Planning

Graded Unit

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## **Project Plan**

See Attached

## Research technologies

### Rich Internet Apps

Rich internet apps describe web-based application that share many of the characteristics of a desktop based application and is most often delivered via a browser plug-in, sandbox or virtual machine. RIA have developed due to user frustration at the limitations of standard HTML based web pages. Rich Internet Apps create web based interfaces where user’s interactions mirror a more real-life environment, to create a richer user experience. RIA technologies may include file manipulation, multi-media content, increased interactivity, and gaming.

There are two main methods of RIA delivery, plugin-ins or external software framework, or through built-in browser functionality. The main browsers plug-ins used to deliver RIA are Adobe Flash, Microsoft Silverlight, JavaFX and Java, with desktop browser penetration rates around 96%, 76%, and 66%, respectively (as of August 2011). Alternatively, HTML5, JavaScript and Ajax are the main technologies used within browsers to deliver RIA.

### HTML5

HTML5 is a mark-up language for the presentation of information on the web. It has been designed as set of standards to replace previous version of HTML and XHTML. It is still currently under development, with its main aim to improve support for the latest multimedia technology, while keeping it easily readable by humans and consistently understood by computers and devices.

The main features of HTML5 that distinguish it from previous versions is the inclusion of syntax that allows the deployment of multimedia content such as [<video>](http://en.wikipedia.org/wiki/HTML5_video), [<audio>](http://en.wikipedia.org/wiki/HTML5_Audio) for this content to be played within the browser itself, without the need for a proprietary plugin. Other features such as <canvas> consists of a drawable region defined in HTML code with height and width attributes. [JavaScript](http://en.wikipedia.org/wiki/JavaScript) code may access the area through a full set of drawing functions similar to those of other common 2D APIs, thus allowing for dynamically generated graphics.

New elements have been introduced that reflect common and standardised aspects of web pages. Some of these are semantic replacements of common <div> tags, such as <header> and <footer>. Some deprecated elements from HTML 4.01 have been dropped, such as <font> and<center>, who’s use has been superseded by CSS and so no longer needed.

Overall HMTL5 has been designed to be a new set of standards which reflect the increased use of multimedia elements now implemented in most web pages and:

“It includes detailed processing models to encourage more interoperable implementations; it extends, improves and rationalises the markup available for documents, and introduces markup and [application programming interfaces](http://en.wikipedia.org/wiki/Application_programming_interfaces) (APIs) for complex [web applications](http://en.wikipedia.org/wiki/Web_application).”

### Silverlight

Silverlight is an application platform used to write and deliver web and mobile based RIA, with a comparable functionality to that of Adobe Flash. Silverlight is delivered via a free .NET based plug-in compatible with multiple web browsers and able to run on Windows, Linux and Mac OS. Silverlight is the primary development tool now used for Windows phone

Fig 1: Structure of SOA

Silverlight presents multi-media, graphics, animation, interactivity into a single run-time environment. UI presentation is done using Extensible Application Mark-up Language (XAML) and programmed using the .NET languages such as C# or VB.

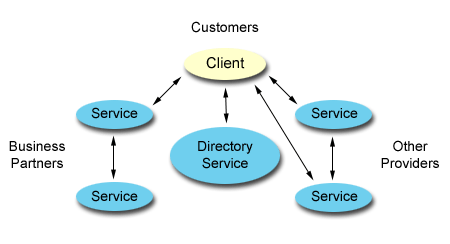
Development of Silverlight applications can be done using any .NET framework language and so any development tool that supports this can be used to create Silverlight applications. Microsoft Visual Studio and Expression Blend however are the most commonly used IDEs used. Expression Blend provides a companion programme to Visual Studio specifically geared towards creating U.I, whereas the Visual Studio is a powerful tool for programming and debug.

Silverlight has many features and an overview of them can be found at <http://www.microsoft.com/silverlight/features/>.

### SOA concepts

Service-orientated architecture is a methodology of designing and implementing software solutions using discreet interoperable services.

"A service is a function that is well-defined, self-contained, and does not depend on the context or state of other services."

