HP NonStop SQL Strategy and Direction

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HP NonStop SQL Positioning

Where you need:
★ Massive linear scalability & parallelism (sub 1 TB →100+ TB)
★ 24 x 7 database availability and absolute data integrity
★ Complex mixed workload support

Targeted areas:
• Real-Time applications
• Large scale and/or business critical transaction requirements
• Large enterprise data warehouses
• Where other DBMS products fear to tread!

NonStop SQL/MX is ready for you!
2003 Winter Corporation Survey

If top 6 NonStop DB size customers were included in the report – then hp would have 6 of 10 largest OLTP databases in the world

<table>
<thead>
<tr>
<th>Winter Corporation Large Database report top 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
</tr>
<tr>
<td>Land Registry</td>
</tr>
<tr>
<td>United States Patent and Trademark Office</td>
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<tr>
<td>Elsevier</td>
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<tr>
<td>UPS</td>
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<tr>
<td>KTF</td>
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<td>AIM Healthcare Services</td>
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<td>Verizon Communications</td>
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<td>Anonymous</td>
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<tr>
<td>US Bureau of Customs &amp; Border Protection</td>
</tr>
<tr>
<td>Anonymous</td>
</tr>
<tr>
<td>DB Size</td>
</tr>
<tr>
<td>23.1 TB</td>
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<tr>
<td>16.4 TB</td>
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<tr>
<td>9.6 TB</td>
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<tr>
<td>9.3 TB</td>
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<td>8.7 TB</td>
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<td>6.0 TB</td>
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<td>Oracle</td>
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<td>Oracle RAC</td>
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<td>MS SQL Server</td>
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<tr>
<td>Sybase ASE</td>
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<tr>
<td>CA Datacom</td>
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<td>MS SQL Server</td>
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</tbody>
</table>

NonStop Customers 6 largest SQL databases in 2003

<table>
<thead>
<tr>
<th>NonStop Customer</th>
<th>DB Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Telco</td>
<td>29 TB</td>
</tr>
<tr>
<td>USA retailer</td>
<td>20 TB</td>
</tr>
<tr>
<td>Japanese Telco</td>
<td>18.6TB</td>
</tr>
<tr>
<td>Japanese cargo carrier</td>
<td>10 TB</td>
</tr>
<tr>
<td>USA Telco</td>
<td>8.8 TB</td>
</tr>
<tr>
<td>USA Telco</td>
<td>8.0 TB</td>
</tr>
</tbody>
</table>

NonStop SQL/MX is ready for you!
2005 Winter Corporation Survey

• HP NonStop SQL’s first year in the survey
  – 2 NonStop customers entered the survey competition
  – 2 NonStop customers won top competition honors

• Largest # Database Rows in the world
  – 1st Place: Sprint = 2.847 trillion rows
  – 2x larger than the 2nd place winner

• Largest Peak Mixed Workload in the world
  – 1st Place: HP Integration Hub Supply Chain
  – 3.56 million SQL operations per hour

NonStop SQL/MX is ready for you!
HP NonStop SQL Strategy …

NonStop Mission

Continuous Real-Time enhancements for existing customers while opening new markets with "NonStop Inside" Industry Standard platforms

NonStop SQL will be providing continuous Real-Time enhancements for existing customers and will incorporate features initially provided for new markets into the product
HP NonStop SQL Strategy

- NonStop SQL family of products will provide continuous Real-Time enhancements for existing customers
- Incorporate features in NonStop SQL family of products to compete in the following new markets
  - Low-end Data Warehouse Appliance market for Data Marts – Neo – to compete against Netezza and DATAllegro
  - High-end Business Intelligence market for Enterprise Data Warehouse applications to compete against IBM, Oracle, and most importantly Teradata
  - Mission critical scalable appliance solution for open source operating system and database software – MySQL
  - Mission critical high-end high performance hybrid application solutions – Hybrid Super Cluster

- NonStop SQL/MP will be matured
Releases and Roadmap
NonStop SQL/MX Roadmap

Future product plans, dates, and functionality are subject to change without notice.
NonStop SQL/MX is ready for you!
NonStop SQL/MX Release 2.0
(SQL/MP tables) – June 2004 (G06.23), General Availability

• Benefits of R2.0 over R1.8.5
  - SQL Compiler/Optimizer Improvements
  - Stable Access (like SQL/MP engine)
  - Statement Atomicity
  - Update Stats performance
  - Display Use Of
  - Built-in Report Writer feature
  - Support for Rowsets in Dynamic SQL
  - ODBC/MX Improvements
  - JDBC/MX (Type 2) & JDBC Type 4
  - NSM/web support for MXCS
  - MXCS management via MXCI
  - Quality Improvements

