

12 Ways SaaS Can Improve Your Environmental Data



Table of Contents

Software as a Service (SaaS) databases offer several unique features that allow you to manage your environmental data more thoroughly and efficiently. This guide highlights twelve key features of SaaS databases for environmental software.

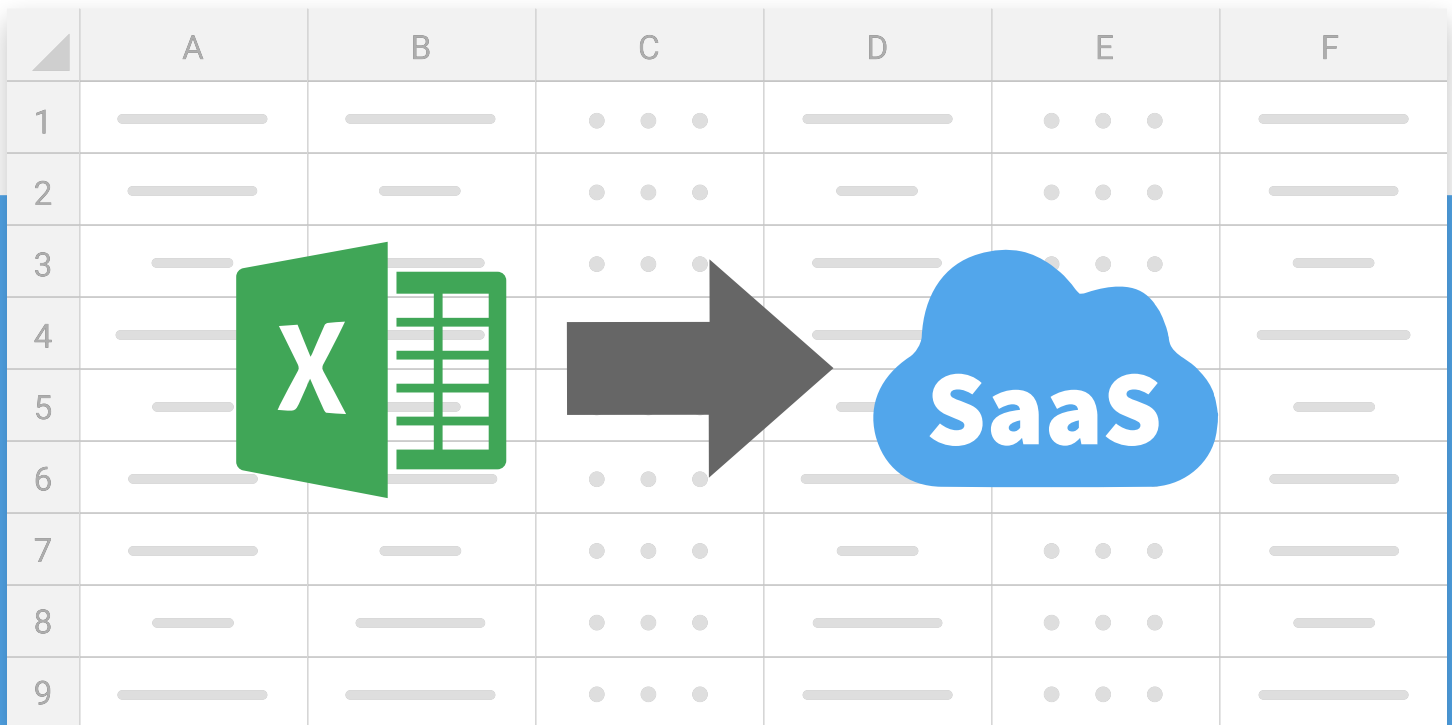
- 00: Introductionpg 3
- 01: Data Entrypg 5
- 02: Data Qualitypg 7
- 03: Data Redundancypg 9
- 04: Entity Relationshipspg 12
- 05: Data Reporting & Integrationpg 13
- 06: Simultaneous Usagepg 14
- 07: Processing Speed & Scalabilitypg 15
- 08: Workflowspg 16
- 09: Securitypg 17
- 10: Prevent Data Loss & Corruptionpg 18
- 11: Data Stewardshippg 19
- 12: Quality Assurancepg 20



The advantages of databases over spreadsheets for managing complex data

Do you currently use a system of Excel spreadsheets to store your environmental data? If so, ask yourself the following questions. If you answer “yes” to any of these questions, you might be outgrowing your homegrown system of Excel spreadsheets. It may be time to consider a more mature tool to manage and store your environmental data.

- ◇ Do you find yourself having to make the same changes in multiple spreadsheets?
- ◇ Is your spreadsheet growing unwieldy and difficult to manage?
- ◇ Are you spending too much time scrolling your spreadsheet for specific information?
- ◇ Do you have to jump through hoops to view specific subsets of data?
- ◇ Do multiple people sometimes need access to the data at the same time? Or, are your colleagues continually asking you to provide them with copies or subsets of the data in your spreadsheet?
- ◇ Are there redundancies in your data? Is the same information repeated on multiple rows of your spreadsheet?
- ◇ Do you ever encounter erroneous entries that have been typed in by hand?
- ◇ Are you concerned about the long-term security of your data?
- ◇ Do you often wonder exactly where your data are?
- ◇ Does someone else really own your data (perhaps your IT department)?



Before we look at other options, let's examine the differences in how data are stored and managed in spreadsheets and databases.

A spreadsheet consists of rows and columns. At the intersection of each are cells that store data values. Some cells can refer to other cells, and some cells can perform processing on other individual cell values.

In contrast, a database is made up of named tables that contain records. Each record has columns in which values are stored. Each table stores information on a particular type of entity. For environmental data, this could be field samples, sampling locations, analytical results, regulatory limits, or laboratory methods. Typically, one or more columns in each record store values that uniquely identify an instance of the entity. In the case of a field sample, this could be the “field sample ID”; for a location, the “location ID”.

Locus user tips:

In Locus EIM, Site ID is also part of the primary key for locations and field samples to accommodate customers with multiple waste sites, facilities, or water systems.

As we move to analytical or field measurements, we have to use more columns to uniquely identify a record (e.g., date, time, field sample or location ID, parameter). The remaining columns in a table that are not part of the “primary key” identify other attributes of the entity. For samples, these attributes include sample date and time, sample matrix, sample purpose, sampling event, sampling program, etc.

If you think of a data table as a grid with rows and columns, it seems very similar to a spreadsheet—but there's a fundamental difference. With a spreadsheet, how you view or report the data is dictated by how it appears in the spreadsheet—WYSIWYG. If you need to view the data differently, you must reformat the spreadsheet. In contrast, you can view information stored in a database (or serve it up in a report) in multiple ways that doesn't necessarily depend on how the data is stored in the underlying tables.

Databases, which are often referred to by the acronym DBMS (Database Management Systems), offer many other advantages over spreadsheets when dealing with complex data.

The following pages will highlight 12 key areas where databases—especially cloud databases built for industry-specific needs—surpass their spreadsheet counterparts.

Data entry is better with databases



If you use spreadsheets to manage your environmental information, how do you get data into it?

If you're collecting the same information every week, month, quarter, or year, perhaps you have a template that you use. You might fill in only the data fields that change from one event to another, then append the rows in this template to an existing worksheet, or insert them into a new one. Alternatively, you might copy a set of rows in your spreadsheet, and then edit any fields with values that have changed.

In the case of analytical data, if you don't have to type in the data manually, perhaps your lab provides data in a spreadsheet that mirrors the structure of your spreadsheet, allowing you to cut and paste it without edits.

Each of these methods of entering data has limitations and risks:

- ◇ **Manual entry** inevitably introduces errors, unless someone is independently checking every entry for accuracy.
- ◇ **Copying and editing** are notoriously prone to mistakes. It is too easy to overlook fields that should be updated in the copied records.
- ◇ **Getting a lab to send you data in a spreadsheet** whose structure mirrors yours can be problematic, even more so if you deal with different labs for different types of analyses. Even then, there is no check on the validity of the laboratories' entries.
 - ◇ Are all date and number fields actually the correct data types?
 - ◇ Do all required fields have values in them?

Databases provide various means of data input. Two of the most commonly used methods are form entry (for when you need to enter a few records at a time) and EDDs (Electronic Data Deliverables), used for uploading text files containing tens, hundreds, or even thousands of data records in text or zipped files.

Flexible form configuration as a standard database feature

Databases provide unlimited flexibility in designing forms—with searchable lookup fields, advanced form controls, sophisticated styling, context-sensitive help, data validation, event handlers, and the ability to conditionally display individual or blocks of fields, based on the user's selections.

Locus user tips:

Locus EIM offers over 30 forms for entering and editing water systems, locations, sample collection, chains of custody, analytical data, field measurements, water levels, boreholes, well construction and other information. All of these input forms have multiple dropdown list boxes for the display of lookup values and online help. You can easily hide unused forms for your organization to simplify the system interface and menu structure.

Better, faster batch data loading with EDDs

The real strength of databases comes about from their ability to load and process EDDs. Each record in an EDD typically consists of 10-50 fields (e.g., in the case of laboratory analyses: Field Sample ID, Analytical Method, Analysis Date, Lab Result, Units, etc.). The data in these EDDs can be checked for incorrect data types, missing required values, entries that are restricted by lookup tables or LOVs (Lists of Values), and duplicates.

Locus user tips:

Locus EIM's powerful EDD loader can upload and error check several thousand records in under a minute. Labs need not all use the same format – the data will still end up in the same place in the database. In fact, Locus EIM even has a special lab interface so (with your permission) your labs can upload their own EDDs. This lab interface shows only a very small part of Locus EIM, namely the EDD Loader and selected LOVs that lab users would need to know.

Data quality is better with databases



Since 2002, a dedicated group of Locus employees has been involved with migrating data into EIM from spreadsheets provided to us by customers and their consultants. As such, we have firsthand experience with the types of data quality issues that arise when using spreadsheets for entering and storing environmental data.

Here is just a small selection of these issues:

- ◇ Locations with multiple variations of the same ID/name (e.g., MW-1, MW-01, MW 1, MW1, etc.)
- ◇ Use of multiple codes for the same entity (e.g., SW and SURFW for surface water samples)
- ◇ Loss of significant figures for numeric data
- ◇ Special characters (such as commas) that may cause cells to break unintentionally over rows when moving data into another application
- ◇ Excel's frustrating insistence (unless a cell format has been explicitly specified) to convert CAS numbers like "7440-09-7 (Potassium)" into dates ("9/7/7440")
- ◇ Bogus dates like "November 31" in columns that have do not have date formats applied to them
- ◇ Loss of leading zeros associated with cost codes and projects numbers (e.g., "005241") that have only numbers in them but must be stored as text fields
- ◇ The inability to enforce uniqueness, leading to duplicate entries
- ◇ Null values in key fields (because entries cannot be marked as required)
- ◇ Hidden rows and/or columns that can cause data to be shifted unintentionally or modified erroneously
- ◇ Bogus numerical values (e.g., "1..3", ".1.2") stored in text fields
- ◇ Inconsistent use of lab qualifiers— in some cases, these appear concatenated in the same Excel column (e.g., "10U, <5") while in other cases they appear in separate columns

With some planning and discipline, you can avoid some of these problems in Excel. For example, you can create dropdown list boxes to limit the entries in a cell to certain values. However, this is not standard practice as most spreadsheets we receive come with few constraints built into them.

While databases are indeed not immune to data quality issues, it is much easier for database designers to impose effective constraints on users' entries. Tasks such as limiting the values in a column to selected entries, ensuring that values are valid dates or numbers, forcing values to be entered in selected fields, and preventing duplicate records from being entered are all easy to implement and standard practice in databases.

However, properly designed databases can do even more. They can check that various combinations of values make sense—for example:

- ◇ They can prevent users from entering analysis dates that are earlier than the associated sample dates.
- ◇ They can verify that numerical entries are within a permitted range of values and make sense based on past entries. This is so popular its even part of our [Locus Mobile app](#) for collecting field data.

Databases also provide the ability to verify the completeness of your data:

- ◇ Have all samples been collected?
- ◇ Have all analyses been performed on a sample?
- ◇ Are there any analytes missing from the laboratory's findings?

You can specify such queries to run at any time. Replicating these checks within Excel, while not impossible, is simply not something most Excel users have the time, skill, or desire to build.

Locus user tips:

Over the years, Locus has helped many of our customers move their data from spreadsheets into Locus EIM. Invariably, these migrations have unearthed many data issues that went undetected until we had to map and move the data into Locus EIM.

It's easier to prevent data redundancy



One of the most striking differences between spreadsheets and databases is the prevalence of redundant information in spreadsheets. Consider, for example, these three tables in EIM:

1. LOCATION
2. FIELD_SAMPLE
3. FIELD_SAMPLE_RESULT

In this subset of their columns, “PK” signifies that the column is a member of the “primary key” of the table. The combination of values in these columns must be unique for any given record.

LOCATION	FIELD_SAMPLE	FIELD_SAMPLE_RESULT
LOCATION_ID (PK)	FIELD_SAMPLE_ID (PK)	FIELD_SAMPLE_ID (PK)
SITE_ID (PK)	SITE_ID (PK)	SITE_ID (PK)
EASTING	LOCATION_ID	ANALYTICAL_METHOD (PK)
NORTHING	SAMPLE_DATE	PARAMETER_CODE (PK)
LOCATION_TYPE	SAMPLE_TIME	ANALYSIS_DATE (PK)
ESTABLISHING_COMPANY	SAMPLE_PURPOSE	ANALYSIS_TIME (PK)
ESTABLISHING_DATE	SAMPLE_TYPE	LAB_RESULT
LOCATION_STATUS	SAMPLING_PROGRAM	LAB_UNITS
PROPERTY_OWNER	SAMPLERS	LAB_QUALIFIER
Etc.	Etc.	Etc.

The two columns LOCATION_ID and SITE_ID can be used to link (join) the information in the FIELD_SAMPLE table. Furthermore, FIELD_SAMPLE_ID and SITE_ID can be used to link the information in FIELD_SAMPLE_RESULT to FIELD_SAMPLE. Because these links exist, we only need to store the above attributes of a given location or field sample once— in one table. This is very different from how data is handled in a single spreadsheet.

Let's compare how the data in a few of these columns might appear in a single spreadsheet compared to a database. We'll look at the spreadsheet first:

Location ID	Site ID	Location Type	Field Sample ID	Sample Date	Analytical Method	Parameter Code	Lab Result
MW-01	A	WELL	MW-01-12	04/17/2017	8260D	96-12-8	10
MW-01	A	WELL	MW-01-12	04/17/2017	8260D	79-01-6	10
MW-01	A	WELL	MW-01-12	04/17/2017	8260D	71-55-6	12

Next, let's see how this information would be stored in a database. Here we can see more fields since we're not as constrained by width.

First, the LOCATION table:

Location ID	Site ID	Easting	Northing	Location Type	Est Company	Est Date	Location Status
MW-01	A	27365.34	8373.35	Well	A&B Drillers	04/03/2007	Active

Then, FIELD_SAMPLE:

Field Sample	Site ID	Location ID	Sample Date	Sample Time	Sample Purpose	Sample Type	Sample Program
MW-01-11	A	MW-01	04/17/2017	11:14	Regular	Groundwater	2017 Well Sampling

Lastly, FIELD_SAMPLE_RESULT:

Field Sample	Site ID	Analytical Method	Parameter Code	Analysis Date	Analysis Time	Lab Result	Lab Units
MW-01-12	A	MW-01	96-12-8	04/24/2017	15:23	10	µg/L
MW-01-12	A	MW-01	79-01-6	04/24/2017	15:23	10	µg/L
MW-01-12	A	MW-01	71-55-6	04/24/2017	15:23	1	µg/L

Note one of the most striking differences between the spreadsheet and the database tables above is that much redundant information is included in the spreadsheet. The Location Type of "WELL" is repeated in every record where location MW-01 appears, and the sample date of "04/17/2017" is repeated wherever sample MW-01-12 is present. Redundant information represents one of the most significant drawbacks of using spreadsheets for storing large amounts of data when many of the data values themselves (e.g., LOCATION_ID and FIELD_SAMPLE_ID above) have multiple attributes that need to be stored as well.

Most spreadsheet data that we have received for import into EIM have consisted of either:

- ◇ Multiple worksheets of the same or similar formats, all containing a combination of sampling and analytical data
- ◇ A single worksheet containing tens of thousands of rows of such data

Occasionally, customers have sent us multiple spreadsheets containing very different types of data, with one or more hosting sample and analytical results, and others containing location, well construction, or other supporting data. However, this is atypical; in most of the migrations that we have performed, redundant data is pervasive in the spreadsheet's contents and inconsistencies in entries are common.

Entering new records in a spreadsheet structured like the example above requires that the attributes entered for LOCATION_ID and FIELD_SAMPLE_ID be consistent across all records whose values are the same in these columns.

The real problems surface when you have to edit records. You must correctly identify all affected records and change them all identically and immediately.

Sounds relatively straightforward, doesn't it?

In fact, judging by what we have seen in our data migrations, discrepancies invariably creep into spreadsheets when edits are attempted. These discrepancies must be resolved when moving the data into a database where constraints prohibit, for example, a single sample from having multiple sample dates, times, purposes, etc.

In addition, audit trails are all but nonexistent in Excel. Many users tend to save the edited version with a new filename as a crude form of audit tracking. This can quickly lead to a data management nightmare with no documented audit tracking. Just as important, almost all our customers, especially customers involved with regulatory reporting, require audit tracking. This is typically required on sites that may be involved in litigation and decisions are made on the health and safety risks of the site necessitating defensible and unimpeachable data.

Related content:

The Horrors of Excel for Data Management

Excel offers little in the way of data security and quality for organizations managing vital environmental and compliance data. Many are learning firsthand the superiority of database management systems over spreadsheets when it comes to managing data.

[Read more >](#)

Entity relationships are more manageable



The discussion of data duplication and redundancy touches on another significant difference between databases and spreadsheets—how entity relationships are handled.

Excel stores data in a two-dimensional grid. While it is possible to create relationships between data in different worksheets, this is not the norm and there are many limitations. More often, as we have stated elsewhere, Excel users tend to store their data in a single spreadsheet that grows increasingly unwieldy and hard to read as records are added to it.

Let's consider some of the relationships that characterize environmental sampling and analytical data:

- ◇ Sampling locations are associated with sites or facilities—or, for our water utility customers, individual water systems. They may also belong to one or more planned sampling routes.
- ◇ Different sampling locations have their own analytical and field measurement requirements.
- ◇ Individual samples may be associated with one or more specific permits or regulatory requirements.
- ◇ Trip, field, and equipment rinsate samples are linked to one or more regular field samples.
- ◇ Analytical results are assigned to analysis lots and sample delivery groups (SDGs) by the laboratory.
- ◇ Analysis lots and SDGs are the vehicle for linking laboratory QC samples to regular samples.
- ◇ Analytical parameters are associated with one or more regulatory limits.
- ◇ Individual wells are linked to specific boreholes and one or more aquifers.

Modeling and building these relationships in Excel would be quite difficult. Moreover, they would likely lack most of the checks that a DBMS offers, like preventing orphans (e.g., a location referenced in the FIELD_SAMPLE table that has no entry in the LOCATION table).

Data reporting and integration is easier



How do you create a report in Excel? If you're working with a single spreadsheet, you use the "Data Filter" and "Sort" options to identify the records of interest, then move the columns around to get them in the desired sequence. This might involve hiding some columns temporarily.

If you make a copy of your data, you can delete records and columns that you don't want to show. If your data is stored in multiple spreadsheets, you can pull information from one sheet to another to create a report that integrates the different types of data housed in these spreadsheets. But this is a somewhat tedious process for all but the simplest of reports.

Let's contrast this drudgery with the simplicity and power offered by relational databases.

In Locus EIM, for example, you pick the primary and secondary filter categories that you want to use to restrict your output to the records of interest. Then, you select the specific values for these data filter categories (usually from dropdowns or list-builder widgets). There is no limit on how many categories you can filter on.

Typically, you then choose a date range. Lastly, you pick which data columns you want to view, and in what order. These columns can come from many different tables in the database. For ease of selection, these also appear in dropdowns or list-builder widgets.

When you have made your filter selections, Locus EIM pulls up the records matching your selection criteria in a data grid. You can further filter the records by values in specific columns in this grid, or hide or rearrange columns. If you want to share or keep a record of these data, you can export the contents of the displayed grid to a text file, Excel, XML, PDF, or copy to your clipboard.

The list of reports spans all the major types of data stored in Locus EIM, including location and sample collection information, chain of custody and requested analyses data, analytical results, field measurements, and well and borehole data. Additional reports provide options to perform statistical calculations, trend analyses, and comparisons with regulatory and other limits.

In short, when it comes to generating reports, databases are superior to spreadsheets in almost every aspect. However, that doesn't mean spreadsheets have no role to play. Many Locus EIM users charged with creating an ad hoc report prefer to download their selected output to Excel, where they apply final formatting and add a title and footer. Although, with some of the newer reporting tools, such as Locus EIM's new enhanced formatted reports, that functionality is also built into the DBMS. The more sophisticated the database, the more advanced and robust reporting options will be available.

Simultaneous usage is better supported



Microsoft Support confirms that it is **possible to share an Excel workbook**. Two or more individuals can indeed access the same spreadsheet simultaneously. Edits are even possible:

You can create a shared workbook and place it on a network location where several people can edit the contents simultaneously... As the owner of the shared workbook, you can manage it by controlling user access to the shared workbook and resolving conflicting changes. When all changes have been incorporated, you can stop sharing the workbook.

Sharing a spreadsheet may work in a small office or facility with a couple of users, but it certainly is not a viable option when more users need to access, view, and generate reports. This is a task for which databases are far better suited.

On any given day, for example, Locus EIM supports hundreds of simultaneous users. Some may be inputting form data, while others are loading and checking laboratory EDDs, and still others are creating reports and graphs and viewing data on maps and in tables. Many of these are very data-intensive processes—yet Locus EIM handles them seamlessly.

Being able to handle such simultaneous activity is inherent in the designs of relational databases. In contrast, the ability to share an Excel workbook is not a native feature of such software and, as such, is unlikely to meet the needs of most organizations (especially as they evolve and grow).

Better processing speed and scalability



Compared to spreadsheets, databases are the hands-down winners with respect to processing speed and the numbers of records they can store. Higher-end databases can store hundreds of millions of records. In contrast, spreadsheets with hundreds of thousands of records can bog down and become difficult to manage.

An underappreciated, yet the critical difference is that while you're using a spreadsheet, the entire file is stored in a computer's random access memory (RAM). In contrast, when using a database, only the dataset that you are currently working with is loaded into RAM.

To illustrate just how fast a powerful database can be, I sent a query to EIM at our secure facility on the opposite coast, asking how many "benzene" records were in one of our larger laboratory results table ($N > 4,500,000$). Sitting at a desk here in the hinterlands of Vermont, the result ("number of records = 64773") came back in less than a second. I did not even have time to call in the cows for their afternoon milking.

Because they are both faster and can store more, databases scale far better than spreadsheets. As such, they can meet both your current and future requirements, no matter how fast the information you are required to store grows over time.

Related content:

Locus Technologies Goes All-In on AWS

Locus Technologies (Locus), the market leader in multi-tenant SaaS water quality, environmental compliance, and sustainability management, today announced that it is going all-in on Amazon Web Services, Inc. (AWS), moving its entire infrastructure to the world's leading cloud.

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Create and follow complex workflows



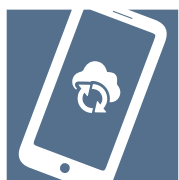
In contrast to spreadsheets, databases support the creation of formal and complex workflows. Let's consider one example from EIM—its cradle-to-grave sample planning, collection, and tracking process.

Using EIM's Sample Planning module, you can:

- ◇ **Identify** one-time or recurring samples and analyses that need to be collected
- ◇ **Transfer** information on these planned samples and analyses to Locus Mobile
- ◇ **Collect** field data
- ◇ **Upload** field data to EIM (where it is stored in various tables)
- ◇ **Generate** chains of custody and sample bottle labels (after which the samples are sent to the lab for analysis)
- ◇ (Days or weeks later, labs upload their findings to EIM's holding table, where they are automatically matched with the previously uploaded field information)
- ◇ **Receive** notifications that the lab results are now available (additional notifications can be sent if any results are found to exceed a regulatory limit)
- ◇ **Track** the status of the samples throughout this process with forms that can tell you the status of each planned sample, including whether any results are late or missing
- ◇ **Generate** relevant reports, maps and charts for internal use or for submittal to the appropriate agency



Identify samples



Transfer to mobile



Collect field data



Upload field data



Generate COC



Generate reports



Track sample status



Receive lab results



Lab upload to holding table

Databases are more secure



Microsoft identifies the following [security features available in Excel](#):

User-level data protection

You can remove critical or private data from view by hiding columns and rows of data, and then protect the whole worksheet to control user access to the hidden data. In addition to protecting a worksheet and its elements, you can also lock and unlock cells in a worksheet to prevent other users from unintentionally modifying essential data.

File-level security

At the file level, you can use encryption to prevent unauthorized users from seeing the data. You can also require password entry to open a workbook, or you can secure a workbook by employing a digital signature.

Restricted access to data

You can specify user-based permissions to access the data, or set read-only rights that prevent other users who may be able to view the data from making changes to it.

Perusing the web for postings comparing the features of databases to spreadsheets, you'll find plenty of accusations that spreadsheets lack security and control features. Clearly, Microsoft's description of the security features available in Excel shows that this isn't the case. However, these security features may not be as robust as Microsoft claims, and they may prove difficult for the average user to implement.

As [Martin Cacace of BoundState Software](#) explains, "Although Excel allows you to protect data with a password and Windows-based permissions, it is extremely delicate and requires a deep understanding of Excel." Some of these features won't work if you have people using different operating systems or if you need access from other computers. Even a password protected Excel file is not really secure; there are tools on the Internet that anyone can use to unlock a protected Excel file without knowing the password."

Databases offer far more control than spreadsheets over who can access and make changes to data. As an example, Locus EIM users must have a unique username and password. Users can be assigned to multiple privilege levels, ranging from "administrator" to "guest". Customers that require a more fine-grained approach can use "roles" to assign permissions to specific modules, activities, or functionality to users. Password security is typically robustly designed in commercial databases, and can be configured to require complex passwords, session expiry, and password expirations to match customer IT requirements, something Excel would find challenging. Locus EIM also tracks all users and makes that information available to database admins to provide yet another layer of security for the system.

Prevent data loss and data corruption



Because of the general lack of controls that exist in most spreadsheets, it is far easier for a user to wreak havoc on them. One of the most dreaded developments that can occur is associated with the “Sort” function. A user may choose to sort on one or more columns, but not all—resulting in the values in the missed columns not matching up with those in the sorted ones. Nightmares like this are easily preventable (or are simply not possible) in databases.

Another advantage of database management systems is their ability to create audit trails, which preserve the original values in separate tables when changes are made to records. In the event that a user wants to undo some changes (including deletions) that he or she has made to a table, a data administrator can retrieve and restore the original state of the modified or deleted records. Also importantly, the circumstances of these changes are fully tracked (who, what, when, where), which is a minimum requirement for any quality assurance process.

Lastly, Excel stores the entire spreadsheet in memory, so if there is a system crash, you will lose everything you have entered or edited since your last save. In contrast, each operation you perform in a database is saved as you complete it. Moreover, most databases have daily backups, and in some cases, maintain an up-to-date copy of the data on a secondary device. Additionally, data is typically backed up in multiple geographic locations to provide even more recovery options in a disaster situation. Any good commercial database vendor will be happy to share their disaster recovery process because securing and maintaining your data is their most important job. In short, you can rest assured that your valuable data—often gathered over many years at a high cost—will not be lost if it is stored in a DBMS like Locus EIM.

Databases are better for data stewardship



Data management is a broad term that includes the range of activities that we have discussed elsewhere in this blog series, including sample planning and collecting, inputting data, uploading EDDs (Electronic Data Deliverables), and analyzing and reporting environmental data and information.

However, the full scope of data stewardship is even broader than this, including necessary things like knowing where your data is located and knowing the quality of the data used in your regulatory reports.

Here at Locus, we have had new customers come to us with some incredible horror stories:

- ◇ Data “held hostage” by third parties
- ◇ Data lost over time with multiple contractor changes
- ◇ Data stored in email or file cabinets
- ◇ Data in scattered piles of PDF documents or hard copies (very typical for boring logs)
- ◇ Labs unable to generate fresh EDDs due to laboratory LIMS system changes or industry consolidation

These are just some of the latest examples we have encountered. We are constantly surprised and concerned at the variety of ways that organizations can unwittingly put their critical data at risk.

The key to effective data stewardship is to know where it is, know its quality, and have uninterrupted access to it. This is something that Excel can’t offer, and it’s also something a hodgepodge of spreadsheets, emailed PDF files, stacks of hard copy boring logs in multiple offices, and custom-built databases simply can’t do.

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Better quality assurance practices



Quality assurance is a popular topic of discussion, but few people consider it in terms of the configurations (behind the scenes code) that people add to popular off-the-shelf programs such as Excel or Access. Of course, these programs go through rigorous quality assurance testing before being released to the public to ensure they perform as expected. After all, no one questions that Excel can perform math correctly.

However, what is often not considered, are the macros, custom functions, and calculations that are often added to spreadsheets when deployed for managing environmental data and other tasks.

Here at Locus, we have yet to encounter one Excel spreadsheet or Access database from a customer that has been documented, tested and comes with clear user instructions. We also have never encountered anyone that has never made errors in Excel by picking the wrong cells for a formula.


You would avoid these types of oversights and lax QA protocols with commercial software that relies on expert functionality for its business. For example, if Locus EIM did not perform proper calculations (repeatedly) or load data properly (repeatedly), the product would not be successful in the marketplace, and we wouldn't have thousands of users who trust and use our software every day. This level of quality assurance is simply not found in user-configured, ad hoc "databases" built-in Excel or Access.

As more environmental sites become embroiled in litigation, or are in the process of making health and risk clean up decisions, the importance of data quality assurance cannot be ignored. Water utilities that are charged with providing clean safe drinking water to the public can't rely on ad hoc Excel or Access systems to analyze such critical data.

Ready to get started?

Hopefully, by this point, we have convinced you of the superiority of database management systems over spreadsheets when it comes to managing environmental data. Now, it's time to make some efforts to examine the specific shortcomings of your current system and consider your options.

Now that you have had the opportunity to consider why SaaS databases allow you to manage your complex data efficiently, make data integration and reporting faster and easier and scale to your requirements, contact us today to find out what Locus can do for you.

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