

Creating Geoweb Applications for Real Estate and Travel

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Executive Summary

Are your website users demanding a richer experience from your travel and real estate maps? With an increasing demand on developers to provide cross browser, cross platform mapping that will make a website stand out from the crowd, a new breed of mapping API's are starting to emerge that will support developers in creating the next generation of scalable geoweb applications.

This paper seeks to demonstrate to developers and business owners how multimedia rich geoweb applications can be created rapidly using the latest mapping platforms to incorporate video, audio, animation and 3d into your next geoweb project.

How Important is Mapping in Real Estate and Travel Websites?

The history of real estate and travel mapping

In terms of consumer geoweb applications, the two most obvious commercial usages of mapping are in real estate and travel websites. Having aerial imagery of your future house or upcoming holiday destination has been the dream of consumers for many years. As soon as the first free mapping platforms became available, especially after the launch of Google Earth, consumers immediately began using these applications to research their purchases beyond the website used to find their purchase originally.

It did not take long for real estate and travel companies to realise what consumers were doing and so began to integrate the new mapping API's into their own websites. Integrated mapping has now become an expected standard feature in the large global real estate websites. However, the travel industry has taken longer to reach a similar level in their use of integrated mapping, mainly been due to the lack of aerial imagery coverage in non-metropolitan areas. Having said this, there is a contradiction: niche products in the travel industry such as hotels and city breaks have been successfully using mapping in their websites for some time, and have now become an expected standard feature in the website.

How important is mapping to consumers current decision making?

By reviewing the number of search engine queries made per month that specifically request mapping we can see just how important mapping has become in both the real estate and the travel industries.

Travel Keywords	Global Monthly Search Volume
hotel map	246000
hotels map	165000
travel map	110000
travel maps	74000
resort map	74000
map resorts	33100
map of hotel	27100
hotel maps	22200
tourism map	22200
hotels maps	18100
map of resorts	18100
travel map of	14800
maps travel directions	6600
travel maps and	6600
beach resort map	6600
destination map	6600

Real Estate Keywords	Global Monthly Search Volume
map house	74000
map property	27100
real estate map	22200
maps property	18100
map of house	14800
map apartments	9900
map apartment	6600
real estate maps	6600
map houses	5400
map properties	4400
the map house	3600
maps houses	3600
apartments map of	3600
map of property	2900
real estate map search	2900
house on map	2400

resort maps	6600
google map hotel	5400
google maps hotel	5400
hotel zone map	4400

maps of house	1900
maps of houses	1600
apartments map in	1600
map of apartments in	1600

Figure 1: Volume of search traffic per month for mapping based phrases in real estate and travel
Keyword traffic data sourced from Google See appendix 1 for more complete keyword traffic.

These keywords represent a small proportion of the total number of travel and real estate map phrases that are searched for every month. A large percentage of searches are done for more specific map types or locations, for example, "map of houses in London". This all demonstrates that a significant number of users are specifically requesting to use maps as their primary method for finding purchases.

How much do real estate and travel companies value their mapping?

Mapping is also becoming crucial to real estate agents for use as a sales tool as much as a research tool. Earthware have recently had clients who have credited their mapping as the direct reason for new property instructions being generated.

The recent introduction of real estate mapping from companies such as Google and MSN UK is set to massively increase the importance of mapping in the travel and real estate sectors over the coming year.

Travel websites are also beginning to see great returns on their mapping investments with websites like VisitBrighton.com recently crediting and increase of 120% on bookings to using mapping technology¹.

What is Broken with Today's Mapping Solutions?

If web based mapping is already being successfully used in the real estate and travel sectors why do we need to create new Geoweb applications? There are a number of areas where mapping is not being used as effectively as it could be. Issues with the available technology and culture within each industry will need to be improved in the near future in order to keep up with consumer's expectations.

Technical issues

The majority of current Geoweb applications are built upon Javascript and AJAX APIs. Whilst these technologies have enabled developers to create much richer mapping experiences than have previously been possible there are limitations to what they can achieve in the near future.

The first of these limitations is performance; there is only so much we can achieve with Javascript before we have to start using compromises to display our data. Adding thousands of points or polygons to an AJAX map quickly becomes impractical as the graph in Figure 2 shows.

