



Razorfish Intelligent Platforms Series:

Reactive Architectures –
New Model for Assembling
Enterprise Systems

Today's Enterprise Architectures

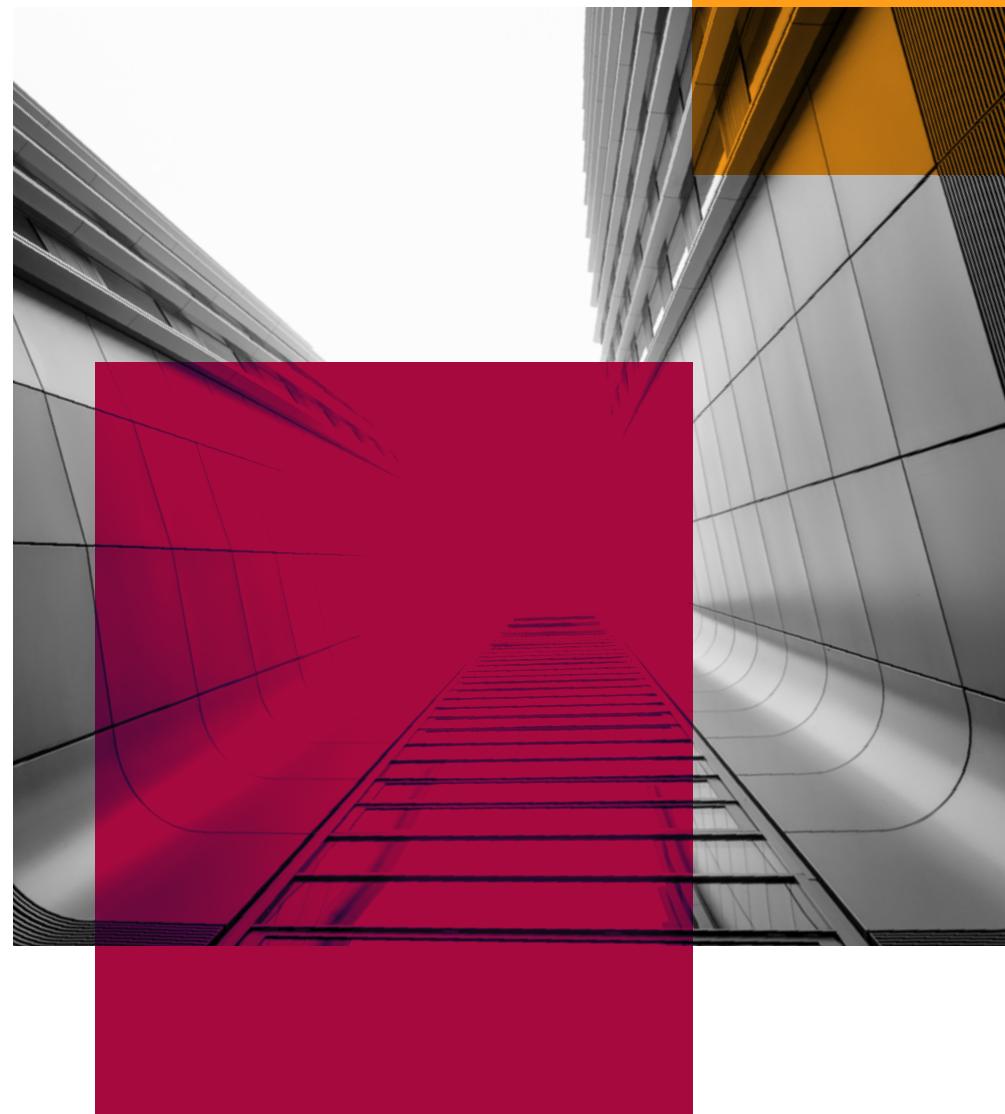
Application requirements of today's enterprise architectures are being pushed to their limits. More device types are being used to access experiences; a massive quantity of data is flowing through enterprise systems; and consumers are demanding rapid response times and constant digital access.

