

Amazon AWS in .NET

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DEVELOPMENTOR

DEVELOPING PEOPLE WHO DEVELOP SOFTWARE

Objectives

- **Cloud Computing**
- **What Amazon provides**
- **Why Amazon Web Services?**
- **Q&A**
- **Instances**
- **Interacting with Instances**
 - Management Console
 - Command Line
 - API
- **Summary**
- **Q&A**

What is cloud computing?

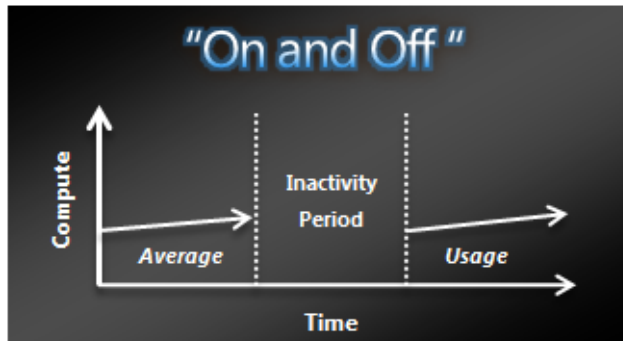
- **Internet-based computing where shared resources and software are provided on demand**
 - dynamically scalable, often virtualized, as a service

It's all about scale

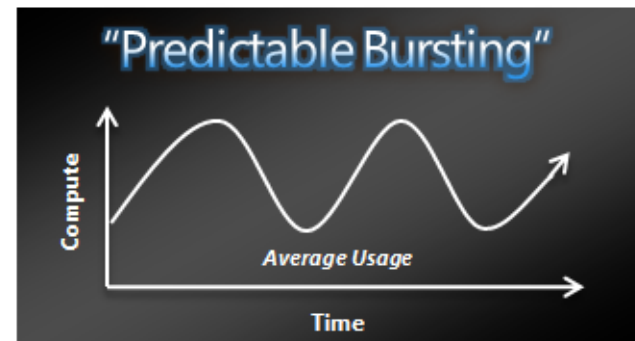
- **Economies of scale**
 - enabled large scale datacenters
- **Reduces risk of over/under provisioning**
- **Eliminates up front commitment**
 - Coverts capital expenses to operating expenses
- **Enables short term usage of vast resources**
- **Makes scaling easier**
 - in both directions



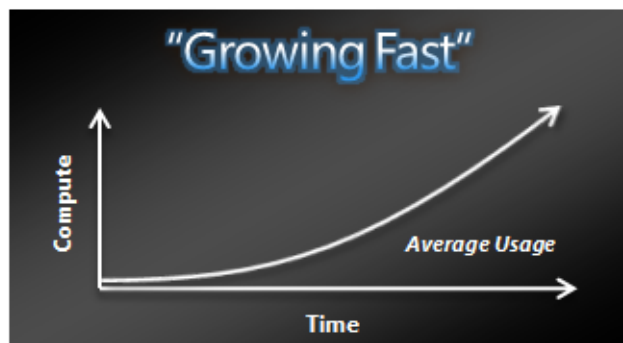
Business cases for the cloud



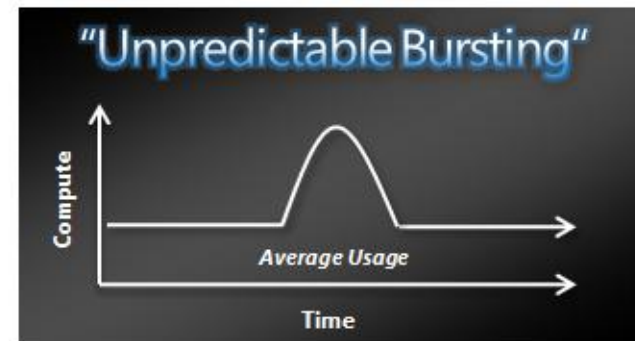
- On & off workloads (e.g. batch job)
- Over provisioned capacity is wasted
- Time to market can be cumbersome



- Services with micro seasonality trends
- Peaks due to periodic increased demand
- IT complexity and wasted capacity



