Instituto Infnet

CURSO DE GRADUAÇÃO EM REDE DE COMPUTADORES

PROJETO DE BLOCO

Arquitetura e Infraestrutura de Aplicações

AVALIAÇÃO TP2

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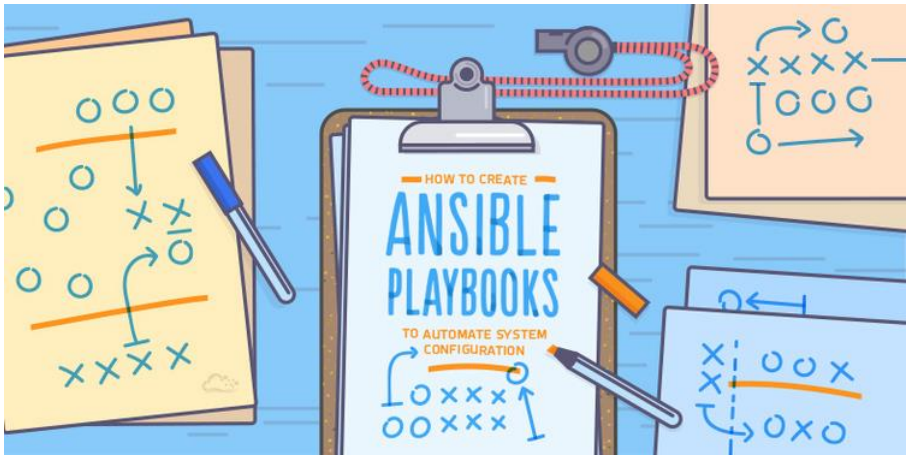
Turma: RDC2016

ÍNDICE

1. INTRODUÇÃO

Esse TP visa a desenvolver a instalação e automatização de aplicações, através do Playbook Ansible, onde irei apresentar o passo a passo da configuração, execução do processo e resultado.

2. SOBRE PLAYBOOK ANSIBLE

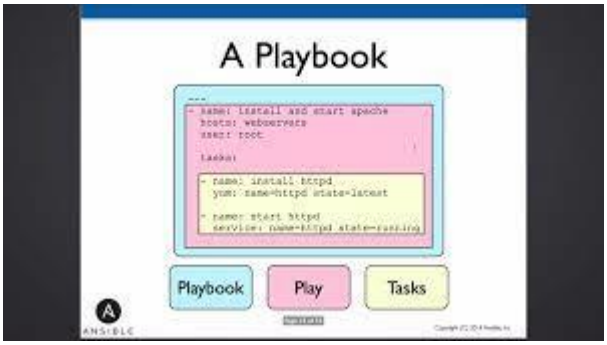


Ansible é uma ferramenta de automação em processos de instalação remotas em vários servidores, a partir de um único ponto.

É possível realizar a instalação de uma ou várias aplicações customizadas.

Dentro do processo, existem as Tasks, que são as tarefas no processo, como por exemplo “Instalar o .net 4.8” ou “Adicionar o user *joao.araujo* no grupo de Administradores Local do servidor”, etc.

Para cada conjunto de execuções dessas tarefas (Tasks) temos o Play, que é composta por essas atividades.



O Playbook é o conjunto de Plays para concluir a automatização do processo.

3. INSTALAÇÃO DO SISTEMA OPERATIVO

Para preparação do ambiente, irei instalar o Debian na versão 10.2, sendo implementado dois servidores no ambiente virtual, com a ferramenta VMWare Workstation.

3.1. SOBRE O DEBIAN 10.2

O Debian é um sistema operacional que usa o Kernel Linux ou FreeBSD. Inicialmente, o Debian foi criado por Linus Torvalds, com o apoio de milhares de programadores espalhados pelo mundo.

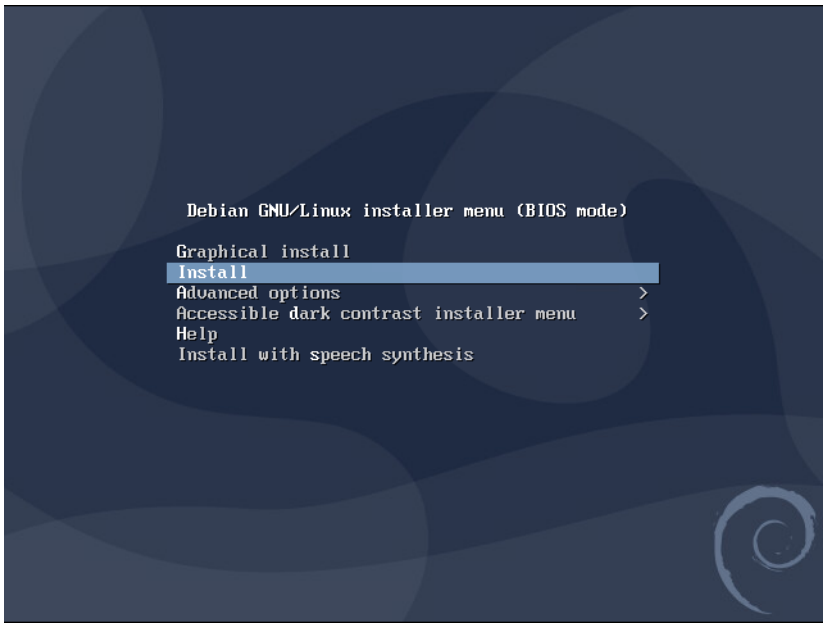
3.2. SOBRE O VMWARE WORKSTATION

O **VMware Workstation** é um Hypervisor hospedado que é executado em versões x64 dos sistemas operacionais Windows e Linux para a criação e configuração de máquinas virtuais (VM's) em uma única máquina física e as utilizem simultaneamente com a máquina real.

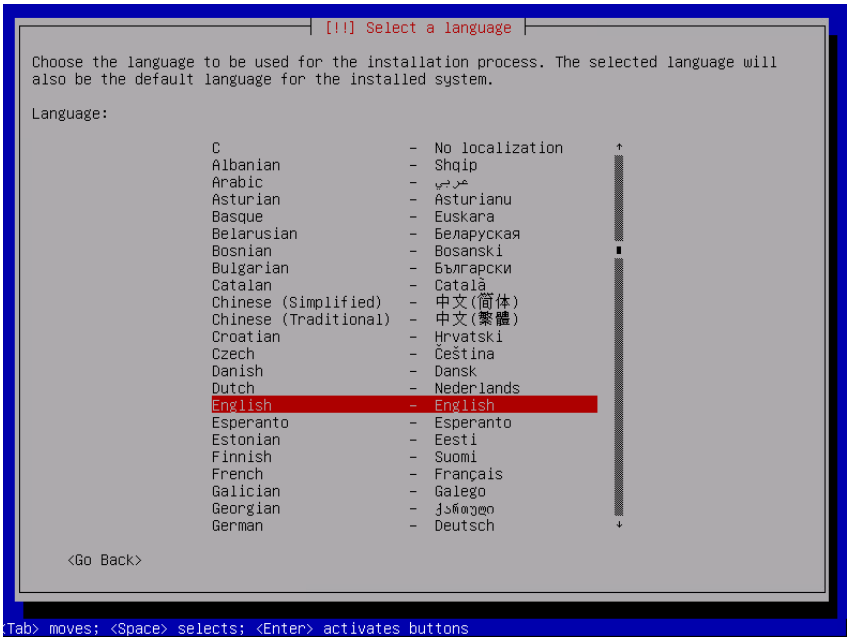
O **VMware Workstation** será o software que irá ser usado na criação do ambiente de LAB para o gerenciamento das Máquinas virtuais.

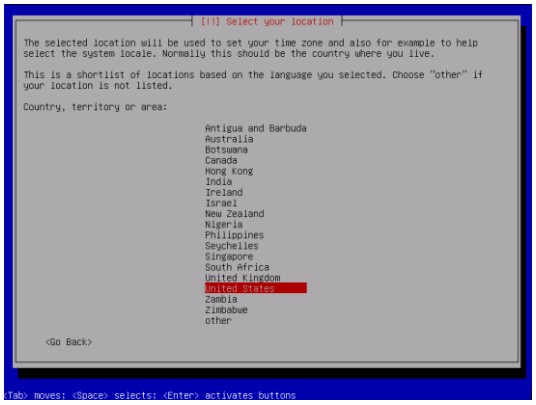
3.3. INSTALAÇÃO DO DEBIAN

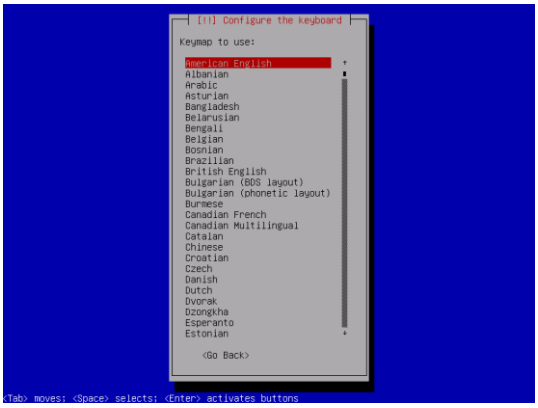
Segue abaixo a instalação de um servidor Linux Debian versão 10.2.0.



