

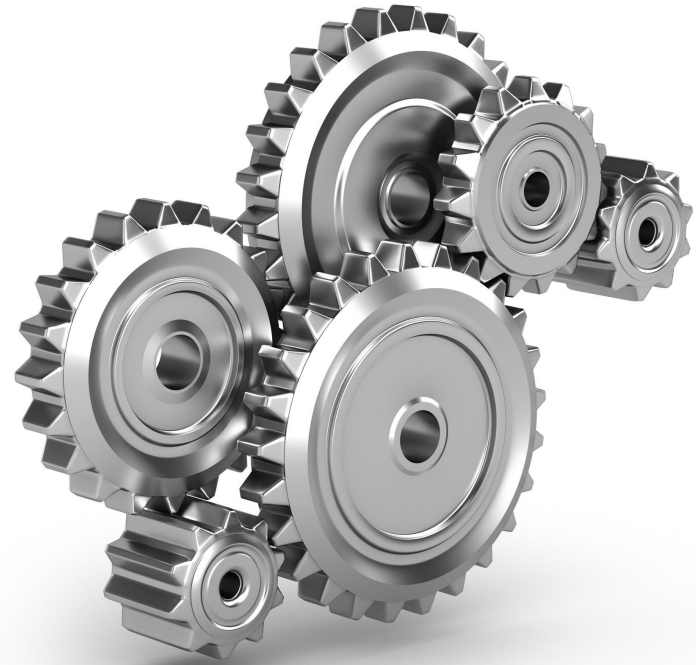


# Leveraging MikroTik in the cloud for fun and profit!

Marc Perea

# Workshop

- Who
- Why
- How
- What



# Who?

Co-founder of MCP Networks, creators of Aerēz

Discovered Routerboard in 2009

MTCNA + MTCTCE + Trainer certified

BS + MS CS/MIS @ Minot State University, ND

Internet Service Provider Network Engineer for over a decade

Started working on Aerēz based on MikroTik in 2015



# Why use the cloud?

- Need a way to validate connectivity from off-net
- Throughput testing
- Idea Proof of Concept (POC) testing
- Off site networking / storage / resources
- Augment services / servers
- It's freakin' cool!



# So how do you do it?

1. Get a (\*free) Amazon account (or other)
2. Login and find EC2 instances

a.



EC2

3. Launch a new instance

a.

**Launch Instance**



**amazon**  
web services™

# AMI

4. Select AWS Marketplace

5. Search for CHR

6. Select

\*Some other user submitted AMIs exist in the community

The screenshot shows the AWS console interface for selecting an AMI. At the top, there are navigation tabs: "1. Choose AMI" (highlighted), "2. Choose Instance Type", "3. Configure Instance", "4. Add Storage", and "5. Add Tag". Below the tabs is the heading "Step 1: Choose an Amazon Machine Image (AMI)" followed by a descriptive paragraph: "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."

The main content area is divided into a left sidebar and a main product display. The sidebar includes "Quick Start", "My AMIs", "AWS Marketplace" (highlighted), "Community AMIs", "Categories" (with sub-items "All Categories", "Software Infrastructure (1)", and "Developer Tools (1)"), and "Operating System". The main display shows a search bar with "chr" entered, a "1 to 1 of 1 Products" indicator, and a product card for "Cloud Hosted Router" by MikroTik. The product card includes a "Free tier eligible" badge, a "Select" button (highlighted), a 5-star rating, and details about the license and operating system.

# Instance Size

7. For testing, stick with free!

~200 Mbps throughput

Scales up to 10Gbps (20G?)

Nano, Micro, Small, Medium...

The screenshot shows the AWS Management Console interface for creating an EC2 instance. The navigation bar at the top includes 'Services' and 'Resource Groups'. The progress indicator shows five steps: '1. Choose AMI', '2. Choose Instance Type' (highlighted), '3. Configure Instance', '4. Add Storage', and '5. Add Tags'. The main heading is 'Step 2: Choose an Instance Type', followed by a descriptive paragraph about Amazon EC2 instance types. Below the text are filter controls: 'Filter by:' with dropdowns for 'All instance types' and 'Current generation', and a 'Show/Hide Columns' link. A summary line states 'Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB mem)'. A note below reads 'Note: The vendor recommends using a t2.micro instance (or larger) for the best experience with...'. A table lists instance options with columns for Family, Type, vCPUs, Memory (GiB), and Instance Storage (GB). The 't2.micro' row is selected and marked as 'Free tier eligible'. At the bottom, there are buttons for 'Cancel', 'Previous', 'Review and Launch', and 'Next: Configure Instance Details'.

