G00296751

# Converging Data and Application Integration: A Step Toward Pervasive Integration Using a Hybrid Integration Platform

**Published:** 18 February 2016

**Analyst(s):** Eric Thoo, Keith Guttridge, Elizabeth Golluscio

Application and data integration silos hinder the implementation of a hybrid integration platform. Application and information infrastructure leaders should apply approaches and tools that enable natural convergence, support the HIP framework and allow for a pervasive integration capability.

## Key Challenges

- The requirement of digital business for converging application and data integration is forcing organizations to develop more flexible and coherently intertwined integration approaches.
- Less segregation of team efforts across different integration technologies and use cases creates opportunities for practices and tools that will enable a path of natural, rather than forced, integration convergence.
- Forward-looking organizations are investigating complementary technologies and aligning iPaaS, iSaaS, API and on-premises integration platforms to create a uniform set of application and data integration capabilities.

## Recommendations

For application and information infrastructure leaders:

- Identify digital and business moments to which your organization must respond, and create the necessary data and application integration capabilities to respond to those moments.
- Apply the integration tools that best complement or increase the agility and effectiveness of your integration processes.
- Use catalyst opportunities for integration convergence in order to spur natural (rather than forced) momentum for integration convergence; iPaaS, HIP, citizen integrators, staffing and delivery optimization, and IoT integration are all agents of convergence.

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# Introduction

The evolution of hybrid integration platform (HIP) approaches creates requirements and opportunities for converging application and data integration. Characteristics of HIP-enabling technologies include interdisciplinary integration patterns, cloud/hybrid enablement, and diversity of user personas (spanning integration specialists to citizen integrators). This technology evolution will drive inherent synergies between data and application integration as a unified and pervasive set of disciplines (see "Modernizing Integration Strategies and Infrastructure Primer for 2016").

In a Gartner study of 317 organizations (during 2Q15), 56% of the respondents made efforts to use data integration tools to interoperate with application integration technology via a single-solution architecture. Not all will pursue joint criteria for selecting both data integration and application integration toolsets, but such requirements are gradually gaining emphasis in enterprises.

Application and information infrastructure leaders must start thinking bigger and more deeply about how integration approaches and technologies will change the game in their industries, by aligning application and data integration to achieve synergy between disciplines and technologies.

Many organizations are looking to pursue a path of natural, rather than forced, integration convergence. Different groups typically deploy integration infrastructure independently, leading to disparate technology approaches in a project-specific or use-case-specific manner. Intertwining data and application flows is a consequence of "normal," pervasive integration in the digital era.

For the most part, a disjointed integration infrastructure (that is, disparate and tactical capabilities deployed in a manner specific to a project or use case) is constricting organizations. Enterprises

going digital are therefore forced to rethink their integration capability; technology and discipline must complement and diversify, and one size doesn't fit all.

Application and information infrastructure leaders can take advantage of an HIP approach to integration by following the best practices we have drawn up. Begin by creating an inventory of the organization's requirements for data and application integration; then decide when to use which integration tools (and whether to use a single tool or a combination several); and finally, augment initiatives to spur natural momentum — using these as agents for integration convergence.

## Analysis

### Identify Key Digital and Business Moments and Your Response to Them

Digital business transformation is intensifying demands for seamless integration across application and information infrastructures. Organizations are conducting an increasing number of business activities and data movements in real time, or on an up-to-the-minute basis. Becoming a digital business forces organizations to seek ways to integrate vast amounts of information from emergent sources and types — such as content, data from operational technologies, NoSQL data stores, social data, open data, machine logs and devices. You will also need to combine disparate data sources and new data types into a usable, cohesive set.

The emergence of a "business moment" is the result of the emergence of digital business, which expands the scope of your business ecosystem, dramatically increases the rate of business change, and introduces the emergence of digital technologies such as the Internet of Things (IoT). A business moment is of very short duration (perhaps just seconds, depending on the nature of the opportunity), and is capable of setting in motion a series of events involving people, business and things that can span multiple industries and multiple ecosystems (see "Architect Your Business to Sense, Respond and Create Business Moments"). Interactions with such environments to harness data and generate relevant action steps will require both application integration and data integration support.