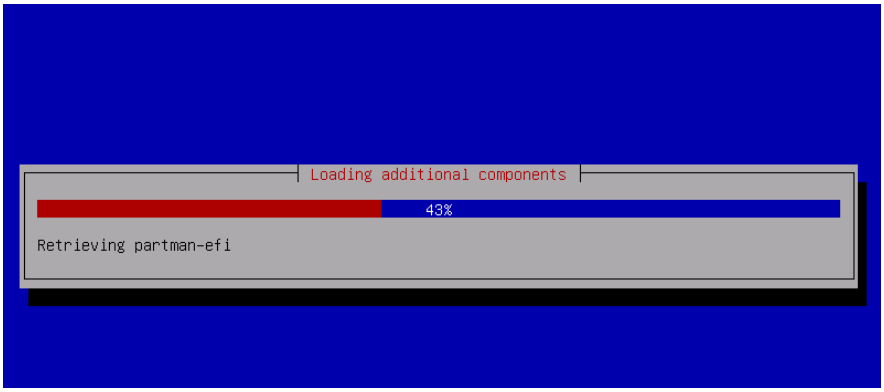
Foi selecionada a língua inglês.



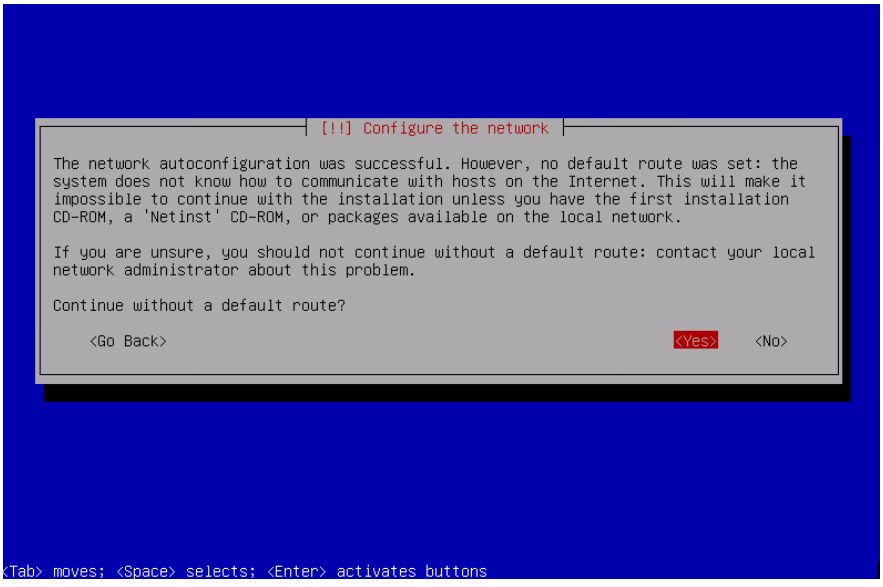




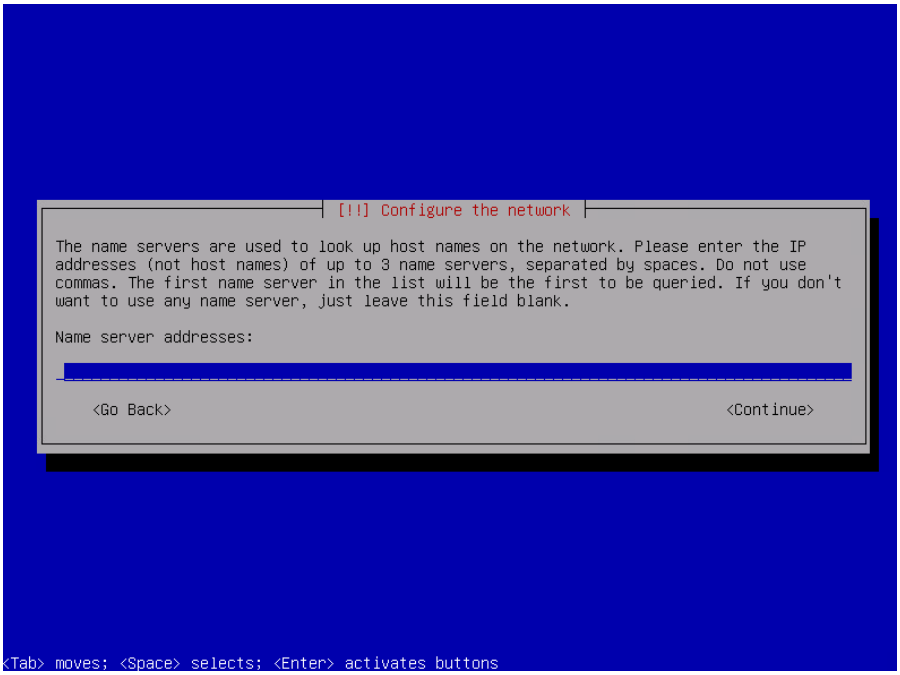
Foi iniciada a preparação para instalação



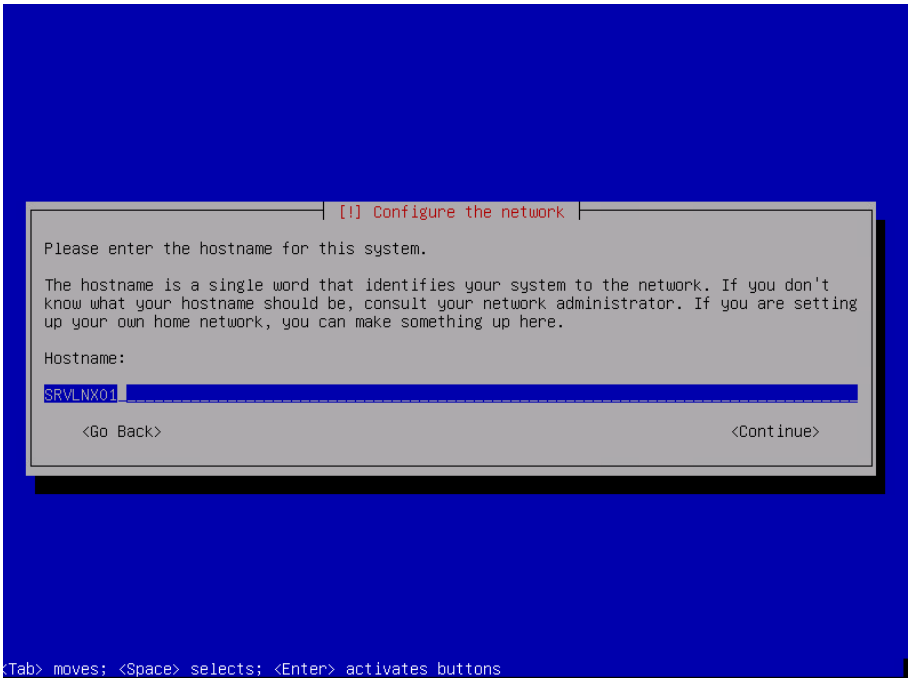
Foi selecionado automatização para as configurações de rede.



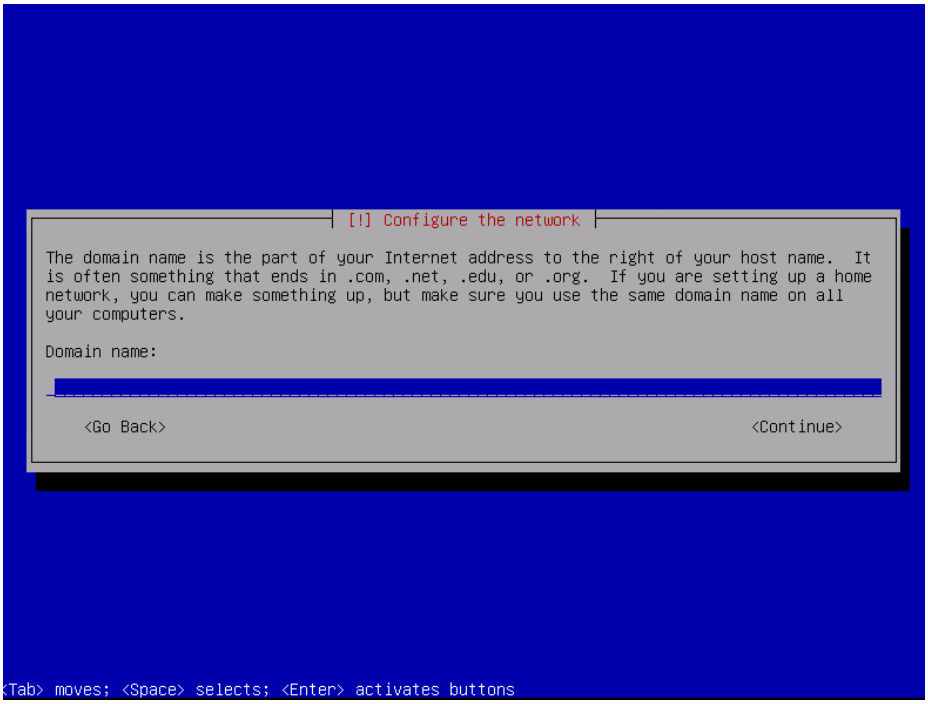
Não foi definido servidor DNS. Desta forma, toda a instalação no Ansible será via IP.



