Creating a safe dev environment on a public Cloud with Docker, Jenkins, OpenVPN and Rancher

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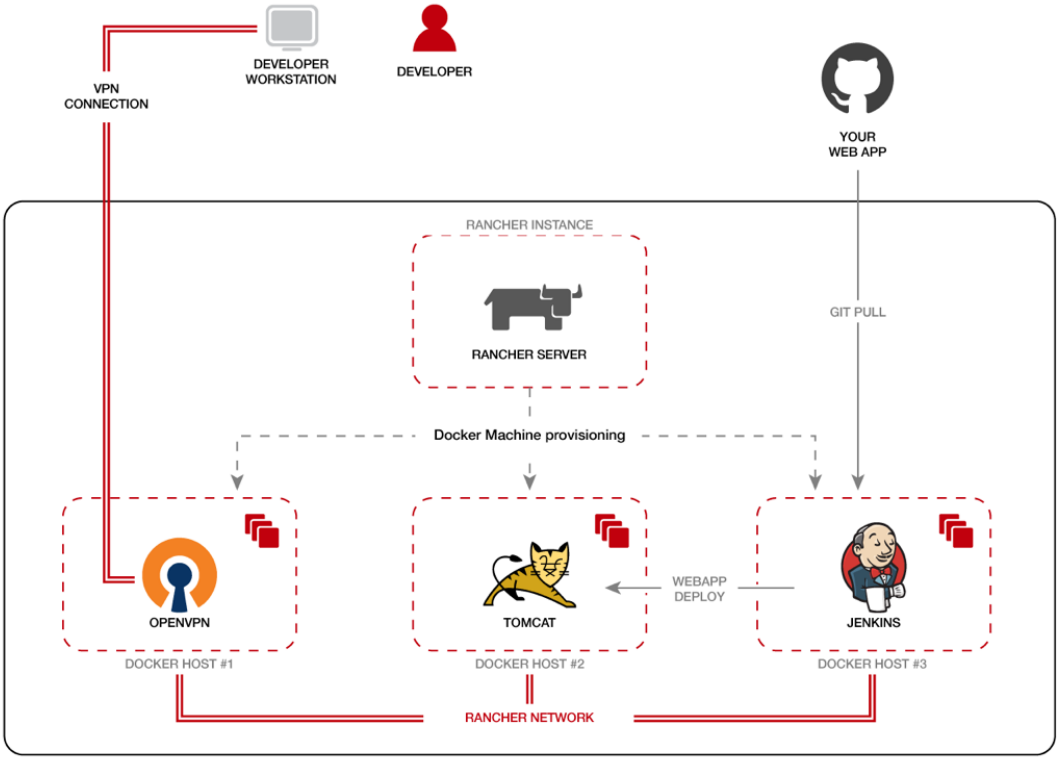
This setup will use 4 instances to run Rancher server, Jenkins, Tomcat and an OpenVPN server. Then you will be able to work, build, deploy over a VPN link to instances in the cloud.



Setup our cloud

Get our credentials

Log on our cloud provider portal and get the account API credentials which you need to expose as environment variables, in my case using exoscale:

```
export DEMO_API_KEY='<your api key>'
export DEMO_SECRET_KEY='<your secret key>'
export CLOUDSTACK_ENDPOINT='https://api.exoscale.ch/compute'
export CLOUDSTACK_KEY=$DEMO_API_KEY
export CLOUDSTACK_SECRET=$DEMO_SECRET_KEY
```

Create a security group

Create a security group by using this python script:

```
# Create a virtual environment named ".venv"
python3 -m venv .venv
source ./.venv/bin/activate
# Install the cs package ①
pip install cs
# Deploy firewall rules
./scripts/create-security-group.py "demo-devoxx"
```

① https://pypi.python.org/pypi/cs

Or manually create one in the interface with those rules:

- Allow 22/tcp, 2376/tcp and 8080/tcp ports from any source, needed for Docker machine to provision hosts.
- Allow 500/udp and 4500/udp ports from any source, needed for Rancher network.
- Allow 9345/tcp and 9346/tcp ports from any source, needed for UI features like graphs, view logs, and execute shell.
- Allow 1194/tcp and 2222/tcp ports from any source, needed to publish our VPN server container.
- Allow 443/tcp ports from any source, needed to access Rancher UI over HTTPS.

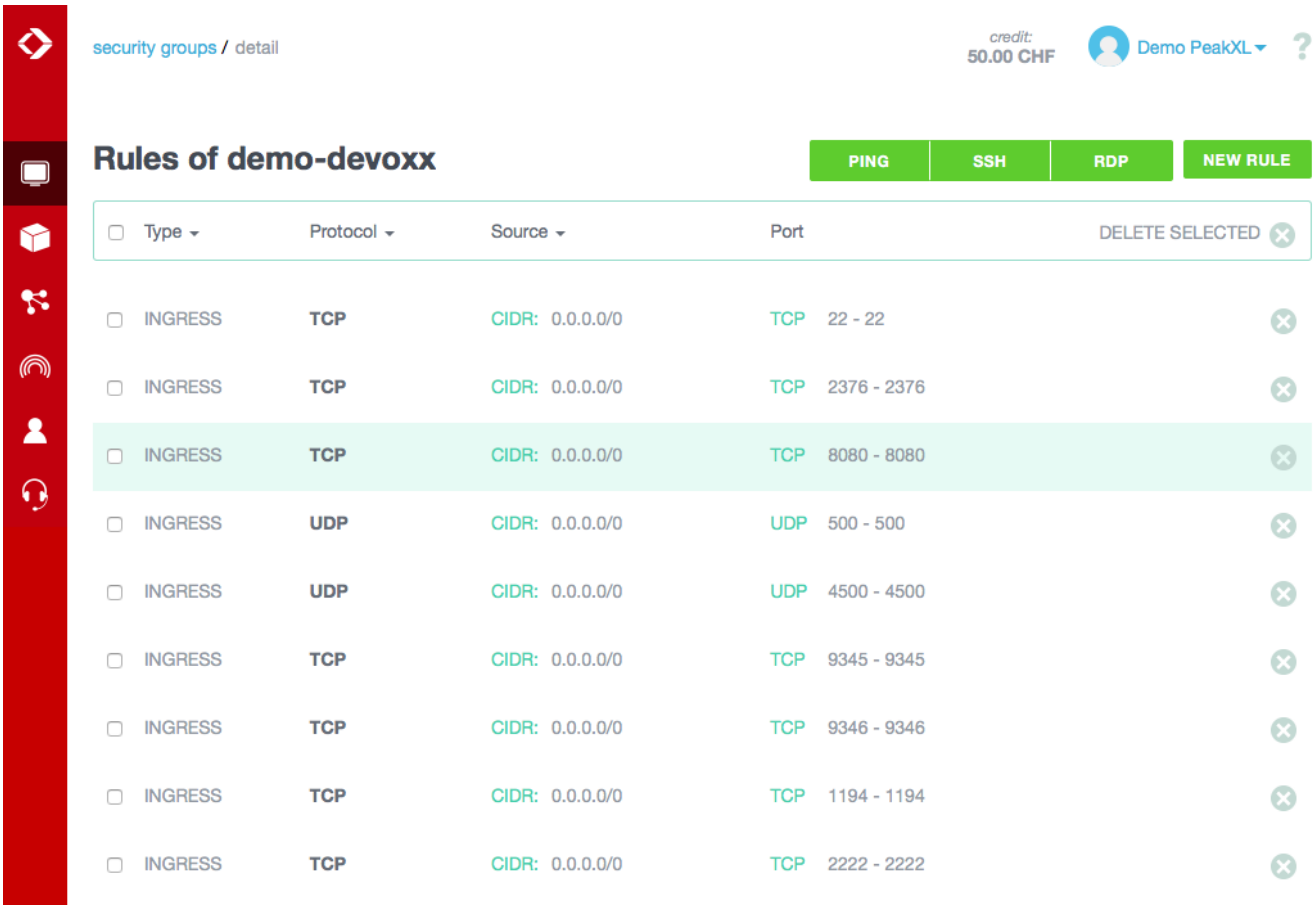


Figure 1. Security Group

Create a docker machine

1. Start a new docker machine directly from your local machine by using a docker driver since exoscale is providing one:

```
docker-machine create --driver exoscale \
    --exoscale-api-key $DEMO_API_KEY \
    --exoscale-api-secret-key $DEMO_SECRET_KEY \
    --exoscale-instance-profile 'Tiny' \
    --exoscale-disk-size '50' \
    --exoscale-image 'ubuntu-16.04' \
    --exoscale-security-group 'demo-devoxx' \
    --exoscale-availability-zone 'ch-dk-2' \
    "devoxxuk-ma"
```

2. Export the docker machine environment variables for this new machine:

```
eval $(docker-machine env devoxxuk-ma)
```

3. Start a docker container with Rancher server on our new docker machine:

```
docker run -d -p 8080:8080 rancher/server:v1.1.0-dev3
```

4. Point your browser to the public IP found in the portal for our instance: `http://xxx.xxx.xxx.xxx:8080/` (http://159.100.249.155:8080/ in my case).

