CHOOSING THE RIGHT CLOUD SaaS PLM BUYER'S GUIDE

Tech-Clarity

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PLM is the Digital Backbone for Manufacturing

Considerations for Digital Transformation with PLM

The pace of business is accelerating and companies must digitally transform to compete. Our research finds that PLM is critical to manufacturers' digital transformations and initiatives like the digital twin and the digital thread[1].

Today's PLM system must serve as the product backbone of the digital manufacturing enterprise. But too many companies are stuck on old, outdated versions of their PLM system or need to move to the cloud to support their goals. Cloud SaaS can provide the modern, full featured PLM capabilities companies need while increasing agility, speed, collaboration, performance, availability, and security and simultaneously reduce cost, time to value, risk, and IT overhead.

Not all "cloud" solutions, however, support digital transformation in the same way. Manufacturers should closely examine their requirements and be careful not to trade off essential PLM capabilities to meet those requirements. What do manufacturers need to consider as they plan to adopt cloud PLM?
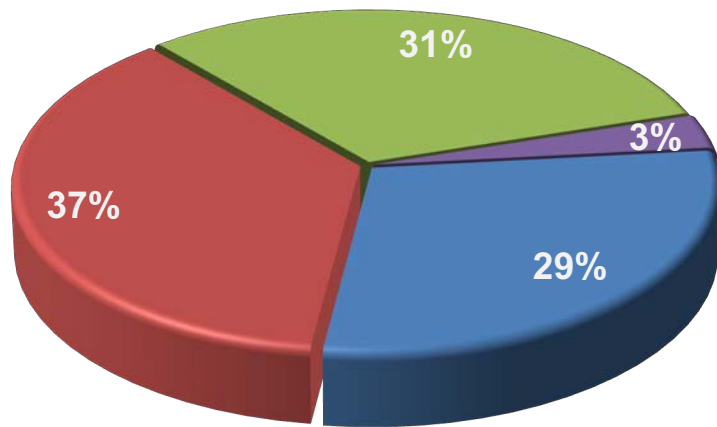
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Table of Contents

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Cloud PLM Adoption Questions Shift

USE / VIEW OF PLM[1]

- ■ Currently Using
- ■ Planning to Use
- ■ Open to Using
- ■ Not Willing to Use

The Shift from "If" Cloud PLM to "When and How"

As recently as our 2019 buyer's guide we observed that more companies were starting to ask "why <u>not</u> the cloud?" instead of "why consider cloud?" Although some companies and industries may still have obstacles that prevent them from moving to the cloud, cloud PLM solutions are quickly becoming the preferred approach. Our research shows that over one-half of manufacturers are considering cloud and about one-quarter already leverage the cloud to support product innovation and manufacturing[1]. Now the questions are "when and how?" to adopt Cloud PLM.

Navigating the Options

Choosing to move to the cloud is just the first step. There are still important decisions to make. The deployment choice impacts important factors including cost, security, resource requirements, performance, availability, upgradability, risk, and time to benefit. While it's clear that the software industry is moving to a cloud SaaS model overall, not all cloud PLM solutions are following that model. Manufacturers need to go deeper into the deployment model than just "cloud." This guide helps companies navigate the options and choose the best-suited cloud PLM solution for their business.

Still a Solution First Approach

Although the priority for cloud solutions has increased, our surveys still show that the majority of companies put a higher priority on PLM capabilities than cloud deployment. They recognize that they don't just need a cloud PLM system, they need a fully-featured PLM system on the cloud. Over ½ of companies stated that they were willing to give up "very little" or "no" functionality as a tradeoff for the IT benefits of the cloud.[2] Companies are still not willing to shortchange functionality in this crucial area, effectively taking a "solution first" approach as opposed to a "cloud first." Therefore, it's important to evaluate the functional capabilities of a PLM system to ensure it will deliver the significant top- and bottom-line benefits they need from PLM.

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Increase the Value of PLM with SaaS

Target Value Beyond Basic Cloud Benefits with Cloud SaaS PLM

Cloud SaaS computing offers numerous benefits over traditional on-premise implementations. We see cloud value along several dimensions:

- IT benefits like increased performance, scalability, and security
- Implementation advantages including lower cost, faster time to value, and reduced risk
- Operational benefits such as better disaster recovery and faster upgrades

These benefits are applicable to almost any cloud SaaS solution. Cloud SaaS PLM offers additional strategic benefits that help manufacturers gain more value from PLM including improving product development collaboration, supporting global design strategies, quickly onboarding new supply chain partners, sharing designs securely, and supporting remote product development.

