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EVALUATION OF RECOMMENDED MODULAR EMAIL BUILDING APPROACHES

Palak Sadhwani

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EVALUATION OF RECOMMENDED MODULAR
EMAIL BUILDING APPROACHES

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
in
Information Systems and Technology

by
Palak Sadhwani
December 2021

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ABSTRACT

Customer relationship management acts as the backbone of marketing. For any company marketing is the most important sector to promote a company and attract customers. Email marketing is one of the most effective ways of digital marketing. However, the cost of design and development is time consuming and redundant. Marketers and project managers are frequently unassertive about how to solve these issues. Although there are blogs, articles and services available for marketing email development, the lack of research in the effectiveness of email building architecture bolsters the need for this study. The project presents an architecture that modularizes the way email architecture is built. The architecture is demonstrated using HTML, CSS and JavaScript. Further the project explains how the same architecture can be implemented using the salesforce marketing cloud. With the help of a case study the project establishes the importance of modularizing email development which supports proposed architecture. The result of the case study proves that modularizing email creation as proposed reduces time required for email development on a large scale. Suggested areas for further study include testing in large scale organizational settings and doing a quantitative analysis. Another area of improvement is porting this architecture to other customer relationship platforms.

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TABLE OF CONTENTS

ABSTRACT	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER ONE: INTRODUCTION	1
Problem Statement	2
Solution Statement.....	4
Organization of the Project.....	5
CHAPTER TWO: LITERATURE REVIEW	6
Email Marketing	7
SMS (Short Message Service) Marketing	8
SMS vs Email Marketing	8
Social Media Marketing.....	9
Social Media vs Email Marketing.....	9
Cloud and Salesforce Marketing Cloud	10
Cloud Computing.....	11
Salesforce Marketing Cloud.....	11
Architecture of Salesforce Marketing Cloud	12
CHAPTER THREE: METHODOLOGY	13
CHAPTER FOUR: ARCHITECTURE	15
Marketing Campaign Process – A case study	16
Results	17
Elements of Marketing Email	18

Email Style and Design	19
Understanding the Proposed Architecture.....	20
HTML Files: Building Blocks for the Email Library	22
Email Library	22
JavaScript Functions Collection.....	22
Salesforce Marketing Cloud: Architecture.....	23
Porting this Architecture to Salesforce Marketing Cloud	24
CHAPTER FIVE: IMPLEMENTATION OF PROPOSED ARCHITECTURE.....	27
CHAPTER SIX: DISCUSSION, CONCLUSION, ADVANTAGES	
AND AREAS FOR FUTURE STUDY	33
Conclusion	33
Advantages of the Proposed Architecture	34
Future Scope	35
APPENDIX A: SALESFORCE CRM ARCHITECTURE	36
APPENDIX B: CODE WITHOUT USING PROPOSED ARCHITECTURE	38
APPENDIX C: CODE USING PROPOSED ARCHITECTURE.....	41
REFERENCES.....	44

LIST OF TABLES

Table 1. Time Comparison for Email Creation	31
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LIST OF FIGURES

Figure 1. Activity Diagram of ABC Company Marketing Campaign Process.....	17
Figure 2. Email Layout.....	19
Figure 3. Architecture for Email Creation using HTML and JavaScript Functions.....	21
Figure 4. Header Folder, Email Library.....	21
Figure 5. Buttons Folder, Email Library.....	21
Figure 6. Salesforce Marketing Cloud Architecture.....	23
Figure 7. Figure of Email Library Elements.....	25
Figure 8. Output of Code without using Proposed Architecture.....	28
Figure 9. Output of Code Following Proposed Architecture.....	30

CHAPTER ONE

INTRODUCTION

Customer relationship management (CRM) has been a major part of company success and customer retention. To maximize the value of consumer interaction, a CRM business system incorporates marketing, advertising, operations, sales, customer service, personnel, R&D, finance, IT and as a whole - the Organization's Web presence on the Internet. Customers benefit from CRM because it allows them to personalize, streamline, and expedite transactions irrespective of the channel through which they interact (Gulati & Garino, 2000). The marketing department plays a vital role in this process since they become the medium through which the customers and the company representatives communicate. Marketing is pivotal to good management and is directly linked to the success of a company (Webster, 2008).

Marketing trends are especially affected by increase in digital media spread. One of the best strategies for effective marketing is using content generated using marketing search engine optimization strategies (Olson et al., 2021). Content based marketing in this respect refers to marketing channels like emails, which allow sharing material over the internet.

Email marketing has evolved greatly over the past 43 years to become one of the personalized and efficient ways for CRM. Link (2021) mentions that Email marketing could contribute up to 36 times the inventory turnover, and 80%

of organizational growth. These statistics not only prove that email marketing is one of the best ways of marketing but also that email marketing is worth the company's capital investment.

Problem Statement

In my research for available architecture designs, there were no scholarly articles on the effectiveness of an architecture for email marketing. Although searching using the terms 'architecture for email marketing', on Google search engine, I found some articles, blogs and services that discuss email development systems, template designs available and services for setting up email system architecture. Author Witt (2020) discusses 'a module' and 'a template' as elements of the email design architecture. Here she refers to the module as a tangible unit that can be stacked, organized and arranged in a specific order to create a template (Witt, 2020). The author further discusses arranging the creating templates as primary, secondary and tertiary in respect to their usages (Witt, 2020). Other services, such as Constant Contact and Campaign Monitor, provide marketing automation (Email marketing automation software, n.d., Drive results with unforgettable email marketing, n.d.). Marketing automation is a process for allowing marketing emails to be sent spontaneously, based on customer behavior and is used to reduce human effort (Email marketing automation software, n.d.). Campaign monitor would allow users to drag and drop email elements for template building service (Drive results with unforgettable email marketing, n.d.). However, these services are independent

systems and are not portable enough to be integrated in existing systems which most companies already use. In addition to these articles and services mentioned above, there is extensive research available on the effectiveness of email marketing and using technology to enhance your audience (Wind, 2008; Aşıroğlu et al., 2019; Webster, 2008; Nanji, 2019). Wind (2008) focuses on how new enhancements in the technical world are demanding new mediums for marketing. The building blocks of email marketing roots from the same technologies that web development comes from such as HTML, CSS, and JavaScript. As Aşıroğlu et al (2019) mention, the process of finalizing output for the web is a rather long and monotonous process. It requires the collaboration of a lot of team members including but not limited to graphic designers, code developers, and project managers. This type of collaboration increases internal dependencies, approvals and thus increases turnaround time. The writers, Aşıroğlu et al (2019) provide evidence for the need of automatic tools for HTML code development. The modular architecture could answer the following:

1. What should be done to reduce the cost of email marketing?
 - a. How can email development code be reused?
 - b. How can email marketing be done faster?
 - c. How can we build a sustainable email development architecture?

Solution Statement

In this culminating experience project, an attempt is made to evaluate the reduction of the cost of email marketing by minimizing redundant work of a developer and by modularizing email development. Reid (2021) in an article talks about Dyspatch, a service that provides a modular email building approach to reduce time and effort. Team Stensul (2018) discusses the pros and cons of modular email marketing and promotes modular development. This culminating project demonstrates the effectiveness of developing an email with modular architecture and writing from scratch. This allows better recycling of code and potentially faster production of bulk emails.

In a survey study, Nanji (2019) found that 23% of people took a few days to create an email, and 53% say that on average, it takes more than 2 weeks to create an email. On Average, the time taken to develop an email from scratch takes up to 11 hours. About 10 emails might take up to 110 hours of the developer's time (Nanji, 2019), which translates to 13.75 eight hour days, or \$6,600 for a developer paid \$60 per hour. This project will attempt to reduce this time by about 30%, that is 9.625 days or from \$6,600 to \$4,620.

