

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ
РОССИЙСКОЙ ФЕДЕРАЦИИ

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Отчет по лабораторной работе №2

Дисциплина: «Развертывание и жизненный цикл программного обеспечения»

Тема: «**Git and CI**»

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Самара 2021

TASK

Шаги

1. Download Gitlab-Bitnami vm image from <https://bitnami.com/stack/gitlab/virtual-machine>
2. Upload <https://github.com/olindata/sample-gitlabci-cpp-project> to your Gitlab server.
3. To unblock SSH <https://docs.bitnami.com/virtual-machine/faq/get-started/enable-ssh/>
4. <https://askubuntu.com/questions/204400/ssh-public-key-no-supported-authentication-methods-available-server-sent-publ>
5. Install GitLab Runner using the official GitLab repositories <https://docs.gitlab.com/runner/install/linux-repository.html>
6. Update /etc/gitlab/gitlab.rb to disable https on gitlab (yes, it is not for production)

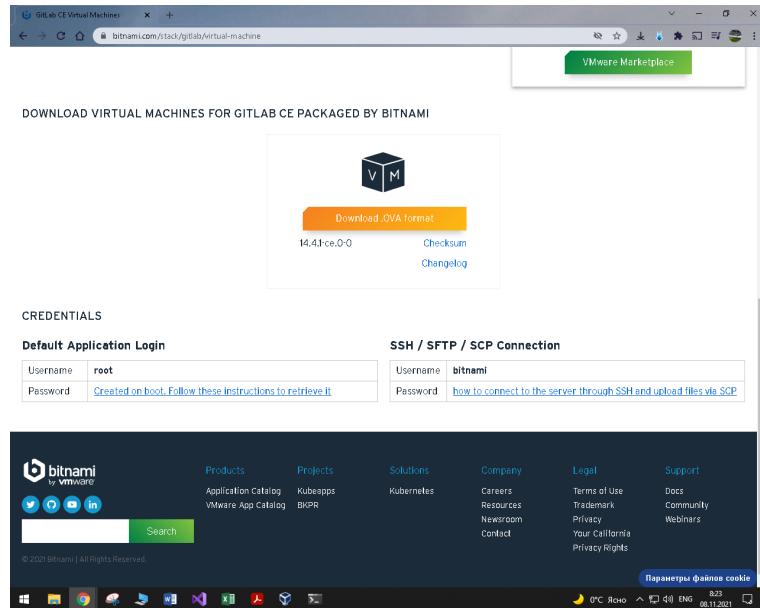
```
# use here your IP, but is must be HTTP
external_url 'http://192.168.88.228'
nginx['redirect_http_to_https'] = false
nginx['ssl_verify_client'] = "off"
```
7. Reconfigure GitLab for the changes to take effect:
\$ sudo gitlab-ctl reconfigure
8. Register runner. Choose shell executor type. Use your ip and registration-token for command below:
\$ sudo gitlab-runner register --url
<http://192.168.88.228/> --registration-token yqjsLYNFrbaC-QhmycE
9. Edit .gitlab-ci.yml to run runner in shell mode (without Docker)

```
job:
script:
g++ helloworld.cpp -o helloworld
```
10. Run Pipeline: CI/CD > Pipelines > Run pipeline

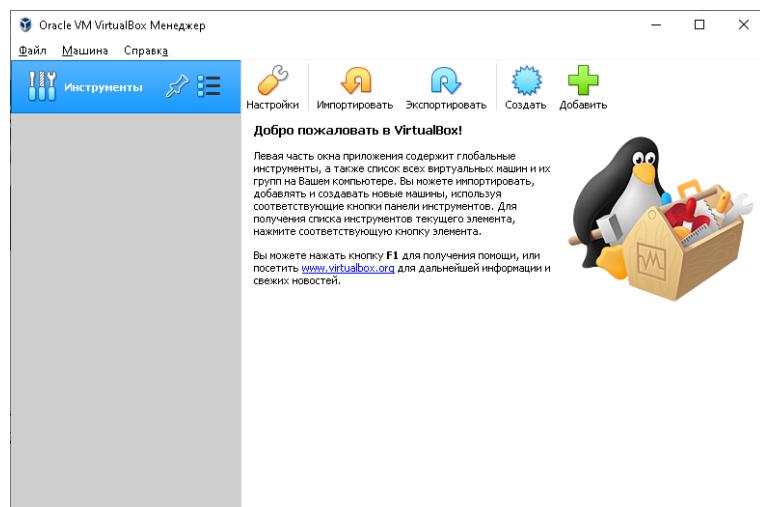
ХОД РАБОТЫ

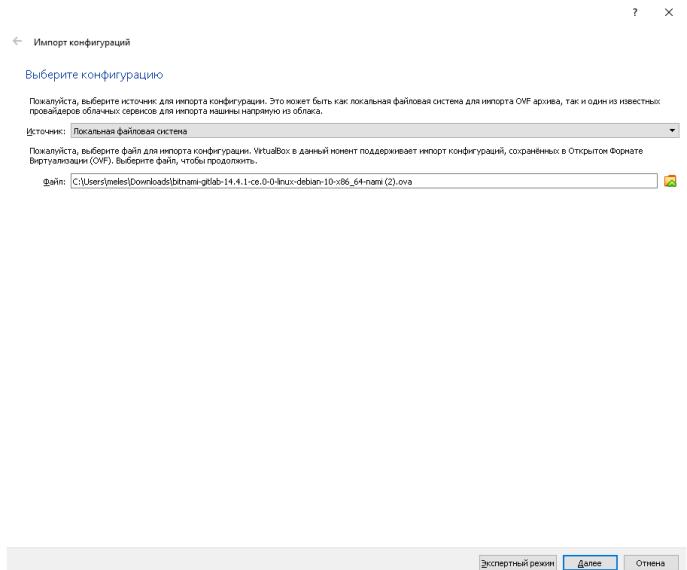
Шаг 1. Загрузка и установка образа виртуальной машины Gitlab-Bitnami

1.1. Загрузим образ виртуальной машины с сайта <https://bitnami.com/stack/gitlab/virtual-machine>.

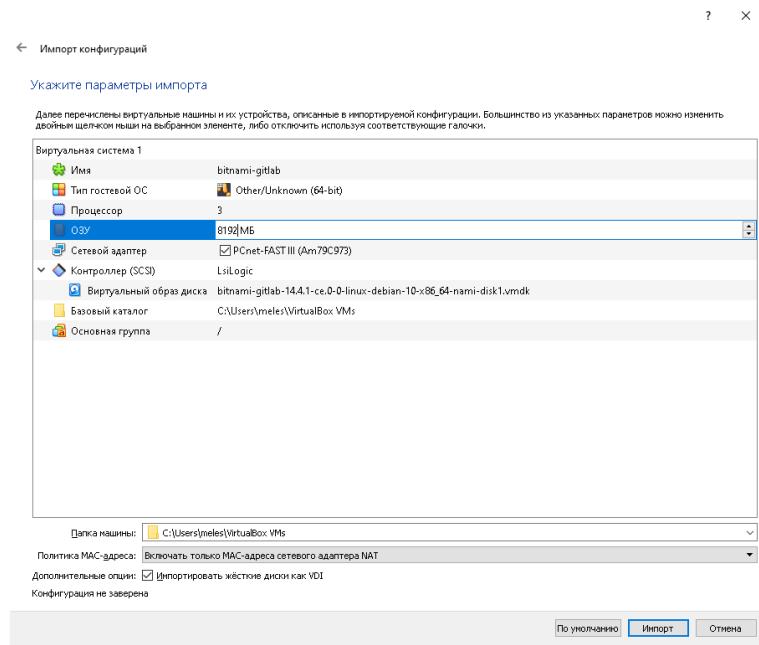


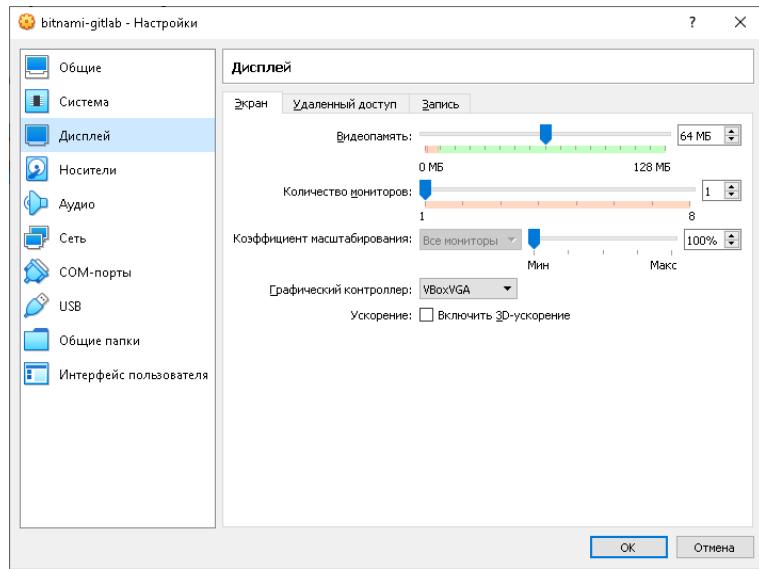
1.2. Импортируем скачанный образ в VirtualBox.



