HPE Shadowbase Key New Features to Solve Business Challenges

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HPE Shadowbase Agenda

HPE Shadowbase Product Suite Overview

Key New Features to Solve Business Challenges

- IBM DB2 Replication
- Synchronous Replication – Zero Data Loss

Additional New & Future Features

Summary & For More Information

Introduction

Paul J. Holenstein
Executive Vice President
Shadowbase Products Group
Gravic, Inc.

Corporate HQ
Malvern, PA USA

HPE Shadowbase Product Suite Overview

Hewlett Packard Enterprise

HPE Shadowbase Product Suite Overview

The Shadowbase Extensible Architecture

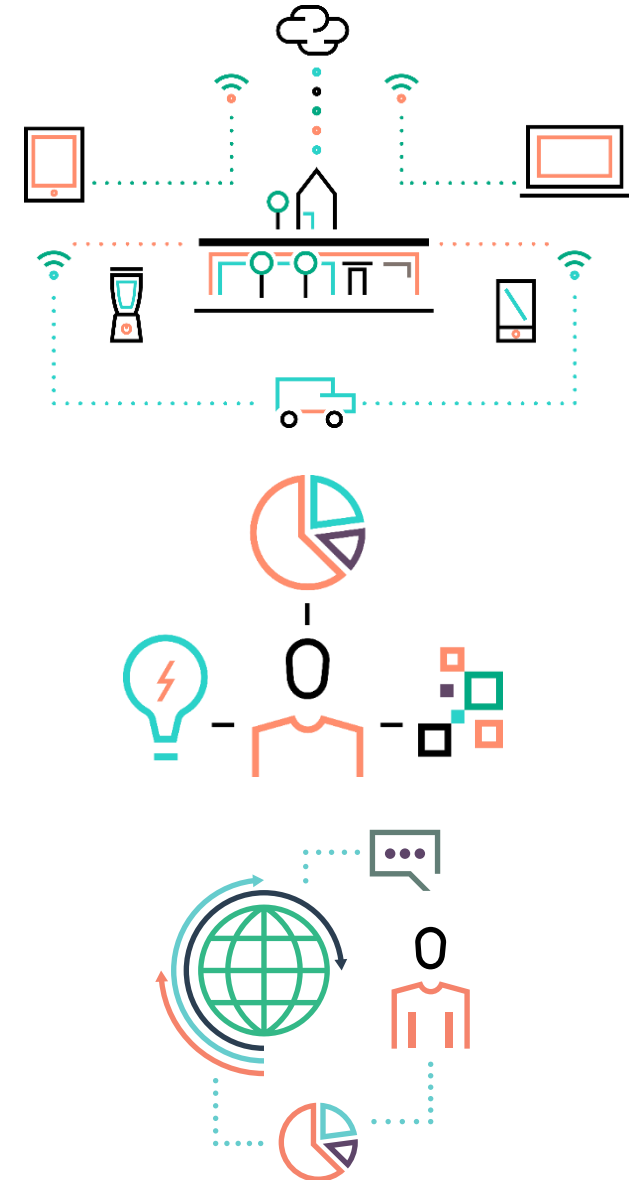### Business Continuity & Application Availability Environments

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

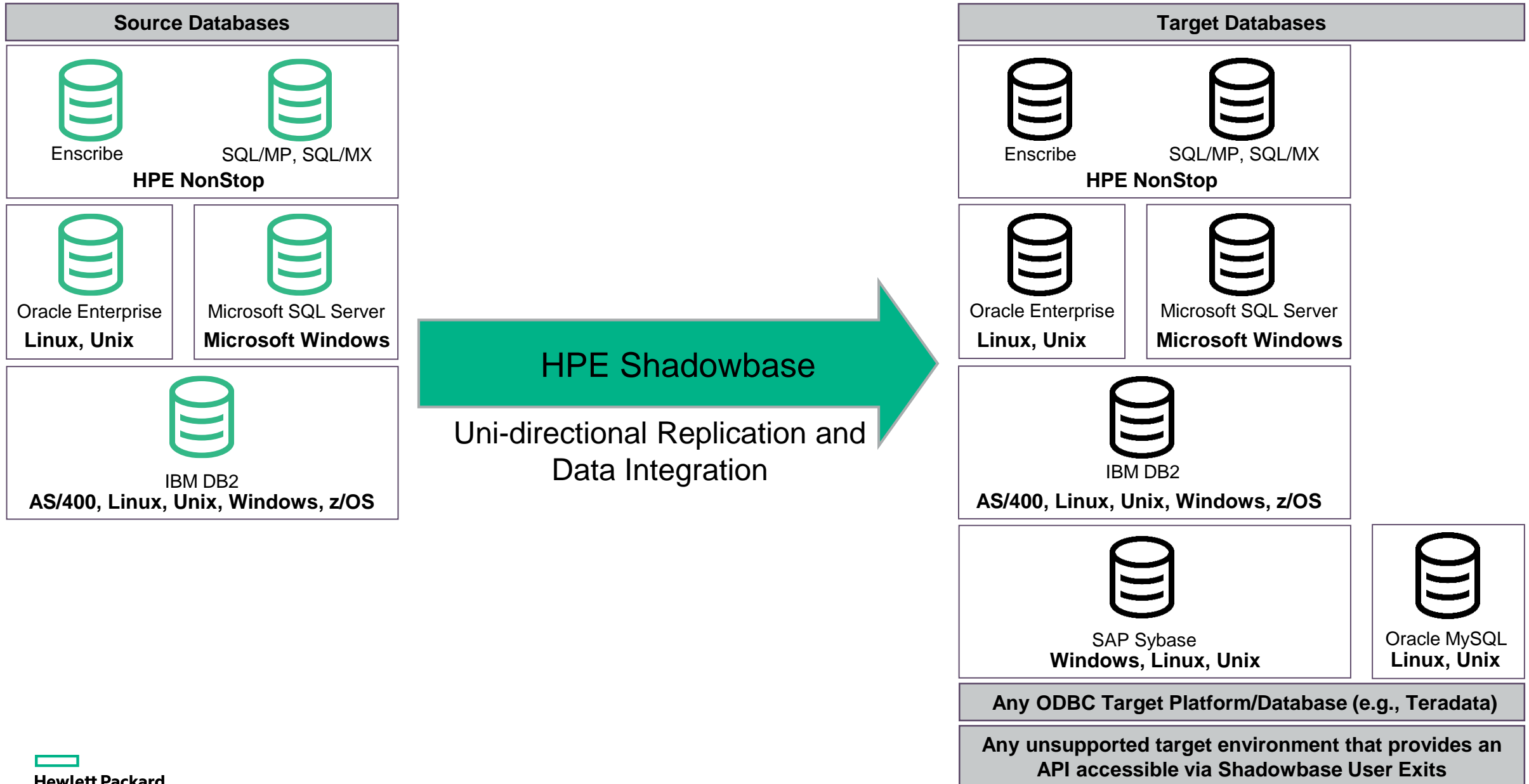### Data Integration & Data Synchronization

