Feasibility Evidence Description (FED)

Discovery Tool

Team 3

Josh Bendig - IIV&V

Xizhao Deng - Project manager

Jingzhou Hong - Requirement Engineer

Guancheng Liu - Tester

Michael Russo - Prototyper

Shenghao Tang - Feasibility Analyst

Fan Zhan - Software Architect

Yiming Zhang - System Architect

10/21/18

Version History

Date	Author	Version	Changes made	Rationale
10/10/18	XD	1.0	Initial template	Initial template for Discovery Tool FED
10/13/18	ST	1.1	1. Added Introduction 2. Added Business Case Analysis 3. Added Architecture Feasibility	FED draft for Discovery Tool
10/14/18	JH	1.2	1. Added Risk Assessment 2. Added NDI/NCS Interoperability	Completed FED to be uploaded before the DCR presentation
10/20/18	ST	2.0	Re-analysis costs, LOS and CR	Revised version after presentation
10/20/18	JH	2.1	Small fixes and increments on Risk Assessment and NDI/NCS Analysis	Reviewed and small increments and fixes
10/21/18	XD	2.2	fixed some formatting	Reviewed for DC package

Table of Contents

Table of Tables

Table of Figures

1. Introduction

1.1 Purpose of the FED Document

The purpose of the Feasibility Evidence Description (FED) document is to provide the evidence to prove the feasibility of this project Discovery Tool. The FED document provides a throughout analysis documenting the feasibility of the Discovery Tool to be completed within the constraints of time and budgets by following sections: Business Case Analysis, Architecture Feasibility, Process Feasibility, Risk Assessment and NDI/NCS Interoperability Analysis.

1.2 Status of the FED Document

This is the first completed version of FED document since all sections are carefully evaluated and finished including: Business Case Analysis, Architecture Feasibility, Process Feasibility, Risk Assessment and NDI/NCS Interoperability Analysis. It has been reviewed for DC package deliverables.

2. Business Case Analysis

<table>
<tr><td colspan="4"><b>Assumptions</b> :
● Content creators are unhappy with their current excel based solutions
● Developers understand the client's workflow
● Client will have maintainers on staff to take over the project upon handoff
● Client has developers that will be able to integrate product
● Development team has the resources to support large scale team
● Development team has the resource to maintain a database</td></tr>
<tr><th>Stakeholders</th><th>Initiatives</th><th>Value Propositions</th><th>Beneficiaries</th></tr>
</table>

<table>
<tr><td>- System1 Content Writer
- System1 Content admin
- Developers Maintainer</td><td>- Content writer and admin correctly use the app
- Maintainers maintain the whole system after hands-off occured
- Admin and content writer are responsive to the different stages of content production
- Developers implement system to mimic and streamline existing process</td><td>- Increased publication speed
- Modernized frontend and backend technology
- Streamlined process with real-time feedback
- Ease of scaling the project and team size
- Monitoring team progress and performance with confidence</td><td>- Content writer
- Content admin</td></tr>
<tr><td colspan="2"><b>Cost</b>
- Development costs
- Database hosting service costs
- Maintenance costs</td><td colspan="2"><b>Benefits</b>
- Increase publication speed of content writers
- Create a easy way for content admins to manage the content writers</td></tr>
</table>

2.1 Cost Analysis

This section is the analysis of time spent by the clients on the different phases of the Discovery Tool.

2.1.1 Personnel Costs

Table 1: Personnel Costs

Activities	Time Spent (Hours)
Exploration Phase (1 week)	
Client Meetings	1
Win-Win Negotiation 1	1
Valuation and Foundation Phase (3 weeks)	
Win-Win Negotiation 2	2
Prototype Analysis Meeting	2
Requirement Negotiation	2

Content writer Meeting	5
Content admin Meeting	5
Meeting by email, slack, skype or in person	1 per week
Development and Operation Phase (8 weeks)	
Interface review	3
Meeting by email, slack, skype or in person	1 per week
Process Meeting	3 per week
TOTAL	**56**
Maintenance Period (1 year)	
Maintenance (6h per month * 12 months * 1 person)	72

