## Six Advantages of Cloud Computing

* 1. Trade capital expense for variable expense
  2. Benefit from massive economies of scale
  3. Stop guessing capacity
  4. Increase speed and agility
  5. Stop spending money running and maintaining data centers
  6. Go global in minutes

## Types of Cloud Computing

### Cloud Computing Models

* + 1. Infrastructure as a Service (IaaS) – Private cloud
    2. Platform as a Service (PaaS) – OS or Virtual Machine
    3. Software as a Service (SaaS) – Email
  1. Cloud Computing Deployment Models
     1. Cloud
     2. Hybrid
     3. On-premises -- Private cloud

## Global Infrastructure

* 1. Target -- lower latency and higher throughput
  2. Achieve -- fault tolerance and stability

## Security and Compliance

### Security, How

* + 1. allows you to scale and innovate, while maintaining a secure environment
    2. inherit all the best practices of AWS policies, architecture, and operational processes built
    3. enables a shared responsibility model
    4. provides you with guidance and expertise
    5. get access to hundreds of tools and features
    6. AWS environments are continuously audited

### Benefits of AWS Security

* + 1. Keep Your Data Safe
    2. Meet Compliance Requirements
    3. Save Money
    4. Scale Quickly
  1. Compliance
     1. AWS Compliance enablers build on traditional programs.

## Amazon Web Services Cloud Platform

* 1. AWS Management Console
  2. AWS Command Line Interface
  3. Software Development Kits
  4. **Analytics**
     1. Amazon Athena – run SQL query on S3, serverless
     2. Amazon EMR – Hadoop framework, dynamically scalable EC2 instance.
     3. Amazon CloudSearch – Provide Search function
     4. Amazon Elasticsearch Service – real-time search, analyze and visualize
     5. Amazon Kinesis – real-time streaming data process
        1. Amazon Kinesis Data Firehose – load, pre-process
        2. Amazon Kinesis Data Analytics – analyze, calculation
        3. Amazon Kinesis Data Streams – Massive stream data collect
        4. Amazon Kinesis Video Streams – video store and analyze
     6. Amazon Redshift – Data Warehouse database
        1. Machine learning
        2. Parallel query
        3. Columnar storage
        4. High-performance disk
     7. Amazon QuickSight – BI Service
     8. AWS Data Pipeline – load data to different AWS service
     9. AWS Glue – ETL Service
     10. AWS Lake Formation – build data lake
     11. Amazon Managed Streaming for Kafka (MSK) – stream data processing
         1. automatically provisions node
         2. continuously monitors node
         3. automatically replaces node
         4. encrypting data
  5. **Application Integration**
     1. AWS Step Functions – workflow and scheduling for AWS service
     2. Amazon MQ – message broker service
     3. Amazon SQS – Simple Queue Service for micro service
     4. Amazon SNS – Simple Notification Service, push notification to customer
     5. Amazon SWF – Simple Work Flow, state tracker and task coordinator
  6. AR and VR – build VR and AR 3D program on web browser.
  7. **AWS Cost Management**
     1. AWS Cost Explorer -- analyze cost and usage data
     2. AWS Budgets -- costs or usage alert
     3. AWS Cost & Usage Report -- single location access
     4. Reserved Instance (RI) Reporting
  8. Blockchain
     1. Amazon Managed Blockchain
        1. manages your certificates
        2. easily invite new members
        3. tracks operational metrics
        4. replicate an immutable copy into Amazon Quantum Ledger Database
  9. **Business Applications**
     1. Alexa for Business -- intelligent assistant
     2. Amazon WorkDocs -- like Dropbox
     3. Amazon WorkMail – like Outlook
     4. Amazon Chime – like Ms Team
  10. **Compute**
      1. Amazon EC2 – compute instance
         1. On-Demand Instances – pay as capacity by hour
         2. Reserved Instance
         3. Spot – bid on spare capacity
      2. Amazon EC2 Auto Scaling
         1. Dynamic scaling
         2. Predictive scaling
      3. Amazon Elastic Container Registry – Docker image registry
      4. Amazon Elastic Container Service
      5. Amazon Elastic Container Service for Kubernetes
  11. Amazon Lightsail – Virtual Private server
  12. AWS Batch – batch run jobs
  13. AWS Elastic Beanstalk – web auto deployment
  14. AWS Fargate
      1. Only launch docker
      2. Create a server to launch docker
  15. AWS Lambda – serverless functional calculation
  16. AWS Serverless Application Repository
  17. AWS Outposts -- build native AWS services, infrastructure in customer side
  18. VMware Cloud on AWS – migrate VMware to AWS

