What is Cloud Computing?

What is Cloud Computing?

The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

OR

Using someone else's computer to do your job.

A deep-dive - Why Cloud?

What works?

- No capital investment in hardware
- No need for managing the hardware
- Still **accessible from anywhere**
- No risk of data loss due to any calamity (like fire) due to multiple back up
- Pay per use and stop anytime

What are the Challenges?

- Data privacy may be compromised (depends on type of cloud)
- **Compliance and cross-border data storage issues**
- Elaborate Access control is required (with type of communication channel with cloud)
- Enterprise paradigm shift needed (e.g. **DevOps**)

Public Cloud Introductory type

- Available for general public for a very cheap cost
- Data stored in Provider's environment
- Insecurity Or Perception of Insecurity
- **Amazon Web Services**, Microsoft Azure, Google Cloud Platform, Oracle Cloud etc

Private Cloud Uses Advanced Computing & Resources

- Hardware and Software dedicated to the tenant
- Data stored behind dedicated Firewall
- More expensive than public cloud but secure
- Netmagic Solutions, Hewlett Packard Enterprise (HPE), Dell EMC.

Hybrid Cloud Benefits of Public & Private cloud

- Some services can be on Public Cloud for lower cost
- Other sensitive data and operations managed on Private.

Trinity of Cloud Providers

Launch Year:
Amazon Web Services (2006)
Microsoft Azure (2010)
Google Cloud Platform (2008)

AWS Success Stories

Amazon is Achieving Database Freedom Using AWS
Today, Amazon stands on the verge of completing the migration of about 50 petabytes of data & shutting down last of those 5,000 Oracle databases.How did it pull off this massive migration? View more

Samsung Migrates 1.1 Billion Users across Three Continents from Oracle to Amazon Aurora with AWS Database Migration Service. View more

The **NASA Image and Video Library** is a AWS cloud-native solution, with the front-end web app separated from the backend API. It runs as immutable infrastructure in a fully automated environment, with all infrastructure defined in code to support continuous integration and continuous deployment (CI/CD). Details : nasa-image-library

HPC on AWS for COVID-19 Research and Development
Researchers and scientists working on time-critical projects are using AWS to instantly access virtually unlimited infrastructure capacity, & the latest technologies in compute, storage and networking to accelerate time to results. View more

AWS In India's Public Sector
Thousands of active customers from India use AWS to deliver flexibility, scalability, and reliability. View more

Netflix on AWS
Netflix uses AWS for nearly all its computing and storage needs, including databases, analytics, recommendation engines, video transcoding, and more—hundreds of functions that in total use more than 100,000 server instances on AWS. View more

AWS Success Stories

Dropbox Migrates 34 PB of Data to an Amazon S3 Data Lake for Analytics
Dropbox has moved 34 PB of analytics data to a data lake in **Amazon Simple Storage Service (Amazon S3)**—an object storage service that offers industry-leading scalability, data availability, security, and performance - and uses Amazon Elastic Compute Cloud (Amazon EC2) and Amazon EC2 Spot Instances to power the compute for its Hadoop clusters. View more

BigBasket Grows Bigger with 400,000 Daily Orders on AWS : View More

Airbnb on AWS : View More

Matchmaking Site Shaadi.com Doubles Algorithm Testing Using AWS : View More

Faasos Grows its Business by up to 30% by using AWS : View More

NDTV scales to reach digital media audience of 1 billion using AWS : View More

BMW Group uses Amazon Web Services (AWS) to build its next-generation Unified Configurator Platform : View More

AWS Success Stories

Cloud based initiatives like MyGov Saathi, Curfew ePass, COVID-19 repository, Aarogya Setu and CoWIN are few examples of the role of cloud by the Indian government.

- https://www.businesstoday.in/latest/economy/story/large-scale-cloud-adoption-can-add-14-mn-jobs-uad-380-bn-to-gdp-by-2026-nasscom-342135-2022-07-20

Army announces new 2022 Cloud Plan : View More

Behind the scenes: McDonald's event-driven architecture : View More

McDonald's event-driven architecture: The data journey and how it works : View More

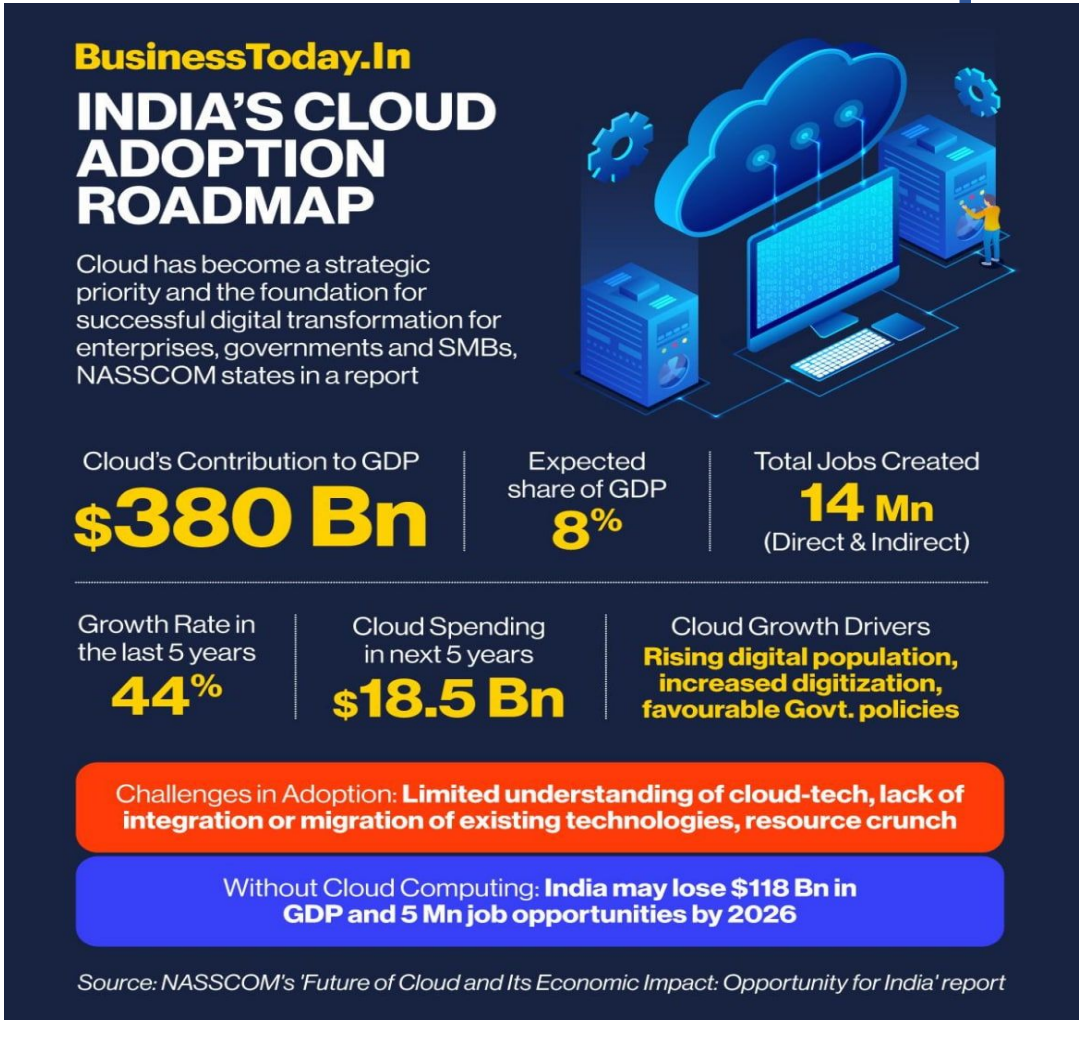
BookMyShow Improves TCO by 70 Percent on the AWS Cloud : View More

NASSCOM: Future Of Cloud And Its Economic Impact: Opportunity For India : View More

Guidelines for Enablement of Government Departments for Adoption of Cloud : View More

