
# Introduction to Cloud Computing

# Security and Privacy in Cloud

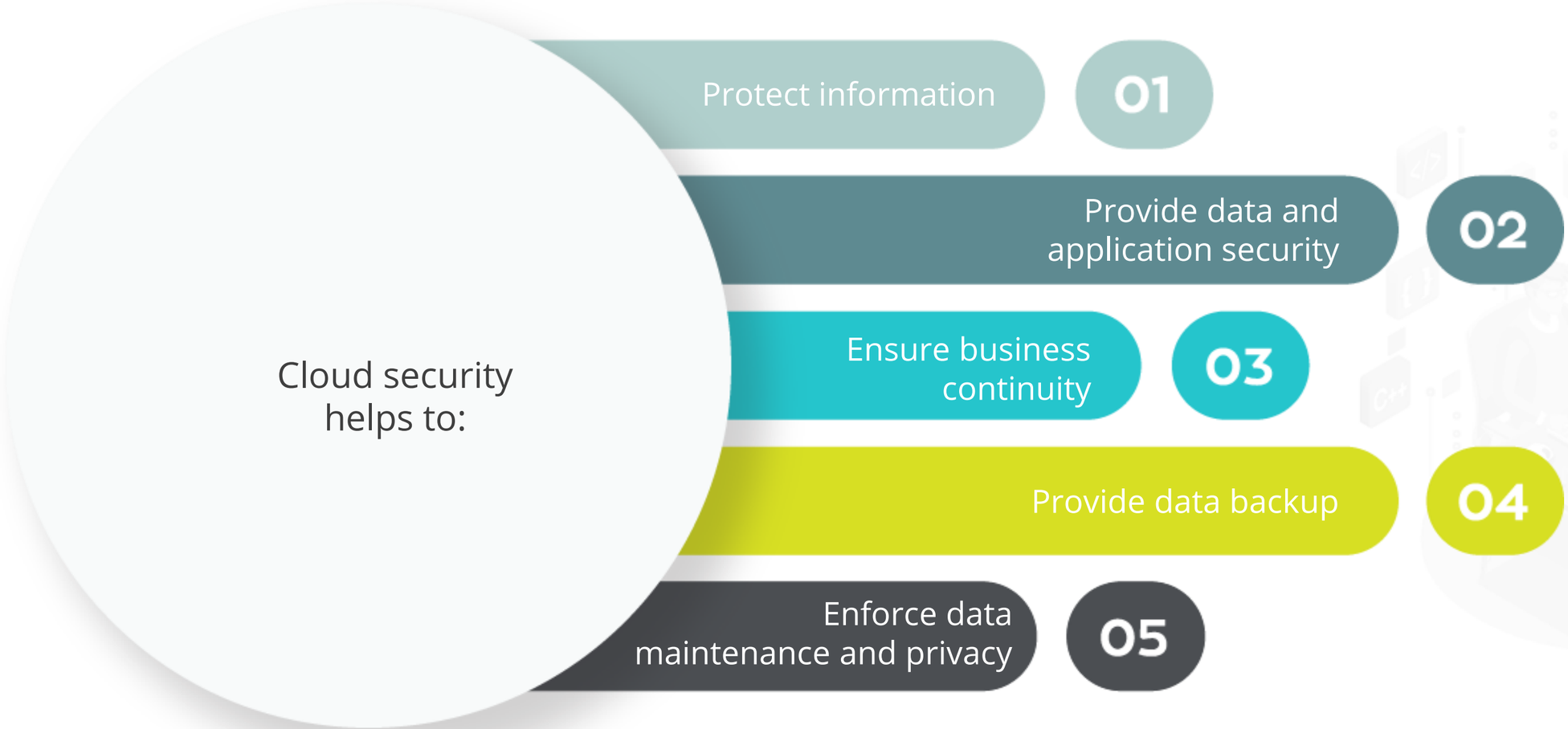
# Learning Objectives

By the end of this lesson, you will be able to:

- List the pros and cons related to data security in both public and private clouds
- Describe how cloud security is a shared responsibility between the cloud vendor and enterprises
- List the components of compliance
- List some of the laws governing compliance

# Cloud Security

# Why Is Cloud Security Important?



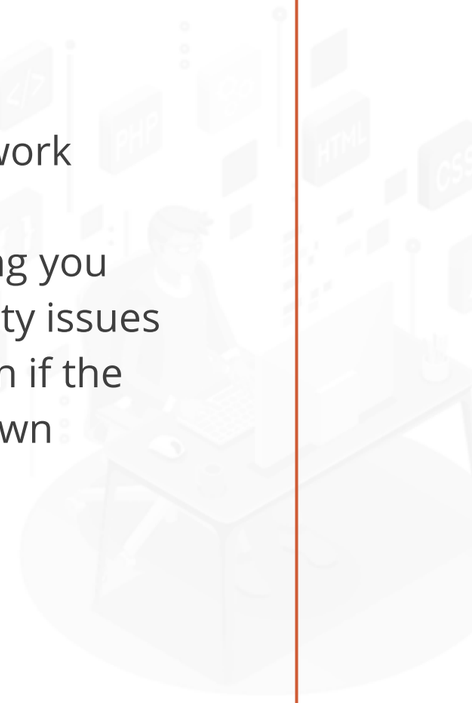
# Public Cloud vs. Private Cloud: Advantages