Reactive architectures represent a new model for assembling enterprise systems to better meet today's needs. Instead of fully integrating each piece of a complex technology architecture, reactive approaches separate distinct parts and use common patterns to facilitate the appropriate connections between each part. This approach enables easier integration between modules and allows systems to flex up or down, depending on demand. Although this model is not new, the technology landscape has changed drastically with technologies such as virtualization and containers,

and with today's cloud offerings from vendors such as Amazon and Microsoft, the full benefits can finally be realized. The result? Greater site uptime, rapid update cycles for marketing and development teams, and more flexible and optimized platforms.

In this point-of-view piece from Razorfish, we will look at:

- 01. An Example: A Reactive Architecture for Walmart Canada**
- 02. Benefits of a Reactive Architecture**
- 03. When to Explore a Reactive Architecture**
- 04. Recommended Strategies for Moving Toward a Reactive Approach**



An Example: A Reactive Architecture for Walmart Canada

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Because this is a complex topic to explain, let's start by looking at a real example of a brand Razorfish helped to deploy a reactive architecture.

Walmart Canada

Like any big retailer, Walmart had substantial system requirements that varied based on the volume of web traffic. Slow load times or site downtime were major risks to hitting online revenue goals. Razorfish helped Walmart Canada create a flexible, modular architecture that is making the business more agile and enabling a massive amount of new transactions online. Using an agile development and design process, our teams built North America's first responsively designed commerce site for a big box retailer. The site is maintained and optimized using a cloud-based DevOps framework. A reactive architecture has enabled the team to decouple the systems of engagement (like targeting and search) from the systems of record (such as content management, catalog management and inventory management). This shift provides the ability to make changes to the experience and also enables a better security model.

Results:

98% increase in mobile orders from new site

20% increase in conversion in the first month after site launch

35% decrease in average page load time

NEW scalable platform rapidly flexes to the client's needs



Benefits of a Reactive Architecture

Transitioning a traditional development environment to a reactive architecture has a wide range of benefits that can ultimately prove to be transformative for the business. With this approach, your technology will be more:

Agile

In a reactive architecture, there are intelligent components and message passing “pipes” that communicate between each of these components. If components are modified, updated or replaced with another, as long as the messaging through the “pipes” remains intact and identical, there should be no other parts of the architecture that are affected. This makes it much simpler to address dependencies, allowing businesses to make updates or respond to issues more quickly. For example, replacing a search engine can be a complex undertaking, as it is tightly integrated with many other systems and incorporates

dependencies on database schema, feed format and others. With a more reactive approach, these dependencies are much more streamlined and simplified, creating the opportunity to replace the search tool with another.

Decoupled

The presence of intelligent components that isolate platforms means individual technologies can be replaced with new ones, as long as they feed or consume the same messages other components depend on. This “decoupling” of technologies within a common architecture helps to avoid creating tangled systems that get unwieldy, expensive and complicated to manage over time. It also helps isolate failures and create new strategies for addressing those failures without bringing down all systems.



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Extensible

Reactive architectures also allow us to connect technologies in a unique combination of ways, resulting in new capabilities. If we have data from one system feeding another, we can create an additional connection to feed it to a third system that gives us new ways of enhancing that data. For example, catalog update data can be fed to search indexing tools. However, we can establish another connection with a component that consumes the catalog data, does comparison analysis with competitive sites, and potentially signals to another system that the price should be modified. In short, we have tremendous flexibility to further connect and enhance systems. For example, in many content management solutions, a publish event is triggered to ensure content is approved and live in

production. This publish message can also be connected to your CDN network to ensure caches are invalidated.

Predictive

The distinct separations between system elements lets us look at individual components to see how well they are performing or when they are being utilized. This enhanced level of granular measurability allows companies to be more analytical and predictive in how they scale up or down, helping to improve uptime in peak periods and also creating opportunities for cost savings when systems are not being fully utilized. For example, when leveraging Amazon Web Services, instrumentation of components can be performed through Cloudwatch, and auto-scaling on certain events can make this fully automated.

When to Explore a Reactive Architecture

Although reactive architecture is a common theme for many of our clients, there are three key scenarios when evaluating whether to invest in moving toward a reactive architecture, including:

The volume of customers or interaction points is growing

Reactive architectures are more critical for organizations that have millions of customers or millions of devices and interaction points that they need to support. The demands for each of these devices are frequently changing, and a reactive architecture can help maintain a manageable technology infrastructure. Netflix is a classic example of using a reactive architecture to scale across devices and customer base. Organizations that deliver digital services or focus on omnichannel experiences (like retailers) are likely to have a large number of customers or interaction points to manage and would be good candidates for a reactive architecture.

