

# Informix 12.1: NoSQL for the Enterprise = NewSQL

**Delivering Native, mobile and hybrid apps though NoSQL, JSON, RDBMS**



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# Industry-wide: NoSQL is gaining traction because.....

- **Non-traditional needs driven by Web 2.0 interactive applications**
  - Document stores, key-value stores, graph and columnar DBMS
  - Lower development costs – DevOps deployment
- **The Three Vs:**
  - Velocity – high frequency of data arrivals
  - Volume – BigData
  - Variability – unstructured data, continuous change requires rapid / immediate response
- **Scale-out requirements across heterogeneous environment – Cloud computing**
  - Low cost commodity platforms
  - Immediate extensibility
  - Global access



# What is a NoSQL Database?

- **Not Only SQL or NOT allowing SQL**
- **A non-relational database management systems**
  - Does not require a fixed schema
  - Avoids join operations
  - Scales horizontally
  - No ACID (eventually consistent)
- **Good with distributing data and prototype project**
- **Big with web developers**

**Provides a mechanism for storage and retrieval of data while providing horizontal scaling.**

# Basic NoSQL Terms

Term	Description
NoSQL	A class of database management systems that use some API other than SQL as the primary language. Two common features in such databases are a flexible schema, and automatic sharding and query routing across distributed nodes.
JSON	Acronym for JavaScript Object Notation – It is a text-based standard for data representation and interchange. The JSON format is often used for serializing and transmitting structured data over a network connection. It is used primarily to transmit data between a server and web application, serving as an alternative to XML.
BSON	A standardized binary representation format (see <a href="http://bsonspec.org">bsonspec.org</a> ) for serializing JSON documents. It allows for faster traversal of the document than when using the textual representation.

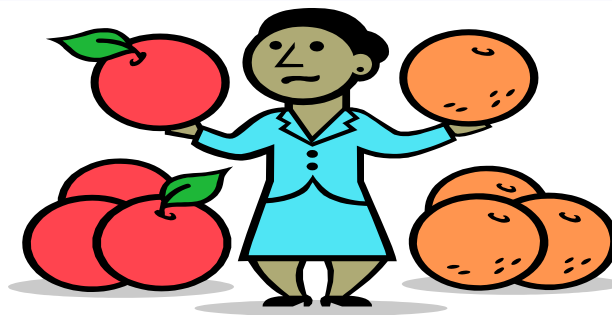
# Basic Terms Translation

Mongo/NoSQL Term	Informix Term
Database	Database
Collection	Table
Document or BSON document	Row
Field	Column
Embedded documents and links	Table joins
Aggregation framework	Group by with aggregation functions

# Apples and Oranges

**Relational systems and non-relational systems solve different problems and have different philosophies on server responsibility.**

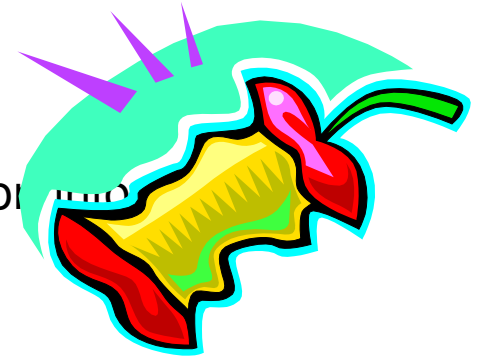
<b>Informix – Relational Database</b>	<b>MongoDB - Document Store</b>
<b>Scales within node and by adding nodes</b>	<b>Scales by adding nodes</b>
Suite of data protection capabilities	Minimal security
Transactional	No multi-statement transactions
Guaranteed writes	Write concern levels
Consistency of data	Eventual consistency
<b>DB schema defines app structures</b>	<b>App structures define DB data</b>



# Informix Core Themes to a NoSQL Solution

## ▪ Invisible and Easy to Install and Administer

- Support for Mongo Data Base is now part of Informix
- JSON/BSON – NoSQL and SQL bi-directional function
  - Can, but do not have to combine both data organization



## ▪ Dynamic Elasticity

- Simple to Scale Up
- Easy to Scale-out
- Adding and removing nodes is simple

## ▪ Informix Value Add Propositions

- Hybrid functionality (combined NoSQL and Relational)
  - Relational tables and NoSQL collections co-existing in the same database
  - Join between NoSQL and Relational tables
  - Joins utilize indexes on both Relational and NoSQL
- Enterprise level functionality