> **NOTE**
>
> **TLS**
>
> At the time of writing, there's a bug in the rancher server UI which loads content over http only, making impossible to start a NGINX-TLS proxy in front of it. You'll find in `docker-compose.yml` file the setup to run rancher behind a nginx + let's encrypt proxy.

Provisioning Docker hosts

1. First you need to add our cloud provider, exoscale in my case, as it's not enabled by default.

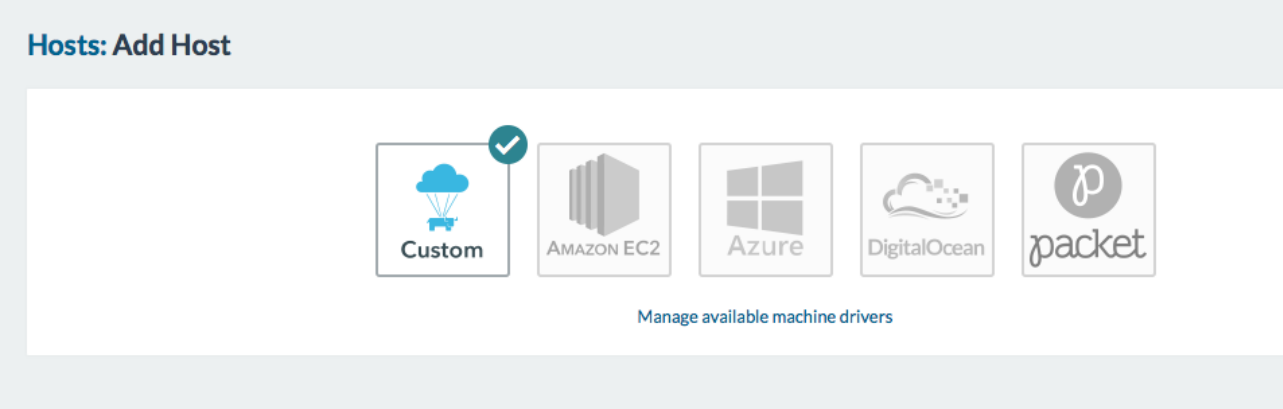
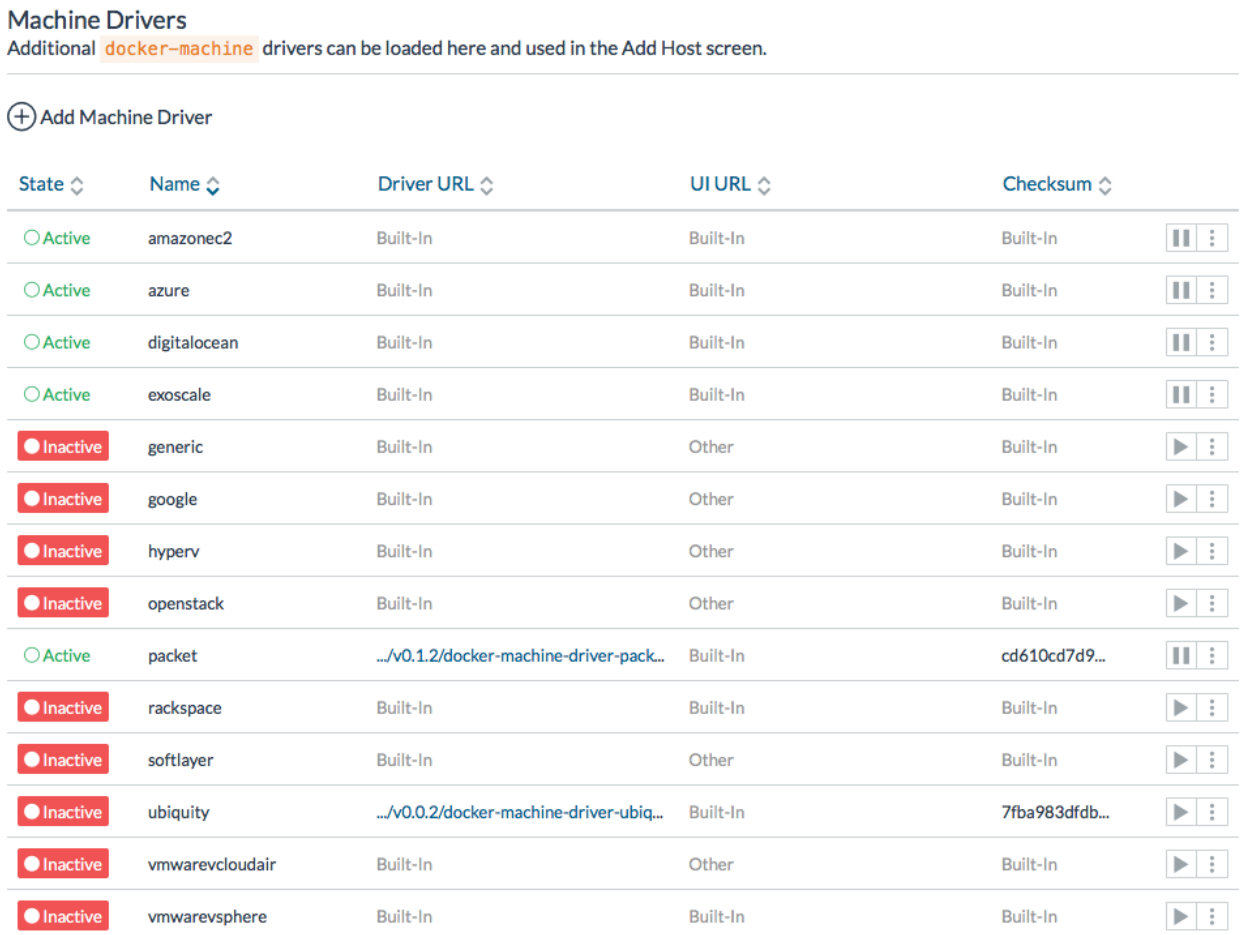


