

Администрирование сетевых подсистем

Настройка SMTP-сервера

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Цели и задачи работы

Приобрести практические навыки по установке и конфигурации почтового сервера **Postfix**, а также закрепить знания о принципах работы протокола **SMTP** и взаимодействии почтовых клиентов и серверов.

Выполнение лабораторной работы

Установка Postfix и необходимых пакетов

```
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing     : postfix-lmdb-2:3.8.5-8.el10.x86_64 1/3
  Running scriptlet: postfix-2:3.8.5-8.el10.x86_64 2/3
  Installing     : postfix-2:3.8.5-8.el10.x86_64 2/3
  Running scriptlet: postfix-2:3.8.5-8.el10.x86_64 2/3
  Running scriptlet: s-nail-14.9.24-12.el10.x86_64 3/3
  Installing     : s-nail-14.9.24-12.el10.x86_64 3/3
  Running scriptlet: s-nail-14.9.24-12.el10.x86_64 3/3

Installed:
  postfix-2:3.8.5-8.el10.x86_64      postfix-lmdb-2:3.8.5-8.el10.x86_64      s-nail-14.9.24-12.el10.x86_64

Complete!
[root@server.ahmedfarg.net ~]# firewall-cmd --add-service=smtp
success
[root@server.ahmedfarg.net ~]# firewall-cmd --add-service=smtp --permanent
success
[root@server.ahmedfarg.net ~]# firewall-cmd --list-services
cockpit dhcp dhcpv6-client dns http https smtp ssh ssh-custom
[root@server.ahmedfarg.net ~]# restorecon -vR /etc
Relabeled /etc/NetworkManager/system-connections/eth1.nmconnection from unconfined_u:object_r:user_tmp_t:s0 to unconfined_u:object_r:NetworkManager_etc_rw_t:s0
[root@server.ahmedfarg.net ~]# systemctl enable postfix.service
Created symlink '/etc/systemd/system/multi-user.target.wants/postfix.service' → '/usr/lib/systemd/system/postfix.service'.
[root@server.ahmedfarg.net ~]# systemctl start postfix.service
[root@server.ahmedfarg.net ~]# postconf
```

Рис. 1: Установка пакетов Postfix и s-nail

Настройка межсетевого экрана и запуск службы

```
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing     : postfix-lmdb-2:3.8.5-8.el10.x86_64 1/3
  Running scriptlet: postfix-2:3.8.5-8.el10.x86_64 2/3
  Installing     : postfix-2:3.8.5-8.el10.x86_64 2/3
  Running scriptlet: postfix-2:3.8.5-8.el10.x86_64 2/3
  Running scriptlet: s-nail-14.9.24-12.el10.x86_64 3/3
  Installing     : s-nail-14.9.24-12.el10.x86_64 3/3
  Running scriptlet: s-nail-14.9.24-12.el10.x86_64 3/3

Installed:
  postfix-2:3.8.5-8.el10.x86_64      postfix-lmdb-2:3.8.5-8.el10.x86_64      s-nail-14.9.24-12.el10.x86_64

Complete!
[root@server.ahmedfarg.net ~]# firewall-cmd --add-service=smtp
success
[root@server.ahmedfarg.net ~]# firewall-cmd --add-service=smtp --permanent
success
[root@server.ahmedfarg.net ~]# firewall-cmd --list-services
cockpit dhcp dhcpv6-client dns http https smtp ssh ssh-custom
[root@server.ahmedfarg.net ~]# restorecon -vR /etc
Relabeled /etc/NetworkManager/system-connections/eth1.nmconnection from unconfined_u:object_r:user_tmp_t:s0 to unconfined_u:object_r:NetworkManager_etc_rw_t:s0
[root@server.ahmedfarg.net ~]# systemctl enable postfix.service
Created symlink '/etc/systemd/system/multi-user.target.wants/postfix.service' → '/usr/lib/systemd/system/postfix.service'.
[root@server.ahmedfarg.net ~]# systemctl start postfix.service
[root@server.ahmedfarg.net ~]# postconf
```