NonStop SQL/MX is ready for you!
NonStop SQL/MX Release 2.0
(SQL/MX tables) – Sept 2004, Controlled Availability

• New SQL/MX DDL delivers
  − ANSI tables
  − Hash and decoupled range partitioning
  − Grant/revoke security
  − ANSI 99 Triggers
  − Referential integrity
  − IEEE floating point
  − I18N in database via Unicode UCS2
  − Online manageability
  − Management GUI – NSM/web
  − ETL (Import, Dataloader/MX)
  − ANSI VIEWs – support for UNIONs etc.
  − Removal of Limit on VIEW text size

NonStop SQL/MX is ready for you!
NonStop SQL/MX Release 2.1.0
June 2005 on S-Series

• 15% to 30% performance improvements for Dynamic SQL
  – Particularly using JDBC/MX Type 2 Driver
  – based on internal tests – actual performance improvements are dependent on specific applications

• Support for the EXTEND and CURRENT function in SQL/MP views and constraints accessed through SQL/MX

• NSM/web support for:
  – ALTER to change SQL/MX object definitions
  – CQD configuration GUI for data sources

• About 80 general maintenance fixes
NonStop SQL/MX R2.1.1
in G06.27 – Sept 2005; in H06.04 – Nov 2005

• Approximately 50 fixes
• Improvements to the accuracy of Update Statistics
• Measure support for Publish/Subscribe
• Stored Procedures in Java RFE: SET CATALOG/SCHEMA is propagated to stored procedures
• Enhancement to VQP to display the plans for statements in compiled module files
NonStop SQL/MX R2.2.0
Planned 1Q2006 in H06.05 Integrity NonStop

- ANSI Names support for FUP and EMS Event messages
- SQL/MX Native table support in FCHECK
- TP Performance improvement via plan size reduction for SQLBUFFER
- Update Stats performance improvement via partitioned sample table

In H06.06

- Constant folding of range predicates with AND on leading clustering key columns to reduce or eliminate scans
  - Expressions like “a > 10 and a < 5” to be reduced to FALSE
  - Expressions like “a > 10 and a > 15” to be reduced to a > 15
- Support for OSS large files (> 2 GB)

*Future product plans, dates, and functionality are subject to change without notice.*

NonStop SQL/MX is ready for you!
NonStop SQL/MX R2.3.0
In Re-plan – Integrity NonStop

- GA for SQL/MX tables
  - Online Populate Index
  - Completion of Online Partition Management
    - Support for hash and decouple key partitioned objects

*Future product plans, dates, and functionality are subject to change without notice.*

NonStop SQL/MX is ready for you!

May 11, 2006
NonStop SQL/MP …
Enhancements since G06.21

• G06.23
  - PARTONLYIN support for load/append
    • To read only one partition of a source file
    • For matching keys between source and target tables it runs as if SORT option is ON

• G06.24
  - SQLNULLABLE DDL clause support for load/copy/append
    • To handle null values when loading from Enscribe to SQL or from SQL to Enscribe. This enables use of SQL-like indicator values for Enscribe records.
NonStop SQL/MP
Enhancements since G06.21

• G06.27
  – SLTE performance enhancement
    • Enhanced search in SLT table for CURSOR or PROC name
  – Enhanced VERIFY to support REPAIR option
    • Recreates any missing file label from the available catalog information
    • Newly created object does not contain any data
    • Support for tables, partitions, indexes and views
Releases and Roadmap Connectivity
Releases and Roadmap Connectivity

- MX Connectivity Services
- ODBC/MX
- JDBC Type 4 driver

- JDBC/MX or Type 2 driver
MX Connectivity Services R2.0 …

- Transport replacement (native TCP/IP instead of Krypton runtime library)
- Support for IPv4 and IPV6 on client side
- Process priority configuration per data source
- CPU distribution per data source
- Support for the JDBC T4 driver
- Support for SequeLink (on MIPS)
- Support for both MP and MX tables in catalog APIs
- Support for Windows based pre-processor for both MP and MX tables (invoke)
- Unicode UCS2 support
MX Connectivity Services R2.0

- Microsoft Access attribute configuration
- Capability to Grant/Revoke administrator privileges for users to configure and manage MXCS or to read the configuration
- MXCI/MACL management
MX Connectivity Services 2.1.1
in G06.27 – Sept 2005

