Case Study

Pitney Bowes

Next-Gen Master Data Management Comes to Marketing at Pitney-Bowes

INDUSTRY
Software

CHALLENGE
Gain competitive advantage by building next-generation tool for 360-degree customer insight

STRATEGY
- Develop a new architecture to leapfrog competition

- Use Neo4j to avoid insufficient RDBMs and other NoSQL solutions

SOLUTION
Chose Neo4j for maturity, scalability, APIs available and easy adoption

RESULT
High-speed, scalable platform that provides meaningful data integration providing full view of customer insights

For most businesses, IT strategies include consolidating information, automating data analysis and lowering cost. For most businesses, IT strategies include consolidating information, automating data analysis and lowering cost.

However, revenue growth, increased revenue per customer, higher rates of referral and ever more effective marketing, require a holistic view of customers and prospects. The explosion of data from mobile, Web, user experience and behavior monitoring, lead scoring and legacy data silos is a challenge for both marketers and the IT professionals working to support them.

Pitney-Bowes, an established leader in direct marketing, is also a major player in digital marketing communications and is helping clients deliver on the promise of an omni-channel experience for their customers by delivering contextually relevant information.

With its leading edge Master Data Management (MDM) system, it has leapfrogged its competition by building its MDM system around the Neo4j graph database – avoiding the pitfalls of slow and insufficiently flexible RDBMSs, or insufficiently rich NoSQL solutions. As the market-leading graph database, Neo4j provides a scalable infrastructure for capturing and querying connected data that far surpasses traditional databases for cost and agility.

Specifically, Neo4j is extremely well suited for managing complex relationships between heterogeneous data sources, like the 360 degree view of customer problem PB is trying to address for its clients: it is able to handle complexity that brings relational databases to a grinding halt.

Background

Pitney-Bowes is synonymous with mailing systems worldwide. Building on that success, Pitney-Bowes has diversified widely and now sells the tools and services its clients need to intelligently serve and market to their own customers across digital channels. In fact, digital revenues are the fastest growing part of its business, up 23% in 2013, making up 19% of its overall business.[1]

In creating a vision for its next generation offering, the Pitney-Bowes team led by Pitney-Bowes VP, Navin Sharma realized that their customers were running into three overlapping problems: Firstly, data about customers was being created in many different information systems. Some information was stored in internal accounting and billing systems, and some in logistics and delivery systems. Some was also collected in customer relationship management and sales management systems. Marketing data was tracked by other internal systems and external services, while mobile data increased the volume and variety of trackable data.

For retailers, in-store inventory and footfall data were not easily linked with on-line customer and prospect behavior. The net result was that marketing decisions, resource allocation and tactical marketing and pricing decisions were made on incomplete internal company data, typically uncorroborated with external behavioral tracking of customers at external, Web sites.

Secondly, differing definitions of customer across the application landscape resulted in poor quality data with little predictability. It was clear that to reduce the effort of cleaning, comparing and integrating data, Pitney-Bowes' clients were in need of a total solution that included proper

quality controls and governance processes, to ensure data could be consistently validated and cleansed.

Thirdly, each of the different information silos had been optimized for different tasks. Some were designed for short online transactions like order processing while others were batch processed. Some were so large that they were essentially unusable for analysis, resulting in subsets of data being loaded into data marts simply to boost query performance. Overall the differing timeliness of each kind of data store substantially compounded the overall data problem.

Expanding the Product Line

Sharma realized that, in order to increase the utility of the data quality, cleansing, and marketing services, Pitney-Bowes had to tackle the difficult task of integrating the different data sources. This was not merely a middleware exercise: there had to be semantic understanding of the data his clients needed for successful lead scoring, prospecting, follow-up and cross-selling.

Meaningful data integration – Master Data Management in other words – was the major pain point for marketers. Without a logically centralized capability to examine customer data across all relevant systems, the marketers are limited in their ability to improve customer engagement across channels.

Yet technically, the combination of mobile, data, and real time data makes scalability a significant issue. Furthermore, the predictability of the growth of different sources and types of information required a highly scalable, highly flexible and agile system. Sharma believed that Pitney-Bowes faced many companies in the information management business who provide customer marketing analytics, data management and data quality solutions.

The world of marketing automation, in particular, is also exploding, but the ability to integrate data easily and quickly was potentially a game changer. Individual point solutions for CRM, for

Pitney Bowes' Master Data Management solution based on Neo4j provides a 360-degree view of the customer by including the customer, their relationships, and a complete view of the individual interactions to generate their insights.

