HPE Shadowbase Support for IBM DB2

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- From NonStop to DB2 on AIX, Linux, or Windows
- From NonStop to DB2 on IBM Mainframe

Current HPE Shadowbase DB2 Requirements

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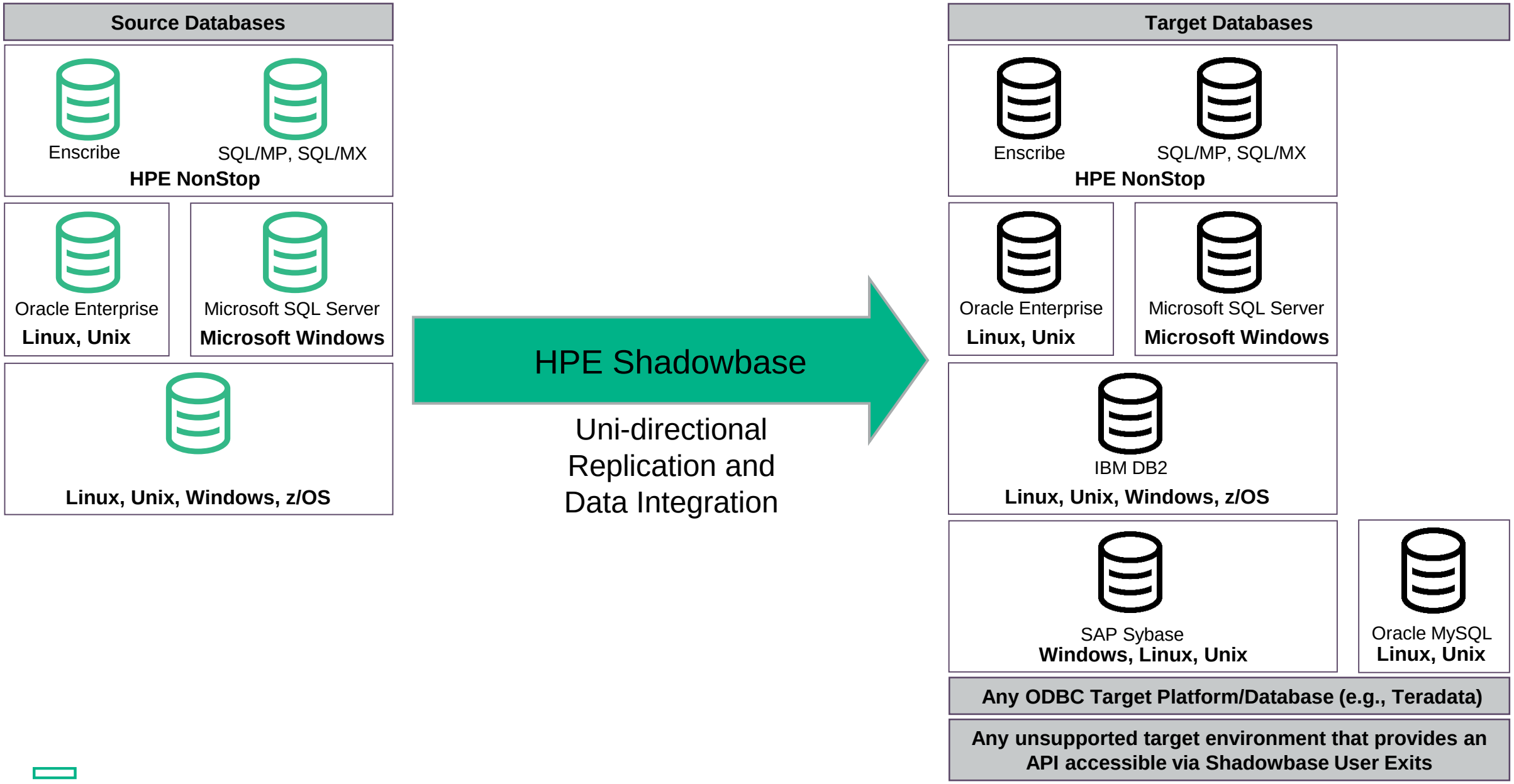
Further Information

