iDeal Web and Mobile Application

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EXECUTIVE SUMMARY

Dear Potential Investor or iDeal Early Adopter,

Our team of developers, engineers, and marketers would like to thank you in advance for taking the time to review our attached concept document for the iDeal web and mobile app. This executive summary will help you to understand why we undertook this project, what planning and preparation activities we took to determine the feasibility of launching this project in fairly short order, the results of our planning activities and our recommendation for interested parties, such as yourself.

The iDeal web and mobile app allows: buyers to find high quality sporting equipment in their vicinity without hours of online research; sellers the ability to list the same types of equipment with a single click of the camera and all while eliminating the need to exchange large amounts of cash in person. Our original idea and intent was and still is to expand the site beyond its current niche / narrow SCOPE.of sporting equipment. We decided to narrow the scope to focus our market research (i.e. SWOT Analysis) to build our base and popularity with early adopters using the Demand Creation Tasks and goals for iDeal.

We devised an agile Development Approach for the iDeal App to create the app. With the development Figure K and Table 2: iDeal Resource Requirements on board, we will launch version one in approximately one year. We've conducted Table 3: Cost Estimate for iDeal Developments, Figure U: Platform Selection Decision Treeanalysis to select the best platforms to support our app and thorough Requirements Development and Management to determine the best construct for our Figure R: SysML Diagram for the iDeal App (Buy Feature Expanded). Our overall Table 22: Technology Readiness Assessment is high and the Figure W: iDeal Technical Risk Assessment is moderately low.

Based upon our budget and schedule estimates, as well as our assessment of our Figure P: Earned Value for iDeal App Development to date, we are on track and within our COST CONTROL LIMITS. to finish this development and version one launch by our November 2015 date. As such for investors, we request funding for or toward the maximum acceptable budget of $940,550 (USD). If you are an early adopter, we recommend that you sign up at www.ideal.com and join the site. Here you will have exclusive access to the features as they are developed and will be able to provide direct feedback.

We thank you for your time and attention and look forward to providing you with the iDeal experience!

PART A: PROJECT

I.   PROJECT CONCEPTUALIZATION.

This section captures the development of the iDeal concept, overall plan for executing the project, and proposals to facilitate a successful project. It encompasses processes needed to conceive a project in its entirety – from initial planning through resource allocation – through the establishment of project requirements, key management artifacts, and credible cost and risk assessments consistent with the overall vision, strategies, and objectives

A. PROJECT PROPOSAL

Craigslist and eBay are two very successful online marketplaces for users to list, search, buy and sell goods. However, there is a gap in both companies' services that iDeal plans to exploit and capitalize upon to compete as a preferred provider of this particular niche of online services. iDeal's approach to being the preferred online provider for sporting equipment will encompass the following key tenets:

- Allow buyers to find high quality sporting equipment in their vicinity without hours of online research.

- Allow sellers the ability to list the same types of equipment with a single click of the camera, all while eliminating the need to exchange large amounts of cash in person.

- Provide not only a web application as a platform for conducting such transactions, but also incorporate a mobile app service which would allow future users to access account information, browse goods, and upload new products and details at any time.

1. DEMAND CREATION.

Craigslist and eBay have both already proven that a business such as theirs is not only profitable, but also sustainable - as well as needed. However, with the advent of mobile phones and mobile applications becoming more prevalent not only here in the United States, but worldwide, iDeal's product will close the gap between the web-based platforms being offered by today's online vendors and the new mobile age. Mobile apps have already become a staple in today's society, particularly among those younger than 33 years of age – known as Millennials. A 2013 Forrester report stated that 50% of Americans owned a smartphone; of that number, 72% of Millennials owned one. (Fleming, Reitsma, & Morrill, 2013). Smartphone ownership will continue to increase, and iDeal is well-positioned to capitalize. The first step in earning a market share is to create a demand for our product; fortunately, the groundwork has already been laid by the current providers, and is captured in the demand creation cycle in **Figure A.**
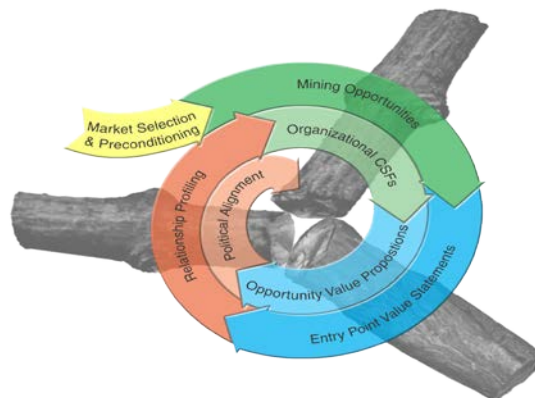

Figure A : Demand Creation Cycle

To ensure the success of iDeal, we have either already performed or will perform the following tasks (all of which align with each area of the **Demand Creation Cycle** [Bixler, 2013]).

Market Selection	• Includes determining target markets – who, where and how. The "how" includes an analysis of our current state and where we would like to be tomorrow, as well as highlighting how our product is different from others (image development), and looking at developing other opportunities.
Mining Opportunities	• Understanding the current market: Includes analyzing trends; possibilities and making a valuable contribution to the market (our future clients).
Value Statement	• Value Messaging: Generating interest by answering why this product is needed, why it is needed now, and more importantly, why you should buy our product.
Relationship Profiling	• Networking/Relationship Building: Use networking to not only identify and align our company with those that will help champion our product, but to also as a means of identifying potential competitors.
Organizational CSFs	• Identify and outline our mission essential functions – along with their supporting activities – that will be critical to the success of our company. These should include metrics such as revenues, cost and operations, as well as potential services and clients.
Value Propositions	• Maintain a balance between our Mission Essential Functions and providing our services and products to ensure we not only stay relevant, but also profitable. This will occur by addressing Cause – Effect – Offering – Result.
Political Alignment	• In order to gain a foothold in certain markets (particular overseas), there may be a need to align ourselves with companies who already have a presence in those markets. This will also assist us in understanding and then developing a cultural awareness that will be needed to succeed in such places.

Figure B: Demand Creation Tasks and goals for iDeal

Our Business Model will be similar to Craigslist, in that we will charge companies for ads and sponsored listings on our site. The price of each ad will depend on the city in which the company is located. For example, a company in New Orleans may be charged $25.00 per advertisement, whereas a company in Manhattan, NY may be charged $55.00 per advertisement. The cost will be the same for both the web application and the mobile app. Our users will only be charged a minimal fee to cover the fees from our external payment system.

2. STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREAT ASSESSMENT.

Figure C below outlines our Strength, Weaknesses, Opportunities, and Threat (SWOT) analysis of iDeal and the current market.

Figure C: SWOT Analysis

B. REQUIREMENTS DEVELOPMENT AND MANAGEMENT

The iDeal traceability matrix was established to document how the functional and non-functional requirements are derived from the customer's needs. The matrix below will be used to maintain configuration control and traceability of requirements.

Project Name:	iDeal System			Project Name:	<optional>	
National Center:	iDeal			National Center:	<required>	
Project Manager Name:	Michael Gooden			Project Manager Name:	<required>	
Project Description:	Requirements for iDeal System			Project Description:	<required>	

REQ ID	Technical Assumption(s) and/or Customer Need(s)	Functional Requirement	Status	System Component(s)	Software Module(s)	Test Case Number	Verification	Additional Comments
001	Customer Need	iDeal shall allow users to upload pictures of items for Sale or Trade.	Completed	Software	Sprint 1	TC01	Test Doc 1	
002	Customer Need	iDeal users shall add textual descriptions and pricing information of each item.	Completed	Software	Sprint 1	TC02	Test Doc 1	
003	Customer Need	iDeal users shall have the option to proposal counter-offers to priced items.	Completed	Software	Sprint 1	TC03	Test Doc 1	
004	Customer Need	iDeal shall process payments through a payment service.	Completed	Software	Sprint 1	TC04	Test Doc 1	

Figure D: Requirements Traceability Matrix

Figure D shows a segment of the requirements traceability matrix for iDeal. To view the full document, click on the figure above.

Stakeholder Requirements will serve as the baseline for the iDeal Requirements Development. Additional technical and system constricts will be accounted to review, assess and balance requirements. First system boundary and performance objectives will be defined to establish functional requirements, Measure of Performance (MOP) and Measure of Effectiveness (MOE). IEEE and Industry standards will be used to meet required quality design considerations. External interfaces with iDeal and human factors considerations will have functional requirements. Design constraints such as wifi connectivity vs LAN connects will be analyzed. Requirement verification methods will be employed to ensure and maintain traceability. Configuration management control of requirements will be managed and changed utilizing Rational Dynamic Object Oriented Requirements System (DOORS).

This section organizes and describes functional and non-functional system requirements for the iDeal online marketplace. This document is limited to the iDeal online marketplace mobile app and web application. Other external interfaces will be mentioned but not detailed within this document. This section

is developed for and intended to be used by web and mobile apps developers, IT engineers, project managers, testers, and technical writers.

1. CONCEPT OF OPERATIONS (CONOPS)

The upsurge of e-commerce online sales have increased exponentially over the past few years even with the proliferation of various retail and online stores there is still a growing market for e-commerce. To capture a part of this market share, Team Epic developed an online marketplace in the spirit of eBay and Craigslist called iDeal. It combines local listings, yet commercially inclined. The iDeal web application and mobile app is intended to close the gap between the consumers and sellers - sellers will have the ability to list their entire inventory – and eliminate the shipment aspect with local pick-up. There will be an electronic bidding capability, where cash or barter items are the options. iDeal allows safe and secure online transactions via the payment service through the web application or mobile app. **Figure E** depicts the iDeal CONOPS
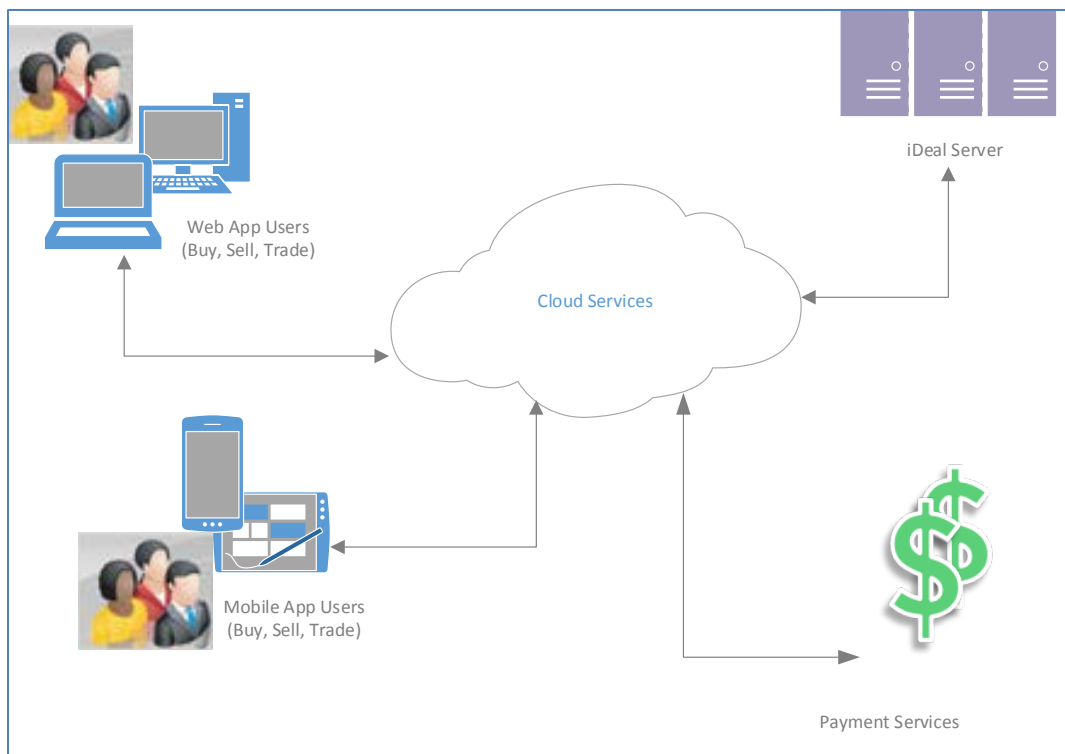
Figure E: iDeal CONOPS

iDeal is an online e-commerce web application where sellers and traders can post an inventory of items available for sale to buyers or traders. Sellers set up an account on the web application and upload items to sell via the mobile camera phone or pictures can upload by their home PC. Buyers can review items and make purchases through iDeal's web application or mobile app. iDeal will use a payment service to facilitate the purchase of these items for a small transaction fee.

