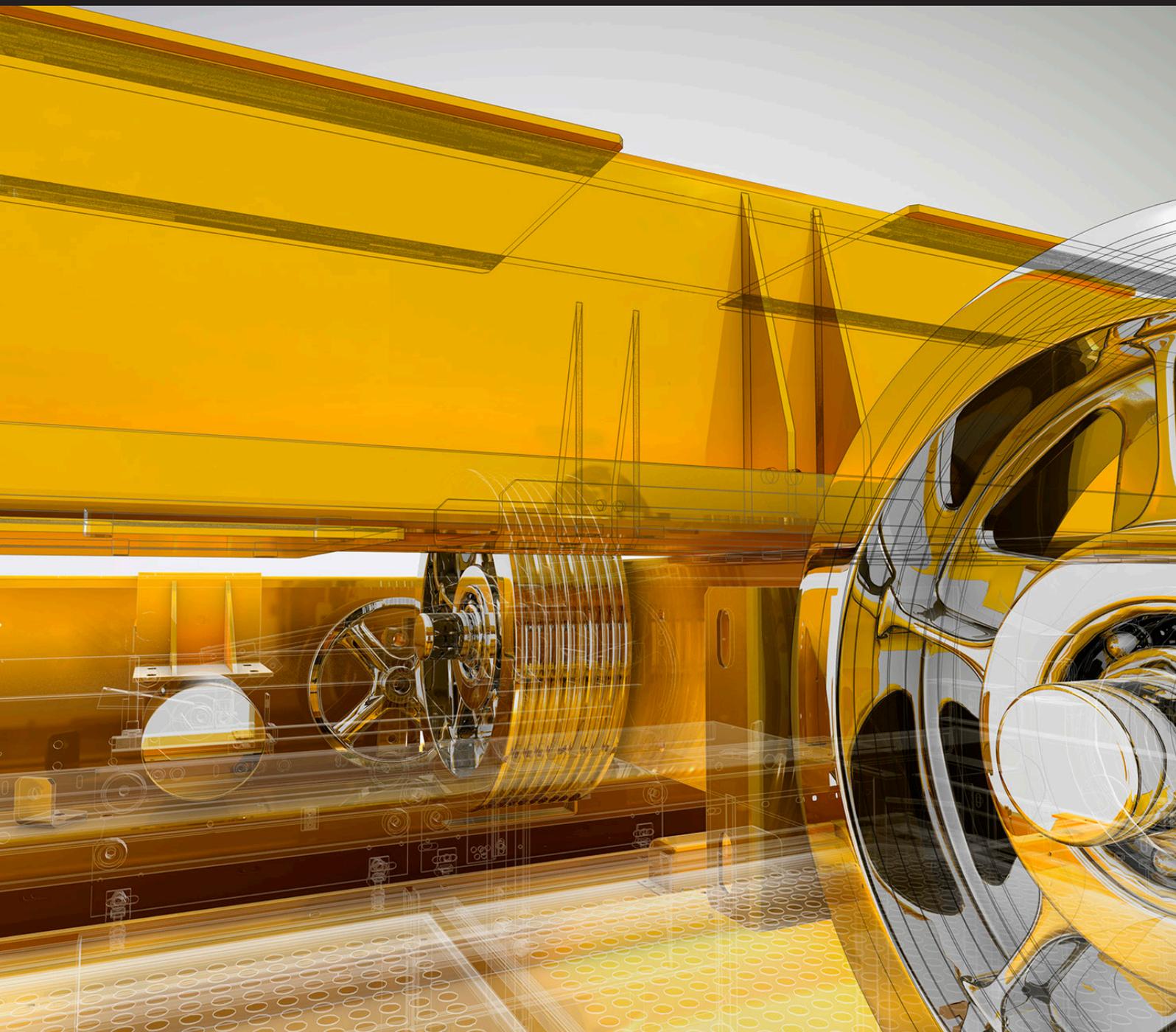


WHITE PAPER

How Data Management Solves Business Issues



How Data Management Solves Business Issues

Introduction

Data Management can mean different things to different people and businesses. For the purposes of this document we are defining Data Management as a strategy for managing your product related data and information, with an overriding engineering processes, all in one single location. This generally breaks down into three important topics: Data, People and Process.



