

17/08/2015

FULL STACK ENGINEERING; DIY DEVOPS - How to set up a CA signed SSL web application, LAMP stack and CentOS 7 AWS EC2 t2.micro instance in < 30 minutes.

DISCLAIMER: This tutorial is about setting a reasonably safe and secured production environment while throwing out of the window some annoying industry standard good practices (particularly selinux policy enforcement and application based database permissions) which are time consuming and/or require a good deal of skill and effort to be properly put in place and maintained. This is a big NO if you have the resources and time to do otherwise, specially if your web app grows big enough or manages critical enough data to be considered anything else than a random target for a malicious hacker. Unless that is the case or you are contractually bound otherwise, I would recommend starting with a set up like this and build up carefully designed and implemented custom security measures and policies that make sense in the context they are going to be used. In other words: Before thinking on building on a hurry an online fortress with complex auditing and security constrains (which if you are not an expert you will probably misuse, leaving the doors open for anybody to enter), make sure that you know how to set the basic locks on a public server so you or anyone having a key + passphrase are the only ones able to do nasty stuff on it. Also, don't spend countless hours on having the most awesome, secure and efficient production environment when you still have less than 1000 users and your beta service is still full of bugs and lacks very much demanded functionality and UX improvements; that's the shortest path to sink. Instead, try to start with something sound and simple and keep making it better. That being said, I take no responsibility for the damage that any of my advice might cause to your company or reputation.

1/5: DEPLOY AND ACCESS AN AWS EC2 CENTOS 7 INSTANCE

On this part I will show how to quickly deploy an affordable AWS EC2 LAMP instance for kick-starting a production environment. It won't handle boatloads of traffic but with the proper tuning you will be able to serve up more than 50 simultaneous average requests, like a WordPress user requesting a blog page, without your users noticing any performance impact; and without the need of setting up any kind of load balancing or dynamic content caching mechanism.

Since I want to make this quick I will presume you already are somehow familiar with the terminology and the technology involved and have at least a notion of what you are about to do, so let's go:

- First you log into your AWS account, go to EC2, confirm you are in your region of choice (in my case north virginia, as you can see in the top right of the screen capture) and then click on the launch instance button that shows up when you select the instances tab

The screenshot shows the AWS EC2 Management Console interface. The left sidebar navigation includes 'EC2 Dashboard', 'Events', 'Tags', 'Reports', 'Limits', 'INSTANCES' (selected), 'Instances', 'Spot Requests', 'Reserved Instances', 'IMAGES', 'AMIs', 'Bundle Tasks', 'ELASTIC BLOCK STORE', 'Volumes', 'Snapshots', 'NETWORK & SECURITY', 'Security Groups', 'Elastic IPs', 'Placement Groups', 'Key Pairs', 'Network Interfaces', 'LOAD BALANCING', 'Load Balancers', and 'AUTO SCALING', 'Launch Configurations', 'Auto Scaling Groups'. The main content area has tabs for 'Launch Instance', 'Connect', and 'Actions'. A search bar at the top says 'Filter by tags and attributes or search by keyword'. Below it is a table with columns: Name, Instance ID, Instance Type, Availability Zone, Instance State, and Status Checks. One row is shown: Webserver2, i-ad539e44, t2.micro, us-east-1e, running, 2/2 checks. A detailed view for instance i-ad539e44 (Webserver2) is expanded, showing tabs for Description, Status Checks, Monitoring, Tags, and Usage Instructions. The 'Description' tab is active, displaying fields like Instance ID (i-ad539e44), Public DNS (ec2-54-173-93-70.compute-1.amazonaws.com), Public IP (54.173.93.70), Elastic IP (54.173.93.70), Availability zone (us-east-1e), Instance state (running), Instance type (t2.micro), Private DNS (ip-10-0-0-115.ec2.internal), Private IPs (10.0.0.115), Security groups (launch-wizard-4, view rules), Secondary private IPs, VPC ID (vpc-bea06cdb), AMI ID (CentOS 7 x86_64 (2014_09_29) EBS HVM- b7ee8a99-ee97-4a49-9e68-afaee216db2e- ami-d2a117ba.2 (ami-96a818fe)), Subnet ID (subnet-f86df6c2), Platform (-), Network interfaces (eth0), IAM role (-), Source/dest. check (True), Key pair name (webserver2hvm), Owner (548573895641), ClassicLink (-), Launch time (December 14, 2014 at 9:29:47 PM UTC+1 (5851 hours)), and EBS-optimized (False). At the bottom, there are links for Feedback, English, Privacy Policy, and Terms of Use.

- Now pick your AMI from the AWS marketplace tab: Centos 7 with updates on HVM virtualization

EC2 Management Console - Google Chrome

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Launch

AWS Services Edit

Gael Abadín | N. Virginia | Support

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

Step 1: Choose an Amazon Machine Image (AMI)

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 (161)
- Business Software (2)

Operating System

Clear Filter

All Linux/Unix

- Amazon Linux (3)
- CentOS (158)

Software Pricing Plans

- Free (38)
- Hourly (80)
- Annual (2)
- Bring Your Own License (43)

Software Free Trial

- Free Trial (2)

Region

- Current Region (161)
- All Regions (161)

centos

1 to 25 of 161 Products

CentOS 6.5 (x86_64) - Release Media

★★★★★ (49) | 6.5 - 2013-12-01 | Sold by CentOS.org

\$0.00/hr for software + AWS usage fees

Linux/Unix, CentOS 6.5 | 64-bit Amazon Machine Image (AMI) | Updated: 2/27/14

This is the Official CentOS 6.5 x86_64 image that has been built with a minimal profile. The image contains just enough packages to run within AWS, bring up an SSH Server ...

More info

CentOS 6 (x86_64) - with Updates

★★★★★ (87) | 6 - 2014-09-29 | Sold by Centos.org

\$0.00/hr for software + AWS usage fees

Linux/Unix, CentOS 6 | 64-bit Amazon Machine Image (AMI) | Updated: 9/29/14

This is the Official CentOS 6 x86_64 image that has been built with a minimal profile. The image contains just enough packages to run within AWS, bring up an SSH Server ...

More info

CentOS 7 (x86_64) with Updates HVM

★★★★★ (29) | 7 2014-09-29 | Sold by Centos.org

\$0.00/hr for software + AWS usage fees

Linux/Unix, CentOS 7 | 64-bit Amazon Machine Image (AMI) | Updated: 9/29/14

This is the Official CentOS 7 x86_64 HVM image that has been built with a minimal profile, suitable for use in HVM instance types only. The image contains just enough ...

More info

CentOS 6 (x86_64) - with Updates HVM

★★★★★ (19) | 6 2014-09-29 | Sold by Centos.org

\$0.00/hr for software + AWS usage fees

Linux/Unix, CentOS 6 | 64-bit Amazon Machine Image (AMI) | Updated:

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- Pick the instance type: A general purpose t2.micro, with 2.5GHz and 1GB of RAM, is a good place to start

EC2 Management Console - Google Chrome

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Launch

AWS Services Edit Gael Abadín N. Virginia Support

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

T2 instances provide a baseline level of CPU performance with the ability to burst above the baseline. The baseline and ability to burst are governed by CPU Credits. The t2.micro receives CPU Credits continuously at a rate of 6 CPU Credits per hour. To learn more about Amazon EC2 T2 instances, see the [Amazon EC2 details page](#).

Family	Type	Cores	Threads	Memory (GiB)	Storage	Network	Performance
General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	
General purpose	t2.large	2	8	EBS only	-	Low to Moderate	
General purpose	m4.large	2	8	EBS only	Yes	Moderate	
General purpose	m4.xlarge	4	16	EBS only	Yes	High	
General purpose	m4.2xlarge	8	32	EBS only	Yes	High	
General purpose	m4.4xlarge	16	64	EBS only	Yes	High	
General purpose	m4.10xlarge	40	160	EBS only	Yes	10 Gigabit	
General purpose	m3.medium	1	3.75	1 x 4 (SSD)	-	Moderate	
General purpose	m3.large	2	7.5	1 x 32 (SSD)	-	Moderate	
General purpose	m3.xlarge	4	15	2 x 40 (SSD)	Yes	High	
General purpose	m3.2xlarge	8	30	2 x 80 (SSD)	Yes	High	

Cancel Previous Review and Launch Next: Configure Instance Details

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- Fill in the instance details form, so it looks more or less like this. It is a no brainer. You will have to create a VPC and subnet if you don't have one (As a general rule avoid EC2 Classic even when it is an option; if you become a frequent AWS user you'll thank me for that many times). In this case I did not enable a public IP because I wanted to transfer an Elastic IP address from another instance, as I will show you later on.

Screenshot of the AWS EC2 Management Console showing the "Step 3: Configure Instance Details" page. The instance configuration includes:

- Number of instances:** 1
- Purchasing option:** Request Spot Instances (unchecked)
- Network:** vpc-bea06cdb (10.0.0.0/16) | Create new VPC
- Subnet:** subnet-f86dff6c2(10.0.0.0/24) | webserver | us-east-1 | Create new subnet
250 IP Addresses available
- Auto-assign Public IP:** Disable (selected)
- IAM role:** None | Create new IAM role
- Shutdown behavior:** Stop
- Enable termination protection:** Protect against accidental termination (checked)
- Monitoring:** Enable CloudWatch detailed monitoring (unchecked)
- Tenancy:** Shared tenancy (multi-tenant hardware)

Network interfaces:

Device	Network Interface	Subnet	Primary IP	Secondary IP addresses
eth0	New network interface	subnet-f86dff6c2	Auto-assign	Add IP

Advanced Details:

Buttons: Cancel, Previous, Review and Launch (highlighted), Next: Add Storage

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- For the storage, I chose the General purpose SSD option because I don't expect significant load most of the time, it is cheap and it performs better than magnetic storage on occasional peaks. The only app I will deploy on this server will not require more than a few megabytes per user, and that's the worst case scenario. Choosing 8 GB will leave me with 1 GB for swapping plus 4GB of free space for their needs, and it didn't took much of a design effort to make sure I could move all the user space to another drive without downtime or hassle if I ever require it.

EC2 Management Console - Google Chrome
https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Launch

AWS Services Edit

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

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more about storage options in Amazon EC2.](#)

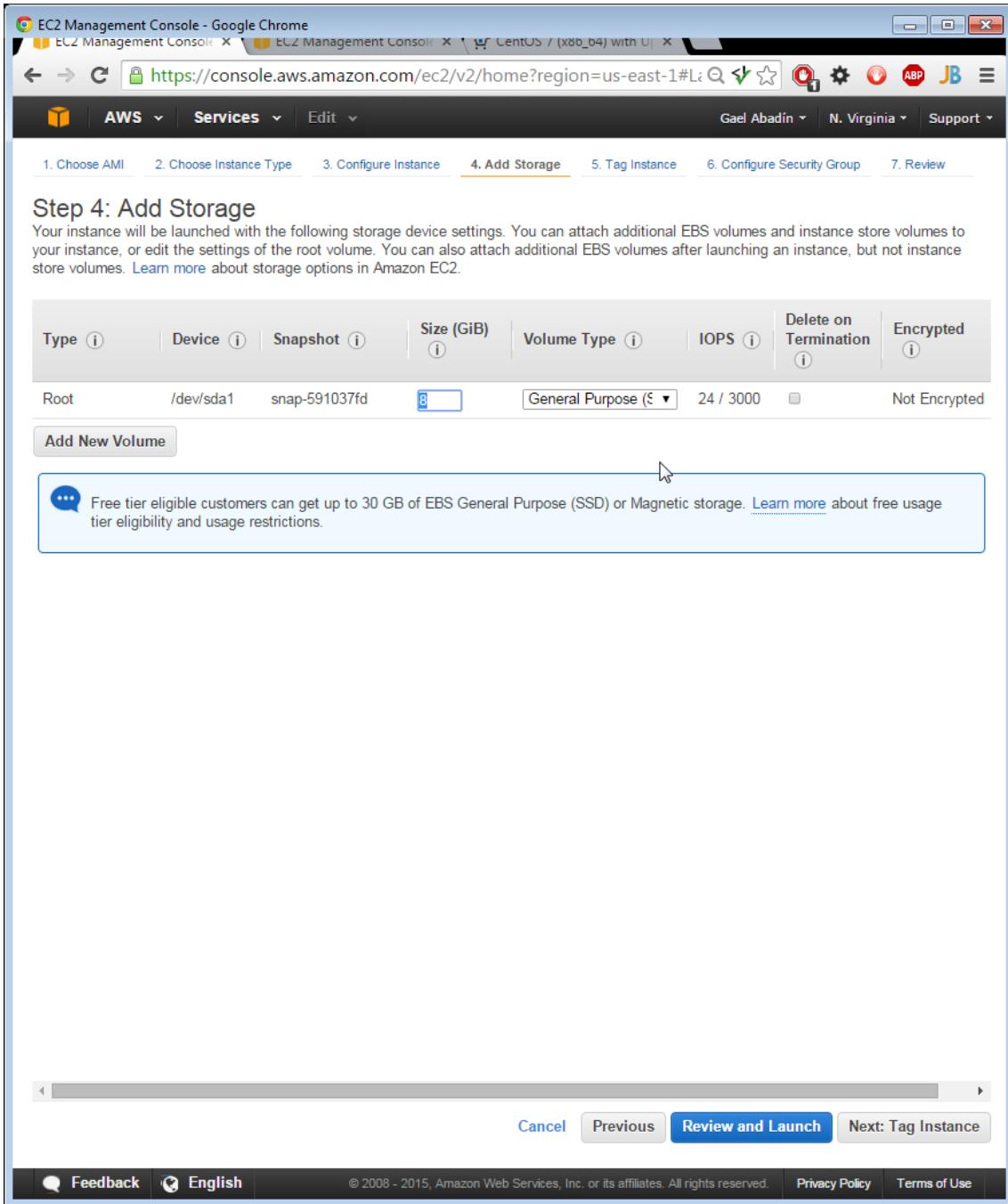
Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Delete on Termination	Encrypted
Root	/dev/sda1	snap-591037fd	8	General Purpose (SSD)	24 / 3000	Yes	Not Encrypted

Add New Volume

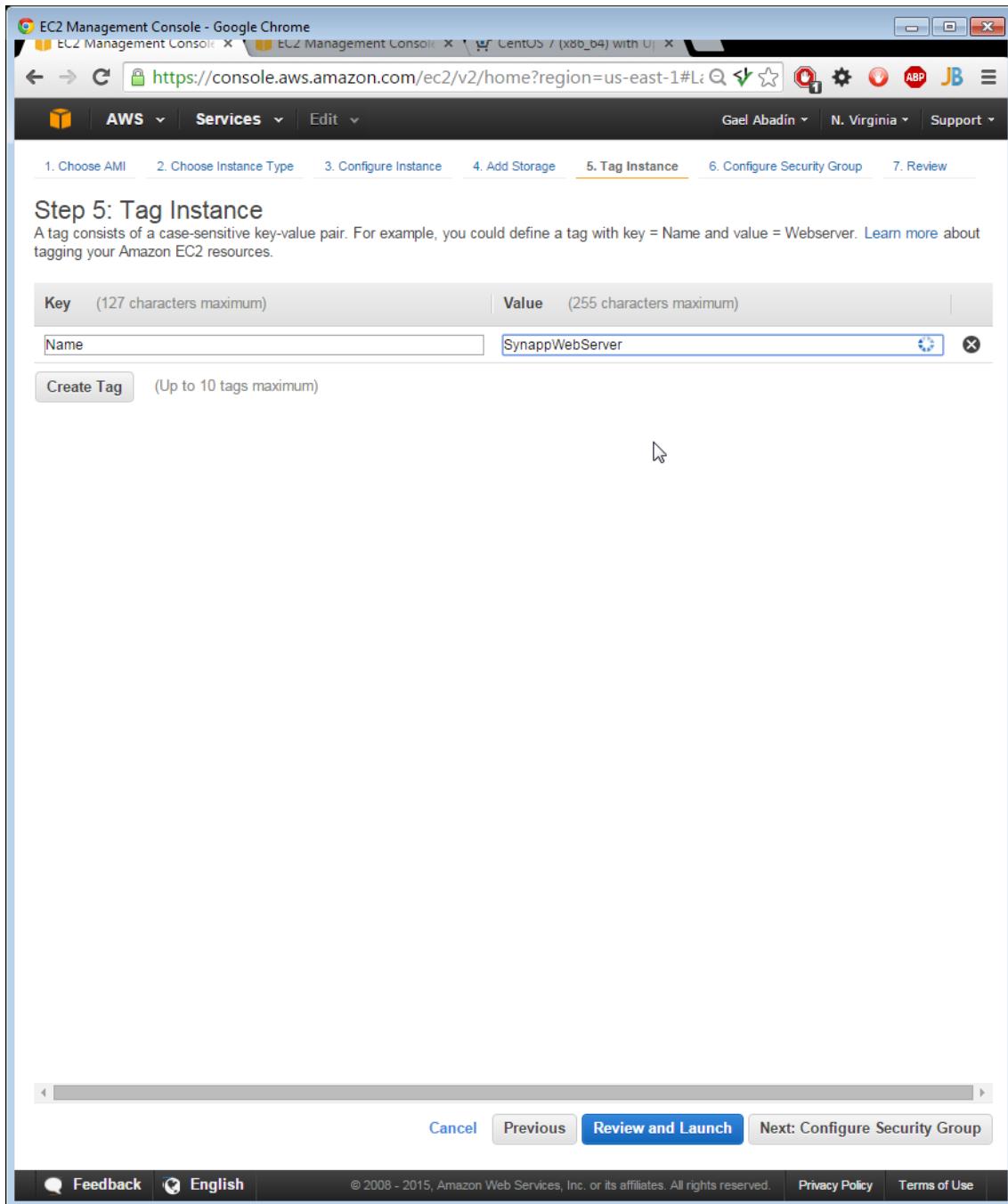
Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more about free usage tier eligibility and usage restrictions.](#)

Cancel Previous **Review and Launch** Next: Tag Instance

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- Moving on to the tagging step. Here you name your instance. This should be an easy one.



- The next step is a little bit tricky. You can always edit this settings and open up any service you require, so I suggest to leave it to the absolute minimum. Something I usually do is restrict the source of all incoming connections to my IP until I finish deploying the app and I am ready to go live, which I recommend you do instead. I have adapted this workflow a little bit and set the machine live right away to cover the whole EC2 management process in one part instead of adding an extra bit at the end of the last one. If you are doing the whole set up in one session it won't make much of a difference, anyway.

EC2 Management Console - Google Chrome
https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Launch

AWS Services Edit

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

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

Assign a security group: Create a new security group Select an existing security group

Security group name: CentOS 7-x86_64-with Updates HVM-7 2014-09-29-AutogenByAWSMP-

Description: This security group was generated by AWS Marketplace and is based on recommended rules.

Type	Protocol	Port Range	Source
All ICMP	ICMP	0 - 65535	Anywhere
SMTP	TCP	25	Anywhere
HTTPS	TCP	443	Anywhere
HTTP	TCP	80	Anywhere
DNS (UDP)	UDP	53	Anywhere
SSH	TCP	22	Anywhere

Add Rule

Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Cancel Previous Review and Launch

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- Last step before launch is to review the configuration, and the most important! You must generate and download a public/private key pair to connect to the instance you are about to launch. Later on I will show you how to set up this connection.

EC2 Management Console - Google Chrome
https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Launch

AWS Services Edit Gael Abadín N. Virginia Support

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

Step 7: Review Instance Launch

AMI Details [Edit AMI](#)

CentOS 7 (x86_64) with Updates HVM
CentOS 7 x86_64 (2014_09_29) EBS HVM
Root Device Type: ebs Virtualization type: hvm
Free tier eligible

Hourly Software Fees: \$0.00 per hour on t2.micro instance
Software charges will begin once you launch this AMI and continue until you terminate the instance.

