What's New in IBM Informix and the Future Roadmap

think 2019

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Session #6948

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Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user’s job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

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Agenda topics

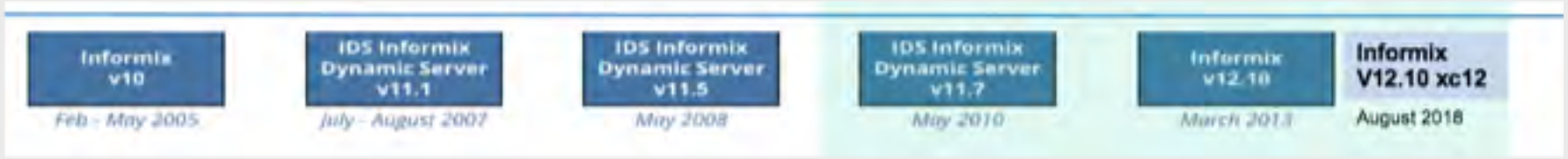
- IBM Informix key differentiators
- IBM Informix vNext themes, features, editions, platforms
- Future roadmap
- Major innovation themes
- *Q&A*
- *Thank you*

Where is Informix **used**?

Informix is **everywhere.**

30+ years enduring Informix differentiators in database market

Optimized Database for Time Series and Geospatial data	Optimized data type support and language extensions that permit high performance domain specific queries and efficient compressed storage
Small Footprint, Low Administration and Distributed instances	Minimize the cost of hardware and DBAdmin resources for embedded solution ISVs and enterprises serving highly distributed locations (retail, hotels, transport,…)
Multi-Model Integration in one database	Informix supports NoSQL data access methods and integration with SQL relational data, including the unique TimeSeries and spatial data types
Flexible pricing metrics and embedded solutions business model	Informix has been successfully used in creating customized pricing for business partners building high value domain and geo specific custom solutions
Proven Enterprise class Reliability and Security	High uptime and proven replication technology for HA. Built-in encryption at rest and in backups.
Integrated In-memory Warehouse Accelerator	Very high performance analytic queries with low tuning on operational data stored in Informix database



Strategic offering investment **Priorities**

Roadmap Acceleration

- ✓ **Reinvigorate** IBM Informix in the market with new interfaces and feature innovation
- ✓ **Enhance** client value, experience & loyalty
- ✓ **Engage** with clients and partners to discuss the new and accelerated product roadmap and address new enhancement opportunities
- ✓ **Expand** digital influence
- ✓ **Enable** hybrid cloud journey

Market **Expansion**

- ✓ **Target** new application developers with new programming languages and graphical administration tools
- ✓ **Deliver** in all commercial clouds and ICP for Data platform
- ✓ **Reinvigorate** academic presence to build more expertise for hire
- ✓ **Publish** case studies and materials to help clients get started quickly
- ✓ **Increase** partnerships with OEM and ISV

Internet of Things Focus

- ✓ **Present** the power of IOT with Informix TimeSeries, JSON, geospatial and relational embeddable in edge devices
- ✓ **Complement** various IOT frameworks
- ✓ **Build** partnerships across the gateway HW manufacturer ecosystem in key industries like utilities
- ✓ **Deploy** educational hands-on workshops to client and partners
- ✓ **Leverage** Informix in Watson IoT and embedded partner solutions

Motivations and Use cases for embedded databases at edge – IT/OT

- *Intermittent or unstable connectivity* creates need to locally persist data for later processing and continue operations (stores, factory floor, oil rigs,…)
- *Real time decision making and continuous monitoring* is required near point of origin without unpredictable latency of round-trip to cloud and back
- *Volume of data is cost prohibitive* even for cheap cloud storage so only filtered and aggregated information can be uploaded for historical analysis
- *Implementing local ML/Optimization routines* are now feasible and require local persistency and data processing power
- *Data security and regulations* may mandate local data storage
- *Competition* from new highly efficient business models (‘Uberization’)

Informix Today – Perfect for embedded IoT and Edge solutions

•*Low footprint, low resource usage Hybrid Database (SQL/NoSQL) with optimized Time Series and Geospatial data*

•Optimized sensor data storage (clustered, compressed, round robin, high frequency data)

