# HPE Shadowbase Online Loading and Verification (SOLV)

## Databases Need to be Loaded with Data in Order to be Useful

The HPE Shadowbase Online Loader (SOLV) and Shadowbase Extract, Transform and Load (ETL) Toolkit are specifically designed to perform this loading task.

## Load and Unload Databases Whether They are Online or Not

SOLV can perform loads/unloads while the source and/or target database(s) are open and being actively read and updated. It can also perform loads/unloads during normal day-to-day operations such as application updates and data replication. Loading offline databases is also supported.

SOLV works by consuming the source database changes and merging them with the data being loaded to keep the target fully synchronized with the source database change data (see Figure 1):

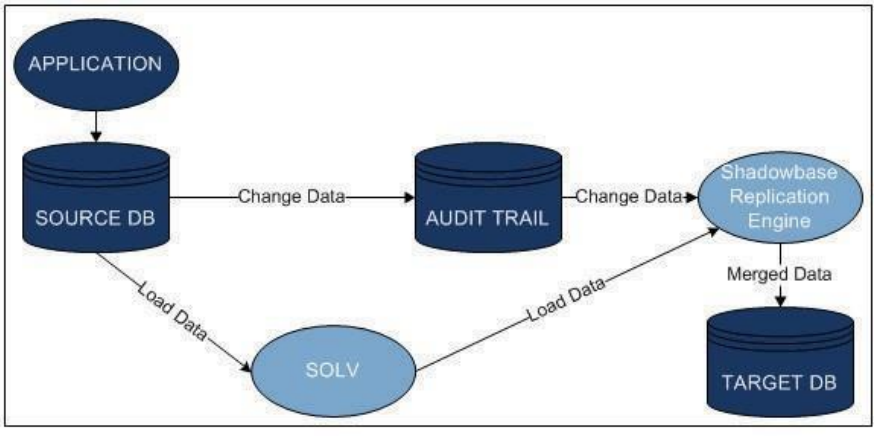


**Figure 1 – SOLV Online Loading Integrated with HPE Shadowbase Change Data Replication**

## Supported Database Formats

SOLV supports HPE NonStop audited and non-audited source files and tables (including HPE NonStop Enscribe, SQL/MP, and SQL/MX) and any HPE Shadowbase-supported target environment and database combination (e.g., HPE NonStop Enscribe or HPE NonStop SQL targets, or other server targets such as Oracle, SQL Server, Sybase, Db2®, SAP HANA, PostgreSQL, and MySQL. For an up-to-date and complete list, please see: Supported Databases and Platforms.)

## Key Features

- Perform non-disruptive initial bulk loads and periodic refreshes
  - Source and target databases can be opened for read/write activity during loads
- Extract, transform, filter, and cleanse data before loads
  - Use the same (or different) conversion routines as Shadowbase replication
- Synchronize both databases during and after loads
  - Coordinate loads with Shadowbase change data capture replication
- Leverage SOLV's efficiency
  - Perform loads without needing to drain a queue of events
  - SOLV automatically and dynamically adjusts load processing to minimize system resource utilization

## HPE Shadowbase Extract, Transform and Load (ETL) Toolkit


The HPE Shadowbase ETL Toolkit provides online and offline loading (or unloading) of a source database into a target environment. HPE Shadowbase Application Integration provides a suite of adapters to easily integrate the source data with the target environment. Available adapters include:

- Integrating with KAFKA
- Integrating with IBM MQ environments
- JSON output format
- Flat files (CSV, fixed position, tab-delimited)

The Toolkit is particularly useful for feeding large volumes of data into a data warehouse, and for feeding row-based data into columnar databases. The Toolkit can be used to load target databases not supported by Shadowbase replication out-of-the box. (Please reference Supported Databases and Platforms.) The Toolkit can extract select data from a source database, and then SOLV can transform/cleanse the data into the proper format and save it into a format compatible with the existing vendor's ETL utility. This capability enables loading target databases out-of-the-box that are not supported by Shadowbase replication.

The Toolkit can also be combined with SOLV's loading capabilities to read and inject events from flat files into the Shadowbase replication engine for real-time processing. This capability is useful, for example, when replicating data from change logs. Certain applications can use an existing vendor's ETL utility to load a data warehouse. The Toolkit allows a Shadowbase user to perform these tasks. It can even periodically extract source change data from an audit trail (or change log) and process the data into flat files to incrementally load a target environment via micro-batch updates, which synchronizes both source and target databases.

## Key Features

- Perform non-disruptive initial bulk loads and periodic refreshes
  - Source and target databases can be open for read-write activity during loads
- Trickle-feed change data as replicated events
- Extract, transform, filter, and cleanse data before loads
- Prepare the data into flat files for loads by reading and generating data from various formats
  - Supported formats include CSV, fixed position, and variable length
- Leverage the SOLV features for ETL processing
- Use the available adapters to send data to Kafka, IBM MQ, and other target environments

## Summary

Databases need to be loaded with data in order to be useful. SOLV provides loading and unloading for databases whether they are online or not. The ETL toolkit extracts database changes or initial load data into flat files for subsequent loading into a target environment. Both solutions can be combined to create sophisticated architectures that extract select data from a source database, and then transform/cleanse the data into the proper format for loading into the target database. Additionally, data can be extracted and loaded into the Shadowbase replication engine for real-time data replication into a database format that is not supported out-of-the box.

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