

# **Rich Internet Applications 101: A Primer for Marketing Agencies & Multimedia Developers**

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A White Paper from Integration New Media



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## Introduction

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Picture this - you log in to a popular website to make a purchase. You search through a number of products researching which ones best fit your needs. You take the time to carefully add items to your cart, each time checking your quantities and clicking on the “continue shopping” option. Your order is complete and you return to the shopping cart, enter all your shipping information and payment details only to be presented with an error at the end of the process. You’re back to square one and must now either spend time on the phone with the retailer to see if your order was processed in that split second before the site crashed, or start from scratch with your order with the hope that you don’t receive it twice.

This frustrating experience is one that consumers encounter day-in and day-out because of poorly architected sites that are not designed with the user experience as the number one mantra.

***ZapThink predicts that the RIA space will grow to become a \$3 billion market by 2011.***

As your clients struggle with how to deliver better user experiences, many are reaching out for technology to help them create a more immersive and responsive environment. One way that your clients can achieve this is through the use of Rich Internet Applications (RIAs). Designed to combine the full “content rich” experience of a desktop application with the “broad reach” of a website, RIAs deliver the best of both worlds.

Originally coined by Macromedia in a 2002 white paper, RIAs have since grown into a widely accepted technology and are now the direction of choice for many new web development projects. According to Gartner Research, nearly 60 percent of all new application development will include RIA technology by 2010.<sup>1</sup>

For marketing agencies, the RIA sector is one of significant growth. ZapThink, a leading IT advisory and analysis firm, predicts that the RIA space will grow to become a \$3 billion market by 2011.<sup>2</sup>

As your clients consider their options in the web development sector and consider adopting RIAs, it’s important to understand both the value they deliver and the challenges they can introduce. Yes, RIA technology is still in the early adopter stages, but the long-term business applications of this technology are huge. RIA’s ability to enrich the customer experience while supporting more complex services and transactions makes it a strong differentiator for your clients.

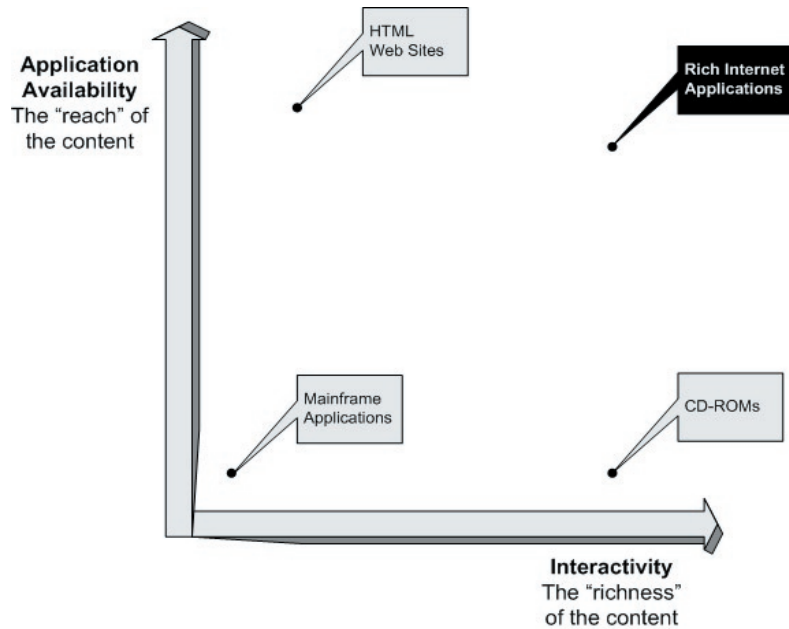
Already the early adopters are seeing significant financial impacts from the deployment of RIAs:

- After The Broadmoor Hotel and BlueGreen Vacation Rentals rolled out their one-screen RIA, they saw an 89 percent increase in reservations and nearly double the conversion rate of the 4.1 percent industry average.<sup>3</sup>
- When Yankee Candle added RIA technology for real-time visualization of custom candles, the company saw a 25 percent increase in both product revenues and average order size.<sup>4</sup>
- When TJX switched from an HTML-driven shopping cart to an RIA-based one-screen model, the company witnessed a 50 percent increase in conversion rates, increased average order size and reductions in abandonment rates.<sup>5</sup>

This paper will present the concept of RIAs and explain why your clients should be embracing this technology. It will also provide examples of how RIA technology has been implemented wisely to address specific business needs and will present a foundation of what you need to know to kick start RIA projects with your clients.

