THE TOP 3 SYSTEMS INTEGRATION CHALLENGES FOR MANUFACTURERS

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Introduction

Even in the best of times, today's manufacturers are in a constant state of continuous improvement and evolution. In 2020, the coronavirus pandemic has compounded this and pressured manufacturing operations like never before. As organizations strive to ensure the health and safety of their employees, they are also responding to supply-chain shifts that are impacting sourcing and distribution logistics. Supplier reliability is now more critical than ever, and labor shortages are having a severe impact on production capabilities. Even as markets settle into this new normal, the crisis will eventually resolve, and manufacturers will need to move quickly to respond to new sources of supply and shifting customer demands.

Digital transformation has been one strategy leveraged by manufacturers to improve and evolve over time. However, the current market forces and pressures are bringing the critical need for digital transformation to the forefront and highlighting the requirement for a connected, integrated enterprise. Not only does a connected enterprise mean having systems that can talk to each other and share data, but it also enables employees to work and stay connected from anywhere. In fact, according to the Manufacturing Leadership Council, "The Connected Enterprise has been a priority for manufacturing companies in recent years but has experienced unprecedented acceleration due to COVID-19 in 2020."

As a result, manufacturers are looking to digital transformation for innovation, flexibility and resilience to operate in this new, unfamiliar territory. In short, to survive. Yet many manufacturers have attempted enterprise-wide digital transformation in the past and failed to realize the full potential that digital capabilities make possible because:

1. Digital transformation puts a greater demand on IT departments to deliver more projects with tighter deadlines and budgets. This creates a gap between what needs to be delivered, and IT's capacity to actually deliver it.
2. The massive increase in the amount of data manufacturers are now capturing through technologies such as the Internet of Things (IoT), and the disparate systems used to store and analyze that data.

While there are a myriad of other issues that can get in the way of successful digital transformation, our clients have experienced three common challenges that manufacturers face as it relates to digital transformation - and they can be significant inhibitors to achieving success.

## CHALLENGE #1: DISPARATE SYSTEMS CONTAINING SILOED DATA

The average enterprise organization uses more than 1,000 individual applications across their business and these applications are usually purpose-built, antiquated, highly customized systems that are owned and managed by different stakeholders. An average complex business transaction involves 35 different back-end systems. These transactions are requiring and generating more data than ever before.

Operational data is also growing exponentially through an ever-increasing number of IoT devices and sensors in advanced equipment. For example, a manufacturer that produces a consumer product can generate 5,000 data samples every 33 milliseconds, which is 13 billion data samples per day or 4 trillion samples in a year. And that's just one product in one plant! When you multiply that amount of data by different product lines and different plants in different regions, you end up with a massive amount of data that is usually structured and presented in inconsistent ways. This creates challenges for employees and systems that want to analyze, integrate, and share and act on this data. Combining disparate systems and massive amounts of inconsistently structured data quickly can lead to data integrity issues and prohibits a 360-degree view of the business. Employees don't have access to the right data, and the corresponding business value that can be derived from it is essentially locked up in these disparate systems. As a result, many manufacturers end up using only a small percentage of their data in a way that adds true business value.

CHALLENGE #2: INTEGRATING NEW APPLICATIONS WITH LEGACY SYSTEMS

As manufacturers increase the number of cloud applications and services they consume, new challenges appear as they try to connect these new, modern systems with their existing legacy application inventory. These legacy systems usually include ERPs, CRMs, machine-level control systems, manufacturing execution systems, production planning systems, and a number of ancillary customer and operations systems. They frequently lack a well-defined interface and proper documentation, and have typically been programmed in different or obsolete coding languages. The lack of well-defined interfaces makes it difficult to connect to these systems and understand the data they need to operate, as well as the data they can provide. Traditional approaches to enterprise application integration have not been successful at solving this challenge.

