Exploring Cloud Options for
Product Innovation and Development

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It's Time for a Cloud Strategy

The shift toward cloud computing is undeniable. An increasing number of companies are transitioning to cloud solutions in order to take advantage of significant advantages, including:

- Cost reduction
- Reduced IT resource needs
- Scalability
- Agility
- Rapid deployment
- Shifting capital investments to expenses

Software for product innovation, product development, and engineering – including PLM, CAD, and CAE – has evolved toward the cloud at a cautious pace. This market is closer to the beginning of the cloud transformation than some others such as CRM and ERP where cloud adoption is already more prevalent. But it's happening.

Initial skepticism is fading away and companies are learning how to effectively manage cloud software. The market is responding with the entry of new cloud offerings and incumbents evolving to the cloud.

For manufacturers planning to implement or replace product-related software, it's time to develop a strategy that reflects the reality of today's market. The strategy needs to consider:

- Cloud delivery models
- Software capabilities and scope
- Timing and transition

This eBook is intended to provide education and insight to help manufacturers develop a practical strategy to leverage the cloud appropriately while supporting their product development processes.

"Cloud computing is generally recognized as the next generation of IT architecture. Large and small companies alike are using cloud solutions to simplify their IT infrastructure. These companies are taking advantage of lower costs, faster time to value, and increased agility."

Assessing the Cloud PLM Opportunity – Tech-Clarity

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Understanding the Options

It's important to look at both how a solution is paid for and how it is delivered to understand a cloud option. "Cloud" and "Software as a Service" (SaaS) are not synonymous. SaaS is a business model, not a technology. SaaS allows companies to take advantage of business agility and scalability, letting them pay for the solutions as they use them instead of up front. It makes software procurement easier and reduces risk because software shifts from a capital expenditure to an operational expense. In many cases switching from traditional licensing to lease or subscription offers similar benefits.

Cloud options also take advantage of shared resources that lead to lower internal IT demand, cost reduction, access to high performance computing, and scalable capacity. Options include:

- **Cloud SaaS (multitenant)** – Software natively architected for the web, shares software and databases across customers
- **Cloud SaaS (single tenant)** – Software delivered as a service on the web, typically shares software across customers
- **Managed Service** – Software deployed on the cloud and managed on behalf of the customer, allowing customization for unique needs
- **Infrastructure as a Service (IaaS) / Hosted** – Traditional deployment but using servers in the cloud
- **Private Cloud / On Premise** – Traditional deployment on company servers

Each of these options has positives and negatives that should be considered before choosing a path for your company. There are important implications in how the software is delivered and supported that need to be examined.

Comparing Your Options

Every cloud option comes with tradeoffs. This chart summarizes some of the most important factors that need to be considered and how they compare by option.

Option	Cloud Delivery Model	Shared Database	Cost Impact	Scalability & Performance	IT Resource Needs	Primary Security Ownership*	Upgrade Timing	Customization & Integration
Cloud SaaS (Multitenant)	Public Cloud	Yes	Reduced	"Infinite"	Reduced	Cloud Provider	Controlled by Provider	Limited
Cloud SaaS (Single tenant)	Public Cloud / Private Instance	No	Reduced	"Infinite"	Reduced	Cloud Provider	Limited or Controlled by Provider	Somewhat Limited
Managed Service	Public Cloud	No	Reduced	"Infinite"	Reduced	Cloud Provider	Flexible	Flexible
IaaS / Hosted	Public Cloud	No	Reduced Somewhat	"Infinite" w/in Contracted Limits	Reduced Somewhat	Cloud Provider	Flexible	Flexible
On Premise	Onsite / Private Cloud	No	N/A	Limited to Existing HW, Virtualization	High / Unchanged	Company	Flexible	Flexible

* Security is the responsibility of all parties.

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Assessing Company Readiness

Regardless of the options available on the market, it's important to understand what your company is ready for. Some questions to consider include:

- Is your company comfortable with the cloud?
- What applications are already deployed on the cloud?
- Do you already have sensitive data in the cloud?
- Are there mission critical applications there?
- Are there strong supporters (or detractors) of cloud solutions?

Many companies have guidelines for cloud solutions in their IT strategy. For example, some may dictate "cloud-only" or "cloud-first" selection criteria for new software selections. "Cloud optional" is a more common approach, although some disallow cloud solutions altogether. Product innovation, development, and engineering are typically some of the later solutions that companies feel comfortable moving to the cloud.

Companies often start with less sensitive and mission critical application areas. But security standards and practical experience with cloud solutions have more companies considering cloud for product development solutions.

The decision on if and when to move to cloud PLM will vary by company. It depends on factors including:

- Current PLM Maturity
- Existing Solutions
- Requirements and Timelines
- Company Policies
- Current Vendor Offerings and Cloud Strategies

The flowchart on the next page is an example of the decision process for a typical manufacturer.

"We expect to see more companies adopt cloud PLM, although we don't expect it to be an all or nothing shift. Nor will it be immediate. But less than one out of four companies say they will not consider cloud solutions – a significant change in viewpoint over the last several years."

PLM Beyond Managing CAD – Tech-Clarity

Sample Cloud Decision Tree
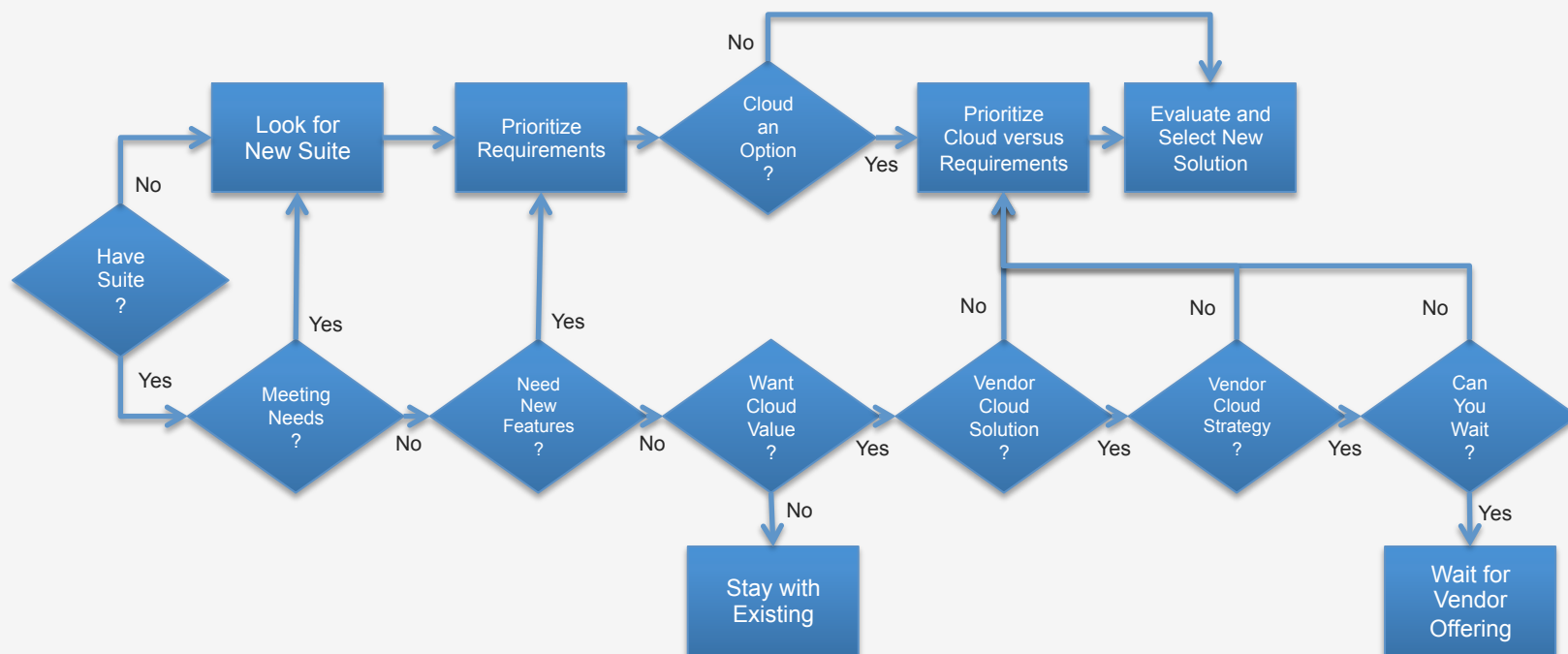
Reviewing Vendor Cloud Maturity

One of the challenges in choosing how to deploy product development software is that choices are limited by the maturity of the market. Even if your company is ready, there are significant tradeoffs between the capabilities and scope available for different deployment options. There are no native cloud PLM or CAD solutions on the market that are equivalent to the capabilities of the current market leaders.

For example, there are arguably four categories of PLM solutions available today:

- New entrants with simplified PDM/PLM solutions on the cloud
- Existing cloud PLM providers (primarily supply-chain centric)
- Traditional solutions with SOA architecture (cloud ready)
- Traditional solutions

Many of the newer entrants tend to be simpler data management and collaboration solutions. They're trying to extend the success of simple file-sharing tools from Box, Dropbox, Google Drive, and other Internet file-sharing tools to product data and processes. The

solutions hold a lot of promise, particularly for smaller businesses, but are not designed to be enterprise-scale solutions.

Another category includes existing SaaS PLM solutions. These tend to be very supply-chain, process-oriented solutions. These can offer a lot of value in the right scenarios, but are not a replacement for traditional solutions designed to manage complex CAD data.

Another category of solutions includes traditional software that has been transitioned to a service-oriented architecture (SOA). These solutions are architected to perform over the web, even if not initially delivered on the cloud. Using these solutions could significantly reduce the impact of transition by using existing vendor solutions.

Solutions must be architected properly to run effectively on the cloud! Traditional software that isn't developed around web services can cause latency and other issues that result in poor performance.

Special Cloud Opportunities for Product Innovation and Engineering
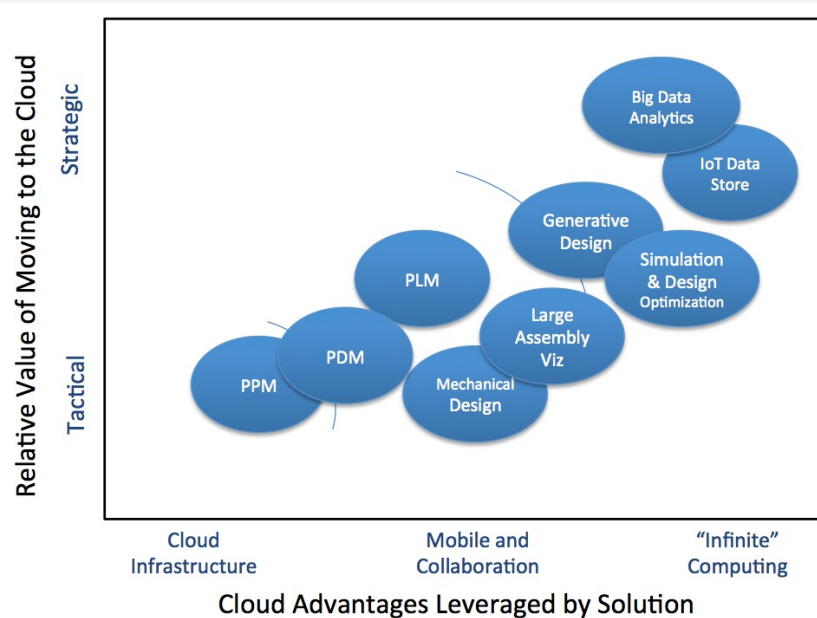
Not all cloud opportunities are equal. It's important to differentiate between offerings that simply replace on-premise infrastructure from those that leverage special cloud computing characteristics to deliver previously difficult or impossible solutions. There are some applications where the cloud offers differentiated benefits that go beyond simple cost savings to fundamentally change the way a job is done. For example, some very memory- or computation-intensive tasks can be drastically improved by applying the "infinite" computing power of the cloud.

Big data analytics is a good example. Analytics is shifting to the cloud to take advantage of computing elasticity and resources that few companies have. Companies can leverage the cloud's significant resources to develop new insights from large data sets from the plant or collected via the Industrial Internet or Internet of Things (IoT).

Simulation is another example of a solution that is well suited for the cloud. Simulation can benefit from high performance computing that most companies could not afford on their own.

The cloud also lends itself more easily to developing mobile and collaborative applications. For example, Tech-Clarity's Product Design in the Cloud explains, "*Beyond IT benefits, product design on the cloud also offers many strategic benefits for design. Since a cloud environment shares models in real time, non-value added work is eliminated so engineers and designers can complete their work in less time or use that valuable time for innovation and better designs.*"

Weighing the Options, Looking at Timing

The right strategy depends on the scope you want to deploy and how to best achieve it. Few companies "rip and replace" existing solutions to get to the cloud. So the strategy typically involves a function of what your enterprise is ready for and what your chosen vendor supports.

Companies with existing solutions should investigate their vendor's strategy and timeline, and ask whether they will help with the transition to help mitigate the potential cost and business disruption from the change.

As with any implementation, recognize that there will be costs for retraining, changes to compatible third party applications, process updates, re-integration to other applications, and more. Of course the decision criteria may be different if the solution is for a new business, program, or joint venture where existing systems aren't available and rapid startup is important.

Making the transition is not an "all or nothing" proposition. Many will start with areas that add new value first rather than replace what's working, unless already planning a major transition. Most companies will stage the transition in a multi-step program, with quite a few

Change Management Risk versus Benefits

|	**Cloud Option: Existing**	**Cloud Option: New**
Solution Implemented: New	Potential Value from New Capabilities / High Risk of Change / Low IT Change Risk	Potential Value from New Capabilities / Lower Demand on IT / Reduced Cost / High Risk of Change / Retraining Cost / Reduced Business Risk
Solution Implemented: Existing	Potential Value from Enhancements / Low Risk of Change	Lower Demand on IT / Reduced Cost / Minimal Retraining / Low Risk of Change / Reduced Business Risk

adopting a hybrid approach. For example, they may extend an existing solution with SaaS for functions where the cloud offers more than just low cost. Alternatively, they might change an existing onsite system to a managed services model without retraining users.

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Next Steps

The time is right to take advantage of the cloud, but it's not a trivial decision or transition for product innovation, product development, and engineering software. The reality of the market maturity requires companies to develop a strategy that jointly considers vendor cloud maturity, company readiness, and the availability of needed capabilities.

A considered cloud transition is important to reap the benefits without major disruption. Most companies are taking a very deliberate, methodical approach to leverage the cloud. For most, a staged program with a hybrid mix of solutions will be the most reasonable approach, as few companies can justify wholesale replacement of existing systems.

Fortunately, companies may not have to do it all on their own. They can adopt a pragmatic, staged approach that coordinates with their vendor's timeline. Many existing vendors have predefined relationships with cloud services companies and trained service providers. These partnerships can provide an IaaS or managed services approach that provides benefits without having to replace existing software. In addition, many vendors offer complementary solutions that provide unique
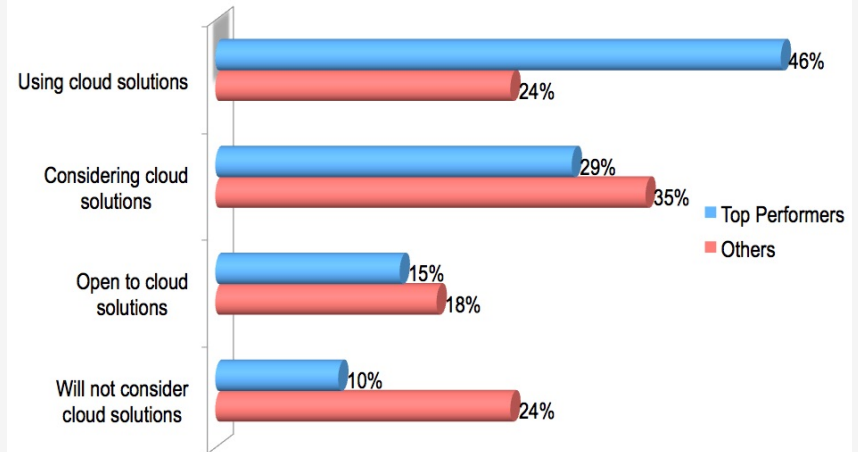
PLM Beyond Managing CAD – Tech-Clarity

opportunities only realistically available from the cloud. It's important to understand the potential of these solutions in your transformation strategy.

The transition to the cloud is underway. It's time for manufacturers to take a closer look and develop a practical strategy and timeline that works for their business.

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About the Author

Jim Brown is the President of Tech-Clarity, an independent research and consulting firm that specializes in analyzing the business value of software technology and services. Jim has over 20 years of experience in software for the manufacturing industries. He has a broad background including roles in industry, management consulting, the software industry, and research.

Jim's experience spans enterprise applications including PLM, ERP, quality management, service lifecycle management, manufacturing, supply chain management, and more. Jim is passionate about improving product innovation, product development, and engineering performance through the use of software technology.

Jim is an experienced researcher, author, and public speaker and enjoys the opportunity to speak at conferences or anywhere he can engage with people with a passion to improve business performance through software technology.

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