## Public Cloud

1. Provides an enterprise-level firewall
2. Stores and protects data in their datacenter
3. Keeps data safe from malicious employees
4. Employs security expertise to improve data security
5. Guards against datacenter or hardware failures
6. Handles any sudden increase in demand

## Private Cloud

1. Provides an internal firewall
2. Stores data in a private network
3. Protects from data leakage
4. Keeps data isolated, guarding you from network-related security issues
5. Ensures zero downtime even if the cloud providers face shutdown



# Public Cloud vs. Private Cloud: Disadvantages

## Public Cloud

1. Grants data access to anyone and from anywhere
2. Can result in a vendor lock-in
3. Creates dependency on cloud vendors for issue resolutions
4. May be subject to jurisdictional or compliance issues

## Private Cloud

1. Grants physical access to very few people, increasing security risk from malicious insiders
2. Requires protection from different kinds of security attacks, like DDoS or malwares
3. Needs a disaster recovery plan
4. May get impacted by ISP or power failures
5. Relies completely on internal security

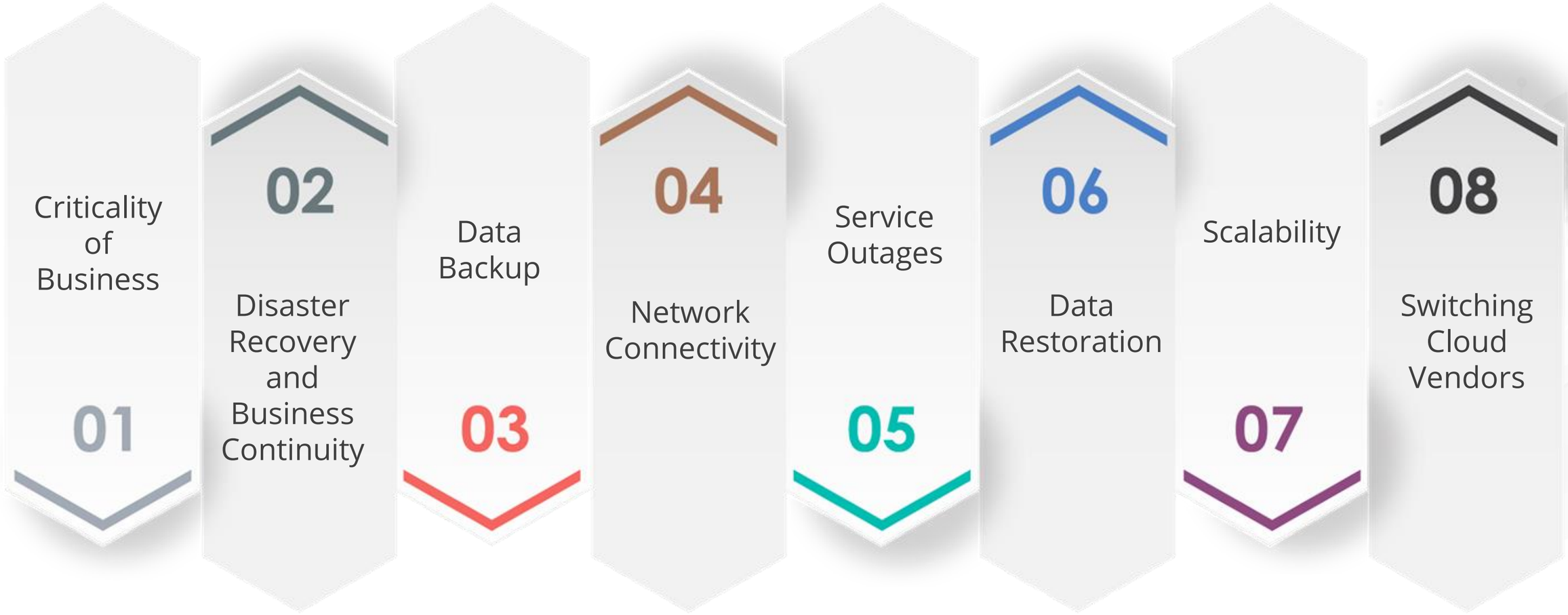
# Cloud Security Considerations

# Security Considerations for the Cloud

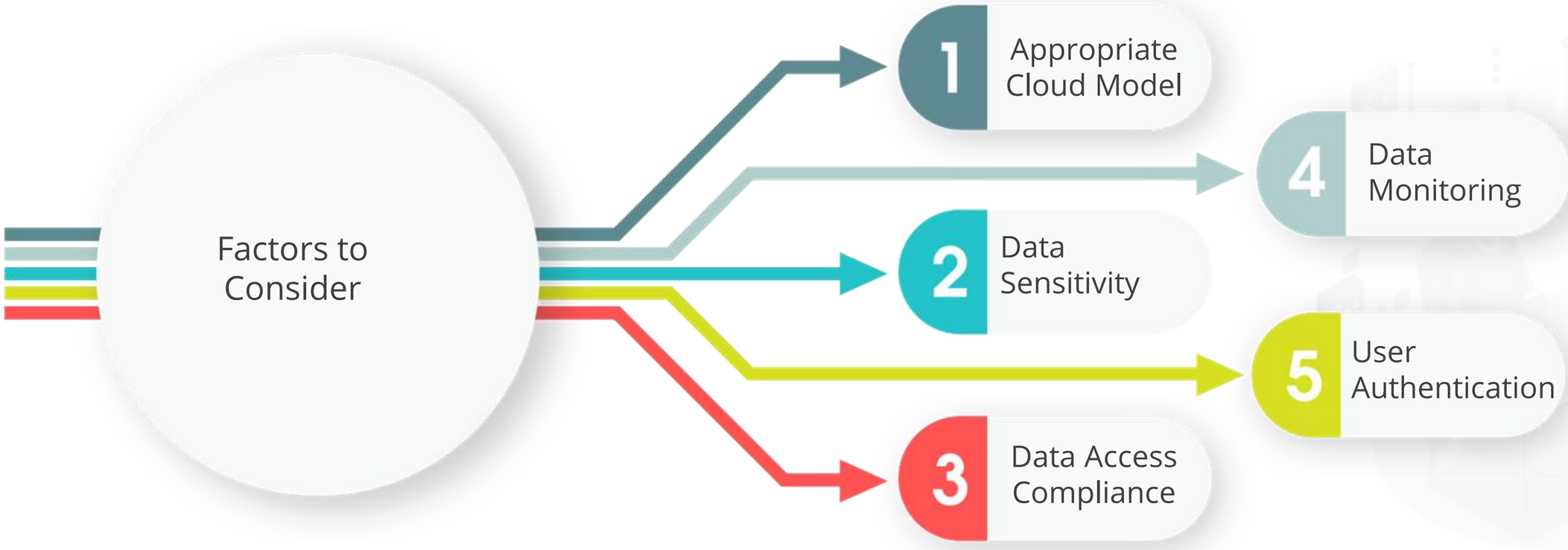
1. Maintaining Business Functionality and Availability
2. Protecting Data from Unauthorized Third-Party Access
3. Handling Security Incidents
4. Providing Advanced Networking Options

# Maintaining Business Functionality and Availability

These are some factors to consider:



# Protecting Data from Unauthorized Third-Party Access



# Networking Options and Best Practices

# Handling Security Incidents

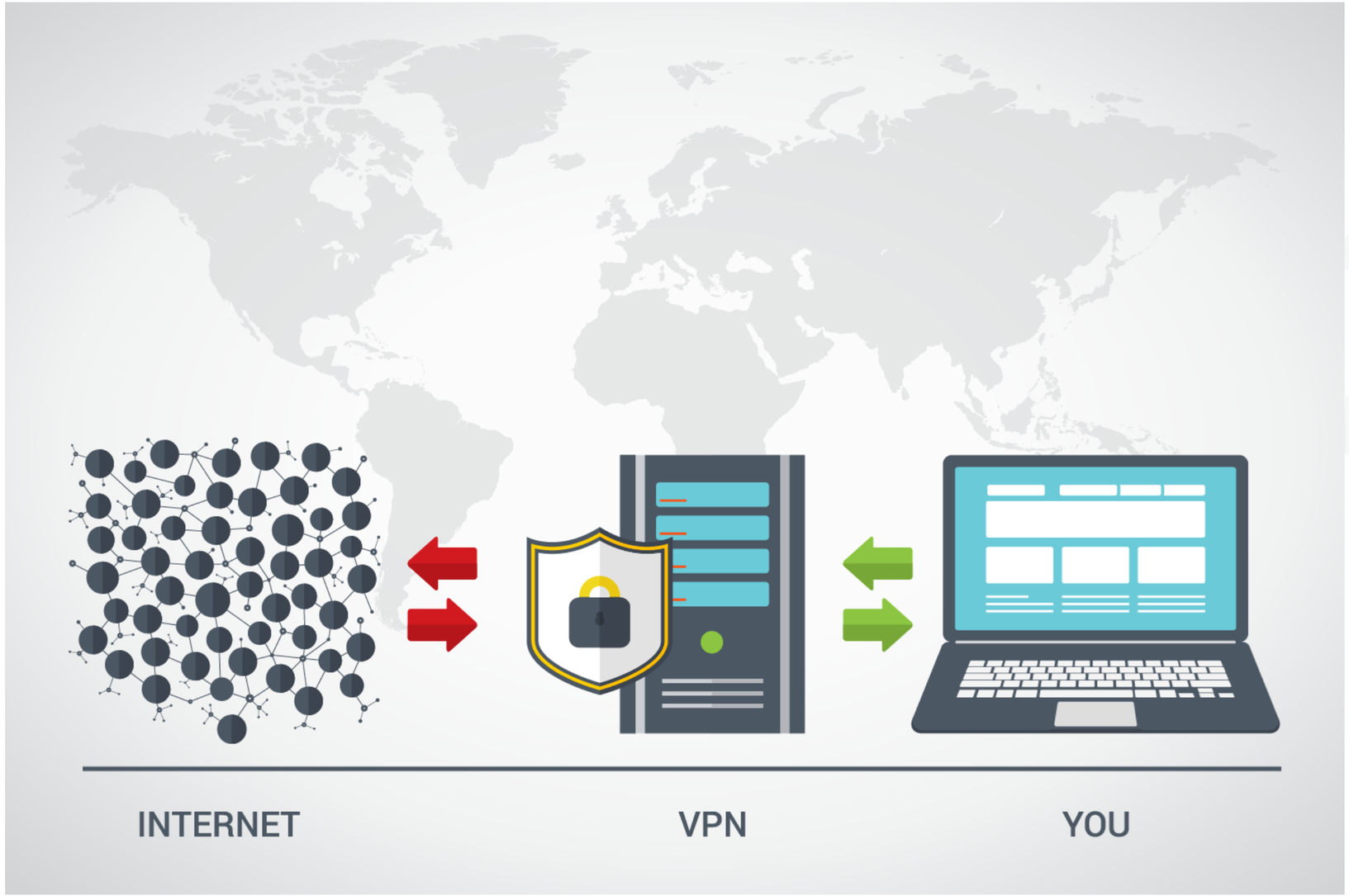
Log Monitoring

Alerts and Notifications

Vendor Support

# Providing Advanced Networking Options

You can get high throughput and enhanced security with a dedicated Virtual Private Network (VPN).



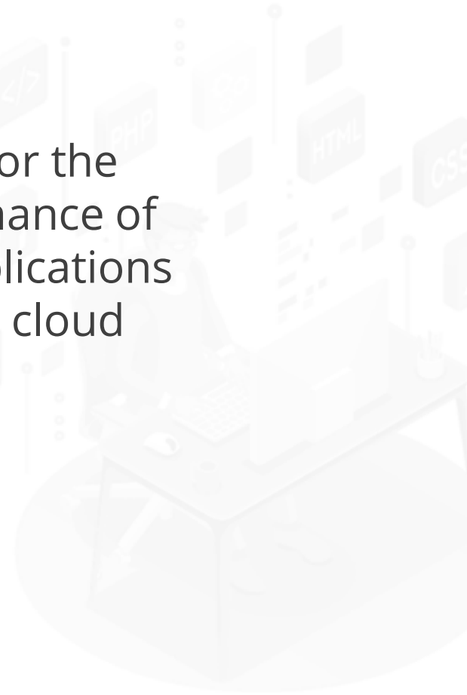
# Security Considerations: Best Practices

