

# Apply hybrid multicloud architecture to design commerce ecosystems

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September 12, 2016

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This document provides insights into the business need for a retail digital platform and gives you an overview of various components and design considerations for creating your own platform.

Retail organizations must make their customer experience more innovative. You can only achieve innovation by establishing a foundation built on a true retail digital platform. A retail digital platform consists of a complex set of components and services that work together with the right level of support mechanisms.

Each component is built on a Platform as a Service (PaaS), Software as a Service (SaaS), Infrastructure as a Service (IaaS), or custom on-premises solution. The overall system is often a composition of a variety of systems, forming a true, hybrid multicloud ecosystem.

So, what are the benefits of hybrid cloud platforms? A hybrid model offers you growth, scalability, and IT cost savings. Hybrid cloud solutions help establish an ecosystem which can easily evolve through the ability to add new services, partner services, and other services with ease.

To adopt hybrid cloud platforms, organizations must have significant readiness, with clearly documented technical considerations and coordination between potentially disparate cloud infrastructure professionals.

This document provides insights into the business need for a retail digital platform and gives you an overview of various components and design considerations for creating your own platform.

## **Business problem: Retail organizations need to provide state-of-the-art customer experience**

To promote customer centricity, retail organizations must bring end-to-end engagement with their customers, from marketing to sales to customer service. Commerce and online channels are not simply transactional. To get the best customer experience, commerce platforms must be significantly enriched with knowledge about the customer and driven by customer insights. What does it take to seamlessly integrate customer insights into customer touchpoints?

Assume a retail organization has a core commerce order capture and management (multichannel) system that also includes content authoring and publishing systems. To achieve a true customer-driven platform, multiple services must be aggregated together. The following is a potential list of these services:

- Customer insights that analyze various data points, such as customer information, past transactions, service touchpoints, social activities, prior responses to promotional offers, and the like
- Customer interactions (captured through web and data analytics) from various channels
- Seamless mobile channel integration, in addition to standard core channels such as web, in store, and customer service
- Marketing and campaign services that are driven by customer interactions through all channels
- Partner services such as payments, notification, product and service ratings and reviews, address validation, store location, loyalty and reward services, proactive chat services, social media integration services, and the like

Given the complexity of integrating multiple services and systems, today's businesses require significant agility with minimal investments. Retail organizations need accurate, measureable return on their investment (ROI) that requires outcomes such as order volumes, order value, conversion rates, campaign effectiveness, etc.

As opposed to heavy capital expenditure (CAPEX) or partial CAPEX models, hybrid cloud systems make ROI easier to model and bring agility to the customer by allowing IT to be more business-focused versus operationally focused. The move to "as-a-service"- or consumption-based solutions that are aggregated on a continuous basis is a significant change in IT strategy, focus, and execution.

It is crucial for retail organizations to embrace a cloud strategy that supports a hybrid cloud-based architectures both from an integrated services functional as well as from a globally measured perspective.

## Key shortcomings of current ecosystems

Most of today's retail organizations have established good online commerce platforms. However, many of these platforms are on-premises systems that pose problems. These on-premises systems are often:

- Challenging to scale
- Dependent on physical system appropriation and time-consuming capacity and procurement planning, typically requiring heavy CAPEX
- Burdened by in-house analytics solutions that don't effectively influence or drive enhanced customer experience
- Siloed, with broken or point-to-point integrations that don't bring insights at right transaction or customer touch-points

For example, you can improve customer engagement if you integrate potential fulfillment patterns for the product(s) ordered at the time a client adds the product to the cart or makes an order. Point-to-point integrations are difficult and enforce adhoc integrations that make the system rigid with time.

Most organizations don't have a clear cloud strategy—much less a hybrid cloud strategy—which limits the goal of true operational expenditures (OPEX) model ecosystems. Due to lack of funding or excessive operational expenditures, organizations settle for incremental transformation of their systems that yield little or no measureable results.

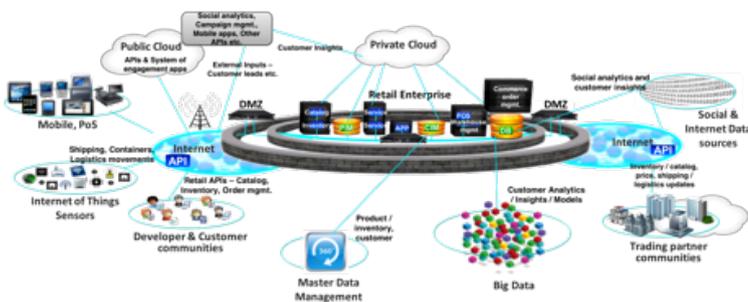
While retail organizations have legacy systems and architectures that limit the potential for a scalable, profitable digital platform, there are also some characteristic shortcomings with the modern retail technology landscape including:

- **Lack of true born-on-cloud, retail-focused systems:** Most common core retail system components (online commerce, order management, warehouse management, campaign management systems, and the like) are not naturally “cloud ready.” However, vendors, including IBM, are offering the core by establishing a layer of default core managed services on top of Infrastructure as a Service platforms (SoftLayer, Amazon Web Services, etc.). Different vendors offer their services through their respective infrastructure partners and this results in multi-cloud ecosystems in both “pure play” ecosystems (for example, IBM Commerce on Cloud, IBM Digital Experience on Cloud, or IBM Marketing cloud) and cross-vendor ecosystems (for example, IBM Commerce on Cloud, Adobe AEM, and Marketing Cloud). There is little or no visibility or patterned cloud-to-cloud aggregation of services.
- **Data analytics and integrations are still traditional:** Most data analytics and process integrations happen through traditional software components (such as Cognos, Informatica, DataStage, Oracle, etc.) that are deployed on an Infrastructure as a Service system. While there are several Software as a Service vendors, this area has not matured enough to handle the data volumes and complexity as well as data privacy and security that are required to generate insights from complex data sources mentioned above. A combination of network and bandwidth issues, lack of real-time data insight tooling given the data volumes in commerce landscape results in this challenge.

- **Significant managed services required on top of services and systems:** Even though many SaaS and IaaS vendors claim SLA compliances for availability, data resiliency, and disaster recovery (such as 99.99% for IBM Commerce on Cloud), there is a need for additional managed services from retail organizations either directly or through services vendors to address key customer needs such as proactive monitoring, automation. This also includes end-to-end network architecture, bandwidth and last mile connectivity issues which organizations are left to grapple with in most cases.

## Hybrid cloud ecosystem in the context of a retail digital platform

The following diagram shows an end-to-end digitally enabled retail organization. At the core of the enterprise are the key systems of record that own and manage inventory, catalog, pricing, customer information, ERP, finance, and HR systems deployed in a private cloud or on-premises data center. It represents a complex mix of public and/or private clouds which attempts to manage multiple methods (Web, mobile web, native mobile), system APIs, trading partner APIs, and the like. There may be a suite of system insight applications that provide a variety of analytics, customer insights, promotion or campaign insights, performance reporting, and the like. This mix of private cloud, public cloud, and APIs form a hybrid cloud ecosystem.



## Retail digital platform: Overview and key components

A retail digital channel requires a customer-centric view of the ecosystem including its architecture, components, and integrations and this marks a change from current transaction-centric view above. While the above diagram depicts a true retail organization ecosystem, the core issue is that most of these systems today are on traditional, on-premises deployment bases.

If you can imagine the above ecosystem as a service or microservices ecosystem, then it gives the whole organization a much-needed configurability and agility through quicker orchestration, changes, and new product or offering introductions.

A true retail digital platform should have the following components:

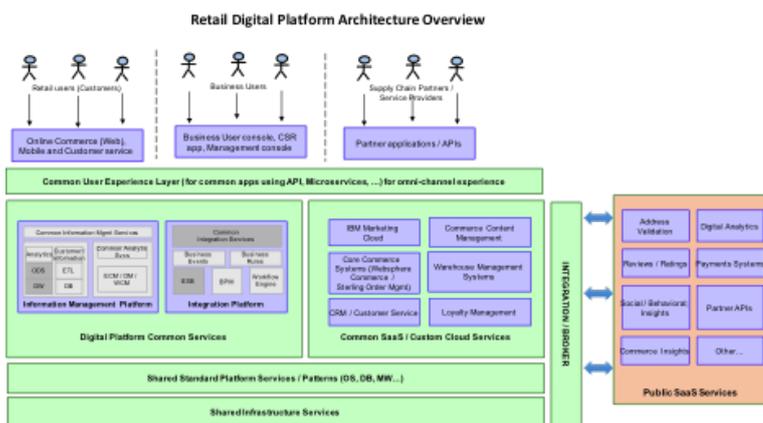
- **A retail analytics platform** that establishes a standard information model for collecting retail data – customer information, channel interaction summary, transaction history, social media interaction summary and insights, campaign and promotional insights, loyalty data, and more. A hybrid cloud-based architecture helps separate systems of engagements from systems of records (SOR), building agility and standardization. Heavily transactional SOR-based systems stays on premises while the information model in SOE are enriched for improved

client experience and this segregation helps build as many customer interaction channels as required through aggregation and integration of as-a-service components (e.g. customer analytics and campaign management system).

