Executing a SaaS Strategy: The Role of the Database

A whitepaper published on behalf of NuoDB
Executive Summary

The rapid growth of ‘on-demand’ services in the consumer world has helped to spark the rise of Software-as-a-Service (SaaS) solutions in the business environment, producing a new set of opportunities and challenges for software companies.

On the positive side, rising interest in web-based alternatives to traditional on-premise, perpetual license software is fueling demand for a new generation of easy to deploy and more economical subscription services. Businesses are turning to SaaS solutions because of their collaborative capabilities, elasticity and continuous innovations. However, customer expectations regarding the availability and performance of their SaaS applications are also rising. As users of SaaS solutions become more dependent on their web-based applications, they are also becoming less tolerant of service failures, slow response times and even scheduled downtime for service maintenance.

And, with the barriers to entry in the SaaS market disappearing and customer lock-in a thing of the past, SaaS companies are increasingly at risk of customer abandonment if they don’t continuously satisfy their escalating needs.

SaaS companies must also build highly scalable service delivery infrastructures to handle their rapidly growing customer bases. As these applications become more data-driven, building the SaaS solutions on a highly elastic data architecture is essential. Yet, many SaaS companies can’t afford to make major capital investments in their service delivery systems given the nature of SaaS revenue streams and growing price competition.

Traditional database architectures were not designed to respond to today’s SaaS requirements. They don’t fit in today’s increasingly hybrid world. A new approach to database design is necessary to meet the operational and financial needs of SaaS companies.

This whitepaper will explain:

- Where SaaS companies are failing to deliver on the promise of cloud
- How the cloud delivery model has created new database performance challenges
- How a new database architecture can respond to these challenges

Today’s ‘On-Demand’ Market Realities

A confluence of market forces are driving businesses and consumers to adopt a new generation of ‘on-demand’ services to meet their changing needs.

The success of e-commerce websites such as Amazon and entertainment services such as Netflix, have inspired a new generation of ‘shared services’ such as Airbnb and Uber.
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Mobile technology has given consumers and corporate workers immediate access to on-demand consumer services and business applications.

And as the pace of innovation accelerates, corporate and consumer customers are less inclined to purchase technology and software that could become obsolete quickly. Instead, they are choosing to acquire their applications and compute power on a ‘pay-as-you-go’ basis.

Rather than continue to invest in costly applications and support systems that have proven to be difficult to deploy, costly to scale and unable to quickly adjust to the increasingly dynamic needs of today’s marketplace, organizations are seeking to leverage more flexible and user-friendly software services that can keep pace with their changing needs.

These trends are fueling the demand for a new generation of SaaS solutions and encouraging organizations to move away from traditional, on-premise software and systems and toward a cloud delivery model.

The migration from on-premise enterprise applications to SaaS is clearly illustrated by IDC’s market estimates for the customer relationship management (CRM) segment of the software industry.¹

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**Figure 3: Worldwide CRM Applications Revenue Share by SaaS and On-Premise, 2013 - 2018**

Source: IDC, Worldwide SaaS Enterprise Applications 2014–2018 Forecast and 2013 Vendor Shares, #252558

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SaaS solutions have gained broad-based corporate acceptance because of their ease of deployment and the pay-as-you-go subscription service fees which lower the implementation and financial risks of software adoption while accelerating the return on investment (ROI).

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¹ Worldwide SaaS Enterprise Applications 2014–2018 Forecast and 2013 Vendor Shares, IDC.
Beyond these upfront benefits, SaaS solutions are also better designed to respond to the dynamics of a turbulent market and an increasingly dispersed workforce.

The SaaS solutions are not only more elastic, but they provide end-users real-time access to the applications from anywhere at any time. These benefits are particularly appealing to organizations that are facing unprecedented challenges and have to be more nimble.

As a consequence, IDC recently predicted:

"By 2018, most software vendors will have fully shifted to a SaaS/PaaS code base. This means that many enterprise software customers, as they reach their next major software upgrade decisions, will be offered SaaS as the preferred option. Put together, new solutions born on the cloud and traditional solutions migrating to the cloud will steadily pull more customers and their data to the cloud."

The New SaaS Company Realities

The rapid rise of SaaS has created new challenges for the software vendors providing these on-demand solutions.

The shift from on-premise applications to a cloud delivery model has not only changed the way enterprise software is acquired and utilized, it has also changed how independent software vendors operate to meet their customers’ escalating needs. Now, the application provider is responsible for ensuring the availability and performance of the software application – regardless of where the user is located or how many users are accessing the application at the same time.

This is not an easy task. It means that the software provider must not only continuously improve the quality of its software functionality, but also ensure that it can deliver its solutions in a reliable fashion around the world.

The SaaS provider must now assume the costs and complexities of building the service delivery infrastructure to support its applications and the associated customer data. Since subscription revenue in a service business can only be recognized incrementally (compared to the upfront revenue recognition in the traditional perpetual license model), the operating costs associated with that infrastructure build out places significant financial constraints on the SaaS provider.

