

Cloud Services

خدمات الحوسبة السحابية

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Cloud computing offers computing infrastructure, platform and application delivered 'as-a-service'. Those services are considered as primary cloud computing services and are referred to as:

■ **Infrastructure-as-a-Service (IaaS)**

■ **Platform-as-a-Service (PaaS)**

■ **Software-as-a-Service (SaaS)**

➤ **Infrastructure-as-a-Service:**

- Infrastructure-as-a-service, or IaaS, is a step away from on-premises infrastructure. It's a pay-as-you-go service where a third party provides you with infrastructure services, like storage and virtualization, as you need them, via a cloud, through the internet.
- As the user, you are responsible for the operating system and any data, applications, middleware, and runtimes, but a provider gives you access to, and management of, the network, servers, virtualization, and storage you need.
- You don't have to maintain or update your own on-site datacenter because the provider does it for you. Instead, you access and control the infrastructure via an application programming interface (API) or dashboard.
- IaaS gives you flexibility to purchase only the components you need and scale them up or down as needed. There's low overhead and no maintenance costs, making IaaS a very affordable option.
- It provides the facility of remotely using virtual processor, memory, storage and network resources to the consumers. These virtual resources can be used just like physical (hardware) resources to build any computing setup (like virtual machine or virtual network). For this reason, IaaS is also referred as Hardware-as-a-Service (HaaS).

- The main drawbacks to IaaS are the possibilities of provider security issues, multi-tenant systems where the provider must share infrastructure resources with multiple clients, and service reliability. These drawbacks can be avoided by choosing a reliable and trustworthy provider with a solid history and reputation.
- Public cloud providers such as **AWS, Microsoft Azure, and Google Cloud** are examples of IaaS.

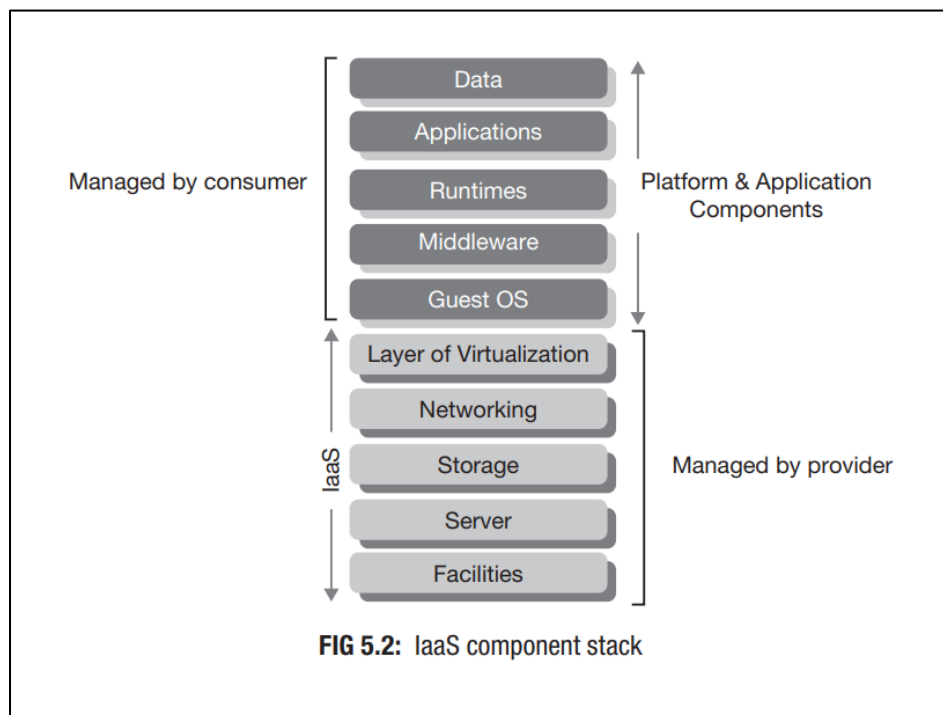
❖ Benefits of IaaS:

Compared to traditional IT, IaaS gives customers more flexibility build out computing resources as needed, and to scale them up or down in response to spikes or slow-downs in traffic. IaaS lets customers avoid the up-front expense and overhead of purchasing and maintaining its own on-premises data center.

Other benefits of IaaS include:

- **Higher availability:** With IaaS a company can create redundant servers easily, and even create them in other geographies to ensure availability during local power outages or physical disasters.
- **Lower latency, improved performance:** Because IaaS providers typically operate data centers in multiple geographies, IaaS customers can locate apps and services closer to users to minimize latency and maximize performance.
- **Improved responsiveness:** Customers can provision resources in a matter of minutes, test new ideas quickly and quickly roll out new ideas to more users.
- **Comprehensive security:** With a high level of security onsite, at data centers, and via encryption, organizations can often take advantage of more advanced security and protection they might provide if they hosted the cloud infrastructure in-house.
- **Faster access to best-of-breed technology:** Cloud providers compete with each other by providing the latest technologies to their users, IaaS customers can take

advantage of these technologies much earlier (and at far less cost) than they can implement them on premises.