For example, using combined application and data integration techniques plays an increasingly important role in integrating SaaS applications (for enabling postmodern ERP that operates well) with cloud and hybrid environments. Systems of innovation that leverage mobile and Web applications will demand coherent data integration and application integration techniques to gain just-in-time insights and activate responses across continuously evolving events. Systems of record that interact with a growing range of data types from endpoints (including machine-generated data and IoT-related data) will involve the linking of business flows with data access and the analysis of event streams.

Intertwining data and application flows is simply "normal" integration in the digital era. This demands frictionless integration that goes beyond the conventional segregation of application integration and data integration efforts into separate efforts and teams. Joint application and data

integration initiatives may need to extend across different lines of business (LOBs) and departments and touch multiple technology areas.

Segregation of application integration and data integration disciplines increasingly leads to escalating costs due to overlapping effort, delayed deployment and a lack of economies of scale in fulfilling integration requirements. Maintaining a siloed approach to application and data integration can dramatically increase deployment resources and risk in terms of counterproductive activities — such as substantial custom coding, manual processes and additional administrative overheads — which will likely result in the failure to meet various requirements.

Significant complementary and synergistic opportunities exist when neither the applications nor the data for integration requirements are stand-alone.

*Recommended Actions:*

- Pursue application and data integration technology capabilities to ensure business agility together with a cohesive view of application and information infrastructures.
- Rather than a focus on integration requirements that meet needs specific to an application, use case or project, seek broadly applicable, common, reusable capabilities to exploit the intersection of aligned application integration and data integration infrastructure. Data integration efforts, for example, need to be aligned with application integration as part of an integrated solution — such as use of change data capture (CDC) tooling that publishes captured changes into message queues.
- Formulate shared benefits in common areas of both integration disciplines. Focus on, for example, how this alignment positively affects customer-facing interactions and a broad range of operational flows, and gradually optimizes costs and shared competencies — as compared with the pursuit of disparate approaches to similar or common use cases.

## Identify Which Combination of Tools Will Complement or Increase the Agility and Effectiveness of Your Integration Processes

Application and information infrastructure leaders who are focusing on integration initiatives will need to change how they evaluate providers of integration technologies (see "Five Questions to Ask Integration Technology Providers About Application and Data Integration Convergence" and "Introduction to Gartner's Information Capabilities Framework"). A single vendor's tooling probably won't deliver every aspect of application and data integration infrastructure you need, and is unlikely to meet some specialized needs. Many providers focus on either the manipulation of data or the orchestration of business flows, but not both. For those technology providers that say they address both, ask how they deliver various capabilities and how well those capabilities integrate with each other. Assess how technology providers address the aspects they don't cover, and how they plan to fill these gaps through evolving technology or partnerships.

Ask vendors to lay out their visions of how application integration and data integration will intersect, and whether they have the ability to support a combination of relevant technologies — such as enterprise service bus (ESB), data integration technologies, integration platform as a service (iPaaS), integration software as a service (iSaaS), or an HIP approach. Different vendors have traditionally

offered separate products to address each integration approach in isolation. Thus, the technology products used by organizational units responsible for each discipline have evolved independently. No matter how large or broad a technology provider is, it may not be able to deliver every part of an integration infrastructure and is unlikely to meet all of your needs for collaboration between application and data integration roles.

Tools that support convergence of the application integration and data integration disciplines will need coherence to work together, such as supporting reusable capabilities rather than narrow support of individual applications or data structures.

*Recommended Actions:*

- Architect flexibility in integration work streams to dynamically switch between integration patterns, and to interact with and share knowledge (such as metadata) of the landscape of application and data assets. Technology consistency across the various components of tool platforms will be increasingly required to enable interoperability, end-to-end management and self-service support.
- Pursue the HIP as a strategic direction during the next three years, to be able to:
  - Pervasively address integration challenges driven by digital business
  - Evolve HIP approaches as part of a long-term strategic integration framework (see "Market Guide for Hybrid Integration Platform-Enabling Technologies")
  - Optimize a mix of integration technologies and practices to meet the pervasive integration needs of the future
  - Effectively support systematic and adaptive types of requirements in a consistent, managed and governed way (bimodal)

## Use Catalyst Initiatives to Spur Natural Momentum for Integration Convergence

The separation of the discipline predominantly stems from traditional approaches to organizing IT and from different vendors offering separate products to address each integration approach in isolation. The segregation of these different forms of integration resulted in multiple integration skills and technologies spread across various IT organizations.