## What Are “RIAs”?

Rich internet applications are web applications that have many of the features and functionality of traditional desktop applications, but are delivered over the web. These applications combine the best of both worlds – the power and rich content of the desktop with the connectivity of the internet.

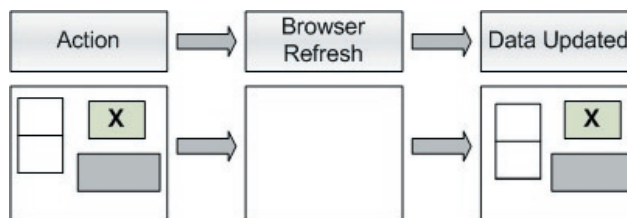


RIAs offer the best mix of “reach” in application availability and “richness” in their content. Since they are web-based and cross platform, RIAs can run on any system or platform. Their efficiencies in processing at both the client- and server-level allow for the delivery of richer and more interactive content.

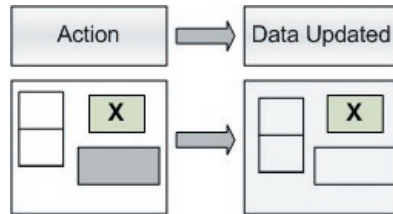
The important differentiator between an RIA and a more traditional website is that an RIA is a true “application” that allows you to perform a task. This task can include finding a product, customizing a service, learning new information, playing a game, or mixing information to create something new.

Another difference with RIAs is the way they handle and process information. Traditional desktop applications today rely exclusively on client-side processing. When a task is initiated, the local system’s resources are leveraged to process the request. In contrast, a web application relies exclusively on the server technology to process a request. With RIAs the load is shared by both client- and server-side tasks.

With an HTML website, when a user fills in data, changes options, or checks boxes and hits, the page must be submitted to the server for data validation and then the screen is reloaded with the new data incorporated.



With RIAs, the data is partially processed by the client, so a full page refresh and return trip to the server are not necessary with every action performed. This means that when users click boxes, fill in forms and modify preferences, the results can be displayed on screen immediately without the data being reloaded.



This responsiveness and smooth interaction creates new possibilities in information flow for the user and new methods of information display for your clients. Web-enabled applications no longer have to present information in a rigid page-by-page format. The user experience is no longer limited by a client's web browser as the shared interaction between the server and the client delivers vast improvements in usability and productivity over today's web sites.

## Why Are Organizations Choosing RIAs?

RIAs offer marketers many promises from richer content distribution through to increased sales. Even the bleeding-edge adopters of RIA technology, those in the riskiest group who embraced the technology in its infancy, have seen return on their investments and hard results from deploying applications.

RIAs introduce several key benefits for your clients:

- **Present Richer Content** – RIAs offer better support for data presentation than typical HTML applications can. This allows for replacement of numbers and symbols with visual elements and status indicators that can be more easily interpreted by users.
- **Present High Fidelity Content** – RIAs allow for the delivery of pixel-perfect screen layouts. This means that rich content can be presented with perfect replication in a web-based application.
- **Present Complex Offerings or Large Data Sets** – One of the challenges RIAs solve nicely is the presentation of complex offerings. RIAs allow for users to adapt searches on the fly and immediately see results. This makes sifting through large volumes of data faster and much more efficient.
- **Improve the Customer Experience** - RIAs allow you to convert processes from the limited page-by-page model of typical websites and present more information in a single screen. This means fewer clicks for users to find what they are looking for, less waiting time, and fewer opportunities for drop-off or abandonment.

*After The Broadmoor Hotel and BlueGreen Vacation Rentals rolled out its one-screen RIA, the company saw an 89 percent increase in reservations and nearly double the conversion rate of the 4.1 percent industry average.*