❖ IaaS use cases:

- ❖ **Disaster recovery:** Instead of setting up redundant servers in multiple locations, IaaS can deploy its disaster recovery solution to the cloud provider's existing geographically dispersed infrastructure.
- ❖ **Ecommerce:** IaaS is an excellent option for online retailers that frequently see spikes in traffic. The ability to scale up during periods of high demand and high-quality security are essential in today's 24-7 retail industry.
- ❖ **Internet of Things (IoT), event processing, artificial intelligence (AI):** IaaS makes it easier to set up and scale up data storage and computing resources for these and other applications that work with huge volumes of data.

- ❖ **Startups:** Startups can't afford to sink capital into on-premises IT infrastructure. IaaS gives them access to enterprise-class data center capabilities without the up-front investment in hardware and management overhead.

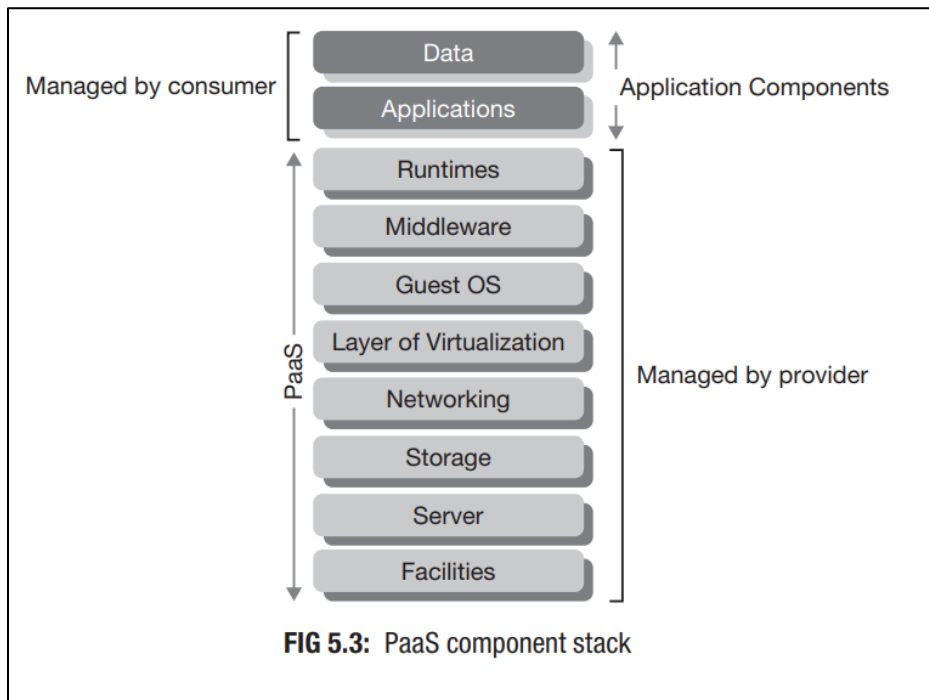
➤ **Platform-as-a-Service:**

- Platform-as-a-Service (PaaS) is a framework for application creation and deployment. This cloud computing model scales up or down automatically based on demand. The PaaS Cloud service provider manages the servers, storage, and networking, while the developers manage only the application part.
- Primarily useful for developers and programmers, PaaS allows the user to develop, run, and manage their own apps without having to build and maintain the infrastructure or platform usually associated with the process.
- You write the code, build, and manage your apps, but you do it without the headaches of software updates or hardware maintenance. The environment to build and deploy is provided for you.
- Developers can use built-in software components to create their applications, which cuts down on the amount of code they have to write themselves.
- There are many PaaS offerings available in market. [Google App Engine](#), [Microsoft Azure Platform](#), [GoGrid Cloud Center](#), [Force.com](#) are very popular among them. Open-source PaaS offerings are also available in the market. [Cloud foundry](#) is one such which is developed by VMware.

❖ **Benefits of PaaS:**

The primary benefit of PaaS is that it allows customers to build, test, deploy run, update and scale applications more quickly and cost-effectively than they might if they had to build out and manage their own on-premises platform. Other benefits include:

- ❖ **Faster time to market:** PaaS enables development teams to spin-up development, testing and production environments in minutes, rather than weeks or months.
- ❖ **Low- to no-risk testing and adoption of new technologies:** PaaS platforms typically include access to a wide range of the latest resources up and down the application stack. This allows companies to test new operating systems, languages and other tools without having to make substantial investments in them, or in the infrastructure required to run them.
- ❖ **Simplified collaboration:** As a cloud-based service, PaaS provides a shared software development environment, giving development and operations teams access to all the tools they need, from anywhere with an Internet connection.
- ❖ **A more scalable approach:** With PaaS, organizations can purchase extra capacity for building, testing, staging and running applications whenever they need it.
- ❖ **Less to manage:** PaaS offloads infrastructure management, patches, updates and other administrative tasks to the cloud service provider.