A Google search for any existing email building architectures specifically using the terms 'architecture for marketing email building' and 'system for email development for marketing' I could not find any focused scholarly research. For validating the modular architecture proposed in this culminating project

experience, I have used a case study based on existing literature and my own work experience.

Organization of the Project

The project is organized into 5 chapters. Chapter one provides the introduction to the project, problem statement, and questions to be answered. Chapter two focuses on Literature Review. Chapter three describes the methods used for this project. Chapter four covers the proposed architecture in detail using a small demonstration. Chapter five discusses the proposed architecture and tests it out using a small implementation. And lastly, Chapter six provides discussion, conclusion, and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

The marketing function in organizations has been evolving. An effective marketing strategy focuses on attracting customers to view a company's products and services, and creating a positive image of the company (Webster, 2018). Marketing has been advancing from columns in newspapers to online media like Social platforms, Emails, and SMS. Several studies have highlighted the use of technology and customer behavior analysis to more effectively make use of all media to gain customer intimacy.

Webster (2008) quotes Drucker, one of the most distinguished and noteworthy contributors to the marketing and management disciplines, emphasizing the importance and pivotal role of customer intimacy for effective marketing management.. He also talks about marketing as the essence for customer satisfaction and business success.

Multiple studies talk about the multifold benefits of good marketing strategies for companies. According to author Thompson (2018) benefits of a good marketing strategy include knowing our customers, being able to communicate with the company's clientele efficiently, understanding company growth, and ultimately resolving consumer issues. Marketing strategies also aid in better team collaboration, efficient use of resources such as cost and man hours, define an audience segment and set business's visions and missions (Raka, 2021). In addition, author John (2019) compares innovation and

marketing, blaming innovation and technological advancements for overshadowing the importance of marketing. She claims that marketing assists innovation in every aspect and is an output of the industrial revolution that should not be forgotten.

Atshaya and Rungta (2016) talks about different mediums of digital marketing like SMS, Emails and television, and identifies email marketing as the most widely used channel of marketing. As of 2021, the number of people using emails is around 4.3 billion (Duò, 2021). This number is expected to keep increasing and thus makes email marketing a clear winner (Duò, 2021).

Email Marketing

Email marketing still stands as one of the most effective ways to market and has been lucrative for all industries. The returns on investment in email marketing is substantial (Cabrera, 2001). Using a survey of about 200 people, Jeshurun (2018) talks about email as a strong tool for marketing and how email can generate quicker responses. He concludes with two major findings that coincide with the project's objective. One, the youth find email marketing as a worthwhile medium for marketing, and second, various attributes of email marketing make it an optimal marketing channel. The success of email marketing is supported by the volumes of emails being sent to potential customers everyday (Pavlov et al, 2008).

SMS (Short Message Service) Marketing

Since the early 90's when SMS started becoming popular, companies started marketing using SMS. Although the amount of information that can go into an SMS is limited, it could still remind a customer of sometime sensitive information. A major population checks their phones first thing in the morning, which greatly caters to the success of SMS Marketing (Rettie & Brum 2001). Rettie and Brum (2001) found in their study that the acceptance of SMS marketing differs based on the demographics, age, income etc. They also agree that due to these factors the success rate is low for SMS marketing.

SMS Vs Email Marketing

Rettie and Brum (2001) compared the cost of email marketing and SMS and found that the cost of email per email was about 5 cents and SMS is about 10 cents per SMS. Soodan (2018) compared SMS and Email marketing channels based on a variety of factors such as open rate, deliverability, cost, and other characteristics. Some of the advantages of SMS marketing included high click rate and quick turnaround (Soodan, 2018). On one hand, email marketing was credited for information emails can hold and that it was cheaper (Soodan, 2018). A combination of SMS and email marketing is suggested to be the best, as a conclusion of this comparison (Soodan, 2018). The return on investment for

email marketing was found to be \$40 for every \$1 spent, which is 40 times the investment. On the other hand, return on investment on SMS marketing is \$25 for every \$1 spent (Soodan, 2018).

Another study talks about email marketing being a channel which allows more content being sent, easier to use with a computer system/screen/tab and allowing attachments (Jensen, 2019). Jesnen (2019) also mentioned SMS marketing channel was more of a prompt approach for reaching the customers. The study by Jensen (2019) in conclusion also bolsters Soodan's (2018) approach to suggest the effectiveness of a combination of SMS and email marketing.

Social Media Marketing

Recent increase of social media platforms such as Instagram and Facebook have led to a different dimension in marketing. These platforms allow brands to create brand awareness, brand recognition, generate website traffic etc. (Atshaya & Rungta, 2016). The use of social media for marketing requires creating unique content in the form of video or graphics that follow certain trends. This incurs more cost, time and management of several other factors. (Atshaya & Rungta , 2016; Yasmin et al, 2015). Some platforms are Twitter, Instagram, Facebook, Google+, TikTok.

Social media Vs Email Marketing

Author Santora (2019) argues if email marketing is yet fruitful and adds that in terms of return of investment, email marketing can be acclaimed as a winner. On comparing numbers, we can see that about 3.8 billion people have email accounts whereas about 3.4 billion are on social media (Santora, 2019). The study concludes that email marketing in combination with social media marketing, might yield the best results (Santora, 2019). Another article by Santora (2019) compares social media marketing to email marketing. She finds that the conversion rate for email marketing is about 6.05% and social media marketing is 1.9%, whereas the click through rate for email is 22.86% and for social media marketing is 0.59%.

Cloud and Salesforce Marketing Cloud

Salesforce Marketing cloud facilitates marketing by providing a platform for all types of marketing. It can easily be integrated to provide personalized marketing campaigns(Salesforce.com). Researchers regard the emergence of cloud computing to go back to about the 1960s (Regalado, 2011). The true use of cloud computing does come years later, but we are in a generation where cloud computing is reaching different horizons. Cloud adoption serves a wide range of businesses, including the medical industry, marketing & branding, commerce & e-commerce, finance, and education (Tafoya, 2020). Tafoya (2020) also notes that cloud computing enables the marketing process by making it easy

for the whole team to share resources, enabling changes in large systems with ease.

Cloud Computing

Cloud computing is a form of computing that allows us to connect to resources using the internet from anywhere. Thus, the uses of cloud computing are multifold (Sultan, 2010). Ikin (2021), talks specifically about cloud computing trends in 2020 & 2021 emphasizing that about 50% of the total data that organizations hold was being stored in cloud spaces in 2020. He further predicts that in 2021, global spending on public cloud services is expected to increase by 18.4%. These numbers help us understand the importance of cloud computing and insist us to propose solutions to accommodate cloud storages and operations using cloud technologies.

Salesforce Marketing cloud

Marketing using cloud storage has been on the horizon for quite some time now. Cloud solutions for marketing allows affordable ERP system implementation, automated marketing tasks such as sending out surveys, emails, that would otherwise consume time and human-effort, and concurrent management of multiple sales cycles for existing and prospective customers (Blasidell, 2015).

By learning about the platforms provided by salesforce, we facilitate the understanding of this architecture. Since salesforce is one of the most popular

choices of businesses for marketing (Bentubo, n.d.), in the following section we explain how salesforce marketing cloud can adapt to our proposed architecture.

