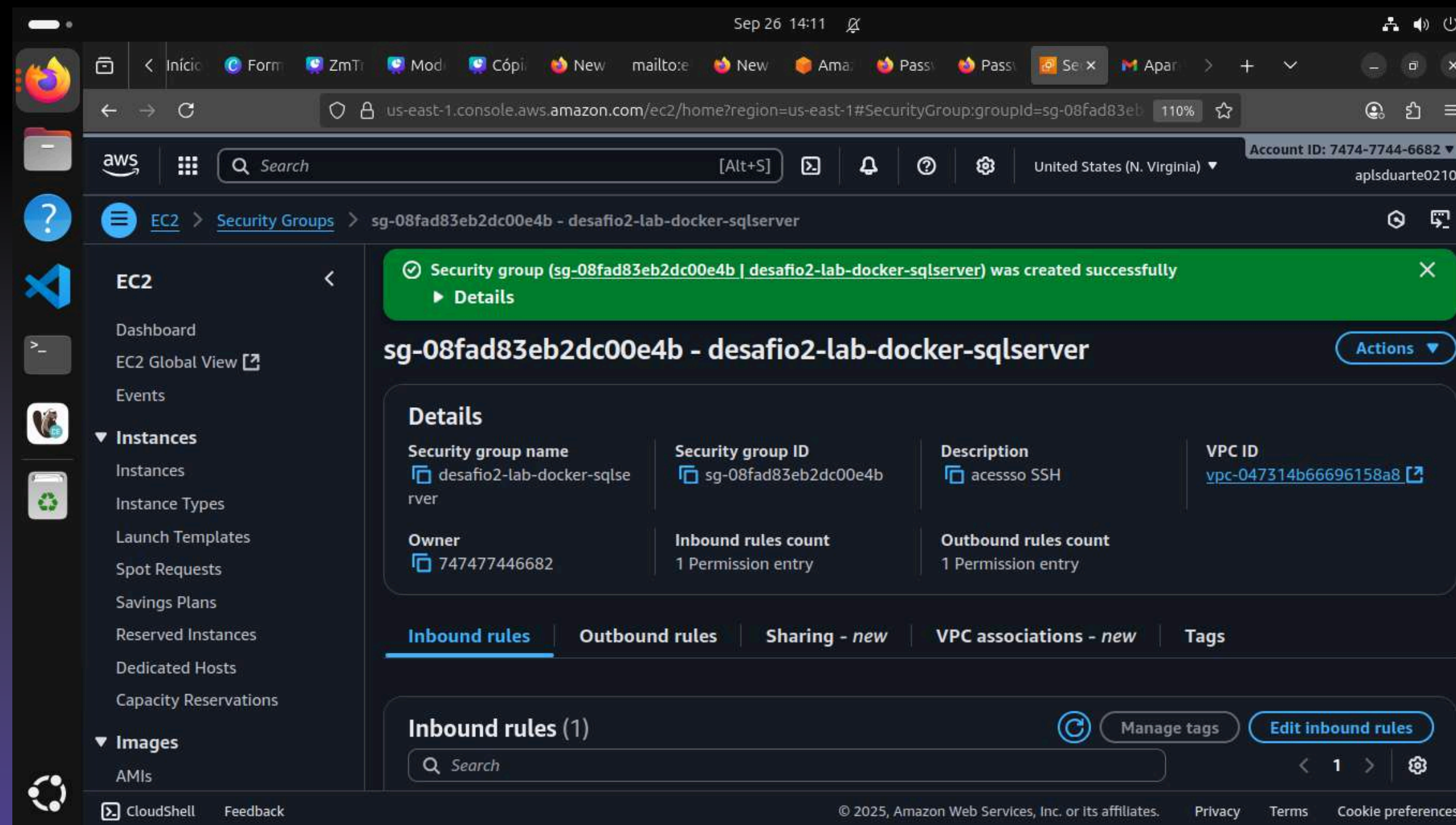


Desafio Labs 2.0

RDS + SQL SERVER

Next Slide

2.Lançamento da instância EC2 - sqlserver.docker

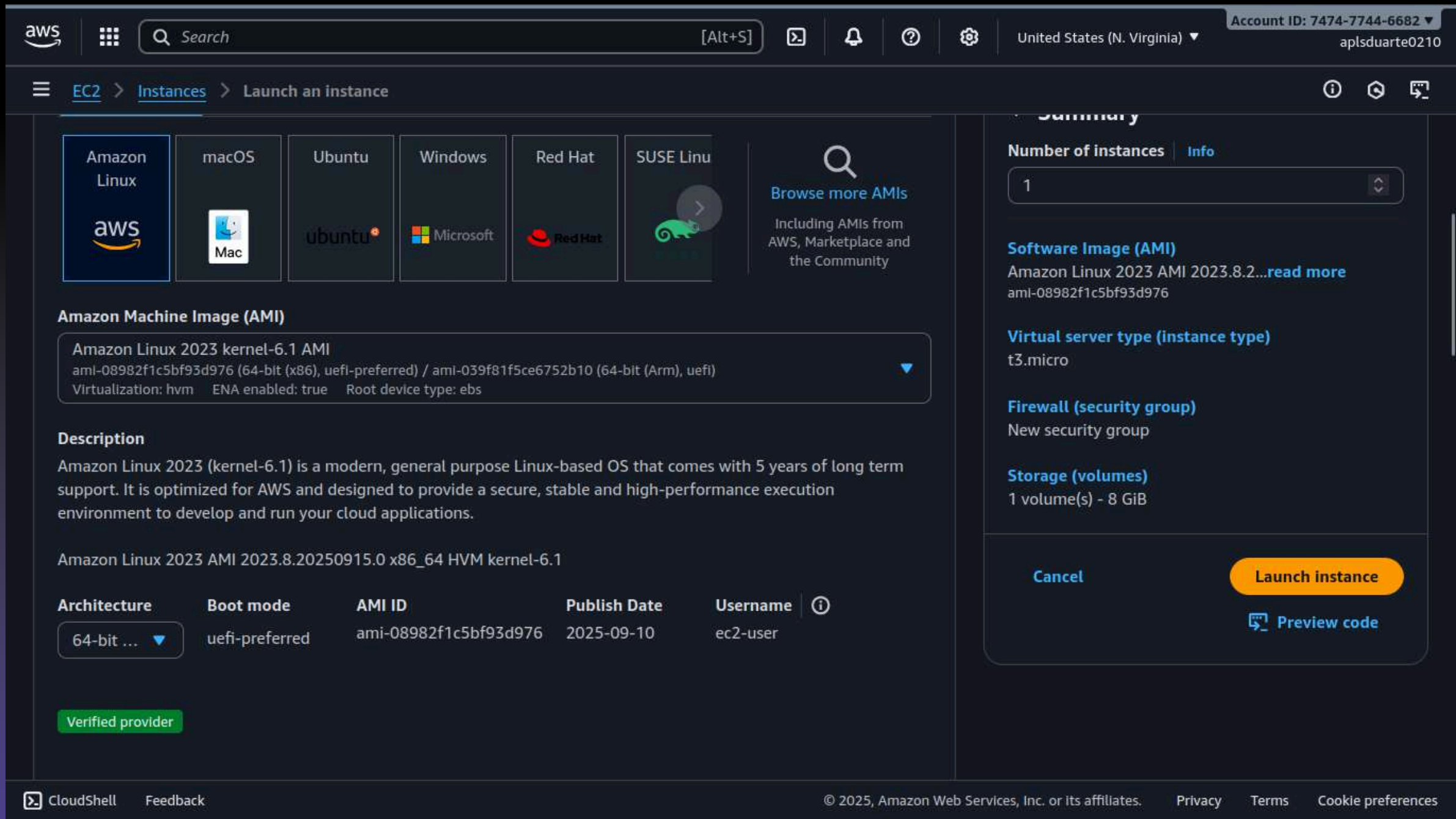


Setembro/2025

-

apduarte@gmail.com

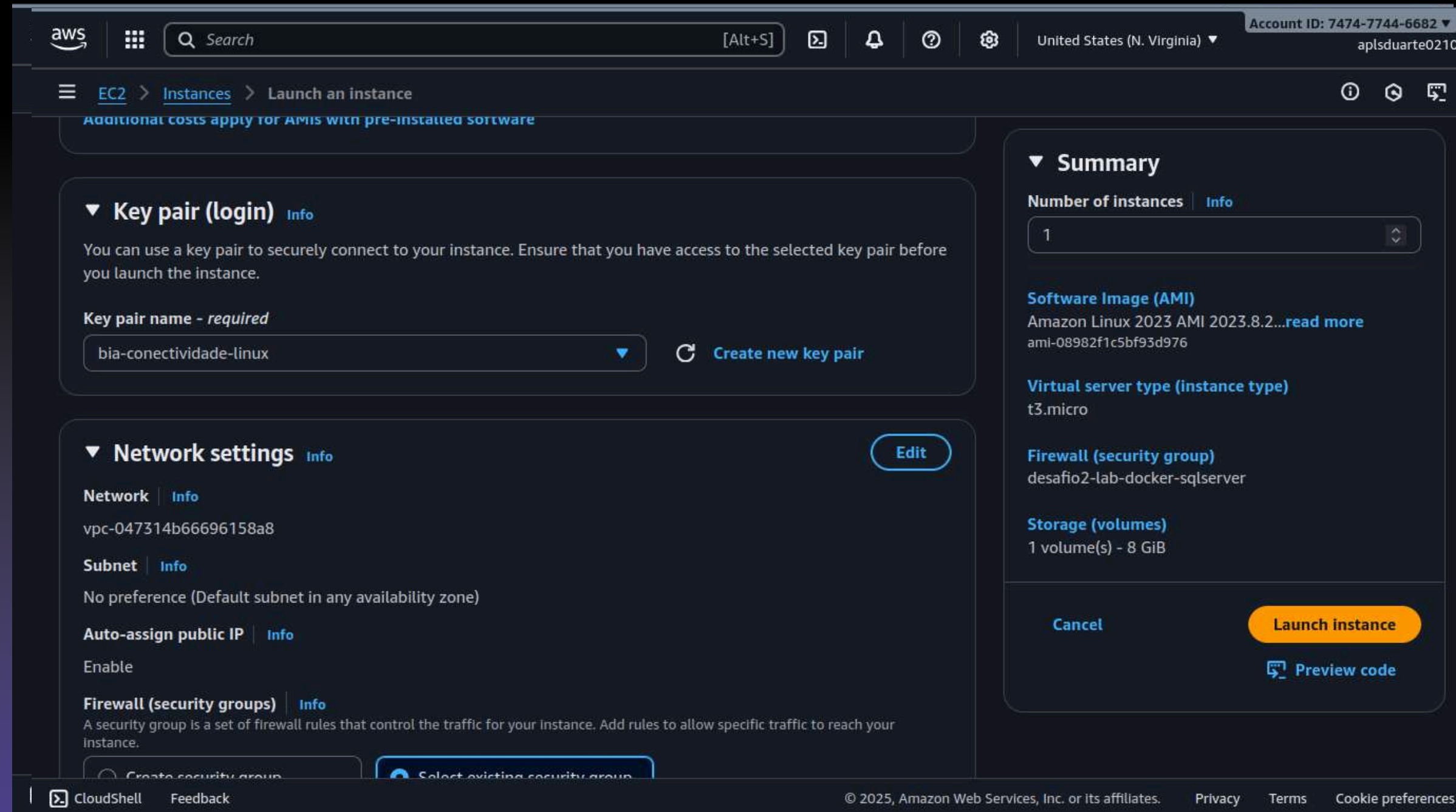
3. Amazon Machine Image (AMI): É a definição do sistema operacional e software inicial da instância. O modelo selecionado é Amazon Linux 2023, que é gratuito no nível Free Tier e otimizado para rodar na AWS.