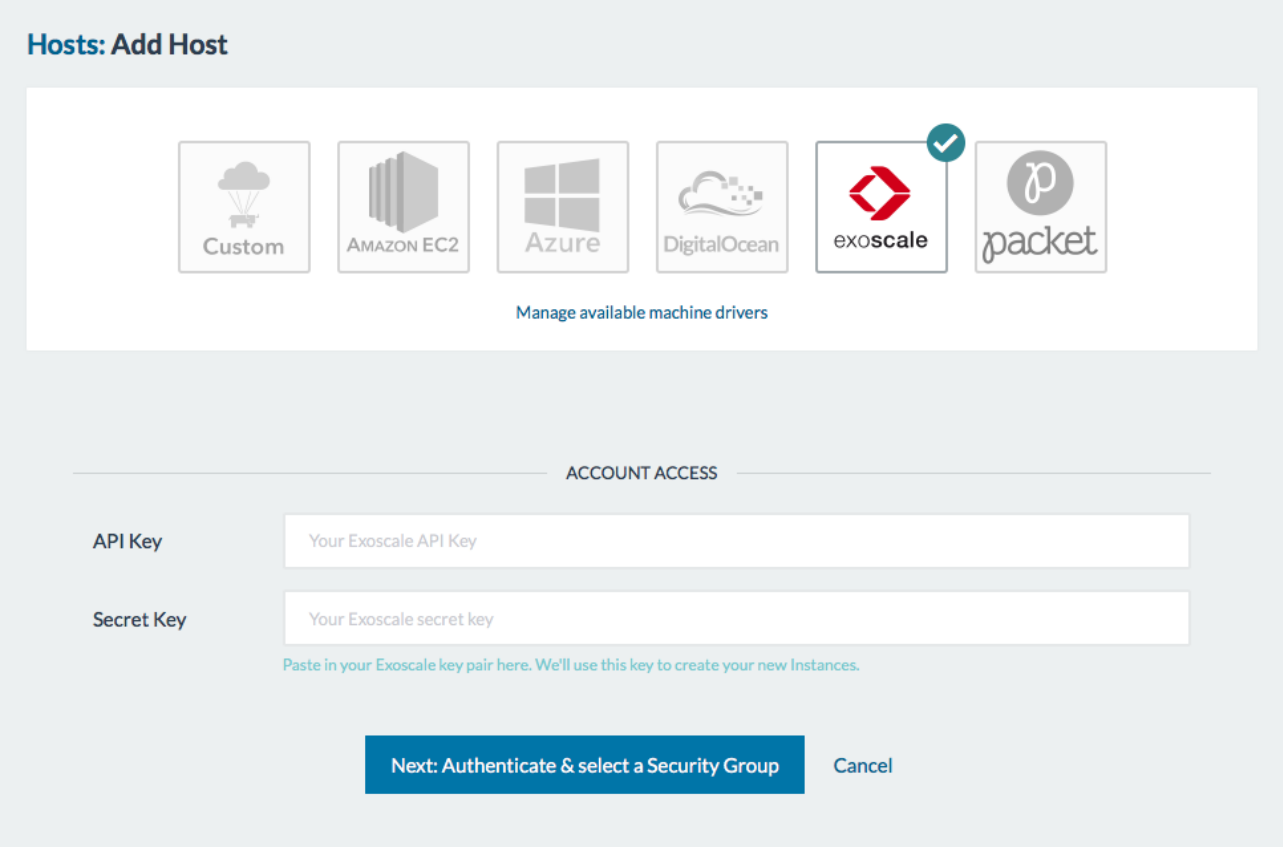
Figure 2. Only a few provider are enabled by default

2. Click on *Manage available machine drivers* and click the *play* sign button to the far right to enable *exoscale* driver.

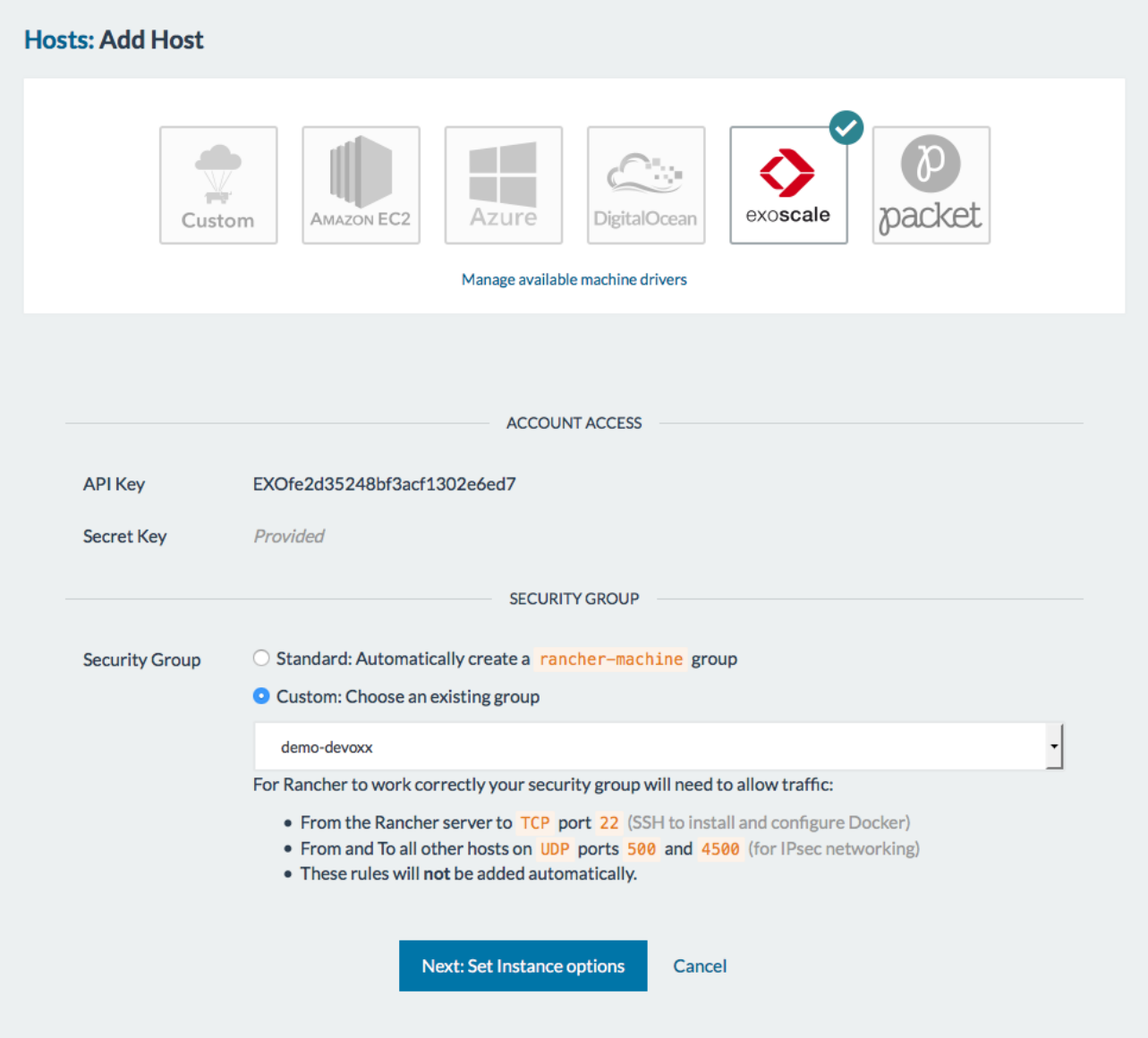


State	Name	Driver URL	UI URL	Checksum
Active	amazonec2	Built-In	Built-In	Built-In
Active	azure	Built-In	Built-In	Built-In
Active	digitalocean	Built-In	Built-In	Built-In
Active	exoscale	Built-In	Built-In	Built-In
Inactive	generic	Built-In	Other	Built-In
Inactive	google	Built-In	Other	Built-In
Inactive	hyperv	Built-In	Other	Built-In
Inactive	openstack	Built-In	Other	Built-In
Active	packet	.../v0.1.2/docker-machine-driver-pack...	Built-In	cd610cd7d9...
Inactive	rackspace	Built-In	Built-In	Built-In
Inactive	softlayer	Built-In	Other	Built-In
Inactive	ubiquity	.../v0.0.2/docker-machine-driver-ubiq...	Built-In	7fba983dfdb...
Inactive	vmwarevcloudair	Built-In	Other	Built-In
Inactive	vmwarevsphere	Built-In	Built-In	Built-In