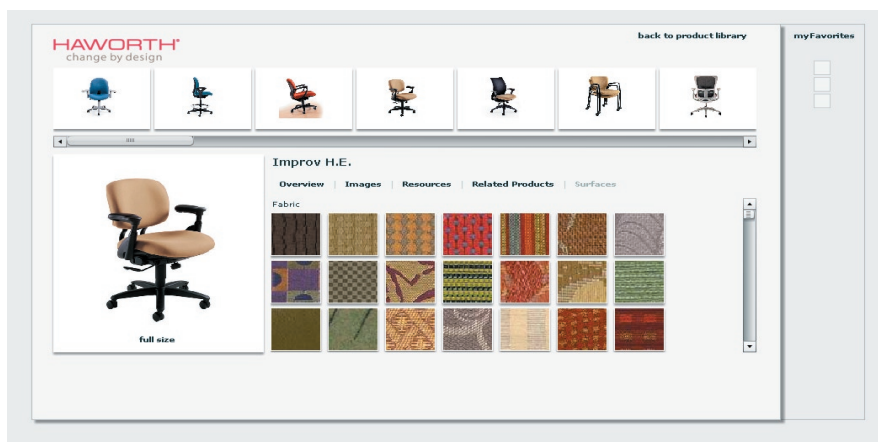
- **Enhance Interactivity** – RIAs make the web more like the desktop and allow for better interactivity and communication between the user and the application. Better support for drag and drop, tool tips, field validation, sortable lists, keyboard shortcuts and other elements that have typically been associated with desktop applications means better interaction.
- **Increase Responsiveness and Reliability** – RIA applications only refresh the parts of a page that have changed, this means fewer trips to the server and fewer opportunities for errors. In addition, the ability for select data to be pre-fetched from the server helps to reduce the delays that are typical with traditional web interfaces.
- **Lower Operational Costs** – RIAs are easier to maintain than both traditional desktop applications and websites. Since they are web-based, they provide a more seamless enhancement path for new features, and easier deployment. In addition, the load balance of client and server processing results in fewer server requests and lower bandwidth costs.
- **Provide Users with More Control** – RIAs allow clients to more easily visualize products, customize offerings, or personalize services. This creates a greater sense of involvement and more control over their interaction and overall experience.

## Which Applications Are Best Suited for RIAs?

While a variety of applications have already been ported over to RIA environments, not all of them have been successful. Just because RIA technology is available, doesn't mean that it's the right solution for every process. Some of the best applications of RIA technology include:

### Product Catalogs and Product Selectors

With one of the key strengths of RIAs lying in their ability to help users sift through large volumes of data and easily narrow results down to just their area of focus, product catalogs and product selectors are a natural fit. Using sliders, check boxes, color swatches and other customizations, users can search for products and then selectively narrow results to find exactly the right fit. The enhanced ability to customize views on the fly and provide real-time visual representations of products also significantly enhances the users' shopping experiences.



The Haworth product catalog allows users to view products, narrow down results and select options. Users can also add products to their favorites to view later.

(© Haworth.com)

RIA-based product catalogs can also support cross-sell and up-sell nicely by showing multiple products together or highlighting products that are from the same brand or family. For example, if a user is looking at desks in the catalog above, the retailer could show related chairs, filing cabinets and other accessories in the same wood grain or color palate to help increase the total value of the sale.

Amazon.com's diamond selector allows users to leverage interactive sliders and checkboxes to narrow down search criteria and see a real-time view of how many results meet their needs.

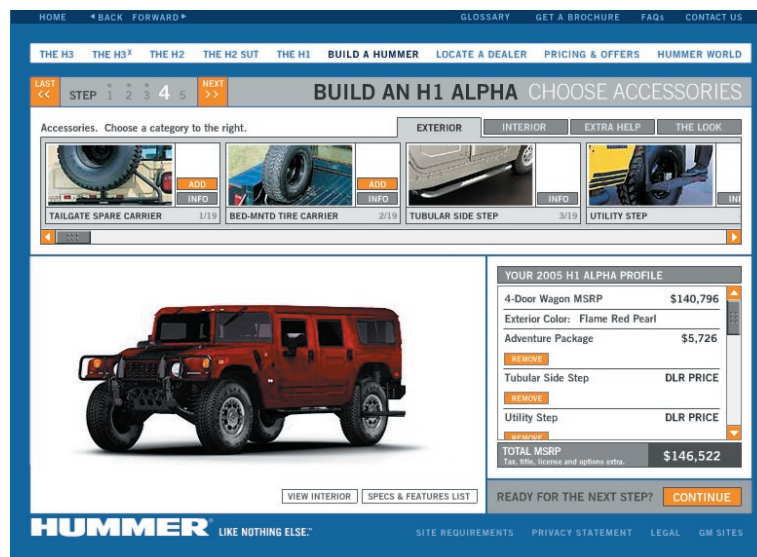
(© Amazon.com)



The immediate feedback and real-time results for product selectors, such as the diamond finder above, allow users to select several options or search criteria in their desired sequence without having to constantly submit and re-submit forms. This means a faster shopping experience, with more immediate satisfaction and fewer delays which can often trigger shopping cart abandonment.

