Mod-07 Lec-43 Cloud Service Providers

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Hello and welcome back. In this lecture, I will introduce you to some popular cloud service providers. I will talk about Google App Engine, which is a leading provider of cloud services for application development and I will also talk about Amazon Web Services, which is one of the earlier players in cloud computing landscape.

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Cloud Computing

SERVICE PROVIDERS

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Commercial providers



- Amazon Web Services (AWS)
 IaaS, PaaS
- Microsoft Azure
 - IaaS, PaaS
- Google
 - IaaS, PaaS, SaaS
- Several other providers: RackSpace, IBM, Yahoo etc.

So let's start by looking at the commercial providers of various cloud services. We have Amazon Web Services, Microsoft Azure and then Google provides several of cloud services. Most of these providers offer all the three basic variants of services that is Infrastructure as a Service, Platform as a Service and Software as a Service and of course there are several other players such as RackSpace, IBM, Yahoo etc., which provide different services, different cloud based services.

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On the open source space there are several projects which allow you to set up an in-house cloud that is a private cloud where you may configure different services such as Infrastructure as a Service. So all of these projects, which I have highlighted here, like OpenNebula, Nimbus, Eucalyptus, OpenStack etc., they're typically used for setting up IaaS clouds.

AppScale is an open source project, which provides necessary software infrastructure for you to set up a Google App Engine like PaaS platforms in-house.

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laaS provider: AWS



- One of the earliest cloud services provider

 Compute, storage, networking, applications etc.
- Has datacenters in several geographies

 North America, Europe, Asia
- Offers excellent tooling support

 For admins as well as developers

As I said Amazon Web Services is a Infrastructure as a Service provider and it is one of the earliest players in the cloud computing space and it has data centers across different geographies such as North America, Europe and Asia and it offers excellent APIs and tooling support for the cloud users so that they can make use of Amazon Web Services.

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PaaS/SaaS provider: Google

- Started with PaaS/SaaS offerings
 - Google App Engine (PaaS platform)
 - Develop web accessible applications
 - Deploy on Google managed platform
 - Google Apps (SaaS)
 - Enterprise productivity applications suite
 - Email, collaboration applications etc.

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Google is another provider, which started with mainly PaaS and SaaS offerings. Google App Engine was their initial offering. Google App Engine is a PaaS platform, which allows the

developers to build web accessible applications and Google Apps basically is a suite of productivity applications, which different enterprises may subscribe to such as for email, collaboration etc.

Just to give you an idea about what different services are available from both Google and Amazon Web Services, I will be showing their respective portals.



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So Google provides a variety of services, cloud services. They provide the core infrastructure services such as Compute Engine. Then you have application development using App Engine. It's a PaaS platform.

Further down you have various types of storage services available ranging from SQL-based fully MySQL database to NoSQL instances using their cloud storage. Then you have various networking services such as Load Balancing, Interconnect through VPNs etc., and then DNS services.

Then further along they have Big Data related services available on their cloud infrastructure. Further they offer specialized services through the APIs such as Prediction API, Translate API etc. And then finally to allow managing your cloud subscriptions, cloud service subscriptions, they offer various other services for the management purposes. And then associated development tools are also provided. So they provide quite a comprehensive solution if you want to use different cloud services.

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Then we have Amazon Web Services. Amazon also provides a variety of different cloud services.

So I'm going to show you how a typical console, Amazon Web Services console looks like when you have subscribed to their cloud services. So I have got an account with them. So I will just try to log on to that account. I have enabled multi-factor authentication. That is what is prompting me to enter another code. So I have entered this code and it should log on.

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Okay. So after I successfully log on, authenticate with the Amazon Web Services console, I see all the services that is available to my account. So you see here Amazon provides Elastic

Compute. Then you have various storage services here and database services, networking and so on and so forth.

I will demonstrate launching of a virtual machine. A virtual machine can be launched through EC2 that is Elastic Compute cloud.

