

15-319 / 15-619

Cloud Computing

Recitation 2

September 7 & 10, 2015

Accessing the Course

- Open Learning Initiative (OLI) Course
 - Access via Blackboard
- <http://theproject.zone>
 - AWS Account Setup
 - Azure Account Setup
 - Updated your TPZ profile with AWS & Azure info
 - Primers
 - Project 0
- Piazza Access

You should have access to

- ✓ Open Learning Initiative Course
 - ✓ Access via Blackboard
- ✓ <http://theproject.zone>
 - ✓ AWS Account Setup
 - ✓ Azure Account Setup
 - ✓ Updated your TPZ profile with AWS & Azure info
 - ✓ Primers
 - ✓ Project 0
- ✓ Piazza Access

Reach out to the instructors over Piazza if you have trouble accessing any of the systems above.

Amazon Web Services (AWS) Account - 1

- Students who are just joining us or who have not completed the AWS Account Setup:

=== ONLY IF YOU HAVEN'T DONE SO ALREADY ===

- Log on to <http://theproject.zone> and make sure you follow the instructions in the Account Setup Primer
- Wait to receive Consolidated Billing Request email from Amazon
 - Manual process, waiting time varies
- Click the link to verify the linked billing
 - Many students have not clicked on the link yet!

Amazon Web Services (AWS) Account - 2

- **ALL STUDENTS:**

- If you have created an AWS account and have not received notification that it was linked to our account
 - Your credit card on file may get charged!
 - We CANNOT reimburse you!!!
 - It is your responsibility to verify that your account is linked to us correctly.
 - Contact us if there are any issues related to your account.
- Check your spam box
 - Let us know ASAP so we can resend the link request.

Microsoft Azure

- Experimental Platform for F15
 - Working closely with Microsoft to iron our bugs
- Please contact us if you have trouble signing up
 - Your token is valid for \$100 per month for 6 months
- Account Linking Issues
 - We don't link your account for billing like we do for AWS
 - Purely monitoring and data collection
- Don't worry if you couldn't link your account
 - Just make sure you can sign in and provision VMs

Azure FAQs

- Q: I signed up for Azure with my *.cmu.edu email. I can't Link my Azure Account!
 - A: We're working with Microsoft to fix this. Continue using the account and working on the projects.
 - Don't sign up for another Azure account.
- Q: I signed up for Azure but the website says I don't have a subscription
 - A: We have a fix: [@115](#)

Piazza

- Suggestions for using Piazza
 - Discussion forum, contribute questions and answers
 - Read the Piazza Post Guidelines ([@7](#)) before asking
 - Read Piazza questions & answers carefully to avoid duplicate ones
 - Give us context and as much information as possible!
 - Don't ask a public question about a quiz question
 - Try to ask a public question if possible
 - Provide your andrew ID if you think we need it to debug
- TA office hours are posted on Piazza and [Google calendar](#)

Piazza Examples:

“I tried doing xyz as per the instructions, but I got some error, what to do?”



Unclear on what the student did



No additional information on the error condition



No indication of any work the student did to find out more about the error



No information on what the student did to try to fix it

“I tried doing xyz as per the instructions, step number 7, but I got a specific error (error code).

I looked through various resources and on google for this error condition, and tried the following fixes: however, I seem to be stuck. Here’s a dump of the error. Can someone help me out?



Clear indication of the exact point where student failed



Additional information on the error (screenshots or text dump)



Indication of the approaches the student took to fix the problem



Solutions or fixes that the student tried

Be clear and concise. Help Us so that we can Help You!