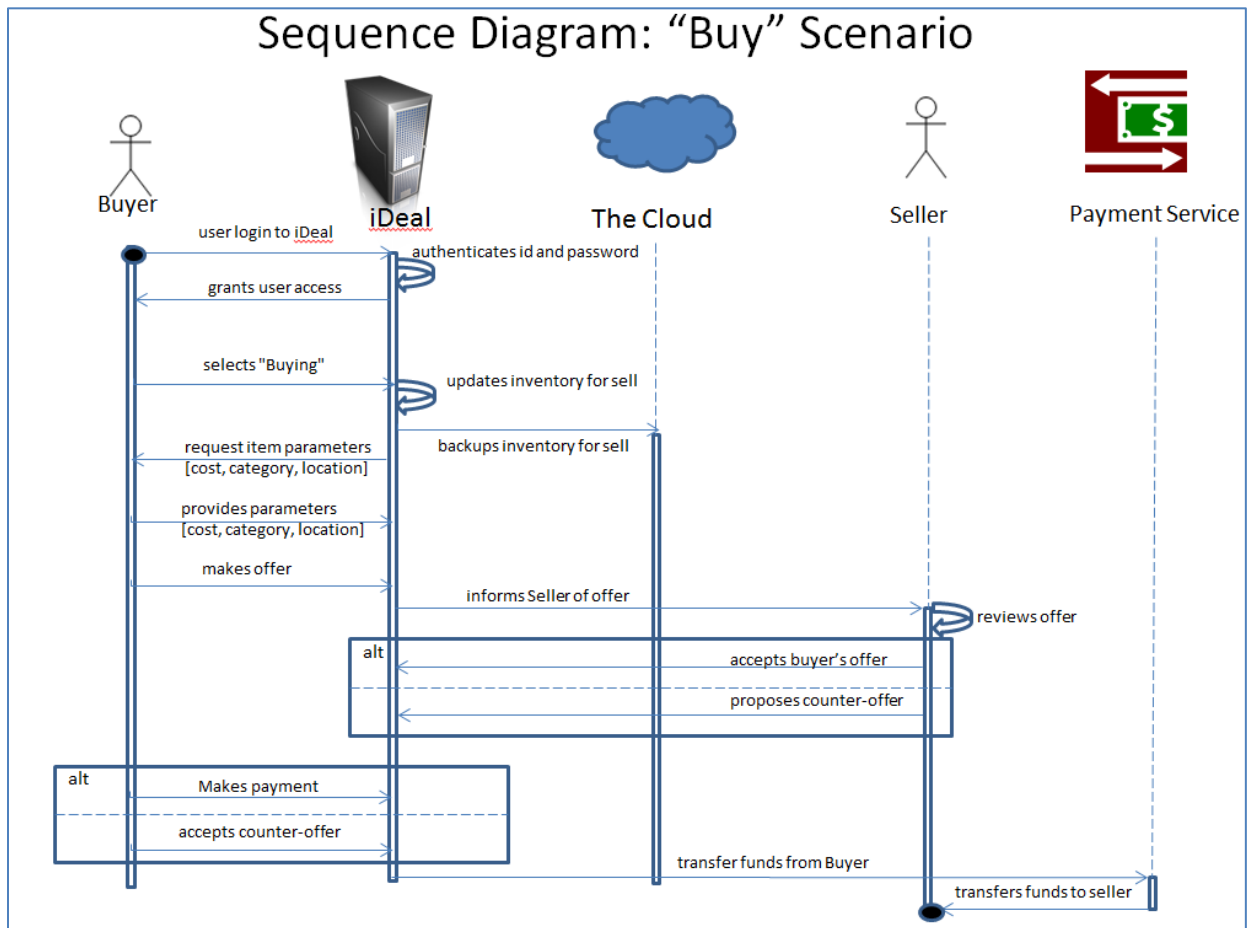### 2. USE CASE SCENARIO & SEQUENCE DIAGRAM.

Figure F: Sequence Diagram

3. MEASURE OF PERFORMANCE (MOP) AND MEASURE OF EFFECTIVENESS (MOE)

To establish the iDeal system preferred performance parameters for success levels of effectiveness and suitability are required; as are measurements that address customer satisfaction (e.g. performance, safety, reliability, availability, maintainability, and workload requirements) (INCOSE, 2006).

The iDeal levels and measures of performance (MOP) for the top-level system functional and non-functional requirements required to satisfy the system Measures of Effectiveness (MOE) are determined from the following criteria (INCOSE, 2006):

Table 1: Measures of Effectiveness & Performance

Measurement Criteria	Measures of Effectiveness (MOE) Areas
	Measures of Performance (MOP) Areas
Selected Standards	IEEE, Internet Protocols, (XML, HTML, CSS)
System Boundaries	Network System,
External Interfaces	Payment Services, Twitter, Facebook
Utilization Environment	Cloud, Mobile Devices, Computers
Life Cycle Process Requirements	Software Development and Application Upgrades
Design considerations	User Interface, Security, Safety Factors
Define Verification Criteria	Test, Demo, Model and Simulations

C. ACQUISITION MANAGEMENT

1. ACQUISITION.

As a start-up, iDeal will focus on the acquisition of talent and skills using systems engineering methods designed to bring value to the company beyond the initial funding stream. To become viable in a competitive market place, acquisitions will have to be carefully management to maximize initial resources. As such, iDeal's acquisition management plan will serve as a guide for iDeal project managers to identify and define the items to be procured, the types of contracts to be used, the contract approval process, and key decision criteria. At a high level, key decisions in the acquisition strategy will depend on:

- Buy vs. Make, and pros and cons of each
- Decision criteria for selecting the best vendors or service providers

A careful analysis of these factors will shape the acquisition strategy and project budget. **Figure G** below shows the make or buy process that will be applied to infrastructure and services over $10,000.
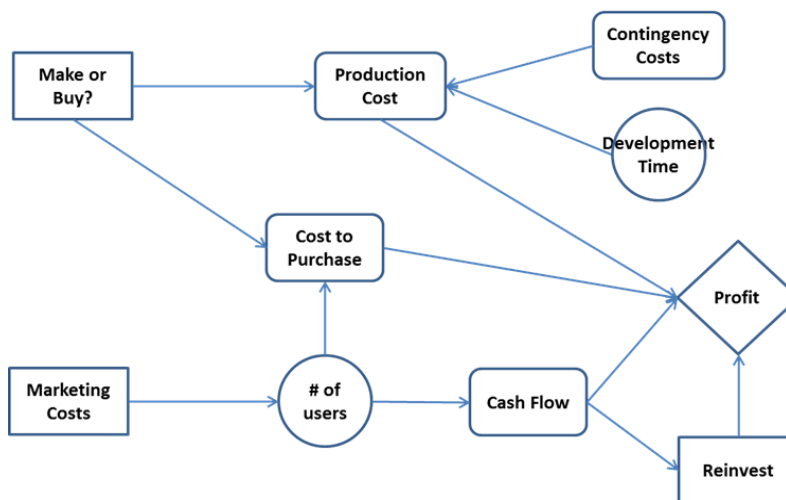

Figure G: Influence Diagram for iDeal Make or Buy Decision

2. PROCUREMENT

If iDeal moves ahead with external acquisitions, all items procured will be solicited under firm-fixed price contracts. The project team will define the item types, quantities, services and required delivery dates for material purchases. Services and personnel procurement will be conducted through either a talent agency or criteria-based decision process focusing on: ability of the vendor to provide all items by the required delivery date; quality; cost; comparison of outsourced cost versus in-sourcing; and past performance (based on submitted code/design work).

F. PROJECT PLANNING

1. SCOPE.

The scope of this particular project is the creation of the iDeal web and mobile application – version one. The project will be completed by September 2015. The iDeal application shall allow: buyers to find high quality sporting equipment in their vicinity without hours of online research for purchase or trade; sellers the ability to list the same types of equipment for sale or trade with a single click of the camera all while eliminating the need to exchange large amounts of cash in person.

2. DEVELOPMENT APPROACH.

As depicted in **Figure H,** our team will use the Agile project management approach to develop the iDeal web and mobile applications. We selected Agile vice Waterfall project management due to the iterative nature of application development. Our project will consist of five phases: 1) Development, 2) Integration, 3) Testing and Quality Assurance, 4) Staging, and 5) Production. Phases 1-3 are iterated over the course of 6-8 months and shall yield the various features required of the web and mobile application against the identified requirements. Phase 4 consists of final testing within which we have also inserted some room to return to Phases 1-3, if needed. Phase 5 is the production or launch of the version of the web and mobile app. While these high-level stages are applicable across infinite versions of the web and mobile app, the work breakdown structure is highly specific to the first version of the product. We expect to have additional or "desired" requirements arise during the version 1 development, but intend to table those items for subsequent versions.
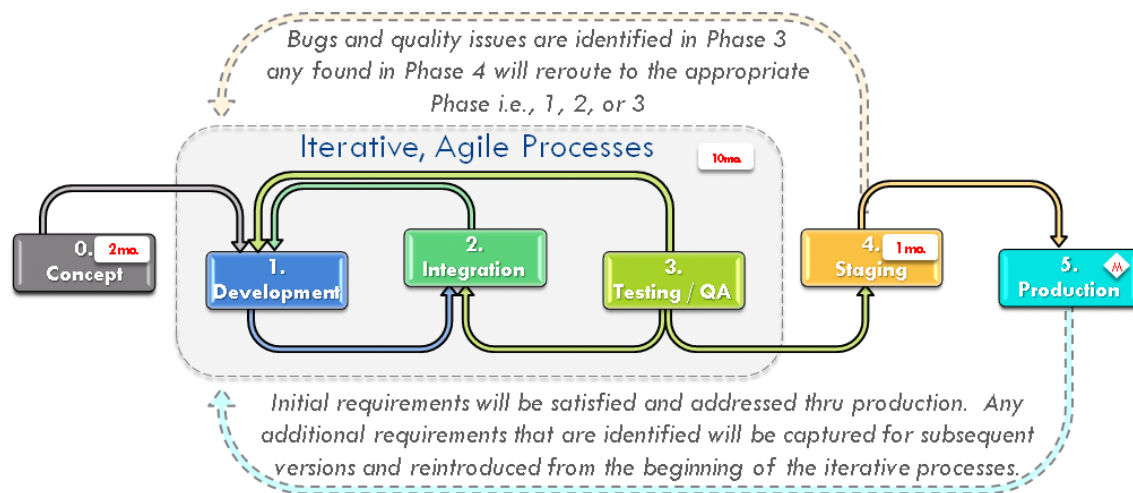
Figure H: Development Approach for the iDeal App

Figure I is a rendering of the Systems 'Vee' with colors correlating to the phases in our iDeal project. Through this color coding you can see that our approach follows and addresses the fundamentals of systems engineering. Phase 0 – Concept encompasses the aspects of identifying user requirements and preliminary design. Phase 1 – Development, 2 – Integration, and 3 – Testing & QA are the phases that are looped together in an iterative nature and reflect the detailed design, development and subsystem testing aspects. Meanwhile Phase 4 – Staging and Phase 5 – Production mirror the system testing and operation & maintenance aspects in the systems model.