By launching this product, you will be subscribed to this software and agree that your use of this software is subject to the pricing terms and the seller's [End User License Agreement](#)

Instance Type [Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Security Groups [Edit security groups](#)

Security group name: CentOS 7 -x86_64- with Updates HVM-7 2014-09-29-AutogenByAWSMP-
Description: This security group was generated by AWS Marketplace and is based on recommended settings for CentOS 7 (x86_64) with Updates HVM version 7 2014-09-29 provided by Centos.org

Type (i)	Protocol (i)	Port Range (i)	Source (i)
All ICMP	All	N/A	0.0.0.0/0
SMTP	TCP	25	0.0.0.0/0
HTTPS	TCP	443	0.0.0.0/0
HTTP	TCP	80	0.0.0.0/0
DNS (UDP)	UDP	53	0.0.0.0/0
SSH	TCP	22	0.0.0.0/0

Instance Details [Edit instance details](#)

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

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EC2 Management Console x EC2 Management Console x CentOS 7 (x86_64) with Updates HVM

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Launch

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

Step 7: Review Instance Launch

AMI Details

CentOS 7 (x86_64) with Updates HVM
CentOS 7 x86_64 (2014_09_29) EBS HVM
Root Device Type: ebs Virtualization type: hvm
Free tier eligible

Hourly Software Fees: \$0.00 per hour on t2.micro instance

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: SynappWebServer

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

Instance Type: t2.micro

Security Groups: Security group: Default Description: 7 (x86_64) with Updates HVM

Type: All ICMP, SMTP, HTTPS

Ports:

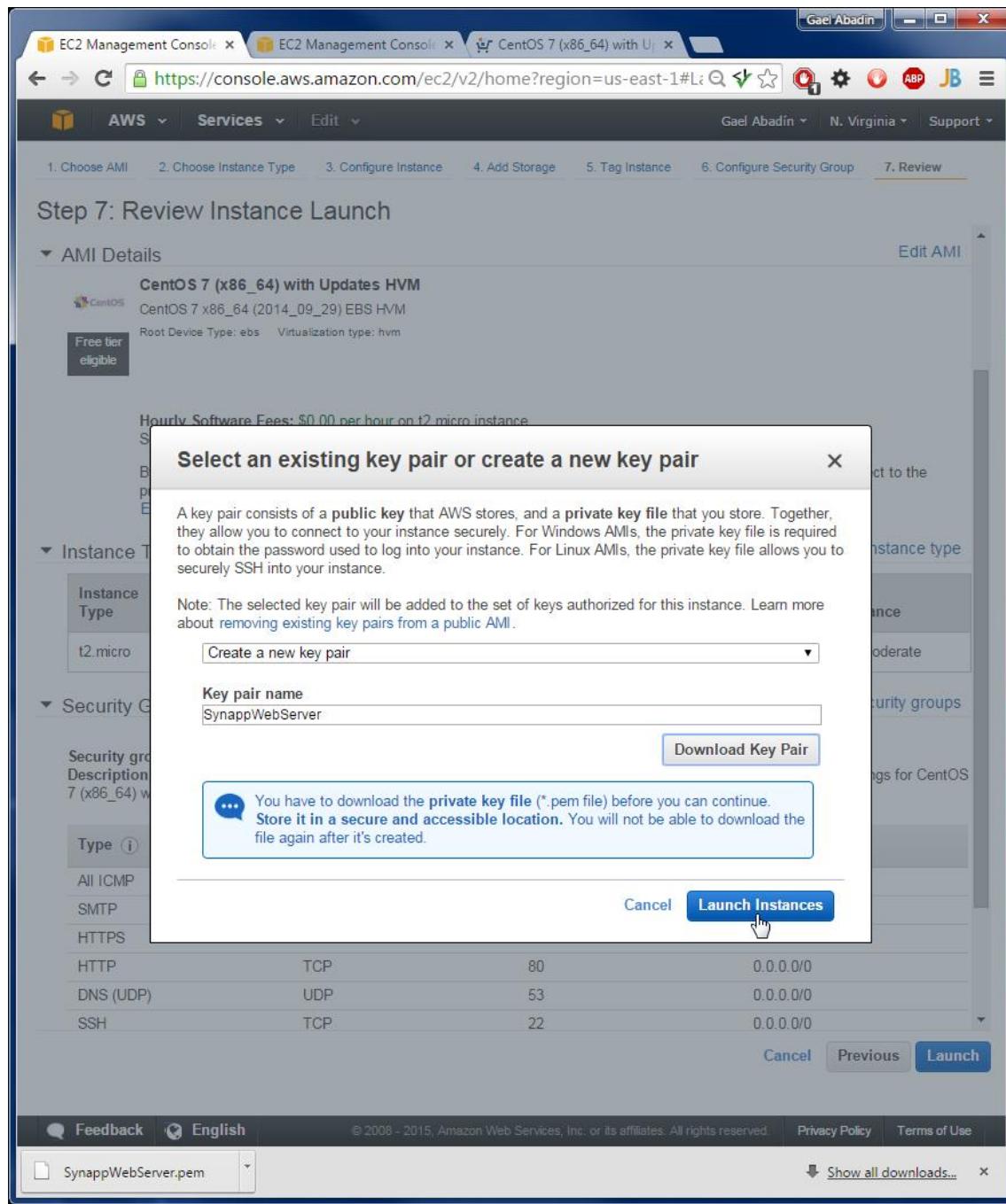
Port	Protocol	From Port	To Port
HTTP	TCP	80	0.0.0.0/0
DNS (UDP)	UDP	53	0.0.0.0/0
SSH	TCP	22	0.0.0.0/0

Instance Details

Edit instance details

Cancel Previous Launch

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- This is what you will see when your instance is running. Wait for the checks to show and that will mean it is ready to accept connections. If you have not assigned a public IP address you will have to connect internally through another machine on the subnet or, like I am about to do, assign a public IP address to the machine so you can establish a direct connection from your PC.

Screenshot of the AWS EC2 Management Console showing the Instances page. The left sidebar shows navigation links for EC2 Dashboard, Events, Tags, Reports, Limits, Instances, Images, AMIs, Bundle Tasks, Elastic Block Store, Volumes, Snapshots, Network & Security, Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, Load Balancing, and Auto Scaling.

The main content area displays a table of running instances. One instance, "SynappWebServer" (i-0c69f3e5), is selected. The details for this instance are shown in a large table below:

Description	Value	Description	Value
Instance ID	i-0c69f3e5	Public DNS	-
Instance state	running	Public IP	-
Instance type	t2.micro	Elastic IP	-
Private DNS	ip-10-0-0-13.ec2.internal	Availability zone	us-east-1e
Private IPs	10.0.0.13	Security groups	CentOS 7 - x86_64 - with Updates HVM-7 2014-09-29 AutogenByAWSMP - view rules
Secondary private IPs		Scheduled events	
VPC ID	vpc-bea06cdb	AMI ID	CentOS 7 x86_64 (2014_09_29) EBS HVM- b7ee8a69-ee97-4a49-9e68- afaee216db2e- ami-d2a117ba.2 (ami-96a818fe)
Subnet ID	subnet-f86df6c2	Platform	-
Network interfaces	eth0	IAM role	-
Source/dest. check	True	Key pair name	SynappWebServer
ClassicLink	-	Owner	548573895641
EBS-optimized	False	Launch time	August 15, 2015 at 5:46:48 PM UTC+2 (less than one hour)

At the bottom of the page, there are links for Feedback, English, Privacy Policy, Terms of Use, and a download link for "SynappWebServer.pem".

- Creating and assigning an Elastic public IP address to an instance is very easy. You can see I am releasing it from a running instance but you can also do a hot swap reassignment. Just select the Elastic IPs tab on the menu and fill in the form on the screen, like this.

EC2 Management Console - Google Chrome

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#Instances

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EC2 Dashboard | AWS Services | Edit

Launch Instance | Connect | Actions

Filter by tags and attributes or search by keyword

1 to 2 of 2

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks
SynappWebServer	i-0c69f3e5	t2.micro	us-east-1e	running	2/2 checks ...
Webserver2	i-ad539e44	t2.micro	us-east-1e	running	2/2 checks ...

Connect | Get Windows Password | Launch More Like This

Instance State | Instance Settings | Image | Networking | ClassicLink | CloudWatch Monitoring

Change Security Groups | Attach Network Interface | Detach Network Interface | Disassociate Elastic IP Address | Change Source/Dest. Check | Manage Private IP Addresses

Instance: i-ad539e44 (Webserver2) Elas

Description	Status Checks	Monitoring	Tags	Usage Instructions
Instance ID: i-ad539e44	Public DNS: ec2-54-173-93-70.compute-1.amazonaws.com	Public IP: 54.173.93.70	Elastic IP: 54.173.93.70	Availability zone: us-east-1e
Instance state: running	Security groups: launch-wizard-4, view rules	Scheduled events: No scheduled events	AMI ID: CentOS 7 x86_64 (2014-09-29)	
Instance type: t2.micro			EBS HVM- b7ee8a69-ee97-4a49-9e68-aafe216db2e- ami-d2a117ba.2 (ami-96a818fe)	
Private DNS: ip-10-0-0-115.ec2.internal				
Private IPs: 10.0.0.115				
Secondary private IPs				
VPC ID: vpc-bea06cdb				
Subnet ID: subnet-	Platform: -			

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SynappWebServer.pem | Show all downloads...

EC2 Management Console - Google Chrome

EC2 Management Console

EC2 Management Console

CentOS / (x86_64) with U...

https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#AddressScope=vpc

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EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

- Instances
- Spot Requests
- Reserved Instances

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots

NETWORK & SECURITY

- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces

LOAD BALANCING

- Load Balancers

AUTO SCALING

- Launch Configurations
- Auto Scaling Groups

Allocate New Address Actions

Filter by attributes or search by keyword

1 to 1 of 1

Elastic IP Instance Private IP Address Scope

54.173.93.70 vpc

Associate Address

Allocate New Address

Release Addresses

Disassociate Address

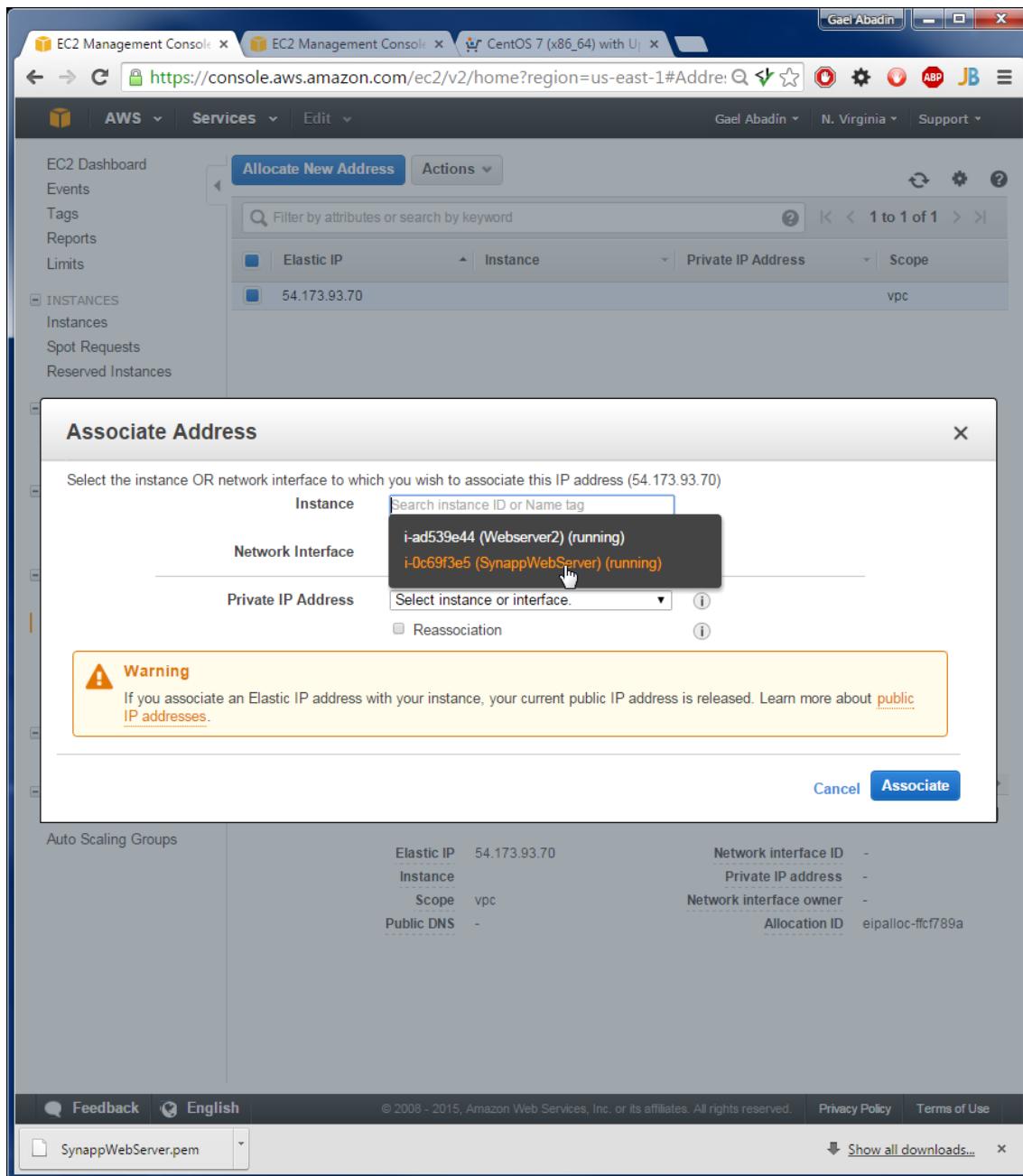
Address: 54.173.93.70

Elastic IP	54.173.93.70	Network interface ID	-
Instance		Private IP address	-
Scope	vpc	Network interface owner	-
Public DNS	-	Allocation ID	eipalloc-ffcf789a

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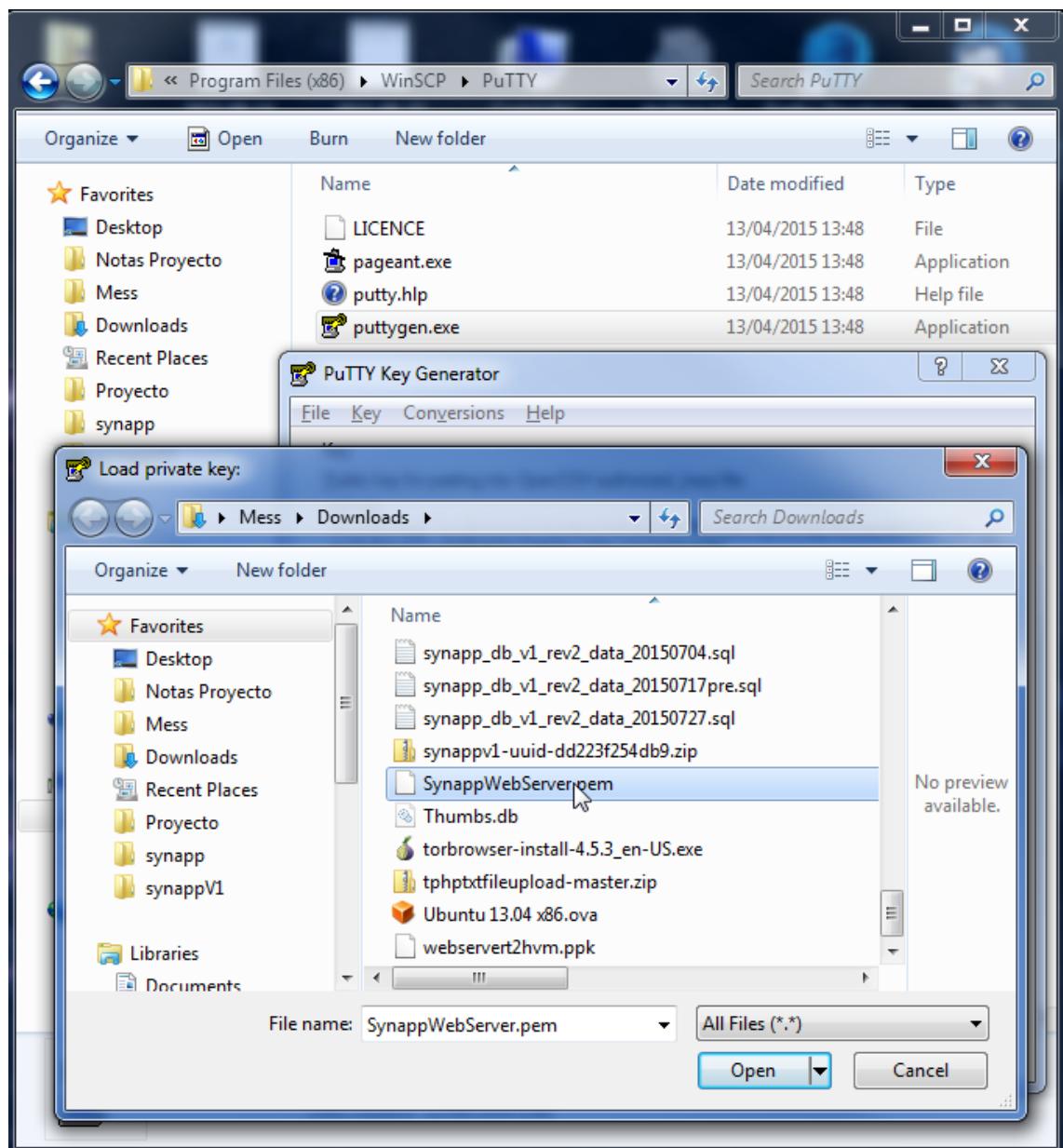
SynappWebServer.pem Show all downloads...

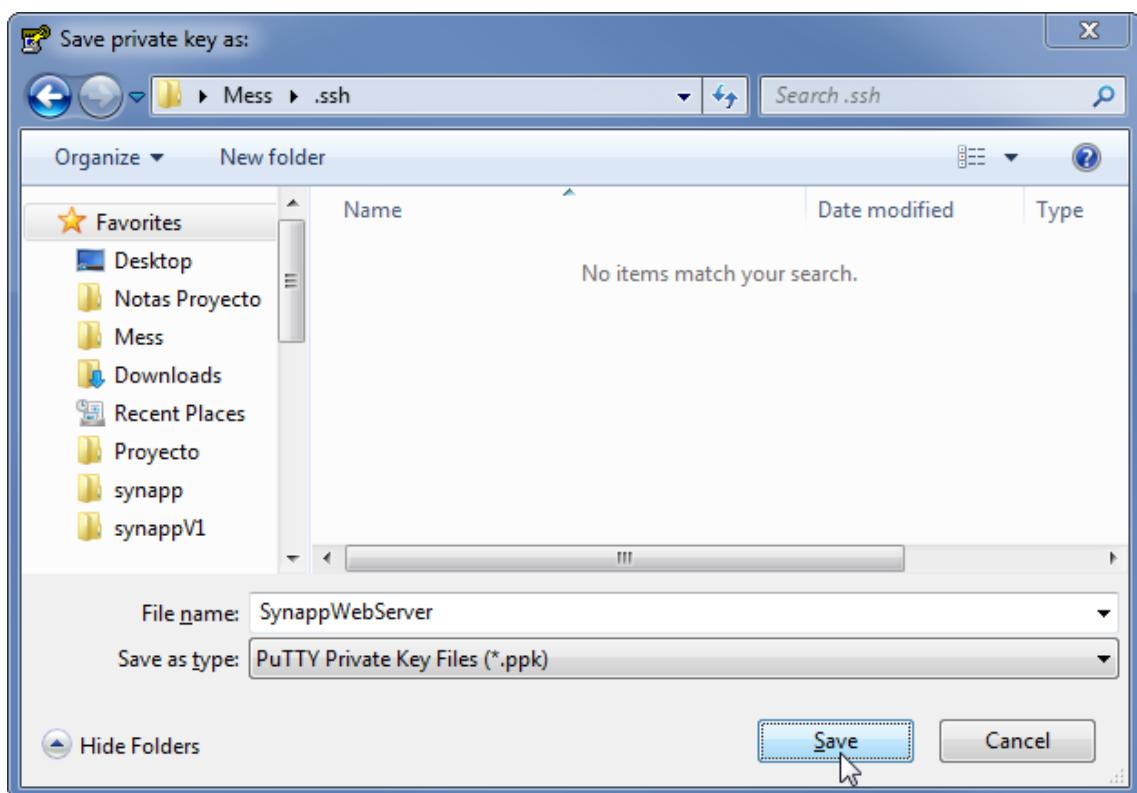
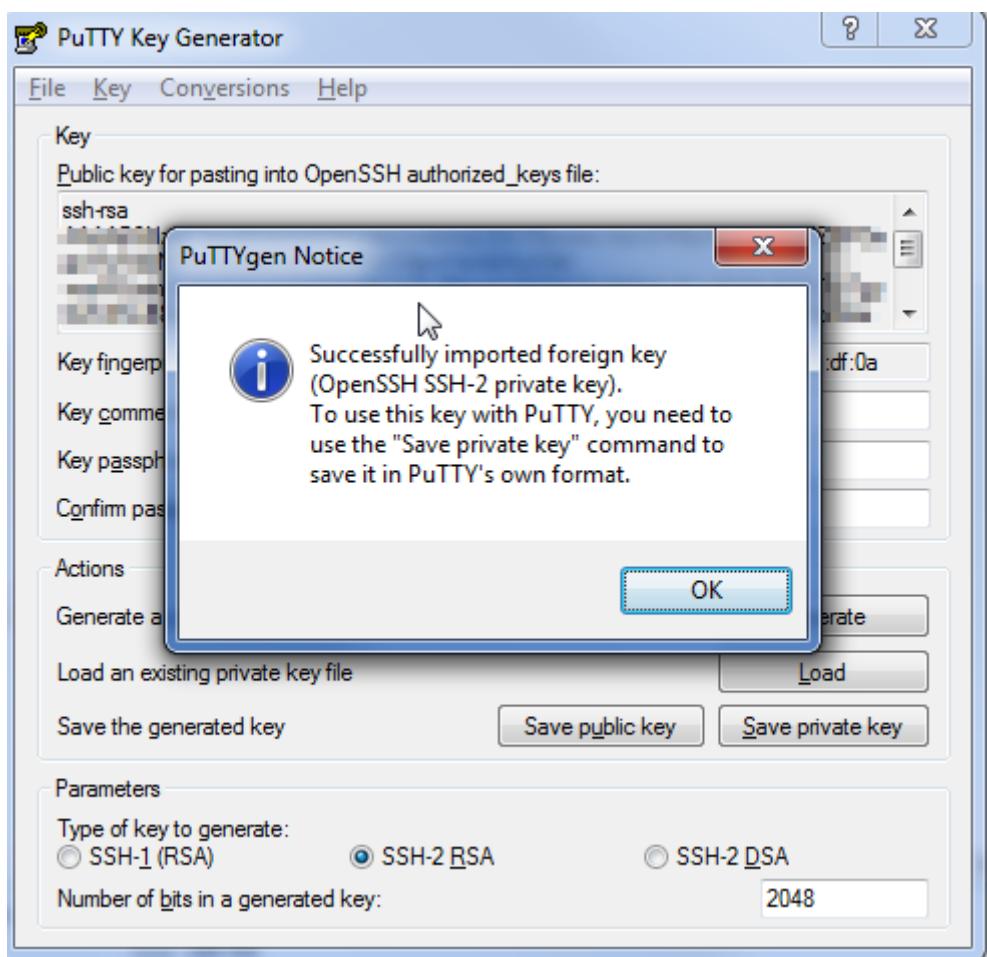
Detailed description: This screenshot shows the AWS EC2 Management Console interface. On the left, there's a navigation sidebar with links like EC2 Dashboard, Instances, and Auto Scaling. The main area shows a list of Elastic IPs, with one specific entry (54.173.93.70) selected. A context menu is open over this entry, with 'Associate Address' being the selected option. Below the menu, a detailed view of the selected address is shown, including its elastic IP, instance, scope (vpc), and allocation ID. At the bottom, there are download links for files like 'SynappWebServer.pem'.