Рис. 2: Запуск службы Postfix

Проверка и изменение параметров конфигурации

```
root@server:~ - sudo -i

virtual_alias_expansion_limit = 1000
virtual_alias_maps = $virtual_maps
virtual_alias_recursion_limit = 1000
virtual_delivery_slot_cost = $default_delivery_slot_cost
virtual_delivery_slot_discount = $default_delivery_slot_discount
virtual_delivery_slot_loan = $default_delivery_slot_loan
virtual_delivery_status_filter = $default_delivery_status_filter
virtual_destination_concurrency_failed_cohort_limit = $default_destination_concurrency_failed_cohort_limit
virtual_destination_concurrency_limit = $default_destination_concurrency_limit
virtual_destination_concurrency_negative_feedback = $default_destination_concurrency_negative_feedback
virtual_destination_concurrency_positive_feedback = $default_destination_concurrency_positive_feedback
virtual_destination_rate_delay = $default_destination_rate_delay
virtual_destination_recipient_limit = $default_destination_recipient_limit
virtual_extra_recipient_limit = $default_extra_recipient_limit
virtual_gid_maps =
virtual_initial_destination_concurrency = $initial_destination_concurrency
virtual_mailbox_base =
virtual_mailbox_domains = $virtual_mailbox_maps
virtual_mailbox_limit = 51200000
virtual_mailbox_lock = fcntl, dotlock
virtual_mailbox_maps =
virtual_minimum_delivery_slots = $default_minimum_delivery_slots
virtual_minimum_uid = 100
virtual_recipient_limit = $default_recipient_limit
virtual_recipient_refill_delay = $default_recipient_refill_delay
virtual_recipient_refill_limit = $default_recipient_refill_limit
virtual_transport = virtual
virtual_transport_rate_delay = $default_transport_rate_delay
virtual_uid_maps =
[root@server.ahmedfarg.net ~]#
```

Изменение параметров myorigin и mydomain

```
[root@server.ahmedfarg.net ~]#  
[root@server.ahmedfarg.net ~]# postconf myorigin  
myorigin = $myhostname  
[root@server.ahmedfarg.net ~]# postconf mydomain  
mydomain = ahmedfarg.net  
[root@server.ahmedfarg.net ~]# postconf -e 'myorigin = $mydomain'  
[root@server.ahmedfarg.net ~]# postconf myorigin  
myorigin = $mydomain  
[root@server.ahmedfarg.net ~]# postfix check  
[root@server.ahmedfarg.net ~]# systemctl reload postfix  
[root@server.ahmedfarg.net ~]#
```

Рис. 4: Изменение параметров myorigin и mydomain

Проверка конфигурации и перезагрузка службы

```
[root@server.ahmedfarg.net ~]# postconf -n
alias_database = lmdb:/etc/aliases
alias_maps = lmdb:/etc/aliases
command_directory = /usr/sbin
compatibility_level = 3.8
daemon_directory = /usr/libexec/postfix
data_directory = /var/lib/postfix
debug_peer_level = 2
debugger_command = PATH=/bin:/usr/bin:/usr/local/bin:/usr/X11R6/bin ddd $daemon_directory/$process_name $process_i
d & sleep 5
default_database_type = lmdb
html_directory = no
inet_interfaces = localhost
inet_protocols = all
mail_owner = postfix
mailq_path = /usr/bin/mailq.postfix
manpage_directory = /usr/share/man
meta_directory = /etc/postfix
mydestination = $myhostname, localhost.$mydomain, localhost
myorigin = $mydomain
newaliases_path = /usr/bin/newaliases.postfix
queue_directory = /var/spool/postfix
readme_directory = /usr/share/doc/postfix/README_FILES
sample_directory = /usr/share/doc/postfix/samples
sendmail_path = /usr/sbin/sendmail.postfix
setgid_group = postdrop
shlib_directory = /usr/lib64/postfix
smtp_tls_CAfile = /etc/pki/tls/certs/ca-bundle.crt
```