Figure I: System Vee Correlated to iDeal Project Development Approach

The iterative nature of steps Phases 1, 2, 3 mirror and incorporate the Systems Engineering process - i.e., the Systems 'Vee'. In our particular model, during development (Phase I) requirements are used to conduct preliminary design followed by detai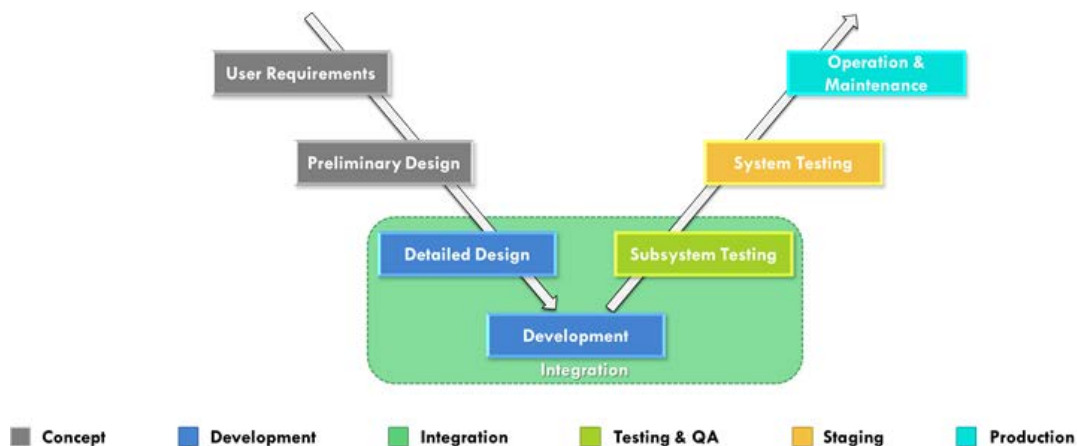led design. Next the components go thru integration (Phase 2) where the components are brought together for interoperation in the testing environment. Once integrated in the testing environment, the testing and quality assurance (Phase 3) commences and this addresses subsystem and system testing.

3. WORK BREAKDOWN STRUCTURE (WBS).

We will utilize our development approach to complete each work package in the WBS at **Figure J**. The WBS for the iDeal web and mobile app consists of three (3) high-level work packages. These work packages represent the features for which we will conduct our Agile development. The features are 1.1 User, 1.2 Buy / Trade, and 1.3 Sell / Trade. For the purpose of this paper, we have only fully expanded one of the high-level WBS work packages, 1.1 User, to its lowest level work packages.

The User Feature consists of four lower level (third tier) work packages. They are 1.1.1 Create Account, 1.1.2 Account Verification, 1.1.3 Account Recovery, and 1.1.4 Application Security. Each of these lower level work packages would be developed per iteration of phases 1, 2, and 3.
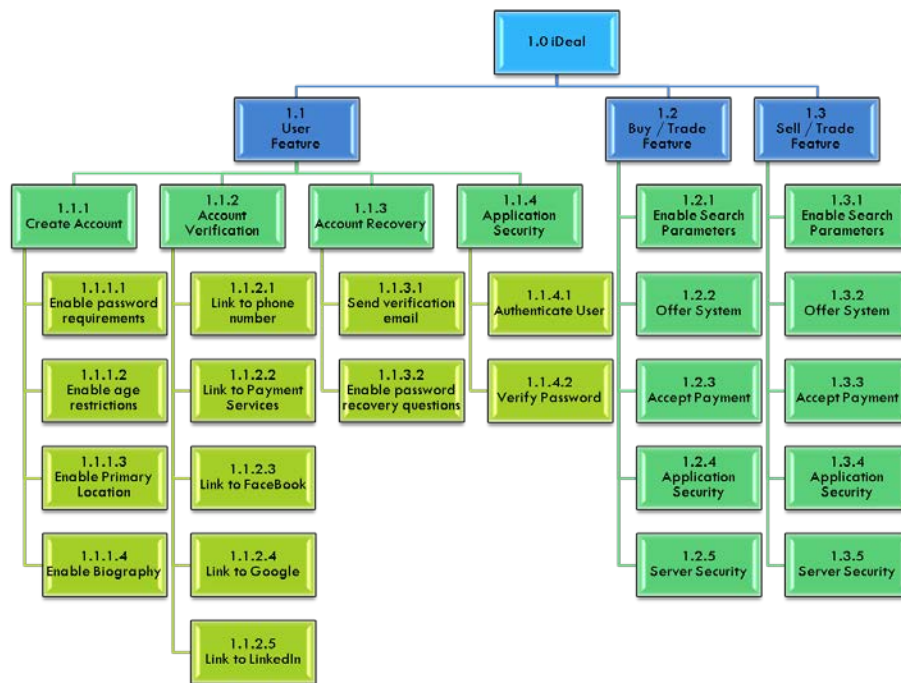
Figure J: iDeal App Work Breakdown Structure (WBS)

4. PROJECT SCHEDULE.

The project schedule is aligned with the overall project approach through the phases (**Figure K**). Each phase becomes an overarching schedule activity and to ensure that that each of the WBS work packages are aligned to the development, integration, and testing / QA schedule activities - we have aligned the WBS to the schedule as well. Another key aspect of our schedule is the Backlog activity which provides time for backlog and bug resolution. This is separate from the other phases and may lengthen either (or both) the testing & QA or Staging phases depending on where the backlog occurs.
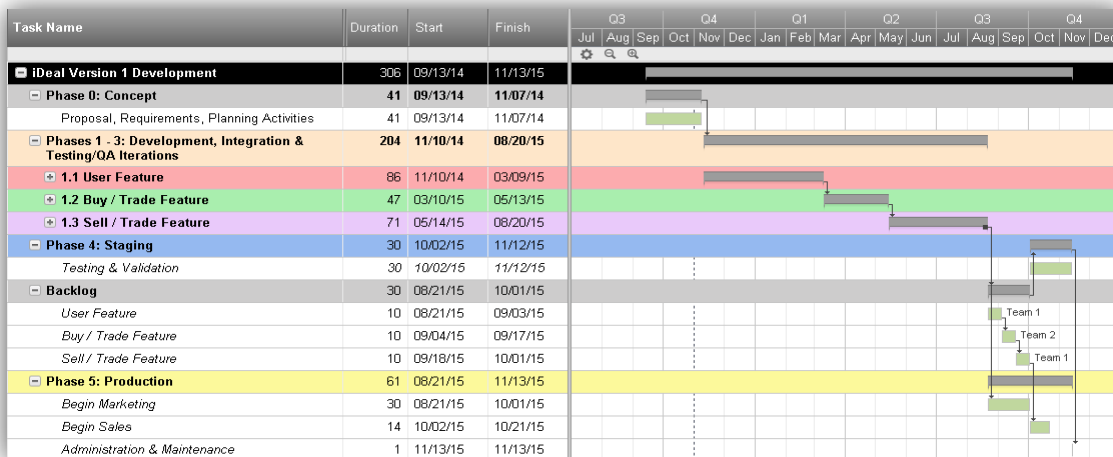
Figure K: iDeal Development Schedule

Since the WBS work packages represent specific features of the iDeal system, we decided to align the schedule and the WBS. Each feature / WBS work package correlates with a sprint in the schedule **Figure L** shows the schedule when expanded to the lowest level.

Figure L: iDeal Project Schedule Expanded (WBS Alignment)

5. *RESOURCE REQUIREMENTS.*

Table 2 below outlines the Resource requirements for version one of the iDeal application. The next segment of this document will outline the costs associated with these resource requirements as well as our planned values for the project.

Table 2: iDeal Resource Requirements

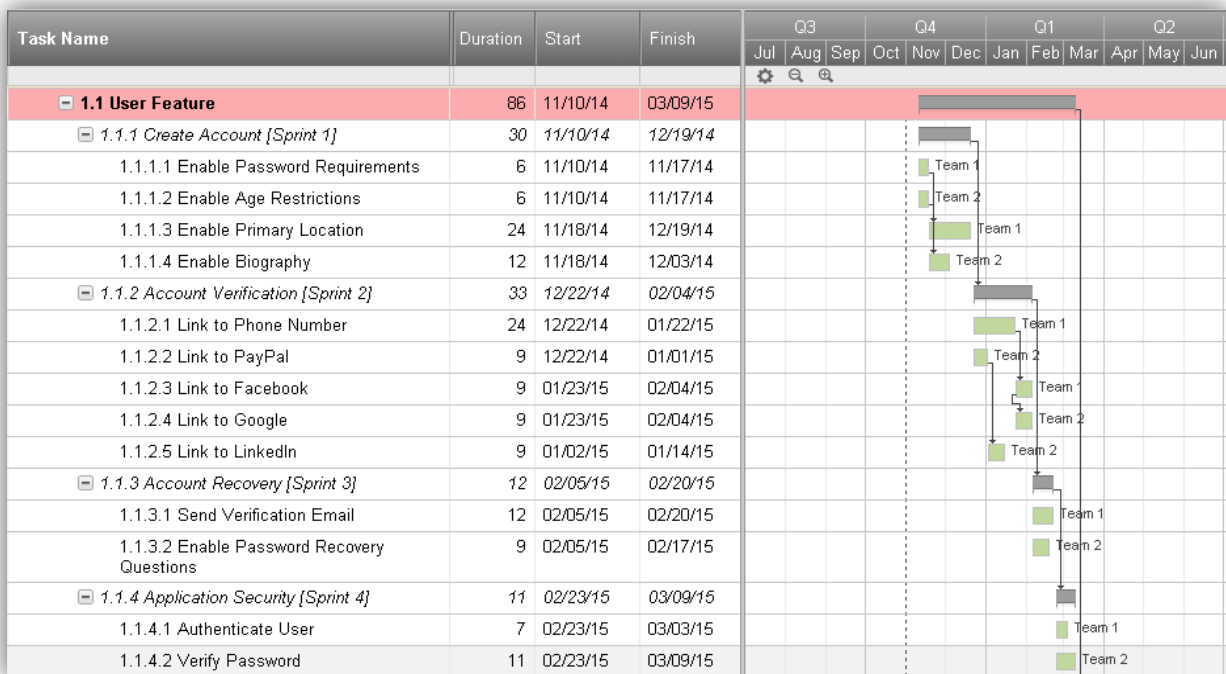| Resource Type	Description	Quantity
Personnel	▸ Designers	▸ 2 FTE
	▸ Developers	▸ 5 FTE
	▸ Quality Assurance	▸ 2 FTE
	▸ Administrators	▸ 2 FTE
	▸ Marketing	▸ 2 FTE
	▸ Technical Support	▸ 3 FTE
Equipment	▸ Development & Integration	
	– Laptops	– 6
	– Specialty Software & Licenses	– 24 licenses
	– Servers	– TBD
	– Infrastructure	– TBD
	▸ Testing / QA & Staging	
	– Devices (Android; iOS, Windows phones & tablets)	– 9 devices
	▸ Production	
	– Performance Monitoring Software	– 1 perpetual license
Marketing	▸ Direct Marketing Email Campaign	▸ 4 campaigns
	▸ Digital Presence Management (Social Media, SEO, Adwords)	▸ 1 year
	▸ Website Visitor Intelligence and Lead Tracking	▸ 1 year
	▸ Strategic Public Relations (Blogs / Publications, Press Releases)	▸ 5 releases, 4 blog entries, 3 publications

G. COST-ESTIMATING

To provide a cost estimate for the activities above, we used analogous cost estimates to determine the price of equipment and marketing services based on similar hardware, software, and services. A complete estimate the entire project cost, including equipment, core services, personnel and marketing, is shown below.

