**Cloud Computing Platforms Comparison**

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|  | | Amazon AWS | Google AppEngin | Microsoft Azure | IBM Smart Business Dev. |
| focus | | Infrastructure, targeting Government Agencies, Educational Institutions and public sectors. | Platform and Infrastructure | Infrastructure and Platform | Platform, allowing enterprise and government clients to develop and test. |
| Infrastructure and virtualization architecture | | EC2: Elastic compute cloud upon which you can instantiate 32 or 64 bit Amazon Machine Images (AMIs) or upload your XEN virtual machine images. | Specification provided by Google.  Creating application and servers for end- users so that they can easily deploy on Google and run on it | Servers at back end runs in virtual machines on windows Azure while front end is in .net servers can be customized according to your specifications. | Virtual Machine Instances – multiple sizes for 32 and 64 bit architectures.  Consumed via self service or managed service.  It is a private which can enjoy the benefits in secure environment. |
| Platforms | | IAAS.(Infra structure as a service)  Linux and Windows servers | PAAS(platform as a service).  Language Specific | IAAS.(Infra structure as a service)  PAAS(platform as a service)  Microsoft Server 2008 | IAAS.(Infra structure as a service)  Redhat, SUSE and Windows |
| Persistent Storage | | EBS: Elastic Block Storage,  S3: Simple Storage Service. | Google Cloud Storage.  Gdisk – bulk storage. | Standard Application Storage .  Uses Azure SQL database in virtual machines, free to run NoSQL tools such as MongoDB and Casandra. | IBM Persistent Storage , Blue Mix and Web Sphere. |
| Monitoring | | Cloud watch | App Engin System Status Dashboard.  Monitoring API | MP – Management Pack  Azure management portal makes the monitoring done. It can be set to minimal and verbose for each service role. | IBM Smart Cloud Monitoring used for monitoring health and performance of cloud infrastructure. |
| Load Balancing | | ELB: Elastic Load Balancing | Google Compute Engine , (gcloud – command line interface) | Their two levels of load balancing   1. DNS level which uses round robin and traffic manager methods 2. Network level –done with Azure load balancer. | Load balancing achieved by Hadoop MapReduce and virtualization. |
| Message Queues | | SQS: Simple Queue Service . It which is a fast, reliable service.. SQS makes it simple and cost-effective.  SMS: Simple Message Service. | Push Queues. (these are written in Java)  Task Queues and pull Queues | Azure Data Queues. Service Bus Queues | Web sphere and Soft Layer Message Queues |
| Development Tools | | Web console, Command line API’s for all Services, SDK’s for Java, PHP, Rails & Python, and several Eclipse plugins. | Java plug-in for Eclipse and Python software development kit (SDK) | Visual Studio and SDK for .NET  Azure SDKs, Azure Powershell command line tools for management and deploying activities. | Java plug-in for Eclipse , IBM Domino Designer, Connector for SAP solutions, Expeditor, Workflow, Enterprise Integrator for Domino |
| Integration with other services | | All services are designed to work together like the pieces on chessboard., Dynamo DB is integrated with other AWS | A number of API’s available like maps, contacts , calendar etc. | Large number of .NET services including line services. Microsoft Azures Biz Talk Services. | Sandbox, Open clove ,CRM |
| Web APIs | | Yes | Yes | Yes | Yes |
| Programming Framework | | Amazon Machine Images (AMIs)  NET, Java, PHP, Python  Ruby Rails | Python | Microsoft .NET, Java, PHP, Python, Ruby Rails | Java , Node.js and Ruby |
| Pricing | Machine CPU | Pricing depends on the location.  $0.100 /GHz/hr | $0.100 /GHz/hr | $0.150/GHz/hr | $0.10/GHz/Hr |
| Storage | $0.25 /GB/Month | $0.150/GB/Month | $0.150/GB/Month | $0.150 /GB/ Month |
| I/O | $0.01 / 1000 Write operations and $0.001 for 1000 Read operations | $0.01 / 1000 Write operations and $0.001 for 1000 Read operations | $0.01 / 1000 Write operations and $0.001 for 1000 Read operations | $0.01 / 1000 Write operations and $0.001 for 1000 Read operations |
| Bandwidth | $0.10 / GB for incoming and $0.15 for outgoing traffic | $0.10 / GB for incoming and $0.152for outgoing traffic | $0.10 / GB for incoming and $0.15 for outgoing traffic | $0.10 / GB for incoming and $0.15 for outgoing traffic |

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