Reflecting on Last Week

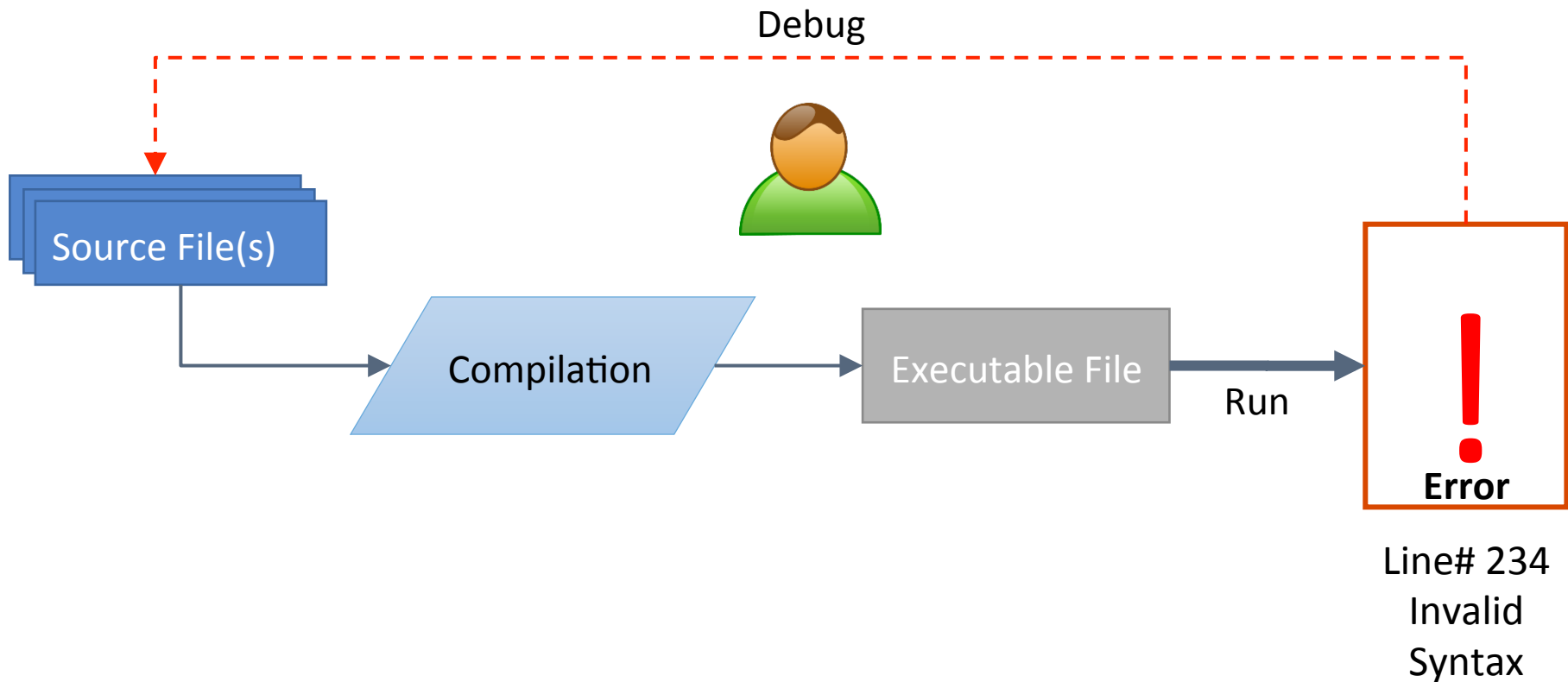
- You should have learned
 - AWS
 - Launching, connecting to and terminating EC2 instances
 - Installing & running software on an EC2 instance
 - How EC2 spot instances work
 - Using S3 to store and retrieve files
 - A Bit of Azure
 - Launching, connecting to and terminating Azure VMs
 - Installing & running software on an Azure VM
 - Basic Linux/SSH skills
 - Running a web server, testing to access the server over a browser
 - Setting up the web server software.
 - Opening up the required ports.