Table 3: Cost Estimate for iDeal Development

Category	Description	Quantity	Unit	Cost	Phase	Duration (months)	Total
Personnel	▸Designers	2	FTE	$60,000.00	I-II	8	$80,000.00
	▸Developers	5	FTE	$80,000.00	I-II	8	$266,666.67
	▸Quality Assurance	2	FTE	$65,000.00	III-IV	4	$43,333.33
	▸Sys. Administrators	2	FTE	$75,000.00	V	12	$150,000.00
	▸Management	2	FTE	$80,000.00	I-V	12	$160,000.00
	▸Sales	2	FTE	$30,000.00	V	2	$10,000.00
	▸Technical Support	3	FTE	$45,000.00	V	2	$22,500.00
						Subtotal:	$732,500.00
Equipment	▸Development & Integration	▸					
	-Laptops	6	each	$1,500.00			$9,000.00
	-Specialty Software & Licenses	24	each	$200.00			$4,800.00
	▸Testing / QA & Staging	▸					
	-Devices (Android; iOS, Windows phones & tablets)	9	devices	$500			$4,500
	▸Production	▸					
	-Performance Monitoring Software	1	year	$2,100			$25,200
	▸Entire lifecycle						
	IT Infrastructure						
	- Servers	1	year	$15,000			$15,000
	Cloud solution (AWS)	1	year	$10,000.00			$10,000.00
	Network devices	1	set	$6,000.00			$6,000.00
						Subtotal:	$74,500.00
Marketing	▸Direct Marketing Email Campaign	12,000	dollars	$12,000.00			$12,000.00
	▸Digital Presence Management (Social Media, SEO, Adwords)	15,000	dollars	$15,000.00			$15,000.00
	▸Website Visitor Intelligence and Lead Tracking	9,000	dollars	$9,000.00			$9,000.00
	▸Strategic Public Relations (Blogs / Publications, Press Releases)	12,000	dollars	$12,000.00			$12,000.00
						Subtotal:	$48,000.00
						Total Cost:	$855,000.00

As currently conceptualized, $855,000.00 is needed to cover the development and initial marketing costs for a quality product that will meet our requirements and business goals. The majority of the cost for this project comes from activity costs associated with the development, quality assurance, and management our applications and interfaces.

While we will not apply it on this project, if we wanted an ever better estimate of project costs, we can apply the beta distribution method and apply expert judgment to derive a range of estimates for key costs. A sample beta distribution for our activity costs can be found in (**Table 4**).

Table 4: Beta Estimate for iDeal Activity Costs

Role	Optimistic	Most Likely	Pessimistic	Beta Estimate
▸ Designers	$50,000.00	$60,000.00	$80,000.00	$61,666.67
▸ Developers	$59,000.00	$80,000.00	$110,000.00	$81,500.00
▸ Quality Assurance	$60,000.00	$65,000.00	$80,000.00	$66,666.67
▸ Sys. Administrators	$55,000.00	$75,000.00	$100,000.00	$75,833.33
▸ Management	$65,000.00	$80,000.00	$110,000.00	$82,500.00
▸ Sales	$25,000.00	$30,000.00	$50,000.00	$32,500.00
▸ Technical Support	$40,000.00	$45,000.00	$55,000.00	$45,833.33

H. STAKEHOLDER MANAGEMENT

The success of this project will depend highly on internal and external stakeholders across the private sector and in select pilot cities where the iDeal application will be deployed. The stakeholders fall under the main categories of financial stakeholders, potential customers and users, project stakeholders, and other indirect stakeholders. These are further delineated in **Table 5**.

Table 5: Stakeholder Analysis

Stakeholder Group	Description	Power	Interest
Funding Partners			
Venture Capital	Investors who buy equity in ideal	10	8
Crowd-funders	Those who donate through crowd-funding	3	8
Others	Others with equity stakes in iDeal	10	10
Potential Customers (Sellers and Buyers)			
Coaches/Trainers	Local coaches and trainers who may participate in iDeal outreach programs	4	3
Merchandising Partners	Medium and large retailers that could provide initial inventory for iDeal	7	3
Early Adoptors	Young and tech-saavy; the target demographic for the initial rollout	8	7
Other users	Everyone else, not fully defined at the moment	7	2
Project-related Stakeholders			
Project Management Team	Team in charge of managing and developing the web and mobile apps	9	10
Marketing Partners	Vendors/services assisting with marketing efforts	7	6
Infrastructure and Service Providers	Amazon Web Service, Apple, Android, Microsoft, Paypal, performance monitoring, and other external services that facilitate iDeal operations	8	1
Other Indirect Stakeholders			
Federal Government	iDeal must comply with Federal rules and regulations	5	1
Bloggers and Tech websites	Site and bloggers influence the promotion and "buzz" of new applications	6	5
Other Web Applications	Competitors and similar applications	7	7

To better understand how to manage these stakeholders, we leveraged the high/low stakeholder model where each group is rated, from 1 to 10, on their level of power or influence of the power and on their level of interest in iDeal. The results are graphed in **Figure M** below:
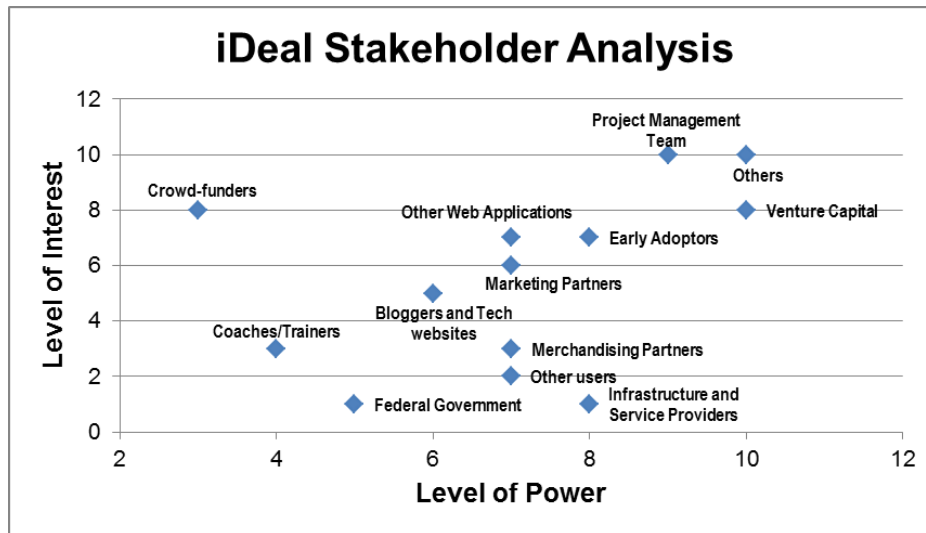
Figure M: High/Low Stakeholder Map

In order to manage the stakeholders, those with high power and high interest should be monitored closely. Those with high interest and low power should be informed of ongoing process and kept in the loop. Those with high power but low interest should be kept satisfied, and finally, those with low power and interest require minimal effort to maintain.

I.   RISK MANAGEMENT

The iDeal project development team will implement a Risk Management Plan that employs the following steps: Risk Identification, Risk Assessment, Risk Handling, Risk Tracking and Control, and Risk Mitigation. The diagram below illustrates the impacts of Technical Risk, Cost Risk, Schedule Risk and Programmatic Risk.

Figure N: Typical Relationships Between Risk Categories (INCOSE)

The SWOT assessment (**Figure C**) identified potential threats and opportunities of the iDeal system. The initial iDeal system capability was captured and reviewed for system development. The risks

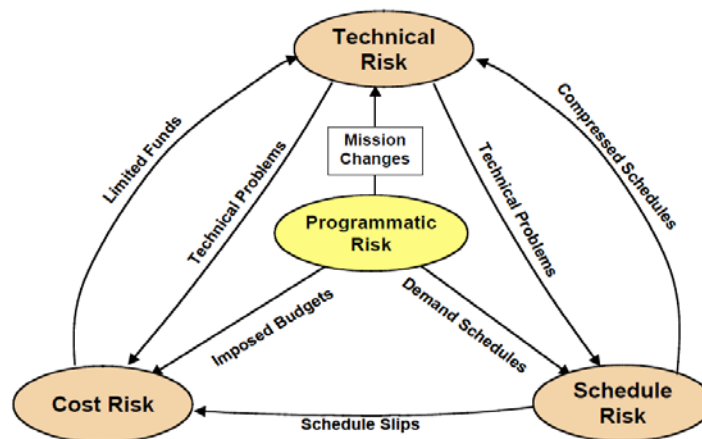identified were assessed in a Risk Matrix by probability of occurrence and severity, and if they impact Cost, Schedule, Technical or Programmatic. Risk will be handled by either: accepting, mitigating, or transferring the risk. Risk will be mitigated through monitoring and controlling cost, schedule and technical metrics.

J. EARNED VALUE MANAGEMENT (EVM).

EVM is a tool for measuring and assessing project performance through the integration of technical scope with schedule and cost objectives during the execution of the project. EVM provides quantification of technical progress, enabling management to gain insight into project status and project completion costs and schedules. Two essential characteristics of successful EVM are EVM system data integrity and carefully targeted monthly EVM data analyses (e.g., identification of risky WBS elements). Planning for EVM is essential to effective EVM implementation. EVM entails ability to: identify and develop EVM requirements for applicable major acquisitions (in-house and contract); develop effective EVM Implementation Plans for projects with EVM requirements; and establish, assess and maintain the project Performance Measurement Baseline (PMB).

Figure O depicts the planned values for the project. The phases defined for the planned values are aligned to the project phases and calculated using the percentage of the total project length that is correlated to the project phase as well as the estimated costs for the various resource requirements previously identified. These planned values will be utilized as our performance measurement baseline.

