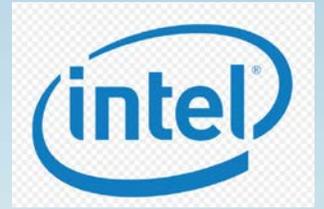




**Hewlett Packard  
Enterprise**



**eBITUG**

# **NonStop Database Services and futures**

**Roland Lemoine**

May 2017



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# Forward-looking statements

This is a rolling (up to three year) Roadmap and is subject to change without notice.

This document contains forward looking statements regarding future operations, product development, product capabilities and availability dates. This information is subject to substantial uncertainties and is subject to change at any time without prior notification. Statements contained in this document concerning these matters only reflect Hewlett Packard Enterprise's predictions and / or expectations as of the date of this document and actual results and future plans of Hewlett Packard Enterprise may differ significantly as a result of, among other things, changes in product strategy resulting from technological, internal corporate, market and other changes. This is not a commitment to deliver any material, code or functionality and should not be relied upon in making purchasing decisions.



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# HPE NonStop SQL strategy



## DBS

Reduce over provisioning  
and capex  
Develop apps faster  
Deploy at cloud speed

- Multi-tenancy
- Fast, automated, provisioning
- Integration with Cloud orchestration
- Elasticity



## Database Compatibility

Reduce high cost licensing  
and lock in dependency  
Make ultra mission critical  
and simple scale out  
available to the wider industry

- Minimize efforts to bring applications using an Oracle database to NonStop SQL
- Compatibility features in SQL dialect, built-in functions, data types, procedures and user defined functions.



## Analytics

Control and monetize your  
digital core  
Optimize your workload  
Real-time data

- Stream or replicate data in real-time, including into data lakes with analytics on the fly.
- Analyze and throttle your NonStop SQL workload with NonStop Database Analyzer

# SQL/MX Database Services (DBS)

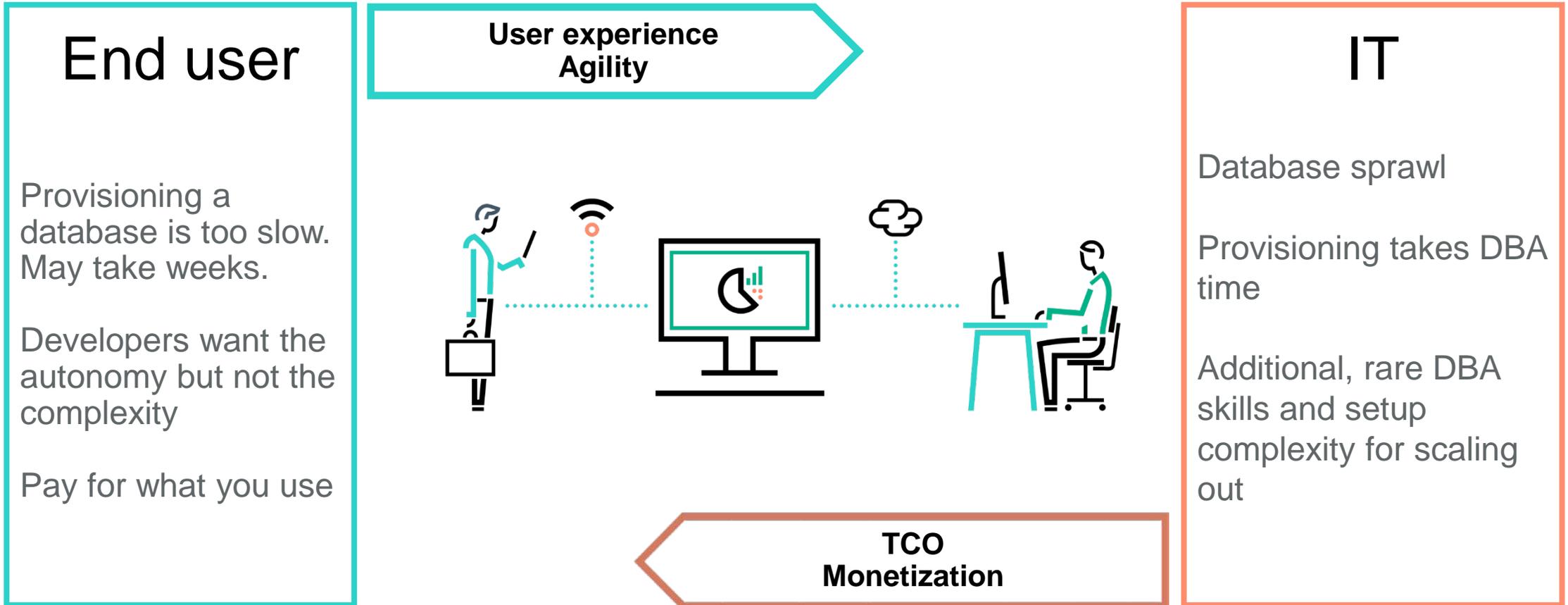
Introducing:

- Automated, self provisioning
- Multi-tenancy capabilities
- Cloud integration



# SQL/MX 3.5: Database Services

The key challenges for Database-as-a-Service to address



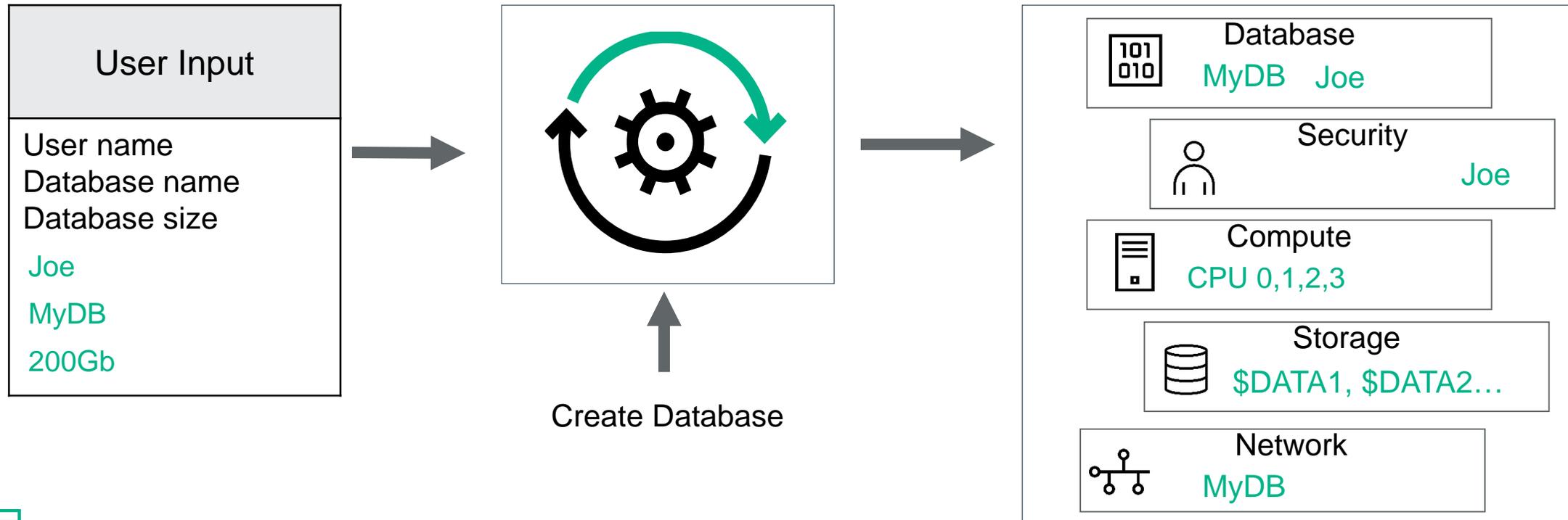
# SQL/MX 3.5: Database Services

Self Service: End users get what they want simply, when they need it, in a few minutes

Simple, vendor agnostic,  
thin provisioning  
exposed to the end user

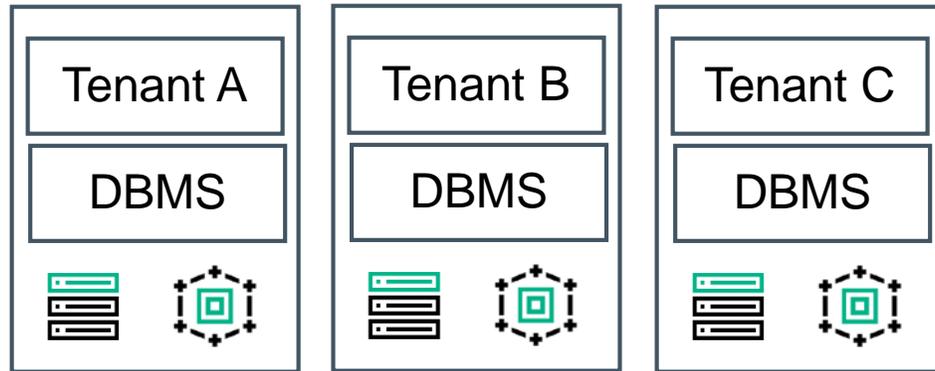
## DBS

Fully featured, scaled out, highly available  
and secure database automatically  
provisioned along with storage, network,  
security and compute resources



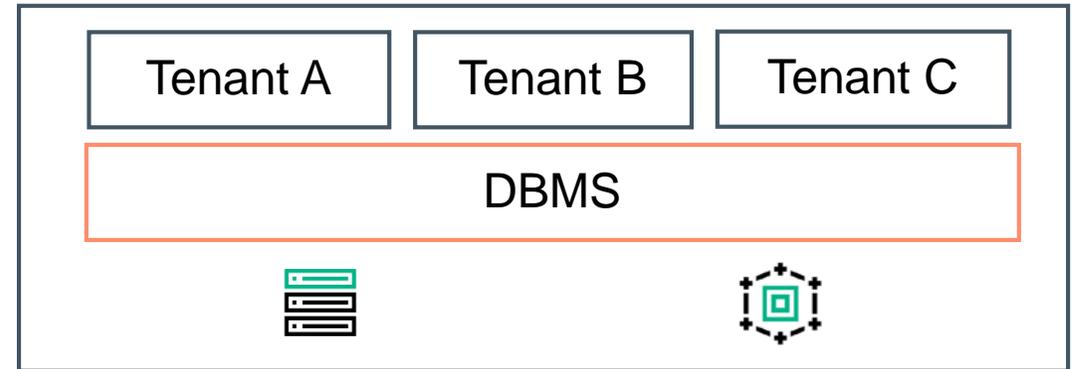
# SQL/MX Multi-tenancy

## SINGLE TENANT MODEL



Implicit isolation  
Database sprawl  
License costs are high  
Maintenance costs increase with scale  
Upgrade time controlled by the tenant

