

**РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ**

**Факультет физико-математических и естественных наук**

**Кафедра теории вероятностей и кибербезопасности**

**ОТЧЕТ**

**ПО ЛАБОРАТОРНОЙ РАБОТЕ №4**

*дисциплина: Основы администрирования операционных систем*

Студент: Хамди Мохаммад, 1032235868

**МОСКВА**

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# Постановка задачи

Получить навыки работы с репозиториями и менеджерами пакетов.

## Выполнение работы

### Работа с репозиториями

1. В консоли перейдите в режим работы суперпользователя (используйте команду `su -`).
2. Перейдите в каталог `/etc/yum.repos.d` и изучите содержание каталога и файлов репозитория: `cd /etc/yum.repos.d ls cat название_репозитория.repo`

```
[root@hamdimohammad hmohammad]# cd /etc/yum.repos.d/
[root@hamdimohammad yum.repos.d]# ls
rocky-addons.repo rocky-devel.repo rocky-extras.repo rocky.repo
[root@hamdimohammad yum.repos.d]# cat rocky.repo
# rocky.repo
#
# The mirrorlist system uses the connecting IP address of the client and the
# update status of each mirror to pick current mirrors that are geographically
# close to the client.  You should use this for Rocky updates unless you are
# manually picking other mirrors.
#
# If the mirrorlist does not work for you, you can try the commented out
# baseurl line instead.

[baseos]
name=Rocky Linux $releasever - BaseOS
mirrorlist=https://mirrors.rockylinux.org/mirrorlist?arch=$basearch&repo=BaseOS-$releasever$rltype
#baseurl=http://dl.rockylinux.org/$contentdir/$releasever/BaseOS/$basearch/os/
gpgcheck=1
enabled=1
countme=1
metadata_expire=6h
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-Rocky-9

[baseos-debuginfo]
name=Rocky Linux $releasever - BaseOS - Debug
mirrorlist=https://mirrors.rockylinux.org/mirrorlist?arch=$basearch&repo=BaseOS-$releasever-debug$rltype
#baseurl=http://dl.rockylinux.org/$contentdir/$releasever/BaseOS/$basearch/debug/tree/
gpgcheck=1
enabled=0
metadata_expire=6h
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-Rocky-9

[baseos-source]
name=Rocky Linux $releasever - BaseOS - Source
mirrorlist=https://mirrors.rockylinux.org/mirrorlist?arch=source&repo=BaseOS-$releasever-source$rltype
#baseurl=http://dl.rockylinux.org/$contentdir/$releasever/BaseOS/source/tree/
gpgcheck=1
```

3. Выведите на экран список репозитория: `dnf repolist` и поясните полученную информацию.

4. Выведите на экран список пакетов, в названии или описании которых есть слово user:  
dnf search user и поясните полученную информацию.

```
libibverbs.i686 : A library and drivers for direct userspace use of RDMA (InfiniBand/iWARP/RoCE) hardware
libkcap.i.x86_64 : User space interface to the Linux Kernel Crypto API
libkcap.i686 : User space interface to the Linux Kernel Crypto API
libnbd.x86_64 : NBD client library in userspace
libnbd.i686 : NBD client library in userspace
libnetfilter_conntrack.x86_64 : Netfilter conntrack userspace library
libnetfilter_conntrack.i686 : Netfilter conntrack userspace library
libnetfilter_cthelper.x86_64 : User-space infrastructure for connection tracking helpers
libnetfilter_cthelper.i686 : User-space infrastructure for connection tracking helpers
libnetfilter_queue.i686 : Netfilter queue userspace library
libnetfilter_queue.x86_64 : Netfilter queue userspace library
libnfnctlink.x86_64 : Netfilter netlink userspace library
libnfnctlink.i686 : Netfilter netlink userspace library
libnfsidmap.i686 : NFSv4 User and Group ID Mapping Library
libnfsidmap.x86_64 : NFSv4 User and Group ID Mapping Library
libpcap.x86_64 : A system-independent interface for user-level packet capture
libpcap.i686 : A system-independent interface for user-level packet capture
librdmacm.x86_64 : Userspace RDMA Connection Manager
librdmacm.i686 : Userspace RDMA Connection Manager
libsigsegv.x86_64 : Library for handling page faults in user mode
libsigsegv.i686 : Library for handling page faults in user mode
lksctp-tools.x86_64 : User-space access to Linux Kernel SCTP
lksctp-tools.i686 : User-space access to Linux Kernel SCTP
ltnng-ust.i686 : LTTng Userspace Tracer library
ltnng-ust.x86_64 : LTTng Userspace Tracer library
lvm2.x86_64 : Userland logical volume management tools
make.x86_64 : A GNU tool which simplifies the build process for users
man-pages.noarch : Linux kernel and C library user-space interface documentation
mc.x86_64 : User-friendly text console file manager and visual shell
memkind.x86_64 : User Extensible Heap Manager
mod_lookup_identity.x86_64 : Apache module to retrieve additional information about the authenticated user
mutt.x86_64 : A text mode mail user agent
newt.x86_64 : A library for text mode user interfaces
```

5. Установите nmap, предварительно изучив информацию по имеющимся пакетам:

```
dnf search nmap
```

```
dnf info nmap
```

```
dnf install nmap
```

```
dnf install nmap\*
```

Поясните разницу между `dnf install nmap` и `dnf install nmap\*`.