Questions? Please ask as we go along…

HPE Shadowbase Supported Platforms

Homogeneous & Heterogeneous Uni-directional Data Replication



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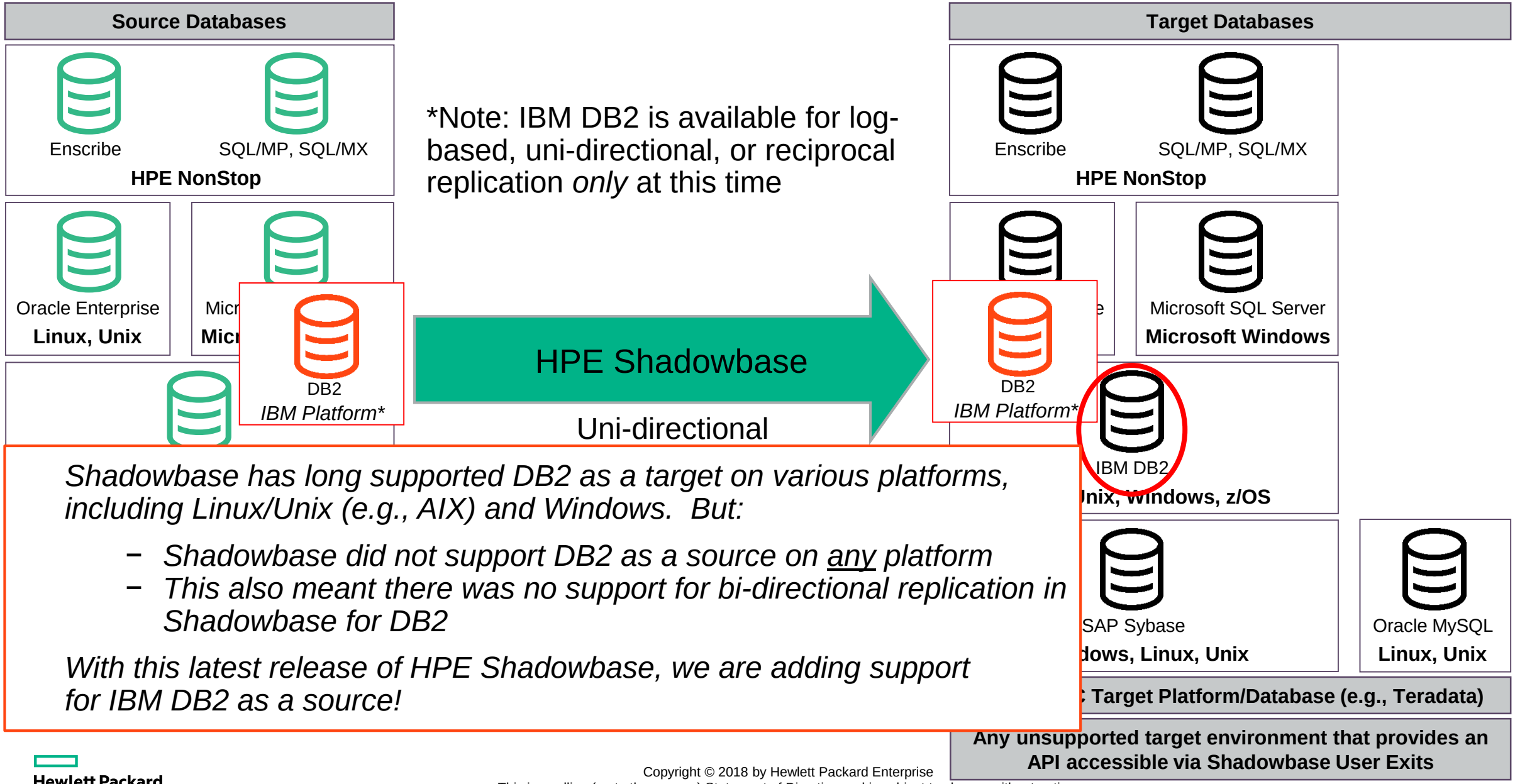
Homogeneous & Heterogeneous Uni-directional Data Replication



Shadowbase has long supported DB2 as a target on various platforms, including Linux/Unix (e.g., AIX) and Windows. But:

- *Shadowbase did not support DB2 as a source on <u>any</u> platform*
- *This also meant there was no support for bi-directional replication in Shadowbase for DB2*

With this latest release of HPE Shadowbase, we are adding support for IBM DB2 as a source!

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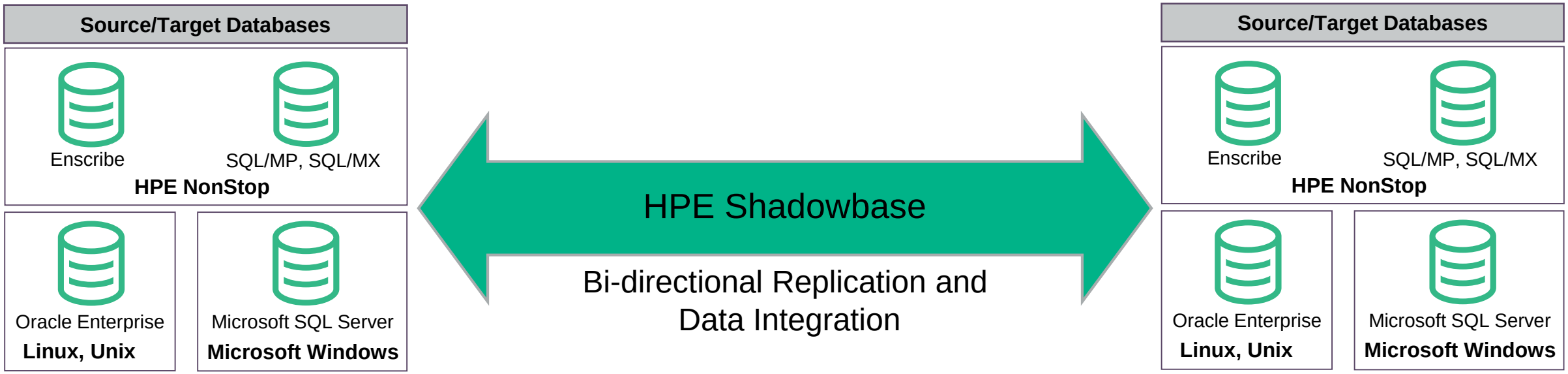
Homogeneous & Heterogeneous Bi-directional Data Replication



Enhancements to HPE Shadowbase for IBM DB2 Support

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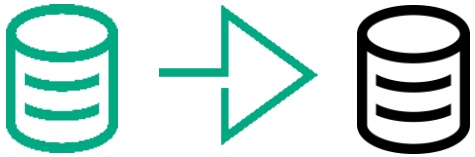
Enhancements to HPE Shadowbase for IBM DB2 Support

- Uni-directional DB2 source replication to any supported HPE Shadowbase target
- DB2 source database can be on any IBM source environment/platform
  - AIX, AS/400, Linux, Windows, z/OS, etc.
- Does not require the installation of any 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, AS/400, Linux, Windows, and z/OS, platforms