DATA



PEOPLE



PROCESS

Data is all about managing the files and metadata that make up the source code for your product. People is about the challenges your engineering and non-engineering staff have while developing the product. Process is about the challenges with maintaining standard procedures throughout development.

How does this differ from Product Lifecycle Management (PLM), another term which gets used a lot alongside Data Management (PDM)? Product Lifecycle Management covers a much larger area, integrating different areas of a business together in one connected system of communication, with Data Management making up a part of this. Typically allowing you to integrate functions such as new product introduction (NPI), supplier collaboration or quality management amongst others.

So, what key industry challenges do businesses experience, which Data Management can look to help solve?

- Performance
- Product Complexity

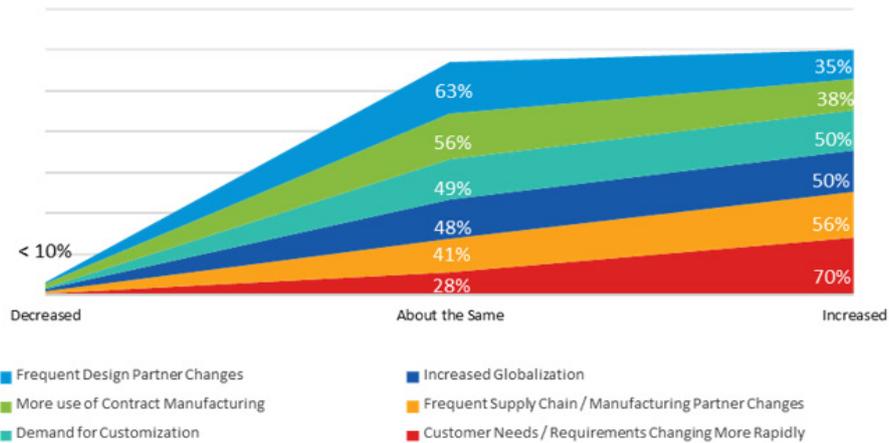
Design data management challenges cost businesses time and money, alongside limiting the amount of time engineers and designers can focus on innovation. The most common challenge is wasted time and effort. In fact, companies waste an average of 20% of their technical resource's on non-productive Data Management tasks. Which equates to one workday a week of non-value-added time, with some companies reporting even higher levels.

The impacts of these challenges also include missed deadlines and budgets. With two thirds of companies routinely missing design due dates, project/program budgets and time to market goals by more than 5%. Including one-third missing quality targets at that level. It is well proven that design, engineering and manufacturing businesses lose time and money due to inadequate data management.

Product complexity has increased but the business of developing and delivering new products has also increased across multiple dimensions. Market places are more dynamic, with 70% of companies saying that customer requirements are changing more rapidly and around 30% saying that it has increased significantly.

Manufacturing products have also got more dynamic, with over 1/3 having increased contract manufacturing. The majority have also experienced more dynamic supply chains, 56% saying they have more frequent supply chain/manufacturing partner changes. Half of these businesses have seen continued increases in globalisation and a greater demand for customisation.

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Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

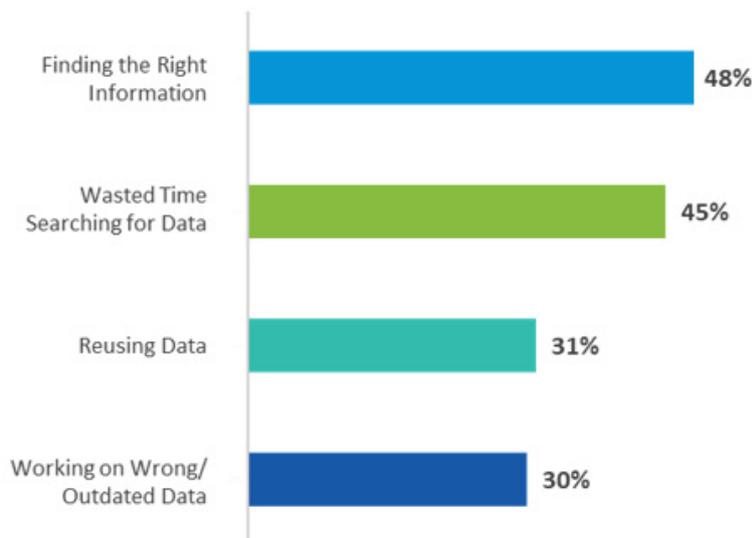
Each of these topics are challenging, but it is important to recognise that these challenges are happening at the same time and the cumulative increase in complexity is enormous.