Software engineers primarily performed application integration, along with the development of data objects and models for transient data that can support user interfaces and business flows. Because they knew mostly about the applications and how to integrate them, their skills evolved into the use cases (collections of requirements) that are unique to application integration. Data integration activities were predominantly carried out by practitioners involved in data management and integration; they knew mostly about the data structures to be integrated and their skills were honed to address issues such as data aggregation and operational data sharing requirements related to data. Thus, the competencies and organizational units responsible for each discipline have evolved independently. As such, these domains typically don't intersect without a conscious effort from IT management and project teams.

Convergence is hard, but are there paths of less resistance where application and data integration naturally converge? Five movements that, in effect, act as agents of integration convergence are making this happen.

## Going Digital Requires That Application and Data Integration Match the Speed of the Business

Digital business increasingly requires you to deliver or process data at the relevant time or the specific moment that matches the speed of the business. As pressures for real-time data integration grow, so you will need to manage a range of data latencies to make data available for use at the right time and in the necessary context.

Addressing these business requirements early is essential, because it is far easier to eliminate latency challenges in a new system than it is to remove latency at a later stage. A narrow architecture or one-size-fits-all approach that is confined to bulk data movements, such as extraction, transformation and loading (ETL), will fail to support varying degrees of granularity and latency in delivering data. The use of other data delivery styles (such as CDC/replication and data virtualization) will become more important when processing data at business speed.

*Recommended Actions:*

In enabling information services and business flows, application integration and data integration leaders and integration competency center leaders should understand the impact of real-time requirements and prepare to:

- Look for business scenarios that demand more business value from existing information and orchestrated flows, such as online channel optimization and advanced analytics supporting sentiment analysis. Such scenarios will require reduced or flexible latency of data and process throughput that can adapt to the timing that the business needs.
- Consider integration approaches such as deploying data virtualization capabilities to federate data to applications that need it, so that business activities can occur at the speed required.

## Rationalize Different Integration Teams, Tools and Approaches Stuck With the Same Recurring Problems

Overlapping and conflicting roles between application-oriented and data-oriented people continue to grow when two different paradigms exist to support the same business strategy and goals. Notably (from the Gartner survey), 47% of organizations want to bring both disciplines together as integrated teams while 32% prefer separate teams with shared activities. This growing desire among organizations to intertwine their application integration and data integration disciplines will drive staffing optimization. Joint practices and the convergence of both competencies will also increase the synergy between teams and align skills with common goals (see "Implement an Application and Data Integration Convergence Strategy With Three Best Practices").

*Recommended Actions:*

To reduce this type of operational inefficiency and restore the value proposition of application integration and data integration competency centers, integration leaders should:

- Create an overarching integration strategy group (ISG) to focus on integration strategy, standards and process. This will improve collaboration between integration delivery teams, while still enabling each team to focus on its specialized integration delivery tasks.
- Apply API management to both application and data services to enable consistent access and control.
- Apply data governance practices to both application and data integration, to ensure a consistent view and to improve data quality.

## Exploit a Combination of Application and Data Integration Using iPaaS

IT leaders and directors of integration are compelled to revise their application and data integration strategy to accommodate all variations of use cases, with a mix of integration technology approaches to bring together both disciplines. While some technology providers have products for both application integration and data integration, very few seek to offer all application and data integration capabilities in a seamless manner.

Trends in the iPaaS market reflect an increasing focus and activity among vendors to capitalize on the interests of enterprises in a unified platform for data and application integration. Offerings for iPaaS provide a combination of common features traditionally found in on-premises integration platform software and that span multiple integration disciplines and capabilities, including enterprise service buses, data integration tools, B2B gateway software and other integration tools (see "Magic Quadrant for Enterprise Integration Platform as a Service").

*Recommended Actions:*

IT and integration leaders must seek ways to close the gap between the worlds of integration technology by leveraging the pervasive integration approaches embedded in iPaaS:

- Develop evaluation criteria that seek alignment of data and application integration capabilities when selecting a new integration technology provider.
- Review existing and planned integration projects, identify overlaps, and explore opportunities for using data integration and application capabilities together.
- Determine what use cases best suit a specific iPaaS offering, and when to intertwine application and data integration technologies.