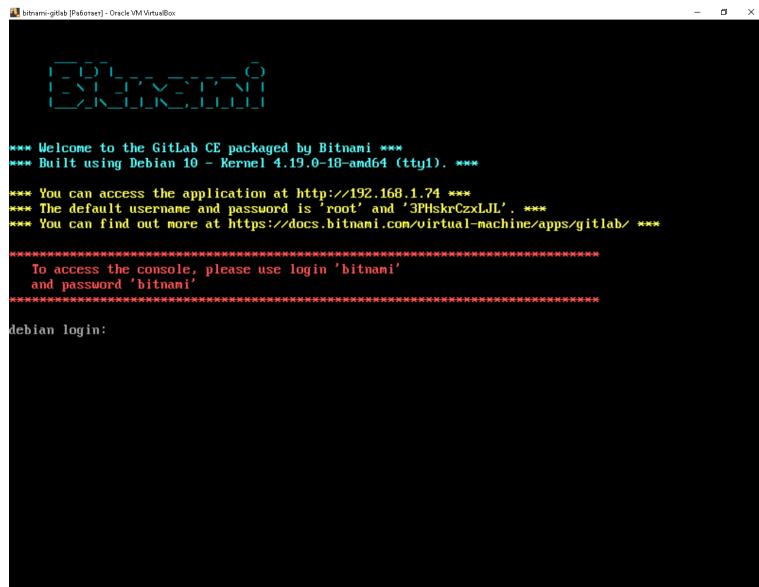


1.3. Настроим виртуальную машину. В качестве процессора выделим ей ровно половину ресурсов ПК, то есть 3 физических ядра процессора и половину объема оперативной памяти – 8192 Мб, а также выделим ей 64 Мб видеопамяти.





1.4 Запустим настроенную виртуальную машину.



На данном этапе будет необходимо скопировать несколько данных, которые нам в будущем очень пригодятся:

Адрес приложения - <https://192.168.1.74>;

Username – root;

Password – 3PHskrCzxLJL;

1.5 Выполним вход на сервер приложения.

По умолчанию логин и пароль для входа на сервер являются bitnami и bitnami.

```

*** Welcome to the GitLab CE packaged by Bitnami ***
*** Built using Debian 10 - Kernel 4.19.0-18-amd64 (tty1). ***

*** You can access the application at http://192.168.1.74 ***
*** The default username and password is 'root' and '3PHskrCzxLJL'. ***
*** You can find out more at https://docs.bitnami.com/virtual-machine/apps/gitlab/ ***

***** To access the console, please use login 'bitnami'
and password 'bitnami' *****

debian login: bitnami
Password:
Last login: Mon Nov  8 04:42:23 UTC 2021 on tty1
Linux debian 4.19.0-18-amd64 #1 SMP Debian 4.19.208-1 (2021-09-29) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

***** Welcome to the GitLab CE packaged by Bitnami 14.4.1-ce.0-0 ***
*** Documentation: https://docs.bitnami.com/virtual-machine/apps/gitlab/ ***
*** https://docs.bitnami.com/virtual-machine/ ***
*** Bitnami Forums: https://community.bitnami.com/ ***
bitnami@debian:~$ 

```

После выполнения входа, необходимо будет подождать продолжительное время для развертывания и инициализации всей машины. А в это время произведем установку пары элементов, которые пригодятся позже.

a) sudo apt-get install mc – установка аналога Total Commander.

```

bitnami@debian:~$ sudo apt-get install mc
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libssl2 mc-data
Suggested packages:
  arj catdvi l texlive-binaries dview djvuibre-bin epub-utils genisoimage gv imagemagick
  libaspell-dev links l w3m l lynx odt2txt poppler-utils python python-boto python-tz xpdf
  l pdf-viewer
The following NEW packages will be installed:
  libssl2 mc mc-data
0 upgraded, 3 newly installed, 0 to remove and 0 not upgraded.
Need to get 2,315 kB of archives.
After this operation, 9,100 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://deb.debian.org/debian buster/main amd64 libssl2 amd64 2.3.2-2 [507 kB]
Get:2 http://deb.debian.org/debian buster/main amd64 mc-data all 3:4.8.22-1 [1,292 kB]
Get:3 http://deb.debian.org/debian buster/main amd64 mc amd64 3:4.8.22-1 [516 kB]
Fetched 2,315 kB in 1s (3,129 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libssl2:amd64.
(Reading database ... 107691 files and directories currently installed..)
Preparing to unpack .../libssl2:amd64_2.3.2-2_amd64.deb ...
Unpacking libssl2:amd64 (2.3.2-2) ...
Selecting previously unselected package mc-data.
Preparing to unpack .../mc-data_3:4.8.22-1_all.deb ...
Unpacking mc-data (3:4.8.22-1) ...
Selecting previously unselected package mc.
Preparing to unpack .../mc_3:4.8.22-1_amd64.deb ...
Unpacking mc (3:4.8.22-1) ...
Setting up libssl2:amd64 (2.3.2-2) ...
Setting up mc-data (3:4.8.22-1) ...
Setting up mc (3:4.8.22-1) ...
Processing triggers for nme-support (3.62) ...
Processing triggers for libc-bin (2.28-10) ...
bitnami@debian:~$ 

```

b) sudo apt-get install nano – установка аналога текстового редактора.

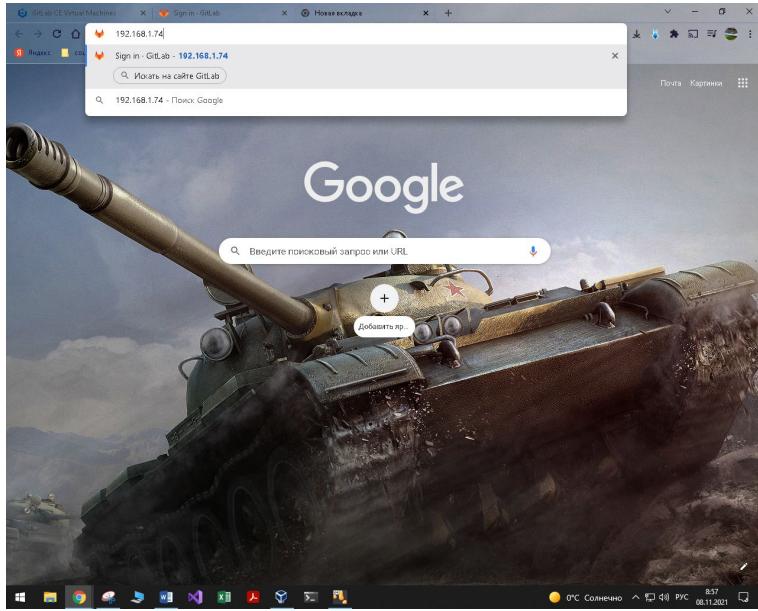
```

bitnami@debian:~$ sudo apt-get install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 544 kB of archives.
After this operation, 2,269 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian buster/main amd64 nano amd64 3.2-3 [544 kB]
Fetched 544 kB in 0s (1,858 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package nano.
(Reading database ... 108093 files and directories currently installed..)
Preparing to unpack .../archives/nano_3.2-3_amd64.deb ...
Unpacking nano (3.2-3) ...
Setting up nano (3.2-3) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
bitnami@debian:~$ 

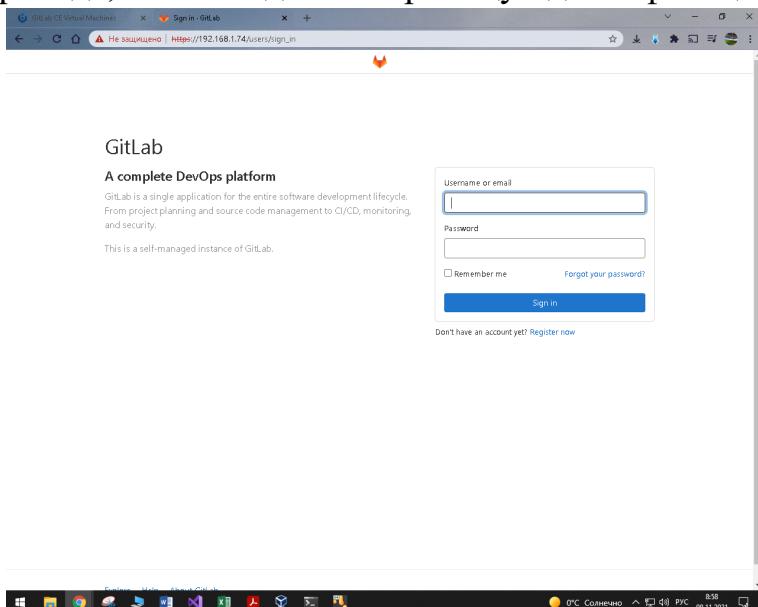
```

1.6 Выполним вход в приложение.