- Successful services needs to grow/scale
- Keeping up w/ growth is big IT challenge
- Complex lead time for deployment

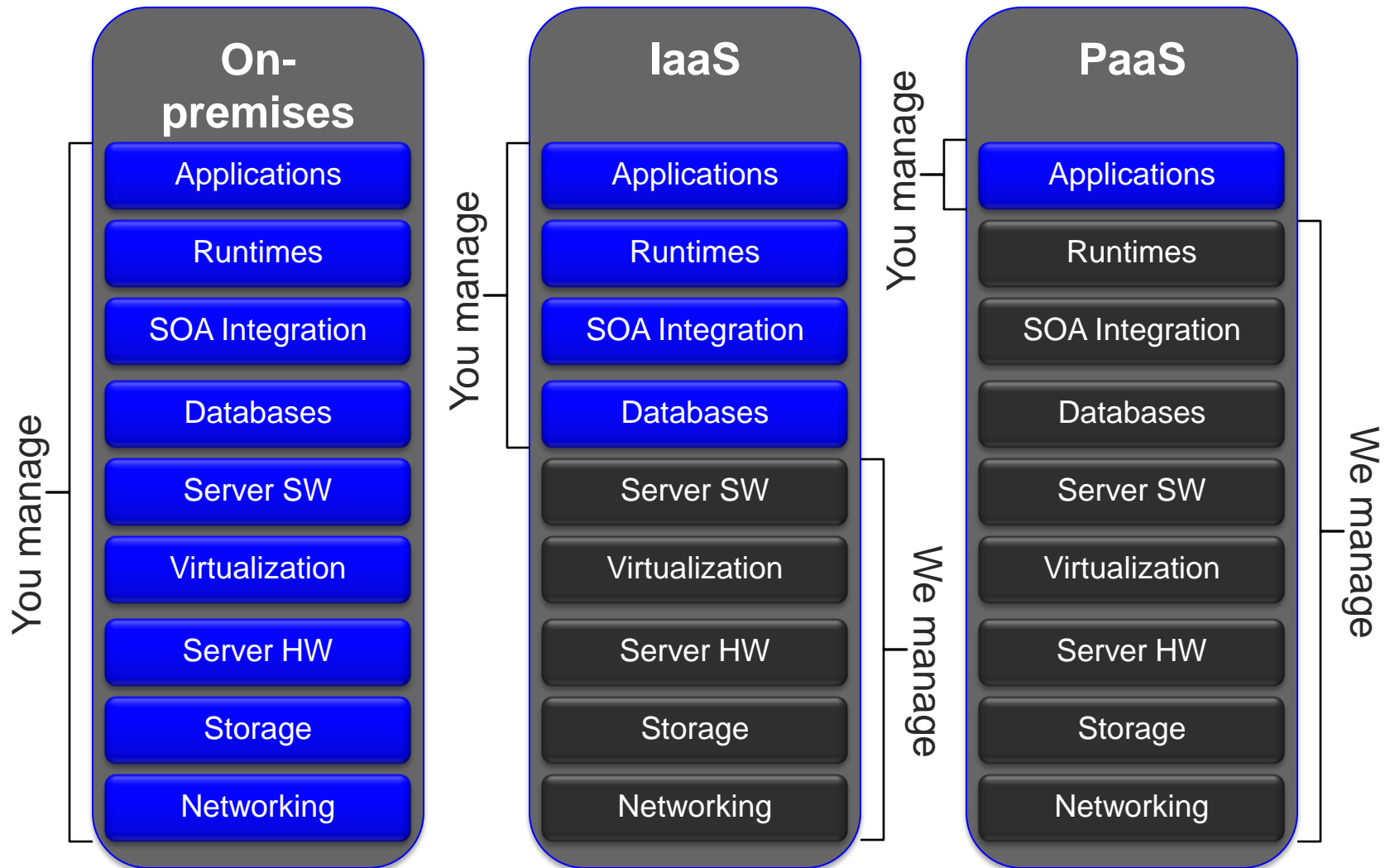


- Unexpected/unplanned peak in demand
- Sudden spike impacts performance
- Can't over provision for extreme cases

