CS15-319 / 15-619
Cloud Computing

Recitation 6

Sept 30th and Oct 2nd, 2014

Announcements

- The team information form is open until midnight **October 4th** Saturday. You should form teams and submit their information prior to the deadline.

- Checkpoint Quizzes
  - The project checkpoint quizzes are not timed and you have **three** attempts.
  - The unit checkpoint quizzes are timed and you have **one** attempt.
  - Read the checkpoint quiz instructions carefully.

Announcements

- Protect your AWS account!
  - Protect your credentials
  - Do not give anyone access to your account
- Budget Control!
  - Do remember to **TERMINATE** instances, ELB and ASG when you are done
  - You will incur penalties if you spend more than the required budget

Announcements

- **Do not** cheat!
  - Some suspected cases were found
  - We are using various tools to identify cheating
  - You learn nothing when you cheat
- Manual Grading
  - Will be done **one week** after the deadline

Announcements

- Please check the pinned post on Piazza for any updates and changes to this project's write-up
  - P2.3 new AMI
- Ask proper questions on Piazza
  - Search Piazza or the internet (Google) before asking
  - Duplicate questions will be deleted
  - Posting solutions on Piazza will be deleted
  - The TAs will not debug for you, even if a private post
  - AWS SDK doc will answer most of your programming questions