### Product Configurators

Product configurators allow users to build and configure their own products. The quick responsiveness and ability to update partial page information make product configurators a great fit for RIAs. The responsiveness of the application, the ability to deliver real-time visualization and the support for rich, graphic-intensive content allow for an immersive and interactive environment.



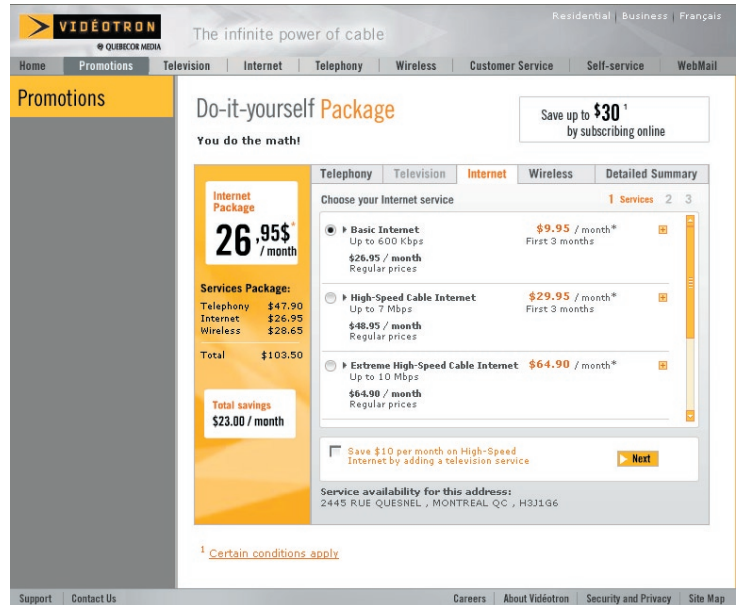
The Hummer product configurator enables website visitors to customize and price-out their own Hummer. From the choice of color, through to the addition of multiple accessories, users are guided through the customization process with a visual representation of their custom Hummer in view at all times.

(© Hummer.com)

RIA-based product configurators are very useful for complex products that offer many options and exceptions. They can be used to strategically show accessory dependencies and to up-sell additional features to clients. Although frequently designed solely as a way to help potential buyers, these tools can also become extremely useful tools for sales people and other company representatives.

This package builder from Videotron allows users to select services, choose features and customize an offering to meet their specific requirements. The logic behind the scenes shows special prices and discounts that are applied based on the combinations selected.

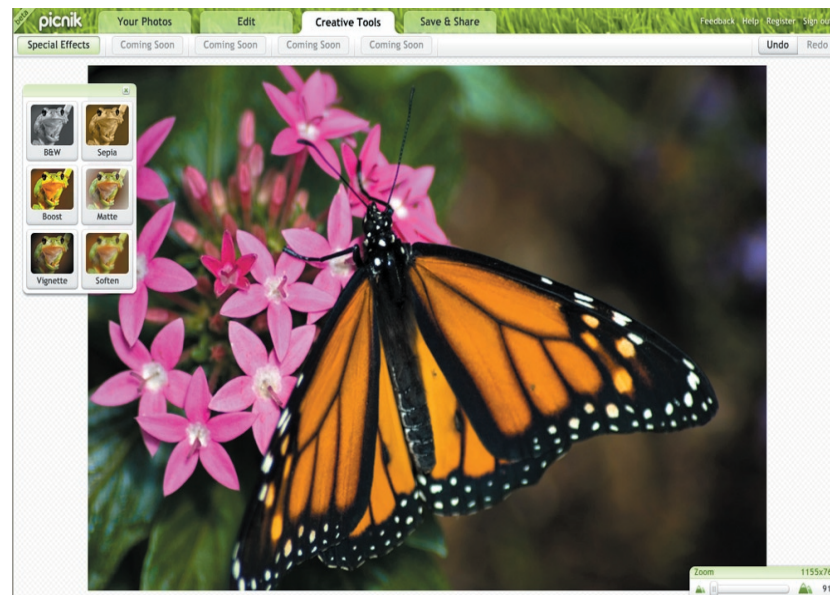
(© Videotron)



These types of configurators can also be very useful for service offerings, where certain options and configurations have strong dependencies. They can easily show discounts and specials that apply when a user selects multiple services or a mix of products and services.