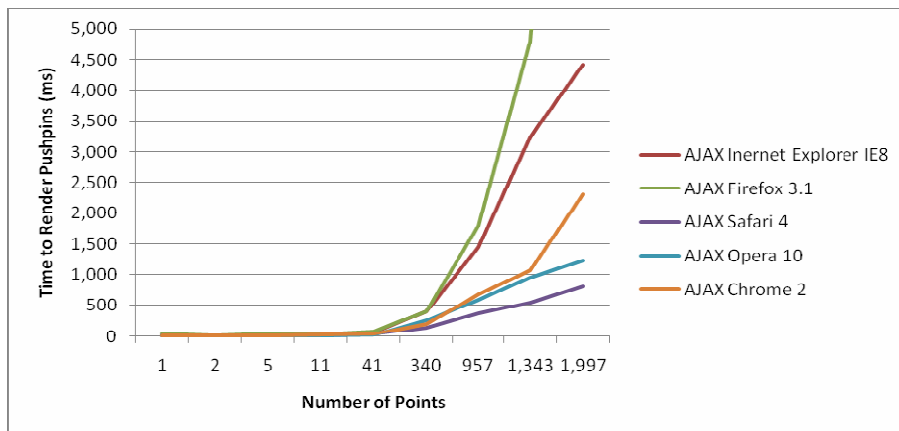


Figure 2: Graph showing the time taken in ms to plot pushpins on a Bing map using a range of the latest web browsers. Credit Johannes Kebeck of Microsoft.

¹ Microsoft Case Study on VisitBrighton.com
http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000004999

The resolution to this issue has been to use solutions such as clustering for pushpins (see Figure 3) and polygon simplification to display large polygon sets. However, although these solutions solve the performance issues, they often comprise and are not necessarily the best way to display data in terms of map usability.

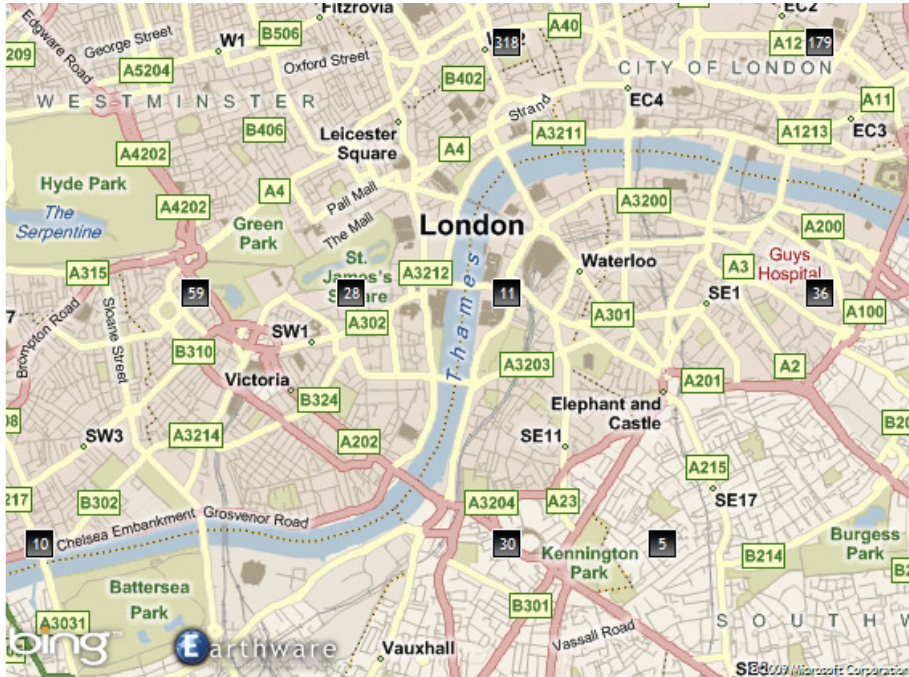


Figure 3: An example of pushpin clustering in Earthware's property mapping product.

An additional technical issue is around maintaining cross browser compatibility. The work involved as a developer to ensure our applications work consistently across a range of browsers and platforms often takes a considerable amount of time and can be equally impacted by the release of future browsers. Although there are a number of libraries and API's to help reduce these cross browser issues it is almost unheard of not to experience some issues in every project.

Traditional AJAX applications require the transfer of, often, considerable amounts of data usually in a very verbose XML format or the more compact JSON (Javascript Object Notation) format. However, neither of these web based formats is comparable to the speed of data transfer to more traditional desktop applications which usually transfer binary data.