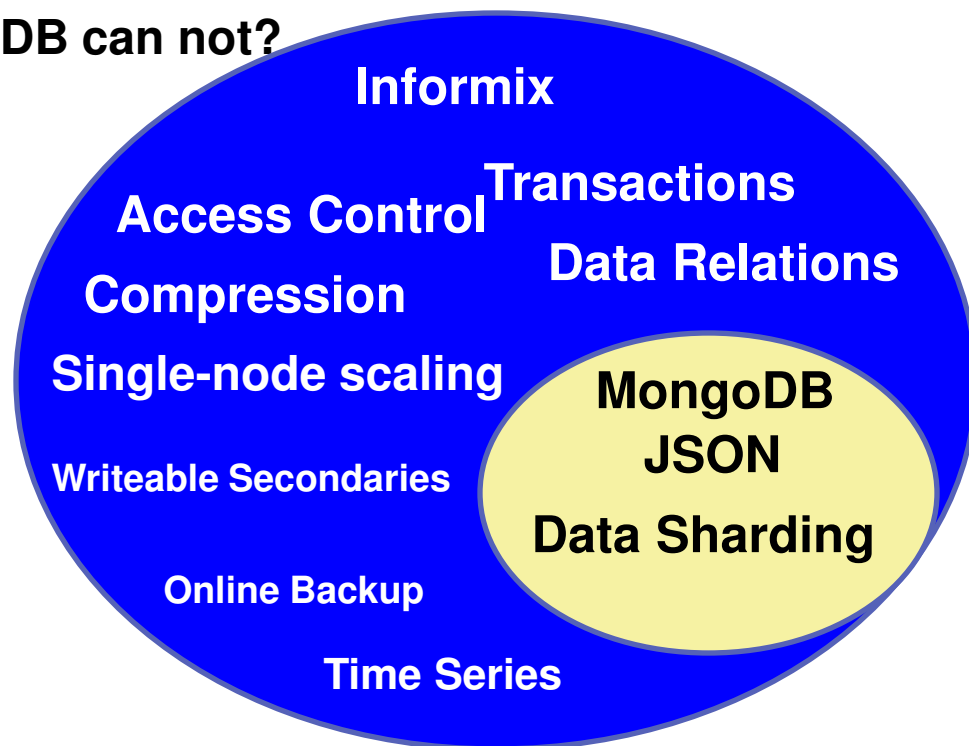
# Major Capability Differences

## ▪ What can MongoDB and Informix both do?

- Handle structured data in JSON format
- Distribute (shard) query execution between server nodes

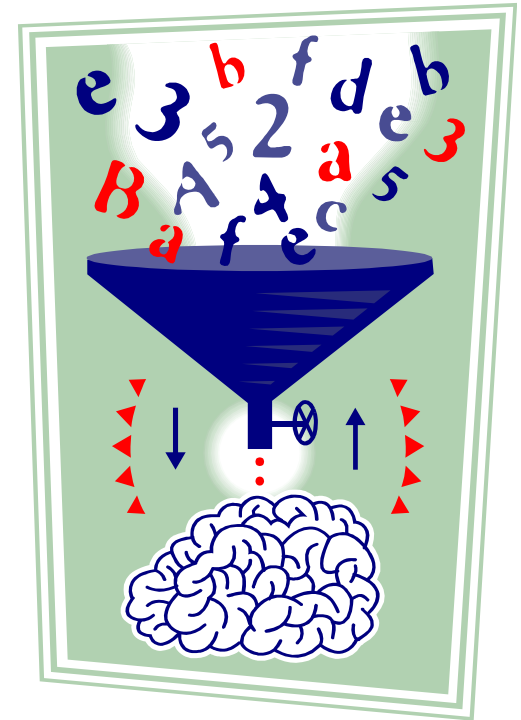
## ▪ What can Informix do that MongoDB can not?