Architecture of Salesforce Marketing Cloud

Since we would also be porting this modular architecture to Salesforce Marketing Cloud it's beneficial to study the architecture of Salesforce CRM.

Salesforce CRM Architecture is based majorly on three input formats. Enterprise applications i.e., PeopleSoft, Qlik, SAP, databases such as Oracle, PostgreSQL, and flat files. These flat files are files that have simple text/data all stored in one place such as comma separated files and delimited files.

The input from different sources is migrated, altered or cleaned before being sent to the Salesforce CRM, which then generates contacts and leads (APPENDIX A). The Salesforce architecture consists of a multi-tenant cloud, metadata environment, API collection, and other CRM and enterprise functionalities (Retrieved from https://www.tutorialspoint.com/salesforce/salesforce_architecture.htm, n.d.). The multi-tenant cloud allows the application to be on the same hardware system and still be of different users; the metadata environment enables salesforce to hold data about data; The rich API collection salesforce provides allows access to data and compatibility to other softwares (Retrieved from https://www.tutorialspoint.com/salesforce/salesforce_architecture.htm, n.d.).

CHAPTER THREE

METHODOLOGY

This project takes a three-step framework for studying the ways for constructing modular email marketing systems. The first step is finding the relevant research and studying the background for marketing, email marketing and email development. We also compare the effectiveness of email marketing with other channels like SMS, Social Media Marketing. This will provide background as to why email marketing is so important. It will also entail an introduction to cloud services, namely Salesforce Marketing Cloud which allow email marketing. In the next step we explain the modular architecture and use a case study for understanding the marketing campaign process. For validating and evaluating the mentioned architecture, we implemented a sample email. This email was developed using HTML and CSS. For building the interactive elements of the application, we used JavaScript. JavaScript allows interaction with the web browser, and for the purpose of the study, it enables a modular implementation. Later we discuss how to port this architecture to the Salesforce Marketing Cloud.

The research provided is based on literature and data from multiple sources. These sources include peer-reviewed journals, published research papers, and articles found on the internet. Google Scholar, CSU's library and some accredited publications were sources for the articles, journals and papers used.

For the purpose of validating the modular email architecture and evaluating it, we will develop a case study. The case study scenario will study the marketing campaign process in an organization. We will then use this case study to analyze the factors that can be improved for a better campaign and develop an architecture.

On an implementational level, the study explores:

- 1) The template design architecture through template library creation
- 2) Restructuring template creation methodology
- 3) Understanding cloud technologies such as Salesforce Marketing Cloud for creating marketing emails.

CHAPTER FOUR

ARCHITECTURE

For understanding the proposed architecture, this section begins with explaining the process flow for email building following up with a sample case study. Next, we elaborate the different elements of an email template. The chapter concludes by finally understanding the proposed architecture.

The following description is to understand a typical marketing campaign process flow and is based on my own work experience. Firstly, the marketers along with managers define the goal of the marketing campaign. Marketers then do the analysis to determine the best channel for marketing, the target audience, and other parameters. This is followed by email design discussion and content creation. Once the marketers confirm the layouts, the developers start writing code. Typically, the code for the email development is written in HTML & CSS, which is specific to each campaign. After the approval of these developed HTML email designs, the emails are tested on several devices. These devices include IOS, Android, Desktops, Tablets and Chromebooks. Any errors or inconsistencies in the layout of these emails requires the developer to re-work on the code and make changes. These new modifications require altering the code for the email and has a possibility to interrupt the project timeline. In the following section we see a case study for diving deeper into a marketing campaign development process.

Marketing Campaign Process - A Case Study

The marketing department of a retail store 'ABC' launches a new campaign for Thanksgiving. This campaign is aimed at increasing the sales for the festival season this year. The marketing department wants to attract customers that have bought with them a few times before but are not regular buyers at their store, online or in-person. The company does a quick analysis and finds out the common products this segment of customer base is buying. Now the company uses email marketing to spread pamphlets with a special 'friends and family' discount. For the customers that opened this email, the marketing department's goal has been achieved. This set of customers have information on the current holiday offers. The next set of customers the marketing department needs to address are the set of customers that did not open the email. After a wait time of about a week, the company sends another email with a coupon offering an extra 5% discount. By sending repeated offers, the customers are reminded of the exclusive holiday discounts. Following this, to create more traction the company decides to send one last offer to customers that did not open the second email as well. The company sends a code for free delivery for online shopping. The company does this using SMS marketing so that customers that might not be email friendly are also targeted.

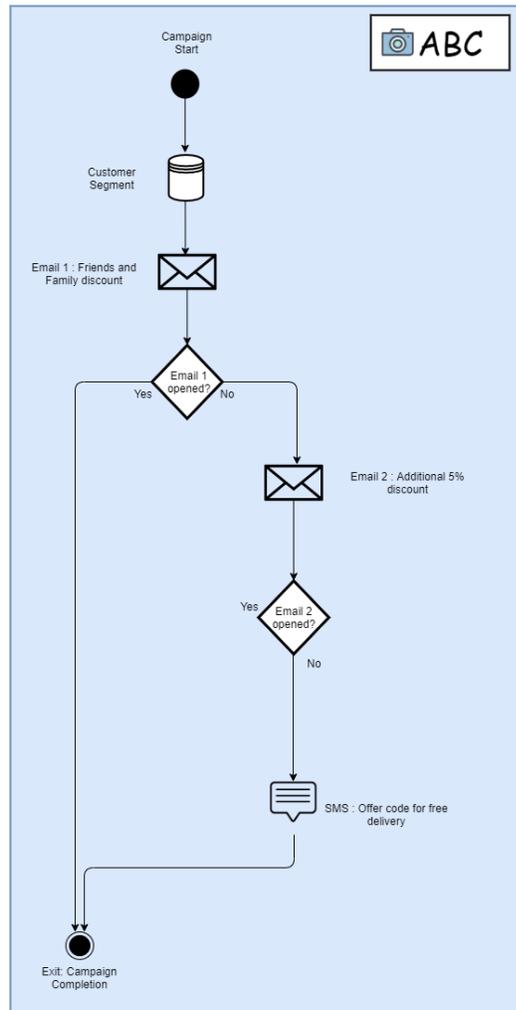


Figure 1: Activity Diagram of ABC Company Marketing Campaign Process

Results

From the above scenario, we can conclude that the marketing process is time sensitive, has dependencies and is lengthy. Like any project, most profitability is achieved by reducing cost and time taken for project completion. In this respect the first optimization criteria is the cost of email development for marketing.

As clearly observed in the study above, the marketing department of the mentioned company needs to focus on optimizing resources needed for efficient marketing campaign completion. The first target for optimization is the cost of email marketing. Email marketing is a major marketing expense and reducing the cost involved will generate lucrative outcomes for the organization. Another area for improvement could be the email building and development time. This architecture answers this by modularizing code which can be reused and reduces the time of development significantly.

Elements of a Marketing Email

The basic elements of a marketing email include the header, the main body, and the footer. These elements can vary for each company and can be decided by the marketing team. The layout of these elements could be understood by referring to figure 2 and the description in the following paragraph.

Element '1' in figure 2 shows the preheader & header, which consists of the logo of the company, along with a company name, or both. Element '2' is the next email section which includes the primary agenda of the email, or the offer description. This would act as the starting of the main body of the email. Element labeled '3' is known as the main body of the email, which contains images, main heading, a button (Call to Action), and any text or offer describing text. Element '4' is the last element, mostly placed at the bottom of the email, the footer. The

footer includes the social media links, unsubscribe links, terms and conditions and copyright information.