And yet the quality of the customer experience can’t be compromised. Service latency and availability issues can quickly translate into customer frustration and service abandonment.

Customer churn is a major concern in a SaaS model because it can have a severe impact on short-term revenue streams and long-term profitability and viability. Lost customers not only represent a direct financial loss, but in today’s networked world, dissatisfied customers can easily and quickly broadcast their discontent via social channels and seriously hurt the SaaS providers’ market image and reputation.

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David Skok, a managing partner at Matrix Partners, has published an economic analysis of the revenue impact of churn on a SaaS company. Skok’s analysis suggests that if a SaaS company cuts its churn rate in half, it can double customer lifetime value (CLTV).

For instance, a SaaS company with a Monthly Recurring Revenue (MRR) of $10k in the first month that is increasing its sales by $2k/month can produce $180k or 60% more revenue in five years by reducing a 3 percent per month churn rate 50%.

In order to prevent customer churn caused by dissatisfaction with the application performance and availability, SaaS companies must properly architect their service delivery infrastructure in general and the database design in particular.

The Shortcomings of Traditional Database Architecture

Today’s SaaS market realities have revealed a number of fundamental flaws in the traditional, monolithic, relational database management systems (DBMSs) of the past.

Traditional database architectures were conceived in an era in which software and systems were deployed in a relatively centralized and static environment, often in a single data center. The traditional database vendor viewed service as a reactive support function rather than a proactive delivery method.

In today’s world, software users are both increasingly mobile and international and expect to access applications from anywhere at any time. They also expect continuous enhancements to the software to improve its usability on a regular basis. And, they expect the SaaS vendor to help them successfully utilize their applications to achieve their business objectives.

Traditional database vendors that have historically released updates and upgrades on a periodic basis are not accustomed to delivering new features and functionality at today’s pace. Their database architectures also fall short in today’s cloud delivery environment for a number of reasons, including:

1. **Lack of continuous availability** which forces SaaS vendors to schedule downtime for routine updates and other maintenance requirements.
2. **Slow fail-over capabilities** in any single-region that can make the SaaS solution vulnerable to total-region failures – a particularly big issue as demand grows globally.
3. Mobile and multi-device access is setting user expectations that SaaS applications will be available anywhere at any time, but causing “local everywhere” latency issues.
4. **Bursty SaaS demand** can lead vendors to **over-provision their systems** for peak periods and incur unnecessary costs that fail to take advantage of cloud elasticity.
5. Simple virtualization requires each customer be given their own database, archives and security credentials, creating **additional capital and operating costs** for the SaaS vendor.

Although many SaaS vendors have relied for years on traditional SQL databases to manage their data, these relational databases are typically unable to scale to meet today’s global market realities. The monolithic architectures were not designed to accommodate rapidly growing and geographically distributed workloads.

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3 Unlocking the Path to Negative Churn, David Skok, Matrix Partners.
across a heterogeneous environment with multiple Infrastructure-as-a-Service (IaaS), datacenter and geographic configurations.

This demands a scale-out architecture to respond to organic growth without step-change upgrades that can become costly. The architecture must also be highly elastic to accommodate workload fluctuations. As described above, existing on-premise applications typically have a rich heritage steeped in a transaction-oriented database and must take that heritage into account when migrating to the cloud.

By contrast, many applications “born in the cloud” have experimented with forgoing a lot of the traditional transaction logic. Such an approach has the advantage of simplifying the API and application requirements, but introduces complexity and cost to adequately manage consistency, handle failure, or otherwise ensure the operational flexibility a SaaS application needs to adjust to changing requirements. In incorporating necessary logic into the application instead of the database, upgrades, new features, dynamics of scale, and general operational activities become increasingly difficult to implement because of the many assumptions built into the application.

In addition, SaaS companies increasingly require a database that can not only handle more transaction-oriented SQL applications, but also complex data structures beyond relational – such as table-style, key-value document stores, or graph models. Where today organizations deploy single-data-model databases for each of their needs (and the accompanying complexity of data movement tools), SaaS companies ideally seek a single, multi-model database that can support two or more data models in a single platform.

**Maximizing the Value of SaaS Data in the Cloud**

Given the shortcomings of traditional databases, a new database architecture is necessary to support today’s SaaS requirements.

This new approach must include SQL and ACID compliance capabilities to handle the mission-critical SaaS workloads that are typically assigned to relational database management systems (RDBMSs).

Gartner has predicted that,

>“Through 2019, 70% of new projects requiring scale-out elasticity, distributed processing and hybrid cloud capabilities for relational applications, as well as multi-data-center transactional consistency, will prefer an emerging RDBMS over a traditional RDBMS.”

