Due: Your project 5 deadline (Dec 8, 11:59pm plus any late days you may have left).

What to submit: Send email to cs3214-staff@cs.vt.edu with a URL.

Using the Amazon Elastic Compute Cloud (EC2)

In this exercise, you will install a virtual machine in the Amazon Elastic Compute Cloud (EC2) and demo your web service running in it. Amazon's EC2 service is an example of emerging infrastructure as a service (IaaS) products that provide users with access to virtual machines.

Thanks to a teaching grant from Amazon, every student is provided with free credits that can be used towards Amazon's web services.

The goal of this exercise is to demo your project 5 solution running inside the Amazon cloud. To this end, you'll have to set up an account, and set up and launch a virtual machine or 'instance.' The following steps will be necessary.

- Sign up for an Amazon Web Services (AWS) account at www.amazon.com/aws. Redeem your credit code (it's in the file aws-code.txt in your grades directory).
- Go to https://aws.amazon.com/ec2/ and sign up for Amazon EC2. You will need to provide a credit card here, which however will only be charged should you exceed the credits provided as part of Amazon's grant ($100).
- Using the AWS Management Console, launch an instance. Choose an AMI (Amazon Machine Image) (the basic 32-bit Amazon Linux AMI 1.0 is a suitable choice, as may be others). Launch the instance. Create a key pair. Store the .pem file created, you'll need it to log on to the instance. Make sure the .pem file is readable and writable only by you (chmod 600 yourkeyfile.pem will do).
- Create a new security group. A security group includes the required firewall settings to ensure your instance's service will be reachable. By default, only port 22 (SSH) is open. If you wish to run Apache's httpd, add port 80 (HTTP). Launch the instance.
- In the main menu, choose Security Groups, hit refresh. You should see the security group you've just created (with a name such as 'quick-start-1'). Select it and add a port on which to run your service, such as TCP/9011. Make sure you allow access from anywhere by setting the source to 0.0.0.0/0.
- Under My Instances, select your running instance and find its Public DNS name (for instance, ec2-184-73-27-136.compute-1.amazonaws.com). Log on to your instance using ssh like so:

```
ssh -i yourkeyfile.pem ec2-user@ec2-184-73-27-136.compute-1.amazonaws.com
```

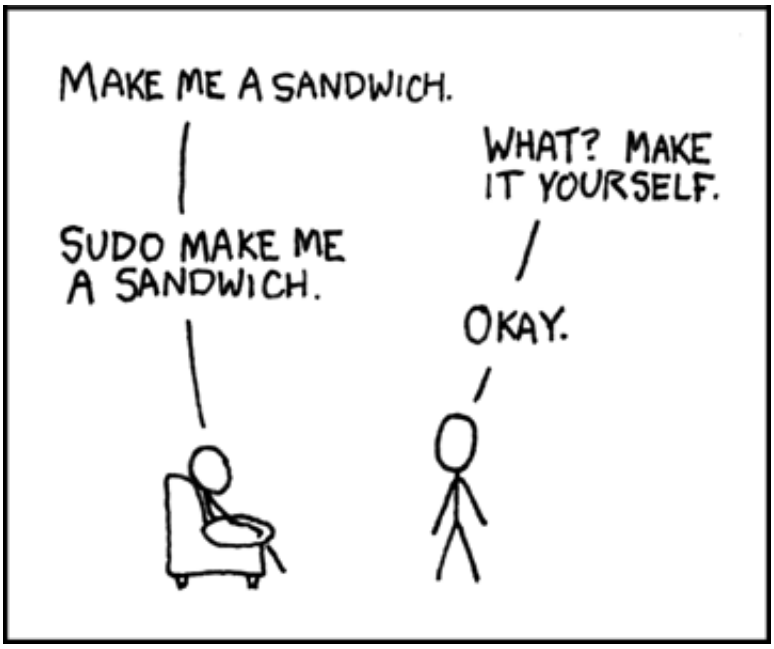

Figure 1: Source: xkcd.com

where yourkeyfile.pem is where you stored your key pair. You should now have shell access to your instance.

- To be able to build your project 5, you may need to install additional tools, such as gcc and svn. If you've used Amazon's Linux AMI 1.0 image, you should be able to use `sudo yum install gcc subversion` to that effect. The sudo command allows authorized users to perform commands that require administrative privileges. (See Figure 1 and sudoers(5).)
- Check out and build your project, and start your server. If everything is set up correctly, you should be able to connect to your public instance. My own instance provides the sysstatd service at ec2-184-73-27-136.compute-1.amazonaws.com:9011/loadavg and ec2-184-73-27-136.compute-1.amazonaws.com:9011/meminfo
- (Optional) Set up a Web Server by installing httpd and starting it with `sudo yum install httpd` and `sudo /etc/init.d/httpd start`. Add content to /var/www/html, for example a page using your web service in a widget ec2-184-73-27-136.compute-1.amazonaws.com
- Send email to teaching staff at cs3214-staff@cs.vt.edu with a URL to your service and/or widget integration.
- When you've received confirmation that we've verified your web service, don't forget to terminate or stop your Amazon instance. Please note that while your instance is running, charges of currently $0.085 per hour (or $2.04 per day) incur until you shut down the instance.

- The instructions above created an ephemeral instance with no persistent storage. If you terminate it, all data will be lost and you will have to repeat all steps, but all charges will stop. If you stop it (rather than terminating it, see AWS console), the data on the boot partition (which includes all files you've installed and/or uploaded) will be retained; a smaller charge of $0.10 per GB/month applies to keep the data of the boot partition of a stopped instance until it is restarted or terminated.
- Feel free to explore. For instance, you could try out Amazon's Elastic Block Store to create persistent volumes that appear as hard drives in your instances.