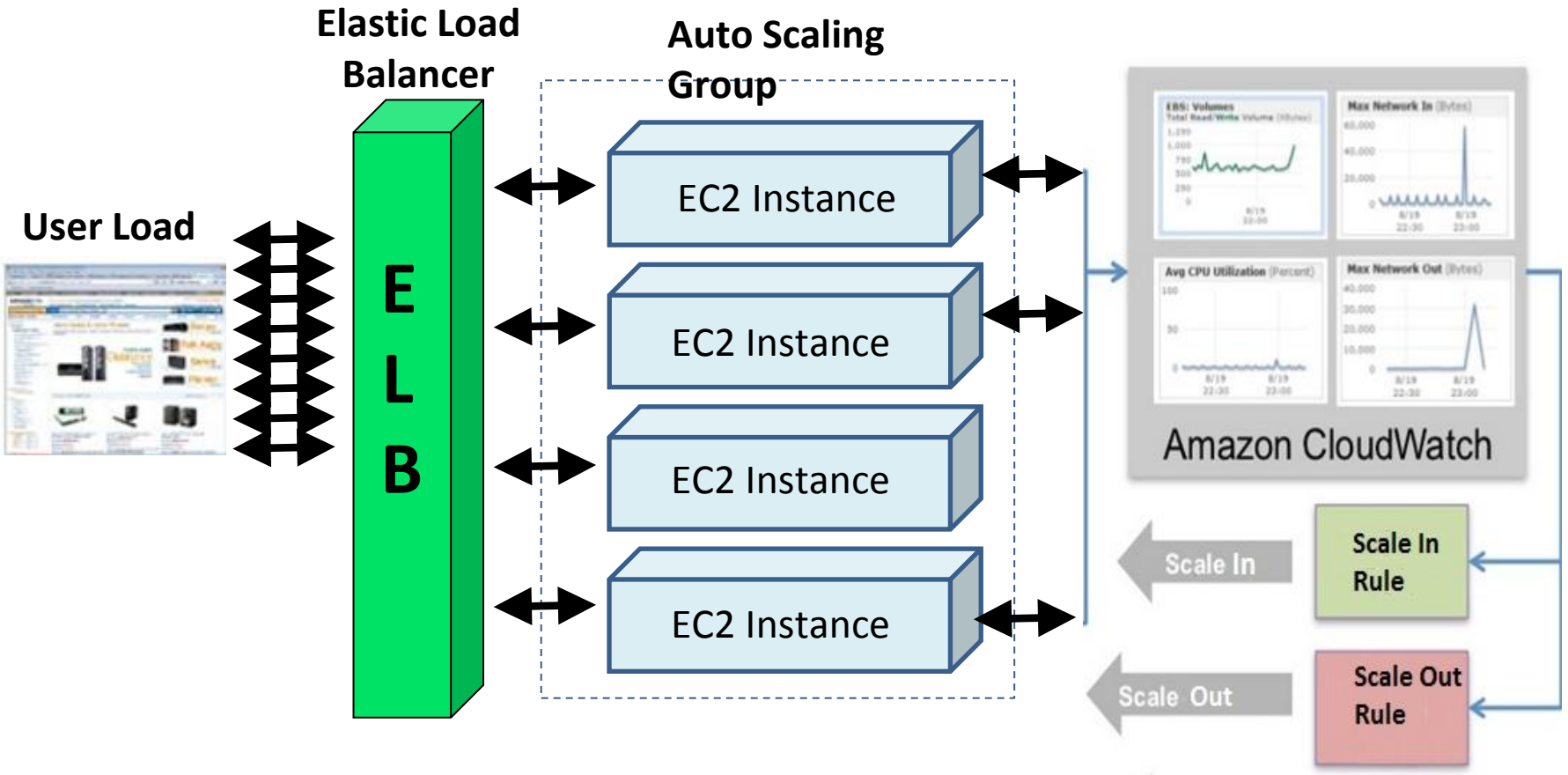
Last Week Review

- Elastic Load Balancing
  - Junior System Architect at the MSB
- Auto Scaling Group