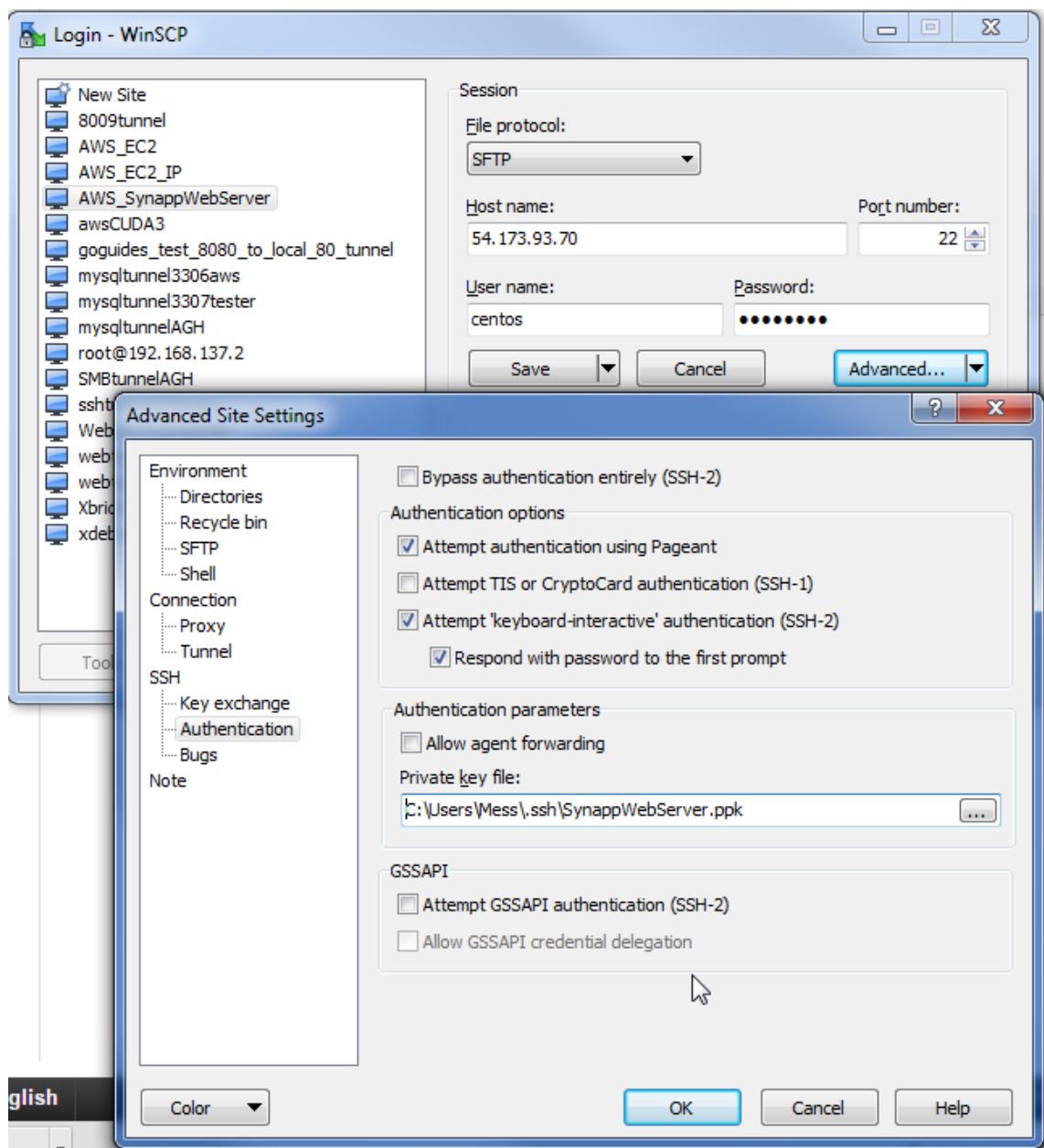


That's all. You set your instance running in no time and we have arrived to the second part of this part where you can see how to connect to it using WinSCP and putty SSH client. With all due respect to Windows users, the reason I am not showing how to do this to Linux desktop users is that you will probably think that I think that you were born yesterday.

- Moving on: the first step is to download and install WinSCP (<http://www.winscp.com>) and then run the putty key generator that comes with it. This tool will allow you to open the key pair you downloaded before launching the instance (If you didn't you are out of luck because Amazon doesn't store them), and save the private key part so you can assign it to your connection.







- Once you have done that you are ready to set up a WinSCP or putty connection to your server to transfer files from it and to it or open a terminal to issue commands to the server from it. The only problem is that you have to use the "unprivileged" user centos. A simple sudo su will give you root access on the console but that's still a problem when you want to transfer files to restricted folders, so here is how to do to activate root login.

- First, edit /etc/ssh/sshd_config to uncomment and set PermitRootLogin option to yes

```
root@ip-10-0-0-13:/home/centos
#RekeyLimit default none

# Logging
# obsoletes QuietMode and FascistLogging
#SyslogFacility AUTH
SyslogFacility AUTHPRIV
#LogLevel INFO

# Authentication:

#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

#RSAAuthentication yes
#PubkeyAuthentication yes

# The default is to check both .ssh/authorized_keys and .ssh/authorized_keys2
# but this is overridden so installations will only check .ssh/authorized_keys
AuthorizedKeysFile .ssh/authorized_keys

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

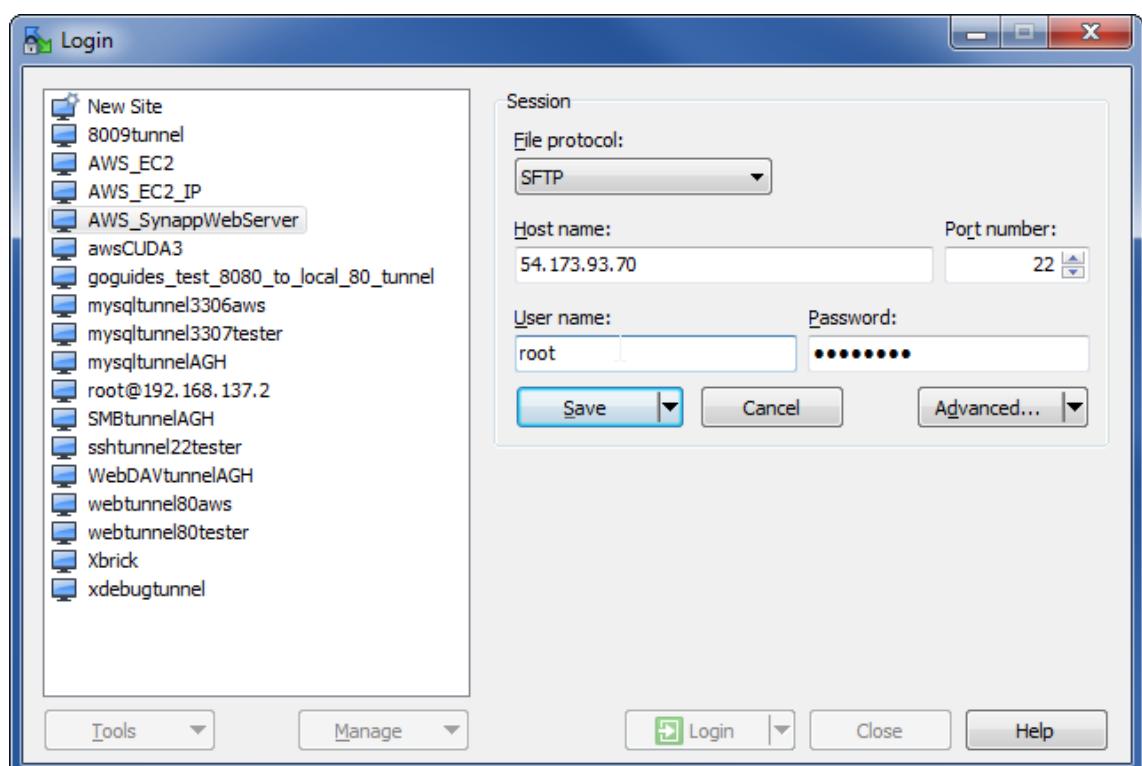
"/etc/ssh/sshd_config" 157L, 4438C written
```

- Then, edit /root/.ssh/authorized_keys and delete all the rubble before the key, particularly the echo command, so it ends up like this

root@ip-10-0-0-13:/home/centos/.ssh

```
ssh-rsa
SynappWebServer

"~/.ssh/authorized_keys" 1L, 397C written
```



In case you are interested on activating a swap partition to avoid occasional out-of-memory service crashes:

```
dd if=/dev/zero of=/swapfile bs=1M count=2048  
chown root:root /swapfile  
sudo chmod 600 /swapfile  
sudo mkswap /swapfile  
sudo swapon /swapfile  
echo '/swapfile swap swap defaults 0 0' >> /etc/fstab
```

You should set the swappiness to a minimum (sysctl vm.swappiness=10 and add vm.swappiness=10 to /etc/sysctl.conf to persist it on reboot) and monitor the swap usage closely, though: Amazon charges EBS volumes based on USAGE and they will charge you A LOT if you make heavy use of them. In that case you will be saving money and getting a much greater performance by upgrading your instance to a "non-EBS only", mounting a swap partition on ephemeral storage instead if you still require it.

You have now deployed an AWS EC2 instance and you are able to connect to it. The next part of this tutorial will show how to provision this instance to set up a LAMP stack on it. That simply means installing packages using the package manager; a piece of cake. Then there will be three more parts: On the first one I will show how to obtain a signed certificate, because I am tired of visiting sites with self-signed certs when it's only 9 US dollars and a few minutes of your time to set up a signed one that will last you at least a year. After that I will publish another short part on how to configure the Maria DB SQL service, the PHP FPM service and the Apache Web Server on our CentOS 7 instance. Finally, the last part of this series will teach you how set up and deploy a PHP web application using git and composer, plus how to set up the records of a DNS zone file so your domain points to your EC2 instance and you can give your users a nice way to access your web app.

2/5: ADDING DISTRO REPOS AND PROVISIONING A CENTOS 7 LAMP INSTANCE

This is the second part of a five part series on how to set up a web application with proper SSL support and a LAMP stack on a CentOS 7 Amazon Elastic Compute Cloud virtual machine.

On this part I will show you how to provision the EC2 instance we launched on the previous part.

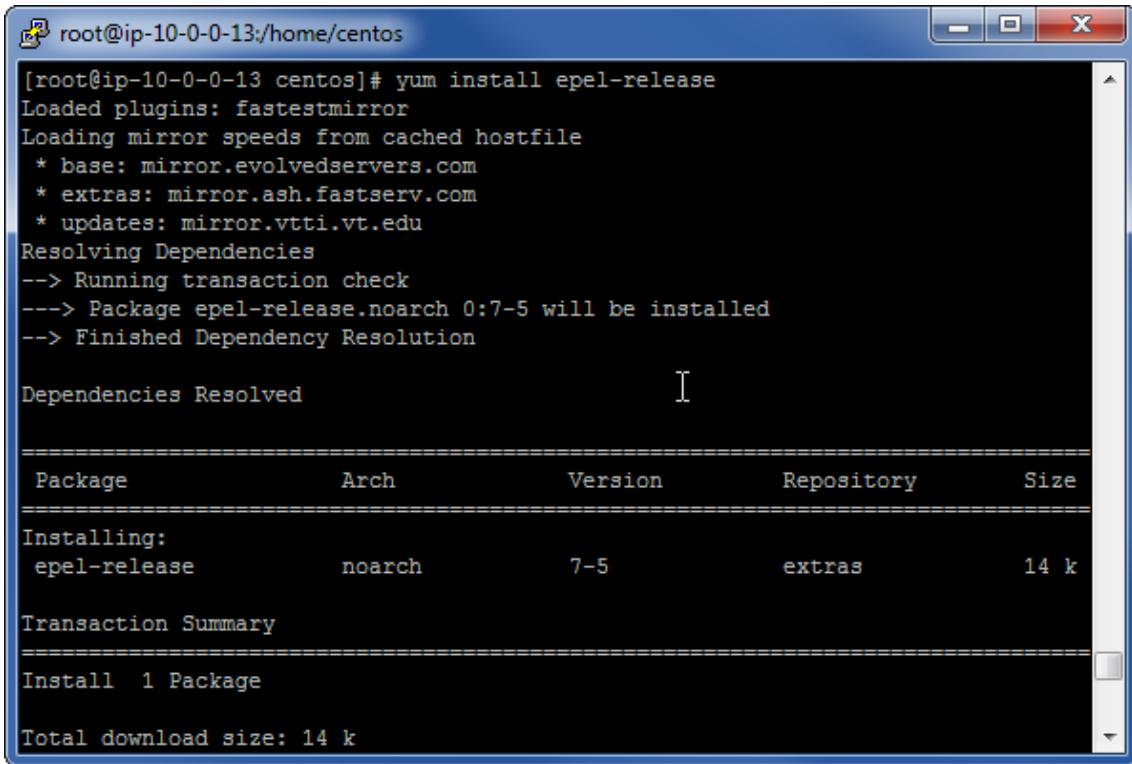
This will be a short and easy one. The goal is to install all the updated packages we need to deploy the services required by our PHP web application.

These requirements may vary depending on what kind of web application you want to deploy. At the very least you usually need a web server and PHP interpreter; Often enough you will need an SQL database too, and the capability to send mails from your PHP web app, using

sendmail or postfix, for example. We will take care of installing the pertinent packages and all the dependencies involved.

In order to get the latest stable versions of the packages we are about to install, we will start by adding a few repositories to those included on the standard CentOS release: epel, remi and MariaDB.

For epel repositories, that boils down to performing a simple yum install epel-release, as you can see in the screen capture.



```
[root@ip-10-0-0-13 centos]# yum install epel-release
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * extras: mirror.ash.fastserv.com
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
---> Package epel-release.noarch 0:7-5 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository     Size
=====
Installing:
epel-release     noarch    7-5          extras        14 k

Transaction Summary
=====
Install 1 Package

Total download size: 14 k
```

In the case of remi repos, we need to wget the rpm package and then yum-install it. After that, don't forget to edit the etc/yum.repos.d/remi.repo to activate the PHP and remi-release repositories.

```
root@ip-10-0-0-13:/home/centos
Resolving rpms.famillecollet.com (rpms.famillecollet.com)... 195.154.241.117, 20
01:bc8:33a1:100::1
Connecting to rpms.famillecollet.com (rpms.famillecollet.com) |195.154.241.117|:8
0... connected.
HTTP request sent, awaiting response... 200 OK
Length: 7307 (7.1K) [application/x-rpm]
Saving to: 'remi-release-7.rpm'

100%[=====] 7,307      --.-K/s   in 0s

2015-08-15 16:15:38 (677 MB/s) - 'remi-release-7.rpm' saved [7307/7307]

[root@ip-10-0-0-13 centos]# rpm -Uvh remi-release-7*.rpm epel-release-7*.rpm
error: File not found by glob: epel-release-7*.rpm
[root@ip-10-0-0-13 centos]# rpm -Uvh remi-release-7*.rpm
warning: remi-release-7.rpm: Header V3 DSA/SHA1 Signature, key ID 00f97f56: NOKEY
Preparing...                                           #####[100%]
Updating / installing...
 1:remi-release-7.1-2.el7.remi          #####[100%]
[root@ip-10-0-0-13 centos]# vi /etc/yum.repos.d/
[root@ip-10-0-0-13 centos]# vi /etc/yum.repos.d/
CentOS-Base.repo      CentOS-Sources.repo    remi-php70.repo
CentOS-CR.repo        CentOS-Vault.repo     remi.repo
CentOS-Debuginfo.repo epel.repo            remi-safe.repo
CentOS-fasttrack.repo epel-testing.repo
[root@ip-10-0-0-13 centos]# vi /etc/yum.repos.d/remi.repo
[root@ip-10-0-0-13 centos]# vi /etc/yum.repos.d/remi.repo
```

```
[remi]
name=Remi's RPM repository for Enterprise Linux 7 - $basearch
#baseurl=http://rpms.remirepo.net/enterprise/7/remi/$basearch/
mirrorlist=http://rpms.remirepo.net/enterprise/7/remi/mirror
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-remi

[remi-php55]
name=Remi's PHP 5.5 RPM repository for Enterprise Linux 7 - $basearch
#baseurl=http://rpms.remirepo.net/enterprise/7/php55/$basearch/
mirrorlist=http://rpms.remirepo.net/enterprise/7/php55/mirror
# WARNING: If you enable this repository, you must also enable "remi"
enabled=0
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-remi

[remi-php56]
name=Remi's PHP 5.6 RPM repository for Enterprise Linux 7 - $basearch
#baseurl=http://rpms.remirepo.net/enterprise/7/php56/$basearch/
mirrorlist=http://rpms.remirepo.net/enterprise/7/php56/mirror
# WARNING: If you enable this repository, you must also enable "remi"
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-remi

[remi-test]
-- INSERT --
```

For mariadb there is a web page detailing the process

(https://downloads.mariadb.org/mariadb/repositories/#mirror=tedeco&distro=CentOS&distro_release=centos7-amd64--centos7&version=10.0), which is as simple as copying the repo definition to a .repo file in etc/yum.repos.d directory

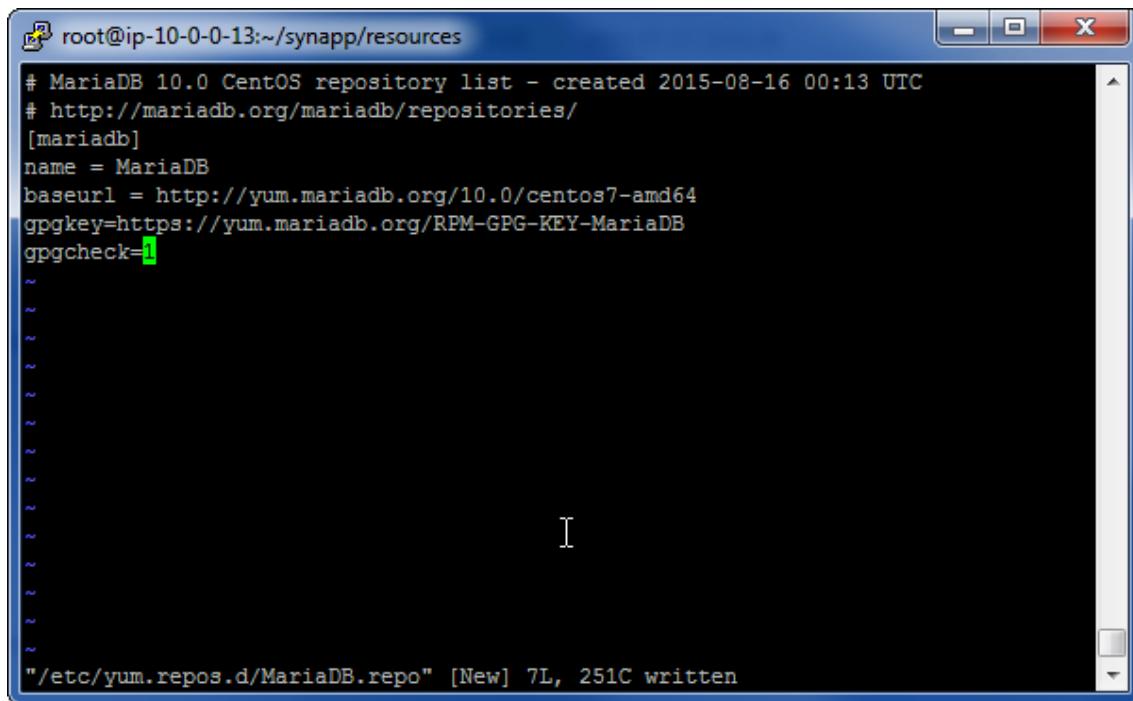
The screenshot shows a web browser window titled "MariaDB - Setting up Mar". The URL in the address bar is https://downloads.mariadb.org/mariadb/repositories/#mirror=tedeco&distro=CentOS&distro_release=centos7-amd64--centos7&version=10.0. The page is titled "Downloads Setting up MariaDB Repositories". It contains three dropdown menus:

- 1. Choose a Distro
 - openSUSE
 - Arch Linux
 - Mageia
 - Fedora
 - CentOS**
 - RedHat
 - Mint
 - Ubuntu
 - Debian
- 2. Choose a Release
 - CentOS 7 (64-bit)**
 - CentOS 6 (64 bit)
 - CentOS 6 (32 bit)
 - CentOS 5 (64 bit)
 - CentOS 5 (32 bit)
- 3. Choose a Version
 - 10.0**
 - 5.5

Below the dropdowns, a text box displays a custom MariaDB YUM repository entry for CentOS:

```
# MariaDB 10.0 CentOS repository list - created 2015-08-16 00:13 UTC
# http://mariadb.org/mariadb/repositories/
[mariadb]
name = MariaDB
baseurl = http://yum.mariadb.org/10.0/centos7-amd64
gpgkey=https://yum.mariadb.org/RPM-GPG-KEY-MariaDB
gpgcheck=1
```

Further instructions below the code box say: "After the file is in place, install MariaDB with: sudo yum install MariaDB-server MariaDB-client". A note at the bottom states: "If you haven't already accepted the MariaDB GPG key, you will be prompted to do so. See "Installing MariaDB with yum" for detailed information."



A screenshot of a terminal window titled "root@ip-10-0-0-13:~/synapp/resources". The window contains the following text:

```
# MariaDB 10.0 CentOS repository list - created 2015-08-16 00:13 UTC
# http://mariadb.org/mariadb/repositories/
[mariadb]
name = MariaDB
baseurl = http://yum.mariadb.org/10.0/centos7-amd64
gpgkey=https://yum.mariadb.org/RPM-GPG-KEY-MariaDB
gpgcheck=1
```

The line "gpgcheck=1" is highlighted with a green rectangle. The terminal window has a blue border and a scroll bar on the right side.

