**CS551 Advanced Software Engineering**

Feb. 25 (T), 2014

In-Class Exercise

<http://cloud-computing.findthebest.com/compare/5-15-17-24/Amazon-EC2-vs-Google-App-Engine-vs-Microsoft-Windows-Azure-vs-IBM>

Name:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | **Amazon**  **AWS** | **Google**  **AppEngine** | **Microsoft**  **Azure** | **IBM**  **Smart Business Dev.** |
| Focus | | INFRASTRUCTURE as a service | PLATFORM as a service | PLATFORM as a service | INFRASTRUCTURE as a service |
| Infrastructure & Virtualization Architecture | | OS level running on a Xen hypervisor  EC2- elastic cloud compute | Application container,  Specification provided by Google | At back end server runs in virtual machine in windows Azure and uses .net at front end.  OS level through fabric controller  Hyper-V | Virtual machine instances. Hypervisors |
| Platforms | | Amazon Linux,  Cent OS,  Debian,  Oracle Enterprise Linux,  Red Hat Enterprise Linux,  SUSE Enterprise  Linux,  Ubuntu Linux,  Window Server | Linux operating system, Windows server | Cent OS, Windows server | Red Hat Enterprise Linux, Suse Linux, Windows Server |
| Persistent Storage | | S3- simple storage service  EBS- elastic block storage | Gdisk | Standard application storage | Bulk storage |
| Monitoring | | YES, using Amazon CloudWatch to monitor throughput and I/O sizes | NO | YES, Management pack | YES, IBM Tivoli |
| Load Balancing | | YES, elastic load balancing – extra charge | YES, automatic scaling and load balancing | YES, KEMP azure load balancer | Yes, IBM websphere edge |
| Message Queues | | YES, Amazon SQS  SMS | No | YES, Azure data queues | No |
| Development Tools | | Amazon EC2 API tools, Elastic Load Balancing API tools, Amazon EC2 AMI Tools, Amazon CloudWatch Command line tool | APIs for data storage, Google Accounts, URL fetch, image manipulation and email services | Microsoft.NET, visual studio, Microsoft SharePoint services, Microsoft SQL Services | IBM rational Tools,  Java plug-in for eclipse |
| Integration with other services | | YES | YES, several services like maps, contacts etc are used. | YES, web services also include live services. | Not available |
| Web APIs | | YES | NO | YES | YES |
| Programming  Framework | | JAVA  .NET  PHP  PYTHON  RUBY | PYTHON  .NET  GO  JAVA  PHP | Microsoft.NET  JAVA  NODE  PEARL  PHP  PYTHON  RUBY | JAVA  NODE  RUBY |
| Pricing | Machine | Hourly charge vary from $0.085 (Small – Linux – N. Virginia) to $3.16  (Quadruple Extra Large – Windows – N. California)  $0.14 to $0.154 per hour depending on location | $0.10 per hour of CPU  6.5 hours of CPU time is free. | $0.12 per hour of CPU usage for processing requests | 0.0965 per hour |
| Storage | $0.125 per GB/month | $0.15 per GB per month | $0.15 per GB per month  Storage transactions are charged separately at $0.01 per 10,000  Transactions. | $0.19 per GB/month |
| I/O | $3.850/Hour | $0.08 / hour | $0.072 / hour | $0.125 per hour |
| Bandwidth | Out bound- 0.12$ | $0.10 per GB for incoming traffic.  $0.12 per GB for outgoing traffic.  1 GB of incoming traffic and 1 GB of outgoing traffic is free | $0.10 per GB for incoming traffic.  $0.15 per GB for outgoing traffic. | In bound- 0.15$ per GB  Out bound- $0.15 per GB |