Introduction

Problem Context Status

Nexart is an enterprise which manufactures and sells networking devices and accessories to clients. This enterprise was started in 2000 by Alexander Watson. Nexart branches are located all around the globe and the main branch is situated at California, USA.

Manufactured devices and accessories are distributed to Nexart sub branches of other nations via shipping according to the requests of sub branches. Network infrastructure installation companies play the role Nexart clients. They provide services to government and non government organizations. After getting quotations approved from the clients, they place orders by logging into Nexart website. The clients choose their nearest Nexart branch and select the network equipment that they require for the job and proceed to payments. They fill out the payment details and finalize the payment. Nexart send an email to the client informing about the order that the customer has placed and the order details include payment amount and network equipment details. In addition, Nexart also provide shipping details and order tracking details in the mail. So that the clients can keep track of the orders. Each of the Nexart sub branches have a stock. When they are out of stock, they order items from their nearest sub branch. In this manner, Nexart optimize their shipping costs. In comparison to past years, the revenue of Nexart has sky rocketed drastically.

Nexart enterprise uses relational database management system, Microsoft SQL Server to store the records of clients, branches, products, orders and stock requests. The attributes inherited by the client entity are client id, name, contact information, billing address and registered date. Features inherited by the branch are branch id, name, location, contact information and stock. Device object is inherited by the product id, name, description and price. The characteristics owned by the order entity are order id, order date, total amount, items, payment and shipping. The attributes which belong to the Stock Request are stock request id, request date and quantity requested. As the customer base of the Nexart grew rapidly, the databases were unable to handle the requests from clients all around the globe. This resulted in latencies in database operation, lack of interest in customers, loosing business edge, increased expenses and under performance of businesses. Apart from the business impacts, the Nexart also suffer from scalability, query latencies, concurrency limits, cost efficiency and schema rigidity issues. Complexity issues and errors have occurred due to maintaining integrity and maintenance. So the Nexart clients were not satisfied with the service and they turn towards their main competitor Cisco. This resulted in a revenue decline and they had to plead customers to purchase items from them. The CEO of Nexart wanted get things back on track and he escalated the issue to the IT Department. The data engineers of IT department started to narrow down issue step by step isolating irrelevant factors. This process is discussed thoroughly in the next section.

Business Questions

Data engineer asses the allegations of their clients regrading the web application. With the corporation of network engineers they monitor network traffic. According to the observation, they noticed that the increase of their clients compared to past. In addition they notice that Nexart generates bulks of data compared to past. As they produce new network devices and accessories to the market, new features are added to the device table. This results in a storage expansion and order processing delays where caused due to the amount of queries that I have been fired towards the MSQL database during peak hours. Nexart didn’t encounter this issue before because of the lower customer base and limited devices in the production line. The issue can be assessed with the following questions.

What factors caused the revenue loss?

Why did the revenue decline occur?

Where did the revenue decline occur?

When did the revenue decline occur?

Who are part of the revenue decline?

What are the measures that can be taken to enhance the accuracy of real-time data processing and downsize query latency?

How much expenditure can be saved from migrating all the data that is in the MSSQL to MongoDB database?

What actions can be taken to manage the data storage effectively in terms of scaling data?

How does the database can manage the real-time sensor data that is being generated in production?

How to ensure the redundant connectivity to the database as the number of users grow?

How does the latencies in query responses can affect the customer satisfaction?

Every bit of data generated by the Nexart may posses a value. So it would be unwise to get rid of the data without properly assessing it. The next chapter discusses about the ways of managing Nexart’s generated data in an effective manner.