Planned Value

	Start	Phase 0	Phase 1, 2, 3	Phase 4	Phase 5
Planned Value	$-	$111,150.00	$684,000.00	$769,500.00	$855,000.00
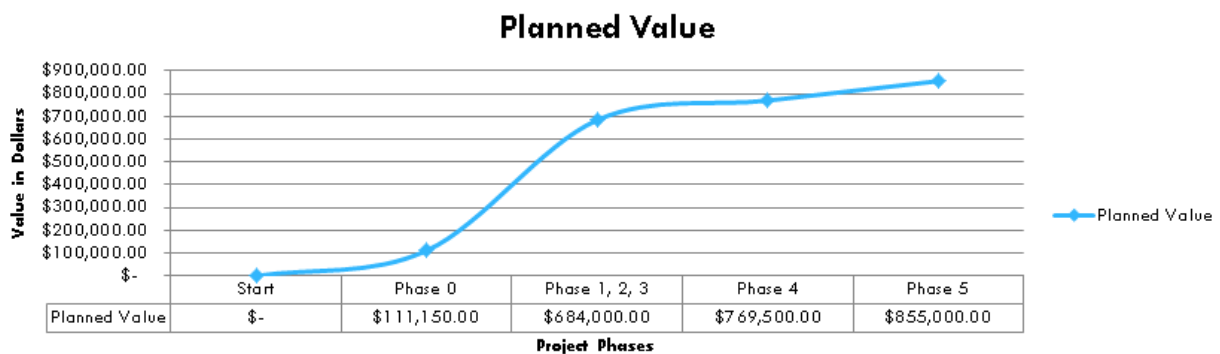
Figure O: Planned Value for iDeal App Development

II. PROJECT CONTROL & EVALUATION.

This section addresses activities involved in managing and controlling project status and performance.

A. TRACKING / TRENDING OF PROJECT PERFORMANCE

Outlined below are the methods we shall utilize to monitor and evaluate performance metrics, project risks, and earned value data to analyze, assess and report the status and technical performance of the iDeal project. Below are samples of the various checklists we will utilize for the iDeal project.

1. PROJECT STATUS CHECKLIST.

Reporting on project performance should be commensurate with project complexity and risk. For many projects, especially those of low complexity and risk, a simple project status checklist may be sufficient for reporting performance to stakeholders (**Table 6**).

Table 6: Project Status Checklist

Project Title: iDeal	**Project Number:** EMSE 6099
Project Leader/Manager: Kafi Joseph	**Anticipated Project Start Date:** 09/11/14
Sponsor: Professor Sy Sarkani	**Date Prepared:** 31/10/14
Project Risk Level: Medium Risk	**Estimated Completion Date:** 06/10/15
Report Period From-To: 09/11/14 - 11/08/14	

Project Status Checklist:

Ref	Status	Status Item (explain if "yes")
Scope		
1	NO	Are there significant changes to Scope requested?
2	NO	Have the objectives in the Project Plan changed?
3	NO	Have the deliverables in the Project Plan changed?
Schedule		
4	**YES**	Is a critical path deliverable or milestone about to be missed?
5	NO	Is decision-making, needed but not completed about to impact the schedule?
6	NO	Does the actual time expended to date vary significantly from the project plan?
Budget		
7	**YES**	Will the approved budget be overrun?
General		
8	NO	Are there any other major issues or new risks?
9	**YES**	Is the project impacted by external factors?
10	NO	Are there project resource problems?
11	NO	Will the deliverables fail to meet specifications?
12	NO	Are there sponsor related issues?
13	NO	Are there any problems affecting the project team's ability to perform the work?
Explanation of status item and other comments:		
For every item answered "yes", give a brief explanation.		
Scope 4: We are currently slightly behind schedule, however the deadline is still obtainable.		
Scope 7: We have exceeded our budget by 1.5%.		
Scope 9: We are relying on an outside vendor to provide Platform/Software as a Service (PAAS/SAAS) via their		
Cloud Infrastructure. We also need to be cognizant of obtaining Licenses and Specialty Software.		

2. DETAILED STATUS REPORT.

For more complex projects, of medium to high complexity and risk, a more detailed status report may be appropriate (**Table 7**). In addition to the project status checklist, typical information that may be included in more elaborate status reports are, major accomplishments in this reporting period, current project milestones achieved and/or pending, current key issues analysis, current change requests analysis.

Table 7: Detailed Status Report

Project Milestones & Major Accomplishments		
Milestone or Accomplishment	Target Completion Date	Actual Completion Date
Proposal, Requirements, Planning Activities	11/7/2014	11/7/2014
User Feature	3/9/2015	
Buy/Trade Feature	5/13/2015	
Sell/Trade Feature	8/20/2015	
Staging	11/12/2015	
Production	11/13/2015	

Key Issues Analysis			
Issue Description	Issue Response	Date Opened	Date Closed

Change Request Analysis - (Highlight new changes since last status report here.)		
ID[1]	Major Change Requested	Impact
	NO NEW CHANGES SINCE LAST PPR	

[1] Change request ID from the integrated change control form.

Projects of high complexity and risk should include measures of project performance. In addition to the project

Project Performance Metrics (refer to Budget Plan Worksheet)			
	Budgeted cost for work	Budgeted cost of work	Actual cost for work
Personnel	$64,950.00	$60,875.00	$61,875.00
Equipment	$19,800.00	$18,100.00	$18,300.00

3. PROJECT PERFORMANCE METRICS.

Projects of high complexity and risk should include measures of project performance (MOP) metrics (**Table 8**). In addition to the project status checklist and detailed status report a common measure of project performance is earned value management which integrates project scope, cost, and schedule measures to assess project performance. Variances from approved baselines are calculated and monitored for unacceptable deviations.

Table 8: Project Performance Metrics

Project Performance Metrics (refer to Budget Plan Worksheet)	Budgeted cost for work planned to be done (Planned Value [PV]) [2]	Budgeted cost of work actually accomplished (Earned Value [EV]) [2]	Actual cost for work accomplished (Actual Cost [AC]) [2]
Personnel	$64,950.00	$60,875.00	$61,875.00
Equipment	$19,800.00	$18,100.00	$18,300.00
Advertising & Marketing	$26,400.00	$23,625.00	$24,000.00
Totals			

[2] Reported values are either "to date" or for some pre-determined time period.

Earned Value Analysis	Cost Variance[3] (CV) (EV - AC)	Schedule Variance[4] (SV) (EV - PV)	Performance Index	
			Cost (CPI)[5] (EV / AC)	Schedule (SPI)[6] (EV / PV)
Personnel	-$1,000.00	-$4,075.00	0.983838384	0.93725943
Equipment	-$200.00	-$1,700.00	0.989071038	0.914141414
Advertising & Marketing	-$375.00	-$2,775.00	0.984375	0.894886364

[3] Measures cost performance where >0 is desirable and indicates the project is under budget.

[4] Measures schedule performance where >0 is desirable and indicates the project is ahead of schedule.

[5] Measures cost efficiency for work completed where >1 is desirable and indicates a cost underrun for work completed.

[6] Measures progress achieved compared to planned where >1 is desirable and indicates more work completed than planned.

Project Leader/Manager Comments

Although we are currently behind schedule and slightly over budget for Phase 0 of our project, we fully anticipate completing this phase/project on, or ahead, of schedule.

B. PROJECT CONTROL

Earlier we established EVM as our mechanism for conducting project control. **Figure P** depicts the PV, EV and AC based upon completion of Phase 0 - Conceptualization. Using EVM as our project control mechanism, we can discern several things about our project's progress to date. The EV and AC appear to be very close in the graph below. As a result, it would appear on first glance that our project is currently on-track. However, we would need to further study the numbers to understand exactly where we stand.

1. SCHEDULE, COST, AND BUDGET PROGRESS.

Using EVM we can calculate schedule variance (SV) and the schedule performance index (SPI). **Table 9** below depicts the outcome of these calculations. From project management standard practices we understand that a positive SV indicates that the project is ahead of schedule and an SPI greater than 1 indicates ahead and less than 1 indicates behind schedule.
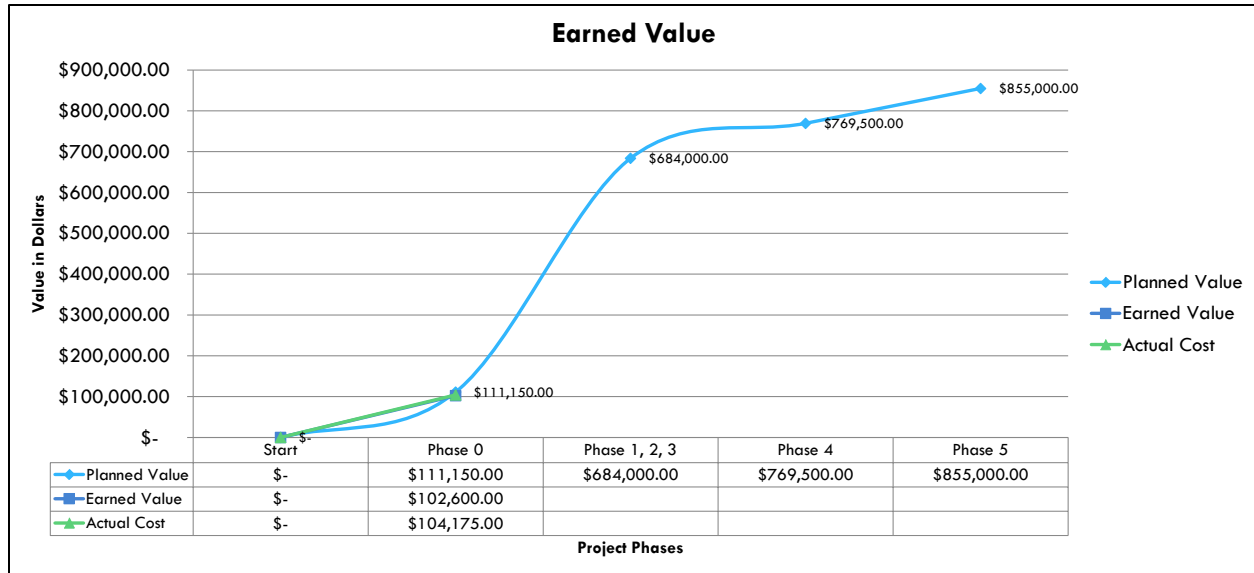
Figure P: Earned Value for iDeal App Development

As you can see in **Table 9**, our SV is negative and the SPI is less than 1. Both of these figures would indicate a project that is behind schedule, but once our team implements control limits, we will be better able to gauge current progress.