These are high level market contributors, but what are the challenges and impacts at a more day to day level? To review this, lets break this down our three topics: Data, People and Process.

Data

For those that work with CAD files every day, it is probably no surprise to see “finding the right information” and “wasted time searching for data” are challenges reported by almost 50% of businesses. Many companies struggle with the basics of Data Management; controlling, accessing and sharing product data.

Capturing and reusing engineering knowledge is an area where most people understand the benefits, yet it is not always practiced. With 31% of engineers saying that reusing design data is a significant challenge as they are developing a product. Going beyond just reusing data, many engineers do not have a way to revisit past engineering decisions to understand the rationale behind them. For instance, why was a change to a certain design needed? What approach did they take to implementing the change? This number is up 2% from the last Tech-Clarity research in 2015.



Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

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There are many other subjects under the topic of Data, which can be both challenging and an opportunity for change within a business. But a good place to start, is to ask yourself and/or your business some of the questions below to start establishing where your Data issues might reside:

- Has your company ever lost product data? What did you do to overcome the loss?
- Has your company started manufacturing using the wrong or outdated data? What was the value of that? Did you identify the root cause of it? Did you take any steps to prevent it from happening again?
- Are you able to copy design data as much as you think you should? What is the value of copying designs? Do you measure it in productivity, reduced product costs or quicker time-to-market?
- What value do you think your engineers would get out of easily finding and understanding past design decisions?
- Do you have engineering best practices? How are they administered?

People

Collaboration is an essential part of the development process but nearly half of all businesses say this is a significant challenge. There are collaboration issues internal to the technical resources, such as working on wrong or outdated data. Just as common are challenges working with other departments both inside and outside the company, such as customers or suppliers.



Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

Wasted engineering productivity is one of the most common reasons companies begin considering Data Management. Engineers waste on average 20% of their time managing design data. This is the equivalent of 1 day a week or more for each technical resource. This number is up 5% from Tech-Clarity research conducted in 2012.

Even small to medium sized manufacturers are seeing more and more product development handled by different departments/teams distributed all over the world. This creates some significant collaboration issues, with 42% of businesses suggesting this as their top product development process challenge. This will be most obvious at companies with distributed teams at multiple sites. Whether it is just down the road, across the country or on the other side of the world, sharing information becomes more difficult the further apart you get.

Again, a good place to start, is to ask yourself and/or your business some of the questions below to start establishing where your People issues might reside:

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- Are your engineers able to work together effectively?
- How easy is it for your engineering team to collaborate with other departments, such as manufacturing, purchasing or sales?
- Can you easily share data and information with outside suppliers and customers?
- What do you think the impact of these collaboration issues are?
- Does it slow down product development? Does it result in errors that need correcting later in the development process?
- How much time do your engineers waste?
- What is the value of that time to you?
- Where do you think are the primary sources of wasted time?
- Are engineers in different sites able to access data equally?
- Are there any collaboration challenges? Can design reviews and engineering changes be conducted without delays?
- Are you getting the full value out of multiple engineering sites that you would expect?

Process

Data Management is about more than managing your CAD files and helping people collaborate and work efficiently. The second phase is looking at the engineering workflows and processes that are centred around that data, such as managing change, design reviews, project management and bills of materials. 57% of companies (up by 14% since Tech-Clarity research in 2015), stated that they had challenges with managing change and another 33% (up by 4% since Tech-Clarity research in 2015), managing design data by projects. These engineering processes are essential and managing them effectively can have high returns.



Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

Compliance is also a major issue, with more than one in three companies reporting challenges with understanding requirements, lack of defined processes for managing compliance, and determining current compliance status.

Lastly, ask yourself and/or your business some of the questions below to start establishing where your Process issues might reside:

- How do you handle change and release today? Are these processes efficient? Do they include all necessary parties?
- Can managers and executives easily see current project status?
- What benefits do you think you would realise from better managing these processes?
- How would you characterise your ability to ensure compliance?
- Do compliance issues slow down your product development process?
- Have compliance issues resulted in lost business or customers?