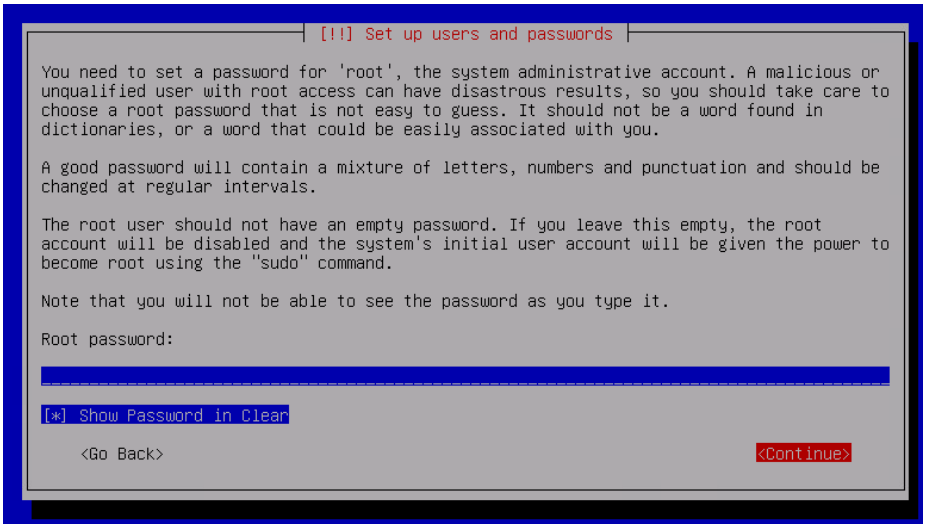
Foi definido o nome do servidor.

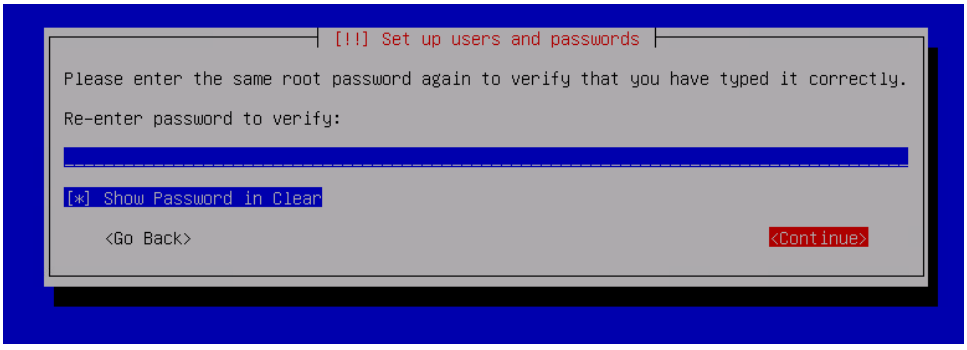


Não foi definido nome do domínio.

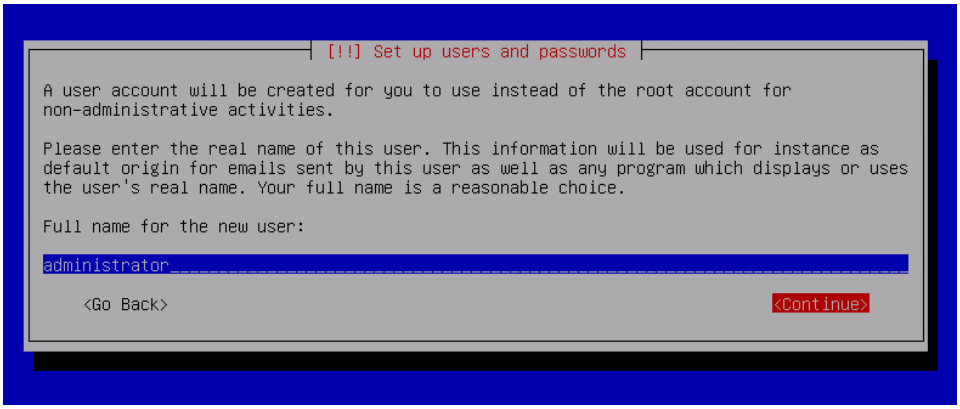


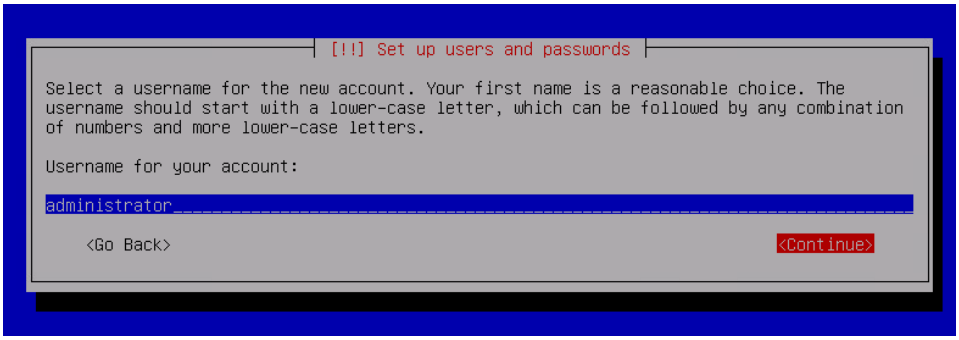
Foi definida a senha do root.



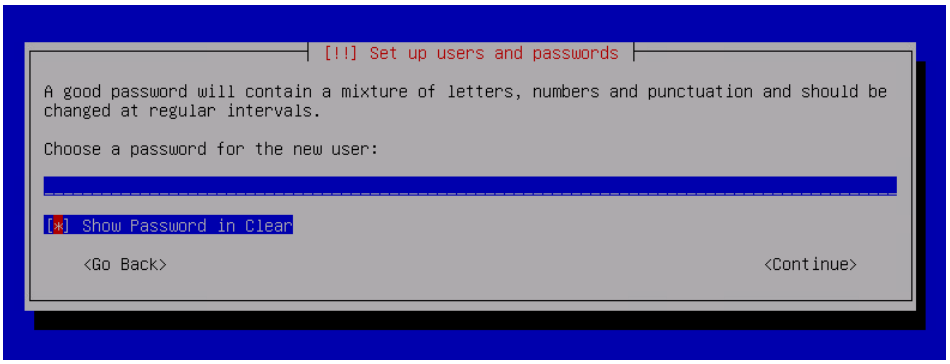


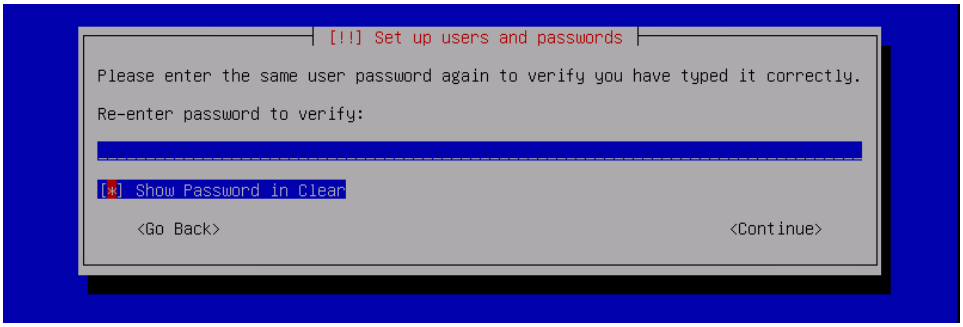
Foi criado um usuário de nome administrator.



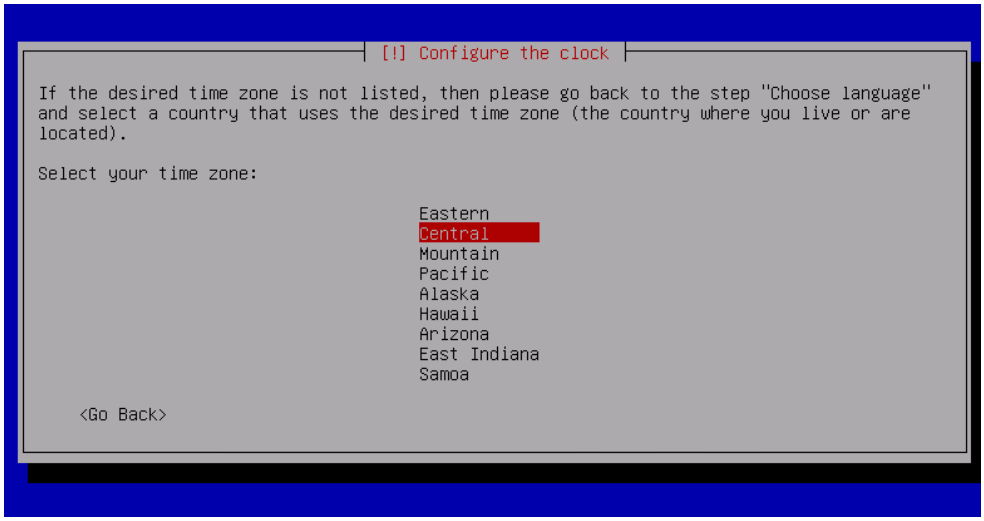


Foi definida a senha para o novo usuário.