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Security Groups Elastic IPs Placement Groups Load Balancers Key Pairs Network Interfaces # AUTO SCALING Launch Configurations Auto Scaling Groups	US West (Oregon): This service is operating normally Availability Zone Status: Us-west-2a: Availability zone is operating normally Us-west-2a: Availability zone is operating normally Us-west-2a: Availability zone is operating normally	No events		Or by these popular AMIs: Vyata Virtual Router Pinewall VPN Provide by Vyata, Inc. Rating	

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So this is after I go to EC2 dashboard, it shows the summary of all my resources. So I have two instances running. There are 11 volumes, disk volumes and 12 key pairs created and 1 elastic IP. So let's look at the existing instances. That is existing virtual machines that are running on my account.

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		i-3067bcc6	t2 micro		us-west-2b	stopped		None	2	
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		i-9d62b390	c4.large		us-west-2a	stopped		None	2	
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So this is how typically it looks like. So once you click on the name of an individual instance, you can see the details of that instance underneath here.

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So let's try to launch a new instance. So after I clicked on the launch new instance button, it takes me to multi -- it takes me through multiple steps right from choosing the Amazon Machine Image, AMI to choosing the instance type, then configuring the instance, adding some storage, putting any meta information such as tagging that machine and I'm putting some security setup on this. Finally, after I review all the settings, I can finally launch that particular virtual machine.

So let's pick some Amazon virtual machine image here. So there are a variety of them. So let's put a Ubuntu -- so let's try to launch a Ubuntu Server instance. I will select that.

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ep 2 azon EG	Choose an Instance provides a wide selection of ins a flexibility to choose the appropria	tance types optimized to find the mit of resources for yo	t different use cases. Instanc ur applications. Learn more	es are virtual servers that o about instance types and h	can run applications. They have varyo ow they can meet your computing ne	ng combinations of CPU, memory, store eds.	age, and networking capacity, and
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urrent)	selected: 12.micro (Variable EC	Us, 1 vCPUs, 2.5 GHz, Int	al Xeon Family, 1 Gi8 memo	ry, EBS only)			
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	General purpose	t2.small	1	2	EBS only		Low to Moderate
	General purpose	t2.medium	2	4	EBS only		Low to Moderate
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So in this step it is asking me to choose the type of virtual hardware that my virtual machine should have. So here you see a variety of options such as micro, small, medium, large and so on and so forth. Each one of those differ in terms of how many virtual CPUs does it have, how many gigabytes of memory is attached to it, and what is the type of instance storage that is virtual machine's storage attached to that virtual machine and so on.

So let us go by the default. I will pick that micro instance. Let's go to the next step.

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Instance Type	3. Co	enfigure Instance 4 Add Storage 5 Tag Instance 6	Config	gure	e Security Group	7. Revie						
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asing option	1	Request Spot Instances							13	-	1	
Network	1	vpc-04993161 (172.31.0.0/16) (default)	• •	3	Create new VPC				1/A	5		
Subnet		No preference (default subnet in any Availability Zon	٠		Create new subn	net						
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IAM role	1	None	• •	3	Create new IAM	role	30		27			
wn behavior	۲	Stop	•					1100	1. 44			
n protection	۲	Protect against accidental termination										
Monitoring	1	Enable CloudWatch detailed monitoring Additional charges apply.										
Tenancy	١	Shared tenancy (multi-tenant hardware) Additional charges will apply for dedicated tenancy.	٠									
i												
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Here I can further configure, further specify various details such as number of instances I want to launch. I just want to launch one instance at this time and then there are various roles, security specific things, what should happen on the shutdown and so on and so forth.

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1. Choose AM Step 4: Add Your instance will b edit the settings of storage options in A	2 Choose Instance Type Storage e Isunched with the fo the root volume. You o kmazon EC2.	3 Configure Instance Rowing storage device an also attach eddition	4. Add Storage 5. settings. You can attact al EBS volumes after la	Tag instance 6. Configure Secur h additional EBS volumes and in unching an instance, but not ins	nty Group Instance store tance store v	7. Review volumes to your instance, or rolumes. Learn more about			
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Then I go to the next step. I review the storage attached to it. So we just keep the default, which is 8 GB of virtual hard disk. It's the general-purpose SSD and put some meta information.

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tep 5: Tag Instance tag consists of a case-sensitive key-value peir. For example, you coul	id define a tag with key = Name and value = Wabserver. Learn more about tagging your Ame	zon EC2 resources.
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Cobine to make manufacture	8	
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	Cancel	Previous Review and Launch Next: Configure Security Gr

Let's say we put it as Cloud Demo. Go to the next step.