## MULTI TENANT MODEL



Isolation level depends on implementation

- Catalog based isolation is good
- Noisy neighbor can be avoided if needed.

Lower TCO

- Higher H/W density, Elasticity, DBA staff
- Deployment agility

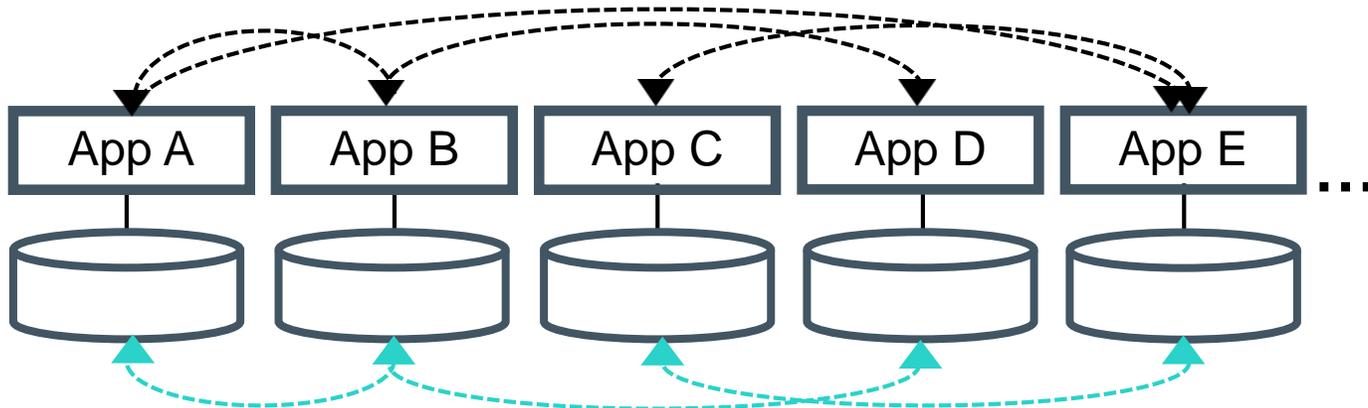
# SQL/MX DBS

## Use case and Demo



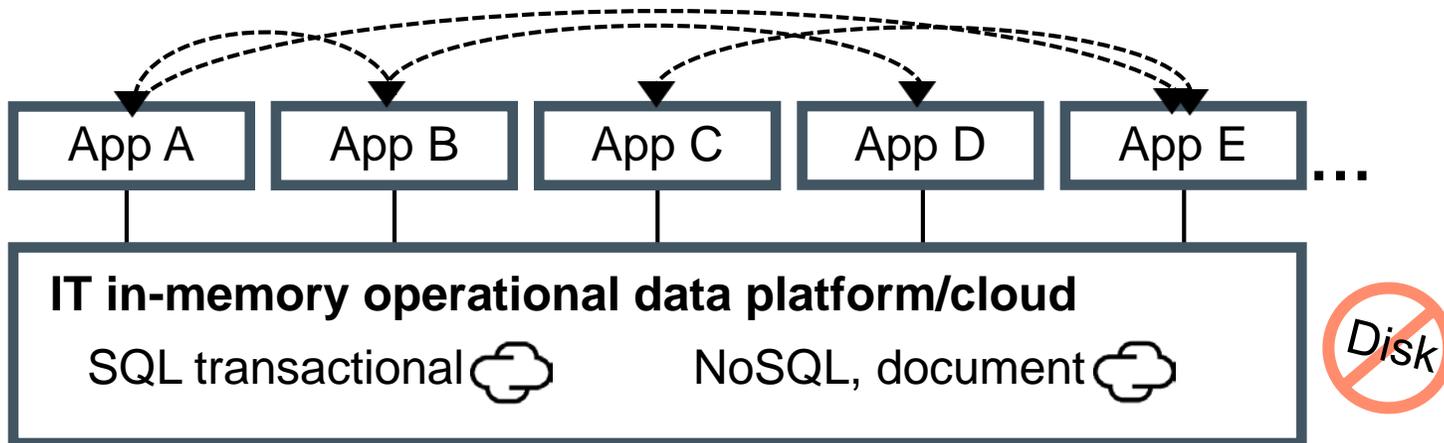
# HPE IT MC data backplane transformation

Shifting to manage data as a strategic asset, accelerate and position for evolution



**Present state**

**Future state**



- Faster ability to respond to biz model pivots and shifts in data intersections
- From 25k DBMS instances to a “managed set”- PaaS apps “bind and go”
- Apps decoupled from data residency- enterprise data backplane vs fragmentation
- Less data replication and lower operational costs
- Position for future evolution and collocated data and compute scale (machine, etc.)