After we set up the repos, the first thing we want to do is a system update. But before that, a little piece of advice: When you are working remotely it is a good idea to use a virtual terminal session manager like tmux or gnu screen to avoid broken connections terminating lengthy processes, specially if you manage your servers from a WiFi connected terminal like I often do. A simple yum install tmux will provide you with the tmux command that you can execute without parameters to start a new session. Once you do that, just run yum update and wait for the update to finish. A kernel update will be performed, which requires a system restart for the new kernel to be loaded. Instead of doing that right away we will first edit the selinux configuration by on /etc/sysconfig/selinux file and set the SELINUX property to permissive, which also requires a system restart to take effect. Don't freak out by this global security policy change. Unless your server is a juicy target for hackers or you are a very careless sysadmin or you share admin rights on this server with a few other people which shouldn't be trusted with having god powers on a production server you should be OK. Although I admit that's a lot of ifs...

```
[root@ip-10-0-0-13:~]# yum install tmux
Loaded plugins: fastestmirror
base                                         | 3.6 kB     00:00
epel/x86_64/metalink                         | 13 kB      00:00
extras                                        | 3.4 kB     00:00
mariadb                                       | 2.9 kB     00:00
remi                                           | 2.9 kB     00:00
remi-php56                                    | 2.9 kB     00:00
remi-safe                                      | 2.9 kB     00:00
updates                                       | 3.4 kB     00:00
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * epel: mirror.symnds.com
 * extras: mirror.us.leaseweb.net
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirrors.advancedhosters.com
Resolving Dependencies
--> Running transaction check
---> Package tmux.x86_64 0:1.8-4.el7 will be installed
--> Finished Dependency Resolution
```

```
[root@ip-10-0-0-13:/home/centos]# tmux
[centos@ip-10-0-0-13 ~]$ sudo su
[root@ip-10-0-0-13 centos]# yum update
Loaded plugins: fastestmirror
base                                         | 3.6 kB     00:00
extras                                       | 3.4 kB     00:00
updates                                      | 3.4 kB     00:00
(1/4): extras/7/x86_64/primary_db           | 74 kB      00:00
(2/4): base/7/x86_64/group_gz              | 154 kB     00:00
(3/4): updates/7/x86_64/primary_db         | 3.2 MB     00:00
(4/4): base/7/x86_64/primary_db            | 5.1 MB     00:07
Determining fastest mirrors
 * base: mirror.evolvedservers.com
 * extras: mirror.ash.fastserv.com
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
---> Package audit.x86_64 0:2.3.3-4.el7 will be updated
---> Package audit.x86_64 0:2.4.1-5.el7 will be an update
---> Package audit-libs.x86_64 0:2.3.3-4.el7 will be updated
---> Package audit-libs.x86_64 0:2.4.1-5.el7 will be an update
---> Package audit-libs-python.x86_64 0:2.3.3-4.el7 will be updated
[0] 0:root@ip-10-0-0-13:~*                  "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

A screenshot of a terminal window titled "root@ip-10-0-0-13:~". The window contains the following text:

```
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=permissive
# SELINUXTYPE= can take one of these two values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes are protected.
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted

~
~
~
~
~
~
~
~/etc/sysconfig/selinux" 14L, 547C written
```

All that's left to do now is performing a yum-install on the required packages, as you can see in the following screen captures. You may install any package you are not sure you are going to need, but you should not install anything you know don't need; particularly the mail services.

A screenshot of a terminal window titled "[root@ip-10-0-0-13 centos]#". The window contains the following text:

```
[root@ip-10-0-0-13 centos]# yum install php-mcrypt php-gd php-pdo php-mbstring
php56
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.symnds.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
--> Package php-gd.x86_64 0:5.6.12-1.el7.remi will be installed
--> Processing Dependency: php-common(x86-64) = 5.6.12-1.el7.remi for package: p
hp-gd-5.6.12-1.el7.remi.x86_64
--> Processing Dependency: gd-last(x86-64) >= 2.1.1 for package: php-gd-5.6.12-1
.el7.remi.x86_64
--> Processing Dependency: libvpx.so.1()(64bit) for package: php-gd-5.6.12-1.el7
.remi.x86_64
--> Processing Dependency: libt1.so.5()(64bit) for package: php-gd-5.6.12-1.el7.
remi.x86_64
--> Processing Dependency: libpng15.so.15()(64bit) for package: php-gd-5.6.12-1.
el7.remi.x86_64
--> Processing Dependency: libgd.so.3()(64bit) for package: php-gd-5.6.12-1.el7.
remi.x86_64
--> Processing Dependency: libXpm.so.4()(64bit) for package: php-gd-5.6.12-1.el7
.remi.x86_64
[0] 0:root@ip-10-0-0-13:~*          "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

The image shows two separate terminal windows, each with a blue title bar and a black body. Both windows are titled with the root user's name and IP address.

Terminal Window 1:

```
[root@ip-10-0-0-13 synapp]# yum install php-fpm
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * epel: mirror.symnds.com
 * extras: mirrors.tripadvisor.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: linux.cc.lehigh.edu
Resolving Dependencies
--> Running transaction check
--> Package php-fpm.x86_64 0:5.6.12-1.el7.remi will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package      Arch      Version      Repository      Size
=====
Installing:
php-fpm      x86_64    5.6.12-1.el7.remi   remi-php56   1.4 M
[0] 0:root@ip-10-0-0-13:~*
```

Terminal Window 2:

```
[root@ip-10-0-0-13 resources]# yum install php-mysql
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * epel: mirror.symnds.com
 * extras: mirrors.tripadvisor.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: linux.cc.lehigh.edu
Package php-mysql is obsoleted by php-mysqlnd, trying to install php-mysqlnd-5.6.
12-1.el7.remi.x86_64 instead
Resolving Dependencies
--> Running transaction check
--> Package php-mysqlnd.x86_64 0:5.6.12-1.el7.remi will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package      Arch      Version      Repository      Size
=====
[0] 0:root@ip-10-0-0-13:~*
```

On the last part of this tutorial I will be deploying a PHP web application with GPG encryption support, which doesn't come packaged on CentOS, bringing up the opportunity to show how simple is to install PECL and the development tools required to build a PHP PECL extension from the PECL repository. This is something you should actually skip if you don't need it, because it will install a lot of dependencies that will take a relatively significant amount of space for an 8 GB drive

```
root@ip-10-0-0-13:~# yum install php-pear
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.symnds.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
---> Package php-pear.noarch 1:1.9.5-13.el7.remi will be installed
---> Processing Dependency: php-xml for package: 1:php-pear-1.9.5-13.el7.remi.noarch
---> Processing Dependency: php-posix for package: 1:php-pear-1.9.5-13.el7.remi.noarch
---> Processing Dependency: php-cli for package: 1:php-pear-1.9.5-13.el7.remi.noarch
---> Running transaction check
---> Package php-cli.x86_64 0:5.6.12-1.el7.remi will be installed
---> Package php-process.x86_64 0:5.6.12-1.el7.remi will be installed
---> Package php-xml.x86_64 0:5.6.12-1.el7.remi will be installed
---> Finished Dependency Resolution

Dependencies Resolved

=====
[0] 0:root@ip-10-0-0-13:~* "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
root@ip-10-0-0-13:~# yum install php-devel
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.symnds.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
---> Package php-devel.x86_64 0:5.6.12-1.el7.remi will be installed
---> Processing Dependency: php-pecl-jsonc-devel(x86-64) for package: php-devel-5.6.12-1.el7.remi.x86_64
---> Processing Dependency: pcre-devel(x86-64) for package: php-devel-5.6.12-1.el7.remi.x86_64
---> Processing Dependency: automake for package: php-devel-5.6.12-1.el7.remi.x86_64
---> Processing Dependency: autoconf for package: php-devel-5.6.12-1.el7.remi.x86_64
---> Running transaction check
---> Package autoconf.noarch 0:2.69-11.el7 will be installed
---> Processing Dependency: perl >= 5.006 for package: autoconf-2.69-11.el7.noarch
---> Processing Dependency: m4 >= 1.4.14 for package: autoconf-2.69-11.el7.noarch
---> Processing Dependency: perl(warnings) for package: autoconf-2.69-11.el7.noarch
[0] 0:root@ip-10-0-0-13:~* "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
[root@ip-10-0-0-13 centos]# yum group install "Development Tools"
Loaded plugins: fastestmirror
There is no installed groups file.
Maybe run: yum groups mark convert (see man yum)
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.symnds.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
---> Package bison.x86_64 0:2.7-4.el7 will be installed
---> Package byacc.x86_64 0:1.9.20130304-3.el7 will be installed
---> Package cscope.x86_64 0:15.8-7.el7 will be installed
---> Processing Dependency: emacs-filesystem for package: cscope-15.8-7.el7.x86_64
---> Package ctags.x86_64 0:5.8-13.el7 will be installed
---> Package diffstat.x86_64 0:1.57-4.el7 will be installed
---> Package doxygen.x86_64 1:1.8.5-3.el7 will be installed
---> Package elfutils.x86_64 0:0.160-1.el7 will be installed
---> Package flex.x86_64 0:2.5.37-3.el7 will be installed
---> Package gcc.x86_64 0:4.8.3-9.el7 will be installed
---> Processing Dependency: cpp = 4.8.3-9.el7 for package: gcc-4.8.3-9.el7.x86_64
---> Processing Dependency: glibc-devel >= 2.2.90-12 for package: gcc-4.8.3-9.el7.x86_64
[0] 0:root@ip-10-0-0-13:~* "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
[root@ip-10-0-0-13 centos]# yum install gpgme-devel
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.symnds.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
---> Package gpgme-devel.x86_64 0:1.3.2-5.el7 will be installed
---> Processing Dependency: libgpg-error-devel(x86-64) for package: gpgme-devel-1.3.2-5.el7.x86_64
--> Running transaction check
---> Package libgpg-error-devel.x86_64 0:1.12-3.el7 will be installed
---> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository  Size
=====
Installing:
gpgme-devel      x86_64   1.3.2-5.el7   base        112 k
Installing for dependencies:
libgpg-error-devel x86_64   1.12-3.el7   base        16 k
[0] 0:root@ip-10-0-0-13:~* "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
[root@ip-10-0-0-13 centos]# pecl install gnupg
downloading gnupg-1.3.6.tgz ...
Starting to download gnupg-1.3.6.tgz (19,273 bytes)
.....done: 19,273 bytes
5 source files, building
running: phpize
Configuring for:
PHP Api Version: 20131106
Zend Module Api No: 20131226
Zend Extension Api No: 220131226
building in /var/tmp/pear-build-rootC3XoDC/gnupg-1.3.6
running: /var/tmp/gnupg/configure
checking for grep that handles long lines and -e... /usr/bin/grep
checking for egrep... /usr/bin/grep -E
checking for a sed that does not truncate output... /usr/bin/sed
checking for cc... cc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether cc accepts -g... yes
checking for cc option to accept ISO C89... none needed
checking how to run the C preprocessor... cc -E
checking for icc... no
checking for suncc... no
checking whether cc understands -c and -o together... yes
[0] 0:root@ip-10-0-0-13:~* "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
[root@ip-10-0-0-13 ~]# yum install httpd
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.symnds.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-31.el7.centos will be installed
--> Processing Dependency: httpd-tools = 2.4.6-31.el7.centos for package: httpd-2.4.6-31.el7.centos.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-31.el7.centos.x86_64
--> Running transaction check
--> Package httpd-tools.x86_64 0:2.4.6-31.el7.centos will be installed
--> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
[0] 0:root@ip-10-0-0-13:~* "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
root@ip-10-0-0-13:/var/www
[root@ip-10-0-0-13 www]# yum install mod_ssl
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.evolvedservers.com
 * epel: mirror.cogentco.com
 * extras: mirror.ash.fastserv.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: mirror.vtti.vt.edu
Resolving Dependencies
--> Running transaction check
--> Package mod_ssl.x86_64 1:2.4.6-31.el7.centos will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package      Arch      Version       Repository      Size
=====
Installing:
mod_ssl      x86_64    1:2.4.6-31.el7.centos   base            99 k
[0] 0:root@ip-10-0-0-13:~*          "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
root@ip-10-0-0-13:~/synapp/resources
[0] 0:root@ip-10-0-0-13:~*          "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```



```
[root@ip-10-0-0-13 resources]# yum -y install MariaDB-server MariaDB-client
Loaded plugins: fastestmirror
base                                         | 3.6 kB  00:00:00
epel/x86_64/metalink                         | 12 kB   00:00:00
epel                                         | 4.4 kB   00:00:00
extras                                         | 3.4 kB   00:00:00
mariadb                                         | 2.9 kB   00:00:00
remi                                         | 2.9 kB   00:00:00
remi-php56                                     | 2.9 kB   00:00:00
remi-safe                                       | 2.9 kB   00:00:00
updates                                         | 3.4 kB   00:00:00
(1/10): epel/x86_64/group_gz                 | 169 kB   00:00:00
(2/10): base/7/x86_64/group_gz               | 154 kB   00:00:00
(3/10): mariadb/primary_db                   | 21 kB    00:00:00
(4/10): epel/x86_64/primary_db                | 3.7 MB   00:00:00
(5/10): remi-php56/primary_db                | 174 kB   00:00:00
[0] 0:root@ip-10-0-0-13:~*          "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
root@ip-10-0-0-13:~# yum install postfix
Loaded plugins: fastestmirror
base                                         | 3.6 kB     00:00
epel/x86_64/metalink                         | 13 kB      00:00
extras                                         | 3.4 kB     00:00
mariadb                                         | 2.9 kB     00:00
remi                                            | 2.9 kB     00:00
remi-php56                                     | 2.9 kB     00:00
remi-safe                                       | 2.9 kB     00:00
updates                                         | 3.4 kB     00:00
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * epel: mirror.symnds.com
 * extras: mirrors.tripadvisor.com
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
 * updates: linux.cc.lehigh.edu
Resolving Dependencies
--> Running transaction check
--> Package postfix.x86_64 2:2.10.1-6.el7 will be installed
--> Processing Dependency: libmysqlclient.so.18(libmysqlclient_18) (64bit) for package: 2:postfix-2.10.1-6.el7.x86_64
[0] 0:root@ip-10-0-0-13:~*                  "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

```
root@ip-10-0-0-13:~# yum install mailx
Loaded plugins: fastestmirror
base                                         | 3.6 kB     00:00
epel/x86_64/metalink                         | 10 kB      00:00
epel                                           | 4.4 kB     00:00
extras                                         | 3.4 kB     00:00
mariadb                                         | 2.9 kB     00:00
remi                                            | 2.9 kB     00:00
remi-php56                                     | 2.9 kB     00:00
remi-safe                                       | 2.9 kB     00:00
updates                                         | 3.4 kB     00:00
(1/3): mariadb/primary_db                     | 20 kB      00:00
(2/3): epel/x86_64/primary_db                 | 3.7 MB     00:00
(3/3): updates/7/x86_64/primary_db            | 3.3 MB     00:00
(1/2): epel/x86_64/updateinfo                | 457 kB     00:00
(2/2): epel/x86_64/pkgtags                   | 1.6 MB     00:00
Loading mirror speeds from cached hostfile
 * base: ftp.linux.ncsu.edu
 * epel: mirror.symnds.com
 * extras: mirror.es.its.nyu.edu
 * remi: mirrors.mediatemple.net
 * remi-php56: mirrors.mediatemple.net
 * remi-safe: mirrors.mediatemple.net
[0] 0:root@ip-10-0-0-13:~*                  "ip-10-0-0-13.ec2.inter" 16:02 17-Aug-15
```

And that's all. We have reached the end of this part and your instance is now provisioned with the services required to run a PHP web application. Before I show you on another part how to configure these services, I suggest you see the next part on this tutorial where you can see how to obtain a cheap 9 US dollar signed certificate to securely deploy your web application, protecting your users against somebody stealing your server's identity. If you are not concerned about your users being scammed that way, you may skip that part and go straight

ahead to the services configuration part, which should be listed on the tutorial playlist and the description below.

3/5: OBTAINING A VALID CA SIGNED SSL CERTIFICATE

The third part of this five part series on how to deploy an SSL enhanced web application and bring up a CentOS LAMP stack on the Amazon cloud from the ground.

On this part I will show you how to get your certificate signed so your users can trust that your webapp is your webapp and not some impersonator trying to do nasty things.

I want to demonstrate how easy and simple this procedure is by clearly explaining all there is to know in less than two minutes so let's cut to the chase:

Go to namecheap.com or whatever registrar you like best and put in your cart the cheapest SSL certificate you find. Yes, the cheapest will do; you don't need anything else. Here is my confirmation order I received the moment I entered my billing details. As simple as buying anything on eBay or Amazon or any other place on the Internet.

Outlook.com - ataryx@hotmai...

Microsoft Corporation [US] https://dub110.mail.live.com/?ti

Outlook.com Nuevo Responder | Eliminar ... Gael A. M.

Buscar en el correo

Carpetas Bandeja de entrada oDesk Correo no deseado 9 Borradores Enviados Eliminados elance facebook Marketo_Health_Check oDesk-GoGuides oDesk-ITEL_Marketing repast-interest 32 thomann Nueva carpeta

Namecheap.com Order Summary (Order# [REDACTED], Order Ref# [REDACTED]; [REDACTED]);

Namecheap Support Agregar a contactos 18/03/2015 | Para: Gael Abadin CC: registrationsummary1@namecheap.com

Namecheap.com Order Summary
Date: 03/18/2015

Dear Gael,

Thank you very much for choosing services offered by Namecheap.com. The following is the summary of your order.

Order Details

Order Date:	3/18/2015	Payment Source:	PAYPAL
Order Number:	[REDACTED]	Initial Charge:	\$9.00
Transaction ID:	[REDACTED]	Final Cost:	\$9.00
User Name:	[REDACTED]	Total Refund:	N/A
Address:	Vilagarcia Pontevedra, 36600 ES	Refund Transaction ID:	N/A
		Refunded To:	N/A

Categorías

Marketo_Health_Check oDesk oDesk-GoGuides oDesk-ITEL_Marketing Nueva categoría

TITLE	QTY	DURATION	PRICE	SUB TOTAL
Renew PositiveSSL for synapp.info	1	1 year	\$9.00	\$9.00
			ICANN Fee \$0.00	
			Sub Total	\$9.00
			TOTAL	\$9.00

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Next thing you have to do is to give them your certificate signing request code which you will generate along with your certificate key using openssl, like you are seeing on this screen caption.

```

root@ip-10-0-0-13:~# cd /etc/pki/tls/private
[root@ip-10-0-0-13 private]# openssl req -new -newkey rsa:2048 -nodes -keyout nppca.key -out synapp.csr
Generating a 2048 bit RSA private key
.....+
.....+++
writing new private key to 'nppca.key'
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [XX]:ES
State or Province Name (full name) []:PONTEVEDRA
Locality Name (eg, city) [Default City]:VIGO
Organization Name (eg, company) [Default Company Ltd]:SYNAPP
Organizational Unit Name (eg, section) []:
Common Name (eg, your name or your server's hostname) []:synapp.info
Email Address []:gael.abadin@gmail.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:
An optional company name []:
[root@ip-10-0-0-13 private]#

```

Depending on your provider the CSR form access and details may change, but you will be looking at something like this.

Namecheap.com - My Acc x

← → C Namecheap, Inc [US] https://manage.www.namecheap.com/myaccount/ssl-list.asp

SUPPORT Hi ataryx SIGN OUT

Domains Hosting Apps Security Menu

My Account → SSL Certificates

.XYZ Domains Just \$1
That is not a typo! Register a new first-year .XYZ for only \$1, through September 18. Find yours [here](#).

Your SSL Certificates

Domain Names

- Your Domains
- Renew Domains
- Reactivate Domains
- Whois Verification
- Your Domains For Sale

Hosting, Email & Apps

- Onepager Website
- Web Hosting Accounts
- Private Email
- SSL Certificates

Related Help

FILTER

PREFERENCES

CERT ID	HOST NAME	SSL TYPE	PURCHASE DATE	EXPIRE DATE	STATUS
1245211	synapp.info	POSITIVESSL	03/18/2015	N/A	Activate Renew

Page 1 of 1

Q&A 26

Gael Abadin

Namecheap, Inc [US] https://manage.www.namecheap.com/myaccol

Digital Certificate Order Form

PRODUCT INFORMATION

Certificate Type	positivessl
Purchase Years	1
Renewal Order For	synapp.info

CERTIFICATE SIGNING REQUEST (REQUIRED)

Select web server
Apache + OpenSSL

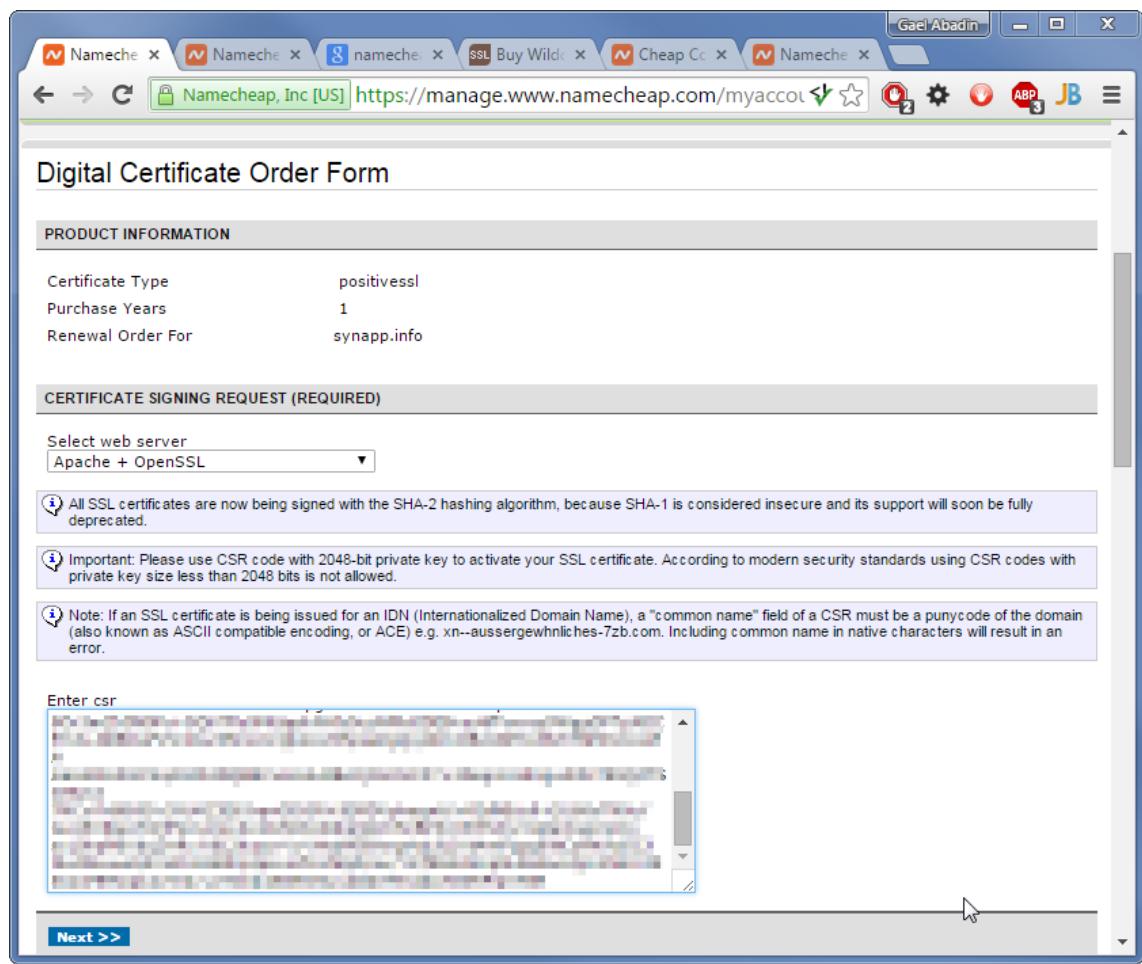
Info All SSL certificates are now being signed with the SHA-2 hashing algorithm, because SHA-1 is considered insecure and its support will soon be fully deprecated.