  -- Why is auto scaling useful?
- Cloud Watch

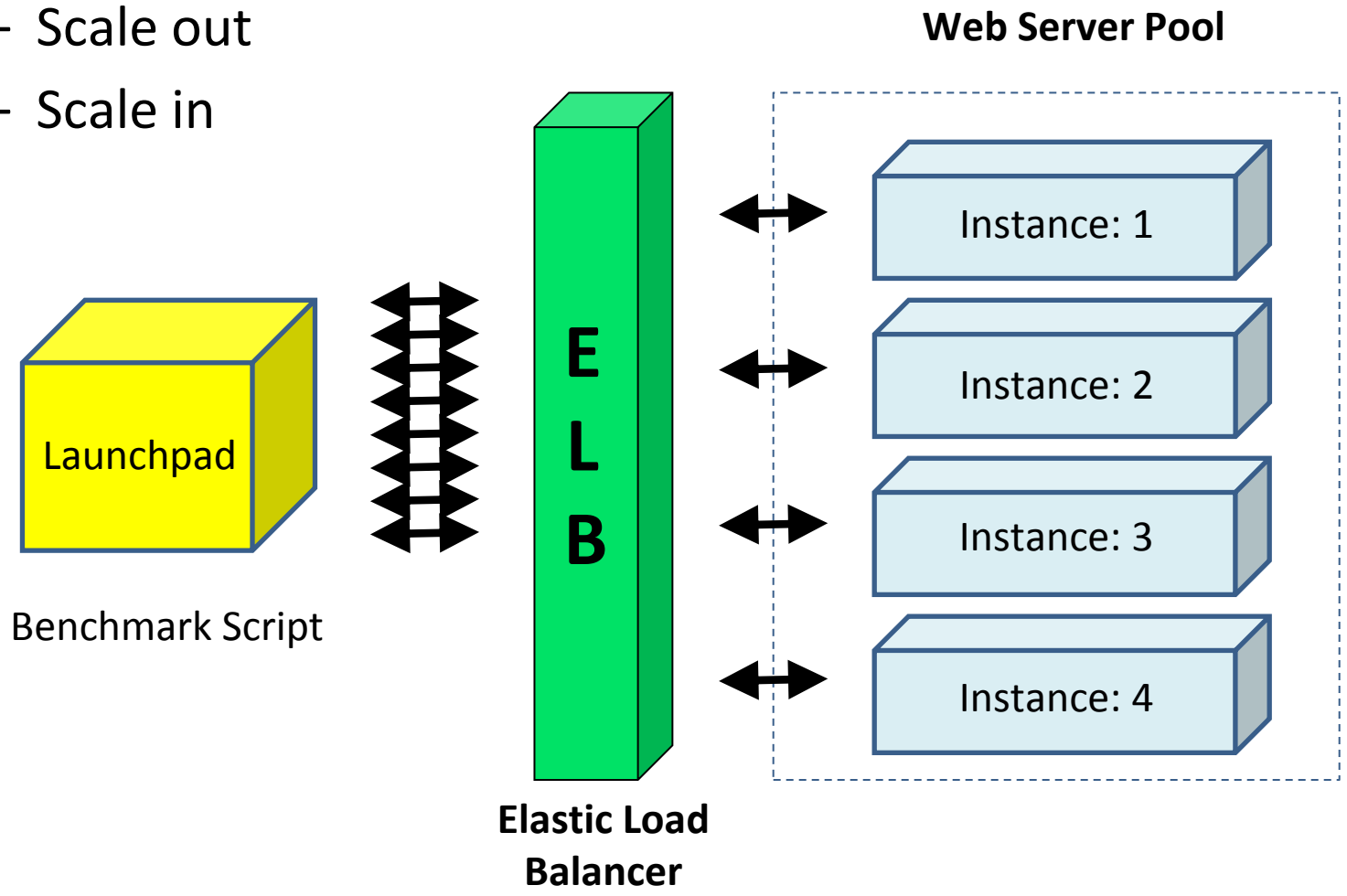
Last Week Review

- Scale Amazon EC2 capacity automatically according to conditions you define



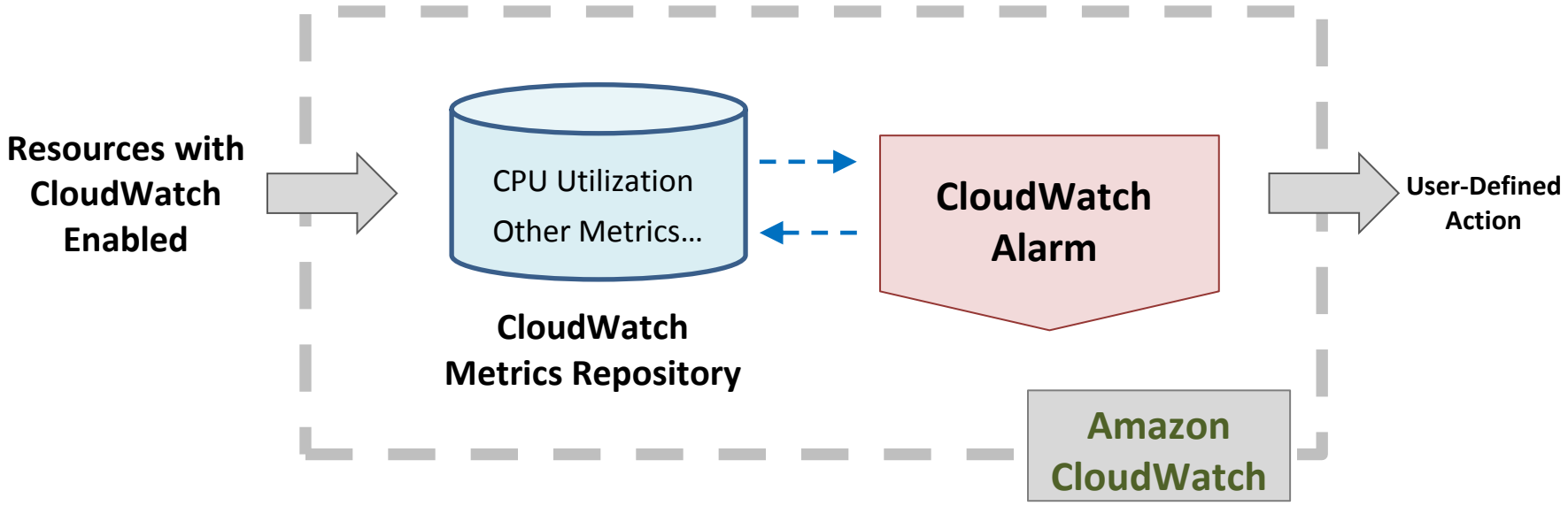
Elasticity

- Horizontal Scaling
  - Scale out
  - Scale in



Amazon's CloudWatch Alarm

- Monitor CloudWatch metrics for some specified alarm conditions
- Take automated action when the condition is met



Piazza Questions

- Do not use t1.micro when running load test (blank results) and t2.micro (does not support our AMI, does not use paravirtualization)
- Some students use too many instances, which causes too much delay at the ELB while dividing traffic
- Choose the correct metrics
  - Network In versus CPU Util

ELB Needs Warming Up

- ELB has a starting point for its initial capacity, and it will scale up or down based on traffic
- It is recommended that the load is increased at a rate of no more than 50 percent every five minutes
- You need to figure out how long the warm up should be, so you can achieve a good performance

Calculate instance-hours

- An instance-hour is the unit of cost when one m3.medium instance is billed for a period of one hour.
- For the purposes of our tests, time-warping makes 1 hour of MSB time correspond to 5 minutes of real time.
- The instance-hours for m1/m3.small/medium/large are based on the on-demand prices.