# SQL/MX DBS Demo

**Hewlett Packard Enterprise**

Menu Athena Store Data My C

**Application CI**

**Type**

**Environment**

**Location**

**Database/Sche Name**

**Size (GB)**  [2202 GB \(Max\)](#)

  
2 minutes  
30  
seconds!

## Athena

### Cloud Database Provisioned

This is an automated message from Athena

Cloud Database request 'MYDB1' (Size : 5GB) has been provisioned successfully!

Connection details are :

**Database :** MYDB1

**Cloud Database Connection String :**

`jdbc:t4sqlmx://g4a6084.houston.hpescorp.net:2100  
/:serverDataSource=MYDB1;user=americas_rlemoire;password=welcome-1234`

**UserName :** americas\_rlemoire

**Password :** welcome-1234 *(You may be required to change password upon initial login).*

# SQL/MX database compatibility

Allow a low risk and economical porting to NonStop SQL of applications using an Oracle database



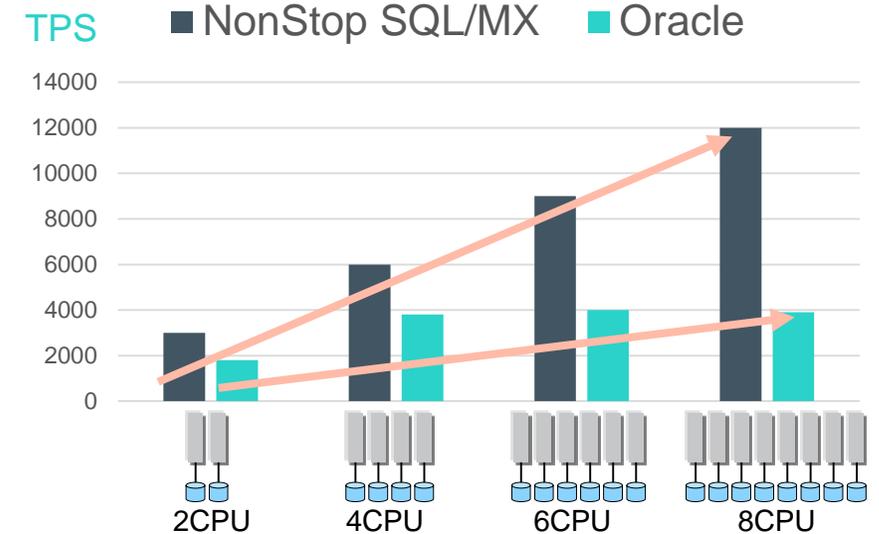
# 4 reasons you should move from Oracle to HPE NonStop SQL

## Reason 1: Scalability

- Why Oracle RDBMS does not scale out?
  - Its original design is based on a SMP scale up architecture.
  - Its design choice uses a shared disk architecture, which requires each node's cache to be synchronized, quickly induces a traffic bottleneck over the fabric. This is unlike the typical Massively Parallel Processing (MPP) design which uses a shared nothing architecture therefore not subject to the same scaling limitation.

HPE NonStop SQL, on the other hand, is well known for its linear scalability

> 98% of added processing capability translates to increase in throughput



Oracle RAC does not scale out either

Beyond 4 nodes, adding more nodes is less and less efficient as you increase the number of nodes

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# 4 reasons you should move from Oracle to HPE NonStop SQL

## Reason 2: Simplified architecture

Setting up Oracle RAC is very complex

- Oracle cannot count on the underlying Operating system to provide clustering capabilities which are not present natively in Linux or other Operating systems.
- Presenting a single system image of the database to the application requires an enormous manual effort upfront such as implementing front end load balancers, managing IP addresses, provisioning each node separately, add clustering software.
- Complexity is extremely detrimental to reliability

HPE NonStop SQL, on the other hand, requires just one OS installation, just one RDBMS to setup and manage, no additional cluster software to manually install and configure each node

“Simplicity is prerequisite for reliability”

- Edsger W. Dijkstra (1970).

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# 4 reasons you should move from Oracle to HPE NonStop SQL

## Reason 3: Availability

- The highest availability level you can achieve with Oracle RAC is “AL3”
  - As ranked by IDC Oracle RAC availability level is at AL3\* (element failure is not transparent to the user application).
  - HPE NonStop systems is at AL4\* (highest availability).
- Even achieving AL3\* for Oracle RAC is dependent on factors that are difficult to control:
  - All required Oracle HA and clustering options have been ordered.
  - Highly skilled and experienced DBAs are available for the project and developers.
  - The final manual setup did not leave any single point of failure in the architecture and requires a review to be budgeted.