Info Important: Please use CSR code with 2048-bit private key to activate your SSL certificate. According to modern security standards using CSR codes with private key size less than 2048 bits is not allowed.

Info Note: If an SSL certificate is being issued for an IDN (Internationalized Domain Name), a "common name" field of a CSR must be a punycode of the domain (also known as ASCII compatible encoding, or ACE) e.g. xn--aussergewhnliches-7zb.com. Including common name in native characters will result in an error.

Enter csr

Next >>



Gael Abadin

Namecheap, Inc [US] https://manage.www.namecheap.com/myaccol

Digital Certificate Order Form

PRODUCT INFORMATION

Certificate Type	positivessl
Purchase Years	1
Renewal Order For	synapp.info
Approver Email	gael.abadin@gmail.com

ENTER CONTACT INFORMATION FOR YOUR SSL CERTIFICATE

The administrative contact is the primary contact and will be contacted to assist in resolution of any questions about the order.

Administrator Email Address

E-Mail Address to send the certificate *

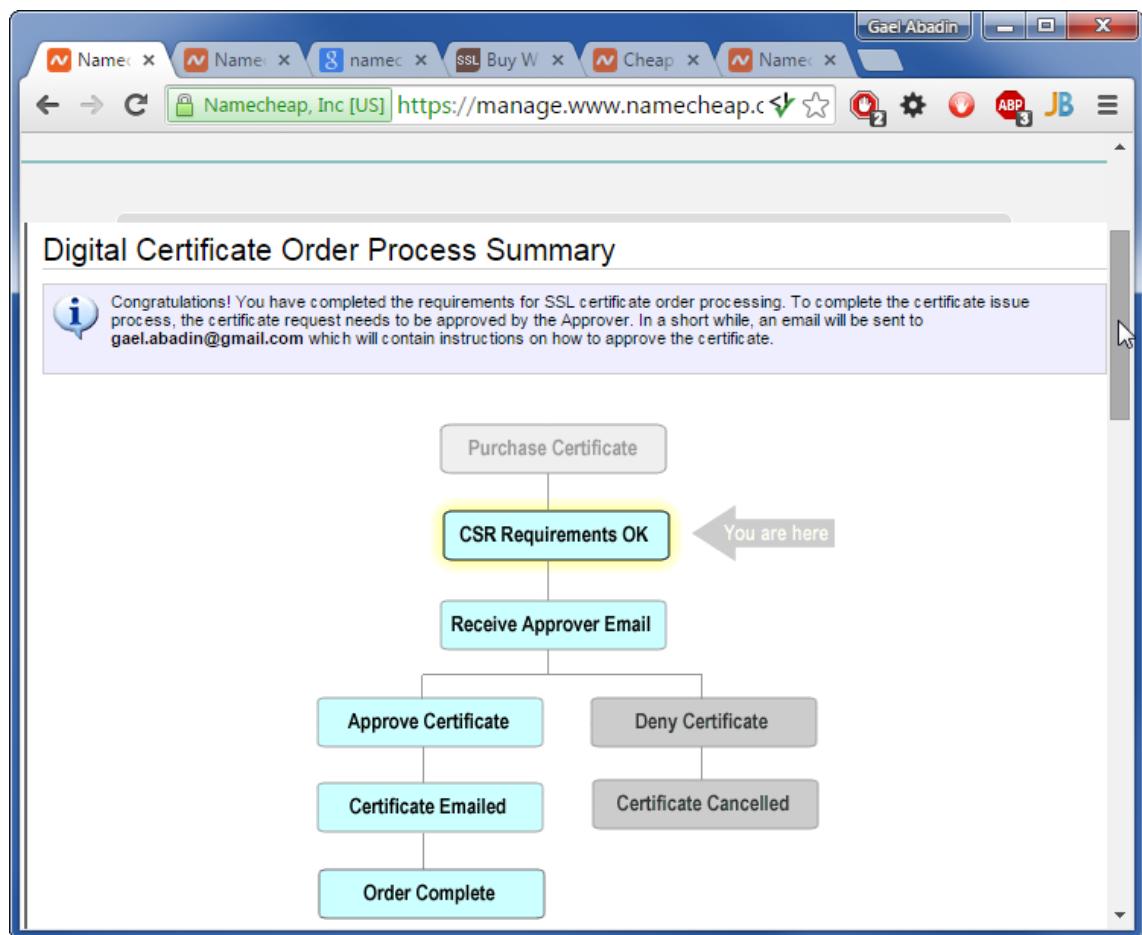
ADMINISTRATIVE CONTACT

PICK AN ADDRESS FROM MY PROFILE

First Name *	Last Name *	Organization Name *	
Gael	Abadin	synapp.info	
Street Address *	Address 2	Job Title	
██████████	██████████	CEO	
City *	State/ Prov. *	Zip/ Postal Code *	Country *
Vilagarcia	Pontevedra	36600	Spain
Phone Number *			
+34 ██████████ ██████████			
Fax Number			
+1 ██████████			

The fields marked with * are required.

Submit Order >>



Once you fill and send the form you will receive a confirmation code on your email and a link to generate your certificate.

The screenshot shows a Gmail inbox with the URL <https://mail.google.com/mail/u/0/#inbox/14f32c4d8d7aac38>. The inbox contains 1 of 3,163 messages. A message from "Comodo Security Services" is selected, with the subject "ORDER # [REDACTED] - Domain Control Validation for synapp.info". The message body is as follows:

SSL Certificate Validation

Domain Control Validation for [synapp.info](#)

Dear gael.abadin@gmail.com,

We have received a request to issue an SSL certificate for:
Domain: [synapp.info](#)
Subject: SYNAPP

To permit the issuance of the certificate please [browse here](#) and enter the following "validation code":

[REDACTED]

*****PLEASE NOTE CHOOSING THE OPTION BELOW WILL REJECT THE CERTIFICATE*****
If neither you nor a trusted colleague made this request for a certificate then you can reject it by browsing to [Reject](#)

Note! Rejecting the certificate at this stage will affect the whole order including the original certificate before the reissue attempt. It will not be possible to undo this action.

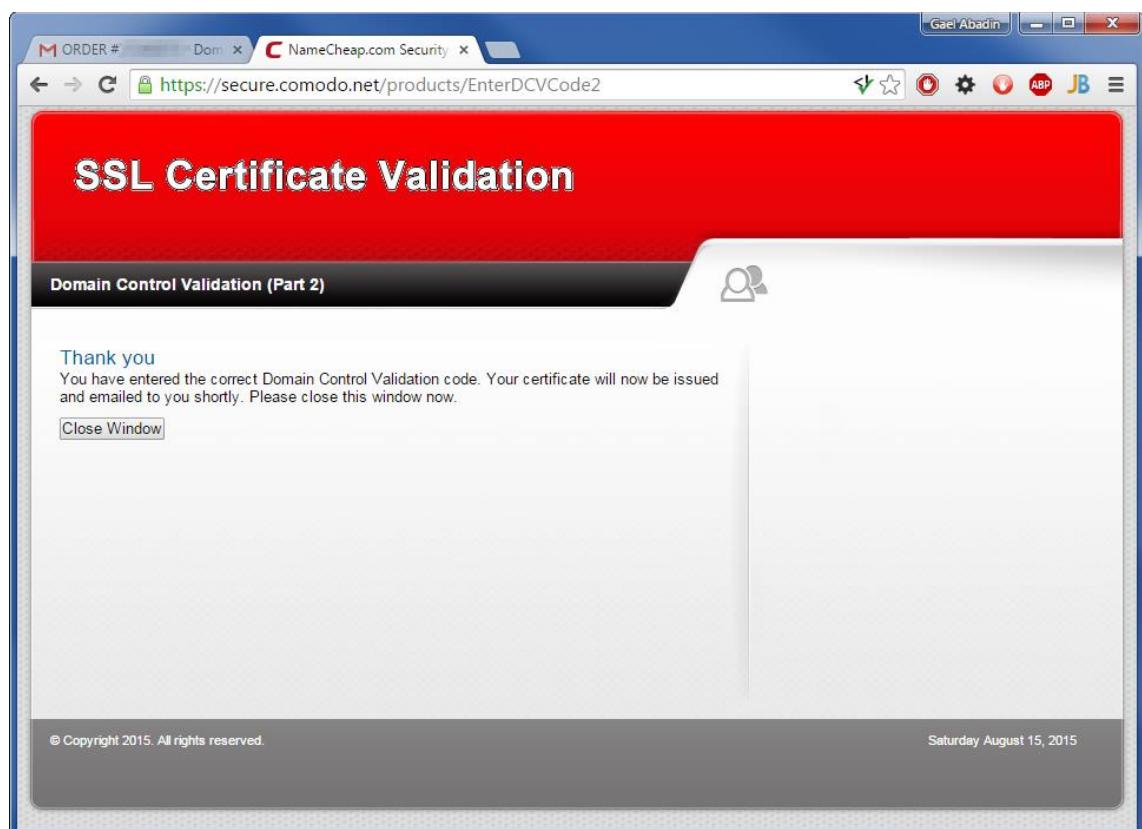
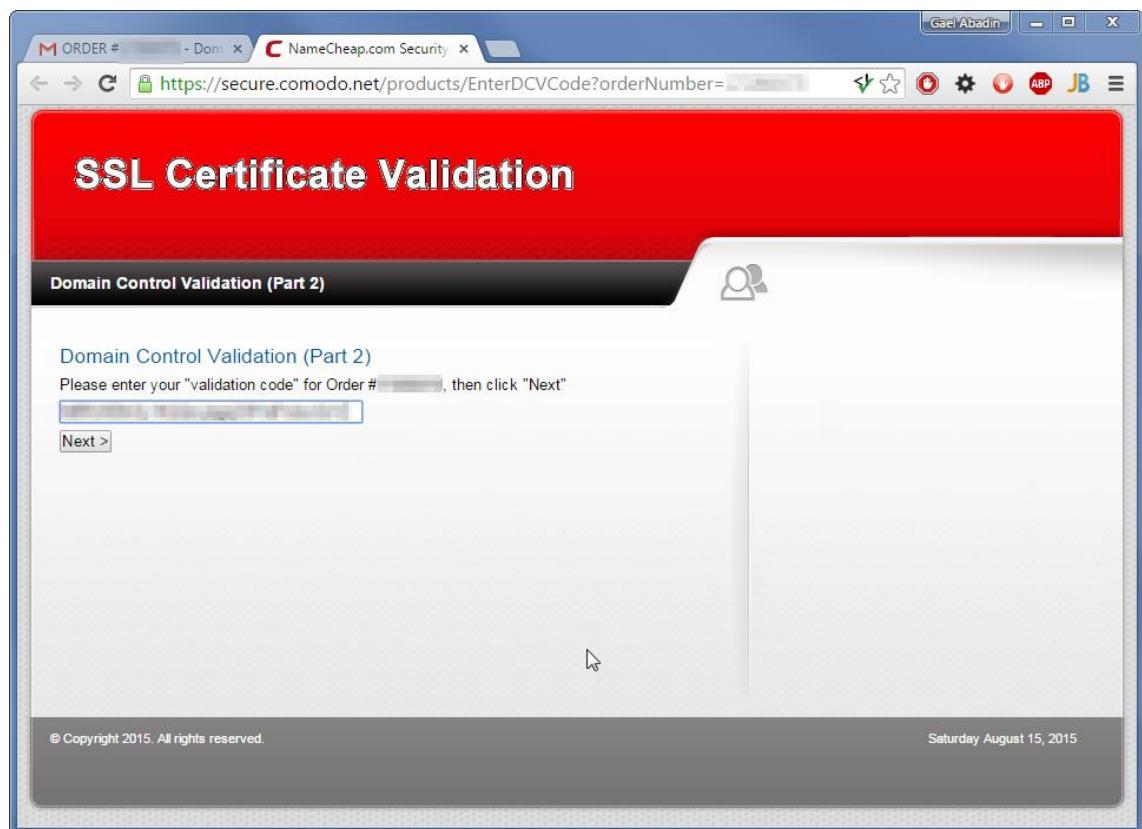
Kind Regards,

Comodo Security Services

Support Telephone: +1.888.266.6361 / +1.703.581.6361
Support Website: <http://support.comodo.com/>
Validation Docs Fax: US and Canada +1.866.831.5837 / Worldwide +1.801.303.9291

[Take me to Inbox](#)

Follow that link to complete the process and the certificate will be sent to your email address.



Inbox - gael.abadin@gmail.com Outlook.com - ataryx@hotmail.com

Microsoft Corporation [US] https://dub110.mail.live.com/?tid=cml_FMpIJD5RGAaAiZMHXA2&v=1

Outlook.com Nuevo Responder | Eliminar Archivar Correo no deseado | ...

Gael A. M.

Buscar en el correo

ORDER # - Your PositiveSSL Certificate for synapp.info

Carpetas

Bandeja de entrada

oDesk

Correo no deseado 9

Borradores

Enviados

Eliminados

elance

facebook

Marketo_Health_Check

oDesk-GoGuides

oDesk-ITEL_Marketing

repast-interest 32

thomann

Nueva carpeta

Categorías

Marketo_Health_Check

oDesk

oDesk-GoGuides

oDesk-ITEL_Marketing

Nueva categoría

synapp_info.zip

Descargar como zip Guardar en OneDrive

SSL Certificate Validation

Your PositiveSSL Certificate for synapp.info is attached!

Dear ataryx@hotmail.com,

Thank you for placing your order. We are pleased to announce that your PositiveSSL Certificate for synapp.info has been issued.

To help reduce domain name mismatch warnings, we have also included the domain name www.synapp.info in your certificate.

We strongly recommend that you [click here for instructions](#) to ensure that your certificate is installed and your webserver is configured correctly.

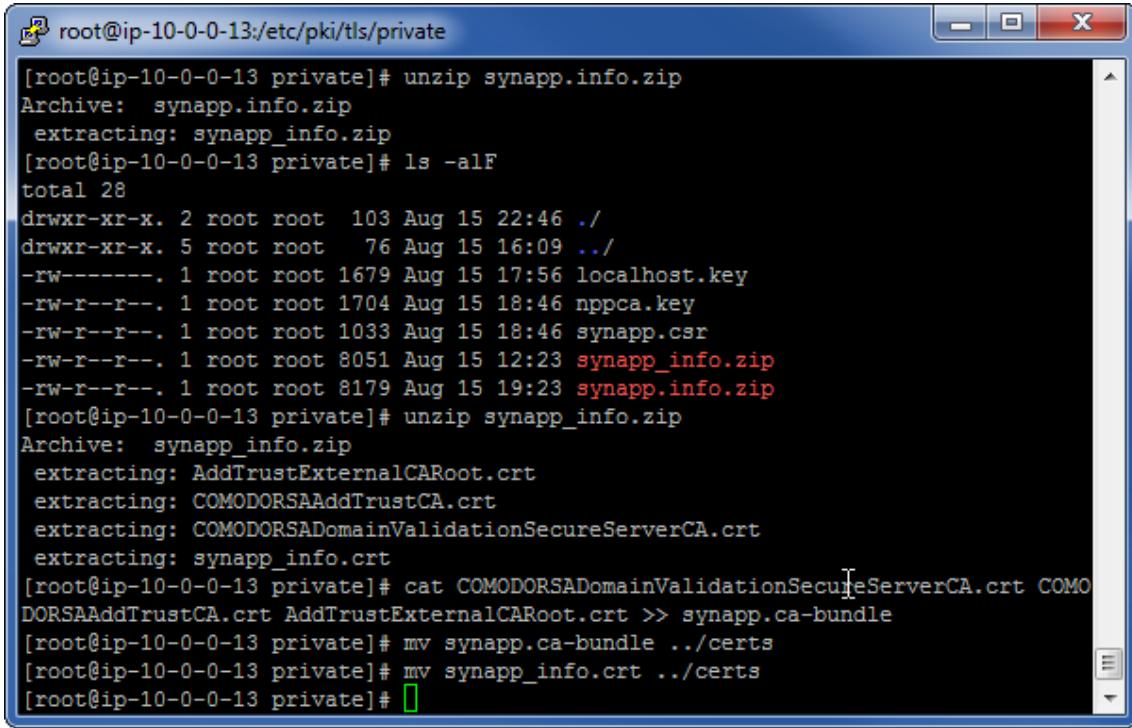
Attached to this email you should find a .zip file containing:

- Root CA Certificate - AddTrustExternalCARoot.crt
- Intermediate CA Certificate - COMODORSAAddTrustCA.crt
- Intermediate CA Certificate - COMODORSADomainValidationSecureServerCA.crt
- Your PositiveSSL Certificate - synapp_info.crt

You can also find your PositiveSSL Certificate for synapp.info in text format at the bottom of this email.

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Now upload the contents of the certificate bundle to your server's /etc/pki/tls/certs and put them together by concatenating them in the order shown in the caption (from highest to lowest hierarchy), as shown on the screen.



The screenshot shows a terminal window titled "root@ip-10-0-0-13:/etc/pki/tls/private". The terminal displays the following command sequence:

```
[root@ip-10-0-0-13 private]# unzip synapp.info.zip
Archive: synapp.info.zip
 extracting: synapp_info.zip
[root@ip-10-0-0-13 private]# ls -alF
total 28
drwxr-xr-x. 2 root root 103 Aug 15 22:46 .
drwxr-xr-x. 5 root root 76 Aug 15 16:09 ../
-rw-----. 1 root root 1679 Aug 15 17:56 localhost.key
-rw-r--r--. 1 root root 1704 Aug 15 18:46 nppca.key
-rw-r--r--. 1 root root 1033 Aug 15 18:46 synapp.csr
-rw-r--r--. 1 root root 8051 Aug 15 12:23 synapp_info.zip
-rw-r--r--. 1 root root 8179 Aug 15 19:23 synapp.info.zip
[root@ip-10-0-0-13 private]# unzip synapp_info.zip
Archive: synapp_info.zip
 extracting: AddTrustExternalCARoot.crt
 extracting: COMODORSAddTrustCA.crt
 extracting: COMODORSADomainValidationSecureServerCA.crt
 extracting: synapp_info.crt
[root@ip-10-0-0-13 private]# cat COMODORSADomainValidationSecureServerCA.crt COMO
DORSAddTrustCA.crt AddTrustExternalCARoot.crt >> synapp.ca-bundle
[root@ip-10-0-0-13 private]# mv synapp.ca-bundle ../certs
[root@ip-10-0-0-13 private]# mv synapp_info.crt ../certs
[root@ip-10-0-0-13 private]#
```

And that's it! You have a signed certificate bundle ready to be used with Apache Web Server or any other web server with SSL support. An important reminder: The certificate bundle is public and your server will be passing it along to any connected client. The private key on the other hand is super secret stuff and you should be very careful who you give access to it, which ideally should be nobody.

On the next part I will be configuring apache's SSL module, using the certificate and key generated on this part, which will take like 2 seconds, plus all the other things that need to be configured before deploying our application, which will take a little longer, but not much longer. Meet me there if you want to know more.

4/5: CONFIGURING A CENTOS 7 LAMP STACK

This is the fourth part out of a five part series on how to deploy a PHP Web Application on an Apache Web server on a CentOS 7 machine on Amazon Elastic Compute Cloud. If you didn't get lost and ended up here by chance, by the end of this part you will know how to set up your web server, PHP and MySQL services on your production machine to bring joy to thousands of users with an infrastructure that costs you less than a sandwich per month.

