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Computer and systems engineering

Distributed Systems – Assignment No. 4

Examples of cloud computing infrastructure

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Section 3

Amazon EC2

1. Cloud services provided
   EC2 encourages scalable deployment of applications by providing a web service through which a user can boot an Amazon Machine Image to configure a virtual machine, which Amazon calls an "instance", containing any software desired. A user can create, launch, and terminate server-instances as needed, paying by the hour for active servers - hence the term "elastic". EC2 provides users with control over the geographical location of instances that allows for latency optimization and high levels of redundancy

2. Level of virtualization used

Linux Amazon Machine Images use one of two types of virtualization: paravirtual (PV) or hardware virtual machine (HVM). The main difference between PV and HVM AMIs is the way in which they boot and whether they can take advantage of special hardware extensions (CPU, network, and storage) for better performance.

3. Typical tenant requirements profile

BIG-IQ Cloud integrates with three different Amazon Web Services: Amazon EC2, Amazon CloudWatch, and BIG-IP Virtual Edition deployed in managed Amazon Virtual Private Cloud (VPC). For proper communication to devices located in an Amazon web service, BIG-IQ Cloud you must configure an outbound self IP address to DNS and NTP, and you must define a network route between the BIG-IQ Cloud internal VLAN and the public Internet, or the Amazon web services endpoint. For specific instructions, refer to *BIG-IQ System: Licensing and Initial Setup* and your Amazon documentation.

a- Creating an Amazon Identity and Access Management (IAM) user account

b- Creating a Virtual Private Cloud

c- Launching a virtual server with an Amazon Machine Image (AMI)

d- Configuring an EC2 cloud connector

e- Creating a BIG-IP VE version 11.5 or later in the Amazon EC2 cloud

f- Creating a BIG-IP VE version 11.3 or 11.4 in the Amazon EC2 cloud

g- Creating a customized application template

h- Deploying applications

i- Setting up tenant access using IAM

j- Viewing activity for cloud resources

EMC2 Atmos

1- Cloud services provided

Cloud storage services platform that can be deployed as either a hardware appliance or as software in a virtual environment. And object storage architecture designed to manage petabytes of information and billions of objects across multiple geographic locations as a single system.

Atoms can be used as data storage for custom or packaged applications using either a REST or SOAP data API, or more traditional storage interfaces like NFS and CIFS. It presents a single unified namespace or object-space, stores information as objects (files +metadata), and manages information by user or administrator-defined policies

2- Level of virtualization used

EMC Virtualization technologies & Integration - EMC offerings feature virtualization and integration technologies. EMC arrays support SMI-S, VMware vStorage APIs (VAAI) and vCenter plug-ins enabling EMC storage to be provisioned from VirtualCenter with VM granularity and functionality to offload tasks from the virtual machine. EMC storage integrator for Microsoft windows (ESI) provides the ability to provision VMAX and VNX block and file storage for Windows and SharePoint sites, as a standalone tool or MMC snap-in. EMC storage is also Citrix Ready.
Virtual I/O - EMC storage and Connectrix networks provide multiple connectivity including iSCSI, FC and converged networking (FCoE). EMC Powerpath provides resilient multi-pathing across IP and SAN networks to the EMC and third party storage arrays. This provides the ability to manage the pathing through the network, enables non-disruptive storage migrations and copying, and data encryption with EMC RSA Key Manager.
Virtual Provisioning - EMC arrays support virtual provisioning - where the array presents storage capacity to a host, but consumes space only as needed from a shared pool. This lowers total cost of ownership (TCO) by reducing initial over allocation of storage and simplifies management by reducing the management needed to support growth. Features like "zero space re-claim" enable unused capacity to be restored back to the pool.

Microsoft Azure

1- Cloud services provided
   - Popular services
   a- App Service
   b- SQL Database
   c- Virtual Machines

1	Services
1.1	Compute
1.1.1	App services
1.1.1.1	Websites
1.1.1.2	WebJobs
1.2	Mobile services
1.3	Biztalk Services
1.3.1	Cloud services
1.3.2	Virtual machines
1.4	Big Compute
1.4.1	Batch
1.4.2	HPC Pack
1.4.3	Scheduler
1.4.4	Remote App
1.5	Storage Services
1.5.1	Table Service
1.5.2	Blob Service
1.5.3	Queue Service
1.5.4	File Service
1.6	Data management
1.6.1	SQL Database
1.6.2	Azure Search
1.6.3	Document DB
1.6.4	Redis Cache
1.6.5	StorSimple
1.7	Business Analytics
1.7.1	HDInsight
1.7.2	Azure Machine Learning
1.7.3	Stream Analytics
1.7.4	Data Catalogue
1.7.5	Data Factory
1.8	Identity
1.8.1	Azure Active Directory

2- Level of virtualization used

Windows Azure virtual machines constitute the infrastructure as a service (IaaS) offering from Microsoft for their public cloud. Virtual machines enable developers to migrate applications and infrastructure without changing existing code and can run both Windows Server and Linux virtual machines. It was announced in preview form at the Meet Windows Azure event in June 2012. Customers can create virtual machines, of which they have complete control, to run in Microsoft's data centers. As of the preview the virtual machines supported Windows Server 2008 and 2012 operating systems and a few distributions of Linux. The General Availability version of Virtual Machine was released in May 2013.

3- Typical tenant requirements profile

Have an existing Office 365 subscription

Have an existing Azure subscription associated with a Microsoft Account

Have an existing Azure subscription associated with an organizational account

Have none of the above & want to start from scratch

Google App Engine

1- Cloud services provided

Compute: Compute Engine- App Engine - Container Engine

Storage: Storage – Bigtable – Datastore - SQL

Networking: Load Balancing – Interconnect - DNS

Big Data: BigQuery – Dataflow – Dataproc – Datalab - Pub/Sub

Services: Translate API - Prediction API - Endpoints

Management: Deployment Manager – Logging – Monitoring.

Google App Engine supports apps written in a variety of programming languages.

- **Java:** Using App Engine's Java runtime environment, you can build your application using standard Java technologies.
- **Python:** App Engine features a fast Python interpreter and standard Python libraries.
- **PHP:** App Engine uses Google's Cloud Platform services under the hood when you call standard PHP functions.
- **Go:** App Engine features a Go runtime environment that runs natively compiled Go code.

2- Level of virtualization used

Machine Types:

Machine types determine the virtualized hardware resources available to your instances, such as the amount of memory, virtual CPU, and persistent disk limits an instance will have. A single virtual CPU maps to a single hardware hyper-thread on the host CPU running your instance.

There are two categories of machine types: predefined and custom machine types. Predefined machine types have a preset number of vCPUs and memory.

Predefined machine types are divided into different classes, and are managed by Google Compute Engine. Each machine type has its own pricing and is billed separately. For pricing information, review the price sheet.

Available machine types include:

Standard machine types

High-CPU machine types

High-memory machine types

Shared-core machine types

3- Typical tenant requirements profile

To get started...

Download the SDK.

Sign up for an account.

Read the getting started information for your language.

Check out the rest of the App Engine documentation.