Sensor_ID	Origin	00:00	00:30	01:00	01:30	...
1	2010-06-01	(1,3,0, ... 15.6)	(1,6,0, ... 15.5)	(1,4,0, ... 15.5)	(1,4,0, ... 15.4)	
2	2010-06-01	(0,4,0, ... 12.3)	(0,3,0, ... 12.3)	(0,2,0, ... 12.2)	(0,5,0, ... 12.3)	
3	2010-06-01	{v1: 1.5}	{v1: 9.1}	{v1: 0.3}	{v1:0.3,v2:4}	

•Time series elements can be JSON documents

•Built-In time series data high performance loader API (> 60000 values/sec/CPU core) plus MQTT-to-TimeSeries loading interface

•Simplified application development
- More than 100 built-in SQL time series functions (incl. pattern matching and spatiotemporal functions) → User extensible
- Choice of APIs: SQL, MongoDB, REST

•Full data sharding and replication support across Edge-/IoT-Gateways and into the Cloud

•Multi platform/OS availability (incl. Cloud): ARM v6/v7/v8, Intel (incl. Quark/Atom), Power, Sparc

► *IBM Informix database is well suited for the whole spectrum of IoT database requirements at enterprise scale*

Building an Embedded Application? Bring All the Power of Your Enterprise Database with You!

Thursday, 3:30 PM - 4:10 PM | Session ID: 5293A
Moscone South, Level 2 | San Francisco Ballroom 212

IBM Edge Analytics of Industrial Production Automation Data w/ Hilscher's netIOT Edge Gateways
Tuesday , 12:30 PM – 13:10PM San Francisco Ballroom 215

Informix Today – Developer Jump Start

- IBM Smart Gateway kit - https://ibm.biz/BdXr2W
- Code samples - https://ibm.biz/BdX4QV
- Github - https://github.com/IBM-IoT/
- Free Informix Developer Edition - https://ibm.biz/BdXp2g
- Innovator-C edition on Docker Hub - https://registry.hub.docker.com/u/ibmcom/informix-innovator-c/
- Developer edition on Docker Hub - https://registry.hub.docker.com/u/ibmcom/informix-developer-database/
- Informix Developer Edition for Raspberry Pi (32bit) - https://registry.hub.docker.com/r/ibmcom/informix-rpi/
- Client and connectivity examples - https://github.com/ibm-informix/informix-client-examples
- Informix Python driver - https://github.com/ifxdb/PythonIfxDB
- Informix Node.js driver - https://github.com/ifxdb/node-ifx_db; https://www.npmjs.com/package/ifx_db

Developers—Get Up and Running with IBM Informix with Docker

Wednesday, 4:30 PM - 5:10 PM | Session ID: 6819A
AMC at Metreon, Level 3 | Theatre 14

Informix Roadmap

Informix 12.10.xc12

Current release

Sept, 2018

Informix vNext

Currently in active beta

- **Major Performance Improvements**
- **InformixHQ**
- **Increased uptime, better TCO**
- **Security Updates**
- **Spatiotemporal Improvements**
- **Up to date OS and platforms**

Q1 19

IBM Think!

vNext.xc2

- Application Developer Ecosystem Improvements
- Prioritized RFEs and defect fixes

Multi-Model (graph, geodetic) – research

4GL fixpack

2019

vNext.xc3

- BI and Data Visualization
- Prioritized RFEs and defect fixes

Super Scale Out Phase1 - research

Innovate!