I will start by showing how to edit /etc/my.cnf file to bind the mariadb daemon to localhost address so you can connect to it from the local machine using a TCP client. After that I suggest you run mysql_secure_installation script like shown on the screen to perform some security checks and configuration tasks.

```
[mysqld]
datadir=/var/lib/mysql
socket=/var/lib/mysql/mysql.sock
bind-address=localhost
# Disabling symbolic-links is recommended to prevent assorted security risks
symbolic-links=0
# Settings user and group are ignored when systemd is used.
# If you need to run mysqld under a different user or group,
# customize your systemd unit file for mariadb according to the
# instructions in http://fedoraproject.org/wiki/Systemd

[mysqld_safe]
log-error=/var/log/mariadb/mariadb.log
pid-file=/var/run/mariadb/mariadb.pid

#
# include all files from the config directory
#
!includedir /etc/my.cnf.d

~
~
~
"/etc/my.cnf" 20L, 593C written
```

```
[root@ip-10-0-0-13 www]# systemctl enable mariadb.service
ln -s '/usr/lib/systemd/system/mariadb.service' '/etc/systemd/system/multi-user.target.wants/mariadb.service'
[  ]
```

```
root@ip-10-0-0-13:~# mysql_secure_installation
/usr/bin/mysql_secure_installation: line 379: find_mysql_client: command not found

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
you haven't set the root password yet, the password will be blank,
so you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password ensures that nobody can log into the MariaDB
root user without the proper authorisation.

Set root password? [Y/n] Y
New password:
Re-enter new password:
Password updated successfully!
Reloading privilege tables..
... Success!

By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them. This is intended only for testing, and to make the installation
go a bit smoother. You should remove them before moving into a
production environment.

Remove anonymous users? [Y/n] Y
... Success!

Normally, root should only be allowed to connect from 'localhost'. This
ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n] Y
... Success!

By default, MariaDB comes with a database named 'test' that anyone can
access. This is also intended only for testing, and should be removed
before moving into a production environment.

Remove test database and access to it? [Y/n] Y
- Dropping test database...
... Success!
- Removing privileges on test database...
... Success!

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n] Y
... Success!

Cleaning up...

All done! If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
```

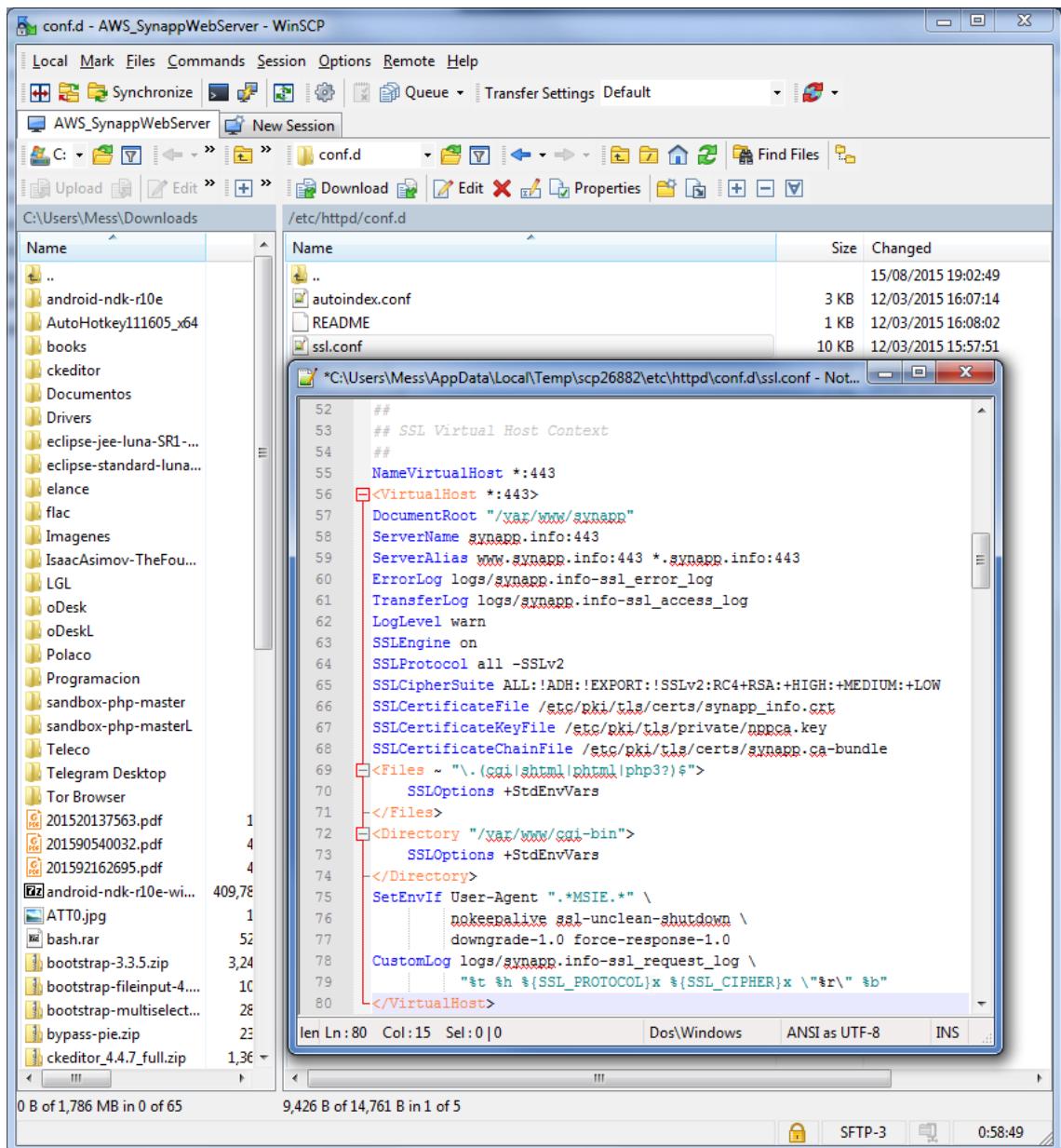
Now we will set up the SSL redirection on the httpd.conf file as shown by the highlighted text on this screenshot, so our clients are pointed to a secure connection when they try to reach us through a plain HTTP connection on port 80.

```

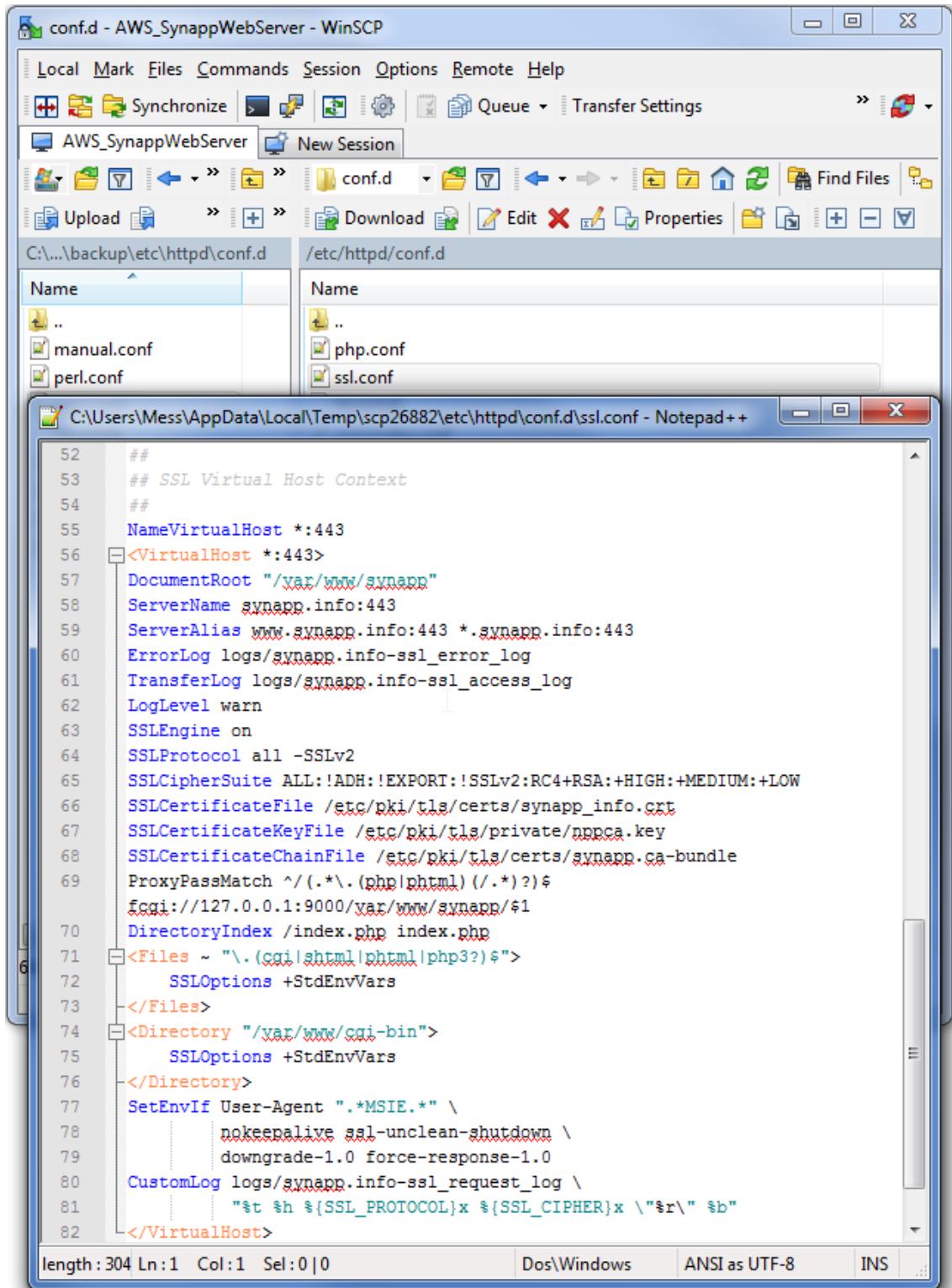
338      #
339      # EnableMMAP and EnableSendfile: On systems that support it,
340      # memory-mapping or the sendfile syscall may be used to deliver
341      # files. This usually improves server performance, but must
342      # be turned off when serving from networked-mounted
343      # filesystems or if support for these functions is otherwise
344      # broken on your system.
345      # Defaults if commented: EnableMMAP On, EnableSendfile Off
346      #
347      #EnableMMAP off
348      EnableSendfile on
349
350      # Supplemental configuration
351      #
352      # Load config files in the "/etc/httpd/conf.d" directory, if any.
353
354
355      NameVirtualHost *:80
356      IncludeOptional conf.d/*.conf
357      <VirtualHost *:80>
358          ServerAdmin webmaster@synapp.info
359          DocumentRoot /var/www/synapp
360          ServerName synapp.info
361          ServerAlias *.synapp.info
362          Redirect permanent / https://synapp.info/
363          ErrorLog logs/synapp.info-error_log
364          CustomLog logs/synapp.info-access_log common
365      </VirtualHost>
366

```

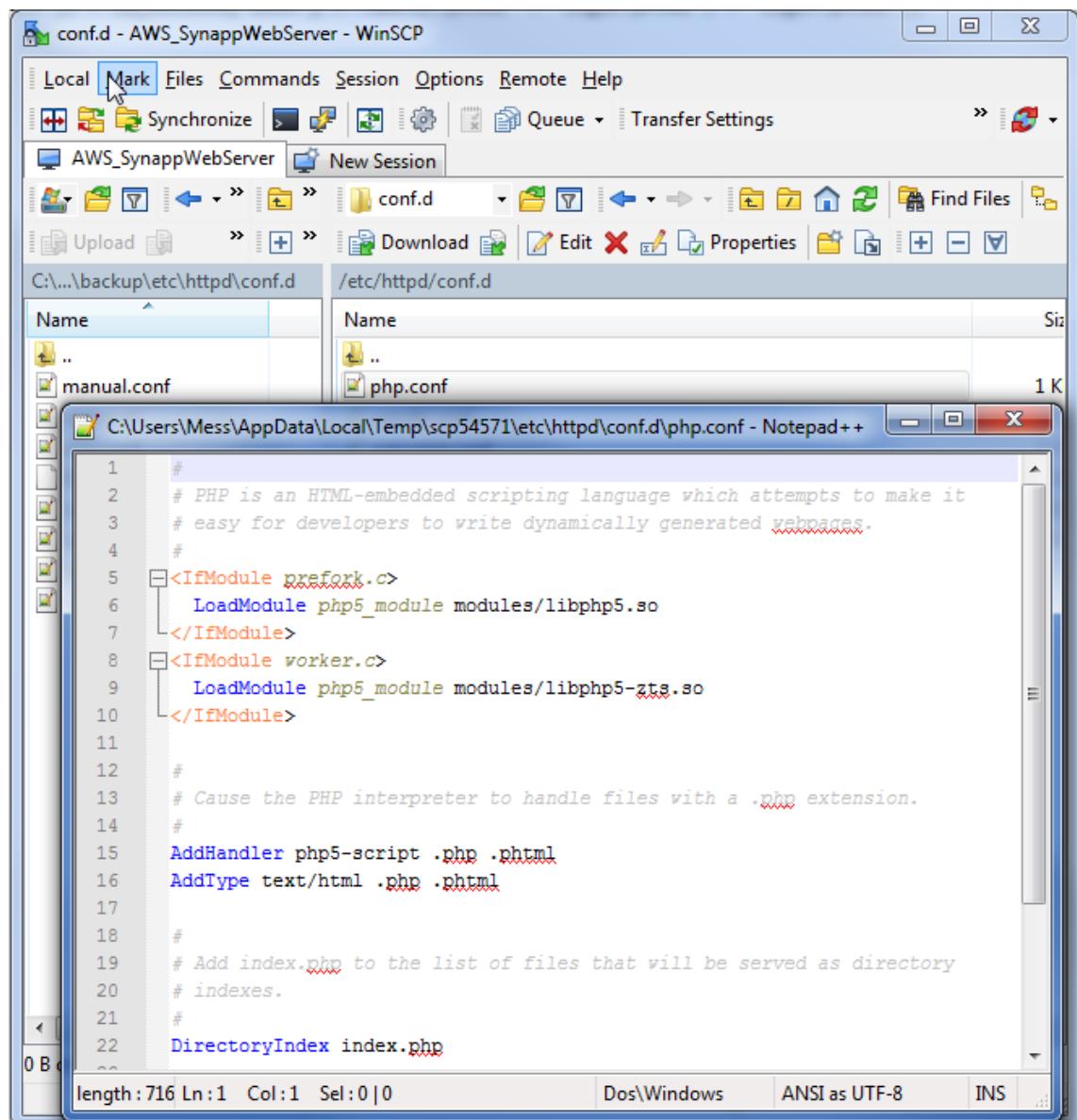
Continuing with the web server set up, this is how your SSL virtual host configuration should look like if you don't have fpm enabled.



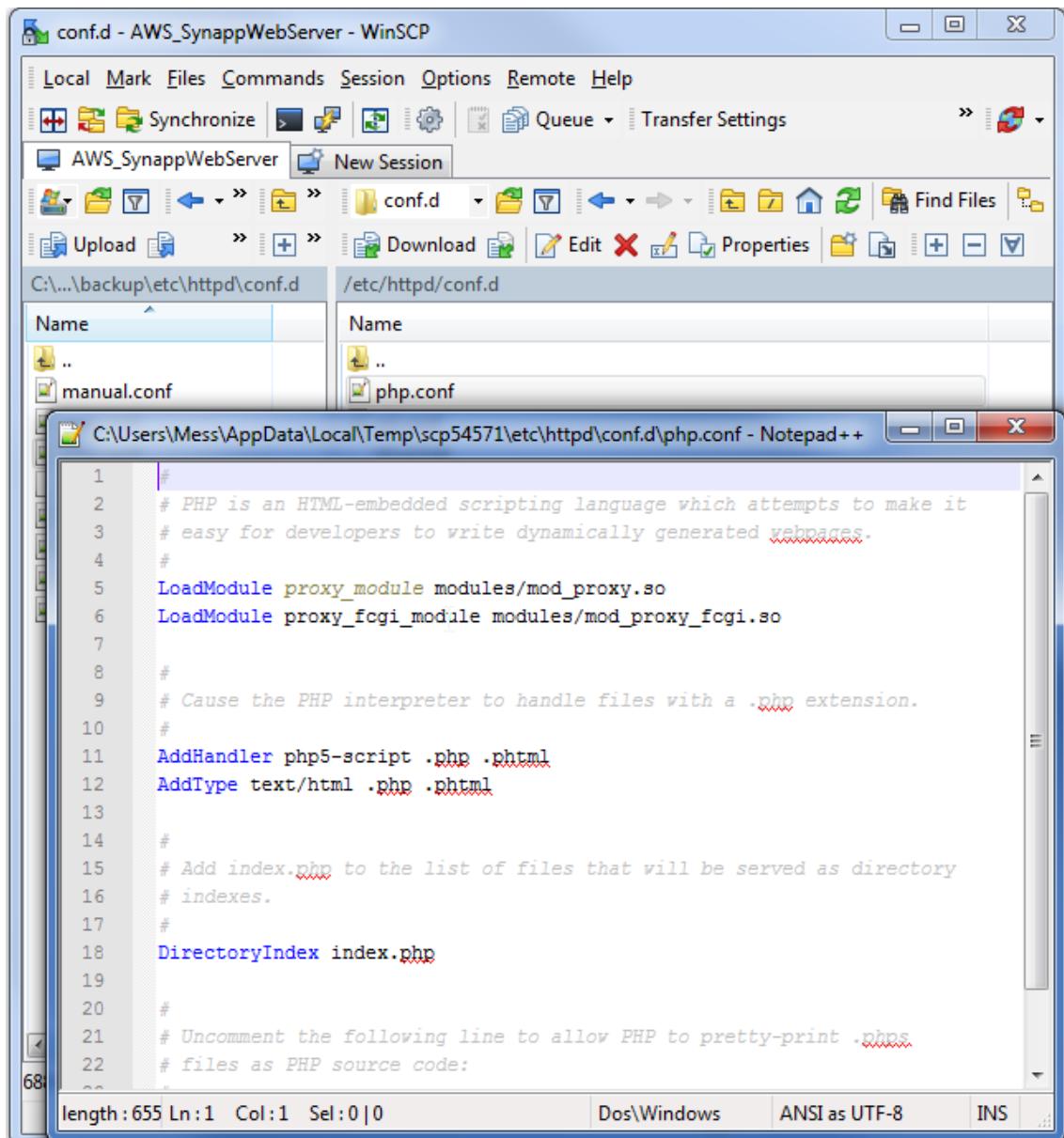
If you do (which you should if you were following this tutorial). It will look like this.



The same goes for the CGI module on php.conf Apache configuration file. This is without fpm.

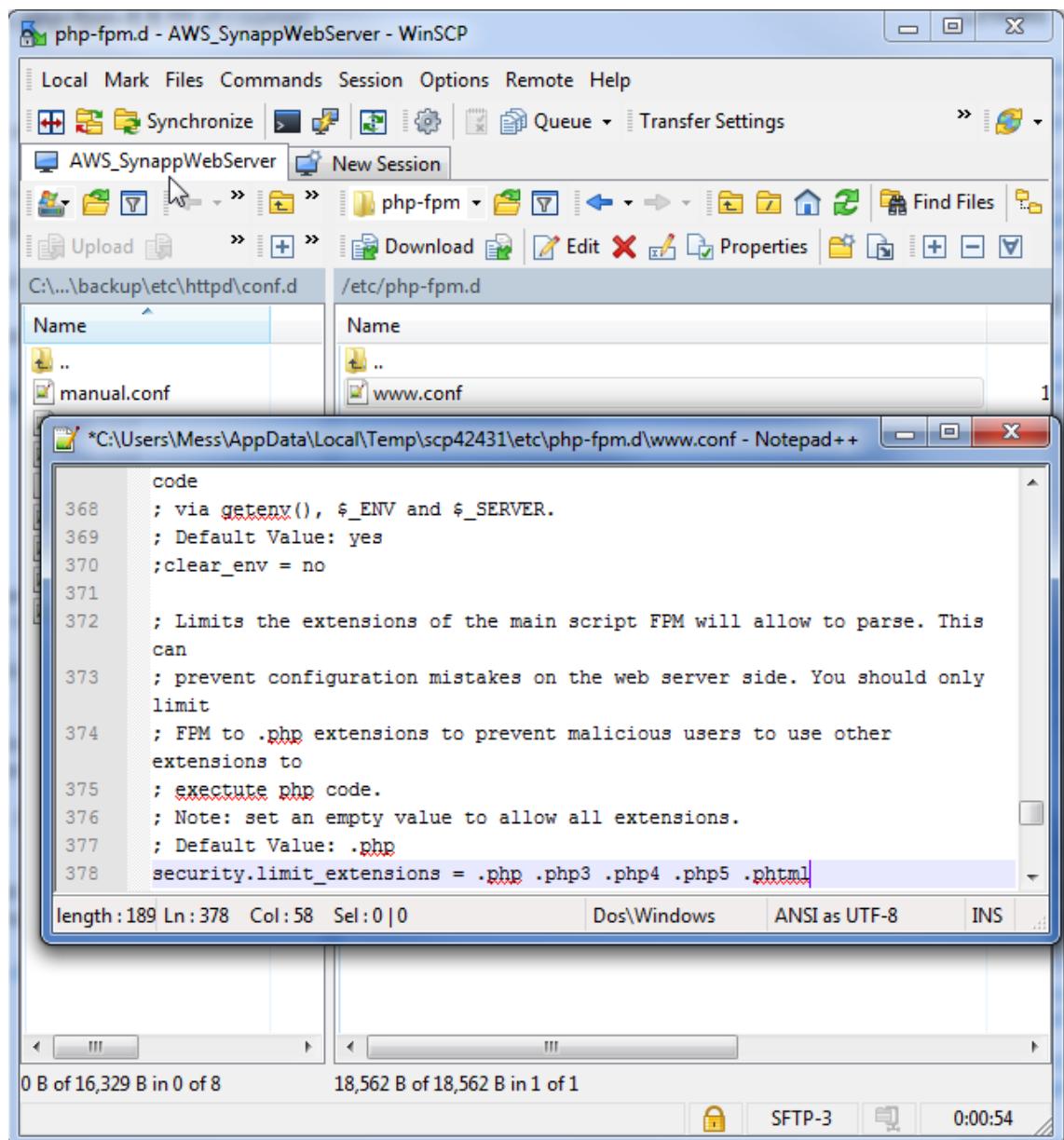


And this is with fpm.

