

# Лабораторная работа №8

Администрирование сетевых подсистем

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Приобретение практических навыков по установке и конфигурированию SMTPсервера.

## Выполнение лабораторной работы

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```
root@server:~  
[ioithenko@server.ioithenko.net ~]$ sudo -ii  
[sudo] password for ioithenko:  
[root@server.ioithenko.net ~]# dnf -y install postfix  
Rocky Linux 9 - BaseOS                    5.5 kB/s | 4.1 kB    00:00  
Rocky Linux 9 - AppStream                  4.4 kB/s | 4.5 kB    00:01  
Rocky Linux 9 - AppStream                  1.5 MB/s | 8.0 MB    00:05  
Rocky Linux 9 - Extras                     4.1 kB/s | 2.9 kB    00:00  
Dependencies resolved.  
=====
```

Package	Architecture	Version	Repository	Size
postfix	x86_64	2:3.5.9-24.el9	appstream	1.4 M

```
=====
```

Installing:

Transaction Summary

Install 1 Package

Total download size: 1.4 M  
Installed size: 4.4 M  
Downloading Packages:

Package	Download Size	Progress
postfix-3.5.9-24.el9.x86_64.rpm	1.4 MB	1.1 MB/s   1.4 MB 00:01

Total: 791 kB/s | 1.4 MB 00:01

Running transaction check  
Transaction check succeeded.  
Running transaction test  
Transaction test succeeded.  
Running transaction

Step	Progress
Preparing	1/1
Running scriptlet: postfix-2:3.5.9-24.el9.x86_64	1/1
Installing	1/1
Running scriptlet: postfix-2:3.5.9-24.el9.x86_64	1/1
Verifying	1/1

Installed:

postfix-2:3.5.9-24.el9.x86\_64

Complete!

[root@server.ioithenko.net ~]# dnf -y install s-nail  
Last metadata expiration check: 0:01:14 ago on Thu 24 Oct 2024 09:59:01 AM UTC.  
Dependencies resolved.

Рис. 1: Установка пакетов

```
Complete!  
[root@server.ioithenko.net ~]# firewall-cmd --add-service=smtp  
success  
[root@server.ioithenko.net ~]# firewall-cmd --add-service=smtp --permanent  
success  
[root@server.ioithenko.net ~]# firewall-cmd --list-services  
cockpit dhcp dhcpv6-client dns http https smtp ssh ssh-custom  
[root@server.ioithenko.net ~]# restorecon -vR /etc  
Relabeled /etc/sysconfig/network-scripts/ifcfg-eth1 from unconfined_u:object_r:u  
ser_tmp_t:s0 to unconfined_u:object_r:net_conf_t:s0  
[root@server.ioithenko.net ~]# systemctl enable postfix  
Created symlink /etc/systemd/system/multi-user.target.wants/postfix.service → /u  
sr/lib/systemd/system/postfix.service.  
[root@server.ioithenko.net ~]# systemctl start postfix
```

Рис. 2: Конфигурация межсетевого экрана, восстановление контекста безопасности, запуск Postfix

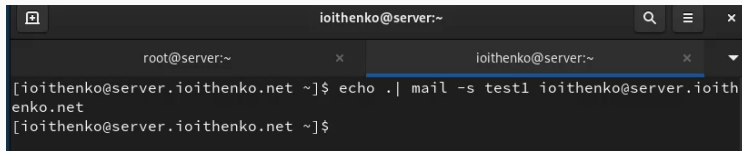
A terminal window titled 'root@server:~' with search and menu icons in the title bar. It displays the output of the 'postconf' command, listing various Postfix configuration parameters and their values. The parameters include bounce notice recipient, access map codes, address verification settings (cache, transport, negative cache, etc.), alias database, mail command permissions, and anvil status update times.