HPE Shadowbase IBM DB2 Sample Architectures

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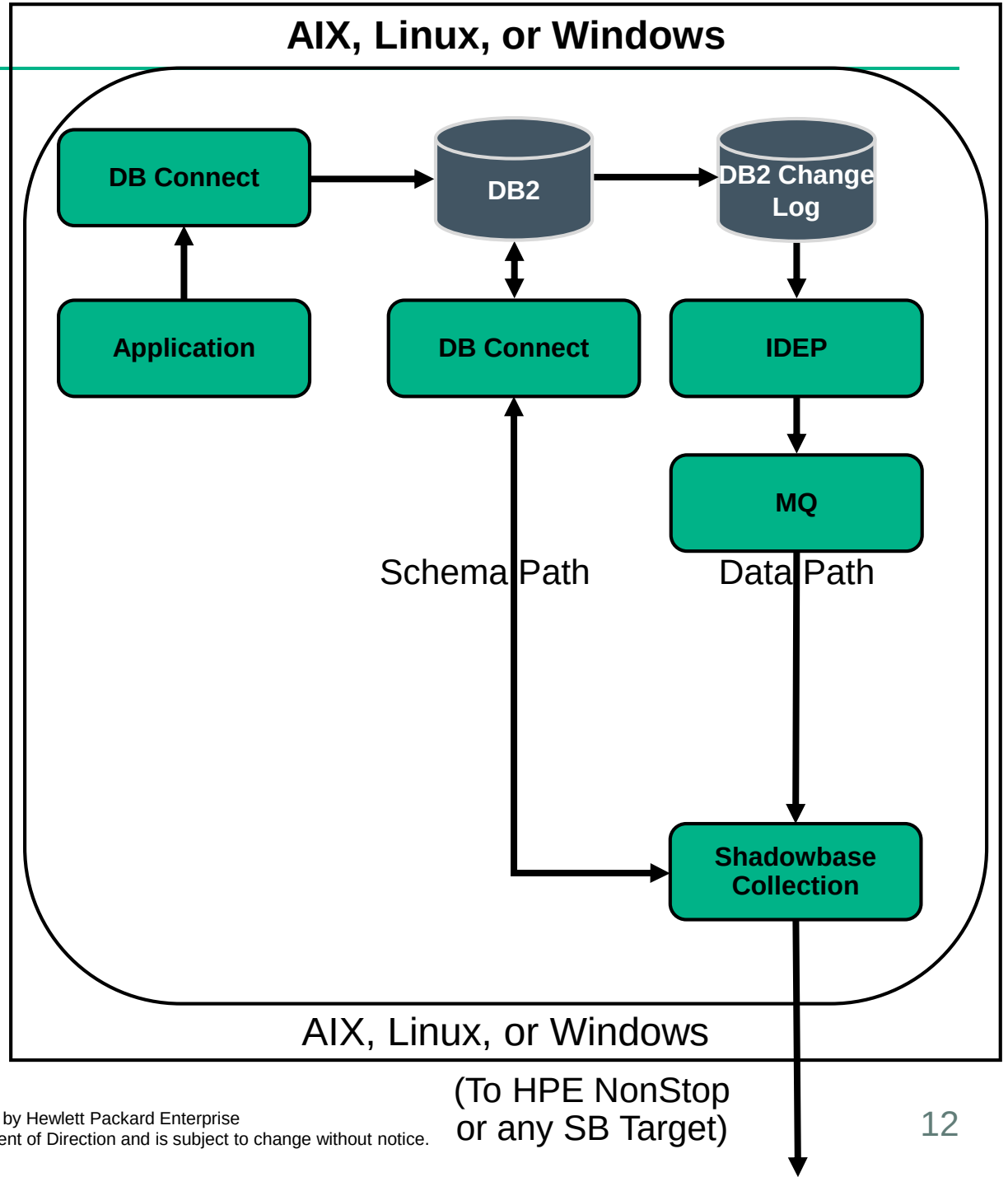
Enhanced IBM DB2 Support

From DB2 on AIX, Linux, or Windows to HPE NonStop (1)

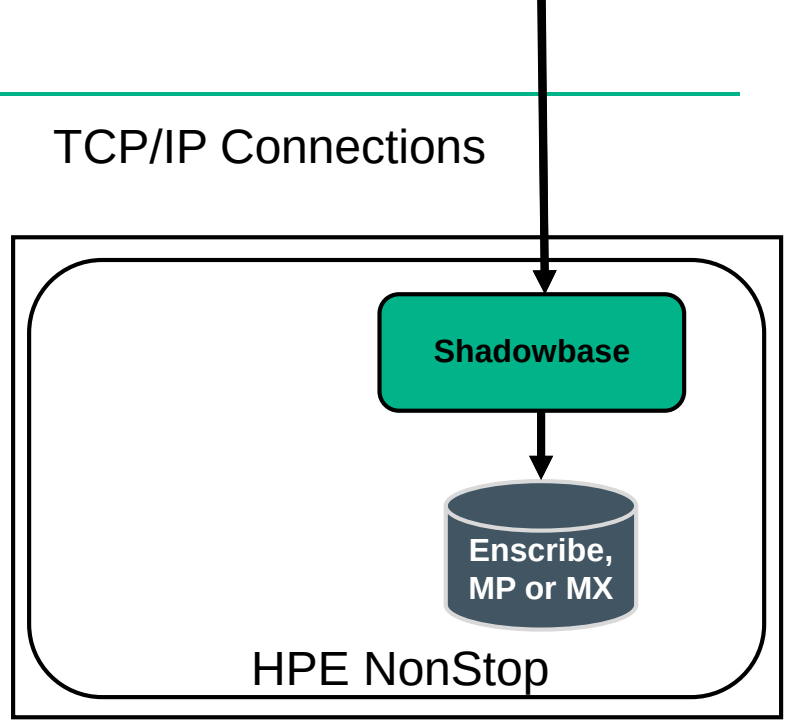
- This example shows HPE Shadowbase replication from an AIX DB2, Linux, or Windows source database into an HPE NonStop target environment
- The Application updates the *DB2* database
- Changes to the *DB2* database are recorded in the *DB2 Change Log*
- Then, IBM InfoSphere Data Event Publisher publishes the DB2 changes to an MQ queue
- MQ delivers the changes and Shadowbase Collection reads the changes from the MQ queue
  - Shadowbase uses DB Connect to retrieve table schema information for new tables it has not received/processed previously
- Shadowbase Collection then forwards the changes to any supported Shadowbase target environment (a NonStop in this example)



