The Impact of Web 2.0 on Advancement

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Executive Summary

This document addresses the impact of Web 2.0 technology on the Harris Connect Online Alumni system, HC2.0. It explores the impact of Web 2.0 software on the development of applications for the alumni and development market. It will explain how Web 2.0 is a fundamental shift for the Internet, which can now be viewed as a platform for ever-more complex services, rather than a means of presenting sequential pages in response to user requests.

The key concepts are:

- The Internet is no longer a sequential page medium. It is now a platform for increasingly interactive data exchange for a far more satisfying user experience.
- Web 2.0 applications become more effective the more people use them.
- Applications developed under Web 2.0 are data driven, and must be designed to exploit this strength.

With the Internet as a platform, a Web 2.0 application provides responses to user queries within the same web page, as opposed to the traditional web experience of hitting a “Submit” button and waiting for the result. In HC2.0 the user interface to update the profile is implemented so that all interaction takes place on the same page. The alumnus selects the information, updates it, saves it, and reviews the result. No sequential pages have to be loaded to complete the update.

A second fundamental principle of Web 2.0 applications is that they are driven by user-contributed content, and that they become more interesting and more valuable as more people participate. Alumni are especially motivated to provide this data, as they have life-long relationships with their alma maters, and because they ultimately benefit from the resulting networking. This happens through Career Advisors, Mentor and Social Networks, Groups, Tagging and Commenting, Communication, Outreach, and Events. The design principles of HC2.0 incorporate this thinking.

Alumni applications and websites can support any specific client design and navigation needs. The design principles of HC2.0 are not a fixed design, but suggest how content and applications can be organized to promote individual usage and overall participation. These can build on HC2.0’s standard fields and organization, and are accomplished through APIs, XML Schema, database integration, and mashups of expanded services.

HC2.0 technology encompasses the ability to create queries in the Query Builder through the use of an Ajax interface. Campaign Builder, the new email-targeting platform was developed using open source technology, the industry trend rather than using a third-party email tool. This enables the support of the ever-expanding Alumni Profile. The Google Web Toolkit has accelerated the development of the Campaign Builder. In addition, dynamic content building and graphical HTML editors are also offered.

Web 2.0 applications are data driven. As users add more information, they make the application more valuable and the ability to collect, manage, and use the data must be inherent in the software.

HC2.0, using Web 2.0, focuses on the end user experience and the use of the ever-expanding alumni profile as the key element in Alumni applications. HC2.0 incorporates the best of available Web technologies, and establishes a firm foundation for the future.
Introduction

Web 2.0\(^1\) is viewed as a “business revolution in the computer industry.” Web 2.0 applications are sophisticated, easy to use, and are changing how business is done on the web.

Several aspects of Web 2.0 application development are highly relevant to the alumni and development market, and we will be exploring the impact of Web 2.0 from the alumni and advancement perspective. This overview explores how Web 2.0 applications get more effective as more people use them. The importance of unique data and user provided data is examined along with design and technology principles. Specific technological and design principles of the HC2.0 implementation are included.

The key concepts are:

- The Internet is no longer a sequential page medium. It is now a platform for increasingly interactive data exchange for a far more satisfying user experience.
- Web 2.0 applications become more effective the more people use them.
- Applications developed under Web 2.0 are data driven, and must be designed to exploit this strength.

The illustration below shows the differences between traditional Internet applications, and the new Web 2.0 approach.

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\(^1\) The Web 2.0 concepts are from Tim O’Reilly’s article “What is Web 2.0?”
The Internet as Platform

A fundamental principle of Web 2.0 is that the Internet is a **platform**.

With the Internet as a platform, sophisticated applications provide a rich experience to individual end users. The first Web 2.0 application to garner notice was Google Maps. From the end user perspective, Google Maps provides to and from directions **within the same web page** by opening simple interactive call outs on the page. The traditional web experience of hitting a “Submit” button and waiting for a page of results had been eliminated.