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

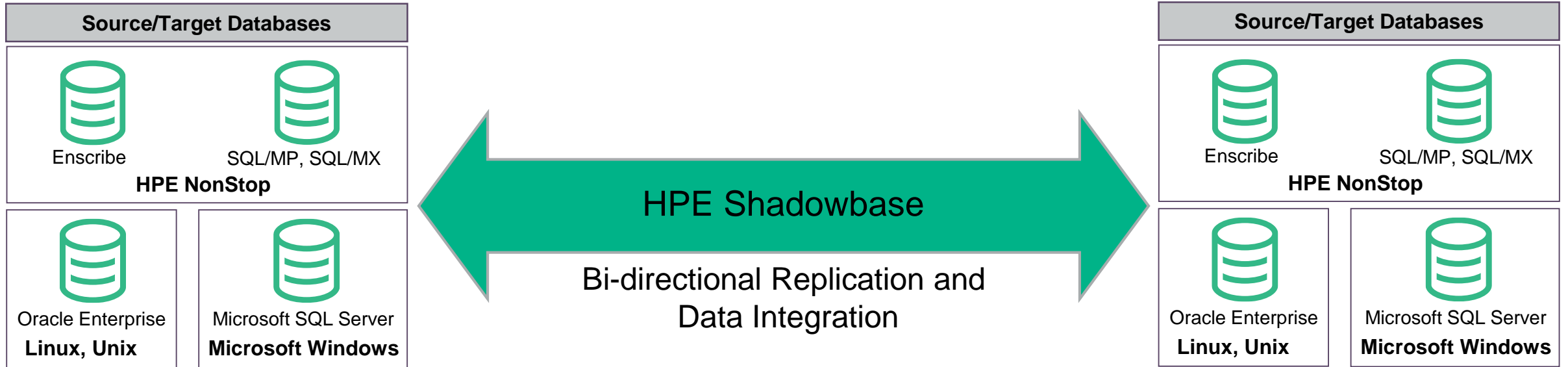### Application Integration

- Build *Event-Driven* Architectures
  - Process events <u>as</u> they occur; no more polling for needed data
- Build *Real-Time* Architectures
  - Process events <u>when</u> 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

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Homogeneous & Heterogeneous Uni-directional Data Replication

Source Databases

Enscribe   SQL/MP, SQL/MX
HPE NonStop

Oracle Enterprise   Microsoft SQL Server
Linux, Unix   **Microsoft Windows**

IBM DB2
AS/400, Linux, Unix, Windows, z/OS

HPE Shadowbase

Uni-directional Replication and Data Integration

Target Databases

Enscribe   SQL/MP, SQL/MX
HPE NonStop

Oracle Enterprise   Microsoft SQL Server
Linux, Unix   **Microsoft Windows**

IBM DB2
AS/400, Linux, Unix, Windows, z/OS

SAP Sybase   Oracle MySQL
Windows, Linux, Unix   **Linux, Unix**

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

Any unsupported target environment that provides an API accessible via Shadowbase User Exits

