

CLOUD HOSTED ROUTER

EXPANDINDO O USO DO
ROUTEROS COM
GNS3 E AWS.

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AGENDA

- Porque falar de CHR?
- O que é CHR?
- Licenciamento;
- Exemplos:
 - GNS3;
 - Amazon Web Services.

Porque falar sobre CHR?

- Apesar de não ser uma novidade da MikroTik, nem todos conhecem;
- Tem como principal característica a virtualização;
- Multiplataforma;
- Facilita o deploy do RouterOS;
- Facilmente utilizável em ambientes de testes;
- Possibilita levar o RouterOS para a nuvem.

O QUE É CHR?

De acordo com a Wiki, o Cloud Hosted Router é uma versão do RouterOS, destinada para máquinas virtuais. Tem suporte a x86 e x64, roda na maioria dos Hypervisors atuais (VirtualBox, VMware, Hyper-V, etc), e possui um método de licenciamento um pouco diferente das outras versões. Ainda assim, o CHR não deixa de possuir quase todas as funções do RouterOS.

LICENCIAMENTO

The image shows two overlapping windows from the Belluno software interface. The top window, titled "License", contains fields for "System ID" (xmsXtwYPaA), "Level" (free), "Next Renewal At", and "Deadline At". It also has a "Limited Upgrades" checkbox and buttons for "OK", "Generate New ID", and "Renew License". The bottom window, titled "Renew License", contains fields for "Account" (mum_brazil), "Password" (masked with asterisks), and "Level" (P1). It includes "Start", "Stop", and "Close" buttons. Both windows have standard Windows-style window controls (minimize, maximize, close).

License

System ID: xmsXtwYPaA

Level: free

Next Renewal At:

Deadline At:

☐ Limited Upgrades

OK

Generate New ID

Renew License

Renew License

Account: mum_brazil

Password: *****

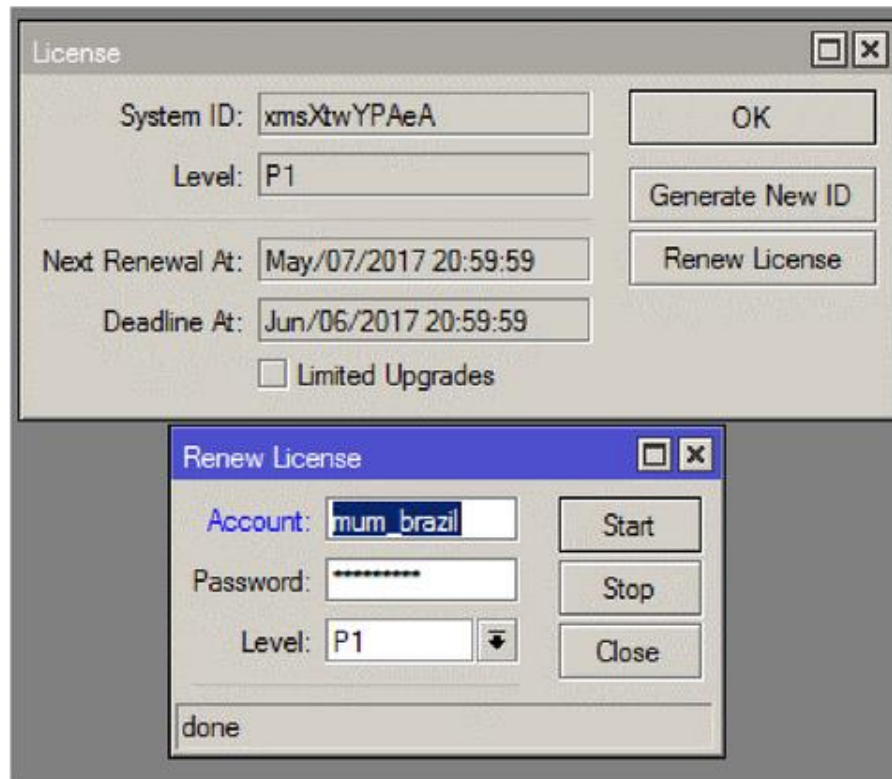
Level: P1

Start

Stop

Close

LICENCIAMENTO



The image shows two overlapping windows from a MikroTik management interface. The top window, titled 'License', contains the following fields and buttons:

- System ID: xmsXtwYPaA
- Level: P1
- Next Renewal At: May/07/2017 20:59:59
- Deadline At: Jun/06/2017 20:59:59
- ☐ Limited Upgrades
- Buttons: OK, Generate New ID, Renew License

The bottom window, titled 'Renew License', contains the following fields and buttons:

- Account: mum_brazil
- Password: *****
- Level: P1 (with a dropdown arrow)
- Buttons: Start, Stop, Close
- Status bar: done

```
[admin@MikroTik] > /system license renew account=mum_brazil password=***** level=p1
```


Exemplos de uso

- The Dude;
- VPN Server;
- CAPsMAN;
- User Manager;
- Hotspot Server;
- Ambiente de testes (GNS3, eve, etc);
- Cloud (AWS, Azure, etc).

{ MUM Brazil 2016 - Anderson Matozinhos e Guilherme Ramires
http://mum.mikrotik.com/presentations/BR16/presentation_3687_1482132273.pdf }

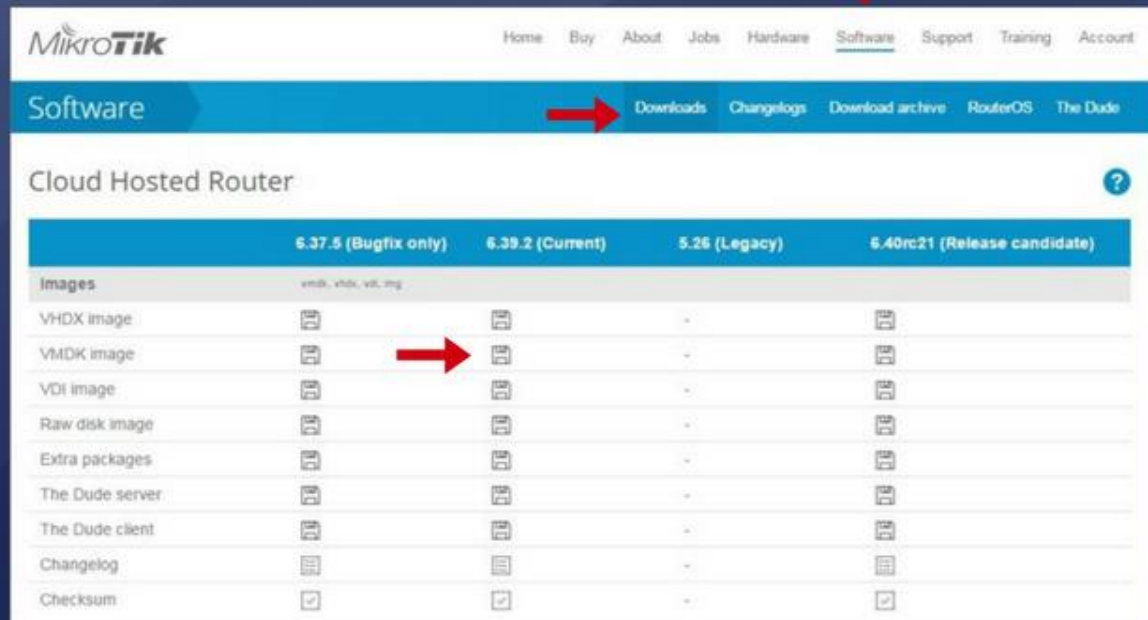
GNS3

- GNS3 ou Graphical Network Simulator é um software capaz de simular ambientes de rede, com suporte a multi plataforma (MS-Windows, GNU/Linux e MacOS).
 - Além de possuir muitas funções, é possível utilizar uma grande variedade de fabricantes, tal como Cisco, Juniper, Brocade.
- E claro, MikroTik :)

GNS3

- Instalação fácil para qualquer SO;
<https://docs.gns3.com/>
- Utilização do CHR com Virtualbox e/ou Qemu;
- Facilidade para construção de ambientes virtuais.