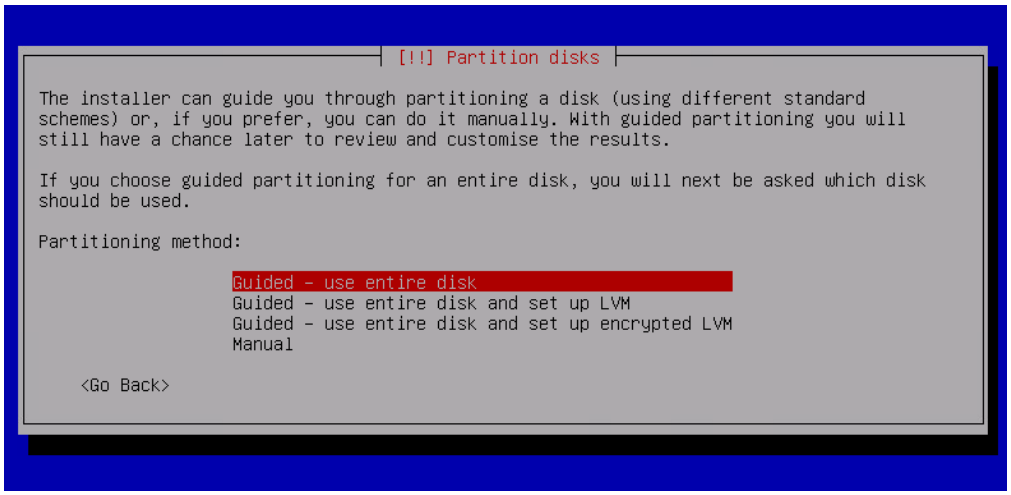


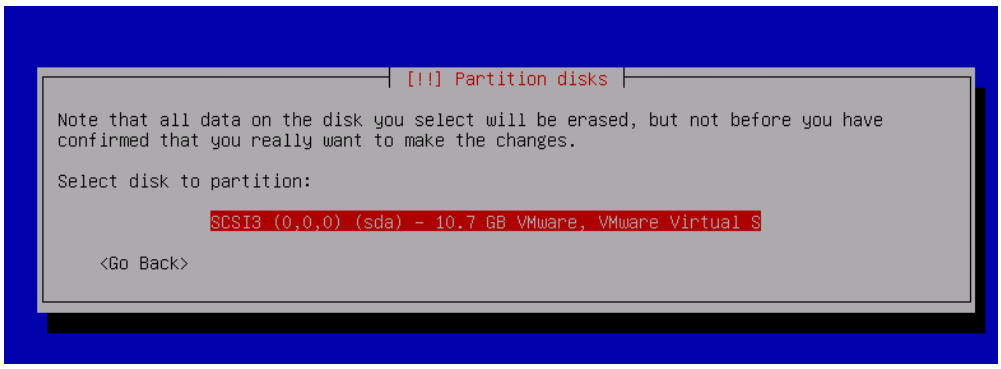


Foi definida a time zone.

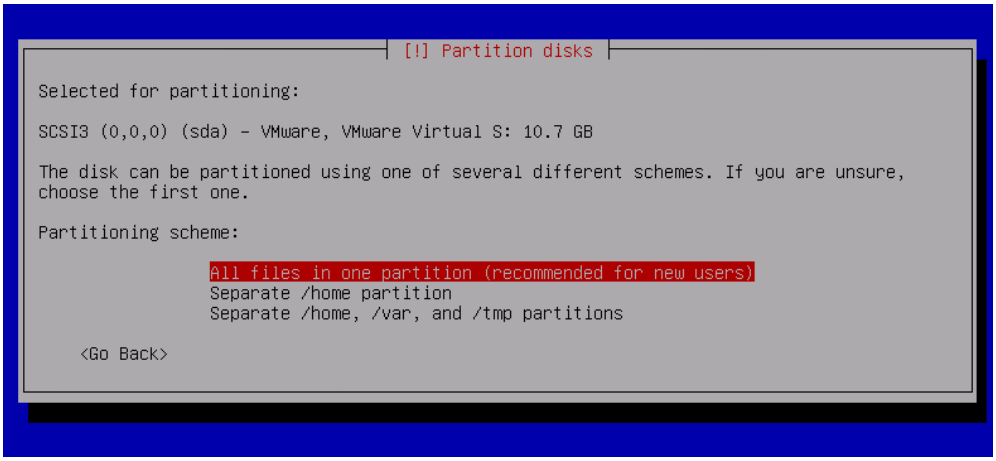


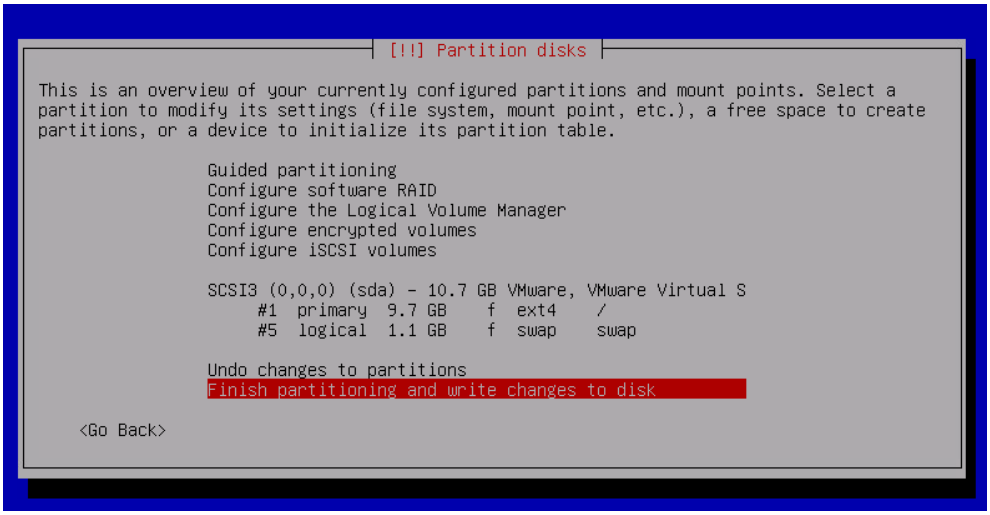
Foi selecionado o disco para a instalação.

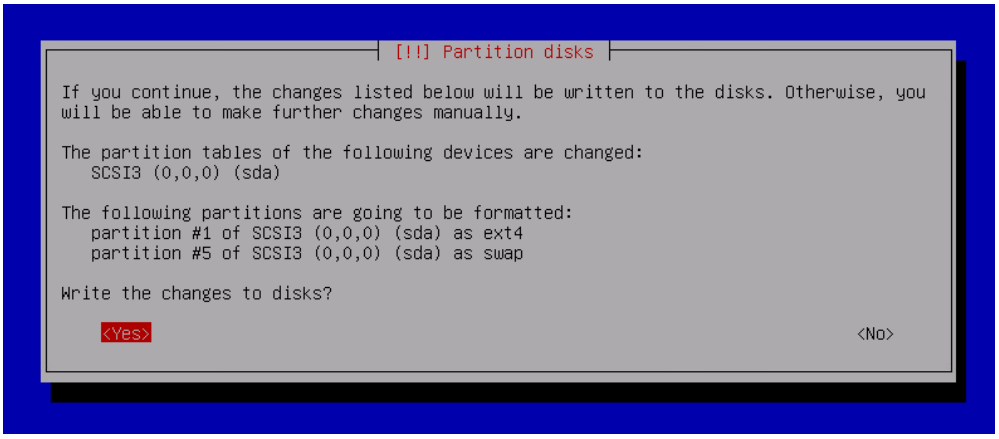


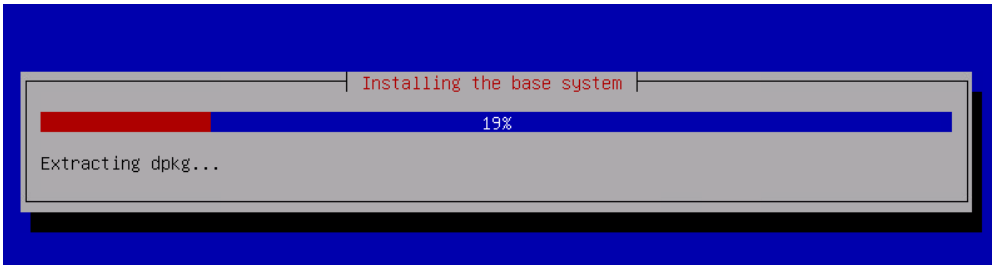


Foi selecionada a partição.

