usr/sbin/apache2 -k start
                   1008 /usr/sbin/apache2 -k start
                   1009 /usr/sbin/apache2 -k start
                   1060 /usr/sbin/apache2 -k start
                   1061 /usr/sbin/apache2 -k start
                   1065 /usr/sbin/apache2 -k start
                   1066 /usr/sbin/apache2 -k start
```

```
May 18 18:04:55 osint systemd[1]: Starting The Apache HTTP Server...
May 18 18:04:56 osint systemd[1]: Started The Apache HTTP Server.
May 18 06:04:10 osint systemd[1]: Reloaded The Apache HTTP Server.
May 17 00:00:10 osint systemd[1]: Reloaded The Apache HTTP Server.
```

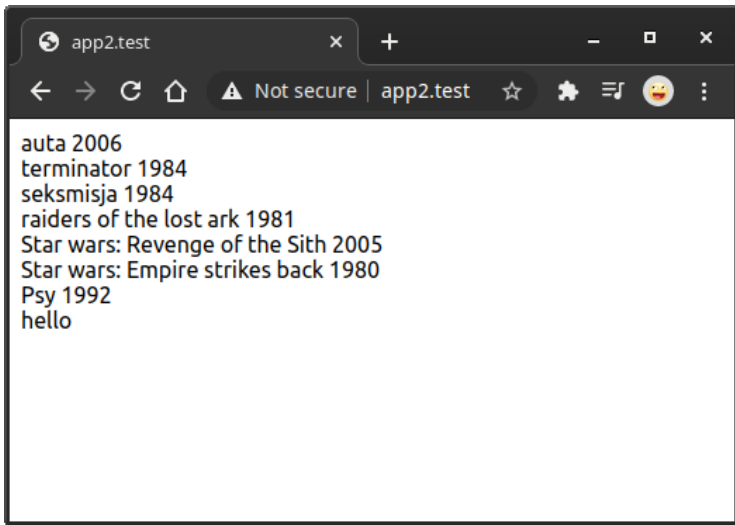
```
# curl -I http://osintip.org/osintip.html
HTTP/1.1 200 OK (text/html)
```

```
total 32
drwxr-xr-x 2 www-data www-data 4096 May 18 06:01: .
drwxr-xr-x 2 www-data www-data 4096 May 18 00:01: ..
lrwxrwxrwx 1 root root 17 May 19 00:17 None -> /home/osintip/.ssh
-r--r--r-- 1 www-data www-data 4092 May 18 00:05 index.php
```

App2

