

Case Study:

Migration of Participant Website from Vignette 7 to Adobe Experience Management (AEM)

By Jerome M. Griffith

4/30/2016

This is a report on a company's migration of the Participant Website from Vignette 7 to in Adobe Experience Manager (AEM), which offers more streamlined and modern CMS options for non-technical business associates. The name of the company used in this report, ZoZiva Financial Corporation, is an alias used to represent a real company I was employed with that performed a similar project to the one that will be described in this report. The name of the company and the associates/employees involved have been changes or withheld for privacy purposes and restrictions from sharing classified information.

During job shadowing sessions for more than 6 months I have been participating in this project in the following areas:

- Reviewing and testing webpages' user interfaces and front-end codes (HTML5, CSS3, SASS, JavaScript, AJAX, jQuery, Java, JSP, CQ5, BootStrap)
- Reviewing code in Eclipse for Java EE, and in Adobe CRXDE Lite
- Learning AEM CQ5
- Account login testing
- Testing Webpage responsiveness on desktops and mobile devices
- Participated in discussions and review on UI and UX designs and interactivity or web pages and applications
- Attended and participated in daily standups for the project using Agile Software Development Methodology
- Attended and participated in Americans with Disabilities Act (ADA) meetings for UI Developers

This report demonstrates my technical writing skills.

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Report Summary

Well known and respected finance company, ZoZiva Financial Corporation, provides finance advice, investment planning, 401(k) savings, college savings, mutual funds and Roth IRAs to millions of customers around the world. It was founded in 1939 by businessman Henry Allen Zoziva on the principles of business integrity and intelligent financial practices even during The Great Depression before World War Two and has kept afloat even when similar financial establishments went under in the recent financial crisis of 2008-2009. The award winning company's headquarters is located just outside of Washington D.C. in southern Maryland USA and has always stayed up to date with modern technology to keep its IT systems and infrastructure running efficiently and securely. Since 1997 ZoZiva Financial's Web Development and Programming department has been using the enterprise web content management software Vignette (now OpenText Vignette) to build and manage portions of its website. This included all the client facing web pages where individual investors and companies can log in and manage their personal and group plan accounts. As was always expected, employees of the Customer Relations Management department—Marketers, Sales Associates and Customer Services Representatives—had to contact the IT's web services department whenever changes were needed to a webpage or a component of it.

The Participant website portal, where clients log in to review and manage their accounts, was hosted, built and managed in Vignette 7. Although Vignette was an efficient and popular developers' tool when it was first launched in 1997, it can only collect the client data based on the basic information participants enter into their account profiles about themselves (date of birth, age of retirement, etc.) from a general plan level (high-level view), but not from a more detailed, personal level (low-level view), like number and age of children, children who may be going to college, etc. Financial Plan Representatives were not able to gather enough

information and therefore make the appropriate respond to the clients and offer the best plan solutions according to their needs. It would have been more convenient and efficient for non-technical personnel to be able to perform the changes and manage digital assets such as advertisements, videos and documents, on their own, while, of course, still depending on IT to manage more complex technicalities in the background.

Many companies have either upgraded to OpenText Web Experience Manager (WEM) or migrated to other CMSs like Drupal and Adobe Experience Manager that offer web content management experience with digital marketers in mind (Zinck, 2013). As noted by Tom Wentworth in an online article on the plight of legacy CMS products, “If your company is still using Vignette, it's just a matter of time before you will need to switch.” (Wentworth, 2014).

Therefore, this is a report on migration of the Participant Website from Vignette to in Adobe Experience Manager (AEM), which offers more streamlined and modern CMS options for non-technical business associates. With AEM there are dynamic features included that allow non-developers like Customer Representatives and other applicable ZoZiva associates to make the necessary changes to the website that will allow them to choose options to automatically target client participants according to their demographics and offer the best plan package options to fit their needs. All website pages are now “responsive”, meaning when the website is viewed on all modern mobile devices—laptops, smart phones and tablets—the layout will adjust and resize itself to fit effectively within the screen for easy navigation and use.

This was an ongoing project that took several months longer than expected to complete. Agile Software Development methodology was used to complete this project. A team of Business Analysts, DBAs, System Engineers, Architects, Software Engineers and UI Developers was be lead and managed by a Scum Master to work in 2 week “Sprints”. A Sprint is iterations of particular tasks completed within a certain time frame.

The main components and functionalities of the website addressed during content migration included:

- Participant Website login page
- Banner Advertisements
- Connectivity to the Workplace Retirement website and ConneX Intranet website
- Articles Pages
- ZoZiva in the News links/pages
- Contact Information Page
- Informational and Educational pages
- Database Connectivity (JCR, Java, SQL, XML)
- Web Responsiveness (Desktops, laptops, tablets and smart phones)
- Front-End Design and Development (HTML5, JSP, CSS, SASS, BootStrap, JavaScript, Images)
- User Interface and Experience (UI/UX)
- Web Browser version testing
- Disclaimers, Hedges and Legal Prospectuses
- Links to Social Media websites

The company's ConneX website (Intranet Home Page) was already created using AEM and has received positive reviews from customer relationship managers, customer representatives, marketers and other non-technical business partners for its intuitive interface, conveniences and functionality that makes a pleasant web authoring experience.

This document is a report on how the migration of the Participant website was analyzed, orchestrated, designed and implemented from the limited functions of Vignette 7, to the new

and more dynamic and low level reaches of AEM and the benefits and challenges of using both systems.

Review of Other Work

Many companies will eventually be faced with the challenges of having to deal with a web framework and content management system that has become outdated. They either face the plight of having out dated technologies in their infrastructure that is at risk of network and cyber-security risks, an outdated and unappealing website, out of step with modern advertisement and marketing standards and web building and management tools that are clunky and unintuitive (Wentworth, 2014). Remember when Flash videos and websites were the big trends on the World Wide Web about ten years ago? Not anymore. Trends come and go and what was yesterday's leading and cutting edge technology can become tomorrow's legacy product. Having a legacy CMS can be costly, risky and time-consuming.

Take Vignette of example, the entity that invented the term Content Management System (Gottlieb, 2013). When they first launched in 1995 the goal of co-founders Ross Garber and Neil Webber was to make web publishing easier and more personalized (Spencer, 2000). For a long time they were the leaders in the software industry providing web platforms to some of the biggest company websites in various industries from technology, entertainment, banking and more. They offered both technical and non-technical users the ability to create, edit and publish websites faster and easier without having to depend as much on the developers in the IT department. Then the internet grew and technology evolved to the point where much more is expected of our service providers in terms of how we communicate and how fast customers expect to be served. Now there is social media, instant messaging, online banking and e-commerce on laptops, smart phones and tablets. Eventually Vignette, and other CMS platforms

like it, was considered to be slow, the interface too complicated and hard to learn, and they could not compete with newer CMS companies offering advanced technologies that integrate HTML5, CSS3, jQuery, Bootstrap and Java into their applications for building responsive websites after a few clicks of a mouse. Vignette was bought out by OpenText in 2009 and even they recognized this growing need and released Web Experience Manager (WEM). WEM offers all the bells and whistles of responsive design with more intuitive and easy-to-use web building tools with features for Customer Relations Managers responsible for targeted marketing, customer analytics, management of videos, images and documents, customer interaction and compelling user experience.

This is where the website migration and recreation comes in for many enterprise and small websites that must keep up with the advancement of technologies for the demands of customers and the expectations in the age of instant “selfies” posted on social media outlets like Facebook and Twitter. Users of leading CMS like WEM, Drupal, SiteCore and AEM can now easily take advantage of these same social media sites to instantly reach a mass audience by posting news feeds, ads and announcements on their latest service or product.