Services ▾ Resource Groups ▾

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags

## 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 mem)

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

	Family ▾	Type ▾	vCPUs ⓘ ▾	Memory (GiB) ▾	Instance Storage (GB) ⓘ
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only

Cancel Previous Review and Launch Next: Configure Instance Details

# Network

## 8. Click Next

Free public IP - yay! Static IP?

AWS is very flexible and scalable,  
learn more on your own ;-)

Just like MikroTik, AWS has lots of  
cool firewall, routing and access  
controls

Services ▾ Resource Groups ▾ ☆

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

### Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

**Number of instances** ⓘ  
1 [Launch into Auto Scaling Group](#) ⓘ

**Purchasing option** ⓘ  
 Request Spot instances

**Network** ⓘ  
vpc-55db4730 (default) [Create new VPC](#)

**Subnet** ⓘ  
No preference (default subnet in any Availability Zone) [Create new subnet](#)

**Auto-assign Public IP** ⓘ  
Use subnet setting (Enable)

**IAM role** ⓘ  
None [Create new IAM role](#)

**Shutdown behavior** ⓘ  
Stop

**Enable termination protection** ⓘ  
 Protect against accidental termination

**Monitoring** ⓘ  
 Enable CloudWatch detailed monitoring  
[Additional charges apply.](#)

**Tenancy** ⓘ  
Shared - Run a shared hardware instance  
[Additional charges will apply for dedicated tenancy.](#)

Cancel Previous **Review and Launch** Next: Add Storage



# Storage

9. Might as well use all the free storage, change GB to 30!

After free, you pay!

The screenshot shows the AWS Management Console interface for the EC2 Launch Instance Wizard, specifically the 'Add Storage' step. The breadcrumb navigation at the top indicates the current step is '4. Add Storage'. Below the navigation, the 'Step 4: Add Storage' section provides instructions on attaching EBS volumes. A table lists the storage configuration for the root volume:

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encrypted
Root	/dev/sda1	snap-e173acb1	30	General Purpose	100 / 3000	N/A	<input checked="" type="checkbox"/>	Not Encrypted

The 'Size (GiB)' field in the table is highlighted with a red box. Below the table is an 'Add New Volume' button. A light blue informational box states: 'Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.' At the bottom of the console, there are buttons for 'Cancel', 'Previous', 'Review and Launch', and 'Next: Add Tags'.

# Tags and Launch

10. It's a good idea to name everything

11. Review and Launch!

12. You have to hit Launch one more time!



The screenshot shows the AWS Management Console interface for the 'Step 5: Add Tags' step of an EC2 instance launch. At the top, there are navigation tabs for 'Services' and 'Resource Groups'. Below these are two numbered steps: '1. Choose AMI' and '2. Choose Instance Type'. The main heading is 'Step 5: Add Tags', followed by a descriptive paragraph: 'A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. Learn more about tagging your Amazon EC2 resources.' Below this is a table for adding tags. The table has two columns: 'Key' (with a limit of 127 characters maximum) and 'Value' (with a limit of 255 characters maximum). A single row is visible with the key 'Name' and the value 'MUM2017'. Both the key and value input fields are highlighted with red boxes. Below the table is a button labeled 'Add another tag' and a note '(Up to 50 tags maximum)'. At the bottom of the console, there are three buttons: 'Cancel', 'Previous', and 'Review and Launch'.

Services ▾ Resource Groups ▾

1. Choose AMI 2. Choose Instance Type

## Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. [Learn more](#) about tagging your Amazon EC2 resources.

