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Guide to PIM Implementation in the **Cloud-First World**

Empowering Innovation via Cloud-led Transformation

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Introduction

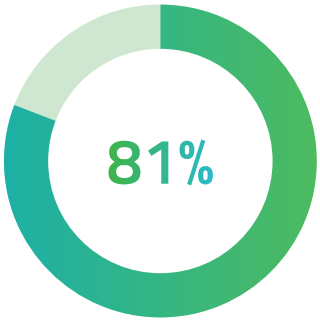
The Current State of Cloud Adoption in PIM

In recent years, the cloud has turned into an overarching element in software implementation, cutting across a host of industries. Undoubtedly, cloud adoption is gaining momentum. Organizations are weighing their capabilities, comprehending advantages, and making decisions in favor of the cloud to unlock flexibility, innovation, resilience, and scalability. In a survey conducted by **Harvard Business Review (HBR) Analytics Services**, it was reported that 67% of senior executives accepted that their organizations had fast-tracked their cloud adoption plans.

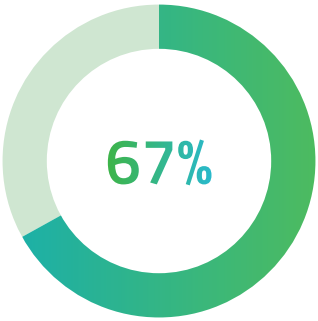
Product Information Management (PIM) implementation is not far behind. The path to the cloud in **PIM implementation** has been non-linear. While exponentially growing product data and complex and unique data management challenges have mostly been the drivers of PIM projects, the question of cloud deployment has been contingent on how feasible, fast, and cost-effective an organization finds it among all the other options viz: on-premises, cloud, and hybrid deployment.

Even though organizations want to take the plunge into cloud adoption, there are factors of increased complexities, cybersecurity, data control, privacy, undefined strategic path, challenges to integrating data, and additional costs that are seen as some of the issues in decision-makers minds.

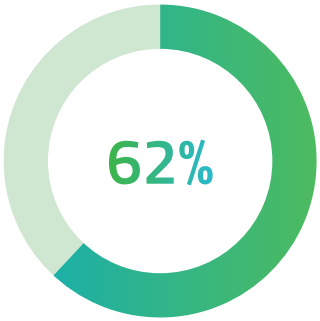
However, as most modern business systems are designed to leverage various contemporary cutting-edge technologies such as AI (Artificial Intelligence), NLP (Natural Language Processing), and IoT (Internet of Things), a fundamental shift towards the need for adopting cloud has taken place, to ensure rapid scaling and facilitation of seamless growth.



Respondents said Cloud is extremely important to their organization's future strategy and growth.



Respondents said that their organization has sped up the adoption/implementation of cloud applications, services, or infrastructure in the last 1 year.



Agree their organization struggles to keep up with evolving tech roles and responsibilities to manage cloud adoption.

Source: **HBR Report**

Observation

Mastering Product Information Complexity with Cloud

Today, PIM solutions deal with multi-layered complexities encompassing a whole host of functions such as marketing, creative, merchandising, operations, legal, finance, manufacturing, commerce, customer service, agencies, distributors, and third-party suppliers. Many of these functions are present outside of the organization but are very much part of the larger PIM ecosystem.

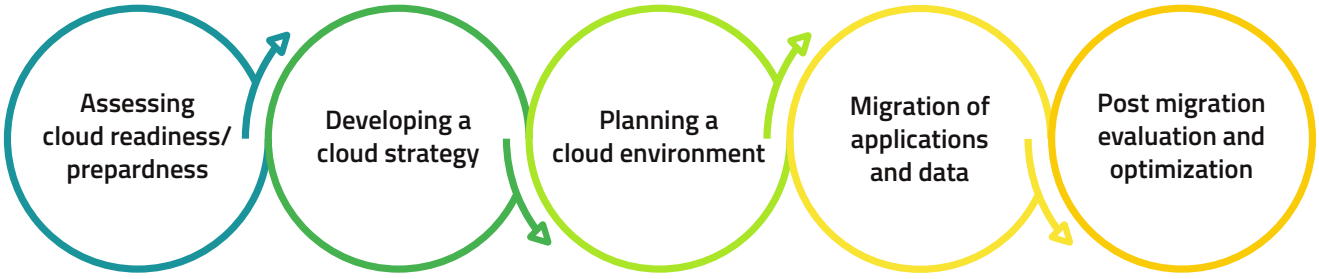
One thing a cloud-based PIM solution has been able to do is empower businesses by providing them with a rock-solid foundation for moving mission-critical systems to the cloud.
The plug-and-play nature of cloud service required for PIM solutions has eliminated business disruptions and the pressure to spend or customize the prevailing ERP, supply chain, or customer-experience CX architecture.