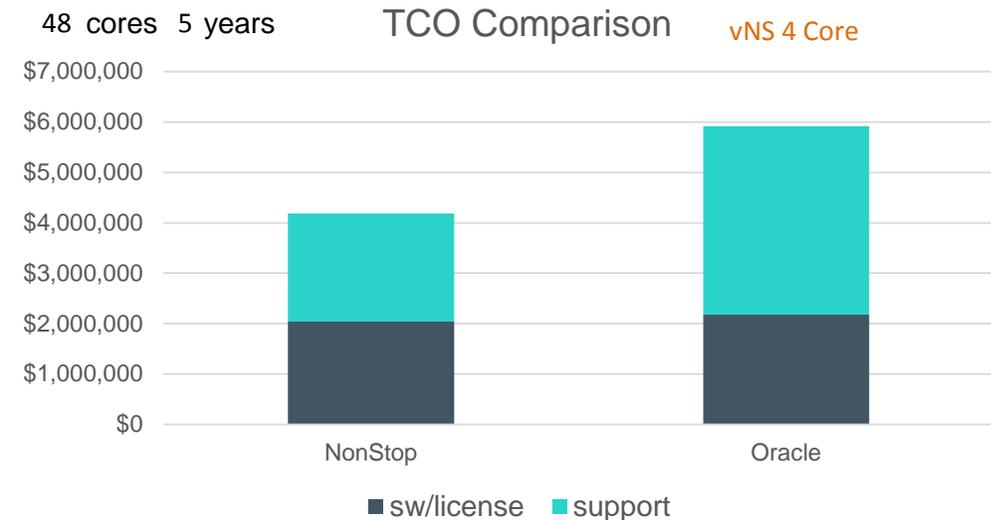
HPE NonStop availability is native in the OS, therefore easily adopted by its full software stack without the need for a multitude of additional options for each layer

# 4 reasons you should move from Oracle to HPE NonStop SQL

## Reason 4: Cost

A TCO comparison shows that the cost for Oracle RAC attempting to achieve a similar level of availability, scalability and simplified architecture is up to 50% higher for the Oracle solution

- Exact percentage depends on the number of cores and whether Oracle Maximum Availability (MAA) is used to achieve Fault Tolerance similarly to what NonStop provides out of the box.
- RedHat is not providing transparent fault tolerance to the rest of the software stack such as Middleware or other OS services. Additional administrative tasks are likely required to compensate for non fault tolerant OS, frequent OS updates for security patches, etc.
- Does not account for the added cost of complexity of deployment, highly skilled DBAs or backup systems licenses which could make the difference even more dramatic.



In the above chart, the Oracle stack includes Red-Hat Linux, Oracle Database Enterprise Edition, Oracle RAC, Oracle partitioning, Active Data Guard, Advanced compression, diagnostic and tuning pack, DB lifecycle management pack. The NonStop software compared includes the virtualized NonStop OS, NonStop SQL, Measure and Viewsys.

# Aren't all those Oracle RAC issues addressed with Exadata?

	Oracle	Oracle RAC	Exadata	NonStop SQL
TPS scale out	✗	Very limited	Better than Oracle RAC but inherent bottleneck of maintaining cache coherency	✓ Using Shared Nothing
Cloud scalability	✗	Very limited	Specialized hardware not adapted to cloud deployment requirements	✓ Using Virtualized NonStop
Business scalability	✗	Typically require application changes	Appliance model with only 4 possible configurations not adapted to fast application requirements changes.	✓ 2 to 4080 nodes without changing the architecture
Simplified architecture	✓	✗	Only at setup time	✓ Using single system Image
High Availability	✗	AL3* at best	Using replication which comes with its own limitations (latency and collision resolution) and cost (specialized hardware, complex architecture to maintain)	✓ Out of the box AL4*

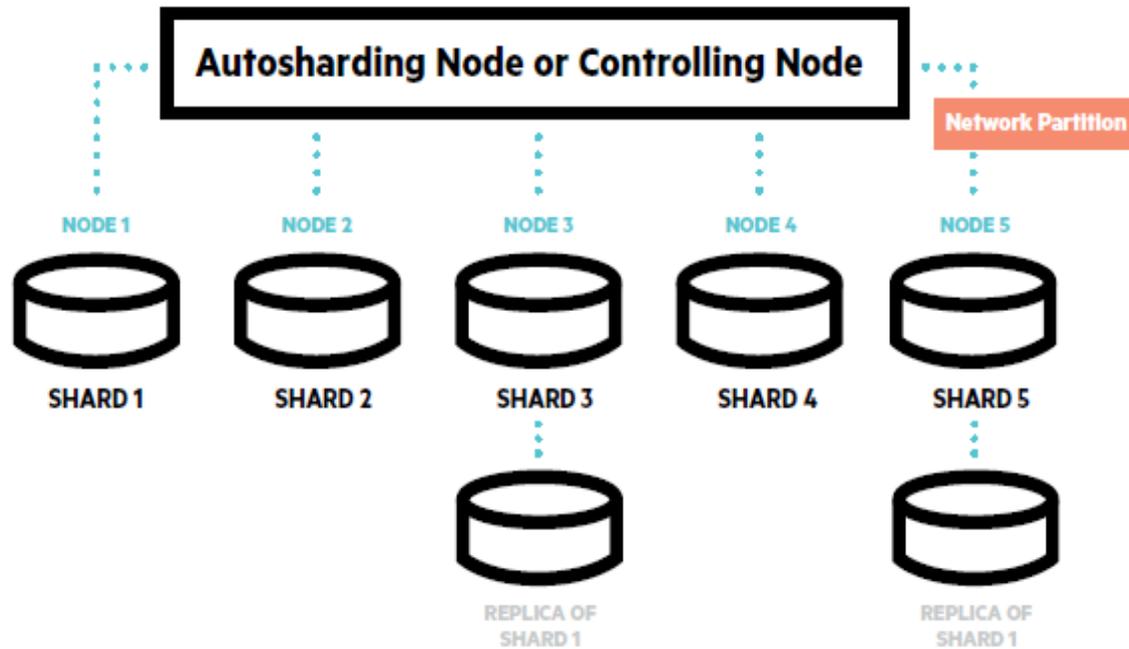
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# Applications start small and sometimes need to grow or become mission critical overnight.