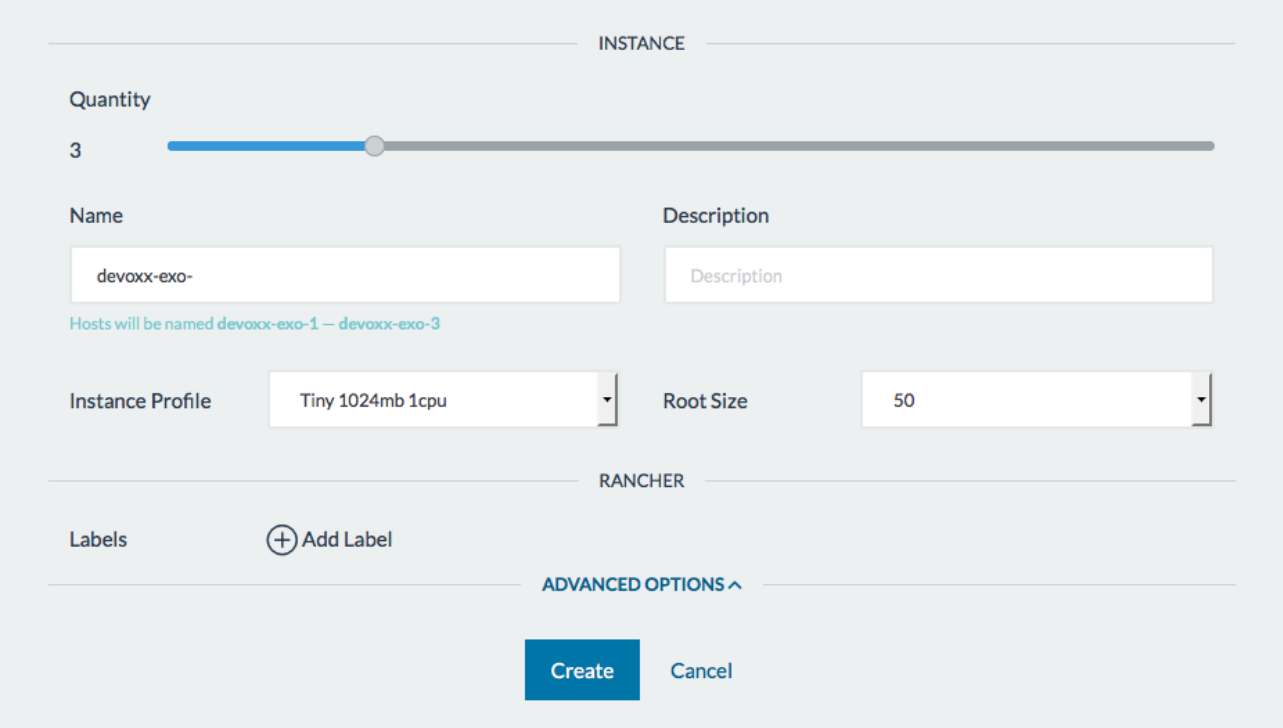
3. Go back in your browser and you will see the logo for exoscale, click on it and enter your credentials, the same as used before for docker.



4. Next choose the security group you created in the portal (*might be buggy*)



5. Next choose the number of instances, 3 for our scenario (VPN, Jenkins, Tomcat). Named them as you want and choose a profile size that suits your needs.

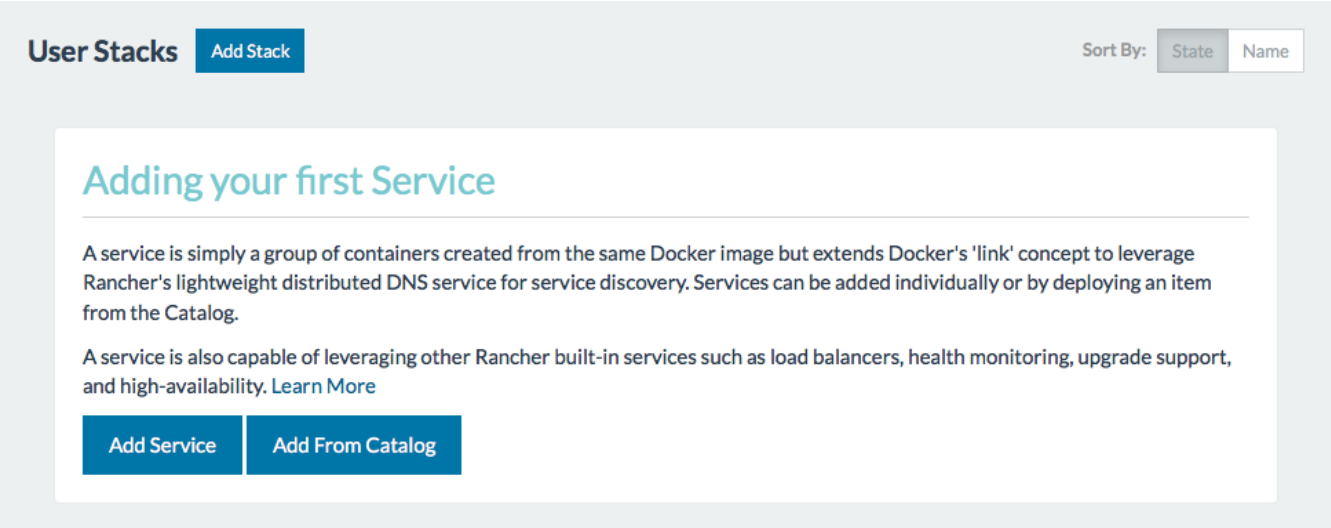


Now we have a working rancher server running on a cloud instance with a provision of 3 hosts to run containers on them. Let's deploy those 3 containers:

- OpenVPN to create the VPN acess.
- Jenkins to build our webapp.
- Tomcat to run our webapp.

Setup containers on Rancher server

Time to deploy a first service, click on *Add Service* button (*you will have to do this add 3 times*)

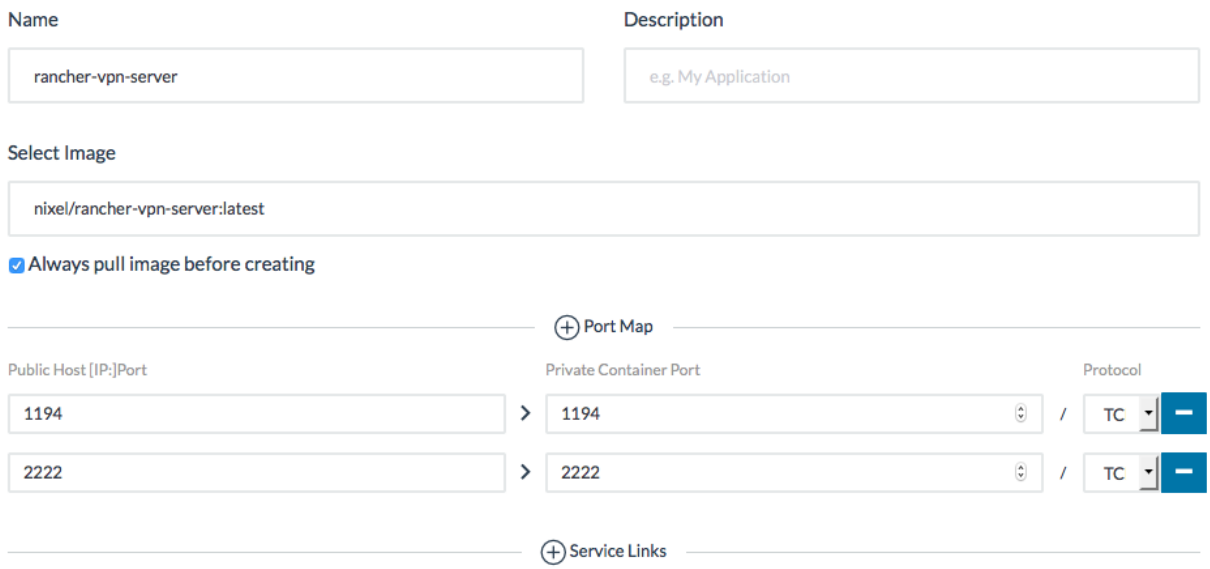


OpenVPN

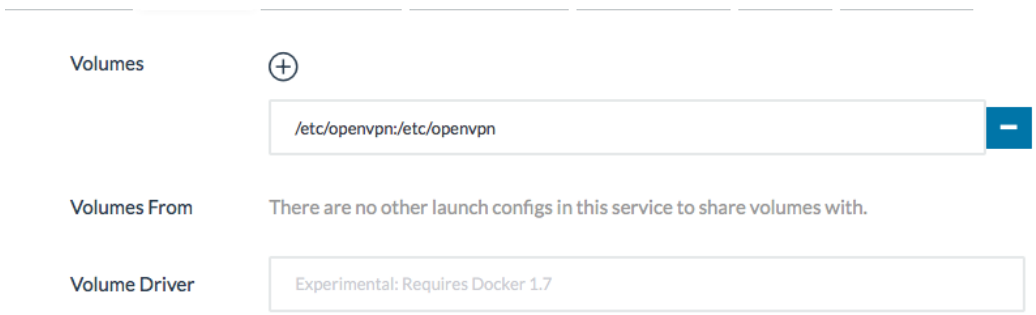
For the OpenVPN container:

1. Scale it to 1 container.

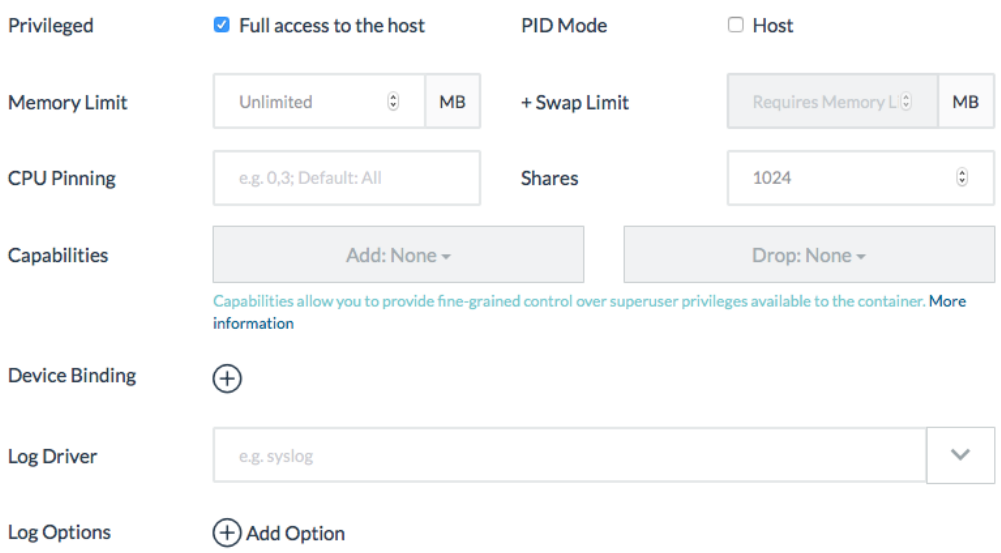
2. Enter a name for it: **rancher-vpn-server**.
3. Enter the docker image: **nixel/rancher-vpn-server:latest**.
4. Add this TCP port map: 1194 (on Host) to 1194 (in Container).
5. Add this TCP port map: 2222 (on Host) to 2222 (in Container).



6. In *Volume* section add a new volume to persist the VPN configuration: `/etc/openvpn:/etc/openvpn`



7. In *Security* enable the container *full access to the host* by checking the box.



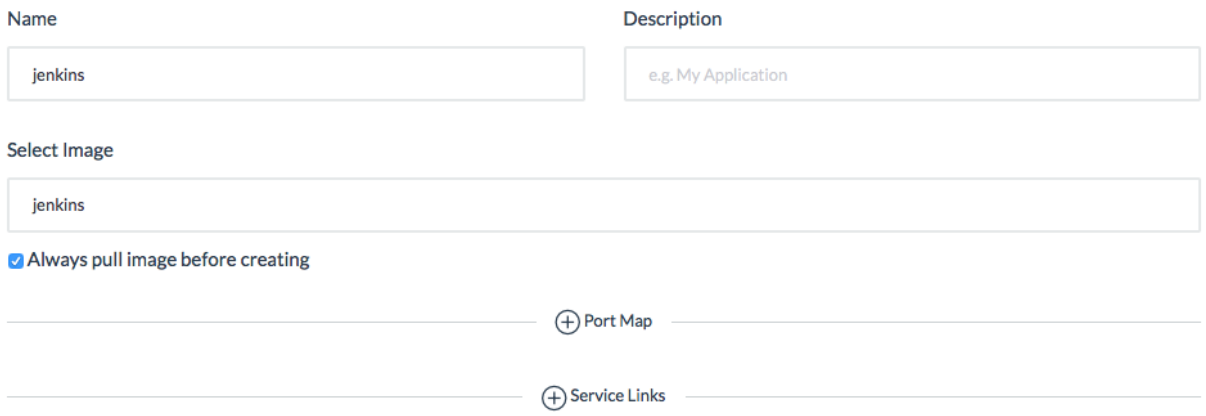
8. And start the container

After a while the container will be ready. But you don't need to wait before creating the other ones.

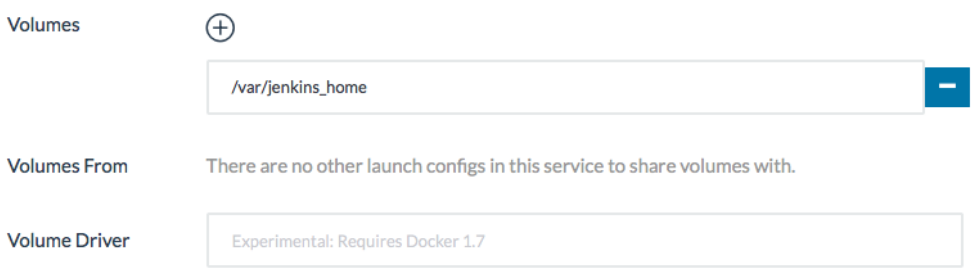
Jenkins

1. Scale it to 1 container.

2. Enter a name for it: **jenkins**.
3. Enter the docker image: **jenkins**.
4. No port map is required



5. In *Volume* section add a new volume to persist the Jenkins configuration: `/var/jenkins_home`

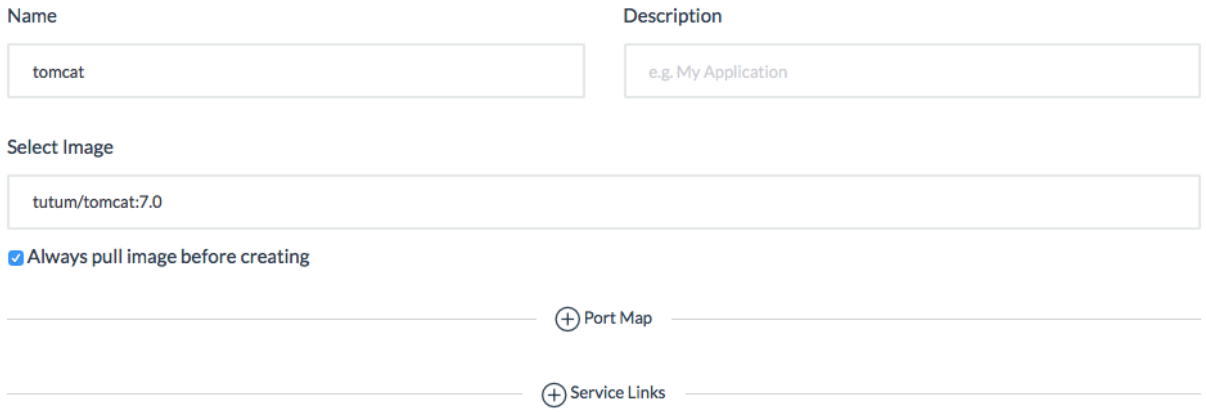


6. And start it!.

Tomcat

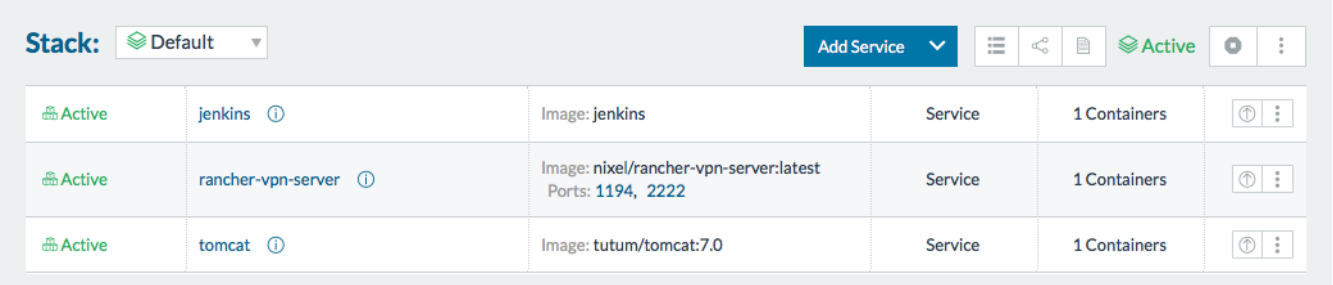
1. Scale it to 1 container.