In order to create the next generation of rich Geoweb applications we will need to find suitable APIs, technologies and platforms to either improve or replace AJAX and javascript.

Ineffective mapping solutions

Although most real estate and travel websites offer some kind of mapping the majority, especially of smaller players, are still only allowing visitors to see the location of a single product and only after they have used a list based search to find it. Even large property portals such as Rightmove.co.uk still do not offer consumers a way to complete their property research using maps as a main navigation device.

It is the large companies and portals that are at the cutting edge of technology within their industries that are using map based searches as an equal alternative to list based searches. For example, USA based Zillow and Redfin and UK based PropertyFinder and Globrix.

For smaller players in these markets, it is the cost of developing rich Geoweb applications, beyond the simple "you are here" maps that appears to be the main reason for the lack of effective map based searching being offered.

Cultural industry issues

A major issue preventing wider availability of mapping in real estate and travel websites today is the existing culture within companies and a lack of understanding of the possibilities of mapping for the company as well as their consumers.

The quality, quantity and availability of relevant data are pivotal to being able to create rich Geoweb applications. This is something that causes some challenges for both real estate and travel industries. Travel companies, especially those in the holiday letting market, are very protective of the exact location of their properties due to worries of rival companies 'poaching' their property owners. Traditionally this issue has slowed down the adoption of previous features, for example, showing full real time availability, a feature which has become a major decider for consumers when comparing websites. Likewise, estate agents often wish to highlight some geographical features of a property, whilst downplaying others. Showing aerial imagery and location information on a map still causes issues within the real estate industry as everything about the location can be seen.

By demonstrating the long term benefits to consumers and companies of providing rich data, this issue will need to be overcome in order for developers to build the next generation of rich Geoweb applications.

Coverage issues

The availability of high quality aerial imagery and street level mapping data is an essential feature in providing rich mapping solutions. With priority being given to collecting this data for heavily populated areas the real estate market is not facing too many issues in this respect. However, it is a different picture for the travel industry. When working across multiple countries providing consistent high quality imagery of holiday destinations which are often not heavily populated locations is difficult.

However, the frequency of updates and a lack of publically available timelines from imagery companies is an issue that affects both the real estate and travel industries and is a constant source of frustration. The future of Geoweb applications will rely heavily on the continued improvement in coverage and updates of geographic imagery.

What Are Consumers Already Starting to Expect from Web Based Maps?

User expectations for web based mapping have increased dramatically over the last 2 years with Google and Microsoft partnering with large organisations such as BBC (Figure 4) and Disney (Figure 5) to deliver richer mapping experiences. In addition, the massive press coverage of Google's street view imagery has meant users are becoming more aware of the mapping technology that is available and as a result have begun to expect something more than the "you are here" applications of yesterday.

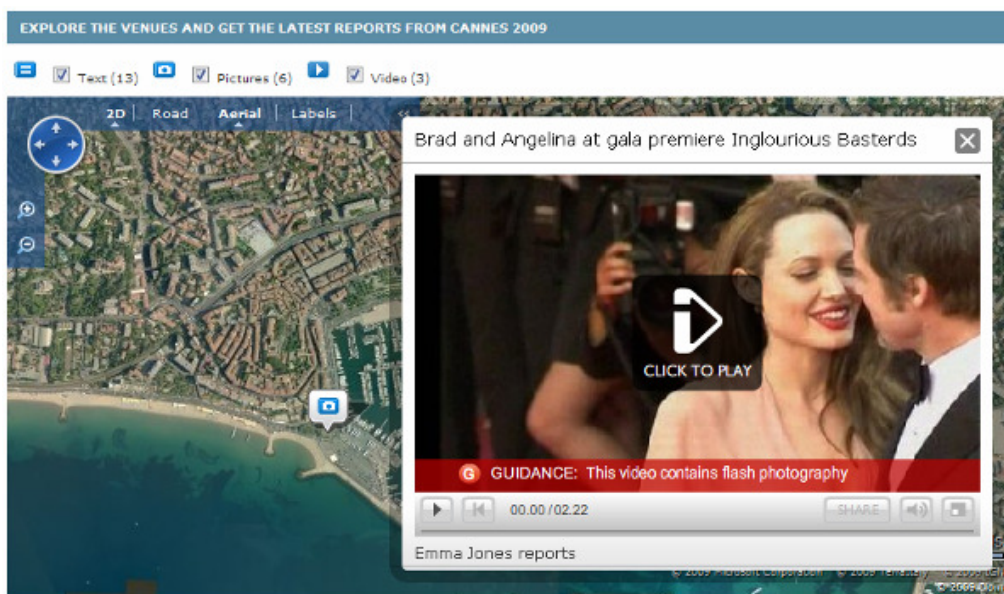


Figure 4: The BBC's recent use of Bing maps to integrate video and other multimedia into their news stories (<http://news.bbc.co.uk/1/hi/entertainment/8040672.stm>)