Рис. 5: Результат проверки конфигурации Postfix

```
[root@server.ahmedfarg.net ~]#  
[root@server.ahmedfarg.net ~]#  
[root@server.ahmedfarg.net ~]# postconf -e 'mydomain = ahmedfarg.net'  
[root@server.ahmedfarg.net ~]# postconf inet_protocols  
inet_protocols = all  
[root@server.ahmedfarg.net ~]# postconf -e 'inet_protocols = ipv4'  
[root@server.ahmedfarg.net ~]# postfix check  
[root@server.ahmedfarg.net ~]# systemctl reload postfix.service  
[root@server.ahmedfarg.net ~]#
```

Рис. 6: Отключение IPv6 и перезагрузка Postfix

Проверка работы Postfix

```
Oct  7 05:27:23 server postfix/pickup[15697]: D695B412E557: uid=1001 from=<ahmedfarg>  
Oct  7 05:27:23 server postfix/cleanup[15936]: D695B412E557: message-id=<20251007052723.D695B412E557@server.ahmedfarg.net>  
Oct  7 05:27:23 server postfix/qmgr[15698]: D695B412E557: from=<ahmedfarg@ahmedfarg.net>, size=340, nrcpt=1 (queue active)  
Oct  7 05:27:23 server postfix/local[16113]: D695B412E557: to=<ahmedfarg@server.ahmedfarg.net>, relay=local, delay=0.01, delays=0/0/0/0, dsn=2.0.0, status=sent (delivered to mailbox)  
Oct  7 05:27:23 server postfix/qmgr[15698]: D695B412E557: removed
```

Рис. 7: Лог успешной доставки письма на сервере

Проверка почтового ящика

```
[ahmedfarg@server.ahmedfarg.net ~]$ echo . | mail -s test1 ahmedfarg@server.ahmedfarg.net
[ahmedfarg@server.ahmedfarg.net ~]$
[ahmedfarg@server.ahmedfarg.net ~]$ cd /var/spoll/mail
bash: cd: /var/spoll/mail: No such file or directory
[ahmedfarg@server.ahmedfarg.net ~]$ cd /var/spool/mail
[ahmedfarg@server.ahmedfarg.net mail]$ ls
ahmedfarg  vagrant
[ahmedfarg@server.ahmedfarg.net mail]$ cat ahmedfarg
From ahmedfarg@ahmedfarg.net  Tue Oct  7 05:27:23 2025
Return-Path: <ahmedfarg@ahmedfarg.net>
X-Original-To: ahmedfarg@server.ahmedfarg.net
Delivered-To: ahmedfarg@server.ahmedfarg.net
Received: by server.ahmedfarg.net (Postfix, from userid 1001)
        id D695B412E557; Tue,  7 Oct 2025 05:27:23 +0000 (UTC)
Date: Tue, 07 Oct 2025 05:27:23 +0000
To: ahmedfarg@server.ahmedfarg.net
Subject: test1
User-Agent: s-nail v14.9.24
Message-Id: <20251007052723.D695B412E557@server.ahmedfarg.net>
From: ahmedfarg@ahmedfarg.net

.
[ahmedfarg@server.ahmedfarg.net mail]$ █
```