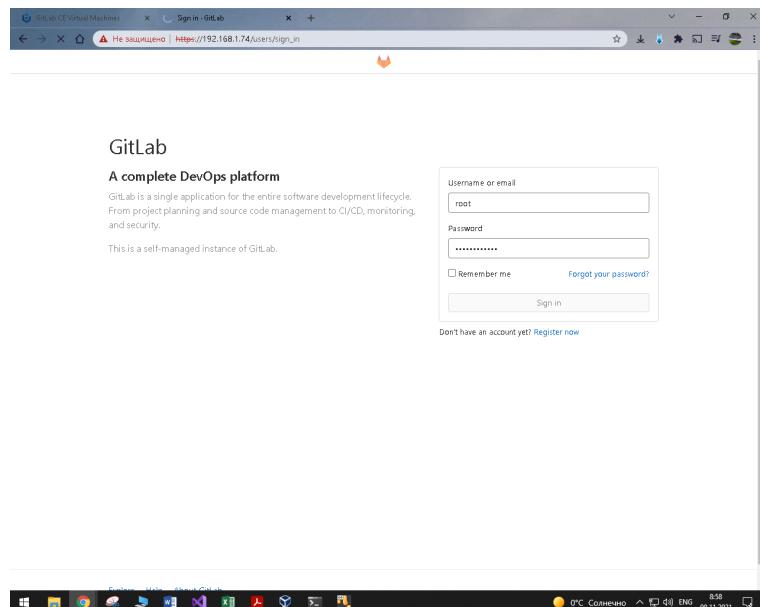
Перейдем в браузер и в поисковой строке наберем адрес приложения, скопированный с виртуальной машины на шаге 1, при выполнении действия (1.4)



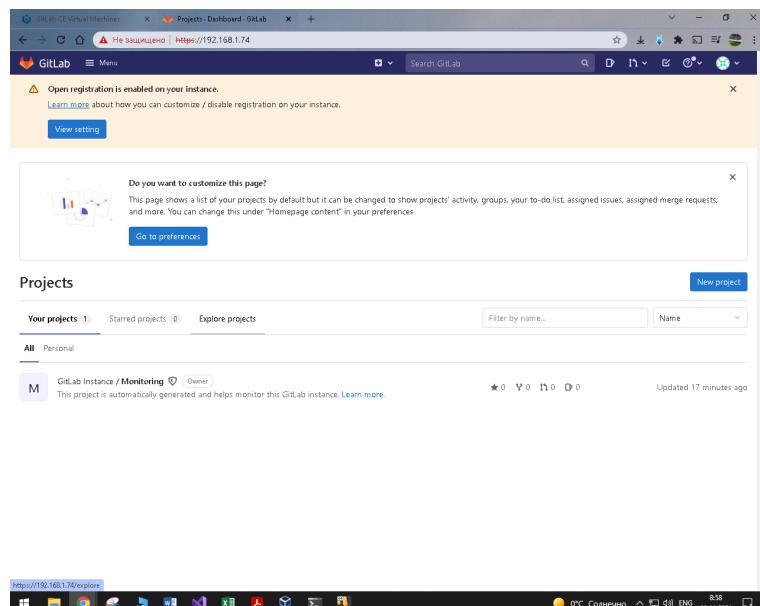
После перехода, нас выведет на страницу идентификации.



Тут необходимо указать логин и пароль, скопированные из виртуальной машины на шаге 1, при выполнении действия 1.4.

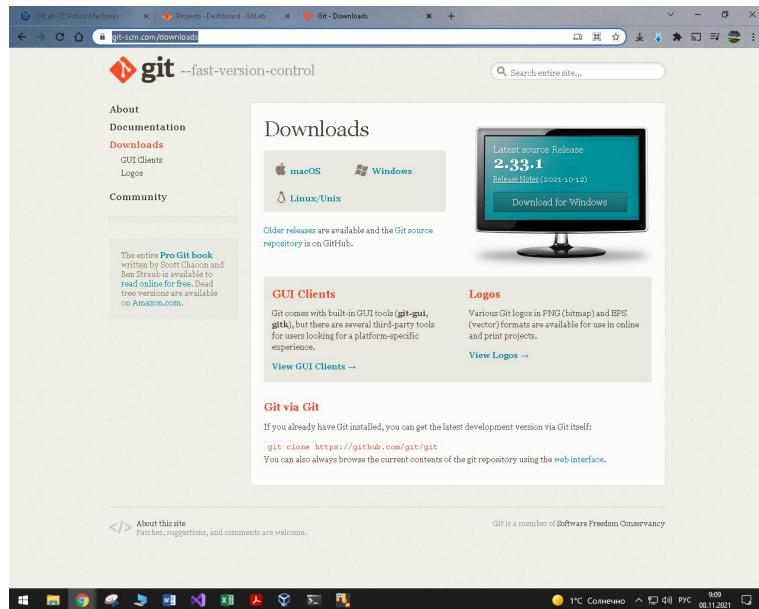


После чего нас выведет на страницу приложения Gitlab, в которой мы и будем работать.

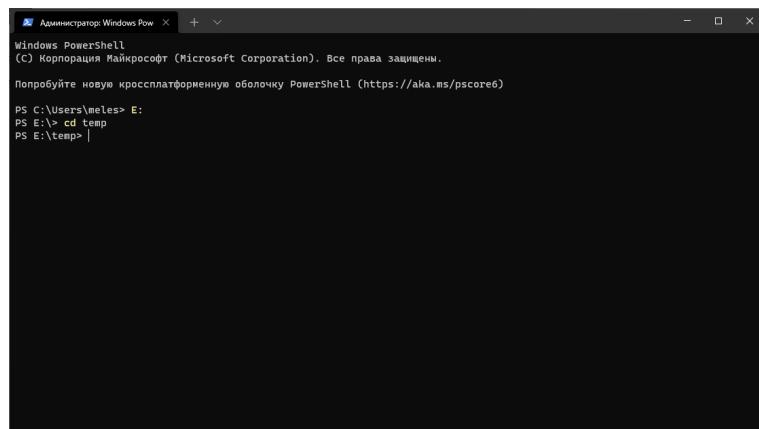


Шаг 2. Загрузка проекта с <https://github.com/olindata/sample-gitlabci-cpp-project> на наш сервер Gitlab.

2.1 Установка git-scm. Git-scm нам потребуется для продолжения работы, установка данной программы позволит работать с GitHub и Gitlab в консоли (Windows Terminal). Скачать git-scm можно по ссылке <https://git-scm.com/downloads>

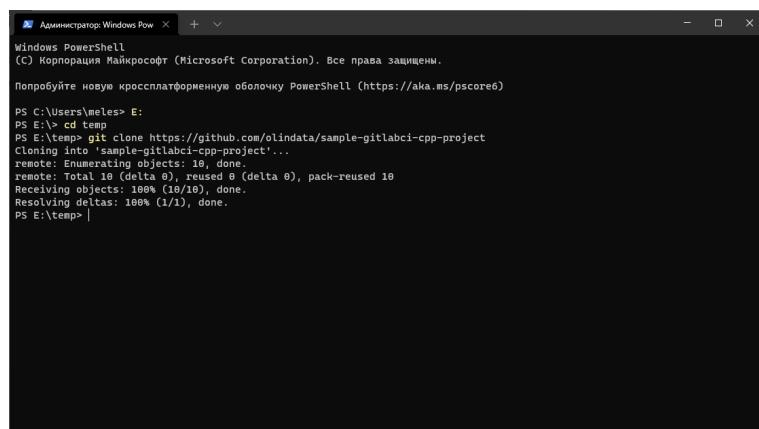


2.2 После установки git-scm, откроем терминал и перейдем в пустую папку в которую будем клонировать репозиторий с сайта <https://github.com/olindata/sample-gitlabci-cpp-project>

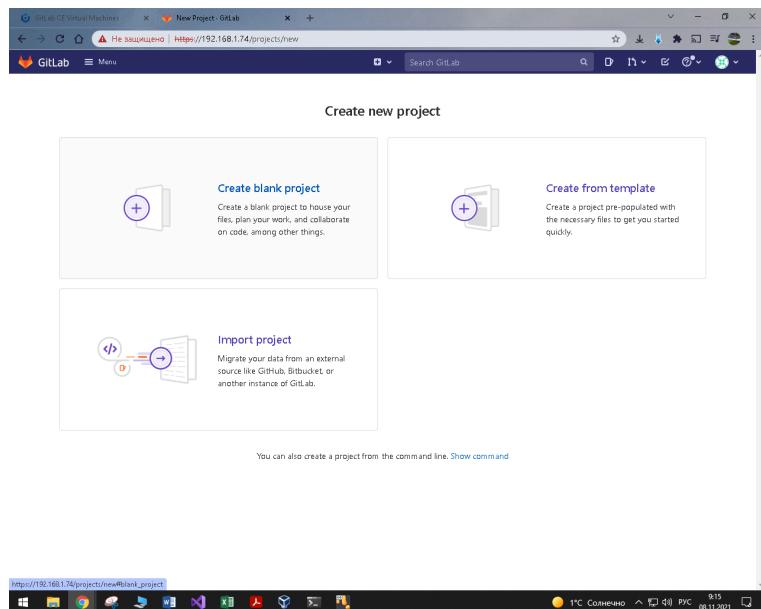


2.3 Клонируем репозиторий в эту папку, при помощи следующей команды:

```
git clone https://github.com/olindata/sample-gitlabci-cpp-project
```



2.4 Создадим пустой репозиторий в приложении на сервере.

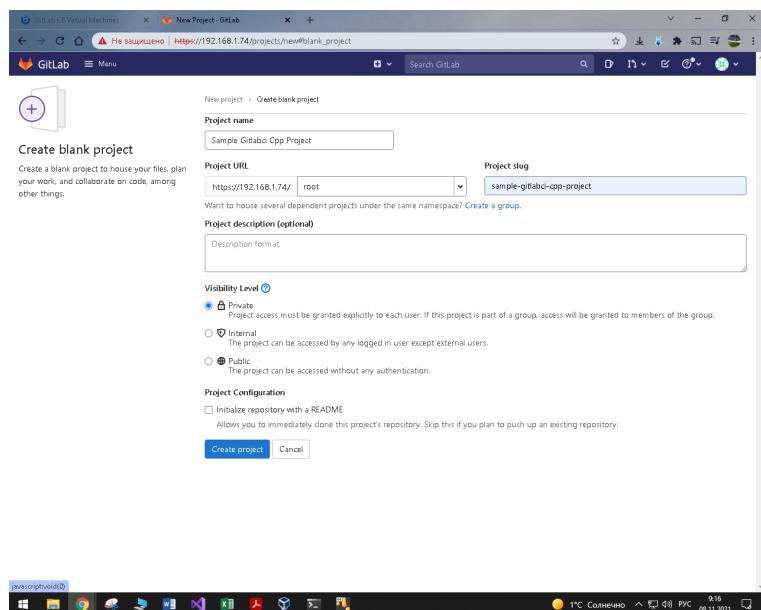


2.4.1 При создании проекта укажем следующие параметры:

Project slug: sample-gitlabci-cpp-project.