Figure 5: Disneyland Paris recently completely modelled in Google Earth (<http://www.disneylandparis.co.uk/googleearth3d/index.xhtml>)

Consumers are now expecting to be given the option to search for their products in a purely map based environment and the availability of this function in sites such as Propertyfinder and Zillow is continuing to generate this expectation. The result is that this “map based searching” is already starting to cascade down into smaller portals and websites as they try to differentiate themselves from competitors as Figure 6 shows.



Figure 6: Map based searching using Bing's birds eye imagery on UK commercial property portal Novaloca.com

Consumers are now also increasingly expecting to find a deeper level of data on the maps including house prices, local services, government statistics, local attractions as well as user generated content and reviews. Sites such as MSN local (Figure 7) are starting to provide this information for consumers which will soon start to filter into other real estate and travel sites.

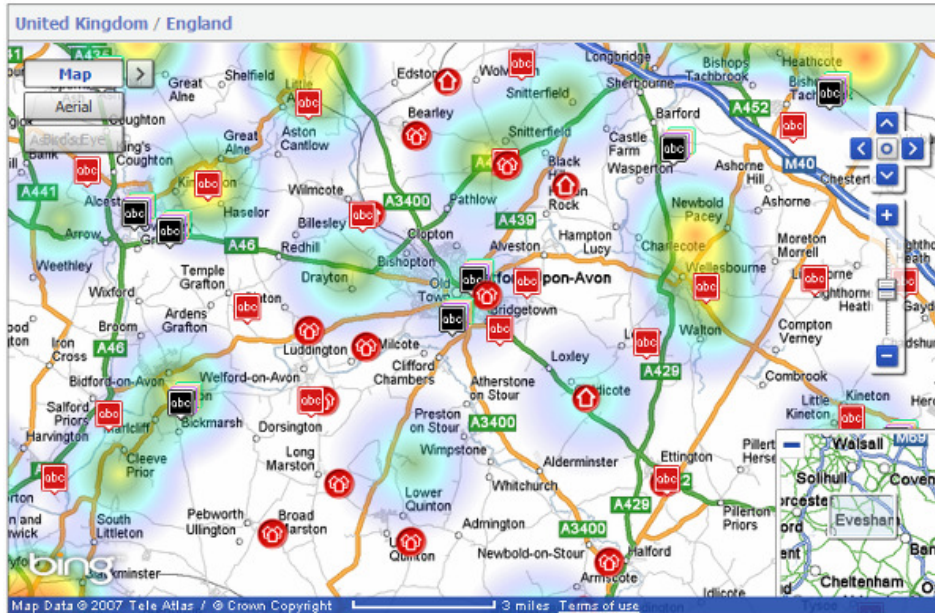


Figure 7: MSN UK map showing crime 'heat maps', properties for sale and local services (<http://local.uk.msn.com/>)

How Can We Start to Deliver on User Expectations Now?

As consumer expectations continue to rise how can we overcome the historical issues with web based mapping in the real estate and travel industry and begin to deliver the mapping solutions consumers are wanting?

Rich internet application platforms

The technical issues with the performance of Geoweb applications already have potential solutions in the form of rich internet application platforms such as Adobe's Flash/Air and Microsoft's Silverlight. Both of these platforms have the following advantages over the current traditional AJAX/Javascript solutions:

- **Performance** – as the processing of map data is no longer directly processed by the web browsers Document Object Modal (DOM) the performance massively increases. See Figure 8.