Рис. 8: Проверка содержимого почтового ящика пользователя

Настройка Postfix на клиенте

```
Installed:
 postfix-2:3.8.5-8.el10.x86_64      postfix-lmdb-2:3.8.5-8.el10.x86_64
 s-nail-14.9.24-12.el10.x86_64

Complete!
[root@client.ahmedfarg.net ~]# postconf inet_protocols
inet_protocols = all
[root@client.ahmedfarg.net ~]# postconf -e 'inet_protocols = ipv4'
bash: postconf: command not found...
Similar command is: 'postconf'
[root@client.ahmedfarg.net ~]# postconf -e 'inet_protocols = ipv4'
[root@client.ahmedfarg.net ~]# systemctl start postfix
[root@client.ahmedfarg.net ~]# systemctl enable postfix
Created symlink '/etc/systemd/system/multi-user.target.wants/postfix.service' →
'/usr/lib/systemd/system/postfix.service'.
[root@client.ahmedfarg.net ~]#
```

Рис. 9: Настройка и запуск Postfix на клиенте

```
Oct 7 05:37:58 server postfix/smtpd[17700]: connect from client.ahmedfarg.net[192.168.1.30]
Oct 7 05:37:58 server postfix/smtpd[17700]: 511FE412E56E: client=client.ahmedfarg.net[192.168.1.30]
Oct 7 05:37:58 server postfix/cleanup[17704]: 511FE412E56E: message-id=<20251007053758.4A4DB412ED32@client.ahmedfarg.net>
Oct 7 05:37:58 server postfix/qmgr[17668]: 511FE412E56E: from=<ahmedfarg@client.ahmedfarg.net>, size=564, nrcpt=1 (queue active)
Oct 7 05:37:58 server postfix/smtpd[17700]: disconnect from client.ahmedfarg.net[192.168.1.30] ehlo=2 starttls=1 mail=1 rcpt=1 data=1 quit=1 commands=7
Oct 7 05:37:58 server postfix/local[17705]: 511FE412E56E: to=<ahmedfarg@server.ahmedfarg.net>, relay=local, delay=0.01, delays=0/0/0/0, dsn=2.0.0, status=sent (delivered to mailbox)
Oct 7 05:37:58 server postfix/qmgr[17668]: 511FE412E56E: removed
```

Рис. 10: Передача письма с клиента на сервер

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

Рис. 11: Настройка сетевых интерфейсов и разрешённых сетей

Конфигурация Postfix для домена

Ошибка доставки и очередь сообщений

```
farg.net
[ahmedfarg@client.ahmedfarg.net ~]$ echo .| mail -s test1 ahmedfarg@server.ahmedfarg.net
[ahmedfarg@client.ahmedfarg.net ~]$
[ahmedfarg@client.ahmedfarg.net ~]$ echo .| mail -s test2 ahmedfarg@ahmedfarg.net
[ahmedfarg@client.ahmedfarg.net ~]$ postqueue -p
-Queue ID- --Size-- ----Arrival Time---- -Sender/Recipient-----
24ADB412ED2C      347 Tue Oct  7 05:32:28  ahmedfarg@client.ahmedfarg.net
                    (connect to server.ahmedfarg.net[192.168.1.1]:25: Connection refused)
                    ahmedfarg@server.ahmedfarg.net

2DE80412ED2F      347 Tue Oct  7 05:36:53  ahmedfarg@client.ahmedfarg.net
                    (host server.ahmedfarg.net[192.168.1.1] said: 451 4.3.0 <ahmedfarg@server.ahmedfarg.net>: Temporary lookup failure (in reply to RCPT TO command))
                    ahmedfarg@server.ahmedfarg.net

-- 0 Kbytes in 2 Requests.
[ahmedfarg@client.ahmedfarg.net ~]$
```