1. Customer Engagement
   1. Amazon Connect – customer service system
   2. Amazon SES – simple Email Service
2. **Database**
   1. Amazon Aurora – A DB like MySQL and PostgreSQL
   2. Amazon RDS – Relational Database Service, A service that can build database on it. Like MySQL
   3. Amazon RDS on VMware -- build DB on VMware on premise
   4. Amazon DynamoDB – Key value DB like mongo db
   5. Amazon ElastiCache – like Redis
   6. Amazon Neptune -- graph database
   7. Amazon Quantum Ledger Database (QLDB) – block chain database
   8. Amazon Timestream – time series database
3. Desktop and App Streaming
   1. Amazon WorkSpaces – cloud desktop
   2. Amazon AppStream 2.0 -- App demo and training environment
4. Developer Tools
   1. AWS CodeCommit – like github
   2. AWS CodeBuild – Auto compile and build
   3. AWS CodeDeploy – Auto deploy
   4. AWS CodePipeline – CI/CD
   5. AWS CodeStar CI/CD tools on AWS
   6. Amazon Corretto -- Open Java Development Kit
   7. AWS Cloud9 – online IDE
   8. AWS X-Ray – Debug tools for distributed app
5. Game Tech
   1. Amazon GameLift – session-based game server
   2. Amazon Lumberyard – 3D game engine
6. Internet of Things (IoT)
   1. AWS IoT Core – connect device with AWS service
   2. Amazon FreeRTOS
   3. AWS IoT Greengrass – AWS on local device
   4. AWS IoT 1-Click – button to trigger Lambda
   5. AWS IoT Analytics – analytic platform for IOT
   6. AWS IoT Button
   7. AWS IoT Device Defender – audit configuration
   8. AWS IoT Device Management – manage device at scale
   9. AWS IoT SiteWise – manage device on industrial equipment
   10. AWS IoT Things Graph – visual connect console
   11. AWS Partner Device Catalog – help partner to sell device
7. Machine Learning
   1. Amazon SageMaker – help build train deploy ML
   2. Amazon SageMaker Ground Truth – build training dataset
   3. Amazon Comprehend – NLP
   4. Amazon Lex – build conversational interface
   5. Amazon Polly – turn text to voice
   6. Amazon Rekognition – image analysis
   7. Amazon Translate
   8. Amazon Transcribe – speech recognition
   9. Amazon Elastic Inference – attach GPU
   10. Amazon Forecast – ML forecast
   11. Amazon Textract – extract text and data
   12. Amazon Personalize – ML recommendations
   13. Amazon Deep Learning AMIs – tool to accelerate ML
   14. AWS DeepLens – use pre-trained models
   15. AWS DeepRacer – reinforcement ML
   16. Apache MXNet on AWS – training framework
   17. TensorFlow on AWS
   18. AWS Inferentia -- ML platform, base
8. Management and Governance
   1. Amazon CloudWatch – system monitoring service/log analysis
   2. AWS Auto Scaling – monitor and adjust capacity
   3. AWS Control Tower -- automate setup security account
   4. AWS Systems Manager – AWS dashboard
   5. AWS CloudFormation – create template for AWS resource
   6. AWS CloudTrail – web log of API calls
   7. AWS Config – configuration inventory
   8. AWS OpsWorks – automate server configuration deploy
   9. AWS Service Catalog – manage IT service catalog
   10. AWS Trusted Advisor – provide real time guidance
   11. AWS Personal Health Dashboard – provide alert and guidance
   12. AWS Managed Services – auto backup or support
   13. AWS Console Mobile Application – manage resources on mobile phone
   14. AWS License Manager – manage license
   15. AWS Well-Architected Tool – review archit and advice
