Oracle to NonStop SQL migration methodology

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People, processes, and tools from HP ease and accelerate the migration from Oracle

HP NonStop has long been known for its technology leadership.

As customer’s business grows, sometimes an Oracle database is unable to scale to handle this growth. With businesses operating globally 24x7, a database needs to stay continuously available to its users. And these capabilities should be available at an optimal price point. The database should provide operational capabilities like online manageability, automatic mixed workload handling, and cluster awareness so that organizations do not need to invest in people resources to work around these deficiencies in the database.

This paper is intended as an overview of the Oracle to NonStop SQL migration project. It presents the migration methodology and pointers to instructions on how to migrate the database objects, and data and port PL/SQL code using automated conversion tools. The white paper also discusses how to convert the stored procedures, triggers, and functions. In addition, we also provide references to white papers on data loading and manageability along with differences in features and functions of the two products.

Why NonStop?

Companies choose to migrate to NonStop due to various business and technical reasons. Company executives are looking to get an enterprise-wide view of the state of the business that is current and helps them make timely business-critical decisions. CIOs are concerned about the runaway IT budgets due to significant costs of licensing and supporting Oracle databases especially compared to comparable NonStop configurations. Companies can look at factual numbers and experience first-hand real cost savings by moving to NonStop. IT departments are concerned about keeping mission-critical applications and database available at all times to its users.

HP NonStop Enterprise Division has setup an Oracle to NonStop migration program. NonStop Professional Services Solutions Development and Implementation (SDI) has developed tools, resources, training, and processes that help customers migrate their Oracle databases to NonStop SQL.

HP Integrity NonStop servers are out-of-the-box and clustered. They come fully integrated with hardware and software to provide nearly continuous 24x7 availability, linear scalability at a better cost of ownership. NonStop SQL is an ANSI standard relational database that fully leverages shared-nothing, massively parallel processing of NonStop architecture to deliver high performance in a cluster environment that can easily scale to handle high volume transactions and multi-petabytes of database.

NonStop has a state-of-the-art “optimizer” and “executor”, which virtualize data and query processing across the entire cluster and present the clustered database as a single logical database instance to its users. It performs concurrent mixed-workloads, both transactional and decision support, with end-to-end transactional integrity, all out-of-the-box with no add-on licensing or additional complex configuration. Online database administration and management tasks can be done concurrently with OLTP transactions, ad-hoc queries, complex analytical queries, and real-time high volume data ingests.

The way NonStop presents a clustered database as a single database instance as opposed to multiple database instances gives users flexibility in operations and reduces ongoing costs of database administration.

The NonStop database performance for very large databases is achieved by its shared-nothing, massively parallel architecture and its ability to virtualize data and query workloads across all available resources.

As decision making gets more complex, decision-makers need up-to-date information about the state of the enterprise. Customers expect that the database engine would provide faster and deeper insights into enterprise information. This requires the database engine to support real-time data ingests and queries to happen concurrently.

NonStop SQL offers these capabilities out-of-the-box. Its handling of mixed-workloads is well known and enjoyed by numerous customers worldwide. NonStop SQL enables short and tactical as well as large strategic queries concurrently with data ingests and database administration activities to execute on the same data sets on the same platform at the same time and it offers these capabilities out-of-the-box. None of these benefits are possible on an Oracle platform without expensive licenses, complex configurations, and continuous monitoring and fine tuning of the database platform thus resulting in an expensive Oracle database solution for your enterprise.
Migration strategy: Assess; Plan; Conversion; Implementation

Figure 1. Lifecycle of a database migration

Assess

Before undertaking a migration project, assessment activities need to be performed.

- Perform an IT architectural assessment
  - Understand current state
    - Workload characteristics and SLAs
    - Number of concurrent users
    - Throughput and response time baselines
    - Software and hardware revision levels
    - Characteristics and size of the production database
    - Number and size of tables (number of columns and rows)
    - Use of views and indexes
    - Number and complexity of stored procedures
    - Number and complexity of triggers accessing the database
    - Use of database archiving tools
    - Brief description of application, third-party tools, and programming languages used
    - Document IT standards and constraints to be followed
  
  - Investigate the scope, duration, and cost of the project
    - Which databases are to be migrated?
    - How many database objects are to be migrated?
    - How many stored procedures should be migrated?
    - How many Triggers are to be migrated?
    - What is the scope of application code conversion?
    - What is the complexity of code and database objects to be migrated?
    - How much data is to be migrated?
    - Assess the duration of the migration
    - Determine the effort estimate for the migration project.
Identify business dependencies
- Are there timeline requirements for the business users?
- Are the licensing agreements coming up for renewal?

Identify technical dependencies
- Are there commercial off-the-shelf solutions (COTS) solutions involved?
- Do these COTS use non-standard non-published interfaces?