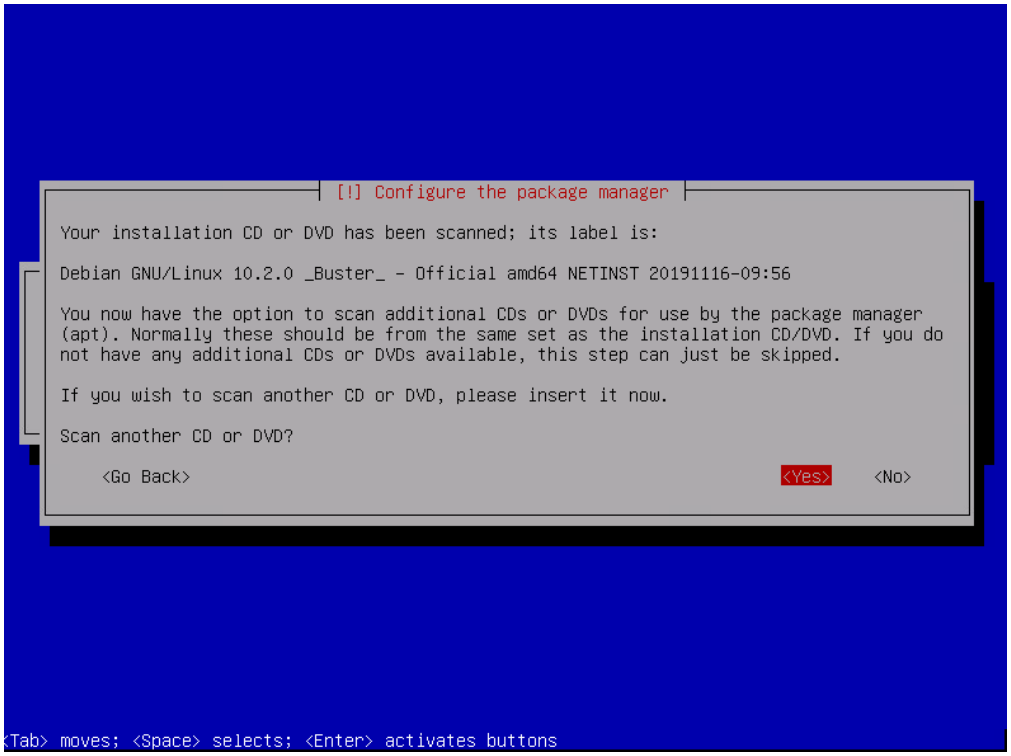




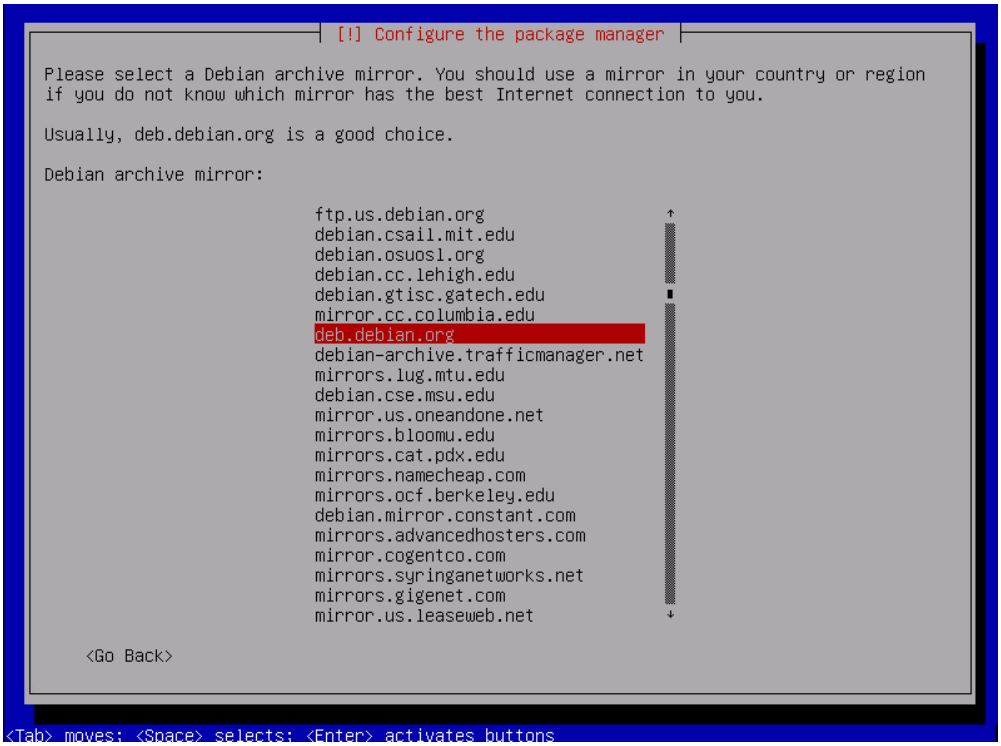




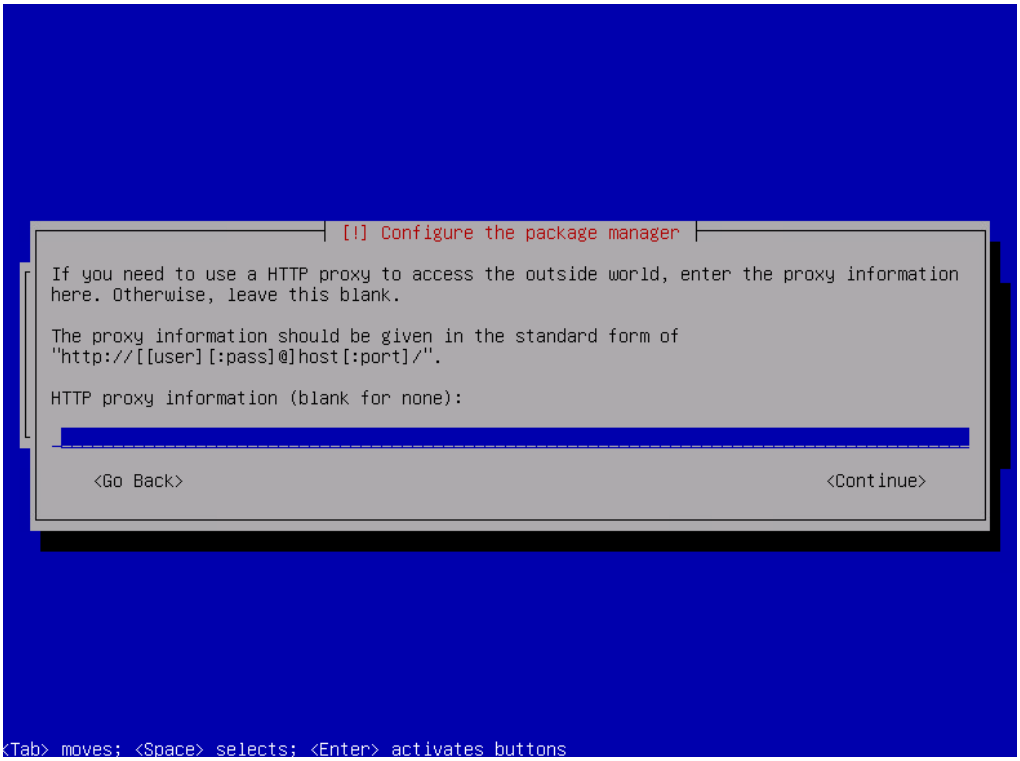
Foi iniciada a instalação.



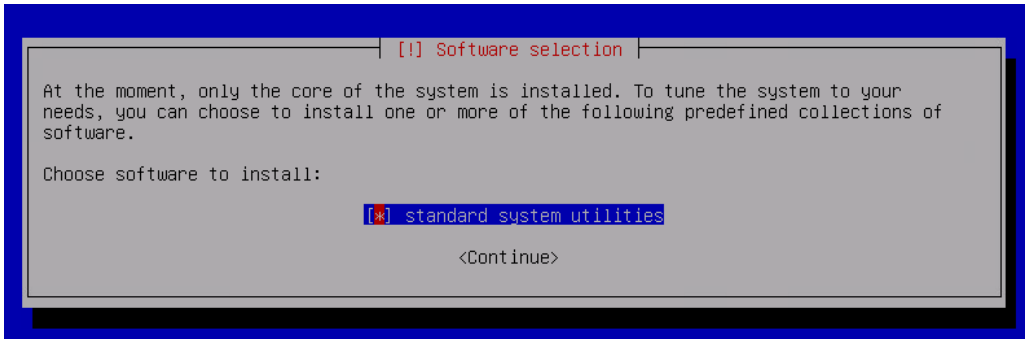
Foi definida o local para download dos pacotes adicionais.

