



BRIDGING THE SOLUTIONS GAP:

POWERING IT OPERATIONS WITH A BOM DATA BACKBONE



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02

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IT Ecosystems Are Increasingly Fractured

In today's digital enterprise landscape, organizations have embraced specialized IT solutions to drive innovation and productivity across departments. Engineering teams leverage powerful computer-aided design (CAD) and product lifecycle management (PLM) systems, procurement relies on sourcing platforms, manufacturing depends on enterprise resource planning (ERP) and manufacturing execution system (MES) solutions, and service teams utilize field service management tools. This digital transformation has empowered functional teams with tailored capabilities that optimize their specific workflows.

However, this proliferation of specialized systems has created a fractured IT ecosystem that presents significant challenges for businesses. Each department often operates within its own digital silo, with critical product information—particularly the bill of materials (BOM)—existing in multiple versions across disparate systems. This fragmentation leads to information that becomes isolated, incomplete, and often outdated.

The consequences of this fractured ecosystem extend beyond mere inconvenience. Engineering teams define replacement parts based on outdated specifications. Procurement orders incorrect components. Manufacturing produces the wrong parts. Service technicians arrive at customer sites without the proper replacement items. These disconnects directly impact the bottom line through increased scrap rates, excess inventory, and extended equipment downtime.

For IT departments, the burden is equally challenging. Staff members spend countless hours developing and maintaining custom point-to-point integrations between systems. These brittle connections frequently break during system updates, creating a continuous cycle of troubleshooting and repair that diverts resources from strategic initiatives.

FRACTURED IT ECOSYSTEMS COMPLICATE COLLABORATION

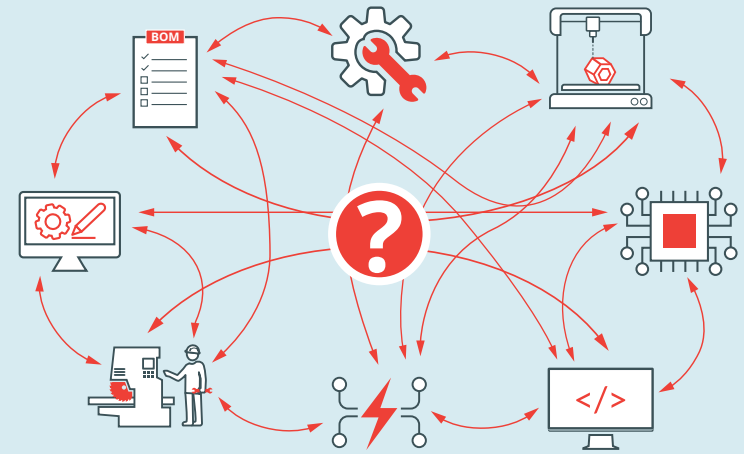


Figure 1
Companies that rely on numerous specialized solutions must manage a complex web of integrations that makes cross-functional collaboration inefficient.



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Disconnected Solutions Create Functional Challenges

The proliferation of department-specific cloud and SaaS solutions has created a fragmented IT landscape with far-reaching consequences. As engineering, sourcing, manufacturing, and service teams operate within their isolated systems, critical information becomes trapped in departmental silos, creating significant operational challenges.

The BOM—a foundational artifact referenced across the organization—suffers particularly in this environment. Unlike department-specific data, the BOM is modified and referenced by multiple teams, making its accuracy and consistency paramount. Yet when teams make changes within their respective systems, these updates rarely propagate effectively to other departments, leaving colleagues to make decisions based on incomplete or outdated information.

This fractured ecosystem creates a cascade of operational problems. Engineering teams design replacement parts based on outdated specifications. Sourcing departments order incorrect components due to misaligned information. Manufacturing produces parts that no longer meet current requirements. Service technicians arrive at customer sites without the right parts to resolve issues on the first visit.

These disconnects inevitably impact business performance through increased scrap rates, unused inventory, and extended equipment downtime. The challenge of aggregating and resolving divergent data becomes increasingly difficult as systems multiply. When changes are made in one system, they often fail to propagate properly across the ecosystem, resulting in outdated information throughout the organization.

As organizations continue to add specialized tools to their technology stack, the complexity of maintaining data consistency—especially for critical artifacts like the BOM—grows exponentially, creating an unsustainable burden on both business operations and IT resources.