Hewlett Packard Enterprise

Homogeneous & Heterogeneous Bi-directional Data Replication

Source/Target Databases

Enscribe   SQL/MP, SQL/MX
HPE NonStop

Oracle Enterprise
Linux, Unix

Microsoft SQL Server
Microsoft Windows

HPE Shadowbase

Bi-directional Replication and Data Integration

Source/Target Databases

Enscribe   SQL/MP, SQL/MX
HPE NonStop

Oracle Enterprise
Linux, Unix

Microsoft SQL Server
Microsoft Windows

Hewlett Packard Enterprise

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Enhancements to HPE Shadowbase
IBM DB2 Support
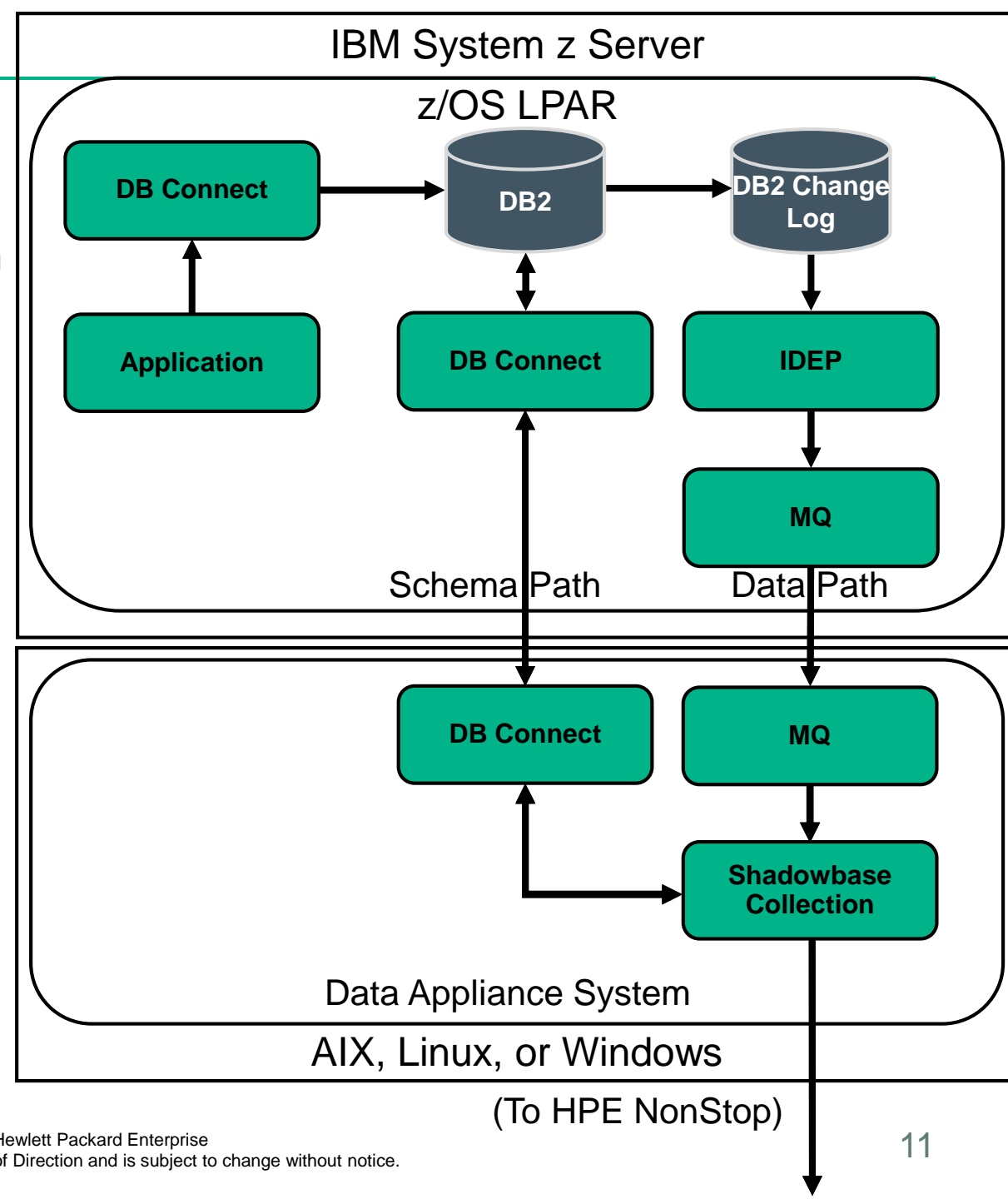
Enhancements to HPE Shadowbase for IBM DB2 Support

– Uni-directional DB2 source replication to any supported HPE Shadowbase target

– DB2 source database can be on any IBM source environment/platform

  – AIX, Linux, Windows, z/OS, etc.

– Does not require the installation of <u>any</u> HPE Shadowbase components on the source DB2 environment, nor any changes to the application

  – Uses *IBM InfoSphere Data Event Publisher* (IDEP) on the source environment to extract the transactional database changes from the DB2 change log and feed them into MQ Series for transport

  – Uses *IBM MQ Series* on the source environment (or data appliance, depending on the configuration) to deliver the source transactional database changes into HPE Shadowbase

  – Requires a DB2 client connection into the DB2 source database for HPE Shadowbase to extract DB2 table schema information (similar to any other application that accesses the DB2 database)

  – Works with any MQ version supported by IDEP

– So, with this new introduction, HPE Shadowbase now supports DB2 both as a source and a target, uni-directionally and reciprocally, on AIX, Linux, Windows, and z/OS, platforms
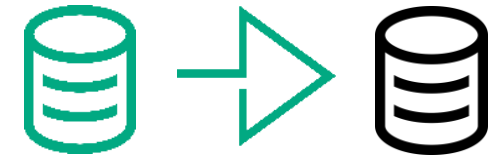
Enhanced IBM DB2 Support
From DB2 on z/OS to HPE NonStop (1)

- This example shows HPE Shadowbase replication from an IBM z/OS mainframe DB2 source database into an HPE NonStop target environment

- When the *DB2* database is on a platform other than AIX, Linux, or Windows (e.g., z/OS), HPE Shadowbase runs on an intermediate *Data Appliance System* that has the MQ API and DB2 client access to the database

- The Mainframe Application updates the *DB2 database*

- *DB2* changes are recorded in the *DB2 Change Log*

- Then, IBM InfoSphere Data Event Publisher publishes the *DB2 changes* to an MQ queue located on an intermediate data appliance (AIX/Linux/Windows)

- Shadowbase Collection on the intermediate data appliance reads the changes from the MQ queue and forwards them to the *NonStop*

  - Shadowbase uses DB Connect to retrieve table schema information for new tables it has not received/processed previously

IBM System z Server

z/OS LPAR

DB Connect → DB2 → DB2 Change Log

Application → DB Connect

DB2 ← → DB Connect

DB2 Change Log → IDEP → MQ

Schema Path   Data Path

Data Appliance System

DB Connect   MQ

Shadowbase Collection

AIX, Linux, or Windows

(To HPE NonStop)

Enhanced IBM DB2 Support
From DB2 on z/OS to HPE NonStop (2)