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	Security group name:	Select an existing security group		
	Description:	launch-wizard-18 created 2015-04-11T12:51:13.7	21+05:30	
Туре 🕕		Protocol (i)	Port Range	0
SSH	•	TCP	22	
Add Rule				
Rules w	ng vith source of 0.0.0.0/0 allow all I	P addresses to access your instance. We recom	mend setting security group rules to	allow access from known IP ad

So here I can specify a new security group basically telling how your machine should be accessible over the network. So I can create a new security group or I can use an existing one. Let's just create a new one.

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1 Choose AM 2 Choose In Step 7: Review In Please review your instance is	stance Type 3 Istance La	I Contigure Instar aunch ou can go back	nce 4 Add Storage 5	5 Tag Instance 6 Configure Security Gro section. Click Launch to assign a key	up 7. Review	unch process.	
Your instances may a Your an also open a	tances' secul be accessible fit dditional ports in	rity. Your se om any IP add	curity group, launch- ress. We recommend that group to facilitate access	wizard-18, is open to the world, you update your security group rules to to the application or service you're runn	allow access from known IP addresser ing. e.g., HTTP (80) for web servers.	enty. It security groups	
AMI Details Ubuntu Server Bigger	ver 14.04 LTS 14.04 LTS (HVb) 6. ets - Wbail20	(HVM), SSD V I), EBS General on type, Itvm	Volume Type - ami-518 Purpose (SSD) Volume Typ	9a661 pe. Support available from Canonical (http	Rwww.ubuntu.com/cloud(services)		Edit AMI
 Instance Type 							Edit instance type
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							Cancel Previous Launch
© 2008 - 2015, Amazon Web 5	Services, Jinc. or it	s attilutes. All re	ghts reserved. Privacy Po	ficy Terms of Use			Feedback

Now at this time it is showing me the overall configuration that I have selected in the previous steps. I can expand these details and look at more information as I have selected. So I will just click on launch.

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Now at this time, it will ask me whether I should get a new key pair, whether I should ask them to give me a new encryption key pair using which I can remotely log on to that virtual machine or I should use an existing one. So I already had created a key pair earlier. So I selected that and i put a check box here that I have -- I acknowledge that I have access to the selected key. If you don't have that then you will not be able to get into that virtual machine remotely.

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So let's just launch it. So it will perform various steps and after doing some basic checks, your virtual machine will be up and running.

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	balwinder-d	le i-0bf45bfd	t2 micro	us-west-2b	stopped			None	20		
		i-3067bcc6	t2.micro	us-west-2b	stopped			None	20		P
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So I can go into the view instances. So at that place I will be able to see what my machine is actually doing. So on this screen, I can see where my machine is, whether it has started or not.

So this was the machine Cloud Demo and it is still in the initialization stage. Once it is in the running stage, we will see the appropriate status message here and the details about that machine are actually given over here. Okay. So all these status checks are complete in past. We can see the description of our machine. So it has assigned a public IP to this machine and also a public DNS is available using which we can SSH remotely log onto that machine. Let's try to do that. I'll copy this IP address and log on using a client tool.

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		Instance type	t2 micro	Tunnels	Chanaka Chanar Goolayon	ast	ic IP -	
		Private DNS	ip-172-31-1	- Bugs V		ty	zone us-west-	2b
		Private IPs	172.31.16.2	About	Open	Cancel	ups balwinde	ar-demo, view rules
	Seco	ndary private IPs				Scheduled ev	ents No sche	duled events
		VPC ID	vpc-0499310	61		AI	ID ubuntu-ti 29ebb51	rusty-14.04-amd64-server-20150 9)

Put the IP address and under Auth, I have actually generated a key using -- I have already downloaded the key. So I will select that and all right.





So we have logged on to the remote machine, which has been started in Amazon's data center. So I can list. There are no files. I can run some command.

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We have seen that launching a machine didn't take much time and we were quickly able to log on to that machine remotely.

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THANK YOU!

So what we have seen is different players that provide different services in cloud computing space. We have looked at Amazon Web Services and we have also looked at different services, which are provided by Google cloud platforms.

So that's it for this lecture. Thank you.