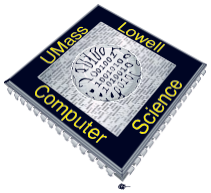
Kennedy College of Sciences

Computer Science Department

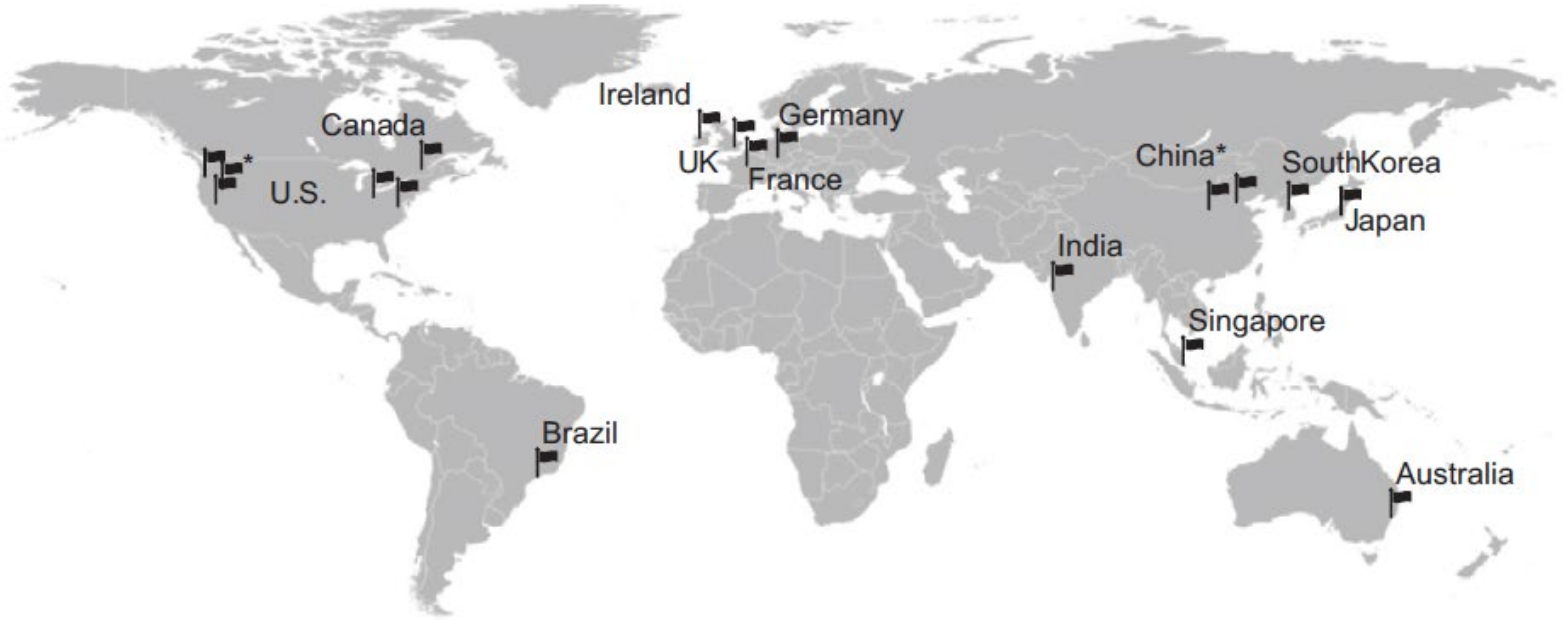


Cloud Computing UML CLub

1/25/24

Prof. Johannes Weis

AWS Data Centers:



NIST - National Institute of Standards and Technology

The NIST Definition of Cloud Computing:

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (networks, virtual machines, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Clouds are often divided into three types:

Public—A cloud managed by an organization and open to use by the general public.

Private—A cloud that virtualizes and distributes the IT infrastructure for a single organization.

Hybrid—A mixture of a public and a private cloud.

