



Description: TrendWorX32 Data Logging Performance white paper to aid in building efficient applications.

OS Requirement: The operating system required is Win XP/2000/NT/95/98/Me.

General Requirement:

TrendWorX32 Logging performance is based on many different factors. This applications note is meant to serve only as a *suggestion* for trend logging configurations. Please also read the “Performance Optimization and Evaluation” chapter of the TrendWorX32 help file (located under the “TrendWorX32 SQL Data Logger” chapter) before setting up your TrendWorX32 data logging application.

How to read this chart:

- All recommendations here are based on a **P4, 1.8GHz** system, with **256MB** of RAM if you are using MS Access or MSDE, or **512MB** of RAM if you are using any other type of database.
- The database types are across the top. First decide which database you will be using.
- Next decide how many tags you will be data logging.
- Now find the corresponding spot in the matrix. The first number is your recommended data collection rate, and the second number is your recommended logging rate. Note that these are the fastest recommended times, you may choose to log at a slower rate if that fits your application needs better.
- If your application falls into a “Contact Tech Support” square in the matrix, that does not mean we cannot accommodate your needs; it means you may have to make some special adjustments or log at a slower rate, but talk to Tech Support to figure out how to make it work for you.

Factors to consider:

- When setting up your logging application, **disk storage** is a major factor. If you will only be keeping the data around for a short time, you can afford to log at a much faster rate. But for long-term data storage, logging at a slower rate may be necessary in order to avoid running out of disk space. See the following page for a data storage requirement formula.
- On average, we have found that for every 100 tags logged per second, you will accumulate about 300MB of data per day.
- **Dead-band** and **data-logging filters** can drastically improve performance, and save disk space usage as well. Dead-band settings cause the application to log only if the data has changed by more than a specified interval since the last log. Data-logging filters allow you to perform calculations on the data (min, max, average, standard deviation, etc.) and only log the calculated value.
- Values in the **SQL** column below are based on **SQL 2000**. **SQL 7.0** has less performance than **SQL 2000**.
- **Personal SQL** is only intended for use on Windows 2000 workstations and XP Professional. For small applications, its performance is just as good as standard SQL. As application size increases, performance decreases on Personal SQL.
- **SQL** (Enterprise or Standard Edition) requires Windows 2000 Server, however it can scale much better than Personal SQL.



Recommended Data Collection and Logging Times

# of Tags	MS Access	SQL	MSDE	Personal SQL	Oracle
< 500	10 sec / 1 min *	1 sec / 1 min	10 sec / 1 min *	1 sec / 1 min	1 min / 5 min
500 – 1000	1 min / 5 min *	10 sec / 1 min	30 sec / 2 min *	10 sec / 1 min	5 min / 15 min
1000 – 1500	10 min / 15 min *	1 min / 5 min	1 min / 5 min *	1 min / 5 min	10 min / 30 min
1500 – 2000	15 min / 15 min *	2 min / 10 min	2 min / 10 min *	2 min / 10 min	15 min / 30 min
> 2000	Contact Tech Support	5 min / 15 min	5 min / 15 min *	5 min / 15 min	Contact Tech Support

Keep in mind that MS Access and MSDE have limited storage capabilities

Data Storage Requirements:

Data storage requirements refer to the size of the target database once data collection and data storage begin. Again, the differences between Microsoft Access and Microsoft SQL Server arise from the fact that Microsoft Access is a file-based database engine, while Microsoft SQL Server is a server-based database. As a result, Microsoft Access databases are limited by the capacity of the hard disk on which they reside, while Microsoft SQL Server databases can expand across multiple hardware devices. In addition, Microsoft SQL Server can be configured to increase the database size automatically, if needed, while data logging is activated. The size of MSDE databases is limited to 2 GB, and the size of Microsoft Access databases is limited to 1 GB. To compute an estimate of required database size, on a per-group basis, use the following equation:

Total Number of Records = (Number of Tags x Logging Interval) / (36 x Data-Collection Rate)

Required Size = (Total Number of Records) x (1024 Bytes/Record) x (1.25)

Example:

For example, assume you want to data log 100 tags with a data-collection rate of 1 second and a logging interval of 24 hours (converted to seconds). This will require the following:

Total Number of Records = (100) x (24 hours x 60 min/hr x 60 sec/min) / (36 x 1 sec) = 240,000 Records

Required size = (240,000) x 1,024 x 1.25 = 295 MB per day

Note: When you are logging data to an Oracle database, you can expect a 20 percent increase in database size because of the data types supported by Oracle. When logging to Microsoft SQL 2000 or MSDE 2000 databases, you can expect a 20 percent increase in database size.

Note, however, that the above example is a worst-case scenario that assumes all tags are updated every second from the OPC server. In reality, OPC servers are event-based, so they will update only when the value of the tag changes. The TrendWorX32 SQL Data Logger also supports various data-logging filters, on a per-tag basis, as well as dead-band. These can be used to reduce the database-storage requirements effectively. When the targeted size of the database is more than 1 GB, it is recommended that you use Microsoft SQL Server or MSDE (for up to 2 GB) instead Microsoft Access.

To help you in maintaining the target database size and avoiding situations in which the database size grows uncontrolled, the TrendWorX32 SQL Data Logger supports a cyclic database table structure, which if configured will always maintain the configured number of tables into the database by overwriting existing data as it rolls over each table. Refer to the TrendWorX32 Configurator documentation for more information.

In addition, keep in mind that ordinary database maintenance tasks, such as defragmentation, compaction, and table index updates, may require additional space on the target device(s), which can vary depending on the database tasks under operation. It is recommended that you allow for additional device space in these cases.