An example of a successful website migration from a legacy CMS to a modern alternative, AEM, is First Financial Bank (Nguyen, 2014). The bank previously had a non-responsive website that needed to be redesigned and updated for all the modern perks. It would have cost them a lot of time and money to hire or contract system administrators and developers to rebuild on the platform they were using, which was probably Vignette or TeamSite, and the IT department would have to be expanded to spend countless hours focusing on web content rather than more critical network, data and security issues that banking and financial establishments require. In the old service provider that hosted First Financial, Chris Nguyen, the senior marketing manager on the AEM team, stated that the bank was at risk of

network security breaches as they dealt with patches and reports and other issues almost every day. First Financial's new website looks great and thanks to AEM's personalized targeted marketing, analytics and more they can keep up to pace with larger banking competitors (Nguyen, 2014). They selected AEM over two major CMS known for the banking industry but it was Adobe's deep understanding of First Financial's requirements that won them over.

The UK based consulting and financial advisory company, Deloitte, recently completed a larger project and overcame the looming challenge of having multiple websites for more than 150 countries around the world, supporting multiple languages, hosted in an outdated platform. Under the umbrella corporation Deloitte Touche Tohmatsu Limited (DTTL), Deloitte provide audits, consulting, financial advisory, risk management, tax and related services to select clients. Having a vast global presence with locally specialized experts in each territory is one of Deloitte's greatest strengths but this resulted in varied web building skill sets that resulted in inconsistent user experience for website visitors and content managers. Keeping track of all their customer trends in every territory for personalization purposes also became problematic. They needed one authoritative online source for information that all other subsidiary websites can relate to, while maintaining a consistent global brand (McGarth, 2015). With AEM Deloitte underwent a complete redesign and transformed there whole online presence and personality.

“From a broad perspective, we wanted to be much more accessible from mobile devices and understand as much about our customers as possible,” says Barbara Venneman, Deloitte Digital Principal and Global Digital Marketing Leader of Deloitte Consulting LLP. With the migration to AEM they were able to achieve their goals.

We’re now delivering a much richer digital experience and presenting appropriate content on the fly. Even though we have so many different sites in so many languages,

our online experience is now one of the most effective ways to build our brand and drive global demand (Venneman, 2015).

As we can see, companies are having a lot of success migrating and rebuilding their enterprise websites to AEM with positive results and vast improvement to their internet presents, customer satisfaction, reports of non-technical users and IT professionals having “fun” building websites with the intuitive AEM user interface. Adobe has cited in their website and white paper reports testimonials from several other companies in various industries: HealthNow, FirstEnergy, Kate Spade Saturday, Time Warner Cable, University of Phoenix, Caesar Corporation, and TE Connectivity to name a few out of hundreds of satisfied customers.

Web Developers like Simon De Schutter from Euroscript.com point out 6 reasons why they love AEM (De Schutter, 2015):

1. **Project Dashboard:** Editors can manage one or several projects through a central environment that are linked together and represented by tiles. Users can associate websites, assets external links project information team information and tasks with their projects.
2. **Digital Asset Management (DAM):** Users can store and manage various types of assets such as images, videos, and documents in a comprehensive folder structure, and drag and drop them into any part of the website they desire.
3. **Content Editing:** Blocks for text fields and images can be easily dragged and dropped into sections of the canvas to build a webpage. This way of editing is similar to the popular WYSIWYG text editors.
4. **Adobe Marketing Cloud Integration:** Marketing to a targeted audience or client is much more streamlined with all the other products in the Adobe Marketing Cloud such as

Adobe Analytics, Adobe Campaign and Adobe Target making AEM very powerful and extensible.

5. **Out of the Box Components:** These pre-installed blocks or components decreases the development costs as most of the functionalities are already written, resulting in faster delivery time for projects.
6. **Personalization:** Content can be filtered depending on the profile or demographics of the site visitor. Information is captured about the visitor's location, relationship to available products, usage history, search history and more which automatically trigger the system to make suggestions to the client like offer discounts, suggest other products or services, etc. Customer Relations officers can also use this information to make additional responses to the client.

There is also the option to launch CRXDE Lite, AEM's integrated development environment (IDE) designed for true developers to look under the hood and edit the HTML5, CSS, JavaScript, XML, JSP and Java code if desired. The CMS also uses the robust database distribution of MongoDB to store the vast quantity of assets (Adobe, 2016).

In a survey conducted last year in 2015 by The Forrester Wave has ranked AEM – with SiteCore – as the number one “Leaders” in the field of CMS software, stating all the points mentioned above (Schadler, 2015). The survey adds “Adobe has built the best portfolio for companies with the greatest marketing need.”

Project Rationale

In light of the scenarios described earlier, after several meetings with the upper-mangers and directors of ZoZiva Financial, they came to a unanimous decision that they should switch from the legacy CMS system Vignette 7 to Adobe Experience Manager. Other systems were also researched and considered like WEM8 and SiteCore but AEM came out on top for its

continued positive reviews and adaptability to the technological and marketing needs of ZoZiva. Vignette has limited functionality and it can only target participants/clients at a general Plan level but not Participant level. This means it can only target a client based on the type of savings or retirement package they have enrolled/signed up for, in contrast to the ability to assist clients the way AEM tools/options allow, based on demographic information in their account profile, such as, their age, interests/hobbies, children in high school or college, special interests or needs, home owner or renter, etc. If they would have continued using Vignette much longer the company would experience tremendous loss of engagement of its clients, lose the opportunity of gain new participants and therefore the company would lose money and be surpassed by its competitors. With AEM the company can now maintain and even revitalize its online presence with the engagement of new and old participants and their Customer Relations Managers (CRMs) being able to contact and assist the participants in a more intuitive and interpersonal level. These CRMs and marketers who use AEM to update sections of the Participant website have learned how to use the site manger quickly and have grown to enjoy using it.

Vignette's system also posed a security risk to the ZoZiva network. The legacy Vignette CMS is not updated anymore by OpenText, the company that owns it. With cyber-attacks, new viruses and hacking accruing everyday this is not a good situation for a financial institution, or any company for that matter. Computer hackers are constantly developing new ways and techniques to penetrate systems and networks and compromising data for their own malicious reasons. Recently there were data and network security breaches that made headlines in the news, namely Sony, JP Morgan Chase and Target come to mind. The AEM system is fairly new and constantly being updated and managed by Adobe and like most software application

companies will do these days, often updating and deploying security patches and hotfixes to all clients who installed their software packages.

The Vignette interface does not allow for fast and intuitive interaction like the AEM interface, although in the 1990s when it was first released it was considered to promote fast and easy web creation at the time. AEM's interface is much more intuitive and includes drag and drop features where blocks can be placed for the various sections of a webpage, the header, body, sidebar, footnotes, image and videos.

Also, to keep up to date with the trends and techniques of modern communication the executive managers and other top decision-makers of ZoZiva had to move forward with the upgrade to AEM. AEM has the tools that allow easy communication through their clients' personal email, and to the public through Facebook, LinkedIn, WordPress, Twitter and more.