2020

vNext.xc4

- Prioritized RFEs and defect fixes

Self Healing Server - research

Under Consideration

Super Scale Out Phase 2 - research

Enterprise Replication to Cloud - research

IWA on Cloud - research

And beyond

What is Informix vNext.xC1? Themes

Faster

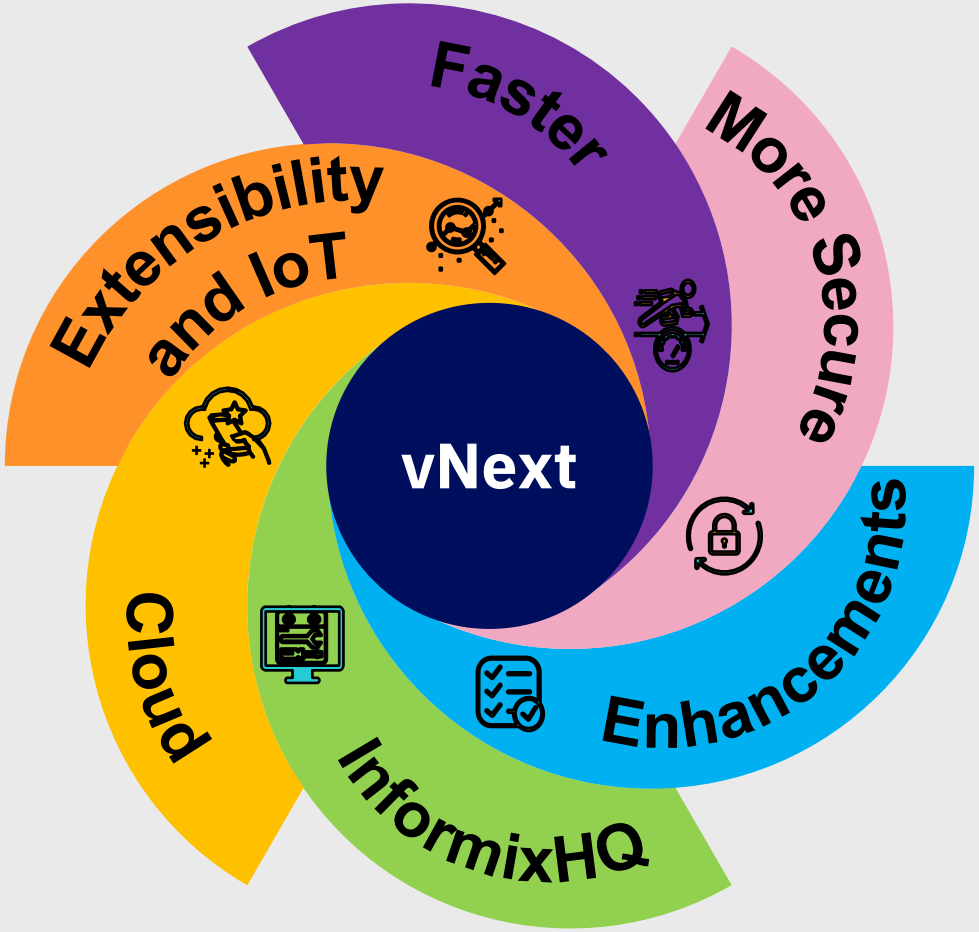
Significant performance improvements for replication workloads and OLTP

More Secure

Provides higher security for encryption keys and Transport Layer Security (TLS)

Enhancements for Usability, Administration, and Increased Uptime

Customer RFEs implemented to include in-place alter improvements, renaming of indexes and constraints online, and common table expression implementation



InformixHQ

New, fully supported, graphical administration tool

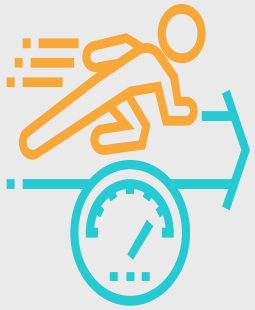
Cloud & Containerization

New VPC pricing metric for easier license monitoring

Extensibility and IoT

ARM v8 support
Enhances timeseries granularity and spatial projection systems

What is Informix vNext.xC1? Features



vNext is Faster!

- Up to 5x improvements in replication log replay enables near zero latency allowing faster recovery time objective in disaster scenario
- Up to 10% faster than 12.10 for standard OLTP transactions
- Java UDR performance improvements including Smart Blob (up to 40% faster) and message log (up to 2x faster) processing.
- Mongo (up to 19% faster) and REST listener (up to 2x faster) performance improvements
- Increased the speed of large object access via JDBC by > 60%
- Increased the speed of onmode –c block and unblock for external backups
- Workgroup edition has higher limits and storage optimization is now available in Enterprise Edition at no extra charge

What is Informix vNext.xC1? Features

vNext is More Secure!