```
[root@server.ioithenko.net ~]# postconf
2bounce_notice_recipient = postmaster
access_map_defer_code = 450
access_map_reject_code = 554
address_verify_cache_cleanup_interval = 12h
address_verify_default_transport = $default_transport
address_verify_local_transport = $local_transport
address_verify_map = btree:$data_directory/verify_cache
address_verify_negative_cache = yes
address_verify_negative_expire_time = 3d
address_verify_negative_refresh_time = 3h
address_verify_pending_request_limit = 5000
address_verify_poll_count = ${stress?(1):{3}}
address_verify_poll_delay = 3s
address_verify_positive_expire_time = 31d
address_verify_positive_refresh_time = 7d
address_verify_relay_transport = $relay_transport
address_verify_relayhost = $relayhost
address_verify_sender = $double_bounce_sender
address_verify_sender_dependent_default_transport_maps = $sender_dependent_default_transport_maps
address_verify_sender_dependent_relayhost_maps = $sender_dependent_relayhost_maps
address_verify_sender_ttl = 0s
address_verify_service_name = verify
address_verify_transport_maps = $transport_maps
address_verify_virtual_transport = $virtual_transport
alias_database = hash:/etc/aliases
alias_maps = hash:/etc/aliases
allow_mail_to_commands = alias, forward
allow_mail_to_files = alias, forward
allow_min_user = no
allow_percent_hack = yes
allow_srv_lookup_fallback = no
allow_untrusted_routing = no
alternate_config_directories =
always_add_missing_headers = no
always_bcc =
anvil_rate_time_unit = 60s
anvil_status_update_time = 600s
append_at_myorigin = yes
append_dot_mydomain = ${compatibility_level} < {1} ? {yes} : {no}
```

Рис. 3: Текущие настройки

```
[root@server.ioithenko.net ~]# postconf -e 'mydomain = ioithenko.net'
[root@server.ioithenko.net ~]# postconf inet_protocols
inet_protocols = all
[root@server.ioithenko.net ~]# postconf -e 'inet_protocols = ipv4'
[root@server.ioithenko.net ~]# postconf inet_protocols
inet_protocols = ipv4
[root@server.ioithenko.net ~]# postconf check
postconf: warning: check: unknown parameter
[root@server.ioithenko.net ~]# postfix check
[root@server.ioithenko.net ~]# systemctl reload postfix
[root@server.ioithenko.net ~]#
```

Рис. 4: Изменение параметров с помощью postconf



A terminal window with a dark background. The title bar shows 'ioithenko@server:~' and standard window controls. Below the title bar, there are two tabs: 'root@server:~' and 'ioithenko@server:~'. The active tab is 'ioithenko@server:~'. The terminal content shows a command being executed: '[ioithenko@server.ioithenko.net ~]\$ echo . | mail -s test1 ioithenko@server.ioithenko.net'. The output of the command is '[ioithenko@server.ioithenko.net ~]\$'.

```
ioithenko@server:~  
[ioithenko@server.ioithenko.net ~]$ echo . | mail -s test1 ioithenko@server.ioithenko.net  
[ioithenko@server.ioithenko.net ~]$
```

Рис. 5: Текущие настройки



```
Oct 24 10:13:32 server postfix/pickup[11262]: CEDA214EBB: uid=1001 from=<ioithen  
ko>  
Oct 24 10:13:32 server postfix/cleanup[11294]: CEDA214EBB: message-id=<202410241  
01332.CEDA214EBB@server.ioithenko.net>  
Oct 24 10:13:32 server postfix/qmgr[11263]: CEDA214EBB: from=<ioithenko@ioithenk  
o.net>, size=336, nrcpt=1 (queue active)  
Oct 24 10:13:32 server postfix/local[11300]: CEDA214EBB: to=<ioithenko@server.io  
ithenko.net>, relay=local, delay=0.16, delays=0.1/0.05/0/0.01, dsn=2.0.0, status  
=sent (delivered to mailbox)  
Oct 24 10:13:32 server postfix/qmgr[11263]: CEDA214EBB: removed
```

Рис. 6: Мониторинг работы почтовой службы: письмо доставлено

```
From ioithenko@ioithenko.net Thu Oct 24 10:13:32 2024
Return-Path: <ioithenko@ioithenko.net>
X-Original-To: ioithenko@server.ioithenko.net
Delivered-To: ioithenko@server.ioithenko.net
Received: by server.ioithenko.net (Postfix, from userid 1001)
        id CEDA214EBB; Thu, 24 Oct 2024 10:13:32 +0000 (UTC)
Date: Thu, 24 Oct 2024 10:13:32 +0000
To: ioithenko@server.ioithenko.net
Subject: test1
User-Agent: s-nail v14.9.22
Message-Id: <20241024101332.CEDA214EBB@server.ioithenko.net>
From: ioithenko@ioithenko.net
.
```

Рис. 7: Проверка /var/spool/mail