Enhanced IBM DB2 Support

From DB2 on AIX, Linux, or Windows to HPE NonStop (2)

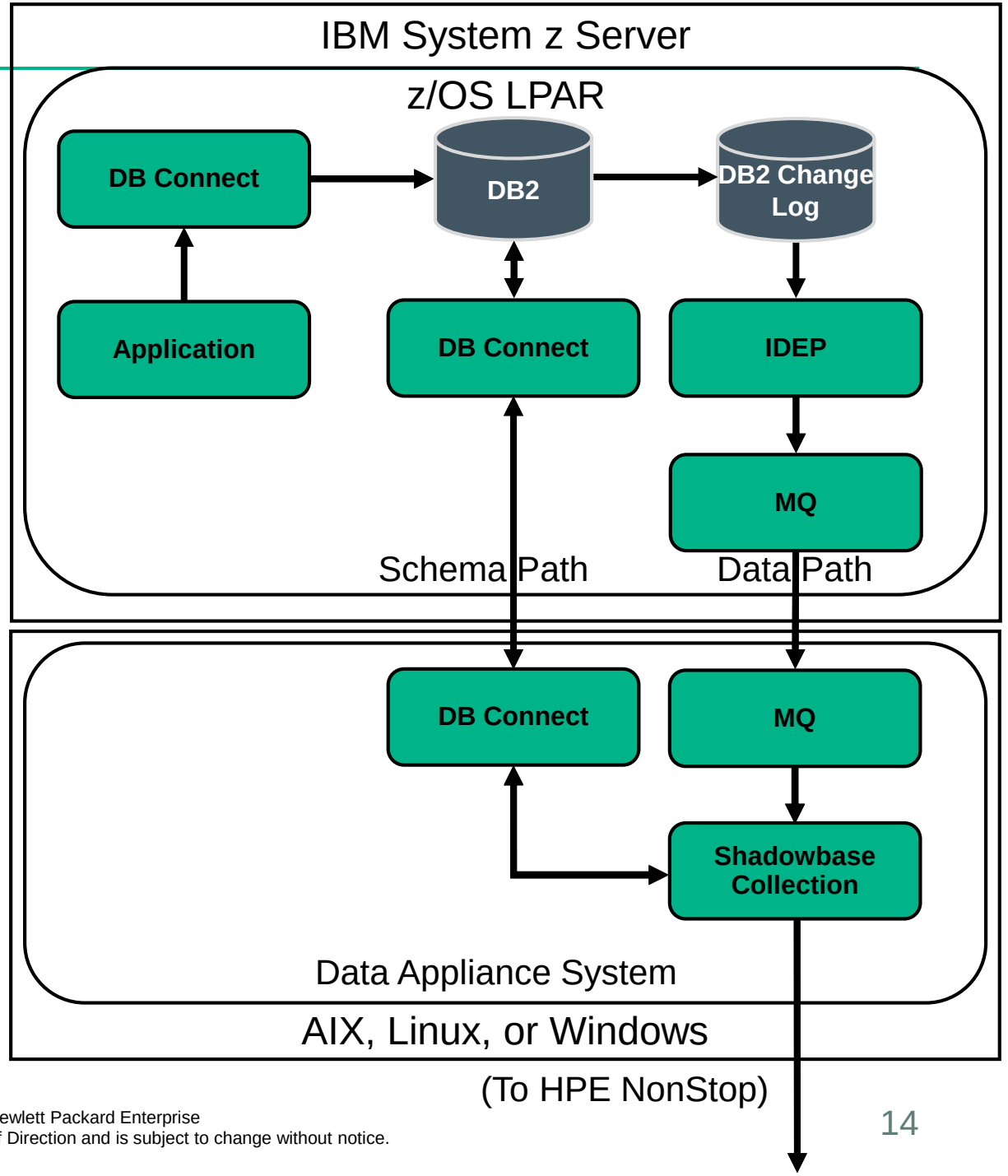
– Shadowbase on the NonStop receives the changes and applies them into the *NonStop database*



Enhanced IBM DB2 Support

From DB2 on z/OS to HPE NonStop (1)