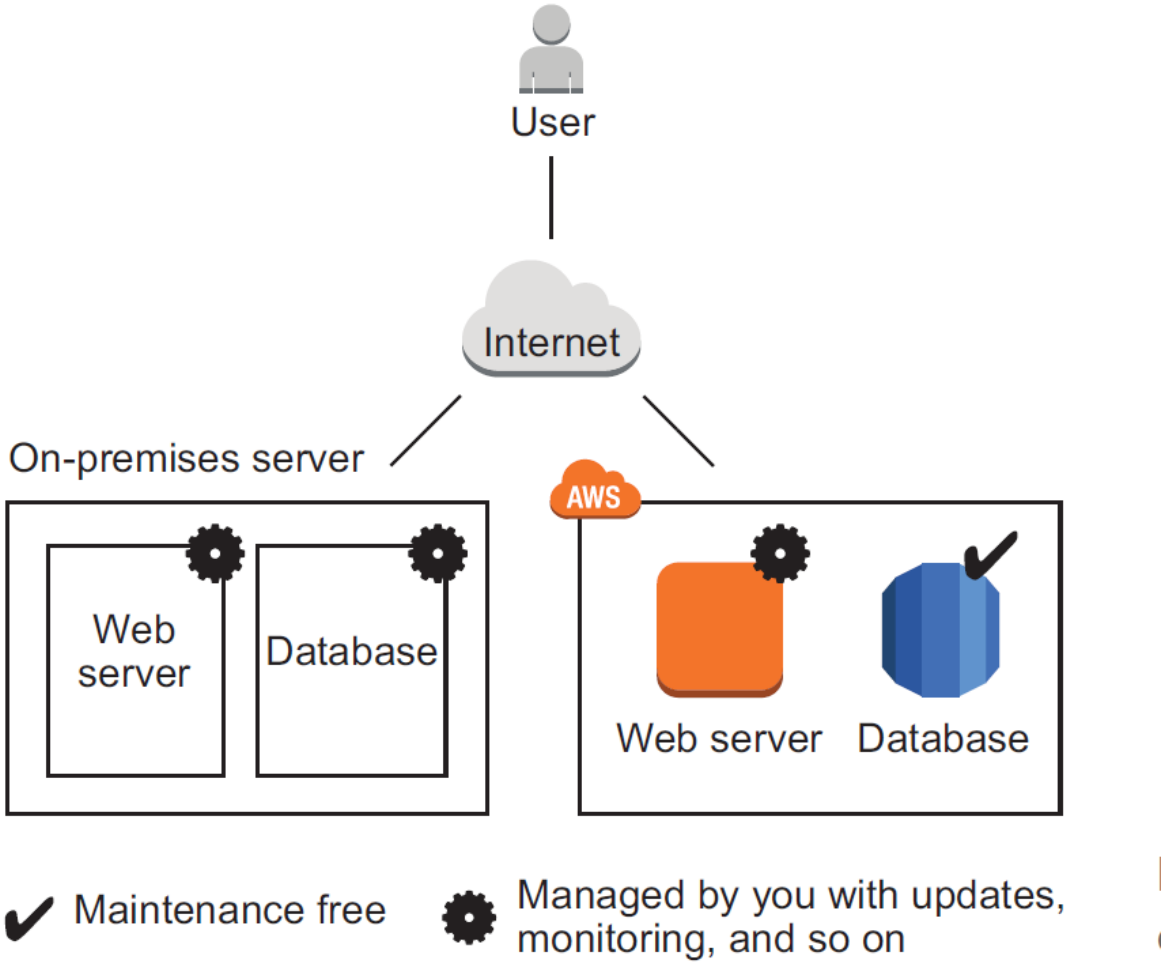
AWS is a public cloud. Cloud computing services also have several classifications:

Infrastructure as a service (IaaS)—Offers fundamental resources like computing, storage, and networking capabilities, using virtual machines such as Amazon EC2, Google Compute Engine, and Microsoft Azure.