Visibility Level: Private.

Project Configuration: Initialize repository with a README (снять галочку, так как он нам не нужен).



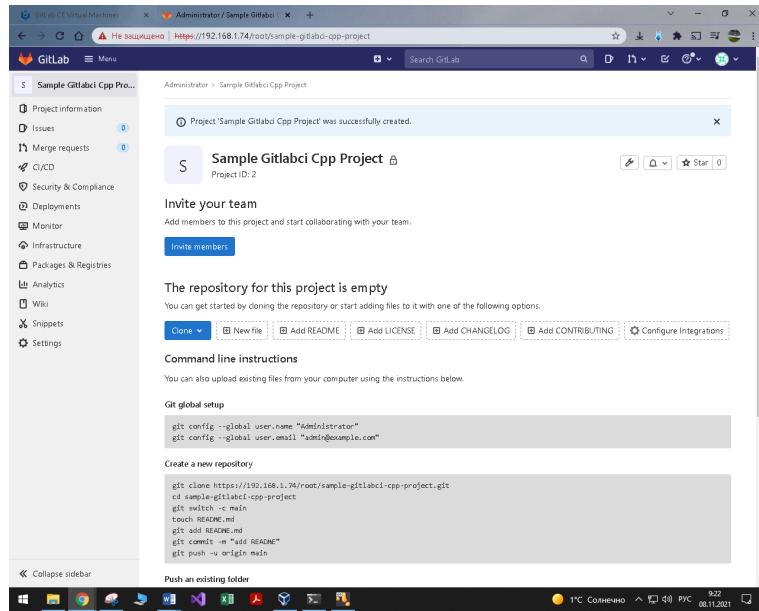
2.4.2 Репозиторий создан. На данном этапе так же выполним пару копирований, поскольку эти данные потребуются далее.

Данные для входа при работе с консолью git.

```
git config --global user.name "Administrator"
```

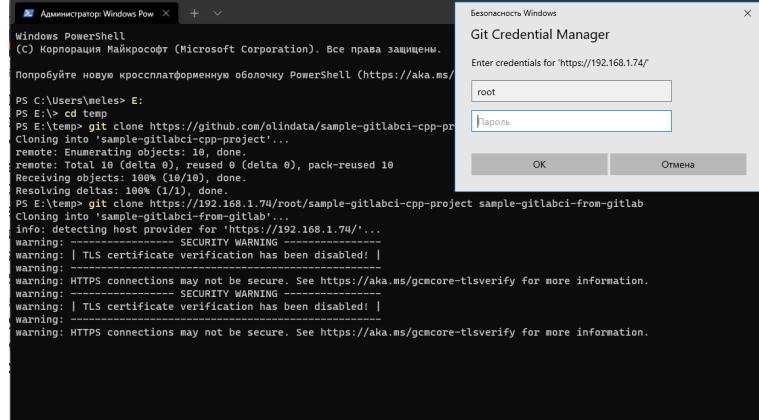
```
git config --global user.email admin@example.com
```

А также регистрационный токен, для регистрации runner:
zuaQ_-QexbSvtHtFwJrr



2.5 Клонируем, только что созданный репозиторий, к себе на ПК. Для этого перейдем в терминал и воспользуемся следующей командой:

```
git clone https://192.168.1.74/root/sample-gitlabci-cpp-project sample-gitlabci-from-gitlab
```



Так же на данном этапе необходимо указать логин и пароль, полученные на шаге 1, при выполнении действия 1.4.

После чего репозиторий будет скопирован на ПК.

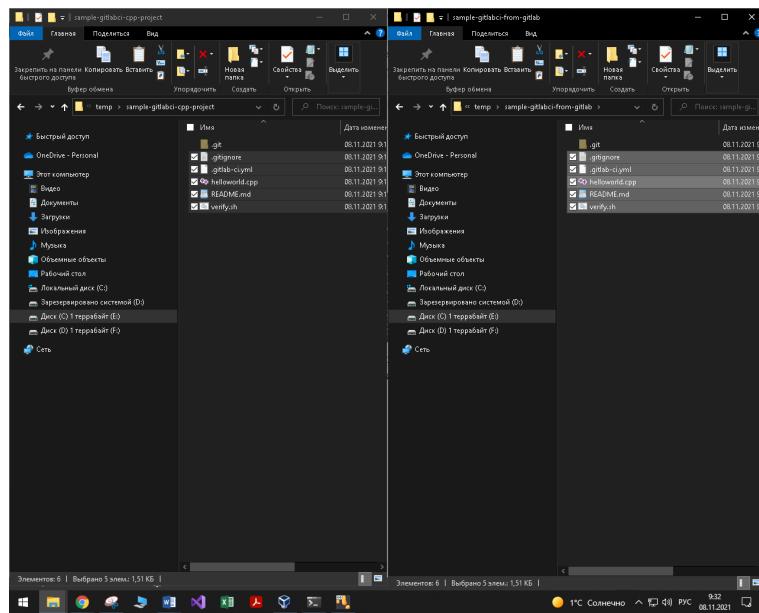
```

Administrator: Windows Pow + -
Попробуйте новую кроссплатформенную оболочку PowerShell (https://aka.ms/pscore6)

PS C:\Users\meles> E:
PS E:\temp> cd ..
PS E:\temp> git clone https://github.com/olindata/sample-gitlabci-cpp-project
Cloning into 'sample-gitlabci-cpp-project'...
remote: Enumerating objects: 10, done.
remote: Total 10 (delta 0), reused 0 (delta 0), pack-reused 10
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (1/1), done.
PS E:\temp> git clone https://192.168.1.74/root/sample-gitlabci-cpp-project sample-gitlabci-from-gitlab
Cloning into 'sample-gitlabci-from-gitlab'...
info: detecting host provider for 'https://192.168.1.74/'...
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: | TLS certificate verification has been disabled!
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: redirecting to https://192.168.1.74/root/sample-gitlabci-cpp-project.git/
warning: You appear to have cloned an empty repository.
PS E:\temp>

```

2.6 Для выгрузки проекта на сервер, нам потребуется скопировать файлы находящиеся в папке репозитория с Github в папку репозитория с Gitlab.



2.7 Перейдем в терминале в папку, в которую только что копировали данные и выполним выгрузку.

```

Administrator: Windows Pow + -
Попробуйте новую кроссплатформенную оболочку PowerShell (https://aka.ms/pscore6)

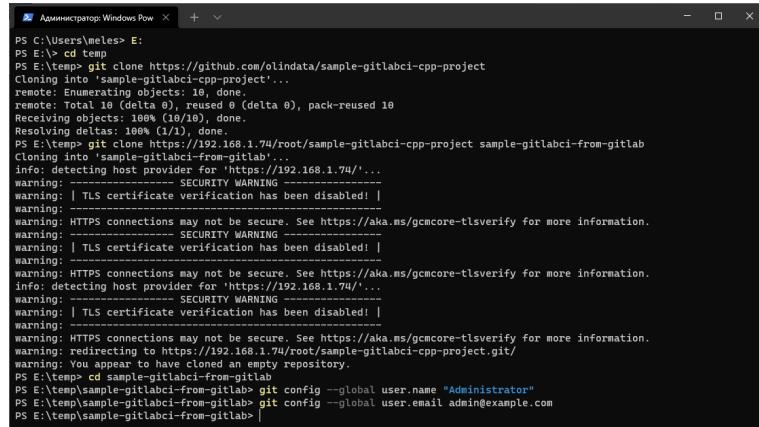
PS C:\Users\meles> E:
PS E:\temp> cd ..
PS E:\temp> git clone https://github.com/olindata/sample-gitlabci-cpp-project
Cloning into 'sample-gitlabci-cpp-project'...
remote: Enumerating objects: 10, done.
remote: Total 10 (delta 0), reused 0 (delta 0), pack-reused 10
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (1/1), done.
PS E:\temp> git clone https://192.168.1.74/root/sample-gitlabci-cpp-project sample-gitlabci-from-gitlab
Cloning into 'sample-gitlabci-from-gitlab'...
info: detecting host provider for 'https://192.168.1.74/'...
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: | TLS certificate verification has been disabled!
warning: -----
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: redirecting to https://192.168.1.74/root/sample-gitlabci-cpp-project.git/
warning: You appear to have cloned an empty repository.
PS E:\temp> cd sample-gitlabci-from-gitlab
PS E:\sample-gitlabci-from-gitlab>

```

2.8 Перед началом выгрузки представимся системе, что это мы при помоши команд скопированных, при выполнении действия 2.4.2:

git config --global user.name "Administrator"

```
git config --global user.email admin@example.com
```