Calculate instance-hours

Piazza@865

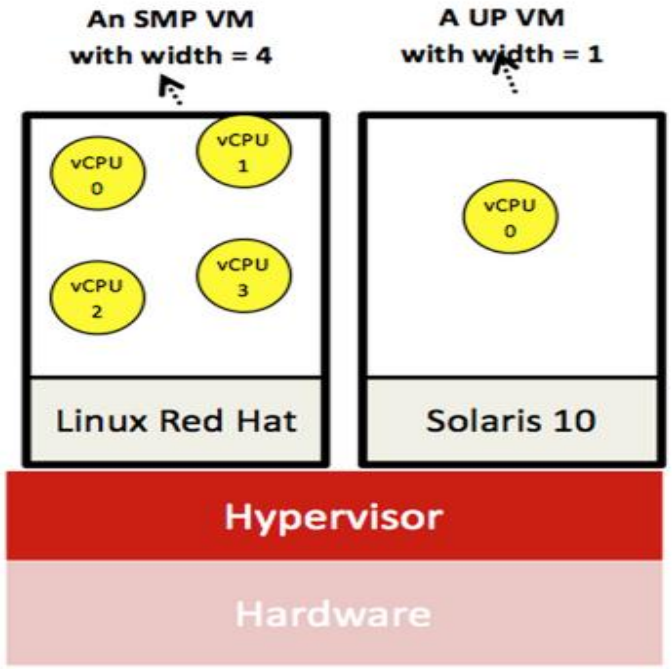
- Take the maximum number of instances running in a 5 minutes window and aggregate them
- Instance hours for the first 40 minutes in the example is: 4+3+3+4+4+4+5+5

Unit 3: Virtualizing Resources for the Cloud

- UNIT 3: Virtualizing Resources for the Cloud
  - Module 6: Introduction and Motivation
  - Module 7: Virtualization
  - **Module 8: Resource Virtualization - CPU**
  - Module 9: Resource Virtualization - Memory
  - Module 10: Resource Virtualization – I/O
  - Module 11: Case Study
  - Quiz 3: Virtualizing Resources for the Cloud

Module 8: Resource Virtualization - CPU

- The Conditions for Virtualizing ISAs
- Full Virtualization and Paravirtualization
- Emulation
- Virtual CPU



This week-Project

- Introduction and APIs
  - MSB Recruitment Exam
- Elastic Load Balancing
  - Junior System Architect at the MSB

- Auto Scaling on Amazon
  - MSB Management Test

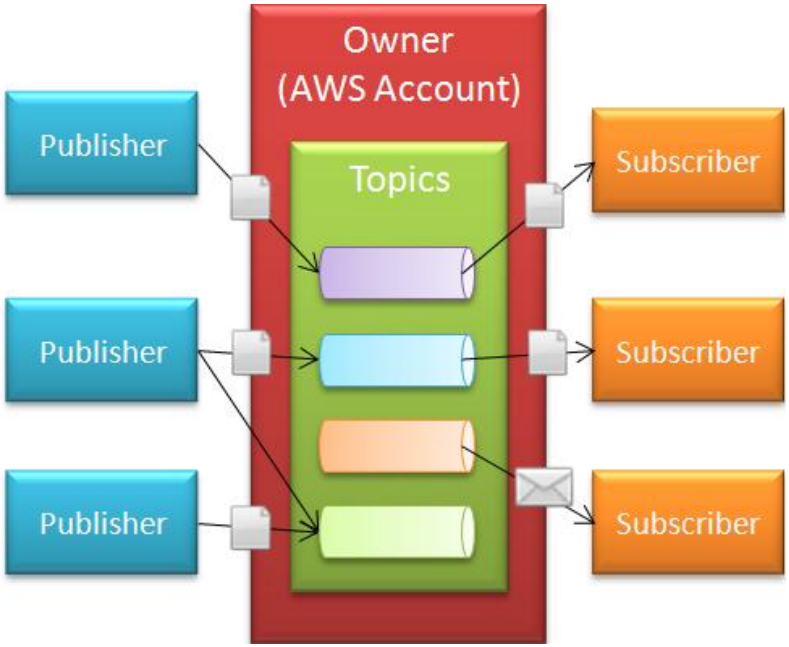
Failure Optimization

- Imagine you have a service that may fail, you have three reactions:
  (1) Monitor the service, to learn when it will fail
  (2) Diagnose the failure and find out the reason
  (3) Optimize the system