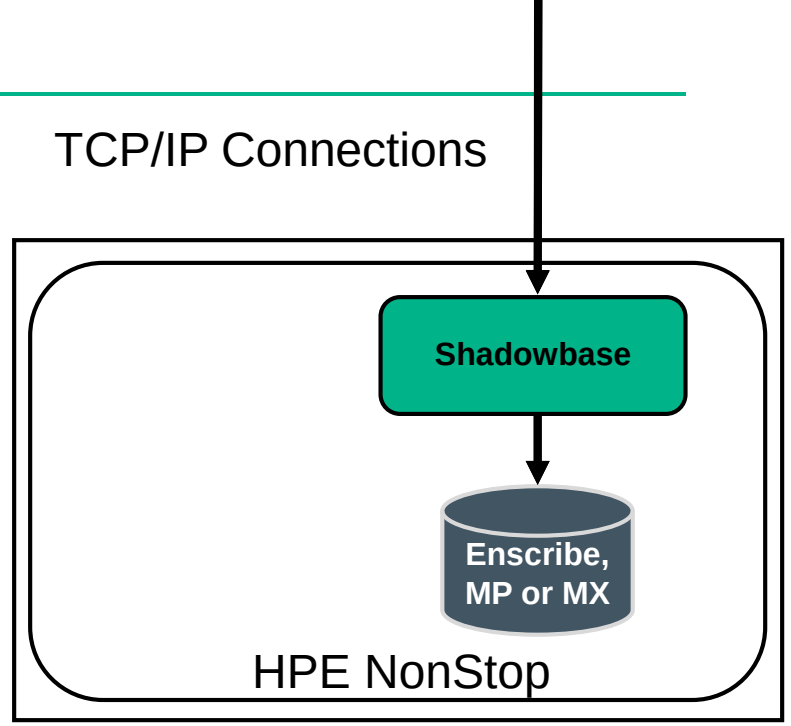
- This example shows HPE Shadowbase replication from an IBM z/OS mainframe DB2 source database into an HPE NonStop target environment
- When the *DB2* database is on a platform other than AIX, Linux, or Windows (e.g., z/OS), HPE Shadowbase runs on an intermediate *Data Appliance System* that has the 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



Enhanced IBM DB2 Support

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

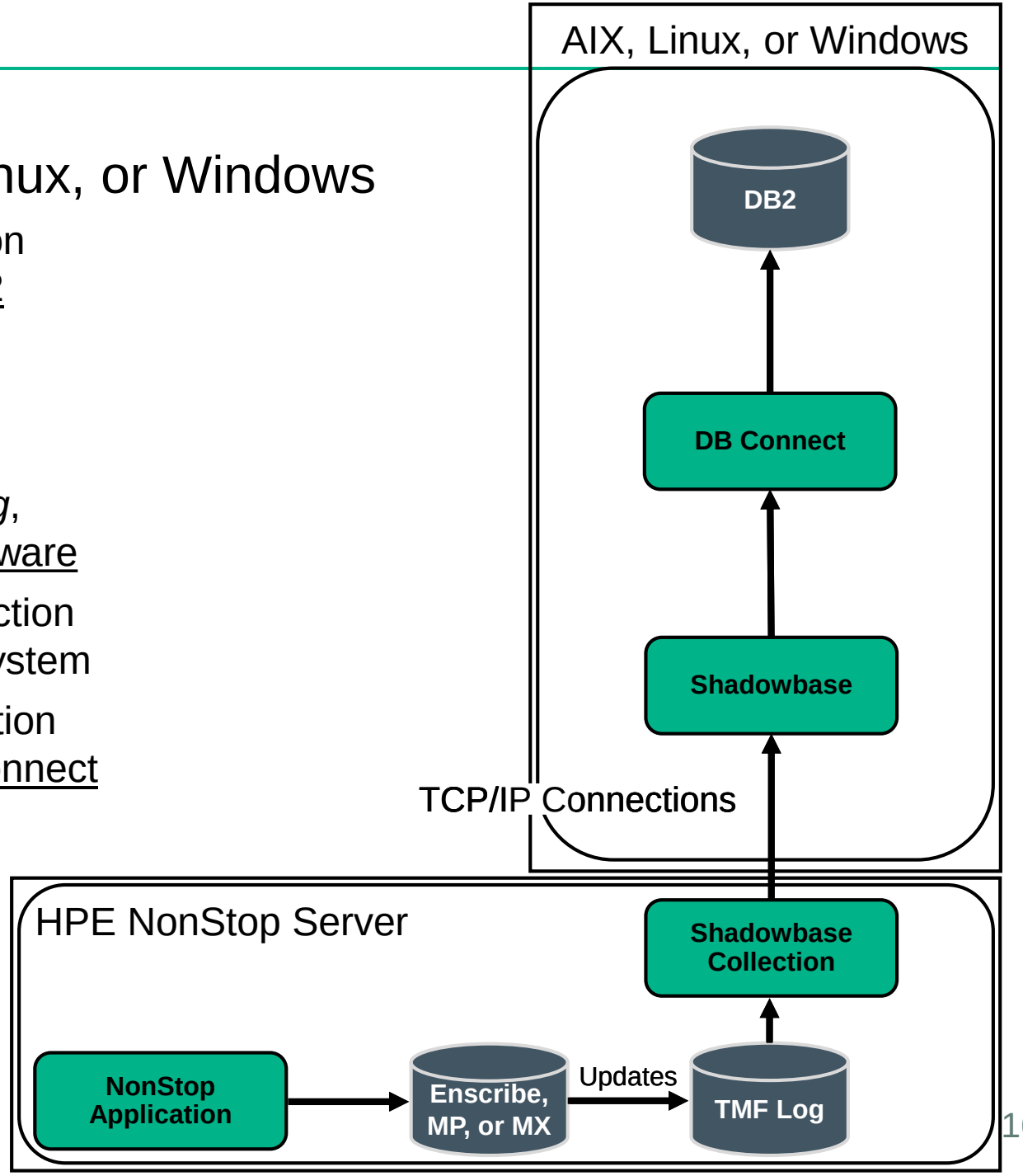
– Shadowbase on the NonStop receives the changes and applies them to the *NonStop database*



