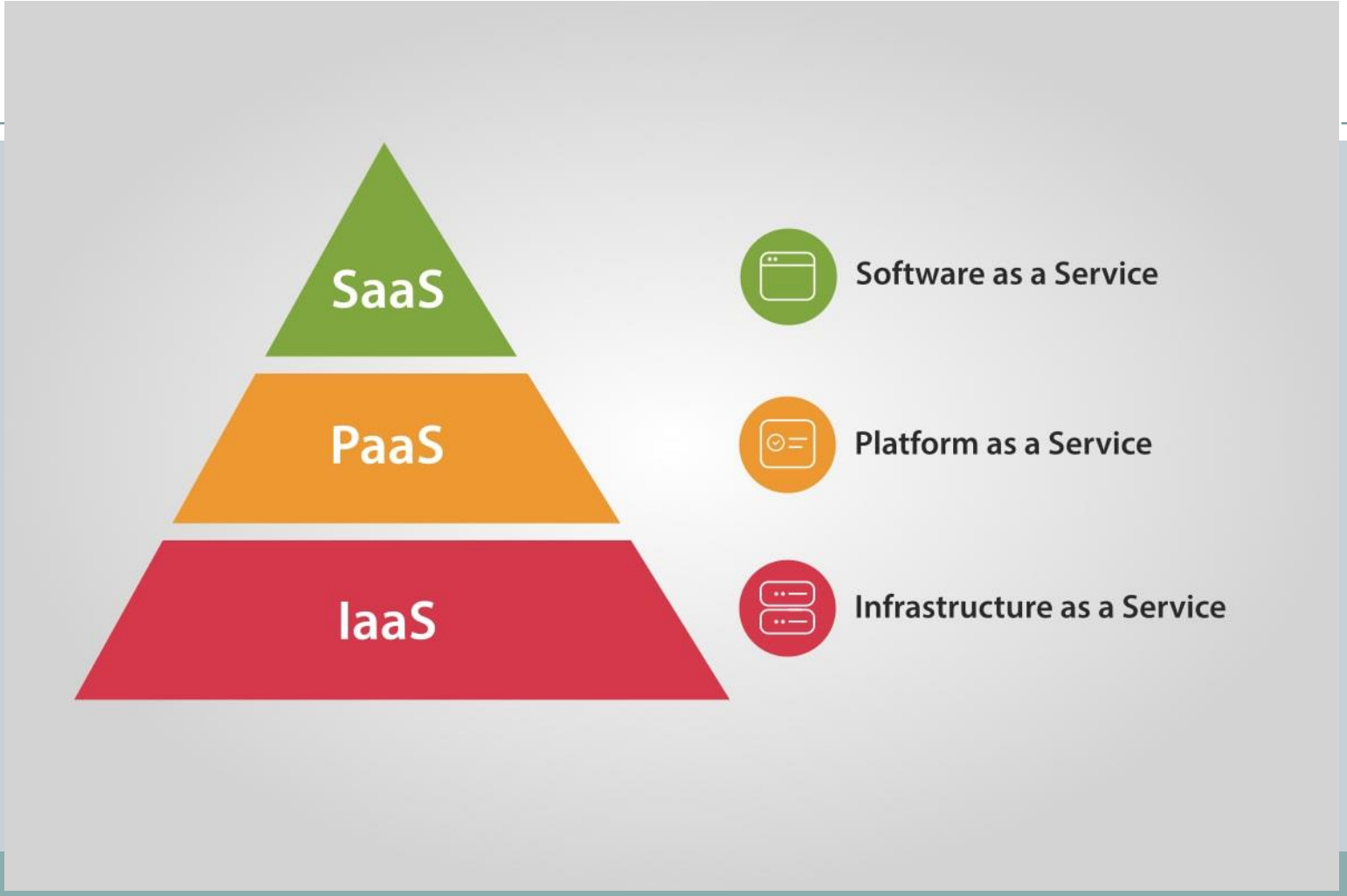
Platform-as-a-Service (PaaS)

MODULE CODE:CIS435

MODULE NAME: CLOUD COMPUTING

MODULE TEACHER: DR. MD. NADIR BIN ALI

Layered architecture of Cloud Computing



What is PaaS?

Platform as a Service, often simply referred to as **PaaS**, is a category of cloud computing that provides a *platform and environment* to *allow developers to build applications* and services over the Internet.