GNS3 - CHR com Qemu



MikroTik

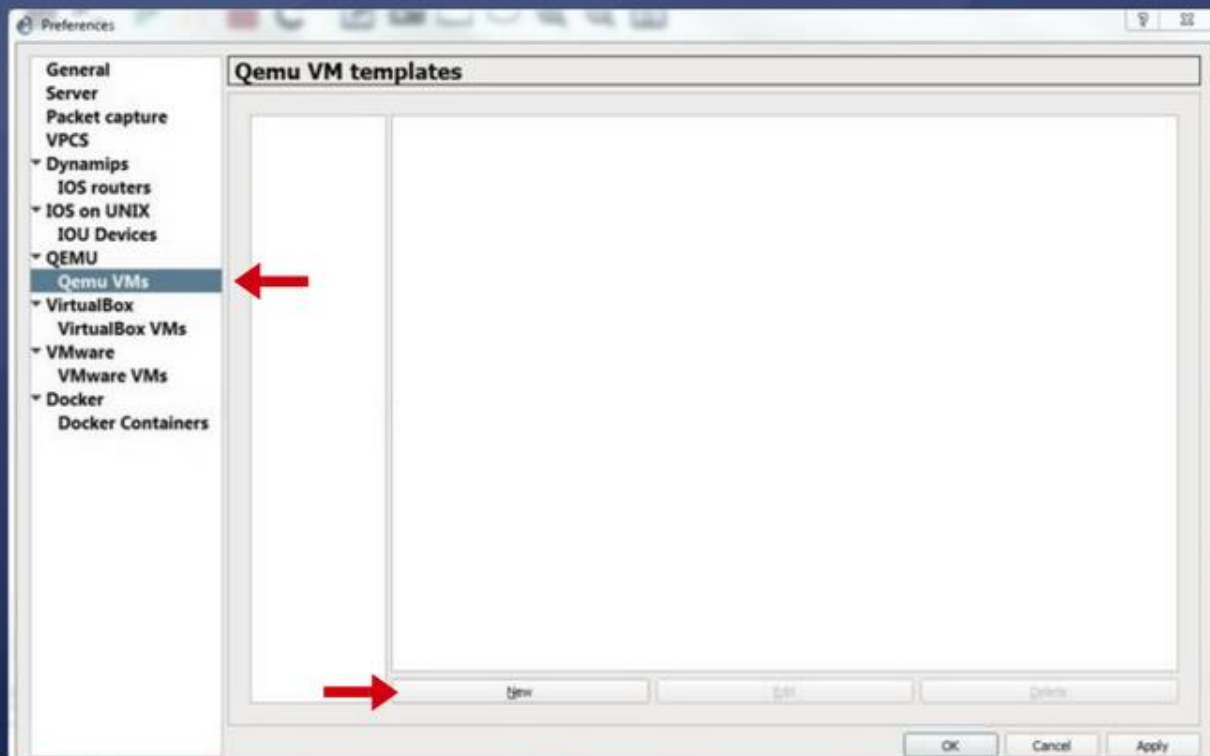
Home Buy About Jobs Hardware Software Support Training Account

Software Downloads Changelogs Download archive RouterOS The Dude

Cloud Hosted Router ?

	6.37.5 (Bugfix only)	6.39.2 (Current)	5.26 (Legacy)	6.40rc21 (Release candidate)
Images	vmdk, vhdx, vdi, img			
VHDX image			-	
VMDK image			-	
VDI image			-	
Raw disk image			-	
Extra packages			-	
The Dude server			-	
The Dude client			-	
Changelog			-	
Checksum			-	

GNS3 - CHR com Qemu



GNS3 - CHR com Qemu

New QEMU VM template

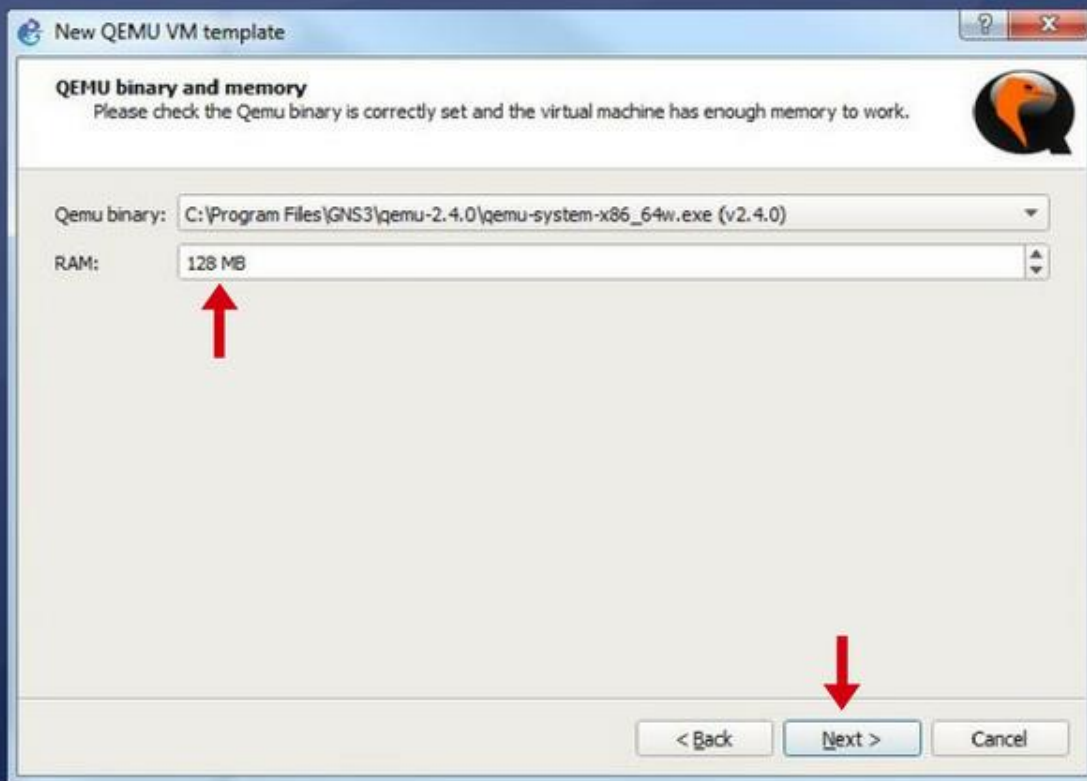
QEMU VM name
Please choose a descriptive name for your new QEMU virtual machine.