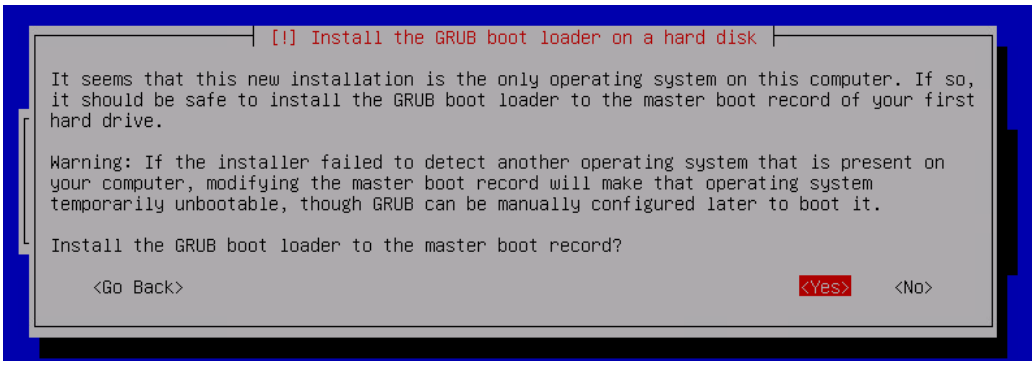


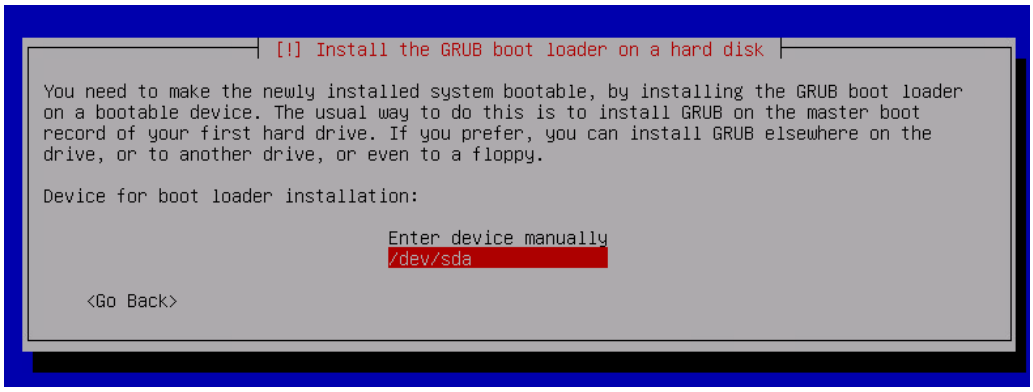
Definido o proxy.

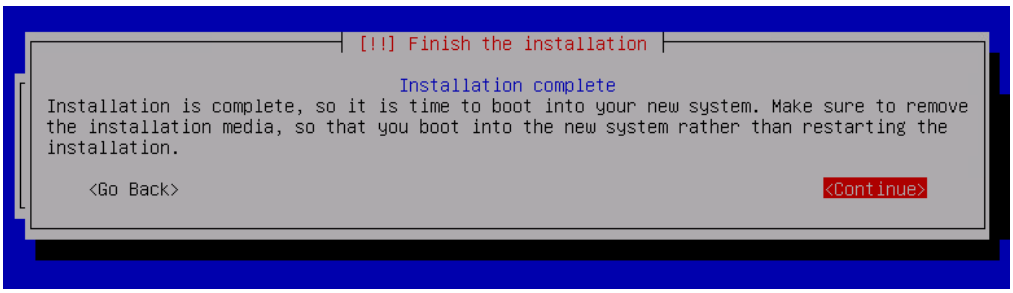


Foi definido o diretório e tipo de software para a instalação do Linux Debian

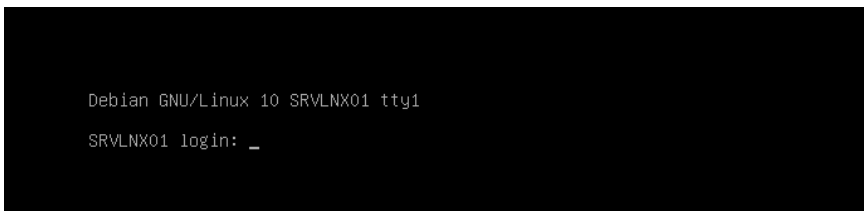








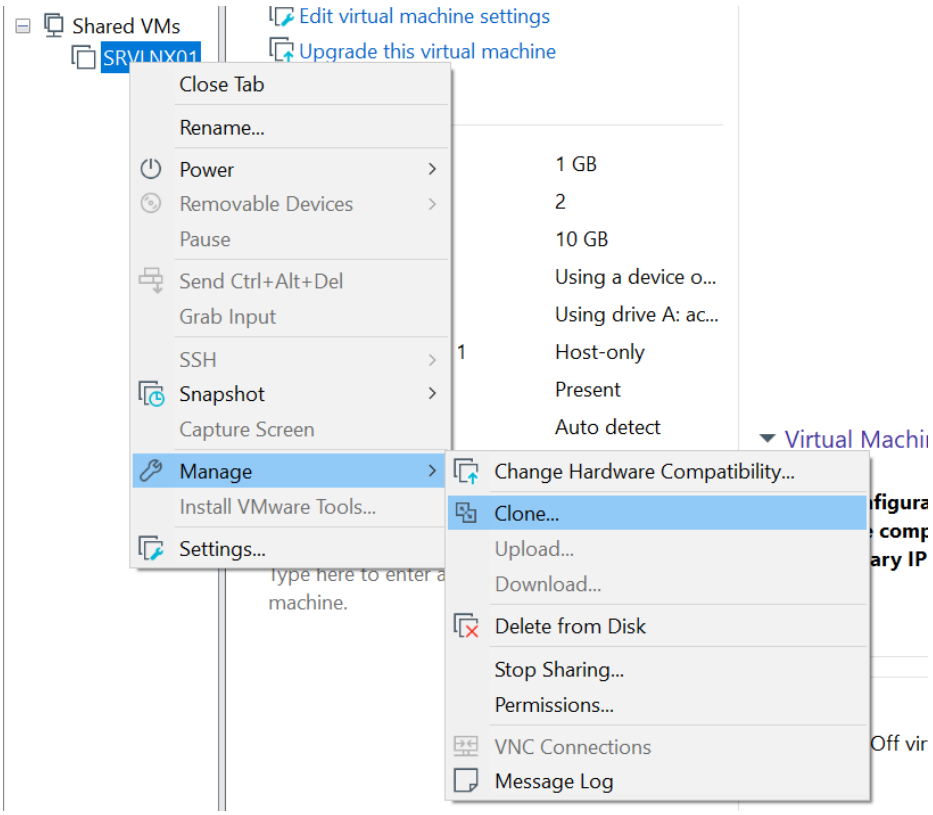
A instalação foi concluída com sucesso.



Após instalação realizei o Update e Upgrade do linux com o comando Apt-get update e apt-get upgrade.

```
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
administrator@SRVLNX01:~$ sudo apt-get update
[sudo] password for administrator:
Get:1 http://security.debian.org/debian-security buster/updates InRelease [65.4 kB]
Get:2 http://security.debian.org/debian-security buster/updates/main Sources [92.5 kB]
Get:3 http://security.debian.org/debian-security buster/updates/main amd64 Packages [159 kB]
Get:4 http://security.debian.org/debian-security buster/updates/main Translation-en [81.8 kB]
Fetched 399 kB in 2s (191 kB/s)
Reading package lists... Done
administrator@SRVLNX01:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following packages will be upgraded:
  linux-image-4.19.0-6-amd64
1 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 48.0 MB of archives.
After this operation, 43.0 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://security.debian.org/debian-security buster/updates/main amd64 linux-image-4.19.0-6-amd6
4 amd64 4.19.67-2+deb10u2 [48.0 MB]
Fetched 48.0 MB in 27s (1,768 kB/s)
(Reading database ... 22432 files and directories currently installed.)
Preparing to unpack .../linux-image-4.19.0-6-amd64_4.19.67-2+deb10u2_amd64.deb ...
Unpacking linux-image-4.19.0-6-amd64 (4.19.67-2+deb10u2) over (4.19.67-2+deb10u1) ...
Setting up linux-image-4.19.0-6-amd64 (4.19.67-2+deb10u2) ...
/etc/kernel/postinst.d/initramfs-tools:
update-initramfs: Generating /boot/initrd.img-4.19.0-6-amd64
/etc/kernel/postinst.d/zz-update-grub:
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-4.19.0-6-amd64
Found initrd image: /boot/initrd.img-4.19.0-6-amd64
done
administrator@SRVLNX01:~$
```

Para o segundo servidor, utilizei o recurso de clone e alterei o nome do servidor.



4. CONFIGURAÇÃO DO ANSIBLE

Irei configurar o Ansible para a instalação do Apache no servidor SRVLNX02.

