Database Selection Matrix

January 2015

Table of Contents

Introduction

Selecting the appropriate database for a new project requires evaluation against multiple criteria, including:

- **Development considerations:** includes the data model, query functionality, available drivers, data consistency.
- **Operational considerations:** performance and scalability, high availability, data center awareness, security, management and backups.
- **Commercial considerations:** licensing, pricing and support.

All of these considerations need to be evaluated in context of specific application requirements, internal technology standards, skills availability and integration with existing enterprise architecture.

This document is designed to serve as a decision matrix for teams responsible for database selection. Responses to questions will help identify key requirements and guide selection of the most appropriate database for the project.

Development Matrix

Data Model

Support for multiple pluggable storage engines, allowing the database to be extended for specific workloads and hardware architectures
MongoDB: Yes, in MongoDB 3.0
Alternative Database A:
Alternative Database B:

Support for multiple data types to support diverse application requirements: To include Double, String, Object , Array, Binary data, Boolean, Date, Null, Regular Expression, JavaScript, Symbol, 32-bit integer, 64-bit integer, Timestamp, Geospatial
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for JSON documents
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for a dynamic schema that can be modified to support evolving application requirements without downtime
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Schema changes are immediately consistent between nodes
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support of typed data
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for natively storing multiple content assets (i.e. pdfs, images), including binary data above 20MB, within the database, rather than a separate filesystem?
MongoDB: Yes, via GridFS.
Alternative Database A:
Alternative Database B:

Support for embedded/hierarchical data structures including sub-documents and arrays (dictionary, lists, strings, etc.) that match object structure in the programming language. Enhances developer ease of use.
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for strong consistency by default (read your own writes)
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for durability with journaling/write-ahead logging
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Query Model
Support for ad-hoc queries against the database
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for Key/Value queries
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for querying data by secondary indexes to provide flexible data access

MongoDB: Yes
Alternative Database A:
Alternative Database B:

Queries against secondary indexes return consistent data by default, without impacting performance
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for declarative index creation to enhance ease of use
MongoDB: Yes
Alternative Database A:
Alternative Database B:

For ad-hoc query flexibility, can the query planner use more than one index to resolve a query?
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Native support for compound indexes
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Native support for geospatial queries and indexes required for location-aware applications
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Native support for text indexes to support search of text-based data directly within the database, rather than replicating to a dedicated search engine.[1]

---

[1] Text search in the database ensures index consistency and re-use of developer and operational tooling within a single framework.

MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for indexing unique elements within an array
MongoDB: Yes, via array (multi-key) indexes
Alternative Database A:
Alternative Database B:

Support for automatic expiration of data from the database
MongoDB: Yes, via TTL indexes
Alternative Database A:
Alternative Database B:

Support for enforcing unique constraints within the database
MongoDB: Yes, via unique indexes
Alternative Database A:
Alternative Database B:

For real time reporting and analytics, can the database support declarative definition of queries that aggregate and transform data within the database (i.e. without replicating to external analytics nodes or Hadoop)?
MongoDB: Yes, via the Aggregation Framework
Alternative Database A:
Alternative Database B:

Support for MapReduce queries within the database (i.e. without replicating to external analytics nodes or Hadoop)
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Expansive developer choice with support for native client drivers in 10+ languages
MongoDB: Yes, with support for C, C#/.net, C++, Java, node.js, Perl, PHP, Python, Motor, Ruby and Scala + circa 30 community-supported drivers.

Alternative Database A:
Alternative Database B:

For development efficiency, do the client drivers implement the methods and functions of the programming language?
MongoDB: Yes, supported by the drivers listed above
Alternative Database A:
Alternative Database B:

Support for integration with multiple BI/Analytics/ETL tools
MongoDB: Yes, native integrations with Actuate, Alteryx, Informatica, Jaspersoft, Logi Analytics, MicroStrategy, Pentaho, Qliktech, SAP Lumira and Talend
Alternative Database A:
Alternative Database B:

Support for certified integration with multiple Hadoop distributions, including the ability for Hadoop jobs to use the database's indexes to reduce data movement across the network
MongoDB: Yes, via the MongoDB Connector for Hadoop.
Alternative Database A:
Alternative Database B:

Availability of Developer Training
Availability of in-class training
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Availability of Online, self-paced training
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Operations Matrix

<u>**High Availability**</u>
Support for self-healing recovery (Automatic Failover) that eliminates manual intervention to restore service
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for failing over to replacement node in less than 10 seconds
MongoDB: Yes. Currently automatic failover typically takes several seconds only
Alternative Database A:
Alternative Database B:

Ability to accept writes in the event of any node failing (i.e. multi-master)
MongoDB: Under consideration as a roadmap feature. Currently automatic failover typically takes several seconds in a well-designed cluster
Alternative Database A:
Alternative Database B:

Support for fast recovery by resynchronizing failed nodes with the cluster versus reloading entire database to recover the node
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Maintain availability by reading from secondary nodes during an outage
MongoDB: Yes, as long as application can deal with potentially inconsistent data
Alternative Database A:
Alternative Database B:

Support for cross-region replication of a single database, with active/active data centers:
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Eliminate downtime and operational complexity by automating rolling restarts during planned database maintenance
MongoDB: Yes, with Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Scalability