```
<?php
$host = '192.168.200.145';
$db = 'lab3'; $user = 'admin'; $pass = 'pwsz';
$port = '3306'; $charset = 'utf8';
$options = [
    \PDO::ATTR_ERRMODE            => \PDO::ERRMODE_EXCEPTION,
    \PDO::ATTR_DEFAULT_FETCH_MODE => \PDO::FETCH_ASSOC,
    \PDO::ATTR_EMULATE_PREPARES  => false,
];
$dsn = "mysql:host=$host;dbname=$db;charset=$charset;port=$port";
try {
    $pdo = new \PDO($dsn, $user, $pass, $options);
} catch (\PDOException $e) {
    throw new \PDOException($e->getMessage(), (int)$e->getCode());
}
$stmt = $pdo->query("SELECT * FROM filmy");
while ($row = $stmt->fetch()) {
    echo $row['tytul']." ".$row['rok']."<br />\n";
}
?>
```

App2 + db2



Zabbix

Zabbix jest rozwiązanie open-source (GPLv2) do monitorowania dużej ilości komponentów sieci komputerowej w tym:

- ▶ sieci
- ▶ urządzeń sieciowych
- ▶ stacji roboczych
- ▶ serwerów
- ▶ usług

Zabbix

System information

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled)	3	3 / 0
Number of templates	180	
Number of items (enabled/disabled/not supported)	127	125 / 0 / 12
Number of triggers (enabled/disabled / not resolved)	56	56 / 0 / 0 / 0
Number of users (online)	3	1
Required server performance, new values per second	1.52	

Host availability

Availability	Not available	Unavailable	Total
Zabbix agent	1	0	1
SNMP	0	0	0

Problems

Time	Recovery time	Status	Info	Host	Problem / Severity	Duration	Ack	Actions	Tags
07:08:35		PROBLEM		Zabbix server	Zabbix discovered processes more than 75% busy	17m 59s	No		
07:06:34		PROBLEM		Zabbix server	interface testing ground	17m 59s	No		testing:420
07:00:00									
06:51:34	07:00:40	RESOLVED		Zabbix server	interface testing ground	12m 6s	Yes		testing:420
06:48:34	06:40:15	RESOLVED		Zabbix server	interface testing ground	3m 41s	Yes		testing:420
06:35:55	04:56:35	RESOLVED		Zabbix server	Zabbix discovered processes more than 75% busy	23m	Yes		
06:00:00									
05:54:35	06:02:35	RESOLVED		Zabbix server	Zabbix discovered processes more than 75% busy	8m	No		
05:21:34	04:21:34	RESOLVED		Zabbix server	interface has been changed	3s	No		
05:00:00									
04:42:35	04:50:35	RESOLVED		Zabbix server	Zabbix discovered processes more than 75% busy	8m	No		
04:00:00									
03:28:35	03:37:35	RESOLVED		Zabbix server	Zabbix discovered processes more than 75% busy	9m	No		
03:00:00									
02:18:35	02:24:35	RESOLVED		Zabbix server	Zabbix discovered processes more than 75% busy	8m	No		
02:00:00									
01:03:35	01:11:35	RESOLVED		Zabbix server	Zabbix discovered processes more than 75% busy	8m	No		

Favorite graphs

- Zabbix server CPU idle time
- Zabbix server interface explicit bits received
- Zabbix server interface explicit bits sent

Triggery

Trigger Tags Dependencies 1

Parent triggers: Linux CPU by Zabbix agent ⇒ Linux by Zabbix agent

* Name: High CPU utilization (over {SCPU.UTIL.CRIT}% for 5m)

Event name: High CPU utilization (over {SCPU.UTIL.CRIT}% for 5m)

Operational data: Current utilization: {ITEM.LASTVALUE1}

Severity: Not classified Information **Warning** Average High Disaster

* Expression: {Zabbix_server:system.cpu.util.min(5m)}>{SCPU.UTIL.CRIT} Add

Expression constructor

Powiadomienia

```
#!/bin/bash
# uzywajac ssmtp via mailserver
echo "sending mail" > /var/log/zabbix/custom.log
echo "$3" | /usr/bin/mail -s "$2" $1

exit 0
```

Powiadomienia (kont.)

Media type

Media type

Message templates 1

Options

Name

email-script

Type

Script

Script name

zabbix-ssmp

Script parameters

Parameter	Action
{ALERT.SENDTO}	Remove
{ALERT.SUBJECT}	Remove
{ALERT.MESSAGE}	Remove

Add

Description

zabbix alert using ssmp

Enabled

☒

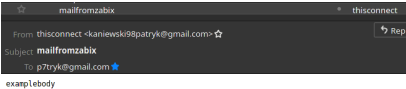
Update

Clone

Delete

Cancel

Efekt



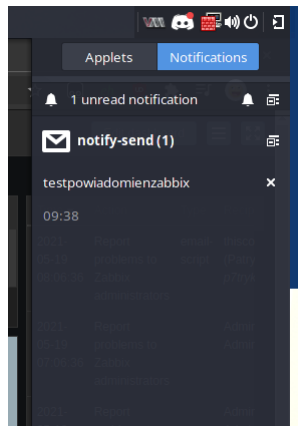
Powiadomienia (kont.)

`notify-send`

`#!/bin/bash`

`ssh 192.168.200.1 "notify-send $1"`

Efekt



802.1x

DHCP

Master

```

DHCP Master [Uruchomiona] - Oracle VM VirtualBox
Plik Maszyna Widok Wejście Urządzenia Pomoc
GNU nano 3.2 /etc/dhcp/dhcpd.conf

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;

failover peer "dhcpfailover" {
    primary;
    address 192.168.0.1;
    port 647;
    peer address 192.168.0.2;
    peer port 647;
    mclt 1800;
    split 128;
}

subnet 192.168.0.0 netmask 255.255.255.0 {
    pool {
        failover peer "dhcpfailover";
        max-lease-time 1800;
        range 192.168.0.50 192.168.0.200;
    }
}

```

Slave

```

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;

failover peer "dhcpfailover" {
    secondary;
    address 192.168.0.2;
    port 647;
    peer address 192.168.0.1;
    peer port 647;
    max-response-delay 30;
    max-unacked-updates 10;
}

subnet 192.168.0.0 netmask 255.255.255.0 {
    pool {
        failover peer "dhcpfailover";
        max-lease-time 1800;
        range 192.168.0.50 192.168.0.200;
    }
}

```

lease

```
default lease time 600;
```

Failover

Do poprawnego działania usługi DHCP Failover wymagane jest aby obydwa serwery miały ustawione takie same daty oraz czas:

```
kuba@kubsoN:~$ date
Wto, 18 maj 2021, 16:23:31 CEST
kuba@kubsoN:~$ _
```

```
kuba@kubsoN:~$ date
Wto, 18 maj 2021, 16:23:23 CEST
kuba@kubsoN:~$
```

Slave

```

DHCP Master [Ubuntu] - Oracle VM VirtualBox
File Machine Window Help View Unpackaged Pomoc

address 192.168.0.1;
port 647;
peer address 192.168.0.2;
peer port 647;
ncft 1800;
split 180;

subnet 192.168.0.0 netmask 255.255.255.0 {

kuba@kuba01:~$ date
wto, 18 maj 2021, 16:23:23 CEST
kuba@kuba01:~$ sudo systemctl status isc-dhcp-server.service
[sudo] hasło użytkownika kuba:
* isc-dhcp-server.service - LSB: DHCP server
   Loaded: loaded (/etc/init.d/isc-dhcp-server; generated)
   Active: active (running) since Tue 2021-05-18 16:05:52 CEST; 23min ago
     Docs: man:dhcpd(8)
   Process: 407 ExecStart=/etc/init.d/isc-dhcp-server start (code=exited, status=0/SUCCESS)
    Tasks: 1 (limit: 2559)
   Memory: 7.2M
   CGroup: /system.slice/isc-dhcp-server.service
           └─432 /usr/sbin/dhcpd -4 -q -cf /etc/dhcp/dhcpd.conf em0s3

maj 18 16:28:54 kuba01 dhcpd[432]: DHCPACK on 192.168.0.51 to 08:00:27:ef:10:e8 (kuba01) via em0s3
maj 18 16:33:17 kuba01 dhcpd[432]: DHCPREQUEST for 192.168.0.51 from 08:00:27:ef:10:e8 (kuba01) via
maj 18 16:35:08 kuba01 dhcpd[432]: DHCPACK on 192.168.0.51 to 08:00:27:ef:10:e8 (kuba01) via em0s3
maj 18 16:35:08 kuba01 dhcpd[432]: peer dhcpfallover: disconnected
maj 18 16:35:08 kuba01 dhcpd[432]: fallover peer dhcpfallover: I move from normal to communications-
maj 18 16:35:08 kuba01 dhcpd[432]: fallover peer dhcpfallover: peer moves from normal to normal
maj 18 16:35:08 kuba01 dhcpd[432]: fallover peer dhcpfallover: I move from communications-Interrupte
maj 18 16:35:08 kuba01 dhcpd[432]: fallover peer dhcpfallover: Both servers normal
maj 18 16:35:08 kuba01 dhcpd[432]: balancing pool 55f8b7622610 192.168.0.0/24 total 151 free 75 b
maj 18 16:35:08 kuba01 dhcpd[432]: balanced pool 55f8b7622610 192.168.0.0/24 total 151 free 75 b
lines 1-20/20 (END)

```

Master