- **Core commerce engagement channel applications** (online commerce, order management, mobile channels, and customer service channels) that seamlessly integrate with retail analytics platform for customer information and promotional insights.
- **Commerce data** (Product catalog, inventory, pricing) that’s integrated to the enterprise backend systems through a scalable and configurable data exchange hub. Hybrid cloud based architectures establish separation of concerns through standardized “as-a-service” consumption models.
- **Near real (or real)-time integrations** with commerce content management systems. These systems might manage images, product description and the like. In a hybrid cloud scenario, most integrations happen from cloud to cloud. A hybrid cloud’s standardized integration methods and SaaS offerings with high bandwidth connectivity, these integrations are much more predictable, agile, and maintainable.
- **Marketing and campaign systems** that integrate with retail analytics platform for deriving insights on campaigns, promotions, and other marketing endeavors.
- **API-based integrations** with third-party systems for payment gateway, ratings and reviews, partner catalog and inventory, web analytics, notification services (email and SMS), shipping, logistics, and so on.

Above all, the core of the ecosystem is a microservices-based architecture that focuses on macro-level components and services as opposed to dealing with low-level services and associated agility issues.

The following diagram shows a conceptual view of a digital retail platform at the core of the architecture and helps transform the above retail ecosystem into a consumption-based, agile ecosystem. The retail digital platform forms the core of an ecosystem, whereas multiple SaaS or as-a-service components could be plugged into the same.



Refer to the [Cloud customer architecture for e-commerce paper](#) for a vendor-neutral, best practices approach to for creating a cloud-based e-commerce system. A detailed view of how to develop, deploy and manage scalable e-commerce solutions is well documented in the [Commerce architecture center](#).

## Retail digital platform: Strategic design imperatives

When creating a hybrid cloud system for e-commerce, you need to clearly define the design imperatives. If you implement the following design imperatives, you will position yourself for a successful transformation.

### Core commerce design principles

A typical retail digital platform should be based on a customer-centric design. Successful commerce implementations leverage commerce packages with few customizations, accelerating time to market. However, large retail organizations also have done significant customizations and this results in dedicated services as opposed to shared platforms. It also helps improve maintainable and ensure that it's easy to upgrade. API enablement of the platform is absolutely required for ease of integrations, and many vendors provide REST APIs.

### Commerce content strategy

The debate over who “owns the glass” is pervasive for desktop and mobile web applications. There is no debate in native mobile applications (often referred to as “headless” commerce) since native Android and Apple iOS applications imply ownership.

For responsive, browser-based retail applications (desktop and mobile), the best practice is to create a side-by-side architecture where the primary areas of content integration follow these principles:

- Commerce instantiated transactional pages dynamically retrieve content from the content management system (CMS) into targeted content areas or fragments
- CMS-instantiated pages (such as marketing landing pages) may or may not dynamically retrieve data from the commerce systems or other data systems of record
- Commerce instantiated search pages providing federated search by dynamically retrieving URL links to content pages that match the search term. Those links are typically to CMS pages with minimal transaction.

Many times, functional requirements impose significant customization demands on the core commerce system. This eventually results in a brittle and inflexible system. In those cases, it's best to isolate the front end by using a platform that can isolate efficiently, like Adobe Experience Manager. The front-end layer could then be built on top of core commerce processes and flows. This is a key architecture decision. You must also consider what is offered by core commerce systems when thinking about user experience demands with what is offered by core commerce systems.

Each component of the retail hybrid cloud platform needs to have a clear segregation across systems of engagement, systems of insights, and systems of record, and the data model strategy needs to reflect that. Only then, can you achieve the much-needed agility.

Components to consider include:

- **End-to-end flow of information and data security factors** (like encryption). You must understand how data flows from one system component to another and understand associated nonfunctional constraints (data volumes, time-lag allowed, SLAs, etc.) and the impact of network architecture and constraints (VPN, bandwidth issues etc.).
- **Data synchronization of core commerce data**, such as inventory, catalog, pricing, and the like. Business processes and constraints control data synchronization of multiple sources of commerce data. Your approach to data synchronization influences the integration workload and data quality and, eventually, the customer experience.
- **Codebase management and functional segregation for multi-country rollouts**. You must determine how much of your codebase is common across multiple country or site rollouts, how much customization is required for each of the rollouts, and how to segregate these rollouts.
- **Digital analytics systems** should be designed and integrated at the beginning of the process, before you incorporate digital analytics links into the online system.

## Hybrid cloud strategy

To achieve the true benefits of a retail digital platform, you must have a hybrid cloud strategy that accounts for different cloud consumption models, including Platform as a Service, Software as a Service (includes APIs), and Infrastructure as a Service. When creating a hybrid cloud strategy, you should consider the following aspects:

- **Technical reference model**: You need a technical reference model to consult when making decisions during the design and implementation process of creating a retail digital platform. No matter what consumption model you use, whether it is PaaS, SaaS or IaaS, your technical reference model needs to detail the right partners and platform strategy to use.
- **Platforms and partnerships**: You need to establish key cloud platforms and partnerships with the right pricing and support models. Doing so makes vendor management and governance easier gives you consistent and predictable support. You should also probably consider whether a cloud broker framework is necessary for your deployments.
- **Architecture governance**: Your entire organization needs to know and understand your hybrid cloud strategy and your approach to implementing it. You should use your vendors and partnerships to correctly enable various teams to enact a “cloud first” approach to building systems. Often, you need to supplement this activity by hiring in-house expertise.
- **Integrated service management**: Your service management organization needs to have processes and systems that can ensure the right level of support for the platform to make sure you meet various service level agreements (SLAs).
- **Organizational tooling and methods**: You need to redefine your organization’s tools and methods for cloud when there is significant focus on DevOps principles for accelerated development and deployments.