Name: MikroTik

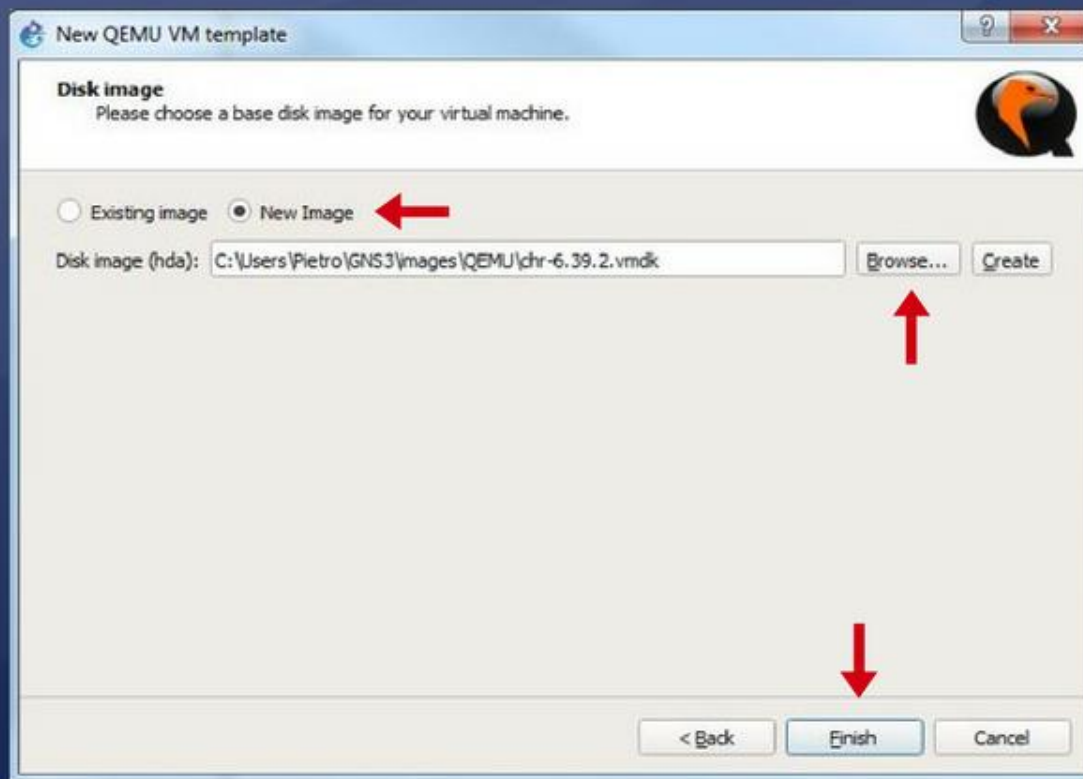
☐ This is a legacy ASA VM

< Back Next > Cancel

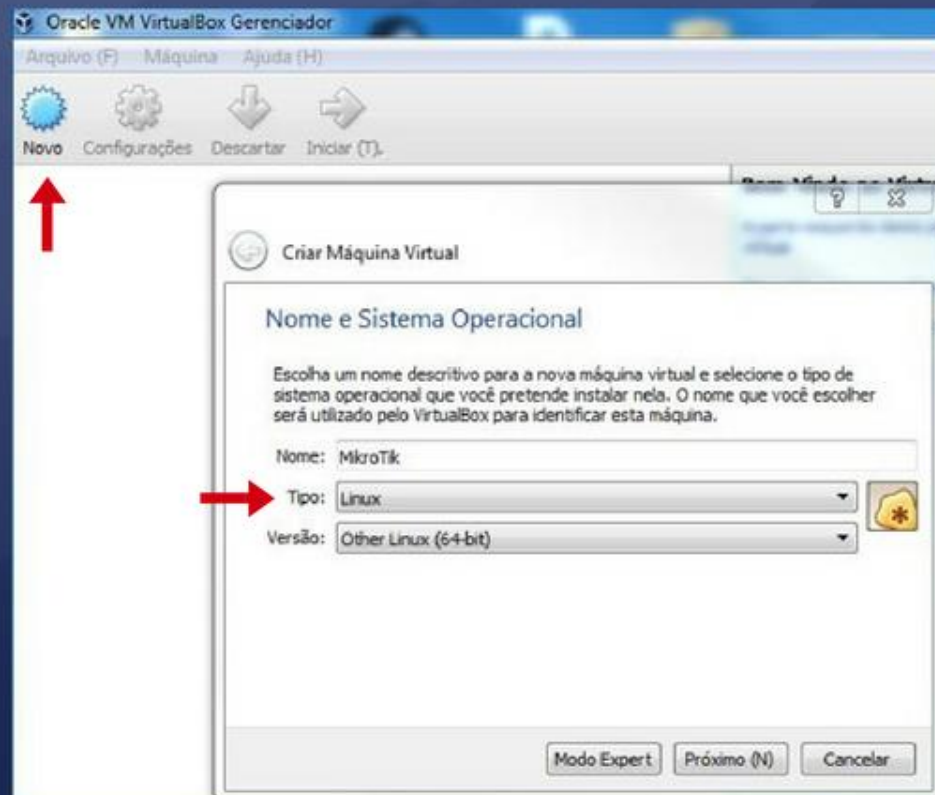
GNS3 - CHR com Qemu



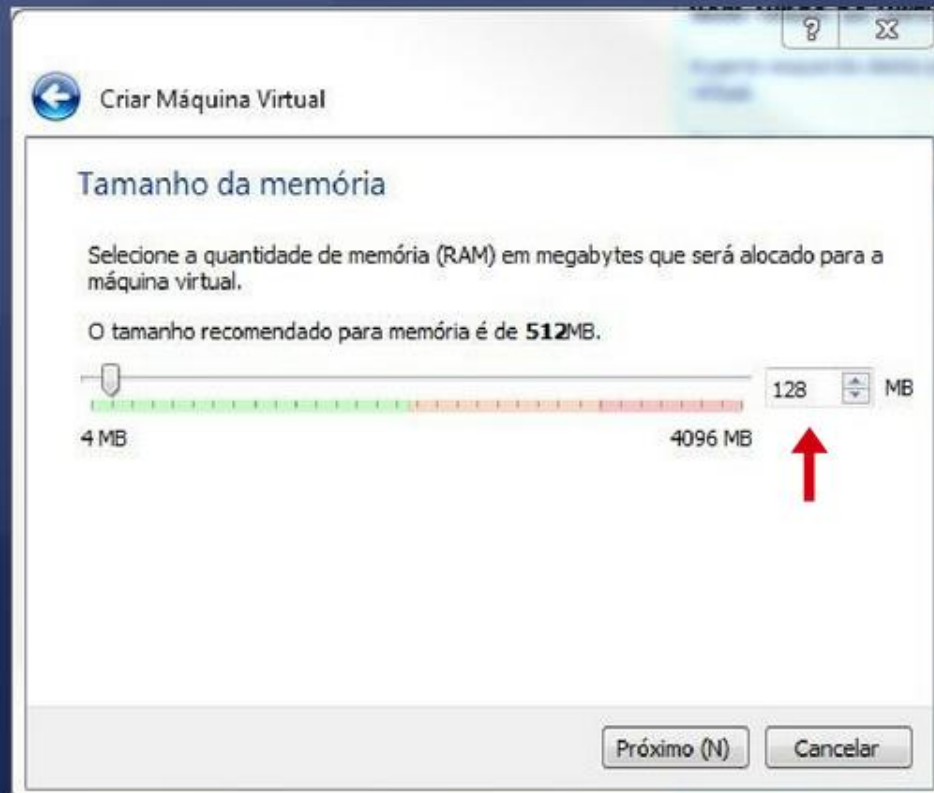
GNS3 - CHR com Qemu



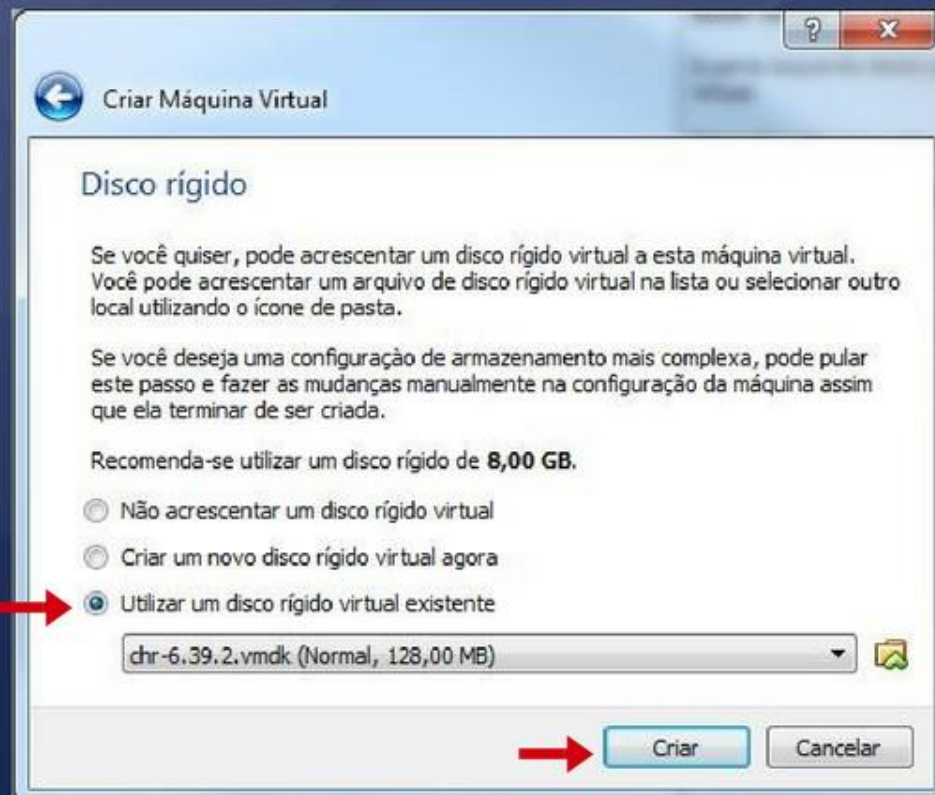
GNS3 - CHR com Virtualbox



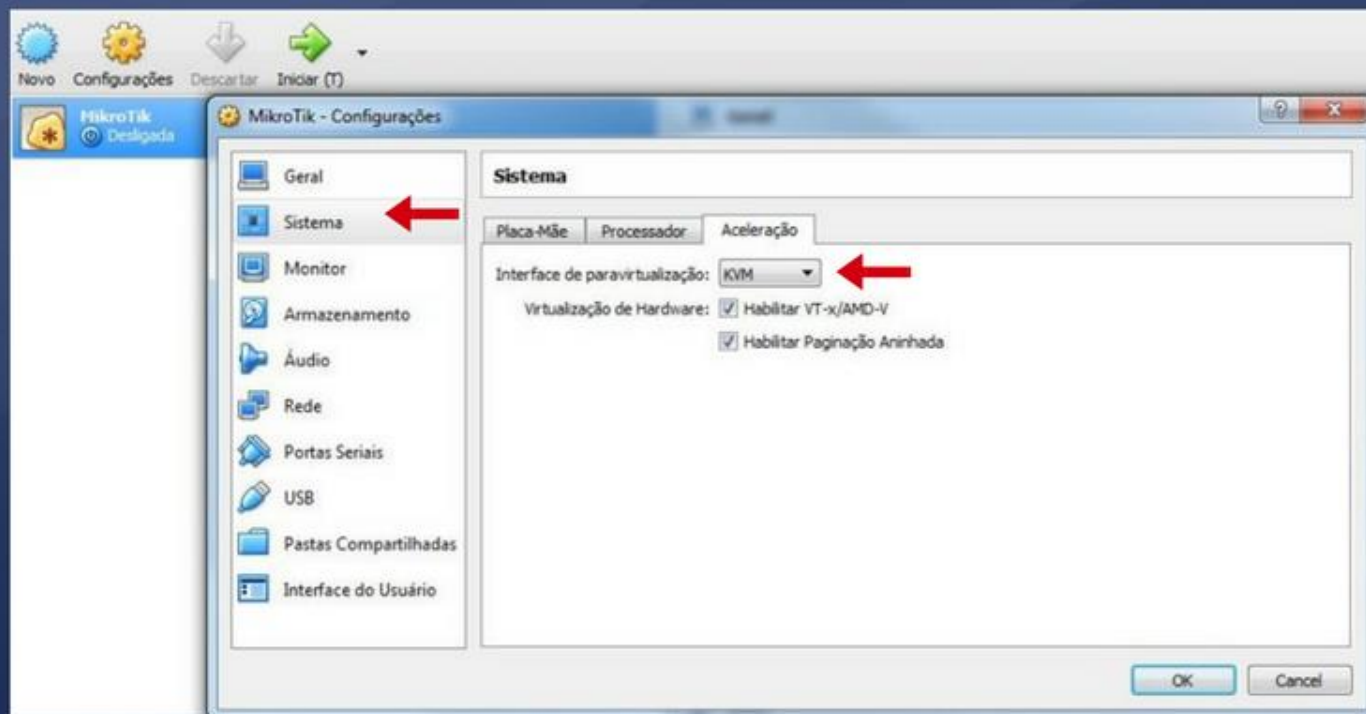
GNS3 - CHR com Virtualbox



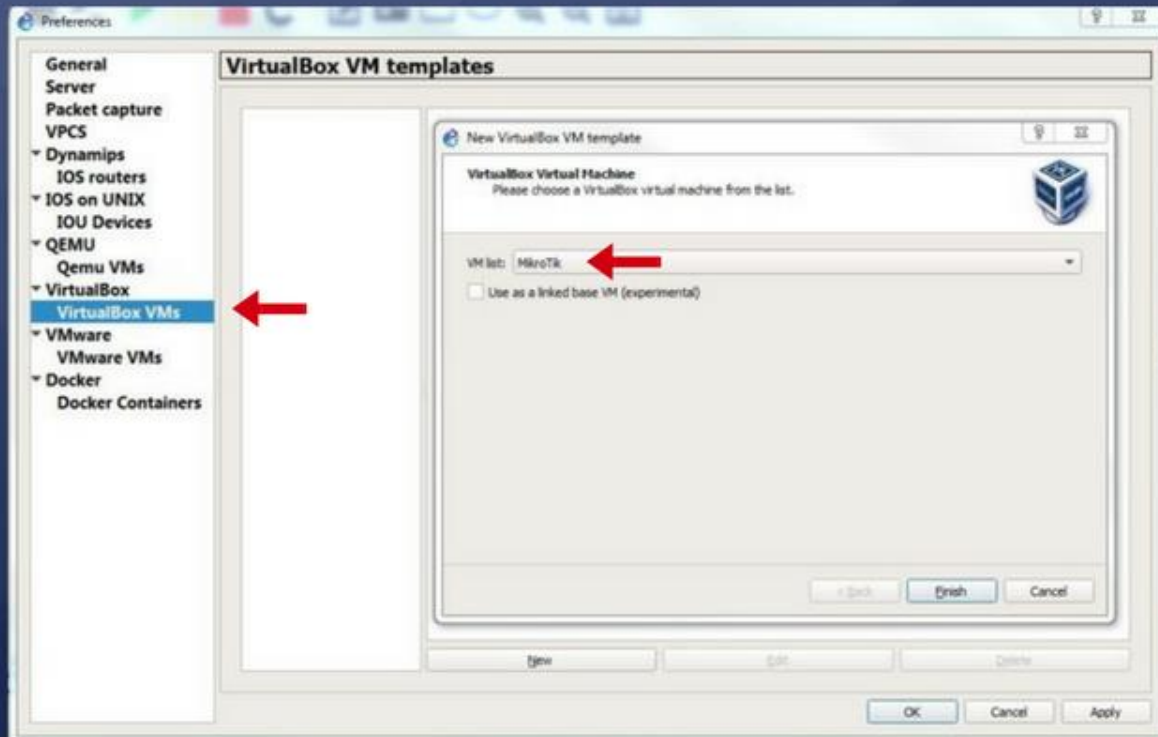
GNS3 - CHR com Virtualbox



GNS3 - CHR com Virtualbox*



GNS3 - CHR com Virtualbox



GNS3

Principal diferença entre o uso com Qemu e VirtualBox:

- Usando o Qemu, precisamos configurar apenas uma imagem, para rodar várias instâncias do RouterOS no GNS3.
- Com VirtualBox, precisamos duplicar as VMs criadas, uma para cada instância do RouterOS no GNS3
- * No caso do VirtualBox, precisamos reinicializar os endereços MAC ao clonar a VM.