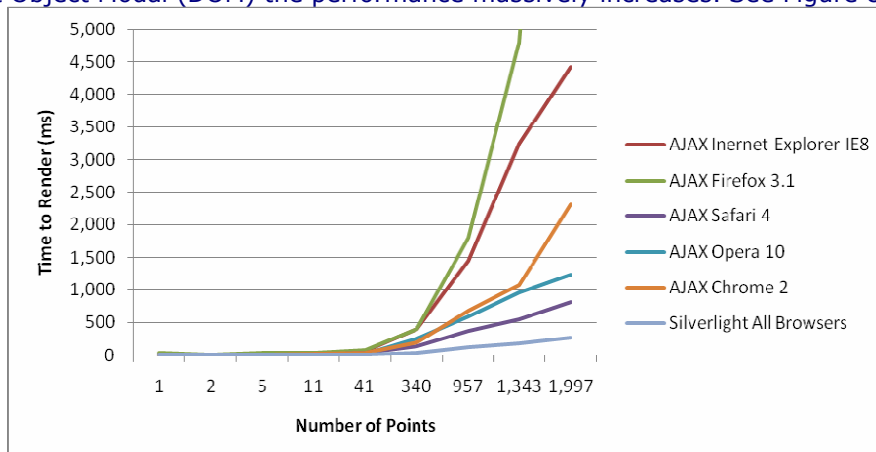


Figure 8: Graph showing the time taken in ms to plot pushpins on a Bing map using a range of the latest web browsers compared to Microsoft's Silverlight platform. Credit Johannes Kebeck of Microsoft.

The transfer of data is also improved compared to AJAX by making it easier to communicate with external services and more efficient by using binary encoding.

- **Cross browser/platform compatibility** – both Flash and Silverlight are available across a wide (and increasing) range of browsers and platforms. This almost entirely eliminates the performance, display and functionality differences between browsers and platforms saving many hours of development time and associated costs.
- **Functionality** – As AJAX has essentially been ‘tagged’ onto HTML and Javascript rather than being designed at the very beginning, it is far from a perfect solution for transferring data. Platforms such as Silverlight have been designed from the outset to support the quick, efficient and safe transfer of data.

HTML and Javascript were designed long before the arrival of multimedia and animation on the web and, therefore, are not optimised to support such intense operations. Silverlight and Flash have support built in for creating smooth multimedia and animation based applications allowing developers to move even further away from the traditional “static page” based web applications.

Of course there is a major disadvantage with both Flash and Silverlight: a browser “plugin” must be installed in order to view any applications developed using these frameworks. However, the introduction of broadband, and the increased consumer usage of sites such as youtube, Iplayer, ITV player and others, has massively accelerated the increase in the percentage of computers with these frameworks installed. Figure 9 shows the current state of UK computers with rich internet application frameworks installed.

