

The Modern Online Application for the Internet Economy: 5 Key Requirements that Ensure Success



Table of Contents

| Abstract | 3 |
|---|----|
| Introduction | 3 |
| Requirement #1 – Smarter Customer Interactions | 4 |
| Requirement #2 – Faster Customer Interactions | 4 |
| Requirement #3 – Always-On Customer Interactions | 4 |
| Requirement #4 – Available-Everywhere Customer Interactions | 5 |
| Requirement #5 – Secure Customer Interactions | 5 |
| Successfully Meeting Top Five Requirements of Modern Applications | 5 |
| Apache Cassandra | 5 |
| What is DataStax Enterprise? | |
| Enabling Internet Enterprise Applications with DataStax Enterprise | 6 |
| Certified and Integrated Transactional, Analytics, and Search Support | 6 |
| Linear Scale Performance | 7 |
| Distributed Operations and Continuous Availability | 7 |
| Enterprise-Class Security | |
| Automated Management | |
| Visual Management and Monitoring | |
| Expert Support | |
| Enterprise Capabilities Built on Open Source | |
| Conclusion | |
| About DataStax | 10 |

Abstract

Applications that succeed in today's digital, Internet economy age are those that interact intelligently with the end customer in specifically tailored and personalized ways, benefitting both the customer and the underlying business. Producing award-winning customer interactions in an application requires adherence to key development priorities and an underlying database technology that fully supports these priorities and meets the needs of modern online application requirements.

Introduction

The continuous evolution of data-driven software applications has rapidly moved from centralized systems decades ago that served very few applications, moderate data volumes and end-user traffic to today's digital Internet economy that is home to millions of follow-you-everywhere Web and mobile applications supporting huge amounts of data and billions/trillions of customer interactions.

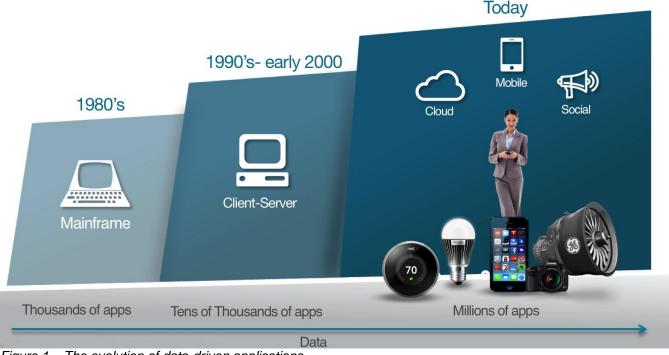


Figure 1 – The evolution of data-driven applications.

Successful businesses in today's environment mirror the actions of Internet companies such as Google and Amazon, incorporating the best practices (the digital DNA) of these companies into their own, thereby becoming an Internet Enterprise. From a practical application development standpoint, this means delivering intensely customer-focused Web and mobile applications that smartly use data to personalize customer experiences and digitally leapfrog the competition where customer satisfaction is concerned.

Regardless of market served (e.g. finance, healthcare, retail, etc.), these Internet Enterprise applications share five common traits that allow them to succeed where their competition fails. Supporting each of these key five application requirements is an underlying data management platform – one that provides the foundation and capabilities that enable today's Web and mobile applications to produce the kind of interactions that quickly make new customers and keep them coming back.

Requirement #1 - Smarter Customer Interactions

Internet Enterprise applications enable intelligent interactions with the end customer where every 'touch' is personalized, focused on achieving a purpose, and designed to influence the next interaction the customer makes.

Achieving this on a practical development level equates to outgrowing old, legacy ACID (Atomic, Consistent, Isolated, Durable) relational database transactions and broadening them so -

- (1) They can be truly distributed in nature no matter how many geographies or cloud availability zones are involved
- (2) They include analytics on the interaction that helps analyze a customer's request and personalizes the returned response.

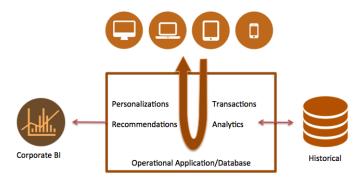


Figure 2 – Transactional-analytical application at work.

Analyst groups such as Gartner Group classify this broadening of legacy transactions as *hybrid transactional analytical processing* or HTAP. Sometimes this transactional-analytics is done purely on the operational data and other times it includes historical data as well. Either way, the application accomplishes its mission of making each interaction with a customer as smart as possible with major benefits such fraud protection, personalized recommendations to products and services, and more.

