HPE Shadowbase
Zero Downtime
Migrations & Upgrades
Overview

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Agenda

Business Continuity Eliminates *Unplanned* Application Downtime
  - Our focus today: ZDM Eliminates *Planned* Application Downtime

A (Brief) Review of the Need to Upgrade
  - Change is the only constant, even when you don’t want to, or need to, or are told to…
  - What can go wrong will go wrong, so plan for it

Migrations & Upgrades – The *Old* Way
  - Application service outages are common
  - Rather risky *big-bang* approaches are common
  - Failback typically is very difficult & time consuming, usually with data loss

Migrations & Upgrades – The *New* Way
  - Application service outages are uncommon (or at least so short that either customers don’t notice or they are not materially inconvenienced)
  - Risk is mitigated – migration is to a *known-working & fully tested* environment
  - Failback is managed, controlled, & fast, with no data loss
Migrations & Upgrades – The *Old* Way

- Single System Environment
- Multi-system Environment
System Migrations the Old Way – The “Big Bang” Approach

Single System Upgrade in a Single System Environment (1)

1. Schedule a (usually long) outage window during a night/weekend
   - Application services are usually down for the entire duration
2. Take existing system out of service
   - Shutdown application and quiesce the database, take a full and consistent backup
3. Perform necessary activities for the upgrade/migration
   - Install new software/systems, build/load new database, install and start new application version, etc.
4. Test system to extent possible within outage window
   - Include load/scaling testing as well as external interfaces testing if possible
5. Put upgraded/migrated system into production, and hope it all works
   - But what about failback if it doesn’t go well?
   - How long will it take to restore and recover the application and database?
   - Will you lose all of the new data during a failback operation?
Why this approach is wrong:
- Application services are unavailable to users during the outage window (who can afford this today?)
- The scheduled outage period may give insufficient time to properly test the new system
- Constrained test environment (e.g., full production load typically not possible)
- Uncertainty as to whether upgraded/migrated system will perform properly in production
- All or nothing – all users migrated at once, no chance to proceed incrementally
- No easy failback if upgrade/migration goes wrong (“sawing off the branch you’re sitting on”)

Net: there is a strong possibility the migration/upgrade will not succeed, and if it doesn’t, getting back to your original configuration will be difficult (prolonged service outage)

And even if it does succeed, you’ve taken a fairly long application service outage
Simply having multiple systems isn’t the answer…

1. Start with the *Alternate* system (e.g., DEV or TEST) and take it out of service

2. Perform necessary activities for the upgrade/migration
   - Install new software/systems, install and start new application version, etc.

3. Test system to the extent possible

4. Take an outage of the application by shutting current production down, take backup, restore/load into new database, and bring up new application

5. Put upgraded/migrated system into production, *and hope it all works*;
   - Failback is easier though – to original production system with original application & database intact.
   - However, any ‘new’ data is usually lost…
This approach improves on the single system approach by allowing certain steps to be completed before the outage period starts…but it still has the same drawbacks as the previous approach:

- Application services are unavailable to users during the outage window
- All or nothing – all users migrated at once, no chance to proceed incrementally
- No easy failback if upgrade/migration goes wrong (“sawing off the branch you’re sitting on”)

Net: there is a possibility the migration/upgrade will not succeed, and if it doesn’t, getting back to your original configuration will be difficult (prolonged service outage)

**And even if it does succeed, you’ve still taken a (fairly long) application service outage**
Migrations & Upgrades – The *Right* Way

- HPE Shadowbase for Zero Downtime Migrations (ZDMs)
System Migrations the Right Way

The HPE Shadowbase Method for Zero Downtime Migrations (ZDM)

**HPE Shadowbase ZDM software:**

- Provides continuous application services availability while the migration occurs, thereby eliminating planned downtime;
- Removes business risk that the migration will fail; and,
- Avoids data loss if a failback does have to occur (Mitigating Murphy’s Law)

**It is used to:**

- Convert from an older to a newer application version or database layout
- Upgrade/convert operating system or database software
- Migrate to new hardware (homogeneous or heterogeneous)
- Relocate systems, sites, or data centers
- Move “other” application or database environments onto NonStop ;)