Systems Analysis and Methodology

ZoZiva Financial's non-technical users like customer relations managers (CRM) and marketers used the Vignette 7 CMS on PC workstations on Windows 7. Some personnel used dual monitors at their work stations at their desk and a few used PC laptops to travel with or work from home. Technical users like web developers, UI developers and other IT associates also used Vignette to make more complex updates in the infrastructure of the website. Many did not use Vignette but are Web Services specialists that perform hard coding and programming on the WebSphere and Apache Struts platform to build parts of the website for backend functionality and data merges. Because of the limitations of Vignette many times IT and Web services department had to be contacted by CRMs to make updates to front-end sections of the website that are "client facing" to the public. These front-end client-facing sections of the website are mainly the login page, articles, about the company pages, educational and informational pages, privacy notices, security pages, advertisements and

promotional pages and more. These page sections are the ones that CRMs need to monitor the most and be able to keep track of and be in communication with their clients/participants. They also need access to upload web banners, ads, and videos that feature commercials to promote ZoZiva services and feature interviews of portfolio managers giving fund and economic reports.

The **Agile Software Development methodology** in the Scrum framework was used to complete this vast task from start to finish. Agile Software Development is a set of principles for software development in which requirements and solutions evolve through collaboration between self-organizing, cross-functional teams (Collier, 2011). This process involves working in collaborative teams to solve a solution/complete a project by breaking the tasks into small increments, in iterations of small time frames called "Sprints". In an enterprise long term project like this one the Scrum Master directed the team to complete particular parts of the website or functionalities within specific time frames, or sprints, of about 2 weeks each. At the end of 2 weeks the team evaluated the progress they've made on the particular element before moving on to the next part of the website. When the first deliverable was complete they moved on to the next part for the 2nd sprint. If the first part was not complete they moved it over to the second sprint if possible. If the first deliverable did not affect the second one, then they began the second deliverable in the next sprint. When the first and second deliverables were completed in the second sprint they moved on to the third sprint, and so on until the whole project was complete. The project did not go out of scope or over budget.

There were be about 20 associates and contractors involved in this project. Some were be stationed in a special room called the Agile Room. Others converged from different departments and teams within ZoZiva Financial. Sometimes they reached out for assistance from developers or SMEs from other departments that were not directly involved in this project. Occasionally, developers/specialists from another department came and sat with one

of the developers in the Agile Room for a few hours or they collaborated by phone conference or by instant messaging in Skype for Business until a particular problem is solved.

Job titles and roles included:

- Product Owner
- Scrum Master
- Business Analysts
- UI Developers
- Java Developers
- Database Administrators
- Data Analysts
- Test Engineers
- Systems Engineer/Architect

Each day during a sprint, for about 30 minutes the team held a daily scrum (or stand-up meeting). During the daily scrum, under the direction of the Scrum Master, each team-member stood up and gave an update on the progress of their responsibility in the project. They gave updates of the following:

- What did I do yesterday that helped the development team meet the sprint goal?
- What will I do today to help the development team meet the sprint goal?
- Do I see any impediment that prevents me or the development team from meeting the sprint goal? (Wikipedia, 2016).

Some days became intense and stressful sometimes but the Scrum master knew how to encourage his team and had moments of fun and refreshments, even had them play a short

game, or had everyone give a short shout-out of appreciation to someone in the team who helped them with a task during the current sprint.

Goals and Objectives

The goal of the company owners and upper management was the migration of the Participant website from the older Vignette 7 to the new dynamic Adobe Experience Manager which was met with success as it provided more intuitive website management and more targeted participant/client involvement. This allowed Customer Relationship Managers the ability to serve their customers as their potential needs were automatically brought to the attention of all parties involved and therefore provided a more holistic customer-satisfaction. Positive customer experience and satisfaction encouraged customer retention which in turn promoted positive company reputation as a sensitive, timely and reliable financial establishment. More satisfied and new customers/participants signing up for retirement and saving packages meant more monetary growth for the company as well. With more money ZoZiva was able to improve its resources, expand its horizons and serve the local and global community more effectively.

The **first objective** was to plan the structure of the website. The plan was a success as decisions were made on whether to match the structure and hierarchy of the web pages as it is in Vignette 7 or if it should be changed or modified. The Architect was one of the main persons responsible and in charge of this task. He was not alone but recruited a Senior Java Developer and a Database Manager to assist him. They used the website architecture software Visio to render diagrams and blueprints.

The **second objective** was to design the front-end look of the webpages. Web designers and developers, the UI/UX Developers, collaborated to discuss the cosmetic design and layout of each webpage. That was the color scheme, graphic images, header, title, banners, buttons, etc. Since the website is responsive they implemented then test the website layout on smart phones and tablets as they designed in Qual (testing) environment. Designs were first done on paper to produce comprehensive drafts of each page. The UI Developers used pencils on paper, Adobe Photoshop and Illustrator.

The **third objective** was the implementation stage where the developers built each webpage into a comprehensive website. UI Developers built the website using AEM/Adobe CQ5 tools and its IDE system, CXDRE Lite. Using the drawings and UML drafts as guidelines the developers used their design and coding skills in HTML5, CSS, JSP, Java, XML, Bootstrap, JavaScript and jQuery to build the website. A few AEM training sessions were held for developers who had no experience developing in AEM. Four UI Developers were assigned to take on these tasks. 15 webpages were built for the Participant website. This does not include the other parts of the ZoZiva websites that were already built in AEM or coded in Apache Struts by another web services team.

The **forth objective** was to ensure database connectivity to all appropriate web pages and database storage of digital assets (images, videos, documents, etc.). The Participant website is mostly client-facing website but there is some connectivity to database heavy pages such as the Workplace Retirement website which is mostly built in Apache Struts framework. For these pages developers were be skilled in Java, XML, and SQL, with an understanding of the Adobe's Digital Asset Management (DAM) feature, and knowledge of new modern database technologies like JCR and MongoDB.

The **fifth objective** was met as they maintained communication with the Customer Relations Managers and other personnel who are now the “web authors”— non-developers who will be creating pages, uploading assets like images, banners, videos, pdfs, documents, etc. This was the job of the Product Owner and Business Analysts who were successful in making sure the website was built as planned and the functions and interface is intuitive enough for the people using it on a regular basis. They understood and provided the needs of the customers, in this case the CRM, marketers, portfolio managers, sales representatives, and Audio-Visual department.

The **sixth objective** was to have all webpages and code reviewed and tested by the Architect and Senior Java Developers. All the developers submitted whatever work and code they did each day for inspection, review and quality control before deploying to “Dev” or published live to the public. They inspected all Java, JSP, HTML5, BootStrap and jQuery code to be sure everything was structured and connecting to the correct pages and data. They also paid close attention to code formatting and legibility.

The **seventh objective** was to maintain open communication with everyone involved in the project, inside and outside the Agile Room. The team was successful in demonstrating decency, respect, and professionalism at all times and had fun doing the work and learning new things everyday on the job. Collaboration was the key to success. They remembered the key principles of Agile Software Development.

The **eighth objective** was to perform testing and debugging of all the webpages and functionalities on all platforms and devices: desktop, laptop, tablet and smart phone. This objective was successful as they had scheduled screen test sessions with the Test Engineers and ZoZiva associates who used AEM and its tools for target marketing, uploading banners, ads and videos, gathering analytics on participants who logged in and who responded to sections of the

website and to special financial savings deals, for example. The agile team was ready for customer feedback and were available to make changes or corrections.

The **ninth and final objective** was the project closeout stage after all the pages were created and tested in AEM and deployed into the “Dev” server, the development team was ready to present the final website to the product owner who in turn presented the completed Participant website to the stakeholders, which included upper management and the Chief Information Officer (CIO). The product owner successfully bridged the communication gap between the agile team and the stakeholders and he demonstrated the skills and techniques to effectively learn and understand all of their needs and presented the final website/product to the satisfied stakeholders.