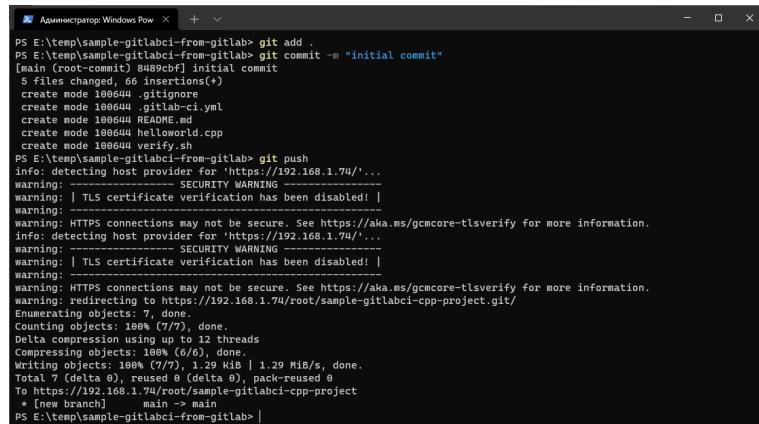
```
PS C:\Users\mleles> E:
PS E:\> cd temp
PS E:\temp> git clone https://github.com/olindata/sample-gitlabci-cpp-project
Cloning into 'sample-gitlabci-cpp-project'...
remote: Enumerating objects: 10, done.
remote: Total 10 (delta 0), reused 0 (delta 0), pack-reused 10
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (1/1), done.
PS E:\temp> git clone https://192.168.1.74/root/sample-gitlabci-cpp-project sample-gitlabci-from-gitlab
Cloning into 'sample-gitlabci-from-gitlab'...
info: detecting host provider for 'https://192.168.1.74/'...
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: |
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: |
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: |
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: redirecting to https://192.168.1.74/root/sample-gitlabci-cpp-project.git/
warning: You appear to have cloned an empty repository.
PS E:\temp> cd sample-gitlabci-from-gitlab
PS E:\temp\sample-gitlabci-from-gitlab> git config --global user.name "Administrator"
PS E:\temp\sample-gitlabci-from-gitlab> git config --global user.email admin@example.com
PS E:\temp\sample-gitlabci-from-gitlab>
```

2.9 Выполним выгрузку на сервер. Для этого необходимо последовательно выполнить следующие команды:

```
git add .
```

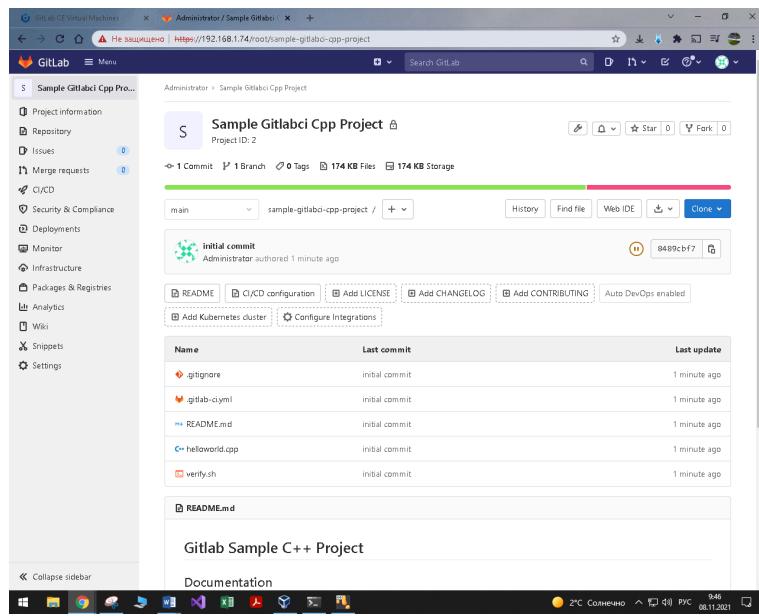
```
git commit -m "initial commit"
```

```
git push
```



```
PS E:\temp\sample-gitlabci-from-gitlab> git add .
PS E:\temp\sample-gitlabci-from-gitlab> git commit -m "initial commit"
[main (root-commit) 84899bf] initial commit
 5 files changed, 66 insertions(+)
   create mode 100644 .gitignore
   create mode 100644 .gitlab-ci.yml
   create mode 100644 README.md
   create mode 100644 helloworld.cpp
   create mode 100644 libhello_verify.h
PS E:\temp\sample-gitlabci-from-gitlab> git push
info: detecting host provider for 'https://192.168.1.74/'...
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: |
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
info: detecting host provider for 'https://192.168.1.74/'...
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: |
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: ----- SECURITY WARNING -----
warning: | TLS certificate verification has been disabled!
warning: |
warning: HTTPS connections may not be secure. See https://aka.ms/gcmcore-tlsverify for more information.
warning: redirecting to https://192.168.1.74/root/sample-gitlabci-cpp-project.git/
warning: You appear to have cloned an empty repository.
PS E:\temp\sample-gitlabci-from-gitlab> git push
Counting objects: 7, done.
Delta compression using up to 12 threads
Compressing objects: 100% (6/6), done.
Writing objects: 100% (7/7), 1.29 KiB | 1.29 MiB, done.
Total 7 (delta 0), reused 0 (delta 0), pack-reused 0
To https://192.168.1.74/root/sample-gitlabci-cpp-project
 * [new branch]      main -> main
PS E:\temp\sample-gitlabci-from-gitlab>
```

2.10 Проверим выгрузку файлов на сервер.



Шаг 3. Разблокируем SSH.

3.1 На сайте <https://docs.bitnami.com/virtual-machine/faq/get-started/enable-ssh/> представлены команды для этого:

```
sudo rm -f /etc/ssh/sshd_not_to_be_run
```

```
bitnami@bitnami-OptiPlex-5090: ~ [root] - Oracle VM VirtualBox
(bitnami@bitnami-OptiPlex-5090: ~ [root] - Oracle VM VirtualBox)
Reading database ... 107691 files and directories currently installed.
Preparing to unpack .../libssl1.0.2-1_amd64.deb ...
Unpacking libssl1.0.2-1:amd64 (1.0.2-1) ...
Selecting previously unselected package libcrypto1.0.2-1:amd64.
Preparing to unpack .../libcrypto1.0.2-1_amd64.deb ...
Unpacking libcrypto1.0.2-1:amd64 (1.0.2-1) ...
Selecting previously unselected package libcurl3-openssl-dev.
Preparing to unpack .../libcurl3-openssl-dev_7.54.0-1_amd64.deb ...
Unpacking libcurl3-openssl-dev:amd64 (7.54.0-1) ...
Selecting previously unselected package libcurl3.
Preparing to unpack .../libcurl3_7.54.0-1_amd64.deb ...
Unpacking libcurl3:amd64 (7.54.0-1) ...
Setting up libcurl3-openssl-dev:amd64 (7.54.0-1) ...
Setting up libcurl3:amd64 (7.54.0-1) ...
Processing triggers for libc-bin (2.28-10) ...
bitnami@bitnami: ~ $ sudo apt-get install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 544 kB of archives.
After this operation, 2,269 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian buster/main libcurl3 amd64 7.54.0-1 [544 kB]
Fetched 544 kB in 0s (1,858 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package nano.
(Reading database ... 108093 files and directories currently installed.)
Preparing to unpack .../archives/nano_7.54.0-1_amd64.deb ...
Unpacking nano (7.54.0-1) ...
Setting up nano (7.54.0-1) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
bitnami@bitnami: ~ $ sudo rm -f /etc/ssh/sshd_not_to_be_run
bitnami@bitnami: ~ $
```

```
sudo systemctl enable ssh
```

```
bitnami-github [Paterner] - Oracle VM VirtualBox
Selecting previously unselected package mc.
Preparing to unpack .../mc_3:3a4.8.22-1_amd64.deb ...
Unpacking mc (3:4.8.22-1) ...
Setting up libssl2.0-0 (2.3.2-2) ...
Setting up mc-data (3:4.8.22-1) ...
Setting up mc (3:4.8.22-1) ...
Processing triggers for mime-support (3.62) ...
Processing triggers for libc-bin (2.28-10) ...
bitnami@debian:~$ sudo apt-get install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 544 kB of archives.
After this operation, 2,269 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian buster/main amd64 nano amd64 3.2-3 [544 kB]
Fetched 544 kB in 0s (1,958 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package nano.
(Reading database ... 108093 files and directories currently installed.)
Preparing to unpack .../archives/nano_3.2-3_amd64.deb ...
Unpacking nano (3.2-3) ...
Setting up nano (3.2-3) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
bitnami@debian:~$ sudo rm -f /etc/ssh/sshd_not_to_be_run
bitnami@debian:~$ sudo systemctl enable ssh
Synchronizing state of ssh.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable ssh
Created symlink /etc/systemd/system/sshd.service → /lib/systemd/system/sshd.service.
Created symlink /etc/systemd/system/multi-user.target.wants/sshd.service → /lib/systemd/system/sshd.service.
bitnami@debian:~$ _
```

sudo systemctl start ssh

```
bitnami-github [Paterner] - Oracle VM VirtualBox
Preparing to unpack .../mc_3:3a4.8.22-1_amd64.deb ...
Unpacking mc (3:4.8.22-1) ...
Setting up libssl2.0-0 (2.3.2-2) ...
Setting up mc-data (3:4.8.22-1) ...
Setting up mc (3:4.8.22-1) ...
Processing triggers for mime-support (3.62) ...
Processing triggers for libc-bin (2.28-10) ...
bitnami@debian:~$ sudo apt-get install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 544 kB of archives.
After this operation, 2,269 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian buster/main amd64 nano amd64 3.2-3 [544 kB]
Fetched 544 kB in 0s (1,958 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package nano.
(Reading database ... 108093 files and directories currently installed.)
Preparing to unpack .../archives/nano_3.2-3_amd64.deb ...
Unpacking nano (3.2-3) ...
Setting up nano (3.2-3) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
bitnami@debian:~$ sudo rm -f /etc/ssh/sshd_not_to_be_run
bitnami@debian:~$ sudo systemctl enable ssh
Synchronizing state of ssh.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable ssh
Created symlink /etc/systemd/system/sshd.service → /lib/systemd/system/sshd.service.
Created symlink /etc/systemd/system/multi-user.target.wants/sshd.service → /lib/systemd/system/sshd.service.
bitnami@debian:~$ sudo systemctl start ssh
bitnami@debian:~$ _
```