> *"As the overarching promise of any PIM implementation remains speeding up the time-to-market of products, improving sales, and offering impeccable product experiences—cloud-led PIM can be the gateway to freedom and flexibility required by enterprises to innovate constantly."*

Implementing PIM on a cloud-native, composable application offers excellent solutions to manage the entire journey of your product data, from the configuration of the PIM soolution to data syndicaton to downstream channels, for high performance and accuracy.

The maturity of today's **PIM solutions** has reached a point where, apart from their regular features, capabilities such as digital shelf analytics (DSA) and content generation, classification, and optimization with the help of OpenAI prompts have become standard characteristics.

From an implementation perspective, cloud service providers (CSPs) such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) offer much more competent and quick solutions to speed up the ROI and results, thereby streamlining the complexities and leveraging cloud implementation's best practices.

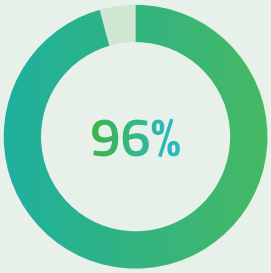


Cloud Adoption Journey for PIM

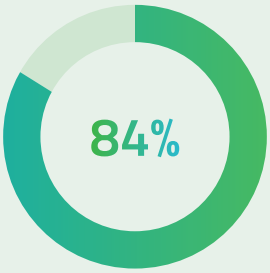
Top Cloud Computing Statistics

With global spending on **cloud computing predicted to reach $679 billion in 2024**, let's look at some key statistics around this area that may inform your business decisions.

By **2025**, there will be **200 zettabytes** (a trillion gigabytes) of **data in the world**.



96% of companies use the **Public Cloud**



84% of companies use the **Private Cloud**

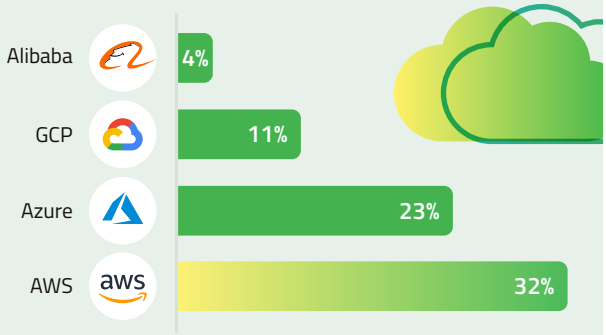
By 2026, the cloud computing market is forecast to be worth.

$947.3 billion

The main challenge facing cloud decision-makers is **managing cloud spend** (82%).

Amazon Web Services

remains the biggest public cloud provider, with 32% of the market.



94% of businesses noted **improvements in their security** after moving to the cloud.

Source: **Spacelift**

5 Step Plan for a Successful Cloud PIM Implementation

I. Assessing the Business Case: Technologically and Economically

II. Planning Cloud Migration: Leaving no Stone Unturned

III. Choosing a Service Architecture Framework for Cloud Deployment

IV. Data Governance in PIM: The Key to Maneuvering

V. Post-Cloud Deployment Assessment

I. Assessing the Business Case: Technologically and Economically

The foremost step is to thoroughly understand the system's current or 'As-Is' state, including any optimizations that have been done (validation or confirmation) right from the beginning.