- Relationships between entities
- Transactions
- Access Control
- ...a great many things



# Informix 12.1 New Release with New Functionality

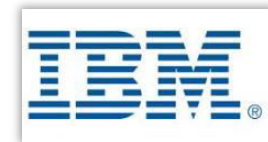
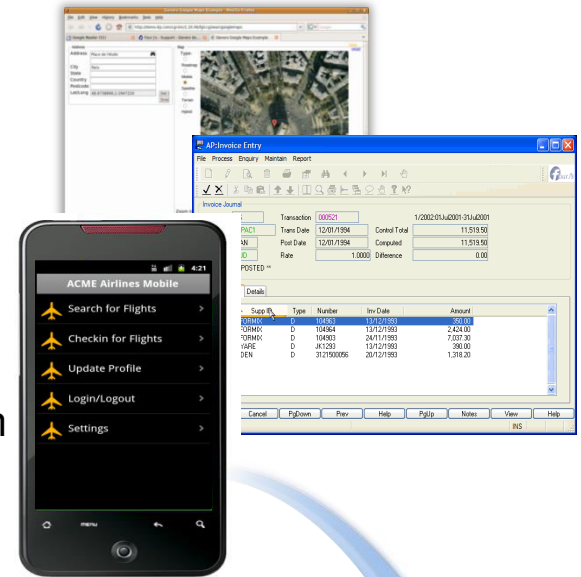
- **Add three new built-in data-types**
  - Longlvarchar
  - JSON
  - BSON
  
- **New data types are native to all databases**
  - Automatically convert JSON to BSON document
  - Automatically converts BSON to JSON
  
- **Add new Built-in BSON Functions**
  
- **Complete the Sharded Operations**
  - Query in 12.10.UC1
  - Insert, Delete, Update
  
- **Add Simplification**
  - Installation
  - Resource Allocation



# Informix's Unique Value and Capabilities

*Benefit from NoSQL capabilities, using MongoDB APIs, to exploit the world-class strengths of Informix*

- **Modern Interface providing JSON and BSON native support**
  - Flexible Schema support allows rapid delivery of application
  - Compatible with all MongoDB programming interfaces
  - Connect the same application developed for MongoDB to Informix with minimal/no application changes
  - Access traditional relational data from NoSQL/MongoDB application
- **Super scale out**
  - Simplify the ability to scale out to multiple nodes, multiple versions, multiple copies
  - Provided diskless and disk based scale out at the individual node with automatic failover
  - Provided Sharded Insert, Update, Delete and Query operations
  - Cloud and Virtualized environment supportability



**NoSQL  
Cluster**

## Informix ~~NoSQL~~ NewSQL – The Hybrid Solution Best of Both Worlds

- **Relational and non-relational data in one system**
  - JSON (BSON) as first-class citizen data type
- **NoSQL/MongoDB Apps can access Informix Relational Tables**
- **Distributed Queries**
- Multi-statement Transactions
- Enterprise Proven Reliability
- Enterprise Ready Security
- Enterprise Level Performance



**Informix provides the capability to leverage  
the abilities of both relational DBMS and document store systems.**

MongoDB does not. It is a document store system lacking key abilities like transaction durability.