### Productivity Applications

There are also a number of excellent productivity tools that leverage RIA technology. Applications such as mapping software, web-based email programs, online calendar/time management tools and organizers, as well as task-specific tools like photo editing solutions are all well presented and served as RIAs.



Picnik provides users with the ability to modify, apply effects, and easily remove red-eye from their pictures, without using complicated desktop applications.

(© Picnik.com)

Google Finance provides real-time access to financial data and allows users to dig into specific incidents that impact stock prices.

(© Google.com)



These tools offer many of the conveniences, features, and behaviors of desktop applications, but are accessible from anywhere on any system. Users don't need to worry about application installation, maintenance or steep learning curves. These RIA-based productivity tools can support their needs quickly and efficiently.

### Entertainment Applications

Another popular use of RIA technology is in gaming and entertainment applications. From web applications that feature virtual worlds to music and video creation tools, RIA-base entertainment applications are popping up everywhere.



Webkinz combines the real-world with the digital one by providing a physical stuffed animal with a secret access code to a virtual world. Users then earn points to purchase food and objects to care for their "virtual pet".

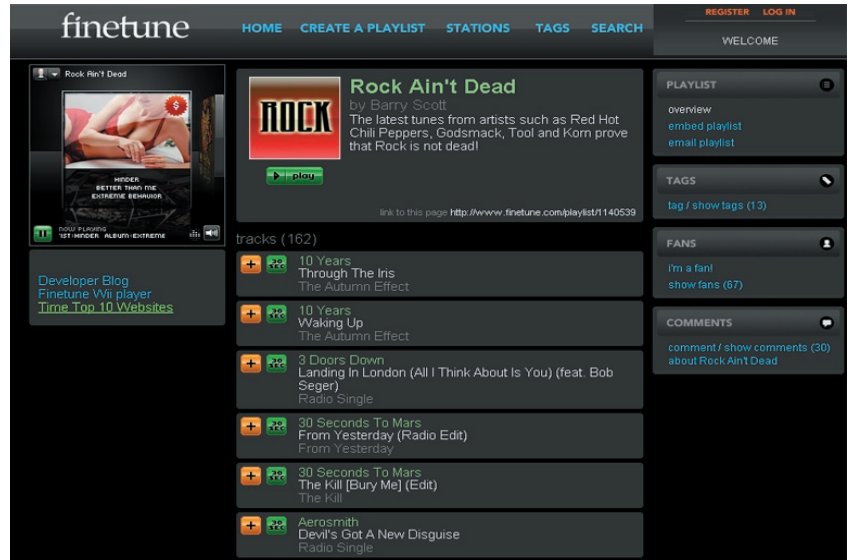
(© Webkinz.com)

These types of gaming applications were already popular with Adobe Flash developers. With RIA tools, such as Adobe Flex (described below), the superior visual appeal of Flash can be leveraged and combined with a sturdy and scalable development platform to achieve faster runtime performance.



Finetune is a rich, Flash-based application that allows users to listen to streaming radio stations and build custom playlists based on artist recommendations. Quick pick buttons add and remove tracks from playlists, and different sized text links visually communicate different artists' popularity.

(© Finetune.com)



## How Are RIAs Built?

RIAs can have many different types of technology behind the scenes. However, it is not the technology itself that makes an application a RIA - it's the way that the technology is used to create the user experience. A true RIA leverages the right internet technologies to create a responsive, immersive and open application.

Behind the scenes, RIAs may leverage:

### Adobe Flash/Flex

Adobe Flex is an umbrella term for a group of technologies that support the development and deployment of rich Internet applications based on the Flash platform. Flex can be used to create and deliver cross-platform RIAs within the enterprise and across the web, seamlessly reaching users on any platform. Flex is made up of two key elements, the Integrated Development Environment (IDE) and the Software Development Kit (SDK) for developers who want to build Flex applications. Applications built with Flash/Flex require users to have the Adobe Flash Player installed, which is already installed today on 80-90 percent of desktops.<sup>6</sup>

### Adobe Shockwave

Adobe Shockwave is a sister technology to Adobe Flash. Where Flash is now the standard format for rich animation on the Web, Shockwave is more versatile and can be used to create more complex games, more elaborate interactivity, and more detailed animations. Like Flash, Shockwave files can play directly within a web page, provided that the user has a Shockwave plug-in installed. Today over 60 percent of all Windows and Mac systems already have this plug-in installed (a Linux browser plug-in is not yet available). Shockwave can be used in RIAs to present complex animations, display 3D content - such as product images on a web site that can be spun, rotated and moved, or as part of a 3D game, with mapping components.