- Can you easily switch your application to a capable database when this happens?
- Do you have the developers or even the code of the application that needs to be modified or re-written to achieve the business changes?
- Can you afford to re-think the whole application architecture to a scale out architecture?
- Can you afford to hire more DBAs to setup complex architecture deployments such as Oracle RAC?
- Is there access to Mission Critical or high scale, something that is only available for selected applications in your company?

With NonStop SQL when your application grows, you do not need to add complexity to achieve scalability or availability. Your costs stays the same. Unlike Oracle or other databases, adding more nodes is the only required change to scale and it fully translates into increased capacity.

# Should I consider an Open Source alternative?



Wait for Node 5 for consistency or continue processing for availability?

Open Source dbms come with a very similar set of issues:

- Regressions: i.e. network partitioning and the CAP theorem issue.
- Complexity of building a cluster out of pieces from different vendors
- Limited set of high availability features far from achieving mission critical applications goals
- Hidden costs of designing scalability and availability manually
- Truly Open Source rdbms do not have mission critical support and enterprise grade features.

# Breaking the lock-in situation

Migrating an application from one database to another requires:

- Migrating the data
  - A relatively well known task covered by ETL or replication tools
- Migrating the application
  - A very costly and risky task because RDBMS are not compatible and migrating requires changes in many parts of the application (SQL queries, including their DML, built-in functions, datatypes, etc...)
  - This creates the lock-in situation which prevents users from adopting other technologies of their choice and force them to accept the costly model from Oracle charging a high premium for database options and making a full featured database available only for selected applications in their enterprise.

HPE NonStop SQL database compatibility is changing that dynamic. With SQL/MX 3.5 we're introducing a whole set of new compatibility features which breaks the lock-in situation

# SQL/MX database compatibility features

	Compatibility features
SQL dialect	Select, update, merge,...
Data types	Varchar2, date, number,...
Built-in functions	60 compatible functions
Objects	Tables, triggers, materialized views
Physical layout	Disk partitioning, clustering
Stored procedures	Stored Procedure in Java, PL/MX
Connectivity	ODBC/JDBC

With NonStop SQL database compatibility we enable a low risk, economical port of your Oracle Applications to NonStop SQL.

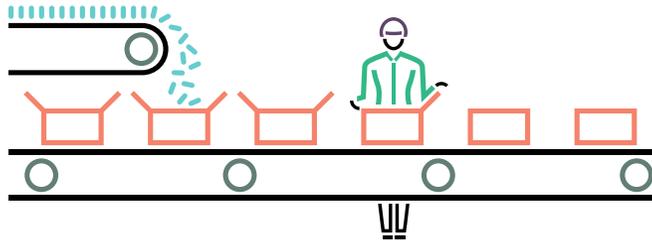
# A smooth migration without downtime

## Evaluate



- Use evaluation form to list required database features 
- Engage ATC to POC a sample application
- May engage partner Ispirer for automated tool evaluation

## Migrate



- No downtime migration by using replication using HPE Shadowbase or partners solutions such as Striim, Merlon,...

## Execute



- Scale out without Oracle RAC complexity and limitations
- Make ultra-mission critical your standard
- Reduce license costs while keeping your applications investments

