

Mobility & “Trendability”

Emerging transformation challenges for next generation Rich Internet Applications

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Abstract — Bandwidth availability, quality and affordability along with the accelerated adoption of handheld devices and connected home systems as a whole, impelled the speed of web consumption. Internet audiences are now more aware of the possibilities and types of interactions available, increasing their expectations and demands towards web content. This article tries to demonstrate what I consider to be the two most defying challenges that impose today for plug-in based Rich Internet Applications, Mobility or mobile browsing device compliance and “Trendability” as the capacity to impose and be adopted as a development tendency, surpassing or blending in with more “standardized” technologies like the upcoming HTML5.

Keywords- RIAs; Mobility; “Trendability”; Transformation; Browsing; Standards; HTML5;

I. INTRODUCTION

Rich Internet Applications commonly known as RIA have come a long way since Adobe (formerly Macromedia) first introduced the concept in [1], back in the year of 2002.

It’s consistency and necessity grew as the web architectural models evolved from the static request/response HTML, to DOM manipulation with JAVASCRIPT, asynchronous page partial renderings with AJAX, DHTML and CSS, to more complex application frameworks supported by powerful vector graphics engines.

From the very beginning the main effort behind this type of technology was to raise the quality of client interactions offered to the end-user, by trying to blur the boundaries between more traditional desktop applications and web based applications.

It’s important to understand the two main “branches” of this development platform, the first one, built upon standards, with direct browser integration, JAVASCRIPT frameworks, like ASP.NET AJAX, Google AJAX API, JQUERY, Prototype, script.aculo.us, MooTools, Yahoo! User Interface Library, among others. The second one executed via browser plug-ins, independent sandboxes (generic security term referring to a limited-privilege application execution environment) or virtual machines, and the 3 most common platforms are Adobe Flash/Flex, Microsoft Silverlight and Java FX.

By next generation RIAs it is purposely intended to aggregate only these last ones, less standardized, more recent and built upon much more complex frameworks, thus facing major challenges concerning it’s time prevalence.

A. Mobility

According to a study developed by Gartner Inc., the world’s leading information technology research and advisory company, mobile applications and media tablets are indicated as one of the top 10 strategic technologies for 2011.

As these devices characteristics evolve, i.e. processing ability, storage capacity, bandwidth speeds, motion detection, location and geo referential features, among others, they push the portability concept towards new standards.

Users are now in an almost “always-online” mode, and making the transition from the pc era to a system embedded mobile environment. It’s not just about carrying on web 2.0 legacy anymore but, above all, it’s an almost “obligatoriness” to anyone, who wants their rich content websites wide exposed, at least to maintain ratios on the number of daily visits, to quickly readapt their pages to comply with this new form of web consumption.

In the HTML developing world, things are much more facilitated because natively it’s what all browsers consume, so that is already a current practice at this side, as almost any site now has a mobile version coupled to it.

In the RIA developing world, on the other hand, things are very different, because it’s not an easy task to bring full rich content to low power devices due high consumption of system resources like memory, CPU speeds, GPU leverage and battery.

What we have seen over the last 3 years, mostly after the launch and the success of Apple’s iPhone new revolutionary interface, was a shift on how phone applications should look like, almost everyone now takes full touch enabled, multi-finger gesture as a giving, so, as a result an increase of new “fully fresh” OOB (out of browser) applications flooded the phone’s marketplace, helping to put the spotlight on mobile driven development.

Apple restricted third party developer guidelines, insuring that only applications built with their SDK and tools reached the phone and limiting in way rich content developers and others to use their developing environments and build applications for the iOS platform. This restriction was recently redrawn in September 2010 as now developers are allowed to compile their applications into the native iOS binary format, but again we are talking about OOB’s and not browser viewable web content.

Concerning internet applications there is still a lot of work that has to be done and despite Adobe’s efforts to enable Flash

content on mobile browsers with their Flash Lite version, it's still not fully optimized and supported by all OS platforms.

There have been some interesting third party browsers like Skyfire who works by sending rich media content, currently only video, to its servers, transcoding it using a proxy and sending it back to mobile devices as HTML5, but that's only a kick-off start because the full rich internet experience, complex sites built upon Flash or Silverlight are still out there resting unsupported.

More recently with the release of Flash 10.1 beta there is now a new generation of mobile optimized flash sites and content, but again not yet fully implemented by Industry "giants", Apple, Nokia and Microsoft. The only current platform officially implementing it is Google Android 2.2 (Froyo) version.

B. "Trendability"

There is no dictionary definition for this word and probably doesn't even exist, but we decided to use it to express the probability that next generation RIAs development technologies have of becoming web development tendencies for the next years.

All that depends mostly on a variety of emerging transformation factors that we will interpret ahead: innovation, cross-platform integration, data-access, security, performance, end-user experience, tooling and developer community strength.

These key factors will dictate the affirmation next generation RIA in the web developing world.

II. RIA'S MARKET PENETRATION OVERVIEW

To fully understand the main foundation from which "Mobility" and "Trendability" concepts arise, one must realize firstly the importance and reach that next generation RIAs development technologies have by looking at global market penetration rates (GMP).