– Shadowbase on the NonStop receives the changes and applies them to the *NonStop database*
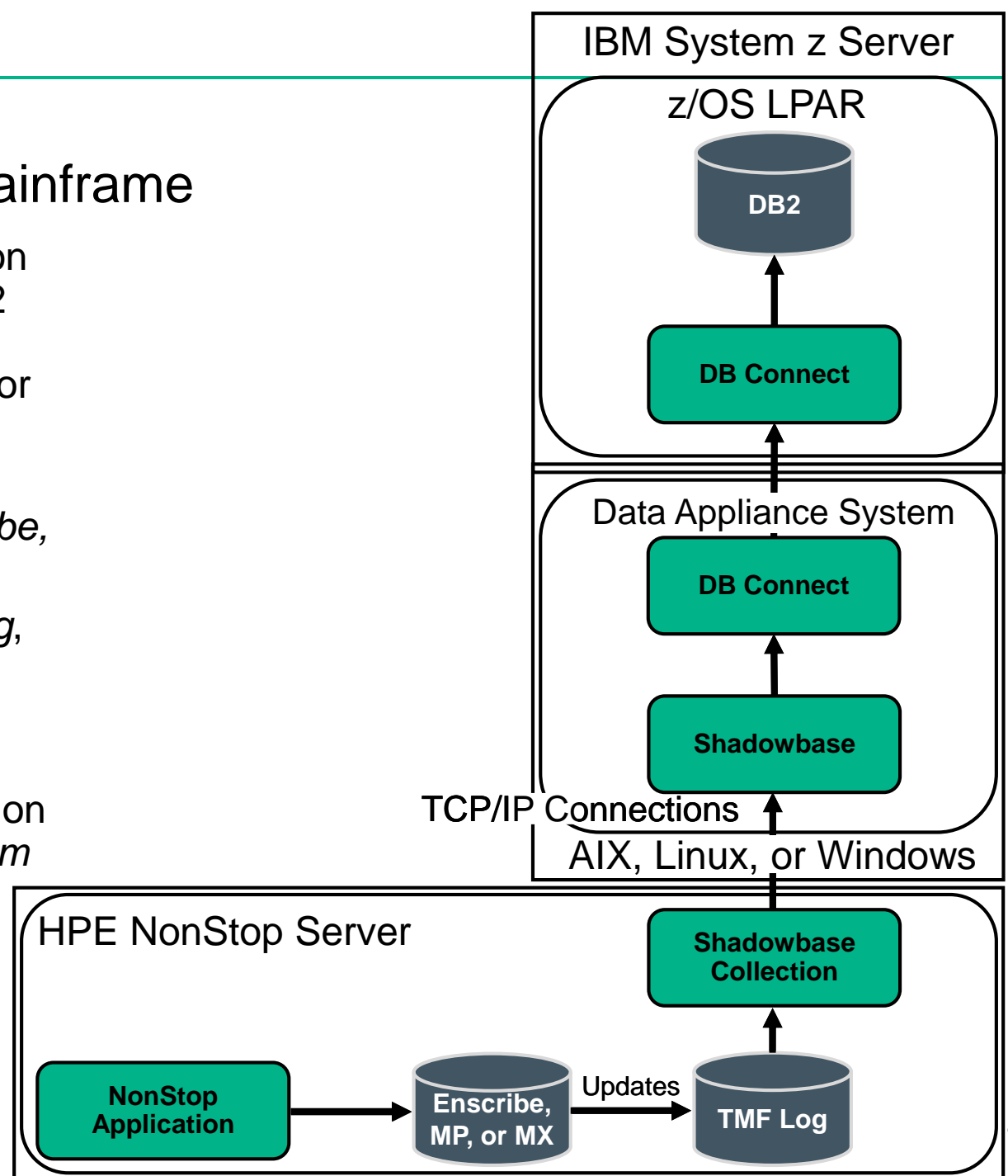
TCP/IP Connections

Shadowbase

Enscribe, MP or MX
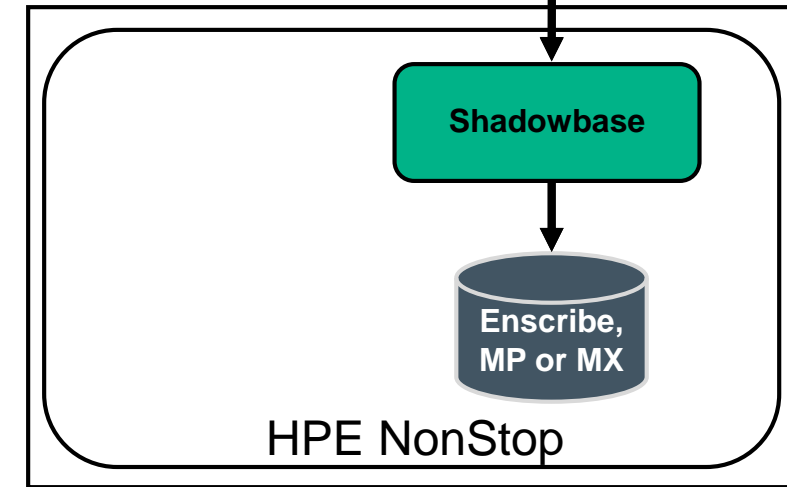
HPE NonStop

Enhanced IBM DB2 Support
From HPE NonStop to DB2 on IBM Mainframe

– This example shows HPE Shadowbase replication from an HPE NonStop source database to a DB2 target database on an IBM mainframe z/OS environment. Note that it will use an AIX, Linux, or Windows "data appliance" system for the Shadowbase processes

– The NonStop application updates audited *Enscribe, SQL/MP, or SQL/MX* source tables

– These changes are recorded in the *TMF audit log*, which is read by the Shadowbase Collection software

– The changes are then sent over a TCP/IP connection to the Shadowbase software running on an AIX, Linux, or Windows *Data Appliance System*

– Shadowbase software on the data appliance system applies the changes, using transaction semantics, into the *DB2 database* using a DB Connect connection