• Several performance enhancements on the MXCS side
  – Including singleton operations (primarily externalized in JDBC Type 4 driver)
  – Reduced pathlengths
• Password expiration and change support
• Configuration wizard added to NSM/web to help configure CQDs for a datasource
• General maintenance fixes
• Fixed TFDS problems with corrupt abend files
• Reduced dial outs in cases where servers can fix themselves
NonStop ODBC/MX R2.0

- Support for both MP and MX tables in Catalog APIs (including wildcards for table names)
- Enhanced support for MS Access applications
  - largeint & unsigned numbers data types
  - MS Access versions
- Rowset recovery
- All partial SQL/MP datetime data types are supported through parameter binding as well as catalog APIs
- Support for temp table creation even if SQL/MX licensed server does not exist
  - Configured through the MXCS data source
NonStop ODBC/MX R2.1.0 (ABE)

- Support for Business Objects 6.1 for metadata retrieval
- Performance improvements for OLTP queries and improvements in the statement handler
- Enhanced trace for support to identify data problems in transport and calls
- Improved cancel processing
  - In the past it waited for the query to finish. If the query is running it will stop the process.
  - If the query is not running it returns and the connection continues
- Timestamp fraction support for six or nine digits
- Password expiration support
NonStop JDBC Type 4
FCS August 2004 (SJ82V1)

• A fast production ready driver that provides connectivity to Nonstop SQL from other platforms

• New architecture (uses MX Connectivity Services)
  − Scalable
  − High performing (over 3x improvement over Sequelink)
  − Positions NonStop as an effective database server for Java applications running off platform
  − TCP/IP – IPV4 and IPV6 support

• Features
  − JDBC 3.0 and JDK 1.4.1 compliant
  − Supports Rowsets, Statement pooling/caching and connection pooling
  − Support for Stored Procedures for Java
  − IEEE float type (in/out client)
  − Java client side is multi-threaded
NonStop JDBC Type 4 – R2.1.0
V1.1 (Update 1) June 2005

• Performance enhancements
  − Testing showed 84 concurrent connections per CPU worked successfully
  − On client side, CPU usage decreased from 17.7% (V1.0) to 11.45% (V1.1 update 2)

• BLOB/CLOB support

• Tracing of client server interactions (for performance monitoring)
NonStop JDBC Type 4
V1.1AAC in G06.27 – Sept 2005

• Significant performance enhancements

• On server side (MXCS):
  – CPU path length is 36% shorter from V1.1
  – CPU utilization dropped to 48% from 62.87%

• On client side:
  – CPU usage decreased from 11.45% (V1.1) to 1.66%
  – Pathlength decreased from 23.08 ms (V1.1) to 2.63 milliseconds

• Overall TPS rate improved from 59.64 to 76.14 - a 27.6% boost
NonStop JDBC/MX Type 2
2004 Releases

• V31
  – Delivered with G06.23 and SQL/MX 2.0
  – Unicode (UCS2) character set and internationalization (I18N) support
  – SQL/MX and SQL/MP metadata support
    • Extended metadata API for MX tables

• V31 AAF
  – BLOB/CLOB data types as per JDBC 3.0 API specification
  – BEA WLI8.1 support
NonStop JDBC/MX Type 2
2005-2006 Releases

• V32 AAM – SQL/MX R2.1.0 – June 2005
  − 15% to 30% Dynamic SQL performance improvement
  − Maintenance fixes for LOB

• V32 – SQL/MX R2.2.0 on H06.05 – 1Q2006
  − Fix defects and cursor performance regression
  − Dynamic SQL cursor performance enhancements in JDBC Type 2 driver
  − Integrity NonStop release: H10 AAA (T1275)
  − S-Series release: V32 AAQ (T1225)

Future product plans, dates, and functionality are subject to change without notice.
NonStop SQL/MX is ready for you!
Quality and Customer Experience
Quality

- We made significant changes to our processes with SQL/MX R2.0 to address quality issues
- We are continuing those changes and making further improvements with each new release

- We have seen, and heard from customers, that it has made a difference…
Customer Quotes

Specific comments we have received from customers about R2.0:

• “R2.0 is significantly better than R1.8.5”

• “SQL/MX 2.0 does not suffer from the lack of stability characteristic in previous versions”

• “MX product quality has finally reached the state we need”
## NonStop SQL/MX CM Data

### SQL/MX Monthly CMs (New & Rediscovery)

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</table>
NonStop SQL/MX CM Data

SQL/MX CMs by Month

<table>
<thead>
<tr>
<th>Rel. Name</th>
<th>CMs/mon.</th>
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<tbody>
<tr>
<td>R1.8</td>
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<tr>
<td>R2</td>
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<tr>
<td>Log. (R1.8)</td>
<td></td>
</tr>
<tr>
<td>Log. (R2)</td>
<td></td>
</tr>
</tbody>
</table>