Requirement #2 - Faster Customer Interactions

Consumers of modern Web and mobile applications have low tolerance for slow response times and demand interactions at the speed of thought. This defines the second requirement of modern Internet Enterprise applications: speed.

Smart businesses understand that slow interactions translate into customer attrition. As a result, these business institute serious performance SLA's for data platforms for both read and write operations. To meet performance standards, organizations deploy a database infrastructure that consists of in-memory technology, log-based write engines, scalable search, localization of data (i.e. putting data close to customers around the world), and more, all geared around ensuring lightning fast customer interactions.

Requirement #3 – Always-On Customer Interactions

We are living in a world of no outages; where online applications must be available 100% of the time. These always-on applications must withstand power outages, natural disasters, and hardware failures, and continue to serve customer requests without missing a beat.

To meet this requirement, a data platform requires more than traditional failover can provide, which may mete out levels of *high* availability, but not *continuous* availability. The latter requires a foundational change in the data platform's architecture that moves beyond the traditional RDBMS master/slave approach to managing uptime.

¹ Gartner Group, *Hybrid Transaction/Analytical Processing Will Foster Opportunities for Dramatic Business Innovation*, January 2014. Available at: http://goo.gl/haOegJ.

Requirement #4 - Available-Everywhere Customer Interactions

Social media, mobile apps, email messages. These all make it possible for customers to stay in contact with the companies they like most, from anywhere in the world. The next requirement of Internet Enterprise applications is that they must be able to serve customers smartly and quickly no matter where they are located. To achieve this goal, the underlying data platform easily distributes data across multiple geographies, on premise or in the cloud, while remaining always-on.

This allows for *location independence*, which equates to putting the data where the customer is and allowing for data to be quickly written, read, and synchronized across a widely distributed database.

Requirement #5 - Secure Customer Interactions

Because Web and mobile applications collect and retain sensitive customer data, it is imperative that such data be protected from unauthorized access. The fifth key requirement of today's online applications is they must protect customer information and ensure data privacy.

From a practical perspective, security requirements encompass everything from authorization, authentication, encrypting data in multiple scenarios (e.g. in-flight from client to database, intra-database communication, data at rest, etc.), and auditing both internal and external activities.

Successfully Meeting Top Five Requirements of Modern Applications

Successfully meeting the five key requirements of today's modern Internet economy applications necessitates looking past legacy relational systems. While relational databases may satisfy some requirements such as security, they are foundationally not equipped to deal with the vast majority of today's Web and mobile application demands.

Internet Enterprises increasingly turn to NoSQL distributed database technologies built from the ground up to service modern Web and mobile applications. From a performance, scalability, availability, and operational simplicity perspective, the leading data management platform for Internet Enterprise applications has proven to be Apache CassandraTM, and for production environments, DataStax Enterprise, which is built upon Cassandra.

Apache Cassandra

Apache Cassandra is an open source, massively scalable and distributed NoSQL database. Cassandra sports a masterless, always-on, continuously available architecture that future-proof's the success of Web and mobile applications by providing linear scale performance against ever-increasing data volumes.

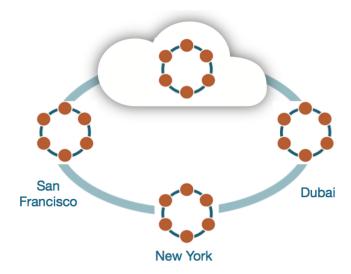


Figure 3 – A single Cassandra cluster can span multiple data centers and cloud availability zones. The modern masterless "ring" architecture and distributed nature of Cassandra allows an Internet enterprise to easily support its customers no matter where they are geographically located, plus it provides hybrid application support for those systems that run partly in private data centers and partly on public cloud providers. Cassandra is operationally simple to manage and maintain, as every node in a database cluster is the same.

What is DataStax Enterprise?

DataStax Enterprise is the fastest, most scalable commercial database platform that delivers a production-ready version of Cassandra along with other critical database features needed by modern Internet Enterprise applications. In addition, DataStax Enterprise supplies web-based visual management and monitoring tools and expert 24x7 support.

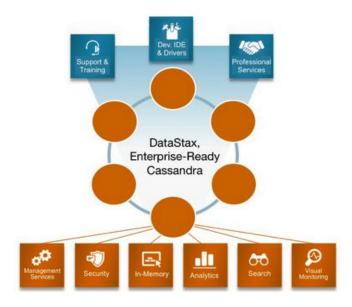


Figure 4 – DataStax Enterprise delivers Cassandra to the Internet Enterprise.