IBM System z Server

z/OS LPAR

DB2

DB Connect

Data Appliance System

DB Connect

Shadowbase

TCP/IP Connections

AIX, Linux, or Windows

HPE NonStop Server

Shadowbase Collection

NonStop Application

Enscribe, MP, or MX

Updates

TMF Log

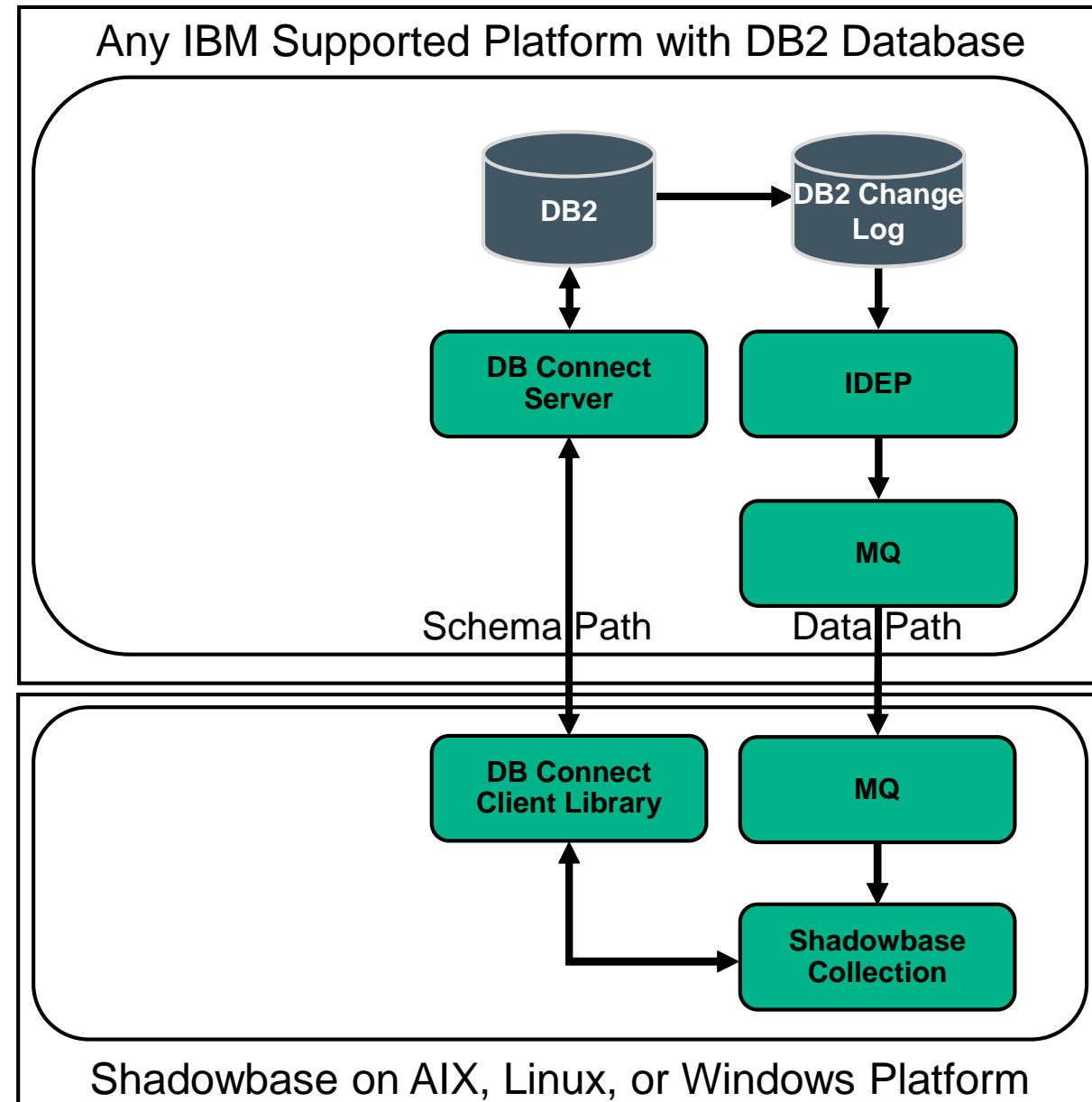Hewlett Packard Enterprise

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HPE Shadowbase Access into IBM DB2
A Closer Look

HPE Shadowbase Access into IBM DB2 – A Closer Look (1)

As a Replication Source

– The DB2 database (along with IDEP and MQ) can reside on <u>any</u> platform that IBM supports

– IDEP extracts the DB2 database changes, and uses MQ to deliver the changes to Shadowbase

– Shadowbase uses the DB Connect Client Library to read the DB2 catalog to retrieve the table schema information for the tables being replicated

– With this release, Shadowbase must run on an AIX, Linux, or Windows platform that has access to MQ and the DB Connect Client Library

– And, the DB2 database can thus be resident on any supported platform

– Note that the solution can scale for resiliency and to handle heavy loads

Any IBM Supported Platform with DB2 Database

DB2 → DB2 Change Log

DB Connect Server

IDEP

MQ

Schema Path   Data Path

DB Connect Client Library

MQ

Shadowbase Collection

Shadowbase on AIX, Linux, or Windows Platform

Hewlett Packard Enterprise

HPE Shadowbase Access into IBM DB2 – A Closer Look (2)

As a Replication Target

- The DB2 database can reside on <u>any</u> platform that IBM supports

- Shadowbase uses the DB Connect Client Library to write the replicated events into the DB2 database

- With this release, Shadowbase must run on an AIX, Linux, or Windows platform that has access to the DB Connect Client Library

- And, the DB2 database can thus be resident on any supported platform

- Note that the solution can scale for resiliency and to handle heavy loads

Any IBM Supported Platform with DB2 Database

DB2

DB Connect Server

DB Connect Client Library

Shadowbase

Shadowbase on AIX, Linux, or Windows Platform
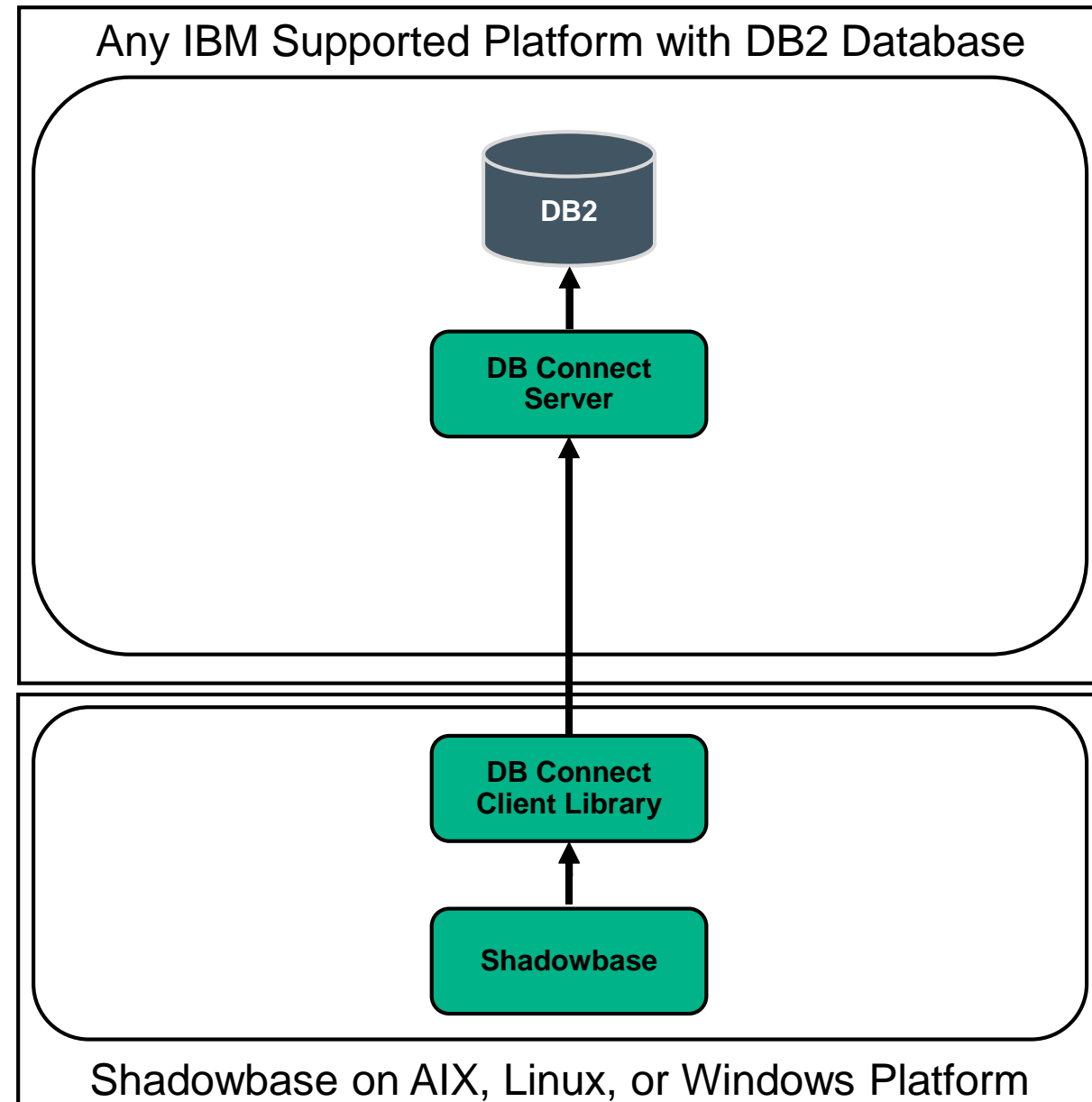
HPE Shadowbase Access into IBM DB2 – A Closer Look (3)
FAQs