```
root@client:~  
[ioithenko@client.ioithenko.net ~]$ sudo -i  
[sudo] password for ioithenko:  
[root@client.ioithenko.net ~]# dnf -y install postfix  
Rocky Linux 9 - BaseOS                3.2 kB/s | 4.1 kB    00:01  
Rocky Linux 9 - AppStream              5.4 kB/s | 4.5 kB    00:00  
Rocky Linux 9 - AppStream              2.2 MB/s | 8.0 MB    00:03  
Rocky Linux 9 - Extras                  2.5 kB/s | 2.9 kB    00:01  
Dependencies resolved.  
=====
```

Package	Architecture	Version	Repository	Size
postfix	x86_64	2:3.5.9-24.el9	appstream	1.4 M

```
=====
```

Installing:

Transaction Summary

=====

Install 1 Package

Total download size: 1.4 M  
Installed size: 4.4 M  
Downloading Packages:  
postfix-3.5.9-24.el9.x86\_64.rpm 1.4 MB/s | 1.4 MB 00:01  
-----

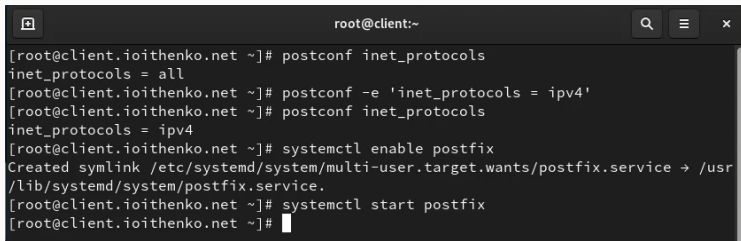
Total 821 kB/s | 1.4 MB 00:01

Running transaction check  
Transaction check succeeded.  
Running transaction test  
Transaction test succeeded.  
Running transaction

Preparing	:	1/1
Running scriptlet: postfix-2:3.5.9-24.el9.x86_64	:	1/1
Installing	:	1/1
Running scriptlet: postfix-2:3.5.9-24.el9.x86_64	:	1/1
Verifying	:	1/1

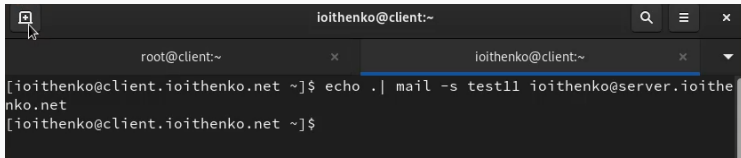
```
Installed:  
postfix-2:3.5.9-24.el9.x86_64  
  
Complete!  
[root@client.ioithenko.net ~]# dnf -y install s-nail  
Last metadata expiration check: 0:01:17 ago on Thu 24 Oct 2024 10:01:48 AM UTC.  
Dependencies resolved.  
=====
```

Рис. 8: Установка пакетов

A terminal window with a dark background and light text. The title bar shows 'root@client:~' and standard window controls. The terminal content shows a series of commands and their outputs for configuring and starting Postfix. The commands are: 'postconf inet\_protocols', 'postconf -e 'inet\_protocols = ipv4'', 'systemctl enable postfix', and 'systemctl start postfix'. The outputs show the current configuration and the creation of a symlink for the service.