ERP, for marketing automation, and for content management all had high switching costs, so any solution had to be able to work with the existing installed base of applications at Pitney-Bowes customers since replacing systems would be prohibitively expensive.
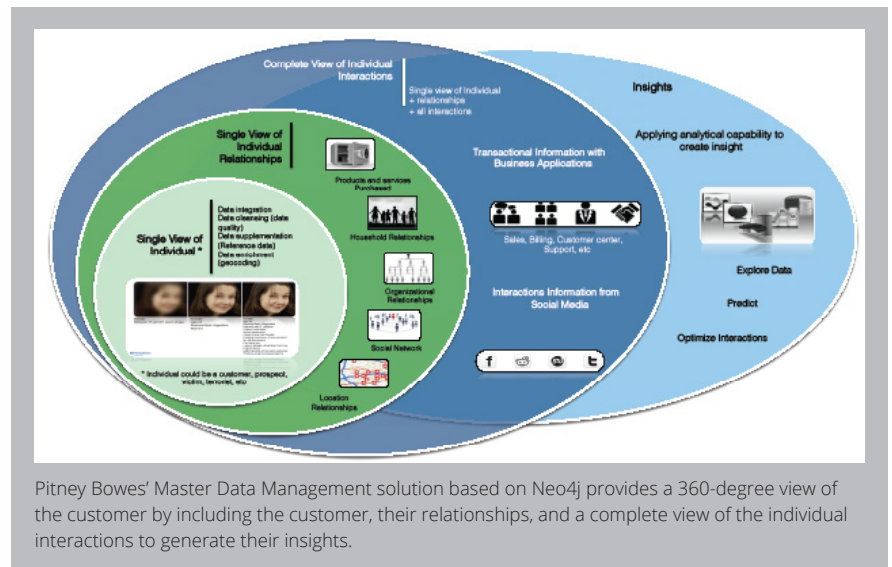
Research on innovation strongly suggests that 'me-too' products don't do as well as differentiated high value offerings. In fact, offering a differentiated high value product is the single largest predictor of new product success.

Navin, therefore, took a page out of Clayton Christensen's "disruptive innovation" to address the problem: He and his team asked themselves, "What can we do to deliver incremental value in weeks but evolve and scale quickly with the same agility as is the foundation for any software development methodologies in the 21st century?" "And how do we democratize that data and knowledge to the masses with least amount of friction?"

Solution

For most companies, when you say database, the instinctive reaction is to think of a relational database. In fact, today, there is still a lingering perception that there is little downside to selecting a relational store. Sometimes, the choice of database is made by the application provider who embeds a database inside their product, on the assumption that it is merely an implementation detail for data persistence. However, persistence is not an implementation detail. In fact, it is typically extremely important to align data strategy with use cases.

Navin and his team were experienced enough to know that mapping data from multiple applications is an expensive and complex proposition with relational databases. Many integration and information warehousing projects have gone astray by underestimating

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the time and complexity of assembling information from multiple disparate systems and data models.

For Pitney-Bowes, the problem is even more complex since they deal with many different customers who have different portfolios of applications. The problem is compounded by newer less predictable data sources like mobile, social networks, measurements of customer experience, governance requirements, and a need to manage the many channels over which customers and companies now communicate – channels that include retail, phone, Internet, instant messaging, Twitter and other social networks.

To address these challenges, the Pitney-Bowes team evaluated different classes of databases. Having decided upon graph databases, they investigated different vendor offerings within the graph database category. They selected Neo Technology's Neo4j product for four reasons:

1) Neo4j was the most established and mature product;

2) Neo4j had demonstrated the ability to scale to large size at major clients;

3) Neo4j fit well within PB's Spectrum product architecture based on the Java Spring Framework; and

4) Neo4j has a pleasant learning curve, so the staff were rapidly productive.

In fact, staffing was even less of an issue than Navin had anticipated. His initial small development team learned the product quickly, and was so productive that product development was exceptionally fast. It was clear from the success of the initial generation of the product, that future evolution and customization stands to benefit substantially from the choice of Neo4j.

Conclusion

Forrester's Michel Goetz writes: "Data architecture is no longer a one size fits all. Increasing complexity requires a strategic lens. Information architects are the answer as champions for progress and should not just fill the role of data plumber and mechanic."[2]

Increased mobile commerce, social network usage, cross-channel data integration, and rapidly changing types of information are challenging companies' legacy infrastructure and information life cycle management. Neo4j provides the capabilities that Pitney-Bowes needs to provide the most cost-effective, most scalable, most flexible and most adaptable repository for supporting the marketers in their client organizations.

References

1. Hough, Jack: "The Reinvention of Pitney Bowes", Barron's, May 17, 2014.

2. Goetz, Michele: "Can you give the business the data that it needs", Forrester, November 13, 2013.

Neo4j is an internet-scale, native graph database that leverages connected data to help companies build intelligent applications that meet today's evolving challenges including machine learning and artificial intelligence, fraud detection, real-time recommendations and master data. As the #1 platform for connected data, Neo4j has over three million downloads, the world's largest graph developer community, and over thousands of graph-powered applications in production.

The world's most sophisticated organizations worldwide, from enterprises like Walmart, eBay, UBS, Cisco, HP, adidas and Lufthansa to hot startups like Medium, Musimap and Glowbl, use Neo4j to harness the connections in their data.

Questions about Neo4j?

Contact us:
1-855-636-4532
info@neo4j.com