– Can Shadowbase run on the SAME platform as the DB2 database?

  – Yes, if that platform is an AIX, Linux, or Windows platform

  – No, otherwise

– Can Shadowbase run on a z/OS mainframe environment?

  – At this time, Shadowbase has not been ported to run directly on z/OS

– Are there any plans to port Shadowbase to a z/OS mainframe environment?

  – Yes, we are considering z/OS in the future

– Can Shadowbase running on a NonStop directly write to or read from DB2?

  – MQ is available on a NonStop, however the DB Connect Client Library is not

  – Shadowbase must run on a platform where the DB Connect Library is available

  – At this time, this means an AIX, Linux, or Windows platform

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HPE Shadowbase Synchronous Replication
Zero Data Loss (ZDL)
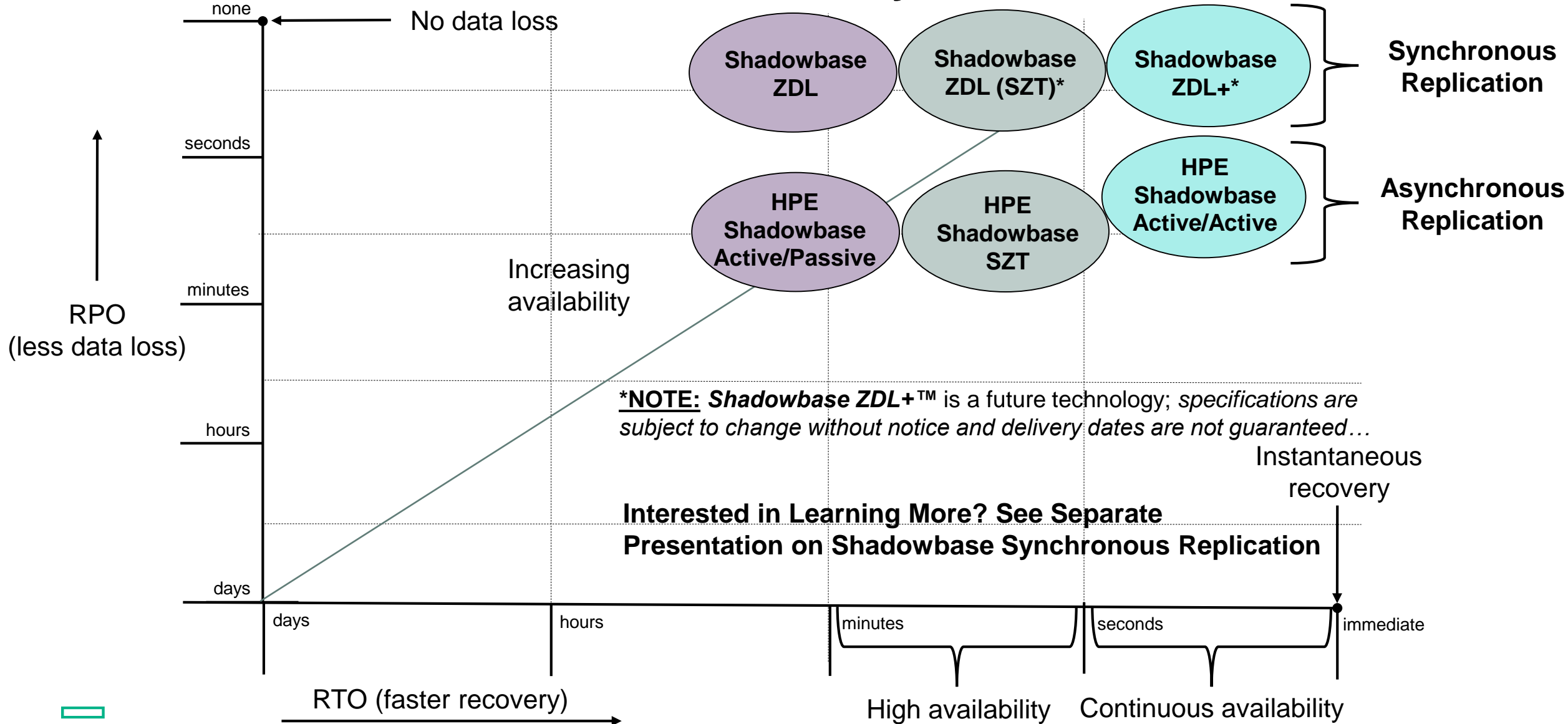
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HPE Shadowbase Product Structure