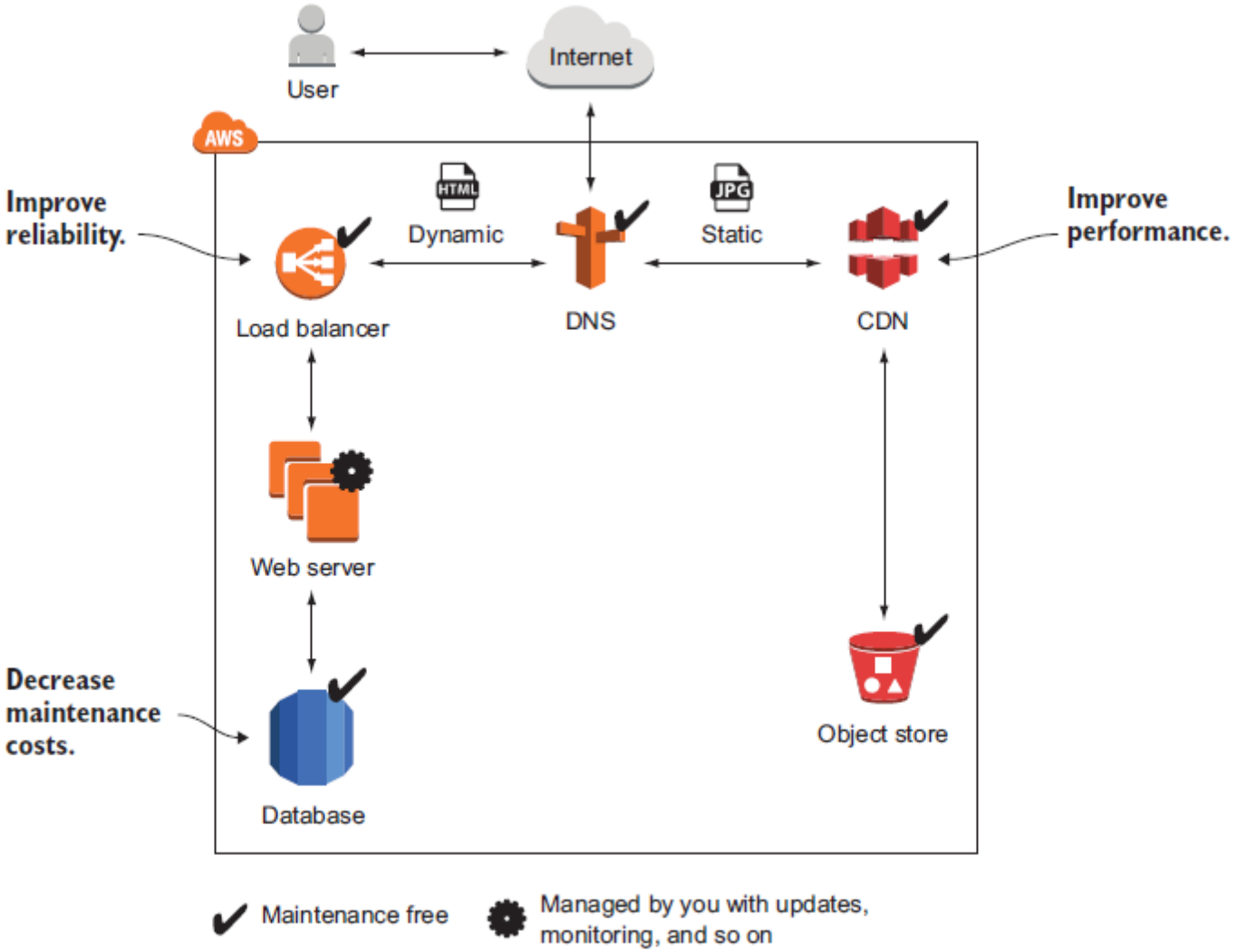
Platform as a service (PaaS)—Provides platforms to deploy custom applications to the cloud, such as AWS Elastic Beanstalk, Google App Engine, and Heroku.