2. Enter a name for it: **tomcat**.
3. Enter the docker image: **tutum/tomcat:7.0**.
4. No port map is required



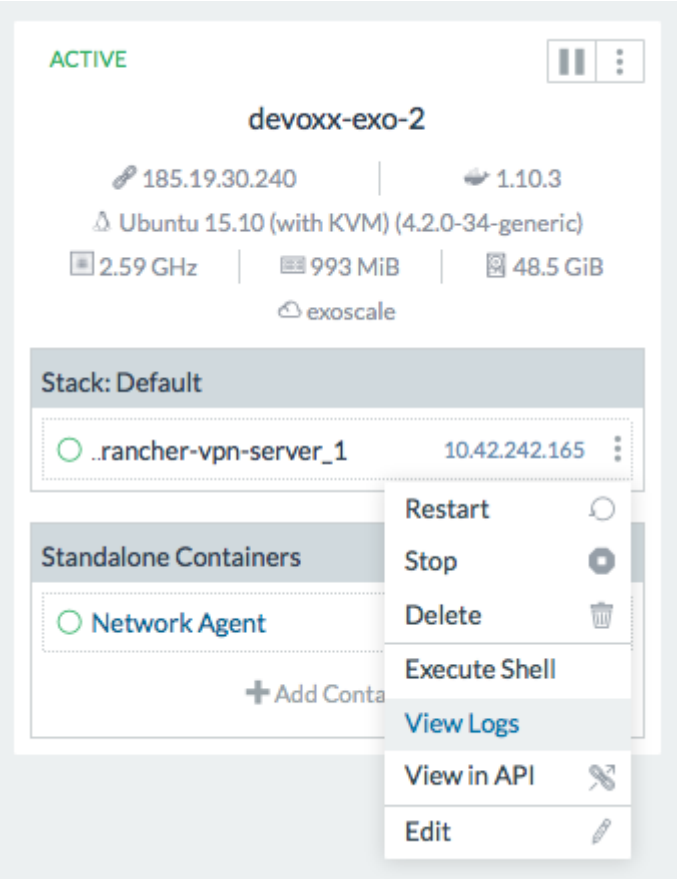
5. And start it!.

Now we have 3 services running on our rancher server:



Connect to the VPN

You need to access the logs of the VPN server to get the generated password to download the configuration. Go in `Infrastructure` → `Hosts` to see the 3 instances details. On the vpn server container, clikc the 3 vertical dots and choose `View Logs`.




```
03/06/2016 10:17:35 organizationalUnitName:PRINTABLE:'NIXEL'
03/06/2016 10:17:35 commonName            :PRINTABLE:'RancherVPNClient'
03/06/2016 10:17:35 name                  :PRINTABLE:'EasyRSA'
03/06/2016 10:17:35 emailAddress          :IA5STRING:'manel@nixelsolutions.com'
03/06/2016 10:17:35 Certificate is to be certified until Jun  1 08:17:35 2026 GMT (3650 days)
03/06/2016 10:17:35
03/06/2016 10:17:35 Write out database with 1 new entries
03/06/2016 10:17:35 Data Base Updated
03/06/2016 10:17:35 /etc/openvpn
03/06/2016 10:17:35 ==========================================
03/06/2016 10:17:35 If you are using nixel/rancher-vpn-client docker image you must run rancher-vpn-client container using the following
03/06/2016 10:17:35 sudo docker run -ti -d --privileged --name rancher-vpn-client -e VPN_SERVERS=185.19.30.240:1194 -e VPN_PASSWORD=Kkd5
03/06/2016 10:17:35
03/06/2016 10:17:35 Then execute "sudo docker logs rancher-vpn-client" so you can view the ip route you need to add in your system in or
03/06/2016 10:17:35 ==========================================
03/06/2016 10:17:35 If you are using another OpenVPN client (for example for mobile devices) you can get the VPN client configuration ex
03/06/2016 10:17:35 sshpass -p Kkd58ew5gEk0QCcZFrWq ssh -p 2222 -o ConnectTimeout=4 -o UserKnownHostsFile=/dev/null -o StrictHostKeyChec
03/06/2016 10:17:35 ==========================================
03/06/2016 10:17:35 /usr/lib/python2.7/dist-packages/supervisor/options.py:295: UserWarning: Supervisord is running as root and it is se
03/06/2016 10:17:35   'Supervisord is running as root and it is searching '
03/06/2016 10:17:35 2016-06-03 08:17:35,529 CRIT Supervisor running as root (no user in config file)
03/06/2016 10:17:35 2016-06-03 08:17:35,529 WARN Included extra file "/etc/supervisor/conf.d/supervisord.conf" during parsing
```

Figure 3. Command line in the logs to download the VPN configuration.

Using a OpenVPN client

Download the configuration file for OpenVPN through SSH as you will see in the log output with the corresponding command line. In my case I got this command:

```
sshpass -p Kkd58ew5gEk0QCcZFrWq ssh -p 2222 -o ConnectTimeout=4 -o
UserKnownHostsFile=/dev/null -o StrictHostKeyChecking=no root@185.19.30.240
"get_vpn_client_conf.sh 185.19.30.240:1194" > RancherVPNClient.ovpn
```

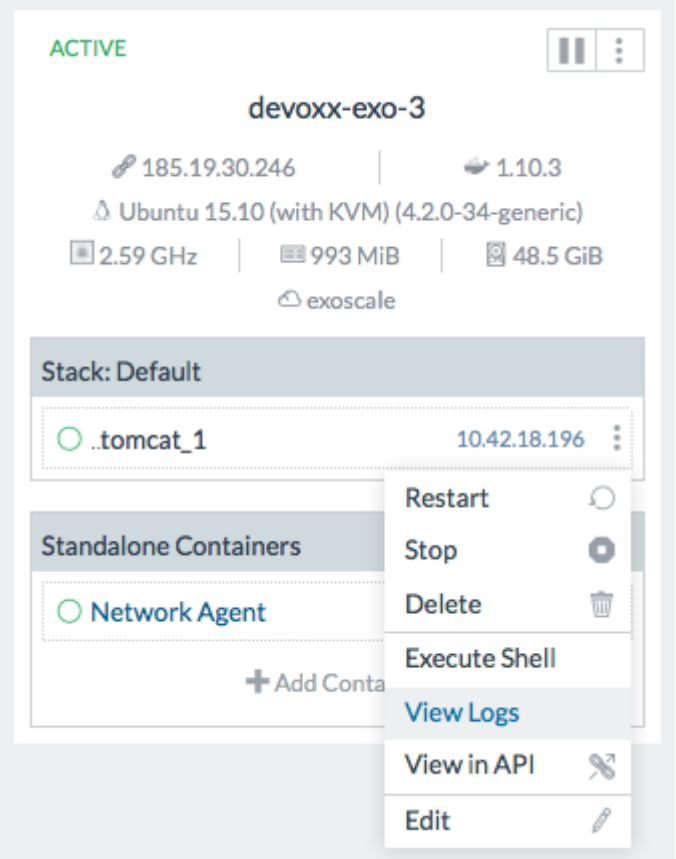
Best is it to do the `ssh -p 2222 ...` command and enter the password in the prompt, skipping the use of `sshpass`.

```
ssh -p 2222 -o ConnectTimeout=4 -o UserKnownHostsFile=/dev/null -o
StrictHostKeyChecking=no root@185.19.30.240 "get_vpn_client_conf.sh
185.19.30.240:1194" > RancherVPNClient.ovpn
# when prompt enter: Kkd58ew5gEk0QCcZFrWq
```

And just load it in your OpenVPN client, and start the connection to the server. Now you are able to connect to Jenkins and tomcat using their own container IP address you'll find on the service view. If you tried before connecting the VPN, you wouldn't have been able.

Configure Jenkins

First we will need to get the admin password for Tomcat to be able to deploy the app. On the rancher server interface, go to the host view again, and view the Tomcat logs.