```

DHCP Slave [Ubuntu] - Oracle VM VirtualBox
File Machine Window Help View Unpackaged Pomoc

link/ether 08:00:27:1d:98:e8 brd ff:ff:ff:ff:ff:ff
inet 192.168.1.85/24 brd 192.168.1.255 scope global dynamic em0s3
   valid_lft 8492sec preferred_lft 8492sec
inet6 2a01:116:f652:3800:a00:27ff:fe1d:98e8/64 scope global dynamic mngtmpaddr
   valid_lft 875sec preferred_lft 275sec
inets 4500:800:27fffffe4d9308/64 scope link
   valid_lft forever preferred_lft forever
3: em0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1
000
link/ether 08:00:27:1d:98:e8 brd ff:ff:ff:ff:ff:ff
inet 192.168.0.2/24 brd 192.168.0.255 scope global em0s8
   valid_lft forever preferred_lft forever
inet6 f600:a00:27fffffe4d9308/64 scope link
   valid_lft forever preferred_lft forever
kuba@kuba01:~$ sudo systemctl restart isc-dhcp-server.service
kuba@kuba01:~$ sudo systemctl status isc-dhcp-server.service
* isc-dhcp-server.service - LSB: DHCP server
   Loaded: loaded (/etc/init.d/isc-dhcp-server; generated)
   Active: active (running) since Tue 2021-05-18 16:35:10 CEST; 7s ago
     Docs: man:dhcpd(8)
   Process: 617 ExecStart=/etc/init.d/isc-dhcp-server start (code=exited, status=0/SUCCESS)
    Tasks: 1 (limit: 2559)
   Memory: 7.4M
   CGroup: /system.slice/isc-dhcp-server.service
           └─629 /usr/sbin/dhcpd -4 -q -cf /etc/dhcp/dhcpd.conf em0s8

maj 18 16:35:00 kuba01 dhcpd[629]: fallover peer dhcpfallover: I move from normal to startup
maj 18 16:35:00 kuba01 dhcpd[629]: Server starting service.
maj 18 16:35:00 kuba01 dhcpd[629]: fallover peer dhcpfallover: peer moves from normal to communicat
maj 18 16:35:00 kuba01 dhcpd[629]: fallover peer dhcpfallover: I move from startup to normal
maj 18 16:35:00 kuba01 dhcpd[629]: balancing pool 55f8b08095f0 192.168.0.0/24 total 151 free 75 b
maj 18 16:35:00 kuba01 dhcpd[629]: balanced pool 55f8b08095f0 192.168.0.0/24 total 151 free 75 b
maj 18 16:35:00 kuba01 dhcpd[629]: fallover peer dhcpfallover: peer moves from communications-Inter
maj 18 16:35:00 kuba01 dhcpd[629]: fallover peer dhcpfallover: Both servers normal
maj 18 16:35:10 kuba01 isc-dhcp-server[617]: Starting ISC DHCPv4 server: dhcpd.
maj 18 16:35:10 kuba01 dhcpd system[1]: Started LSB: DHCP server.
lines 1-20/20 (END)

```

klient

interface

```

DHCPClient [Uwchomona] - Oracle VM VirtualBox
File  Machine  Window  Helpdesk  Firewall
GNU nano 3.2 /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet dhcp
  
```

ip a

```

DHCPClient [Uwchomona] - Oracle VM VirtualBox
File  Machine  Window  Helpdesk  Firewall
kuba@kubson:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:1e:10:e8 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.51/24 brd 192.168.0.255 scope global dynamic enp0s3
        valid_lft 986sec preferred_lft 500sec
    inet6 fe80::a00:27:ff:fe:1e:10:e8/64 scope link
        valid_lft forever preferred_lft forever
kuba@kubson:~$
  
```


DHCP leases

Jak można zobaczyć dane zostały zsynchronizowane na obydwu serwerach

Master

```

kuba@kubsofi:~$ sudo tail -n13 /var/lib/dhcp/dhcpd.leases
lease 192.168.0.51 {
  starts 2 2021/05/18 14:47:16;
  ends 2 2021/05/18 14:47:16;
  tstp 2 2021/05/18 14:52:16;
  tstp 2 2021/05/18 14:52:16;
  atstp 2 2021/05/18 14:52:16;
  cltt 2 2021/05/18 14:57:16;
  binding state active;
  next binding state expired;
  hardware ethernet 08:00:27:ef:10:e8;
  uid "\377\357\020\350\000\001\000\001\370\323\010\000\276";";
  client-hostname "kubsofi";
}
kuba@kubsofi:~$ _
  
```

Slave