Шаг 4. SSH Public Key

4.1 Редактировать файл /etc/ssh/sshd_config.

```

bitnami@elab [Pformer] - Oracle VM VirtualBox
Unpacking mc (3:4.8.22-1) ...
Setting up libssl1.0-0:amd64 (2.3.2-2) ...
Setting up mc-data (3:4.8.22-1) ...
Setting up mc (3:4.8.22-1) ...
Processing triggers for mime-support (3.62) ...
Processing triggers for libc-bin (2.28-10) ...
bitnami@elab:~$ sudo apt-get install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 544 kB of archives.
After this operation, 2,269 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian buster/main amd64 nano amd64 3.2-3 (544 kB)
Fetched 544 kB in 0s (1,858 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package nano.
(Reading database ... 108093 files and directories currently installed.)
Preparing to unpack .../archives/nano_3.2-3_amd64.deb ...
Unpacking nano (3.2-3) ...
Setting up nano (3.2-3) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
bitnami@elab:~$ sudo rm -f /etc/ssh/sshd_not_to_be_run
bitnami@elab:~$ sudo systemctl enable ssh
Synchronizing state of ssh.service with SysV service script with /lib/systemd/systemctl-sysv-install.
Executing : /lib/systemd/systemd-sysv-install enable ssh
Created symlink /etc/systemd/system/sshd.service → /lib/systemd/system/sshd.service.
Created symlink /etc/systemd/system/multi-user.target.wants/sshd.service → /lib/systemd/system/sshd.service.
bitnami@elab:~$ sudo systemctl start ssh
bitnami@elab:~$ sudo nano /etc/ssh/sshd_config

```

4.2 Изменить PasswordAuthentication и ChallengeResponseAuthentication на yes.

```

bitnami@elab [Pformer] - Oracle VM VirtualBox
GNU nano 3.2                               /etc/ssh/sshd_config                         Modified
#Compression delayed
#ClientAliveCountMax 3
#UseDNS no
#PidFile /var/run/sshd.pid
#MaxStartups 10:30:100
#PermitTunnel no
#ChrootDirectory none
#VersionAddendum none

# no default banner path
#Banner none

# Allow client to pass locale environment variables
AcceptEnv LANG LC_*

# override default of no subsystems
Subsystem sftp    /usr/lib/openssh/sftp-server

# Example of overriding settings on a per-user basis
#Match User anonymous
#    X11Forwarding no
#    AllowTcpForwarding no
#    PermitTTY no
#    ForceCommand exec /usr/local/bin/secure

ClientAliveInterval 180
Ciphers aes128-ctr,aes192-ctr,aes256-ctr,aes128-gcm@openssh.com,aes256-gcm@openssh.com,chacha20-poly1305@openssh.com
PasswordAuthentication yes

# Get Help   W Write Out  Where Is  Cut Text  Justify  Cur Pos  Undo
X Exit     R Read File  Replace  Uncut Text  To Spell  Go To Line  Redo

```

```

bitnami@elab [Pformer] - Oracle VM VirtualBox
GNU nano 3.2                               /etc/ssh/sshd_config                         Modified
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
#PasswordAuthentication yes
#PermitEmptyPasswords no

# Change to yes to enable challenge-response passwords (beware issues with
# some PAM modules and threads)
ChallengeResponseAuthentication yes

# Kerberos options
#KerberosAuthentication no
#KerberosOrLocalPasswd yes
#KerberosTicketCleanup yes
#KerberosGetTGTFromToken no

# GSSAPI options
#GSSAPIAuthentication no
#GSSAPICleanupCredentials yes
#GSSAPIStrictAcceptorCheck yes
#GSSAPIKeyExchange no

# Set this to 'yes' to enable PAM authentication, account processing,
# and session processing. If this is enabled, PAM authentication will
# be allowed through the ChallengeResponseAuthentication and
# PasswordAuthentication. Depending on your PAM configuration,
# PAM authentication via ChallengeResponseAuthentication may bypass
# the setting of "PermitRootLogin without-password".

```

4.3 Перезапуск ssh-сервиса командой (на выбор)

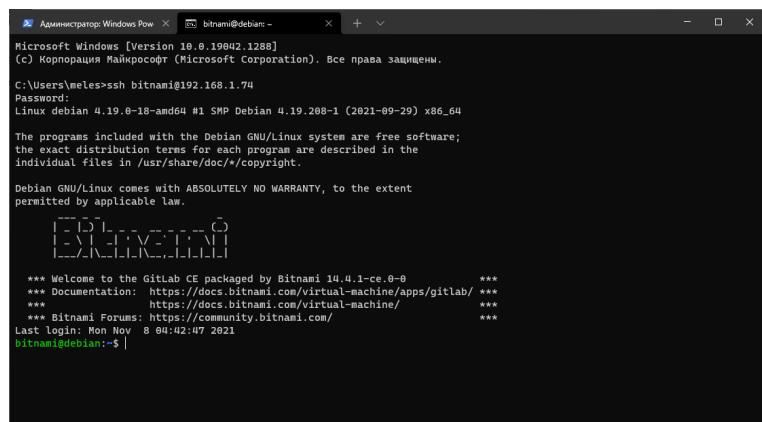
```
sudo /etc/init.d/ssh restart
```

```
sudo service sshd restart
```

```
[bitnami@gb64 ~]$ sudo /etc/init.d/ssh restart
[ ok ] Restarting ssh (via systemctl): ssh.service.
bitnami@gb64 ~$
```

Шаг 5. Установка GitLab Runner.

5.1 Перейдем в терминал и выполним подключение к виртуальной машине через SSH.



5.2 Для установки GitLab Runner добавим официальный репозиторий GitLab по ссылке: `curl -L "https://packages.gitlab.com/install/repositories/runner/gitlab-runner/script.deb.sh" | sudo bash`

```

Administrator: Windows Pow bitnami@debian: ~
[...]
*** Welcome to the GitLab CE packaged by Bitnami 14.4.1-ce.0-0 ***
*** Documentation: https://docs.bitnami.com/virtual-machine/apps/gitlab/ ***
*** https://docs.bitnami.com/virtual-machine/
*** Bitnami Forums: https://community.bitnami.com/ ***
Last login: Mon Nov  8 04:02:47 2021
bitnami@debian:~$ curl -L "https://packages.gitlab.com/install/repositories/runner/gitlab-runner/script.deb.sh" | sudo bash
Total Received % Xferd Average Speed Time Time Current
          Dload Upload Total Spent Left Speed
100 5945 100 5945 0 0 17383 0 --:--:-- --:--:-- --:--:-- 17383
Detected operating system as debian/buster.
Checking for curl...
Detected curl...
Checking for gpg...
Detected gpg...
Running apt-get update... done.
Installing debian-archive-keyring which is needed for installing
apt-transport-https on many Debian systems.
Installing apt-transport-https... done.
Installing /etc/apt/sources.list.d/runner_gitlab-runner.list...done.
Importing packagecloud gpg key... done.
Running apt-get update... done.

The repository is setup! You can now install packages.
bitnami@debian:~$ 

```

5.3 Установка GitLab Runner

```

Administrator: Windows Pow bitnami@debian: ~
[...]
Running apt-get update... done.
Installing debian-archive-keyring which is needed for installing
apt-transport-https on many Debian systems.
Installing apt-transport-https... done.
Installing /etc/apt/sources.list.d/runner_gitlab-runner.list...done.
Importing packagecloud gpg key... done.
Running apt-get update... done.

The repository is setup! You can now install packages.
bitnami@debian:~$ sudo apt-get install gitlab-runner
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  git-man libcurl3-gnutls liberror-perl
Suggested packages:
  git-daemon-run | git-daemon-sysvinit git-doc git-el git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
  docker-engine
The following NEW packages will be installed:
  git-man gitlab-runner libcurl3-gnutls liberror-perl
0 upgraded, 2 newly installed, 0 to remove and 11 not upgraded.
Need to get 461 kB of archives.
After this operation, 532 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://deb.debian.org/debian/buster/main amd64 libcurl3-gnutls amd64 7.64.0-4+deb10u2 [330 kB]
Get:2 http://deb.debian.org/debian/buster/main amd64 liberror-perl all 0.17027-2 [30.9 kB]
Get:3 http://deb.debian.org/debian/buster/main amd64 git-man all 1:2.20.1-2+deb10u3 [1,620 kB]
Get:5 http://deb.debian.org/debian/buster/main amd64 git amd64 1:2.20.1-2+deb10u3 [5,633 kB]
Get:7 http://packagecloud.io/gcutter/gcutter/runner/debian/buster/main amd64 gitlab-runner amd64 14.4.0 [453 kB]
Fetched 461 kB in 4s (9,916 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libcurl3-gnutls:amd64.
(Reading database ... 108395 files and directories currently installed.)
Preparing to unpack .../libcurl3-gnutls_7.64.0-4+deb10u2_amd64.deb ...
Unpacking libcurl3-gnutls:amd64 (7.64.0-4+deb10u2) ...
Selecting previously unselected package liberror-perl.
Preparing to unpack .../liberror-perl_0.17027-2_all.deb ...
Unpacking liberror-perl (0.17027-2) ...
Selecting previously unselected package git-man.
Preparing to unpack .../git-man_1x3a2.20.1-2+deb10u3_all.deb ...
Unpacking git-man (1:2.20.1-2+deb10u3) ...
Selecting previously unselected package gitlab-runner.
Preparing to unpack .../gitlab-runner_14.4.0_amd64.deb ...
Unpacking gitlab-runner (14.4.0) ...
| 