How Data Management Solves Business Issues

What is Autodesk Vault?

Autodesk Vault data management software helps organise, manage and track data creation, simulation and documentation processes for design, engineering and construction teams.

You can organise all your files and keep them in one location for easy access. All file versions are retained, so you never misplace or replace past versions. In a design team, all the files and associated data are stored on the server, so all users have access to the information and its history. Team members check out files to prevent more than one member from editing the same file at the same time. Once a file is checked back into the vault, team members get the latest version from the vault, so all members of the design team work together.

So how does Autodesk Vault do this? Let us break this down into focus areas as below:



ENTERPRISE



USERS



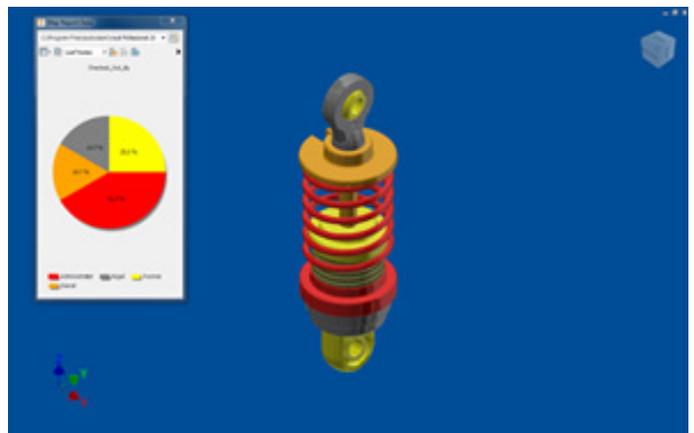
PROCESS

Enterprise

An important element to any business from an enterprise perspective is security, whether that be user access security or data centralisation for backup procedures. With Autodesk Vault, security is a central and integral component of the system. With integrated Vault or Domain users and groups, alongside the ability to secure access to your data at a very granular level when required. Depending on your configuration, you can prevent unwanted changes to design milestones and automate change approval processes, even improve compliance with client, governmental and regulatory bodies. All in the confidence that all your data is central, secure and easy to backup.

Reporting is an important element of most business-critical systems, so why should design and engineering data be any different. Autodesk Vault can map analytical report data directly onto a CAD model within the CAD application. Highlight and quickly select data based on status, compliance, material, lifecycle state, amongst others. Share data and status updates to the wider business using dashboard style reporting tools, meaning everyone has the level of information they require, when they need it.

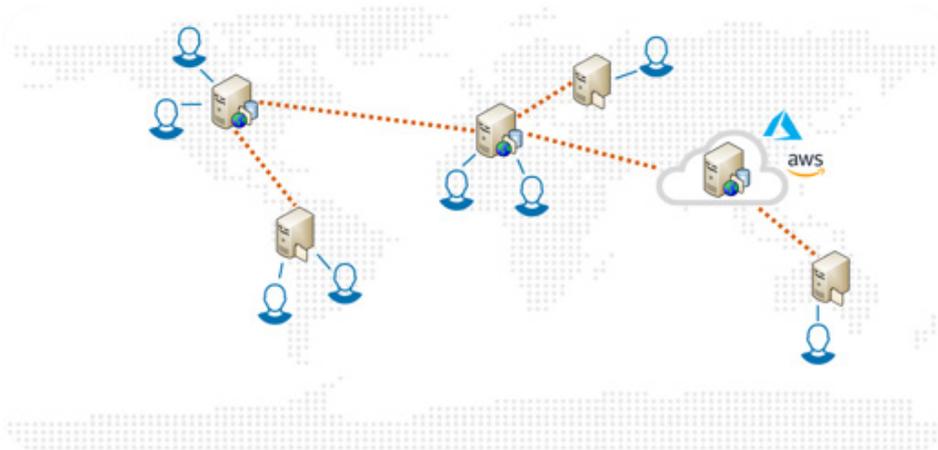
Number	Quantity	Title	Revision	Status	Latest	Obsolete	On/Off
100-001	-	100-001	B	Work in Progress	False	True	
200-174	1	200-174	A	Released	False	True	
200-171	7	200-171	B	Work in Progress	False	True	
200-172	2	200-172	B	Work in Progress	False	True	
200-169	7	200-169	C	Work in Progress	False	True	
200-124	1	200-124	A	Work in Progress	False	True	
200-094	1	200-094	C	Work in Progress	False	True	
200-133	1	200-133	A	In Review	False	True	
200-132	1	200-132	A	In Review	False	True	
200-131	1	200-131	A	In Review	False	True	
200-117	2	200-117	A	Work in Progress	False	True	
200-116	2	200-116	A	Work in Progress	False	True	
200-117	2	200-117	A	Work in Progress	False	True	
200-114	1	200-114	A	Work in Progress	False	True	