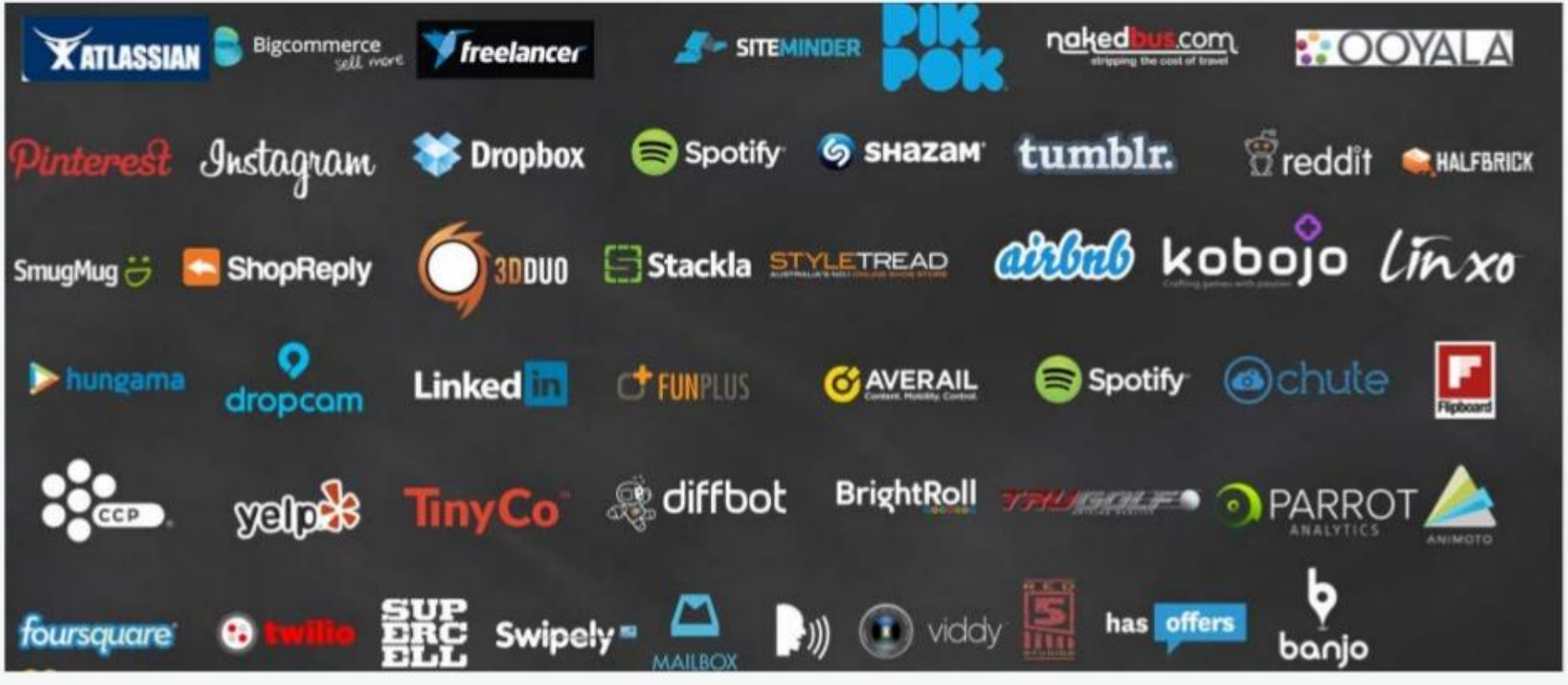
NeGD organises Capacity Building programme in Cloud Computing for central and state government officials : View More

India's Cloud Adoption RoadMap



https://www.businesstoday.in/latest/economy/story/large-scale-cloud-adoption-can-add-14-mn-jobs-uad-380-bn-to-gdp-by-2026-nasscom-342135-2022-07-20

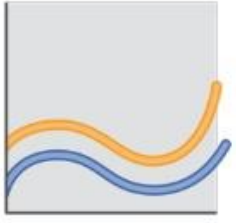
Start up success on AWS



Enabling Your Digital Transformation

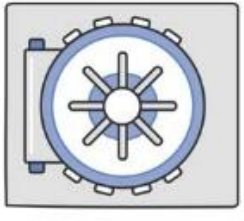
Fast Deployments
Access computing infrastructure in minutes

Low Cost
Pay-as-you-go pricing

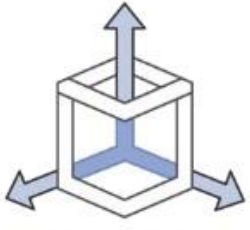


Elastic
Easily add or remove capacity

Globally Accessible
Easily support customers around the world



Secure
A collection of tools to protect data and privacy



Scalable
Access to effectively limitless capacity

What sets AWS apart?

Experience	Building and managing cloud since 2006
Service Breadth & Depth	165+ services to support any cloud workload
Pace of Innovation	Over 1,957 significant features and services launched in 2018
Global Footprint	22 Regions, 69 Availability Zones, 187 points of presence
Pricing Philosophy	74 proactive price reductions as of September 4, 2019
Partners	Thousands of consulting and technology partners

* As of July 30, 2019

aws INITIATE PUBLIC SECTOR

AWS Global Infrastructure

2006 N. Virginia
2008 Ireland
2009 N. California
2010 Singapore
2011 Govcloud
2011 Oregon
2011 São Paulo
2011 Tokyo
2012 Sydney
2014 Beijing
2014 Frankfurt
2016 Seoul
2016 Mumbai
2016 Ohio
2016 Canada
2016 London
2017 Paris
2017 Ningxia
2018 EAST Govcloud
2018 Stockholm
2019 Hong Kong
2019 Bahrain
2020 Cape Town
2020 Milan
NEW
2021 Osaka
2022 Spain
2022 Jakarta
2022 Zurich
2022 Hyderabad
2022 Melbourne

AWS Infrastructure-New Region

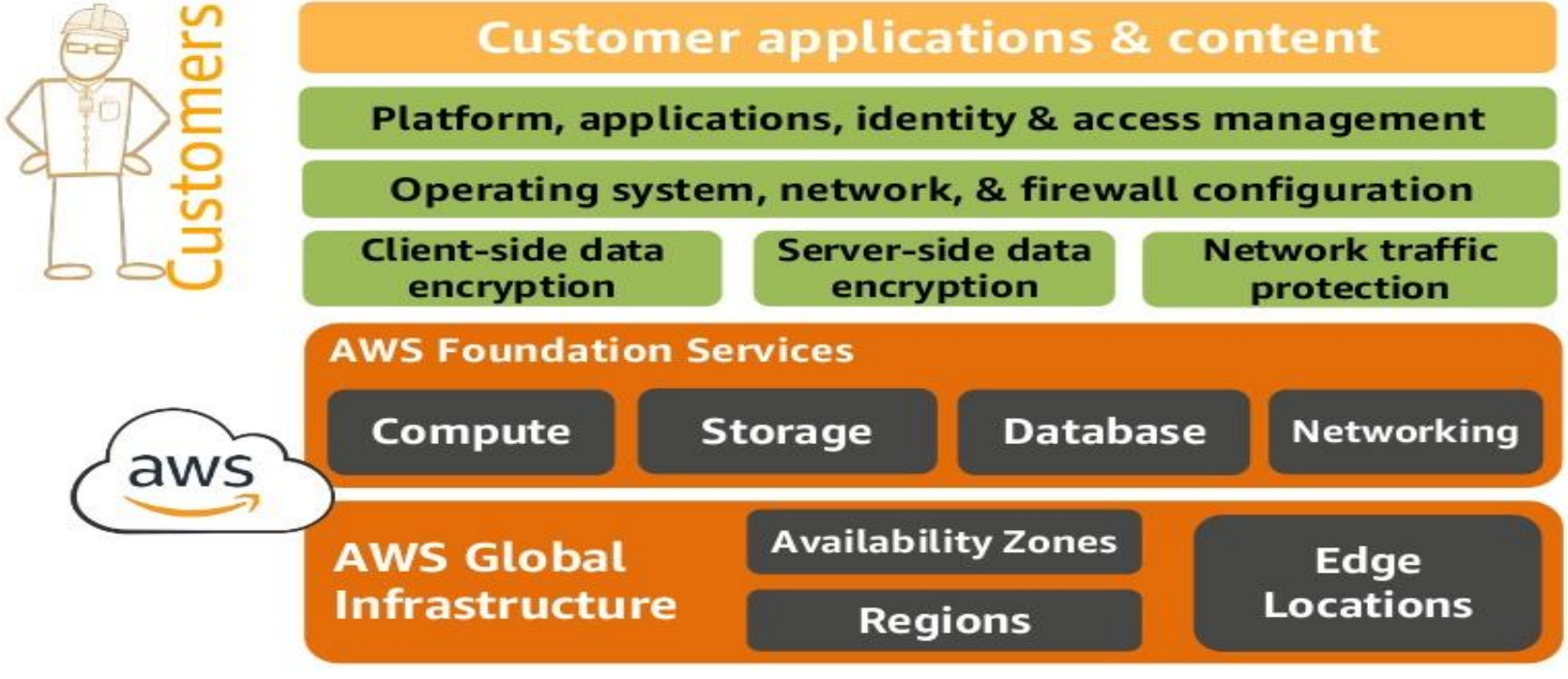
- Hyderabad Region
  - AWS Announces Plans to Launch a Second Region in India
- https://www.gadgets360.com/internet/news/aws-virginia-usd-35-billion-amazon-web-services-data-centre-investment-plan-3711801
-