Choose appropriate cloud services and explore your shared responsibilities

Encrypt data to protect it from any unauthorized access

Ensure data backup and recovery options are in place

Monitor the performance of your applications on the cloud



# Cloud Security, Compliance, and Vulnerability

# Multi-Cloud Approach

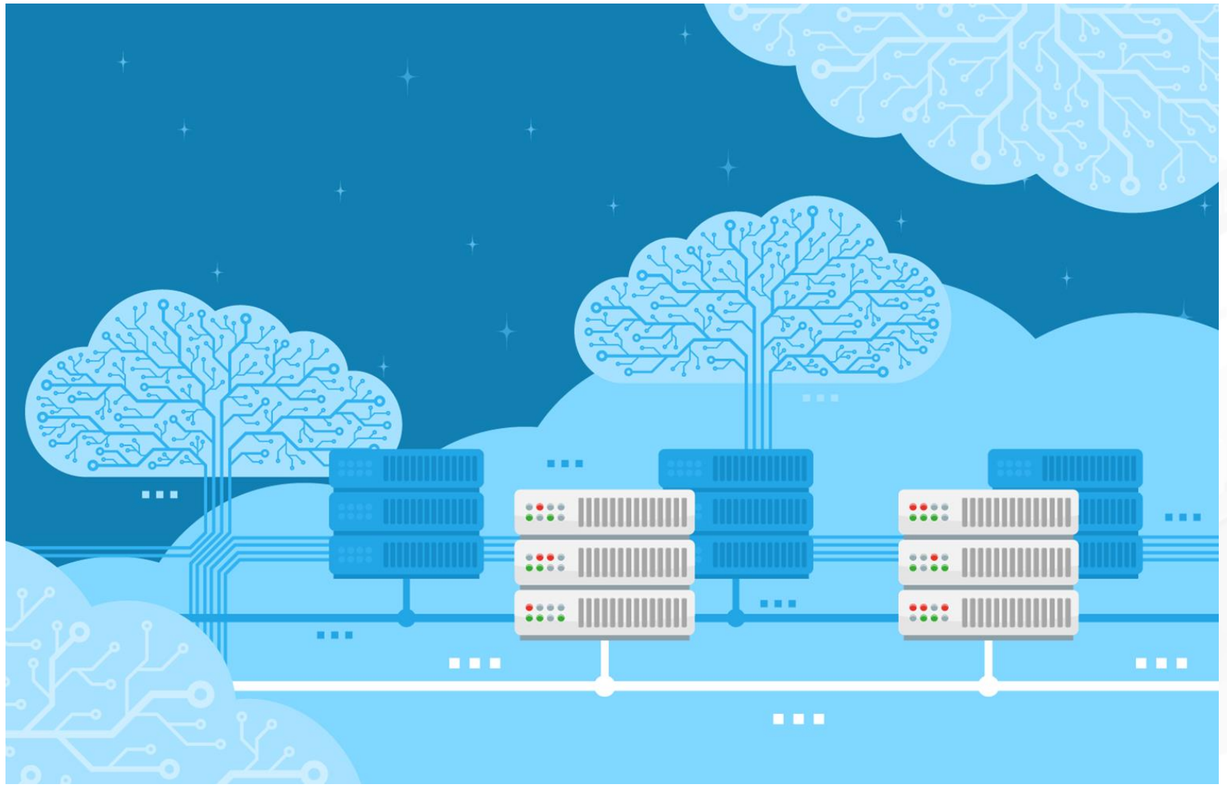
Enterprises are leveraging multiple clouds to run their services or workloads. This helps prevent:

- Vendor lock-in
- Any unexpected service outage at a specific vendor's end

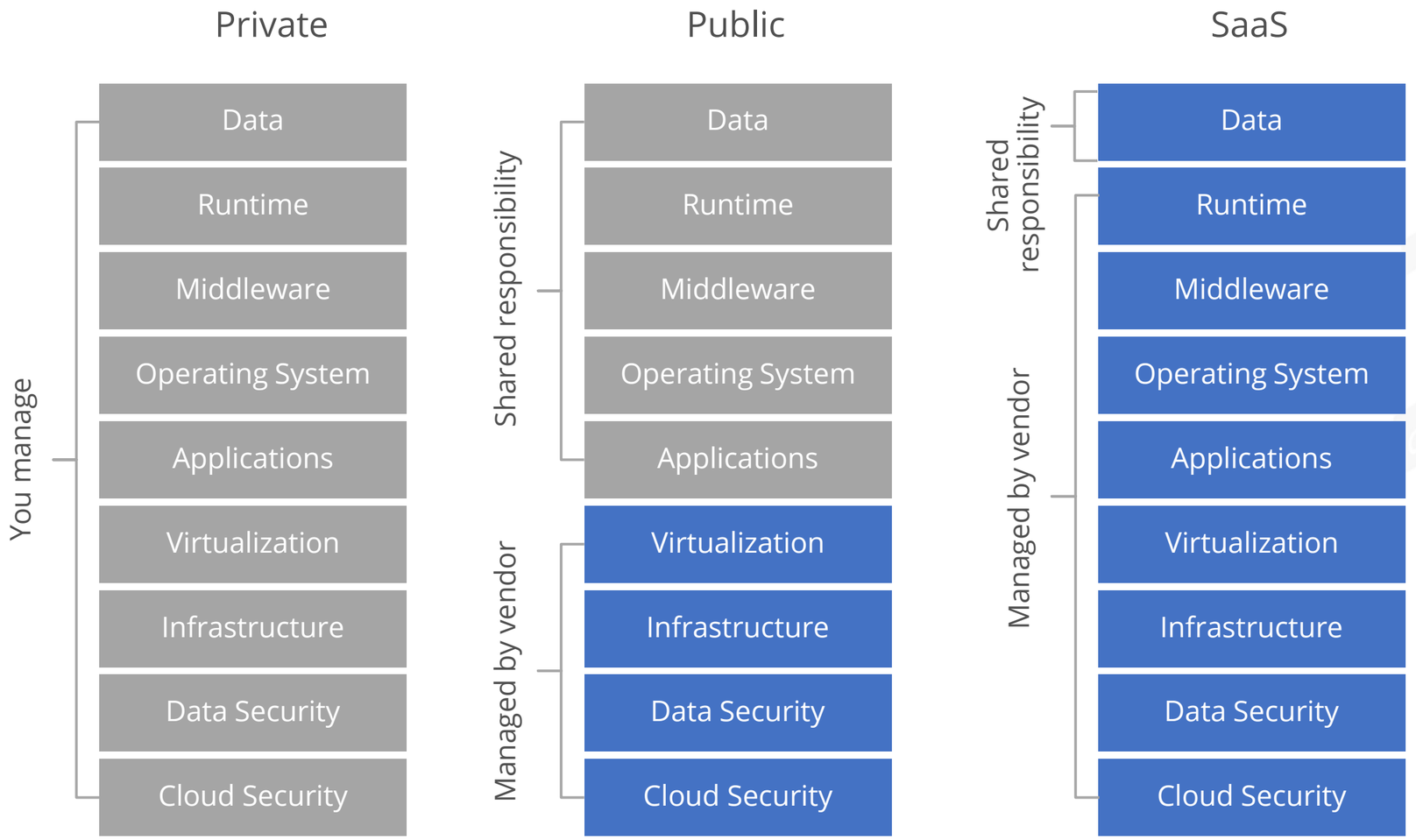
**Example:**

HSBC uses:

- A mix of AWS, Azure, and GCP to divide its workload
- GCP for Big Data and analytics
- Azure for migrating its legacy application to cloud

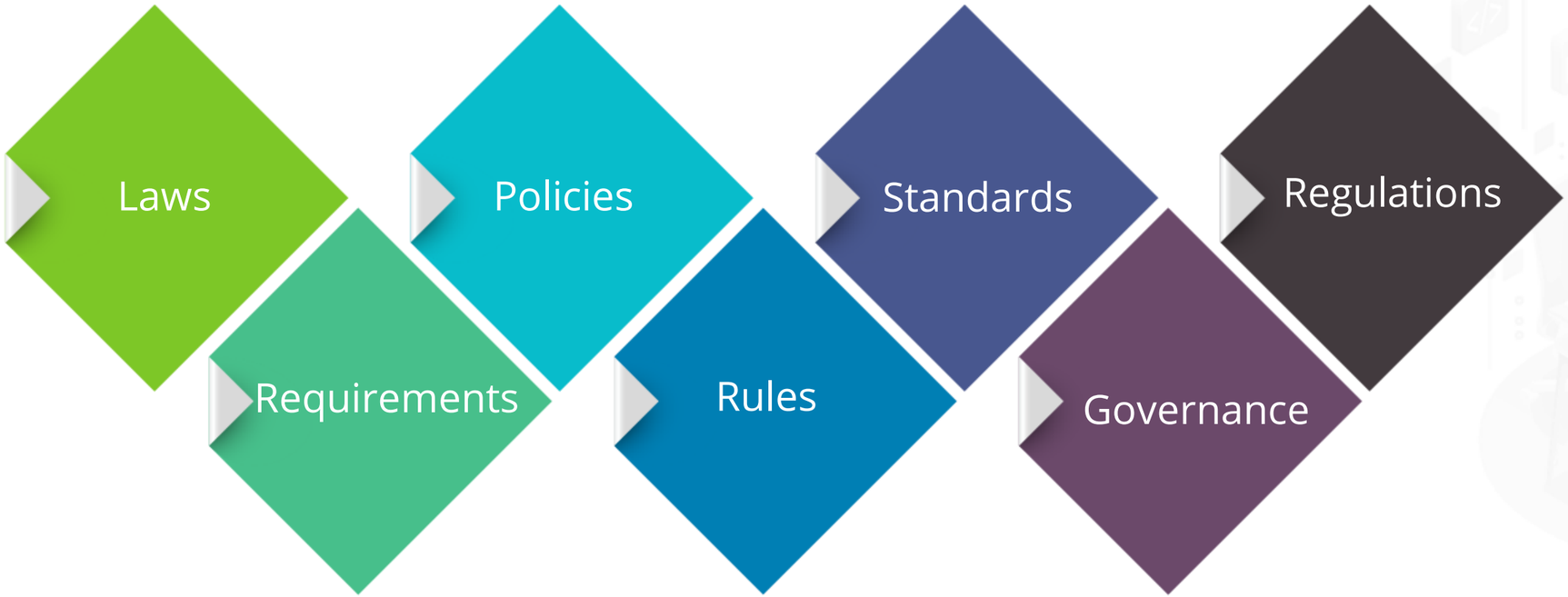


# Security Responsibilities of Vendor vs. Enterprise



# Compliance

You should maintain and achieve compliance in the relevant region or industry you are catering to.
Compliance includes:



# Vulnerability and Mitigation Assessment

Update operating systems and applications

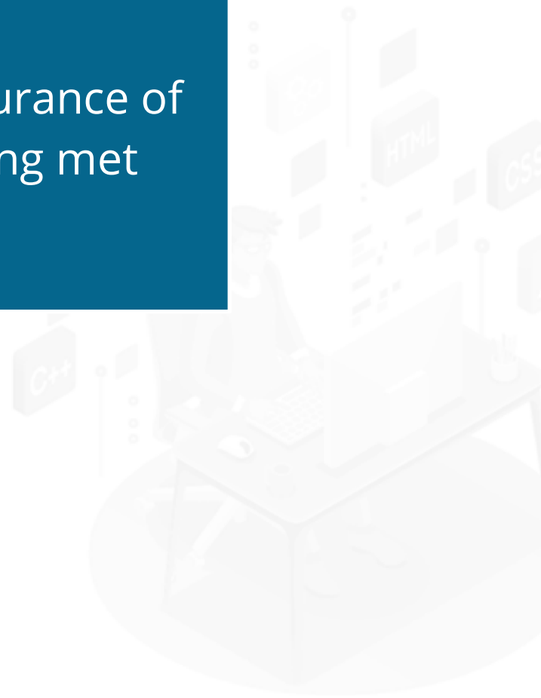
Data backup and testing

Perform virtual machine security scan

# Compliance

# Benefits of Compliance

- Promotes interoperability, eliminating vendor lock-in
- Facilitates hybrid cloud computing
- Provides an assurance of standards being met
- Provides a means for customers to compare and contrast cloud service providers
- Enables regulatory compliance