```

Шаг 6 Изменим /etc/gitlab/gitlab.rb для дезактивации https на gitlab

sudo nano /etc/gitlab/gitlab.rb

```

Administrator: Windows Pow bitnami@debian: ~
[...]
git-man libcurl3-gnutls liberror-perl
Suggested packages:
  git-daemon-run | git-daemon-sysvinit git-doc git-el git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
  docker-engine
The following NEW packages will be installed:
  git-man gitlab-runner libcurl3-gnutls liberror-perl
0 upgraded, 2 newly installed, 0 to remove and 11 not upgraded.
Need to get 461 kB of archives.
After this operation, 532 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://deb.debian.org/debian/buster/main amd64 libcurl3-gnutls amd64 7.64.0-4+deb10u2 [330 kB]
Get:2 http://deb.debian.org/debian/buster/main amd64 liberror-perl all 0.17027-2 [30.9 kB]
Get:3 http://deb.debian.org/debian/buster/main amd64 git-man all 1:2.20.1-2+deb10u3 [1,620 kB]
Get:5 http://deb.debian.org/debian/buster/main amd64 git amd64 1:2.20.1-2+deb10u3 [5,633 kB]
Get:7 http://packagecloud.io/gcutter/gcutter/runner/debian/buster/main amd64 gitlab-runner amd64 14.4.0 [453 kB]
Fetched 461 kB in 4s (9,916 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package libcurl3-gnutls:amd64.
(Reading database ... 108395 files and directories currently installed.)
Preparing to unpack .../libcurl3-gnutls_7.64.0-4+deb10u2_amd64.deb ...
Unpacking libcurl3-gnutls:amd64 (7.64.0-4+deb10u2) ...
Selecting previously unselected package liberror-perl.
Preparing to unpack .../liberror-perl_0.17027-2_all.deb ...
Unpacking liberror-perl (0.17027-2) ...
Selecting previously unselected package git-man.
Preparing to unpack .../git-man_1x3a2.20.1-2+deb10u3_all.deb ...
Unpacking git-man (1:2.20.1-2+deb10u3) ...
Selecting previously unselected package git.
Preparing to unpack .../git_1x3a2.20.1-2+deb10u3_amd64.deb ...
Unpacking git (1:2.20.1-2+deb10u3) ...
Selecting previously unselected package gitlab-runner.
Preparing to unpack .../gitlab-runner_14.4.0_amd64.deb ...
Unpacking gitlab-runner (14.4.0) ...
Setting up libcurl3-gnutls:amd64 (7.64.0-4+deb10u2) ...
Setting up liberror-perl (0.17027-2) ...
Setting up git-man (1:2.20.1-2+deb10u3) ...
Setting up git (1:2.20.1-2+deb10u3) ...
Setting up gitlab-runner (14.4.0) ...
GitLab Runner: creating gitlab-runner...
Home directory skeleton not used
Running gitlab-runner: arch=amd64 os=linux pid=15302 revision=4b9e985a version=14.4.0
gitlab-runner: the service is not installed
Runtime platform arch=amd64 os=linux pid=15313 revision=4b9e985a version=14.4.0
gitlab-ci-multi-runner: the service is not installed
Runtime platform arch=amd64 os=linux pid=15344 revision=4b9e985a version=14.4.0
Runtime platform arch=amd64 os=linux pid=15389 revision=4b9e985a version=14.4.0
INFO: Docker installation not found, skipping clear_docker_cache
Processing triggers for libc-bin (2.28-10) ...
bitnami@debian:~$ sudo nano /etc/gitlab/gitlab.rb

```

external_url 'http://192.168.1.74'

```

## GitLab configuration settings
## This file is generated during initial installation and **is not** modified
## by GitLab itself.
## Check out the latest version of this file to know about the different
## settings that can be configured, when they were introduced and why:
## https://gitlab.com/gitlab-org/omnibus-gitlab/master/files/gitlab-config-template/gitlab.rb.template
## Locally, the complete template corresponding to the installed version can be found at:
## /opt/gitlab/etc/gitlab.rb.template

## You can run 'gitlab-ctl diff-config' to compare the contents of the current gitlab.rb with
## the gitlab.rb.template from the currently running version.

## You can run 'gitlab-ctl show-config' to display the configuration that will be generated by
## running 'gitlab-ctl reconfigure'

## In general, the values specified here should reflect what the default value of the attribute will be.
## There are instances where this behavior is not possible or desired. For example, when providing passwords,
## or connecting to third party services.
## In those instances, we endeavour to provide an example configuration.

## GitLab URL.
## URL on which GitLab will be reachable.
## For more details on configuring external_url see:
## https://docs.gitlab.com/omnibus/settings/configuration.html#configuring-the-external-url-for-gitlab
##
## Note: During installations/upgrades, the value of the environment variable
## EXTERNAL_URL will be used to populate/replace this value
## On AWS EC2 instances, we also attempt to fetch the public hostname/IP
## address from AWS. For more details, see:
## https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/instancedata-data-retrieval.html
## external_url 'http://192.168.1.70'

## Roles for multi-instance GitLab
## The default is to have no roles enabled, which results in GitLab running as an all-in-one instance.
## Options:
##   redis_sentinel_role redis_master_role redis_replica_role geo_primary_role geo_secondary_role
##   roles_consul_role consul_role application_role monitoring_role
## For more details on each role, see:
## https://docs.gitlab.com/omnibus/roles/README.html#roles
##!
## roles ['redis_sentinel_role', 'redis_master_role']

## Legend
[ Wrote: 2854 lines ]
G Get Help W Write Out W? Where Is M Cut Text J Justify C Cur Pos U Undo A Mark Text
R Exit R Read File R\ Replace U Uncut Text T To Spell G Go To Line U- Redo C-C Copy Text

```

`nginx['redirect_http_to_https'] = false`

```

##! Docs: https://docs.gitlab.com/omnibus/settings/nginx.html#using-a-non-bundled-web-server
#####
## When bundled nginx is disabled we need to add the external webserver user to
## the GitLab webserver group.
## web_server['external_users'] = []
## web_server['username'] = 'gitlab-www'
## web_server['group'] = 'gitlab-www'
## web_server['uid'] = nil
## web_server['gid'] = nil
## web_server['shell'] = '/bin/false'
## web_server['home'] = '/var/opt/gitlab/nginx'

##!
## GitLab NGINX
##! Docs: https://docs.gitlab.com/omnibus/settings/nginx.html
##!

# nginx['enable'] = true
# nginx['client_max_body_size'] = '250m'
nginx[ 'redirect_http_to_https' ] = false
# nginx['redirect_http_to_https_port'] = 80

## Most root CA's are included by default
# nginx['ssl_client_certificate'] = '/etc/gitlab/ssl/ca.crt'

## enable/disable 2-way SSL client authentication
# nginx['ssl_verify_client'] = 'off'

## if ssl_verify_client on, verification depth in the client certificates chain
# nginx['ssl_verify_depth'] = "1"

nginx[ 'ssl_certificate' ] = '/etc/gitlab/ssl/cert.pem'
nginx[ 'ssl_certificate_key' ] = '/etc/gitlab/ssl/server.key'
# nginx['ssl_ciphers'] = "ECDHE-ECDSA-AES128-GCM-SHA256;ECDHE-RSA-AES128-GCM-SHA256;AES256-GCM-SHA384;ECDHE-ECDSA-AES256-GCM-SHA384;ECDHE-RSA-AES256-GCM-SHA384"
# nginx['ssl_prefer_server_ciphers'] = 'off'

## ==Recommended by: https://rayvil.org/s/tutorials/Strong_SSL_Security_On_Nginx.html
## ==See also: https://cipherli.st/*
# nginx['ssl_protocols'] = "TLSv1.2 TLSv1.3"

## ==Recommended in: https://nginx.org/en/docs/http/ngx_http_ssl_module.html==
# nginx['ssl_session_cache'] = 'shared:SSL:10m'

G Get Help W Write Out W? Where Is M Cut Text J Justify C Cur Pos U Undo A Mark Text
R Exit R Read File R\ Replace U Uncut Text T To Spell G Go To Line U- Redo C-C Copy Text

```

`nginx['ssl_verify_client'] = "off"`

```

#!/usr/bin/env bash
# GitLab Runner Configuration File
# https://gitlab.com/help/README.md#runner-configuration

# General settings
[[ -f /etc/gitlab-runner/config.toml ]]
```

Шаг 7 Переконфигурируем GitLab, для того чтобы изменения вступили в силу:

7.1 Выполним команду sudo gitlab-ctl reconfigure

```

bitnami@debian:~$ sudo gitlab-ctl reconfigure
Starting GitLab Infra Client, version 15.17.4
resolving cookbooks for run list: ["gitlab"]
Synchronizing Cookbooks:
- logrotate (0.1.0)
  gitlab (0.0.1)
  postgresql (0.0.1)
- package (0.1.0)
- monitoring (0.1.0)
  registry (0.1.0)
  gitlab_rundeck (0.1.0)
- mattermost (0.1.0)
- consul (0.1.0)
- letsencrypt (0.1.0)
  acme (0.1.3)
  letsencrypt (0.1.0)
- prafefct (0.1.0)
- gitlab-pages (0.1.0)
- nginx (0.1.0)
  runit (5.1.3)
  cron (0.1.0)
Installing Cookbook Gems:
Compiling Cookbooks...
Recipe: gitlab::default
* directory[/etc/gitlab] action create (up to date)
* cookbook_file[/etc/gitlab/.gitlab] action create (up to date)
* directory[/etc/gitlab] action create (up to date)
* directory[create /var/opt/gitlab] action create (up to date)
* directory[create /var/log/gitlab] action create (up to date)
* directory[/var/opt/gitlab/embedded/etc] action create (up to date)
* template[/var/opt/gitlab/embedded/etc/gitconfig] action create (up to date)
Recipe: gitlab::web-server
* account[Webserver user and group] action create
  * group[Webserver user and group] action create (up to date)
  * linux_user[Webserver user and group] action create (up to date)
  (and 1 more resource)
Recipe: gitlab::users
* directory[/var/opt/gitlab] action create (up to date)
* account[gitlab user and group] action create
  * group[gitlab user and group] action create (up to date)
  * linux_user[gitlab user and group] action create (up to date)
  (and 1 more resource)
* template[/var/opt/gitlab/.gitconfig] action create (up to date)
* directory[/var/opt/gitlab/bundle] action create (up to date)
Recipe: gitlab::gitlab-shell
* git_repository[/var/opt/gitlab/ssh] action create
  * ruby_block[directory resource: ./var/opt/gitlab/.ssh] action run (skipped due to not_if)
    (up to date)
```