Skill Building in This Course

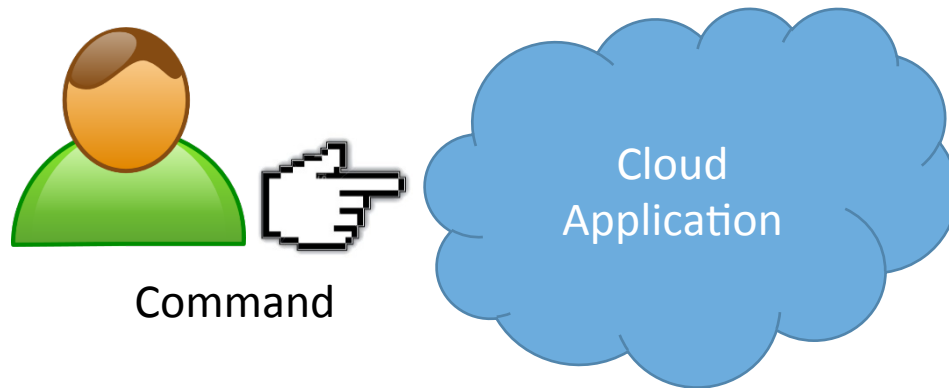
- Complete the Primers
 - Practice working in the Linux Shell
 - Understanding AWS/Azure
 - provisioning resources, connecting to VMs, playing around, ...
- Important Skill in this Course!
 - Reduce your debugging time if you know the environment
 - You can bring down the time taken to complete a project from 10 hours to 5 hours per week

Typical Programming Workflow:

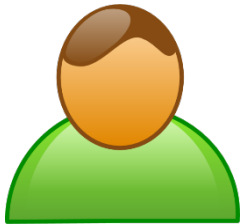
- For most courses:



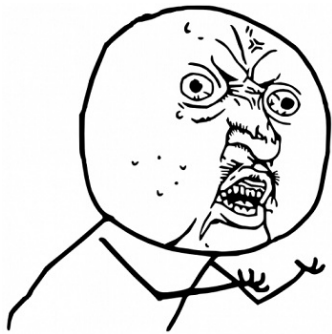
In the Cloud



In the Cloud



In the Cloud

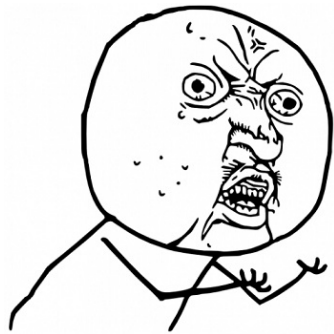


Y U NO WORK?!?

How do I even
begin to fix this?



In the Cloud



Y U NO WORK?!?

How do I even
begin to fix this?

AWS
Instances

Load
Balancers

!
Error

Databases

Front-End
Services

Suggested Error Debugging Workflow

What information can I get about the error?

- Read Error messages, Look through Logs, other information

How can I isolate the source of the problem?

- What component seems to have the problem?

What remedial action can I take?

- The error messages and other information should have clues.
- Configuration changes, command parameters

Am I Still Stuck?

- Google, Piazza, TA Office Hours (In that order!)

Programming Experience Expected

- **Strong proficiency** in at least one of the following, with some fair comprehension of the others:
 - **Java**
 - **Python**
 - **Bash**
- GraphLab uses a bit of C++ in Project 4 (at the end)
- Use the time now to brush up
- Do not fear bash/python scripting, it will make your life easier!

Completing Projects in this Course

- Provision EC2 instances
 - Use the AMIs we provide for the project
 - Launch on-demand or spot
 - Tag the instances!
- Monitor your cost
 - Calculate costs before you provision!
 - Use the EC2 cost explorer to see how much you have spent so far.
- Complete tasks for each project module
 - Each project module has several sections unlocked by AssessMe
- Submit your work
 - Pledge of integrity
 - Results in scoreboard
- Terminate all instances