Cloud Tradeoffs

- **On Premises**
 - **Control**
 - Customizability
 - Firewalls / Privacy
 - Centralization
 - Data consistency
- **In the Cloud**
 - **Scale**
 - Ease of Provisioning
 - Global Reach
 - Partitioning/Redundancy
 - Data availability

“As a Service”



Amazon Web Services

- **One of the first cloud providers**
 - Launched in June 2002
- **Market leader**
 - In June 2007 had 330,000 developers
- **Offer primarily Infrastructure as a service**
 - with free Software as a service to manage
- **Over 15 different services available**
 - EC2, S3, RDS, SQS, etc.
- **Administration APIs offered in several formats**
 - Web UI, Command line, SOAP, REST

Compute Services

- **Elastic Compute Cloud (EC2)**
 - Four regions (Northern Virginia, Northern California, Ireland, and Singapore)
 - Linux, Windows (also w/ SQL) flavors
 - On Demand, Spot or Reserved instance types
- **Additional services to support EC2**
 - Elastic IP Addresses
 - Elastic Load Balancing
 - Elastic Block Store
 - Virtual Private Cloud (for hybrid clouds)
- **Amazon Elastic MapReduce**
 - Uses Hadoop to break down large data processing tasks

Storage and Database Services

- **Simple Storage Service (S3)**
 - Stores blobs (one way to store instances)
- **Elastic Block Storage (EBS)**
 - Stores file systems (other way to store instances)
- **SimpleDB**
 - Stores Entities (Not SQL)
- **Relational Data Service**
 - Uses MySQL to store relational tabular data
- **CloudFront**
 - Content Delivery Network

Messaging and Monitoring Services

- **Simple Queuing Service**
 - Reliable, durable way to send messages
 - Enables loose coupling between systems
- **Simple Notification Service**
 - Many-to-many Publish and subscribe mechanism
 - Several different protocols supported on both ends
- **CloudWatch**
 - visibility into resource utilization, operational performance, and overall demand patterns
 - Allows AutoScale

Other Services

- **Fulfillment Web Service (FWS)**
 - Send inventory to Amazon, they ship it to customers
 - Eliminates the need for a warehouse
- **Flexible Payments Service (FPS)**
 - Accept payments
- **DevPay**
 - Calculate billing usage
- **Alexa Web Information and Alexa Top Sites**
 - A data warehouse for website information
- **Mechanical Turk**
 - Crowd-sourcing: break problem into small specifications
 - Farm them out and collect results

Amazon AWS vs. Microsoft Azure

- **Amazon started targeting Infrastructure as a Service**
- **Microsoft started targeting Platform as a Service**
- **By now there are few differences between the offerings**
- **Amazon has some advantages in the compute space**
 - Allows developers to customize instances
 - Map Reduce allows solving large data problems
 - Can AutoScale with CloudWatch
- **Offers some services that Microsoft does not (yet)**

Instances

- **Choose base image**
- **Generate a key pair***
- **Configure the images security group**
 - Firewall settings
- **Start the new instance**
- **Get admin password**
- **Login and customize**
- **Save the volumes****
- **Setup elastic IPs**

Instances with Management Console

Demo

Instances with Command Line tools

Demo

Instances with APIs

Demo

Summary

- **Amazon allows more control than other cloud providers**
 - Infrastructure as a service
- **Enables install-based scenarios which are not possible otherwise**
- **There are many ways to access and control instances**
 - Management Console
 - Command Line
 - SOAP and REST APIs

References

- Berkeley Cloud Paper
 - <http://www.eecs.berkeley.edu/Pubs/TechRpts/2009/EECS-2009-28.pdf>
- Microsoft Slides
 - <http://ecn.channel9.msdn.com/o9/pdc09/ppt/SVC54.pptx>

Additional Info

- **Links we referenced:**
 - The starting point: (<http://aws.amazon.com/>)
 - BgInfo (<http://technet.microsoft.com/en-us/sysinternals/bb897557.aspx>)
 - Sync support for S3 (<http://s3mssyncfx.codeplex.com/>)