Who is responsible for the security of the cloud?

AWS is responsible for the security of the cloud

What do Customers do?

Customers configure their security in the cloud



Current Market Intelligence Reports

IDC is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets.

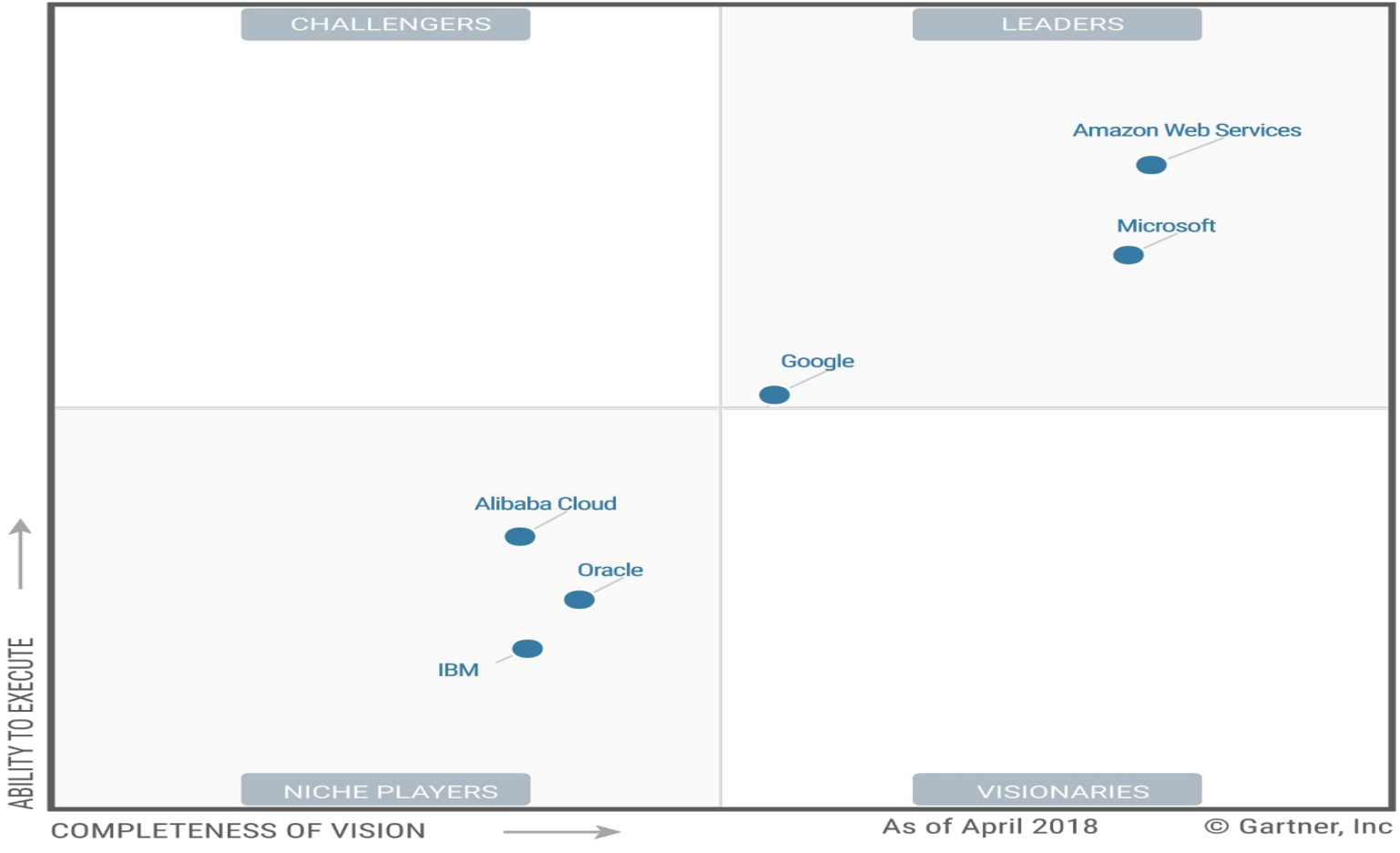
Forrester is an American market research company that provides advice on existing and potential impact of technology, to its clients and the public

Gartner is a global research and advisory firm providing insights, advice, and tools for leaders in IT, finance, HR, customer service and support, legal and compliance, marketing, sales, and supply chain functions across the world.

IaaS - Gartner Quadrant Description

Challengers Well-positioned to serve current market needs. Deliver a good service targeted at a particular set of use cases & have a track record of successful delivery. However, they **are not adapting to market challenges sufficiently quickly, or do not have a broad scope of ambition.**	**Leaders** Leaders distinguish themselves by offering a service suitable for strategic adoption & having an **ambitious roadmap**. Leaders in this market **have appreciable market share and many referenceable customers.** Can serve a **broad range of use cases**, although they do not excel in all areas, may not necessarily be the best providers for a specific need and may not serve some use cases at all.
Niche Players For cloud IaaS these **may be excellent providers for particular use cases or in regions in which they operate**, but they should ultimately be viewed as specialist providers of cloud IaaS. Do not serve a broad range of use cases well or have a broadly ambitious roadmap. Some may have solid leadership positions in markets adjacent to this market, but have developed only limited capabilities in cloud IaaS.	**Visionaries** Visionaries **have an ambitious vision of the future**, and are making significant investments in the development of unique technologies. Their services are still emerging, and they have many capabilities in development that are not yet generally available. Although they may have many customers, they might not yet serve a broad range of use cases well.

Magic Quadrant for Cloud Infrastructure as a Service (2018)



Magic Quadrant - Cloud IaaS (2019)

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide

Source: Gartner (July 2019)

https://pages.awscloud.com/Gartner-Magic-Quadrant-for-Infrastructure-as-a-Service-Worldwide.html