According to riastats.com and targeting all major OS and browsers (desktop and mobile), in terms of plug-in detection, Flash was found on 67% of the browsers, Silverlight 65% and JavaFX 62%.

We can complement this numbers on statoul.com and effective RIA global usage, 96% Flash, 78% JavaFX and 60% Silverlight. Web Direction's survey "The State of Web Development 2010" showed implementation, 67% of web developers include rich content on their sites other than HTML, CSS, JAVASCRIPT and images.

On the netmarketshare.com statistics show web content access, and in that field, 3.5% of all browsing is now gone mobile. This last indicator may seem insignificant but when we compare with the homologous period (1.4%) it shows us an increase rate of almost 150%.

With this numbers bearing in mind is very important to look also at the effective usage of the plug-ins, that is to say, in a very direct way, "what do users consume as rich content?"

Our research found in [2] that the two following areas apply:

- Consumer RIAs - Media Centric Experiences.
- Enterprise RIAs - B2E, B2C and B2B Applications.

A. Consumer RIAs - Media Centric Experiences

Audio and video are becoming the standard media types for information delivery on the web. Next generation RIA frameworks enable the delivery of these types of content not only with higher quality (HD) but also with "intelligent" streaming and next generation codec compression like the recent H.264.

According to Experian Hitwise, YouTube is the third most visited site in the world with an estimated 40% of the web's video. It's main player technology is Flash.

Online browser gaming can also be included in this category as the top five browser game sites (according to onlinemba.com) are all RIA based. In China, for instance there are 105 million browser game users, numbers published by [3].

B. Enterprise RIAs - B2E, B2C and B2B Applications

The predominance of consumer RIAs propels end-users to demand similar capabilities from the business they work for (B2E - business to employees), buy from (B2C - business to consumers) and collaborate with (B2B - business to business).

Next generation RIAs, lightweight applications blend instant web access to centralized data with a visibly different and "better" user experience than the ones produced by the existing development platforms.

Running on computer browsers as client-centric applications or as fit client platforms in the computer desktop, they enable a much higher level of UI responsiveness and overall system performance.

In [4] these several point highlighted as the major benefits of using RIA technologies for the Enterprise:

- Reducing data entry costs.
- Reducing contact center costs.
- Increasing conversion to sales.
- Increasing upsell.

Enterprise RIAs are still an emerging business and according to [5], until the end of 2012 this market is crossing its early majority phase, with enterprises making strategic commitments to these technologies. An example of an "heavyweight" adopter is NASDAQ Stock Market, Inc. with an increase of productivity of 50%, according to [6].

III. UBIQUITOUS WEB AND STANDARDS "THREAT"

As we've stated internet is no longer consumed exclusively by desktop or laptop computers, but by panoply of different devices such as mobile phones, tablets, PDAs, digital TV, home appliances, game systems, MP3 players, cameras etc,

impelling it to a never seen level of ubiquity, available for everyone and everywhere, the so called "open web".

Such a uniformity like the one stated can only be accomplished through standards, just because they obligatorily have to be supported and implemented by all platforms and as seen, mobile industry giants like Apple and more recently Google, only support open web standards on their mobile browser, leaving behind RIAs proprietary platforms like Flash, Silverlight or JavaFX.

With the W3C first specification announcements for the fifth version of the web's core language, HTML5, aside with the recent development advancements and new features like direct audio and video support, 2D drawing, local offline storage database, drag-n-drop, real-time communications, file and hardware access, mobile browsers support, cross document messaging and much more, gave birth to rumors stating that this new technology would eventually "kill" RIAs plug-in model.

Despite all this promising capabilities, HTML5 is still in an early phase and has several related technologies that are being developed in parallel, included as part of its global specifications, which are still very far away from the level of achievements and functionalities that new generation RIAs enable. There's also a paradox about HTML5 that currently not all browsers support it, at least its full set of features, so all of them that the billions of people have installed need to be replaced with "full HTML 5 compliant browsers" and plug-in model RIAs this is an installation of something new required to experience those "standards".

In its early adopting stage, HTML5, contrary to all "doom's day predictors" for RIAs, would not be a threat but will function in a "hybrid" mode, slowly blending in with RIAs especially on those functionalities still not implemented and that don't have full browser support. Also, as we'll see up next, it can be a propeller for RIA core platform developers to step up to new levels of innovation and maintain the competitive advantage that their experience curve holds.

IV. ON BECOMING A SOLID DEVELOPMENT TREND

Market adoption rates showed that plug-in RIAs are well implemented not only development wise but also consumer wise, but that doesn't mean it will stay that way, mainly because the web's concept is constantly changing.

As seen earlier when introducing "Trendability" we stated several factors that will be the key for this "new web" to adopt or drop plug-in RIAs. These are the transformations needed:

Firstly we identified innovation and it's easy to understand why. Being able to do first what no other does it's called the novelty effect and that is a plus in every development technology, raising the expectations for both the developer and user, concerning platform aliveness and proliferation.

Secondly was cross-platform integration and this is directly connected not only with "Mobility" but also with every other device that consume web content. The more OS platforms are reached the more usage and fidelity levels for this technology increase.