Key (127 characters maximum)	Value (255 characters maximum)
Name	MUM2017

[Add another tag](#) (Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#)

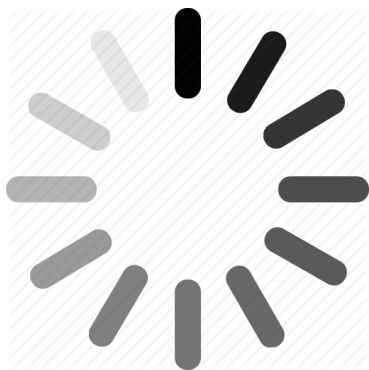
# What about security?

Default AWS firewall for this AMI:

TCP 22 allowed from 0.0.0.0/0

Secure? Warning?

12. Download the PEM and Launch  
(and wait)



### 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

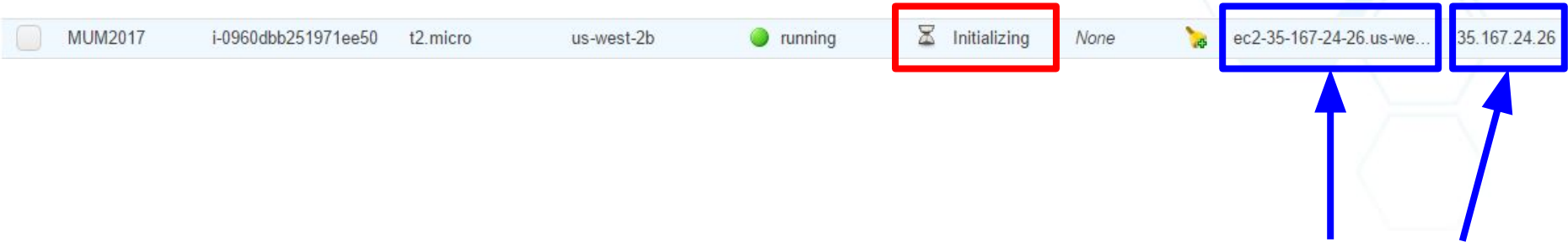
mum\_key\_pair

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

# That's it?



Pretty much, now you need to connect

Go back to EC2 services, check on instances and for several minutes Initializing

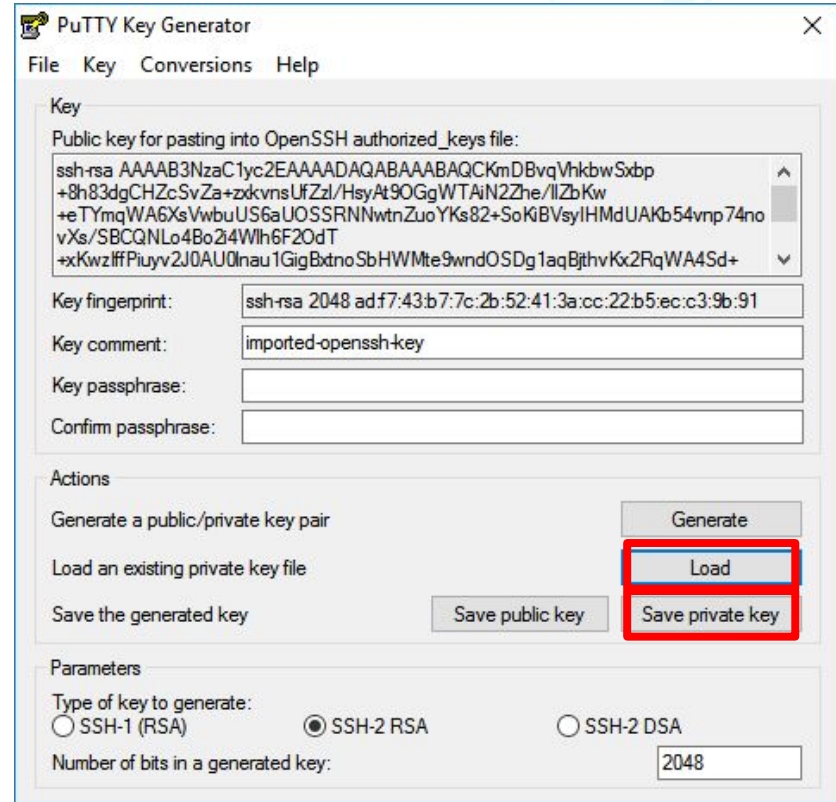
In the meantime, set up your favorite SSH client