Project Deliverables

There were **nine objectives** in this project and the following **deliverables** were achieved successfully for each one:

The **first objective** was to plan the architectural structure of the Participant website. The end result was the production of illustrated and computer generated diagrams and flow charts of the website, that demonstrated how all the webpages interconnect with each other, the databases and existing webpages that have already been built in AEM and Apache Struts. This objective was spearheaded by the Architect in the team. Scheduled meetings with the Product owner, Stakeholder, Architect, DBAs, Business Analysts, Java Developers and UI Developers were important for this stage which produced effective deliverables. Diagramming and vector rendering software Microsoft Visio was used to construct the website architecture that show the web pages labeled, with each one of these functions, and where they fit in the grand scheme. Key text phrases, technologies, programming languages and codes were also labeled

on the Visio diagrams and in separate notepads for more detailed descriptions and break downs. Details on the front-end design, look and feel of the website were not discussed in detail at these initial meetings. White boards and PowerPoint presentations were also utilized at these meetings for larger display to everyone in the room. The Architect shared the deliverables from this objective with the rest of the developer team and the Scum master in the stand-ups, group meetings and individually as everyone got on the same page as to how the website will be built, laid out and connected to each other before beginning their tasks. There were no major changes done to the web pages or their positions on the architectural scheme after they started creation, but developers were ready for the occasional unexpected changes as is normal in Agile Software development methodology.

For the **second objective** the deliverables were for the Architect to work with the UI Developers to design and develop the front-end design and layout of the webpages. This was based on the architectural structure of the website that was discussed and agreed upon in objective number one with the project owner, architect and senior java developer. The UI Developers used pencil, pen, markers, paper and white board to sketch out the layout of key and subsidiary pages, outlining the header, body, footer, side bar for ads and text. Mockups were constructed in Adobe PhotoShop and Illustrator (depending on developer preference) to produce the most comprehensive visual composition of website templates before implementing in HTML and the AEM platform. Colors, text for body and section copy, pixel size for each part of the page and responsive functionality were also taken in consideration to minute details. They also designed what the pages will look like in the three media platforms for responsiveness on laptops, tablets and smart phones. The developers had an idea of what the website looked like when they are complete but in some instances they deviated a bit for

the draft as they made necessary adjustments in AEM as it fit best for a particular template or webpage.

For the **third objective** the main deliverable was be the implementation stage where the UI Developers built and developed the templates for the front-end design and layout of the webpages based on the drafts and prototypes discussed in the first objective. In the legacy Vignette 7 CMS the ZoZiva website was already created with its own color scheme of blue, gray and purple, Arial fonts branding and “ZZ” logo. Most of the colors and branding did not change much when they rebuild in AEM but the layout and design did to change to correspond with the new responsive design features that were now be implemented into the website. They took layout into consideration for display on desktops, laptops and various sizes, tablets and smart phones. Building in Adobe CQ5, another name for AEM based on the origin *Communique5* web content management system it was built from in 2002, is very easy and intuitive for webpage layout and responsiveness. Although the tools in AEM make it easy to drag and drop elements into a web page, the UI/UX Developers still had to go into the advanced features for editing the HTML5, CSS and JavaScript, Java, JCR nodes and Bootstrap code in the AEM's built in integrated development environment (IDE) called CRXDE Lite. This technical task was performed in approximately 50% less time than it would has taken to complete in Vignette and other older CMSs (Adobe, 2013, page 8).

In **objective four** one of the deliverables was to ensure database connectivity to all appropriate web pages by having the three DBAs on the team review the current databases and determine if the data tables need to remain the same, or updated with new rows and columns. They also determine that new servers were needed to handle the extra data needed when new customers visit and sign up with new accounts. Two new servers were installed by the Data Canter during the timeline of this project. There was an issue that arose for the first week after

the servers were installed as they were down and not responding to user names and passwords entered into the login page. During the second week this issue was resolved by the data center. AEM is integrated with Java Content Repository (JCR) database and MongoDB to store data and assets like videos and images so this made the task for DBAs a lot easier as they did not have to manually create tables for more data storage. Another deliverable is the Data Analysts successfully collected the data using Adobe Analytics, which is part of the Adobe Market Cloud suite that AEM is also part of. Analytics is used to keep track of customer interaction, website navigation history and engagement to determine faster target marketing as compared to the Vignette 7's methods. AEM's JCR database is dynamic and scalable and does not use SQL code to build and manage tables, so the traditional role of the DBA was not needed for this part of the project but they stood in as "customers" of the input fields in the login page to assist the Data Analysts in testing the data collection using Adobe Analytics. JCR is also has a unique layered structure and is more secure, making it harder for the attempts of database hackers to access the data (Adobe, 2015, p. 2). The DBAs dedicated more time to focus on SQL database connectivity in other sections of the ZoZiva website that does not use AEM but Apache Struts and WebSphere.

For the **fifth objective** the Product Owner and Business Analysts (BA) communicated with the non-technical representatives in Customer Relationship Managers (CRM) which included Marketers, Customer Support/Service and Sales Department. BAs met and interacted with these personnel to find out what type of user interface is be easiest to use and navigate, and the goals they would like to achieve in their respective roles using AEM to do their jobs effectively. Information gathered from them determined the best design and layout for the webpages and required some testing by the CRM associates. Marketing used Adobe Marketing Cloud's Target and Analytics to analyze customer interaction and experience with the landing

pages and target them personally based on navigation, searches, clicks and time spent in the specific pages. They worked with the BA, who in turn related the information from Marketing to the UI Developers on how the web template should be created to best optimize the participant web experience. They accomplished their goal by increasing the conversion rate of potential customers and site visitors to actual new participants that were enticed to sign up for a service of financial package. Also current customers were rewarded by being offered special deals and savings. Marketing was able to learn how to administrate the relevant Participant web pages for future potential client conversions.

The Sales representatives work in tandem with the Marketers to coordinate and prepare sales promotions based on client demographics in their account profiles. They were also taught how to use AEM to manage pages for example, the page offering College Saving Plans to a new client who indicates in their profile they have a child of a certain age, or they may be encouraged to contribute more to their retirement plan. They learned how to optimize client profiles to offer assistance on adopting a child, and ones that were planning to purchase a new home. Marketers and sales reps easily learned how to create pages in AEM by dragging and dropping text fields, image banners, videos and audio clips to convey their message and service to the client.

The Customer Services representatives of the CRM group were also be taught by the BA's how to manage client-facing webpages in the Participant website if they needed to make quick updates to the Frequently Asked Questions, Forms, Contact Us page, company phone number and email, etc. The developers used the information gathered by the BA to build the right template for the specific purposes mentioned above for CRMs of all types. The UI Developers were successful in programming and coding in the CRXDE Lite repository, where the HTML5, JSP, Java, JavaScript, CSS, Bootstrap and XML coding was implemented accordingly.

Objective six called for all code to be reviewed by the Architect and Senior Java Developer. This is a very important step for both the UI developers and the reviewers. Sometimes the developers forgot to submit their new and updated code for review, or waited wait a few days after performing a significant amount of code revisions before sending it off for reviews. This was not acceptable to the Architect as he prefers to review code changes as soon as possible no matter how little amount of code variation. Sometimes the slightest coding error can cause an application or the whole website to break, which can lead to many hours of debugging to figure out what caused the error and then fix it. The Architect has many years of experience building and managing enterprise website infrastructure including programming in some languages and on various platforms. The Senior Java Developer is also a master in her field with many years of experience and credentials in Java and all other web development technologies relevant to the project and therefore has a keen eye and knows what to look for in the codes. She is also very familiar with the website architecture and knows where all the connectivity links to. When errors or concerns were found with syntax, functions, methods, formatting, design, etc., the developers were informed and instructed on how to fix the code. The Architect and Senior Java Developers often sat with the developers to assist them in correcting the code and design. They also reviewed code for other sections of the website that was constructed in Apache Struts and not in AEM, so there was a ton of work cut out for them.