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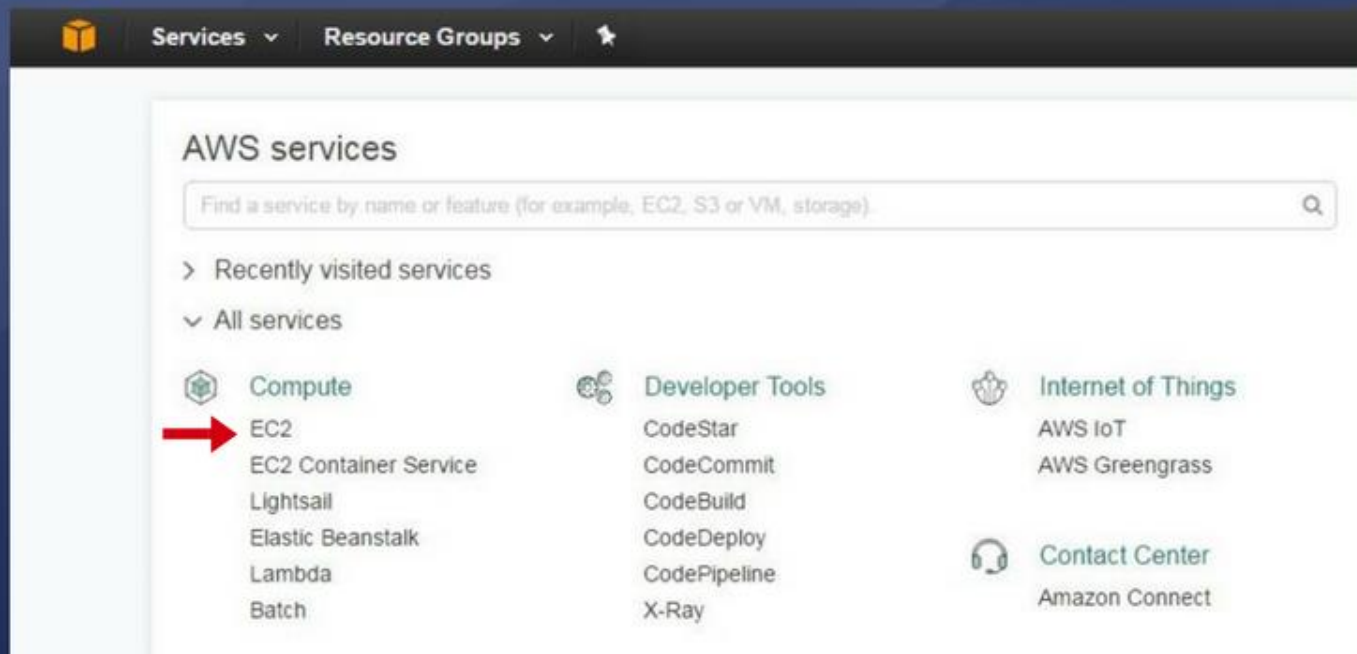
- Amazon Web Services ou AWS é um serviço da Amazon que oferece computação em nuvem. Possui servidores distribuídos em diversos cantos do mundo, com uma grande variedade de serviços.
- Além de sua grande estrutura mundial, possui um número muito elevado de disponibilidade, o que torna o serviço muito confiável.
- Possui um console de administração intuitivo, com muitas funcionalidades.

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- Em sua estrutura EC2, é possível utilizar diversos sistemas operacionais, em diferentes configurações de recursos. O Marketplace, como é conhecido, possui para escolha a versão CHR do RouterOS.
- O preço para utilização do CHR é apenas o da instância na AWS, necessitando inserir uma licença válida do CHR (BYOL).

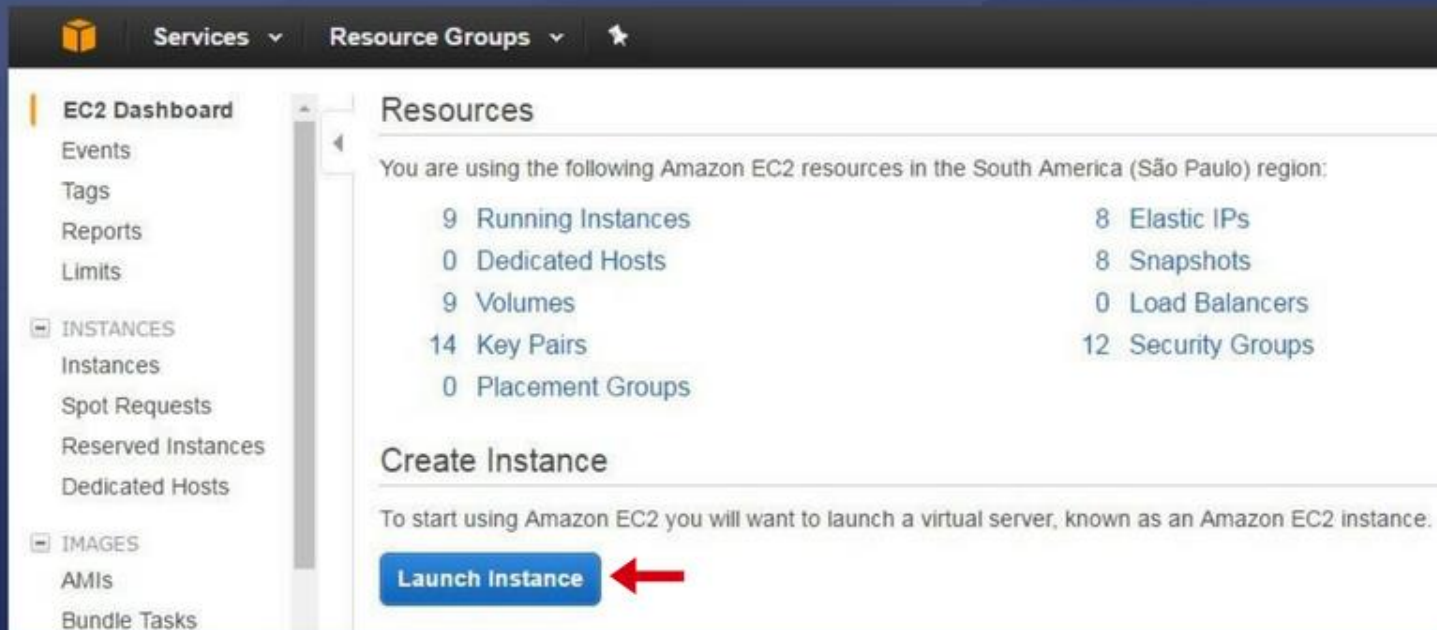
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Configurando CHR



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Configurando CHR



Services ▾ Resource Groups ▾ ⭐

EC2 Dashboard

- Events
- Tags
- Reports
- Limits
- INSTANCES
 - Instances
 - Spot Requests
 - Reserved Instances
 - Dedicated Hosts
- IMAGES
 - AMIs
 - Bundle Tasks

Resources

You are using the following Amazon EC2 resources in the South America (São Paulo) region:

9 Running Instances	8 Elastic IPs
0 Dedicated Hosts	8 Snapshots
9 Volumes	0 Load Balancers
14 Key Pairs	12 Security Groups
0 Placement Groups	