Tagging

- Tag ***all*** tag-able resources
 - Before you make a resource request, read the docs/specifications to find out if tagging is supported
 - Apply tags during resource provisioning
 - We need tags to track usage, a grade penalty will be applied automatically if you do not tag!
- Tagging Format
 - Project: <Project#>
 - Project#: 0, 1.1, 1.2....etc
 - Information is always present in the project instructions

Budgets and Penalties

- No tags → 10% grade penalty
- Budget
 - For P1.1, each student's budget is \$5
 - Exceeding Budget → 10% project penalty
 - Exceeding Budget x 2 → 100% project penalty (no score)
- We will enforce these penalties automatically starting from Project 1.1
- Plagiarism → the lowest penalty is 200% & potential dismissal
 - Other students, previous students, Internet (e.g. Stackoverflow)
 - Do not work on code together
 - This is about learning
 - Penalty for cheating is SEVERE – don't do it!
 - Ask us if you are unsure.

How to Work on a Budget

- P1.1 Budget → \$5
- You are only allowed to use t2.micro
 - \$0.013 per hour (on demand)
 - Total time you have: 385 hours of t2.micro
- Other Costs to consider:
 - EBS is \$0.1 per GB/month
 - t2.micro has a default of 8 GB EBS attached.
 - Data transfer costs (minimal)
- **Note:** Free Tier does not apply to any of the linked accounts!

Deadlines!

- **Hard Deadlines**

- No late days, no extensions
- Start early!
- Plan your activities, interviews and other commitments around the deadlines.

- **No exceptions!**

- Project modules due every Sundays at Midnight ET
- Quizzes are typically due on Fridays
- Team projects are typically due on Wednesdays

Deadlines!

- **Project deadlines**
 - **On TheProject.Zone**
- **Quiz deadlines**
 - **On OLI**

What's due this week:

- On OLI: Quiz 1

Cloud Computing		
Assignment	Status	
UNIT 1: Introduction to Cloud Computing		
Module 1: Cloud Computing Overview (Gradebook) (Learning Dashboard)		
Module 2: Economics, Benefits, Risks, Challenges and Solutions (Gradebook) (Learning Dashboard)		
Quiz 1: Introduction to Cloud Computing	Checkpoint	Available 9/11/15 12:01 AM Due 9/11/15 11:59 PM

- On <http://theproject.zone>: Project 1.1

Project 1 Big Data Analytics		
Module	Open time	Deadline
Sequential Programming Ongoing	09/07/2015 00:01 -0400	09/13/2015 23:59 -0400

Quiz 1 Preparation

- Tests your understanding in Modules 1 and 2
 - Cloud computing fundamentals, service models, economics, SLAs, security
 - Use the activities in each page for practice.
 - You will be tested on you ability to perform the stated learning objectives on OLI:

Module 1 / Cloud Computing Overview

1

LEARNING OBJECTIVES

Explain the concept of cloud computing	Briefly understand how computing systems across domains dealt with scale before the cloud	Briefly recall the recent history of cloud computing, illustrating its evolution
List some of the enabling technologies in cloud computing, and discuss their significance	Differentiate cloud service models, such as IaaS, PaaS, and SaaS	Enumerate the different types of clouds, and compare and contrast them
List some of the common cloud providers and their associated cloud stacks	Recall popular cloud use case scenarios	