`dnf install nmap` - это команда, которая устанавливает пакет nmap.

`dnf install nmap\*` - команда устанавливает все пакеты, начинающиеся с nmap

```
[root@hamdimohammad yum.repos.d]#
[root@hamdimohammad yum.repos.d]#
[root@hamdimohammad yum.repos.d]# dnf info nmap
Rocky Linux 9 - BaseOS                               4.7 kB/s | 4.1 kB      00:00
Rocky Linux 9 - BaseOS                               235 kB/s | 2.3 MB      00:10
Rocky Linux 9 - AppStream                             7.1 kB/s | 4.5 kB      00:00
Rocky Linux 9 - AppStream                             6.2 MB/s | 8.6 MB      00:01
Rocky Linux 9 - Extras                               4.3 kB/s | 2.9 kB      00:00
Rocky Linux 9 - Extras                               16 kB/s | 16 kB       00:01
Available Packages
Name           : nmap
Epoch         : 3
Version        : 7.92
Release        : 3.el9
Architecture   : x86_64
Size           : 5.4 M
Source         : nmap-7.92-3.el9.src.rpm
Repository     : appstream
Summary        : Network exploration tool and security scanner
URL            : http://nmap.org/
License        : Nmap
Description    : Nmap is a utility for network exploration or security auditing. It supports
                  : ping scanning (determine which hosts are up), many port scanning techniques
                  : (determine what services the hosts are offering), and TCP/IP fingerprinting
                  : (remote host operating system identification). Nmap also offers flexible target
                  : and port specification, decoy scanning, determination of TCP sequence
                  : predictability characteristics, reverse-identd scanning, and more. In addition
                  : to the classic command-line nmap executable, the Nmap suite includes a flexible
                  : data transfer, redirection, and debugging tool (netcat utility ncat), a utility
                  : for comparing scan results (ndiff), and a packet generation and response
                  : analysis tool (nping).
```

```

Total download size: 5.7 M
Is this ok [y/N]: y
Downloading Packages:
(1/2): nmap-ncat-7.92-3.el9.x86_64.rpm          445 kB/s | 222 kB    00:00
(2/2): nmap-7.92-3.el9.x86_64.rpm              8.0 MB/s | 5.4 MB    00:00
-----
Total                                           4.2 MB/s | 5.7 MB    00:01
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                : 1/1
  Upgrading                : nmap-ncat-3:7.92-3.el9.x86_64 1/3
  Running scriptlet: nmap-ncat-3:7.92-3.el9.x86_64 1/3
  Installing              : nmap-3:7.92-3.el9.x86_64 2/3
  Running scriptlet: nmap-ncat-3:7.92-1.el9.x86_64 3/3
  Cleanup                 : nmap-ncat-3:7.92-1.el9.x86_64 3/3
  Running scriptlet: nmap-ncat-3:7.92-1.el9.x86_64 3/3
  Verifying                : nmap-3:7.92-3.el9.x86_64 1/3
  Verifying                : nmap-ncat-3:7.92-3.el9.x86_64 2/3
  Verifying                : nmap-ncat-3:7.92-1.el9.x86_64 3/3

Upgraded:
  nmap-ncat-3:7.92-3.el9.x86_64
Installed:
  nmap-3:7.92-3.el9.x86_64

Complete!
[root@hamdimohammad yum.repos.d]# dnf install nmap\*
Last metadata expiration check: 0:00:43 ago on Mon 17 Feb 2025 05:06:18 PM MSK.
Package nmap-3:7.92-3.el9.x86_64 is already installed.
Package nmap-ncat-3:7.92-3.el9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@hamdimohammad yum.repos.d]#

```

## 6. Удалите nmap: dnf remove nmap dnf remove nmap\\*

```

[root@hamdimohammad yum.repos.d]# dnf remove nmap\*
Dependencies resolved.
=====
Package                        Architecture      Version           Repository        Size
=====
Removing:
  nmap-ncat                    x86_64            3:7.92-3.el9      @appstream        469 k

Transaction Summary
=====
Remove 1 Package

Freed space: 469 k
Is this ok [y/N]: y
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                : 1/1
  Running scriptlet: nmap-ncat-3:7.92-3.el9.x86_64 1/1
  Erasing               : nmap-ncat-3:7.92-3.el9.x86_64 1/1
  Running scriptlet: nmap-ncat-3:7.92-3.el9.x86_64 1/1
  Verifying              : nmap-ncat-3:7.92-3.el9.x86_64 1/1

Removed:
  nmap-ncat-3:7.92-3.el9.x86_64

Complete!
[root@hamdimohammad yum.repos.d]#