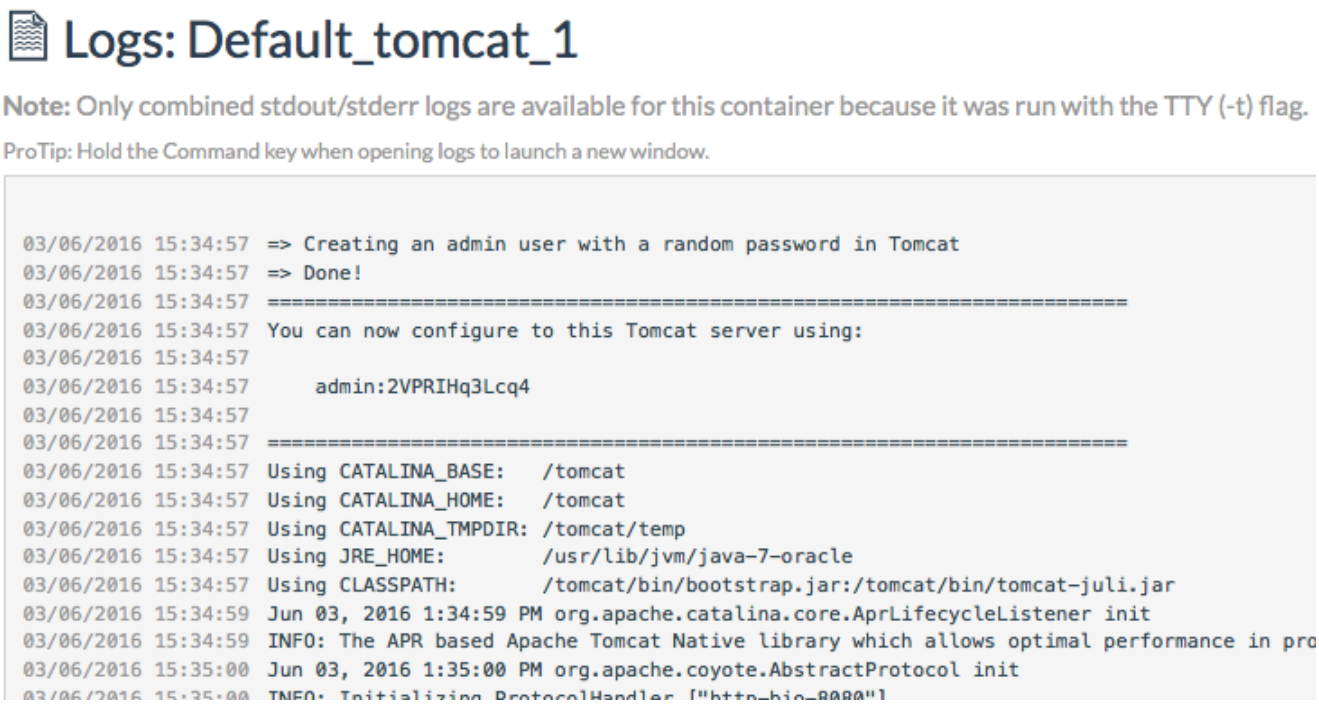


Figure 4. Keep this admin password for later

Open your browser to the http://JENKINS_CONTAINER:8080 (in my case http://10.42.45.156:8080/)

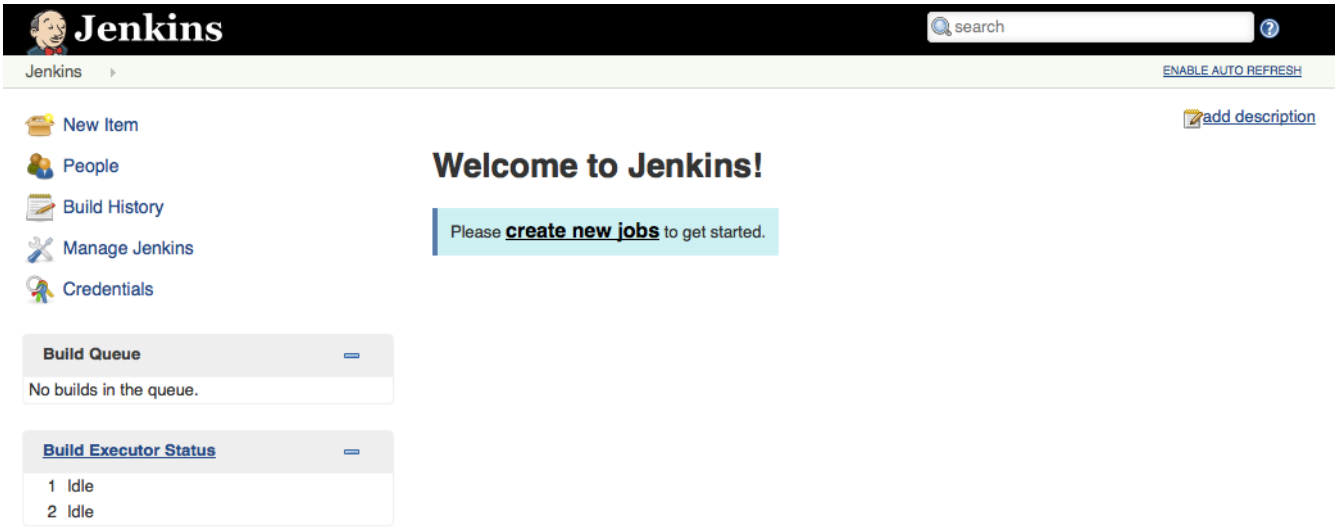
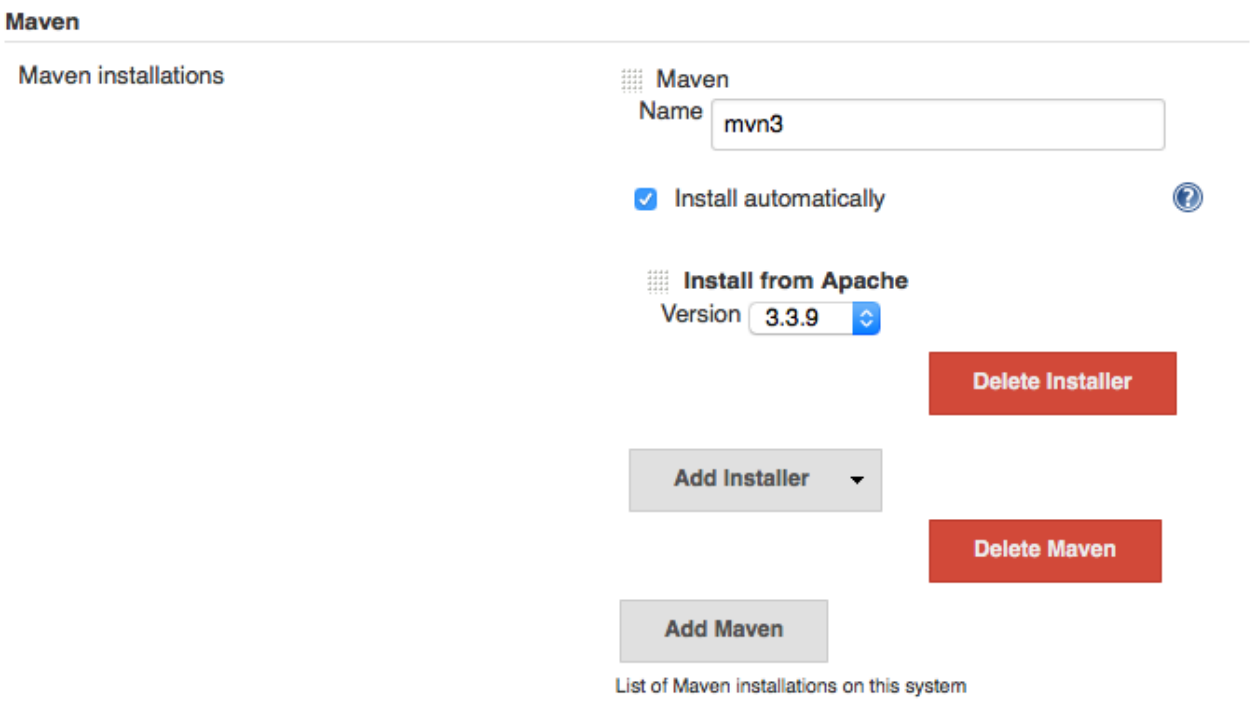


Figure 5. Jenkins Dashboard

Before starting you must install Github Plugin and Maven following these steps:

1. Click *Manage Jenkins* menu option and then Manage Plugins
2. Go to Available tab and search for Github plugin, named “Github Plugin”. Activate its checkbox
3. Click Download now and install after restart button
4. When the plugin is installed enable checkbox Restart Jenkins when installation is complete and no jobs are running, and then wait for Jenkins to be restarted
5. When Jenkins is running again, go to Manage Jenkins and click Configure System
6. In Maven section click Add Maven button, enter a name for the installation and choose the