Module 2 / Economics, Benefits, Risks, Challenges and Solutions

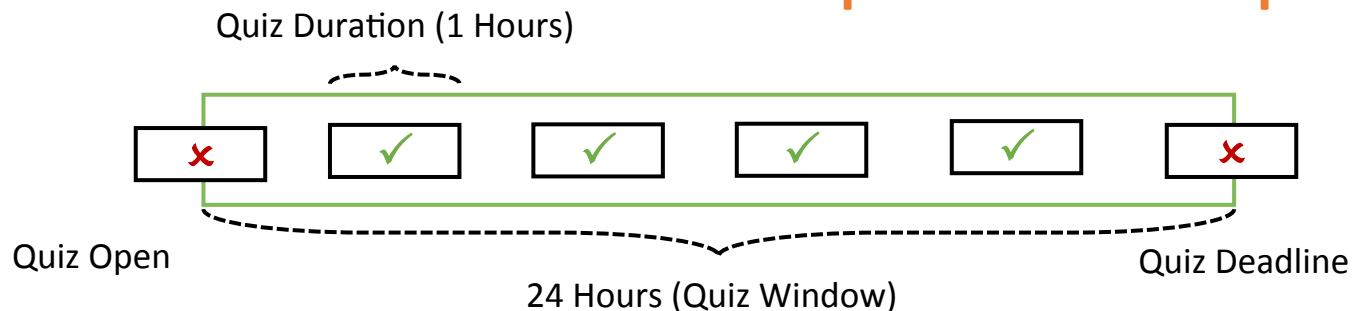
11

LEARNING OBJECTIVES

Discuss some of the advantages and disadvantages of the cloud paradigm	Articulate the economic benefits as well as the issues/risks of the cloud paradigm for users	Articulate the economic benefits as well as the issues/risks of the cloud paradigm for cloud service providers
Define SLAs and SLOs and illustrate their importance in Cloud Computing	Enumerate and explain various threats in cloud security	Enumerate and explain various controls in cloud security

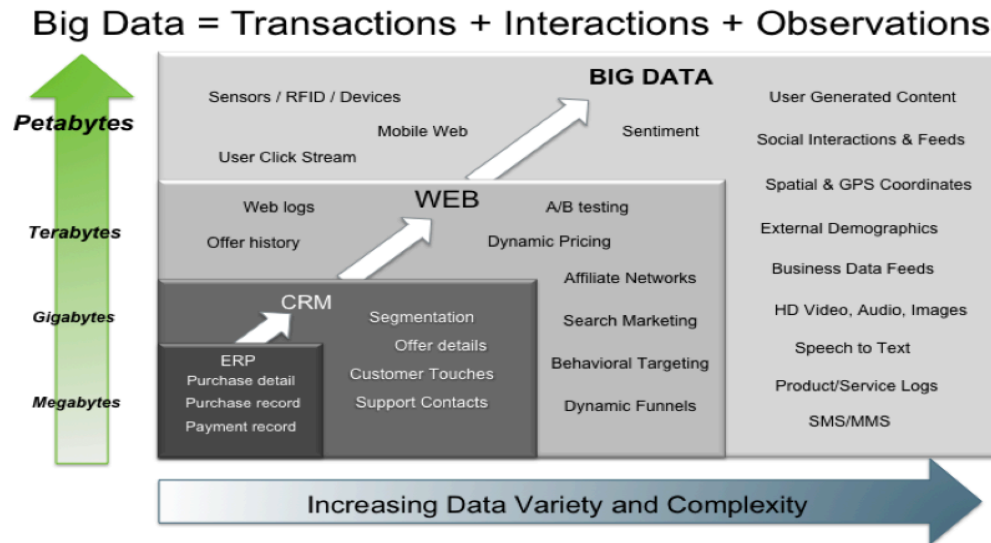
Quiz 1 Logistics

- Quiz 1 will be open for 24 hours, Friday, Jan 23
 - Quiz 1 becomes available on **Sep 11, 00:01 AM EST.**
 - Deadline for submission is **Sep 11, 11:59 PM EST.**
 - Once open, you have **60 min** to complete the quiz.
 - You may not start the quiz after the deadline has passed.
 - Every 15 minutes you will be prompted to save.
 - **Maintain your own timer from when you start the quiz.**
 - **Click submit before deadline passes. No Exceptions!**



Project 1 Motivation: Big Data

- What is Big Data?
 - It is high volume, high velocity, and/or high variety information assets.
 - There is a lot of value in analysis of big data for organizations



Source: Contents of above graphic created in partnership with Teradata, Inc.

