StruxureWare Power Monitoring 7.0.1

Database Upgrade FAQ

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Document Overview

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Document Purpose	Upgrading ION-Enterprise to StruxureWare Power Monitoring 7.0.1 requires the ION databases to be upgraded. For the ION_Data database, this is a long-running operation. The new databases also require additional hard drive space. This document provides more information regarding: • time required to complete an upgrade • storage requirements • developer/system integrator questions
Note(s)	Estimated upgrade times will not apply when upgrading from StruxureWare Power Monitoring 7.0.

Recommendations

* **Ensure you have enough hard drive space available on your database server**
* **Have an external hard drive available for storing database upgrade backup files**
* **Plan an ION-Enterprise system downtime window**
* **Consider archiving data (with Trim) to reduce system downtime**

General

Does the software upgrade process perform a database backup?

Yes. You do not have to perform database backups manually.

When will the database be upgraded?

The database is upgraded before installation of the software.

What if the database upgrade fails?

The installation process has been improved to perform the database upgrade before installing the updated software. The installer performs a database backup before installation.

This backup can be restored and ION-Enterprise 6.0 SP1 software can be reactivated in case of an upgrade error while the root cause of the upgrade problem is analyzed.

In the past, if the database upgrade failed, ION-Enterprise 6.0 SP1 could not be reactivated and the customer would experience an extended downtime period.

Will All Historical Data Be Migrated?

Yes. All historical data within the `ION_Data` database will be moved. Data within archives will not be moved.

Can Archives Be Upgraded?

StruxureWare Power Monitoring 7.0.1, like previous versions, enables upgrading of archives via Database Manager Utility.

Can Archives Be Merged?

There is no utility to 'merge' archives back into `ION_Data`.

How Much System Downtime Can I Expect?

Note: this section does not apply when upgrading from version 7.0.

Large databases will take a significant amount of time to upgrade. Two factors determine upgrade duration:

- Database Size
- I/O sub-system

Enterprise class server machines with SAS drives, SAN, or performance-oriented RAID configuration will significantly reduce database upgrade duration. Approximate downtime based on internal tests:

Database Size	Enterprise Class Server	Desktop/Workstation
15GB	1 hr	3 hr
50GB	6 hr	18 hr
150GB	1 day	3 days
250GB	2 days	

How can I reduce the required downtime?

If you have an extremely large database or need to avoid an extended downtime, consider archiving data that you do not need anymore.

The database upgrade duration is dominated by the migration of logged data to the new `DataLog2` table. The more data that is removed from `ION_Data`, the shorter the database upgrade duration will be.

Can data loss occur?

Yes - for systems that utilize the 'PC based logging' feature, data loss can occur. System services are offline until the software upgrade has completed. Devices with on-board logging capabilities will be submit data after the upgrade has completed.

Storage

How Much Additional Hard Drive Space Is Required?

3x size of database required. Detailed example: 150GB `ION_Data` database.

Original Database Size	150GB
Database Growth (@ ~80%)	125GB
Tempdb Growth	50GB
Database Backup	130GB
Hard drive space required for upgrade	400GB~
Hard drive space permanently required	275GB

Note: the tempdb space is required during the upgrade process and will be returned to the operating system automatically by SQL Server after the upgrade has completed.

Where Is The Database Backup Saved?

By default, the installer will save the database backup to this location:

```
[Install Location]\DB\DBBackups
```

I have limited hard drive space – can I move the backup to a custom location?

Yes. We recommend utilizing an external hard drive for the backup location to save hard drive space on your server.

Will The Database Permanently Grow After Upgrading?

Yes - plan for a 2x increase in the size of the `ION_Data` database after upgrading to ION-Enterprise 7.0.1. The database will also grow temporarily during the upgrade; this space will be returned after successful upgrade.

Why Is Additional Hard Drive Space Required?

To improve performance, the new DataLog2 table has two indexes:

- Clustered index favors reporting queries, `SELECT` operations that provide source, quantity and time range information
- Non-clustered index that favors queries by `DataLogStampID`.

How Do I Run a Disk Usage Report?

Running a Disk Usage Report before the database upgrade can help when troubleshooting upgrade issues. From SQL Server Management Studio:

- Right-click the `ION_Data` database (do not choose an archive)
- Choose 'Reports'
- Choose 'Disk Usage Report'
- Once generated, print to xps or pdf document

Schema Changes

ION-Enterprise 7.0.1 significantly alters the `ION_Data` database schema from versions prior to 7.0.

Justification

- **Logged Source/Measurement Pairs**: with the previous schema, the question 'what quantities has this device logged' was expensive to answer due to the `DataLog` and `DataLogStamp` join. The view, `vSourceQuantityName` has been added.
- **Performance**: combining the `DataLogStamp` and `DataLog` tables into a single table will simplify the database schema and increase reporting query performance.
- **DATETIME2**: working with timestamps in ION-Enterprise is easier. SQL Server 2008 introduced a new high-precision data type, `DATETIME2`. This allows a single timestamp column to represent precise 100ms data. `DATETIME2` is accurate to 7 decimal places for fractional seconds.