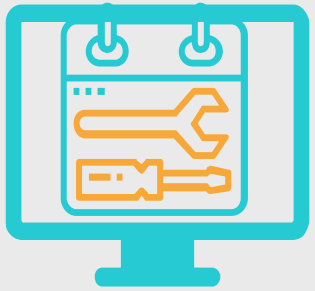
- Provides higher security for encryption keys and integrated backup encryption
  - By supporting remote generation and storage of encryption at rest keys in Amazon KMS/SSM, an additional layer of security is applied to Informix server encrypted data. Three ciphers AES128, AES192 and AES256 are supported.
  - By supporting a remote key management server to generate the backup encryption keys and reducing DBA's effort to encrypt Informix backups, data security in backup media is enhanced without the risk of losing the backup encryption keys. The encryption key is itself encrypted and stored together with the data (called Envelop Encryption).
- Transport Layer Security (TLS) to 1.2 for a higher level of network transport security
- Provides a better audit trail, capturing userid and session id to determine who caused an event for smart triggers

What is Informix vNext.xC1? Features

vNext has Customer RFE's implemented for Usability, Easier Administration, and Increased Uptime!

- Common Table Expression allows application developers to improve readability and maintenance of complex queries and to write powerful recursive queries
- Support of current Unicode spec v11
- Addition of single 'cdr migrate server' command that automates setting up Enterprise Replication between two servers
- Streaming analytics in a replicated environment with asynchronous post-commit triggers
- Single Product Install - key based licensing to upgrade from edition to edition
- Addition of trim capability to be able to use regular expression on CHAR and NCHAR data
- JDBC 4.1 compliance
- Clients can tag themselves for monitoring purposes with client_label in ODBC and JDBC
- In-place Alter Improvements for tables, additional datatypes, and others
- In-place Alter on varchar to larger varchar, no rebuilding of the indexes
- Renaming indexes and constraints (including system-generated)
- Minimal downtime for table reorgs and codeset conversions utilizing loopback replication
- Table administration – table fragmentation strategies
- Additional enhancements to further avoid the need to perform slow alters
- JDBC now uses feprgram to auto-save the thread information for the session

What is Informix vNext.xC1? Features



vNext has InformixHQ!

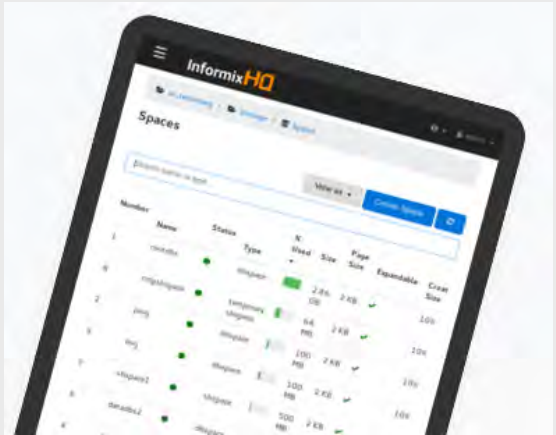
- New graphical tool that elevates administration and monitoring to an integral core part of the Informix server with full support
- Integration with modern IT infrastructures like Pager Duty, Twilo, Email

vNext continues to be in the Cloud!

- IBM Cloud
- New VPC pricing metric for easier license monitoring

New InformixHQ Administration and Monitoring Tool

InformixHQ is the path forward for graphical monitoring, alerting, and administration of your Informix database servers.



- InformixHQ is a modern web console for visualizing, monitoring, and managing your Informix server instances. It is purpose built for ease-of-use, scale-out, and optimizing DevOps needs.

- Provides critical performance management capabilities, monitoring how key performance metrics are changing overtime and tracking how efficiently Informix is running your workload even when you've stepped away from your screen. Its monitoring system feeds directly into a customizable alerting system so you can be immediately alerted via email, Twilio, or PagerDuty whenever an issue occurs on one of your Informix database server instances.

- It is designed to be scalable to efficiently manage and monitor as many Informix database server instances as you run.

- It enables collaboration between the DBAs, the app developers, the ops engineers, and management and accessed from any desktop, laptop, or mobile device.

What is Informix vNext.xC1? Features

vNext has improvements in Extensibility and IoT!