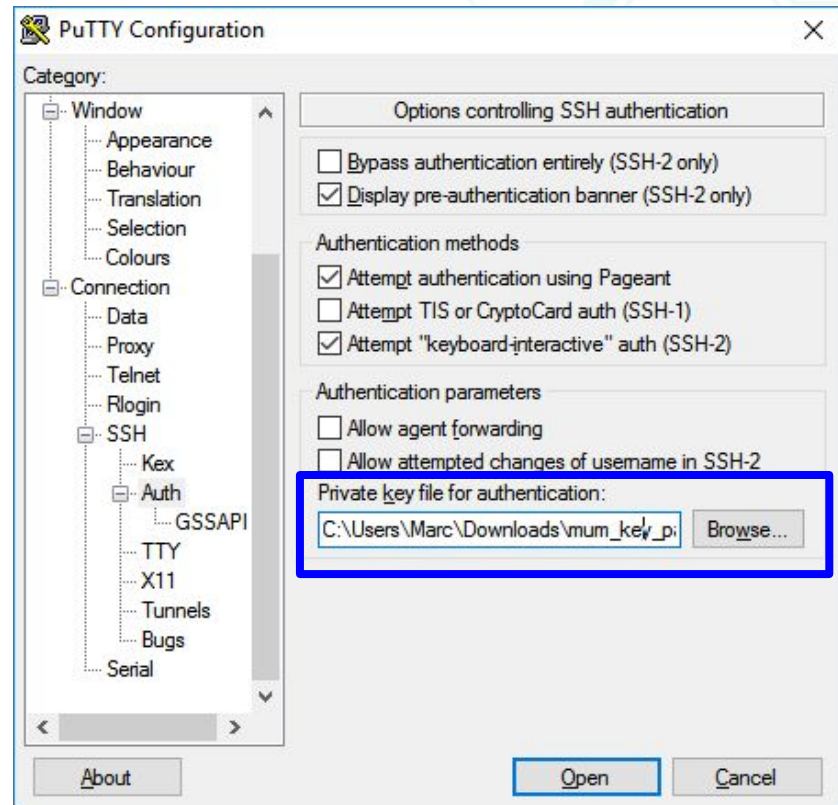
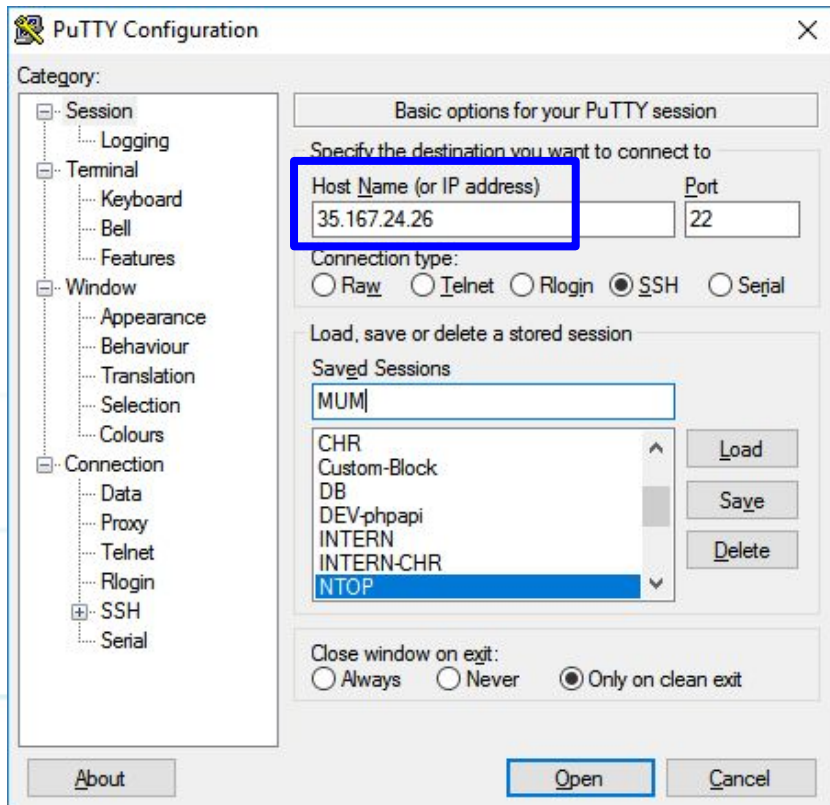
# MAC/Linux G2G - putty can't use PEM