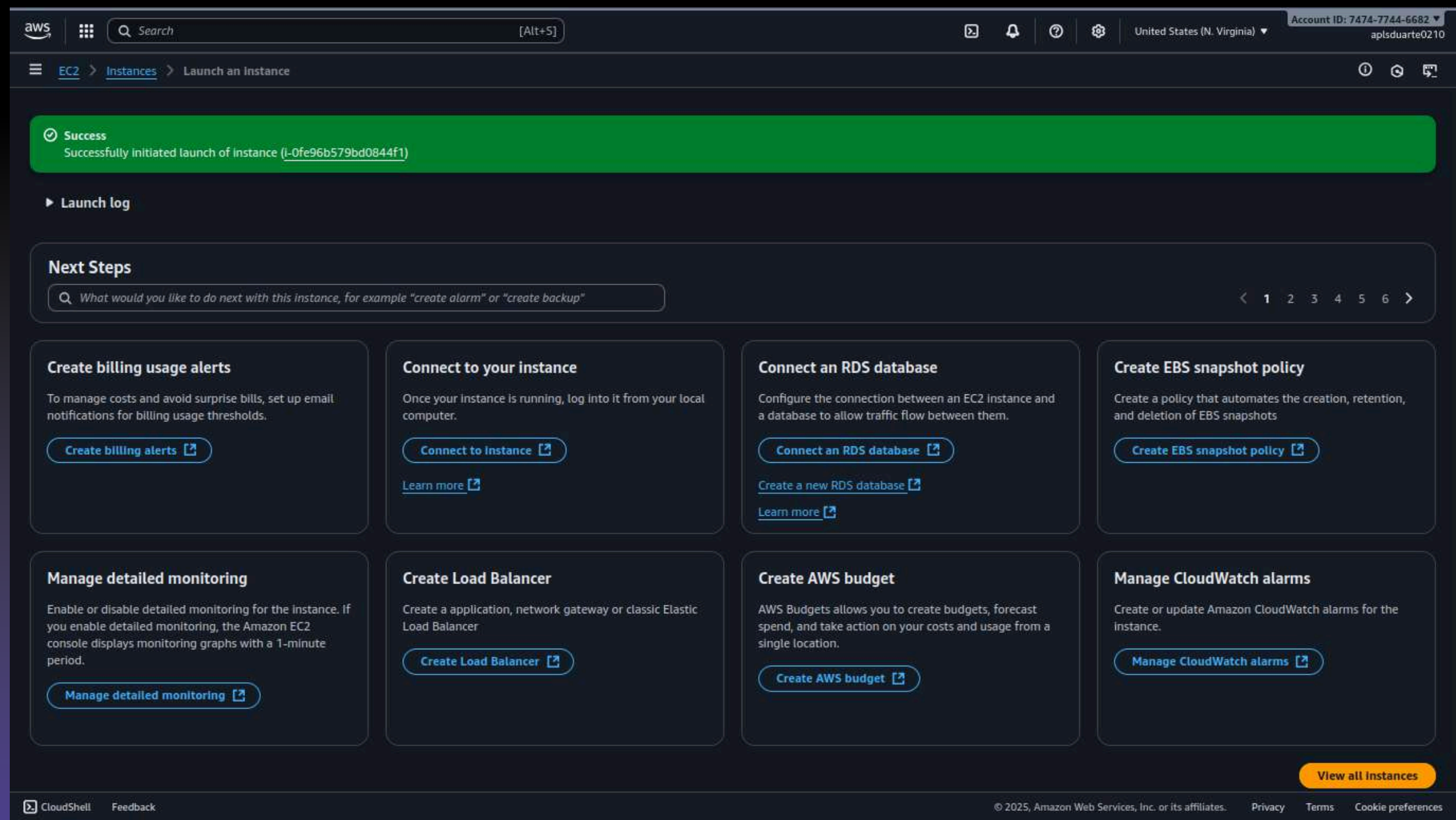
4. Key Pair: Foi criado o par de chaves bia-conectividade para permitir acesso seguro à instância. Utilizamos o algoritmo RSA, por ser amplamente aceito e confiável na AWS. Esse algoritmo garante um bom equilíbrio entre segurança e compatibilidade.

A chave privada é gerada no formato .pem (Privacy Enhanced Mail).

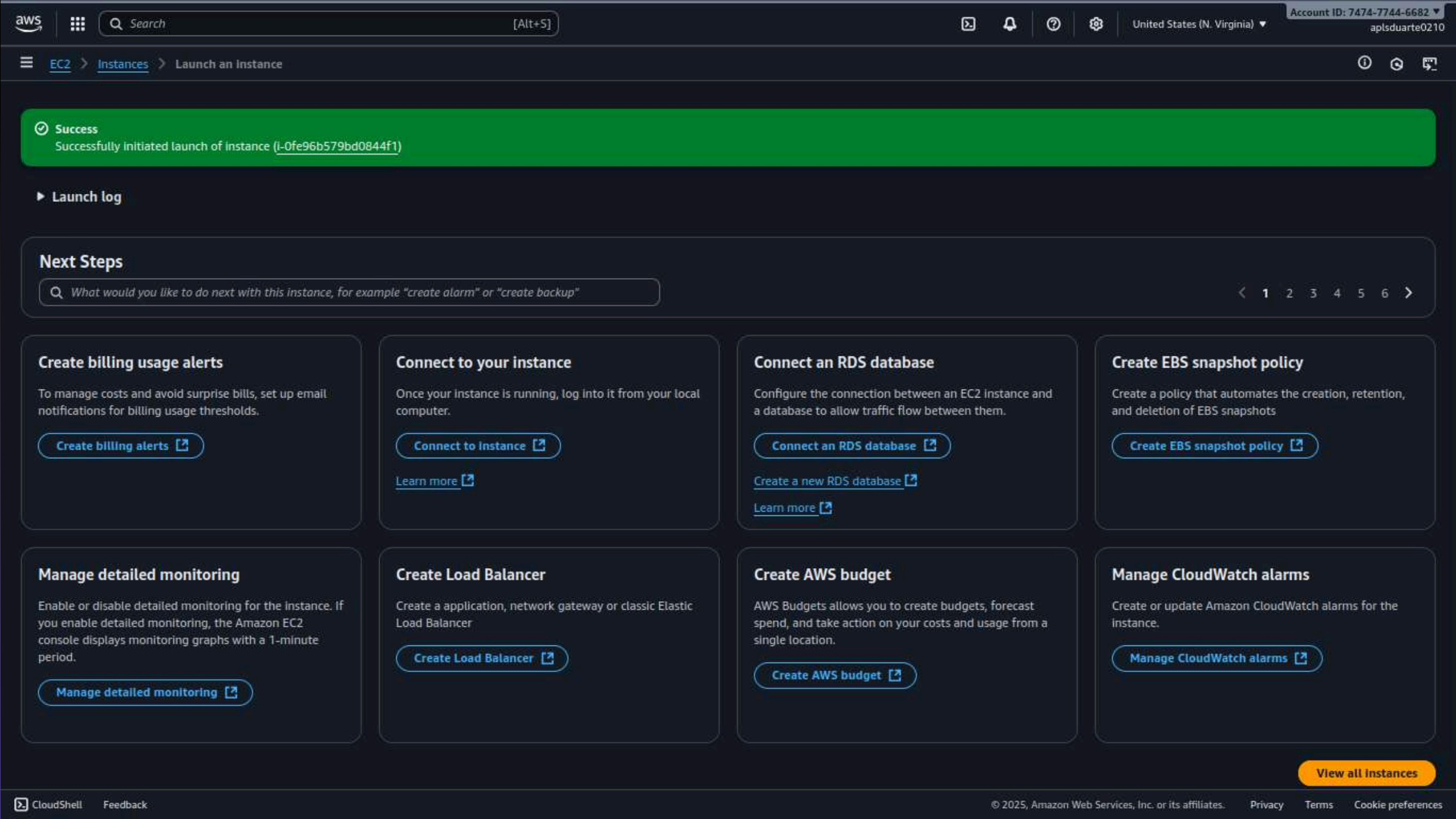
O arquivo .pem é essencial para conexões SSH seguras, sem uso de senha.