Technological

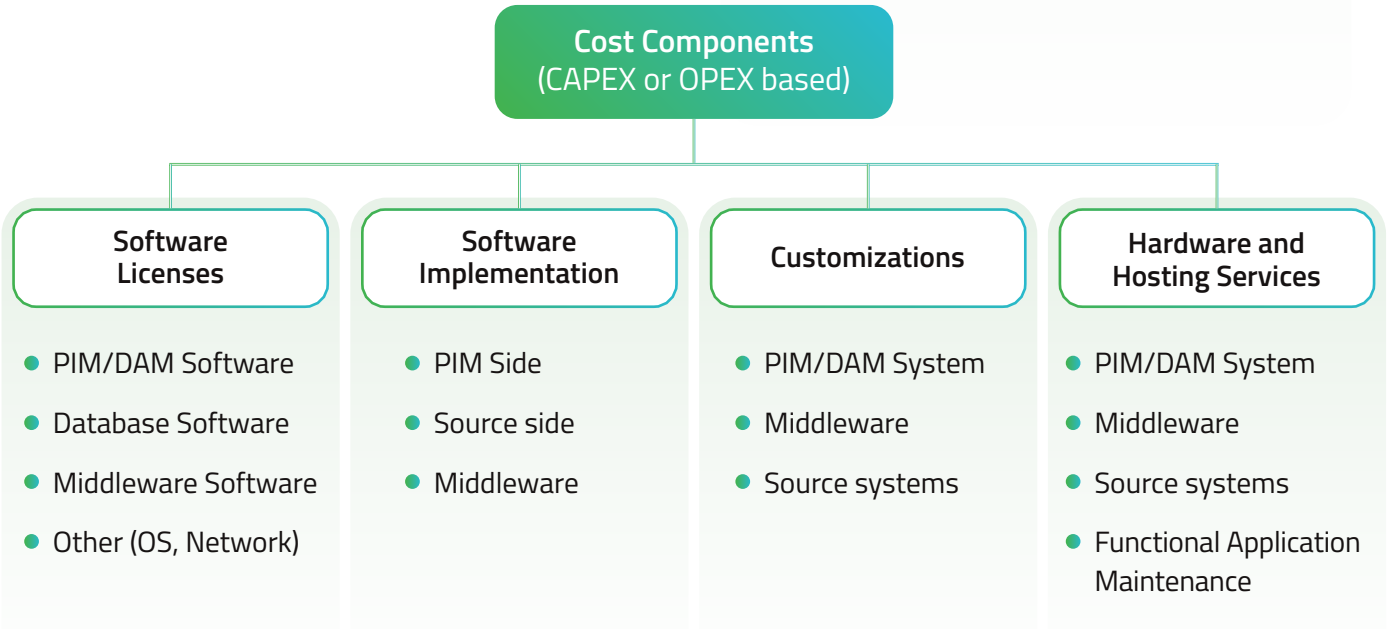
It is significant to comprehend the stack or the software landscape, application dependencies, scalability of the system, and cloud adoption preparedness by identifying the risks and challenges of migration. The next crucial step is planning and architecting the cloud environment by designing the network architecture and assessing resources and capacities. It includes evaluating needs of authentication/authorization, access needs, security and compliance requirements from data and application perspectives, integration needs (inbound and outbound), and the regions of deployment.

It is also imperative to identify the pain points related to the current state of data, document the workflows needed to manage product information, and finally gather feedback from end-users in data management by comprehending their challenges and expectations.

Economic

Before creating the business case, it is essential not to be single-mindedly focused on cost —at least not to the extent that it impairs your future significant decisions. This is primarily because, before the implementation of PIM, data is scattered across various systems, and there are numerous hidden costs associated with it, including loss of productivity.

At the same time, underestimating the costs can sabotage the plans. For instance, the data ingress/outgress cost must be determined in advance, along with evaluating cloud products and services that can be leveraged to enhance the existing PIM. The cost of external software required to work, like middleware and the latest versions of design software, must also be taken into account.