*It provides these capabilities by leveraging the key features of the HPE Shadowbase data replication engine to provide zero application service downtime for the disruptive activity...*
System Migrations the Right Way

The HPE Shadowbase Method for Zero Downtime Migrations (ZDM)

Why this approach is right:

- No need for application service interruption (outage window)
- No "failover faults" (you have either verified that it will work or you don’t do it)
- Take as much time as you need to validate the approach and verify that it is correct
- Build and test new environments without impacting existing production users
- Fully verify the new environment before deploying, no testing constraints
- Cut-over users either gradually or at all at once to a known-working environment
- “Safe-failback” if things go wrong, with no loss of newly generated application data
- Bonus: Can be done with full application business continuity provided across the migration if > 2 nodes are involved

Net: there is a very high confidence that the migration/upgrade will succeed, and if it doesn’t, “failing back” to your original configuration will be straightforward

And whether it succeeds or not, there is no application service outage and no data will be lost
HPE Shadowbase Zero Downtime Migration (ZDM)

A) Multi-Node Upgrade

B) Single-Node Upgrade
HPE Shadowbase for Zero Downtime Migrations

- NonStop to NonStop (Platform/Database Upgrade)
Zero Downtime Upgrades & Migrations (ZDM) – Casino Administration Case

Upgrade from One NonStop Server to Another – Casino Operations Example

- New platform type (S to Itanium Blades)
- New application version
- New database format (differing schemas on the source vs target)
- Minimal application service downtime allowed
Shadowbase Success Stories – Step 1

Sequence:
1-Current Production
Shadowbase Success Stories – Step 2

Sequence:
1. Current Production
2. Create “NEW” DB and/or Application

Diagram:
- NonStop Server
  - Current Application
    - Current Enscribe
    - Current SQL
  - Users
- NonStop Server
  - NEW Application
    - NEW Enscribe
    - NEW SQL
Shadowbase Success Stories – Step 3

Sequence:
1. Current Production
2. Create “NEW” DB and/or Application
3. Test New Environment

NonStop Server

Current Application

Current Enscribe

Current SQL

NEW Application

NEW Enscribe

NEW SQL

Users
Shadowbase Success Stories – Step 4

Sequence:
1-Current Production
2-Create “NEW” DB and/or Application
3-Test New Environment
4-Load and Synchronize New Database With Current
Shadowbase Success Stories – Step 5

Sequence:
1. Current Production
2. Create “NEW” DB and/or Application
3. Test New Environment
4. Load and Synchronize New Database With Current
5. Verify New Matches Current (Optional, but Recommended)
Shadowbase Success Stories – Step 6

**Sequence:**

1. Current Production
2. Create “NEW” DB and/or Application
3. Test New Environment
4. Load and Synchronize New Database With Current
5. Verify New Matches Current (Optional, but Recommended)
6. (Optional) Add Failback
Shadowbase Success Stories – Step 7

Sequence:

1. Current Production
2. Create “NEW” DB and/or Application
3. Test New Environment
4. Load and Synchronize New Database With Current
5. Verify New Matches Current (Optional, but Recommended)
6. (Optional) Add Failback
7. Cut-over Users:
   A. Disconnect from Current
   B. Let Events Drain
   C. Connect to new Prod
   D. (Optional) Reverse Replicate to Keep Old DB Synchronized with New DB (Thereby Avoiding Data Loss if a Failback Must Occur)

NonStop Server

Current Application

Current SQL

Current Enscribe

Shadowbase

NEW Application

NEW SQL

NEW Enscribe

Shadowbase

Users

7A

7B

7C

7D
HPE Shadowbase for Zero Downtime Migrations Case Study

- Using ZDM for a Data Center Migration
- Preserving Full Business Continuity Protection
HPE Shadowbase Zero Downtime Migration

Data Center Migration with Zero Downtime – Large Payments Processor Case

Migrate an Entire Data Center from Toronto (DC-T) to Strath Haven (DC-S) While Maintaining Application Services

- Add in new/third data center at start of the process to maintain full business continuity (preserves fast failback to old data center with no data loss)
- Network needs to support appropriate routing changes prior to migration starting

Statistics:

- Large financial message switch, all Enscribe BASE24 Classic data (audited via AutoTMF)
- TPS: Avg 500, Peak 1000
- Database size: 500GB
HPE Shadowbase Product Suite Overview
HPE Shadowbase Portfolio
Best in class products for a nonstop world

Business Continuity
- Shadowbase Basic* Data Replication
- Shadowbase Advanced* Data Replication

Data & Application Integration
- Shadowbase Basic* Data and Application Integration
- Shadowbase Advanced* Data and Application Integration

Data Utilities
- Shadowbase Data Management Utilities
  - Audit Log
  - Audit Reader
  - Compare
  - Undo

Proven in the Market
- Large, worldwide, marquee customer base
- Shadowbase has been in the market for over 30 years

* Basic = Uni-directional / Advanced = Bi-directional
Shadowbase Product Suite Overview

The Shadowbase Extensible Architecture

Business Continuity & Application Availability Environments
- Active/Passive Disaster Recovery
- Sizzling-Hot-Takeover (SZT)
- Active/Active Continuous Availability
- Eliminate Planned Downtime for Migrations & Upgrades (ZDM)

Data Integration & Data Synchronization
- Homogeneous & Heterogeneous Environments
- Data Transformation, Scrubbing, Filtering & Cleansing
- Extend Replication Capabilities with Embedded Application Logic

Application Integration
- Build Event-Driven Architectures
  - Process events as they occur; no more polling for needed data
- Build Real-Time Architectures
  - Process events when they occur; no more working with “stale” data
- Integrate Disparate Applications with no Application Code Changes
  - Integrate at the data-layer, avoiding costly adapters, middleware, and code changes
HPE Shadowbase Supported Platforms & Databases

Homogeneous & Heterogeneous Uni/Bi-directional Data Replication

HPE Shadowbase

Uni-directional Replication and Data Integration

HPE Shadowbase

Bi-directional Replication and Data Integration

Source Database

HPE NonStop

SQL/MP
SQL/MX

Enscribe

Oracle Enterprise

Microsoft SQL Server

Linux, Unix

Microsoft Windows

Target Database

HPE NonStop

SQL/MP
SQL/MX

Enscribe

SAP

Oracle Enterprise

Oracle MySQL

IBM DB2

Unix/Linux

Microsoft Windows

HPE Shadowbase

Any ODBC Target Platform/Database (e.g., Teradata)

Source/Target Database

HPE NonStop

SQL/MP
SQL/MX

Enscribe

Oracle Enterprise

Microsoft SQL Server

Linux, Unix

Microsoft Windows

Source/Target Database

HPE NonStop

SQL/MP
SQL/MX

Enscribe

SAP

Oracle Enterprise

Oracle MySQL

IBM DB2

Unix/Linux

Microsoft Windows
HPE Shadowbase Summary and
For More Information
Why Choose Shadowbase?

Proven technology
- Shadowbase is deployed at hundreds of sites, including many of the most-demanding NonStop sites

Flexible solutions for your business challenges
- Business continuity, data integration and synchronization, data warehouse feeds, application integration, real-time business intelligence

Global sales organization
- Global reseller presence from HPE Sales

Global 24x7 support organization and Global Professional Services Organization
- Global support presence from the HPE GNSC and Global PS from HPE TS and HPE SDI

Affordable, and committed to the NonStop platform
- Improves TCO via overall cost advantage and features
  - “One product, many solutions”
- We are partnering and investing with HPE in many innovative enhancements
  - “Only on NonStop”
For More Information

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<tr>
<th>If you are interested in:</th>
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| General Overview About Shadowbase | • Shadowbase Total Replication Solutions for HPE NonStop  
• Shadowbase Total Replication Solutions for Open Servers  
• Shadowbase Total Replication Solutions Product Datasheet |
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• Shadowbase Tradeshows  
• Shadowbase White Papers |
| Performing a Zero Downtime Migration | • Using Shadowbase to Eliminate Planned Downtime via Zero Downtime Migration  
• Shadowbase ZDM Achieves Zero Downtime Migration for Large Bank Datacenter  
• Using Shadowbase Solutions for Application Modernization with Zero Downtime  
• Shadowbase Helps a Major ISP Migrate from Sybase to HP NonStop with No Downtime  
• Bank Chooses Shadowbase Solutions for BASE24 Business Continuity |
Thank you!

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