Plan

- Identify people resources and skills required
  - Where are the resources coming from? In-house, outsourced or both?
  - Do we have resources well versed in both Oracle and NonStop SQL databases?

- Identify tools to be used during the migration
  - Ispirer SQLWays for Data Definition Language (DDL) and Data Manipulation Language (DML) Migration
  - NonStop Design Advisor for database design recommendations
  - Select tools to be used for extracting data from Oracle and loading into NonStop SQL
  - Choose manageability tools

- Identify hardware and software resources required for migration
  - Is a POC required to validate technical feasibility and performance?
  - Have all deployment scenarios been addressed?

Apart from the collection of the above metrics, the database specialists also plan for the following development activities:

- Schema migration
- Physical design of the database
- Functional testing
- Integration testing, especially with eco-system providers
- Test criteria and plans
- User acceptance testing
- Performance tuning
- Parallel runs with live systems
- Training
- Production cutover
- Support
- Project management

Once the above activities are complete, NonStop SDI puts together a proposal for work with an estimate in time and dollar. The proposal would list the project milestones and deliverables.

Other factors that influence the size and complexity of a migration project are:

- Extent of Oracle proprietary extensions used
- Quality of data
- Existence of documentation for the applications and their access to database
- Database design requirements
- Third-party and COTS software dependencies
- Multiple integration scenarios
- OS and hardware platform changes
Conversion and Implementation process

In order to create an overall project plan, NonStop specialists conduct the following activities:

- Identify migration scenarios and tasks
- Determine
  - Current operational processes
  - Training requirements
  - User test and support processes
  - Development, test, and production environments
  - Amount of data to migrate
  - Customizations needed for online and batch
  - Requirements for database archiving, backup, and disaster recovery
  - Customer’s change management procedures
- Design the layout of the databases
- Ascertain database security requirements
- Plan system capacity and configuration (number of processors, storage, connectivity, and more)
- Determine integration with other systems and applications
- Establish lifecycle standards like naming conventions and development processes
- Perform migration steps
- Test migration scenarios

The database migration consists of following activities:

- Extract and analyze source database structures from the source DDL
- Use NonStop design advisor to profile and recommend database layout
- Convert database objects—data types, columns, views, indexes, stored procedures, triggers, functions, and more
- Convert queries
  - Enhancements related to performance could be done in this phase
- Test and implement converted objects

Next is data migration, and our team:

- Extracts data from source databases
- Performs any cleansing and enrichment activities
- Loads data in the target database on NonStop
- Tests implementation

And as a final step, the team defines the user acceptance criteria and test procedures.

A preproduction system is setup for a parallel run with production data. This is a critical step to help ensure that the data migration has been successful without any failures. This is followed by a production cutover.
Migration resources

HP NonStop Advanced Technology Center (ATC) and SDI teams provide assistance for assessment, conversion, and implementation tasks. These are database architects and specialists whose mission is to facilitate and assist with all phases of a database migration to NonStop SQL. These teams have helped several customers with their migrations and have database administration and application development skills.

Based on their experiences with migration projects, these teams can quickly identify project risks and come up with a plan to mitigate those.

ATC has developed best practices for migration of database objects and data and published several white papers on these topics.

NonStop SDI can help customers migrate their database applications to NonStop. This is a fee-based service. SDI has a team of migration specialists that can perform the entire migration or partner with your team for a more cost-effective solution.

Summary

The Oracle-to-NonStop migration program comprises people, tools, and processes. NonStop business unit provides access to skilled resources and in-house partner tools to help and enable customers make this transition in an accelerated and efficient manner.

A key component of successful migrations is training available to Oracle DBAs and developers. This specialized training enables an Oracle DBA to learn NonStop SQL from an Oracle perspective and rapidly become productive on the new platform. Oracle developers do not have to re-learn database programming since NonStop SQL is ANSI standards-compliant database and supports many Oracle specific non-standard extensions "as-is"—effective utilization of people resources is a key consideration factor in any cross-platform migration project.

Migrating to NonStop SQL provides a powerful solution to host your OLTP and data warehousing applications on the same database server. Once your enterprise has adopted NonStop SQL, they can also start enjoying the benefits of an integrated database platform that enables you to view your current enterprise information in a consistent manner in near real time. With the scalability and availability and low-cost of ownership of a NonStop database solution, you are all set to meet your business and technical needs.

Get an overview

To perform a health check of your database environment, visit hp.com/go/nonstopfacts
### Additional information

Oracle to NonStop SQL migration case study

Migrating a real-time transaction evaluation and scoring solution to NonStop

True database scalability only on NonStop

Only on NonStop: Manageability

Migrating Oracle data to NonStop SQL

Migrating Oracle Database to NonStop SQL using Ispirer SQLWays

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