Take Advantage of Traditional Cloud Benefits

Although the strategic value of the cloud is compelling, it's important not to overlook the general benefits of Cloud SaaS solutions. The right cloud PLM offers all of the benefits PLM provides at a lower total cost of ownership (TCO), leading to greater return on investment (ROI). And as mentioned above, cloud SaaS benefits are not just cost-related. The cloud makes software implementation and adoption faster and less risky than traditional deployments. This enhances benefits by providing the value sooner, and with less risk. It also allows companies to faster and more reliably take advantage of upgrades and new functionality. For more traditional benefits of the cloud, please see our Cloud PLM Buyer's Guide 2019.

Scalable performance
Reduced risk
Cost savings
Agility
Flexibility
Advanced security
Infinite computing
User scalability
Enhanced performance
Reduced reliance on IT
Faster time to value
Shift capital to expense

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Buyer's Considerations

Cloud Evaluation

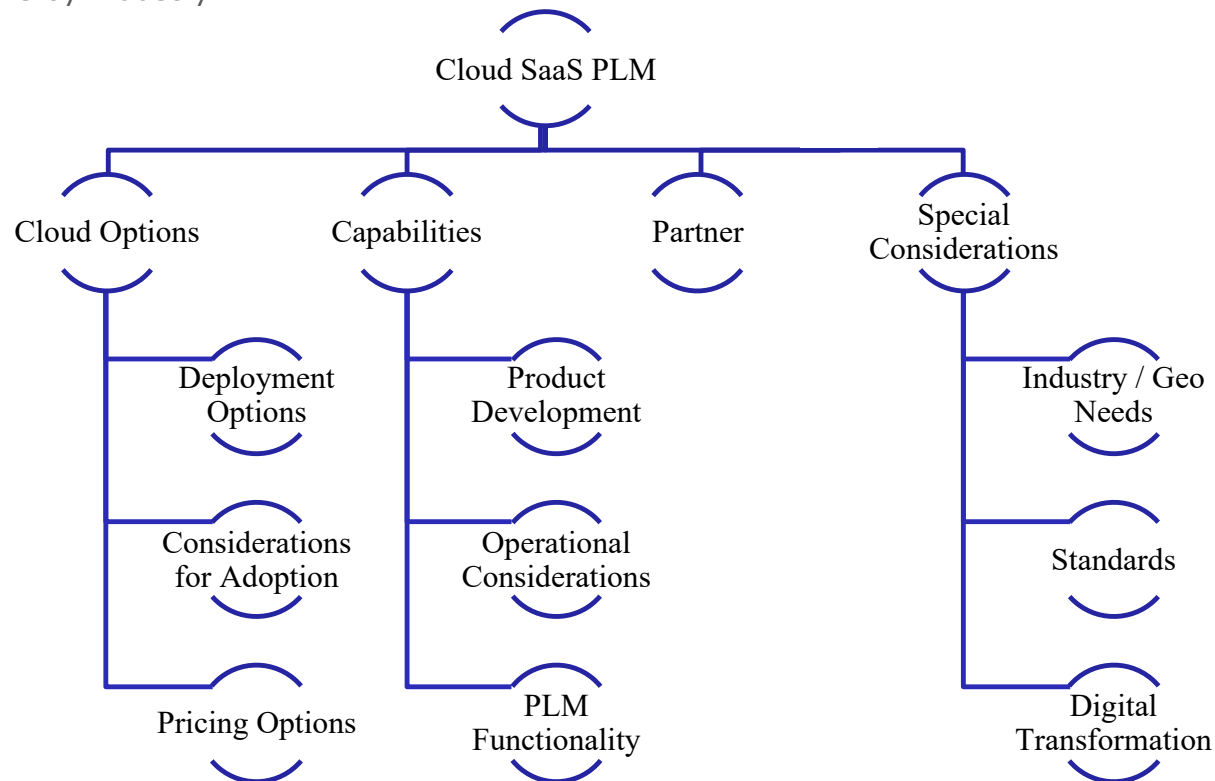This guide focuses on the needs for choosing the right PLM deployment option, including:

- Deployment and pricing options and impacts
- Points important for adoption
- Criteria impacting product developers
- Operational Considerations
- Functional needs
- Special considerations by industry and geography

Additional Requirements

The guide also introduces important criteria to ensure your solution will grow with you in the future and help you gain more value over time. For example, the guide touches on some special considerations to support the digital enterprise. We'll also introduce vendor considerations, which are some of the most important factors for success.