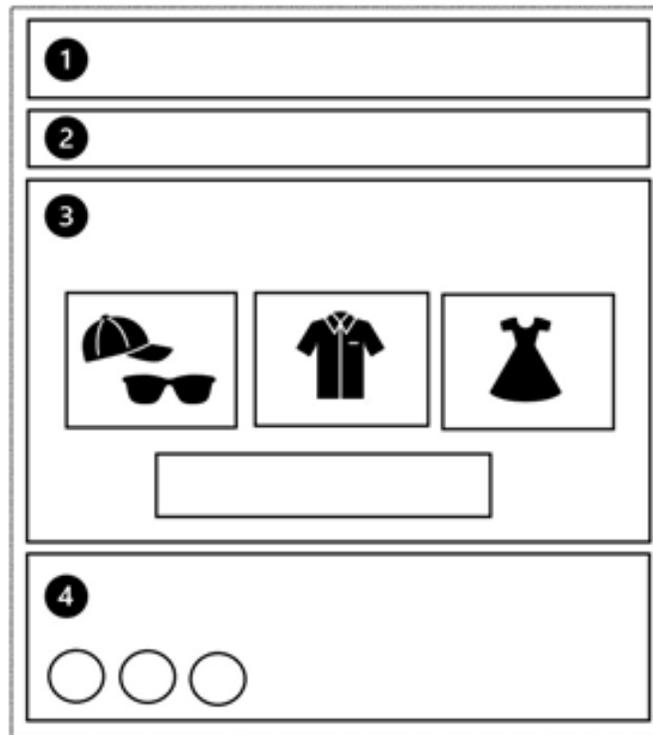


Figure 2. Email Layout

Email Style and Design

Some features of the emails, such as font, headline and title style are majorly constant. Companies set a few layout designs that they set for different campaigns. These layouts follow the same style for the elements, but change the order of the elements, text color, background color or font size. For example, a bumper sale offer would have text in a rather brighter color, but the same

company's account expiration notice email would use a rather simple color for the text. The Christmas and Halloween emails would vary in the images, the content, but the heading with the company name, and the footer with the social media links and unsubscribe links would remain the same.

Understanding the Proposed Architecture

I am proposing this architecture for modular email creation. This architecture is a two-level system essentially input and output. The proposed architecture suggests Level one is the implementation layer which provides the input. The layer is further divided into 2 levels. Firstly, the email Library and secondly the JavaScript function collection.

The second layer for the architecture as a whole is the n number of templates that can be yielded based on the implementation layer. The two layers together become the building blocks for quick and robust email development.

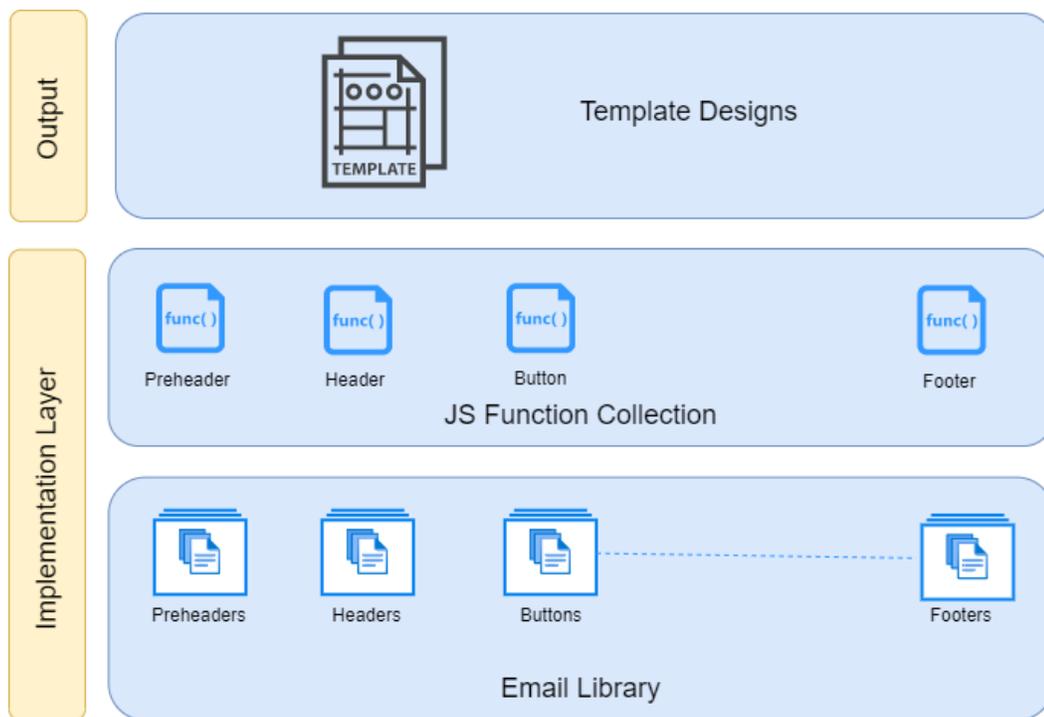


Figure 3: Architecture for Email Creation using HTML & JavaScript Functions

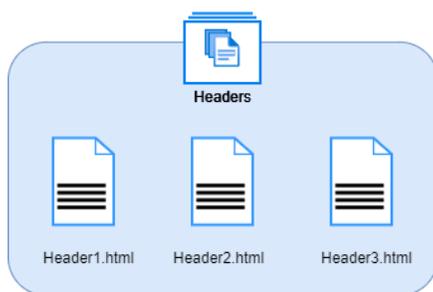


Figure 4: Header Folder, Email Library

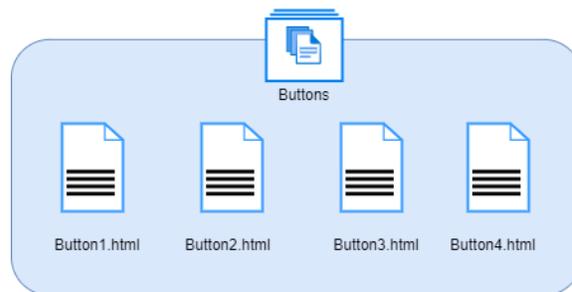


Figure 5: Buttons Folder, Email Library

HTML Files : Building Blocks for the Email Library

The smallest unit constituting the architecture is this block of code - the HTML files. Each block of code represents one style of the email element. For

example, if the marketing department decides to have 3 types of headers, there will be 3 files which represent each header. The content of these is HTML code for building that element. HTML allows the headers to be displayed on the web browser.

Email Library

The email library consists of multiple folders that are organised to represent each element of the email. These elements are Preheader, Header, Images, Buttons, Text, Footer, which together build an email. Each of these folders in the library host the HTML files for all styles of a particular campaign. For example, a Headers folder in the email library would contain multiple HTML files, which represent different styles of the headers.

JavaScript Function Collection

The JavaScript Function Collection as the name suggests is a collection of JavaScript code files. Each of the JavaScript Code has a placeholder for adding the HTML code. JavaScript acts as the medium for interaction between the user interaction, HTML and webpage. JavaScript allows for the developers to paste HTML, make any necessary changes, and display each element as expected.

Salesforce Marketing Cloud: Architecture

The overview of the architecture when ported to Salesforce Marketing Cloud can be depicted through the diagram in Figure 6.