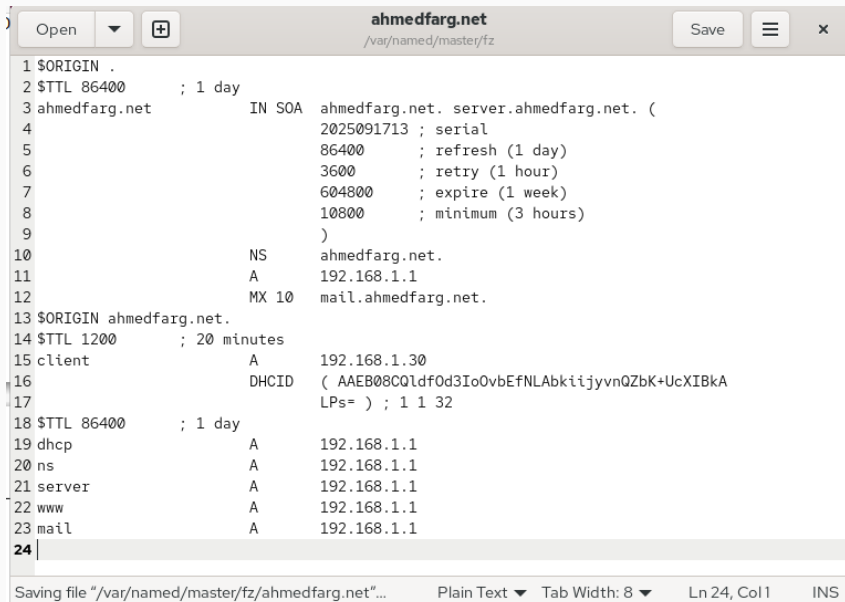
Рис. 12: Очередь сообщений на клиенте и ошибки доставки

Анализ журнала и выявление ошибок маршрутизации

```
Oct 7 05:38:36 server postfix/smtpd[17700]: connect from client.ahmedfarg.net[192.168.1.30]
Oct 7 05:38:36 server postfix/smtpd[17700]: F260E412E56E: client=client.ahmedfarg.net[192.168.1.30]
Oct 7 05:38:36 server postfix/cleanup[17704]: F260E412E56E: message-id=<20251007053836.F01E0412ED32@client.ahmedfarg.net>
Oct 7 05:38:36 server postfix/qmgr[17668]: F260E412E56E: from=<ahmedfarg@client.ahmedfarg.net>, size=550, nrcpt=1 (queue active)
Oct 7 05:38:36 server postfix/smtpd[17700]: disconnect from client.ahmedfarg.net[192.168.1.30] ehlo=2 starttls=1 mail=1 rcpt=1 data=1 quit=1 commands=7
Oct 7 05:38:37 server postfix/smtp[17778]: F260E412E56E: to=<ahmedfarg@ahmedfarg.net>, relay=none, delay=0.01, delays=0/0.01/0/0, dsn=5.4.6, status=bounced (mail for ahmedfarg.net loops back to myself)
Oct 7 05:38:37 server postfix/cleanup[17704]: 01EF7412E577: message-id=<20251007053837.01EF7412E577@server.ahmedfarg.net>
Oct 7 05:38:37 server postfix/qmgr[17668]: 01EF7412E577: from=<>, size=2554, nrcpt=1 (queue active)
Oct 7 05:38:37 server postfix/bounce[17779]: F260E412E56E: sender non-delivery notification: 01EF7412E577
Oct 7 05:38:37 server postfix/qmgr[17668]: F260E412E56E: removed
Oct 7 05:38:37 server postfix/smtp[17778]: connect to client.ahmedfarg.net[192.168.1.30]:25: No route to host
Oct 7 05:38:37 server postfix/smtp[17778]: 01EF7412E577: to=<ahmedfarg@client.ahmedfarg.net>, relay=none, delay=0, delays=0/0/0/0, dsn=4.4.1, status=deferred (connect to client.ahmedfarg.net[192.168.1.30]:25: No route to host)
```