Magic Quadrant - Cloud IaaS (2020)

https://pages.awscloud.com/GLOBAL-multi-DL-gartner-mq-cips-2020-learn.html

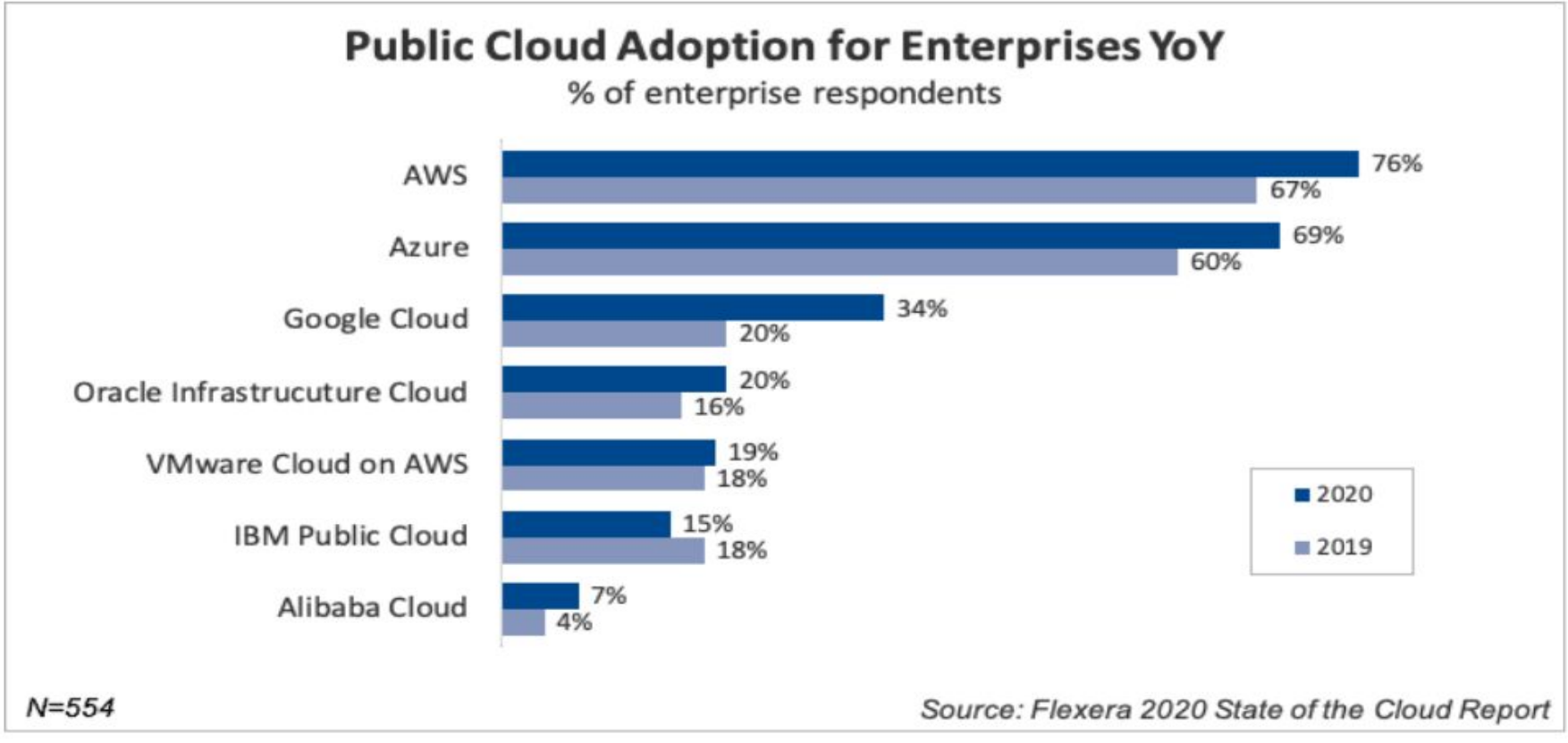
Magic Quadrant - Cloud IaaS (2021)

https://aws.amazon.com/resources/analyst-reports/gartner-mq-cips-2021/?nc1=h_ls
https://www.gartner.com/doc/reprints?id=1-271OE4VR&ct=210802&st=sb

Magic Quadrant - Cloud IaaS (2022)

https://www.gartner.com/doc/reprints?id=1-29B7RDWN&ct=220304&st=sb

So how many cloud service providers are there?



https://www.flexera.com/blog/industry-trends/trend-of-cloud-computing-2020/

Cloud Prediction

- **Oracle Prediction**
  - Oracle's predictions of Cloud-Native estimates that by 2025, 80% of the IT sector will move to the cloud.
  - https://www.oracle.com/a/ocom/docs/cloud/oracle-cloud-predictions-2020.pdf
- **Nascomm Research**
  - India can become world's second-largest cloud talent hub: Nasscom
  - By 2025, India would have an estimated 1.4-1.5 million cloud professionals (baseline growth).
  - However, with an estimated demand for over **2 million professionals by 2025**, India could reach 1.7-1.8 million cloud talent pool with a fairly aggressive skilling roadmap
  - https://www.newindianexpress.com/business/2021/aug/23/india-can-become-worlds-second-largest-cloud-talent-hub-nasscom-2348734.html

Cloud Prediction

- **Nascomm Research**
  - Cloud adoption brings immense potential across multiple facets like **economic growth**, **digital inclusion**, **employment**, and **global technology edge.**
  - **For India**, cloud computing has the potential to transform the Indian economy technologically and make it more resilient and inclusive.
  - However, to ensure large scale adoption of cloud and cloud-based services will require multi-stakeholder collaboration to address mindset challenges and perceptions in cloud adoption, incentivise SMBs to transition to cloud, rapidly scale talent through re-skilling and up-skilling programs and amend cloud related policies to ease cloud deployments.
  - https://www.businesstoday.in/latest/economy/story/large-scale-cloud-adoption-can-add-14-mn-jobs-uad-380-bn-to-gdp-by-2026-nasscom-342135-2022-07-20

Available AWS Certifications

Professional

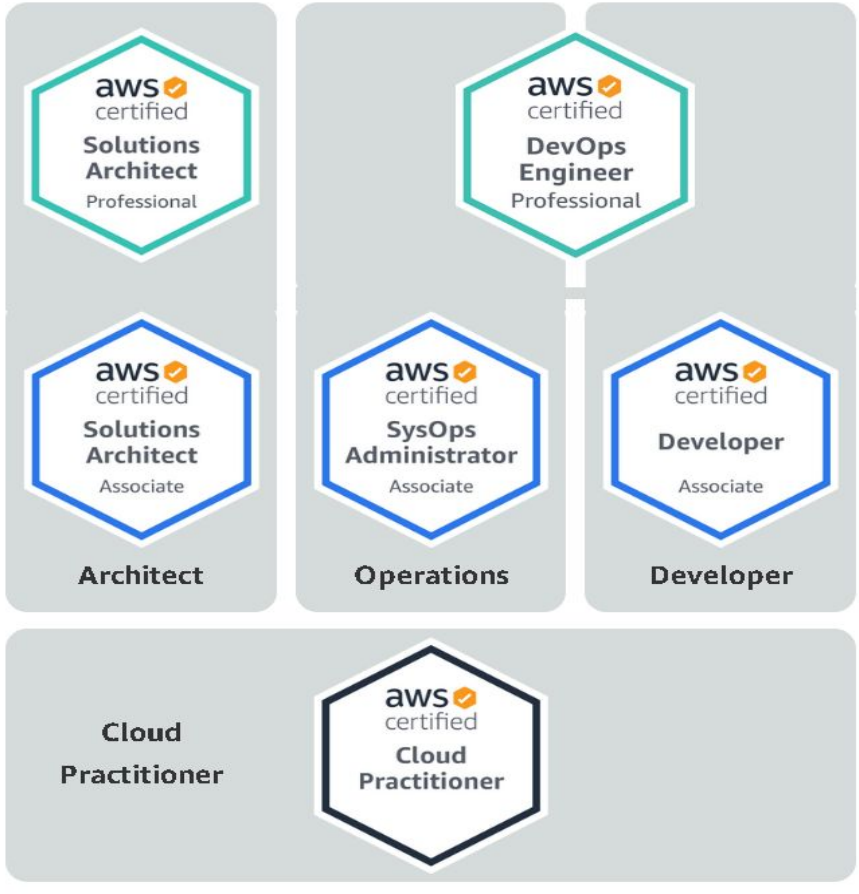
Two years of comprehensive experience designing, operating, and troubleshooting solutions using the AWS Cloud

Associate

One year of experience solving problems and implementing solutions using the AWS Cloud

Foundational

Six months of fundamental AWS Cloud and industry knowledge



Specialty

Technical AWS Cloud experience in the Specialty domain as specified in the **exam guide**

Outline - DevOps

- Challenges in the software and IT service delivery
- What is DevOps?
- How Devops Works?
- Benefits of DevOps
- Devops Practices
- How does DevOps relates to Agile?
- Why AWS for DevOps?