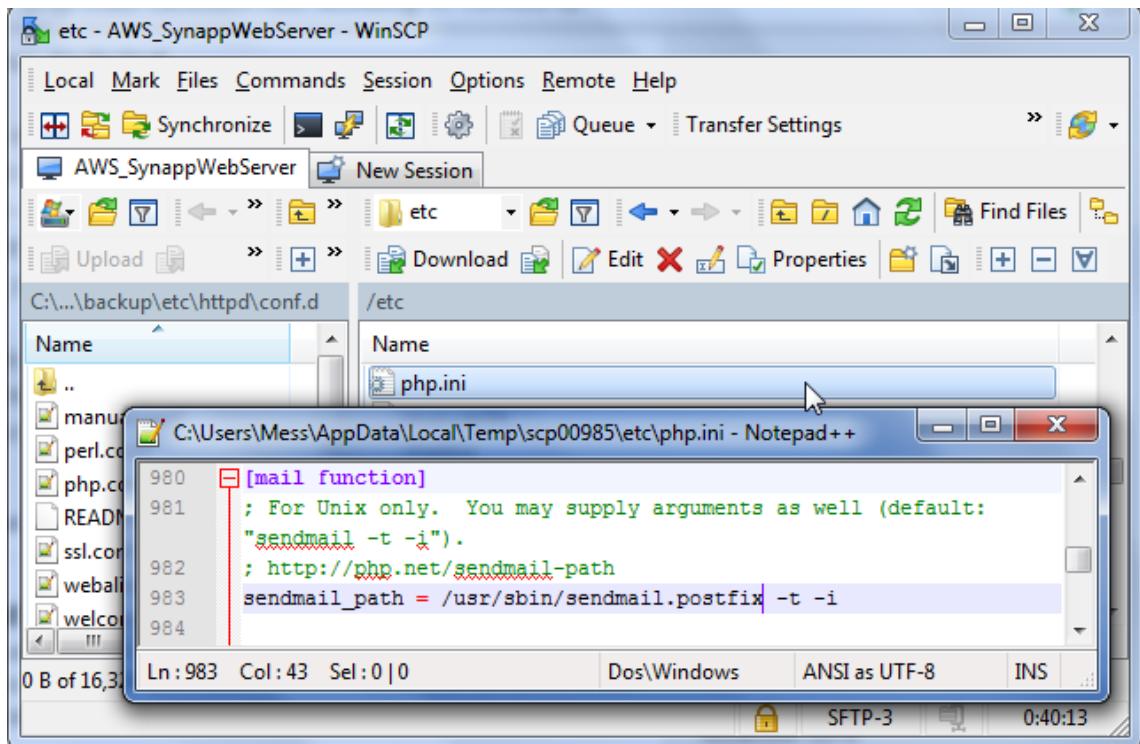


We move on now to the PHP configuration itself. It is only a couple of lines on a couple of files you must edit to get it to work:

- First, configure the allowed extensions on the etc/php-fpm.d/www.conf file.



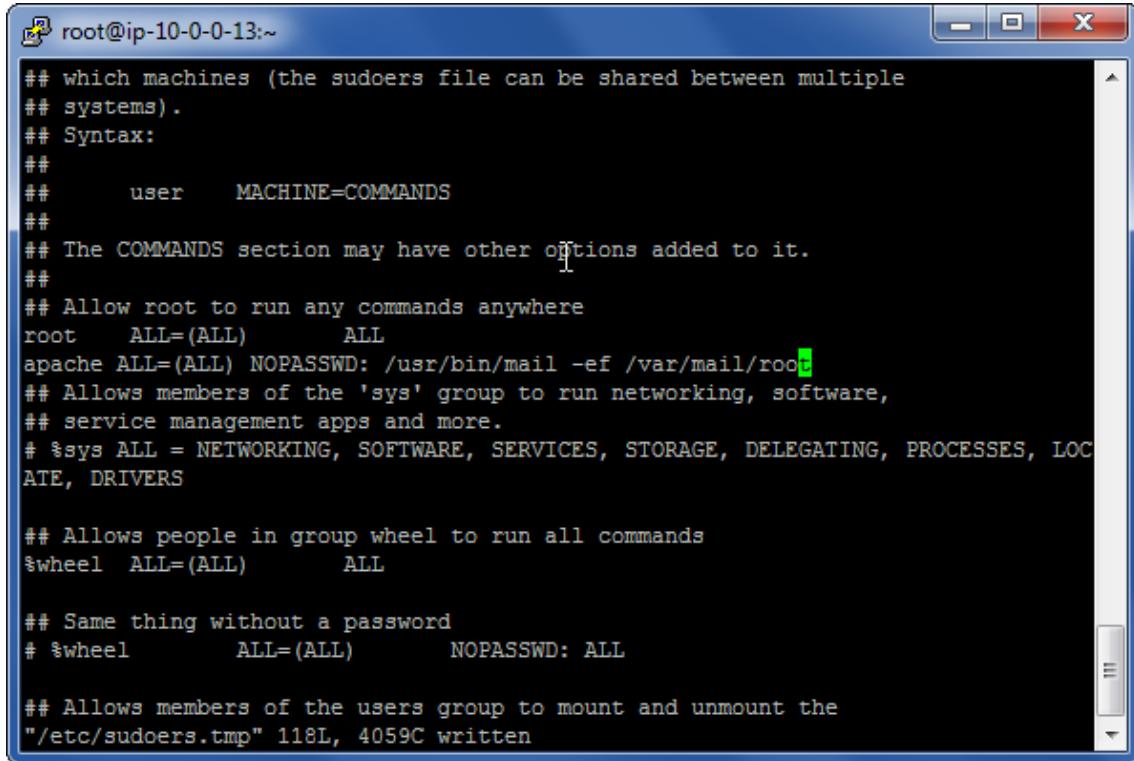
- Now, edit the sendmail path on the /etc/php.ini PHP configuration file to make it work with postfix, which is the default MTA we installed in the second part of this series.



What you can see right now above this paragraph is an example showing how to enable a PHP module. Most of them come enabled by default, gnupg, which I built and installed from PECL repo on the second part of this series, does not, but as you can see it is very easy to activate it if you require it. Just don't forget to restart the php-fpm daemon after doing it.

A screenshot of a terminal window with a blue title bar. The title bar says "root@ip-10-0-0-13:~/synapp". The terminal prompt is "[root@ip-10-0-0-13 synapp]#". Below the prompt, the user has run the command "systemctl start php-fpm && systemctl enable php-fpm". The terminal window is mostly blank below the command line.

Finally, if the specific application we want to deploy needs to execute a particular command with privileges (in this case check if the user root has mail in the local mailbox), we use visudo command to allow its execution as shown on the following capture:



```
root@ip-10-0-0-13:~#
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
##      user      MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)      ALL
apache ALL=(ALL) NOPASSWD: /usr/bin/mail -ef /var/mail/root
## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOC
ATE, DRIVERS

## Allows people in group wheel to run all commands
%wheel  ALL=(ALL)      ALL

## Same thing without a password
# %wheel      ALL=(ALL)      NOPASSWD: ALL

## Allows members of the users group to mount and unmount the
"/etc/sudoers.tmp" 118L, 4059C written
```

That's the end of it. Now you can safely deploy pretty much every PHP web application there is around on your system, including the most popular CMSs such as WordPress, Drupal or Joomla. I kindly invite you to follow me to the next and last part of this tutorial if you want to see a demo on how to deploy the latest release of my very own project using git and composer, plus a little bonus on how your DNS zone file should look like if you want to link an Internet domain to your machine.

5/5: DEPLOYING A LAMP WEB APP AND SETTING THE DNS RECORDS

This is the last part of this five part tutorial on how to set up a LAMP stack on AWS EC2 and deploy an PHP web application with SSL support on it.

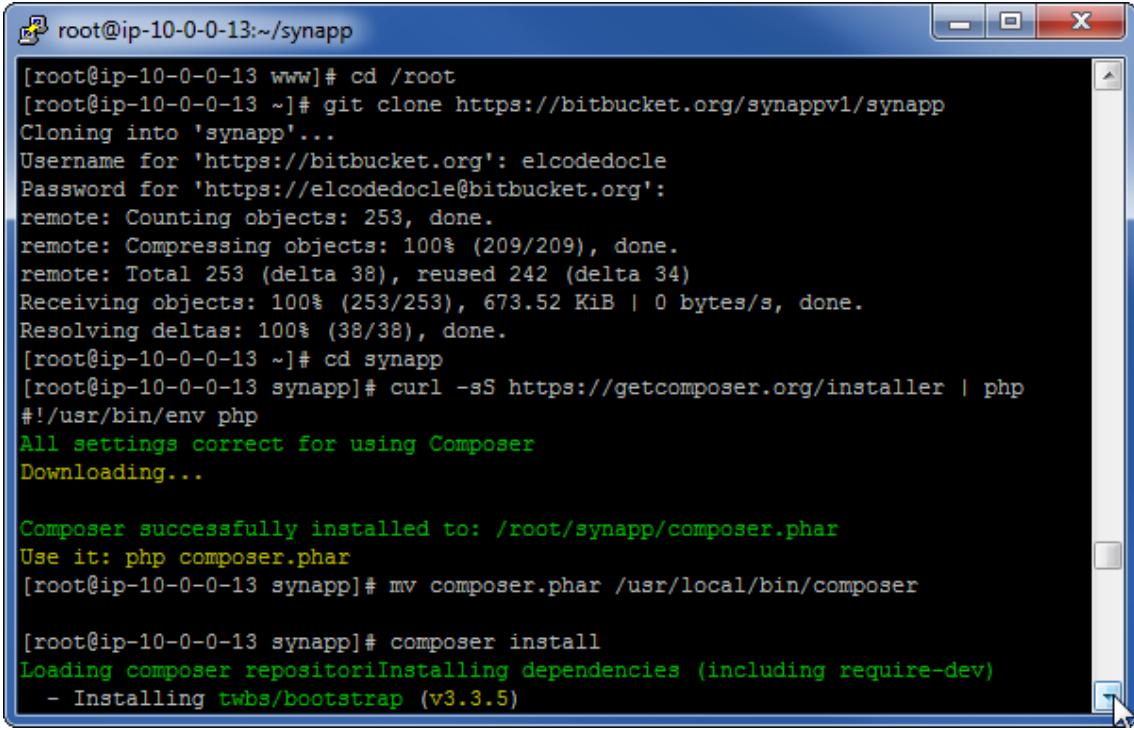
Up until now, I have been giving you vendor specific instructions on how to set up a free and open source system that can run pretty much any PHP web application on the market.

On this part I will show you how to set up a generic web application hosted on a git repository using composer dependencies; I will also show you a sample of a DNS zone file linking a domain to it so it can be easily accessed.

I will be deploying SynAPP, my own master thesis project which is currently online at synapp.info. Chances are you are not very interested on deploying this particular project, but I will be giving only but a few specific details about it which you can ignore to focus on the general aspects of deploying a web app if you wish. Those general aspects would be:

- Installing composer and building the app and its dependencies on a public web folder from its git repository;
- Importing the SQL DDL script containing the application database schema definition;
- Configuring the database connection settings and application paths and routes;
- And, when everything is ready, pointing the domain to the machine where the application is serving requests.

What you are seeing on the next screen capture are the commands required to complete the first step of the process: git cloning the repo; installing composer and running it to retrieve the app's dependencies. I am doing this as the root user in the root directory so when I finish setting up the application and move it to the public web folder all the file permissions and ownerships are set properly. That might not always be the case, so watch out for it or you could be leaving an exploitable attack vector on your server, like many Drupal users already know, unfortunately.



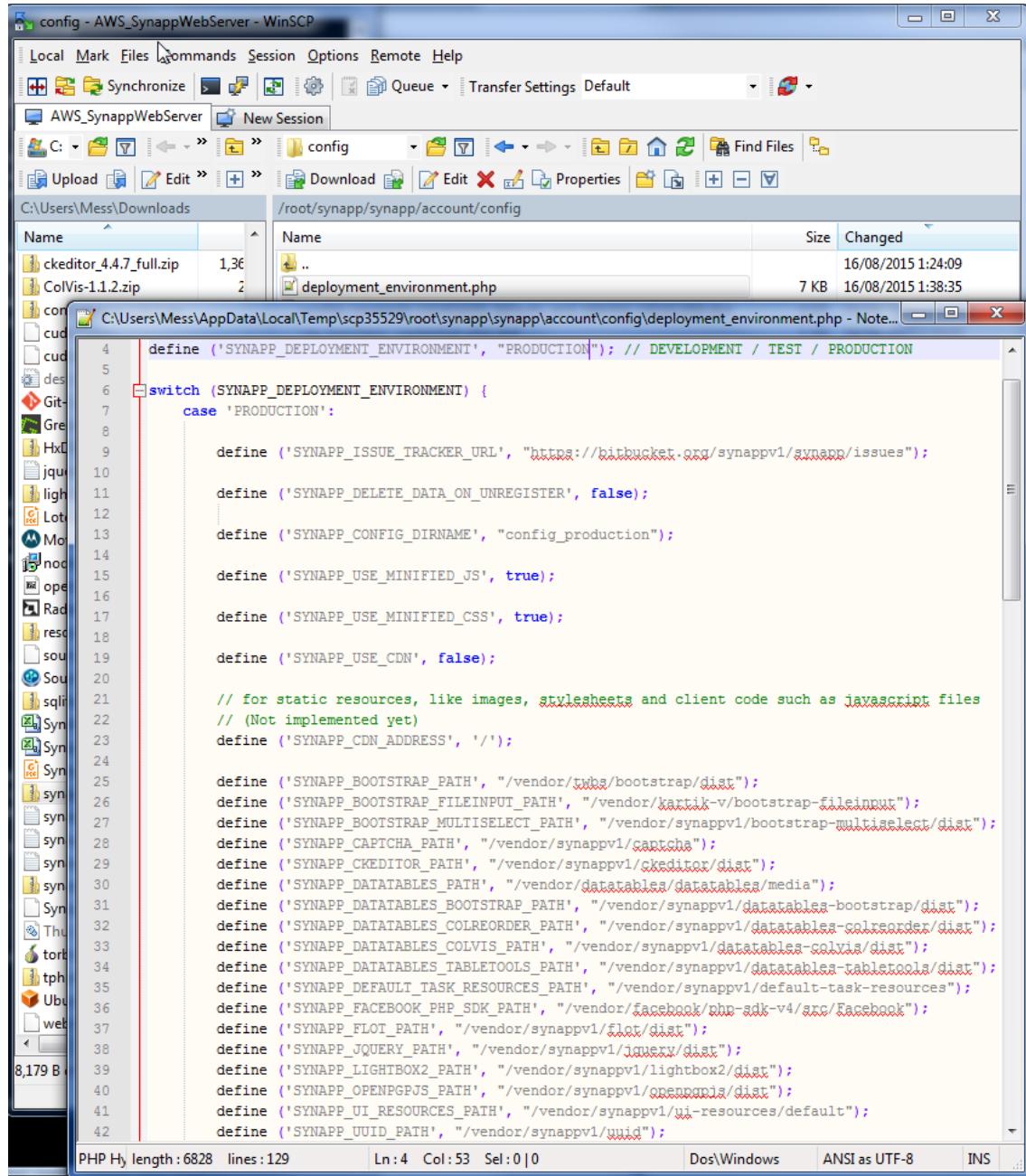
The screenshot shows a terminal window titled "root@ip-10-0-0-13:~/synapp". The terminal output is as follows:

```
[root@ip-10-0-0-13 www]# cd /root
[root@ip-10-0-0-13 ~]# git clone https://bitbucket.org/synappv1/synapp
Cloning into 'synapp'...
Username for 'https://bitbucket.org': elcodedocle
Password for 'https://elcodedocle@bitbucket.org':
remote: Counting objects: 253, done.
remote: Compressing objects: 100% (209/209), done.
remote: Total 253 (delta 38), reused 242 (delta 34)
Receiving objects: 100% (253/253), 673.52 KiB | 0 bytes/s, done.
Resolving deltas: 100% (38/38), done.
[root@ip-10-0-0-13 ~]# cd synapp
[root@ip-10-0-0-13 synapp]# curl -sS https://getcomposer.org/installer | php
#!/usr/bin/env php
All settings correct for using Composer
Downloading...

Composer successfully installed to: /root/synapp/composer.phar
Use it: php composer.phar
[root@ip-10-0-0-13 synapp]# mv composer.phar /usr/local/bin/composer

[root@ip-10-0-0-13 synapp]# composer install
Loading composer repositories
  - Installing twbs/bootstrap (v3.3.5)
```

This is how the app's deployment script looks like when it's configured for production. The most important thing here is to set the proper 'SYNAPP_DEPLOYMENT_ENVIRONMENT' constant definition, which I have set to production, and inside the production environment definition the proper SYNAPP_CONFIG_DIRNAME constant definition, which points to the folder where the application expects to find the rest of the configuration files.



```

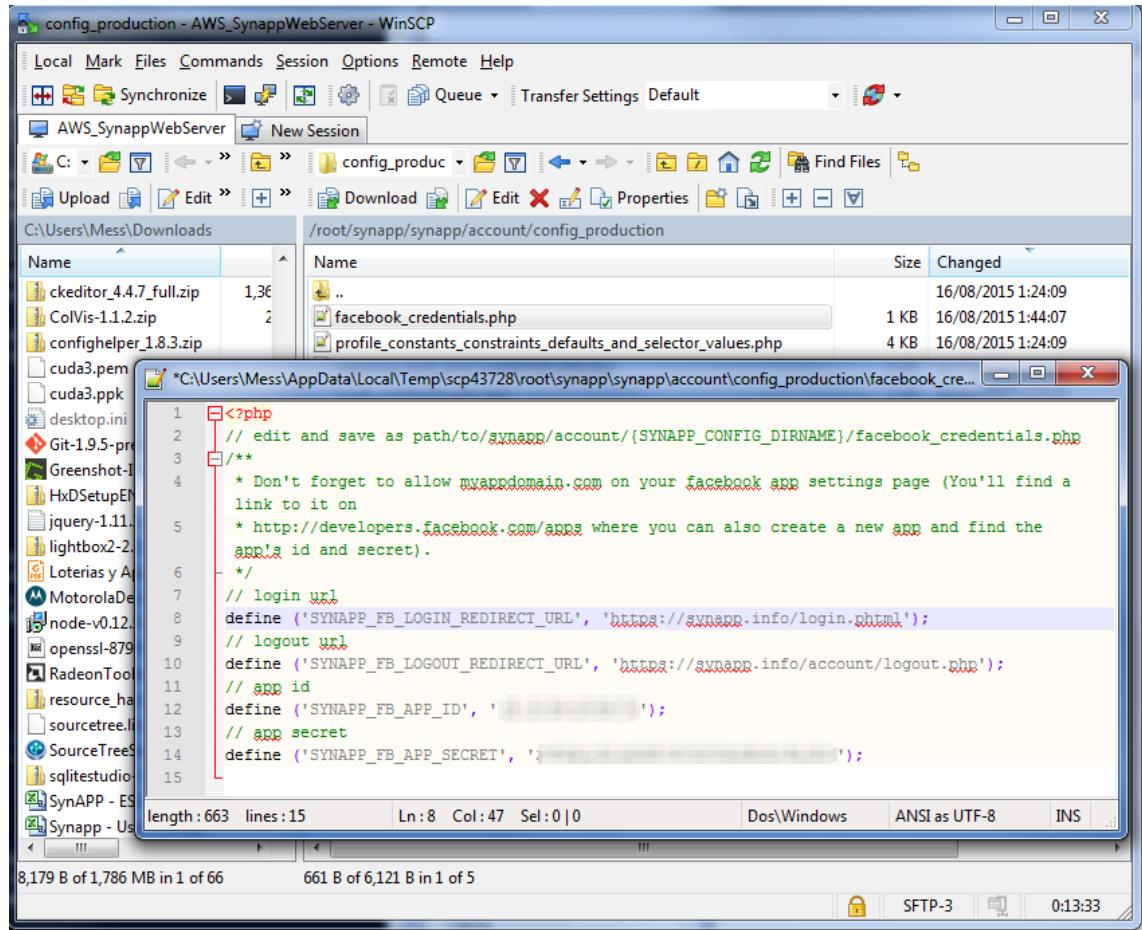
config - AWS_SynappWebServer - WinSCP
Local Mark Files Commands Session Options Remote Help
Synchronize Queue Transfer Settings Default
AWS_SynappWebServer New Session
C:\Users\Mess\Downloads config /root/synapp/synapp/account/config
Name Size Changed
.. 16/08/2015 1:24:09
deployment_environment.php 7 KB 16/08/2015 1:38:35

C:\Users\Mess\AppData\Local\Temp\scp35529\root\synapp\synapp\account\config\deployment_environment.php - Note...
4 define ('SYNAPP_DEPLOYMENT_ENVIRONMENT', "PRODUCTION"); // DEVELOPMENT / TEST / PRODUCTION
5
6 switch (SYNAPP_DEPLOYMENT_ENVIRONMENT) {
7     case 'PRODUCTION':
8
9         define ('SYNAPP_ISSUE_TRACKER_URL', "https://bitbucket.org/synappv1/synapp/issues");
10
11         define ('SYNAPP_DELETE_DATA_ON_UNREGISTER', false);
12
13         define ('SYNAPP_CONFIG_DIRNAME', "config_production");
14
15         define ('SYNAPP_USE_MINIFIED_JS', true);
16
17         define ('SYNAPP_USE_MINIFIED_CSS', true);
18
19         define ('SYNAPP_USE_CDN', false);
20
21         // for static resources, like images, stylesheets and client code such as javascript files
22         // (Not implemented yet)
23         define ('SYNAPP_CDN_ADDRESS', '/');
24
25         define ('SYNAPP_BOOTSTRAP_PATH', "/vendor/twbs/bootstrap/dist");
26         define ('SYNAPP_BOOTSTRAP_FILEINPUT_PATH', "/vendor/kartik-v/bootstrap-fileinput");
27         define ('SYNAPP_BOOTSTRAP_MULTISELECT_PATH', "/vendor/synappv1/bootstrap-multiselect/dist");
28         define ('SYNAPP_CAPTCHA_PATH', "/vendor/synappv1/captcha");
29         define ('SYNAPP_CKEDITOR_PATH', "/vendor/synappv1/ckeditor/dist");
30         define ('SYNAPP_DATATABLES_PATH', "/vendor/datatables/datatables/media");
31         define ('SYNAPP_DATATABLES_BOOTSTRAP_PATH', "/vendor/synappv1/datatables-bootstrap/dist");
32         define ('SYNAPP_DATATABLES_COLREORDER_PATH', "/vendor/synappv1/datatables-colreorder/dist");
33         define ('SYNAPP_DATATABLES_COLVIS_PATH', "/vendor/synappv1/datatables-colvis/dist");
34         define ('SYNAPP_DATATABLES_TABLETOOLS_PATH', "/vendor/synappv1/datatables-tabletools/dist");
35         define ('SYNAPP_DEFAULT_TASK_RESOURCES_PATH', "/vendor/synappv1/default-task-resources");
36         define ('SYNAPP_FACEBOOK_PHP_SDK_PATH', "/vendor/facebook/php-sdk-v4/src/Facebook");
37         define ('SYNAPP_FLOT_PATH', "/vendor/synappv1/fLOT/dist");
38         define ('SYNAPP_JQUERY_PATH', "/vendor/synappv1/jquery/dist");
39         define ('SYNAPP_LIGHTBOX2_PATH', "/vendor/synappv1/lightbox2/dist");
40         define ('SYNAPP_OPENPGPJS_PATH', "/vendor/synappv1/openpgpjs/dist");
41         define ('SYNAPP_UI_RESOURCES_PATH', "/vendor/synappv1/ui-resources/default");
42         define ('SYNAPP_UUID_PATH', "/vendor/synappv1/uuid");

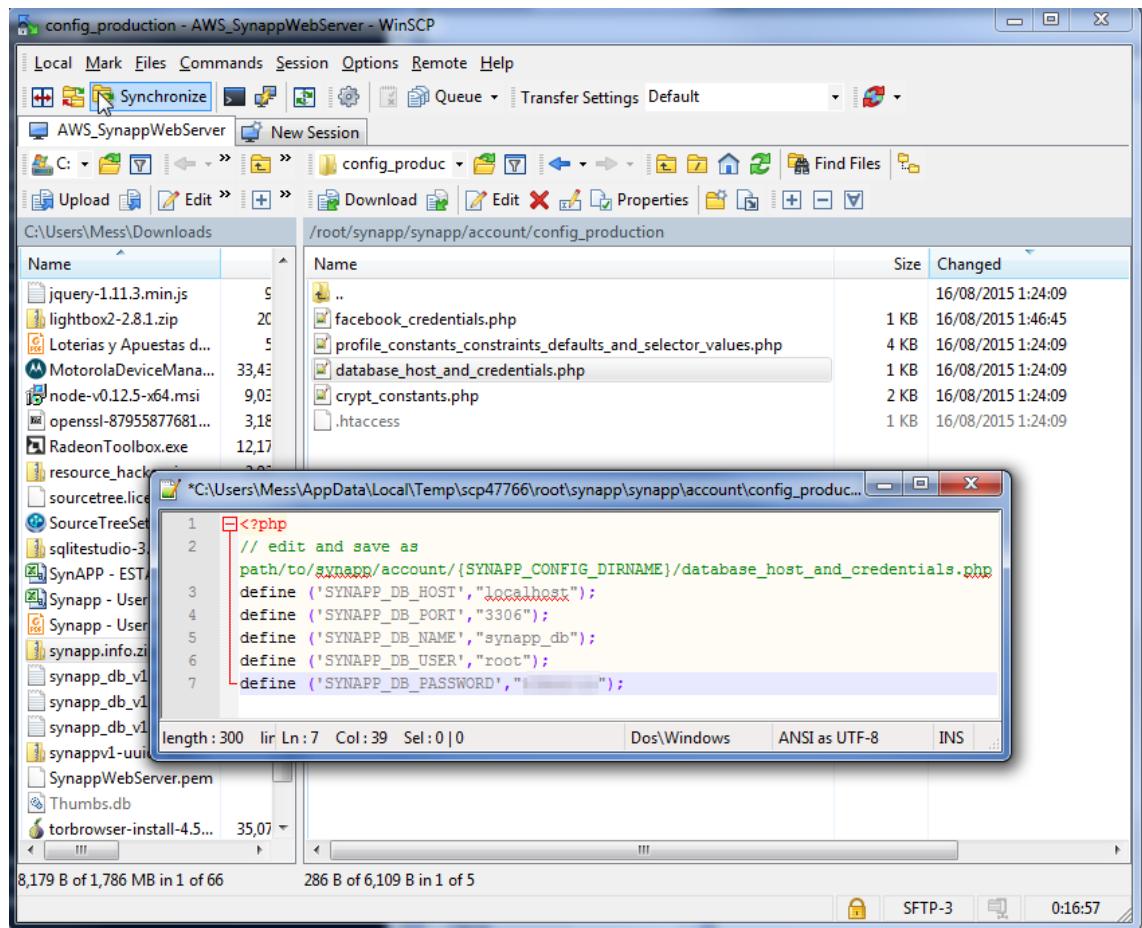
```

