IaaS, or infrastructure as a service, is on-demand access to cloud-hosted physical and virtual servers, storage and networking.

* 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.
* avoids the up-front expense and overhead of purchasing and maintaining its own on-premises data center.
* eliminates the constant trade-off between the waste of purchasing excess on-premises capacity to accommodate spikes, versus the poor performance or outages.
* higher availability: 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.
* 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 on-site, at data centers, and via encryption, organizations can often take advantage of more advanced security and protection they could provide if they hosted the cloud infrastructure in-house.
* faster access to best-of-breed technology.

PaaS, or platform as a service, is on-demand access to a complete, ready-to-use, cloud-hosted platform for developing, running, maintaining and managing applications.

* allows customers to build, test, deploy run, update and scale applications more quickly and cost-effectively.
* Faster time to market: PaaS enables development teams to spin-up development, testing and production environments in minutes, vs. weeks or months.
* Low- to no-risk testing and adoption of new technologies.
* Simplified collaboration: 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: can purchase additional capacity for building, testing, staging and running applications whenever need it.
* Less to manage.

SaaS, or software as a service, is on-demand access to ready-to-use, cloud-hosted application software.

* It offloads all infrastructure and application management to the SaaS vendor.
* 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.

Q4:

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| --- | --- | --- |
| **Category** | **ETL** | **ELT** |
| **Definition** | Data is extracted from a source system, transformed on a secondary processing server, and loaded into a destination system. | Data is extracted from a source system, loaded into a destination system, and transformed inside the destination system. |
| **Extract** | Raw data is extracted using API connectors. | Raw data is extracted using API connectors. |
| **Transform** | Raw data is transformed on a processing server. | Raw data is transformed inside the target system. |
| **Load** | Transformed data is loaded into a destination system. | Raw data is loaded directly into the target system. |
| **Speed** | ETL is a time-intensive process; data is transformed before loading into a destination system. | ELT is faster by comparison; data is loaded directly into a destination system, and transformed in-parallel. |
| **Code-Based Transformations** | Performed on secondary server. Best for compute-intensive transformations & pre-cleansing. | Transformations performed in-database; simultaneous load & transform; speed & efficiency. |
| **Maturity** | Modern ETL has existed for 20+ years; its practices & protocols are well-known and documented. | ELT is a newer form of data integration; less documentation & experience. |
| **Privacy** | Pre-load transformation can eliminate PII (helps for HIPPA). | Direct loading of data requires more privacy safeguards. |
| **Maintenance** | Secondary processing server adds to the maintenance burden. | With fewer systems, the maintenance burden is reduced. |
| **Costs** | Separate servers can create cost issues. | Simplified data stack costs less. |
| **Requeries** | Data is transformed before entering destination system; therefore raw data cannot be requeried. | Raw data is loaded directly into destination system and can be requeried endlessly. |
| **Data Lake Compatibility** | No, ETL does not have data lake compatibility. | Yes, ELT does have data lake compatibility. |
| **Data Output** | Structured (typically). | Structured, semi-structured, unstructured. |
| **Data Volume** | Ideal for small data sets with complicated transformation requirements. | Ideal for large datasets that require speed & efficiency. |