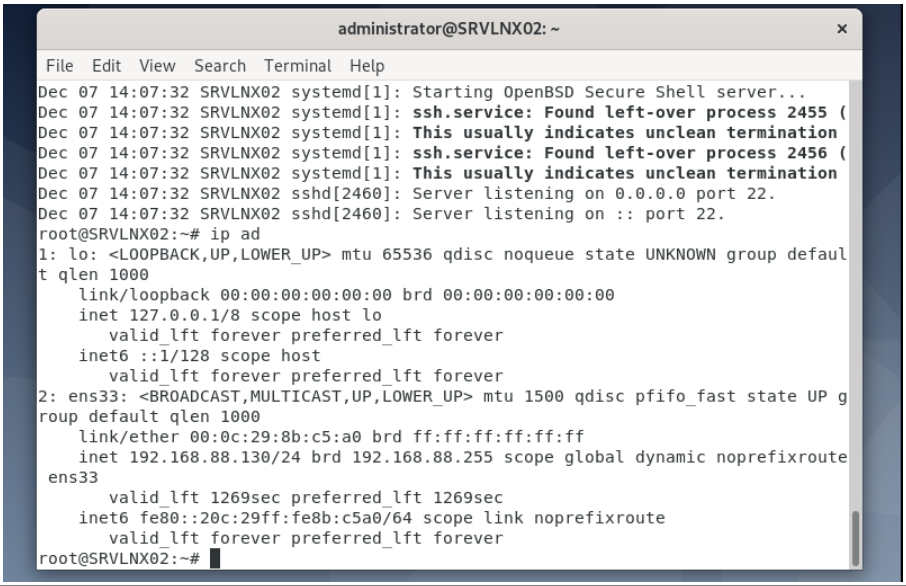
Criação do diretório para as chaves SSH. As chaves serão importantes para a autenticação sem a necessidade de senhas para acesso aos servidores.

```
administrator@SRVLNX01:~$ sudo mkdir /etc/keys
administrator@SRVLNX01:~$ _
```

Criação das chaves publicas e privadas no diretorio /etc/keys com nome key.pem e key.pem.pub

```
root@SRVLNX01:~# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): /etc/keys/key.pem
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /etc/keys/key.pem.
Your public key has been saved in /etc/keys/key.pem.pub.
The key fingerprint is:
SHA256:yOvjbVOrVzjukdtlCbiy3OKVOaMap7g9elXfOYnUZOw root@SRVLNX01
The key's randomart image is:
+---[RSA 2048]----+
|              .  |
|               + |
|              =  |
|     . .   ... E |
|      o S ..ooo o|
|       . .  B+o=.|
|      ...+ Xo+ .+|
|     .++*.O *+ o |
|     =**==.=o .  |
+----[SHA256]-----+
root@SRVLNX01:~# ls -l /etc/keys
total 8
-rw------- 1 root root 1823 Dec  7 14:21 key.pem
-rw-r--r-- 1 root root  395 Dec  7 14:21 key.pem.pub
root@SRVLNX01:~# _
```

Ip do servidor de destino onde será instalado o Apache.



Comando para a cópia da chave pública no servidor onde será instalado o Apache, que será acessado pelo Ansible.

```
root@SRVLNX01:~# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): /etc/keys/key.pem
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /etc/keys/key.pem.
Your public key has been saved in /etc/keys/key.pem.pub.
The key fingerprint is:
SHA256:yOvjbVOrVzjukdtlCbiy3OKVOaMap7g9elXfOYnUZOw root@SRVLNX01
The key's randomart image is:
+---[RSA 2048]----+
|               .  |
|              + |
|             =  |
|     . .   ... E |
|      o S ..ooo o|
|       . .  B+o=.|
|      ...+ Xo+ .+|
|     .++*.O *+ o |
|     =**==.=o .  |
+----[SHA256]-----+
root@SRVLNX01:~# ls -l /etc/keys
total 8
-rw------- 1 root root 1823 Dec  7 14:21 key.pem
-rw-r--r-- 1 root root  395 Dec  7 14:21 key.pem.pub
root@SRVLNX01:~# shh-copy-id -i /etc/keys/key.pem.pub root@192.168.88.130
-bash: shh-copy-id: command not found
root@SRVLNX01:~# ssh-copy-id -i /etc/keys/key.pem.pub root@192.168.88.130
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/etc/keys/key.pem.pub"
The authenticity of host '192.168.88.130 (192.168.88.130)' can't be established.
ECDSA key fingerprint is SHA256:IGiAaqwVyoZ3PAv5bQsuaZsHBibPT6jOX3ukEs6hYW8.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are alr
eady installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to inst
all the new keys
root@192.168.88.130's password:
```

Foram realizados testes com a chave privada (Acesso sem senha).

```
root@SRVLNX01:~# ssh -i /etc/keys/key.pem root@192.168.88.130
Linux SRVLNX02 4.19.0-6-amd64 #1 SMP Debian 4.19.67-2+deb10u2 (2019-11-11) 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.
Last login: Sat Dec  7 14:29:21 2019 from 192.168.88.131
root@SRVLNX02:~# _
```

Foi instalado o pacote do Ansible no servidor

```
root@SRVLNX01:~# apt install ansible
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  distro-info-data ieee-data libpcre2-8-0 libsodium23 libyaml-0-2 lsb-release python3-asn1crypto python3-bcrypt python3-cffi-backend python3-crypto
  python3-cryptography python3-jinja2 python3-jmespath python3-kerberos python3-libcloud python3-lockfile python3-markupsafe python3-nacl python3-netaddr
  python3-ntlm-auth python3-paramiko python3-pyasn1 python3-requests-kerberos python3-requests-ntlm python3-selinux python3-simplejson python3-winrm
  python3-xmltodict python3-yaml wget
Suggested packages:
  cowsay sshpass lsb python-crypto-doc python-cryptography-doc python3-cryptography-vectors python-jinja2-doc python-lockfile-doc python-nacl-doc ipython3
  python-netaddr-docs python3-gssapi
The following NEW packages will be installed:
  ansible distro-info-data ieee-data libpcre2-8-0 libsodium23 libyaml-0-2 lsb-release python3-asn1crypto python3-bcrypt python3-cffi-backend python3-crypto
  python3-cryptography python3-jinja2 python3-jmespath python3-kerberos python3-libcloud python3-lockfile python3-markupsafe python3-nacl python3-netaddr
  python3-ntlm-auth python3-paramiko python3-pyasn1 python3-requests-kerberos python3-requests-ntlm python3-selinux python3-simplejson python3-winrm
  python3-xmltodict python3-yaml wget
0 upgraded, 31 newly installed, 0 to remove and 0 not upgraded.
Need to get 9,932 kB of archives.
After this operation, 74.6 MB 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 libpcre2-8-0 amd64 10.32-5 [213 kB]
Get:2 http://deb.debian.org/debian buster/main amd64 wget amd64 1.20.1-1.1 [902 kB]
Get:3 http://deb.debian.org/debian buster/main amd64 python3-asn1crypto all 0.24.0-1 [78.2 kB]
Get:4 http://deb.debian.org/debian buster/main amd64 python3-cffi-backend amd64 1.12.2-1 [79.7 kB]
Get:5 http://deb.debian.org/debian buster/main amd64 python3-cryptography amd64 2.6.1-3+deb10u2 [219 kB]
Get:6 http://deb.debian.org/debian buster/main amd64 python3-markupsafe amd64 1.1.0-1 [14.8 kB]
Get:7 http://deb.debian.org/debian buster/main amd64 python3-jinja2 all 2.10-2 [106 kB]
Get:8 http://deb.debian.org/debian buster/main amd64 python3-bcrypt amd64 3.1.6-1 [31.7 kB]
Get:9 http://deb.debian.org/debian buster/main amd64 libsodium23 amd64 1.0.17-1 [158 kB]
Get:10 http://deb.debian.org/debian buster/main amd64 python3-nacl amd64 1.3.0-2 [49.5 kB]
Get:11 http://deb.debian.org/debian buster/main amd64 python3-pyasn1 all 0.4.2-3 [57.7 kB]
Get:12 http://deb.debian.org/debian buster/main amd64 python3-paramiko all 2.4.2-0.1 [120 kB]
Get:13 http://deb.debian.org/debian buster/main amd64 libyaml-0-2 amd64 0.2.1-1 [47.2 kB]
Get:14 http://deb.debian.org/debian buster/main amd64 python3-yaml amd64 3.13-2 [121 kB]
Get:15 http://deb.debian.org/debian buster/main amd64 python3-crypto amd64 2.6.1-9+b1 [263 kB]
Get:16 http://deb.debian.org/debian buster/main amd64 ieee-data all 20180805.1 [1,590 kB]
Get:17 http://deb.debian.org/debian buster/main amd64 python3-netaddr all 0.7.19-1 [228 kB]
Get:18 http://deb.debian.org/debian buster/main amd64 ansible all 2.7.7+dfsg-1 [3,958 kB]
Get:19 http://deb.debian.org/debian buster/main amd64 distro-info-data all 0.41+deb10u1 [6,500 B]
Get:20 http://deb.debian.org/debian buster/main amd64 lsb-release all 10.2019051400 [27.5 kB]
Get:21 http://deb.debian.org/debian buster/main amd64 python3-jmespath all 0.9.4-1 [18.5 kB]
Get:22 http://deb.debian.org/debian buster/main amd64 python3-kerberos amd64 1.1.14-2 [18.0 kB]
Get:23 http://deb.debian.org/debian buster/main amd64 python3-lockfile all 1:0.12.2-2 [17.1 kB]
```

Foi criado os diretórios Roles e Playbook;

```
root@SRVLNX01:~# cd /etc/ansible
root@SRVLNX01:/etc/ansible# ls
ansible.cfg  hosts
root@SRVLNX01:/etc/ansible# mkdir roles playbooks
root@SRVLNX01:/etc/ansible# ls
ansible.cfg  hosts  playbooks  roles
```