```

## 7. Получите список имеющихся групп пакетов, затем установите группу пакетов RPM Development Tools:

```

dnf groups list LANG=C dnf groups list
dnf groups info "RPM Development Tools"

```

`dnf groupinstall "RPM Development Tools"`

Для удаления группы пакетов RPM Development Tools можно воспользоваться командой `dnf groupremove "RPM Development Tools"`

```
[root@hamdimohammad yum.repos.d]#  
[root@hamdimohammad yum.repos.d]# dnf groups list  
Last metadata expiration check: 0:01:50 ago on Mon 17 Feb 2025 05:06:18 PM MSK.  
Available Environment Groups:  
  Server  
  Minimal Install  
  Workstation  
  Custom Operating System  
  Virtualization Host  
Installed Environment Groups:  
  Server with GUI  
Installed Groups:  
  Container Management  
  Development Tools  
  Headless Management  
Available Groups:  
  Legacy UNIX Compatibility  
  Console Internet Tools  
  .NET Development  
  Graphical Administration Tools  
  Network Servers  
  RPM Development Tools  
  Scientific Support  
  Security Tools  
  Smart Card Support  
  System Tools  
[root@hamdimohammad yum.repos.d]#
```

```

System roots
[root@hamdimohammad yum.repos.d]# LANG=C dnf groups list
Last metadata expiration check: 0:02:12 ago on Mon Feb 17 17:06:18 2025.
Available Environment Groups:
  Server
  Minimal Install
  Workstation
  Custom Operating System
  Virtualization Host
Installed Environment Groups:
  Server with GUI
Installed Groups:
  Container Management
  Development Tools
  Headless Management
Available Groups:
  Legacy UNIX Compatibility
  Console Internet Tools
  .NET Development
  Graphical Administration Tools
  Network Servers
  RPM Development Tools
  Scientific Support
  Security Tools
  Smart Card Support
  System Tools
[root@hamdimohammad yum.repos.d]#
[root@hamdimohammad yum.repos.d]#
[root@hamdimohammad yum.repos.d]# dnf groups info "RPM Development Tools"
Last metadata expiration check: 0:02:43 ago on Mon 17 Feb 2025 05:06:18 PM MSK.
Group: RPM Development Tools
Description: Tools used for building RPMs, such as rpmbuild.
Mandatory Packages:
  redhat-rpm-config
  rpm-build
Default Packages:
  rpmdevtools
Optional Packages:
  rpmlint
[root@hamdimohammad yum.repos.d]#

```

```

Verifying      : redhat-rpm-config-207-1.el9.noarch                               23/27
Verifying      : rpm-plugin-systemd-inhibit-4.16.1.3-34.el9.0.1.x86_64           24/27
Verifying      : rpm-plugin-systemd-inhibit-4.16.1.3-29.el9.x86_64              25/27
Verifying      : rpm-build-4.16.1.3-34.el9.0.1.x86_64                          26/27
Verifying      : rpm-build-4.16.1.3-29.el9.x86_64                             27/27

Upgraded:
  ima-evm-utils-1.5-2.el9.0.1.x86_64          python3-rpm-4.16.1.3-34.el9.0.1.x86_64
  redhat-rpm-config-208-1.el9.noarch           rpm-4.16.1.3-34.el9.0.1.x86_64
  rpm-build-4.16.1.3-34.el9.0.1.x86_64        rpm-build-libs-4.16.1.3-34.el9.0.1.x86_64
  rpm-libs-4.16.1.3-34.el9.0.1.x86_64         rpm-plugin-audit-4.16.1.3-34.el9.0.1.x86_64
  rpm-plugin-selinux-4.16.1.3-34.el9.0.1.x86_64 rpm-plugin-systemd-inhibit-4.16.1.3-34.el9.0.1.x86_64
  rpm-sign-4.16.1.3-34.el9.0.1.x86_64         rpm-sign-libs-4.16.1.3-34.el9.0.1.x86_64

Installed:
  keyutils-1.6.3-1.el9.x86_64          python3-argcomplete-1.12.0-5.el9.noarch    rpmdevtools-9.5-1.el9.noarch

Complete!
[root@hamdimohammad yum.repos.d]#

```

```

Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Erasing       : rpmdevtools-9.5-1.el9.noarch    1/2
  Erasing       : python3-argcomplete-1.12.0-5.el9.noarch 2/2
  Running scriptlet: python3-argcomplete-1.12.0-5.el9.noarch 2/2
  Verifying     : python3-argcomplete-1.12.0-5.el9.noarch 1/2
  Verifying     : rpmdevtools-9.5-1.el9.noarch    2/2

Removed:
  python3-argcomplete-1.12.0-5.el9.noarch          rpmdevtools-9.5-1.el9.noarch

Complete!
[root@hamdimohammad yum.repos.d]#