Objective seven was integrated into all the other objectives which encourages everyone involve in the project to put their best foot forward, be polite and professional and remember the principles of the Agile Manifesto.

Our highest priority is to satisfy the customer through early and continuous delivery of valuable software. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage. Deliver working

software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale. Business people and developers must work together daily throughout the project. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done (Kent, et al, 2016).

The Scum Master was successful in keeping the team motivated and on track with their goals, objectives and deliverable for each sprint until the end of the project. Everyone in the team performed their duties as expected, worked together, asked questions and learned from each other which created a desirable environment to work in, even during challenging moments.

For **Objective eight** the website was in the hands of Test Engineers, DBAs, and representatives from the different areas of CRM to perform testing of all the components of the web pages. This took several sessions of testing and providing feedback with returns to the developer's station for fixing and then testing again. The website was successfully be tested for functionality, user interface and experience and also tested for the reactions and feedback from CRMs if they can use the AEM tools to manage and build webpages themselves. There are fifteen main pages, plus other subsidiary pages connected to them that add up the about thirty-five webpages total, in the website so all the pages were not completed at the same time. They were tested soon after completion, reviewed and approved by the Architect, before and after being published live. If the stakeholders and CRMs were satisfied with the over all website with little to no complaints. If they were not satisfied with any part of the website, AEM/Adobe CQ authoring tools, user interface or functionalities the developers and everyone in the Agile room were ready receive feedback and instructions to make the updates. That's one of the scenarios expected in Agile Software Development as stated in the 2nd principle, "Welcome changing

requirements, even late in development. Agile processes harness change for the customer's competitive advantage.” (Kent, et al, 2016).

The Product Owner and Business Analysts successfully scheduled sessions with employees from CRM, including the sales reps, marketers and customer service reps, together with other ZoZiva employees, to stand in as potential and current customers and website visitors. They successfully tested the following elements:

- Navigation to and log in to the Participant Website login page with username and password.
- Marketers used AEM to make changes to images, banner ads, and other assets like videos and audio. Reported any issues or bugs.
- Had Sales representatives use AEM to create and update promotional offers and packages. Reported issues or bugs.
- Had Marketers and Sales reps perform targeted promotional offers and services base on customer demographics.
- Had Marketers upload to the AEM Digital Asset Manager: image, photos, videos and audio. Reported issues if any.
- Marketers updated educational pages like News, Articles, Privacy Notice, etc.
- Had Customer Service representatives use AEM to update the FAQs page, forms, Contact Us and About Us pages.
- Had Data Analysts use Adobe Analytic to retrieve, collect and analyze customer interactions.
- Had all parties test the webpages is various web browsers like Chrome, FireFox, Internet Explorer on the PC, and Safari on the Mac.

- Had all parties test responsive design on desktops, laptops, tablets, and smart phones on both iOS and Android platforms.
- Had Marketers use AEM to optimize social media buttons and connectivity to Facebook, LinkedIn, Twitter, YouTube and more.
- Had all parties try to use AEM as a website author by making updates and building pages on the different devices, mainly laptops and tablets,
- Had CRM representatives use AEM authoring tools to make changes to webpages on laptops, touch screen laptops and tablets to emulate the experience of having to make changes while traveling on the road for presentations and campaigns.
- All parties reported and gave feedback on general user interface, user experience, front end design, color, speed of data retrieval, responsiveness to various screen sizes, etc.
- All parties tested the input in forms, comments, IM chat and email features in all browsers, platforms and devices. Reported issue and errors.
- Had a Certified Penetration Tester (CPT) perform penetration tests on the new website and the data repository. Reported strengths and vulnerabilities detected.

The comments and feedback for all these points helped the developers know if all their hard work produced the expected results and if more hard work was expected of them. The whole team continued working until the customer was completely satisfied, no matter how long it took, as long as the project was not out of scope or over budget.

The **ninth and final objective** was the Project Closeout process. After building all the pages for the Participant website, implementation and testing, the Product Owner presented the final product to the stakeholders, which included upper management of ZoZiva Financial. He met with the executive board in a conference room that was equipped with a big screen projector and company owned laptops, tablets and smart phones to present the Participant

website on multiple platforms. A few personal laptops and tablets were also used and connected to the company's Wi-Fi for testing the website. The Product Owner was accompanied by a Business Analyst, the Architect and a Lead Developer to this crucial meeting. They interacted with the stakeholders as they guided them through the Participant website as it was projected on the big screen while they also browsed it on mobile devices. They listened and observed the stakeholders feedback while they took notes of the positive and negative reactions and comments received. It was mostly great positive feedback that they took back to the Agile team of the minor fixes and updates needed and then published the website live from Dev (Development) to live for the public. They agreed to release the website in increments of two to four pages at a time rather than wait for every single page to be complete to launch all at once. Documentation on the project history, accomplishments, milestones, challenges and instructions manuals was produced by the team, collected by the Business Analysts and stored and kept in an accessible location. Electronic copies were archived and hard copies printed. When all the pages were completed and approved by the stakeholders the development team in the Agile room definitely celebrated with potluck lunch and Happy Hour after work.

Project Plan and Timelines

Project Deliverable or Milestone	Duration	Actual Start Date	Actual End Date	Actual Duration
1. Plan website architecture	2 days	10/1/2015	10/3/2015	2 days
1.1. Drafts and UML Diagrams	1 day	10/1/2015	10/2/2015	1 day
1.2. Meeting with Team	1 day	10/2/2015	10/3/2015	1 day
2. Front-end UI Design/Planning	3 days	10/3/2015	10/6/2015	3 days
2.1. Drawing/Sketches	1 day	10/3/2015	10/4/2015	1 day
2.2. Comprehensive Mockups	2 days	10/4/2015	10/6/2015	2 days

3. Implementation	90 days	10/6/2015	1/6/2016	90 days
3.1. Build Page Templates	5 days	10/6/2015	10/11/2015	5 days
3.2. Build webpages	90 days	10/6/2015	1/6/2016	90 days
4. Database and Asset Management	5 days	10/21/2015	10/26/2015	5 days
4.1. Upload images, videos, documents, etc.	5 days	10/21/2015	10/26/2015	5 days
4.2. Test Data Connectivity	5 days	10/21/2015	10/26/2015	5 days
5. Communication with CRMs	3 days	10/26/2015	10/29/2015	3 days
5.1. Markers	1 day	10/26/2015	10/27/2015	1 day
5.2. Sales Representatives	1 day	10/27/2015	10/28/2015	1 day
5.3. Customer Services	1 day	10/28/2015	10/29/2015	1 day
6. Code review	30 days	10/29/2015	11/29/2015	30 days
6.1 Review HTML5, JSP and CSS	30 days	10/29/2015	11/29/2015	30 days
6.2. Review Java codes	30 days	10/29/2015	11/29/2015	30 days
6.3. Review JavaScript, BootStrap code	30 days	10/29/2015	11/29/2015	30 days
7. Collaboration on the project	7 months	10/1/2015	4/1/2016	7 months
7.1. Communication	7 months	10/1/2015	4/1/2016	7 months
7.2. Job Responsibility/Roles	7 months	10/1/2015	4/1/2016	7 months
8. Testing and Debugging	5 days	3/25/2016	4/1/2016	5 days
8.1. Test login	1 day	3/25/2016	3/26/2016	1 day
8.2. Test AEM DAM	1 day	3/26/2016	3/27/2016	1 day
8.3. Test Adobe Target	1 day	3/26/2016	3/27/2016	1 day
8.4. Test Update to Educational pages	1 day	3/26/2016	3/27/2016	1 day
8.5. Test Adobe Analytics	1 day	3/26/2016	3/27/2016	1 day