Software as a service (SaaS)—Combines infrastructure and software running in the cloud, including office applications like Amazon WorkSpaces, Google Apps for Work, and Microsoft Office 365.

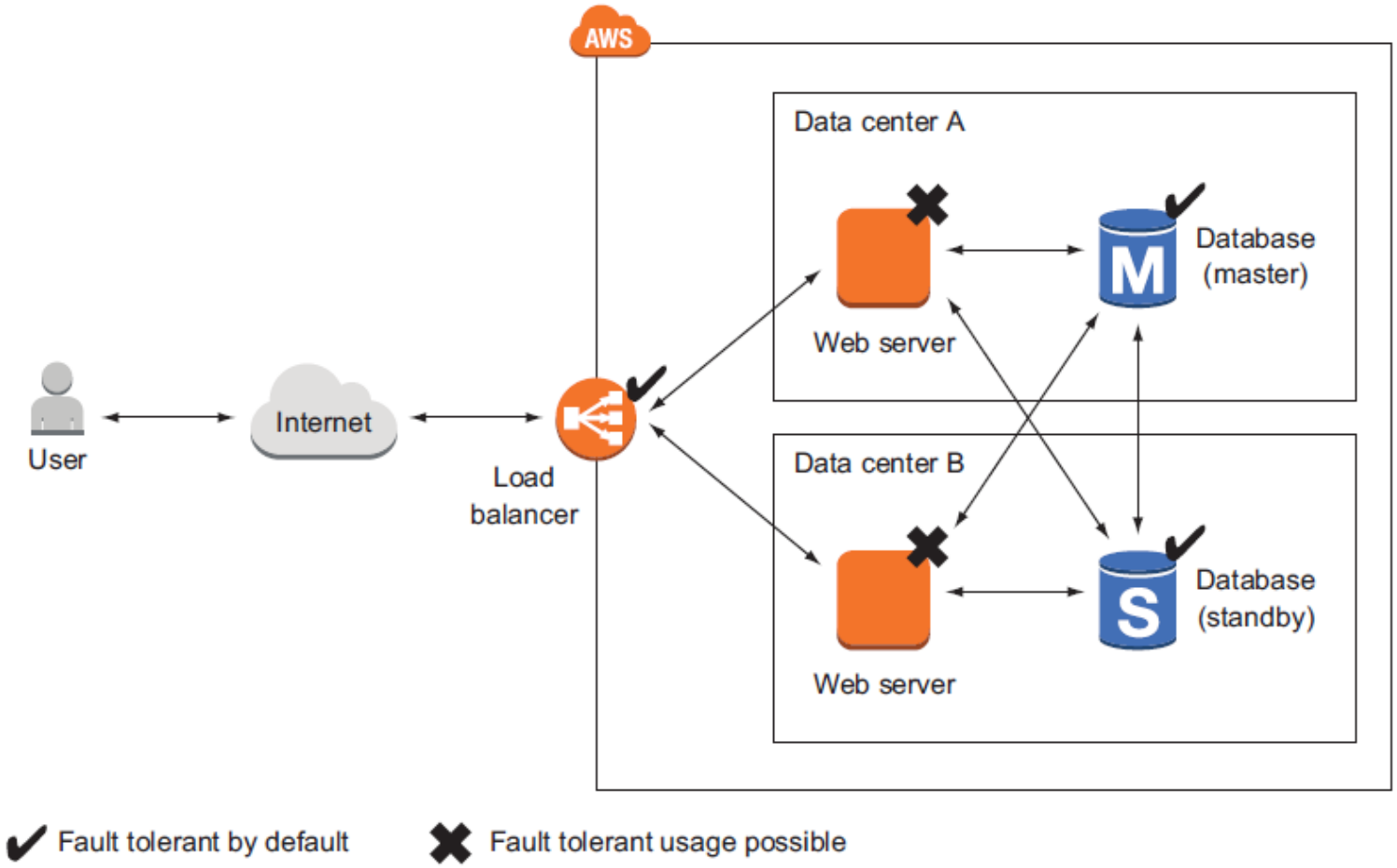
Hosting an ecommerce site on premise vs AWS



