

Overcoming Big Data Challenges at Amazon

Amazon, a global leader in e-commerce, leverages big data to drive its services, optimise operations, and personalise customer experiences. However, the vast amount of data Amazon handles presents several challenges. This essay explores these challenges, proposes potential solutions, and critically examines the associated problems. The discussion includes Amazon's current situation, proposed measures, and the rationale for selecting specific technologies.

Jeff Bezos founded Amazon in 1994, and since then, it has developed into a global technology corporation with an emphasis on digital streaming, cloud computing, e-commerce, and artificial intelligence. The company collects and processes massive amounts of data from its operations, customer interactions, and various business activities. Although big data presents enormous chances for new ideas and insights, it also poses challenges in terms of data privacy and security, infrastructure scalability, and other areas.

Issues to Investigate

- **Data Privacy and Security:** (Crockett, 2023) states that 'Big data security is the process of monitoring and protecting a company's important business data with the goal of ensuing safe and compliant ongoing operation'. Because of the vast amount of data involved, security and privacy breaches are likely to result in more serious consequences and losses in terms of reputational harm, legal

liability, ethical harm, and more (Kshetri, 2014). Privacy and security are a top priority for Amazon.

- **Data Volume and Storage:** Daily data creation amounts to 328.77 million terabytes (Duarte, 2023). Advanced storage solutions are required to collect, store, and process the sheer volume of data. As the amount of data increases exponentially, the need to maintain a scalable infrastructure becomes paramount. Amazon must continue to invest in cutting-edge technologies to maintain performance and reliability.

Proposed Solutions

- **Robust Privacy Measures:** Encryption and anonymization can help protect user information. Amazon should also embrace privacy-friendly machine learning techniques that protect data privacy while extracting valuable insights from large data sets. McMahan et al. (2017) claim that federated learning offers clear privacy benefits over data centre training on persistently stored data. Using Federated Learning, Amazon can train algorithms on distributed data without sacrificing user privacy.
- **Infrastructure Scalability:** Adopting a cloud-native approach can help Amazon scale its infrastructure effectively. Cloud computing (public cloud, private cloud, or a hybrid of the two) offers new levels of scalability and agility. Over the long term, it will be a key enabler for managing the complexities of the digital world (Gantz & Reinsel, 2011).

Problems with the Proposed Solutions

- **Robust Privacy Measures:** Advanced encryption techniques increase security, but they also introduce a lot of computational overhead, which slows down data processing. These techniques require a lot of expertise and resources, which may increase operating costs.
- **Infrastructure Scalability:** Implementing advanced storage solutions and edge computing infrastructures is costly and complex. Amazon needs substantial investments in hardware, software, and a skilled workforce. Moreover, managing and maintaining these systems requires ongoing financial and technical resources, which can be a significant burden.

Amazon's journey in harnessing big data involves navigating numerous challenges that require innovative solutions. Robust privacy measures and infrastructure scalability present viable strategies to address these challenges. However, each solution comes with its own complexities that must be managed to ensure effective implementation. By balancing innovation with vigilance, Amazon can continue to leverage big data to enhance its services while safeguarding customer trust and ensuring regulatory compliance.

References

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