How Data Management Solves Business Issues

Although full time CAD users will typically require a full license of the Autodesk Vault Client. There are opportunities to introduce other business users to all the data you have stored within Autodesk Vault. This could be through Vault Office, which provides an access route for those wanting to interact with Microsoft Office data, such as Word and Excel. Another option is via the Autodesk Vault Thin Client, which is a web-based interface for as many users as needed to gain access to Read Only released data. Lastly, Autodesk have recently previewed a new mobile viewer for Autodesk Vault, giving those on the same network remote access to the relevant data required, without being at their desk.

More and more businesses have distributed assets, whether this be different manufacturing locations, separate design offices or independently located members of staff. This can present a communication issue, with disparate data, multiple versions of the same data or poor data access routes. That is why Autodesk Vault can facilitate Multi-Site Replication, with different configuration options to suit your infrastructure and access demands. Allowing you to deploy Autodesk Vault across multiple country sites or internationally as required.



Connecting your enterprise systems with Autodesk Vault, helps to ensure smooth collaboration with other departments and data types. Whether this is Enterprise Resource Planning (ERP) applications, such as SAP, Microsoft Dynamics or Sage, or perhaps another Document Management System (DMS) such as Microsoft SharePoint or Documentum. Through to a Product Lifecycle Management (PLM) platform, such as Autodesk Fusion Lifecycle, SAP PLM or Aras. Autodesk Vault has several direct enterprise integrations available and for less common scenarios, there are always options. Together Autodesk Vault with your wider business units and systems can bring your data closer together and easier to access for those who need it, at the correct time.

When it comes to collaborating or sharing information with external parties, Autodesk Vault can share a visual representation of your model or design data online. For example, create a shared view for a customer to request approval or to provide easy access to your field sales team for on-site presentations. The provided link enables anyone to view and comment, without needing any Autodesk applications installed. An email is sent when anyone comments on the shared view, along with feedback within Autodesk Vault, allowing you to keep up to date with any change requests from external parties.



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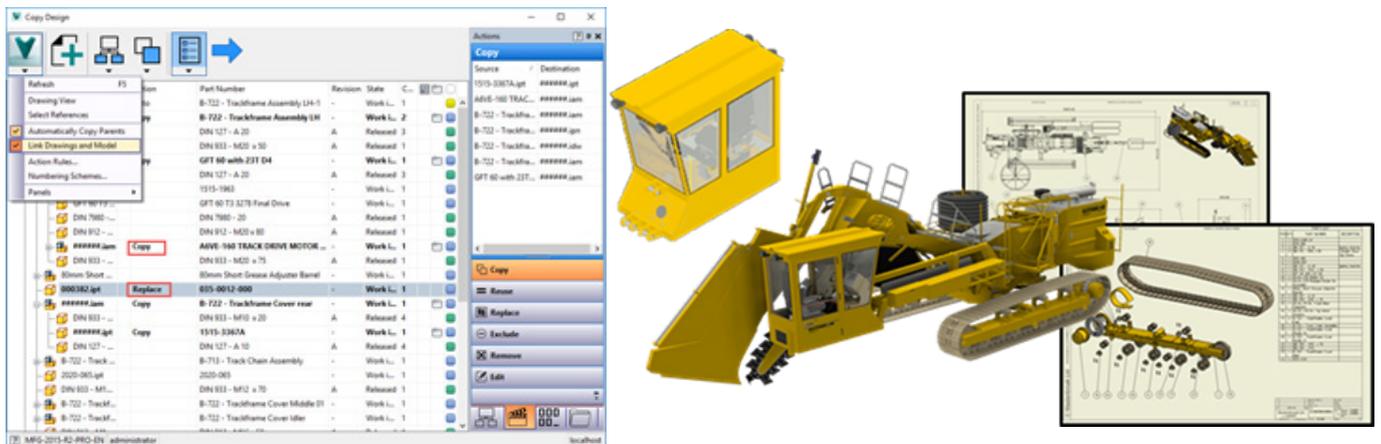
For those looking for wider integration with your supply chain or customers when Autodesk Vault is combined with either Autodesk BIM 360 Docs or Fusion Team. A project sync can be configured, providing the ability to synchronise files and folders between Vault and these supported Autodesk cloud drives. This capability can be automatic or manual and configured to work in either direction or both directions providing simple and reliable two-way communications between project team members.