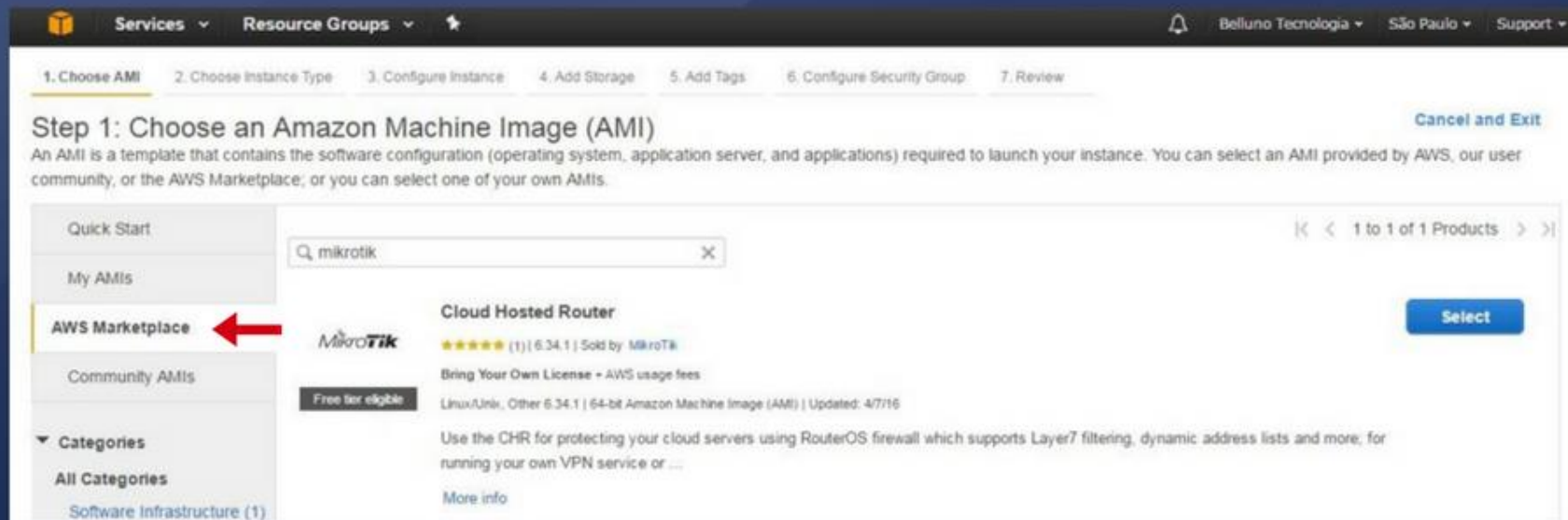
Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#) ←

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Configurando CHR



The screenshot shows the AWS Marketplace console interface. At the top, there's a navigation bar with 'Services', 'Resource Groups', and a search icon. Below this is a progress bar with steps: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Add Tags, 6. Configure Security Group, and 7. Review. The main heading is 'Step 1: Choose an Amazon Machine Image (AMI)' with a 'Cancel and Exit' link. A descriptive paragraph explains that an AMI is a template for launching instances. On the left, a sidebar lists 'Quick Start', 'My AMIs', 'AWS Marketplace' (highlighted with a red arrow), and 'Community AMIs'. Below these are 'Categories' and 'All Categories'. The main content area shows a search for 'mikrotik' with one result: 'Cloud Hosted Router' by MikroTik. The product details include a 5-star rating, version 6.34.1, and a 'Free tier eligible' badge. A 'Select' button is visible on the right.

Services ▾ Resource Groups ▾

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 1: Choose an Amazon Machine Image (AMI)

[Cancel and Exit](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Quick Start

My AMIs

AWS Marketplace ←

Community AMIs

Categories

All Categories

Software Infrastructure (1)

Search: mikrotik

Cloud Hosted Router

★★★★★ (1) | 6.34.1 | Sold by MikroTik

Bring Your Own License • AWS usage fees

Free tier eligible

Linux/Unix, Other 6.34.1 | 64-bit Amazon Machine Image (AMI) | Updated: 4/7/16

Use the CHR for protecting your cloud servers using RouterOS firewall which supports Layer7 filtering, dynamic address lists and more; for running your own VPN service or ...

[More info](#)

[Select](#)

1 to 1 of 1 Products

AMAZON WEB SERVICES

Configurando CHR

 Services ▾ Resource Groups ▾ 

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: All instance types ▾ Current generation ▾ [Show/Hide Columns](#)

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

Note: The vendor recommends using a **t2.micro** instance (or larger) for the best experience with this product.

	Family	Type	vCPUs ⓘ	Memory (GiB)	Instance Storage (GB) ⓘ	EBS-Optimized Available ⓘ	Network Performance ⓘ	IPv6 Support ⓘ
	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Instance Details](#)

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Configurando CHR

Services ▾ Resource Groups ▾

EC2 Dashboard
Events
Tags
Reports
Limits

INSTANCES
Instances
Spot Requests
Reserved Instances
Dedicated Hosts

IMAGES
AMIs

Launch Instance Connect Actions ▾

Filter by tags and attributes or search by keyword

	Name ▾	Instance ID ▴	Instance Type ▾	Availability Zone ▾	Instance State ▾	Status Checks ▾	Alarm Status	Public DNS (IPv4)
☐	...	...	t2.large	sa-east-1c	running	2/2 checks ...	None	...
☐	...	...	t2.medium	sa-east-1c	running	2/2 checks ...	None	...
☐	...	...	t2.medium	sa-east-1c	running	2/2 checks ...	None	...
☐	...	...	t2.small	sa-east-1c	running	2/2 checks ...	None	...
☐	...	...	t2.micro	sa-east-1a	running	2/2 checks ...	None	...
☐	MIKROTIK	...	t2.medium	sa-east-1c	running	2/2 checks ...	None	...
☐	...	...	m4.xlarge	sa-east-1c	running	2/2 checks ...	None	...

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EXTRAS

- Após a instalação do CHR e poder usufruir de todas as funcionalidades do RouterOS, é possível utilizar em conjunto, as diversas funções do serviço EC2 da Amazon.
- Entre as opções, podemos melhorar a segurança no acesso ao nosso CHR através do acesso por meio de chaves SSH e firewall, gerenciar endereços IP, snapshots, etc.

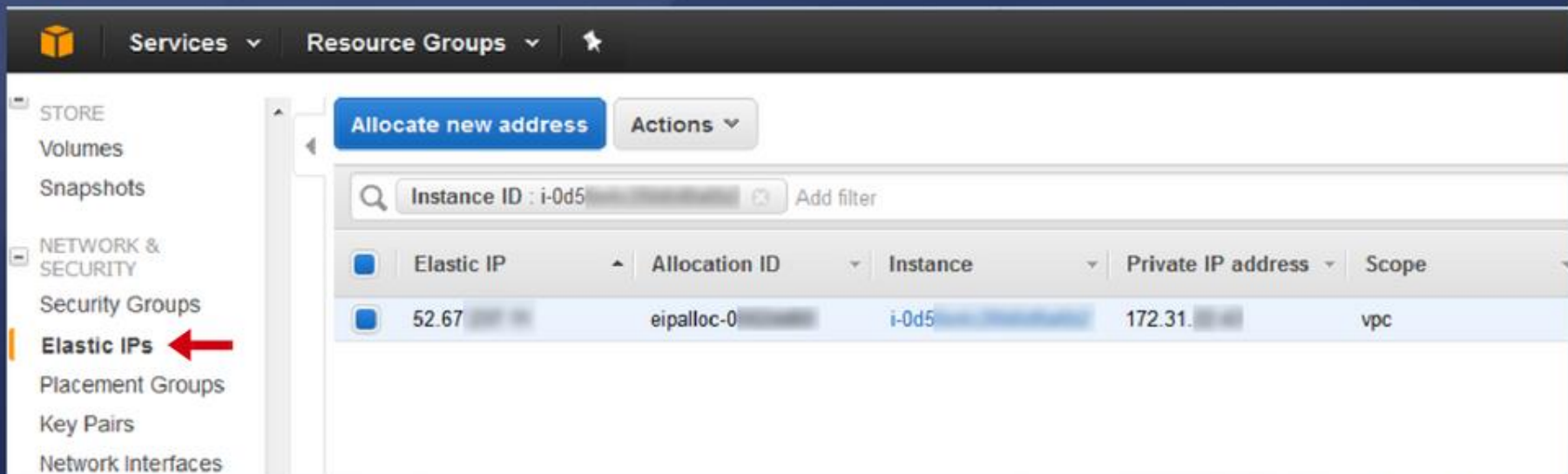
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ELASTIC IPS

- Cada instância EC2 na AWS recebe um IPv4 público, que é mapeado (1:1) para um IPv4 privado. Este IP é dinâmico, e muda a cada vez que a instância for desligada, e ligada novamente.
- Por incrível que pareça, em tempos de esgotamento de IPv4, ainda é possível obter um endereço IPv4 público exclusivo.