2.1.2 Hardware and Software Costs

Table 2: Hardware and Software Costs

Type	Cost	Rationale
AWS EC2	1 year free trial / 54$ per month	Backend Service
mLab AWS M2	$360 per month	Database solution (Enterprise advanced version available but no need)
React	Free	Open-source javascript framework
Webpack	Free	Javascript module bundler
Flask	Free	Python web framework
Creative TIM	$59 one time purchase	Frontend library

2.2 Benefit Analysis

Table 3: Benefits of Discovery Tool System

Current activities & resources used	% Reduce	Time Saved (Hours/Year)
Content Writer side		

Create pitches and submit	30	4hrs/week * 52 weeks = 208
Content Admin side		
Admins review the pitches of all content writer	80	6.5hrs/week * 52 weeks = 338
Admins assign verticals to content writer	10	0.5hrs/week * 52 weeks = 26
Total		**572**

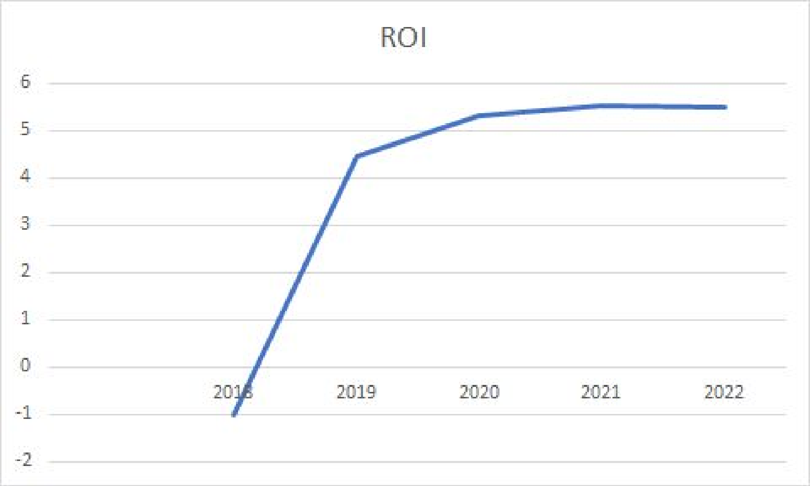
2.3 ROI Analysis

The increasing rate of maintenance is assumed to be 5% per year. There will be a one-time purchase $59 for Creative TIM library and two parts of periodic payment: around $648 per year for AWS EC2 server usage and around .

Table 4: ROI Analysis

Year	Cost	Benefit (Effort Saved)	Cumulative Cost	Cumulative Benefit	ROI
2018	56	0	56	0	-1
2019	72	572	80	572	7.15
2020	87.12	572	130.40	1144	8.77
2021	95.83	572	183.32	1716	9.36
2022	105.42	572	238.89	2288	9.58

Figure 1: ROI Analysis Graph



3. Architecture Feasibility

3.1 Level of Service Feasibility

Table 5: Level of Service Feasibility

Level of Service Requirement	Product Satisfaction
LOS-1: System shall mimic and streamline the entire workflow currently practiced by the client	Product Strategies: Descoping, eliminate added-on if needed
	Process Strategies: Perform prototyping and modeling, cross-check the simulation with the client frequently
	Analysis: With the help of content writer meeting and content admin meeting, a prototype that mimics current workflow can be built. Keep updating according the client requirements
LOS-2: System shall be easy and pleasant to use by a typical team size of 50 content writers and 5 content admins and with the potential to scale up or down	Product Strategies: Optimization (MongoDB, AWS EC2)
	Process Strategies: Perform simulation and pressure testing
	Analysis: Test the capability of the system to handle the scale
LOS-3: System shall be maintained easily by the client	Product Strategies: Consistency, Understandability (Google style guide, Swagger UI)
	Process Strategies: Provide comments to the code and makefile
	Analysis: Use style guide to regulate the comments and build HTML documentation by Swagger UI

3.2 Capability Feasibility

Table 6: Capability Requirements and Their Feasibility Evidence

Capability Requirement	Product Satisfaction
CR-1: Content admin can set target vertical and amount of titles desired for current or future months, and also assign content writers to verticals.	Software/Technology used: MongoDB, Flask, Creative TIM
	Feasibility Evidence: Build tidy and clear UI with CMD library. Connect MongoDB and Backend to implement the workflow.
	Referred use case diagram: UC-39, UC-45, UC-46, UC-48