Challenges in the Software and IT Service Delivery

- Manual deployment and roll out of the code.
- Difficulties in developing new products.
- UI changes happen in different interval with back and forth requirement.
- No tools for continuous development and testing (DevOps Tools)
- Software has to **run on a server** to become a service, delivering a service from inception to its users **is too slow and error prone**.
- Requirement changes happen concurrently.
- Major features release takes 2 complete days/weeks

DEV or OPS

Issues:

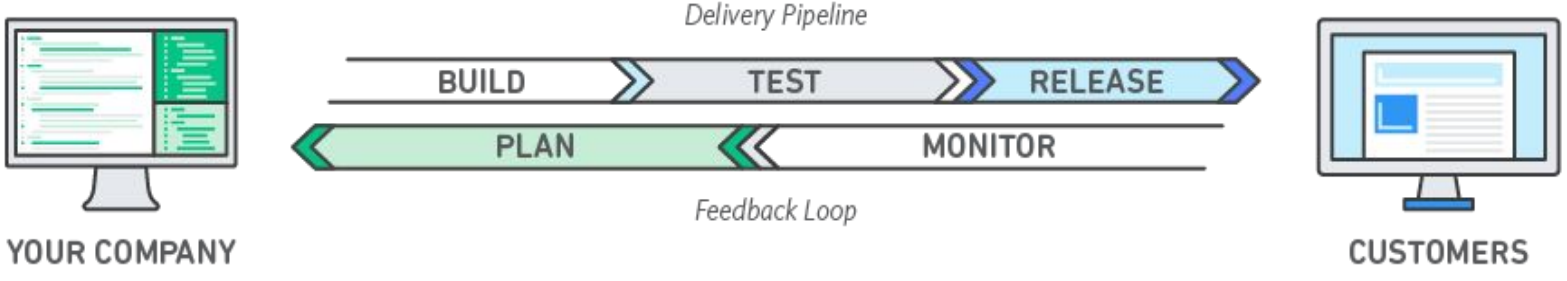
- Few Days after the deployments, the server experiences a high load.
- Application is deployed to test environment, but i am not able to login.
- It works on my machine - **Developer**
- It's not the environment issue, there is an issue with your code - **Operations**

Symptoms:

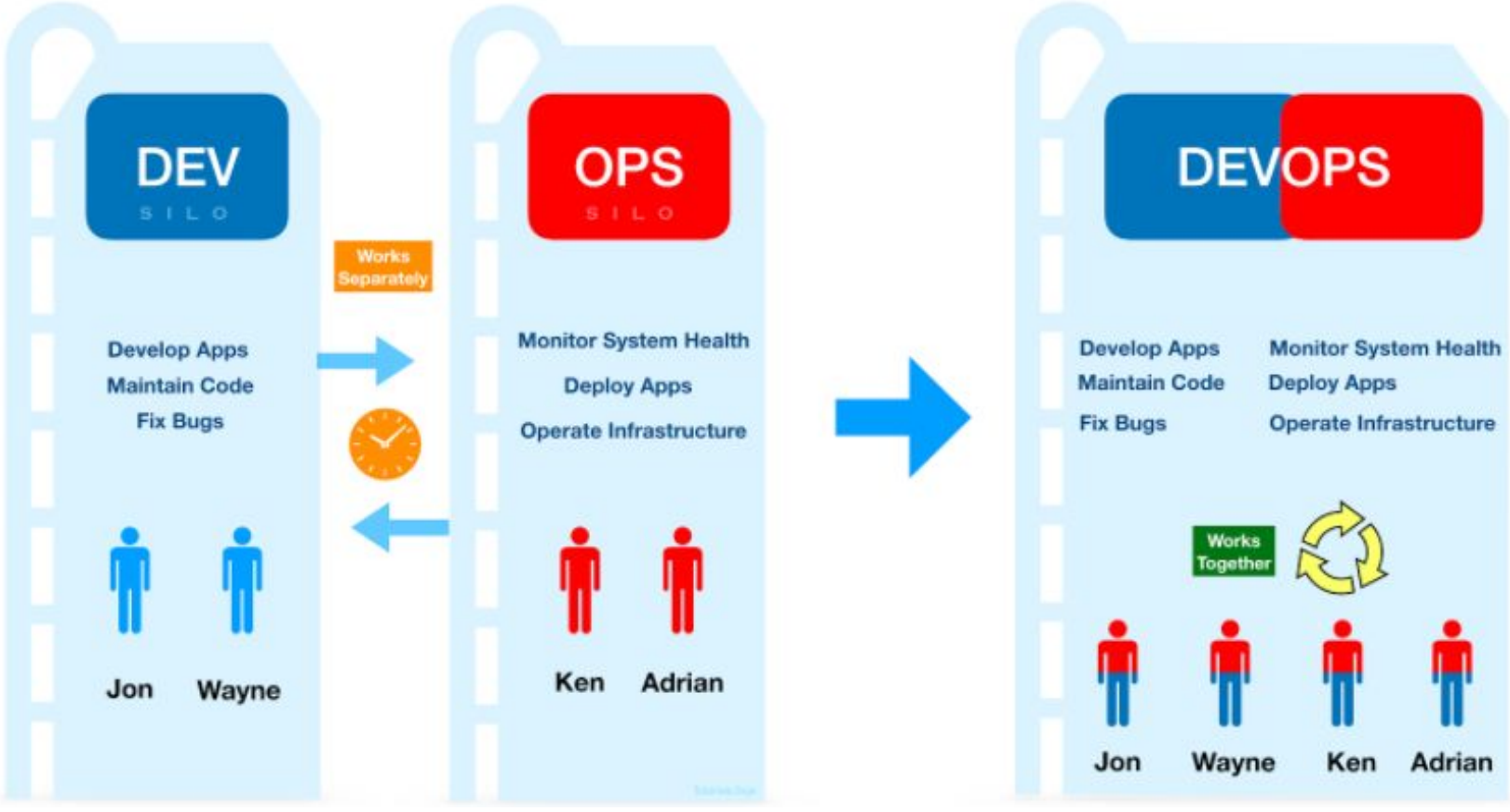
- Defects are released into production, causing outages.
- Problems occur in some environment only.
- **Long delays** while Dev, QA or any another Team waits on resource or response from other teams.

What is DevOps?

- DevOps is the combination of two words: **Development** and **Operations**.
- DevOps is a set of practices that focuses on bringing both **Development and Operation teams** together in order to improve collaboration and productivity during product development.
- It also increases an organization's ability to deliver applications and services at high velocity.
- Thus evolving and improving products at a faster pace to better serve their customers and compete more effectively in the market.
- DevOps is an engineering culture of **collaboration, learning, and accelerating Software Development** right from *ideation to production*.



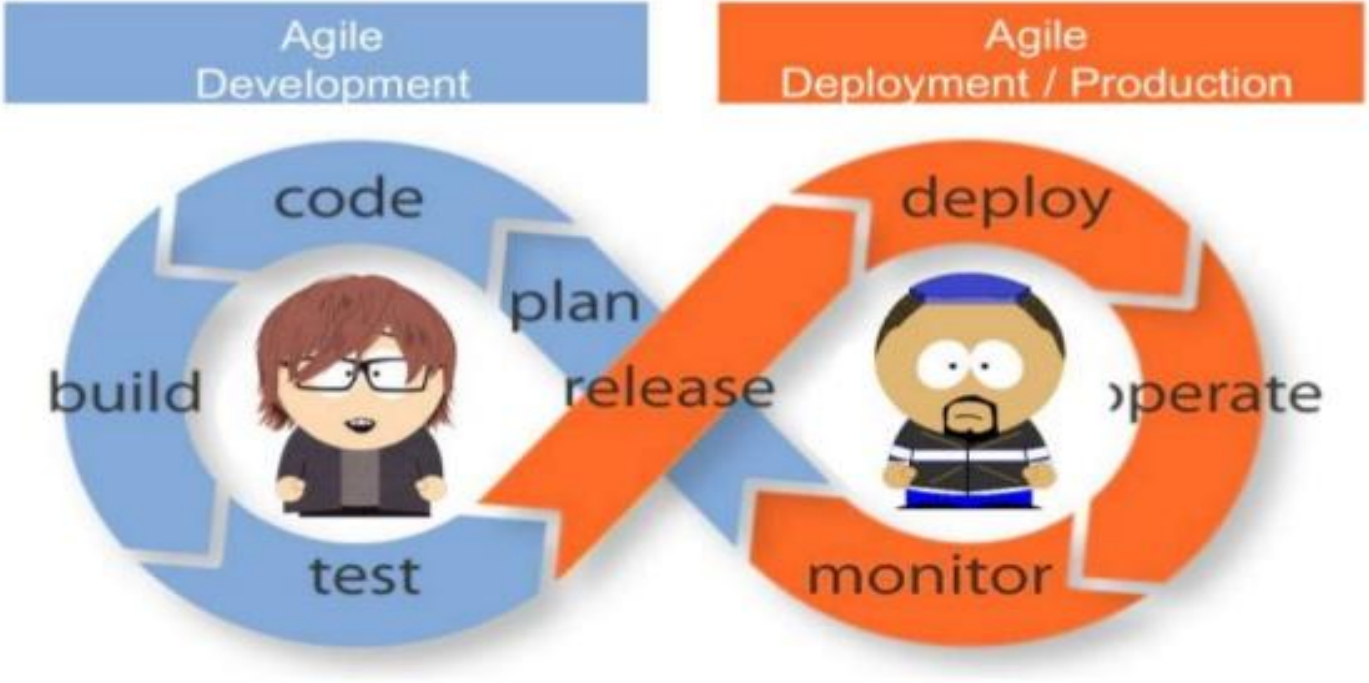
What is DevOps?