8.6. Test in different browsers	1 day	3/25/2016	3/26/2016	1 day
8.7. Test in various devices	1 days	3/25/2016	3/26/2016	1 day
8.8. Test Responsive Design in all Devices	1 day	3/26/2016	3/27/2016	1 day
8.9. Perform Penetration Test.	5 days	3/25/2016	4/1/2016	1 day
9. Project Closeout	1 day	4/2/2016	4/3/2016	1 day
9.1. Present to Stakeholder	1 day	4/2/2016	4/3/2016	1 day
9.2. Documentation	1 day	4/2/2016	4/3/2016	1 day

Project Development

The Agile Software Development methodology worked very well for this project as the 20 professionals on the team followed the principles of the Agile Manifesto, not in a rigid manner, but as orchestrated organically by the Scum Master. Everyone strived to fulfill their goals and tasks daily so they would have something to share at the daily standup. The hard work and dedication of the development team was instrumental in accomplishing to overall goal and objectives of the project, to migrate the Participant website from the legacy Vignette 7 content management system to the new and improved dynamics of Adobe Experience Manager (AEM). AEM has proven to be a formidable system enabling both technical and non-technical associates alike to create intuitive websites that will attract new customers and retain current ones, increasing revenue and maintaining the positive reputation for the ZoZiva Financial company in the process. They can now stand toe to toe with their other financial and banking competitors like First Financial, Legg Mason and Wells Fargo.

From the initial stages with the stakeholders, planning the infrastructure, layout and design of the webpages with the Architect, Java Developers and UI Developers went very well as the ZoZiva brand was to implementation of the website to testing and final deployment went well despite some challenges along the way. Preliminary sketches and drafts of the webpages were presented and discussed while building mockups in Adobe PhotoShop and in Adobe CQ5/AEM simultaneously until

everyone was satisfied with the front-end design for effective user interface and experience. Responsive design for mobile devices was very important and exact measurements of images and the components in HTML5 semantics were always taken into consideration. The dynamics of CSS, Bootstrap and jQuery were also pivotal. All the UI Developers (Web and Software Developers) quickly learned the ins and outs of AEM's CRXDE Lite to develop all the webpages and the templates.

The Product Owner and Business Analysts were successful in maintaining effective communication with the CRM personnel to understand their needs for how the webpage templates should be built and program the AEM components accordingly for these non-technical associate to become productive "web authors". They soon learned how to build webpages with drag and drop components, manage image, ads, videos and pdfs in the Digital Asset Manager (DAM) and launch their own marketing campaigns with Adobe Target, Campaign and Social.

The Architect and Senior Java Developer successfully reviewed all code submitted to them by all developers as they inspected and tested functions, methods, conditions, connectivity, formatting and legibility before deployment.

The Product Owner and BAs successfully scheduled sessions with employees from CRM, to have them test all the website authoring components, together with other ZoZiva employees, to stand in as potential and current customers and website visitors. They successfully tested all sections of the website, including all login fields, forms, url links, pdfs, videos and in all browsers, OS, platforms and mobile devices.

The Product Owner, BA and Architect presented the completed website to the stakeholders who approved and signed off on its launch to go live for the whole world to see and experience the new Participant website.

Problems Encountered

One of the problems encountered by one of the UI Developers while developing the template for the Login page in Adobe CQ5 was trying to set up the three advertising images for responsive design. In AEM tools a web author needs to upload three different versions of an ad in three varying sizes so

when the webpage is published the browser or device will automatically choose the appropriate image to fit the computer device. In the beginning the system will not allow the upload and display of the three images but only one at a time. The correct functionality should be the 500 x 600 pixel ad image automatically response to computer desktop and laptop screens, the 500 x 400 pixel image fit on tablet screens and the 500 x 200 pixel image fit on smart phone screens. This was not happening and only one image size appeared on all three screen sizes. After a day or two of researching and seeking assistance from a UI Developer from another department the problem was resolved. The solution was to adjust the interface by changing the HTML5 and JSP code in CRXDE Lite so the three images can be uploaded into three different components instead of three different tabs. Now the right image automatically displays on screen depending on if the Login page is viewed on a laptop, tablet or smart phone. See the Appendix 1 for a screen shot of the corrected Login page in Edit Mode with the three image components, Appendix 2 for the same page in live mode on a desktop and laptop computer screen and Appendix 3 for the same page on a Samsung tablet.

Another problem that came up was the random usernames of a previous users who logged in recently, from anywhere in the company, suddenly appearing in the text username text field when someone clicks the mouse cursor in the field. This was a potential user privacy violation issue and a cyber-security concern for computer hackers if the problem was not solved soon. At first it was not known if the problem was in the Adobe CQ5 code or on the server. The team of UI Developers, DBAs and the Architect worked together to figure out what the problem was by searching in the JSP and JavaScript for a "listening event" codes that may be remembering previous user ids. After researching for about 5 hours a UI Developer noticed it was caused by code in the JSP that was previously in the old Vignette website code that behaved differently in AEM. That line of code was removed and the user id field was back to normal, not revealing user ids from previous users.

Another issue that came up was changes to codes not being sent to the Architect and Senior Java Developer for review in a timely manner before deployment. The previous problem with the user ids of previous users appearing is an example of the value of having code reviewed regularly and in a

timely manner. The Architect mentioned an error with a condition that happened with a call to a database because a new rule on methods, if statements and loops that were not reviewed by him on time. He reminded the team during one of the Stand-ups the importance of having all code reviewed no matter how small so to avoid major problems that may arise later on during implementation and Dev stages.

Reasons for Changes

A change was done to that design and layout of the Investments page to improve the user interface/experience for users on all platforms, browsers, tablets and smart phones. The functionality in mobile device was of particular concern for this page because the origin website design encouraged too many clicks in order to view some important privacy, FINRA and prospectus information. The Lead UI Developers noticed that participants logged in on their mobile device are most likely to bypass the information rather if extra clicks are required to view it. The interface was adjusted so the participants will see the information immediately and will have to scroll down to read the rest then check a radio button to confirm the text was read. Then, they must click the OK button to automatically be advanced to the next screen.

Unanticipated Requirements

It was brought to the team's attention during implementation that all public service Websites must be ADA Compliant within the next 18 months. ADA stands for Americans with Disabilities Act and this means all websites must be accessible to persons with disabilities. Websites must be designed, layout and adaptable in a way to allow disabled web users the ability to understand, use and navigate without being obstructed because of their disability. This includes persons with hearing impairment, partial or complete blindness, color blindness, mental disabilities and physical disabilities.

Websites must follow WCAG 2.0 Guidelines. The 4 principles of accessible content are: Perceivable, Operable, Understandable and Robust. This policy is also related to Section 508 Compliance for all government websites and all the UI Developers recently began brief training sessions to learn how websites must be designed, coded and layout for ADA Compliance. This adds another goal and objective

for the new AEM built Participant website since it was not a part of the original goal, budget and scope of the project.