```
root@client:~  
[root@client.ioithenko.net ~]# postconf inet_protocols  
inet_protocols = all  
[root@client.ioithenko.net ~]# postconf -e 'inet_protocols = ipv4'  
[root@client.ioithenko.net ~]# postconf inet_protocols  
inet_protocols = ipv4  
[root@client.ioithenko.net ~]# systemctl enable postfix  
Created symlink /etc/systemd/system/multi-user.target.wants/postfix.service → /usr  
/lib/systemd/system/postfix.service.  
[root@client.ioithenko.net ~]# systemctl start postfix  
[root@client.ioithenko.net ~]#
```

Рис. 9: Изменение разрешенных в работе протоколов, запуск Postfix на клиенте



A terminal window titled "ioithenko@client:~" with a search icon, a menu icon, and a close button. The window contains two tabs: "root@client:~" and "ioithenko@client:~". The active tab shows the following command and output:

```
[ioithenko@client.ioithenko.net ~]$ echo . | mail -s test11 ioithenko@server.ioithenko.net  
[ioithenko@client.ioithenko.net ~]$
```

Рис. 10: Установка пакетов

```
Oct 24 10:17:06 client postfix/cleanup[11339]: 7B98F10A99DF: message-id=<20241024101706.7B98F10A99DF@client.ioithenko.net>  
Oct 24 10:17:06 client postfix/qmgr[11307]: 7B98F10A99DF: from=<ioithenko@client.ioithenko.net>, size=348, nrcpt=1 (queue active)  
Oct 24 10:17:06 client postfix/smtp[11345]: 7B98F10A99DF: to=<ioithenko@server.ioithenko.net>, relay=none, delay=0.33, delays=0.1/0.19/0.05/0, dsn=5.4.4, status=bounced (Host or domain name not found. Name service error for name=server.ioithenko.net type=A: Host not found)
```

Рис. 11: Мониторинг почтовой службы

```
[root@server.ioithenko.net ~]# postconf inet_interfaces
inet_interfaces = localhost
[root@server.ioithenko.net ~]# postconf mynetworks
mynetworks = 127.0.0.1/32
[root@server.ioithenko.net ~]# postconf -e 'inet_interfaces = all'
[root@server.ioithenko.net ~]# postconf -e 'mynetworks = 127.0.0.0/8, 192.168.0.0/16'
[root@server.ioithenko.net ~]# postconf inet_interfaces
inet_interfaces = all
[root@server.ioithenko.net ~]# postconf mynetworks
mynetworks = 127.0.0.0/8, 192.168.0.0/16
[root@server.ioithenko.net ~]# postfix check
[root@server.ioithenko.net ~]# systemctl reload postfix
[root@server.ioithenko.net ~]# systemctl stop postfix
[root@server.ioithenko.net ~]#
```

Рис. 12: Изменение параметров

```
[ioithenko@client.ioithenko.net ~]$ echo . | mail -s test11 ioithenko@server.ioithenko.net
```

Рис. 13: Отправка письма



```
From ioithenko@client.ioithenko.net Thu Oct 24 12:16:21 2024
Return-Path: <ioithenko@client.ioithenko.net>
X-Original-To: ioithenko@server.ioithenko.net
Delivered-To: ioithenko@server.ioithenko.net
Received: from client.ioithenko.net (unknown [192.168.1.30])
        by server.ioithenko.net (Postfix) with ESMTPS id A81521708C
        for <ioithenko@server.ioithenko.net>; Thu, 24 Oct 2024 12:16:21 +0000 (U
TC)
Received: by client.ioithenko.net (Postfix, from userid 1001)
        id 4BEFA10A99DB; Thu, 24 Oct 2024 12:16:21 +0000 (UTC)
Date: Thu, 24 Oct 2024 12:16:21 +0000
To: ioithenko@server.ioithenko.net
Subject: test11
User-Agent: s-nail v14.9.22
Message-Id: <20241024121621.4BEFA10A99DB@client.ioithenko.net>
From: ioithenko@client.ioithenko.net
.
```

Рис. 14: Письмо

```
Oct 24 12:16:21 client postfix/pickup[7028]: 4BEFA10A99DB: uid=1001 from=<ioithen  
nko>  
Oct 24 12:16:21 client postfix/cleanup[7292]: 4BEFA10A99DB: message-id=<20241024  
121621.4BEFA10A99DB@client.ioithenko.net>  
Oct 24 12:16:21 client postfix/qmgr[7029]: 4BEFA10A99DB: from=<ioithenko@client.  
ioithenko.net>, size=348, nrcpt=1 (queue active)  
Oct 24 12:16:21 client postfix/smtp[7298]: 4BEFA10A99DB: to=<ioithenko@server.io  
ithenko.net>, relay=server.ioithenko.net[192.168.1.1]:25, delay=0.44, delays=0.0  
6/0.15/0.18/0.05, dsn=2.0.0, status=sent (250 2.0.0 Ok: queued as A81521708C)
```

Рис. 15: Мониторинг почтовой службы

