CASE STUDY 2: Deliverables
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1. Define what is SAAS and how SAAS makes cloud engineers' life easy?

DEFINITION OF SaaS:

SaaS is a cloud computing model where software applications are delivered over the internet on a subscription basis. Instead of installing and maintaining software on local devices, users can access applications via a web browser. The SaaS provider manages the infrastructure, security, maintenance, and updates.

BENEFITS:

SaaS simplifies a cloud engineer's job by eliminating infrastructure management, reducing maintenance tasks, and enhancing security. It provides built-in scalability, cost efficiency, and automatic updates, allowing engineers to focus on cloud architecture, automation, and integrations instead of deployment and system administration. While SaaS limits control and customization, it streamlines operations, making cloud management more efficient.

KEY CHARACTERISTICS OF SaaS:
- **Accessibility:** Available from any device with an internet connection.
- **Managed Infrastructure:** The provider handles maintenance, updates, and security.
- **Subscription-Based Pricing:** Typically offered as pay-as-you-go or tiered pricing models.
- **Scalability:** Can easily scale up or down based on user needs.
- **Multi-Tenancy:** A single instance of the application serves multiple customers while keeping data isolated.

EXAMPLES OF SaaS:
- **Productivity Tools:** Google Workspace (Docs, Sheets), Microsoft 365
- **Customer Relationship Management (CRM):** Salesforce, HubSpot
- **Communication Apps:** Slack, Zoom
- **Project Management:** Trello, Asana
- **Cloud Storage:** Dropbox, Google Drive

TYPES OF SaaS:
- **General-Purpose SaaS (Pre-Built Software)**
  - Software applications developed for a broad user base. Offer common features for multiple industries.
  - **Examples:**
    - Productivity: Google Workspace, Microsoft 365
    - Communication: Slack, Zoom
  - **Benefit:** Ready to use, widely available, and pre-built integrations.
- **Industry-Specific SaaS (Vertical SaaS)**
  - Specific industry or use case, often including tailored workflows and compliance features.
  - **Examples:**
    - Healthcare: Electronic Health Records (EHR) like Epic or Cerner.
    - Legal: Case management software like Clio for law firms.

- Finance: QuickBooks for accounting professionals.
  - **Benefit:** Industry compliance, specialized features, and more relevant workflows.
- **Customizable & Modular SaaS**
  - Provide low-code or no-code tools or APIs, allowing businesses to customize the software to their needs.
    - **Examples**:
      - Salesforce CRM allows companies to customize workflows, integrations, and dashboards.
      - AWS WorkSpaces (cloud desktops) can be tailored for different user groups.
    - **Benefit:** Balance between pre-built convenience and customizability.
- **Bespoke SaaS (Custom-Built SaaS)**
  - Companies develop SaaS solutions from scratch for specific needs, either for internal or external clients.
  - **Example:**
    - A logistics company developing its own SaaS for fleet management.
  - **Benefit:** Full control over features, performance, and security.

Advantages of SaaS:
- ✓ **Lower Initial Costs** – No need for on-premises hardware or software installations.
- ✓ **Automatic Updates** – No manual patching or upgrades required.
- ✓ **Global Accessibility** – Can be accessed from anywhere, fostering remote collaboration.
- ✓ **Security & Compliance** – Many providers offer built-in security and compliance measures.

Challenges of SaaS:
- ✖ **Limited Customization** – Users might have restricted control over configurations.
- ✖ **Dependency on Internet Connectivity** – Requires a stable internet connection.
- ✖ **Data Security Concerns** – Sensitive data is stored on third-party servers.

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2. Create a diagram of SAAS, PAAS and IAAS and define the main difference.

There are many nuances between the different "as a Services". Many of the responsibilities and categorizations may be different based on user needs and Cloud Service Provider. Below is a generalized comparison of the options based on most frequent use cases.

Option	IaaS	PaaS	SaaS
Great deal of control over the operating System.	✓	✖	✖
Most amount of responsibility by customer.	✓	✖	✖
CSP only provides core services such as servers and storage.	✓	✖	✖
You need maximum control within your cloud environment.	✓	✖	✖
Avoid external management data and security issues.	✓	✖	✖
Amazon EC2 Instance: Rent a virtual machine and need to install O/S.	✓	✖	✖
Build Apps without hosting them on-premise, more flexibility and control.	✖	✓	✖

Build new products on top of an already existing network.	✘	✓	✘
Create your own payroll app tailored to your HR needs.	✘	✓	✘
Pre-configured environment where developers build, test,and deploy apps	✘	✓	✘
AWS Lambda: Runs code without the need to manage servers	✘	✓	✘
Least amount of responsibility by customer.	✘	✘	✓
Products entirely managed by the Cloud Service Provider (CSP).	✘	✘	✓
Use a payroll app you created across many hospitals across the country.	✘	✘	✓
Use the Quickbooks app for your payroll needs.	✘	✘	✓
Customer Responsibility	High	Med	Low
Customer Flexibility/Control	High	Med	Low
Customer Quick/Ease	Low	Med	High

SUMMARY:
Choose IaaS if: you need full control over infrastructure and want to configure OS, middleware, and runtime manually. If you want to avoid purchasing hardware. Or, if don't have the time and staff to host large data centers.
Choose PaaS if: You want to build custom SaaS apps, coworking on development projects to streamline workflow. Or, if your organization requires customized applications in a short time.
Choose SaaS if: You are a small company or startup that can't develop their own software. You need a quick and easy solution. You don't need highly customized applications or applications that are not used often.

3. Fill the label the Diagram with the level of vendor responsibility.

Layer	On-Site	IaaS	PaaS	SaaS
Data	Customer	Customer	Customer	Cloud Provider
Application	Customer	Customer	Customer	Cloud Provider
O/S	Customer	Customer	Cloud Provider	Cloud Provider
Virtualization	Customer	Cloud Provider	Cloud Provider	Cloud Provider
Servers	Customer	Cloud Provider	Cloud Provider	Cloud Provider
Storage	Customer	Cloud Provider	Cloud Provider	Cloud Provider
Network	Customer	Cloud Provider	Cloud Provider	Cloud Provider
Physical	Customer	Cloud Provider	Cloud Provider	Cloud Provider