How DevOps Works?

- Under a DevOps model, **development and operations teams** are no longer working independently.
- Sometimes, these two teams are merged together where they work across the **entire application lifecycle**, from dev and test to deployment operations.
- These teams use **practices to automate processes** that historically have been manual and slow.
- They use a technology stack and tooling which help them operate and evolve applications quickly and reliably.

Extend Agility to Production:



How ?

1. Infrastructure as Code

2. Continuous Delivery

3. Culture of Collaboration

Benefits of DevOps

- **Speed**
  Move at high velocity so you can innovate for customers faster and adapt changes for growth.

- **Rapid Delivery**
  Increase the frequency and pace of releases.

- **Reliability**
  Ensure the quality of application updates and infrastructure changes.

- **Scale**
  Operate and manage your infrastructure and development processes at scale.
- **Improved Collaboration**
  Emphasize values in the team such as ownership and accountability

DevOps Practices

Continuous Integration

- Developers regularly merge their code changes into a central repository after which automated builds and tests are run.

Continuous Delivery

- code changes are *automatically built, tested, & prepared for a release to production.*
- It expands upon continuous integration by deploying all code changes to a testing and/or a production environment after the build stage.

Security

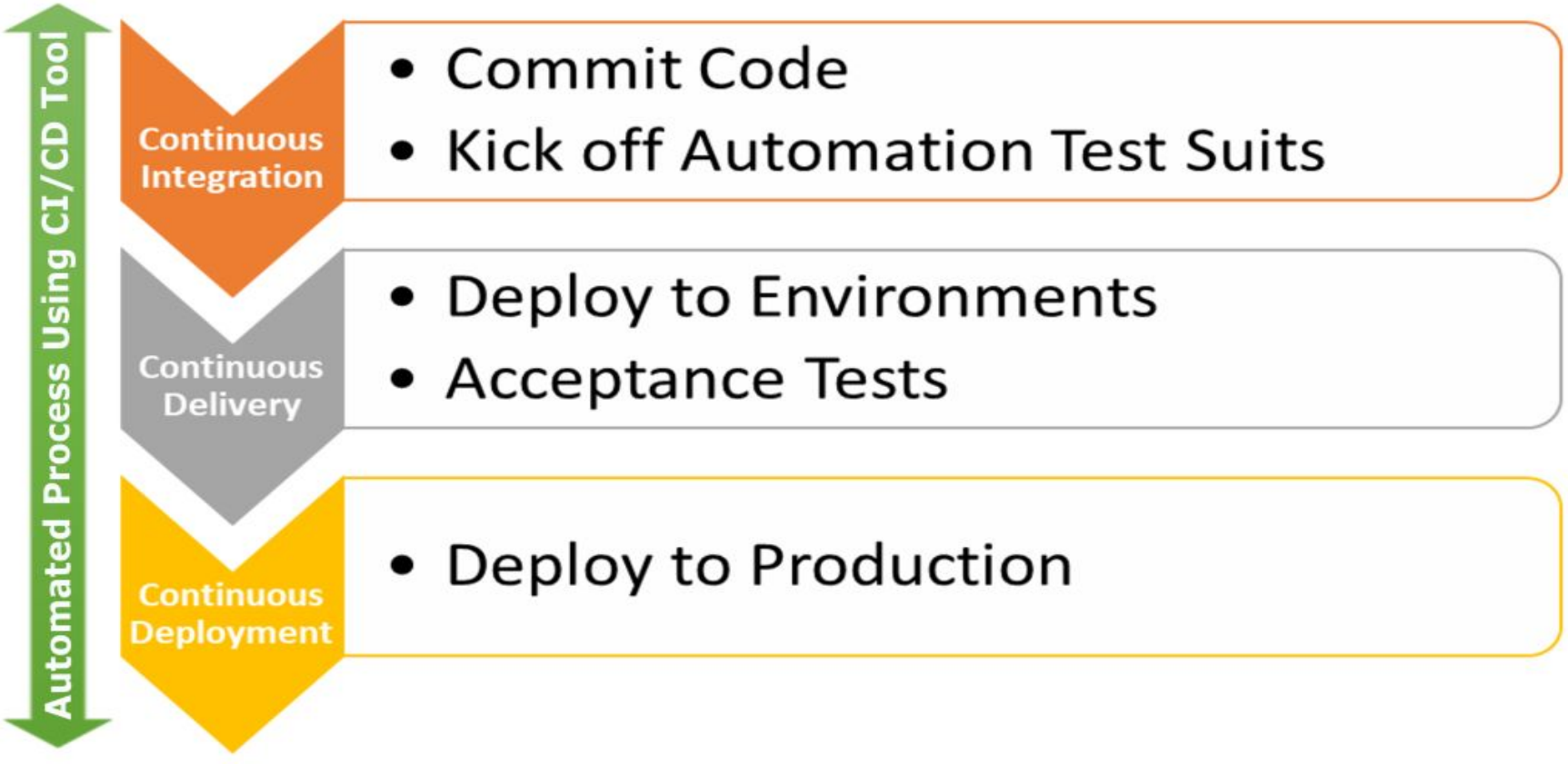
- Move quickly while retaining control and preserving compliance