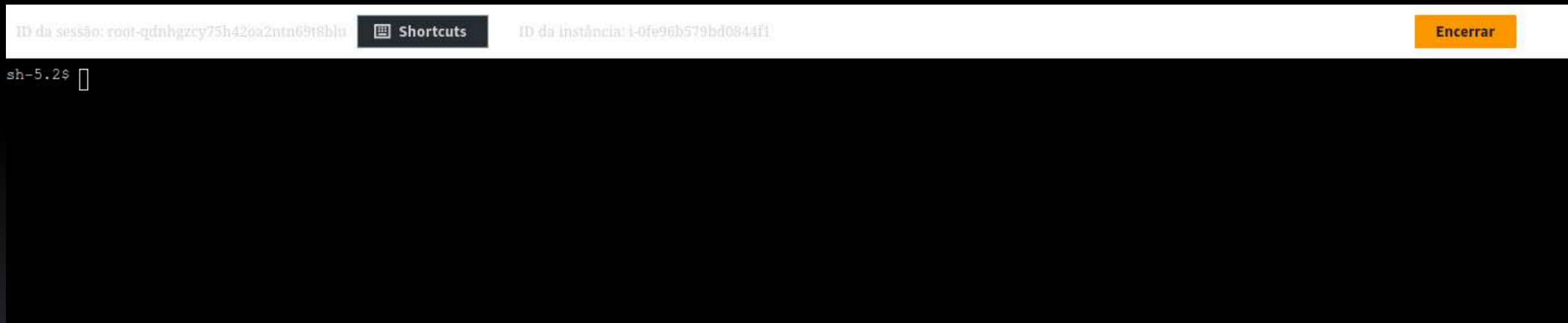
5.Instância EC2 criada com sucesso na AWS (Região N. Virgínia).
A tela confirma a inicialização bem-sucedida da instância, exibindo o ID 0fe96b579bd0844f1, pronta para acesso remoto e configuração dos próximos recursos do ambiente.



5. Instância EC2 criada com sucesso na AWS (Região N. Virgínia).
A tela confirma a inicialização correta do ambiente, com o ID da instância gerado e pronta para configuração e execução dos próximos passos do laboratório.



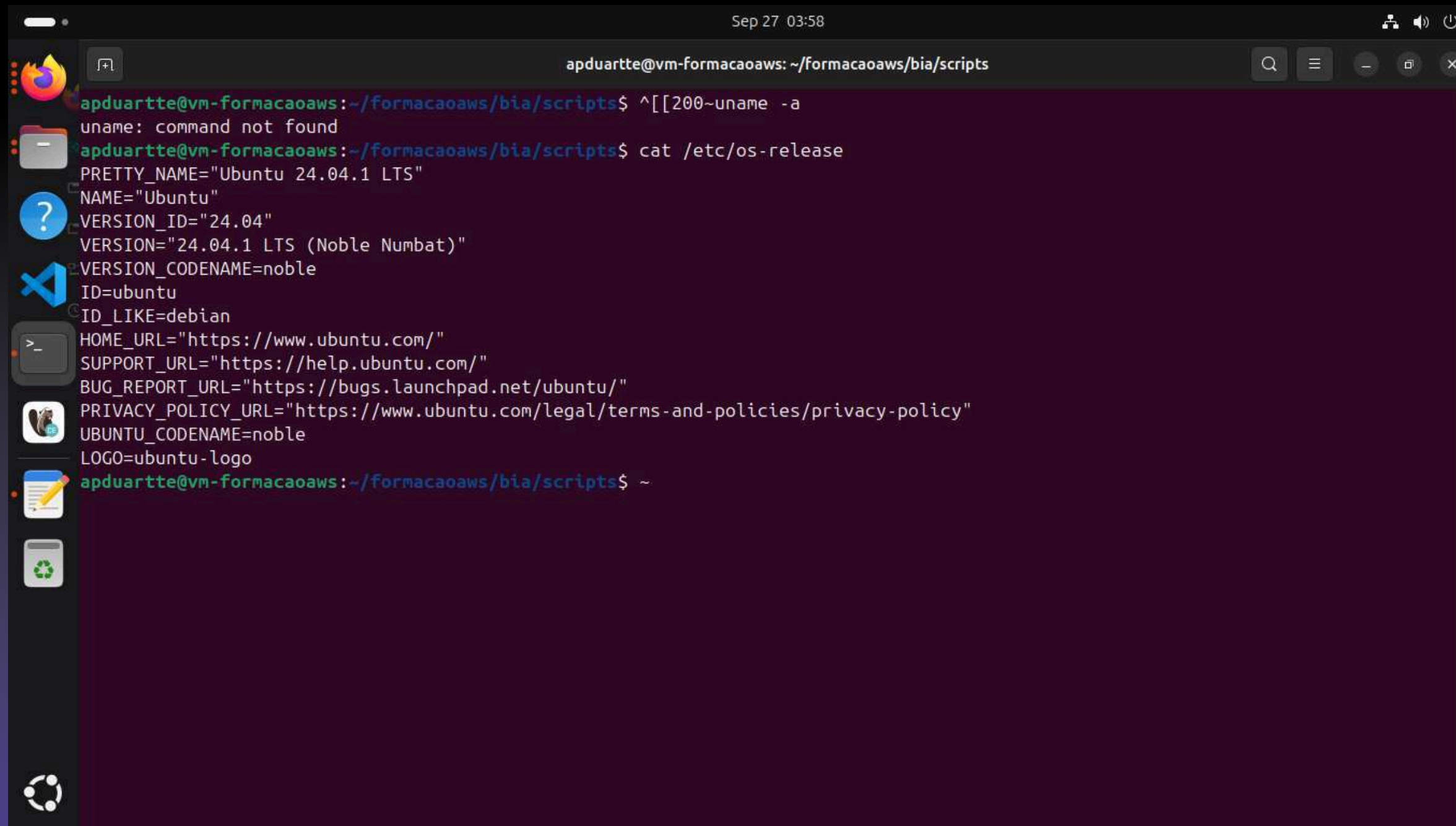
6. Conexão Session Manager - Acesso à EC2 realizada com sucesso!



🔒 SSH vs Session Manager – Acesso à EC2

Aspecto	SSH Tradicional	Session Manager
Chave de acesso	Precisa de arquivo <code>.pem</code> (key pair)	Não precisa de chave <code>.pem</code>
Portas	Porta 22/TCP deve estar liberada no Security Group	Não requer porta aberta (usa o agente SSM)
Segurança	Exposição da porta SSH pode ser alvo de ataques	Mais seguro, sem porta exposta
Dependências	Cliente SSH instalado localmente + permissões corretas	Apenas navegador + console AWS
Controle de auditoria	Logs de sessão não são gravados automaticamente	Pode registrar logs no CloudWatch/CloudTrail
Facilidade	Requer configurar IP, chave e permissões	Basta clicar em <i>Conectar</i> no Console AWS
Casos de uso	Bom para ambientes tradicionais com acesso direto	Ideal para ambientes seguros e gerenciados (prod/hardening)

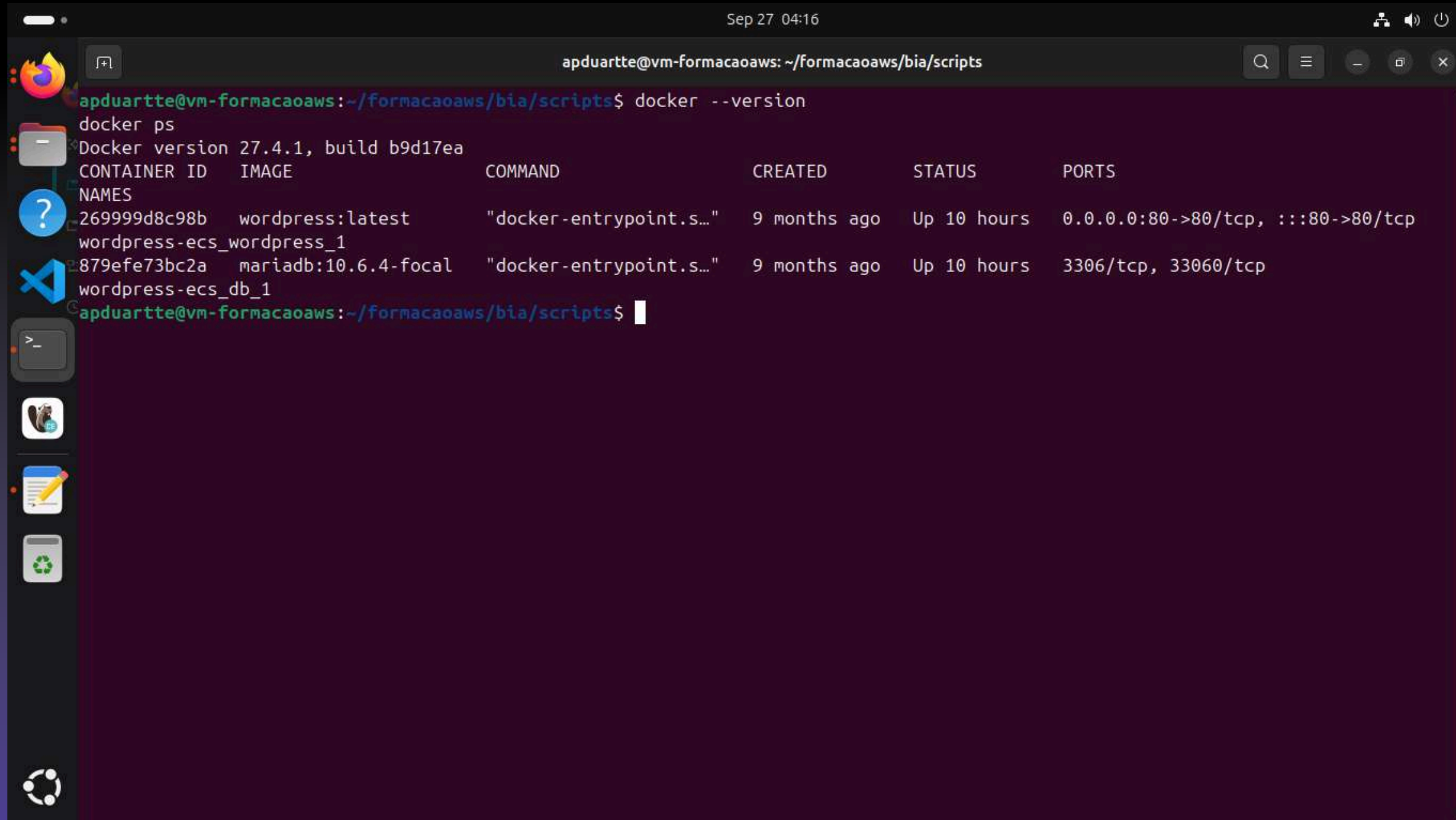
7. Identificação do sistema operacional concluída com sucesso. A imagem mostra a instância EC2 executando Ubuntu 24.04.1 LTS(Noble Numbat), baseado em Debian, garantindo estabilidade, suporte prolongado e compatibilidade com ferramentas como Docker, Node.js e Python..