Mon. since FCS

NonStop SQL/MX is ready for you!
NonStop SQL/MX Customers

SQL/MX with SQL/MP tables
• In recent survey, approximately 25% of NonStop SQL customer base is using SQL/MX in production
• Many in production for almost 3 years
• Examples: Sabre, HP iHUB, ADP/SIS

SQL/MX with SQL/MX tables
• Released September 2004, still in CA
• More than 75 customers/partners have requested the software

JDBC Type 4 Driver
• Very fast uptake by customers
• 50 customers are using JDBC Type 4 driver
• In general, pleased with performance
Customer Application Verification …

• A Large Retailer
  - Application migrated from R1.8.5 to R2.0
    • Migration to R2.0 was smooth and very stable
    • Low incidence of problems with R2.0
    • SequeLink and Java Type 4 drivers proved compatible with other vendors

• A Large Telecommunications Provider
  - Two applications migrated from R1.8.5 to R2.0
    • Order processing app experienced 16% throughput improvement
    • Stable and error-free
    • Easy and painless migration

• An International Association for Investment Banking
  - MP table customer migrating an existing application
    • “Seamless” migration from R1.8.5 to R2.0
    • MX R2.0 very stable compared with previous versions

NonStop SQL/MX is ready for you!
Customer Application Verification …

- **iHUB**
  - Migration of existing application from R1.8.5 to R2.1.0
    - Phased migration into production
    - Successful upgrade of Integration testing machine

- **SimDesk**
  - Port of Linux application and SQL Server database to NonStop (SQL/MX native tables)
    - Successfully ported and tested 18 most used stored procedures (90% of database access)
    - Implemented existing SQL Server database structures with minimal modifications
    - Very low incidence of problems with MX native tables product

- **A Financial Services Provider**
  - Migration of existing application from R1.8.5 to R2.0
    - Migration from R1.8.5 to R2.0 went “as advertised”
Questions?

NonStop SQL/MX is ready for you!

• For additional info and white papers:
  − http://www.hp.com/go/nonstop

• Or email:
  − rohit.jain@hp.com
Why go to SQL/MX? …

• ANSI Compatibility
  - Supports most ANSI SQL-99 Core features and many features in the Enhanced Conformance datetime facilities, integrity management, OLAP, and PSM packages
  - Powerful SQL syntax
    • Table expressions allowed for table references
      - SELECT * FROM (SELECT …) AS T1 WHERE ...
    • Scalar subqueries allowed for column references
      - SELECT Col_A, (SELECT COUNT (*) FROM …) AS Qty, Col_B, …
      - Removal of limits such as number of tables, view size, table names
  • ANSI Views
    - Views can support Unions and Aggregates
    - Aggregate over a view or join it to another table
    - Insert into views

• Ability to use standard development and end user tools out of the box

NonStop SQL/MX is ready for you!
Why go to SQL/MX?

- Advanced Optimizer and Executor architecture
- Built-in parallelism
- Publish/Subscribe and Queuing Services
- Rowsets
- Hash Partitioned tables for ease of management
- Decoupled clustering and partitioning keys
- Multiple partitions per disk without SMF
- Better ESP management
- Triggers
- Referential Integrity
- Stored Procedures in Java (upcoming Result Sets support)
- Grant/Revoke security
Why go to SQL/MX?

• JDBC Type 4 driver
• IEEE Floating point and Unicode UCS2 data types
• Management GUI – NSM/web and Visual Query Planner
• Slew of new string, date, arithmetic, statistical functions
• Data Mining Features
  − Transpose
  − Sampling
  − Sequence Functions (similar to ANSI OLAP functions)
• It is where we are investing!! SQL/MP soon to mature!
• And SQL/MX is ready for you!!
NonStop SQL/MX Customers
SQL/MX with MP Tables

• In 2005 survey, approximately 25% of NonStop SQL customer base is using SQL/MX in production
  − Many in production for 2+ years
  − Examples: Sabre, HP iHUB, ADP/SIS
• Majority are using COBOL (85%) and ODBC (65%)
• Almost 70% are using C/C++
• 50% are using SQL/MX with JDBC, on and off platform
• Heavy use of publish/subscribe (queuing)
• Used for both query and update applications
• What we heard:
  − Significant quality improvements in R2.0 and later

75 customers & partners have requested SQL/MX with MX tables

NonStop SQL/MX is ready for you!