Each service is a piece of code/data structure with a distinct business function, and can be re-used for different purposes. Service can provide one specific function, such as converting a currency, or can be a set of inter-related services, such as handling the various operations of an airline booking.

Each service is loosely-coupled i.e. means that the client of a service is independent of the services and the services themselves have little or no knowledge of the definitions of the other service. Calls to each service are not hard-wired into the code of the service, but instead information is passed through defined protocols, which describe how the services pass and parse information to each other and then leaves it up to the service implementation to perform the necessary processing.

#### XML and SOAP

To deliver SOA programmes, data needs to be communicated by a set of standards that allow information to be passed across a wide variety of platforms and across language boundaries. A wide range of technologies can be used to structure and deliver the data that used to drive SOA however the most commonly used are XML and SOAP. XML is an extensible mark-up language and is the de facto method of describing data to be exchanged on the web, however it is not sufficient alone for exchanging information over the web. SOAP ([Simple Object Access Protocol](http://www.w3.org/TR/2000/NOTE-SOAP-20000508/)) is a set of protocols which describes how the XML document is structured.[[1]](#footnote-2)

#### Why use SOA?

SOA aims to stitch together large chunks of pre-written functionality to create an ad hoc application from previous software services.

1. Reusing functionality that already exists outside or inside an enterprise instead of developing code that reproduces those functions can result in a huge savings in application development cost and time.
2. SOA also allows interoperability between services and allows communication and understanding between each other, no matter what platform they run on.
3. Loosely coupling services makes SOA inherently scalable, with the addition of more services to the application relatively easily achieved to satisfy the business requirements.
4. SOA are typically more flexible as services can be swapped or modified to meet changes in the business requirements.
5. SOA can typically provide a cost efficient approach that avoids tying legacy systems, business partner applications, and department-specific solutions. These solutions are expensive because they tend to be custom developed. Customized solutions are costly to build because they require extensive analysis, development time, and effort.

The following principles were proposed by Yvonne Balzer to guide development, maintenance, and usage of the SOA:[[2]](#footnote-3)

* Reuse, [granularity](http://en.wikipedia.org/wiki/Granularity), [modularity](http://en.wikipedia.org/wiki/Modularity_(programming)), composability, componentization and interoperability.
* Standards-compliance (both common and industry-specific).
* Services identification and categorization, provisioning and delivery, and monitoring and tracking.

### ATOM

ATOM is a set of standards for the syndication of website content (ATOM Syndication Format) in the form of an XML web feed. ATOM was developed as a response to what was seen as some of the limitation of the RSS (Rich Site Summary) standard.

Atom and other web syndication formats are now used for many purposes, including journalism, marketing, bug-reports, or any other activity involving periodic updates or publications[[3]](#footnote-4).

XML web feeds can be accessed by using a feed reader (aggregator) to allow the user to display updates of the site. Web-based feed readers require no further software and display the updates within the user’s browsers.

### JQuery

JQuery is multi-platform javascript library designed to simplify client side scripting on the web and is currently the most popular javascript library used[[4]](#footnote-5). It is a lightweight, *"write less, do more"*, JavaScript library making it much easier to use JavaScript on websites.[[5]](#footnote-6)

Jquerey is a free open source library which is designed to allow easy selection, manipulation and modification of DOM elements within the HTML document. JQuerey also offers built in animation functions and event handling.

### LINQ to XML

Language Integrated Query is a Microsoft .NET Framework component that allows data querying capabilities to .NET languages. LINQ allows the querying of data sources such as [arrays](http://en.wikipedia.org/wiki/Array_data_structure), enumerable [classes](http://en.wikipedia.org/wiki/Class_(computer_science)), [XML](http://en.wikipedia.org/wiki/XML) documents, [relational databases](http://en.wikipedia.org/wiki/Relational_database), and third-party data sources using statement structures similar to that of SQL.[[6]](#footnote-7)

LINQ to XML brings the XML document into memory allowing it be queried and modified, after it has been modified it can be saved to a file or serialize and sent over the Internet. LINQ to XML provides a function similar to that of XPath and XQuery.