A terminal window titled 'apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts' with a timestamp 'Sep 27 03:58'. The terminal shows the user attempting to run 'uname -a' (which fails with 'command not found') and then running 'cat /etc/os-release'. The output of 'cat /etc/os-release' is displayed, showing system information for Ubuntu 24.04.1 LTS (Noble Numbat). The terminal window has a dark theme and a sidebar with application icons on the left.

```
apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts$ ^[[200~uname -a
uname: command not found
apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts$ cat /etc/os-release
PRETTY_NAME="Ubuntu 24.04.1 LTS"
NAME="Ubuntu"
VERSION_ID="24.04"
VERSION="24.04.1 LTS (Noble Numbat)"
VERSION_CODENAME=noble
ID=ubuntu
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
UBUNTU_CODENAME=noble
LOGO=ubuntu-logo
apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts$ ~
```

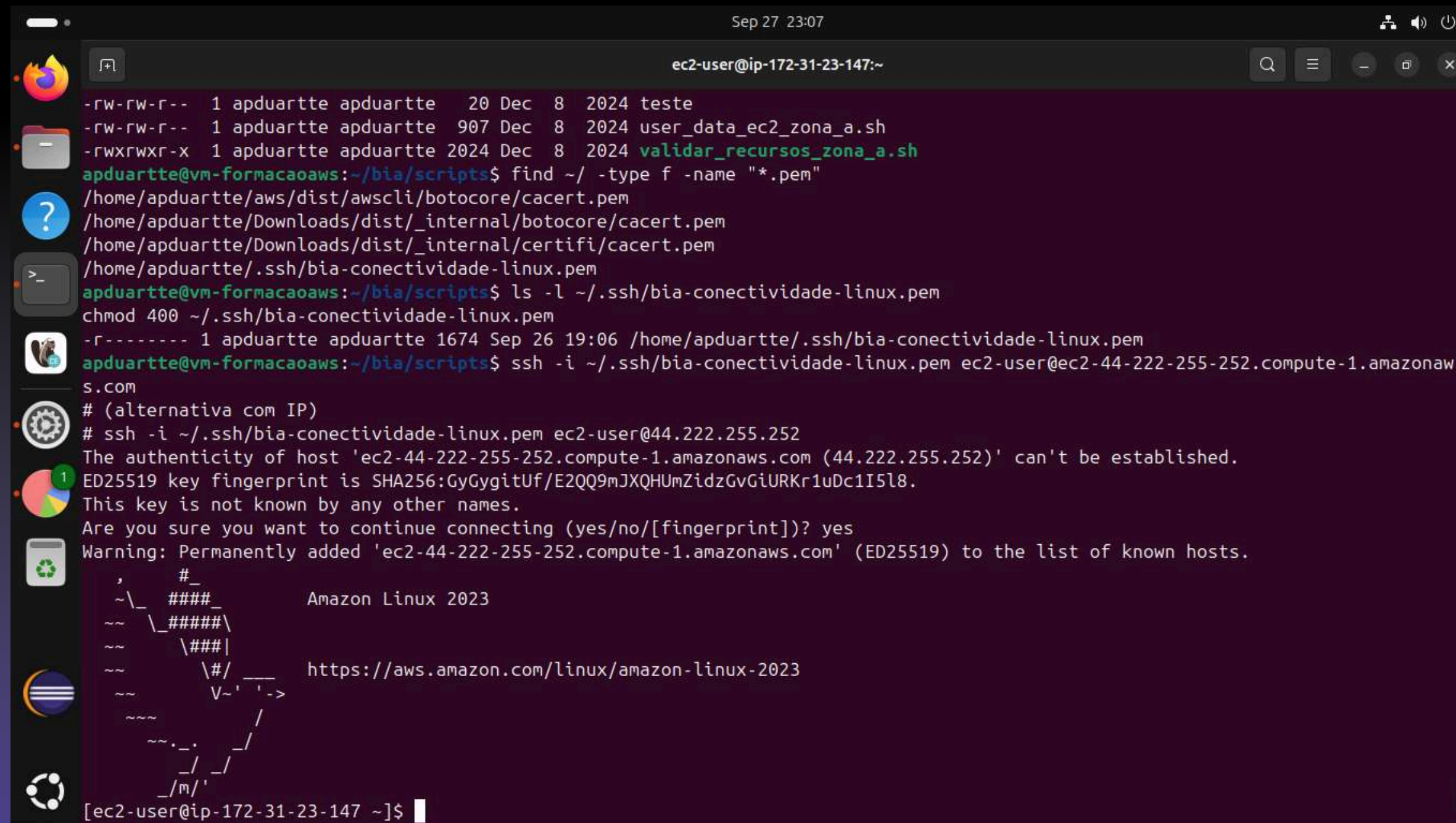

08. Verificação do ambiente Linux concluída com sucesso.

A imagem mostra o terminal confirmando o uso da distro Ubuntu 24.04.1 LTS (Noble Numbat) baseada em Debian, com o Docker versão 27.4.1 ativo e containers em execução, demonstrando ambiente estável e pronto para operação.

A terminal window titled 'apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts' with a timestamp 'Sep 27 04:16'. The terminal shows the command 'docker --version' and its output: 'Docker version 27.4.1, build b9d17ea'. Below this, the command 'docker ps' is executed, displaying a table of running containers. The table has columns for CONTAINER ID, IMAGE, COMMAND, CREATED, STATUS, and PORTS. Two containers are listed: 'wordpress-ecs_wordpress_1' (ID: 269999d8c98b) and 'wordpress-ecs_db_1' (ID: 879efe73bc2a). The terminal window has a sidebar with icons for Firefox, Files, Visual Studio Code, and other applications.

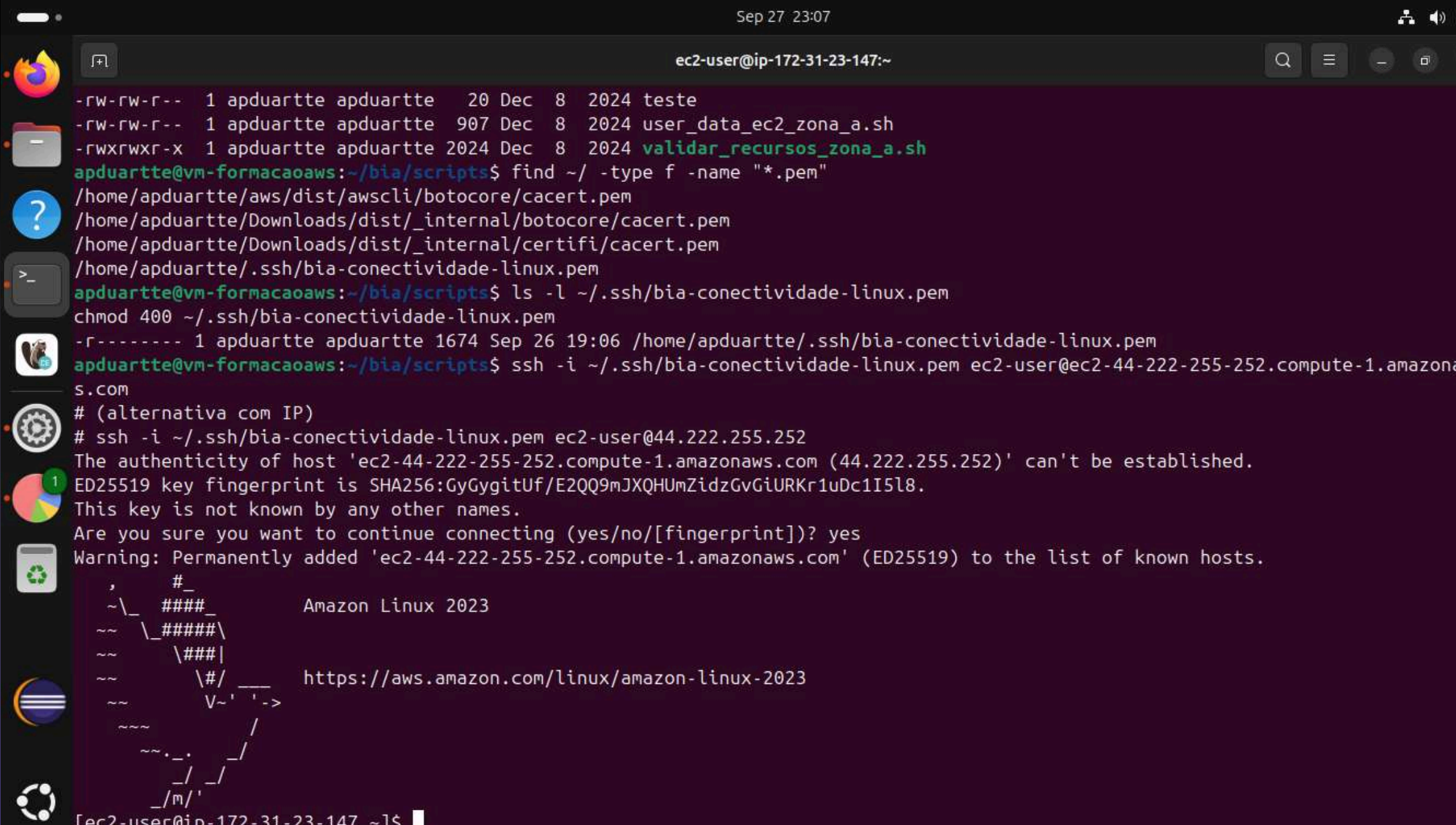
```
apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts$ docker --version
Docker version 27.4.1, build b9d17ea
apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts$ docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED        STATUS        PORTS
269999d8c98b   wordpress:latest      "docker-entrypoint.s..." 9 months ago   Up 10 hours   0.0.0.0:80->80/tcp, :::80->80/tcp
879efe73bc2a   mariadb:10.6.4-focal "docker-entrypoint.s..." 9 months ago   Up 10 hours   3306/tcp, 33060/tcp
apduartte@vm-formacaoaws: ~/formacaoaws/bia/scripts$
```