Load the key pair  
downloaded from AWS

Save the private key PPK to  
use with putty!



# Login and enjoy!

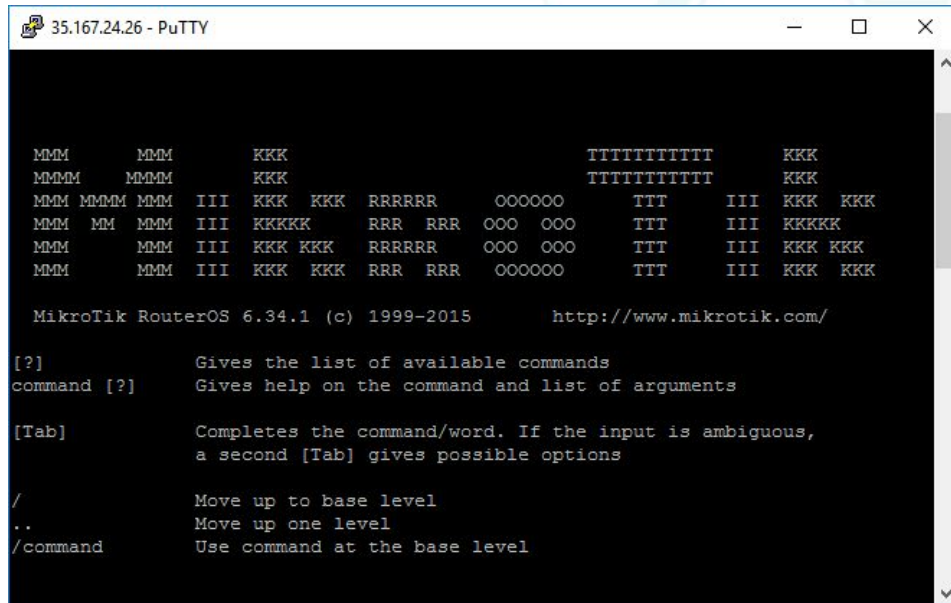


# Add security

Firewall + Firewall (AWS & ROS)

Tips:

- Use wimi.com
- Toggle winbox from your IP
- Elastic IP = Static IP



```
35.167.24.26 - PuTTY

MMM      MMM      KKK      TTTTTTTTTT      KKK
MMMM     MMMM     KKK      TTTTTTTTTT      KKK
MMM MMMM MMM III  KKK  KKK  RRRRRR   OOOOOO   TTT   III  KKK  KKK
MMM MM  MMM III  KKKKKK  RRR  RRR  OOO  OOO   TTT   III  KKKKKK
MMM     MMM III  KKK  KKK  RRRRRR   OOO  OOO   TTT   III  KKK  KKK
MMM     MMM III  KKK  KKK  RRR  RRR   OOOOOO   TTT   III  KKK  KKK

MikroTik RouterOS 6.34.1 (c) 1999-2015      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

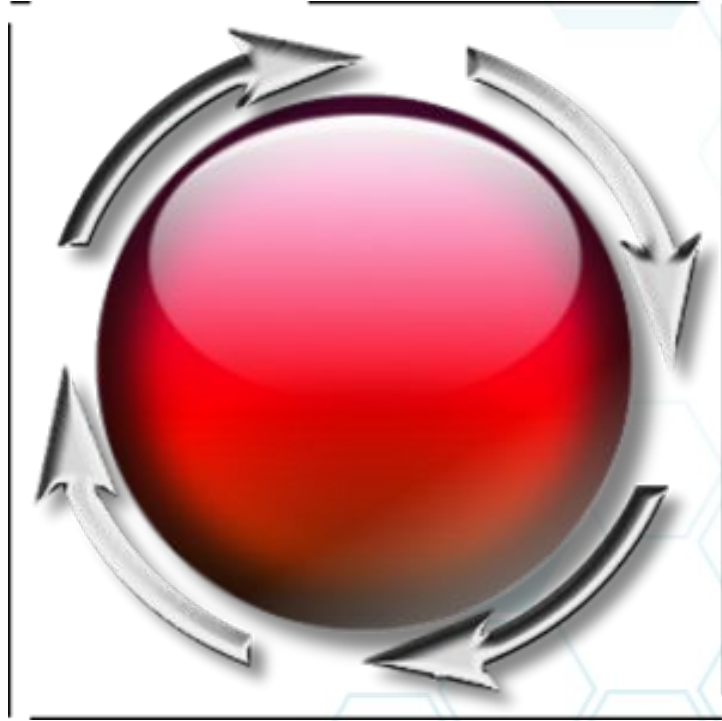
[Tab]       Completes the command/word. If the input is ambiguous,
            a second [Tab] gives possible options

/           Move up to base level
..         Move up one level
/command   Use command at the base level
```