Users

As discussed in the introduction earlier, there are huge time savings to be had from improved searching and reuse of design data across a business. This is a pivotal reason for many companies to review and adopt a Data Management solution. One that Autodesk Vault holds strong at its core, with data metadata indexed and organised within a Microsoft SQL database. Providing a powerful way for users to search and find exactly what they need, by the snippets of information they may know at the time. For example, two users are trying to find a piece of data, it does not mean they will be searching for it with the same terms. One of the users may know the data by its Part Number or Stock Number, the other may be looking for it by Material or Finish. The power of indexing and storing all metadata gives the flexibility for both users to find the same data, but not necessarily from the same entry point.

Compared with a standard Windows folder structure, where everyone must find a file by just its name, you can quickly start to see the advantages and how a Data Management system can expedite this regular task.

When it comes to design data reuse, Autodesk Vault includes the ability to completely copy a design. Not only copying or reusing files where applicable, but also deciding where the new files should be located, what the new names should be and updating any relevant metadata along the way. Providing designers and engineers with a quick way of duplicating a complete design, ready to make a few adjustments for the latest customer requirement. Or perhaps the beginnings of a new design concept with several carry over components from existing designs.

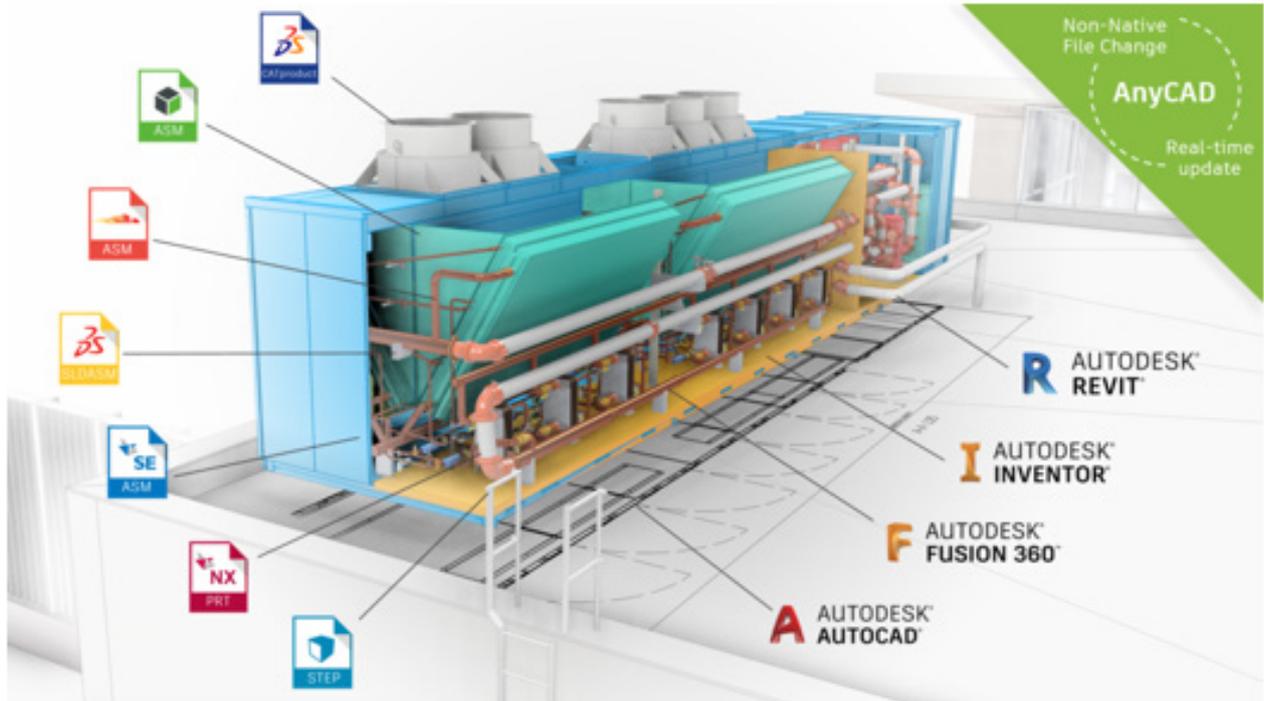


For larger projects it can be common for a few users to be working concurrently on a design. This can present a large logistics and communication overhead, with each user working on isolated components or areas of a project. So how does each user ensure that they have the latest and most up to date version of the data they are working on? How do the users ensure they are not overwriting each other's work? What methods do they have to capture the current status of the overall project, alongside individual progress? With Autodesk Vault, concurrent design can be accomplished in a streamlined way, with each user having access to a single and latest version of each file. Along with status icons to enable them to track which files may need to be refreshed. Combined with reporting to generate an easy review method of the overall and individual status of a design throughout the process.

One important development in Autodesk Inventor over recent years has been the Any-CAD translator. This gives designers and engineers a powerful toolset for importing and reusing data from many different sources. Streamlining the integration of third-party data from suppliers/clients or perhaps needing to work directly with other users with different applications. This is an enormous time saver, whilst also ensuring that the most up to date information is used.