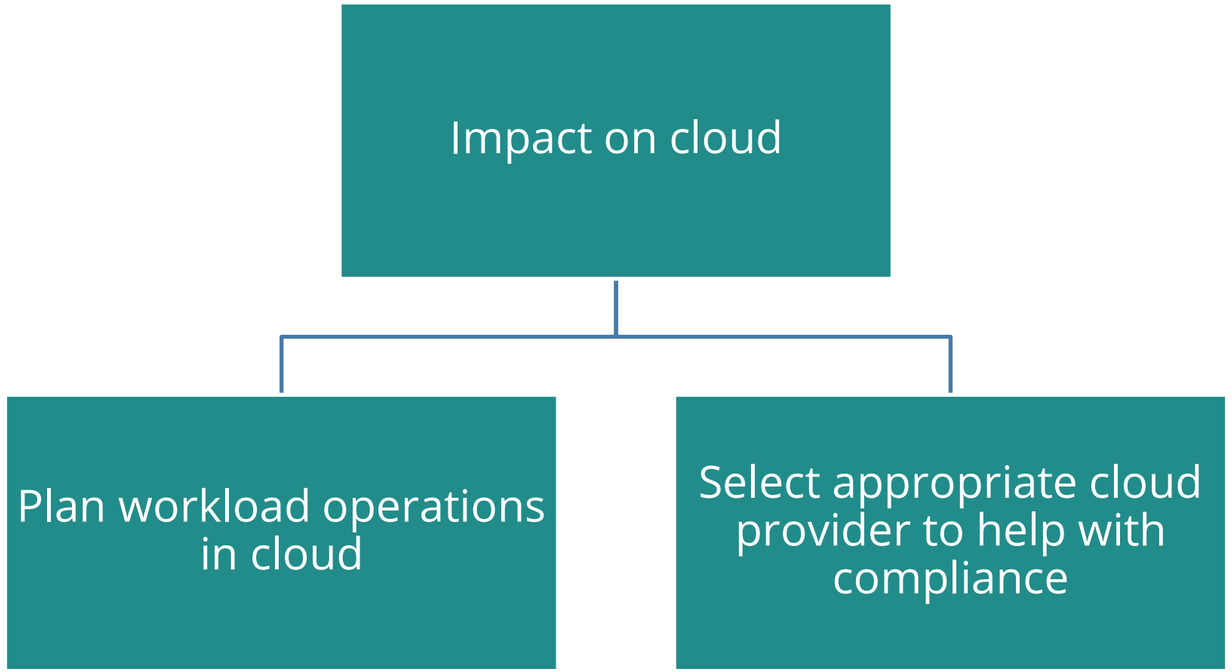


# Laws Governing Various Geographies

# Compliance Using GDPR and FedRAMP

# GDPR

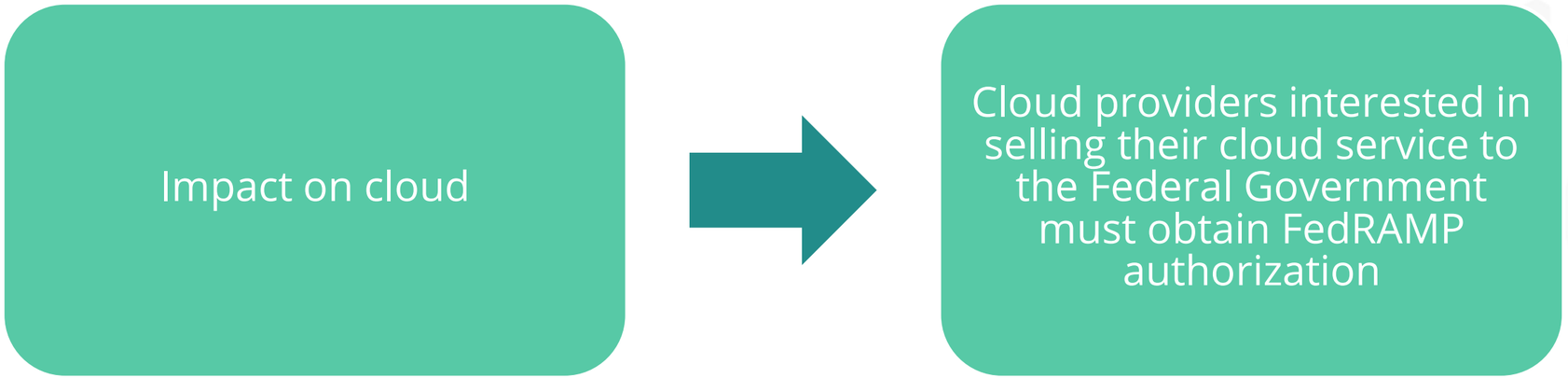
The General Data Protection Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 is a regulation in EU law on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).



# FedRAMP

The US Federal Risk and Authorization Management Program (FedRAMP) was established to:

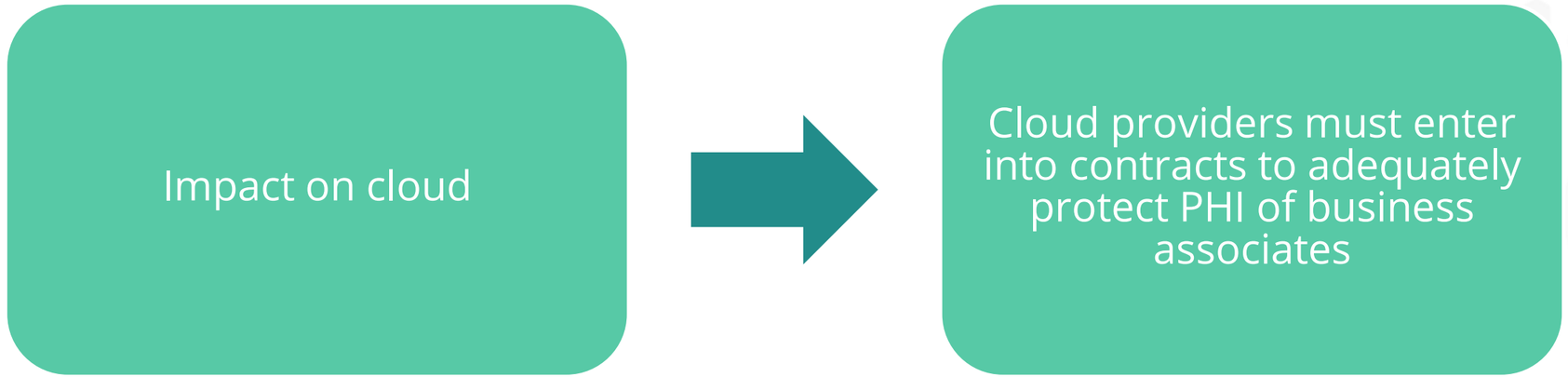
- Assess security
- Monitor continuously
- Authorize cloud computing products and services



# Compliance Using HIPAA and HITRUST

# HIPAA

The Health Insurance Portability and Accountability Act (HIPAA) is a US healthcare regulation. It requires cloud providers to maintain confidentiality and security of individually identifiable health information (PHI).



# HITRUST

The Health Information Trust Alliance (HITRUST) is an organization governed by representatives from the healthcare industry. The organization creates and maintains the Common Security Framework (CSF).

Impact on cloud

HITRUST provides a benchmark against which cloud service providers and covered health entities can measure compliance

# Privacy Use Case

# Walmart

Walmart has achieved scalability, security, and reduced capital expenditure by doing the following:

**Omni-channel experience**

- Created a mix of both e-commerce and brick and mortar
- Enabled customers to access the store from anywhere

**Digital transformation**

- Adopted Microsoft Azure to:
  - Grow and enhance their online experience
  - Meet customer demands with powered checkout

**Innovation**

- Leveraged IoT to reduce energy consumption for refrigeration units
- Used machine learning techniques to route trucks backing their supply chain

# Key Takeaways

- Cloud security helps protect data and ensures business continuity.
- Public and private clouds have their own advantages and disadvantages related to data security.
- Cloud security is a shared responsibility between the cloud vendor and the enterprise.
- Compliance involves region or industry specific laws, requirements, policies, rules, standards, governance, and regulations.
- GDPR, FedRAMP, HIPAA, and HITRUST are some of the laws governing various geographies.