- Adding ARMv8 64bit support
- Ability to get a count of the number of objects in a given region in a given time range such as “how many times a taxi was at an intersection in a given period of time”
- tstamp distinct type for TimeSeries usability
- Added TimeSeries:Extend CountIF() which enables you to count and find missing readings for a given sensor or meter
- Support for geodetic and projections systems other than WGS 84 – enables you to track packages in a shipping depot using your own coordinate system
- Subsecond GPS readings (1/10 of a second timestamps) – enables you to track airplanes that generate GPS points in sub second intervals
- Additional linear units of measure for Spatio-temporal support

What is Informix vNext.xC1? Platform/OS/Compiler modernization

Workgroup/Enterprise:	32-bit 12.10	64-bit 12.10	64-bit vNext.xC1
AIX	6.1, 7.1	**6.1**, 7.1, 7.2	**7.2**
HP-UX Itanium		11.31	**11.31**
Linux – Intel	RHEL 5,6 CentOS 6 SuSE SLES 11 Asianux 3.0 Debian 5.0 Ubuntu 8.04 LTS thru 12.04 LTS	**RHEL 5**,6,7 CentOS 6,7 SuSE SLES 11, 12 Asianux 3.0 Debian 5.0 Ubuntu 8.04 LTS thru 17.10	**RHEL 7 (min update 4)** CentOS 7 (1708) SuSE SLES 12 (SLES 15) Ubuntu 14.04 LTS
Linux – IBM POWER (Big Endian)		**RHEL 5**,6,7 SuSE SLES 11	*n/a*
Linux – IBM POWER (Little Endian)		RHEL 7.1 SuSE SLES 12 Ubuntu 14.04 LTS	RHEL 7 (min update 4) SuSE SLES 12 (SLES 15) Ubuntu LTS 14.04
Linux – IBM system z		**RHEL 5**,6,7 SuSE SLES 11,12	n/a
Mac OS X		10.9, 10.10	n/a
Solaris SPARC		**10**,11	**11.3**
Solaris x64		10,11	n/a
Windows	Windows 2008R2 thru 2016 Windows 7,8	**Windows 2003R2** thru 2016 Windows 7 thru 10	**Windows 2016** **Windows 10**
ARM	**V7 (Debian 7)**		**V8 (OpenSuSE)** ***Debian V7 (32bit) for Raspberry Pi***

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And beyond

Informix into the Future

Energize **Modernize** **Innovate**

	Energize	Modernize	Innovate
Delight the Client	• Single install of language drivers • InformixHQ admin and machine learning options ongoing • Backup from RSS or HDR Secondaries using ontape, onunload, onbar, dbexport	• Compress Smart Blobs • KMIP – External encrypted key mechanism • BI and Data Visualization via 3rd party tools - Grafana • More autonomics 7*24*365 uptime	• Unicode Phase 2 – expanding limits for wider rows, bigger page sizes, wider indexes… • Perf improvements for NUMA • Asynchronous connections • Go programming language support and others
Expand on Cloud		• Elastic Scaling in the cloud • Helm charts for easier containerization	
Optimize for IoT	• Simplify TimeSeries API • Enhancements for IoT device support • Sensors in motion	• Edge-2-Cloud Solution Stack • Finer grain (microsecond) for Timeseries	• Enhanced BlockChain Integration • TimeSeries compression on other datatypes
Cross Focus Items	• Defect fixing and backlog reduction • Collateral • Developer Ecosystem and Community Engagement • Competitive analysis		• 3rd party integrations • SQL Compatibility Enhancements