```

kuba@kubsofi:~$ sudo tail -n13 /var/lib/dhcp/dhcpd.leases
}
lease 192.168.0.51 {
  starts 2 2021/05/18 14:47:16;
  ends 2 2021/05/18 14:47:16;
  tstp 0 2021/05/18 10:38:39;
  tstp 2 2021/05/18 14:52:16;
  atstp 2 2021/05/18 14:52:16;
  cltt 0 2021/05/18 10:28:39;
  binding state active;
  next binding state expired;
  hardware ethernet 08:00:27:ef:10:e8;
  uid "\377\357\020\350\000\001\000\001\370\323\010\000\276";";
}
kuba@kubsofi:~$
  
```

```

C:\Windows\system32\cmd.exe
D:\MCP Master [Administrator] - Oracle VM VirtualBox

Start 192.168.0.51
ipset 2021/05/18 14:47:16
arp 2021/05/18 14:47:16
tftp 2021/05/18 14:52:16
tftp 2021/05/18 14:52:16
arp 2021/05/18 14:52:16
cifs 2021/05/18 14:57:16
binding state active;
next binding state expired;
hardware ethernet 08:00:27:fef1:0ee0;
uid "3P7" 3E7/3E7/00000000/00000000/370"/3E3/00000000"/276"/";
client hostname "kubukun";

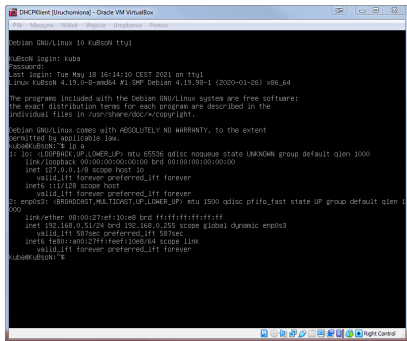
ls /usr/sbin/* % sudo systemctl stop isc-dhcp-server.service
[sudo] haszlo użytkownika kuba:
kubukun@Kali:~$ sudo systemctl status isc-dhcp-server.service
● isc-dhcp-server.service - LSB: DHCP server
   Loaded: loaded (/etc/init.d;/etc/dhcp-server.conf; generated)
   Active: inactive (dead) since Tue 2021-05-18 16:57:59 CEST; 3s ago
     Docs: man:dhcpd(8); dhcpd.conf(5)
    Process: 497 ExecStart=/etc/init.d/isc-dhcp-server start (code=exited, status=SUCCESS)
    Process: 613 ExecStop=/etc/init.d/isc-dhcp-server stop (code=killed, status=SUCCESS)
   Tasks: 0 (limit=2593)
   Memory: 3.1M
   Output: /systemd.journal/syslog-isc-dhcp-server.service

[+] 18 16:45:56 kubukun dhcpd[432]: DHCPREQUEST for 192.168.0.51 from 08:00:27:fef1:0ee0 (kubukun) via eno8
[+] 18 16:45:56 kubukun dhcpd[432]: DHCPACK on 192.168.0.51 to 08:00:27:fef1:0ee0 (kubukun) via eno8
[+] 18 16:50:34 kubukun dhcpd[432]: DHCPREQUEST for 192.168.0.51 from 08:00:27:fef1:0ee0 (kubukun) via eno8
[+] 18 16:50:34 kubukun dhcpd[432]: DHCPACK on 192.168.0.51 to 08:00:27:fef1:0ee0 (kubukun) via eno8
[+] 18 16:55:27 kubukun dhcpd[432]: DHCPREQUEST for 192.168.0.51 from 08:00:27:fef1:0ee0 (kubukun) via eno8
[+] 18 16:55:27 kubukun dhcpd[432]: DHCPACK on 192.168.0.51 to 08:00:27:fef1:0ee0 (kubukun) via eno8
[+] 18 16:57:59 kubukun systemd[1]: Stopping LSB: DHCP server...
[+] 18 16:57:59 kubukun dhcpd[432]: Stopping ISC DHCP server: dhcpd.
[+] 18 16:57:59 kubukun systemd[1]: Stopping ISC DHCP server: Service Succeeded.
[+] 18 16:57:59 kubukun systemd[1]: Stopped LSB: DHCP server.