```

8. Посмотрите историю использования команды dnf: `dnf history` и отмените последнее, например шестое по счёту, действие: `dnf history undo 6`

```
[root@hamdimohammad yum.repos.d]#
[root@hamdimohammad yum.repos.d]# dnf history
ID      | Command line                                | Date and time | Action(s) | Altered
-----|-----|-----|-----|-----
11      | groupermove RPM Development Tools          | 2025-02-17 17:10 | Removed  | 3
10      | groupinstall RPM Development Tools          | 2025-02-17 17:09 | I, U     | 16
9       | remove nmap*                               | 2025-02-17 17:07 | Removed  | 1
8       | remove nmap                                | 2025-02-17 17:07 | Removed  | 1
7       | install nmap                               | 2025-02-17 17:06 | I, U     | 2
6       |                                             | 2024-11-10 13:57 | Install  | 2
5       | upgrade --refresh                          | 2024-10-28 20:30 | I, U     | 182 EE
4       | -y install lynx                            | 2024-10-21 12:28 | Install  | 1
3       |                                             | 2024-10-10 10:37 | Install  | 1
2       | -y install httpd                           | 2024-10-10 10:35 | Install  | 11 <
1       |                                             | 2024-10-08 22:06 | Install  | 1293 >E
[root@hamdimohammad yum.repos.d]#
```

## Использование rpm

Предположим, что требуется установить текстовый браузер lynx из rpm-пакета.

1. Скачайте rpm-пакет lynx: `dnf list lynx` `dnf install lynx --downloadonly`

```
[root@hamdimohammad yum.repos.d]#
[root@hamdimohammad yum.repos.d]# dnf list lynx
Last metadata expiration check: 0:05:58 ago on Mon 17 Feb 2025 05:06:18 PM MSK.
Installed Packages
lynx.x86_64                               2.8.9-20.el9                                @appstream
[root@hamdimohammad yum.repos.d]# dnf install lynx --downloadonly
Last metadata expiration check: 0:06:19 ago on Mon 17 Feb 2025 05:06:18 PM MSK.
Package lynx-2.8.9-20.el9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@hamdimohammad yum.repos.d]# rpm -e lynx
[root@hamdimohammad yum.repos.d]# dnf install lynx --downloadonly
Last metadata expiration check: 0:06:39 ago on Mon 17 Feb 2025 05:06:18 PM MSK.
Dependencies resolved.
=====
Package                Architecture      Version           Repository        Size
=====
Installing:
lynx                    x86_64            2.8.9-20.el9      appstream         1.5 M
Transaction Summary
=====
Install 1 Package

Total download size: 1.5 M
Installed size: 6.1 M
DNF will only download packages for the transaction.
Is this ok [y/N]: y
Downloading Packages:
lynx-2.8.9-20.el9.x86_64.rpm                                4.3 MB/s | 1.5 MB    00:00
-----
Total                                                    1.6 MB/s | 1.5 MB    00:00
Complete!
The downloaded packages were saved in cache until the next successful transaction.
You can remove cached packages by executing 'dnf clean packages'.
[root@hamdimohammad yum.repos.d]#
```



2. Найдите каталог, в который был помещён пакет после загрузки:

```
find /var/cache/dnf/ -name lynx*
```

3. Перейдите в этот каталог и затем установите rpm-пакет: rpm -Uhv lynx-.rpm

```
[root@hamdimohammad yum.repos.d]#  
[root@hamdimohammad yum.repos.d]# find /var/cache/dnf/ -name lynx*  
/var/cache/dnf/appstream-25485261a76941d3/packages/lynx-2.8.9-20.el9.x86_64.rpm  
[root@hamdimohammad yum.repos.d]# cd /var/cache/dnf/appstream-25485261a76941d3/  
[root@hamdimohammad appstream-25485261a76941d3]# rpm -Uhv  
packages/ repodata/  
[root@hamdimohammad appstream-25485261a76941d3]# cd packages/  
[root@hamdimohammad packages]# rpm -Uhv lynx-2.8.9-20.el9.x86_64.rpm  
Verifying... ##### [100%]  
Preparing... ##### [100%]  
Updating / installing...  
  1:lynx-2.8.9-20.el9 ##### [100%]  
[root@hamdimohammad packages]# which lynx  
/usr/bin/lynx  
[root@hamdimohammad packages]# rpm -qf $(which lynx)  
lynx-2.8.9-20.el9.x86_64  
[root@hamdimohammad packages]#
```

4. Определите расположение исполняемого файла: which lynx

5. Используя rpm, определите по имени файла, к какому пакету принадлежит lynx:

```
rpm -qf $(which lynx)
```