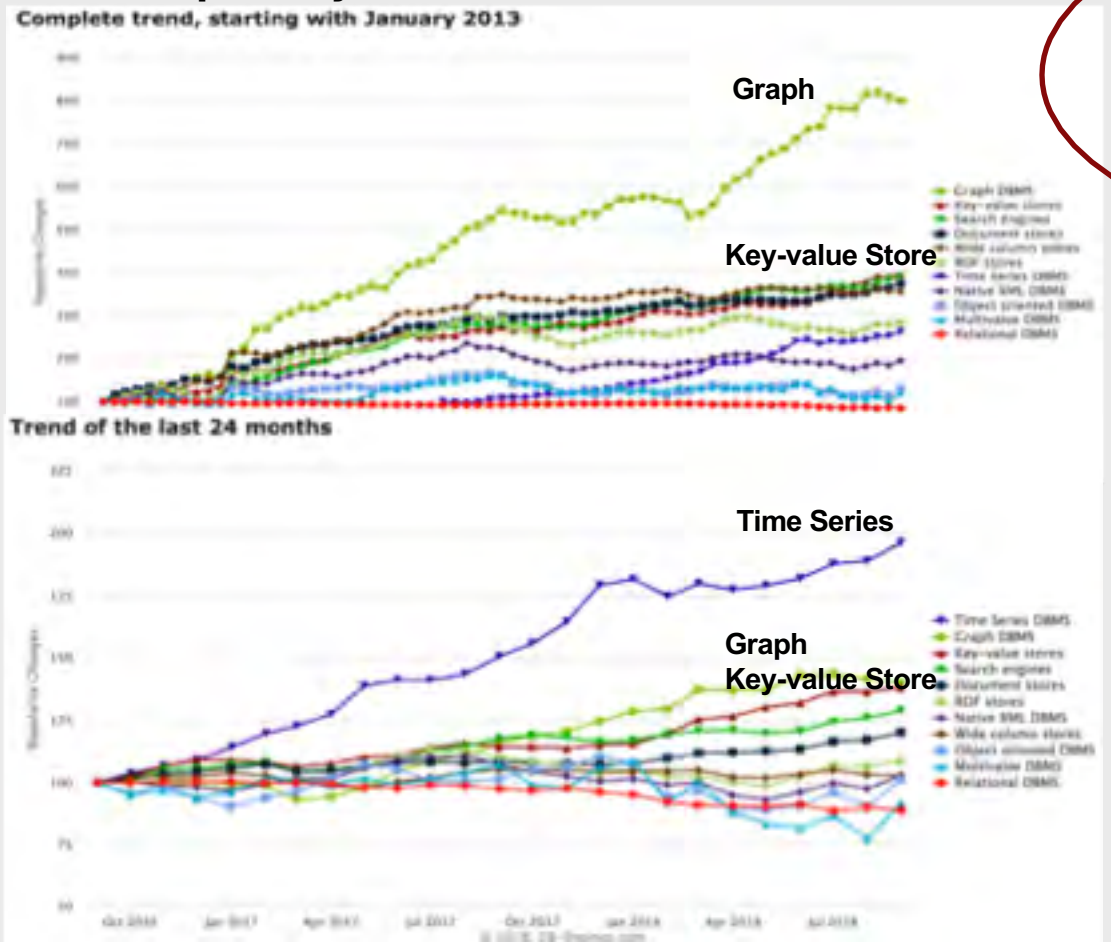
Innovation – Multi-Model

Completed ☼ **Innovation Research Items**

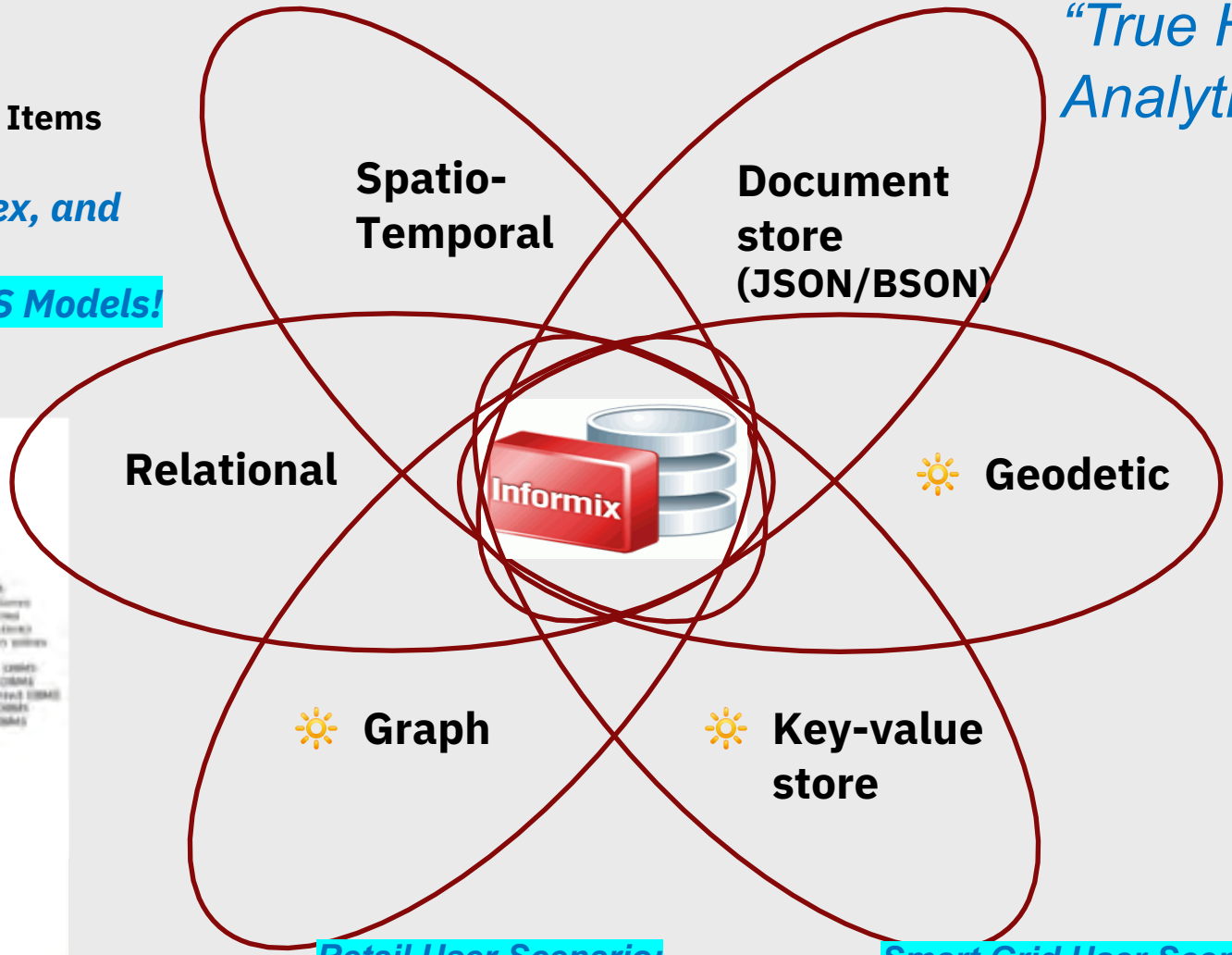
A Multi-Model database is one that can store, index, and query data in more than one model.