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But alongside this, we want to ensure that all this data can be centralised, searched and referenced in an uncomplicated way for all involved. Autodesk Vault is constantly developed alongside our design tools, meaning that Any-CAD is directly compatible. Allowing any of these third-party file types to be directly added to Vault alongside native file formats, building a complete and unified dataset.



A big problem area we come across regularly is where companies are using design applications utilising data relationships. For example, Autodesk Inventor assemblies linking to relevant parts, drawings, images or spreadsheets. Maybe Autodesk AutoCAD drawings with external references (xrefs) between documents. This is where traditional methods of storing the information in Windows folders can really start to fail. With links between files being broken by renaming files, reorganising data into different folders or accidentally deleting data. Autodesk Vault indexes and constantly monitors relationships between files, allowing users to simply rename or move a file, with the confidence that the next time they try to open the documents everything will still be found and in the right place. In addition, users will gain insights into where files are used, for example, which products use a particular component. This allows businesses to fully appreciate the impact of a design change across several different designs.

Lastly for users and the wider business is project organisation, which Autodesk Vault can help facilitate in several ways. Whether it be simple solutions, such as folder structuring to more detailed project/review reporting. With object or folder level security to help provide the right people with the correct visibility and access within each project. In addition, Autodesk Vault offers the opportunity to categorise objects and folders, with automatic assignment of lifecycles, revision scheme and metadata. Metadata (such as Inventor iProperties and AutoCAD Attributes) can be viewed and edited directly within the Autodesk Vault client, directly synchronising back to the native design data. Giving you the flexibility to organise your projects and documentation however you need it across the business.

Process

Freeing up designers from manual and repetitive tasks, can offer massive productivity benefits. Autodesk Vault will automatically synchronise both metadata and revision tables with design files during a release process. Whilst providing an option to consistently convert CAD data into alternate file types, such as STEP or STL. Visualisation files such as Autodesk DWFx or PDF can be produced and filed within your project structure, providing all the right data where you need it and in the correct format for others downstream.

Alongside design content, many organisations need to organise and manage standard component libraries.