HPE Shadowbase Business Continuity Replication

- Provides the data *replication* facilities to eliminate unplanned downtime:
  - Active/Passive uni-directional disaster recovery solutions for high availability
  - Active/Almost-Active bi-directional Sizzling-Hot-Takeover (SZT) solutions for higher availability
  - Active/Active bi-directional solutions for continuous availability
- Provides the data *replication* facilities to eliminate planned downtime:
  - Building Zero Downtime Migration (ZDM) solutions to avoid application downtime during upgrades, migrations, and platform refresh
- Can be uni-directional or bi-directional depending on the needs of the customer

HPE Shadowbase Business Continuity Overview

RPO (less data loss) — vertical axis: none, seconds, minutes, hours, days

No data loss

Increasing availability

Shadowbase ZDL

Shadowbase ZDL (SZT)*

Shadowbase ZDL+*

} **Synchronous Replication**

HPE Shadowbase Active/Passive

HPE Shadowbase SZT

HPE Shadowbase Active/Active

} **Asynchronous Replication**

*__NOTE:__ *Shadowbase ZDL+*™ is a future technology; *specifications are subject to change without notice and delivery dates are not guaranteed…*

Instantaneous recovery

Interested in Learning More? See Separate Presentation on Shadowbase Synchronous Replication

RTO (faster recovery) — horizontal axis: days, hours, minutes, seconds, immediate

High availability   Continuous availability
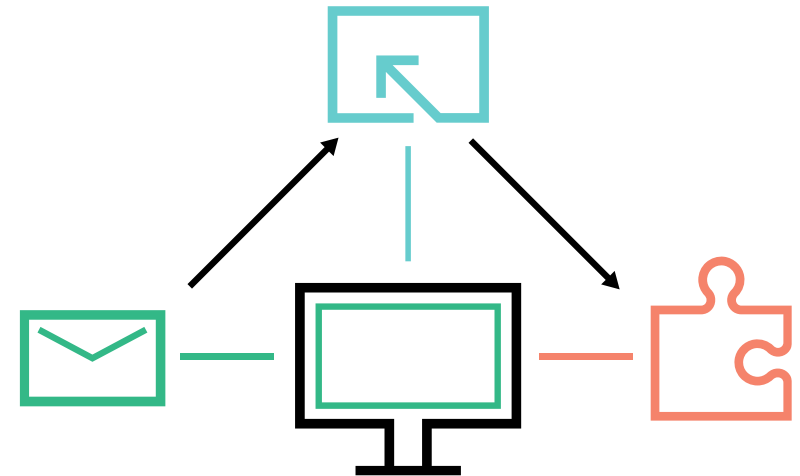
Shadowbase Sync Replication – Feature Rollout (1)

Incremental Feature Rollout

− Synchronous replication benefits will be rolled out *over time*

− Not all benefits will be available on first release

Feature Rollout Sequence:

1. First release is called ***Shadowbase Zero Data Loss R1*** (aka ***Shadowbase ZDL™ R1***)

   a) Built on the tried and true Shadowbase asynchronous technology platform

   b) Supports ***zero data loss for active/passive system architectures only (uni-directional)***

   c) SZT and active/active system architectures are *not* supported (yet)

   d) Available now (but check system pre-requisites, e.g., TMF versions, closely)

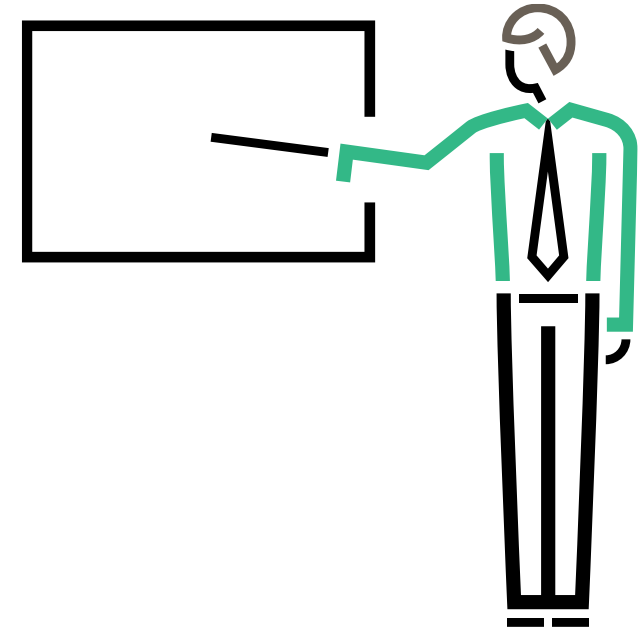# Shadowbase Sync Replication – Feature Rollout (2)

Incremental Feature Rollout

- Synchronous replication benefits will be rolled out *over time*
- Not all benefits will be available on first release

Feature Rollout Sequence:

2. Second release is called **Shadowbase ZDL R2** (aka **Shadowbase ZDL R2)**

   a) Adds **zero data loss for SZT and active/active system architectures (bi-directional)**

   b) BUT, data collisions will still be possible in active/active environments

   c) Existing Shadowbase data collision identification and resolution (or data collision avoidance via partitioning) solutions can be used

   d) Beta version under development

Shadowbase Sync Replication – Feature Rollout (3)

Incremental Feature Rollout

- Synchronous replication benefits will be rolled out *over time*
- Not all benefits will be available on first release

Feature Rollout Sequence:

3. Third release is called **Shadowbase ZDL+**

    a) This release will continue to provide zero data loss protection as well as adding ***data collision elimination for active/active "route-anywhere" system architectures***

    b) Data collisions become transaction deadlocks, which are much less serious and more easily handled programmatically, for example aborting and then resubmitting the original request

    c) Project will follow ***Shadowbase ZDL R2*** release

Shadowbase Sync Replication – Feature Rollout (4)

	Shadowbase ZDL R1	Shadowbase ZDL R2	Shadowbase ZDL+
Zero data loss?	A/P: Yes SZT: Not Supported A/A: Not Supported	A/P: Yes SZT: Yes A/A: Yes	A/P: Yes SZT: Yes A/A: Yes

Shadowbase Sync Replication – Feature Rollout (5)

	Shadowbase ZDL R1	Shadowbase ZDL R2	Shadowbase ZDL+
Zero data loss?	A/P: Yes SZT: Not Supported A/A: Not Supported	A/P: Yes SZT: Yes A/A: Yes	A/P: Yes SZT: Yes A/A: Yes
Data Collisions possible in Active/Active environment?	N/A	Yes	No

Released!   *In Process*   *Future*

Match your application's needs to the features provided for release planning

HPE Shadowbase
New & Future Features

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New features in HPE Shadowbase

Please periodically upgrade to stay current!