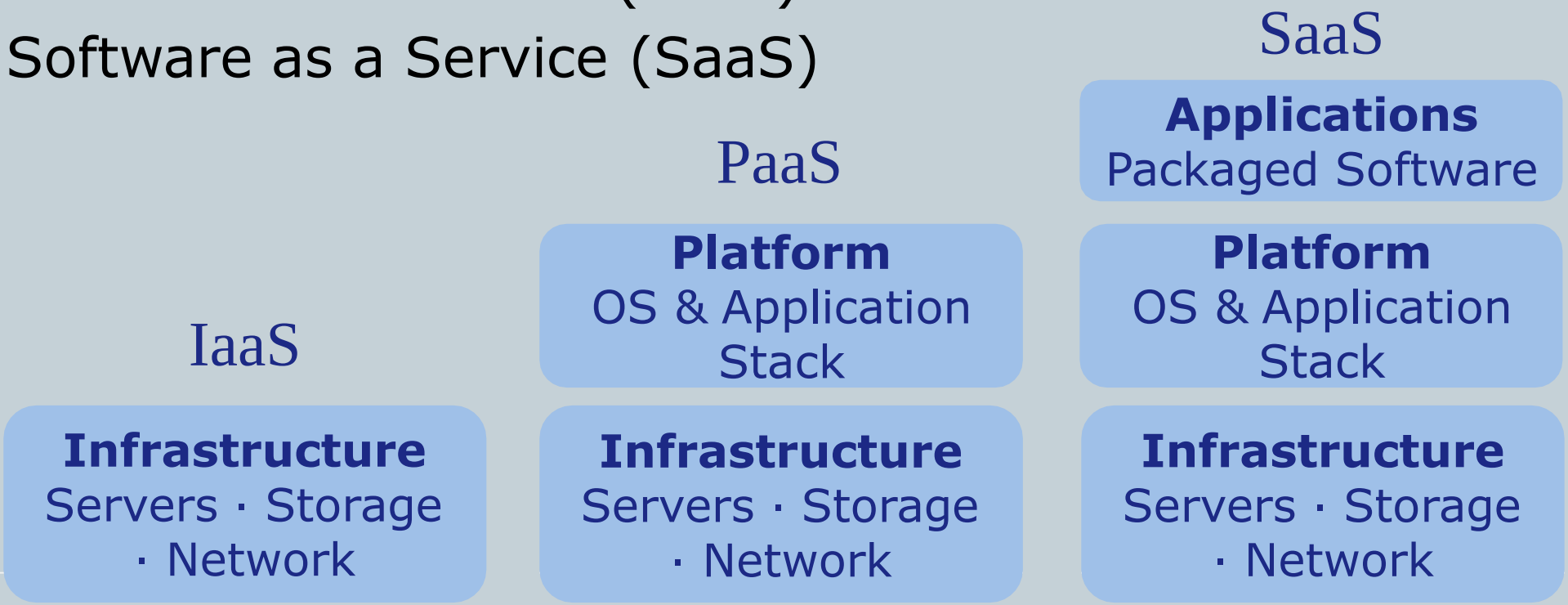
PaaS services are hosted in the cloud and accessed by users simply via their web browser.

Examples of PaaS:

AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos, OpenShift

IaaS, PaaS and SaaS

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)