Support for automatic sharding to scale-out database read and write operations on commodity hardware
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for sharding by multiple policies to optimize for application's query patterns
MongoDB: Yes, shard by range, hash or tag (e.g. assigned to a specific location or data center)
Alternative Database A:
Alternative Database B:

Support scaling read operations by querying replica nodes
MongoDB: Yes, as long as application can deal with potentially inconsistent data
Alternative Database A:
Alternative Database B:

Support for multi-region deployments with data center-aware read and write operations
MongoDB: Yes, via read preferences and tag aware sharding
Alternative Database A:
Alternative Database B:

Storage Compression

Support for multiple compression libraries to optimize storage density and CPU overhead?
MongoDB: Yes, in MongoDB 3.0
Alternative Database A:

Alternative Database B:

Support for compression of data, indexes & journal for maximum storage efficiency?
MongoDB: Yes, in MongoDB 3.0
Alternative Database A:
Alternative Database B:

Security

Support for centralized identity management with LDAP integration
MongoDB: Yes, with MongoDB Enterprise Advanced
Alternative Database A:
Alternative Database B:

Support for password elimination by using Kerberos authentication
MongoDB: Yes, with MongoDB Enterprise Advanced
Alternative Database A:
Alternative Database B:

Support for PKI by using x.509 certificates
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for fine-grained authorization with User-Defined Roles (RBAC)
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for restricting access to individual fields of a record
MongoDB: Yes, via Field Level Redaction
Alternative Database A:
Alternative Database B:

Support for auditing operations against the database
MongoDB: Yes, with MongoDB Enterprise Advanced

Alternative Database A:
Alternative Database B:

Support for SSL encryption of data over the network
MongoDB: Yes
Alternative Database A:
Alternative Database B:

For security assurance, traffic is encrypted to FIPS 140-2 standard
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for encryption of data on disk
MongoDB: Yes, via partner solutions
Alternative Database A:
Alternative Database B:

Database Backup & Restore
Support for incremental backup to reduce storage and time overhead
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for consistent, cross cluster backups to ensure seamless recovery
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Support for Point in Time recovery
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Database Management

Availability of GUI-based administration, monitoring and backup tool for operational ease-of-use
MongoDB: Yes, MongoDB Ops Manager, available as part of MongoDB Enterprise Advanced or MongoDB Management Service, hosted in as a service in the cloud
Alternative Database A:
Alternative Database B:

Flexibility to deploy management app on-premise or consume as a hosted cloud service (SaaS)
MongoDB: Yes. On-Prem deployments are included with MongoDB Enterprise Advanced
Alternative Database A:
Alternative Database B:

Ability to automatically deploy clusters and perform rolling upgrades
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Proactively warn of potential issues by configuring of alerts against any monitored database metric
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Integration of metrics data with Operations workflow tooling (i.e. Hipchat, Pagerduty) and with SMS
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Ability for vendor support engineers to view live metrics data from the database when resolving issues, without opening ports to the live cluster and its data
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

For complete management visibility, is it possible to alert against actions invoked outside of the management tool (i.e. from a CLI)?
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Ability to configure pre-defined roles to authorize only specific administrative actions
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

For security, is traffic encrypted between database and management tools?
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Can the management application be integrated with 3rd party operational tools via a RESTful API?
MongoDB: Yes, via Ops Manager and MMS
Alternative Database A:
Alternative Database B:

Support for SNMP to enable integration with 3rd Party systems management tools
MongoDB: Yes, included with MongoDB Enterprise Advanced
Alternative Database A:
Alternative Database B:

Database Deployment
Support for Linux, Windows, Solaris and Mac OS X operating systems
MongoDB: Yes (Solaris is supported on x86 processor architectures when configured with the MMAPV1 storage engine. Mac OSX for development environments)
Alternative Database A:
Alternative Database B:

Support for multiple container, virtual machine & cloud environments

MongoDB: Yes, AWS, Google Compute Engine, OpenStack, OpenShift, Cloud Foundry, Microsoft Azure, Joyent, Docker
Alternative Database A:
Alternative Database B:

Availability of pre-build cloud images, including AWS AMIs
MongoDB: Yes, multiple, including AWS with PIOPs, Azure, Joyent Smart Machine
Alternative Database A:
Alternative Database B:

Availability of hosted DBaaS options
MongoDB: Yes, multiple via partners including Rackspace (ObjectRocket), IBM (Softlayer), MongoLab, MongoSoup and more
Alternative Database A:
Alternative Database B:

Availability of Operations Training
Availability of in-class training
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Availability of online, self-paced training
MongoDB: Yes
Alternative Database A:
Alternative Database B:

Licensing, Pricing and Support Matrix

<u>Licensing</u>

OSI-Approved open source license to prevent lock-in and facilitate rapid community adoption

MongoDB: Yes. Database is licensed under GNU AGPL V3, with drivers distributed under the Apache Software License

Alternative Database A:

Alternative Database B:

Availability of a commercial license, including indemnification

MongoDB: Yes, with MongoDB Enterprise Advanced

Alternative Database A:

Alternative Database B:

<u>Support</u>

Availability of proactive, consultative support, including 24x7 global coverage with response time SLA of one hour or less

MongoDB: Yes, with MongoDB Enterprise Advanced

Alternative Database A:

Alternative Database B:

Ability to purchase support for the community edition of the product

MongoDB: Yes

Alternative Database A:

Alternative Database B: