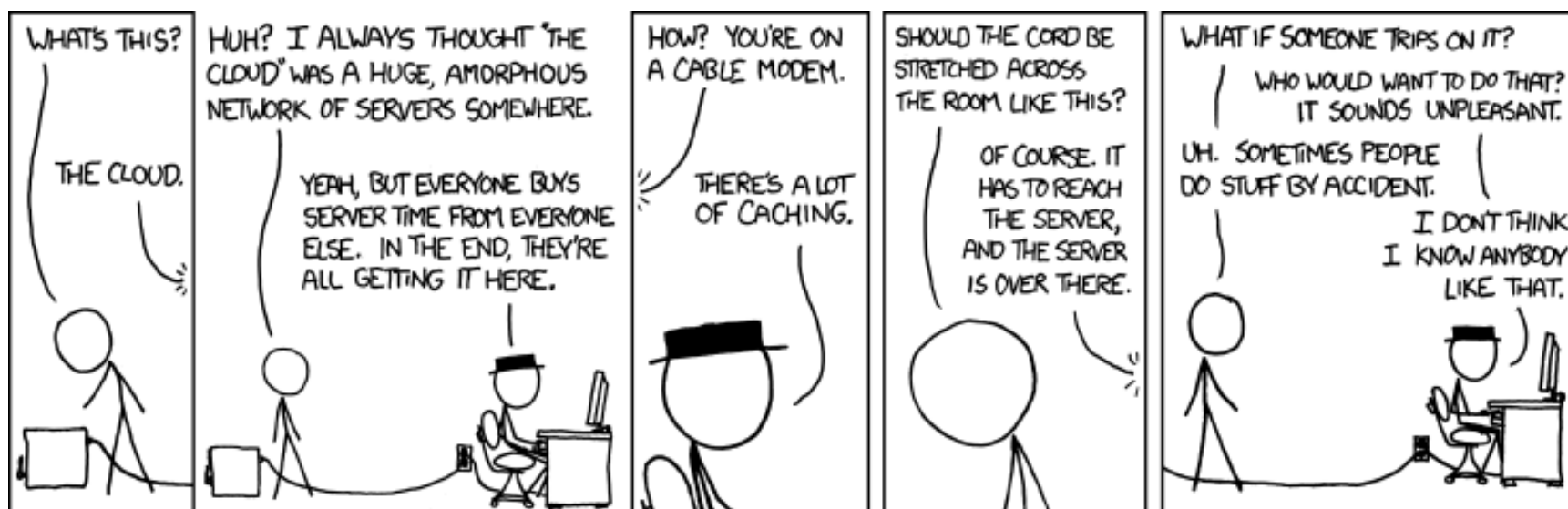# Using the Cloud

Assignments, Setup, and Best Practices

http://xkcd.com/908

Assignments Overview

1. Prepare to use EC2 & Azure

2. Measure the performance of EC2 & Azure services (storage, network, and compute)

3. Run and analyze MapReduce in EC2

4. Evaluate EC2 & Azure content distribution

5. Develop an SDN application to leverage network services

Overview of amazon webservices™

- Elastic Compute Cloud (EC2)—virtual machines with local or EBS-backed storage and basic network connectivity

- Elastic Block Store (EBS)—bulk data volumes; optionally with "Provisioned IOPS"

- Simple Storage Service (S3)—key/value store

- CloudFront—content delivery network

- Virtual Private Cloud (VPC)—virtual network

EC2 Costs

- Covered by AWS in Education Grant
  - $100 in AWS credits
- Covered by Free Usage Tier (per month)
  - Compute: 750 hours of Linux Micro instance + 750 hours of Windows Server Micro instance
  - Storage: 30GB Elastic Block Storage + 2 million IOs
  - Data transfer: 1GB regional + unlimited in + 15GB out
  - Consult website for full list

EC2 Costs

- Charges incurred
  - Compute: Linux VMs in US East $0.02/hour (micro) to $0.64/hour (extra large)
  - Storage (Elastic Block Store): $0.10/GB-month + $0.10/1 million IOs
  - Data transfer: unlimited in + $0.12/GB
  - Consult website for full list

EC2 Best Practices

- **Test with micro instances** – only use larger instances when you know things will work

- **Use EBS-backed VMs** – these can be stopped and started later without loosing files

- **Use a single region**, if possible – avoids the cost of data transfers between regions

- **Write scripts** – eases the time and energy required to repeat tasks later or on other VMs

EC2 Best Practices

- **Clean-up after yourself** – stop or terminate instances, delete EBS volumes, etc.

- **Create AMIs** – install everything you need, then create an AMI and use it for other VMs

- **Allow all traffic** – modify the default security group to accept all ICMP, TCP, and UDP traffic

Overview of Windows Azure

- Virtual Machines—Windows or Linux OS with storage and basic network connectivity

- Storage—bulk data volumes with local or global redundancy

- Cloud/Hosted Services—Platform-as-a-Service for running .Net applications

- Networks—virtual network; VPN to local site

Azure Costs

- Covered by Educator Passes
  - Compute: 2 small instances
  - Storage: 3GB of data + 250,000 transactions
  - Database: Two 1 GB Web Edition databases
  - Data transfer: 3GB in + 3GB out (per region)
  - Hosted services: 1 service + 2 service bus connections + 100,000 access control transactions

Azure Costs

- Covered by Free Trial (per month)
  - Compute: 750 small compute hours (in VMs or cloud services)
  - Storage: 35GB of data + 50,000 transactions
  - Database: 1 unit of Web & Business Editions
  - Data transfer: Unlimited in + 20GB out
  - Services: 10 shared websites + 10 shared mobile services

Azure Costs

- Charges incurred
  - Compute: VMs $0.013/hour (extra-small) to $0.64/hour (extra large)
  - Storage (Locally Redundant): $0.093/GB-month + $0.10/1 million transactions
  - Data transfer: unlimited in + varying price out
  - Consult pricing calculator for full list

Azure Best Practices

- **Test with extra-small instances**
- **Use a single region**
- **Write scripts**
- **Clean-up after yourself** – delete VMs (shutdown saves no money) and disks

Getting Started

1. Decide you will **definitely** be taking the class

2. Email agember@cs.wisc.edu
   - Subject: Cloud Credits
   - Body: CS username

3. Create AWS account
   - You will need to provide a credit/debit card
   - Redeem AWS code

Getting Started

4. Redeem Azure code
   - Create account after code has been approved
   - Switch to Preview Portal (https://manage.windowsazure.com)
   - Sign-up for Virtual Machines Preview

5. Complete Assignment #1

Getting Answers

- Consult EC2 and Azure documentation

- Ask your peers using Piazza

- Email or setup an appointment with Aaron