Spectrum of Cloud Users

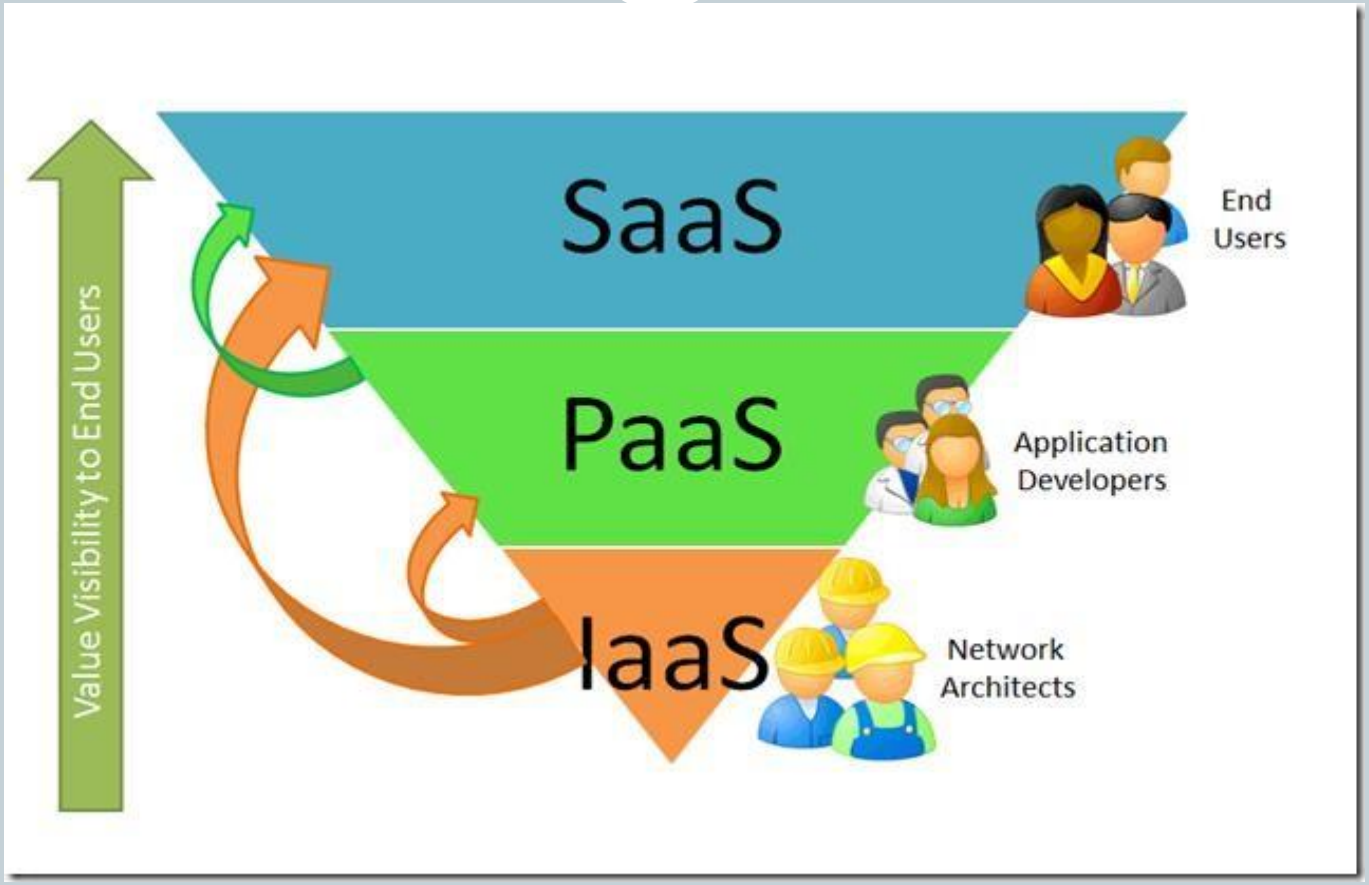


Image credit:

http://blogs.msdn.com/b/seliot/archive/2010/03/04/what-the-heck-is-cloud-computing-another-re-look-with-pretty-pictures.aspx

Platform-as-a-Service (PaaS)

- **Platform as a Service (PaaS)** is a computing platform that abstracts the infrastructure, OS, and middleware to drive developer productivity.
- PaaS leverages **dynamic provisioning**
- PaaS leverages **multi-tenancy**

IaaS is not Enough

- IaaS provides virtual machines, but it cannot provide *elastic computing* by itself, where services scale up and down to meet user demand.
  - **Dynamic provisioning**