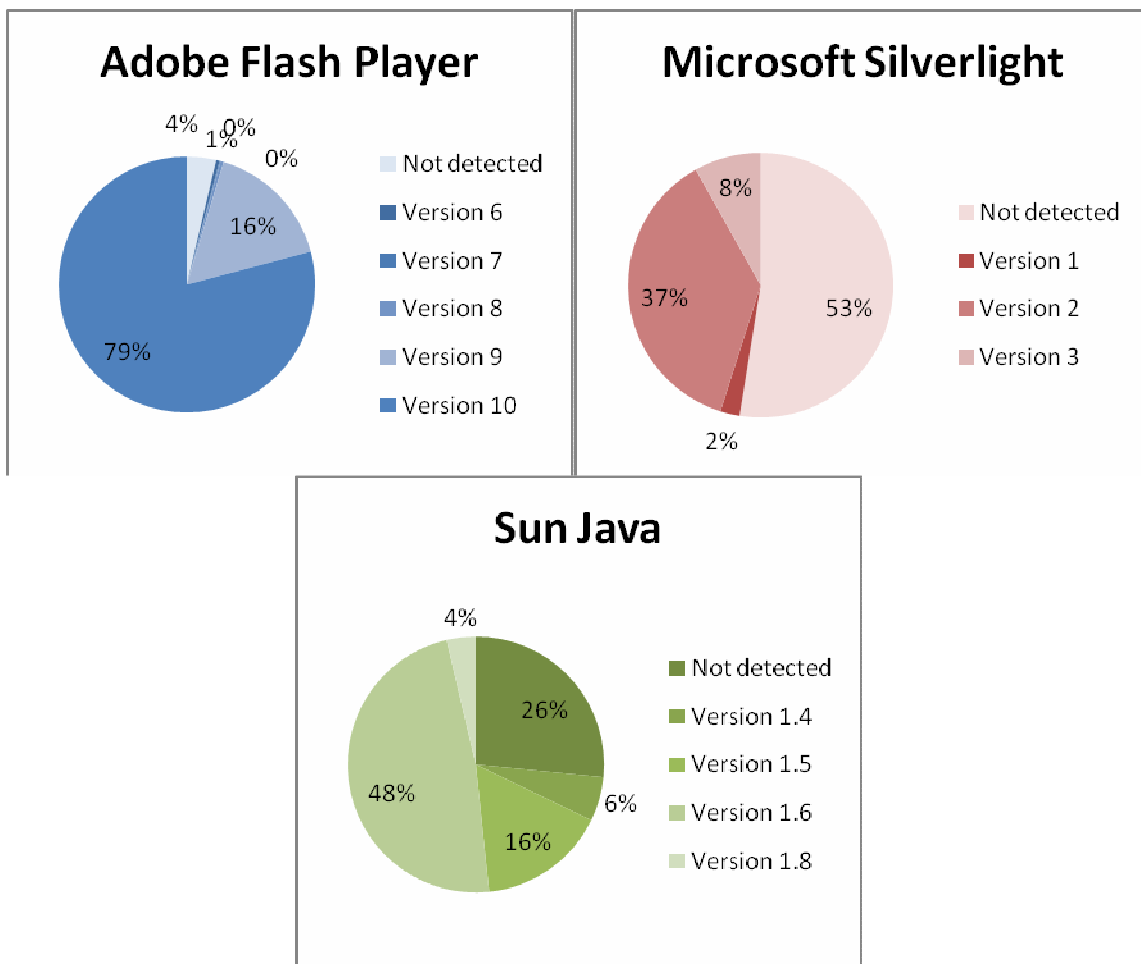


Figure 9: Graphs showing the percentage of UK computers in July 2009 with Rich Internet Application frameworks already installed. Source <http://riastats.com/>

What do these applications look like?

The next generation rich Geoweb applications feature a number of typical key technologies and types of content:

- Fully integrated multimedia including video (sometimes in HD) and audio
- Rich animation support within the user interface and the way maps are displayed
- Rich user interfaces, often scalable to any screen size
- Ability to load vast quantities of map and other data very quickly and seamlessly

Figures 10 -13 give examples of currently available applications.



Figure 10: Demonstration of Silverlight and Bing maps travel application currently in development at Earthware (<http://www.earthware.co.uk/demos/bingtravelgallery>)



Figure 11: Microsoft's Silverlight powered BingMapsWorldTour application showing recent imagery releases (<http://bingmapsupdates.cloudapp.net/>). This application demonstrates showing hundreds of pushpins whilst maintaining smooth animation performance.



Figure 12: Google's Flash powered advanced driving directions demo (<http://googlegeodevelopers.blogspot.com/2009/07/3d-perspective-in-maps-api-for-flash.html>)



Figure 13: GeoQuake's Flash and Google Maps powered driving game demonstration (<http://geoquake.jp/en/webgame/DrivingSimulatorPerspective/>)

What's involved in building these applications?

There is always a learning curve involved when using new technologies. For Flash this involves learning a new scripting language (actionscript) and a new set of design tools. However, Silverlight is different: .net developers can use their existing .net language skills and developer IDE (Visual Studio) to build Silverlight applications. However, there is still a new markup language (XAML) to learn.

Once the basics of either framework have been mastered it can be very quick and simple to create powerful Geoweb applications in a small amount of code, and effort, when compared to traditional Javascript mapping applications. For example, see the Silverlight code in Figure 14 to see how to add a video to a Silverlight Bing maps control and Figure 15 for the result.

```
<UserControl x:Class="BasicBingMap.Page"
  xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
  xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
  xmlns:ve="clr-
namespace:Microsoft.VirtualEarth.MapControl;assembly=Microsoft.VirtualEarth.MapCont
rol">
  <Grid x:Name="LayoutRoot" Background="White">
    <ve:Map Mode="Aerial" Center="52.1952,-1.6968" ZoomLevel="17">
      <ve:Map.Children>
        <MediaElement ve:MapLayer.MapPosition="52.1952,-1.6968"
          ve:MapLayer.MapPositionMethod="Center"
          Source="ChrisPendleton_s_ch9.wmv"
          Width="300" Stretch="Uniform" />
      </ve:Map.Children>
    </ve:Map>
  </Grid>
</UserControl>
```

Figure 14: Silverlight code sample showing a simple multimedia map application



Figure 15: Screenshot of Silverlight application showing live video running on a map using code from Figure 14

How Can We Deliver on Increasing User Expectations in the Future?