Enhanced IBM DB2 Support

From HPE NonStop to DB2 on AIX, Linux, or Windows

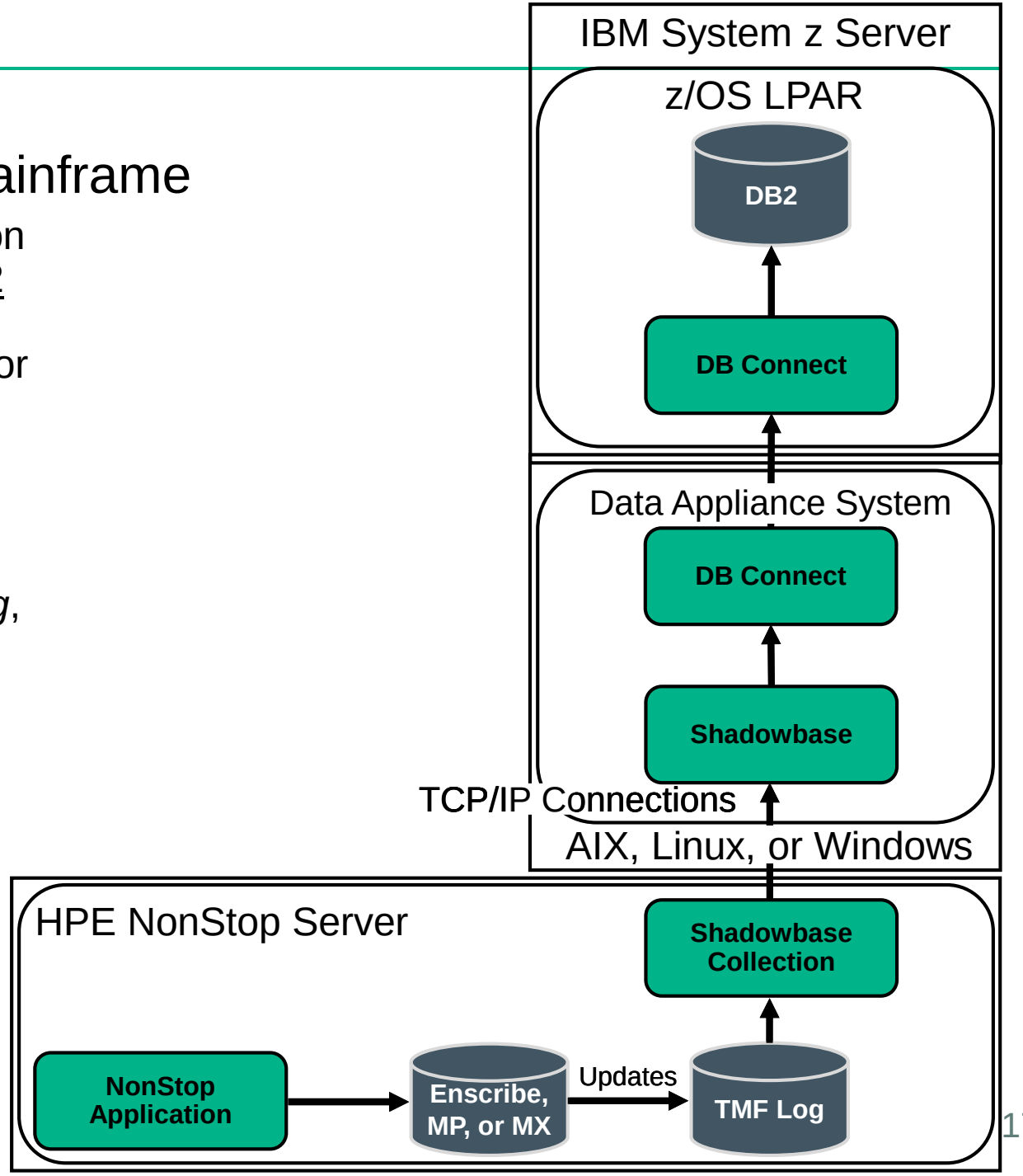
- This example shows HPE Shadowbase replication from an HPE NonStop source database to a DB2 target database on AIX, Linux, or Windows
- NonStop Application updates audited *Enscribe, SQL/MP, or SQL/MX* source tables
- These changes are recorded in the *TMF audit log*, which is read by the Shadowbase Collection software
- The changes are then sent over a TCP/IP connection to Shadowbase on the AIX, Linux, or Windows system
- Shadowbase applies the changes, using transaction semantics, into the *DB2 database* using a DB Connect connection



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
- 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 a Linux, Unix, 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