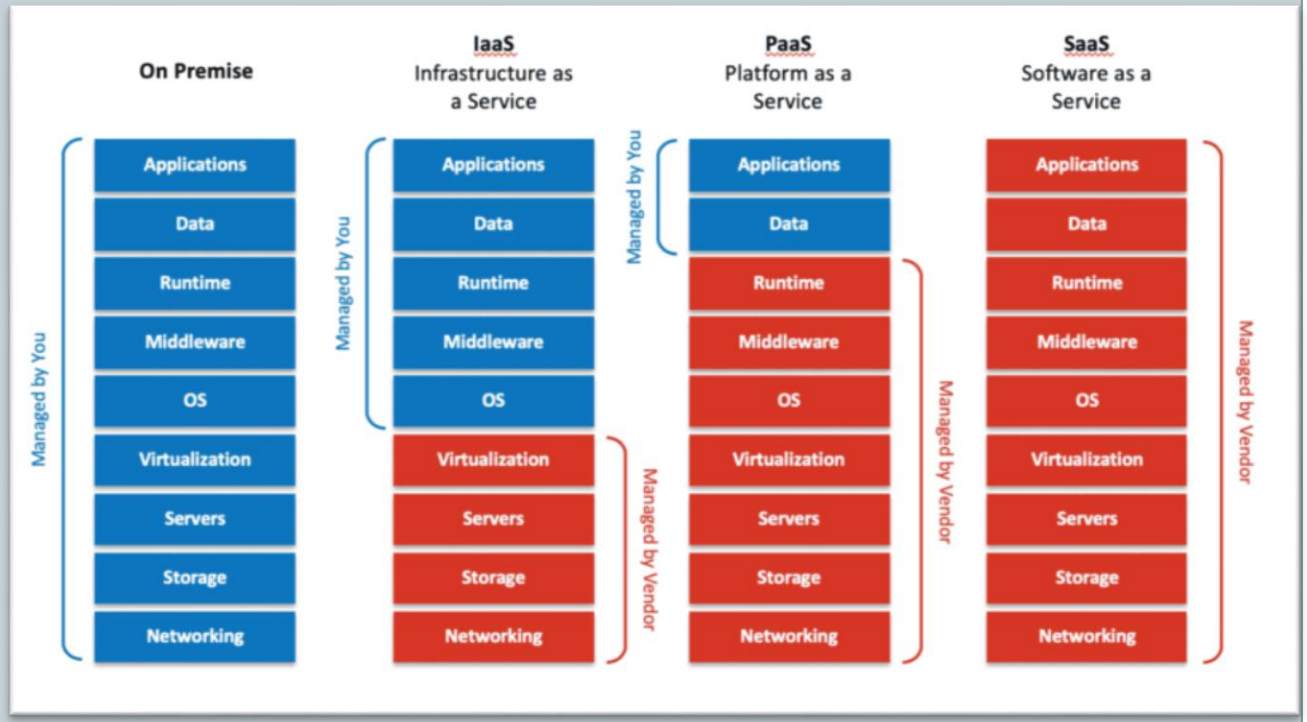
- Existing IaaS' do not provide support for the sharing middleware platforms among different VMs
  - **Multi-tenancy**

  Multi-tenancy is where a single instance of the software runs on a server, serving multiple clients.