Рис. 13: Ошибки обратной маршрутизации в логе сервера

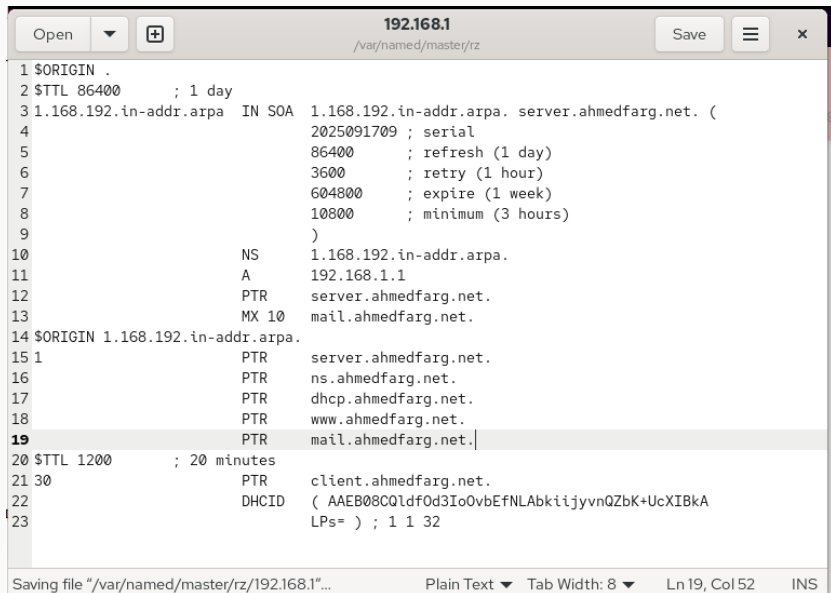
Настройка прямой DNS-зоны с MX-записью



```
1 $ORIGIN .
2 $TTL 86400      ; 1 day
3 ahmedfarg.net   IN SOA  ahmedfarg.net. server.ahmedfarg.net. (
4                  2025091713 ; serial
5                  86400      ; refresh (1 day)
6                  3600       ; retry (1 hour)
7                  604800     ; expire (1 week)
8                  10800      ; minimum (3 hours)
9                  )
10                NS      ahmedfarg.net.
11                A       192.168.1.1
12                MX 10   mail.ahmedfarg.net.
13 $ORIGIN ahmedfarg.net.
14 $TTL 1200      ; 20 minutes
15 client         A       192.168.1.30
16                DHCID   ( AAEB08CQldfOd3Io0vbEfNLABkiijyvnQZbK+UcXIBkA
17                LPs= ) ; 1 1 32
18 $TTL 86400     ; 1 day
19 dhcp           A       192.168.1.1
20 ns             A       192.168.1.1
21 server         A       192.168.1.1
22 www            A       192.168.1.1
23 mail           A       192.168.1.1
24
```

Saving file "/var/named/master/fz/ahmedfarg.net"... Plain Text ▾ Tab Width: 8 ▾ Ln 24, Col 1 INS

Настройка обратной DNS-зоны с PTR-записями



The screenshot shows a text editor window titled "192.168.1" with the file path "/var/named/master/rz". The editor contains a DNS zone file configuration for the reverse lookup zone 1.168.192.in-addr.arpa. The configuration includes a \$ORIGIN statement, a TTL of 86400, an SOA record, and several PTR records for the domain 1.168.192.in-addr.arpa. The PTR records are for the domains server.ahmedfarg.net, ns.ahmedfarg.net, dhcp.ahmedfarg.net, www.ahmedfarg.net, and mail.ahmedfarg.net. The PTR record for mail.ahmedfarg.net is highlighted. The editor also shows a \$TTL of 1200 and a DHCID record.

```
1 $ORIGIN .
2 $TTL 86400          ; 1 day
3 1.168.192.in-addr.arpa IN SOA 1.168.192.in-addr.arpa. server.ahmedfarg.net. (
4                               2025091709 ; serial
5                               86400      ; refresh (1 day)
6                               3600       ; retry (1 hour)
7                               604800     ; expire (1 week)
8                               10800      ; minimum (3 hours)
9                               )
10                          NS      1.168.192.in-addr.arpa.
11                          A       192.168.1.1
12                          PTR     server.ahmedfarg.net.
13                          MX 10   mail.ahmedfarg.net.
14 $ORIGIN 1.168.192.in-addr.arpa.
15 1                          PTR     server.ahmedfarg.net.
16                          PTR     ns.ahmedfarg.net.
17                          PTR     dhcp.ahmedfarg.net.
18                          PTR     www.ahmedfarg.net.
19                          PTR     mail.ahmedfarg.net.
20 $TTL 1200              ; 20 minutes
21 30                       PTR     client.ahmedfarg.net.
22                          DHCID   ( AAEb08CQldf0d3Io0vbEfNLABkiiyv nQZbK+UcXIBkA
23                          LPs= ) ; 1 1 32
```