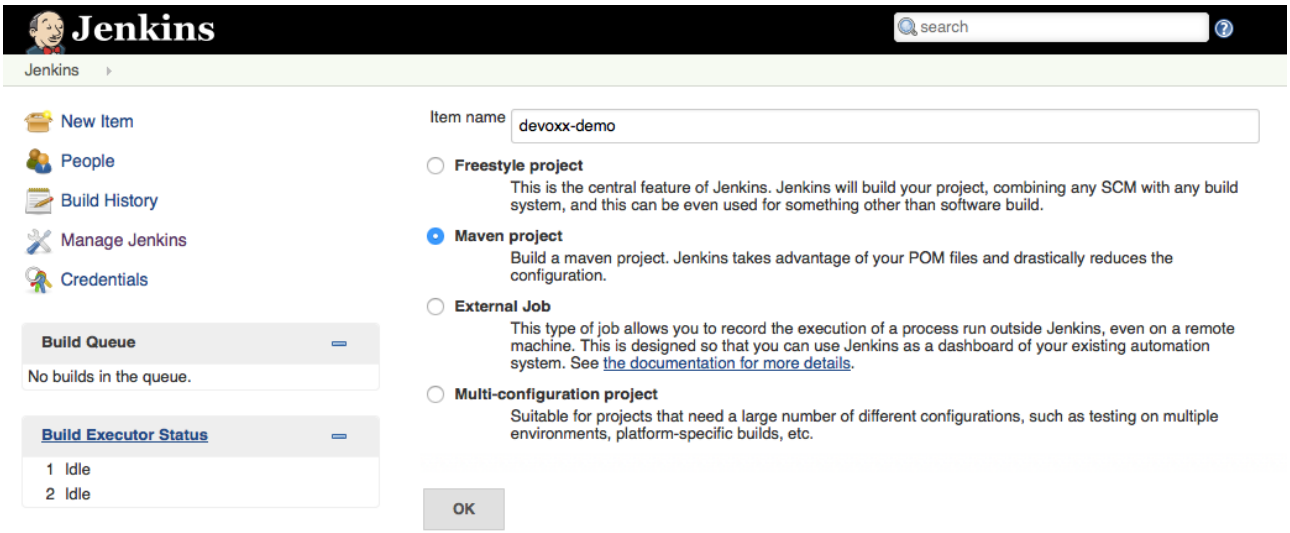
maven version you want, in my case the latest available 3.3.9.



7. Click Save button to finish

Create a new job in the *Dashboard*, clikc *create new jobs* and do as follow:

1. Enter a job name, for example *devoxx-demo*
2. Choose *Maven project* and click *OK*



3. In *Source Code Management* section choose *Git* and enter this repository url:
   - https://github.com/marcaurele/sample-spring-boot
4. In *Build* section enter the following maven goals and options. Replace **TOMCAT_CONTAINER_IP** with the IP assigned to your Tomcat container (10.42.18.196 in my case) and

TOMCAT_ADMIN_PASSWORD with the password we saw in the Tomcat logs of the container (`2VPRIHq3Lcq4` in my case).

```
clean package tomcat7:redeploy -DTOMCAT_HOST=TOMCAT_CONTAINER_IP -DTOMCAT_PORT=8080
-DTOMCAT_USER=admin -DTOMCAT_PASS=TOMCAT_ADMIN_PASSWORD
# In my case
clean package tomcat7:redeploy -DTOMCAT_HOST=10.42.18.196 -DTOMCAT_PORT=8080
-DTOMCAT_USER=admin -DTOMCAT_PASS=2VPRIHq3Lcq4
```

5. Save the job

Now you can click *Build Now* to run the job. If you check the *Console Output* you will see at the end a *Build success*:

```
[INFO]
[INFO] --- tomcat7-maven-plugin:2.2:redeploy (default-cli) @ sample-spring-boot ---
[INFO] Deploying war to http://10.42.18.196:8080/sample
Uploading: http://10.42.18.196:8080/manager/text/deploy?path=%2Fsample&update=true
Uploaded: http://10.42.18.196:8080/manager/text/deploy?path=%2Fsample&update=true
(12914 KB at 19046.1 KB/sec)

[INFO] tomcatManager status code:200, ReasonPhrase:OK
[INFO] OK - Deployed application at context path /sample
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 37.123 s
[INFO] Finished at: 2016-06-03T13:44:14+00:00
[INFO] Final Memory: 29M/70M
[INFO] ------------------------------------------------------------------------
[JENKINS] Archiving /var/jenkins_home/jobs/devoxx-demo/workspace/pom.xml to
com.peakxl.demo/sample-spring-boot/1.0.0/sample-spring-boot-1.0.0.pom
[JENKINS] Archiving /var/jenkins_home/jobs/devoxx-demo/workspace/target/sample-spring-
boot-1.0.0.war to com.peakxl.demo/sample-spring-boot/1.0.0/sample-spring-
boot-1.0.0.war
channel stopped
Finished: SUCCESS
```

Testing the sample app

Now browse to http://TOMCAT_CONTAINER_IP:8080/sample/ (in my case http://10.42.18.196:8080/sample/) and you will see some information about the Tomcat container and your browser.

Sample SpringBoot app

Server IP addresses:

- fe80:0:0:0:77:d6ff:fe7d:9f90%18
- 10.42.18.196
- 172.17.0.3
- 0:0:0:0:0:0:0:1%1
- 127.0.0.1

Server Hostname: **f05ddffd11b4**
Your current IP address: **10.42.242.165**
Your current User-Agent: **Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:46.0) Gecko/20100101 Firefox/46.0**

Deploying the app from your local machine

Of course you can also deploy the app from your local computer to iterate faster by running the maven command locally:

```
git clone https://github.com/marcaurele/sample-spring-boot.git
cd sample-spring-boot
# Replace TOMCAT_CONTAINER_IP and TOMCAT_ADMIN_PASSWORD
mvn clean package tomcat7:redeploy -DTOMCAT_HOST=TOMCAT_CONTAINER_IP
-DTOMCAT_PORT=8080 -DTOMCAT_USER=admin -DTOMCAT_PASS=TOMCAT_ADMIN_PASSWORD

# In my case
mvn clean package tomcat7:redeploy -DTOMCAT_HOST=10.42.18.196 -DTOMCAT_PORT=8080
-DTOMCAT_USER=admin -DTOMCAT_PASS=2VPRIHq3Lcq4
```

```
[INFO] Packaging webapp
[INFO] Assembling webapp [sample-spring-boot] in [/Users/marco/exoscale/sample-spring-boot/target/sample-spring-boot-1.0.0]
[INFO] Processing war project
[INFO] Webapp assembled in [57 msecs]
[INFO] Building war: /Users/marco/exoscale/sample-spring-boot/target/sample-spring-boot-1.0.0.war
[INFO]
[INFO] --- spring-boot-maven-plugin:1.3.5.RELEASE:repackage (default) @ sample-spring-boot ---
[INFO]
[INFO] <<< tomcat7-maven-plugin:2.2:redeploy (default-cli) < package @ sample-spring-boot <<<
[INFO]
[INFO] --- tomcat7-maven-plugin:2.2:redeploy (default-cli) @ sample-spring-boot ---
[INFO] Deploying war to http://10.42.18.196:8080/sample
Uploading: http://10.42.18.196:8080/manager/text/deploy?path=%2Fsample&update=true
Uploaded: http://10.42.18.196:8080/manager/text/deploy?path=%2Fsample&update=true (12914 KB at 7587.1 KB/sec)

[INFO] tomcatManager status code:200, ReasonPhrase:OK
[INFO] OK - Deployed application at context path /sample
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 26.808 s
[INFO] Finished at: 2016-06-03T15:47:52+02:00
[INFO] Final Memory: 32M/269M
[INFO] ------------------------------------------------------------------------
sample-spring-boot/ on master
>
```

Conslusion

We have now a development environment running on a public cloud provider, exoscale, with an encrypted connection to stay safe while coding our app, without to have to think anymore about exposing or mapping ports or editing firewall rules. This setup enables you to work from any location (office, home, wifi hotspot) too, or to give access to your environment to other people.

Credits

Based on Manel Martinez Gonzalez post with some modifiations.