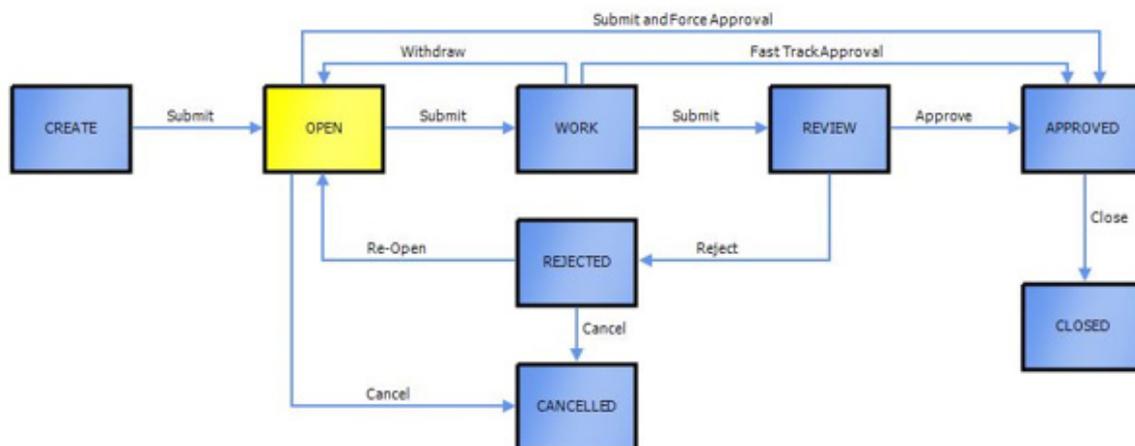
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Whether this is in conjunction with Autodesk Inventor Content Center, which is a library providing over 750,000 standard components, such as Bolts, Washers, Nuts, Steel Sections and Bearings, or independently published components created by users. All this content, regardless of creation method will be managed in Autodesk Vault, with the same security constraints you would apply to your design data.

One subject, which organisations often raise around Data Management and can struggle with through more manual processes with Windows folders or offline visualisations relates to document Lifecycle & Revision Management. This is another core component of Autodesk Vault, not only from the perspective of automating the process, meaning an accurate and streamlined system. But also provides a full audit trail for businesses to fully understand the product development, why certain directions were taken or choices were made, and how a design went from concept to final release. This brings with it more levels of security, providing the ability to lock files at a released state, preventing users from making changes without going through the correct processes. Whilst also assisting with released product events, to help with spares records and instructional documentation. This could also form part of your business standards and accreditation processes, digitally recording all steps in a products development lifecycle.



Lifecycle and Revision Management provides an opportunity to introduce different levels of digital document approval. There are built in functions, such as user or group security on workflow transitions, meaning that only certain users can move a file to a particular state. For example, you may only wish to have Senior Engineers or Project Managers move a components status from Review to Release for Manufacture. For more involved processes, where you may want to control approval, lifecycles can be linked with the Autodesk Vault Engineering Change Order (ECO) management system. This can be configured to unlock files when a change request has been logged and progresses to a specific stage in the process. Providing a full audit trail and email notifications along the way. There are further opportunities for multiple pairs of eyes checks throughout your lifecycles, so the options are there however you need Autodesk Vault configuring. Building a digital approval process enables everyone to adhere to one process in a simple way, without impeding important design and development work.



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Engineering Change Order management (ECO) as already mentioned, can help replace manual change requests/orders. Or perhaps introduce this type of record for those not currently documenting and tracking this type of information. Allowing all users within a business to add design change requests, from goods in to manufacturing or quality control to sales/service. Achieving a complete record of changes, however small, across your product range, ensuring that your product is the best it can be throughout its lifecycle.

Conclusion

Returning to the start of this document, the three topics that Data Management is focused on is Data, People and Process. Hopefully this document has shown the typical issues experienced within these key areas, how Autodesk Vault can address these and how implementing a Data Management strategy can have far reaching benefits across an organisation. Allowing all users to have secure visibility of the correct data, at a time and location they require.



DATA



PEOPLE



PROCESS

Ultimately, implementing a Data Management solution should help speed up product development and improve internal/external collaboration. There are a vast number of other topics discussed in this document, which may also resonate with you and your business, however these two areas alone can provide the following benefits:

- Track changes, revisions and design history automatically as you work
- Reduce waste and streamline your product data with intelligent search capabilities
- Control what data people can access and edit based on their roles and projects
- Share data with customers, suppliers and design contractors
- Connect workgroups across multiple sites in different locations

World-class manufacturers are 30% more likely to use Data Management or Product Lifecycle Management (PLM) to manage their design data; these top performers also spend 25% less time on non-productive data management tasks. Data Management is likely to have a positive impact on your efficiency and productivity, too.

To discuss your needs and evaluate how a Data Management solution could benefit you and your business, please get in touch with us today by emailing info@symetri.co.uk.

Together we can help you digitise and streamline your product development lifecycle with greater visibility and collaboration throughout the process.