Questions to ask are:

- **How difficult is it to make sure the same messaging exists on all interaction channels?**
- **Do all interaction points fully leverage the potential capabilities the systems can provide?**

Responsiveness of the business environment needs to increase

Businesses that have huge volumes of traffic or lots of data that needs to be addressed quickly, or that need real-time data analysis that then feeds through their systems could benefit from the agility of reactive infrastructures. Financial services organizations or commerce experiences with dynamic content and pricing are two examples of needing real-time data to further enhance the experience, service, sales and conversions.

Questions to ask are:

- **Does responding in real time have an impact on your organization?**
- **Are you currently leveraging real-time (big) data in your infrastructure?**
- **Are you challenged with the volume of data you have to work with to impact the end-user experience?**

The need for infrastructure agility is critical

A reactive architecture can help an organization become more agile. However, a reactive architecture does require investments in people, process and technologies.

We believe that organizations with a strong technical or digital focus and investments, and that require frequent new functionality or significant technical capabilities, will benefit most from the ability to speed up deployment, upgrades or enhancements. Companies that prefer to buy "out of the box" tools will be challenged as they might not have the in-house technical staff needed to maintain and update the infrastructure.

Questions to ask are:

- **Do you have a dedicated technical team owning your infrastructure?**
- **Have you explored cloud technologies already in the past?**
- **Does the business leverage an agile approach toward project development?**
- **How much are you looking to buy out-of-the-box solutions versus assembling your own?**

Recommended Strategies for Moving Toward a Reactive Approach

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The first step toward a reactive approach is assessing your current architecture to see how well your current environment aligns to reactive principles. After that discovery has been completed, we recommend creating a roadmap to guide investments.

In the discovery, key assessment areas are:

- **Intelligent components, dumb pipes:** Is all logic in independent components of your overall system, with no intelligence built into connectors? Are you using lightweight protocols, such as HTTP and REST for communication between components? Are you able to easily add other components that leverage the same APIs or data streams? Can each component be scaled and deployed independently? Will component failure not disrupt the rest of your system?
- **Asynchronous communication:** Are interactions between components asynchronous? If they are not, are you able to move them to a more asynchronous architecture?
- **Data distribution:** How is your data organized? If it is centralized, is it easily accessible? If it is distributed, is there clear data ownership? Can you develop

independent components leveraging this data easily?

- **Automation:** How much automation is in place to manage your infrastructure? Is there a continuous integration process? Are tests and deployments automated? Does your organization have the skills and the capabilities to further automate technology operations? Does your hardware infrastructure support automation and elasticity?
- **Distributed governance:** Is the organization set up for distributed governance? From an organizational perspective, is there distributed ownership of distinct elements or components of your overall infrastructure? To what level are they responsible for each component? Does the organization have full independence?

The initial assessment across these areas will help identify initial pain points and allow you to prioritize where to focus first as you begin to design, implement and then evolve your reactive architecture. Keep in mind that the roadmap will be unique to each brand's situation and maturity level across the different areas.

Contact Us

Motivated and inspired by what's next, Razorfish helps its clients navigate the unknown, drive change and transform business. This content series is designed to help brands achieve customer-obsessed business transformation, with a special focus on the core pillars of Experience Innovation, Participation Marketing, Ubiquitous Commerce and Intelligent Platforms. For more content, visit Razorfish.com.

With specific questions about Razorfish's Intelligent Platforms solutions, contact:



Ray Velez
Global Chief Technology Officer
Ray.Velez@Razorfish.com

Ray is a globally recognized business and technology leader who frequently speaks at industry events and works with clients to transform businesses by leveraging innovative software.



Martin Jacobs
**Group Vice President, Data Driven
Marketing Technology**
Martin.Jacobs@Razorfish.com

Martin leads the Razorfish data-driven marketing practice and has supported several large brands in the transition to a more reactive architecture.