Actual and Potential Effects

Now that the Participant website has been successfully migrated to AEM the company is receiving positive interactions and customer experiences for current accounts. Sales representatives are able to assist their patrons more fully with relevant services and offers. All areas of Customer Relations are able to be aware of a participants/customer's demographics and provide relevant information and assistance. Now the managers of ZoZiva Financial must find the time and funding to train Customer Relations personnel how become effective web authors or how to use and interpret Adobe Analytic, Adobe Target, Adobe Campaign and all the other solutions in the Adobe Marketing Cloud suite. They will also be trained on how to handle and communicate with the increase in new customers that have found and signed up for new accounts because of the improved marketing features in the website that have attracted new participants. With the increase in the number of customers landing on the website the company may also need to invest in new servers to handle the web traffic without slowing down or crashing. Investment into a cloud storage service may be worthwhile to have that scalable data storage. Being ADA compliant will be important in the near future since the company should expect more Participants of various backgrounds and needs, including customers with disabilities, whether it is vision impairment, hearing impairment, mobility impaired, etc. These patrons must also be able to enjoy the experience of a website enhanced by the dynamic features on Adobe Experience Manager which may actually make conversion the ADA compliance much easier.

Conclusion

The migration of the Participant website for ZoZiva Financial from Vignette to AEM was a success with most of the goals and objectives met, which launched a new objective just on the heels of the completion of this project—Make the website ADA compliant. The CRMs are happy with the compelling new interface and the freedom and ease of updating web pages with blocks for text fields

and images that can be easily dragged and dropped into sections of the canvas, and taking control of marketing strategies and campaigns. Web developers are also happy with the features and options in CXRIDE Lite to edit the code for the website front-end design and back-end events and connectivity.

The company has already experienced a 25% increase in new participants signing up for services, based on data gathered from Adobe Analytics and a 35% increase in revenue from targeted marketing using Adobe Target. CRM is now more productive as web authors in Adobe Experience Manager updating web pages and managing digital assets (images, videos, pdf, etc.) on their own without having to contact IT Web Services as much as before. They have improved the company's market and brand perception and gaining time by 40%. They use Adobe Social to identify trends and opportunities to bridge the gap between social interactions and business results by responding to customer conversations in real time (Adobe, 2013). Web and UI Developers now spend more time on other more critical enterprise web technologies and programs.

ZoZiva's Enterprise Security has reported the new Participant website has improved layers of security, with increased protection from hacking and data breaches compared to the vulnerability of being hosted in Vignette. And all the stakeholders and upper-management are happy with the results and outcome of the Participant websites that has been added to the other sections of the website built in AEM. ZoZiva Financial is looking forward to a bright future using the entire Adobe Marketing Cloud package and all it have to offer.

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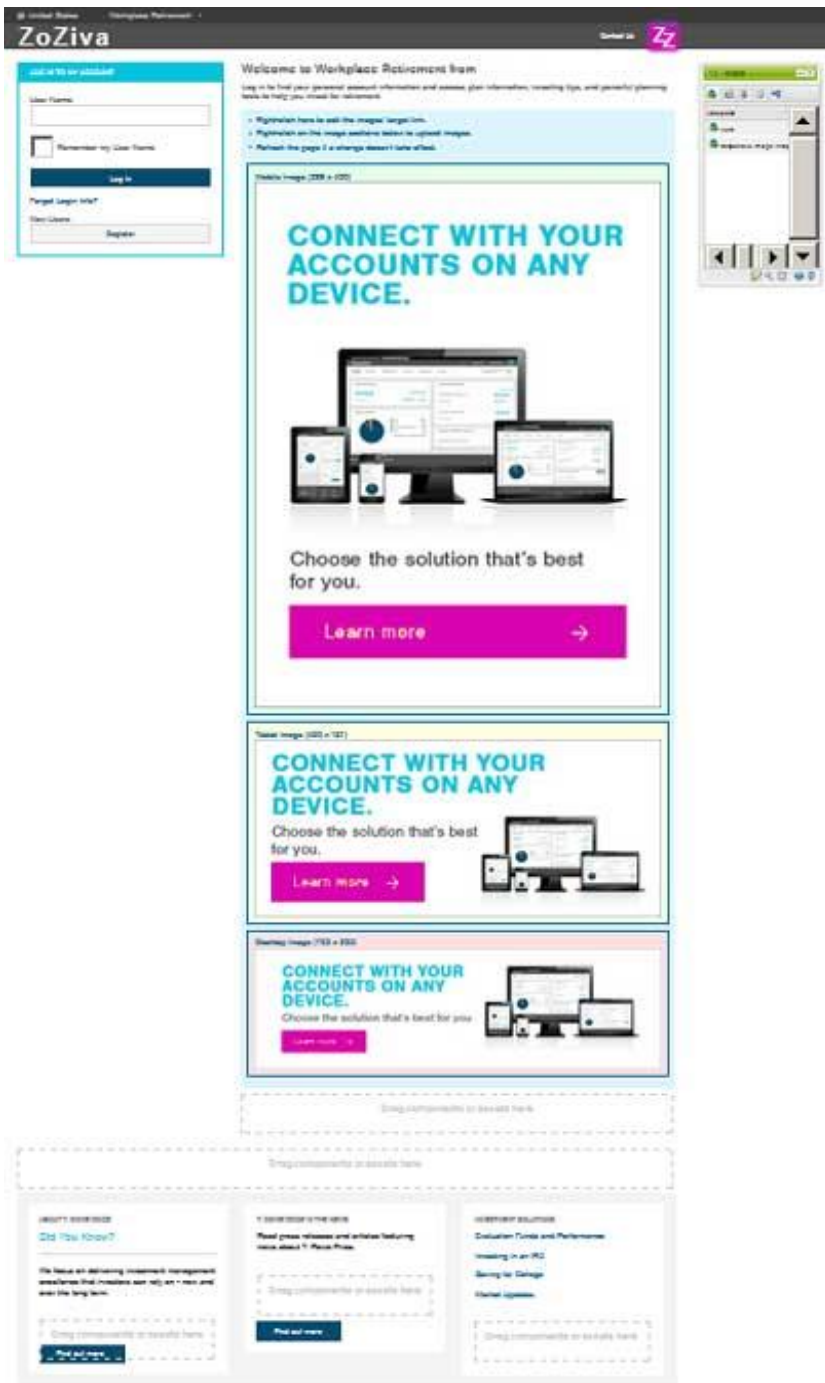
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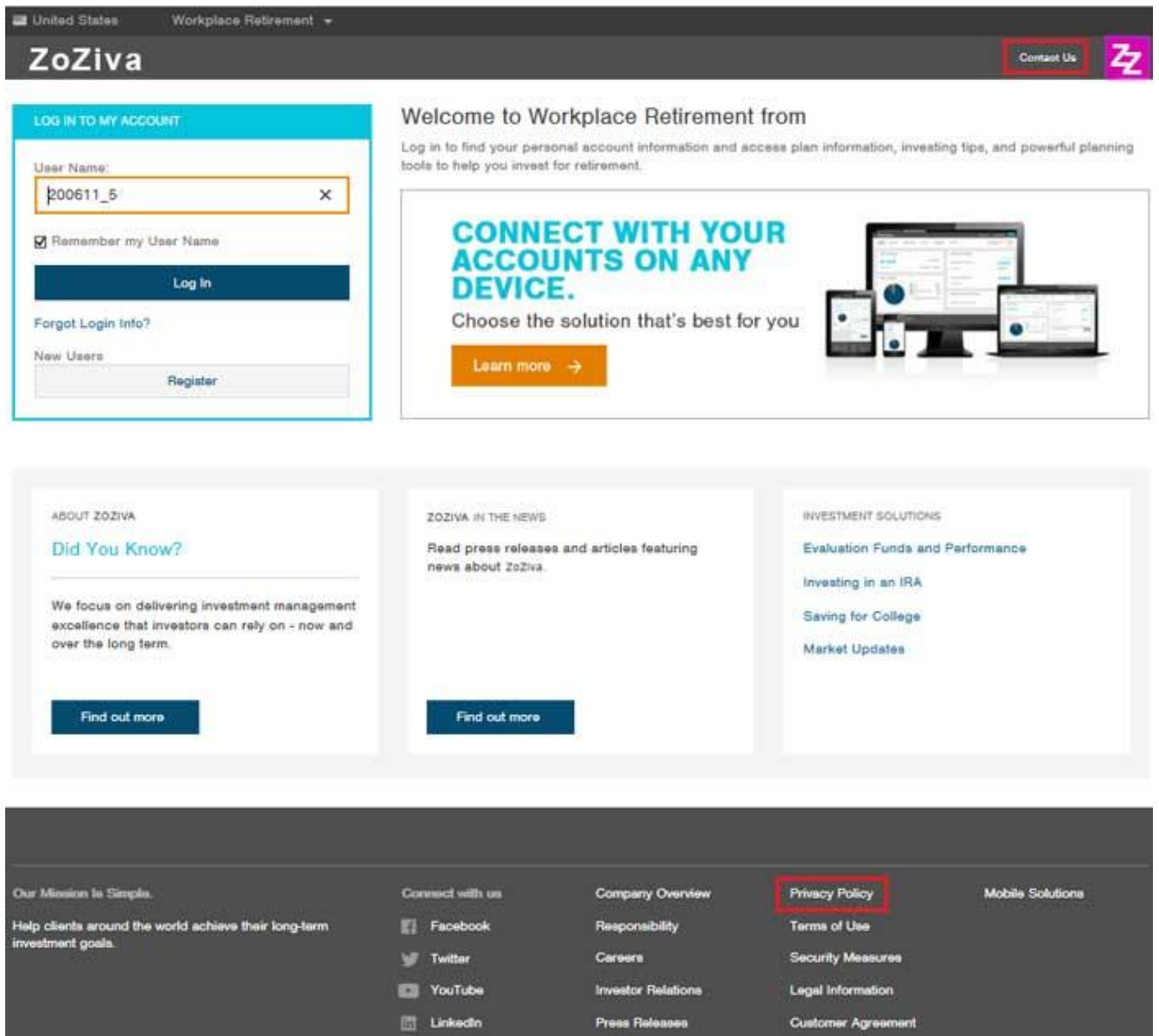
Appendix 1