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Fragmented Solutions Increase the IT Burden

For IT departments, today's fractured technology landscape creates a relentless operational burden that diverts resources from strategic initiatives. As functional departments adopt specialized cloud-based and SaaS solutions, IT teams find themselves trapped in a cycle of integration maintenance that grows increasingly complex with each new system added to the enterprise architecture.

The many-to-many integration challenge is particularly problematic. When engineering, sourcing, manufacturing, and service teams each operate within isolated systems, IT staff must craft custom connections between all these platforms to ensure that critical information—especially the BOM—remains synchronized. These point-to-point

integrations are inherently fragile, often breaking when any single system updates to a newer version.

This integration treadmill consumes an inordinate amount of IT resources. Rather than focusing on innovation or strategic technology initiatives, skilled IT professionals spend their days troubleshooting broken connections and reconciling conflicting data across systems. The problem compounds exponentially with each new application added to the ecosystem, creating an unsustainable maintenance burden.

Consider the real-world impact: When a PLM system updates, connections to ERP, customer relationship management (CRM), and service management platforms may simultaneously fail. IT teams must then scramble to restore these critical pathways, often manually transferring data between systems during the outage. Meanwhile, engineering teams design with outdated specifications, sourcing teams order incorrect components, and service technicians arrive at customer sites without the right parts.

For chief information officers (CIOs) and IT leaders, this fractured reality presents a strategic dilemma. The specialized functionality that each department gains from its tailored systems comes at the cost of overall system integrity and IT efficiency. As organizations continue to expand their technology portfolios, the challenge of maintaining data consistency—especially for critical artifacts like the BOM—becomes increasingly unsustainable, preventing IT from delivering its full strategic value to the organization. In addition, the growing complexity of IT environments strains department resources and can limit an organization's ability to innovate and scale effectively.



IT staff must craft custom connections between numerous platforms to ensure that critical information—especially the BOM—remains synchronized. These point-to-point integrations are inherently fragile, often breaking when any single system updates to a newer version.

The Data Backbone Unifies Fractured IT Ecosystems

The data backbone offers a powerful solution to the challenges of fractured IT ecosystems by serving as a centralized hub that communicates with and synchronizes data across departmental IT systems throughout the enterprise. Unlike traditional point-to-point integration approaches that require complex many-to-many connections between systems, a data backbone establishes simpler one-to-one integrations between each departmental system and the backbone itself. This architecture dramatically reduces integration complexity while providing a single source of truth for critical information like the BOM—laying the foundation for an end-to-end digital thread that connects product data across the entire lifecycle.

The data backbone captures product information from the earliest stages of development—whether marketing requirements or initial engineering designs—and maintains data consistency as that information flows through the organization. As changes occur in any connected system, the backbone accepts these updates and synchronizes them in real time across all relevant departments, ensuring everyone works with current, accurate information.

This approach preserves the specialized functionality that each department needs while eliminating the problems of divergent, incomplete, or outdated information. Engineering teams access the same product data as manufacturing, sourcing has visibility into the latest design changes, and service technicians arrive on site with the correct parts information.

For IT leaders, implementing a data backbone transforms system integration from an endless maintenance burden into a strategic advantage. Rather than constantly troubleshooting broken connections between disparate systems, IT teams can focus on higher-value initiatives. The backbone's pre-built and easily configured integrations reduce manual work while minimizing the risk of system integration failures when individual applications are updated.

Organizations with effective data backbones will gain significant competitive advantages through improved data quality, enhanced cross-functional collaboration, and the ability to respond more quickly to changing business requirements.