- Support for all L-Series NonStop X platforms (including vNS)

- Premier introduction of HPE SB Zero Data Loss (ZDL) synchronous replication (for uni-dir NonStop environments)

- Expanded replication capabilities for *DB2 as a source* (log-based, uni-dir, and reciprocal)

- Performance improvements for SQL/MX and non-NonStop target databases

- Support for BASE24™ Classic *Full Refresh for CAF or PBF* using AutoTMF

- New features to support container, tenant, and multiplexed redo logs (i.e., for Oracle database as a source)

- *Reverse replication cut-off* feature prevents configuration mishaps after transitioning from RDF to HPE SB (e.g., when changing from uni-dir to bi-dir SZT architectures)

- New *repair* function in the Compare product for SQL/MP and SQL/MX

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This is a rolling (up to three years) Statement of Direction and is subject to change without notice.

HPE Shadowbase Futures

– HPE Shadowbase ZDL synchronous replication for bi-directional NonStop environments (SZT & A/A)

– Redesign off-platform encryption infrastructure to enhance data in motion and data at rest protection

– Active/active support for BASE24™ environments

– Redesign the mapping utility to facilitate data transformation for Enscribe, SQL/MP, or SQL/MX source to SQL targets

– Bi-directional DB2 replication (enhances current DB2 reciprocal replication)

– HPE Shadowbase support for SAP Hana as a target

   – Others…Sybase IQ, Teradata, Kafka, Hadoop, AWS/S3

This is a rolling (up to three years) Statement of Direction and is subject to change without notice.
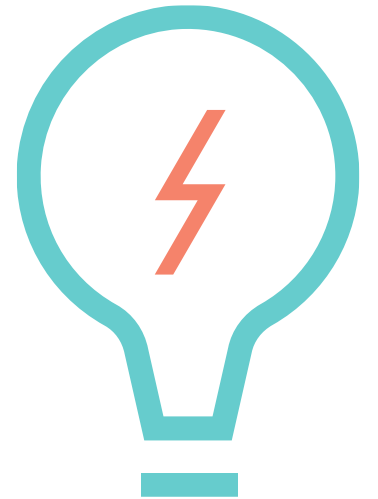
HPE Shadowbase
Summary & For More Information

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GRAVIC® Shadowbase

HPE Shadowbase at GTUG
Sessions of Interest

- **Tuesday, 15 May, 11:45-12:15, Potsdam Room**
  New HPE Shadowbase Success Stories
  (Business Continuity, Data Integration, Zero Downtime Migrations)
  Paul J. Holenstein, Exec. Vice President, Gravic, Inc.

- **Wednesday, 16 May, 10:30-11:00, Potsdam Room**
  Shadowbase Tricks: A 'Swiss Army Knife' Guide to Replication/Recovery
  Rick Stather, Sr. System Consultant/Team Lead, TCM Solutions Pty Ltd

- **Wednesday, 16 May, 14:30-15:00, Potsdam Room**
  New HPE Shadowbase Features that Solve Customers' Challenges
  (Zero Data Loss, DB2 as a source, transforming Enscribe data to industry standard DBs)
  Paul J. Holenstein, Exec. Vice President, Gravic, Inc.

IT-Symposium 2018
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Why Choose Shadowbase?

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

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

Global sales organization
- Global reseller presence from HPE Sales

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

Affordable, and committed to the HPE 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

Breaking the Availability Barrier Book Series

Volume 1

Survivable Systems for Enterprise Computing

Volume 2

Achieving Century Uptimes with Active/Active

Volume 3

Active/Active Systems in Practice

Also, Visit our Website for Case Studies, White Papers, Solution Briefs, and Articles:
https://shadowbasesoftware.com/publications/

Also, CONTACT US to receive our periodic *Shadowbase Newsletter*:
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For More Information – Marcom (1)

Preparing for Your HPE Shadowbase Experience

If you are interested in:	Please read these White Papers:
A General Overview About HPE Shadowbase	• HPE Shadowbase Total Replication Solutions for NonStop • HPE Shadowbase Total Replication Solutions for Other Servers • HPE Shadowbase Total Replication Solutions Product Datasheet
Building a Business Continuity Environment	• Choosing a Business Continuity Solution to Match Your Business Availability Requirements • Achieving Century Uptimes with HPE Shadowbase Active/Active Technology • Fingers Crossed? Or What is Your Business Continuity Plan for the Inevitable?
Performing a Zero Downtime Migration	• Using HPE Shadowbase Software to Eliminate Planned Downtime via Zero Downtime Migration • Switching Replication Engines with Zero Downtime and Less Risk
Implementing a Data Warehouse Feed	• HPE Shadowbase Streams for Data Integration
Building a Real-Time Business Intelligence System	• The Evolution of Real-Time Business Intelligence and How to Achieve It Using HPE Shadowbase Software • HPE Shadowbase Streams for Application Integration

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For More Information – Marcom (2)

Preparing for Your HPE Shadowbase Experience

If you are interested in:	Please read these White Papers:
Building a Converged Infrastructure	• HPE Shadowbase Solutions for the Converged Infrastructure • HPE Shadowbase Solutions and Pathway Domains—Perfect Together!
Shadowbase in a Big Data Environment	• HPE Shadowbase Solutions in a Big Data World
Shadowbase in the Cloud	• HPE Shadowbase Solutions for the Cloud
Recovering/Restoring Corrupted Data	• HPE Shadowbase Data Recovery Software
Shadowbase Articles, Case Studies, Solution Briefs, News, Upcoming Tradeshows, and White Papers	• Shadowbase Articles • Shadowbase Case Studies • Shadowbase Solution Briefs • Shadowbase News • Shadowbase Tradeshows • Shadowbase White Papers

Thank you

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