Two concepts of the Internet as a platform are:

- Web applications are more sophisticated
- APIs (Applications Programmers Interfaces) provide the ability to access data and applications to create “Mashups”

Google maps also provide an API that enables third party developers to interact with the application. As Google maps are combined with other applications, “mashups” are created. Mashups use content obtained from other, external data sources to initiate entirely new services. Google maps now include Starbuck’s location finders, interactive maps of the Turin winter Olympics, and the tracking of flights on JetBlue’s airline.

A traditional web application for an Alumni Directory includes the ability for alumni to update their own addresses. Typically, this would be a form with a “Submit” button. Multiple pages might be required to make this update. This method is still the most common on the Web.

In a Web 2.0 application, an update to an address would occur on a single page with no “Submit” button or multiple pages being required.

In the Harris Connect product, HC2.0, the user interface to update the profile is implemented so that all interaction takes place on the same page. The user interface shows categories of data for the alumnus to update. As the address is selected, the address information expands on the same page and is updated on the same page and within the same context as the initial view. On the same page, the alumnus selects the information, updates it, saves it, and reviews the result.
The ability for an institution to access and update alumni data via an API is a key aspect of HC2.0. For those alumni offices with methods in place to programatically access and update alumni data, the APIs will provide the ability to review and programatically update HC2.0 Alumni Directory data.

Additionally, a Web 2.0 application to import, export, and query the online data through a tool is provided.
Web 2.0 Applications Improve with Use

A second fundamental principle of Web 2.0 applications is that they are driven by user-contributed content, and that they become more interesting and more valuable as more people participate.

How an alumnus presents himself or herself to the greater alumni community is the basis for applications that are important to Advancement. To provide an alumni directory and enhance networking, the complete set of alumni data should be available, and the individual profiles should be up to date and maintained by the alumnus.

What incentives does an alumnus have to keep his data current? What are the drivers of alumni participation? Is the profile presented to the alumni community the same one presented to family and friends or professional peers? Does my MySpace profile look like the one on LinkedIn? And why do people have more than one anyway?

Web 2.0 applications get better as more people use them, but what makes an individual initially participate in an online alumni community?

Early in their post-college lives, individuals may be driven by a need to find a job, to find a place to live, or to find a friend in an unfamiliar city. At varying life stages, these requirements and others may spark a need to return to the alumni community for additional networking and opportunities to reconnect. The need for a new job or business venture may be the spark. A travel program, a desire to get help publishing a novel, or a plan to start a non-profit agency may be the catalyst for an alumnus to turn to the greater alumni community.

Colleges and universities and their Advancement offices have an institutional advantage over anyone else who may attempt to provide these services. All alumni have a relationship to their alma mater. The ability for the advancement office to harness the whole of their alumni base assures their relevance and importance to that same alumni base.

Alumni participation and network effects

Specific applications are briefly reviewed with a focus on alumni participation and how they harness network effects and get better as more people use them.

Searchable Alumni Directory

A searchable alumni directory is the basic component of alumni applications. The directory provides a way for alumni to find each other and to keep their profile information up to date. Alumni use the directory for basic networking. It is valuable when moving to a new city or to find people with common interests. After the alumnus has found a new job, he can ask who from his alma mater is working your company.

The power of the alumni directory comes from the fact that it contains the whole of the alumni community.
Is there an incentive for a graduating senior or recent alumnus to participate in this community? They may be a current job seeker or networker who is looking for help in a new city, but participation in the alumni community is also an investment in a future relationship with the larger alumni community. I may abandon my Friendster friends for a MySpace page, but I will always be an alumnus and have a relationship with my alma mater.

Advancement professionals have the advantage of the timelessness of their institution’s relationship with their alumni.

As an alumnus updates his contact information or extends his profile by uploading his resume, that alumnus is making the whole of the application better. That network effect is a cornerstone of Web 2.0 applications.

As information about who has recently joined the community or which alumni have recently updated their information is presented, the actions of individuals enhance the value of the community.

The completeness of the alumni data provides for valuable connections.