и получите дополнительную информацию о содержимом пакета, введя: rpm -qi lynx

```
lynx-2.8.9-20.el9.x86_64  
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# rpm -qi lynx  
Name       : lynx  
Version    : 2.8.9  
Release    : 20.el9  
Architecture: x86_64  
Install Date: Mon 17 Feb 2025 05:14:33 PM MSK  
Group      : Unspecified  
Size       : 6356615  
License    : GPLv2  
Signature  : RSA/SHA256, Tue 16 Apr 2024 02:13:04 AM MSK, Key ID 702d426d350d275d  
Source RPM : lynx-2.8.9-20.el9.src.rpm  
Build Date : Tue 16 Apr 2024 02:10:31 AM MSK  
Build Host : pb-abd37acc-ala8-4064-a86c-09fcc75626b8-b-x86-64  
Packager   : Rocky Linux Build System (Peridot) <releng@rockylinux.org>  
Vendor     : Rocky Enterprise Software Foundation  
URL        : http://lynx.browser.org/  
Summary    : A text-based Web browser  
Description:  
Lynx is a text-based Web browser. Lynx does not display any images,  
but it does support frames, tables, and most other HTML tags. One  
advantage Lynx has over graphical browsers is speed; Lynx starts and  
exits quickly and swiftly displays web pages.
```

6. Получите список всех файлов в пакете, используя:  
`rpm -ql lynx`

```
exit; query; and directly displays web pages.  
[root@hamdimohammad packages]# rpm -ql lynx  
/etc/lynx-site.cfg  
/etc/lynx.cfg  
/etc/lynx.lss  
/usr/bin/lynx  
/usr/lib/.build-id  
/usr/lib/.build-id/5a  
/usr/lib/.build-id/5a/06d3c4e1a8f4e4a2a1a5305737084bab728b85  
/usr/share/doc/lynx  
/usr/share/doc/lynx/INSTALLATION  
/usr/share/doc/lynx/README  
/usr/share/doc/lynx/docs  
/usr/share/doc/lynx/docs/CHANGES2.3  
/usr/share/doc/lynx/docs/CHANGES2.4  
/usr/share/doc/lynx/docs/CHANGES2.5  
/usr/share/doc/lynx/docs/CHANGES2.6  
/usr/share/doc/lynx/docs/CHANGES2.7  
/usr/share/doc/lynx/docs/CHANGES2.8  
/usr/share/doc/lynx/docs/CRAWL.announce  
/usr/share/doc/lynx/docs/FM.announce  
/usr/share/doc/lynx/docs/IBMPG-charsets.announce  
/usr/share/doc/lynx/docs/README.TRST  
/usr/share/doc/lynx/docs/README.chartrans  
/usr/share/doc/lynx/docs/README.cookies  
/usr/share/doc/lynx/docs/README.defines  
/usr/share/doc/lynx/docs/README.metrics  
/usr/share/doc/lynx/docs/README.options  
/usr/share/doc/lynx/docs/README.release  
/usr/share/doc/lynx/docs/README.rootcerts  
/usr/share/doc/lynx/docs/README.ssl  
/usr/share/doc/lynx/docs/README.sslcerts
```

также выведите перечень файлов с документацией пакета, введя:

```
rpm -qd lynx
```

```
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# rpm -qd lynx  
/usr/share/doc/lynx/INSTALLATION  
/usr/share/doc/lynx/README  
/usr/share/doc/lynx/docs/CHANGES2.3  
/usr/share/doc/lynx/docs/CHANGES2.4  
/usr/share/doc/lynx/docs/CHANGES2.5  
/usr/share/doc/lynx/docs/CHANGES2.6  
/usr/share/doc/lynx/docs/CHANGES2.7  
/usr/share/doc/lynx/docs/CHANGES2.8  
/usr/share/doc/lynx/docs/CRAWL.announce  
/usr/share/doc/lynx/docs/FM.announce  
/usr/share/doc/lynx/docs/IBMPCC-charsets.announce  
/usr/share/doc/lynx/docs/README.TRST  
/usr/share/doc/lynx/docs/README.chartrans  
/usr/share/doc/lynx/docs/README.cookies  
/usr/share/doc/lynx/docs/README.defines  
/usr/share/doc/lynx/docs/README.metrics  
/usr/share/doc/lynx/docs/README.options  
/usr/share/doc/lynx/docs/README.release  
/usr/share/doc/lynx/docs/README.rootcerts  
/usr/share/doc/lynx/docs/README.ssl  
/usr/share/doc/lynx/docs/README.sslcerts  
/usr/share/doc/lynx/docs/SocketSHR.announce  
/usr/share/doc/lynx/docs/TCPWARE.announce  
/usr/share/doc/lynx/docs/VMSWAIS.announce  
/usr/share/doc/lynx/docs/djgpp.key  
/usr/share/doc/lynx/docs/pdcurses.key  
/usr/share/doc/lynx/docs/slang.key  
/usr/share/doc/lynx/docs/win-386.announce  
/usr/share/doc/lynx/lynx.hlp
```