# High Level Architecture

**Applications**

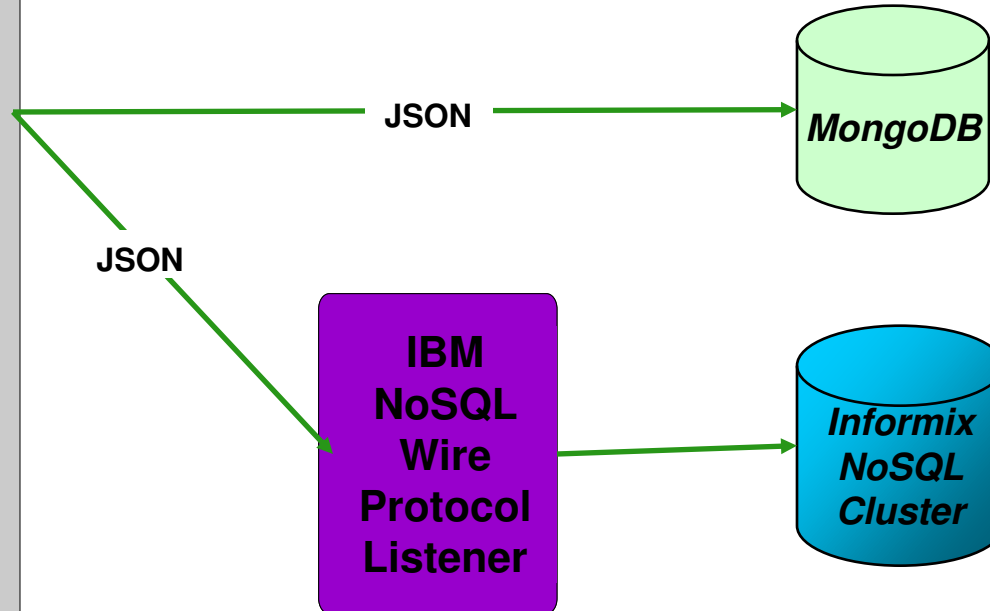
**MongoDB native Client**

Trl	Supp	Type	Number	Inv Date	Amount
2	INFORMIX	D	10483	13/12/1993	20.00
3	INFORMIX	D	10484	13/12/1993	2424.00
4	INFORMIX	D	10485	14/12/1993	7201.00
5	JAVARE	D	JK1203	13/12/1993	390.00
1	MEDIA	D	312100005	20/12/1993	1,310.00

**MongoDB web browser**

**Mobile**

- **New Wire Protocol Listener supports existing MongoDB drivers**
  - Simple port change allows applications written for MongoDB to be intercepted by wire listener
  - Compatible with all MongoDB programming interfaces
    - Java, PHP, Python, Javascript, etc.
- **The wire listener combines MongoDB messages and BSON documents to perform actions against a distributed data store**



## Where Informix NewSQL Wins

**Easy application development, in popular, new languages, to exploit the traditional strengths and new NoSQL capabilities of Informix**

- **In Retail Enterprises**
  - Front-end order processing
  - Product to Location demand patterns/predictions
- **Hospitability**
  - Reservation system
  - Targeted loyalty program benefits, services delivery
- **Insurance**
  - Manage documents, records, claims, using the JSON/BSON support
- **Internet of Things/Everything (IoT/IoE)**
  - 10s of billions of internet/web enabled devices – a sensor driven world
  - Services, platforms, delivered on the strengths of Informix TimeSeries and NoSQL capabilities



## Some Typical NoSQL Use Cases - Mostly Interactive Web/Mobile

- **Online/Mobile Gaming**
  - Leaderboard (high score table) management
  - Dynamic placement of visual elements
  - Game object management
  - Persisting game/user state information
  - Persisting user generated data (e.g. drawings)
- **Display Advertising on Web Sites**
  - Ad Serving: match content with profile and present
  - Real-time bidding: match cookie profile with ad inventory, obtain bids, and present ad
- **Dynamic Content Management and Publishing (News & Media)**
  - Store content from distributed authors, with fast retrieval and placement
  - Manage changing layouts and user generated content
- **E-commerce/Social Commerce**
  - Storing frequently changing product catalogs
- **Social Networking**
  - Feeds
  - Extractions
- **Communications**
  - Device provisioning
  - Session control
- **Logging/message passing**
  - Drop Copy service in Financial Services (streaming copies of trade execution messages into (for example) a risk or back office system)

# Enterprise Level NoSQL Operational Requirements

- **Consistent low latency, even under high loads**
  - Ability to handle thousands of users
  - Typically millisecond response time
- **Schema flexibility and development agility**
  - Application not constrained by fixed pre-defined schema
  - Ability to handle a mix of structured and unstructured data
- **Continuous availability**
  - 24x7x365 availability
  - Online maintenance operations
  - Ability to upgrade hardware or software without down time
- **Dynamic Elasticity**
  - Rapid horizontal scalability
  - Ability to add or delete nodes dynamically in the grid
  - Application transparent elasticity
- **Low cost infrastructure**
  - Commonly available hardware (Windows & Linux,...)
- **Reduced need for database administration and maintenance**



# Scalability

- **Better performance on multi-core, multi-session scenarios**
  - Architecture has finer grain locking – not just entire database as with MongoDB
  - Better concurrency because less resources locked
- **Document Compression**
  - 60% to 90% observed
- **Bigger documents – 2GB maximum size**
  - MongoDB caps at 16MB
- **Informix has decades of optimization on single node solution**

**Better utilization of enterprise system resources means less need to shard, for Informix**

MongoDB has higher space requirements for same data

# Security

- **Encryption**
  - Protects data from access in transit and on disk
- **Auditing**
  - Records who has accessed data
- **Discretionary Access Control**
  - Verifies that a user is authorized to do what they are trying to do – roles, etc

**Informix has decades of solving customer security requirements**

## With MongoDB

- Security mostly responsibility of the application
  - Every application has to code for security
    - Consistent implementation of policies?