**Career Advisor/Mentor Networks**

Using Career Advisor and Mentor networks, alumni enhance their profiles by adding additional information. Advisors and mentors indicate their willingness to be contacted by fellow alumni. This provides significant value to the entire alumni network.

These networks provide *high quality connections* between alumni.

The value of a career network increases with network size. Users add value in a career network.

The willingness of an individual within the community to be contacted provides for high quality connections.

**Social Networking**

Growing connections between individuals is the basis of “social networking.” Social Networking is an academic term referring to connections among people. These connections form a network with “hubs” and “spokes.” An individual with many connections may be seen as a hub. A small number of hubs can provide connections among many people. If Mary and Jane both know Joe, but do not know each other, Joe is the hub that connects them.

Social networking studies have shown that “weak ties” between individuals can be valuable to their ability to network. If I am seeking a job, I am more likely to learn about opportunities from someone with whom I have a weak tie than someone with whom I have a strong tie. The reason for this is that those with whom I closely associate have the same information that I do. Those with whom I have less interaction are more likely to have information that I do not have.

All alumni have at minimum a weak tie to each other. That tie is based on common experience and affinity.
Web 2.0 Alumni applications provide the ability to build an individual network of connections. These connections grow from individual ties into larger networks.

Network effects are significant in social networking. Social networking applications get better as more people use them.

**Groups**

The ability to find, create, and participate in groups within the alumni community provides connections based on common interests.

Active group participation reinforces an individual’s ties to the community, and increases the likelihood of keeping his or her profile up to date, and also in participating with other areas of the community.

Groups are driven by user provided content, and grow and get better as more people participate.

**Tagging and Commenting**

As users “tag” or add keywords to content of the site, they make that content easier to find and more usable. The word “folksonomy” was coined to describe the phenomenon of how people’s participation in the classification of content makes for better searching and more useable applications.

Adding tagging to content-rich areas enhances relevant searching, as in:

- “Find more friends like…”
- “Find more photos like…”
- “Find more resumes like…”

Commenting on content adds more opportunity for participation on every activity. If the alumni office has an event or an alumnus posts a class note, the ability to comment on that activity invites more participation.

Tagging and commenting enhance applications and are more valuable as the network grows.

**Communication, Outreach, and Events**

The alumni profile, updates, and extensions to it are the initial basis for an individual user to interact with the alumni community. As the profile is extended with additional information or photos or the addition of a resume, the alumnus is providing additional value to the overall community.

Interactions between individual users increase participation and the value of the overall community. An alumnus may search, connect through a career network, or build a group of connections through social networking. Each of these group activities enhances the value of the experience for the individual user and for the entire community.
The role of Advancement for communication, outreach, and to support alumni events can be the catalyst for individual and group alumni activity. This role of harnessing the power of the alumni network makes the alumni network more valuable as participation increases.

**Design principles in support of Web 2.0 Advancement applications**

Web 2.0 applications that harness network effects to expand and become more valuable to the community must focus on the individual, consider the individual’s connections to others, and foster greater connections to the whole community.

The design principles of HC2.0 incorporate this thinking.

Alumni applications and web sites can support any specific client design and navigation needs. The design principles of HC2.0 are not a fixed design, but suggest how content and applications can be organized to promote individual usage and overall participation.

The design principles cover 3 areas:

**Individual Profile**

1. Any page that allows members to view or edit their profiles
2. Any page that allows members to view or edit their profile extensions

**My Community**

1. Any page that displays info about the member’s connections to other members (friends, contacts, social networking invitations, event invitations)
2. Any page that displays information about the member’s transactions (event registrations, donations, etc.) and subscriptions (discussion groups)
3. Any page that displays information about or provides a tool for the member’s community membership.

**Community Features**

Includes links to…

1. Any community page that displays “browsable” community information that is managed or posted by the community administrators or Harris Connect
2. Any community application that allows individual members to contribute content that does not fall under the category of “profile data” or “profile extension”

*See the screen example on the following page. It illustrates these design principles.*
HC2.0 design principles gather individual contributions and harness network effects

Without leaving this page, the user can edit profile information, add a photo, or change a resume.