### **AJAX and Javascript-Based**

AJAX, shorthand for Asynchronous JavaScript and XML, is a development process for creating interactive web applications. AJAX is not a technology in itself, rather a term that describes a group of technologies. An AJAX-built application leverages an intermediary between the user and the server to ensure that the user's interaction with the application happens asynchronously and the user is never staring at a blank browser window waiting for the server to react. AJAX relies on JavaScript, which may be implemented differently by different browsers or versions of a particular browser, meaning cross-browser compatibility can become an issue. In addition users can choose to disable JavaScript support in the browser altogether, which will disable the functionality of the page. There are a number of different approaches to building AJAX applications, including the use of open source technology, AJAX frameworks and specialized toolkits.

### **Microsoft Windows Presentation Foundation**

Microsoft Presentation Foundation “formerly code named Avalon” is the new graphics engine and API on which Windows Vista was built. WPF provides a way to build single-platform applications that behave like RIAs, using Extensible Application Markup Language (XAML) and languages like C# and Visual Basic. WPF provides developers with the ability to create experiences that simply cannot exist in the browser, including rich user interface options and 3D capabilities. A second technology in this vein from Microsoft is Windows Presentation Foundation/Everywhere (WPF/E), the company's answer to the Flash Player. The client for WPF/E is a small download that runs on both Windows and Mac as well as inside browsers such as Firefox, Internet Explorer, and Safari to present Windows Media content. WPF is meant for creating rich desktop experiences while WPF/E is designed for rich web experiences.

### **Java Applets**

Java Applets are small applications that provide interactive features for web applications that are not possible using HTML. Since the base code of a Java applet is platform independent, they can -- in theory -- be executed identically on most operating systems (Windows, Unix, Mac and Linux). Java Applets are often used for calculators, product configurators and scientific projects that involve advanced calculations. While they can be useful, they also come with a number of challenges. Java applets have very limited multimedia capabilities, making it even more difficult to build and design a good user interface with applets than with HTML-based technologies. As well, a Java Virtual Machine (JVM) is required on the end-user's computer to run an applet. JVM's come in different flavors from different vendors and contain differences that prevent applets from running identically on all platforms. The size of the JVM, as well as the impossibility to cache and manage applet versions locally make them a bandwidth-intensive option for end-users.

## **The Pitfalls of RIAs**

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One of the challenges in guiding your clients through the maze of RIAs is in avoiding the pitfalls. With any early adopter technology, it's easy to inadvertently fall into the trap of making sites so innovative that they lose sight of the primary objective. This happened in the early days of Flash adoption. Sites whirred with animations, buttons flashed and images bounced, just because they could.

How do you avoid the pitfalls of RIAs when guiding your clients down this path? The easiest way is to always keep the users' objectives in mind.

When adopting RIA technology, think of ways you can integrate elements into what your client has today. The adoption of RIA technology can be incremental in deployment. Using this approach, it's easier to build a path that allows for a less jarring experience for your clients. HTML and RIA technology can co-exist and can work in harmony to create an expected and responsive environment. By adding RIA functionality for the critical elements of the site, such as shopping carts and product visualization, while leaving HTML in place for standard page navigation and presentation, you can leverage the best elements of each technology.

RIAs should be intuitive and meet the expectations of your clients. They need to provide feedback when an action takes place and visually communicate as much as possible. When users add an item to their cart, it is important to show that the item has been added by using a visual cue. If users narrow their search criteria, and on-screen results are repopulated, it is important to explain that the results are being refreshed. Using animations in a friendly way can significantly enhance your users' overall experiences.

When new functionality is added to your clients' sites, it's also important to add in instructions, tutorials and examples to show how to interact with the site. Missing instructions mean that many users won't proceed and can create frustration and increased drop-off rates.