Enabling Internet Enterprise Applications with DataStax Enterprise

DataStax Enterprise enables the intelligent customer interactions needed by today's Web and mobile applications by providing a data platform that seamlessly integrates transactional (OLTP), analytical and search abilities all in the same database cluster.

Certified and Integrated Transactional, Analytics, and Search Support

For online transactional processing (OLTP), Cassandra provides atomic, isolated, and durable transactions with a tunable consistency model that allows the developer to control how strong or eventual they want each operation to be across a cluster. Additionally, DataStax Enterprise enables both real-time and batch analytics on Cassandra data, and integrates seamlessly with BI tools such as Tableau, Pentaho, Jaspersoft, and others. Moreover, DataStax Enterprise provides strong integration for linking historical data stored in Hadoop data warehouses with operational data stored in Cassandra. Hadoop analytics can be run directly on Cassandra data in the DSE platform, and queries may be run that link Cassandra and Hadoop data objects together (e.g. a query that joins a Cassandra table and an external Hadoop Hive table).

DSE provides powerful search capabilities on Cassandra data, scaling as data volumes grow. DSE search features include robust full-text search, hit highlighting, faceted search, rich document (e.g., PDF, Microsoft Word) handling, and geospatial search. Workload management built into DSE ensures full isolation of OLTP, analytics, and search workloads so each does not compete with any other for data or compute resources.

Linear Scale Performance

With Cassandra as its core, DataStax Enterprise delivers linear scale to enable the fastest possible customer interactions. Independent benchmarks and customer tests confirm Cassandra is the leader in scale and performance among distributed, NoSQL databases.

DSE provides extra performance capabilities via its in-memory OLTP option that brings all of Cassandra's features to an in-memory database. The in-memory OLTP option can be combined with in-memory analytics on Cassandra data, which delivers a full in-memory solution for transactional-analytic workloads.

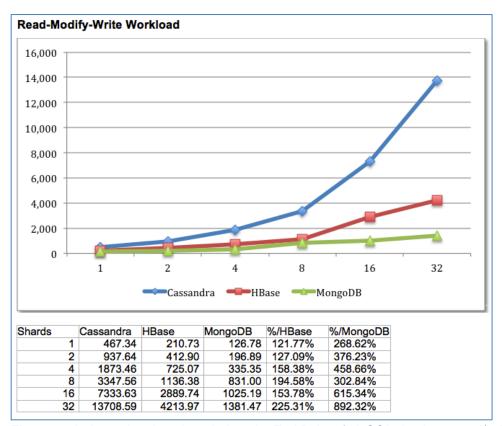


Figure 5 - Independent benchmark done by End Point of NoSQL database read/write performance. \

Distributed Operations and Continuous Availability

DataStax Enterprise handles the application requirements of always-on and available-everywhere customer interactions with its underlying architecture. DSE ensures constant uptime by supplying redundancy in both data and process across a widely distributed cluster that can span multiple data centers, geographies or cloud availability zones.

DSE allows full OLTP, analytics, and search operations on Cassandra data no matter where a customer is located, with full write/read-anywhere abilities, and built-in data distribution/synchronization.

Enterprise-Class Security

DSE ensures secure customer interactions and data privacy by supplying a complete suite of enterprise-security features. Both internal and external authentication support, object permission management, encryption for data at rest objects, as well as client-to-node and node-to-node communications is provided, as is data auditing for tracking database modifications and user activity.

Automated Management

DataStax Enterprise contains built-in management services that operate autonomously and transparently, carrying out key maintenance tasks such as ensuring that data contained within a cluster is consistent across all

nodes, automatically enforcing best practices across a cluster, and more. Such services dramatically reduce the amount of time administrators must devote to managing and monitoring their database clusters.

All management services may be managed either via the command line or visually through OpsCenter.

Visual Management and Monitoring

Managing the DataStax Enterprise platform is made easy by OpsCenter, a visual management and monitoring solution for Cassandra and DataStax Enterprise. Via a Web-based console, administrators and operations staff can visually (on premise or in the cloud) create new clusters, manage existing clusters, perform backup and recovery operations, schedule routine maintenance tasks, monitor performance, set proactive alerts, and more.

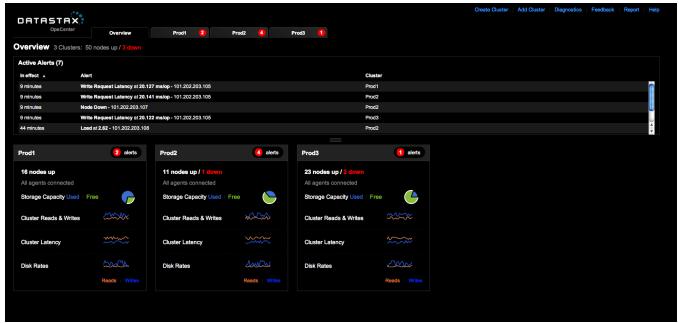


Figure 6 - Managing multiple clusters with OpsCenter.