```
ioithenko.net  
[ioithenko@client.ioithenko.net ~]$ echo . | mail -s test2 ioithenko@ioithenko.net  
t  
You have new mail in /var/spool/mail/ioithenko  
[ioithenko@client.ioithenko.net ~]$
```

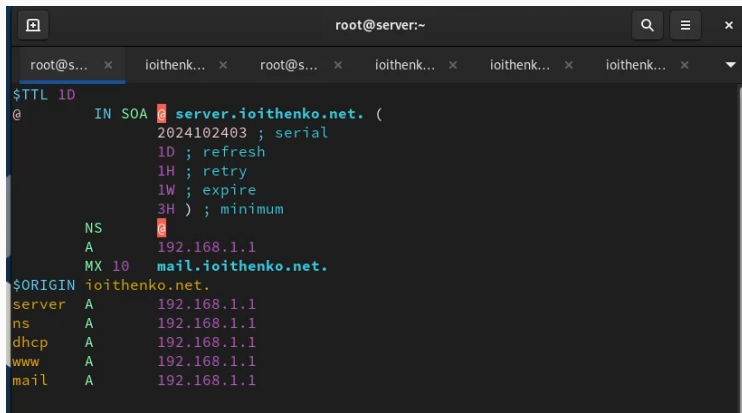
Рис. 16: Отправка письма

```
Oct 24 11:24:01 client postfix/pickup[1204]: 513C310A99C0: uid=1001 from=<ioithen  
nko>  
Oct 24 11:24:01 client postfix/cleanup[6767]: 513C310A99C0: message-id=<20241024  
112401.513C310A99C0@client.ioithenko.net>  
Oct 24 11:24:01 client postfix/qmgr[1205]: 513C310A99C0: from=<ioithenko@client.  
ioithenko.net>, size=340, nrcpt=1 (queue active)  
Oct 24 11:24:01 client postfix/smtp[6773]: 513C310A99C0: to=<ioithenko@ioithenko  
.net>, relay=none, delay=0.47, delays=0.09/0.17/0.22/0, dsn=5.4.4, status=bounce  
d (Host or domain name not found. Name service error for name=ioithenko.net type  
=A: Host not found)  
Oct 24 11:24:01 client postfix/cleanup[6767]: 513C310A99C0: message-id=<20241024
```

Рис. 17: Мониторинг работы почтовой службы: сообщение не доставлено

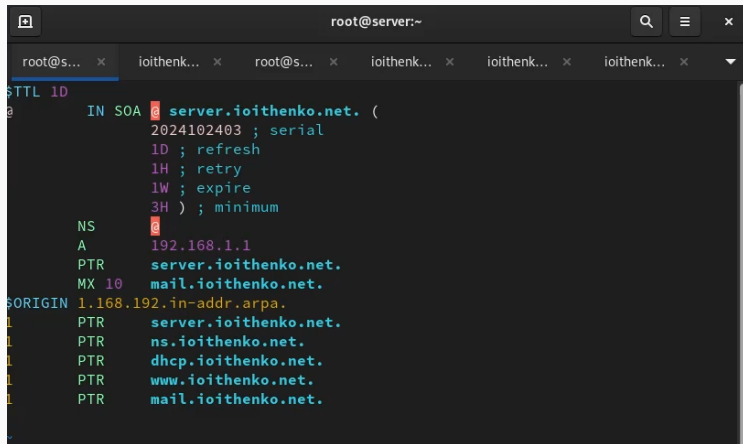
```
[ioithenko@client.ioithenko.net ~]$ sudo postqueue -p  
[sudo] password for ioithenko:  
Mail queue is empty  
You have new mail in /var/spool/mail/ioithenko  
[ioithenko@client.ioithenko.net ~]$
```

Рис. 18: Отправка письма

A terminal window titled 'root@server:~' with several tabs. The active tab shows a DNS zone file being edited. The file content includes a TTL of 1D, an SOA record for 'server.ioithenko.net.' with serial 2024102403, refresh 1D, retry 1H, expire 1W, and minimum 3H. It also lists NS, A, and MX records for the domain. At the bottom, there is a \$ORIGIN directive and a list of hostnames (server, ns, dhcp, www, mail) with their corresponding A records pointing to 192.168.1.1.