Gartner believes this new RDBMS approach can provide greater scalability and distributed processing in hybrid on-premises and cloud deployments. Gartner calls the new database approach, “avant-garde” RDBMS. 451 Research refers to one form of the new avant-garde RDBMS as “NewSQL”.

This new approach to RDBMS can more flexibly operate in a hybrid world of private or public clouds and/or containers to support the needs of an increasingly mobile and global customer base without sacrificing availability and performance. The new generation of RDBMS can scale across multiple cloud and on-premises environments with active-active replication and data sovereignty controls.

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Consider that such avant-garde databases also promise to deliver this functionality with less user effort at a lower price point compared to traditional DBMS offerings, and it’s not surprising to see the outgrowth in interest in this market.

The new approach reduces the deployment challenges, ongoing support requirements and financial risks associated with RDBMS management. This allows the SaaS provider to focus on continuously improving the quality of their software solution and user experience of utilizing their applications.

By reducing the costs and complexities of database management, the SaaS provider can better meet the needs of their customers and better compete in the marketplace.

**A Transactional Cloud Database without Compromise**

As part of the migration to the cloud delivery model, application vendors have adopted numerous workarounds in the hopes of meeting their business requirements. From expensive and complex replication schemes to sacrificing transactional consistency and integrity, these strategies have consistently solved some of the issues, but never all, and often at the expense of development delivery timelines, cost containment, maintenance manpower, and overall architectural simplicity.

It is in this environment that the avant-garde class of databases emerges, finally giving cloud-bound application providers another option. When one appreciates that to achieve geographic scale today, application vendors are in fact relying on the complicated replication techniques alluded to above or worse, multiple, discrete databases stitched together at the application level (through sharding, for example) to achieve geographic scale today, the promise of a geographically distributed database that can maintain strict transactional consistency and integrity while minimizing latency is highly compelling.

One such database, NuoDB, has been built from inception as a distributed database that could operate in a cloud or containerized environment. Part of the new “avant-garde” category of relational databases, NuoDB embraces the standard database requirements – support for SQL; full compliance with Atomicity, Consistency, Isolation, and Durability (ACID) semantics; and enterprise-class security – on which traditional applications rely, while delivering the elasticity, agility, and global accessibility that a cloud delivery model promises.

*NuoDB embraces the standard support for SQL and security, while delivering the elasticity, agility, and global accessibility a cloud delivery model promises.*

**Summary & Conclusions**

We’re living in an on-demand world.

Mobile devices and social media have made everyone aware of the benefits of on-demand applications in our personal lives, and set an example for the ease-of-use and economies we should expect our business environment also.
Given the pace of innovation and the growing intensity of the competitive landscape, corporations are becoming more interested in leveraging on-demand services rather than continuing to invest in on-premise software and systems. As a result, the SaaS market growth is accelerating.

Yet, rising demand for SaaS solutions is creating a new set of challenges for SaaS companies that must adopt database architectures to support the escalating expectations of an increasingly mobile user base worldwide.

SaaS companies must not only deploy more elastic RDBMS solutions to meet the functional requirements of their growing customer base, they must also deploy database solutions that are more economical as price competition in the SaaS market intensifies.

This means that successful SaaS companies must leverage a new generation of flexible and cost-effective RDBMS solutions that can give them the scalability and performance to meet the needs of today’s SaaS user.

About NuoDB

NuoDB’s purpose-built SQL database combines the simplicity, rigor, and reliability of a traditional relational database with the elasticity, agility, and global accessibility provided by the cloud. As application vendors and enterprises increasingly turn to the hybrid cloud to support their growing, global, and mobile, customer base, they rely on NuoDB as the only database that can maintain transactional consistency and integrity at global scale. These organizations trust NuoDB to meet all their needs – active-active deployment, elastic scalability, data residency, and more – as they run applications in the cloud. NuoDB is headquartered in Cambridge, MA, USA, with offices in Dublin and Belfast. For more information, visit www.nuodb.com.

About THINKstrategies, Inc.

THINKstrategies, Inc. is the only strategic consulting services company focused entirely on helping its clients capitalize on the unprecedented business opportunities created by the technology shift from a product-centric to a services-driven “on-demand” business model, such as Cloud Computing, Software-as-a-Service (SaaS), Managed Services and the Internet of Things (IoT).

THINKstrategies’ mission is to help our clients re-THINK their corporate strategies, refocus their resources and re-align their operations to achieve their business objectives.

THINKstrategies has also created the Cloud Computing Showplace online directory and best practices resource center to help IT and business decision-makers find and fully leverage today’s leading SaaS, Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS) solutions. To learn more about the Cloud Computing Showplace, go to www.cloudshowplace.com.

THINKstrategies also hosts a series of executive forums focused on the latest business opportunities and technological developments in the Cloud marketplace, called the Cloud Innovators Summits. To learn more about these events, go to www.cloudsummits.com.

For more information regarding our unique capabilities, visit www.thinkstrategies.com, or contact us at info@thinkstrategies.com.