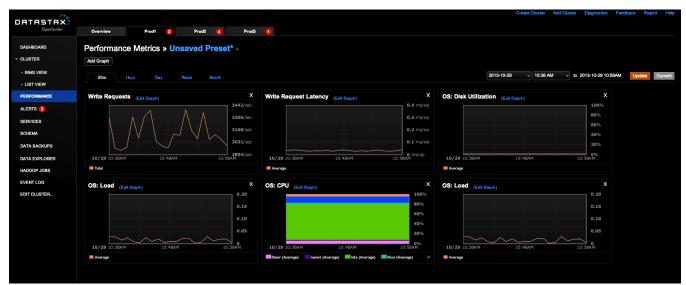


Figure 7 – Monitoring cluster performance with OpsCenter.

Expert Support

DataStax Enterprise includes professional support and advice from the Cassandra experts at DataStax. Customers can choose the right production support package for their business needs, including rapid response SLAs and scheduled health checks. DataStax also provides certified service pack updates for DataStax Enterprise as well as other benefits such as emergency hot fixes (for production outages) and bug escalation privileges for customers.

Enterprise Capabilities Built on Open Source

The following table compares DataStax Enterprise and open source Cassandra to demonstrate the additional features, functionality, and services that DataStax Enterprise provides.

| Feature | Open Source | DataStax Enterprise | | |
|--|----------------------------|--------------------------------|--|--|
| Database Software | | | | |
| Data Platform | Latest Community Cassandra | Production-certified Cassandra | | |
| Core security features | ✓ | ✓ | | |
| Enterprise security features | No | ✓ | | |
| In-Memory OLTP option | No | ✓ | | |
| Built-in automatic management services | No | ✓ | | |
| Integrated real-time and batch analytics | No | ✓ | | |
| Integrated enterprise search | No | ✓ | | |
| Workload/Workflow Isolation | No | ✓ | | |
| Easy migration of RDBMS and log data | No | ✓ | | |
| Certified Service Packs | No | ✓ | | |
| Certified platform support | No | ✓ | | |
| Management Software | | | | |
| OpsCenter | Basic functionality | Advanced Functionality | | |
| Services | | | | |
| Community Support | ✓ | ✓ | | |
| Datastax 24x7x365 Support | No | ✓ | | |
| Quarterly Performance Reviews | No | ✓ | | |

| Hot Fixes | No | ✓ |
|--------------------------|------|--------------|
| Bug Escalation Privilege | No | ✓ |
| Custom Builds | No | Option |
| EOL Support | No | ✓ |
| Licensing | Free | Subscription |

Conclusion

Satisfying the top five requirements of today's Internet Enterprise applications requires a data platform that has been architected from the ground up to handle the nature of modern Web and mobile applications. The following table summarizes how DataStax Enterprise handles each requirement:

| Requirement | | Satisfied by |
|---------------------------------|----------|--|
| Smarter customer interactions | - | OLTP, analytics, and search capabilities in the same database |
| | • | cluster for intelligent transactional-analytical workloads |
| Faster customer interactions | 1 | Fastest distributed database platform for workloads requiring |
| | • | speed and scale, with additional in-memory option for both OLTP |
| | | and analytics |
| Always-on customer interactions | \ | No single point of failure and no downtime |
| Available everywhere customer | 1 | Gold standard in multi-datacenter and cloud support allowing data |
| interactions | • | to be read, written, searched and analyzed anywhere |
| Secure customer interactions | 1 | Enterprise-class security to protect customer data and ensure data |
| | • | privacy |

For more resources and downloads of DataStax Enterprise, visit www.datastax.com today.

About DataStax

DataStax, the leading distributed database management system, delivers Apache Cassandra to the world's most innovative enterprises. Datastax is built to be agile, always-on, and predictably scalable to any size.

DataStax has more than 500 customers in 45 countries including leaders such as Netflix, Rackspace, Pearson Education and Constant Contact, and spans verticals including web, financial services, telecommunications, logistics, and government. Based in Santa Clara, Calif., DataStax is backed by industry-leading investors including Lightspeed Venture Partners, Meritech Capital, and Crosslink Capital. For more information, visit DataStax.com or follow us @DataStax and @DataStaxEU.