



Enterprise Interoperability

Opportunities and Challenges

IMS Enterprise & Technology Architecture

July 2025

Executive Summary

To meet the challenges of the future, executives and technology leadership will need to continue adapting to the changing industry landscape. Adopting new technology platforms to boost capabilities in manufacturing, supply chain, finance and production support is no longer an option - it's a requirement.

In the following paper we explore some of the challenges and opportunities leaders will face as the platform space grows and new data requirements continue to accelerate.

Whether it is IoT, AI or just the growth of data interconnections between systems, we outline the strategic advantage of defining a comprehensive integration strategy across your company.

New Technologies Bring New challenges

Digital transformation remains at the top of mind in executive boardrooms across aerospace & defense as well as the wider manufacturing space. New technology providers and platforms are increasingly competing with established providers creating an ecosystem where companies have a wide range of best-of-breed solutions available to support their business and operations.

With an accelerating 'dual use' market only continued to grow throughout the next decade, technology leaders face increasing pressure to integrate these new tools and offerings into their legacy technology ecosystems or make them interoperable with built for purpose defense platforms. Digital Thread, the layering of new AI capabilities and leadership's need for big-data and advanced analytics will only amplify these challenges.

Moving from a monolithic technology stack to a distributed set of specialized applications brings huge value to your operations - but also opens a new set of issues that can seriously constrain the benefits your new tools can provide.

System interoperability remains difficult and juggling multiple technology initiatives often leads to a sprawl of siloed systems and data.

At IMS, we see the tactical and long-term advantage that having a well-planned and actionable integration strategy. Adopting the right tools and guardrails as an early cornerstone of any digital transformation is critical in ensuring your initiatives bring the desired value to your organization.

Scaling for Tomorrow

With an ever-increasing number of sources and volume of new data, technology leaders need to put scalability as one of the key technology design tenants in their future start architecture planning.

A proliferating IoT space, the move towards Model Based Design (MBD) and adoption of Digital Twin platforms will drive huge growth in the velocity, variety, and complexity of data across the technology space. These new technologies also need to integrate with existing PLM, ERP and scheduling

platforms moving huge amounts of data to unlock holistic end to end operational value.

Modern integration platforms make it easier to connect systems in real time, whether they're in the cloud, on-prem, or at the edge. Taking advantage of modern protocols and approaches such as Event Driven Architectures and taking an API-first approach can ensure that your infrastructure can efficiently scale to support your needs without excessive processing and cost impacts.

Navigating Interoperability Gaps and Adopting Open Standards

Scaling horizontally brings its own new set of issues, especially when integrating new platforms and systems that sit on the precipice between the digital and physical worlds. Incompatible interfaces, data format & protocol mismatches and lack of support for event driven patterns are some of the issues that companies will have to tackle as they integrate new platforms.

Taking a future forward architecture strategy can significantly de-risk these types of issues and ensure that system interoperability is maintained and resource intensive pre- and post-

processing of data is limited only to those cases where absolutely critical.

Choosing the right approach and integration patterns up-front ensures that you avoid incurring significant performance issues and the technical debt & business continuity risk that goes along with fixing them post-adoption.

Pulling together a comprehensive, iterative approach which breaks down your integration and orchestration journey into manageable initiatives based on transition architectures is key in balancing the requirements of today with the needs of tomorrow.

Enabling System Resiliency

Defining and implementing a robust integration strategy and supporting enterprise guardrails also helps in ensuring resilient and modular technology architecture. Rolling out point-to-point system integrations across your technology landscapes results in a large, unwieldy technology monolith with multiple failure points and huge amount of technical debt.

A structured approach to system interoperability based on scalability, modular protocols and architectures with orchestration in mind ensures a maintainable, stable and resilient platform to stitch your system landscape together.

The Path Forward

Want to jumpstart your journey towards an interconnected enterprise? Here are some of the key areas to focus on to drive tactical and strategic transformation in your organization.

