The 6 Most Time-Consuming, Expensive and Frustrating **Document Management** Challenges Microsoft **SharePoint**® based **Engineering** Organisations Face Today…

…and How To Solve Them Quickly, Easily and cheaply!

….and at the same time improve the return on investment in your SharePoint!

Context

As an engineering company, digital documents are at the heart of your business.

Whether you are in Industrial Manufacturing, Engineering & Construction, Utilities, Oil and Gas or Aerospace & Defence, all your assets, including engineering designs are defined in hundreds of thousands of digital documents.

From simple office documents – such as Word and Excel, through to complex 2D and 3D CAD drawings, you rely on these documents to develop and build new products, purchase components, control production and quality and maintain valuable assets.

Your teams of highly paid engineers and designers have spent thousands of hours creating these complex technical documents, your company will have invested a huge amount of time and resources in creating these valuable digital assets.

However, because these documents are not integrated into the existing business systems operating within the company, much of the useful information cannot be easily or efficiently accessed by employees outside the design engineering department.

Ad hoc solutions to some of the problems are found but invariably result in wasted effort, excess costs, expensive mistakes and serious delays.

The challenges you are facing are:-

1) **Users cannot view technical documents.**
2) **Users cannot collaborate on technical documents.**
3) **Users cannot easily and quickly print technical documents.**
4) **Users cannot access all the rich content stored within a technical document.**
5) **Any ancillary 'viewing' applications are not integrated into back-end business systems.**
6) **High IT costs are needed to support various document 'viewers within the organisation.**

In this report we discuss the above six 'document management' challenges you are facing, explain what can be done so that they can be overcome quickly, easily and cheaply and at the same time greatly improving the return on investment with your SharePoint Systems.

1. Users Cannot View Critical Technical Documents

Users outside of the design engineering department cannot easily view technical design documents.

This is because other departments such as production, procurement, operations, quality assurance, , maintenance, etc do not have access to the expensive software authoring tools from which the document was created.

- Naturally, users will find a way around these viewing challenges, by downloading 3rd party viewers or asking the engineering department to print off the documents or viewing documents in neutral PDF or TIFF formats. These methods result in :-Time wasted finding viewers to view the technical documents.
- Time wasted asking the Engineering Department to print off documents.
- lost opportunities through having to view the files in neutral PFD and TIFF formats, rather than in the 2D and 3D formats they were designed in and thus giving access to all the data stored within them.

Example: Users cannot view basic technical documents
AmCo is a manufacturing company about to take a new product to market.

David is AmCo's procurement manager, and has recently received a specification for the new product, detailing the hundreds of individual components he needs to order.

For David to make sure he is ordering the right components, he needs to visually see the design documents, both at a product level and an individual part level. There is a saying that a picture paints a thousand words, we believe a 3D model paints a thousand pictures.

David has three options to view the design documents.

Option 1: Download a standalone PC viewer from Autodesk (AutoCAD) and Dassault Systems (CATIA).

David and his team can download their own AutoCAD and CATIA viewers and install them on their local PCs. David's team has 10 people so there could be as many as 20 instances of 3rd party viewers installed, clearly causing its own IT headache. With hundreds of employees in AmCo, many of whom need to view the design documents, literally thousands of 3rd party document viewers for many different file formats are installed across the organisation.

Option 2: Access neutral viewable formats (i.e. PDF and TIFF) within SharePoint using a free viewer

Because AmCo use SharePoint, the engineering department have been able to upload a PDF version of the design documents for the new product into the SharePoint system. David is able to view these documents using a PDF viewer on his PC. However, whilst this may solve an immediate viewing need, David and his team cannot view the rich content stored within the native files (see challenge No. 4 in this report), and the files that are downloaded to the user's desktop create an additional intellectual property risk.

Option 3: Ask the engineering department to create a new file for David to read.

Often David and his team need to view other layers of data which is not viewable in a free viewer or the PDF/TIFF which is stored in SharePoint. This means David and his team often have to go back to the engineering department and ask them to either create a new digital document or a print. This in itself is a very time-consuming process which can negatively impact the procurement schedule. It is also a massive burden on the engineering department who have to break off from designing new products to create a new file or print the required document.

Solution Using AutoVue & Lifecycle Technology Connectors

Using AutoVue every employee in a company is able to view the native technical documents as if the user was sitting in the engineering department and using the original authoring tool such as CATIA or AutoCAD. AutoVue supports viewing for over 450 native file types (without replication or conversion) including: Office & PDF, AutoCAD, MicroStation, SolidWorks, Wildfire, Siemens NX, Autodesk Inventor, CATIA, Pro/Engineer, JT, Solid Edge, Nx, Zuken and Gerber and many more...

With the click of a button Lifecycle Technology Connectors allow users to view these native files, complete (with full meta data and content such as tags, layers, colours and Product Manufacturing Information, directly within the back-end business system (i.e. SharePoint). This means the right person has access to the right document, in the right format, and at the right time – eliminating endless hours of wasted time and effort.

2. Users Cannot Collaborate on Essential Technical Documents

Users are unable to view, collaborate or mark-up the *same document* at the *same time*.

This lack of collaboration functionality causes major problems when reviewing technical documents, solving problems, or when two or more people need to work on the same document at the same time.

Lack of collaboration capabilities also leads to a plethora of manual workarounds – one of which being printing-off documents, manually writing on them with a red pen, and passing the document to a colleague for them to review.

Lack of collaboration functionality leads to:

- The creation of endless standalone documents sat on users desktops.
- Numerous documents in circulation which are not integrated into back-end systems.
- Duplicated documents which cause a version control nightmare.
- Lost mark-ups, comments and valuable information.
- Increased opportunity for human error.

All this adds time, cost, and complexity and increases the possibility of serious errors

Example 1: Users cannot concurrently review documents
PowGenCo is power generation company which is designing a new power plant.

As part of the project design phase, PowGenCo receive thousands of design drawings which need to be reviewed by the various disciplines such as members of the the electrical, mechanical, piping, P&ID, environmental, construction, commissioning, health and safety, planning and scheduling departments.

During the design phase, as many as 50,000 documents need to be reviewed. With multiple document versions and multiple reviewers, there can be hundreds of thousands of document reviews and collaborations needed.

Traditionally, each technical document is printed off, manually marked up and passed along to the next reviewer in a serial process. This is a hugely time intensive process with massive opportunity for human error.

Solution Using AutoVue & Lifecycle Technology Connectors
By using Lifecycle Technology Connectors and AutoVue integrated into SharePoint and other systems, users can view, annotate and digitally mark-up the same native document concurrently from within their day-to-day business application.

Without altering the source file, users can overlay their comments (which can be switched on and off), and keep all their comments stored within the system in a compliant fashion.

This removes the need for paper based printing and 'red-pen' manual mark ups. It also ensures the user does not have to worry whether they are working on the most up-to-date version of the document which is complete with all the relevant comments from previous reviewers.

Example 2: Users cannot work on the same file at the same time to solve a problem
A German industrial machinery company has outsourced a key part to a Chinese manufacturer.

At the start of the manufacturing process, a problem with one of the components is identified.
The key people to resolve the problem are scattered around various locations.

These include the Lead Designer in Germany, Head Engineer in China and Component Supplier in Singapore.

Ensuring everybody who is working on the problem is able to view the same document and same version of the document, and see each other's mark-ups and comments is a major headache – and causes delays in fixing the problem.

Solution Using AutoVue & Lifecycle Technology Connectors
Using AutoVue with Lifecycle Technology Connectors, any user in anywhere in the world can concurrently view, mark-up and comment on a common shared document. This common view of a single document is often referred to as the 'single view of the truth'.

Using Autovue's rich array of features, such as measuring, viewing multi-level meta data, comparing differences between documents, and accurate dimensions, the time to solve engineering problems is significantly shortened and the quality of information for decision making is much improved.

3. Users Cannot Easily and Quickly Print Technical Documents

Just as users outside the engineering department struggle to view technical documents, they also struggle when trying to print documents.

The problems associated with the printing of documents are:-:

- Inability to print documents with intelligent stamps (i.e. watermarks or headers and footers). This results in numerous uncontrolled documents being in circulation.
- Wasted time in having to manually print documents which could easily be 'batch' printed at the press of a button. This saves time, especially when you have hundreds of documents to print.
- Inability to print a set of documents into a master PDF.
- Inability to include red-lines and mark-ups (or a choice of mark-ups) on printed documents.

Example: Users cannot print individual documents or batches of documents
Simon is a Maintenance Manager and John is a Production Manager. In both of their roles they have to deliver a set of printed (or digitally outputted) shop floor papers for their teams to complete their work.

For both Simon and John, each printed output could include up to 100 documents.
The documents required could be anything from a simple word document, through to a technical 2D CAD file – and anything in between.

Simon and John have two options to print their documents.

1. Identify and download all the required technical documents in a neutral flat-file format. This means the organization has to replicate every document and save native files as a flat PDF, TIFF or other neutral formats.

2. Give Simon and John the native software authoring applications on their desktops (i.e. install expensive licences of AutoCad, CATIA, SolidWorks, etc).

In both these options the design files have to be found and saved locally on the user's desktop, then opened and printed individually.

A final complication is that the printed documents are then uncontrolled as they can't be 'intelligently stamped' with controlling information in a watermark or header and footer.

We have all heard the story of the manufacturing company who made the wrong version of a part by working off the wrong printed specification.

Solution Using AutoVue & Lifecycle Technology Connector

With AutoVue and Lifecycle Technology's Printing and Output Management Solution, users print or output multiple documents without downloading the full file with a single mouse click.

If they have numerous files to print, they can simply 'select all the files' from within their business system and print the entire lot as a batch, regardless of the file type. This results in huge savings in time, especially with the printing of production orders and work orders.

Whether they are printing individual files or mass batches, they can ensure all printed documents are controlled by applying watermarks, intelligent stamps and headers and footers.

As an added advantage, it is also possible to combine different documents into a single PDF for digital distribution for processes such as base-lines for a machine delivery and RFQs.

4. Users Cannot Access All The Rich Content Stored Within a Technical Document

Technical documents contain rich meta-data, layers and tags which users outside of the engineering department cannot readily access when files are converted to neutral formats.

Companies invest thousands of man-hours creating technical documents. Stored within each file is essential information which consumers of the documents need to access in order to do their day-to-day work.

This additional meta-data includes accurate component dimensions, tolerances, section views, asset tags, supplier/vendor information and PMI data.

As a case in point, when a 2D technical document is flattened to PDF or TIFF (file formats which are typically used to share technical drawings with the wider community), all the rich data is lost. This means:

- Users cannot access the essential meta-data which the designer/engineer purposefully included in the document.
- Users waste time finding alternative ways to access this essential meta-data. This might include going back to the engineering department and asking them for more information.

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- Users cannot easily compare two different versions of a document, wasting endless hours looking for differences – in the process, creating massive opportunities for human error.

Example 1: Users cannot contrast and compare 2D documents

EngCo is an engineering construction company which designs buildings, roads and motorways. Through the life of a project, their own internal employees and subcontractors will create many thousands of drawings.

As project developers, it is critical for EngCo to understand the difference between documents v1.0 (as designed) and v10 (as built). Each change can have a direct effect on the project and project variables such as materials needed, planning permission required, project costing and space planning.

A simple illustration of this is the development of a new industrial building.

Over the life of the construction project, thousands of versions of drawings may be created, both internally and from external subcontract suppliers at a huge cost. – costing millions of dollars in design time it takes for a user to understand the difference between each version is costly and labour intensive. A typical solution is to print two versions of the document and manually compare them side by side, noting differences with a red marker pen. The user then has to scan the mark-up document back into the document repository.

Solution Using AutoVue & Lifecycle Technology Connectors

With AutoVue and Lifecycle Technology Connectors, users can easily *contrast and compare* two versions of a document, with differences being highlighted in an instant. Users can also switch on and off different layers of a document as if they were in the native application. This compare and contrast function can save companies endless man hours and speed up time to market and problem solving.

Example 2: Users lose important component measurements and data in neutralised 3D files

IndCo, an industrial manufacturing company design their products in 3D using CATIA. Included in the 3D model is additional PMI and GD&T data. This additional data is a recognised way for an organisation to ensure their products are being manufactured in line with the design engineer's intent.

A set of 2D production drawings are also released.

Once the final design is released for production, the key design documents are neutralisedby. converting them into PDF and TFF files and are then made available to the relevant departments including manufacturing, procurement and QA.

The 2D design documents are now in a flattened state, and the 3D documents have key information missing due to the conversion process.

This causes numerous problems for the user community outside of engineering - as they cannot take advantage of the rich content stored within the original file as it is no longer available.

For example, John in the Quality Assurance department is looking to make sure a part is manufactured to specification and needs to check a critical dimension.

In his role he also needs to check the interface to a supplier part, and bring together an external 3D model and CATIA file in a digital mock-up.

Without a native viewer, John would have to duplicate the data to a viewable file, such as JT or PDF, download the native design files to his machine, download a desktop viewer, and then, if he was lucky, he would be able to access the PMI and view dimensions of the design.

Even if this worked, the time it would take for all of this to happen would be significant, and if there was a problem with the file being saved in a specific state, John would have to go back to engineering to retrieve the information he needed.

Solution Using AutoVue & Lifecycle Technology Connector

Using AutoVue, any user without access to the original software authoring tool can view all the rich content stored within a technical document as if they had opened the file from the original software authoring tool (i.e. CATIA).

Simply by clicking on two points on a 2D drawing or 3D model, AutoVue will provide the exact dimensions between the two distances.

By integrating AutoVue with Lifecycle Technology Connectors into SharePoint, users can drill down even further into the business systems and access additional meta-data such as component supplier, part numbers, asset tags and material masters.

Example 3: Users lose essential meta data stored in technical documents

AssetCo is a leading European Oil and Gas provider with thousands of assets scattered over 12 different countries.

Each of its assets is defined in 2D and 3D technical drawings. Included in these technical drawings are asset numbers, tags, continuation tags, supplier codes, material numbers and layers.

Andrew is a Plant Manager whose daily work involves maintenance and plant turnaround activity.

In order to complete his work, he needs to access information from multiple data sources to evaluate, make decisions and execute the management processes.

These steps include logging into various systems and navigating between the sources of information to bring together all of the relevant parts of the jigsaw in order to make a considered decision.

For example, Andrew receives a notification from a maintenance worker identifying a problem with a piece of equipment. In order to evaluate the problem Andrew needs to access information which is contained within multiple systems. This requires him to drill in and out of each silo trying to connect the dots.

This work is laborious and time consuming.

Solution Using AutoVue & Lifecycle Technology Connector

With AutoVue and Lifecycle Technology Connector, from a single graphical view of an asset, users can visually drill down through a technical document into the ERP system, and access essential asset information such as asset numbers, supplier details, service schedules, etc.

In addition to finding and connecting the information, users are then able to initiate processes such as maintenance operations, work orders, replacement parts, or initiate a printing process for shop floor papers.

5. Viewing Applications Are Not Integrated Into Back-End Business Systems

Too many 'uncontrolled standalone documents' exist which are not integrated into back-end business systems.

A major problem for engineering companies is the lack of integration of technical documents back into ERP systems – as well as document management repositories such as SharePoint.

In addition to causing collaboration problems ,which have been examined in point No. 2 in this report, this lack of integration causes numerous other operational challenges such as:

- Endless 'duplicated' standalone documents in circulation.
- Users working on the wrong version of the document, rather than accessing it from a centrally stored system.
- Users unable to see others comments and mark-ups.
- Users unable to collaborate in real time on the same file.
- Poor productivity as technical documents are not correctly integrated into user's workflow.
- High bandwidth usage and slowing down of the network as users download large files as big as 100mb or more to their desktop.
- Massive Intellectual Property (IP) risk as native source files are downloaded and can leave the building.

Example: Technical documents are standalone and not integrated into back-end systems

John is a CIO and has recently invested in a document viewing platform for his company. This allows his 300 users to view any technical file format from a desktop application installed on their PCs.

However, this viewing application is standalone, and does not integrate back into the company's corporate systems (i.e. SAP and SharePoint).

Because of this lack of integration into back-end systems, when a user wants to view a technical document, they have to download the native file to their desktop thus making it an out of control document, an IP risk and also possible network bandwidth issues as some files are 100mb+ in size.

When a user adds comments in their desktop viewing software, other users cannot view the new comments unless the original user creates a new PDF or TIFF and rechecks the new file back into the corporate systems using a different file format and different naming system.

This creates confusion, file replication and massive potential for human error.

Solution Using AutoVue & Lifecycle Technology Connectors

Using AutoVue, at a click of a button, users can view up to 450 different file types, add comments, print and collaborate.

By using Lifecycle Technology Connectors to integrate AutoVue with your company's business systems (i.e. SAP and SharePoint), users will never again have to download native files. Every user will be working on a common view of the same single source document which is stored in your company's central business system.

This has several advantages:

1. Because users are working within the corporate system, all comments and mark-ups are stored against the original (and unaltered) file - meaning that all future users have access to the history of all users' comments.

2. AutoVue and Lifecycle Technology Connectors do not download the original file, but create a low-bandwidth streaming image of it, meaning the original file is never altered, and your company's IP is never compromised.

3. Some native files can be as large as 100mb (or more) in size and can create bandwidth issues when they are frequently downloaded. Because AutoVue with Lifecycle Technology Connectors uses streaming technology to view an image of the original file, a massive reduction in bandwidth usage and document load times is realised. This is especially important where remote locations are viewing and collaborating on documents.

6. High IT Overhead in Supporting Numerous Document Viewers

In many companies 'end-user downloaded document viewers' exist which are not controlled or supported by the IT department.

It is quite common for end-users to take 'document viewing solutions' into their own hands. Typically an end-user will search on the web for an application to help them view a technical document.

Quite literally, the user will open up Google and type in 'AutoCAD + viewer'.

The user is now presented with a choice of at least 20 different document viewers to download, each from a different company – and each potentially rendering your technical drawing in a slightly different way.

Other IT challenges include:

- Viewers installed are downloaded from the web by end-users and installed on their PCs in an ad hoc and uncontrolled way.
- Numerous viewers have to be supported by IT (i.e. CATIA viewer, AutoCAD viewer, SolidWorks viewer, PDF viewer).
- The need for IT to train end-users on different viewing applications.
- Different version numbers of the same viewing application are installed. Two users can be viewing the same version of a document and both be seeing different results, simply because they are using different viewers or a different version of the same viewer.

Example: Users download their own document viewers directly from the web

John is the CIO of EnergyCo, a national provider of electricity services to homes and businesses. EnergyCo has an asset network of power-lines, power-poles and associated infrastructure. The company has around 5,000 employees and physical assets totalling $5bn.

EnergyCo has tens of thousands of technical documents in use which detail their vast network of physical assets. These documents which are stored in SharePoint include the following formats: AutoCAD (DWG), MicroStation (DGN), scanned images and xreference files (hybrid files).

Many of EnergyCo's 5,000 employees need to access, view, red-line and print technical documents. To facilitate this, John, as CIO, traditionally has two main choices:

1. Allow the 5,000 user community to download free viewers from the web. Although on the face of it, this option appears to be at zero cost, there are actually significant hidden costs associated with downloading free viewers. These include:

- High IT support costs with thousands of users running uncontrolled and non-standard viewers.
- High training costs to train users on various viewing applications.
- The opportunity costs which come from lack of integration into existing systems (i.e. SAP, SharePoint and others).
- Reduced productivity due to non-standardization and business process integration.

2. Install and deploy expensive CAD applications on every user's desktop. Although it is appropriate for engineering and design departments to purchase full licences of expensive authoring tools, for most companies, it is prohibitively expensive to deploy the software to the wider user community.

Solution Using AutoVue & Lifecycle Technology Connectors

With AutoVue and Lifecycle Technology Connectors, a company's IT implementation and support overheads are greatly reduced. These time and costs savings include:

1. Low Overhead. AutoVue uses client/server technology and is accessed through a web browser. This means the installation and maintenance of the application requires minimum effort.

2. Ease of use and Standardization. With a common viewing application which is easy to learn and easy to use, training and support costs are minimised.

3. Integration into existing investments. AutoVue with Lifecycle Technology Connectors are easy and simple to deploy. In fact, it is not uncommon for companies to have the new viewing solution with integration into SharePoint to be up and running within just a few hours.

4. Increased security and Intellectual protection. AutoVue never downloads the original document file to the user's desktop. This reduces network bandwidth and ensures the company's intellectual property never leaves the building.

Summary

Using AutoVue & Lifecycle Technology Connectors

When AutoVue with Lifecycle Technology Connectors are integrated into existing business management systems, companies immediately realise improvements in overall performance through:-

1. Increased end-user productivity. Increased end-user productivity comes as a result of users being more efficient in their jobs, and not wasting endless man-hours trying to find workarounds to view and print documents.

For example a business print process, such as plant maintenance or production orders can normally take many hours to collate and print. Using AutoVuew and Lifecycle Technology Connector for SharePoint, printing tasks can be completed in a couple of minutes.

End-user productivity increases also come from:-
- Shortened review cycles
- Quicker response times to fix problems.
- Faster response times to answer supplier and partners queries
- Improved lead times in the procurement cycle.
- Shorter time to take products to market.

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2. Extracting more value from the technical documents. Thousands of man-hours are invested in creating rich technical documents, however once a 2D document is neutralised into PDF or TIFF, or a 3D document is converted to JT or 3D PDF,a significant amount of the rich meta-data is omitted. Users however still have to find alternative ways to access the data.

By using AutoVue and Lifecycle Technology Connectors integrated into SharePoint, users have instant access to all the rich meta-data and layered information stored within the technical documents. This allows a greater level of productivity, and eliminates endless hours wasted trying to find alternative ways to access this essential information.

3. Reduction in IT support time and cost. By standardising on a single viewing application, companies can significantly reduce their IT investment and support costs. As AutoVue can be delivered through a web browser or installed on a shared network drive, implementation times and costs are minimal. Users immediately benefit from the integrated document viewing applications, delivering a rapid ROI.

About AutoVue

AutoVue Enterprise Visualization is a suite of Oracle solutions designed to view, digitally annotate and collaborate on a variety of engineering, CAD and business documents without requiring investment in specialized CAD or authoring tools.

Initially developed by Cimmetry Systems (which was acquired by Oracle), AutoVue has a rich heritage of helping employees in companies view 2D/3D technical and business documents, irrespective of which department users are in the organisation, and whether or not they have access to the original software authoring tool.

With support for viewing, annotating and marking-up 450 different file types, AutoVue helps companies bring products to market faster, enables better business decision-making, and increases revenue and profitability.

With over 10,000 customers worldwide, AutoVue is used by customers in a broad range of industries, including Utilities, Engineering and Construction, Oil & Gas, Industrial Manufacturing, Automotive, Aerospace and Defence, and High Tech.

Supported document file types include: AutoCAD (DWG, DXF, DWF), MicroStation (DGN), HPGL, CGM, IGES, ME10, Cadkey, Visio, Word, Excel, PowerPoint, PDF, TIFF and many more.

About Lifecycle Technology

Lifecycle Technology is a leading software and consultancy provider which **helps companies view, print and collaborate on technical documents**.

Lifecycle Technology integrates AutoVue into customers' business systems and document management repositories.

With the combination of AutoVue and Lifecycle Technology Connectors, a rich viewing capability is available without users having to have the original authoring software installed on their PCs or a multitude of different viewers installed.

From a single mouse click initiated from within the company's business software (i.e. SAP or SharePoint), or from within a web browser, users can access any technical document, and analyse, comment and collaborate, and be confident that their comments are stored in a compliant fashion and available for others to access.

UK based Lifecycle Technology have a global client base spanning industries such as Industrial Manufacturing, Aerospace & Defence, Engineering and Construction and Utilities Oil and Gas. Customers include Siemens Power Generation, Granite Construction, NUCOR Steel and STORAENSO.

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