Посмотрите файлы документации, применив команду `man lynx`.

```
LYNX(1)                                General Commands Manual                                LYNX(1)

NAME
    lynx - a general purpose distributed information browser for the World Wide Web

SYNOPSIS
    lynx [options] [optional paths or URLs]

    lynx [options] [path or URL] -get_data
    data
    --

    lynx [options] [path or URL] -post_data
    data
    --

    Use "lynx -help" to display a complete list of current options.

DESCRIPTION
    Lynx is a fully-featured World Wide Web (WWW) client for users running cursor-addressable, character-cell display devices (e.g., vt100 terminals, vt100 emulators running on Windows 95/NT/XP/7/8 or any POSIX platform, or any other "curses-oriented" display). It will display hypertext markup language (HTML) documents containing links to files residing on the local system, as well as files residing on remote systems running Gopher, HTTP, FTP, WAIS, and NNTP servers. Current versions of Lynx run on Unix, VMS, Windows 95/NT/XP/7/8, DOS DJGPP and OS/2.

    Lynx can be used to access information on the World Wide Web, or to build information systems intended primarily for local access. For example, Lynx has been used to build several Campus Wide Information Systems (CWIS). In addition, Lynx can be used to build systems isolated within a single LAN.

OPTIONS
    At start up, Lynx will load any local file or remote URL specified at the command line. For help with URLs, press "?" or "H" while running Lynx. Then follow the link titled, "Help on URLs."

    If more than one local file or remote URL is listed on the command line, Lynx will open only the last interactively. All of the names (local files and remote URLs) are added to the Goto history.

    Lynx uses only long option names. Option names can begin with double dash "--" as well, underscores and dashes can be intermixed in option names (in the reference below, options are shown with one dash "-" before

Manual page lynx(1) line 1 (press h for help or q to quit)
```

7. Выведите на экран перечень и месторасположение конфигурационных файлов пакета:  
`rpm -qc lynx`

8. Выведите на экран расположение и содержание скриптов, выполняемых при установке пакета:

`rpm -q --scripts lynx`

и поясните, для чего предназначены скрипты, если они есть.

```
[root@hamdimohammad packages]# man lynx
[root@hamdimohammad packages]#
[root@hamdimohammad packages]#
[root@hamdimohammad packages]# rpm -qc lynx
/etc/lynx-site.cfg
/etc/lynx.cfg
/etc/lynx.lss
[root@hamdimohammad packages]# rpm -q --scripts lynx
[root@hamdimohammad packages]# rpm -e lynx
[root@hamdimohammad packages]#
```

9. В отдельном терминале под своей учётной записью запустите текстовый браузер lynx, чтобы проверить корректность установки пакета.

10. Вернитесь в терминал с учётной записью root и удалите пакет:  
`rpm -e lynx ls`

Предположим, что требуется из rpm-пакетов установить dnsmasq (DNS-, DHCP- и TFTPсервер).

1. Установите пакет dnsmasq:  
`dnf list dnsmasq`  
`dnf install dnsmasq`  
и определите расположение исполняемого файла:  
`which dnsmasq`

```
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# dnf list dnsmasq  
Last metadata expiration check: 0:11:19 ago on Mon 17 Feb 2025 05:06:18 PM MSK.  
Installed Packages  
dnsmasq.x86_64                                2.85-16.el9_4                                @AppStream  
[root@hamdimohammad packages]# dnf install dnsmasq  
Last metadata expiration check: 0:11:29 ago on Mon 17 Feb 2025 05:06:18 PM MSK.  
Package dnsmasq-2.85-16.el9_4.x86_64 is already installed.  
Dependencies resolved.  
Nothing to do.  
Complete!  
[root@hamdimohammad packages]#
```

2. Определите по имени файла, к какому пакету принадлежит dnsmasq:  
`rpm -qf $(which dnsmasq)`

```
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# dnf list dnsmasq  
Last metadata expiration check: 0:11:19 ago on Mon 17 Feb 2025 05:06:18 PM MSK.  
Installed Packages  
dnsmasq.x86_64                                2.85-16.el9_4                                @AppStream  
[root@hamdimohammad packages]# dnf install dnsmasq  
Last metadata expiration check: 0:11:29 ago on Mon 17 Feb 2025 05:06:18 PM MSK.  
Package dnsmasq-2.85-16.el9_4.x86_64 is already installed.  
Dependencies resolved.  
Nothing to do.  
Complete!  
[root@hamdimohammad packages]# which dnsmasq  
/usr/sbin/dnsmasq  
[root@hamdimohammad packages]#
```

и получите дополнительную информацию о содержимом пакета:

`rpm -qi dnsmasq`

```
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# rpm -qf $(which dnsmasq)  
dnsmasq-2.85-16.el9_4.x86_64  
[root@hamdimohammad packages]# rpm -qi dnsmasq  
Name       : dnsmasq  
Version    : 2.85  
Release    : 16.el9_4  
Architecture: x86_64  
Install Date: Tue 08 Oct 2024 10:20:49 PM MSK  
Group      : Unspecified  
Size       : 718654  
License    : GPLv2 or GPLv3  
Signature  : RSA/SHA256, Wed 24 Apr 2024 08:07:47 AM MSK, Key ID 702d426d350d275d  
Source RPM : dnsmasq-2.85-16.el9_4.src.rpm  
Build Date : Wed 24 Apr 2024 08:06:41 AM MSK  
Build Host : pb-2b53df02-b46e-4235-9c27-8fc7c2aded81-b-x86-64  
Packager   : Rocky Linux Build System (Peridot) <releng@rockylinux.org>  
Vendor     : Rocky Enterprise Software Foundation  
URL        : http://www.thekelleys.org.uk/dnsmasq/  
Summary    : A lightweight DHCP/caching DNS server  
Description :  
Dnsmasq is lightweight, easy to configure DNS forwarder and DHCP server.  
It is designed to provide DNS and, optionally, DHCP, to a small network.  
It can serve the names of local machines which are not in the global  
DNS. The DHCP server integrates with the DNS server and allows machines  
with DHCP-allocated addresses to appear in the DNS with names configured  
either in each host or in a central configuration file. Dnsmasq supports  
static and dynamic DHCP leases and BOOTP for network booting of diskless  
machines.  
[root@hamdimohammad packages]#
```

3. Получите список всех файлов в пакете:

`rpm -ql dnsmasq` а также выведите перечень файлов с документацией пакета:

`rpm -qd dnsmasq`

Посмотрите файлы документации, применив команду

`man dnsmasq`.

```
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# rpm -ql dnsmasq  
/etc/dbus-1/system.d/dnsmasq.conf  
/etc/dnsmasq.conf  
/etc/dnsmasq.d  
/usr/lib/.build-id  
/usr/lib/.build-id/f0  
/usr/lib/.build-id/f0/9a26532944eaa77f523aeea8b091bbb7c5ae67  
/usr/lib/systemd/system/dnsmasq.service  
/usr/lib/sysusers.d/dnsmasq.conf  
/usr/sbin/dnsmasq  
/usr/share/dnsmasq  
/usr/share/dnsmasq/trust-anchors.conf  
/usr/share/doc/dnsmasq  
/usr/share/doc/dnsmasq/CHANGELOG  
/usr/share/doc/dnsmasq/DBus-interface  
/usr/share/doc/dnsmasq/FAQ  
/usr/share/doc/dnsmasq/doc.html  
/usr/share/doc/dnsmasq/setup.html  
/usr/share/licenses/dnsmasq  
/usr/share/licenses/dnsmasq/COPYING  
/usr/share/licenses/dnsmasq/COPYING-v3  
/usr/share/man/man8/dnsmasq.8.gz  
/var/lib/dnsmasq  
[root@hamdimohammad packages]#
```

```
[root@hamdimohammad packages]#  
[root@hamdimohammad packages]# rpm -qd dnsmasq  
/usr/share/doc/dnsmasq/CHANGELOG  
/usr/share/doc/dnsmasq/DBus-interface  
/usr/share/doc/dnsmasq/FAQ  
/usr/share/doc/dnsmasq/doc.html  
/usr/share/doc/dnsmasq/setup.html  
/usr/share/man/man8/dnsmasq.8.gz  
[root@hamdimohammad packages]#
```

```
hmoammad@hamdimohammad:/var/cache/dnf/appstream-25485261a76941d3/packages — man dnsmasq
DNMSAQ(8) System Manager's Manual DNMSAQ(8)

NAME
  dnsmasq - A lightweight DHCP and caching DNS server.

SYNOPSIS
  dnsmasq [OPTION]...

DESCRIPTION
  dnsmasq is a lightweight DNS, TFTP, PXE, router advertisement and DHCP server. It is intended to provide coupled DNS and DHCP service to a LAN.

  Dnsmasq accepts DNS queries and either answers them from a small, local, cache or forwards them to a real, recursive, DNS server. It loads the contents of /etc/hosts so that local hostnames which do not appear in the global DNS can be resolved and also answers DNS queries for DHCP configured hosts. It can also act as the authoritative DNS server for one or more domains, allowing local names to appear in the global DNS. It can be configured to do DNSSEC validation.

  The dnsmasq DHCP server supports static address assignments and multiple networks. It automatically sends a sensible default set of DHCP options, and can be configured to send any desired set of DHCP options, including vendor-encapsulated options. It includes a secure, read-only, TFTP server to allow net/PXE boot of DHCP hosts and also supports BOOTP. The PXE support is full featured, and includes a proxy mode which supplies PXE information to clients whilst DHCP address allocation is done by another server.

  The dnsmasq DHCPv6 server provides the same set of features as the DHCPv4 server, and in addition, it includes router advertisements and a neat feature which allows naming for clients which use DHCPv4 and stateless autoconfiguration only for IPv6 configuration. There is support for doing address allocation (both DHCPv6 and RA) from subnets which are dynamically delegated via DHCPv6 prefix delegation.

  Dnsmasq is coded with small embedded systems in mind. It aims for the smallest possible memory footprint compatible with the supported functions, and allows unneeded functions to be omitted from the compiled binary.

OPTIONS
  Note that in general missing parameters are allowed and switch off functions, for instance "--pid-file" disables writing a PID file. On BSD, unless the GNU getopt library is linked, the long form of the options does not work on the command line; it is still recognised in the configuration file.

  --test Read and syntax check configuration file(s). Exit with code 0 if all is OK, or a non-zero code other-
Manual page dnsmasq(8) line 1 (press h for help or q to quit)
```