Table Changes

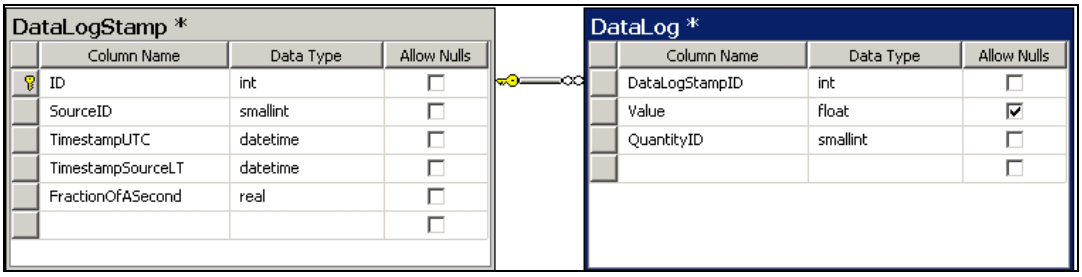
Major changes to the `ION_Data` database include:

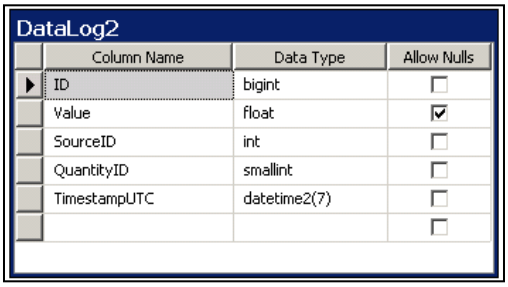
1. `DataLog` & `DataLogStamp` tables combined to `DataLog2` (see below)
2. `EventLog` to `EventLog2`: `TimestampUTC` column now of type `DATETIME2`
3. `WaveformLog` to `WaveformLog2`: samples column now of type `VARBINARY(MAX)` rather than `IMAGE`. The `IMAGE` datatype was deprecated.

DataLog2

`DataLog` & `DataLogStamp` tables have been combined.

- `ID`: `BIGINT` data type. Previous `DataLogStampID` values will be retained. New values will be unique.
- `TimestampSourceLT`: removed. This column contained the local time, but was not used in the system and just took up space.
- `FractionOfASecond` and `TimestampUTC`: merged





Duplicate Data

In rare cases, it was possible for the `DataLog` table to contain duplicate values or a value and a null reported for the same interval.

In StruxureWare Power Monitoring 7.0/7.0.1, a unique constraint has been added to the new `DataLog2` table on the following columns: `TimestampUTC`, `SourceId` and `QuantityID`

Other Schema Changes

- `RecorderState`: updated to use `DataLog2`
- `Source`: database are updated to use INT as the `SourceID` datatype. Previously, the `SMALLINT` datatype was utilized.
- `SourceQuantity`: table added.

Developer FAQ

I have written custom T-SQL code, am I impacted?

Probably - the log tables: `DataLog`, `WaveformLog`, `EventLog` have all been modified in ION-Enterprise 7.0.1.

I have custom code that relies on removed tables, what should I do?

It is strongly recommended that you upgrade the affected custom software so that it uses the new 7.0.1 database schema. Modify relevant code to use the new 7.0.1 schema.

If updating the custom code is not possible at this time, a temporary solution is available: four 'compatibility views' that emulate the old database schema.

The compatibility views should allow you to continue to use your custom software with ION-Enterprise while you update your code. Using the compatibility views for `SELECT` operations will be slower than using the updated 7.0.1 schema.

The compatibility views are:

- `vOldSchemaDatalog`
- `vOldSchemaDatalogStamp`
- `vOldSchemaEventLog`
- `vOldSchemaWaveformLog`

Does a data log view exist?

A view on the `DataLog2` table does not exist in StruxureWare Power Monitoring 7.0.1. It will be added in a future release.

How do I rename one of the compatibility views?

Renaming one, or all, of the compatibility views will allow you to continue to use your custom software with ION-Enterprise while you update your code.

- `EXEC sp_rename 'dbo.vOldSchemaDatalog', 'DataLog';`

Warning: relying on the compatibility views is not a long term fix! Update your custom code when possible.

Has any data been lost or removed?

The `TimestampSourceLT` column has been removed from the DataLog2 table. This column hadn't been used for several versions of the software. All local time calculations are based on `TimestampUTC` and the time zone of the device.

Will an upgrade to 7.0.1 break my reports?

No. If the reports were built using the 6.0 DAL/Reporting Framework then your reports should not be broken due to the database upgrade procedure.

However, SQL Server 2008 R2 made several changes to Reporting Services rendering. Pre-existing reports may be susceptible to this family of rendering issues if SQL Server Reporting Services was also upgraded.