Management of PaaS

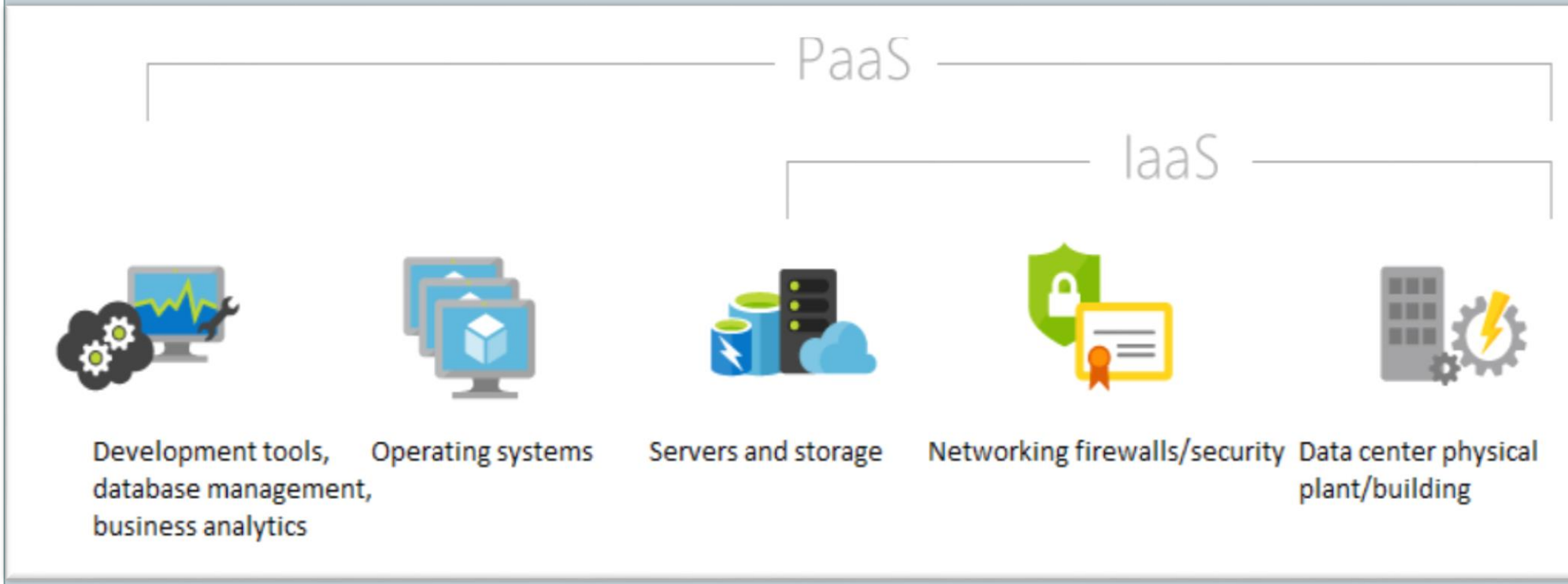
Common examples of SaaS, PaaS, & IaaS

Platform Type	Common Examples
SaaS	Google Workspace, Dropbox, Salesforce, Cisco WebEx, Concur, GoToMeeting
PaaS	AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos, OpenShift
IaaS	DigitalOcean, Linode, Rackspace, Amazon Web Services (AWS), Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE)



Source: Internet

Management of PaaS (Cont.)



Characteristics of PaaS

- It is built on *virtualization technology*, meaning *resources can easily be scaled up or down* as your business changes
- Provides a variety of services to assist with the *development*, *testing*, and deployment of apps
- Numerous users can access the same development application
- Web services and databases are integrated

When to use PaaS

There are many situations where utilizing PaaS is beneficial or even necessary.

- If there are multiple developers working on the **same development project**, or if other vendors must be included as well, PaaS can provide great speed and flexibility to the entire process.

When to use PaaS (Cont.)

- PaaS is also beneficial if you wish to be able to create your own **customized applications**. This cloud service also *can greatly reduce costs* and it can simplify some challenges that come up if you are *rapidly developing* or deploying an app.

Common PaaS business scenarios

- **Development framework.** PaaS provides a framework that developers can build upon to develop or customize cloud-based applications. Similar to the way you create an Excel macro, PaaS lets developers create applications using built-in software components. *Cloud features such as scalability, high-availability and multi-tenant capability are included, reducing the amount of coding that developers must do.*

Common PaaS business scenarios (Cont.)

- **Analytics or business intelligence.** Tools provided as a service with PaaS allow organization's to analyze and mine their data, finding insights and patterns and predicting outcomes to improve forecasting, product design decisions, investment returns and other business decisions.

- **Additional services.** PaaS providers may offer other services that enhance applications, such as workflow, directory, security and scheduling.

Advantages of PaaS

- **Cut coding time.**
- **Add development capabilities without adding staff.**
- **Develop for multiple platforms—including mobile—more easily.**
- **Use sophisticated tools affordably.**
- **Support geographically distributed development teams.**
- **Efficiently manage the application lifecycle.**

Limitations of PaaS

- **Data Security:** Even though organizations can run their own apps and services using PaaS solutions, the data residing in third-party cloud servers controlled by vendors poses security risks and concerns.
- **Integrations:** The complexity of connecting the data stored within in house data center or off-premise cloud is increased and may affect which apps and services can be adopted with the PaaS offering.
- **Vendor Lock-In:** Business and technical requirements that drive decision for a specific PaaS solution may not apply in the future.

Limitations of PaaS (Cont.)

- **Customization of Legacy Systems:** PaaS may not be a plug-and-play solution for existing legacy apps and services. Several customizations and configuration changes may be necessary for legacy systems to work with the PaaS service.
- **Runtime Issues:** In addition to limitations associated with specific apps and services, PaaS solutions may not be optimized for the language and frameworks of your choice.
- **Operational Limitation:** Customized cloud operations management automation workflows may not be applicable to PaaS solutions as the platform tends to limit operational capabilities for end-users.

Thank You