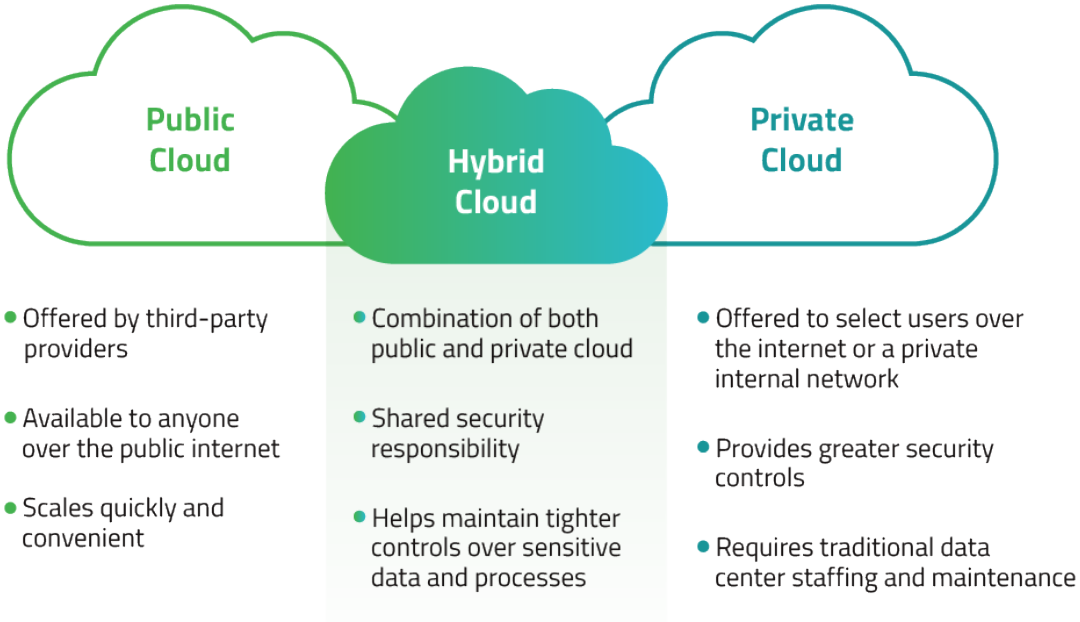


II. Planning Cloud Migration: Leaving no Stone Unturned

For a customized migration tailored to your business strategy and goals, a migration approach must be decided. Two main methods for migration are 'lift and shift' and 're-architecting.' However, in the case of PIM, preparing the data becomes an essential factor. It includes consolidating, cleaning, and validating the product data. However, since a lot of product data stays continuously in use, three main approaches to migration can be imagined.

Big Bang	In this scenario, the implementation happens all at once. All users switch to the new processes and systems simultaneously. The source data is redirected to the new system, and the channels receive input from the new PIM systems.
Incremental	In this approach, the source systems are usually able to deliver to multiple systems simultaneously. Initially, the PIM system is often used to feed the website(s) and is gradually introduced to other channels.
Shadow	This approach, also known as parallel migration, involves maintaining both systems until the new system has proven to work sufficiently well to allow for the final transition.

Teams should ascertain regulatory and compliance mandates and available alternatives during cloud migration and assess user administration options. Besides, making the right selection for the cloud type can influence migration's efficacy. The various options organizations can choose from are:



Public cloud services provide flexible, cost-effective, and easily scalable solutions; however, they can present challenges with compliance and security. Conversely, private clouds generally offer better compliance and security features but are more expensive and harder to scale. On the other hand, hybrid cloud models combine public and private cloud infrastructures, distributing resources according to compliance, security, and other business needs, thus offering a balanced and adaptable approach.

III. Choosing a Service Architecture Framework for Cloud Deployment

The choice of architecture frameworks for cloud-based PIM development is largely contingent on the requirement of the PIM solution. Each framework offers unique advantages in terms of scalability, maintainability, integration capabilities, control levels, customization, and ease of use for varying organizational needs. The choice of any specific architecture framework is especially relevant if the PIM is being built from scratch. Some familiar service architecture frameworks for PIM cloud deployment are mentioned below.

Monolithic Architecture

The PIM is implemented as a single, unified application.
It is simple to develop and deploy but can become cumbersome to manage and scale as the application grows.

Example: A traditional PIM system where all modules (product data, user management, reporting) are integrated into one package.

Microservices Architecture

The PIM development is divided into smaller, independent services that communicate through APIs. This structure offers greater flexibility, scalability, and ease of maintenance as each service can be developed, deployed, and scaled independently.