Research Technologies and Lidiflu Ltd Website

Implementation of all these technologies will be used to develop the Lidiflu website and mobile app to deliver the objectives as outlined in the analysis of the brief, as they are currently part of my skill set. HTML5 and JQuery will be implemented to create a pleasant, usable, accessible and web standard front-end.

Silverlight will be used to develop any parts of the website that will need rich internet applications and XML, LINQ, ATOM and SOAP will be used to pass, query and send information between the website, services, databases and mobile app.

## Development process

### Waterfall

Waterfall is a traditional design management process involving numerous distinct stage, each of which needs to be completed sequentially before moving onto the next stage. The methodology originates from the construction/manufacturing industry where initial planning and development was crucial to the project success, as any changes later in the production process were prohibitively expensive. [[7]](#footnote-8)

Depending on the specific project there are usually 6 distinct phases (fig 2) each of which is discontinuous and must be completed before moving onto the next.[[8]](#footnote-9)

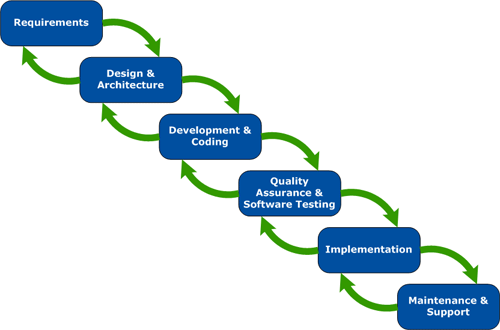


Figure 2: The six phases of waterfall development

1. **Requirements Analysis** – It is important to determine the exact requirement needed for the project and to create goals needed for its completion. Interaction with the client is very important to discover what their requirements are and to identify any potential risks.
2. **Design** – Once the requirements have been identified it is then important to design ways of solving these requirements. This could take the form of prototyping.
3. **Development** - Once the designs stage has been completed it is now time to build the project based on those design solutions. Team members are delegated task to create and implement the projects
4. **Testing** – Once the project has been completed tests are carried out to see if the project is free from errors. Also it is important to see if the project has been completed to the requirements of the client.
5. **Implementation** - The implementation should be done in compliance with all prevalent industry-specific guidelines and regulations and or organizational guidelines.  Post implementation verification and testing must be carried out to ensure the final implementation is successful.
6. **Maintenance** - After the final product is delivered to the client, maintenance service is provided to make sure that the product or the service keeps on performing as expected. The maintenance period is usually for a specified and agreed period of time.

Waterfall systems require that each phase is fully documented at each stage and is the most systematic methodology.

#### Advantages

* Easy to project manage as each phase is completed sequentially.
* Planning allows client to know what will happen at each phase even months down the line.

#### Disadvantages

* Lacks flexibility.
* Usable product only delivered at the end of the process.

### Waterfall methodology and Lidiflu Ltd Website

The Lidiflu Ltd website will be developed using the waterfall methodology as this will be the easiest and fastest methodology to implement. It is a suitable methodology to use with only one developer working on the project, as they are responsible for all task and as such can only work on one task at time, making a sequential methodology a good solution. Other methodologies such as agile would be more suitable for larger scale projects with numerous team members. Although the waterfall approach is being taken, feedback from the client will be incorporated in the development process to provide a suitable conclusion to project.

1. http://192.9.162.55/developer/technicalArticles/WebServices/soa2/WSProtocols.html#soatechs [↑](#footnote-ref-2)
2. http://en.wikipedia.org/wiki/Service-oriented\_architecture [↑](#footnote-ref-3)
3. http://en.wikipedia.org/wiki/Atom\_(standard) [↑](#footnote-ref-4)
4. http://en.wikipedia.org/wiki/JQuery [↑](#footnote-ref-5)
5. http://www.w3schools.com/jquery/jquery\_intro.asp [↑](#footnote-ref-6)
6. http://msdn.microsoft.com/en-us/library/bb387098.aspx [↑](#footnote-ref-7)
7. http://en.wikipedia.org/wiki/Waterfall\_model [↑](#footnote-ref-8)
8. http://projectcommunityonline.com/waterfall-project-management-an-overview.html [↑](#footnote-ref-9)