9. Conexão SSH estabelecida com sucesso na instância EC2 Linux, utilizando a chave bia-conectividade-linux.pem, confirmando o acesso seguro ao ambiente AWS.



```
Sep 27 23:07
ec2-user@ip-172-31-23-147:~
-rw-rw-r-- 1 apduartte apduartte 20 Dec 8 2024 teste
-rw-rw-r-- 1 apduartte apduartte 907 Dec 8 2024 user_data_ec2_zona_a.sh
-rwxrwxr-x 1 apduartte apduartte 2024 Dec 8 2024 validar_recursos_zona_a.sh
apduartte@vm-formacaoaws:~/bia/scripts$ find ~/ -type f -name "*.pem"
/home/apduartte/aws/dist/awscli/botocore/cacert.pem
/home/apduartte/Downloads/dist/_internal/botocore/cacert.pem
/home/apduartte/Downloads/dist/_internal/certifi/cacert.pem
/home/apduartte/.ssh/bia-conectividade-linux.pem
apduartte@vm-formacaoaws:~/bia/scripts$ ls -l ~/.ssh/bia-conectividade-linux.pem
-r----- 1 apduartte apduartte 1674 Sep 26 19:06 /home/apduartte/.ssh/bia-conectividade-linux.pem
apduartte@vm-formacaoaws:~/bia/scripts$ ssh -i ~/.ssh/bia-conectividade-linux.pem ec2-user@ec2-44-222-255-252.compute-1.amazonaws.com
# (alternativa com IP)
# ssh -i ~/.ssh/bia-conectividade-linux.pem ec2-user@44.222.255.252
The authenticity of host 'ec2-44-222-255-252.compute-1.amazonaws.com (44.222.255.252)' can't be established.
ED25519 key fingerprint is SHA256:GyGygitUf/E2QQ9mJXQHUmZidzGvGiURKr1uDc1I5l8.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-44-222-255-252.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
#_
~\_ ##### Amazon Linux 2023
~~\_ #####\
~~\_ #####|
~~\_ \###|
~~\_ \#/ https://aws.amazon.com/linux/amazon-linux-2023
~~\_ V~' '->
~~~
~~\_ .\_
~~\_ /\_
~~\_ /m/'
[ec2-user@ip-172-31-23-147 ~]$
```


10. Verificação do ambiente Docker realizada com sucesso, confirmando a versão 25.0.8 instalada e pronta para execução dos containers no servidor EC2.

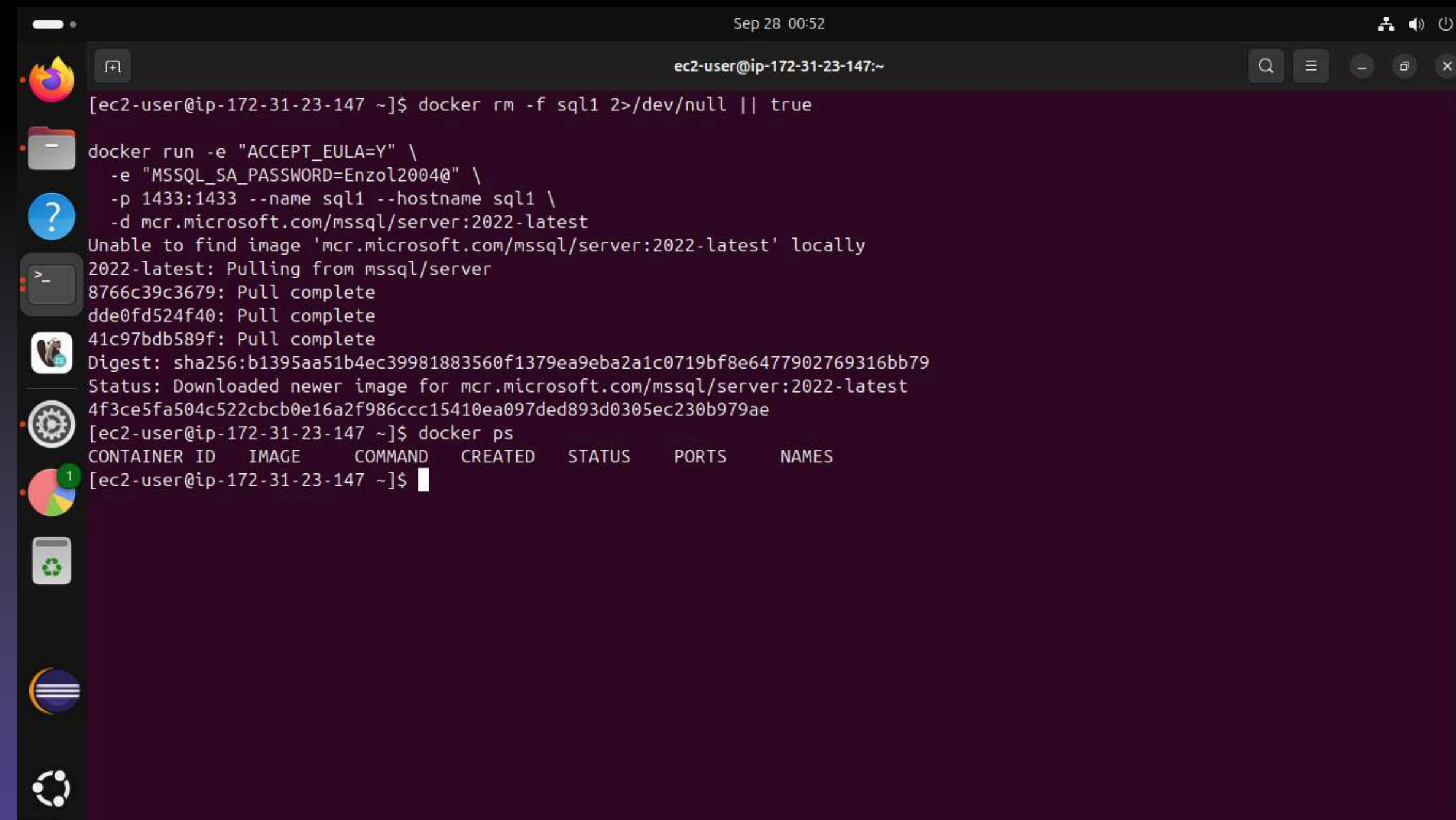


```
ec2-user@ip-172-31-23-147:~  
-rw-rw-r-- 1 apduartte apduartte 20 Dec 8 2024 teste  
-rw-rw-r-- 1 apduartte apduartte 907 Dec 8 2024 user_data_ec2_zona_a.sh  
-rwxrwxr-x 1 apduartte apduartte 2024 Dec 8 2024 validar_recursos_zona_a.sh  
apduartte@vm-formacaoaws:~/bia/scripts$ find ~/ -type f -name "*.pem"  
/home/apduartte/aws/dist/awscli/botocore/cacert.pem  
/home/apduartte/Downloads/dist/_internal/botocore/cacert.pem  
/home/apduartte/Downloads/dist/_internal/certifi/cacert.pem  
/home/apduartte/.ssh/bia-conectividade-linux.pem  
apduartte@vm-formacaoaws:~/bia/scripts$ ls -l ~/.ssh/bia-conectividade-linux.pem  
chmod 400 ~/.ssh/bia-conectividade-linux.pem  
-r----- 1 apduartte apduartte 1674 Sep 26 19:06 /home/apduartte/.ssh/bia-conectividade-linux.pem  
apduartte@vm-formacaoaws:~/bia/scripts$ ssh -i ~/.ssh/bia-conectividade-linux.pem ec2-user@ec2-44-222-255-252.compute-1.amazonaws.com  
# (alternativa com IP)  
# ssh -i ~/.ssh/bia-conectividade-linux.pem ec2-user@44.222.255.252  
The authenticity of host 'ec2-44-222-255-252.compute-1.amazonaws.com (44.222.255.252)' can't be established.  
ED25519 key fingerprint is SHA256:GyGygitUf/E2QQ9mJXQHUmZidzGvGiURKr1uDc1I5l8.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added 'ec2-44-222-255-252.compute-1.amazonaws.com' (ED25519) to the list of known hosts.  
#  
~\_ ##### Amazon Linux 2023  
~~ \_#####\  
~~ \_###|  
~~ \#/ https://aws.amazon.com/linux/amazon-linux-2023  
~~ V~' '->  
~~~  
~~ .-_  
~~ _/_/_  
~~ _/m/'  
[ec2-user@ip-172-31-23-147 ~]$
```