Saving file "/var/named/master/rz/192.168.1"...

Plain Text ▼ Tab Width: 8 ▼ Ln 19, Col 52 INS

Проверка и успешная доставка почты по домену

```
Oct 7 05:43:05 server postfix/smtpd[18626]: connect from client.ahmedfarg.net[192.168.1.30]
Oct 7 05:43:05 server postfix/smtpd[18626]: F184E412E579: client=client.ahmedfarg.net[192.168.1.30]
Oct 7 05:43:05 server postfix/cleanup[18634]: F184E412E579: message-id=<20251007054305.EF855412ED2C@client.ahmedfarg.net>
Oct 7 05:43:05 server postfix/qmgr[18537]: F184E412E579: from=<ahmedfarg@client.ahmedfarg.net>, size=550, nrcpt=1 (queue active)
Oct 7 05:43:05 server postfix/smtpd[18626]: disconnect from client.ahmedfarg.net[192.168.1.30] ehlo=2 starttls=1 mail=1 rcpt=1 data=1 quit=1 commands=7
Oct 7 05:43:05 server postfix/local[18635]: F184E412E579: to=<ahmedfarg@ahmedfarg.net>, relay=local, delay=0, delays=0/0/0/0, dsn=2.0.0, status=sent (delivered to mailbox)
Oct 7 05:43:05 server postfix/qmgr[18537]: F184E412E579: removed
```

Рис. 16: Успешная доставка письма с клиента на сервер

```
From ahmedfarg@client.ahmedfarg.net Tue Oct 7 05:43:05 2025
Return-Path: <ahmedfarg@client.ahmedfarg.net>
X-Original-To: ahmedfarg@ahmedfarg.net
Delivered-To: ahmedfarg@ahmedfarg.net
Received: from client.ahmedfarg.net (client.ahmedfarg.net [192.168.1.30])
        by server.ahmedfarg.net (Postfix) with ESMTPS id F184E412E579
        for <ahmedfarg@ahmedfarg.net>; Tue, 7 Oct 2025 05:43:05 +0000 (UTC)
Received: by client.ahmedfarg.net (Postfix, from userid 1001)
        id EF855412ED2C; Tue, 7 Oct 2025 05:43:05 +0000 (UTC)
Date: Tue, 07 Oct 2025 05:43:05 +0000
To: ahmedfarg@ahmedfarg.net
Subject: test2
User-Agent: s-nail v14.9.24
Message-Id: <20251007054305.EF855412ED2C@client.ahmedfarg.net>
From: ahmedfarg@client.ahmedfarg.net

.

[ahmedfarg@server.ahmedfarg.net mail]$
```

Рис. 17: Просмотр содержимого доставленного письма test2

Выводы по проделанной работе

В ходе лабораторной работы был установлен и настроен почтовый сервер **Postfix**, обеспечивший приём и доставку сообщений внутри домена **ahmedfarg.net**.

Были отработаны навыки настройки параметров Postfix, конфигурации DNS-зон и устранения ошибок маршрутизации.

Тестовые письма, отправленные с сервера и клиента, успешно доставлены, что подтверждает корректность настроенной почтовой инфраструктуры.