CR-2: Content admin can view overall project progress, individual vertical progress, and targets of the past, current, or future months.	Software/Technology used: MongoDB
	Feasibility Evidence: Build an ER-Diagram of the database to implement the workflow
	Referred use case diagram: UC-3
CR-3: Content admin can view team member's performance and progress and change member's account type.	Software/Technology used: JSON web token
	Feasibility Evidence: use JWT for Authentication service then update the data in MongoDB
	Referred use case diagram: UC-43, UC-44
CR-4: Content admin can view pitch details, and approve pitch to move into the next stage of content creation	Software/Technology used: MongoDB, Flask, Creative TIM
	Feasibility Evidence: use AJAX to request data from MongoDB, and then display data to User-end using Flask.
	Referred use case diagram: UC-17, UC-18, UC-19, UC-20
CR-5: Content admin can view titles details, and approve titles to move into the next stage of content creation	Software/Technology used:MongoDB, Flask, Creative TIM
	Feasibility Evidence: use AJAX to request data from MongoDB, and then display data to User-end using Flask.
	Referred use case diagram:UC-23, UC-24, UC-25
CR-6: Content writer can draft an idea then pitch it for approval	Software/Technology used: MongoDB, Flask
	Feasibility Evidence: Build up a prototype with MongoDB and Flask
	Referred use case diagram: UC-15, UC-16

3.3 Evolutionary Feasibility

No evolutionary requirements have been negotiated by this time.

4. Process Feasibility - deferred

This section is deferred per course requirement

5. Risk Assessment

Table 7: Risk Assessment

Risks	Risk Exposure			Risk Mitigations
	Potential Magnitude	Probability Loss	Risk Exposure	
User being misled by our interface UI/UX design: User confused by our design, and do operations that is not what they intended to do.	8	5	40	1. Chat with actual users after we finished development, redesign unreasonable and ambiguous terms or UI/UX component 2. Comply with Material Design logic
Potential high learning curve for maintainers: Majority of the team do not plan to take CS577B. Need to have smooth handoff.	5	4	20	1. Provide documentation to ensure smooth knowledge transfer 2. Build the system using technologies which the client is familiar with
Inability to handle multiple users: If various users are accessing the web application, the system may not be able to resolve requests.	5	4	20	1. Discuss with client about their expected amount of users 2. Prototype system and show how many user can operate on it simultaneously
Concurrency Issue: Multiple users upvote or edit at the same time.	4	3	12	1. Handle each request one at a time
Inaccessibility of Cloud Database (AWS): If the cloud service is not available due to net problem or server break down, the web application will not be able to work.	4	3	12	1. Use progressive web app (PWA) with service workers to serve cached data

6. NDI/NCS Interoperability Analysis

6.1 Introduction

This project has not legacy system so we planned to develop using React as front-end framework, and Flask as Back-end framework. This application will be run on AWS, and use MongoDB as Database.

6.1.1 COTS / GOTS / ROTS / Open Source / NCS

Table 8: NDI Products Listing

NDI/NCS Products	Purposes
React	Front-end Framework
Flask	Back-end Framework
MongoDB	Database
AWS	Cloud Database Server

6.1.2 Connectors

In this project, we use Python/Flask Connector to enable the Web application to retrieve and query data from database.

6.1.3 Legacy System

There is no legacy system. Besides, in our project, all system we are going to use are up to date.

6.2 Evaluation Summary

Table 9: NDI Evaluation

NDI	Usages	Comments
React	Front-end	Positive Points: ● Better performance ● Better compatibility among web browsers ● Better ecosystem Negative Points:

		● Learning curve
Flask	Back-end	Positive Points: ● Open source ● Light Weight ● Familiar by the client Negative Points: ● Have to use third party extensions
MongoDB	Database	Positive Points: ● Flexible and schemaless ● Support large scale of data Negative Points: ● Lack of community support with respect to Flask integration
AWS	Cloud Server	Positive Points: ● Easier than building local server ● Cheaper when having small data scale ● Safe Negative Points: ● More complex setup compared to alternatives (Heroku)