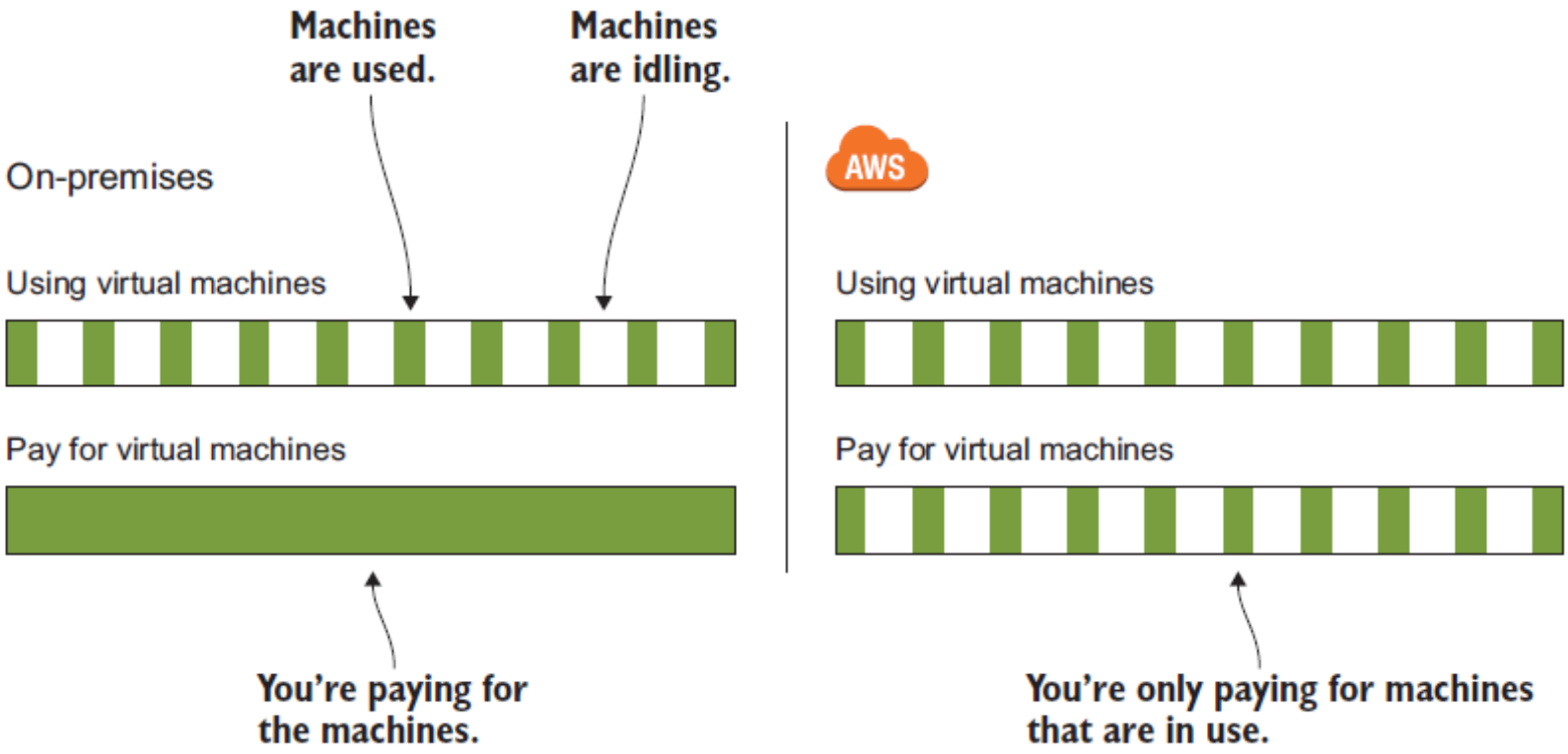
Improvements possible with AWS:



Highly Available Systems



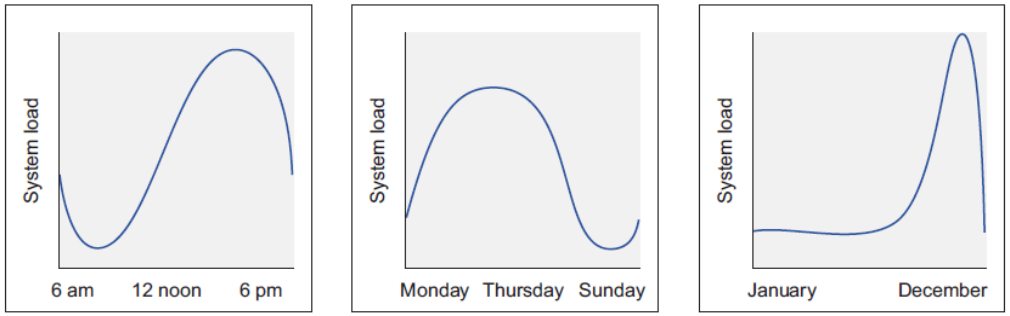
Paying for computing resources only when in use



Benefits of using the Cloud

1. Innovative and fast-growing platform
2. Services solve common problems
    a. Many offerings for functionality
    b. Security is often provided, built in and guided towards
    c. Operational benefits include monitoring and alarming
    d. Development tools like Continuous Delivery or testing
3. Enabling automation
4. Flexible capacity (scalability)
5. Built for failure (reliability)
6. Reducing time to market
7. Benefiting from economies of scale
8. Global infrastructure
9. Professional partner

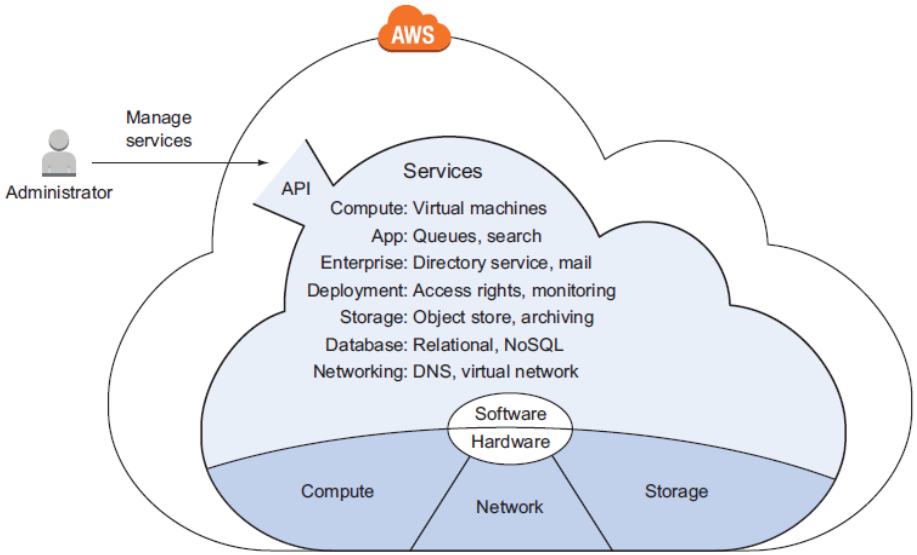
Seasonal capacity needs: scale for peak usage



Concerns of using the Cloud:

1. **Dependency** on 3rd party - what if Amazon, Google or Microsoft go out of business or increase their prices?
2. **Learning curve / migration efforts** can be significant - it can be a daunting task to move your current solution to the cloud
3. **Constantly evolving** - might need to adjust to new offerings, solutions. What if an offering I need or like is deprecated? What is the next big thing? Today, many companies that have invested in older technologies are struggling to migrate or adapt.
4. **Pay as you go model** might not be preferable for everyone. Some people like to buy a car even if there is a great lease offered
5. **Security** is always a risk and threats are evolving especially in the cloud - I am entrusting my potentially highly confidential data to a 3rd party - government cloud. On the other hand. My cloud provider is held to the highest standards and most likely put a lot of effort into making everything secure … more about this later.

AWS is Hardware and Software



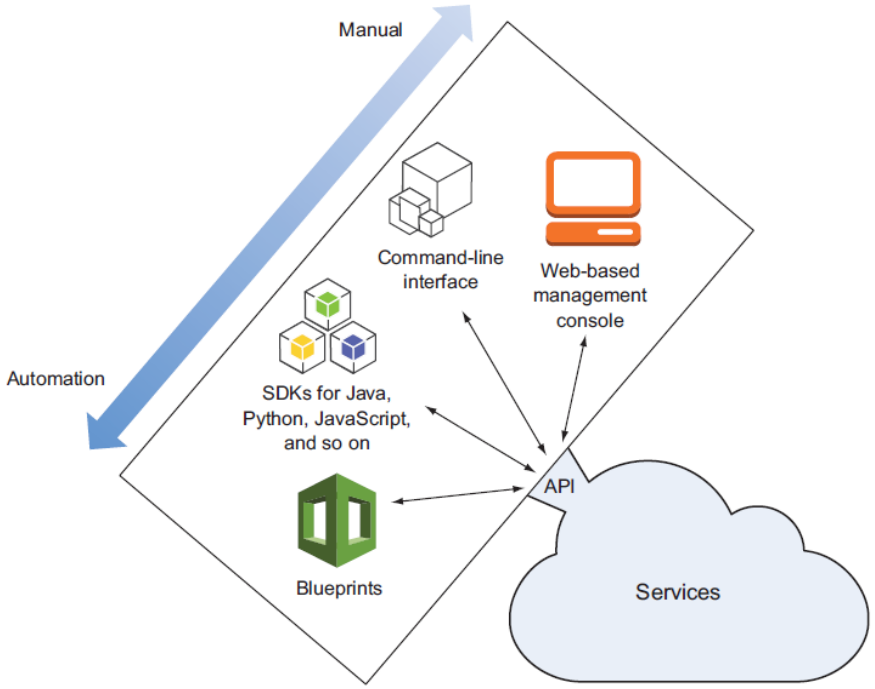
AWS categories

- Analytics
- Application Integration
- AR and VR
- Business Productivity
- Compute
- Customer Engagement
- Database
- Desktop and App Streaming
- Developer Tools
- Game Development
- Internet Of Things
- Machine Learning
- Management Tools
- Media Services
- Migration
- Mobile Services
- Networking and Content Delivery
- Security, Identity, and Compliance
- Storage

Sample of AWS services

1. *EC2*—Virtual machines
2. *ELB*—Load balancers
3. *Lambda*—Executing functions
4. *Elastic Beanstalk*—Deploying web applications
5. *S3*—Object store
6. *EFS*—Network filesystem
7. *Glacier*—Archiving data
8. *RDS*—SQL databases
9. *DynamoDB*—NoSQL database
10. *ElastiCache*—In-memory key-value store
11. *VPC*—Private network
12. *CloudWatch*—Monitoring and logging
13. *CloudFormation*—Automating your infrastructure
14. *OpsWorks*—Deploying web applications
15. *IAM*—Restricting access to your cloud resources
16. *Simple Queue Service*—Distributed queues

Interacting with AWS



Blueprints (generic term) are called Templates in AWS

WordPress System