❖ PaaS use cases:

- ❖ **API development and management:** With its built-in frameworks, PaaS makes it easier for teams to develop, run, manage and secure APIs for sharing data and functionality between applications.
- ❖ **Internet of Things (IoT):** PaaS supports a range of programming languages (Java, Python, Swift and more), tools and application environments used for IoT application development and real-time processing of data from IoT devices.
- ❖ **Agile development and DevOps:** PaaS solutions typically cover all the requirements of a DevOps toolchain, and provide built-in automation to support continuous integration and continuous delivery (CI/CD).

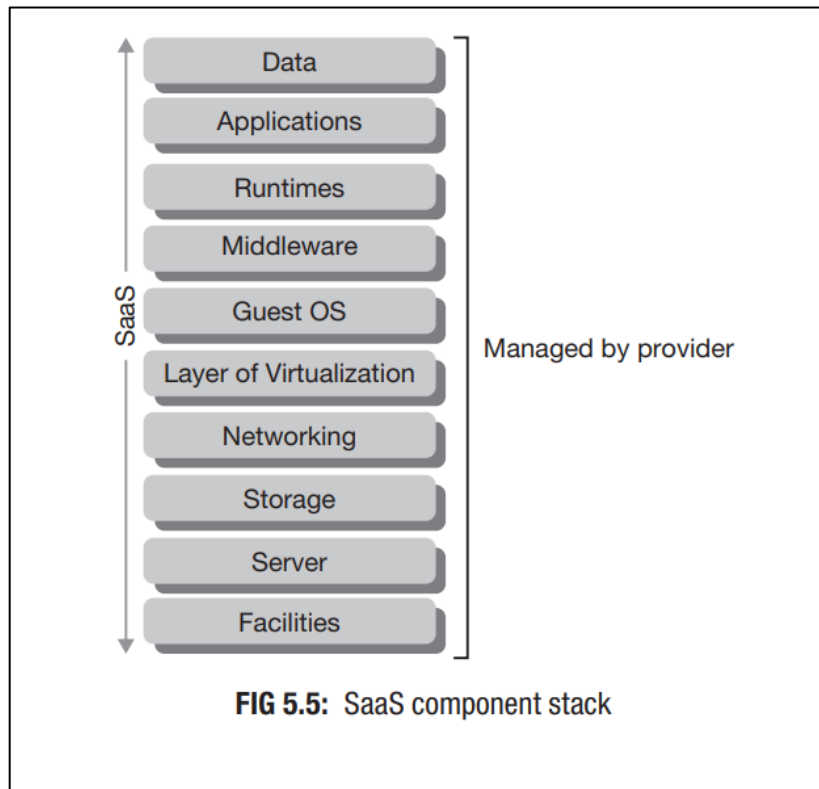
➤ **Services-as-a-Service:**

- Software-as-a-Service (SaaS) is a way of delivering application as a service over the network/Internet that users can directly consume without the tension of installing or configuring an application.
- Unlike traditional packaged applications that users install on their own computing setup, SaaS vendors run it in their data centers. Customers do not need to buy software licenses or any additional computing resources to support the application and can access applications against some rental fee on usage basis. SaaS applications are sometimes referred as web-based software, or hosted software.
- Software updates, bug fixes, and general software maintenance are handled by the provider and the user connects to the app via a dashboard or API. There's no installation of the software on individual machines and group access to the program is smoother and more reliable.

- You're already familiar with a form of SaaS if you have an email account with a web-based service like Outlook or Gmail, for example, as you can log into your account and get your email from any computer, anywhere.
- The CRM (customer relationship management) package of Salesforce.com gained popularity among enterprises since early 2000s.
- SAP (Systems, Application and Products) as the solution provider of Enterprise Resource Planning (ERP) entered into the SaaS CRM and ERP markets with its 'Business ByDesign' solution. Oracle launched its CRM SaaS 'On Demand'. There are also many popular SaaS offerings for general users in the market today like GoogleApps, Microsoft Office 365 and else.
- SaaS is built by adding layers over PaaS component stack.

❖ Benefits of SaaS

- ❖ The main benefit of SaaS is that it offloads all infrastructure and application management to the SaaS vendor. All the user has to do is create an account, pay the fee and start using the application. The vendor handles everything else, from maintaining the server hardware and software to managing user access and security, storing and managing data, implementing upgrades and patches and more.
- ❖ **Minimal risk:** Many SaaS products offer a free trial period, or low monthly fees that let customers try the software to see if it will meet their needs, with little or no financial risk.
- ❖ **Anytime/anywhere productivity:** Users can work with SaaS apps on any device with a browser and an internet connection.
- ❖ **Easy scalability:** Adding users is as simple as registering and paying for new seats—customers can purchase more data storage for a nominal charge.



❖ When to use SaaS?

- SaaS helps in delivering applications that can be widely distributed and accessed. For example, Google workspace, Dropbox, Salesforce, CISCO, WebEx, etc.
- Applications such as tax-calculating software are widely used in cloud computing.
- Used by start-ups or small companies that need to launch e-commerce quickly and don't have time to manage various servers or software issues.
- Short-term projects which need quick, easy, and affordable collaboration.