Use Cases: Big Data Analysis

- Online retailers are analyzing consumer spending habits to learn trends and offer personalized marketing campaigns and offers to individual customers.
- Companies such as Time Warner, Comcast etc. are using big data to track media consumption habits of their subscribers and trends to provide value-added information to advertisers and customers.

Trending Topics are Everywhere!

TRENDING

- AMBER Alert:** US Facebook users to receive alerts within news feed regarding local missing children
- Dazed and Confused:** Actor Matthew McConaughey's audition tape for 1993 comedy movie surfaces
- Penny Dreadful:** Showtime premieres full trailer for season 2 of horror series
- Mega Millions:** Retired school principal wins \$326 million, biggest prize in New York Lottery history
- Ted Cruz:** Senator, R-Texas, named chair of Subcommittee on Space, Science and Competitiveness
- #KissAGingerDay:** Social media campaign promotes displaying affection toward redheads
- Tim Willcox:** BBC reporter apologizes to daughter of Holocaust survivor for Israel, Palestine comment
- Ashley Furniture Industries:** Chain write off \$1.5 million in customer purchases for Ohio State win
- #PrayForNigeria:** Hashtag campaign takes off on social media in response to Boko Haram attack in Baga
- David Cameron:** WhatsApp, Snapchat could be banned in Britain with prime minister's surveillance plan

Trends · Back to Discover

- #EveryVillainNeeds Promoted
- #ElderlyTVShows
- #OscarNoms
- #Empire
- Lego Movie
- Unfriended
- Pittsburgh
- #KiranBedi
- Xbox One
- #MyLastWordsIn5Words

Trending Now

- Oscar Nominations**
500,000+ searches
Image Source - New York Times (blog)
United States
- Cardale Jones**
100,000+ searches
Image Source - USA TODAY
- Martin Luther King Jr**
100,000+ searches
Image Source - Columbus Dispatch



But Why
Trending
Topics?

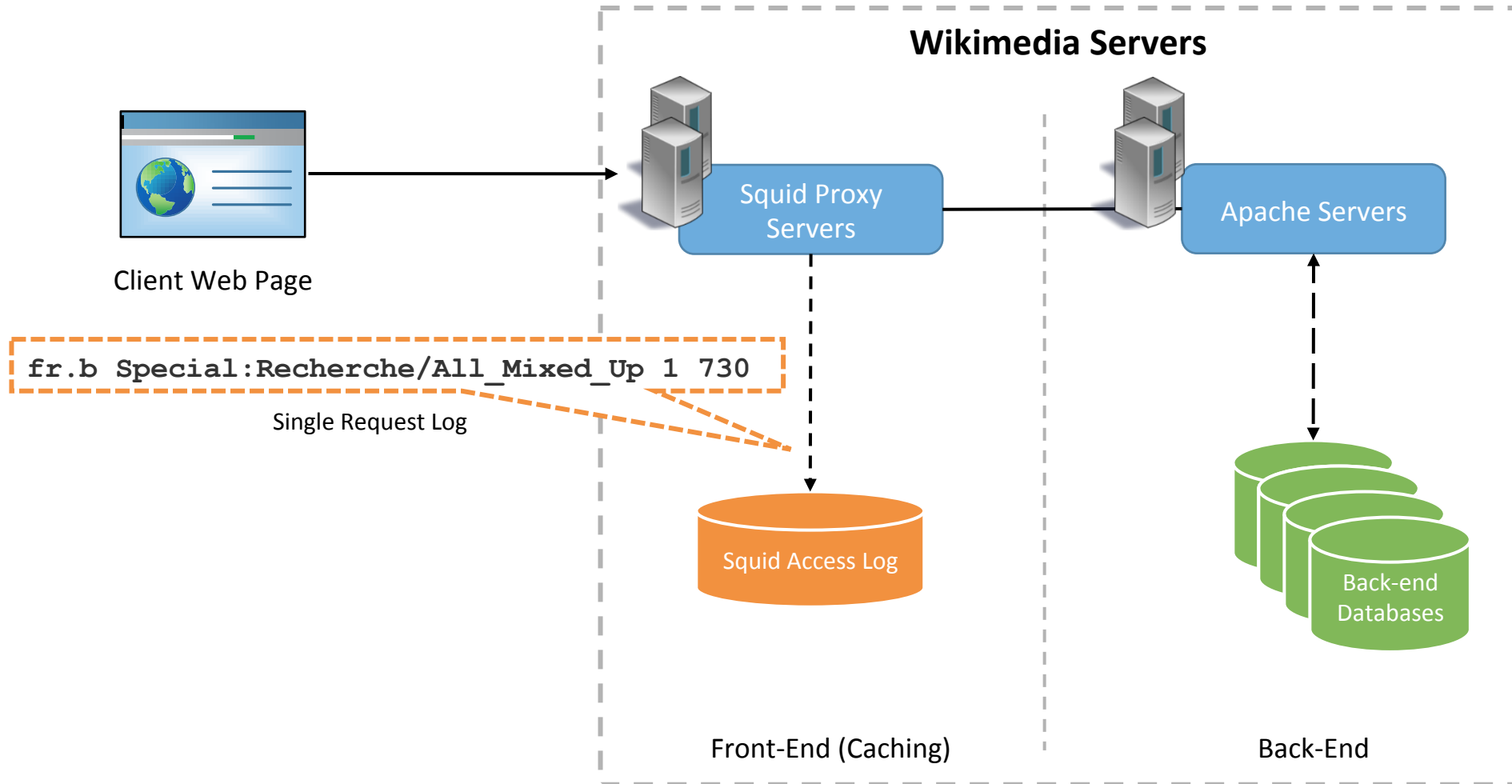
Why Trending Topics?