Thirdly we have data access. Almost every application displays information in some kind of format, so being able to reach that data in a constantly optimized way and giving the power to the user to display it in unseen ways is certainly a capital gain especially for business RIA implementation scope.

Fourthly there is security. As long as core technology developers are able to maintain this platform's security model (client based, low rights, sandboxing, easy deployment, updating, etc) and reduce the level of possible exploits, the more instinctively users will adopt it.

Fifthly, we diagnosed performance. And here a very important factor, robustness, as it simply dictates the limits or the possibilities of usage. Bad performances equal disbelief. Good performances equal better overall results, culminating in technology proliferation.

Sixthly, follows end-user experience. By giving consumers high levels of UI interactivity and richness we increase client contentment, thus incrementing the odds that it will continue using the technology in the future.

Seventhly we announced tooling. If developer tools for creating software for the technology in question are well implemented, interconnected, easy to use and sufficiently documented, more development and implementations will occur.

Lastly, developer community strength takes place. To propel a technology not only in terms of its maturity, continuity and utilization there must stand a strong developer audience, some sort of intangible "affiliation" or voice that speaks in unison not only defending the community interests, but also helping to "evangelize" its usage.

To become a solid development trend it takes a long term progression, with proven results, supported by higher community adoption of both developers and users.

When comparing next generation RIAs to existing standards there is an increased level of uncertainty that is associated with the first ones, change of strategy and investment from proprietary companies can suddenly diminish development speeds or even discontinue the support for a certain technology in detriment of another.

If we look at the adoption and investments in HTML5 for instance that shift is slowly being made by Microsoft and despite there is no official statement about Silverlight discontinuity, Bob Muglia, the president of the Server and Tools Division said that the Silverlight strategy and focus going forward had shifted.

We see now a growing interest and heavy investments on a technology that was never supported in the past versions of Microsoft's browser, Internet Explorer, making Silverlight developers and community a little reluctant about the technology future, wondering if this is the right path of choice for the development of web applications. Windows Phone 7 seems to be the target destination OS platform for Silverlight development in the future.

V. OVERALL SUMMARY CONCLUSIONS

Next generation RIAs plug-in model and its proliferation is uncertain but not condemned to extinction, yet, as long as it is driven by proprietary innovation with strong investment support, making it contemporary, evolve and stand out from other development platforms thus taking advantage of the experience curve that it already has on the market.

Despite what has been said, it also should be actively driven by an exigent developer community that stimulates its progress by helping to extend RIA applications to a wide consumer market, systems wise and platform wise, so that it can have “Trendability”, hampering rejection by turning into a strong web development tendency.

Mobility on web development technologies, as seen, is an inevitable target.

Statistics revealed strong RIA adoption, especially on PC browsers, in mobile devices on the other hand, this technology is mainly used as OOB applications as this handheld devices offer new native services and OS-specific features like stated, geo-location, multi-touch UI, local media, wireless networking APIs, cameras, etc.

Because of an “always-on” connected mode supported by broadband technology plus the revolutionary App Stores concept and its high visibility and accessibility, there has been rapid adoption of these new “content applications”.

With HTML5 strong appearance and promising “out-of-box” features and with industry major players like Apple or Google, radically supporting it (or others like Microsoft who in the past didn’t embrace it, to become extremely supportive in such a way that they are developing a new Internet Explorer 9 version just for it), a new paradigm question emerged: Are next generation RIAs the industry’s primary focus for the upcoming “web 3.0”, “web for all” concept?

In the first stage, adopting HTML5 is like adopting RIAs because it has to have cross browser support, and all Internet dominant platform companies, are somehow releasing new versions of their browsers. So the implementation effort and experience is almost the same, one install, millions of updates.

As a consequence, before HTML5 gains maturity, we will see 3 web development platforms being adopted and often even combine — HTML5 content and applications, and 2 forms of hybrid implementations, as OOB native applications that may contain RIAs and HTML5 content or as pure web applications, HTML5 that contain and leverage RIA plug-ins.

There is a rich array of capabilities emerging, as a result developers and web consumers must be pragmatic enough to consider what will be appropriate for the fulfillment of their needs and especially to the first ones, not to give in easily to

expressions of power and control that drive the businesses of the Internet’s dominant platform companies.

To conclude, Mobility acts as a disruptor whilst “Trendability” acts as a unifier. Nevertheless one must look at both as an “alliance” that creates both challenges and opportunities, impelling the industry, developers and consumers and indirectly shaping the future of next generation web development technologies.

REFERENCES

- [1] A. Jeremy, “Macromedia Flash MX – A next generation rich client”, in press.
- [2] Adobe Systems Inc., “The Business Benefits of Rich Internet Applications for Enterprises”, in press.
- [3] China Internet Network Information Center, “Browser Games Survey Report for 2010”, in press.
- [4] InfoTech Research Group, “Rich Internet Applications: What’s the business Case?”, in press.
- [5] Gartner Inc, “Market Scope for Ajax Technology and RIA Platforms.”, in press.
- [6] Adobe Systems Inc, “Case study – Nasdaq Stock Market, Inc.”, in press.