Informix can store, index, and query data ACROSS Models!

Model Popularity Trends



"True Hybrid Analytics"



Retail User Scenario:

Data Stored in:

- JSON - Metadata on products
- Key Value Data Store - Pricing/SKU
- Graph - Reliability of the supplier

You are able to find the description on a specific product, its price, and vendor information all in one query

Smart Grid User Scenario:

Data Stored in:

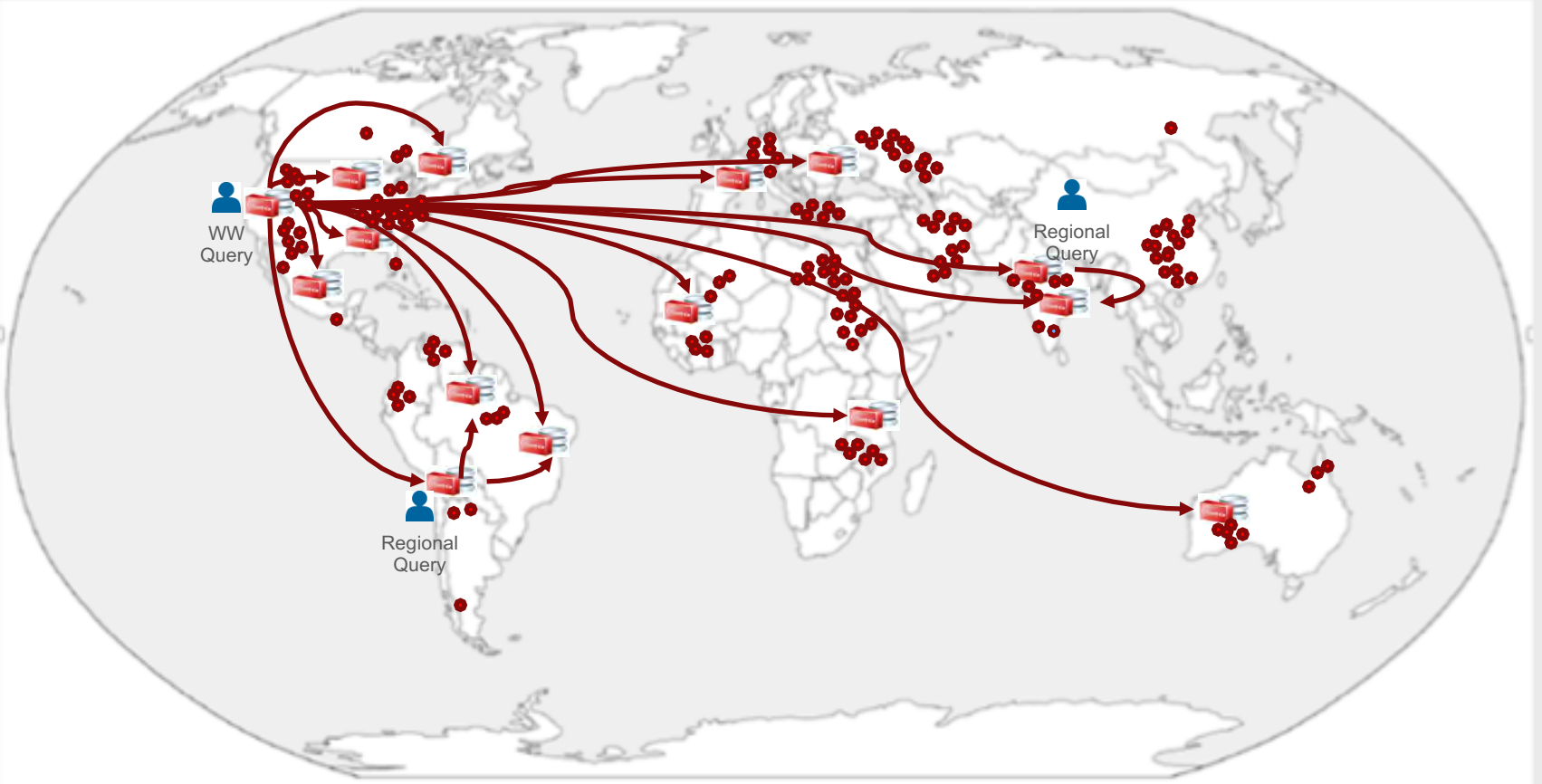
- Graph – Electricity Grid
- Relational - Revenue by Customer

