# Feasibility Proposal

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## Cloud Computing

Given the unique needs and resources of our business, I propose a feasibility study of various data types and cloud models. In light of this a careful evaluation has been completed on the three types of cloud deployment models: Public Cloud, Private Cloud, and Hybrid Cloud. The Public Cloud, administered by third-party providers, is best for corporations that require scalability and wish to prevent upfront capital investment. The Private Cloud, classically on-premises, offers control, customization, and data security, making it appropriate for organizations that require high data security and specific regulatory requirements (Roper, 2023). The Hybrid Cloud combines the advantages of private computing with public clouds, permitting companies to leverage resources from various environments, yielding a perfect combination for establishments that want control over sensitive data and scalability.

Moreover, it is vital to study the three types of cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). IaaS offers on-demand infrastructure abilities, compelling for companies looking to dodge the expense and complexity of managing physical servers (Slingerland, 2023). PaaS delivers and oversees resources for application development, making it suitable for developers focusing on coding and innovation. SaaS allows users to use cloud-based apps over the internet, making it ideal for businesses that require the use of applications without worrying about maintenance or infrastructure.

The choice of cloud deployment and service model depends on existing IT investments, business requirements, and desired outcomes. Thus, understanding their functional capabilities and use cases is crucial.

## Benefits and Drawbacks of the Cloud

On-premises models offer advantages such as complete control over the IT infrastructure, local data management, and faster data access. However, they also present challenges such as high deployment and maintenance costs and difficulties in scaling.

Conversely, cloud deployment models offer flexibility, scalability, cost-effectiveness, and mobility, with computing resources available on-demand (Hazdun, n.d.). Nonetheless, they also come with their own set of challenges, including security risks and dependence on internet connectivity.

Given these factors, it is crucial to weigh the benefits and drawbacks of each model. The choice between on-premises and cloud deployment should align with the specific needs and resources of our business.

## Cloud Deployment Models

Public Cloud models, managed by third-party providers, offer cost-effectiveness, reliability, and scalability, thereby saving businesses from the challenges of developing, maintaining, or upgrading software. Nevertheless, they pose potential data security concerns due to their public accessibility and offer limited control over the underlying infrastructure.

Private Cloud models, on the other hand, provide businesses with complete control over the IT infrastructure and allow for local data storage and management (Cloud Deployment Models: Advantages & Disadvantages, 2020). This can be particularly crucial for companies dealing with sensitive or confidential information. Conversely, these models can be costly to deploy and maintain, and scaling up can be challenging and time-consuming.

Hybrid Cloud models offer the best of both worlds, providing the flexibility of both public and private clouds. They allow businesses to keep sensitive data on a private cloud while using the public cloud for high-volume, less sensitive data. This makes them more cost-effective as businesses can use public clouds for most of their needs and switch to private clouds when necessary. Though, managing a hybrid cloud can be complex as it requires managing both on-premises private cloud and public cloud services. While they can offer more security than public clouds, they can still be vulnerable to attacks.

## Considerations of Cloud Computing

From an organizational perspective, aligning IT strategy with business goals is the first step in understanding why our organization needs to move to the cloud. The shift to the cloud requires a change in mindset, necessitating preparedness and potentially training for the team. Security considerations also change, requiring a shift to a cloud-first security model (Majendran, 2013). Financially, the cost of cloud migration can be significant, encompassing both the cost of the migration itself and the ongoing costs of using cloud services. Lastly, choosing a cloud provider may lead to vendor lock-in, with dependency on their specific tools and services potentially causing difficulty to switch providers in the future.

From a technical standpoint, migrating legacy systems to the cloud can pose challenges. The migration process may also involve periods of downtime, which can disrupt operations. Transferring data to the cloud requires bandwidth, which can be costly. Ensuring the secure transfer and storage of data when moving to the cloud is another key consideration. Some applications may need to be modernized or re-architected to work effectively in the cloud.

Remember, a successful cloud migration requires careful planning and consideration of both organizational and technical issues. It is important to understand these challenges and prepare strategies to address them.

## Big Data vs. Structured Data

Big Data, characterized by its volume, velocity, and variety, refers to the vast amounts of structured, unstructured, and semi-structured data that are generated at an unprecedented rate. It is typically collected from various sources such as social media, sensors, logs, and other digital platforms and is usually stored in data lakes (Bose, 2022). Yet, managing Big Data can be challenging due to its variety of data formats and the need for specific preprocessing methods like discretization and feature selection.

On the other hand, Structured Data is highly organized, easily searchable, and fits into predefined data models. It is typically numeric in nature and is usually collected from databases or spreadsheets. Structured Data is commonly stored in data warehouses and requires less storage space due to its tabular formats. Preprocessing of Structured Data involves a series of tasks to achieve data understanding, as well as data cleaning, and manipulation.

## Volume, Variety, and Velocity of Big Data

Given the significant impact of the scale of a dataset on data analysis methods, processing capabilities, and usability, I propose a strategic approach to handle both Big Data and Structured Data.

**Data Analysis Methods:** The sheer size of big data can render traditional data analysis methods ineffective. Therefore, it is crucial to adopt distributed processing methods, where multiple computers each analyze a portion of the data, a process sometimes referred to as scale-out or horizontal scaling. Given the variety of data formats in big data - structured, unstructured, and semi-structured, it is important to employ flexible and robust data preprocessing methods capable of handling different data types. Furthermore, the speed at which big data is generated and needs to be processed necessitates high-performance processing, especially for real-time data streams from sources like social media (Ninja, 2023).

**Processing by Conventional Methods:** Conventional data processing systems often struggle with the volume of big data, as these systems were not designed to handle such copious amounts of data. The variety of big data also presents a challenge, as conventional systems typically work best with structured data and may not be equipped to handle unstructured or semi-structured data. The velocity of big data can overwhelm conventional systems, which may not be able to process data as quickly as it is generated.

**Usability:** The volume of big data can make it difficult to find specific information or discern patterns without advanced analytical techniques. The variety of big data can complicate its usability, as diverse types of data may need to be interpreted or utilized in diverse ways. The velocity of big data can also affect its usability, as users may struggle to keep up with constantly updating data.

In summary, the scale of big data presents unique challenges that require new computational and statistical paradigms. Nonetheless, it also offers opportunities for discovering subtle population patterns and divergencies that are not possible with small-scale data. Therefore, it is crucial to have a good understanding of these factors when working with big data. This proposal aims to guide you in making an informed decision that best suits our business requirements.

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