**Report on**

**Cloud Computing Platform Comparisons**

**Submitted by,**

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|  | | **Amazon AWS** | **Google App Engine** | **Microsoft Azure** | **IBM Smart Business Dev.** |
| **Focus** | | Public Sector | Rapid Development and deployment  Public Cloud | Public Cloud | Hybrid Cloud  Private and Fast |
| **Infrastructure and virtualization architecture** | | Uses AWS Connect, XEN Para-Virtualization Architecture.  Application launch is flexible | Google Computing Engine is used as infrastructure for virtualization. | Hyper-V virtualization on Azure Compute infrastructure. Azure Express route is used. All the VMs are managed by Fabric controller. | IBM Cloud Computing Reference Architecture is used. For virtualization, IBM offers IBM WebSphere application infrastructure solutions. |
| **Platforms** | | IAAS | PAAS | PAAS , IAAS | IAAS |
| **Persistent Storage** | | Elastic Block storage, Dynamo | MySQL using Cloud, standard application storage | AZURE SQL Database | Bulk Storage. |
| **Monitoring** | | Amazon Cloud Watch | Google Cloud Monitoring | Verbose, Load balancer, AZURE Ops | IBM Smart Cloud |
| **Load Balancing** | | Elastic Load Balancing | Google compute Engine | Azure load Balancer | Elastic Load Balancing |
| **Message Queues** | | Single Queue | Push Queue is used to share information. | Azure Data Queue. | IBM Web Sphere, Soft layer message queue. |
| **Development Tools** | | AWS Management Console  AWS Toolkit for Eclipse  AWS Toolkit for Microsoft Visual Studio. | Eclipse, Netbeans, IntellIJ, Maven, Git, Jenkins, Google Web Toolkit (GWT),  GAE SDK for python. | SDKs for Java, Node.js, PHP, Ruby, Python. Azure command-line interface;  Azure PowerShell. | IBM Domino Designer.  IBM Smart Cloud Application Services.  IBM Pure Application Systems.  IBM Smart Cloud Provisioning. |
| **Integration with other services** | | Dynamo DB. Simple Storage Service and EC2. Easily integrated with other services. | API’s available like Maps, Contacts, Calendar, etc. Integrate other familiar technologies such as Node.js, Scala, Hadoop, MongoDB etc. | .NET services including live services. Integration with many SaaS. BizTalk Services | Sandbox, CRM.  Live chat, Phone. |
| **Web APIs** | | Yes  EC2 API, Java etc. | Yes  Blob Store API, Mail API. | Yes  .NET web API, ASP .NET API. | Yes  REST Java API. |
| **Programming Framework** | | .NET, Java, PHP, Python, Ruby. | Go, Java, PHP, Python. | .NET, Java, Node, PHP, Python, Ruby. | Java, Node, Ruby. |
| **Pricing** | Machine CPU | 0.14/hour | $0.10/hour | $0.12/hour | $0.10/hour |
| Storage | $0.25/GB/ month | $0.18/GB/ month | $0.15/GB/month | $0.15/GB/month |
| I/O | $0.01/1000 requests | $0.02/1000 requests | $0.02/1000 requests | $0.01/1000 requests |
| Bandwidth | $0.10/GB | $0.10/GB | $0.10/GB | $0.10/ GB |

**References:**

1. Amazon web services: <https://aws.amazon.com>
2. Google App Engine: [https://**appengine**.**google**.com/](https://appengine.google.com/)
3. Microsoft Azure: <https://azure.microsoft.com>
4. IBM Smart Business: [www.**ibm**.com/**cloud**-computing/us/en/](http://www.ibm.com/cloud-computing/us/en/)