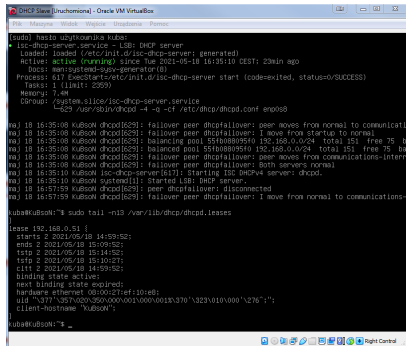
# ifconfig -a (ifconfig)

```

Master



Slave



Tworzenie Forward i Reverse Zone w pliku named.conf.local na Master

```
//  
// Do any local configuration here  
//  
  
// Consider adding the 1918 zones here, if they are not used in your  
// organization  
//include "/etc/bind/zones.rfc1918";  
  
zone "adasko05.org" IN{  
    type master;  
    file "/etc/bind/forward.adasko05.org.db";  
    allow-transfer {192.168.0.20;};  
    also-notify {192.168.0.20;};  
};  
  
zone "0.168.192.in-addr.arpa" IN{  
    type master;  
    file "/etc/bind/reverse.adasko05.org.db";  
    allow-transfer {192.168.0.20;};  
    also-notify {192.168.0.20;};  
};
```

Tworzenie Forward Zone na Master

```
;
; BIND data file for local loopback interface
;
$TTL      604800
@         IN      SOA      ns1.adasko05.org. root.adasko05.org. (
                        5      ; Serial
                        604800 ; Refresh
                        86400  ; Retry
                        2419200 ; Expire
                        604800 ) ; Negative Cache TTL
;
;@         IN      NS       localhost.
;@         IN      A        127.0.0.1
;@         IN      AAAA     ::1

@ IN NS ns1.adasko05.org.

ns1 IN A 192.168.0.10

adasko05.org. IN MX 10 mail.adasko05.org.

www IN A 192.168.0.100
mail IN A 192.168.0.150
```

Tworzenie Reverse Zone na Master

```
;
; BIND reverse data file for local loopback interface
;
$TTL      604800
@         IN      SOA      adasko05.org. root.adasko05.org. (
                                5             ; Serial
                                604800        ; Refresh
                                86400         ; Retry
                                2419200       ; Expire
                                604800 )      ; Negative Cache TTL
;
;@         IN      NS       localhost.
;1.0.0     IN      PTR      localhost.

@ IN NS ns1.adasko.org.

10 IN PTR ns1.adasko05.org.

100 IN PTR www.adasko05.org.
150 IN PTR mail.adasko05.org.
```

Tworzenie Forward i Reverse Zone w pliku named.conf.local na Slave

```
//  
// Do any local configuration here  
//  
  
// Consider adding the 1918 zones here, if they are not used in your  
// organization  
//include "/etc/bind/zones.rfc1918";  
  
zone "adasko05.org" IN {  
    type slave;  
    file "/var/cache/bind/forward.adasko05.org.db";  
    masters {192.168.0.10};  
};  
  
zone "0.168.192.in-addr.arpa" IN {  
    type slave;  
    file "/var/cache/bind/reverse.adasko05.org.db";  
    masters {192.168.0.10};  
};
```

Status bind9 (DNS) Master

```
root@debian:/home/dominik# systemctl restart bind9
root@debian:/home/dominik# systemctl status bind9
• bind9.service - BIND Domain Name Server
   Loaded: loaded (/lib/systemd/system/bind9.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2021-05-18 09:41:13 CDT; 17min ago
     Docs: man:named(8)
  Process: 581 ExecStart=/usr/sbin/named $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 582 (named)
    Tasks: 4 (limit: 1149)
   Memory: 11.9M
   CGroup: /system.slice/bind9.service
           └─582 /usr/sbin/named -u bind
```


Status bind9 (DNS) Slave

```
root@debian:/home/dominik# systemctl status bind9
• bind9.service - BIND Domain Name Server
  Loaded: loaded (/lib/systemd/system/bind9.service; enabled; vendor preset: enabled)
  Active: active (running) since Tue 2021-05-18 09:49:27 CDT; 10min ago
    Docs: man:named(8)
  Process: 454 ExecStart=/usr/sbin/named $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 455 (named)
    Tasks: 4 (limit: 1150)
   Memory: 11.9M
   CGroup: /system.slice/bind9.service
           └─455 /usr/sbin/named -u bind
```

Podsumowanie