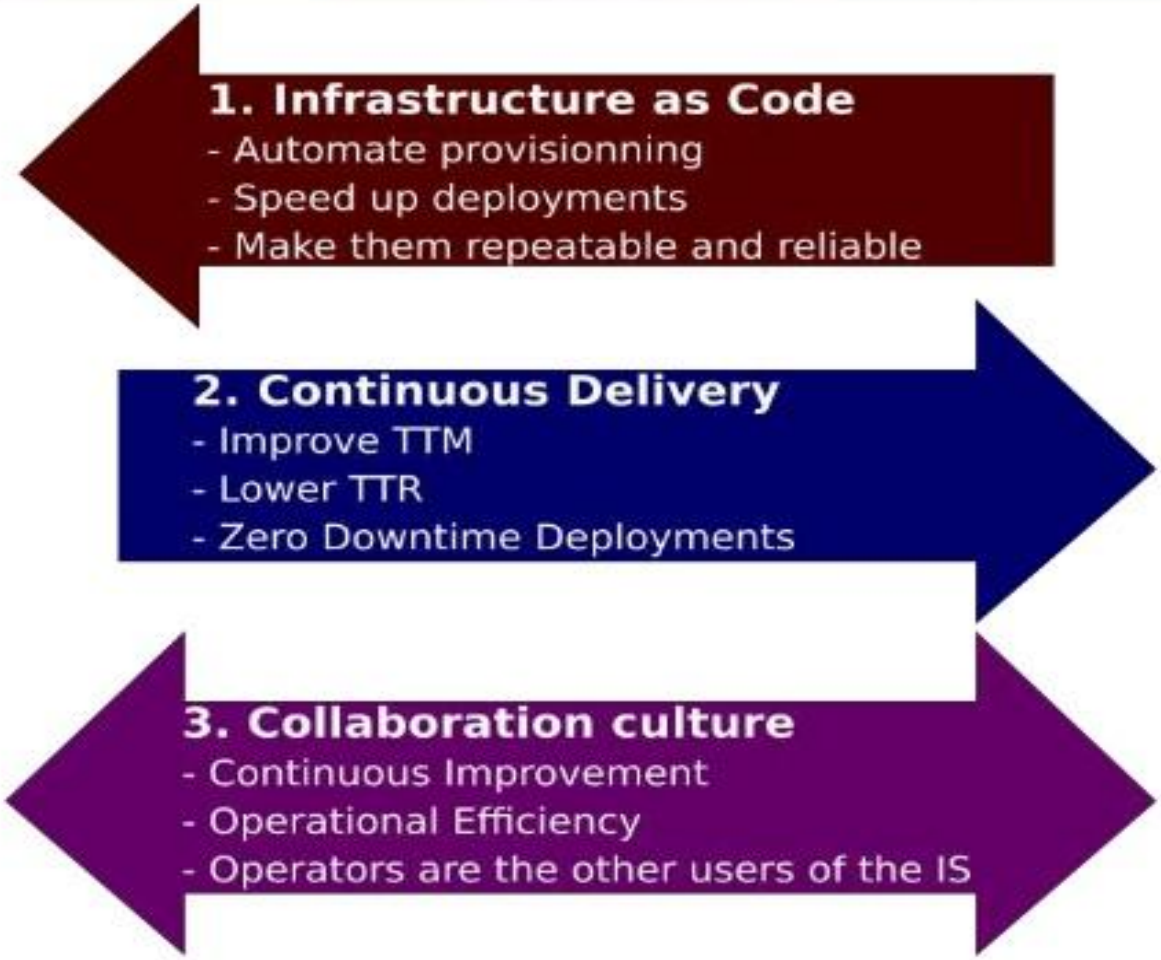
Infrastructure as Code

- Infrastructure as code is a practice in which infrastructure is provisioned and managed using code and software development techniques, such as version control and continuous integration.

Monitoring and Logging

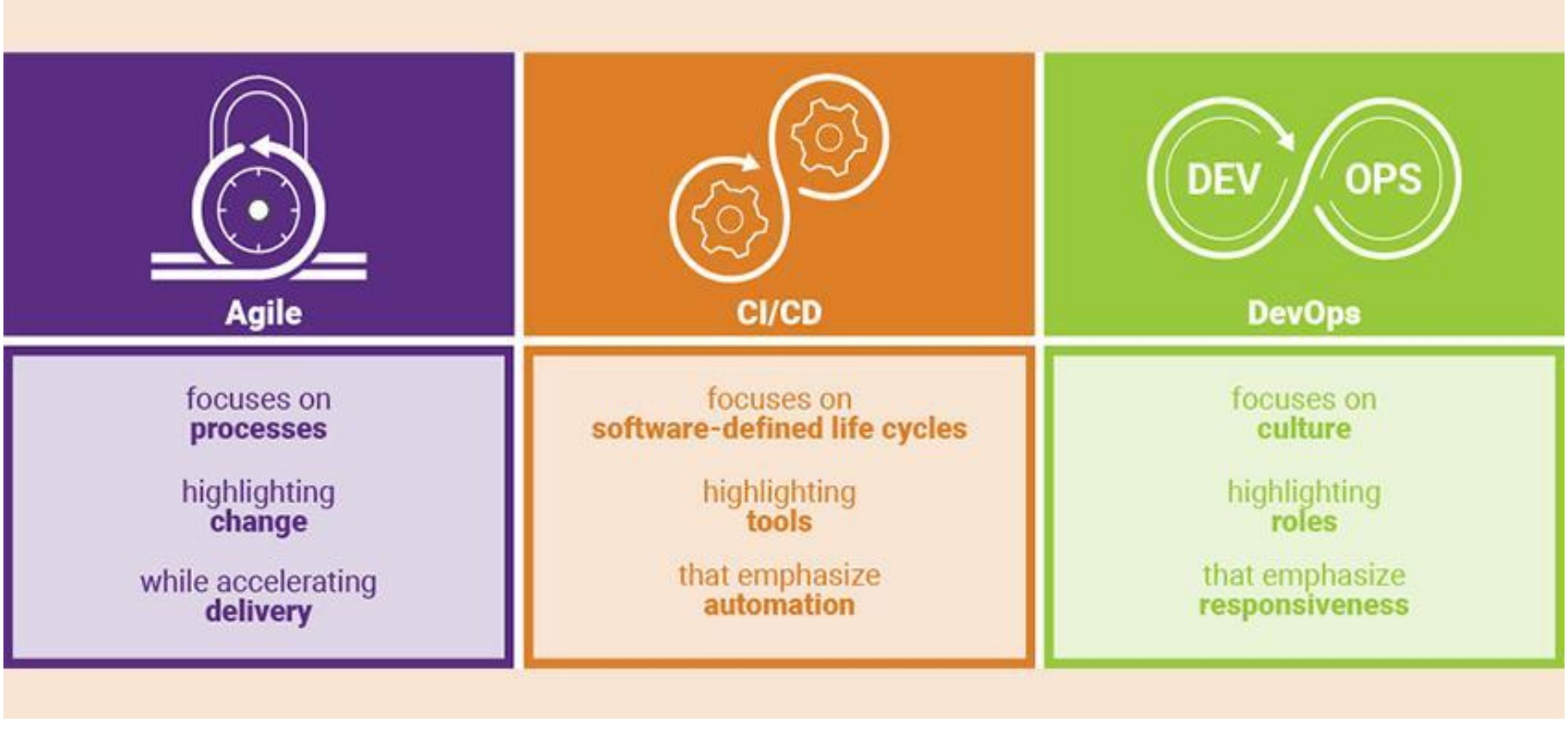
- Capture, analyze data and logs generated by application and infrastructure.


Automated Process Using CI/CD Tool
Continuous Integration
Commit Code
Kick off Automation Test Suits
Continuous Delivery
Deploy to Environments
Acceptance Tests
Continuous Deployment
Deploy to Production



TTM : Time To Market
TTR : Time To Repair/Resolution

How does DevOps relates to Agile?



IT MUST EVOLVE TO STAY AHEAD OF DEMANDS

	Development Process	Application Architecture	Deployment & Packaging	Application Infrastructure
TRADITIONAL	Waterfall	Monolithic	Physical Servers	Datacenter
MODERN	Agile	N-Tier	Virtual Servers	Hosted
DIGITAL	DevOps	Microservices	Containers	Cloud

OUTCOMES

- Speed
- Agility
- Control

Table 1. Worldwide Public Cloud Service Revenue Forecast (Millions of U.S. Dollars)

	2019	2020	2021	2022
Cloud Business Process Services (BPaaS)	45,212	43,438	46,287	49,509
Cloud Application Infrastructure Services (PaaS)	37,512	43,498	57,337	72,022
Cloud Application Services (SaaS)	102,064	104,672	120,990	140,629
Cloud Management and Security Services	12,836	14,663	16,089	18,387
Cloud System Infrastructure Services (IaaS)	44,457	50,393	64,294	80,980
Desktop as a Service (DaaS)	616	1,203	1,951	2,535
Total Market	**242,697**	**257,867**	**306,948**	**364,062**