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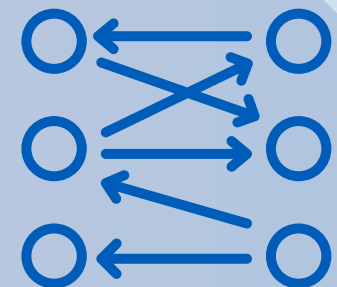
CHALLENGE #3: SURFACING DATA ACROSS MULTIPLE ERPS

Most manufacturers have multiple ERP systems that are a combination of homegrown and COTS systems and it is common for manufacturers to have multiple ERPs inherited from mergers and acquisitions. Historically, "transaction-oriented" ERP systems were designed as stand-alone, self-sufficient applications and were not meant to share information. These ERP systems had difficult to use interfaces that were primarily batch-oriented. Business logic, data format, structure, language, and required information usually vary from country to country and business unit to business unit. Imagine a global manufacturer trying to move at the speed of business with 2, 5, or even 10 different ERP systems. In addition to the enormous cost of resources to manage such an infrastructure, the inability to deliver the right information to the right employee or process at the right time can lead to lost revenue and unhappy customers. Accurate inventory or pricing information may be spread across multiple ERP systems. For example, customer service can be impacted by a wrong promise to the customer (e.g. unrealistic lead-time), incorrect inventory (ordered products are not available), or unreliable delivery of replacement parts. Sales can be impacted if the required products are not on the store shelves or in the system. Customers and partners will decide to switch to another supplier or brand if the data is unreliable. This applies to both B2C and B2B environments. Typically, there is an ongoing effort to simplify and reduce the number of ERP systems, but this is a long, complex process. A big challenge is minimizing the impact of ERP consolidation on other applications that your customers, suppliers and partners use.

OVERCOMING THE CHALLENGES

What lessons can manufacturers learn from organizations that have been successful at digital transformation? What are some best practices for mitigating risk?

LESSON 1 – HAVE A PLAN

Establish a well thought out integration strategy that is closely aligned to the business challenges that need to be solved. In a traditional IT organization, integration projects are designed, implemented and completed on an as-needed basis. It

is very much a siloed approach to integration. As a result, integrations are constantly being re-built, re-tested, re-secured, and re-deployed because project teams usually start over on every IT project. Manufacturers have begun to recognize this approach isn't sufficient when working with different people, different requirements, different technologies, and different outcomes. When correctly planned and implemented, a strong integration strategy can increase the quality, security and speed of delivery for IT projects. The key is to not view each project as separate and unique, but part of a collective series of projects that produce assets that have value beyond their initial use. A repository of reusable integrations assets is central to this integration strategy so that developers and other stakeholders can easily see what systems, data and processes are available across the enterprise.

Having a digital integration platform at the center of this strategy that facilitates not only the building of integrations, but the publishing and reuse of integration artifacts throughout the organization is essential. This increases the scale and reach of IT resources, drives standardization, innovation, and promotes self-service of the business as they look to take on their own integration projects to connect disparate systems to the enterprise application network. A well thought out integration strategy with a comprehensive integration platform as the foundation can have a dramatic impact on the entire manufacturing value chain.

LESSON 2 – HAVE A PLATFORM

How do manufacturers transition from digital strategy to execution? Have a platform and approach that can scale to support your integration strategy and business objectives. In Acumen Solutions' experience, APIs provide the foundation for a successful approach. APIs enable a standard way to gain access to data and business logic across an entire ecosystem. This API-led approach is the same innovation enabler that has launched many other companies to the top of their respective industries. Companies like Amazon, Netflix, and Airbnb are all built from the ground up on the bedrock of APIs. API-led connectivity re-imagines the traditional approaches to integration and enables manufacturers to establish a modern architecture to solve today's unique digital integration challenges. It is an architectural approach that changes the traditional centralized model of delivering IT capability and promotes decentralized access to data and business capabilities while not compromising on governance and security.