HPE Shadowbase Access into IBM DB2 – A Closer Look

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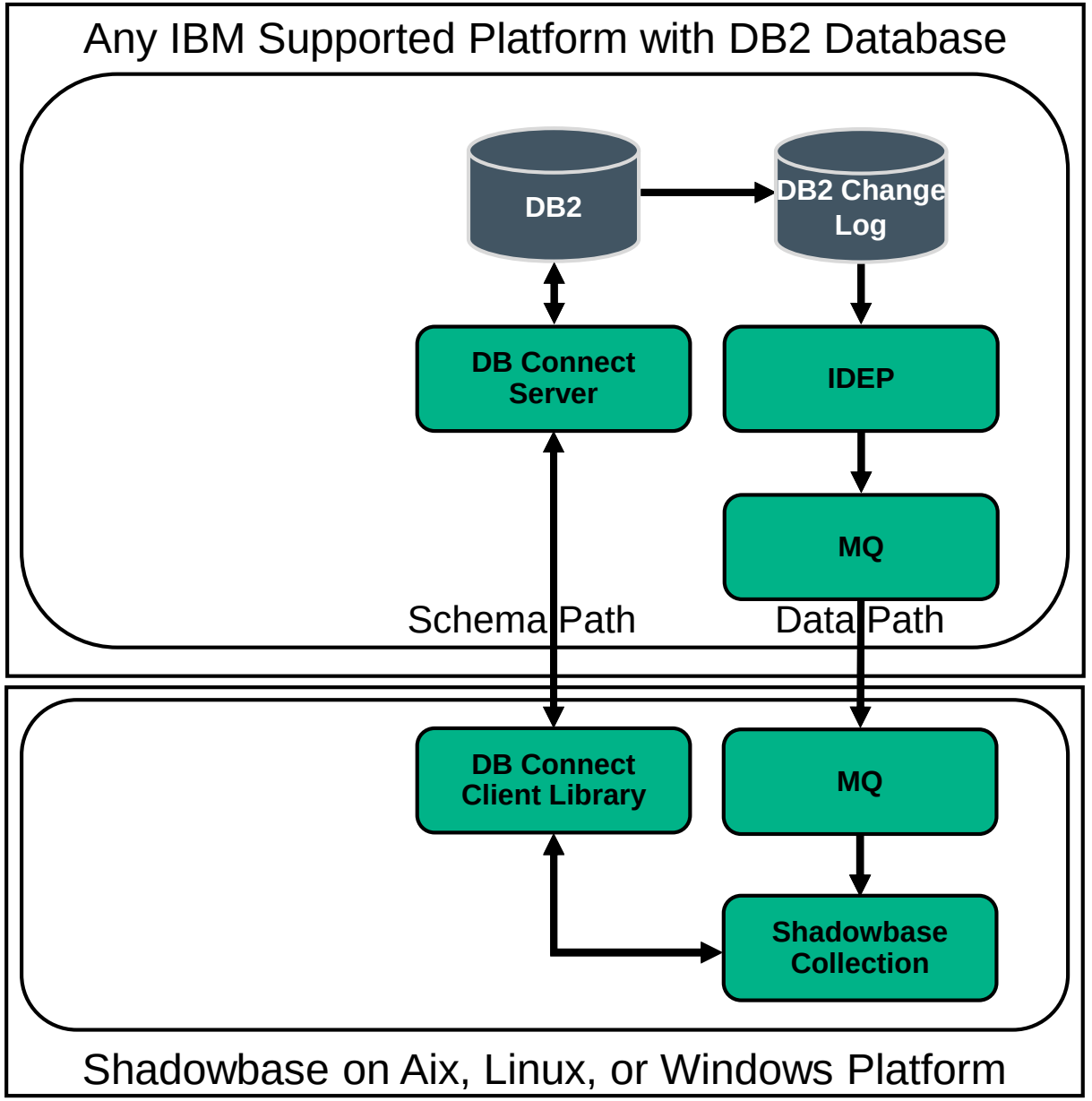
HPE Shadowbase Access into IBM DB2 – A Closer Look (1)

As a Replication Source

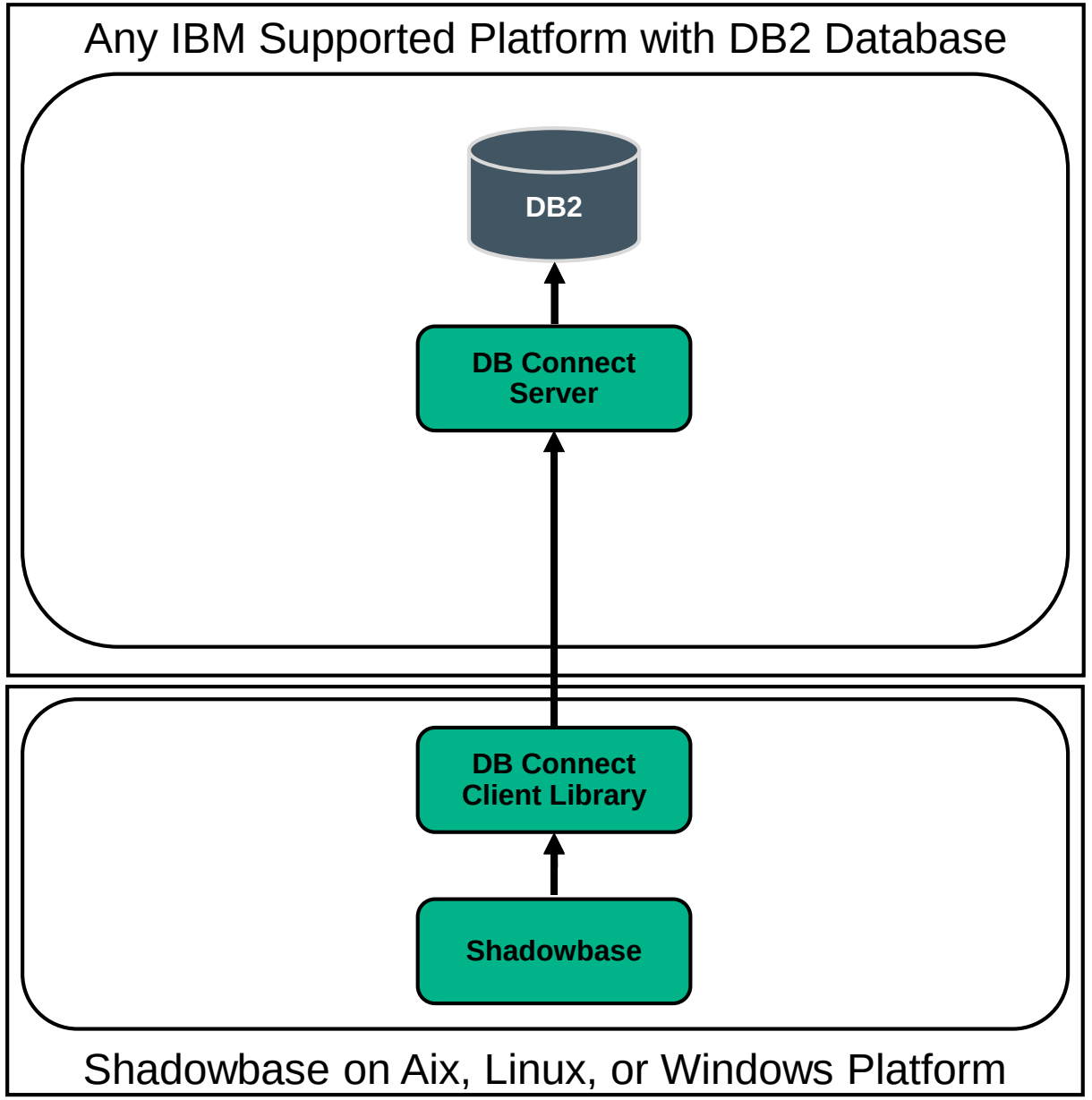
- The DB2 database (along with IDEP and MQ) can reside on any platform that IBM supports
- IDEP extracts the DB2 database changes, and uses MQ to deliver the changes to Shadowbase
- Shadowbase uses the DB Connect Client Library to read the DB2 catalog to retrieve the table schema information for the 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