4. Выведите на экран перечень и месторасположение конфигурационных файлов пакета:  
`rpm -qc dnsmasq`

5. Выведите на экран расположение и содержание скриптов, выполняемых при установке пакета:

`rpm -q --scripts dnsmasq`

и поясните, для чего предназначены скрипты.

Скрипты предназначены для установки dnsmasq как системного сервиса

6. Вернитесь в терминал с учётной записью root и удалите пакет: `rpm -e dnsmask`

```
[root@hamdimohammad packages]# man dnsmasq
[root@hamdimohammad packages]#
[root@hamdimohammad packages]# rpm -qc dnsmasq
/etc/dbus-1/system.d/dnsmasq.conf
/etc/dnsmasq.conf
[root@hamdimohammad packages]# rpm -q --scripts dnsmasq
preinstall scriptlet (using /bin/sh):
#precreate users so that rpm can install files owned by that user

# generated from dnsmasq-systemd-sysusers.conf
getent group 'dnsmasq' >/dev/null || groupadd -r 'dnsmasq' || :
getent passwd 'dnsmasq' >/dev/null || \
    useradd -r -g 'dnsmasq' -d '/var/lib/dnsmasq' -s '/usr/sbin/nologin' -c 'Dnsmasq DHCP and DNS server' 'dnsmasq' || :
postinstall scriptlet (using /bin/sh):

if [ $1 -eq 1 ] && [ -x "/usr/lib/systemd/systemd-update-helper" ]; then
    # Initial installation
    /usr/lib/systemd/systemd-update-helper install-system-units dnsmasq.service || :
fi
preuninstall scriptlet (using /bin/sh):

if [ $1 -eq 0 ] && [ -x "/usr/lib/systemd/systemd-update-helper" ]; then
    # Package removal, not upgrade
    /usr/lib/systemd/systemd-update-helper remove-system-units dnsmasq.service || :
fi
postuninstall scriptlet (using /bin/sh):

if [ $1 -ge 1 ] && [ -x "/usr/lib/systemd/systemd-update-helper" ]; then
    # Package upgrade, not uninstall
    /usr/lib/systemd/systemd-update-helper mark-restart-system-units dnsmasq.service || :
fi
[root@hamdimohammad packages]# rpm -e dnsmasq
[root@hamdimohammad packages]#
```

## Контрольные вопросы

1. Какая команда позволяет вам искать пакет `rpm`, содержащий файл `useradd`?

Для поиска пакета, содержащего файл `useradd`, используйте команду:  
`dnf provides */useradd`

2. Какие команды вам нужно использовать, чтобы показать имя группы `dnf`, которая содержит инструменты безопасности и показывает, что находится в этой группе?

Найти имя группы с инструментами безопасности: `dnf group list | grep -i security`

Показать содержимое группы: `dnf group info "Security Tools"`

3. Какая команда позволяет вам установить `rpm`, который вы загрузили из Интернета и который не находится в репозиториях?

Чтобы установить RPM-пакет, загруженный из Интернета, используйте: `sudo dnf install /path/to/package.rpm`

4. Вы хотите убедиться, что пакет `rpm`, который вы загрузили, не содержит никакого опасного кода сценария. Какая команда позволяет это сделать?

Для проверки содержимого скриптов RPM-пакета: `rpm -qp --scripts /path/to/package.rpm`

5. Какая команда показывает всю документацию в `rpm`?

Для отображения документации, включенной в пакет RPM: `rpm -qd package_name`

6. Какая команда показывает, какому пакету `rpm` принадлежит файл?

Чтобы узнать, какому пакету принадлежит файл: `rpm -qf /path/to/file`

## Заключение

Получены навыки работы с репозиториями и менеджерами пакетов.