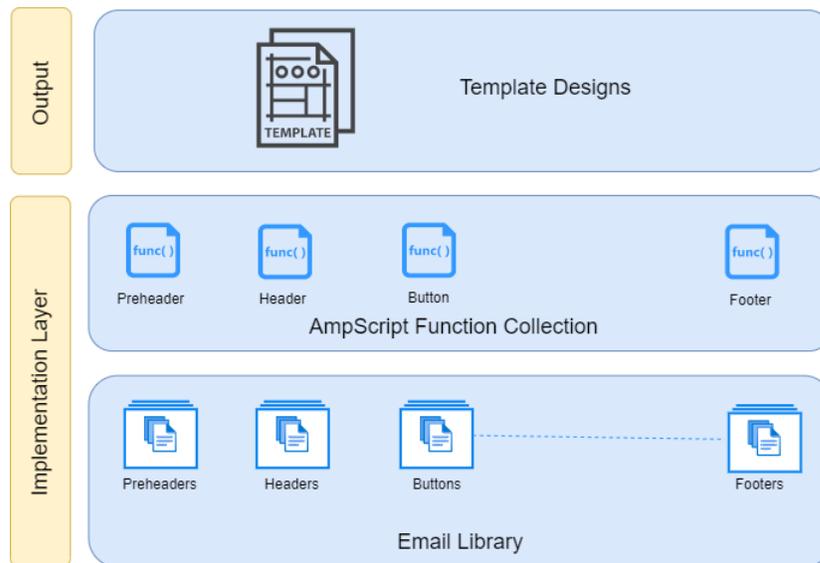


Figure 6. Salesforce Marketing Cloud Architecture

The various elements of the architecture and their interaction remains constant with some changes to the tools that enable us to use the elements. Another addition to the Salesforce Marketing Cloud architecture is AMPscript.

AMPscript is a scripting language which allows customization of emails based on subscriber data, add dynamic content such as date, images based on region and text, and add logical code units (Retrieved from <https://trailhead.salesforce.com/en/content/learn/modules/ampscript-for-nondevelopers/get-to-know-ampscript>).

Porting this Architecture to Salesforce Marketing Cloud

Following are the steps for porting the same architecture in Salesforce Marketing Cloud:

Step 1: Creating HTML code blocks

The most fundamental unit of our architecture, the HTML code block is the first step of our implementation. These blocks are created by the developer and saved in the Content Builder with suitable file names.

Step 2: Defining AMPscript for accessing HTML blocks of code

The developer now writes the AMPscript which accesses the blocks of HTML Codes saved. These AMPscript files are saved at the Email Library.

Step 3: Email Library creation

The next step is for the creation of an Email Library. This Email library consists of multiple AMPscripts, each referring to a block of code.

The figure below shows an example of an email library for reference.

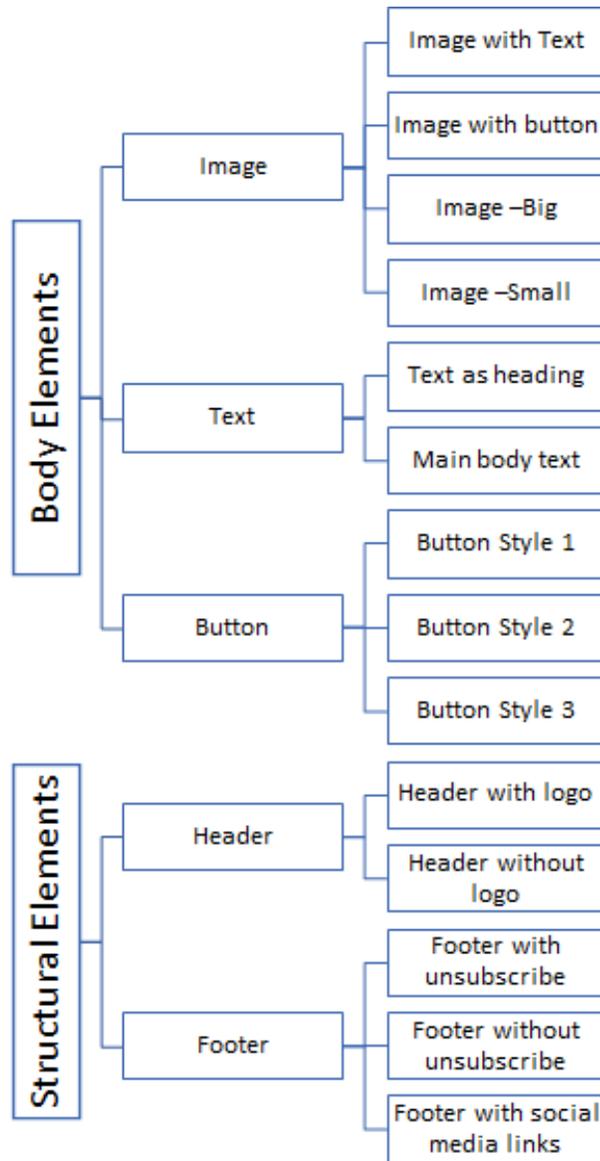


Figure 7: Example of Email Library Elements

Step 4: Email building

The content builder module in Salesforce Marketing Cloud allows you to build multiple email designs as per requirements, merely by pasting Amscript taken from the email library.

CHAPTER FIVE

IMPLEMENTATION OF THE PROPOSED ARCHITECTURE

For implementing and testing the architecture proposed, the first email was created without using the proposed architecture, and the next email was created using the proposed architecture. The first email uses HTML and CSS for design elements and displaying the output to the web browser. The code screenshots are given in Appendix B. The output generated is shown in Figure 8.