- Project 2.3 you will do (1) and (3)

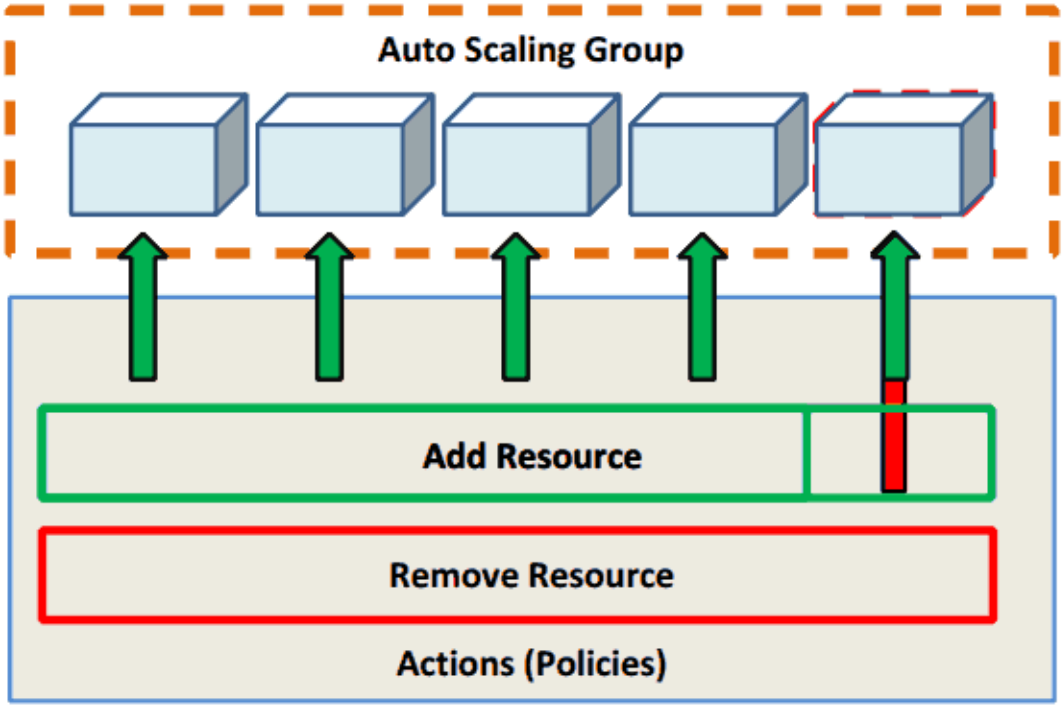
Amazon's SNS

- Simple Notification Service
- Fast and flexible messaging service
- **Publishers** push when certain events happen
- Messages belong to **topics**
- **Subscriber** will **instantly** receive messages from the topic after they subscribe to it



Your Task

- Write a program to create an Elastic Load Balancer (ELB) and an Auto-Scaling Group (ASG) linked to ELB.
- Create CloudWatch Alarms.
- Configure SNS and publish ASG messages to SNS.
- Run the load generator and observe changes.



Highlight of Project 2.3

- You need to figure out which is the best instance type for the test
- Run once with browser only and find out the number of instances first
- In 2.3, instances may automatically shut down, you need to be able to track this

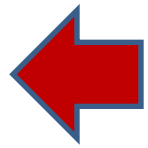
Resources

- Amazon's Auto Scaling Service
  - http://aws.amazon.com/autoscaling/
- Amazon's CloudWatch Alarm
  - http://aws.amazon.com/cloudwatch/
- Amazon's SNS (Simple Notification Service)
  - http://aws.amazon.com/sns/
- Amazon's Scaling Developer
  - http://aws.amazon.com/autoscaling/developer-resources/

Upcoming Deadlines

- Project 2.3 (Due Oct 5 11:59PM Pittsburgh)

AutoScaling on Amazon (Gradebook) (Learning Dashboard)		Opens on 9/29/14 12:01 AM
MSB Management Test	Checkpoint	Not yet available



- Unit 3

Module 8: Resource Virtualization - CPU (Gradebook) (Learning Dashboard)	Opens on 9/29/14 12:01 AM