With the increase in consumer installations of plugins to support these future Geoweb applications the possibility for creating even more innovative applications continues to widen. There are a number of upcoming technologies and opportunities which can be leveraged by developers to create the future real estate and travel focused mapping applications, or indeed any mapping applications.

Mobile Support

The increase in consumer take-up of 'smart phones' such as the Apple iPhone, Palm Pre and Google Android and of Windows Mobile powered phones creates the possibility of rich Geoweb applications that work on mobile platforms as well as desktops and browsers.

Both Microsoft and Adobe have either announced, or been rumoured to be working on, versions of Flash and Silverlight for various smart phone platforms. This would mean that in the near future we can share code and multimedia between browser based Geoweb applications and mobile applications.

Multitouch

With the obvious impact of the iPhone, multitouch navigation is already available to the masses. The October release of Windows 7 will see this take-up increase with support for multitouch screen support built natively into the operating system and into the recently released Silverlight 3.

There are already sample Geoweb applications based on multitouch navigation, some of which were especially created for Microsoft's multitouch table device the Microsoft Surface as show in Figure 16.



Figure 16: Falcon Eye, a multitouch real estate application by Infusion Development powered by Bing maps (http://www.youtube.com/watch?v=QyVshgMoiAs&feature=channel_page)

“Out of browser” applications

Both Silverlight 3 and Adobe Air support applications that can be run outside of the browser and installed to the desktop. Geoweb applications are currently limited in how much they can use this new technology as they require a constant connection to the internet to load new imagery and map data. However, in the future we should start to see ways to cache data for offline use allowing consumers to take their applications and map based searches offline.

HTML 5

There is currently much discussion about the latest proposed specifications for HTML 5 and whether this will natively support the playback of video without the need for additional plugins. HTML 5 also includes suggestions for improving 2d graphics support as well as a number of other minor additions. As the adoption of HTML 5 by web browser developers is a long way off, what will be natively possible in HTML may increase. This should increase the possibilities for future Geoweb applications without the need for additional plugins to be downloaded.

Conclusions

Geoweb applications are still in their infancy, however, it appears that the time has come, both from a technical point of view and from consumer demand, for a “step change” in the functionality and performance of geoweb applications both in travel and real estate and in other industries.

Driven by the availability of new and previously established rich internet application frameworks, the increase in availability of aerial and street view imagery and location based multimedia, the future of Geoweb applications looks very promising. A simpler and more powerful development process, not hampered by cross browser and cross platform issues, should enable the creation of richer more powerful applications for the same development costs as existing Geoweb applications.

Appendix

Travel Keywords	Global Monthly Search Volume
hotel map	246000
hotels map	165000
travel map	110000
travel maps	74000
resort map	74000
map resorts	33100
map of hotel	27100
hotel maps	22200
tourism map	22200
hotels maps	18100
map of resorts	18100
travel map of	14800
maps travel directions	6600
travel maps and	6600
beach resort map	6600
destination map	6600
resort maps	6600
google map hotel	5400
google maps hotel	5400
hotel zone map	4400
hotels on map	4400
europa travel map	4400
world travel map	4400
map resorts in	4400
hotel london map	3600
hotels london map	3600
maps of hotels	3600
travel maps of	3600
destinations map	3600
map of resorts in	3600
vacation map	3600
map to hotel	2900
map and travel	2900
map of tourism	2900
tourism maps	2900
hotel paris map	2400
insight travel map	2400
map london travel	2400
to travel map	2400
travel map south	2400

travel road map	2400
punta cana resort map	2400
world resort map	2400
a travel map	1900
resorts maps	1900
destination maps	1600
disney hotel map	1300
google maps hotels	1300
map of disneyland hotels	1300
google map hotels	1000
hotel rome map	1000
map of benidorm hotels	1000

Real Estate Keywords	Global Monthly Search Volume
map house	74000
map property	27100
real estate map	22200
maps property	18100
map of house	14800
map apartments	9900
map apartment	6600
real estate maps	6600
map houses	5400
map properties	4400
the map house	3600
maps houses	3600
apartments map of	3600
map of property	2900
real estate map search	2900
house on map	2400
maps of house	1900
maps of houses	1600
apartments map in	1600
map of apartments in	1600
maps of property	1300
map of my house	1000
map house price	1000
map property search	1000
city property map	1000
apartment maps	1000
apartments maps	1000