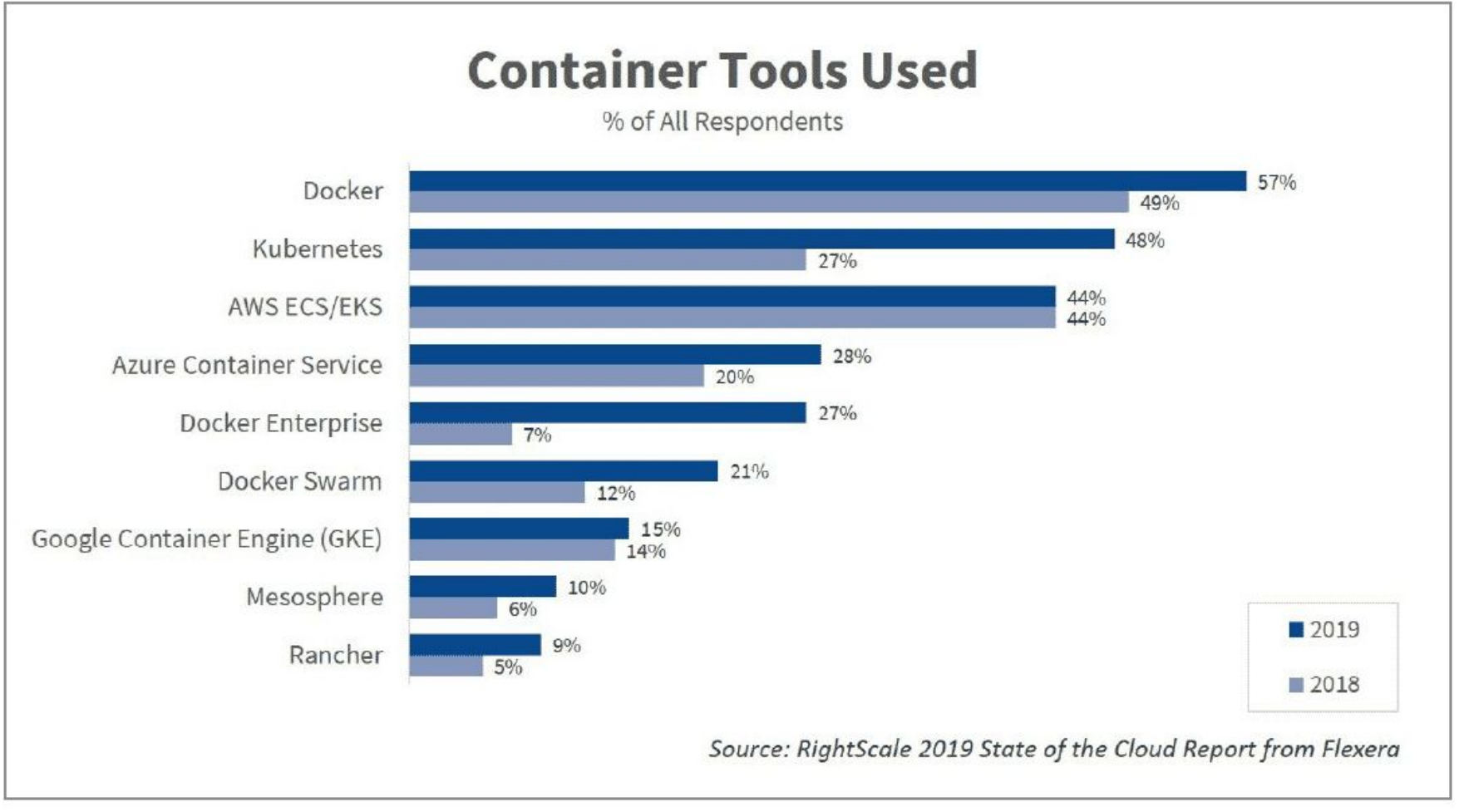
BPaaS = business process as a service; IaaS = infrastructure as a service; PaaS = platform as a service; SaaS = software as a service
Note: Totals may not add up due to rounding.

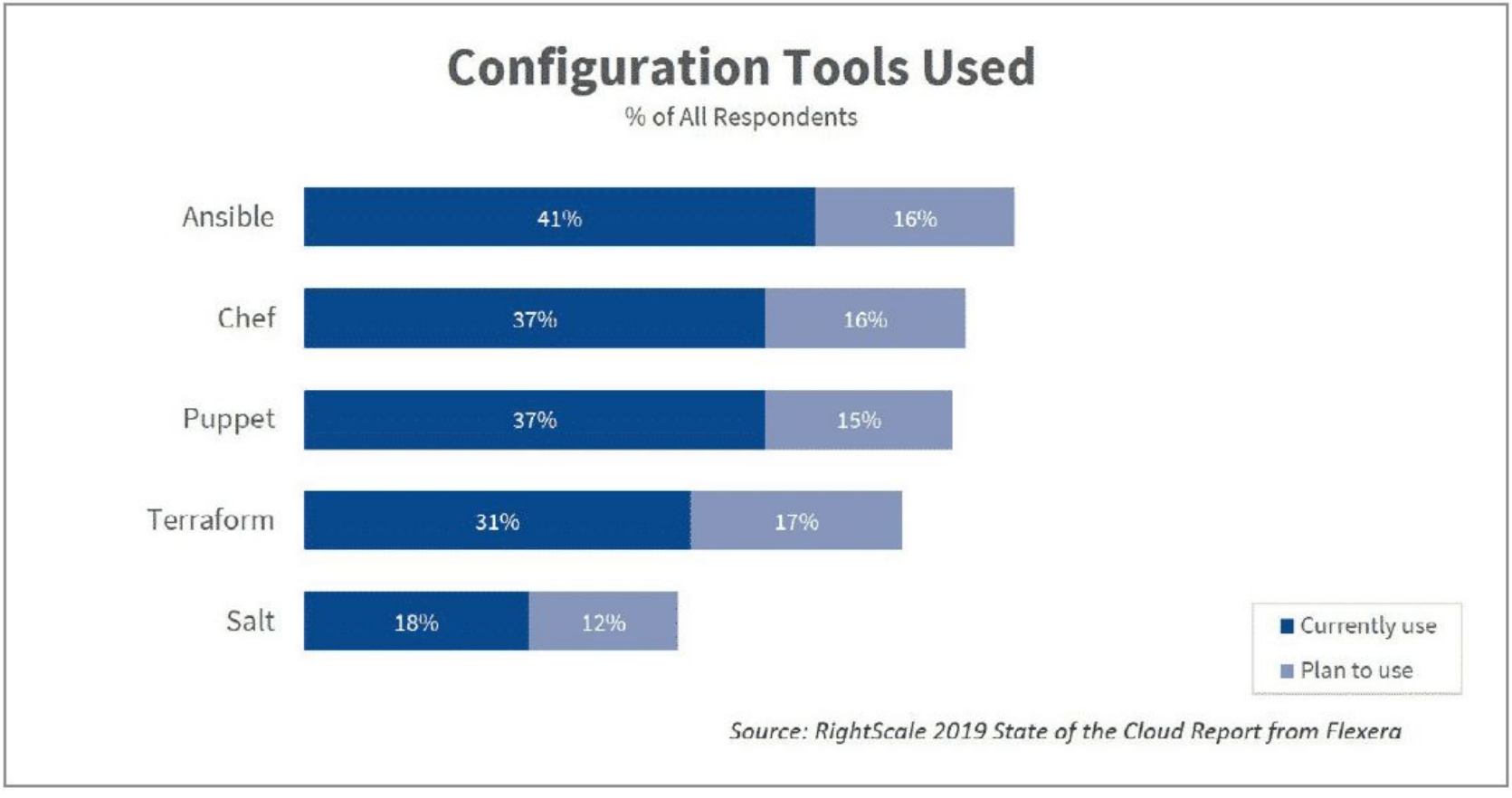
Source: Gartner (July 2020)

https://www.gartner.com/en/newsroom/press-releases/2020-07-23-gartner-forecasts-worldwide-public-cloud-revenue-to-grow-6point3-percent-in-2020

Why AWS for DevOps?

- Get Started fast
- Pay-As-You-Go
- Fully Managed Services
- Built for scale.
- Programmable
- Automation
- Secure
- Large Partner Ecosystem


Container Tools Used
% of All Respondents
Docker
57%
49%
Kubernetes
48%
27%
AWS ECS/EKS
44%
44%
Azure Container Service
28%
20%
Docker Enterprise
27%
7%
Docker Swarm
21%
12%
Google Container Engine (GKE)
15%
14%
Mesosphere
10%
6%
Rancher
9%
5%
2019
2018
Source: RightScale 2019 State of the Cloud Report from Flexera



https://www.flexera.com/blog/cloud/2019/02/cloud-computing-trends-2019-state-of-the-cloud-survey/