Table 9: iDeal Schedule Cost Variance

Schedule		SPI
EV -	PV	0.923076923
$ 102,600.00	$ 111,150.00	$ (8,550.00) **<-SV**

2. SCHEDULE CONTROL LIMITS.

At present, our project is scheduled to last 306 days with an end date pinpointed at November 13, 2015, but our marketing endeavors have publicized "Black Friday 2015" which is November 27, 2015. This results in the following:

- Maximum acceptable project duration = Current project duration + 10 business days = 316 (Note: 10 days derived from 13 Nov to 27 Nov (weekends excluded)
- Lower control limit of SPI (LCLspi) = project duration baseline ÷ maximum acceptable duration
- LCLspi = 306 ÷ 316 = .9684 ← longest project duration

- Minimum acceptable project duration = Current project duration - 30 business days = 276 (Note: 30 days derived from backlog buffer incorporated into schedule
- Upper control limit of SPI (UCLspi) = project duration baseline ÷ minimum acceptable duration
- UCLspi = 306 ÷ 276 = 1.109 ← shortest project duration

Given the LCLspi of .9684 and the current SPI of .9231 our schedule is behind schedule and our team will need to monitor closely and determine if additional personnel will be required to get us back on track. However, since we are only 13% done at this time, we will monitor, but not take immediate action.

3. COST CONTROL LIMITS.

At present, our project budget is set at $855,000. EVM calculations place our current actual costs (AC) at $104,175 while earned value (EV) was calculated to be $102,600. **Table 10** outlines a cost

variance (CV) of -$1,575 and a CPI of .985 which, according to project management standard practice translates to: positive CV is an under budget project and CPI greater than 1 is also under budget. Since our CPI is less than 1, it means our project is over budget. However, until we set the cost control limits we cannot yet determine if this is acceptable.

Table 10: iDeal Cost Variance

Cost		CPI
		0.98488
EV	AC	
$ 102,600.00	$ 104,175.00	$ (1,575.00) <-CV

- Maximum acceptable cost = budget + reserve = $855,000 + $85,500 = $940,500 (Note: our management reserve is 10% of the budget)
- Lower control limit of CPI (LCLcpi) = cost baseline ÷ maximum acceptable cost
- LCLcpi = $855,000 ÷ $940,500 = .9091

- Minimum acceptable cost = budget - $100,000 = $855,000 - $100,000 = $755,000 (Note: the reduction of $100K of salaries given using less backlog manpower)
- Upper control limit of CPI (UCLcpi) = cost baseline ÷ minimum acceptable cost
- UCLcpi = $855,000 ÷ $755,000 = 1.132

Given the LCL of .9091 and the current CPI of .9849 we are well above the limit which means that we do not need to be very concerned about the budget at this point in time. However, as we attempt to make up the schedule time, there is potential to impact our budget.

4. BUDGET ESTIMATE AT COMPLETION.

Table 11 uses three different standard practices to estimate the budget at completion if we continue at our present rates and we will use our given maximum acceptable cost of $940,500 as a guideline. Two of the three EACs are within acceptable limits, while the last is significantly off target. An average of the three reveals an EAC of $885,495 which is within limits.

Table 11: Project Budget Estimates at Completion (EAC)

EAC		
AC + (BAC-EV)	=	$ 856,575.00
BAC/CPI	=	$ 868,125.00
AC + [(BAC-EV) / (CPI * SPI)]	=	$ 931,787.50

C. PROJECT REVIEW AND EVALUATION

This section encompasses the planning, conducting, and managing of internal and external project programmatic and technical reviews. This includes the use of metrics to monitor and track the status of the project

Section 1.   **Identification**
Project Name: iDeal
Review Period: September 13, 2014   to   November 8, 2014
Manager(s), Systems Integration: Maurice T. Sutton
Project Managers: Michael Gooden
                                   Kafi A. Joseph
                                   Thuc Tran
                                   Liang Zhu

Section 2.   **Acceptance**

Delivery Unit Management: Name: Kafi A. Joseph
                                 Title: Product Manager
                                 Signature:
Project Reviewer: Name: Thuc Tran
                                 Title: Senior SW Engineer
                                 Signature:
                                 Date:

Section 3.   **Description Status and Progress**

iDeal will deliver a web and mobile applications system with primary responsibility for developing software falling under our engineering department. However, some of the work, such as integrating hardware with software applications, will be accomplished by partnering with Company BLAZN. Together, we will be responsible for delivering a fully operational system and are providing all of the applications developers.

The project is planned to complete in November 13, 2015.

Parallel testing is planned to commence January 13, 2015.

Pilot testing is planned to commence September 1, 2015.

(NOTE: See Figure E under Project Planning for visual depiction of process)

There are 3 implementation sites (all within the National Capital Region); Arlington, VA; Washington, DC; and College Park, MD.

Rough project budget included: -   Software $350K
                                  -    H/W $100K
                                  -    Communications unbudgeted
                                  -    Effort $300K

The effort remaining as of October 18, 2014 was estimated at 374 person days. Approximately, 21 have been spent.

Section 4.   **Organization**

The details of our company's organizational structure, to include names, roles and responsibilities of each individual on the project team, can be found in the sections below.

 Key personnel on the project include:

 Michael Gooden – Senior Systems/Requirements Engineer
 Kafi A. Joseph – Senior Project Manager/Business Developer
 Maurice T. Sutton – Systems Integration/Project Manager
 Thuc Tran – Senior Software Engineer
 Liang Zhu – Senior Engineer

Our company's user group consist of personnel in our partner organization – BLAZN:

Mohammad Hossain
Rahi Yazdi
Jin Yoo

The vendor group consists of:

John Ashley
Patrick Huskey
Ahed Gondahl
Michael Paige
Dang "Danny" Pham
Kwake Sekyere

In addition to these personnel, we have also contracted out 2 – 3 software developers in case we need the capabilities to surge in order to meet our deadline.

Section 5.   **Risks**

1. Knowledge Management – Every effort must be made to ensure all documentation is captured and stored for future reference. We have an agreement with our partner company detailing this process; however, we are not in a position to make sure it happens.

2. Misinterpretation of Requirements – The level of detail in the Requirements Document may lead to an interpretation not in line with the original concept. Additionally, our approach (agile/iterative) could cause budget issues due to repeated changes to the product.

3. Configuration/Coding – All changes to configuration and codes must go through Change and Configuration Management (CCM) process. Software developers must be vigilant in this area to prevent errors that may not surface until the testing phase.

4. User Expectations – The expectation of the user may not be in line with functions provided by iDeal. Market research must be thorough and meticulously translated into requirements in order to mitigate this risk.

Section 6.   **Recommendations**

1. Consider assigning additional support staff to assist in knowledge management and transfer functions.

2. Formalize project plan and have an independent third party QA input. The plan should then be reviewed by Senior Systems Engineer, Senior Project Manager, Senior Software Engineer, Systems Integration Manager and the Senior Engineer. Requirements have to be written in a clear and concise manner so that there is no ambiguity or uncertainty about what is needed. This is especially important considering that we are employing the agile method to our project.

3. Get everyone involved with coding familiar with the change management process.

4. Validate scope of the project meets the users desire/requirement (based on Market Research).

Section 7.   **Next Project Review**

Next Project Review: 07 November 2014 (Occurs Weekly)
Technical Product Review: 05 November 2014
Detailed Project Review: 01 November 2014

Section 8.   **Strengths**

1. Good relationship with vendor and partner organization.

2. The hardware (servers, fiber/cabling, etc.) seems to be of good quality.

3. Users are involved.

Section 9.   **Summary Evaluation**

Please see **Table 6** for completed project review/status checklist.

PART B: SYSTEM

I. SYSTEM DESIGN.

This section involves developing stakeholder expectations, defining technical requirements, performing logical decomposition, and defining design solutions to result in a validated set of requirements and a validated design solution that satisfies a set of stakeholder expectations

A. TECHNICAL REQUIREMENTS

This section addresses the transformation of base lined stakeholder expectations into unique, quantitative, and measurable technical requirements. Such requirements are expressed as "shall" statements that can be used for defining the design solution. This process includes analyzing the scope of the technical effort, defining the constraints affecting the designs, defining the functional and behavioral expectations in technical terms, defining the performance requirements, validating the resulting technical requirement statements defining the appropriate technical performance measures (TPMs) by which technical progress will be assessed

1. SYSTEM FUNCTIONS

Below are the System Functions:

- Allow buyers to find high quality sporting equipment in their vicinity without hours of online research.
- Allow sellers the ability to list the same types of equipment with a single click of the camera, all while eliminating the need to exchange large amounts of cash in person.
- Provide not only a web application as a platform for conducting such transactions, but also include a mobile app service which would allow future users to access information and upload products and details at any time.
- Create secure user account via iDeal web application or mobile app.
- Buyers can view Seller's inventory and purchase items via the payment service.

Table 12: Functional Requirements

Requirement Identifier	Requirement
REQ-001	iDeal shall allow users to upload pictures of items for Sale or Trade.
REQ-002	iDeal users shall add textual descriptions and pricing information of each item.
REQ-003	iDeal users shall have the option to proposal counter-offers to priced items.
REQ-005	iDeal shall process payments through The payment service.
REQ-006	iDeal shall allow users to browse inventory by select the following parameters:
REQ-007	iDeal shall provide contact information exchange securely via users emails.

Table 13: Hardware Interface Requirements

Requirement Identifier	Requirement
REQ-013	Users shall access iDeal through their smartphone via the iDeal mobile app.
REQ-014	Users shall access iDeal through their PC connected to the internet.
REQ-015	iDeal server hardware shall use cloud server providers to back up the web

Table 14: User Interface Requirements

Requirement Identifier	Requirement
REQ-008	iDeal shall require users to initially set-up accounts to gain access.
REQ-009	iDeal shall require unique username and 6-15 character password to access.
REQ-010	Users shall access iDeal web application through Internet Explorer, Chrome,
REQ-011	iDeal shall be access using either Windows, Android and Apple Operating
REQ-012	Web application users screens on shall use a maximum of 5 screen pages

Table 15: Software Interface Requirements

Requirement Identifier	Requirement
REQ-016	iDeal shall use Java as coding source.
REQ-017	iDeal shall require unique user name and 6-15 character password to access.
REQ-018	Users shall access iDeal web application through their computer.
REQ-019	Users shall access iDeal through their smartphone via the iDeal mobile app.
REQ-020	iDeal shall be access using both Windows and Apple Operating systems

Table 16: Communications Interface Requirements

Requirement Identifier	Requirement
REQ-021	iDeal shall use Cloud server provider to connect user and The payment service
REQ-022	iDeal shall operate on a secure T1 level connection between on-premises servers and cloud infrastructure
REQ-023	Users shall access iDeal web application through their computer.
REQ-024	Users shall access iDeal through their smartphone via the iDeal mobile app.
REQ-025	iDeal shall be access using both Windows and Apple Operating systems

Non-functional Requirements

Table 17: Performance Requirements

Requirement Identifier	Requirement
REQ-026	iDeal system shall have a 95.00% availability
REQ-028	iDeal system shall have a 99.00% reliability.
REQ-029	The maximum latency time on the iDeal Web application or mobile app shall be 2.0 seconds to complete an action.
REQ-030	iDeal system shall restore full capability 1.0 hrs after a critical failure.
REQ-031	Users shall be able to upload files up to 5.0 MB per picture.

Table 18: Safety and Security Requirements

Requirement Identifier	User Interface Requirement
REQ-032	iDeal shall maintain IEEE safety standard for Web Server Power and safety.
REQ-033	iDeal shall require server administrator to develop a Safety Guidelines for Server room operations.
REQ-034	Users shall use 254-bit- encryption for internet access to iDeal.
REQ-035	The cloud service provider shall certify payment information is encrypted.
REQ-036	Any unauthorized access to iDeal system shall be recorded and system administrator shall be alerted.
REQ-037	Users shall only have 3 failed login attempts before the system locks the user's account.