## Equip Citizen Integrators Who Seek Full Integration

As digitalization drives the accelerating pace of business transformation, business users are increasingly performing do-it-yourself automation of integration tasks. Manual cut-and-paste and sporadically attempted integration approaches are no longer good enough.

As business users typically do not segregate application and data integration, they demand simple ways of using both integration disciplines in a seamless manner. This demand is encouraging integration technology providers to offer citizen integrator tools that combine support for both disciplines and deliver shared benefits. This will further reinforce a general industry trend toward the convergence of application and data integration technologies and adoption patterns.

*Recommended Actions:*

Capitalize on the increasing opportunities to equip citizen integrators who seek complete integration approaches. Collaboratively help citizen integrators to fulfill their needs to:

- Support prepackaged integrations such as easy-to-use, configurable technologies for consuming and building cloud-based integration flows (cloudstreams); enable simplified interaction with disparate and diverse applications, data stores and cloud services, which facilitates business flexibility to work across systems and the information landscape.
- Offer technology capabilities to enable citizen integrators — an emerging role that attempts to perform do-it-yourself integration tasks without any support from IT departments or expert developers (see "Market Guide for Citizen Integrator Tools").
- Combine and integrate multiple data sources of diverse types and distributed locations, including big data (for example, to support analytics performed by nontechnical users or business-facing roles to experiment and build models).

## Augment Integration of IoT Work Streams Where Data and Application Flows Intertwine

Less-familiar technical challenges, such as high-performance messaging and Web streaming, which access and deliver real-time messages to and from dispersed IoT endpoints, are becoming commonplace as business initiatives increasingly pursue digital strategies. Both data and application integration disciplines must coherently support use cases that harness IoT devices and enable cloud service integration, mobile app integration, application-to-application integration, business-to-business integration and API deployment. HIP-enabling technologies provide support for these extensive and pervasive integration requirements to work well with IoT environments.

The span of integration effort requires combining integration technologies (such as iPaaS, data integration tools or ESBs) with capabilities for data ingestion and stream processing. A streamlined set of integration capabilities must effectively deliver reliable data to downstream consumers, such as applications, data warehouse, data lakes, and business intelligence and analytical applications.

*Recommended Actions:*

In addressing the added complexities of navigating across application and information infrastructure, integration efforts must ensure proactive planning and provisioning of capabilities:

- To support more flexible ways of accessing events and sharing data, to discover business patterns, or to take actions guided by internal known data sources (as well as less-familiar external, and possibly massive sources). This presents both increasing pressures and opportunities for combining integration approaches.

- To augment integration of IoT work streams where data and application flows intertwine and both disciplines naturally converge. Highly distributed data and processes (both internal and external) that must intersect in forming the integrated digital business, will drive organizations to work with a mix of heterogeneous integration tools to fulfill an enlarging vision for pervasive integration.

### Acronym Key and Glossary Terms

| | |
|---|---|
| **API** | application programming interface |
| **CDC** | change data capture |
| **ESB** | enterprise service bus |
| **HIP** | hybrid integration platform |
| **IoT** | Internet of Things |
| **iPaaS** | integration platform as a service |
| **iSaaS** | integration software as a service |
| **LOB** | line of business |

## Gartner Recommended Reading

*Some documents may not be available as part of your current Gartner subscription.*

"Predicts 2016: The Opportunities for Integration in Digital Business Are Expanding"

"Implement an Application and Data Integration Convergence Strategy With Three Best Practices"

"Five Questions to Ask Integration Technology Providers About Application and Data Integration Convergence"

"Five Reasons to Begin Converging Application and Data Integration"

### Evidence

The best practices and recommendations identified in this research are derived from our observations of numerous Gartner clients, who are revealing increasing interest in aligning their data integration and application integration initiatives. Client inquiries with Gartner during the past 12 months — and interactions with attendees at Gartner's Application Architecture, Development and Integration and Business Intelligence, and Analytics and Information Management summits — reveal that enterprises recognize how managing application integration and data integration infrastructures in a holistic manner is becoming critical to their ability to improve business agility.

**GARTNER HEADQUARTERS**

**Corporate Headquarters**
56 Top Gallant Road
Stamford, CT 06902-7700
USA
+1 203 964 0096

**Regional Headquarters**
AUSTRALIA
BRAZIL
JAPAN
UNITED KINGDOM

For a complete list of worldwide locations,
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