-  **Balance Future-Ready Design With Today's Realities**
-  **Make Integration a Key Architectural Enabler**
-  **Revisit your Existing Tech Stack**
-  **Review your On-Prem vs Cloud Posture**
-  **Use Interim Designs Towards the Goal**

Fig 1: Tactical Actions to Kickstart your Integration Journey

Balance Future-Ready Design with Today's Realities

The speed of change has pushed companies to take an agile approach to planning and development. Agile frameworks have long advocated against big up-front design initiatives (BUFD) - and we agree. However, the right guardrails must be established to

ensure individual projects and initiatives align to the long term vision of integration success. Setting up the requirements for interoperability ensures departments and teams are aware of how systems interact and lays the groundwork to avoid surprises and rework down the road.

Make Integrations & Middleware a Key Architectural Enabler

In the world of functional requirements and exciting new platform features, integration and orchestration can sometime be treated as an afterthought.

But what happens after your initial migration and cutover happens? Beyond manual extracts, low-frequency flat file uploads, one off API integrations and proprietary connectors - what's the plan to ensure that data stays synced between systems for the long run?

Maintaining a holistic, enterprise-wide end-to-end view of data and system flows is critical to ensuring teams have confidence in their data and that your architecture is easily adaptable to needs from the business.

Revisit the Existing Tech Stack

With major platforms moving towards an evergreen update model - new releases and capabilities are pushed semi-annually or even quarterly.

Revisiting and reviewing your platform's capabilities may surprise you; integrations and data exchange options that might not have been available at time of implementation may have been added since.

As vendors adopt an 'API First' approach, taking another look at tools available to you may often yield a quick win and interim solution while a long term integration strategy is ironed out.

Review On-Prem vs Cloud posture

Cloud adoption continues to be a major topic among IT leadership and can bring significant benefits to a company's architecture. Adopting a hybrid approach where cloud resources complement your on-prem footprint can often strike the right balance between the convenience of the cloud and the control of on-prem.

Hybrid and multi-cloud approaches don't need to replace your existing infrastructure but can help you drive efficiencies in those areas where short bursts of high-compute are needed to support your operations.

Reviewing cloud adoption in certain areas to support your integration infrastructure and take advantage of the robust and advanced on-demand integration tools ensures you take advantage of your existing investments while having exposure to best in class cloud solutions. A solution partner with experience in the cloud and hybrid environments can show the scale and ease of use of these platforms and get internal teams onboarded within a matter of weeks.

Use Interim Designs Towards the Goal

Building a robust integration structure can often take months. From assessing your current state through to stakeholder buy-in across the enterprise - it can often feel like the path to value is years away.

Adopting a set of interim and transition architectures that move in the direction of achieving that end state can bring tangible value to the business in a short period of time while minimizing technical debt and throwaway work.

Working with a view towards the future while delivering value today puts you in the driver's seat and ensures the business sees the value IT brings to the table.

Conclusion

New features and novel solutions are driving a need for more data interoperability and inter-system communication. Having a comprehensive and robust data integration strategy that combines architectural principles with the right tools can serve as the interconnective tissue to span cross functional requirements and drive value from your solutions.

Ready to talk? Reach out to IMS and we can show you why our clients trust to help define their vision and to help deliver on their mission critical projects.

About IMS

Intra Management Solutions is a premier consulting, program execution management and technology implementation services provider.

IMS' Enterprise & Technology Architecture practice brings together our functional, system implementation and technology experience to help companies in their digital transformation efforts.

Our experience ranges from design through to implementation across different platforms and technology stacks. IMS' pool of functional SMEs also serves as an expert body to ensure what works on paper will work in the real world for end users.

For over 15 years we've focus on delivering value through sustainable solutions which scale with the needs and ambitions of our clients.

For more information visit us at intramanagement.us

Intra Management Solutions, Inc.

6136 Frisco Square Blvd, Suite 400
Frisco, TX 75034

Tel: (214) 444-6544

Fax: (214) 785-2951

Web: intramanagement.us

Email: info@intramgmt.com