B. LOGICAL DECOMPOSITION

This section addresses the transformation of the defined set of technical requirements into a set of logical decomposition models and their associated set of derived technical requirements for input to the design solution efforts. This includes the allocation of requirements, resolution of conflicts between derived requirements, and the validation of the derived technical requirements.

The logical decomposition in **Figure Q**: Logical Decomposition of the "Sell" function below is associated with selling an item through iDeal. Main functions are indicated by colors that correlate with their respective children functions. The decomposition begins with the overarching section, Sell, at 1.0. The second level indicates the functions associated with sell by the associated number being 1.X. Next, the third level of the decomposition is indicated by a third parameter, being 1.X.X., depending on the associated parent function.
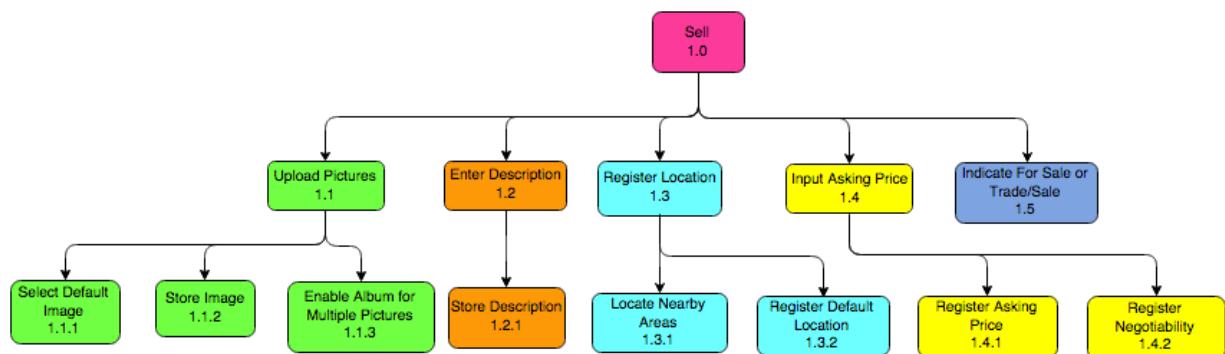

Figure Q: Logical Decomposition of the "Sell" function

C. DESIGN SOLUTION DEFINITION

The design solution definition outlines the appropriate design to meet functional and stakeholder requirements. **Figure R** depicts the SysML diagram of the iDeal App with emphasis on the buy feature being expanded. In this scenario, it is assumed that the user has logged in to begin browsing for items of interest. The beginning and end of the diagram are indicated by green, decisions in yellow, user engagement in teal, and server processes in blue.
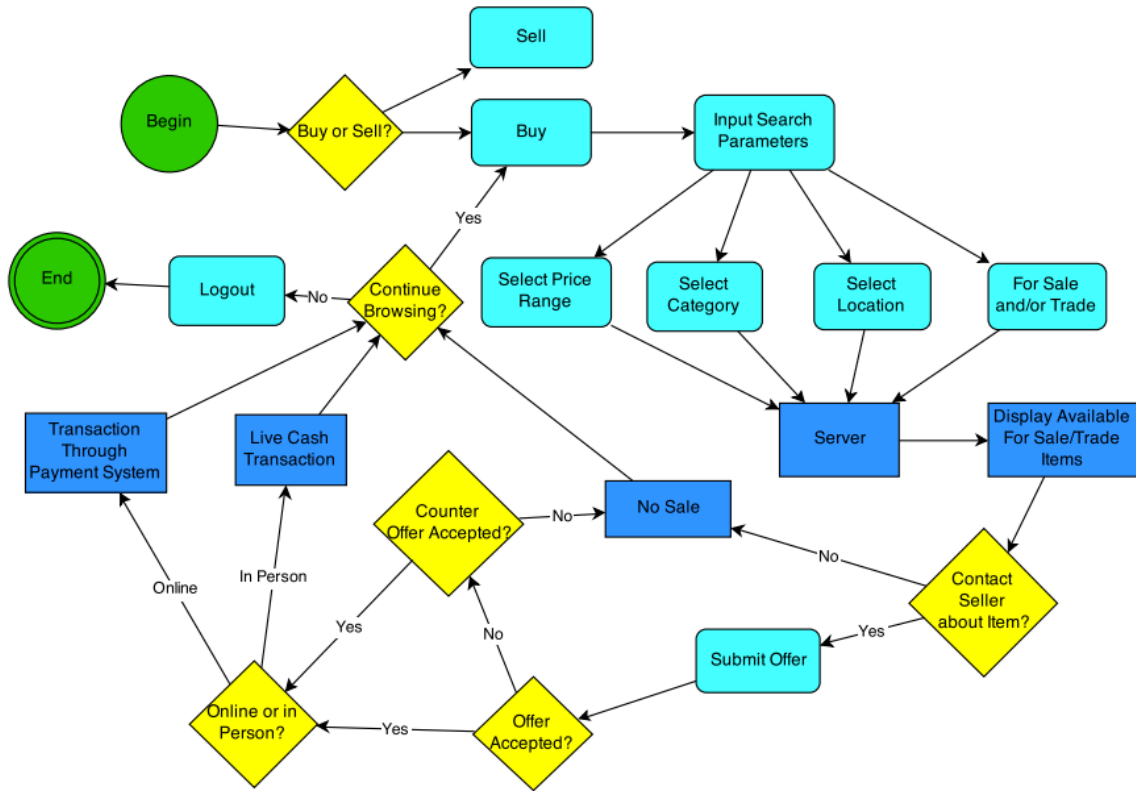
Figure R: SysML Diagram for the iDeal App (Buy Feature Expanded)

II. PRODUCT REALIZATION.

This includes the realization of results in the delivery of the completed system. They should meet the design specifications and stakeholder expectations. This requires products to be produced, acquired, reused or coded; integrated into a higher level assembly; verified against design specifications; validated against stakeholder expectations; and transitioned to the next level of the system. Sub-competencies for this section include Product Implementation, Integration, Verification, Validation, and Transition.

A. PRODUCT IMPLEMENTATION.

This section relates to generating a specific product through buying, making, or reusing parts or the whole while satisfying the design solution definition specified requirements. This includes preparation of an implementation strategy, review of vendor technical information, inspection of delivered, built, or reused products, and preparation of product support documentation for integration.

1. IMPLEMENTATION PLAN.

The Implementation Plan describes how iDeal systems, applications and IT solution will be installed, deployed and transitioned into an operational environment. The plan contains an overview of the system or situation, a brief description of the major tasks involved in the implementation, and the overall resources needed to support the implementation effort (e.g., hardware, software, facilities, materials, and personnel).

2. SYSTEM OVERVIEW

- System Description. Please see the Integration Plan (sections 1.2 and 2) as well as the CONOPS for brief descriptions of the system and its major components.
- System Organization. Please see the Integration Plan (sections 1.2 and 2) as well as the CONOPS for brief descriptions of the system organization.

3. MANAGEMENT OVERVIEW

The subsequent sections provide a brief description of the implementation and major tasks involved in this section.

- Description of Implementation.

The testing of network cabling, equipment, software and services will be ongoing throughout the implementation process. The installation of network cabling will usually be carried out by a specialist cabling company, who will install and test the cables, and provide documentation to certify that the installation meets the required standards. Major items of network equipment such as switches, routers and uninterruptible power supplies will need to be tested for correct operation and configuration after installation. Network connectivity and access to user data and applications can be tested by logging into the network from randomly selected workstations using a generic user account. Access to email, the Internet, network printing and other services will also be tested.

Network documentation will include cabling schematics, floor plans showing the location of network equipment, and a detailed technical specification for each item of network hardware. Records should also be maintained of the software installed on each network computer/device, together with details of software licenses held. The MAC and IP address of each device on the network should also be recorded and cross referenced to a physical location.

4. SECURITY

- System Security Features

Most security features will be provided by Amazon's Cloud services. Our local IT infrastructure will be in its own enclave and only interface with Cloud services for querying activities (trending data, various reports, etc.). For this function, we have employed various defenses: in-depth measures to ensure security to our infrastructure and to also comply with standards in the Service Level Agreement (SLA) we have with Amazon. Our security features follow standard cyber security and best business protocols with regards to hardware/software, such as firewalls (CISCO equipment) and HP's Next-Generation Intrusion Prevention System (NGIPS), Tipping Point.

- Security During Implementation

Security concerns during implementation will be addressed by the vendor/provider of Cloud services (Amazon). iDeal's requirements were provided to Amazon – to include Information Security/Assurance requirements, Vulnerability Assessment requirements, Insider Threat concerns, etc.

5. IMPLEMENTATION SCHEDULE

Integration Implementation Schedule

STEP	NAME	DESCRIPTION	BEGIN DATE	FINISH DATE
1	Procurement	Procurement of equipment, materials and software	11/10/2014	12/19/2014
2	Cabling	Installation and testing of network cabling, including all Trunking, cross-connects and telecommunications Outlets.	12/22/2014	12/30/2014
3	Accommodation	Installation of racks and cabinets, including installation of uninterruptable power supply (UPS) equipment	12/22/2014	12/24/2014
4	Network Hardware	Installation, configuration and testing of network hardware, including switches, routers and firewall equipment	12/22/2014	12/31/2014
5	End – user equipment	Installation, configuration and testing of network servers, workstations/laptops network printers and peripheral devices	12/22/2014	12/31/2014
6	Operating Systems	Installation, configuration and testing of operating systems on network servers and workstations/laptops	12/22/2014	12/31/2014
7	Applications	Installation, configuration and testing of application software on network application servers and workstations/laptops	12/31/2014	12/31/2014
8	Network File System	Creation and testing of network file system, including the creation of shared and public directories	12/31/2014	12/31/2014
9	Domain Structure	Creation and testing of Domain structure (directory)	12/31/2014	12/31/2014
10	Network Accounts	Creation and testing of user and group network accounts	12/31/2014	12/31/2014
11	Network Services	Setup and testing of network services, including e-mail, network printing, data backup and restore facilities, and Internet access proxy server	12/31/2014	12/31/2014
12	Cloud service Integration	Integrate Local File Systems with Cloud Services providing synchronized data	12/31/2014	1/3/2015
13	User Training	User training – Help Desk	1/5/2015	1/8/2015
14	System Testing	Final system testing, to include user login, user access to data, networked applications and network services, backup and restore procedures, network services, network security (including operation of proxy server and firewall) and UPS operation	1/12/2015	1/15/2015

6. IMPLEMENTATION SUPPORT

This section describes the support software, materials, equipment, and facilities required for the implementation, as well as the personnel requirements and training necessary for the implementation.

- **Hardware**. This section provides a list of support equipment and includes all hardware used for testing time implementation. The hardware list includes the following:
  - Laptops
  - Servers
  - Network Devices: Routers, Switches
  - Security Devices: Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS), etc.
  - Phones, tablets
  - Network Monitoring Tools (either HP or BMC suite)

- **Software**. This section provides a list of support equipment and includes all software used for testing time implementation. The software list includes the following:
  - · Software Licensing agreements (such as those used for HP or BMC suite)
  - · Windows, IOS and Android
  - · Coding (to be done by in – house software engineers)
  - ·
- **Facilities**. The physical locations/facilities include iDeal's lab, testers homes, and various locations within the NCR. The testing will be 24/7 and will be iterative (meaning if a problem surfaces, once it is mitigated, testing resumes immediately).