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ELASTIC IPS



The screenshot displays the AWS Management Console interface. In the left-hand navigation pane, under the 'NETWORK & SECURITY' section, 'Elastic IPs' is selected and highlighted with a red arrow. The main content area shows the 'Elastic IPs' page with a search bar containing 'Instance ID : i-0d5'. Below the search bar is a table listing Elastic IP allocations.

	Elastic IP	Allocation ID	Instance	Private IP address	Scope
☒	52.67	eipalloc-0	i-0d5	172.31.	vpc

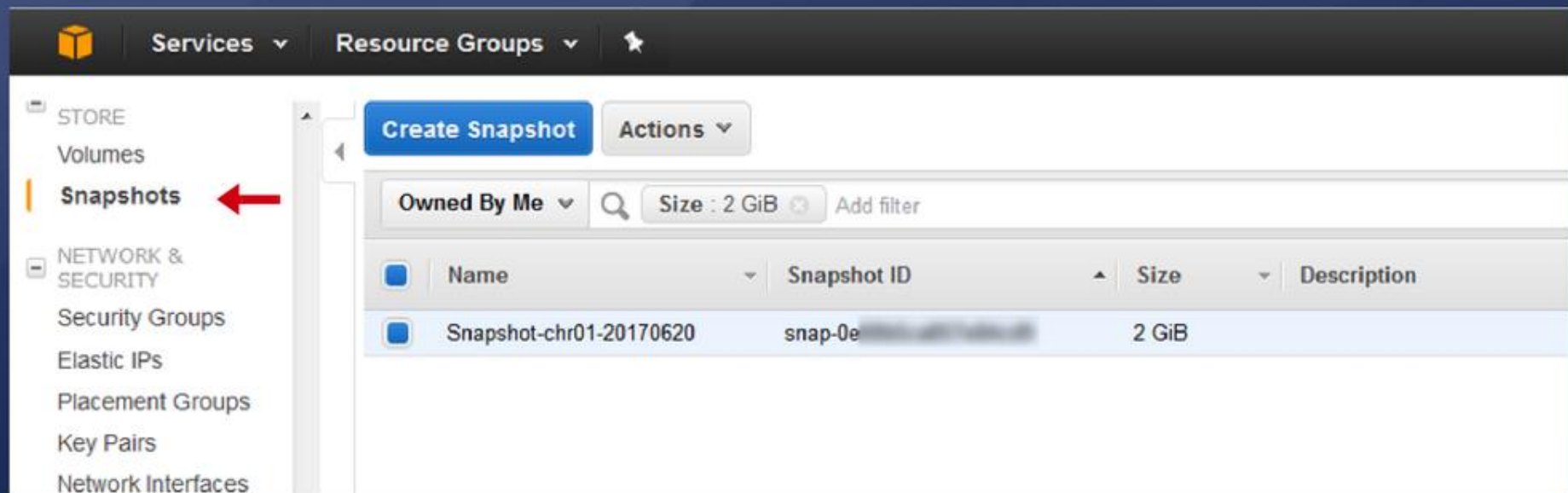
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SNAPSHOTS

- Além dos backups (.backup e .rsc) de nosso CHR, podemos manter Snapshots da instância que está rodando o CHR na Amazon.
- Como o próprio termo já diz, os Snapshots contém uma imagem fiel da instância ao momento que for criado, e pode ser agendado para ser gerado automaticamente de acordo com a necessidade.

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SNAPSHOTS



The screenshot displays the AWS Management Console interface. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and a star icon. The left-hand navigation pane shows the 'STORE' section with 'Volumes' and 'Snapshots' (highlighted with a red arrow). Below 'STORE' is the 'NETWORK & SECURITY' section with links for 'Security Groups', 'Elastic IPs', 'Placement Groups', 'Key Pairs', and 'Network Interfaces'.

The main content area is titled 'Snapshots' and features a 'Create Snapshot' button and an 'Actions' dropdown. Below these are filters: 'Owned By Me', a search icon, 'Size : 2 GiB', and an 'Add filter' link. A table lists the snapshots:

☐	Name	Snapshot ID	Size	Description
☐	Snapshot-chr01-20170620	snap-0e[REDACTED]	2 GiB	

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CHAVES SSH

- Para reforçar a segurança, a Amazon oferece o acesso às instâncias EC2 por meio de chaves SSH.
- Um par de chaves é criado ao momento da criação da instância, e precisa ser obrigatoriamente baixado e armazenado em um local seguro e acessível.
- A chave pública é armazenada pela própria Amazon, enquanto a chave privada é armazenada pelo administrador.

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CHAVES SSH

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair

Key pair name

chr01

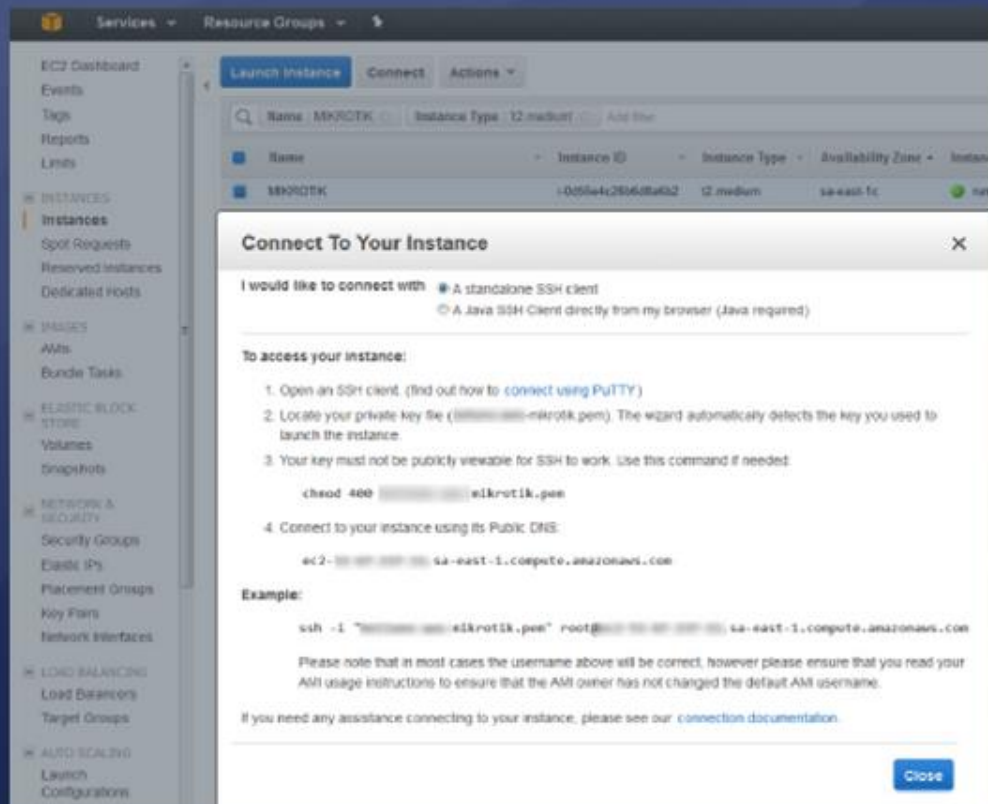
Download Key Pair

You have to download the **private key file** (*.pem file) before you can continue. Store it in a **secure and accessible location**. You will not be able to download the file again after it's created.