## Technical design considerations

You should consider the following technical design considerations when establishing your retail digital platform:

- **Cloud first**: To get the scalability and growth that you need in your platform, you should move more components to the cloud, establishing a true “as a service” solution. To do so, cloud

effectiveness and operability should be the topmost decision point for building or deploying any component of the retail digital platform.

- **Omnichannel experience:** A true multichannel experience is achieved through clearly establishing user journeys and system touchpoints across each of your channels, including your call centers, stores, web, mobile and APIs. To create a great client experience, each of the user journeys and associated touchpoints must integrate sufficient sets of insights. To establish this true, multichannel experience, you should create a mechanism through which newer channels of interactions can be incorporated as needed. Customer information models and associated data architectures need to be flexible and extensible for achieving a true omnichannel experience. This will help multiple systems integrate with a common customer information model and carry customer context across various touchpoints – be it APIs, web portals, or kiosks. This will also help integrate analytics and insights effectively into customer interaction points.
- **Overall data model:** You must establish an overall data model that focuses on core commerce content, including product information, customer information, catalog, pricing, transaction history, sales summary, and other customer insights sources. This data model should have appropriate component, data ownership, and standards or guidelines for various data elements and should be closely linked with business process needs. You should reference this data model frequently when making decisions.
- **Non-functional requirements (NFR):** that includes business volumetric projections – While establishing the non-functional characteristics of the platform, you must align the volumetric projections with expected business growth and align the pricing models with vendors and service providers. This ensures minimal upfront investments while spend is always aligned to business growth. NFRs need to include various integration points across the platform and the volumetric or data projections, and you rationalize to an extent of bringing “practicality” as opposed to going for the “best” solution. Many times, this has significant impact on the overall design as well as costs.
- **Clear integration models:** You should establish clear integration models with reference architectures, standards, and guidelines. Because integrations directly impact performance and SLAs of the overall system, close alignment with business requirements with sufficient optimization is a key aspect of integration design.
- **Data security and privacy requirements:** Any data security or privacy requirements need to be articulated as a broader program guideline for various vendors and providers to comply with. This includes personally identifiable information, regulatory implications, payment integration related constraints, and the like.

## Integrated DevOps approach

A retail digital platform should be ready to fail fast and learn or recover fast. Creating an ecosystem of applications and services built on DevOps principles leads to speedy development, operational automation, faster fixes and patches, and so on.

## Development automation and agile practices

Complex programs should adopt waterfall or iterative development approaches that account for multiple groups delivering that have complex dependencies. When developing a retail digital

platform, you should implement DevOps practices and associated tooling to get the agility to develop how you need. Continuous business planning and prioritization ensures that your investment is valuable and realigns your system in case of failure.

You need to create a culture where you can rapidly deploy and release, quickly and easily pushing new features or updates—and DevOps is the way to do this. When creating a DevOps approach, you must consider tracking and planning tools, continuous integration and development toolsets, and deployment and release management toolsets. When choosing products or platforms, you should look for integrated DevOps capabilities

## **Operations automation**

As SLAs become more stringent, it is critical to automate monitoring and integrate alert mechanisms for timely interventions. Continuous monitoring tools need to become part of your architectural construct. Integrated service management and problem management practices need to drive more automation into issue resolutions.

## **Service level agreement (SLA) considerations h**

Business objectives often drive SLAs. You must analyze SLAs from the top down and consider any business process constraints imposed by existing teams or systems of record (SOR). A best practice is to segregate SLAs based on business criticality and impact and to appropriately assign components and sub-components to these categories. For example, you don't need to update your product inventory every hour if your current business processes limit the availability of the data in SORs to every four hours.

## **Summary**

Overall, a true retail digital platform is made up of complex sets of components that work together to deliver an enhanced and contextual customer experience. A hybrid, multicloud approach that drives an “as-a-service” is the only viable way to support this combination of complex components. Hybrid, as-a-service models improve a system's agility, reduce cost, and focuses on high-value areas. To build an effective hybrid ecosystem, you must carefully design your system to account for technical considerations, cloud strategy and governance, development process, DevOps and tooling, SLAs, and more. Hopefully, this doc gave you the tools you need to get started.

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