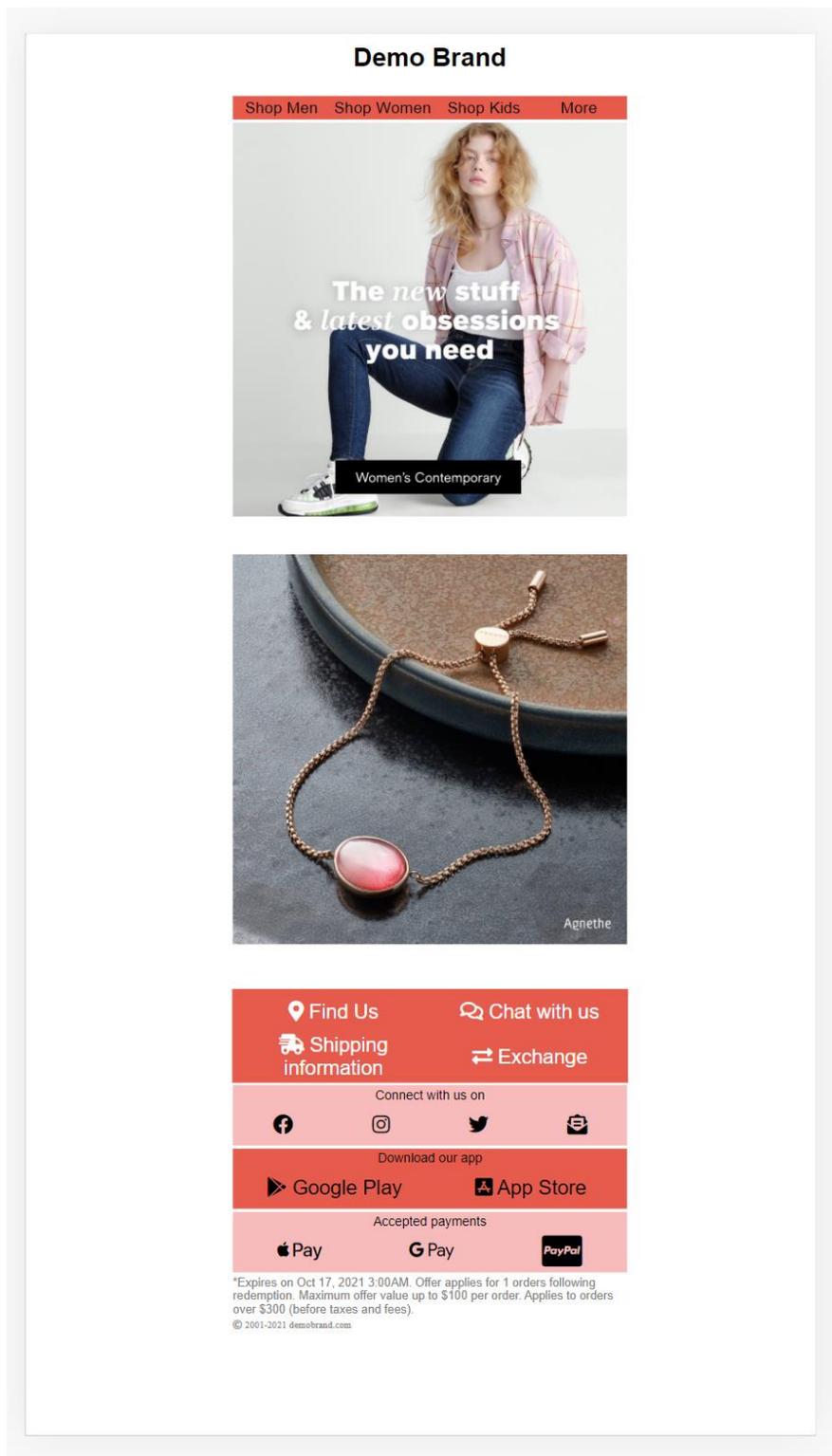


Figure 8: Output of Code without using Proposed Architecture

I decided to prepare this template from scratch using HTML. Using a digital timer, I timed myself every time I worked on this email template. This included the time it took for me to design, develop and test the email. It took me about 3 hours to decide on a style and design for the email. The next phase was writing code, which took about 7 hours. And finally, 3 hours were spent testing and fixing any development bugs. Total, it took me 13 hours total to design, develop and test this email. This confers the study by Nanji (2019) where it took email marketers an average to 12 hours to design, develop and test. If a developer with a different level of experience were to attempt to work on this email, the time taken would be different.

Next, I attempted to create the same email, with modular aspects using the proposed architecture. Appendix C shows the JavaScript code that generates the interactive elements, the buttons.

To prove the usability of opting for a modular approach as suggested, I have created buttons using HTML & JavaScript. Each of these buttons represent an email element as described before.

On clicking the button 'Insert infographics', we can see the element of the email seen in Figure 9.

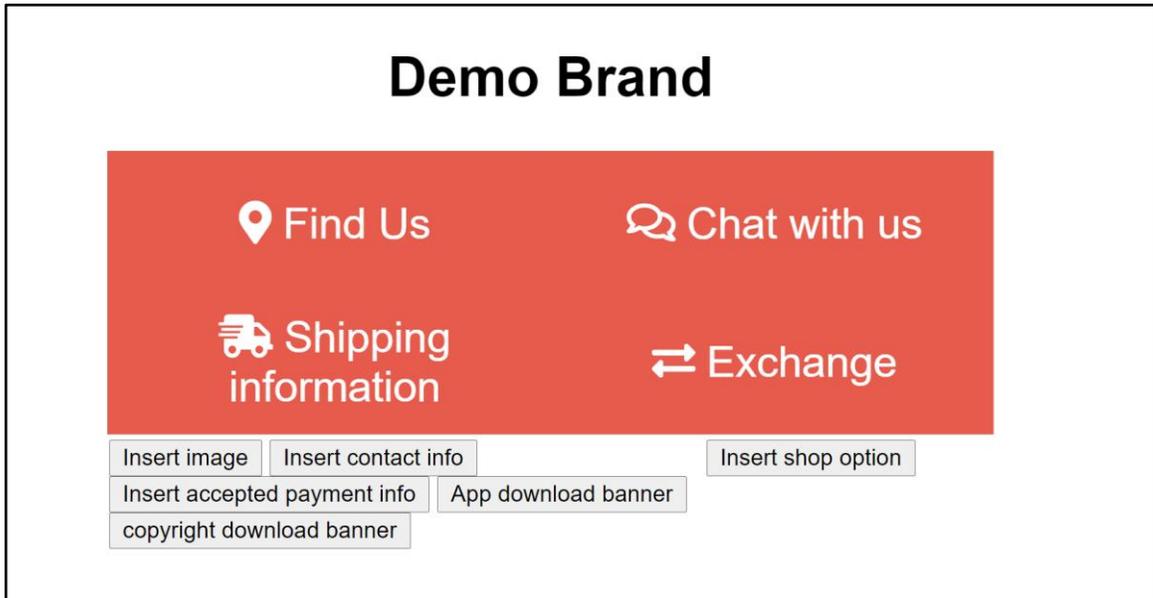


Figure 9: Output of Code Following Proposed Architecture

As you can see the buttons allow the developer to choose the elements and their order. This difference in order can change the look and feel of the output emails. The 'insert image' button could also be used to change the image and in such a way, other parameters could be adjusted.

Similar to the implementation using the traditional architecture, I timed myself using a digital timer. The time calculated includes the time I took to write code to create the JavaScript Function Collection and template library. To design and develop the JavaScript function collection and template library it took me approximately 11 hours. Using the created JavaScript function collection and template library I was then able to create about 4 emails within 2 hours. The created emails as a product of the implemented architecture differed in image

used in the email or in the order of elements being displayed on the email layout. The major time taken for development of modules as described in the proposed architecture was creating the JavaScript Function Collection and Email Library. Using this approach, I was able to create multiple emails in a short period of time. In table 1, I compare the time taken for creating the email using the traditional method vs the proposed architecture for multiple emails.

Table 1: Time Comparison for Email Creation

# of emails	Time taken (in hours)	
	Traditional Architecture	Proposed Architecture
1	11	12
3	33	20
15	165 (estimated)	27 (estimated)

As per the information in table 1, the time taken for the proposed architecture for 1 email was more than creating every email from scratch with HTML. As we increase the number of emails, the time needed reduces significantly.

The first email created using the proposed architecture included time taken for creating the JavaScript function collection and email library. The subsequent emails used the same resources, reducing development time.

CHAPTER SIX

DISCUSSION, CONCLUSION, ADVANTAGES AND AREAS FOR FUTURE STUDY

Conclusion

At the beginning of the project, we asked a few questions: how can we reduce the cost of email marketing? how can email development code be reused? and how can it be done faster? We answered these questions by understanding the existing available systems and services, comprehending a modular architecture for email-development and validating the modular architecture by implementation. The modular architecture uses code blocks that are developed using JavaScript, HTML and CSS. This enables the developers to use the email library built during the early stages of email development to continue the development of new emails by reusing existing code stored in specific folders. We understand the benefits using a Case Study, where I myself used a digital timer to clock myself developing email to calculate time taken by using a traditional approach and by using the proposed architecture. We find in the case study that as the number of emails increases the proposed architecture reduces time taken by the developer for each email reduces significantly. If this architecture is deployed in a large-scale marketing campaign, it would show tremendous benefits that coincides with our project problem statements.

Advantages of the Proposed Architecture

There are some significant advantages that can be achieved when the proposed architecture is adapted. They can be broadly understood as the following:

1) Modularity

Implementation of small units of HTML and a scripting language allows a modular way of creation for email development. The scripting language allows different elements of email to be rearranged according to need. Correct implementation could also result in keeping some attributes such as color, font and size variable from email to email.