THE DATA BACKBONE SIMPLIFIES SYSTEM INTEGRATION

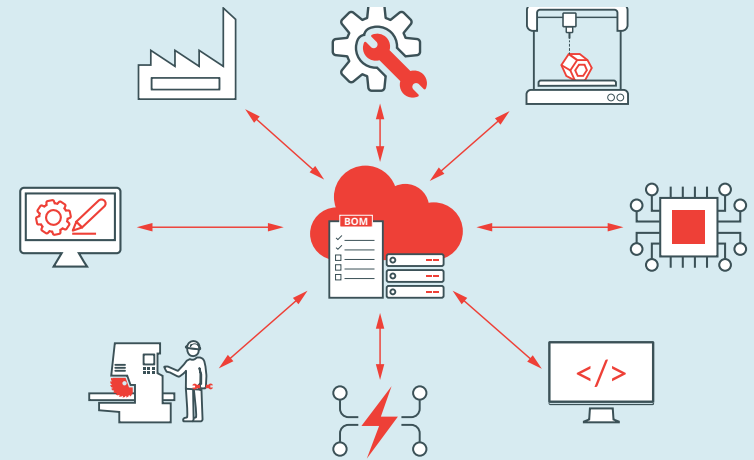
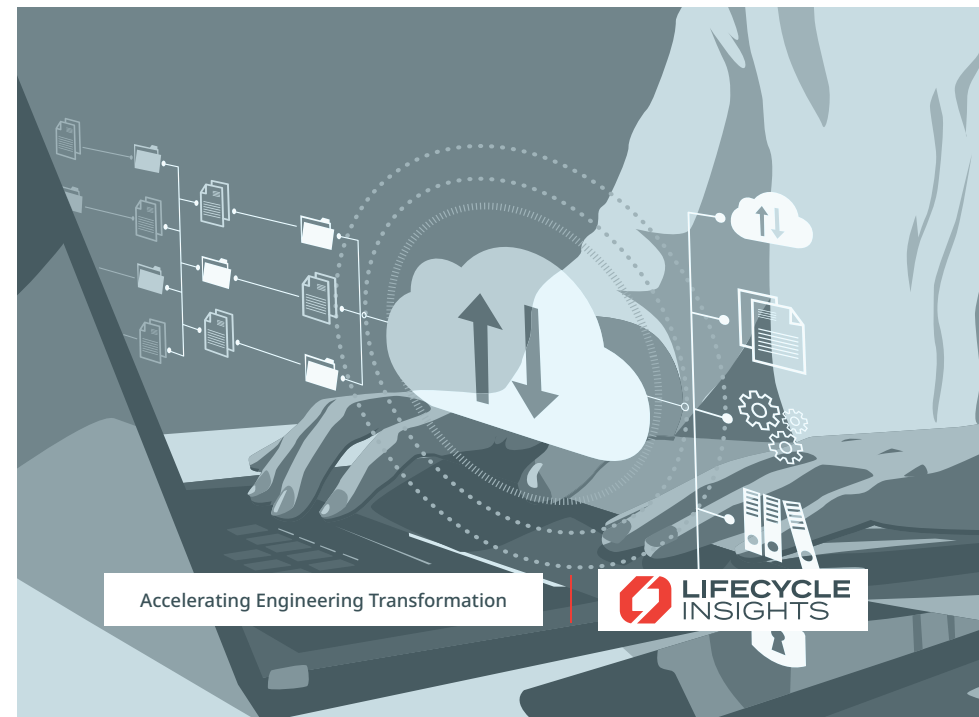


Figure 2

The data backbone provides stakeholders across an organization with a single, always up-to-date source of truth, simplifying cross-functional collaboration.



Accelerating Engineering Transformation

**LIFECYCLE
INSIGHTS**

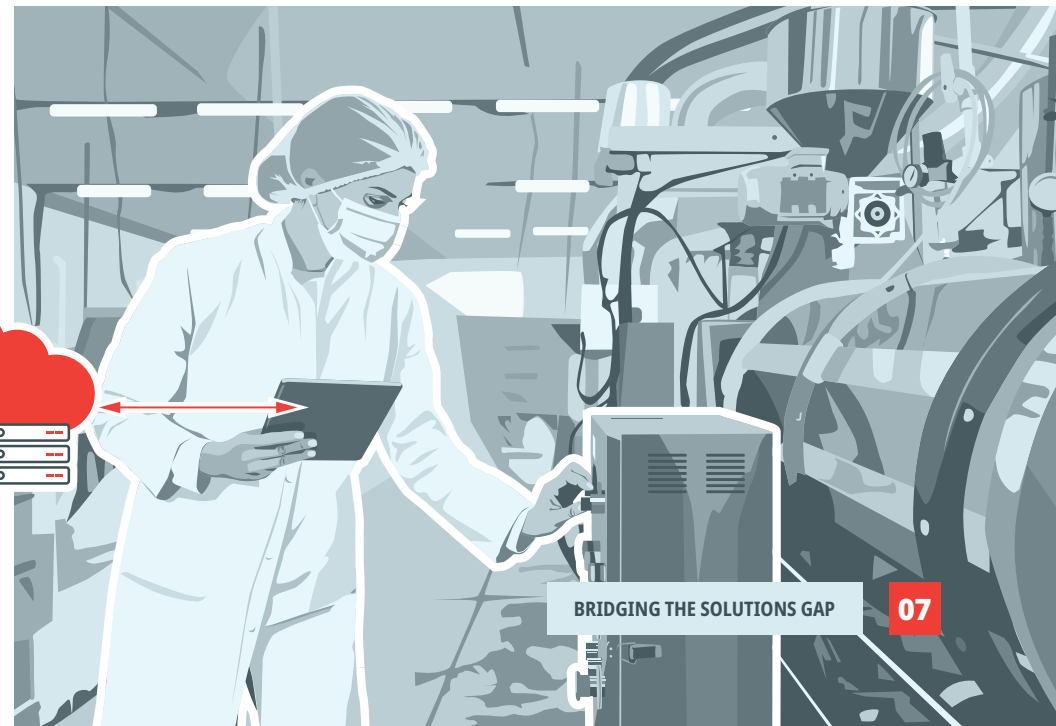
The Benefits of a Single Source of Truth