9. Media Services
   1. Amazon Elastic Transcoder – Media transcode
   2. AWS Elemental MediaConnect – media transport service
   3. AWS Elemental MediaConvert – VOD
   4. AWS Elemental MediaLive – LIVE broadcast
   5. AWS Elemental Media Package – protected broadcast
   6. AWS Elemental MediaStore
   7. AWS Elemental MediaTailor – insert ADS to video
10. **Migration and Transfer**
    1. AWS Migration Hub – migration tools hub
    2. AWS Application Discovery Service – collect local data for Migration
    3. AWS Database Migration Service
    4. AWS Server Migration Service—migration work load to AWS
    5. AWS Snowball – petabyte-scale data transport
    6. AWS Snowball Edge – large data transfer
    7. AWS Snowmobile -- exabyte-scale data transfer
    8. AWS DataSync – auto move date to AWS S3
    9. AWS Transfer for SFTP
11. Mobile
    1. AWS Amplify – create Mobile application backend
    2. Amazon Cognito – app user sign-up sign-in
    3. Amazon Pinpoint – mobile notification, tracking and promotion
    4. AWS Device Farm – app testing serive
    5. AWS AppSync – serverless backend for app
12. **Networking and Content Delivery**
    1. Amazon VPC – virtual private cloud, network environment
    2. Amazon CloudFront – CDN
    3. Amazon Route 53 – DNS
    4. AWS PrivateLink – private connectivity
    5. AWS Direct Connect – establish a dedicate network to aws
    6. AWS Global Accelerator – auto route to network
    7. Amazon API Gateway
    8. AWS Transit Gateway – connect from premise data center to AWS
    9. AWS App Mesh -- monitor and control microservices
    10. AWS Cloud Map – cloud resources name mapping
    11. Elastic Load Balancing
        1. Application Load Balancer (application level)
        2. Network Load Balancer
        3. Classic Load Balancer (same network)
13. Robotics
    1. AWS RoboMaker – make robot application
14. Satellite
    1. AWS Ground Station – Satellite control
15. **Security, Identity, and Compliance**
    1. AWS Security Hub -- security alerts and compliance status
    2. Amazon Cloud Directory – Active Directory
    3. AWS Identity and Access Management -- securely control access to AWS services and resources
    4. Amazon GuardDuty -- threat detection service
    5. Amazon Inspector -- automated security assessment service
    6. Amazon Macie -- automatically discover, classify, and protect sensitive data in AWS
    7. AWS Artifact -- AWS’ security and compliance reports
    8. AWS Certificate Manager – SSL/TLS
    9. AWS CloudHSM -- hardware security module (token)
    10. AWS Directory Service – Microsoft Active Directory
    11. AWS Firewall Manager
    12. AWS Key Management Service -- manage keys and control the use of encryption
    13. AWS Organizations -- policy-based management for AWS accounts
    14. AWS Secrets Manager -- manage, and retrieve database credentials,
    15. AWS Shield -- DDos
    16. AWS Single Sign-On (SSO)
    17. AWS WAF-- web application firewall
16. **Storage**
    1. Amazon S3 -- object storage service
    2. Amazon Elastic Block Store – NAS
    3. Amazon Elastic File System
    4. Amazon FSx for Lustre – high performance file system
    5. Amazon FSx for Windows File Server
    6. Amazon S3 Glacier – extremely low-cost storage
    7. AWS Storage Gateway – mount drive on premises server