# Cool, but now what can I do?

The Dude server

- Bandwidth test
- Remote polling
- Charts
- Troubleshoot, etc





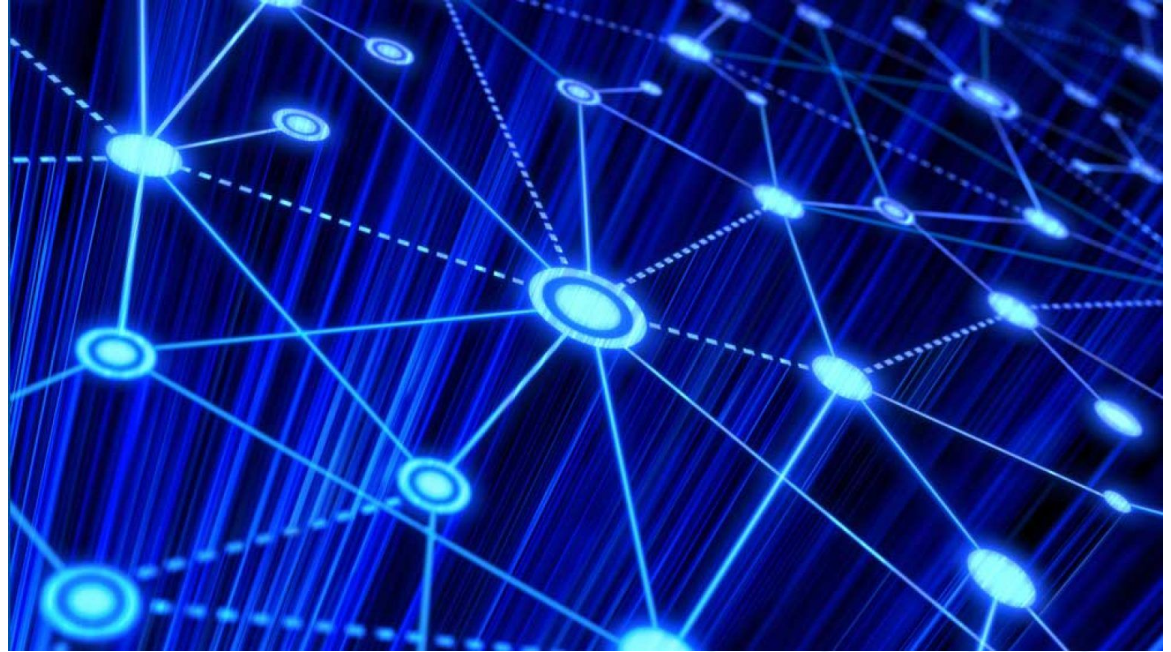
# Lab environment!