Cancel Launch Instances

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CHAVES SSH



The screenshot shows the AWS Management Console interface. On the left is a navigation menu with categories like EC2 Dashboard, INSTANCES, IMAGES, ELASTIC BLOCK STORE, NETWORK & SECURITY, LOAD BALANCING, and AUTO SCALING. The main panel displays the 'Launch Instance' wizard. A modal dialog titled 'Connect To Your Instance' is open, providing instructions on how to connect to an EC2 instance. The dialog offers two options for connection: 'A standalone SSH client' (selected) and 'A Java SSH Client directly from my browser (Java required)'. It lists four steps to access the instance, including opening an SSH client, locating the private key file, and connecting via the public DNS. An example command for the SSH client is provided. A 'Close' button is at the bottom right of the dialog.

Connect To Your Instance

I would like to connect with:

- ☒ A standalone SSH client
- ☐ A Java SSH Client directly from my browser (Java required)

To access your instance:

1. Open an SSH client. (find out how to [connect using PuTTY](#))
2. Locate your private key file (e.g., `mirotik.pem`). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:
`chmod 400 mirotik.pem`
4. Connect to your instance using its Public DNS:
`ec2-10-10-10-10.sa-east-1.compute.amazonaws.com`

Example:

```
ssh -i mirotik.pem root@ec2-10-10-10-10.sa-east-1.compute.amazonaws.com
```

Please note that in most cases the username above will be correct, however please ensure that you read your AMI usage instructions to ensure that the AMI owner has not changed the default AMI username.

If you need any assistance connecting to your instance, please see our [connection documentation](#).

Close

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CHAVES SSH

- Para o acesso SSH:

```
ssh -i "chr01.pem" admin@ec2-xx-xx-xx-xx.sa-east-1.compute.amazonaws.com
```

- Utilizando PuTTY:

Necessária a conversão da chave privada (.pem), para uma chave privada utilizável pelo PuTTY (.ppk)

Manual da Amazon em:

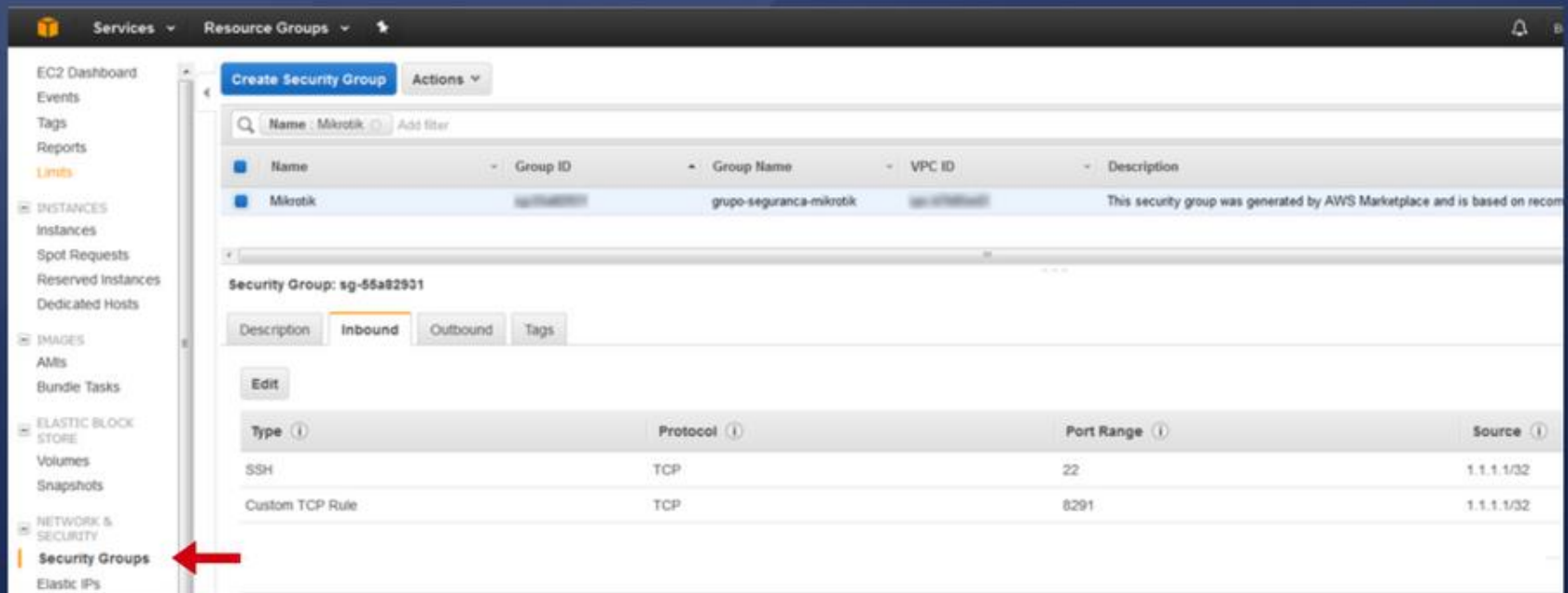
https://docs.aws.amazon.com/pt_br/AWSEC2/latest/UserGuide/putty.html

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FIREWALL

- Para aumentar a segurança e proteção às instâncias EC2, e consequentemente ao nosso CHR, podemos utilizar o firewall da própria Amazon.
- É possível configurar grupos de segurança, atrelando-os a determinadas instâncias.
- Muito flexível na configuração, tratando regras de inbound e outbound.

AMAZON WEB SERVICES FIREWALL



The screenshot displays the AWS Management Console interface. On the left, the navigation menu is visible, with 'Security Groups' highlighted under the 'NETWORK & SECURITY' section. A red arrow points to this link. The main content area shows the 'Security Groups' page for the 'Mikrotik' group. At the top, there is a 'Create Security Group' button and an 'Actions' dropdown. Below this is a search bar and a table listing security groups. The table has columns for Name, Group ID, Group Name, VPC ID, and Description. One security group, 'Mikrotik', is listed with ID 'sg-75a82931' and name 'grupo-seguranca-mikrotik'. Below the table, the details for 'Security Group: sg-55a82931' are shown, including tabs for Description, Inbound, Outbound, and Tags. The 'Inbound' tab is selected, showing a table of inbound rules. The rules table has columns for Type, Protocol, Port Range, and Source. Two rules are listed: 'SSH' (TCP, Port 22, Source 1.1.1.1/32) and 'Custom TCP Rule' (TCP, Port 8291, Source 1.1.1.1/32).

Name	Group ID	Group Name	VPC ID	Description
Mikrotik	sg-75a82931	grupo-seguranca-mikrotik	vp-1778f0ad	This security group was generated by AWS Marketplace and is based on recom

Security Group: sg-55a82931

Description Inbound Outbound Tags

Edit

Type	Protocol	Port Range	Source
SSH	TCP	22	1.1.1.1/32
Custom TCP Rule	TCP	8291	1.1.1.1/32

DÚVIDAS?

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MUM Brazil 2017 - Maceió, AL.

belluno

— CALL CENTER E GESTÃO DE REDES —

OBRIGADO!

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MUM Brazil 2017 - Maceió, AL.