The data backbone approach delivers transformative benefits across the organization by creating a centralized hub that maintains data consistency while preserving specialized departmental functionality. For functional departments, this architecture means they can continue leveraging their purpose-built systems without compromise. Engineering teams still access advanced CAD features, sourcing departments maintain their vendor management capabilities, and service teams utilize their specialized diagnostic tools—all while staying connected to a unified data ecosystem.

When departments make changes to critical artifacts like the BOM, these updates automatically propagate through the data backbone to all relevant systems. By enabling a digital thread, the data backbone ensures that product information remains connected, contextualized, and current across the entire lifecycle. This synchronization ensures that every team works with consistent, up-to-date information. As a result, engineers can execute designs based on accurate specifications and service technicians can always identify the correct parts for repairs because decisions across the organization are based on complete, converged information rather than fragmented, divergent data.

For IT leaders and their teams, the data backbone dramatically simplifies the integration landscape. Rather than maintaining complex many-to-many connections between departmental systems—each prone to breaking when individual applications update—IT can focus on simpler one-to-one integrations between each system and the backbone. This architectural shift reduces the overall integration burden while creating a more stable environment. When new systems are introduced, or existing ones are upgraded, only a single integration point requires attention instead of multiple connection points.

The ideal data backbone captures product information from the earliest stages of development and maintains continuity throughout the product lifecycle. By selecting a system that can accept changes from various departments and synchronize them in real time, organizations create a single source of truth for critical information. This approach not only enhances cross-functional collaboration but also frees IT resources from endless integration maintenance, allowing teams to focus on strategic initiatives that deliver greater business value.



Summary and Recommendations

Today's fractured IT ecosystem poses major challenges across organizations. The rise of specialized cloud and SaaS solutions has created departmental silos that hinder collaboration and produce inconsistent information—especially affecting critical artifacts such as the BOM. This fragmentation too often leads to negative business outcomes, including higher scrap rates, unused inventory, and longer equipment downtime.

The data backbone approach offers a compelling solution to these challenges by creating a centralized hub that maintains data consistency while preserving specialized departmental functionality. By implementing simpler one-to-one integrations between each system and the backbone, organizations can dramatically reduce integration complexity while ensuring everyone works with current, accurate information. For IT leaders navigating this landscape, the data backbone transforms system integration from an endless maintenance burden into a strategic advantage.

Recommendations

As organizations continue to expand their technology portfolios, those with effective data backbones will gain significant competitive advantages through improved data quality, enhanced cross-functional collaboration, and greater operational efficiency. Organizations that establish a data backbone capable of supporting a digital thread will be better positioned to adapt to future complexity, regulatory demands, and innovation cycles. CIOs and other IT leaders seeking to achieve these outcomes should do the following:

- Assess the integration complexity of the current IT ecosystem. Determine how frequently each integration needs updates. Identify how much effort is required to manage and keep those integrations working.
- Investigate how a data backbone could be applied to the IT ecosystem. Identify what integrations become redundant and could be removed. Determine how much time and effort can be eliminated as a result.
- Develop a plan to implement a data backbone, as warranted. Lay out the long-term vision. Determine how the data backbone could be established and connected over time across the IT ecosystem.





Accelerating Engineering Transformation

Lifecycle Insights is a trusted research, advisory, and publishing firm providing data-driven insights and industry-proven guidance on engineering transformation.

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