Шаг 8. Регистрация runner. Выбрать shell.

```
sudo gitlab-runner register --url http://192.168.1.74/ --registration-token zuaQ_-QexbSvtHtFwJrr
```

```

bitnami@debian:~$ sudo gitlab-runner register --url http://192.168.1.74/ --registration-token zuaQ_-QexbSvtHtFwJrr
Runtime platform
arch=amd64 os=linux pid=19265 revision=4b9e985a version=14.4.0
Running in system-mode.

Enter the GitLab instance URL (for example, https://gitlab.com/):
[http://192.168.1.74/]:
Enter the registration token:
[zuaQ_-QexbSvtHtFwJrr]:
Enter a description for the runner:
[debian]:
Enter tags for the runner (comma-separated):

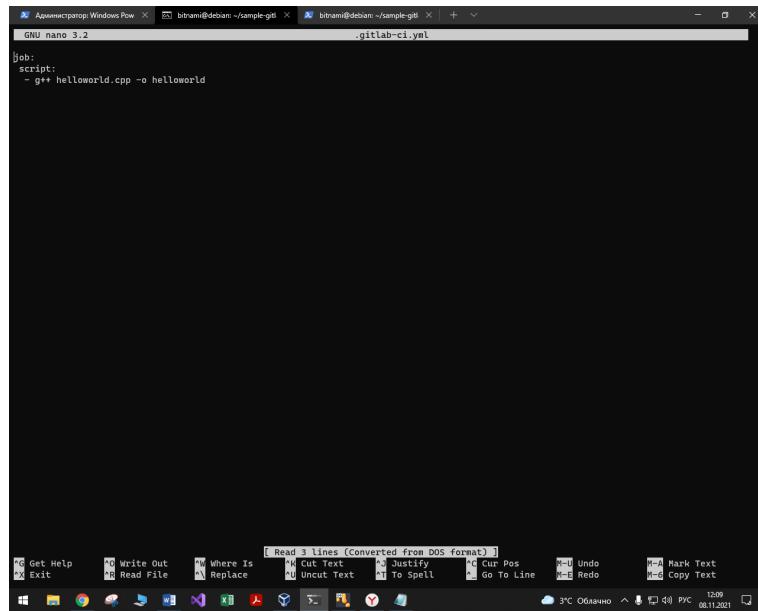
Registering runner... succeeded
runner=zuaQ_-Qe
Enter an executor: docker-ssh+machine, kubernetes, custom, parallels, ssh, virtualbox, docker, docker-ssh, shell, docker+machine:
shell
Runner registered successfully. Feel free to start it, but if it's running already the config should be automatically reloaded!
bitnami@debian:~$ |
```

Шаг 9 Изменить .gitlab-ci.yml для запуска runner в режиме shell (без Docker)

9.1 Перейдем в папку проекта.

```
bitnami@debian:~$ cd sample-gitlabci-cpp-project
bitnami@debian:~/sample-gitlabci-cpp-project$ |
```

9.2 Отредактируем .gitlab-ci.yml

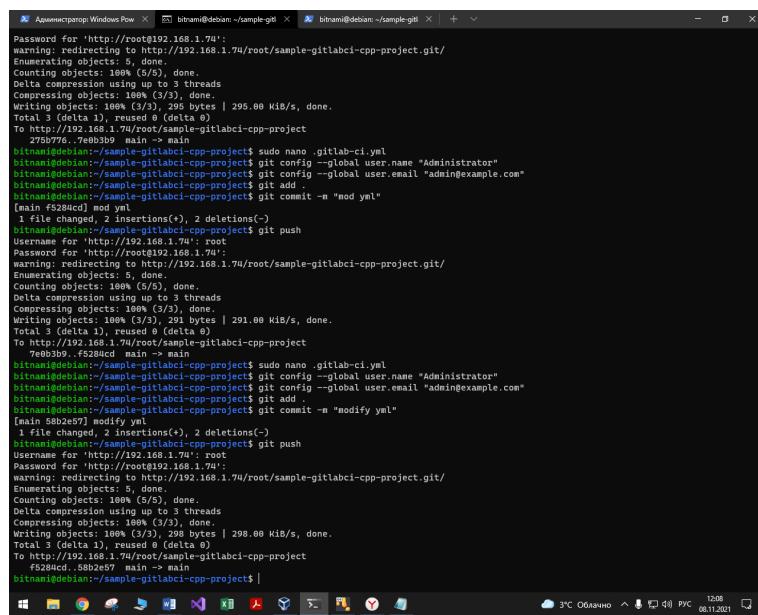


```
bitnami@debian:~$ cd sample-gitlabci-cpp-project
bitnami@debian:~/sample-gitlabci-cpp-project$ |
```

```
[job:
script:
- g++ helloworld.cpp -o helloworld]
```

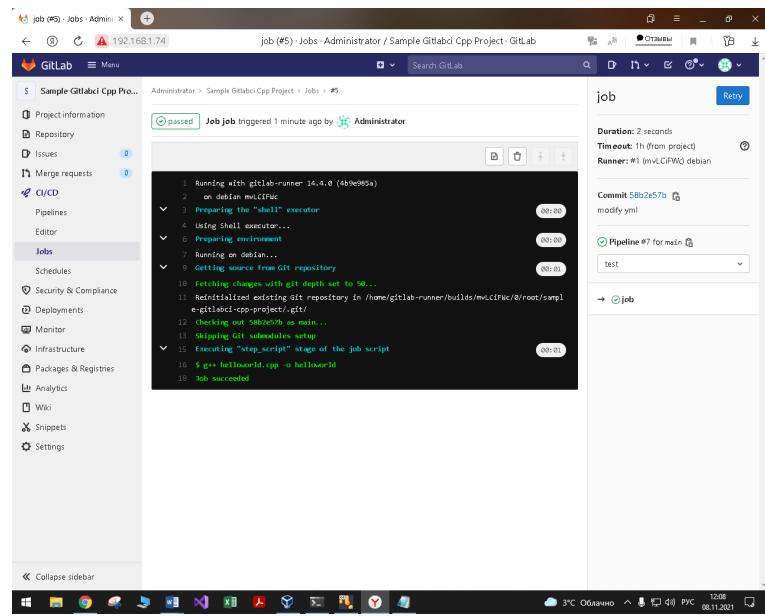
```
bitnami@debian:~/sample-gitlabci-cpp-project$ |
```

9.3 Запушим введенные изменения.



```
bitnami@debian:~/sample-gitlabci-cpp-project$ sudo nano .gitlab-ci.yml
bitnami@debian:~/sample-gitlabci-cpp-project$ git config --global user.name "Administrator"
bitnami@debian:~/sample-gitlabci-cpp-project$ git config --global user.email "admin@example.com"
bitnami@debian:~/sample-gitlabci-cpp-project$ git add .
bitnami@debian:~/sample-gitlabci-cpp-project$ git commit -m "Add .gitlab-ci.yml"
[main 58b2e5d]
1 file changed, 2 insertions(+), 2 deletions(-)
bitnami@debian:~/sample-gitlabci-cpp-project$ git push
Username for 'http://192.168.1.74': root
Password for 'http://root@192.168.1.74':
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 3 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 298 bytes | 291.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To http://192.168.1.74/root/sample-gitlabci-cpp-project
    7e0b3b9..f528acd main -> main
bitnami@debian:~/sample-gitlabci-cpp-project$ sudo nano .gitlab-ci.yml
bitnami@debian:~/sample-gitlabci-cpp-project$ git config --global user.name "Administrator"
bitnami@debian:~/sample-gitlabci-cpp-project$ git config --global user.email "admin@example.com"
bitnami@debian:~/sample-gitlabci-cpp-project$ git add .
bitnami@debian:~/sample-gitlabci-cpp-project$ git commit -m "Modify .gitlab-ci.yml"
[main 58b2e57]
1 file changed, 2 insertions(+), 2 deletions(-)
bitnami@debian:~/sample-gitlabci-cpp-project$ git push
Username for 'http://192.168.1.74': root
Password for 'http://root@192.168.1.74':
warning: redirecting to http://192.168.1.74/root/sample-gitlabci-cpp-project.git/
Enumerating objects: 100% (5/5), done.
Counting objects: 100% (5/5), done.
Delta compression using up to 3 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 298 bytes | 298.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To http://192.168.1.74/root/sample-gitlabci-cpp-project
    f528acd..58b2e57 main -> main
bitnami@debian:~/sample-gitlabci-cpp-project$ |
```

Шаг 10 Запустить Pipeline: CI/CD > Pipelines > Run pipeline



CONCLUSION

In the conclusion of the laboratory work, the basic utilities of Git and CI were studied for working with repositories, runners and pipelines; all steps completed successfully.