- Identify trends and viral content
- Maximize ad placement opportunities
- Search Engine Optimization (SEO)
- And more....

Project 1

- Identify Trending Topics on Wikipedia
 - Use the hourly page-view statistics dataset
- Project 1.1: (This Week)
 - Find trends from a single hour of data.
- Project 1.2: (Next Week)
 - Find trends for an entire month.

Wikipedia page requests



The Dataset

- Data set
 - [Wikimedia raw page views data](#)
 - One File Per Hour
- Format:
 - `<project name> <page title> <number of accesses> <total data returned>`



`<Language>.<ProjectName>`
en.b = English Wikibooks
fr.wm = French Wikipedia Mobile

Parse and Filter

- We are only interested in English Wikipedia pages
- Filter out the rest
 - Use the filtering rules specified
 - Remove non-titles (without uppercase)
 - Remove special pages
 - Filter out images and other files
 - If ambiguous or a special case – keep the line
- This dataset is raw, real-world
 - Not always clean
 - Use your own discretion
- Sort the pages by number of page-views

Project 1.1 Workflow

- Launch EC2 instance with a special AMI
- Download the required dataset
- Write the code to parse, filter and sort
- Complete and run the script
 - `/home/ubuntu/Project1_1/runner.sh`
 - Answer 9 questions of increasing difficulty by providing the commands inside `runner.sh`
- Submit your code for grading
 - Complete the references file
 - Execute `submitter.sh` to submit your code

Grading of your Projects

- Code submissions are auto-graded
- Scores will be made available on <http://theproject.zone>
 - Instantly updated on the scoreboard for each project
- We will grade all the code (both auto and manually)
 - Be sure to make your code readable
 - Preface each function with a header that describes what it does
 - Use whitespace well
 - Indent when using loops or conditional statements
 - Use descriptive variable and function names
 - For more detail, please refer to [Google's Style Guide](#)
- If your code is not well documented and is not readable, we will deduct points
 - Documentation shows us that you know what your code does!
 - The idea is also NOT to comment every line of code

Demo