Once the architecture is defined, a digital platform with full API lifecycle capabilities that enables the development and management of APIs is required. MuleSoft Anypoint platform is our preferred platform for managing APIs. MuleSoft supports full API lifecycle management capabilities including:

- » Planning and design.
- » Test-driven development.
- » Flexible deployment.
- » Secure operation.
- » Governance and monetization.
- » Analysis and testing.
- » Developer engagement.
- » Versioning and retirement.

All of these capabilities are important to realize the full value of API-led connectivity. In our experience, there are some caveats to this approach. One common mistake companies make is assuming IT is the sole owner of API programs. The integration strategy and platform needs to be a collaboration between IT and the business, so the strategy is tightly linked to business goals and outcomes. Another barrier to API success is the same as Challenge #1 above – building APIs in technical siloes. For example, if API efforts are solely focused on a specific data set, or only to support new applications, they will only generate incremental value. To achieve the full promise of API-led connectivity, APIs should be used wherever possible.

Leading organizations are leveraging APIs in a way that creates a common taxonomy that's understood by both the business and IT. The key to this is distinguishing between APIs that directly provide business value versus APIs that are technical en-

USING APIs

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ablers. This allows the business and IT to converse about which APIs directly drive business outcomes (e.g. customer experience, order management), which are part of the infrastructure that enables delivery of those outcomes. An example of an API taxonomy that does this is:

» Experience APIs - interact with a presentation layer specific to a unique business capability. For example, a B2B commerce site or a mobile experience.

» Process APIs - perform specific business process functions and provide access to non-central data. For example, a purchase order process.

» System APIs – expose core systems of record or other difficult to access silos of data. For example, ERP system, IoT database, etc.

LESSON 3 - HAVE A CULTURE FOR SUCCESS

For many manufacturers, APIs and API led development represent a paradigm shift for how IT delivers projects and how the business meets its objectives. Ultimately, it is the people in the organization who hold the key to driving this change and they will therefore play a more significant role in the success or failure than the technology being used. This responsibility is why having a strategy, and implementing an API-driven culture that starts from the top is critical. Manufacturers that have an executive mandate for the use of APIs will be more successful at instilling this type of culture. The most famous example of this is the "Bezos Mandate," where Amazon CEO Jeff Bezos mandated that Amazon's development teams "henceforth expose their data and functionality through service interfaces." As a result, APIs have been a core driver of the business transformation and growth at Amazon over the last 18 years. For your digital strategy to succeed, APIs must be viewed as a strategic weapon, and not a tactical, short-term necessity.

Training and enablement is also a critical success factor. Many manufacturers mistakenly take a "if I build it, they will come," approach to APIs. That never works in IT. Marketing APIs and nurturing an ecosystem to consume them is an important initiative that must be part of the overall integration strategy and is critical to ensure the strategy meets the intended business objectives. Part of the nurturing process includes training line of business IT teams to find and consume APIs along with reinforcing the benefits of doing so. As adoption increases, the next steps include implementing programs to obtain feedback on APIs so that they can be refined and reused more broadly.

Following this approach creates a flywheel effect; adoption leads to feedback, which leads to improvement, which leads to more adoption, and so on. Because the integration strategy and platform are aligned to business requirements, a secondary flywheel effect occurs; by driving measurable business outcomes, manufacturers can justify additional investment in more resources toward accelerating the adoption and proliferation of its API approach.

HOW ACUMEN SOLUTIONS CAN HELP

In this constant state of continuous improvement and evolution manufacturers find themselves in, a new approach is necessary to change the IT operating model in order to scale and support the rapid pace of business change. Manufacturers also need a strategy and platform to overcome the common challenges outlined above when embarking on their digital transformation journey.

The key is to start with a plan, enable a platform to power your digital transformation, and institute organizational change to lead the way. APIs are no longer of value only to IT; they have become a critical part of a company's business strategy.

Acumen Solutions' expertise with MuleSoft, coupled with the right approach to integration strategy, APIs, and change management, can be the catalyst to power accelerated digital transformation. Let us help you on your journey.

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