11.. Backup AdventureWorks2022.bak baixado e instalado com sucesso na instância EC2, confirmando a importação correta do arquivo para o ambiente Docker do SQL Server.

```
ec2-user@ip-172-31-23-147:~  
HTTP request sent, awaiting response... 302 Found  
Location: https://release-assets.githubusercontent.com/github-production-release-asset/53698446/bea81028-d987-42dd-972d-9417c5e6bd1c?sp=r&sv=2018-11-09&sr=b&spr=https&se=2025-09-28T01%3A17%3A26Z&rscd=attachment%3B+filename%3DAdventureWorks2022.bak&rsct=application%2Foctet-stream&skoid=96c2d410-5711-43a1-aedd-ab1947aa7ab0&sktid=398a6654-997b-47e9-b12b-9515b896b4de&skt=2025-09-28T00%3A16%3A54Z&ske=2025-09-28T01%3A17%3A26Z&skv=2018-11-09&sig=m%2FKjJyOUVVG8iMg%2FvF8QVuFGORqqcoJe%2BZQqKC88L1Y%3D&jwt=eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJpc3MiOiJnaXNldHMuZ2l0aHVidXNlcmNvbniRlbnQuY29tIiwia2V5Ijoia2V5MSIsImV4cCI6MTc1OTAxOTUwNSwiImIjoixNzU5MDU0ODAwLCJwYXRoIjoicmVsZWZfZWZfc2V0cHJvZHVjdGlubi5ibG9iLmNvcnUud2luZG93cy5uZXQifQ.ocLoOnTkK7E6Xa86Hx2t66Ma0V6_iz-seprbwTAGKp0&response-content-disposition=attachment%3B%20filename%3DAdventureWorks2022.bak&response-content-type=application%2Foctet-stream [following]  
--2025-09-28 00:20:05-- https://release-assets.githubusercontent.com/github-production-release-asset/53698446/bea81028-d987-42dd-972d-9417c5e6bd1c?sp=r&sv=2018-11-09&sr=b&spr=https&se=2025-09-28T01%3A17%3A26Z&rscd=attachment%3B+filename%3DAdventureWorks2022.bak&rsct=application%2Foctet-stream&skoid=96c2d410-5711-43a1-aedd-ab1947aa7ab0&sktid=398a6654-997b-47e9-b12b-9515b896b4de&skt=2025-09-28T00%3A16%3A54Z&ske=2025-09-28T01%3A17%3A26Z&skv=2018-11-09&sig=m%2FKjJyOUVVG8iMg%2FvF8QVuFGORqqcoJe%2BZQqKC88L1Y%3D&jwt=eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJpc3MiOiJnaXNldHMuZ2l0aHVidXNlcmNvbniRlbnQuY29tIiwia2V5Ijoia2V5MSIsImV4cCI6MTc1OTAxOTUwNSwiImIjoixNzU5MDU0ODAwLCJwYXRoIjoicmVsZWZfZWZfc2V0cHJvZHVjdGlubi5ibG9iLmNvcnUud2luZG93cy5uZXQifQ.ocLoOnTkK7E6Xa86Hx2t66Ma0V6_iz-seprbwTAGKp0&response-content-disposition=attachment%3B%20filename%3DAdventureWorks2022.bak&response-content-type=application%2Foctet-stream  
Resolving release-assets.githubusercontent.com (release-assets.githubusercontent.com)... 185.199.109.133, 185.199.111.133, 185.199.110.133, ...  
Connecting to release-assets.githubusercontent.com (release-assets.githubusercontent.com)|185.199.109.133|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 209838080 (200M) [application/octet-stream]  
Saving to: 'AdventureWorks2022.bak'  
  
AdventureWorks2022.bak      100%[=====>] 200.12M  91.7MB/s   in 2.2s  
2025-09-28 00:20:07 (91.7 MB/s) - 'AdventureWorks2022.bak' saved [209838080/209838080]  
  
[ec2-user@ip-172-31-23-147 ~]$ ls  
AdventureWorks2022.bak  
[ec2-user@ip-172-31-23-147 ~]$
```


12.Imagem do SQL Server 2022 baixada com sucesso e container em execução no EC2 via Docker, configurado para escutar na porta 1433



Sep 28 00:52

ec2-user@ip-172-31-23-147:~

```
[ec2-user@ip-172-31-23-147 ~]$ docker rm -f sql1 2>/dev/null || true
```

```
docker run -e "ACCEPT_EULA=Y" \
-e "MSSQL_SA_PASSWORD=Enzo12004@" \
-p 1433:1433 --name sql1 --hostname sql1 \
-d mcr.microsoft.com/mssql/server:2022-latest
```

Unable to find image 'mcr.microsoft.com/mssql/server:2022-latest' locally

2022-latest: Pulling from mssql/server

8766c39c3679: Pull complete

dde0fd524f40: Pull complete

41c97bdb589f: Pull complete

Digest: sha256:b1395aa51b4ec39981883560f1379ea9eba2a1c0719bf8e6477902769316bb79

Status: Downloaded newer image for mcr.microsoft.com/mssql/server:2022-latest

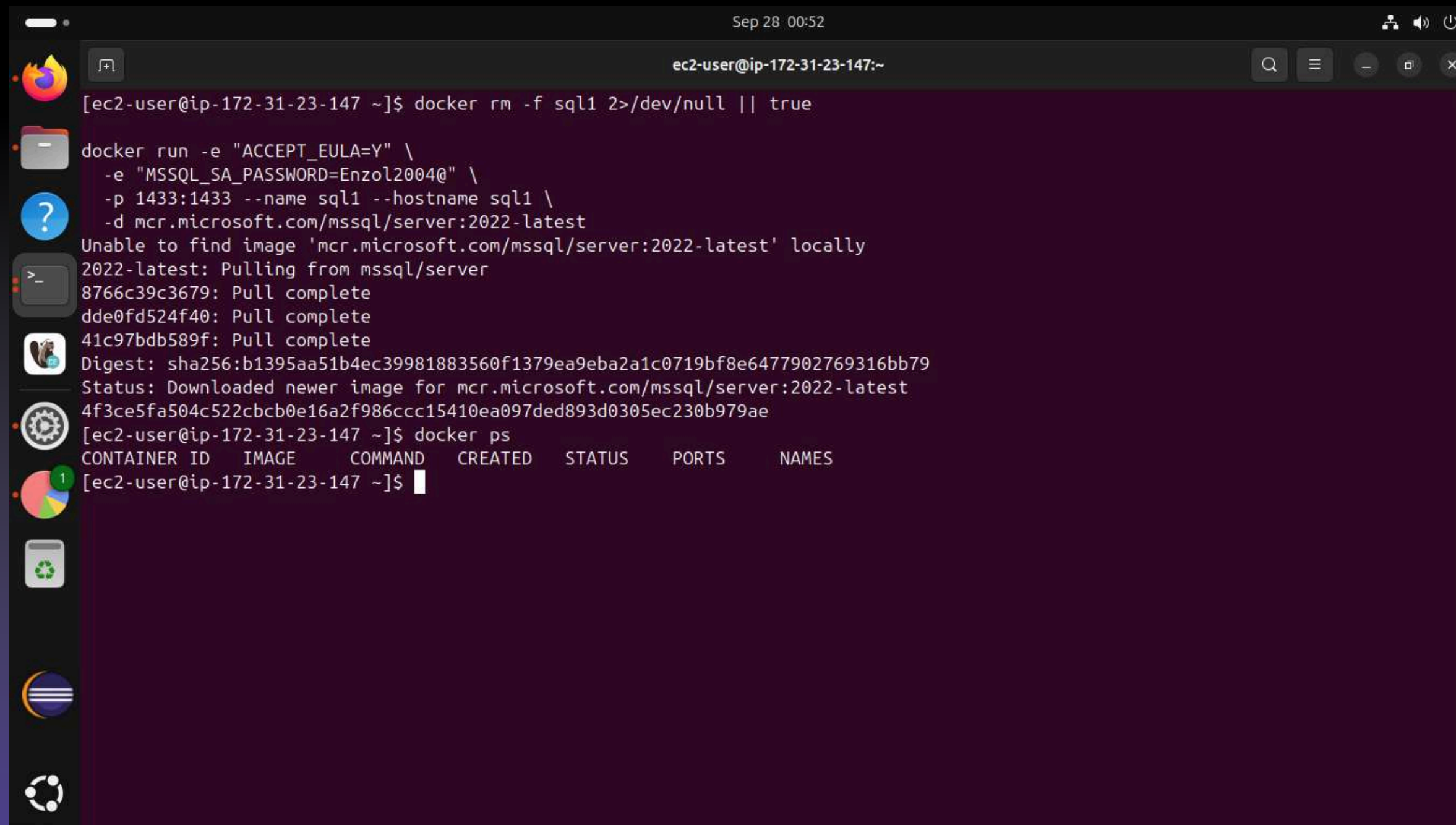
4f3ce5fa504c522cbcb0e16a2f986ccc15410ea097ded893d0305ec230b979ae

```
[ec2-user@ip-172-31-23-147 ~]$ docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
ec2-user@ip-172-31-23-147 ~]						