Tabs are organized so that the focus on the profile and the larger community is maintained.

The specific navigation and elements may be changed for a particular client.
Web 2.0 Applications are Data Driven

Web 2.0 applications are data driven. As users add more information, they make the application more valuable and the ability to collect, manage, and use the data must be inherent in the software.

Alumni Advancement is in the unique position of launching an application that leverages the value of a complete set of alumni data.

Data principles for HC2.0

- Continued Support for common formats and protocols:
  - Tab-delimited, CSV, Secure Copy (SCP), SFTP
- Standard Profile Fields: (First, Last, etc.)
- Organization Defined Custom fields
  - Defined in Admin tool
  - Once created, immediately populate and retrieve custom field data
- Publish XML Schema: Standard and Custom fields
- SOAP & REST APIs to retrieve and update profile data
  - (Web services)
- Integration to Alumni Database packages
  - (Blackbaud, Advance, Millenium)
- Encourage Client technical exchange of code, techniques, and methods: Mashups

Standard Fields and Organization Defined Custom Fields

Common data elements such as first name, last name and address information are contained in "standard field" locations in the HC2.0 database. HC2.0 extends the concept of the online alumni database to include organization defined custom fields and categories of data. The alumni profile and the ability to extend it is a key component of Advancement applications. HC2.0 addresses this by moving control of the profile definition to the alumni office.

The interface that is in development as part of HC2.0 will be used to illustrate standard and custom field concepts.
Category Data Interface

Standard fields and categories include Personal Information, Business Information, Address information, and so on.

Custom categories have been created to test the application and concepts. The Hobbies category was added. It has a description that says, “This is the Hobby Category.” In this interface, choosing edit allows the administrator to change the description right on this page.

Change Category Description
A new category can be added to the profile. A Publications Category is created below.

Add a new Category

New fields are then added to the Publications category. Each publication will include a title, description, date of publication, type of publication (book, story, academic article, or essay) and a magazine or journal title if applicable.

Add a new field

As fields are added to the Publications category, they are set for availability in the alumni profile.

Publication Category and fields are available to end user

Standard fields and custom fields are maintained by the alumni office. New categories and fields are added via a Web 2.0 application.

New categories and new fields will be supported with a user interface that provides for easy import and export of data.
APIs, XML Schema, Database Integration, and Mashups

Underlying support for profile data and extended custom data is done via a set of profile APIs. These APIs provide the ability to create a new profile and to access and change existing profile data.

These APIs will be provided as “web services” so that clients can use online alumni information directly. It is anticipated that these secure web services will initially be used for data verification and synchronization. Alumni offices and their technical teams use various methods to update alumni information. The use of these APIs will not be required to use HC2.0. Standard methods of import and export and common formats will continue to be supported. These APIs will be available for the technology teams that can take advantage of them.

An API will be provided to retrieve current profile data for a specific alumnus. This API will use the unique identifier from the client to retrieve alumni data. The data for the alumnus will be available in real time to the client application. Similarly, an API will be provided to update profile information for a specific alumnus.

An XML schema to access and update profile information will be created in support of these APIs.

As technical teams use these APIs to query and update alumni data, Harris Connect will encourage the sharing of information and best practices. This has been occurring as Harris Connect clients create solutions for databases such as Advance or Raiser’s Edge. The goal of HC2.0 APIs is to make these tasks easier and to facilitate common technology solutions for common data issues.

Other mashups that we cannot anticipate may be created using these web services.
HC2.0: Technology

Three concepts inherent in the definition of a Web 2.0 application have been reviewed. Web 2.0 applications use the Internet as a platform, get better as more people use them, and are data driven.