Find how many customers are affected by an outage and the revenue they bring in all in one query

Innovation – Super Scaleout

"Keep data where it originates; access it from anywhere"

- ***Ability to Scale out to 1000's of nodes***
  - Nodes can be anything from stores to sensors
  - Commodity hardware
- ***Keep the data local***
  - GDPR
  - Faster regional access
- ***Queries survive inaccessible nodes***



Phase 2

- Fog Computing – scaling to 100's of 1000's of nodes
- No Downtime for Schema updates and Upgrades with no downtime

Innovation – Machine Learning/Self Healing

This is the database equivalent of a “driverless car”.

Every Informix customer expects 100% uptime, stability, and peak performance.

1. Gather statistics on vital engine stats and actions
2. Review statistics for trends
3. Anticipate thresholds and take corrective action
    - Runbooks built into the admin tool
    - Alert
    - Health-check

Trend Use Cases:

- Storage
- CPU/mem usage
- Indexing/update statistics
- User

Customer Engagement Opportunities

Client Advocacy

Contacts:

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Tech Connect Events

Taking Informix VNext on the road – coming soon

Blogs, Webinars

Stay Connected

IIUG – www.iiug.org

Requests for enhancements - https://ibmanalytics.ideas.aha.io/

IBM NPS Surveys – Please respond with your feedback!

https://www.g2crowd.com/products/informix/reviews

@ww_informix

Informix Groups

WW.Informix

New Ideas / enhancement requests [RFE] site

https://ibmanalytics.ideas.aha.io/?project=INFX

IBM Data & AI

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IBM Employees:

The correct URL for entering your ideas is https://hybridcloudunit-internal.ideas.aha.io

Clients:

Our team welcomes any feedback and suggestions you have for improving our offerings / products! This forum allows us to connect your offering / product improvement ideas with IBM product and engineering teams.

If you have not registered on this portal please click on the following link and register. To complete registration you will need to open the email you will receive from Aha to confirm your identity.
https://ibm.biz/AnalyticsIdeasPortalRegister

- The shorter URL for this site is: http://ibm.biz/IBMAnalyticsIdeasPortal
- To view our roadmaps: http://ibm.biz/AnalyticsRoadmaps
- Reminder: *This is not the place to submit defects or support needs, please use normal support channel for these cases*

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