Buyer's Guide Scope

This guide assumes that companies recognize the strategic value that a PLM system offers. This is not an overview of PLM value or a full requirements list for selecting one. It's intended to highlight the more important factors to focus on during the SaaS transition, the ones that are critical to achieving value from the solution and those that help companies choose between solution and deployment options.

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                          Cloud SaaS PLM

    Cloud Options      Capabilities      Partner      Special
                                                    Considerations

    Deployment         Product                      Industry / Geo
    Options            Development                   Needs

    Considerations     Operational                   Standards
    for Adoption       Considerations

    Pricing Options    PLM                           Digital
                       Functionality                 Transformation
```

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Review Deployment Options

Evaluate Deployment Options

In addition to choosing a solution to drive business benefits, it's important to evaluate deployment options. There are plusses and minuses of each, as discussed in our *PLM License and Deployment Flexibility Puts PLM in Reach* eBook. Companies should understand what's included from the vendor, including infrastructure like hardware, operating systems, and database management systems. It's also important to understand the impact of deployment options on services such as backups, upgrades, DevOps, performance tuning, regulatory standards, integration, security, and support.

In addition, it's important to understand the impact on functional capabilities like remote work and supply chain collaboration. For example, while traditional solutions offered in a managed service environment may deliver some important "cloud" benefits they are not as inherently designed for mobile, remote, and collaborative works as native SaaS solutions.

The following deployment options are available for PLM solutions:

- **Software as a Service** (multitenant) - Architected for sharing infrastructure and services across customers with a common application in a common environment; managed by a service provider
- **Software as a Service** (single tenant) - Architected for application, infrastructure, and services in a dedicated customer environment; managed by a service provider
- **Managed Service** - Deployed and managed for a customer in a cloud environment; managed by a service provider
- **Infrastructure as a Service** (IaaS) / Hosted – Companies deploying software on public cloud infrastructure; self-managed
- **Private Cloud / On Premise** – Traditional deployment on private or company servers; self-managed

It's important to recognize that there are significant differences in these deployment options and not all cloud solutions offer the same benefits. Companies should understand the functional and operational tradeoffs between the variety of "cloud" options. For some companies, the right decision might be to stay in an on-premise model until their solution and their company are ready to make the transition.

Cloud SaaS PLM Solutions:

- Deliver value more efficiently by leveraging shared resources
- Allow companies to achieve benefits more rapidly
- Offer lower business risk
- Allow companies to achieve a higher level of computing capability

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Considerations for Adoption

Ease Implementation

Many cloud benefits and considerations are related to implementation. Cloud software lowers the barriers to getting a system up and running so companies can recognize benefits sooner. For example, a cloud SaaS implementation doesn't require implementing operating systems (OS), database management system, or other infrastructure software. There is no hardware to specify, procure, and provision. It also eliminates the need to hire and train people to support them. In addition, it helps eliminate the need to create complex data replication strategies by geography. These factors make it faster and less burdensome on IT to get new environments up and running quickly, including pilot and test environments.

Cloud solutions also allow easy expansion to new users and new capabilities on an as-needed basis. The SaaS model allows more agility by making it easy for companies to add new features or functionality by updating their subscription with no need for additional software deployment. Cloud SaaS offerings also more frequent and seamless upgrades to avoid user disruption and make new capabilities sooner.

Streamline the Process

Cloud solutions can also encourage a more out-of-the-box implementation with less customization, further reducing time and resource requirements. This may be an opportunity for companies to de-customize and streamline their business processes to match industry best practices. But they should make sure that the solution offers the ability to tailor workflows to company needs. Solutions that offer tools to help with data migration, while not unique to the cloud, can also help speed implementation and adoption. The cloud also enables easier access by the vendor or their partner ecosystem to offer adoption services to streamline the process on a global level.

Encourage Adoption

Beyond technical aspects, cloud PLM can reduce the effort required to get users to adopt the system. Cloud PLM is more likely to be delivered in less complex, role-specific "apps" that are easier to learn and use. Effective cloud-based training tailored to specific roles and responsibilities can further reduce the learning curve. One final consideration for user adoption is to look for solutions with preconfigured best practices to avoid taking the time to reinvent the wheel.

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Evaluate Pricing Options

Select the Right Pricing for Your Company

Some decisions aren't related directly to the PLM solution but instead to how companies pay for it. The options vary in regards to whether your company purchases perpetual licenses, a subscription, or SaaS. Each model has positives and negatives. Ideally, companies should look for flexibility in purchasing options from their vendor of choice.

Start Small and Scale

One of the key considerations for pricing models is the ability to start small and scale. Companies should look for flexibility to adjust the number and the mix of solutions and users as their needs change. Many pricing models now provide the ability to access more capabilities within the solution without having to pay by "modules." It's important to understand how quickly changes to user counts, solution mix, and other factors can be implemented. This can help companies achieve and expand benefits much faster.

Put a Premium on Flexibility

Pricing options result in lower barriers to entry, increased business agility, and reduced risk. Of course, it's important to understand the cost variability that comes with flexibility, and to have clear, advanced visibility to potential overages. Companies should also understand the impact of upgrades and maintenance.

Align Costs with Usage

Finally, some pricing models, such as subscriptions, have accounting impacts that many companies find favorable because they shift hard to justify capital investments into operational expenses. This aligns costs with usage and avoids the need for complex software amortization. Most solution providers now offer subscription-based pricing and we expect to see "pay as you go" options continue to grow based on benefits for both vendors and customers.

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Product Development Needs

Provide Global Reach

Product developers are some of the biggest recipients of PLM benefits. For example, the cloud facilitates global reach to help companies move from operating independently in different regions to a harmonized global model. This allows them to adopt strategies to securely "design anywhere, build anywhere" and/or produce closer to customers. Cloud systems are simply easier to deploy, scale, and tune across disperse geographies to support global operations.

Enable Collaboration

Another strategic value for product developers is the ability to collaborate more effectively with others. Collaboration is an important value driver for PLM, and the cloud opens up more opportunities and easier ways to achieve them. Cloud PLM helps support today's more dynamic value chains with the ability to quickly connect and collaborate within the company and with suppliers, customers, or regulators. Access permissions and built-in security should allow collaborators to log in and add value from anywhere while product IP remains protected.

Support Remote and Mobile Workers

A closely related benefit is support for the remote and mobile workforce. Cloud systems are easier to extend to mobile devices to ensure that decisions and approvals are made in a timely fashion to support faster time to market. They are also more accessible by remote workers, for example those working from home offices.

Empower Digital Innovators

Finally, product developers will benefit further from the transition to the digital enterprise, including capabilities that are more logically cloud-focused like supporting the digital thread across the value chain and IoT. This has highly strategic value, and is covered further in the Special Considerations section of this Buyer's Guide.

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Operational Considerations

Examine IT Benefits

IT plays an active role in supporting the business by supporting PLM and its underlying technical infrastructure and technology stack. Cloud solutions help IT directly by offloading responsibilities to the cloud provider so internal resources can focus on more value-added activities. The provider leverages centralized resources to perform common, repetitive tasks and is typically responsible for applying patches, maintaining infrastructure, updating the technology stack, ensuring version compatibility of supporting systems, performance tuning, backups, upgrades, and more using a DevOps approach. They're also responsible for important activities like business continuity and disaster recovery and providing highly specialized resources for critical IP and security needs. Because the cloud provider can monitor and analyze system usage and performance at scale, they can provide services like load balancing, autoscaling, and performance tuning much better than on-premise implementations.

Understand Cloud Impacts

Cloud PLM brings new considerations for IT. For example, determining how to help the business adopt more frequent upgrades to take advantage of new capabilities sooner. Your company may also need to consider the physical location where data is stored, particularly if you are supporting operations in Europe. It's also important to recognize that integration with other systems such as ERP and MES may change to adopt cloud integration approaches. Look for open, standard, well-documented APIs. IT can also help companies take advantage of areas where the cloud offers unique technical benefits due to elastic / infinite computing for analytics, simulation, and other compute-intensive processes.

Engage on Options

IT must review their options carefully, because things aren't as simple as "cloud" versus "traditional" or "on premise" (see Deployment Options). There are significant differences between a multi-tenant SaaS solution as compared to a traditional solution hosted on the cloud. IT should take the lead in developing requirements for performance, availability, and security supported by a Service Level Agreement (SLA) with incentives to ensure defined performance objectives are met. IT should also examine advantages common to SaaS solutions that allow for more control and agility for support and to manage users, subscriptions, permissions, configurations, and more without needing to communicate or rely on the software vendor.

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Choosing the Right PLM

Functional PLM Evaluation

Tech-Clarity's Buyer's Guides are intended to help companies understand the key criteria to evaluate when selecting a solution. Companies must also conduct a thorough analysis of PLM functionality. You can find functional requirements in our industry and functionally-oriented buyer's guides including our *Choosing the Right PLM for Multi-Enterprise Collaboration, PDM Buyer's Guide, BOM Management Buyer's Guide*, or *Medical Devices Manufacturers Selection Guide*. For companies transitioning from an existing PLM system, consider using current capabilities as a benchmark or adopt a cloud version of your current solution if it is, at a minimum, a functional equivalent. Look for solutions that offer a large percentage of these capabilities out of the box with pre-configured workflows.

Look Beyond PDM

While this guide focuses on choosing the best way to transition PLM to a SaaS model, it's important to remember that cloud deployments that lack the right PLM capabilities will frustrate users, hamper adoption, and deliver less value. The right solution should cover the basics starting with PDM to help control, access, and share data. But it shouldn't stop there. That foundation should be the backbone to address enterprise PLM needs that expand beyond products to manage processes, projects, portfolios, and more.

FOUR DIMENSIONS OF PLM EXPANSION

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Choosing the Right PLM

Target Broad PLM Needs

The scope of today's PLM system has grown to support a broad array of people and processes (see graphic). Today's PLM systems provide best practice processes out of the box, but also the ability to easily create purpose-built applications from underlying PLM capabilities. They have expanded to more fully support company's digital twin and digital thread needs by expanding support across four dimensions

People – more departments beyond Engineering, including downstream to Manufacturing, Procurement, and Service; involving management; and securely extending collaboration across enterprises and the supply chain

Product – a richer view of the product, spanning across engineering domains and beyond technical specifications to cover other aspects of the product ranging from marketing and sales information to product documentation

Lifecycle – further up and down the lifecycle, to cover requirements and well into the service lifecycle where many companies make the majority of their profits

Processes – integrating process flow with associated data and supporting more processes, such as quality and regulatory compliance poses special issues.

Look Toward the Future

Leading companies take advantage of this broad array of capabilities. Our research finds that top performing companies implement twice as many advanced PLM capabilities as other companies. PLM scope, and value, will continue to expand to serve the future needs of the digital enterprise by extending the digital thread across the value chain, and new technologies like IoT, AR, and more (see Special Considerations). Companies should also keep an eye toward new innovations and solutions from vendors, such as cloud-based CAD, that leverage the unique capabilities of SaaS and the cloud.

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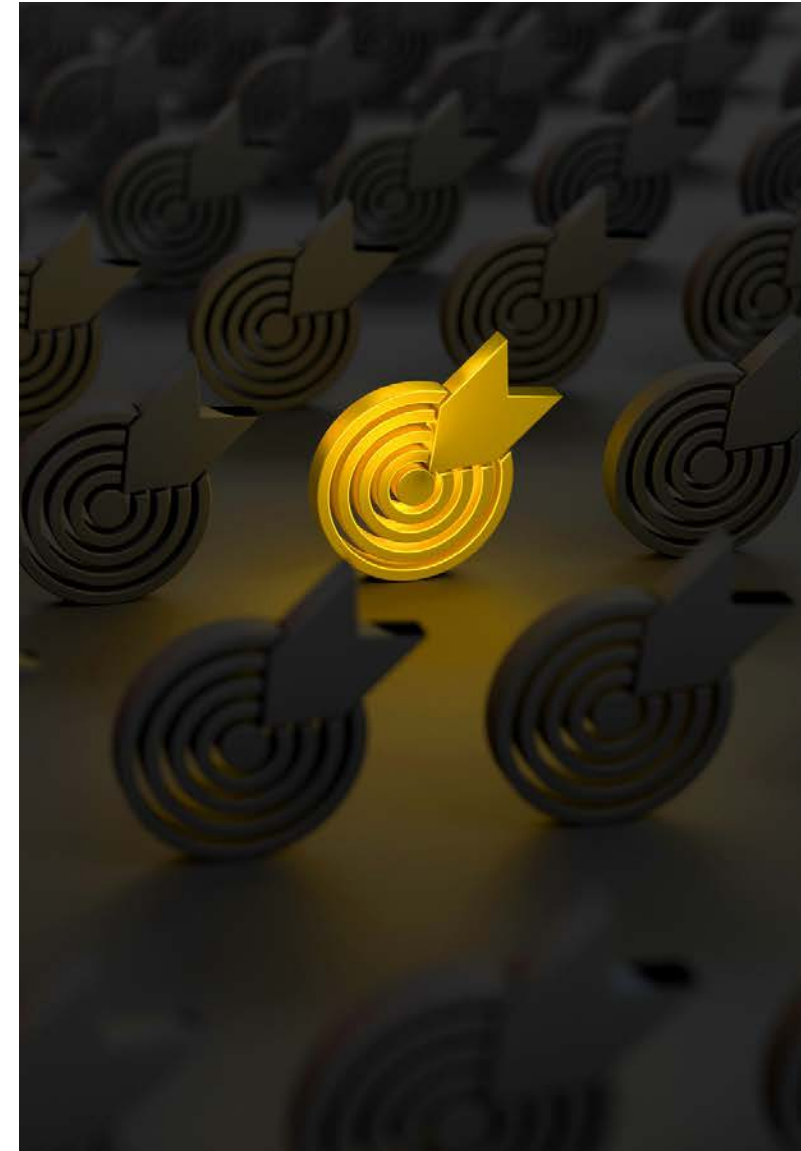
Choose the Right Partner

Find an Innovation Expert

Of all of the decisions to make, it's important to find the right cloud PLM vendor. Your PLM partner should have rich expertise in supporting product development. But don't just look at their software – evaluate the level of product development *business expertise* internally and in their partner network.

Think Beyond Today

Look for comprehensive capabilities from basic PDM/BOM Management to more advanced Digital Thread, Digital Twin, and IoT capabilities. It's best if your vendor is a couple of steps ahead of you strategically, so they can help you grow into your solution as your company matures and adopts IoT, Industry 4.0, Smart Manufacturing, and/or digital transformation strategies.

Research Cloud Specifics

Choosing a cloud provider has some unique considerations. Research whether they host their solution themselves, specify partners, or let you choose your own hosting option. Another thing to consider is whether the vendor not only supports your current deployment model choice, but if they offer multiple options in case your needs change over time.

Find Help with the Cloud Transition

Transitioning PLM to the cloud from on-premise solutions has some unique technical considerations. Look for a partner with experience and capabilities tailer to help with that process. Specific capabilities to consider include help rationalizing and reducing customization, converting data, validating customizations and configurations, and the ability to help with integration.

Cover the Basics

There are also some standard, vendor-related benefits that we include in most of our Buyer's Guides that are worth repeating here:

- Stability
- Continued investment in products
- Industry knowledge
- Size
- Presence in the geographies important to your business

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Special Considerations

Identify Unique Company Needs

Any solution selection has some special considerations to address unique needs. Some of these are based on the industries they serve and the geographies they support, including:

- **Aerospace and Defense:** may require adherence to specific PLM-related regulations like ITAR, in addition to other cloud-specific standards
- **Medical Device:** must have their processes and systems validated and should consider the impact of cloud software upgrade schedules
- **European Companies:** may need to consider where data is stored to comply with local data regulations

Conform to Mandated or Voluntary Standards

Some companies must adhere to standards applicable to cloud solutions based on customer mandates or regulations. Others may choose to voluntarily adopt objective audit criteria to ensure they meet performance and security objectives. It's important to understand which standards are important to your business. Some examples include ISO27001, SOC2, DFARS for suppliers to the US Department of Defense, and FedRAMP for broader work with the US Government.

Support the Digital Enterprise

Perhaps the most important consideration is making sure your chosen solution will support your company well into the future, aka "future proofing." Digitalization is transforming entire industries and is reshaping the competitive landscape in manufacturing. Cloud PLM plays a key role in the transition. Look for a solution that supports:

- Digital thread
- Digital twin
- IoT / IIoT
- AR / VR
- Advanced analytics

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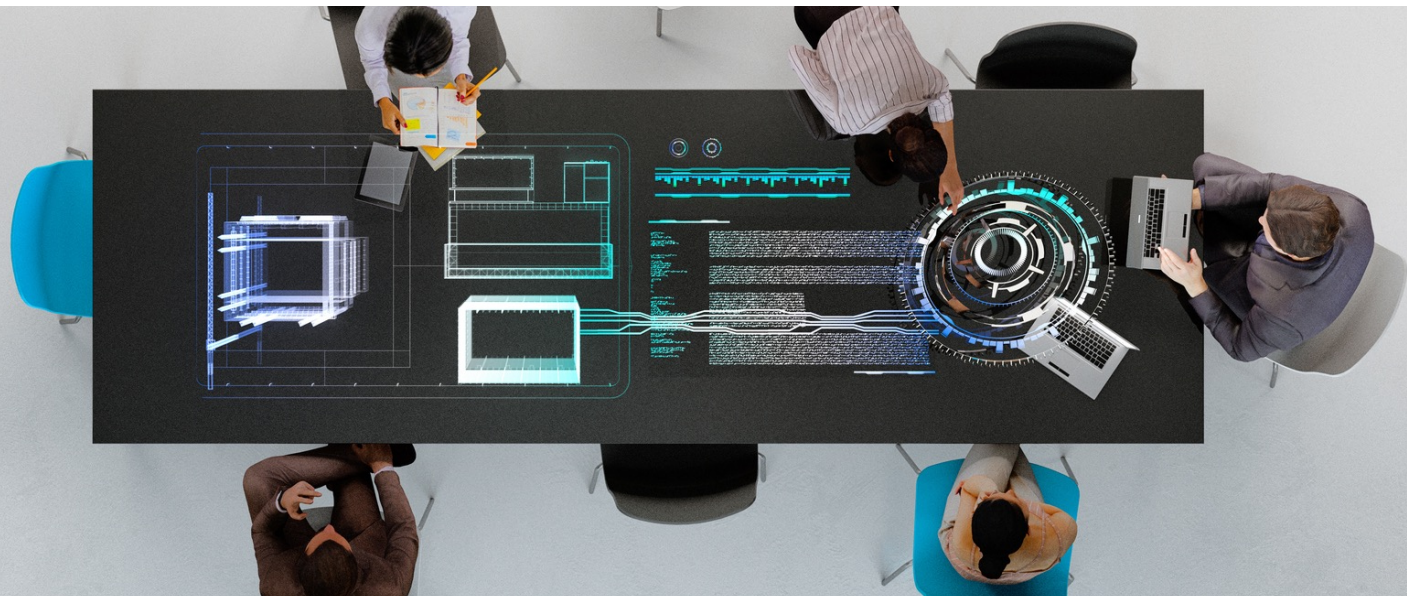
Conclusions and Recommendations

Cloud SaaS Offers Compelling Benefits

Cloud SaaS helps manufacturers achieve and extend the significant business value of PLM faster, with less risk, and lower total cost of ownership. It offers new opportunities to enhance global reach, secure design sharing, and collaboration. At the same time, it offers compelling operational benefits such as improved performance, security, access to new functionality, and scalability. But there are important things to consider when selecting a cloud PLM system, ranging from deployment options to considerations for certain industries and geographies.

Recommendations for Cloud PLM Selection

To help companies research and analyze potential solutions based on company needs, including needs that help deliver benefits well into the future, Tech-Clarity offers the following recommendations:

- Evaluate functional solution capabilities to ensure that PLM solution provides the rich capabilities required to support your business.

- Recognize that there are significant differences in "cloud" PLM offerings.

- Evaluate and select the optimal deployment and pricing models that give your business the most benefit considering cost, risk, and time to achieve value.

- Consider how the deployment approach will impact future financial and operational value during updates, upgrades, and extensions

- Consider the strategic value of cloud solutions for global deployments to support global design environments, remote workers, and secure supply chain collaboration.

- Make sure to consider the future, including the transition to the digital enterprise. We believe that manufacturers that don't digitally transform will be at a competitive disadvantage.

- Narrow down solutions based on these high-level criteria to create a smaller list of solutions to evaluate.

- Recognize that any solution selection process will require tradeoffs and understand which types of requirements are the most important to your company's success and profitability.

Acknowledgments

About the Author

Jim Brown founded Tech-Clarity in 2002 and has over 30 years of experience in the manufacturing and software industries. Jim is an experienced researcher, author, and speaker and enjoys engaging with people with a passion to improve business performance through digital enterprise strategies and supporting software technology.

Jim is actively researching the impact of digital transformation and technology convergence in the manufacturing industries.

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Tech-Clarity is an independent research firm dedicated to making the business value of technology clear. We analyze how companies improve innovation, product development, design, engineering, manufacturing, and service performance through the use of digital transformation, best practices, software technology, industrial automation, and IT services.

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