Example: A PIM system where product catalog management, data enrichment, and user authentication are separate microservices.

Serverless Architecture

The PIM development relies on cloud services to manage the server infrastructure, automatically scaling with usage.
Developers focus on writing application code without worrying about the underlying servers.

Example: Using AWS Lambda functions for various PIM tasks like data import/export triggered by specific events.

Service-Oriented Architecture (SOA)

PIM is composed of loosely coupled services that interact over a network.
It promotes reusability and interoperability between different services.

Example: A PIM system in which services like inventory management, pricing, and customer data integration are distinct but communicate through a standard protocol like SOAP.

API-First Architecture

The PIM system is developed with a focus on API endpoints for all major functionalities. It ensures easy integration with other systems and platforms, facilitating omnichannel strategies.

Example: A PIM system that provides comprehensive RESTful APIs for accessing and managing product data, enabling integration with eCommerce platforms and mobile apps.

Event-Driven Architecture

The PIM system reacts to events (changes in data, user actions) and triggers corresponding processes. Enhances responsiveness and scalability, as components can react to changes asynchronously.

Example: An event-driven PIM where updates to product information automatically trigger notifications to e-commerce platforms and marketing systems.

Component-Based Architecture

The PIM implementation is constructed from reusable components, each responsible for a specific aspect of functionality.
Simplifies development and allows for easier updates and maintenance.

Example: A PIM system with distinct components for data validation, catalog management, and analytics, which can be independently updated or replaced.

Cloud-Native Architecture

The PIM system is built specifically to leverage cloud capabilities, such as scalability, resilience, and managed services.Utilizes cloud-native services for container orchestration, managed databases, and cloud storage.

Example: A PIM system deployed with services like Amazon RDS for the database and Amazon S3 for asset storage.

Most enterprise applications implement multiple architectures, i.e., a mix of monolithic, SOA, API-first, and component-based architectures. This approach enables these applications to leverage the best features of those architectures and overcome some of the limitations of any specific Architecture Framework.

IV. Data Migration to Cloud: Key Considerations

The most crucial step of implanting or migrating a PIM solution on the cloud is Data migration from an existing PIM solution or other existing systems (in case you are not using a PIM solution on-premise yet.)

Migrating data to the cloud requires detailed planning, careful execution, and rigorous validation. Key steps involved in ensuring a smooth and successful migration.

Planning Your Move

- **Define Goals**
  Identify the reasons for the migration, like scalability and cost savings. Set clear objectives for data integrity, minimal downtime, and security.
- **Inventory Assessment**
  Catalog your existing PIM data, identifying types, volumes, sources and data security requirements. Evaluate data quality for inconsistencies and obsolescence.
- **Plan and Partner**
  Choose a migration approach (big bang or phased), select migration tools (ETL, cloud services), and create a detailed plan with timelines and resources.

Executing the Migration

- **Cloud Setup**
  Provision cloud infrastructure (servers, storage, networking) with robust security measures (encryption, access controls).
- **Data Extraction**
  Extract data from your current PIM using ETL tools while minimizing disruption. Validate the extracted data for accuracy.
- **Data Cleansing and Massaging**
  Perform necessary cleaning and massaging of extracted data to ensure that the new system has clean and accurate data as much as possible.
- **Transformation and Loading**
  Apply defined rules to transform extracted data, ensuring compatibility with the new PIM system. Load the transformed data into the cloud-based PIM system.

Validating Success

- **Testing and User Acceptance**
  Perform initial tests to ensure data accuracy and system functionality. Involve end-users in testing to verify the new PIM system meets their needs.
- **Data Quality Checks**
  Ensure migrated data is clean and accurate by performing thorough checks and reconciling it with the original data.
- **Performance and Security**
  Evaluate the cloud-based PIM system's performance under various loads. Verify that all security measures are properly implemented and compliant with regulations.
- **Go-Live and Post-Migration**
  Obtain stakeholder sign-off, finalize cutover procedures, and execute the transition with minimal disruption. Provide ongoing monitoring, training, and support for end-users. Review the migration process afterward, capturing lessons learned for future improvements.