2) Code reusability

The blocks of HTML once created can be reused n number of times to build emails. This allows a dynamic use of the code and allows different combinations for email building.

3) Time Saving

The implementation of the architecture allows the developers to then use just the functions to access elements of the email library. This prevents the software developers from the tedious task of writing HTML Codes time and again and thus reduces man-hours needed. This in the long run reduces time for development.

4) Cost Reduction

The development of emails, once the architecture is established is quick

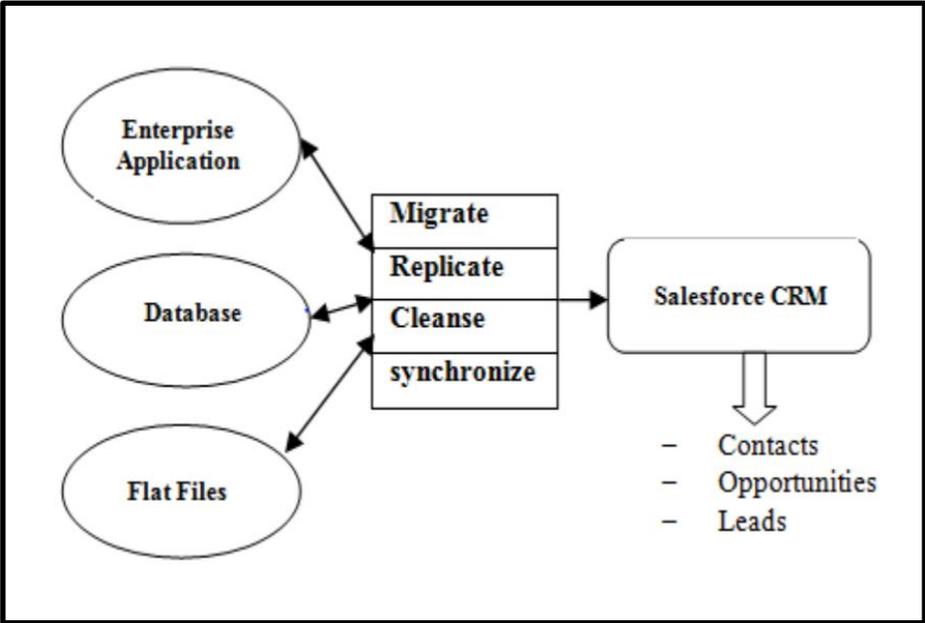
and thus reduces man hours needed. This reduces the cost involved in email building and gets more output in less time.

Future Scope

Future research projects include doing a quantitative analysis in a separate study. In a separate study we could analyze the effectiveness of this architecture in a large-scale organizational setting. This quantitative study could be beneficial in proving the benefits of this architecture and may also uncover some disadvantages. Such a project would provide further evidence in favor of the proposed modular email architectures.

We also suggest using the information given in this validating architecture to evaluate the effectiveness of other platforms. Implementation of this architecture to evaluate other platforms such as Adobe, Mailchimp and other email studios facilitating CRM softwares might give more insights and broaden the scope.

APPENDIX A
SALESFORCE CRM ARCHITECTURE



APPENDIX B
CODE WITHOUT USING PROPOSED ARCHITECTURE

```

1 <html>
2 <head><title>Demo Brand</title>
3 <script src="https://kit.fontawesome.com/ad4615c067.js" crossorigin="anonymous"></script>
4 <link rel="stylesheet" href="csssheet.css">
5 </head>
6 <body style="font-family: Arial, Helvetica, sans-serif;">
7 <table style="margin-left: 25vw; margin-right: 40vw; table-layout: fixed;">
8 <tr style="align: center; align-content: center;" ><h1>Demo Brand</h1></tr>
9 <tr>
10 <td style="width:50vw; align: center;">
11 <div>
12 <div>
13 </div>
14 </div>
15 </td>
16 <tr>
17 <td style="width:50vw; align-content: center;">
18 <div>
19 <table class="menu" ><tr>
20 <td style="width: 25vw; text-align: center; font-size: 20px;">Shop Men</td>
21 <td style="width: 25vw; text-align: center; font-size: 20px;">Shop Women</td>
22 <td style="width: 25vw; text-align: center; font-size: 20px;">Shop Kids</td>
23 <td style="width: 25vw; text-align: center; font-size: 20px;">More</td>
24 </tr></table>
25 </div>
26 </td>
27 </tr>
28 <tr>
29 <td style="width:50vw; align-content: center;">
30 
31 </td>
32 </tr>
33 <tr>
34 <td><br></td>
35 </tr>
36 <tr>
37 <td style="width:50vw; align-content: center;">
38 
39 </td>
40 </tr>
41 <tr>
42 <td><br>
43 </td>
44 </tr>
45 <tr>
46 <td>
47 <br>
48 </td>
49 </tr>
50 <tr>
51 <td style="background-color: #ea5e51;">
52 <table style="table-layout: fixed;">
53 <tr>
54 <td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;" >
55 <i class="fas fa-map-marker-alt"></i> Find Us
56 </td>
57 <td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;">
58 <i class="far fa-comments"></i> Chat with us
59 </td>
60 </tr>
61 <tr>
62 <td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;">
63 <i class="fas fa-shipping-fast"></i> Shipping information
64 </td>
65 <td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;">
66 <i class="fas fa-exchange-alt"></i> Exchange
67 </td>
68 </tr>
69 </table>
70 </td>
71 </tr>
72 <tr>
73 <td style="table-layout: fixed; background-color: #f9bcbd;">
74 <tr>
75 <td colspan="4" style="text-align: center;">Connect with us on
76 </td>
77 </tr>
78 <tr>
79 <td style="width: 25vw; height: 5vw; font-size: 25px; text-align: center;">
80 <i class="fab fa-facebook"></i>
81 </td>
82 <td style="width: 25vw; height: 5vw; font-size: 25px; text-align: center;">
83 <i class="fab fa-instagram"></i>
84 </td>
85 <td style="width: 25vw; height: 5vw; font-size: 25px; text-align: center;">
86 <i class="fab fa-twitter"></i>
87 </td>
88 <td style="width: 25vw; height: 5vw; font-size: 25px; text-align: center;">
89 <i class="fas fa-envelope-open-text"></i>
90 </td>
91 </tr>
92 </td>
93 </tr>

```

```

95         </table>
96     </td>
97 </tr>
98
99
100 <tr>
101 <td>
102     <table style="table-layout: fixed; background-color: #ea5e51;">
103     <tr>
104         <td style="text-align: center;" colspan="2">Download our app</td>
105     </tr>
106
107     <tr>
108         <td style="width: 50vw; height: 5vw; font-size: 25px; text-align: center;">
109             <i class="fab fa-google-play"></i> Google Play
110         </td>
111         <td style="width: 50vw; height: 5vw; font-size: 25px; text-align: center;">
112             <i class="fab fa-app-store-ios"></i> App Store
113         </td>
114     </tr>
115     </table>
116 </td>
117 </tr>
118 </tr>
119
120
121
122 <tr>
123 <td>
124     <table style="table-layout: fixed; background-color: #f9bcbd;">
125     <tr>
126         <td style="text-align: center;" colspan="3">Accepted payments</td>
127     </tr>
128
129     <tr>
130         <td style="width: 50vw; height: 5vw; font-size: 45px; text-align: center;">
131             <i class="fab fa-apple-pay"></i>
132         </td>
133         <td style="width: 50vw; height: 5vw; font-size: 45px; text-align: center;">
134             <i class="fab fa-google-pay"></i>
135         </td>
136         <td style="width: 50vw; height: 5vw; font-size: 45px; text-align: center;">
137             <i class="fab fa-cc-paypal"></i>
138         </td>
139     </tr>
140     </table>
141 </td>
142 </tr>
143
144 <tr>
145 <td class="footertype">*Expires on Oct 17, 2021 3:00AM. Offer applies for 1 orders following redemption.
146     Maximum offer value up to $100 per order.
147     Applies to orders over $300 (before taxes and fees). </td>
148
149 </tr>
150 <tr>
151 <td class="footertype"><i class="far fa-copyright"> 2001-2021 demobrand.com</i>
152 </td>
153
154 </table>
155
156
157 </body>
158
159 </html>