Foi acessado o arquivo do Ansible para edição.

```
# config file for ansible -- https://ansible.com/
# ===============================================

# nearly all parameters can be overridden in ansible-playbook
# or with command line flags. ansible will read ANSIBLE_CONFIG,
# ansible.cfg in the current working directory, .ansible.cfg in
# the home directory or /etc/ansible/ansible.cfg, whichever it
# finds first

[defaults]

# some basic default values...

#inventory      = /etc/ansible/hosts
#library        = /usr/share/my_modules/
#module_utils   = /usr/share/my_module_utils/
#remote_tmp     = ~/.ansible/tmp
#local_tmp      = ~/.ansible/tmp
#plugin_filters_cfg = /etc/ansible/plugin_filters.yml
#forks          = 5
#poll_interval  = 15
#sudo_user      = root
#ask_sudo_pass = True
#ask_pass      = True
#transport      = smart
#remote_port    = 22
#module_lang    = C
#module_set_locale = False

# plays will gather facts by default, which contain information about
# the remote system.
#
# smart - gather by default, but don't regather if already gathered
# implicit - gather by default, turn off with gather_facts: False
# explicit - do not gather by default, must say gather_facts: True
#gathering = implicit

# This only affects the gathering done by a play's gather_facts directive,
# by default gathering retrieves all facts subsets
# all - gather all subsets
# network - gather min and network facts
# hardware - gather hardware facts (longest facts to retrieve)
# virtual - gather min and virtual facts
"ansible.cfg" 496 lines, 20277 characters
```

Foram editadas as seguintes opções:

- **Roles Path**, para definir o diretório onde vai estar todas as roles do Ansible;
- **Timeout**, para definir o tempo da conexão do SSH, que ficou em 30 segundos;
- **Private_key_File**, para definir onde está alocada as chaves publicas e privadas, necessárias para autenticação do servidor;
- **Log_Path**, para definir do diretório onde irá ficar os logs;

```
root@SRVLNX01:/etc/ansible# grep -i roles_path ansible.cfg
roles_path    = /etc/ansible/roles
root@SRVLNX01:/etc/ansible# grep -i "timeout = 30" ansible.cfg
timeout = 30
#connect_timeout = 30
#accelerate_timeout = 30
#accelerate_daemon_timeout = 30
root@SRVLNX01:/etc/ansible# grep -i "private_key_file" ansible.cfg
private_key_file = /etc/keys/key.pem
root@SRVLNX01:/etc/ansible# grep -i log_path ansible.cfg
log_path = /var/log/ansible.log
root@SRVLNX01:/etc/ansible#
```

No arquivo de Host, foi adicionado o IP onde será instalado o Apache, e criado o grupo apache.

```
root@SRVLNX01:/etc/ansible# cat hosts
[apache]
192.168.88.130
root@SRVLNX01:/etc/ansible#
```

Teste com o comando Ansible. Executei o comando ls -l , para listar os diretório e atributos. Desta forma, o comando Ansible, pegou os ip´s existentes no arquivo host e executou o comando, validando assim a configuração.

```
root@SRVLNX01:/etc/ansible# ansible all -m command -a "ls -l /"
192.168.88.130 | CHANGED | rc=0 >>
total 60
lrwxrwxrwx   1 root root     7 Dec  7 04:54 bin -> usr/bin
drwxr-xr-x   3 root root  4096 Dec  7 06:23 boot
drwxr-xr-x  17 root root  3240 Dec  7 13:33 dev
drwxr-xr-x 119 root root  4096 Dec  7 14:05 etc
drwxr-xr-x   3 root root  4096 Dec  7 06:44 home
lrwxrwxrwx   1 root root    30 Dec  7 04:55 initrd.img -> boot/initrd.img-4.19.0-6-amd64
lrwxrwxrwx   1 root root    30 Dec  7 04:55 initrd.img.old -> boot/initrd.img-4.19.0-6-amd64
lrwxrwxrwx   1 root root     7 Dec  7 04:54 lib -> usr/lib
lrwxrwxrwx   1 root root     9 Dec  7 04:54 lib32 -> usr/lib32
lrwxrwxrwx   1 root root     9 Dec  7 04:54 lib64 -> usr/lib64
lrwxrwxrwx   1 root root    10 Dec  7 04:54 libx32 -> usr/libx32
drwx------   2 root root 16384 Dec  7 04:54 lost+found
drwxr-xr-x   3 root root  4096 Dec  7 04:54 media
drwxr-xr-x   2 root root  4096 Dec  7 04:54 mnt
drwxr-xr-x   2 root root  4096 Dec  7 04:54 opt
dr-xr-xr-x 199 root root     0 Dec  7 13:33 proc
drwx------   6 root root  4096 Dec  7 15:23 root
drwxr-xr-x  25 root root   700 Dec  7 15:23 run
lrwxrwxrwx   1 root root     8 Dec  7 04:54 sbin -> usr/sbin
drwxr-xr-x   2 root root  4096 Dec  7 04:54 srv
dr-xr-xr-x  13 root root     0 Dec  7 13:33 sys
drwxrwxrwt  17 root root  4096 Dec  7 15:23 tmp
drwxr-xr-x  14 root root  4096 Dec  7 06:21 usr
drwxr-xr-x  11 root root  4096 Dec  7 04:54 var
lrwxrwxrwx   1 root root    27 Dec  7 04:55 vmlinuz -> boot/vmlinuz-4.19.0-6-amd64
lrwxrwxrwx   1 root root    27 Dec  7 04:55 vmlinuz.old -> boot/vmlinuz-4.19.0-6-amd64
```

Criação do arquivo yml de nome Playbook.yml.

```
root@SRVLNX01:/etc/ansible#
root@SRVLNX01:/etc/ansible# ls -l
total 32
-rw-r--r-- 1 root root 20278 Dec  7 15:06 ansible.cfg
-rw-r--r-- 1 root root    24 Dec  7 15:20 hosts
drwxr-xr-x 2 root root  4096 Dec  7 14:50 playbooks
drwxr-xr-x 2 root root  4096 Dec  7 14:50 roles
root@SRVLNX01:/etc/ansible# mkdir -p /root/exemplos/ansible
root@SRVLNX01:/etc/ansible# cd /root/exemplos/ansible/
root@SRVLNX01:~/exemplos/ansible# vim playbooks.yml
root@SRVLNX01:~/exemplos/ansible#
root@SRVLNX01:~/exemplos/ansible#
root@SRVLNX01:~/exemplos/ansible#
```

Arquivo yaml para a instalação onde a instrução para a instalação do apache, depois o update da aplicação e inicialização do serviço.

```
# Meu primeiro playbook:
#
- name: Instalação do Apache
  hosts: all
  tasks:
          - name: Instalar o apache
            apt: name=apache2 update_cache=yes state=present
~
~
~
~
~
~
~
```

Foi executado o arquivo para instalação com sucesso.

```
root@SRVLNX01:~/exemplos/ansible# ansible-playbook  playbooks.yml

PLAY [Instalação do Apache] ***************************************************************************************************************************************************

TASK [Gathering Facts] ********************************************************************************************************************************************************
ok: [192.168.88.130]

TASK [Instalar o apache] ******************************************************************************************************************************************************
changed: [192.168.88.130]

PLAY RECAP ********************************************************************************************************************************************************************
192.168.88.130             : ok=2    changed=1    unreachable=0    failed=0
```

Foi verificado no servidor de destino, que o serviço foi instalado com sucesso.

```
root@SRVLNX02:~# systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset:
   Active: active (running) since Sat 2019-12-07 15:46:47 CST; 59s ago
     Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 4551 (apache2)
    Tasks: 55 (limit: 1108)
   Memory: 7.3M
   CGroup: /system.slice/apache2.service
           ├─4551 /usr/sbin/apache2 -k start
           ├─4552 /usr/sbin/apache2 -k start
           └─4553 /usr/sbin/apache2 -k start

Dec 07 15:46:46 SRVLNX02 systemd[1]: Starting The Apache HTTP Server...
Dec 07 15:46:47 SRVLNX02 apachectl[4540]: AH00558: apache2: Could not reliably d
Dec 07 15:46:47 SRVLNX02 systemd[1]: Started The Apache HTTP Server.
root@SRVLNX02:~# dpkg -l apache
dpkg-query: no packages found matching apache
root@SRVLNX02:~# dpkg -l apache2
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name           Version          Architecture Description
+++-==============-================-============-=================================
ii  apache2        2.4.38-3+deb10u3 amd64        Apache HTTP Server
```

5. CONSIDERAÇÕES FINAIS

A TP foi realizada dentro da minha experiência, apresentando ideias e conceitos aprendidos ao longo da minha carreira profissional.

A realização do projeto contou com o apoio de alguns profissionais que trabalham com Linux, exaustivas pesquisas na internet sobre o sistema operativo, além do material disponibilizado pelo professor.

6. REFERENCIAS TÉCNICAS

Para prepara o documento, foram usadas as seguintes fontes de pesquisa:

https://docs.ansible.com/ansible/latest/user_guide/playbooks.html

https://www.debian.org/intro/about.pt.html