ZoZiva Login Page in Edit Mode



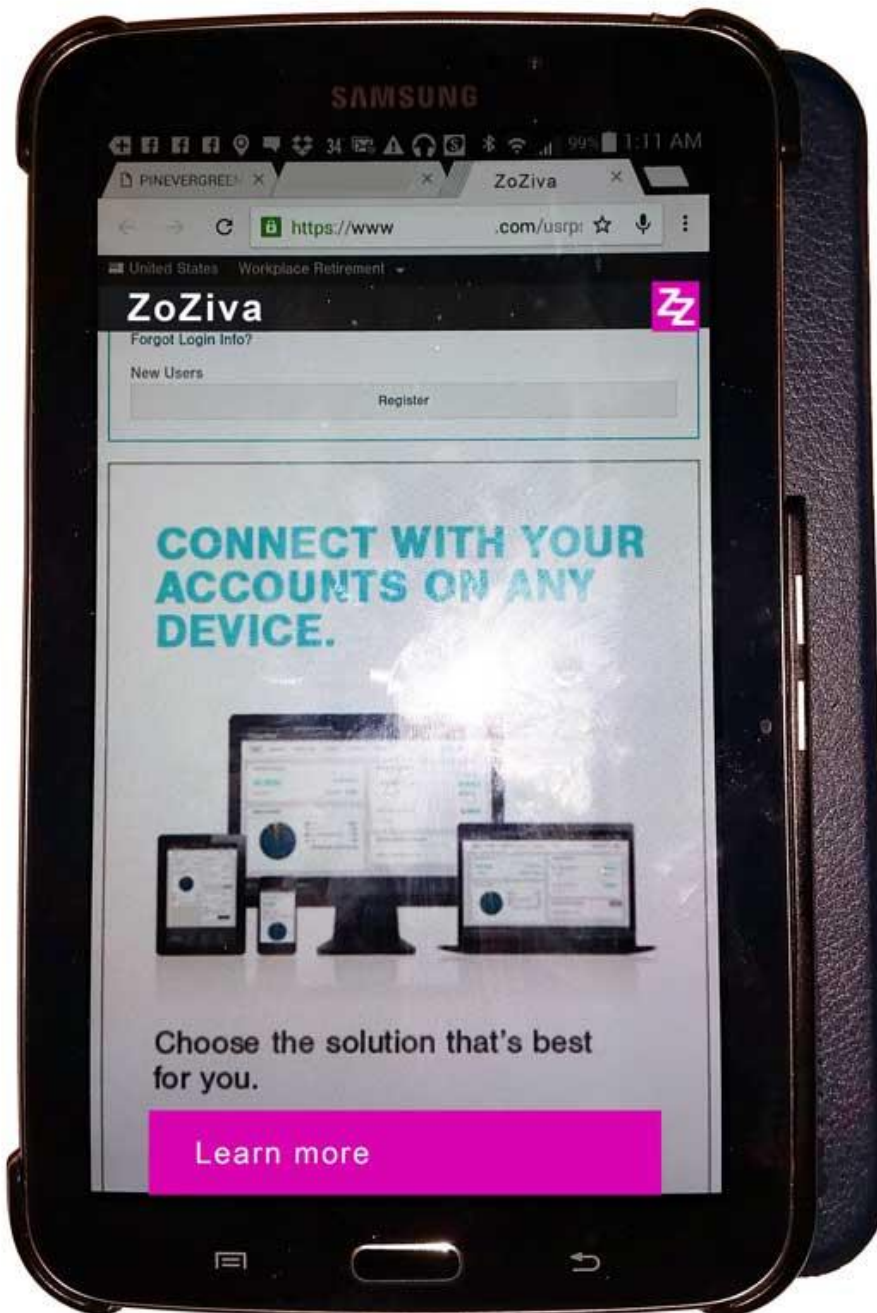
Appendix 2

ZoZiva Login Page in Live Mode



Appendix 3









ZoZiva Login Page on Tablet



Appendix 4

AEM – CQ5



-  **Websites**
Create and manage multiple websites.
-  **Digital Assets**
Organize your various digital assets.
-  **Communities**
Create and manage your social communities.
-  **Campaigns**
Manage your marketing campaigns.
-  **Inbox**
Manage your inbox items.
-  **Users**
Manage your users and groups.
-  **Tools**
Maintain and configure your system.
-  **Tagging**
Organize your tags and their namespaces.

Appendix 5

AEM Workplace Website Directory

The screenshot shows the AEM Workplace Website Directory interface. The left sidebar displays a tree view of website structures, with 'Workplace' and 'English' highlighted. The main content area shows a table of website pages. The table has three columns: 'Title', 'Name', and 'Published'. The rows are:

Title	Name	Published
1 Login Page	login	03-Mar-2016 10:18 (UI Developer 1)
2 Privacy Policy	privacy	02-Mar-2016 12:15 (UI Developer 2)
3 Contact Us	contact-us	02-Mar-2016 12:15 (UI Developer 2)