```

APPENDIX C
CODE USING PROPOSED ARCHITECTURE

```

2
3 ▼ function insertImage(){
4
5     var outertable = document.getElementById("outertable");
6     var row1 = outertable.insertRow(rownum);
7     rownum++;
8     var cell1 = row1.insertCell(0);
9     var imgURL = window.prompt("Enter Image URL: ");
10
11
12
13     cell1.innerHTML = '<img id="imageid" src="" onerror="if (this.src != "error.jpg") this.src =
"error.jpg";"src="" style="display: block; width: inherit; height: inherit;" >'
14     var buttoontoHide = document.getElementById("imgbutton");
15     buttoontoHide.style.visibility = "hidden";
16     var imgtag = document.getElementById("imageid").src = imgURL;
17
18 }
19
20
21 ▼ function insertContactInfo(){
22     var outertable = document.getElementById("outertable");
23     var row1 = outertable.insertRow(rownum);
24     rownum++;
25     var cell1 = row1.insertCell(0);
26     cell1.innerHTML='<table style="table-layout: fixed; background-color: #f9cbcd;"><tr><td colspan="4"
style="text-align: center;">Connect with us on</td></tr><tr><td style="width: 25vw; height: 5vw; font-size:
25px; text-align: center;"><i class="fab fa-facebook"></i></td><td style="width: 25vw; height: 5vw; font-size:
25px; text-align: center;"><i class="fab fa-instagram"></i></td><td style="width: 25vw; height: 5vw; font-size:
25px; text-align: center;"><i class="fab fa-twitter"></i></td><td style="width: 25vw; height: 5vw; font-size:
25px; text-align: center;"><i class="fas fa-envelope-open-text"></i></td></tr></table>';
27     var buttoontoHide = document.getElementById("contactbutton");
28     buttoontoHide.style.visibility = "hidden";
29
30
31 ▼ function insertInfographics(){
32     var outertable = document.getElementById("outertable");
33     var row1 = outertable.insertRow(rownum);
34     rownum++;
35     row1.innerHTML = '<td style="background-color: #ea5e51;"><table style="table-layout: fixed;"><tr><td
style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;" ><i class="fas fa-map-
marker-alt"></i> Find Us</td><td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align:
center;"><i class="far fa-comments"></i> Chat with us</td></tr><tr><td style="color: #FFFFFF; width: 50vw;
height: 5vw; font-size: 25px; text-align: center;"><i class="fas fa-shipping-fast"></i> Shipping
information</td><td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;"><i
class="fas fa-exchange-alt"></i> Exchange</td></tr></table></td>'
36     var buttoontoHide = document.getElementById("infobutton");
37     buttoontoHide.style.visibility = "hidden";
38
39
40     //var cell1 = row1.insertCell(0);
41     //cell1.style.backgroundColor = "#ea5e51";
42     //cell1.innerHTML = '<table style="table-layout: fixed;"><tr><td style="color: #FFFFFF; width: 50vw; height:
5vw; font-size: 25px; text-align: center;" ><i class="fas fa-map-marker-alt"></i> Find Us</td><td style="color:
#FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align: center;"><i class="far fa-comments"></i> Chat
with us</td></tr><tr><td style="color: #FFFFFF; width: 50vw; height: 5vw; font-size: 25px; text-align:
center;"><i class="fas fa-shipping-fast"></i> Shipping information</td><td style="color: #FFFFFF; width: 50vw;
height: 5vw; font-size: 25px; text-align: center;"><i class="fas fa-exchange-alt"></i> Exchange</td></tr>
</table>';
43
44 }
45
46 ▼ function insertShopOption(){
47     var outertable = document.getElementById("outertable");
48     var row1 = outertable.insertRow(rownum);
49     var cell1 = row1.insertCell(0);
50     rownum++;
51     cell1.innerHTML = '<div><table class="menuu" ><tr><td style="width: 25vw; text-align: center; font-size:
20px;">Shop Men</td><td style="width: 25vw; text-align: center; font-size: 20px;">Shop Women</td><td
style="width: 25vw; text-align: center; font-size: 20px;">Shop Kids</td><td style="width: 25vw; text-align:
center; font-size: 20px;">More</td></tr></table></div>';
52     var buttoontoHide = document.getElementById("shopbutton");
53     buttoontoHide.style.visibility = "hidden";
54
55 }
56

```

```

59     var row1 = outertable.insertRow(rownum);
60     rownum++;
61     var cell1 = row1.insertCell(0);
62
63     cell1.innerHTML = '<table style="table-layout: fixed; background-color: #f9bcdb;"><tr><td style="text-align:
center;" colspan="3">Accepted payments</td></tr><tr><td style="width: 50vw; height: 5vw; font-size: 45px; text-
align: center;"><i class="fab fa-apple-pay"></i></td><td style="width: 50vw; height: 5vw; font-size: 45px;
text-align: center;"><i class="fab fa-google-pay"></i></td><td style="width: 50vw; height: 5vw; font-size:
45px; text-align: center;"><i class="fab fa-cc-paypal"></i></td></tr></table>';
64     var buttoontoHide = document.getElementById("paybutton");
65     buttoontoHide.style.visibility = "hidden";
66
67
68 }
69
70 ▾ function insertAppDownload(){
71
72     var outertable = document.getElementById("outertable");
73     var row1 = outertable.insertRow(rownum);
74     rownum++;
75     var cell1 = row1.insertCell(0);
76     cell1.innerHTML='<table style="table-layout: fixed; background-color: #ea5e51;"><tr><td style="text-align:
center;" colspan="2">Download our app</td></tr><tr><td style="width: 50vw; height: 5vw; font-size: 25px; text-
align: center;"><i class="fab fa-google-play"></i> Google Play</td><td style="width: 50vw; height: 5vw; font-
size: 25px; text-align: center;"><i class="fab fa-app-store-ios"></i> App Store</td></tr></table>';
77     var buttoontoHide = document.getElementById("appbutton");
78     buttoontoHide.style.visibility = "hidden";
79
80
81
82
83 ▾ function insertcopyrightAndlegal(){
84     var outertable = document.getElementById("outertable");
85     var row1 = outertable.insertRow(rownum);
86     rownum++;
87     row1.innerHTML = '<td class="footertype">*Expires on Oct 17, 2021 3:00AM. Offer applies for 1 orders following
redemption. Maximum offer value up to $100 per order. Applies to orders over $300 (before taxes and fees).
</td>'
88     var row2 = outertable.insertRow(rownum);
89     rownum++;
90     row2.innerHTML='<td class="footertype"><i class="far fa-copyright"> 2001-2021 demobrand.com</td>'
91     var buttoontoHide = document.getElementById("copyrightbutton");
92     buttoontoHide.style.visibility = "hidden";
93
94 }

```

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