```
[ec2-user@ip-172-31-23-147 ~]$
```

13. Coloquei o SQL Server 2022 para rodar em uma EC2 usando Docker e conectei com segurança via AWS Systems Manager (port forwarding) — sem expor a porta 1433 na internet. Ajustei permissões (UID 10001), validei a escuta com `ss -lntp` e conectei no DBeaver via `localhost:1436`. Resultado: ambiente reproduzível, seguro e pronto para restaurar o AdventureWorks e praticar consultas. 🚀



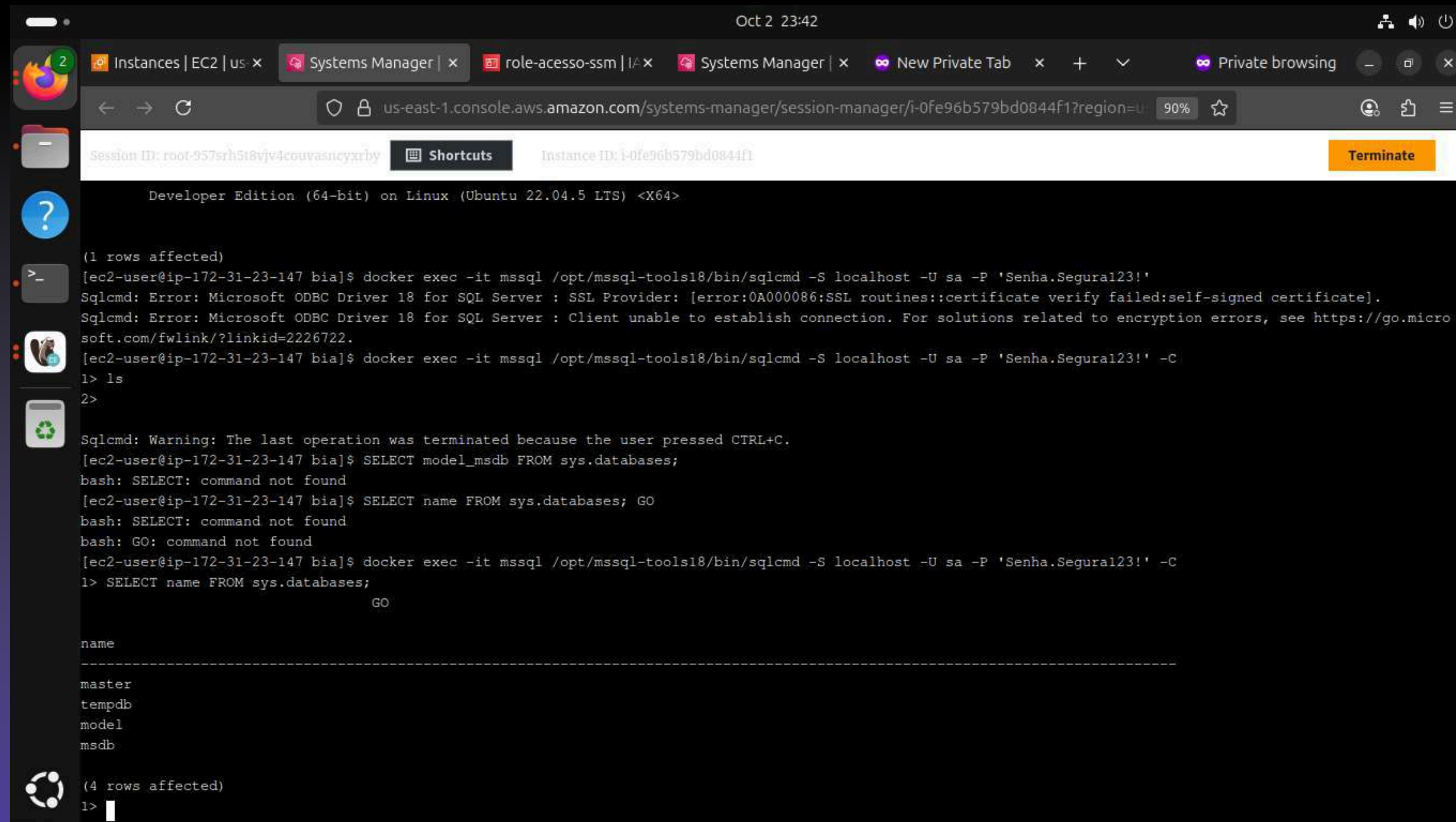
```
Sep 28 00:52
ec2-user@ip-172-31-23-147:~
[ec2-user@ip-172-31-23-147 ~]$ docker rm -f sql1 2>/dev/null || true

docker run -e "ACCEPT_EULA=Y" \
-e "MSSQL_SA_PASSWORD=Enz0l2004@" \
-p 1433:1433 --name sql1 --hostname sql1 \
-d mcr.microsoft.com/mssql/server:2022-latest
Unable to find image 'mcr.microsoft.com/mssql/server:2022-latest' locally
2022-latest: Pulling from mssql/server
8766c39c3679: Pull complete
dde0fd524f40: Pull complete
41c97bdb589f: Pull complete
Digest: sha256:b1395aa51b4ec39981883560f1379ea9eba2a1c0719bf8e6477902769316bb79
Status: Downloaded newer image for mcr.microsoft.com/mssql/server:2022-latest
4f3ce5fa504c522cbcb0e16a2f986ccc15410ea097ded893d0305ec230b979ae
[ec2-user@ip-172-31-23-147 ~]$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS          NAMES
[ec2-user@ip-172-31-23-147 ~]$
```


14. Conexão SQL Server no EC2 (Docker)

O container do SQL Server 2022 foi executado no EC2 via Docker.

A conexão pelo sqlcmd retornou os bancos padrão: master, tempdb, model e msdb, confirmando funcionamento correto do servidor.



```
Oct 2 23:42
Instances | EC2 | us- Systems Manager | role-acesso-ssm | Systems Manager | New Private Tab | Private browsing
us-east-1.console.aws.amazon.com/systems-manager/session-manager/i-0fe96b579bd0844f1?region=us-east-1
Session ID: root-957srh5t8vjv4couvaasncyxrby Instance ID: i-0fe96b579bd0844f1 Terminate

Developer Edition (64-bit) on Linux (Ubuntu 22.04.5 LTS) <X64>

(1 rows affected)
[ec2-user@ip-172-31-23-147 bia]$ docker exec -it mssql /opt/mssql-tools18/bin/sqlcmd -S localhost -U sa -P 'Senha.Segural23!'
Sqlcmd: Error: Microsoft ODBC Driver 18 for SQL Server : SSL Provider: [error:0A000086:SSL routines::certificate verify failed:self-signed certificate].
Sqlcmd: Error: Microsoft ODBC Driver 18 for SQL Server : Client unable to establish connection. For solutions related to encryption errors, see https://go.micro
soft.com/fwlink/?linkid=2226722.
[ec2-user@ip-172-31-23-147 bia]$ docker exec -it mssql /opt/mssql-tools18/bin/sqlcmd -S localhost -U sa -P 'Senha.Segural23!' -C
1> ls
2>

Sqlcmd: Warning: The last operation was terminated because the user pressed CTRL+C.
[ec2-user@ip-172-31-23-147 bia]$ SELECT model_msdb FROM sys.databases;
bash: SELECT: command not found
[ec2-user@ip-172-31-23-147 bia]$ SELECT name FROM sys.databases; GO
bash: SELECT: command not found
bash: GO: command not found
[ec2-user@ip-172-31-23-147 bia]$ docker exec -it mssql /opt/mssql-tools18/bin/sqlcmd -S localhost -U sa -P 'Senha.Segural23!' -C
1> SELECT name FROM sys.databases;
GO