```
root@server:~
$TTL 1D
@      IN SOA  server.ioithenko.net. (
        2024102403 ; serial
        1D ; refresh
        1H ; retry
        1W ; expire
        3H ) ; minimum
       NS   server.ioithenko.net.
       A    192.168.1.1
       MX   10 mail.ioithenko.net.
$ORIGIN ioithenko.net.
server  A    192.168.1.1
ns      A    192.168.1.1
dhcp    A    192.168.1.1
www     A    192.168.1.1
mail    A    192.168.1.1
```

Рис. 19: Изменение файла прямой DNS-зоны



A terminal window titled 'root@server:~' with several tabs. The active tab shows the content of a DNS zone file. The file contains records for 'server.ioithenko.net.', including SOA, NS, A, PTR, and MX records. The SOA record has a serial number of 2024102403, a refresh interval of 1D, a retry interval of 1H, an expire interval of 1W, and a minimum interval of 3H. The NS record points to the same domain. The A record points to 192.168.1.1. The PTR records point to the domain for 1.168.192.in-addr.arpa. The MX record points to mail.ioithenko.net.

```
root@server:~
root@s... x ioithenk... x root@s... x ioithenk... x ioithenk... x ioithenk... x
$TTL 1D
@ IN SOA @ server.ioithenko.net. (
    2024102403 ; serial
    1D ; refresh
    1H ; retry
    1W ; expire
    3H ) ; minimum
    NS @
    A 192.168.1.1
    PTR server.ioithenko.net.
    MX 10 mail.ioithenko.net.
$ORIGIN 1.168.192.in-addr.arpa.
1 PTR server.ioithenko.net.
1 PTR ns.ioithenko.net.
1 PTR dhcp.ioithenko.net.
1 PTR www.ioithenko.net.
1 PTR mail.ioithenko.net.
```

Рис. 20: Изменение файла обратной DNS-зоны

```
[root@server.ioithenko.net ~]# vi /var/named/master/fz/ioithenko.net
[root@server.ioithenko.net ~]# vi /var/named/master/rz/192.168.1
[root@server.ioithenko.net ~]# postconf -e 'mydestination = $myhostname, localho
st.$mydomain, localhost, $mydomain'
[root@server.ioithenko.net ~]# postfix check
[root@server.ioithenko.net ~]# systemctl reload postfix
[root@server.ioithenko.net ~]# restorecon -vR /etc
[root@server.ioithenko.net ~]# restorecon -vR /var/named
[root@server.ioithenko.net ~]# systemctl restart named
[root@server.ioithenko.net ~]# postqueue -p
Mail queue is empty
[root@server.ioithenko.net ~]# postqueue -f
[root@server.ioithenko.net ~]#
```

Рис. 21: Конфигурация postfix



```
[ioithenko@client.ioithenko.net ~]$ echo . | mail -s test2 ioithenko@ioithenko.net  
t  
[ioithenko@client.ioithenko.net ~]$
```

Рис. 22: Отправка письма

```
Oct 24 11:39:38 client postfix/pickup[7028]: 5E00710A99DB: uid=1001 from=<ioithen  
nko>  
Oct 24 11:39:38 client postfix/cleanup[7034]: 5E00710A99DB: message-id=<20241024  
113938.5E00710A99DB@client.ioithenko.net>  
Oct 24 11:39:38 client postfix/qmgr[7029]: 5E00710A99DB: from=<ioithenko@client.  
ioithenko.net>, size=340, nrcpt=1 (queue active)  
Oct 24 11:39:38 client postfix/local[7044]: 5E00710A99DB: to=<ioithenko@ioithenk  
o.net>, relay=local, delay=0.06, delays=0.05/0/0/0, dsn=2.0.0, status=sent (deli  
vered to mailbox)  
Oct 24 11:39:38 client postfix/qmgr[7029]: 5E00710A99DB: removed
```

Рис. 23: Мониторинг работы почтовой службы: сообщение на доменный адрес доставлено