# Database compatibility summary

**Best scale out in the industry**  
From 4 to 24000 cores with 98% linear scalability



**Highest availability in the industry**  
No added latency, no collision resolution and no CAP theorem issue

**Simplified architecture**  
One OS and one RDBMS to maintain regardless of the number of nodes

**Lower TCO**  
with the best value

**Database compatibility**  
Low risk, economical port of applications to NonStop SQL

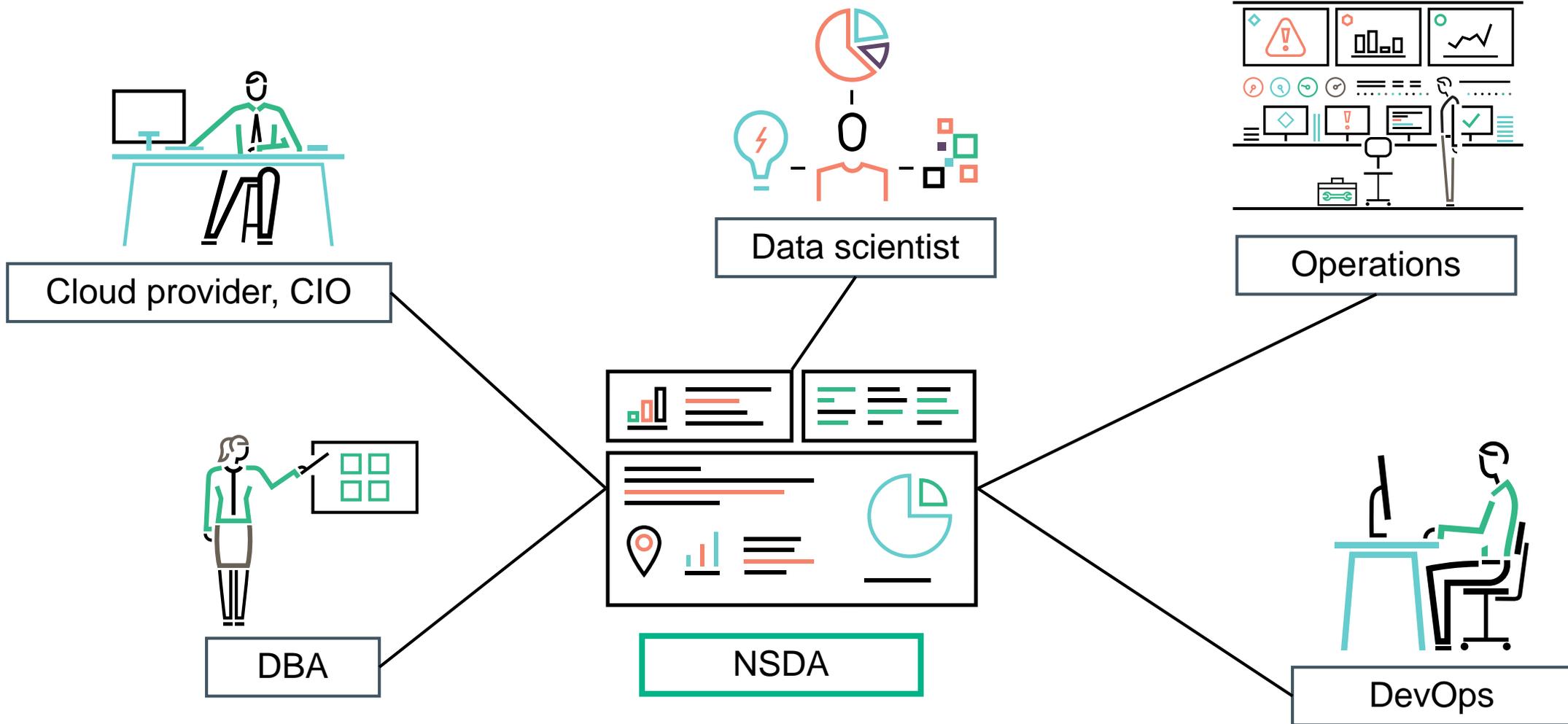
# HPE NonStop Database Analyzer (NSDA)

Apply Big Data principles to manage and optimize your workload



# The Digital Core metrics visualization

Data visualization is of interest to many users



# NSDA, a future offering

Apply Big Data principles to manage and optimize your workload

## Typical requirements

- Query workload monitoring
- Monitor SLA as a service provider or as a consumer of a tenant application
- Workload historical trend analysis
- Live query analysis and locating needle in a hay stack
- Query tuning
- Verify workload balance across systems
- Resources health monitoring

## NSDA features

- Customizable dashboards such as Top N longest running queries.
- Real-time and historical information regarding CPU, memory, queries available by just moving a cursor
- Drill down capability to locate query using all the resources.
- Graphical view of query plans
- Essential, database agnostic, metrics exposed visually.
- Heat map to monitor overall system