# Support and Maintenance

- **IBM Informix Support**

- Consistently highly rated (#1 at VendorRate 2009)
- Simple offering
- Severity and level of response determined by impact to customer

- **Informix reliability second to none**

- Greater than five 9s uptime
- Possible to manage 1000s of seats per DBA

- **MongoDB Support**

- Various support offerings
- Level of response determined by subscription

# Enterprise Version Comparisons

Informix	MongoDB
Replicas Unlimited Writeable – local node updates	Replicas 12 per replica set Read-only
Complete, easy, automated, online backup/restore	Partial solution requiring index rebuild, or file system only
Suite of structured data extensions TimeSeries, Spatial, Text, Video...	Primitive spatial and text search capabilities
Mobile/Remote Administration (OAT)	3 <sup>rd</sup> Party
Security Auditing, Kerberos, encryption, role and fine grain access control...	Security Kerberos, role access control
Reduced storage requirements - data compression	Not available

# Informix and MongoDB Have Free Editions

<u>Editions</u>	Informix	MongoDB
Free	Developer Innovator-C	Standard
For Purchase	Express, Workgroup, Advanced Workgroup, Enterprise, Advanced Enterprise	Enterprise

# MongoDB Subscriptions

	Basic	Standard	Enterprise
Edition	MongoDB	MongoDB	MongoDB Enterprise
Support	9am-9pm local, M-F	24x7x365	24x7x365
License	AGPL	Commercial	Commercial
Emergency Patches	Not Included	Included	Included
Price	\$2,500 / Server / Year	\$5,000 / Server / Year	\$7,500 / Server / Year

Subscription information obtained from 10Gen site, June 26, 2013.

## Price Point Comparison Estimate, 3-year cost

<i>Dual Core Intel Nehalem</i>	Innovator-C	Express (4 core, 8 GB, 2 ER nodes)	Workgroup (16 core, 16 GB, unlimited nodes)
Product Cost	\$0	\$8,540	\$19,740
Support Subscription Year 1 24 x 7 x 365 Production System Down Development Call Emergency Patches Free Upgrades	\$1,680	Included	Included
Support Renewal Year 2	\$1,680	\$1,708	\$3,948
Support Renewal Year 3	\$1,680	\$1,708	\$3,948
<b>Total</b>	<b>\$5,040</b>	<b>\$11,956</b>	<b>\$27,636</b>

MongoDB Enterprise, 3-year cost: \$22,500

Retail prices subject to change, valid as of June 26, 2013.

# Informix 12.1 - Analytic Access Through NewSQL

## Cognos included in Advanced Enterprise and Advanced Workgroup Editions

- Includes Cognos BI 10.2 license
  - Five user license
  - Provides powerful BI capability to the product, synergistic with IWA

## SPSS included in Advanced Enterprise Edition

- SPSS Modeler and Statistics
  - Single user license
  - Provides predictive analytic capabilities, synergistic with IWA and Cognos





# Informix NoSQL Answers for Mobile Requirements

- **Consistent low latency, even under high load**
  - Informix is an enterprise, industrial strength DBMS of handling thousands of users
  - Brings core DBMS functional, operational, and administrative capabilities to NoSQL based apps – Mobile or Web
  
- **Schema-less Flexibility and Development Agility**
  - Provides JSON & BSON functionality by default
  - Adopted core MongoDB API functionality
  - Leverages Informix’s history of “keeping it simple” for JSON and BSON support
  - Provides the ability to integrate relational and NoSQL data
    - Allow indexed joins between relational and NoSQL data!

# Informix NoSQL is Informix NewSQL is *Simply Powerful*

- Knowledge is power.....
- Capture and analyze the “interactive” element of your customer’s relationship with your business
- Change the business view from “what happened?” to “what is happening?”
- Create, learn, adjust, and move forward



*Thank You!*

[shoafs@us.ibm.com](mailto:shoafs@us.ibm.com)

+1 925 899 8747