V. Post-Cloud Deployment Assessment

After a cloud-based PIM deployment, a post-migration assessment is needed to ensure the new system is functioning optimally and that users are adapting to the changes effectively. Here are the essential steps for a comprehensive Post Migration Assessment:

1. Validation and Verification

- Conduct data validation checks to compare the source data with the migrated data, ensuring there are no discrepancies.
- Verify that all functionalities of the PIM system, including core features, integrations, and custom configurations, are working as expected.
- Assess the system's performance under various load conditions by evaluating response times, data processing speeds, and system stability under peak usage.

2. User Acceptance Testing (UAT)

- Engage end-users to test the system in realistic scenarios to identify usability issues and ensure the system meets business needs.
- Collect detailed feedback from users regarding system usability, functionality, and encountered issues via surveys, interviews, and focus groups.

3. Issue Resolution

- Documenting any issues or bugs found during validation and UAT. Classifying these issues based on their severity and impact on business operations.
- Addressing critical issues, followed by less severe ones. Promptly resolving issues to minimize disruptions and improve user experience.
- After resolving issues, retest the affected functionalities to confirm the fixes.

4. Training and Support

- Conducting extensive training sessions for all users, including role-specific training to address different user needs.
- Developing and distributing user manuals, quick reference guides, and FAQs to help users navigate the new system.
- Setting up a help desk to provide ongoing support and address user queries or issues. Ensuring support staff are well-versed in the new system.

5. Change Management

- Maintaining clear, consistent communication with all stakeholders about the changes, benefits, and impacts of the new PIM system to manage expectations and reduce resistance.
- Appointing and training change champions within the organization to support their peers and advocate for the new system.
- Regularly monitoring how well users are adapting to the new system. Addressing any resistance or challenges.

6. Performance Monitoring

- Defining KPIs and metrics to measure the success and performance of the new PIM system.
- Conducting periodic performance reviews to identify areas for improvement, using these reviews to make data-driven decisions for system enhancements.

7. Continuous Improvement

- Establishing a feedback loop with users to gather ongoing input on the system's performance and areas for improvement. Encourage regular feedback to identify evolving needs and issues.
- Planning for regular updates and enhancements based on user feedback and changing business requirements. Continuous improvement ensures the system remains effective and relevant.

Into the Future with Cloud PIM

Transformation and Innovation with Generative AI, NLP, and IoT

As we venture into the future, integrating Cloud-based PIM solutions and converging advanced technologies such as Generative AI, NLP, and IoT promises enhanced efficiency and a fundamentally new way of managing and leveraging product information.

- Generative AI can automate the creation and updating of product descriptions, images, and other essential information, ensuring consistency and accuracy across all platforms. This automation reduces the manual workload and minimizes human error, enabling companies to maintain high-quality data with minimal effort.
- NLP takes this a step further by enhancing the system's ability to understand and process human language. With NLP, Cloud PIM systems can interpret complex queries, facilitate intuitive search functionalities, and provide more personalized and context-aware responses. This improves the user experience, making it easier for employees to retrieve and utilize product information efficiently.
- The integration of IoT into Cloud PIM systems opens up even more possibilities. IoT devices can provide real-time data on product performance, usage patterns, and inventory levels. This data can be fed into the PIM system to ensure that product information is always up-to-date and accurate. For example, if an IoT sensor detects that a product is malfunctioning, the PIM system can automatically update its status and notify relevant stakeholders. This real-time updating capability enhances decision-making and operational responsiveness.

The synergy between Cloud PIM and new-age technologies positions businesses to handle their product information dynamically and intelligently. It allows real-time updates, enhanced decision-making, and more seamless integration of product data across various digital touchpoints. As these technologies continue to evolve, they will undoubtedly set new standards for efficiency, accuracy, and innovation in product information management, driving businesses toward a more intelligent and responsive future.

About the Author

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Ram Awadh Prasad is an Enterprise Architect with around 23+ years of experience in the Software Industry. He is a TOGAF Certified Enterprise Architect, and Google and AWS Certified Professional Architect. He has rich experience in Digital Business Transformation, Product Information Management, Master Data Management, Digital Asset Management, and Cloud Architecture.
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