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

As a Replication Target

- The DB2 database can reside on any 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



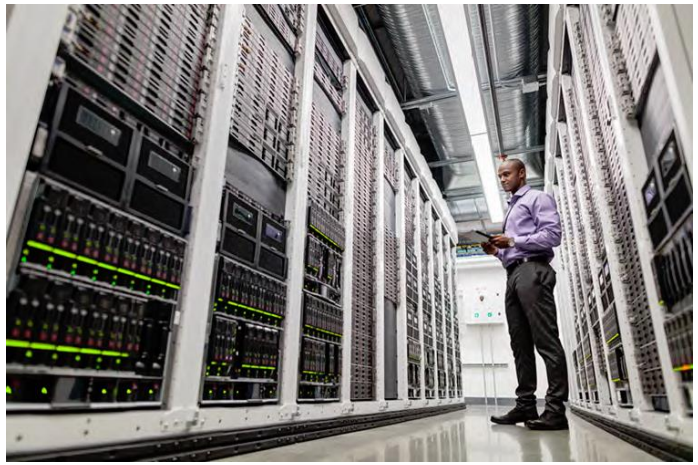
HPE Shadowbase Access into IBM DB2 – A Closer Look (3)
FAQs

- 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

Current HPE Shadowbase DB2 Requirements

Current HPE Shadowbase DB2 Requirements

- Support for uni-directional and reciprocal replication only (no bi-directional support yet)
  - However, different data files/tables can be replicated in each direction at the same time (i.e., a DB2 table can be either a source or a target but not both at the same time)
- Regardless of the DB2 platform, Shadowbase DB2 source support uses IBM InfoSphere Data Event Publisher (IDEP) to extract the DB2 database changes from the DB2 change log and MQ to deliver them to Shadowbase
- Shadowbase DB2 source support needs access to the DB2 catalog through a DB Connect connection to read the DB2 SQL schema information
- Shadowbase source and/or target support for AS/400, z/OS, and other DB2 databases requires use of an intermediate data appliance (can be AIX, Linux, or Windows)
  - For AIX, Linux, or Windows platforms with a DB2 database, Shadowbase can run directly on the platform – the intermediate data appliance is not required



HPE Shadowbase DB2 Pricing and PIDs

For HPE Shadowbase DB2 as a target on AIX, Linux, or Windows:

- Use the existing WSA* PIDs (see *HPE Shadowbase Ordering Guide*)

For HPE Shadowbase DB2 as a source on AIX, Linux, or Windows:

- Business Continuity: Use existing WSA49V6T1/T2 (uni-dir) PID
- Data or Application Integration: Use existing WSA51V6T1/T2 (uni-directional) PID

Note: Set the “T1” or “T2” suffix using the same rules as other “Other Server” platforms:

- Use T1 if the number of cores or the VM’s logical/virtual processor count is 1-8
- Use T2 if the number of cores or the VM’s logical/virtual processor count is > 8

For HPE Shadowbase DB2 as a source or target on any other platform requiring the Data Appliance approach:

- Use the same PIDs as described above for the AIX, Linux, or Windows data appliance system, setting the T1/T2 suffix based on the ‘size’ of the data appliance system

Possible Future HPE Shadowbase DB2 Enhancements

Possible Future HPE Shadowbase DB2 Enhancements/Products

- Support for bi-directional replication (same file/table on each side acting as a source and a target)
- For z/OS, remove the requirement for an intermediate data appliance
  - Port Shadowbase into z/LINUX running as a VM in the z/OS environment
  - Continue to use IBM InfoSphere Data Event Publisher and MQ for delivery into Shadowbase in the z/Linux VM
  - Use TCP/IP connections from the z/Linux VM to send the data off the mainframe to the target Shadowbase environment
- Ultimately, eliminate IBM InfoSphere Data Event Publisher and MQ and read the DB2 change log files (journal files) directly; Shadowbase will then deliver the changes to the target environment directly over TCP/IP connections

Note: These are all *possible* future enhancements to HPE Shadowbase. If these enhancements matter to your organization, please let us know. Future functionality is not guaranteed.

Note: Porting Shadowbase to run directly on the z/OS mainframe's z/Linux environment will be released as a new product and will require new HPE PIDs and HPE Shadowbase pricing

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Further Information

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

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
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