Finally, it's critical that you respect the laws of design and interaction with your RIAs. Although RIAs allow you to build all sorts of fancy boxes, buttons and sliders for interaction, it's important to adhere to expected conventions and not try to reinvent the wheel. If an icon looks like a box it must behave like a box. The same goes for keyboard shortcuts – you must respect the commands that users are familiar with today in the desktop world. By respecting these behaviors, the RIAs you create for your clients will be easily usable and understood by both first-time novices and repeat power-users.

## How to Get Started

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Once you're sold on the idea of exploring RIAs, the question then becomes "how do I get started"? Before you start looking into the technology end of the project, it's important to build the business case for your client and outline the core user needs. Take a look at your client's business objectives and think about how an investment in RIAs can help them generate more revenue or better serve their own clients.

The next step is to look at your client's users and understand who they are, what they are looking to accomplish and how they can achieve their tasks. Are they looking to help their users sift through volumes of information about a specific product or service to find the right item? Are they looking to add structure to a complex, multi-step process? Are they looking to integrate visualization into their site to help users get a better sense of their products? Each of these objectives dictates a slightly different development path.

In addition, it's important to look at the best user experience for the application. If your client has a heavy focus on acquisition and new lead development, then any application must be designed with a "first-time user" profile in mind. In contrast, if your client's focus is in delivering support and service content, it is typically a better fit for a "productivity user" profile, with the integration of key features and functionality to support power-users.

Once the objectives are clear and the needs are well assessed, it's time to dive into the information architecture. This involves evaluating the workflow of the process and the interaction of the user at each stage. Only after this stage can you begin to look at the functionality design of the site (how things work) and the graphic design (how they look).

## Working with a Partner to Accelerate Development

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One way to collapse development cycles and quickly deliver the best results to your clients is by working with a partner. Since designing RIAs is quite different from building a web site, working with a trusted advisor who has a strong history of software and application development will help ensure that your solution is properly architected to meet your client's business requirements. More than ever the development of web applications is a multi-tiered, balanced approach that involves:

- concept development
- visual design
- software design

Depending on your agency's core competency, RIA development can be a joint effort with you handling the concept and visual design, and a partner fulfilling the needs purely on the development front.

The right partner can be instrumental in helping you choose the best technology to fit your needs. There are a number of ways you can build RIAs and dozens of development paths you could follow. Choosing a partner with a broad cross-section of expertise and knowledge ensures that you're working with the best solution to meet your business requirements, not simply the technology that your in-house team or an individual freelancer knows best.

Working with a development partner for RIAs also helps your agency stay focused on core projects and immediate deliverables while offering a broader spectrum of services to your clients.

## Conclusion

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While RIA technology is still relatively new, now is the time for your clients to embrace the technology as a key differentiator for maximum impact. When properly executed, with a strong emphasis on user experience design, RIAs can dramatically improve customer satisfaction, increase sales, and enhance self-service and support.

The critical elements in successfully introducing RIA technology to your clients falls in assessing their business requirements, following industry best practices and avoiding the potential pitfalls. This path will ensure that you will deliver a compelling and effective application. To shorten the delivery cycle and minimize risks, consider working with a development partner with a strong history of building well architected applications.

## About INM

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Integration New Media (INM) helps companies create rich user experiences in both online and offline environments. With projects ranging from rich internet applications through to interactive sales and marketing tools and online libraries, INM has developed solutions for organizations large and small in a variety of different industries. A well-known player in the industry for over 15 years, the company offers top-level interactive project consulting and programming services as well as a successful line of products that includes some of the best-known Xtras for Adobe (formerly Macromedia) Director, Flash and Authorware.

For more information, please visit: <http://www.INM.com/>.

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## Reference Info

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### RIA Examples

- Haworth Product Catalog - <http://www.kwstudio.com/haworthCatalog/>
- Amazon Diamond Finder - <http://tinyurl.com/2zlya4>
- Hummer “Build Your Own” - <http://www.hummer.com>
- Videotron Service Selector - [http://www.videotron.com/services/en/promotions/3\\_calculette.jsp](http://www.videotron.com/services/en/promotions/3_calculette.jsp)
- Picnik Photo Application - <http://www.picnik.com>
- Google Finance Application - <http://finance.google.com/finance>
- Webkins Application - <http://www.webkinz.com/>
- Finetune - <http://www.finetune.com/>