In this section, specifics of HC2.0 technology are reviewed by examining the new Campaign Builder application. Campaign Builder is used to create email campaigns and newsletters. A rich alumni profile allows Alumni and Communication offices to reach their intended audience with the appropriate message. Note that the screenshots are of the product that is in development with a scheduled release in 3Q 2007. The final product will have additional design changes.

As an application that is used by the alumni office, Campaign Builder adheres to several new design principles.

Actions are discrete. It is possible to create an email recipient list independently from creating the content for an email. The user interface provides Tabs and Breadcrumbs in the navigation that helps to break down the tasks to make them easy to understand.

Tabs and Breadcrumbs

Within Campaign Builder, the discrete tasks are to

- Create lists of email recipients. This can be done by querying profiles.
- Create content in both text and email format for distribution.
- Assemble the email by combining content and recipients.
- Send and schedule the email.
Creating Complex Queries AJAX: Query Builder

Within Campaign Builder, an administrator can query profile data to create a targeted list of email recipients. The technology behind this Query Builder is AJAX. AJAX provides dynamic interaction within the web page.

To create a profile query, categories and fields are selected from the profile and targeting criteria is added. In the screenshot below, the administrator has defined a query of everyone who has either a business or residence address in the state of NY and who graduated in 1999. The administrator can continue to add additional criteria.

Dynamic Extensions to Applications

Query Builder was developed to be easily extended. Specifically, this application was written in Java and uses the concept of dynamic extensions. A dynamic extension allows a new Java class to be dropped into the existing application. As development of Query Builder continues, the development team at Harris Connect will add the ability to include profiles of users who have submitted a class note. That capability will be implemented by creating a Java class and dropping it into the Query Builder application. The new class note extension can include any aspect of a class note as targeting criteria such as the type of note or date range. So the ability to target anyone in NY from the class of 1999 who posted a class note about a new job in the last 3 months will be provided. The important concept is the dynamic nature of the extension. As applications are added that have not yet been anticipated, they will be easily supported in Query Builder. It will also be possible to open the ability to create new extensions to clients.

The ability to provide queries on any type of profile or activity data is the basis for additional HC2.0 applications. The searchable alumni directory, report builder, and data exports rely on the Query Builder infrastructure.
Query Builder: Tree View

Tree View

Query Builder Tree view is an alternate method for creating profile queries. The user interface is streamlined and can be used as the basis for the redesigned searchable alumni directory. In the image above, a query has been created to create a list of email recipients who registered in 2007.

As with Query Builder, the tree view can be extended dynamically.
Google Web Toolkit

Campaign Builder development has been accelerated through the use of the Google Web Toolkit.

From the project overview site at http://code.google.com/webtoolkit/overview.html

What is Google Web Toolkit?

Google Web Toolkit (GWT) is an open source Java development framework that lets you escape the matrix of technologies that make writing AJAX applications so difficult and error prone. With GWT, you can develop and debug AJAX applications in the Java language using the Java development tools of your choice. When you deploy your application to production, the GWT compiler translates your Java application to browser-compliant JavaScript and HTML.

Why Translate Java Code to JavaScript?

- Java technologies offer a productive development platform, and with GWT, they can instantly become the basis of your AJAX development platform as well.

The dynamic elements of Query Builder and the Tree “widget” were created using the Google Web Toolkit.

GWT is open source and is available under an Apache 2.0 license. It has all the advantages of an open source project, particularly that there are many users and developers who work on it.

The GWT page for open source developers is called “Making GWT better.” It includes the mission statement for this project.

http://code.google.com/webtoolkit/makinggwtbetter.html

GWT’s mission is to radically improve the web experience for users by enabling developers to use existing Java tools to build no-compromise AJAX for any modern browser.

HC2.0 developers use GWT for precisely this reason.
Java Development

Campaign Builder and Query Builder are Java applications. The dynamic extension capability of Query Builder relies on the ability in Java to recognize a new Java class on the fly.

The Google Web Toolkit allows the use of Java Integrated Development Environments (IDEs) to create complex AJAX applications. The AJAX applications can be debugged in the Java environment and produce consistent and reliable AJAX code.