```
--CD56210A99DB.1729769937/client.ioithenko.net--  
  
From ioithenko@client.ioithenko.net Thu Oct 24 11:39:38 2024  
Return-Path: <ioithenko@client.ioithenko.net>  
X-Original-To: ioithenko@ioithenko.net  
Delivered-To: ioithenko@ioithenko.net  
Received: by client.ioithenko.net (Postfix, from userid 1001)  
        id 5E00710A99DB; Thu, 24 Oct 2024 11:39:38 +0000 (UTC)  
Date: Thu, 24 Oct 2024 11:39:38 +0000  
To: ioithenko@ioithenko.net  
Subject: test2  
User-Agent: s-nail v14.9.22  
Message-Id: <20241024113938.5E00710A99DB@client.ioithenko.net>  
From: ioithenko@client.ioithenko.net  
  
.
```

Рис. 24: Сообщение на доменный адрес в /var/spool/mail/ioithenko

```
root@server:/vagrant/provision/server
root@s... x ioithenk... x root@s... x ioithenk... x ioithenk... x ioithenk... x
#!/bin/bash

echo "Provisioning script $0"

echo "Install needed packages"
dnf -y install postfix
dnf -y install s-nail

echo "Copy configuration files"
#cp -R /vagrant/provision/server/mail/etc/* /etc

echo "Configure firewall"
firewall-cmd --add-service=smtp --permanent
firewall-cmd --reload
restorecon -vR /etc

echo "Start postfix service"
systemctl enable postfix
systemctl start postfix

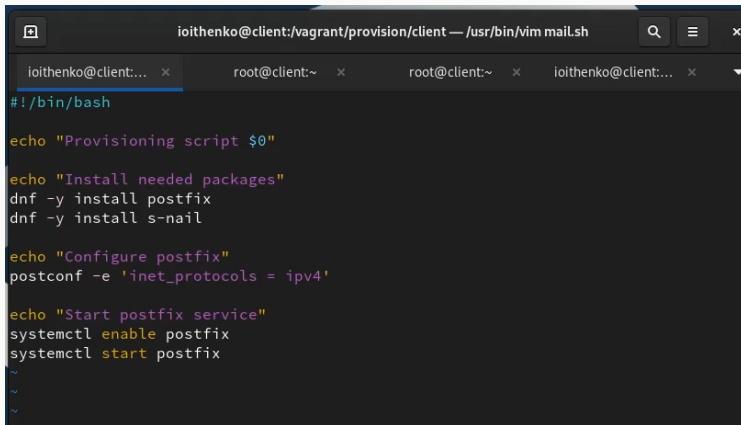
echo "Configure postfix"
postconf -e 'mydomain = user.net'
postconf -e 'myorigin = $mydomain'
postconf -e 'inet_protocols = ipv4'
postconf -e 'inet_interfaces = all'
postconf -e 'mydestination = $myhostname, localhost.$mydomain, localhost, $mydomain'
postconf -e 'mynetworks = 127.0.0.0/8, 192.168.0.0/16'
postfix set-permissions

restorecon -vR /etc

systemctl stop postfix
systemctl start postfix

~
~
~
~
:wq
```

Рис. 25: Создание скрипта mail.sh на сервере



The image shows a terminal window with a dark background. The title bar at the top reads "ioithenko@client:/vagrant/provision/client — /usr/bin/vim mail.sh". Below the title bar, there are four tabs: "ioithenko@client:...", "root@client:~", "root@client:~", and "ioithenko@client:...". The main area of the terminal displays the following text:

```
#!/bin/bash

echo "Provisioning script $0"

echo "Install needed packages"
dnf -y install postfix
dnf -y install s-nail

echo "Configure postfix"
postconf -e 'inet_protocols = ipv4'

echo "Start postfix service"
systemctl enable postfix
systemctl start postfix

~
~
~
```

Рис. 26: Создание скрипта `mail.sh` на клиенте

В ходе лабораторной работы я приобрела практических навыков по установке и конфигурированию SMTPсервера.