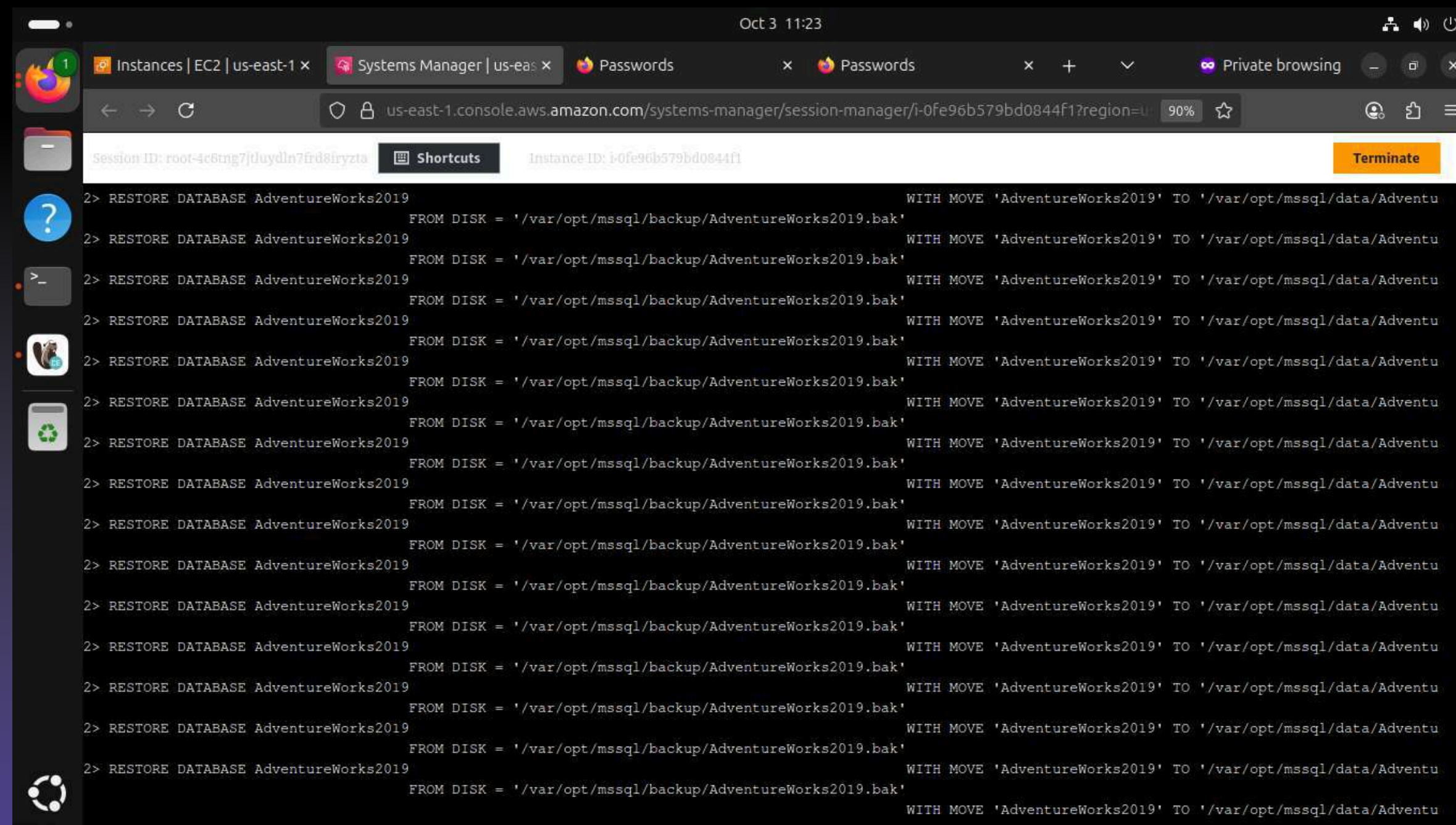
name
-----
master
tempdb
model
msdb

(4 rows affected)
1>
```

15. Restauração do Banco AdventureWorks2019

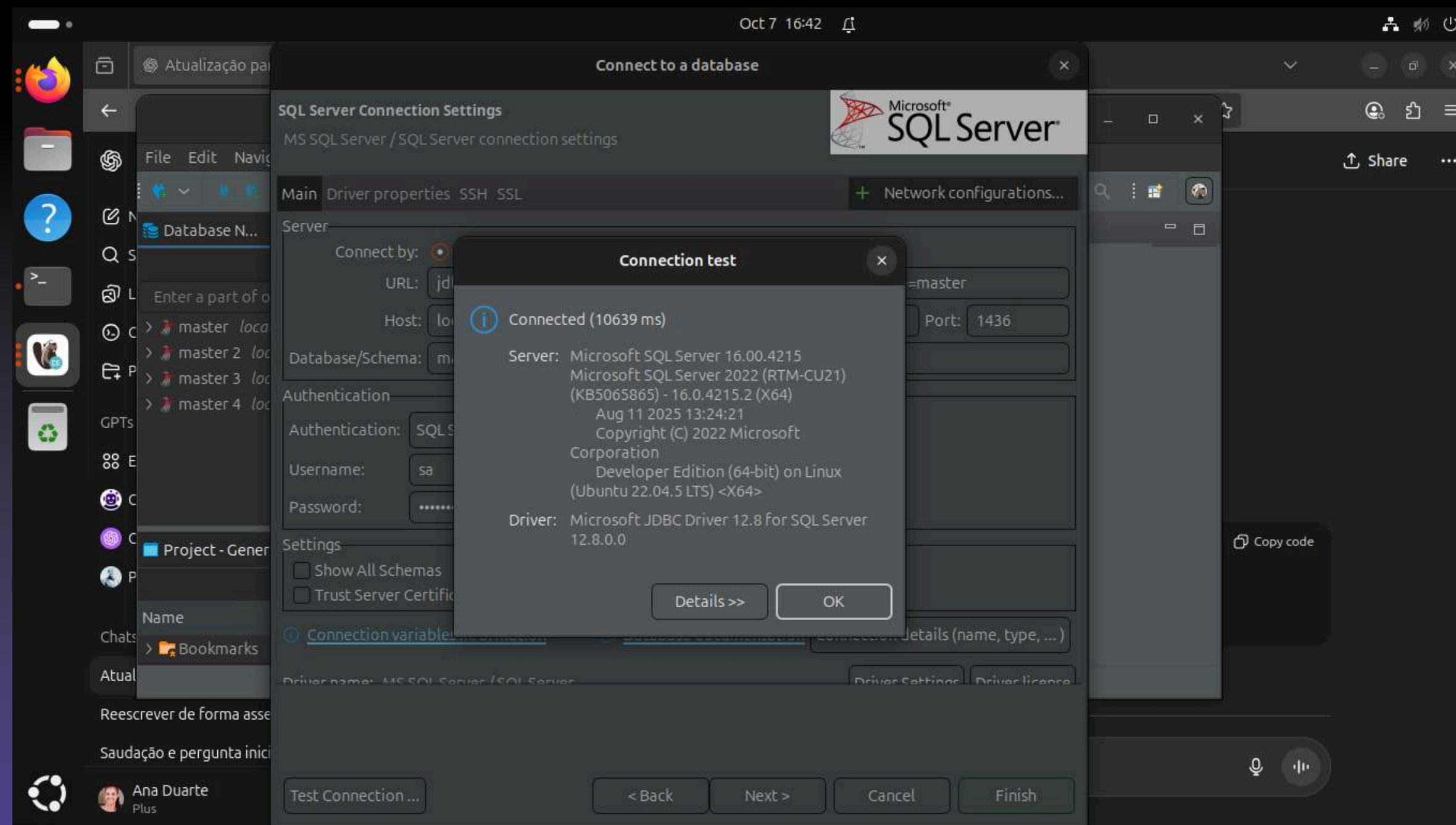
A restauração foi realizada a partir do backup em /var/opt/mssql/backup/.

Os arquivos lógicos foram identificados com RESTORE FILELISTONLY e restaurados corretamente com WITH MOVE para o diretório /var/opt/mssql/data.

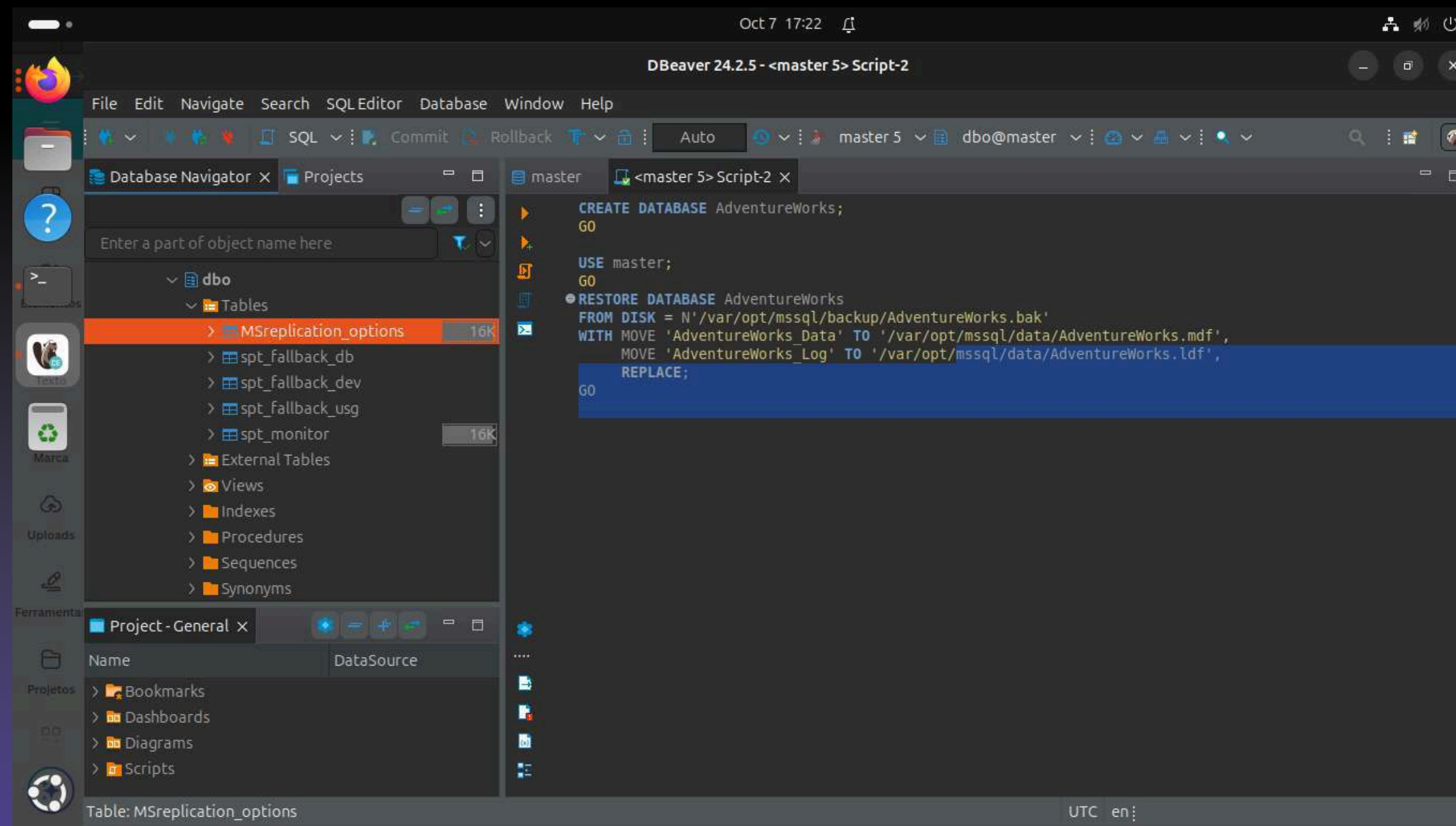


17. A conexão com o SQL Server 2022 foi realizada com sucesso na porta 1436, validando o mapeamento correto entre o host (Ubuntu/VM) e o container Docker.

O teste confirmou a comunicação ativa e segura entre o cliente DBeaver e o servidor SQL dentro do ambiente Docker, garantindo acesso total às bases e permitindo a execução de consultas.



18. Restauração do banco AdventureWorks realizada com sucesso via DBeaver, utilizando o backup .bak no container Docker e confirmando a conexão ativa na porta 1436.



19. Visualização das tabelas do banco master via DBeaver, confirmando conexão ativa com o SQL Server 2022 (porta 1436) e acesso ao schema dbo.