## SQL/MX

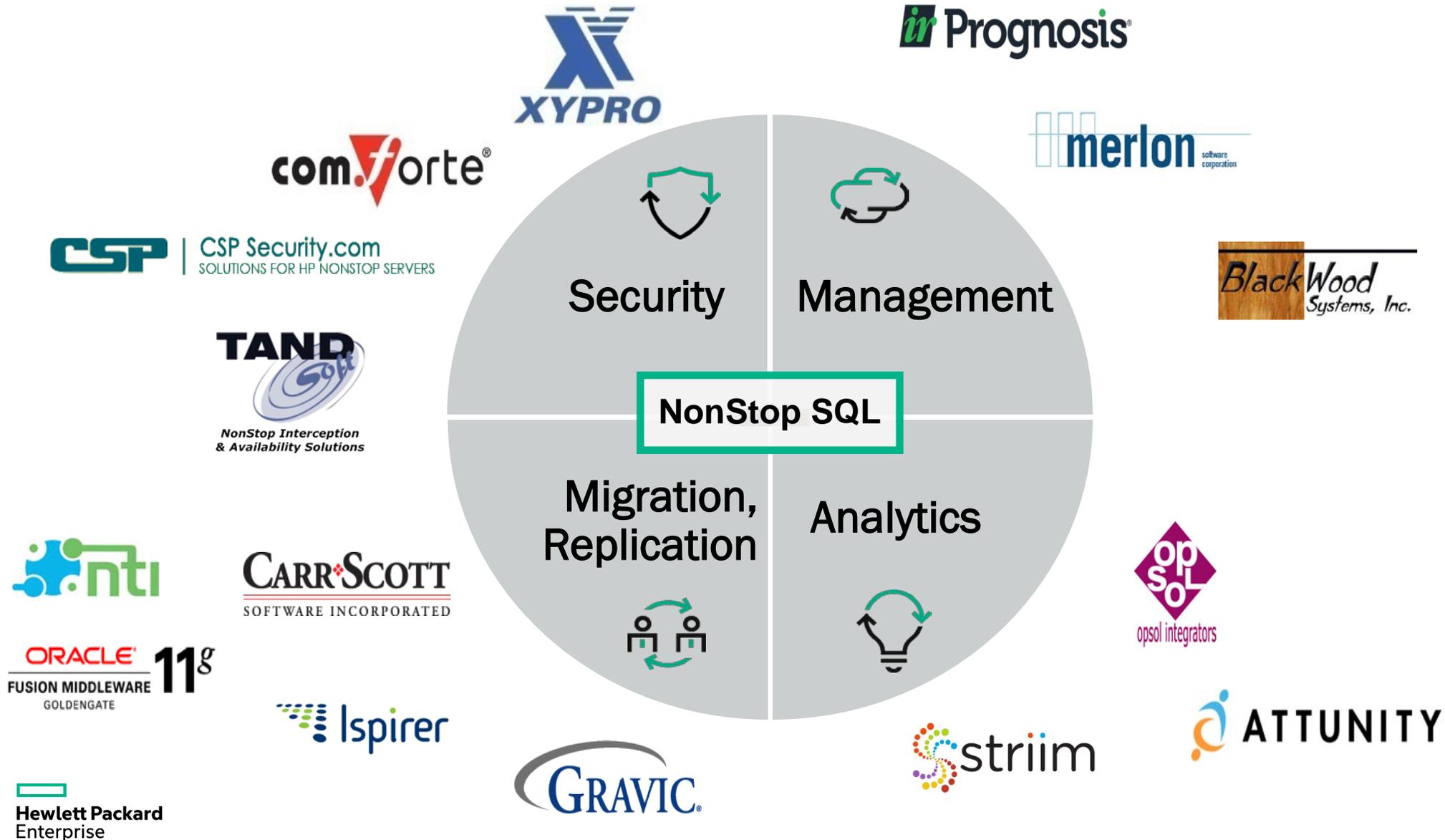
Infrastructure support:

Workload Management Services (WMS)

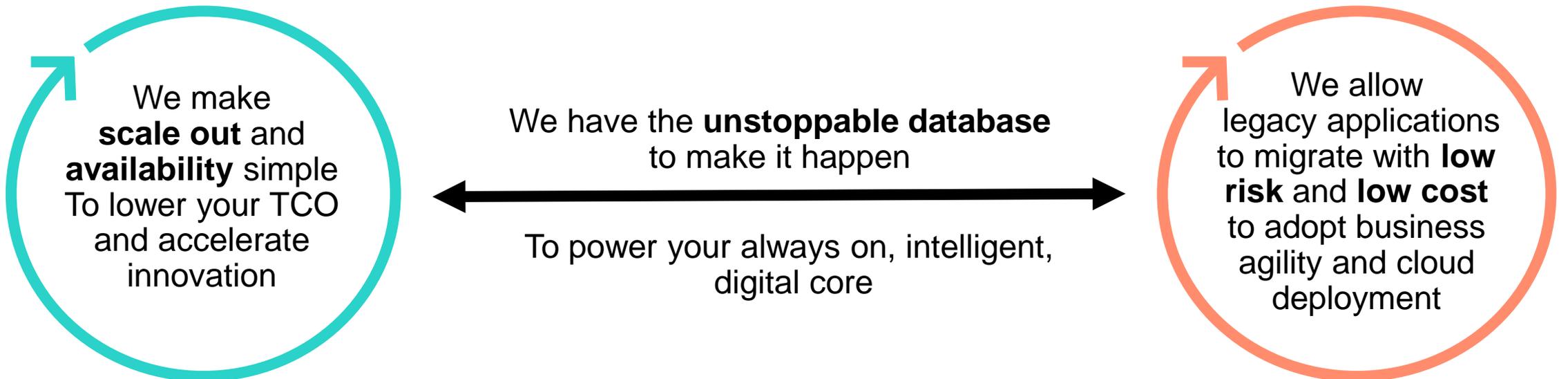
Runtime Statistics (RTS)

Measure

# Partners ecosystem completes the offering with many more features



# HPE NonStop SQL





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**Thank you**

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