PHP Hy length : 6828 lines: 129 Ln: 4 Col: 53 Sel: 0 | 0 Dos\Windows ANSI as UTF-8 INS

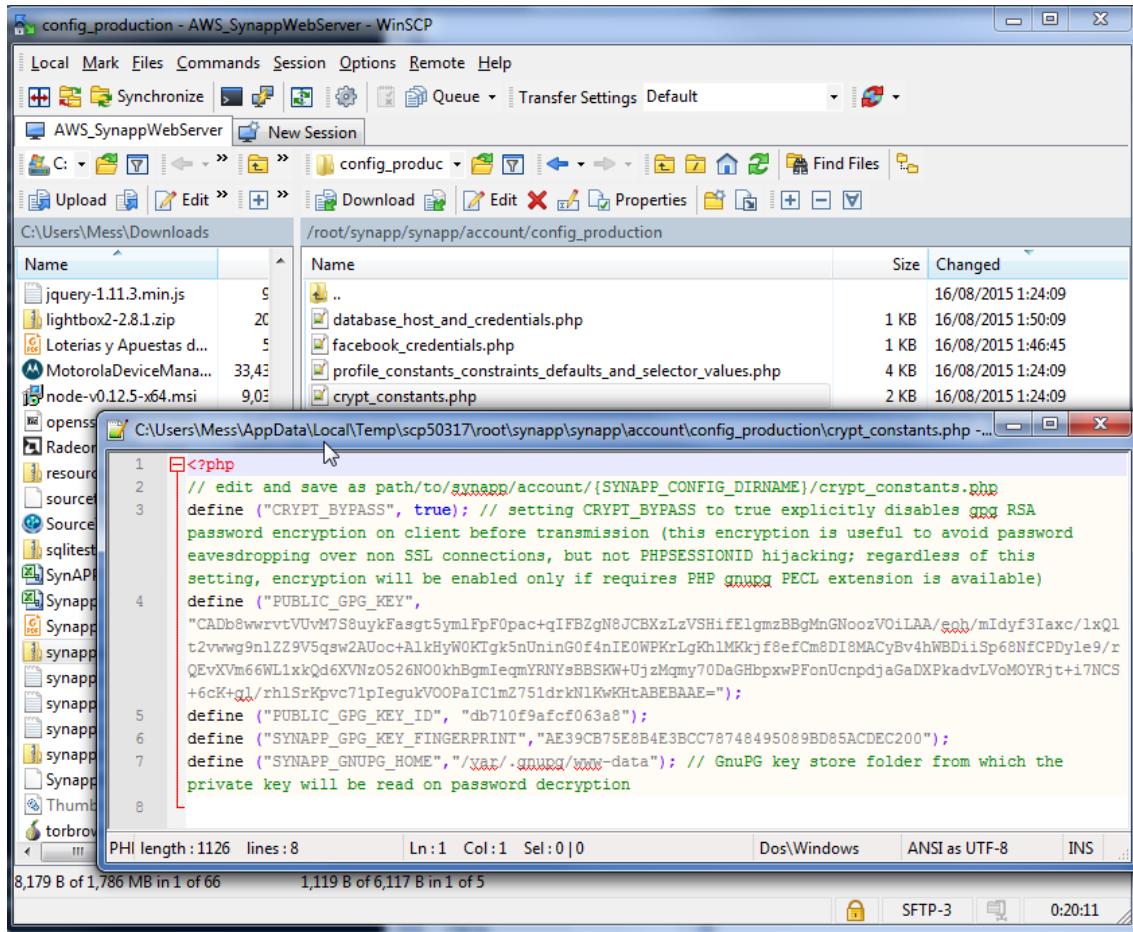
The first of those configuration files to be edited and placed on that folder is the facebook oauth credentials configuration file, which gives the application the parameters required to use facebook login to authenticate its users. There are four parameters to set: login and logout redirections which point to the app's respective processing scripts' URLs; and the application ID and secret which you can get when you register a new facebook app on facebook's developer console.



Then comes the database connection settings configuration. You can leave the default values and just edit the password by setting the same root password you chose when you executed the `mysql_secure_installation` script as indicated on the previous part of this tutorial. To leave a plaintext database root password around is not the best idea even if you are not going to deploy different web applications on the same database, so I suggest you to create a new database user with limited privileges and giving it access to the app database.



The last configuration file are gnupg parameters. This are legacy settings and you can just leave them as they are because they won't be used by the app unless you want to enable password eavesdropping protection over HTTP, which is pointless when you already using SSL.



Now comes the part where we import the database. It is a very straightforward process with only two steps. The first one is creating the database and the second running the script that populates it. In this case the bundled script already creates a database, so the first step is optional.

The only thing you should be careful with is to set up the proper charset encoding for your client. I will be importing directly from the console so I also need to make sure my locale is properly configured.

MariaDB client will connect using utf8 by default which is the encoding of the file I am about to import. The console charset is also set to UTF8 as the locale settings indicate. Once you make sure everything is alright, you can follow the process shown onscreen to load the application schema into the desired database. If you find an error like this, you need to upgrade your MySQL MariaDB version to one that supports CURRENT_TIMESTAMP as the default value on more than one column (that would be 5.6 or later, I believe)

```
root@ip-10-0-0-13:~/synapp/resources
[root@ip-10-0-0-13 resources]# locale
LANG=en_US.UTF-8
LC_CTYPE="en_US.UTF-8"
LC_NUMERIC="en_US.UTF-8"
LC_TIME="en_US.UTF-8"
LC_COLLATE="en_US.UTF-8"
LC_MONETARY="en_US.UTF-8"
LC_MESSAGES="en_US.UTF-8"
LC_PAPER="en_US.UTF-8"
LC_NAME="en_US.UTF-8"
LC_ADDRESS="en_US.UTF-8"
LC_TELEPHONE="en_US.UTF-8"
LC_MEASUREMENT="en_US.UTF-8"
LC_IDENTIFICATION="en_US.UTF-8"
LC_ALL=
[root@ip-10-0-0-13 resources]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 10
Server version: 5.5.41-MariaDB MariaDB Server

Copyright (c) 2000, 2014, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> CREATE DATABASE synapp_db;
Query OK, 1 row affected (0.00 sec)

MariaDB [(none)]> quit
Bye
[root@ip-10-0-0-13 resources]# mysql -u root -p synapp_db < synappV1_schema.sql
Enter password:
ERROR 1293 (HY000) at line 597: Incorrect table definition; there can be only one
TIMESTAMP column with CURRENT_TIMESTAMP in DEFAULT or ON UPDATE clause
[root@ip-10-0-0-13 resources]#
```

```
root@ip-10-0-0-13:~/synapp/resources
[root@ip-10-0-0-13 resources]# mysql -h localhost -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 16
Server version: 10.0.21-MariaDB MariaDB Server

Copyright (c) 2000, 2015, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> drop database synapp_db_v1_rev2
    -> ;
Query OK, 36 rows affected, 36 warnings (0.05 sec)

MariaDB [(none)]> quit
Bye
[root@ip-10-0-0-13 resources]# mysql -h localhost -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 17
Server version: 10.0.21-MariaDB MariaDB Server

Copyright (c) 2000, 2015, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> create database synapp_db_v1_rev2;
Query OK, 1 row affected (0.00 sec)

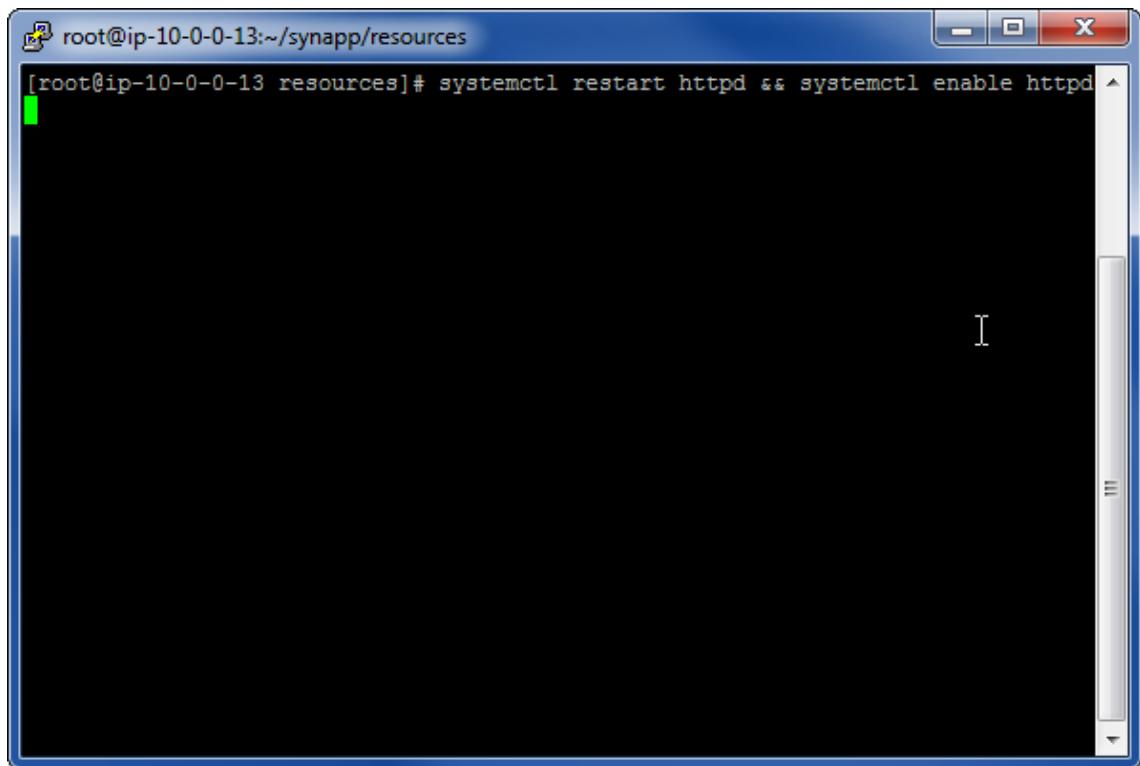
MariaDB [(none)]> quit
Bye
[root@ip-10-0-0-13 resources]# mysql -u root -p synapp_db_v1_rev2 < synappV1_sche
ma.sql
Enter password:
[root@ip-10-0-0-13 resources]#
```

Now, this is only specific to synapp: If you want to access the administrative interface you must create an administrator using the provided CLI script, as shown on the screen. After that, you can move the application's synapp folder to a public web folder. In the second part we defined this path as /var/www, so we will move the project's synapp directory there.

```
root@ip-10-0-0-13:~/synapp/resources
[root@ip-10-0-0-13 resources]# php -f synadmin.php adduser newadminuser gael.abad
in@gmail.com
Password:
[root@ip-10-0-0-13 resources]#
```

```
root@ip-10-0-0-13:~/synapp/resources
[root@ip-10-0-0-13 resources]# mv ../synapp /var/www/
```

The only step left to do in the server would be to bring up the apache web server service.



A screenshot of a terminal window titled "root@ip-10-0-0-13:~/synapp/resources". The window contains a single line of text: "[root@ip-10-0-0-13 resources]# systemctl restart httpd && systemctl enable httpd". The terminal has a blue header bar and a black body with a vertical scroll bar on the right.

```
[root@ip-10-0-0-13 resources]# systemctl restart httpd && systemctl enable httpd
```

After that you should go to your registrar's web admin panel and edit the app domain's DNS zone file. What you see is an example defining 4 subdomains and a default domain plus two mx records for mail exchange services.

The screenshot shows the GoDaddy DNS Manager - Zone File Editor interface. The domain selected is SYNAPP.INFO. The page displays various DNS record types and their configurations:

- A (Host)**:

Host	Points to	TTL
@	54.173.93.70	1 Hour
- CNAME (Alias)**:

Host	Points to	TTL
mail	@	1 Hour
smtp	@	1 Hour
www	@	1 Hour
- MX (Mail Exchanger)**:

Priority	Host	Points to	TTL
10	@	mail.synapp.info	1 Hour
0	@	smtp.synapp.info	1 Hour
- TXT (Text)**:

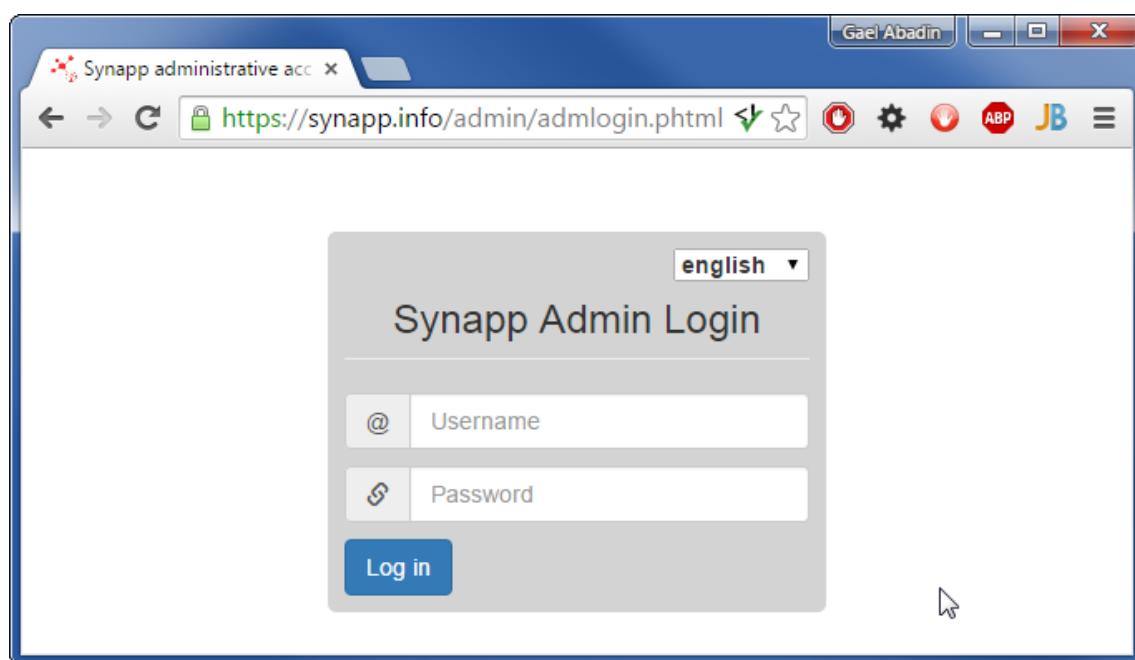
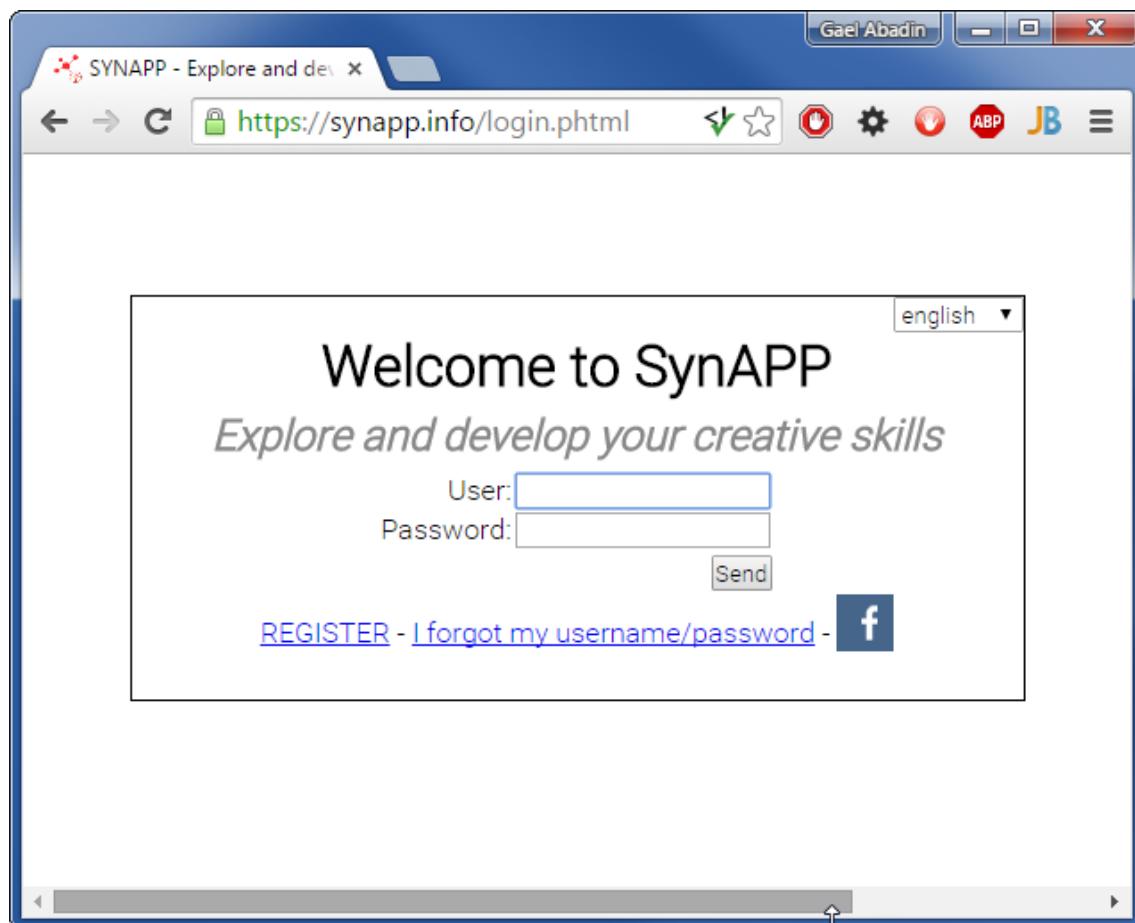
Host	TXT Value	TTL
	Add SPF Record	
- SRV (Service)**:

Service	Protocol	Name	Priority	Weight	Port	Target	TTL
- AAAA (IPv6 Host)**:

Host	Points to	TTL
- NS (Nameserver)**:

Host	Points to	TTL
@ (Informational)	ns43.domaincontrol.com (Informational)	1 Hour (Informational)
@ (Informational)	ns44.domaincontrol.com (Informational)	1 Hour (Informational)

We have reached the end of this tutorial. If everything went ok you should be able to access your webapp, as you can see on the screen.



If you have any trouble, don't hesitate to contact me and I will answer happily to the best of my knowledge as soon as I have the time. Have fun, and happy hacking.