- Proof of Concept
- Learn protocol interaction
- Test code versions
- Interop testing with other vendors



# VPN services gateway

- Concentrator
  - PPTP
  - L2TP
  - openVPN
  - SSTP
  - IPSEC

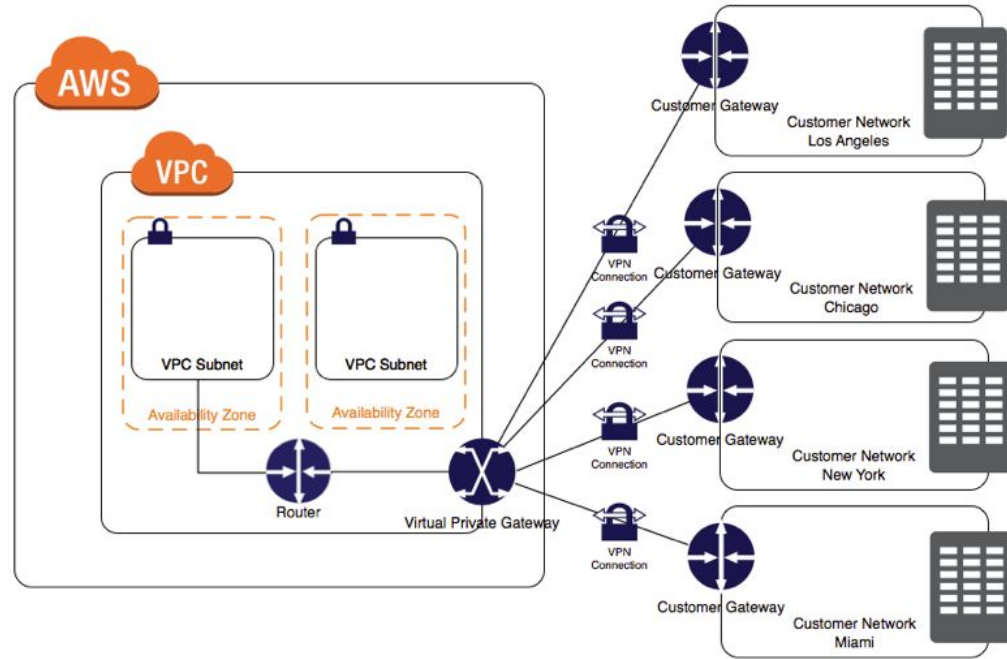


# Offsite data center

- Spin up more servers
- Use CHR as your whole

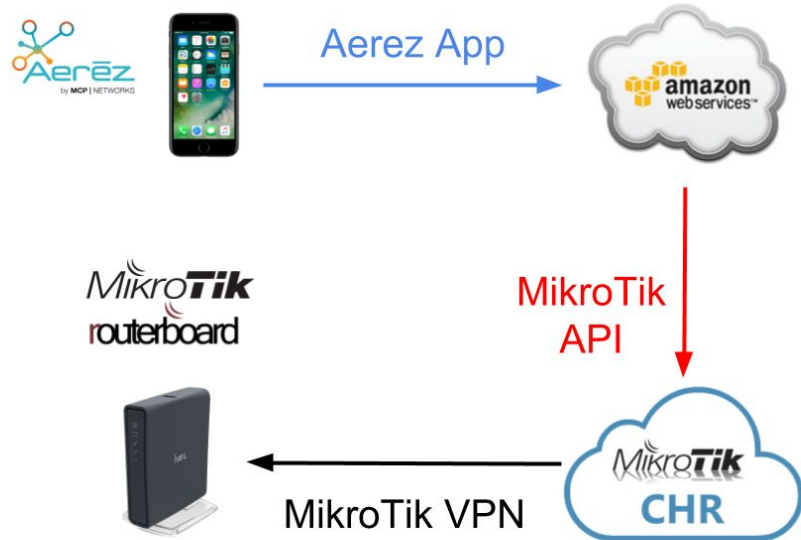
AWS Gateway!

- Backups
- Redundant services



# API Services Gateway

- Securely tunnel traffic with VPN
- Leverage MikroTik API
  - Automation &
  - Scale



# Enjoy the MUM!

- Any issues/questions?
- Visit my booth: Aerez
- Thanks for attending!