Campaign Builder was developed using Eclipse and open source IDE. Google Web Toolkit is supported in Eclipse.

Any language that supports SOAP or REST can be used with HC2.0 APIs. So open source languages like Ruby or Perl could be used and Microsoft proprietary languages under Dot.Net could also be used.

Many colleges and universities use Java internally, there are many tools, and Java has a significant development community. Java will need to be used to create new dynamic extensions.

Dynamic Content

Dynamic Content provides the ability to create an email that provides specific content to specific users based on their profile. Typically, dynamic content is served based on the concept of a template engine. There are many template engines available and it is anticipated that in the future, HC2.0 may expand to include choosing a specific template engine. Campaign Builder has incorporated the open source FreeMarker Template engine.


> FreeMarker is a "template engine"; a generic tool to generate text output (anything from HTML to autogenerated source code) based on templates. It's a Java package, a class library for Java programmers. It's not an application for end-users in itself, but something that programmers can embed into their products.

Campaign Builder has embedded the FreeMarker template engine into the content creation area to support dynamic content. Profile elements are used to both personalize the page and create conditional statements. All aspects of the FreeMarker Template language are supported.

In the example below, the HTML is directly modified to show a 20<sup>th</sup> reunion message for those in the class of 1987 and a simple welcome message for everyone else.

```html
<html>
<head>
  <title>Welcome!</title>
</head>
<body>
  <h1>
```
Welcome Class of ${class_year}!  Your 20th reunion takes place on September 4!  

In HC2.0, dynamic content using FreeMarker will be supported in content management. MyPage, NewPage, and all pages created by the alumni office will support this level of personalization.

The user interface in development anticipates support for users who are familiar with HTML and also for those who are not.

**Graphical HTML Editors**

In Campaign Builder, the ability to upload a file and to edit HTML directly is supported. For those who are not familiar with HTML, Graphical Editors are included. There are a number of HTML editors available with advantages and disadvantages to each. For Campaign Builder, two open source editors are included. It is possible to choose either editor to create email content. It will be possible to drop in additional editors in the future.

http://xinha.python-hosting.com/

_Xinha (pronounced like Xena the Warrior Princess) is a powerful WYSIWYG HTML editor component that works in Mozilla based browsers as well as in MS Internet Explorer._

http://www.fckeditor.net/

_This HTML text editor brings to the web much of the power of desktop editors like MS Word. It's lightweight and doesn't require any kind of installation on the client computer._

**Open Source**

Campaign Builder development:

- Google Web toolkit
- Eclipse IDE

Campaign Builder application:

- Freemarker template engine
- Xinha HTML editor
- FCKEditor
Why not use a 3rd Party Email Campaign Tool?

Technical development often calls for a “buy or build” decision. There are a number of companies that focus solely on a single email campaign product.

The main factor in the HC2.0 decision to develop Campaign Builder instead of using a third party product is the importance of the alumni profile within the product.

As the alumni profile is extended and new interactive HC2.0 features are added, the email campaign tool needs to expand to handle personalization and targeting based on that information. Third party tools can handle that expansion with additional development, but HC2.0 Campaign Builder was designed from the ground up to support an ever-expanding alumni profile.
Summary - HC2.0: Building on the Foundation

Three aspects of Web 2.0 applications have been reviewed. They are:

- The Internet is the platform
- Web 2.0 Applications get better the more people use them
- Web 2.0 applications are data driven

Campaign Builder was examined in detail to illustrate technical aspects of HC2.0.

This brief overview focuses on the technical relationships between HC2.0 applications. Campaign Builder was developed using GWT and Eclipse. It was designed so that several key elements could be re-used in other applications.

- Query Builder: Used for reporting and for exporting data
- Query Builder: Tree View: Used for a redesigned searchable alumni directory
- Dynamic Content: Extended to all content management.
- Alumni Profile Definition: Used for searchable alumni directory

HC2.0 has been conceived, planned, and developed as a foundation for additional development and new products.