- **Training of Implementation Staff**.
  - · Help desk training on problem
  - · Training on network monitoring tools
  - · On – Site training will be provided by Amazon for select employees

- **Performance Monitoring**. Performance monitoring tools will be used to assess latency issues, network availability, capacity, etc. However, the vendor will provide this service and iDeals server will query theirs for this information.

- **Back-Out Plan**. One or more of the following circumstances will necessitate back-out being initiated:
  - · Unstable production environment
  - · Corrupt Data
  - · Failure of critical components (Hardware, Software, Application, Cloud Services)
  - · Check Processing
  - · Financial Processing

The back-out will entail the following:

- · Restoration of environment to last known good configuration.

Interface remediation would need to be backed out and depending on circumstances; the network may need to be shut down.

B. PRODUCT INTEGRATION / VERIFICATION / VALIDATION

1. PURPOSE.

The purpose of the integration test plan is to describe the necessary tests to verify that all of the components of iDeal are properly assembled. Integration testing ensures that the unit-tested modules interact correctly. This Section also analyzes the outcomes of verification and validation, which includes identifying anomalies discovered and establishing recommended corrective actions. iDeal is procuring various systems and subsystems from Vendor 1, Vendor2, and Vendor 3, to meet our strategic and operational needs. Product verification/validation reports providing evidence of conformances are also included. The following list describes at a high level the business objectives of this integration effort:

- Build an integrated solution that meets our strategic, tactical and operational needs.
- Build the solution using best of breed COTS solutions and standard interfaces to enable our product to evolve and upgrade to newer features and functionality.
- Provide tools and applications to field/help desk personnel to improve operational effectiveness and tactical efficiency.
- Provide tools and data to research and development/engineers to meet strategic goal of continuous operational improvement.
- Implement systems in a manner that will allow the iDeal to evolve the operations and business practices with minimal impact and rework.

This document identifies the vendors, systems, sub systems, interfaces and data flows along with the implementation timeline needed to achieve those goals.

2. CORE PRODUCTS

Several core products are to be implemented in support of iDeals' stated goals. They include:

- **Core System**: Cloud Services. This allows iDeal to run software and services on the Internet instead of utilizing funds for physical structures/hardware locally. This also allows us the capability to quickly scale use up or down when required.
- **Product 1**: iDeal Server. Although we will utilize the cloud for many of services, we will also employ the use of a small data center as a repository for financial data, HR documents, etc. This data center will be limited in scale and function.
- **Product 2**: The payment service. This product will be used as a means for buyers/sellers to conduct financial transactions.
- **Product 3**: Mobile App. Will allow users to access information and upload products and information at any time.
- **Product 4**: Web application. Similar to the Mobile App in function, this platform will be used to facilitate transactions between buyers/sellers.

Although each of these components provides unique functionality, these products will share common data elements.

3. TYPE OF TESTING USED.

Top-Down testing: Top-Down testing consists of testing the highest level components first and then step by step start working downwards (lower components). Our test procedures included separating those elements deemed to be most important from those deemed least important – working on the important modules first. The top-down approach is similar to a binary tree you would start off by integrating the top level before slowly working your way down the tree and integrating all the components at that level.

4. COMPONENT ARCHITECTURE DESCRIPTION.

The iDeal system can be divided into several components. Listed below are the five components. A brief description of each component's purpose can be found in the below as well as in the **CONCEPT OF OPERATIONS (CONOPS)** section.

- **Mobile Device**
Software application that is running on the consumer's Mobile Device. Responsible for sending data to and receiving data from the Mobile Device Interface as well as allowing the consumer to enter product input data and view pricing result data

- **Web App:** Has the responsibility for sending data to and receiving data from the Web App Interface as well as allowing the consumer to enter product input data and view pricing result data.

- **Mobile Device Interface:** Mobile Device Interface: Component within the Cloud Server that receives product input data from the Mobile Device, performing queries against the Cloud server with that information, and formatting and returning the result data. It will also sync all information with the Web Interface.

- **Web Interface:** Component within the Cloud Server that receives product input data from the Web Site, performing queries against the Cloud server with that information, and formatting and returning the result data. It will also sync all information with the Mobile Device Interface.

- **Cloud Server:** Component of the system that stores information needed for the application as well as provide the core functions needed to perform daily operations.

- **The Payment Service User Interface:** Responsible for conducting financial transactions between buyer and seller.

- **iDeal Server Interface:** Component of the system that allows a system administrator to view the status of the iDeal server, change the iDeal Server Management Parameters, and manage system administrator accounts, as well as serving as storage for local HR records and other business related artifacts.

5. INTEGRATION TESTS.

Integration Tests: This section provides an example of the black box tests needed to ensure that each component of iDeal is interacting with other components as expected. A Test and Evaluation Master Plan (TEMP) for coding is also provided. These tests are extremely important in the context of iDeal because of its multi-threaded, cross-platform nature.
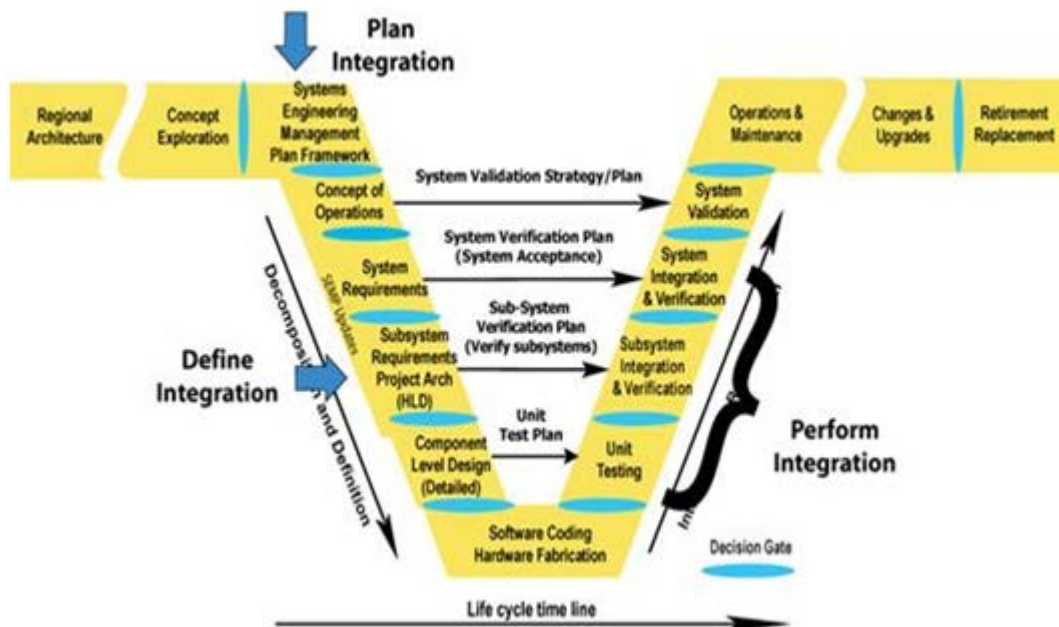

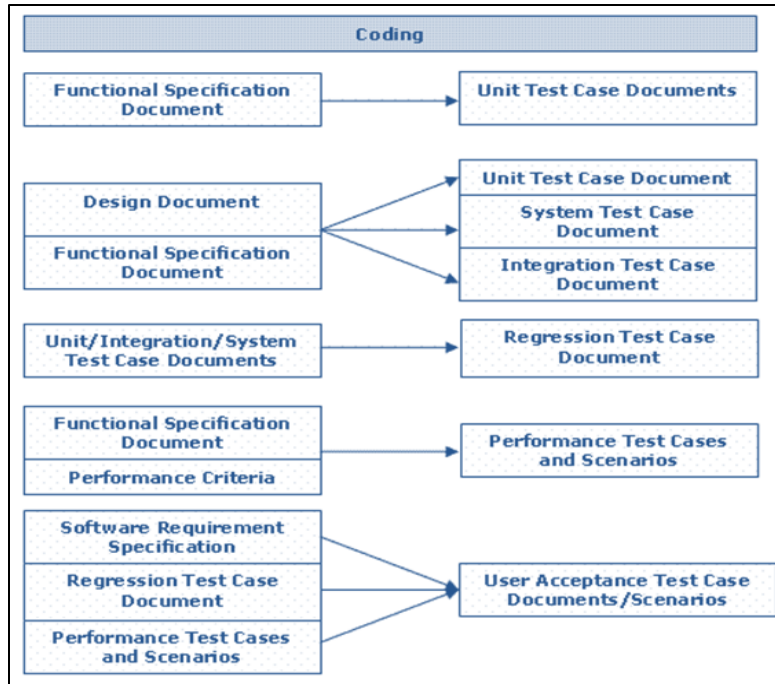**Figure S: Plan Integration Vee Diagram**

Figure T: TEMP Approach

- **Mobile Device – Mobile Device Interface**

Table 19: Successful Communication Message

Purpose	The purpose of this test is to ensure that the cross-device communication between the mobile device and the mobile device interface is functional.
External Dependencies	Ensure that the Mobile Device has wireless connectivity.
Test Description	1) Start the iDeal client application 2) Select the Entry Type 3) Input a random search criteria 4) Send the code
Expected Results	As long as wireless connectivity exists, the mobile device displays information regarding the product or a screen that explains that no products have been found that match the specified search parameters.

- **Mobile Device Interface – Cloud Server**

Table 20: Invalid Product Input Data Result

Purpose	The purpose of this test is to ensure that the Mobile Device Interface can handle invalid Product Input Data.
External Dependencies	None
Test Description	1) Start the iDeal client application 2) Select the Product Name Entry Type 3) Input and send one asterisk (*) character
Expected Results	The Mobile Device displays a message that says that no products matched the search criteria.

6. *SOFTWARE TESTING LIFECYCLE.*

- **Requirements Analysis**

  During this phase, test team studies the requirements from a testing point of view to identify the testable requirements. The QA team may interact with various stakeholders (client, business analyst, technical leads, system architects etc.) to understand the requirements in detail. Requirements could be either Functional (defining what the software must do) or Non Functional (defining system performance /security availability) .Automation feasibility for the given testing project is also done in this stage.

  - Activities
    - · Identify types of tests to be performed.
    - · Gather details about testing priorities and focus.
    - · Prepare Requirement Traceability Matrix (RTM).
    - · Identify test environment details where testing is supposed to be carried out.
    - · Automation feasibility analysis (if required).

  - Deliverables
    - · RTM
    - · Automation feasibility report. (if applicable)

- **Test Planning**

  This phase is also called Test Strategy phase. Typically, in this stage, a Senior QA manager will determine effort and cost estimates for the project and would prepare and finalize the Test Plan.

  - Activities
    - · Preparation of test plan/strategy document for various types of testing
    - · Test tool selection
    - · Test effort estimation
    - · Resource planning and determining roles and responsibilities.
    - · Training requirement

  - Deliverables
    - · Test plan /strategy document.
    - · Effort estimation document.

- **Test Case Development**

  This phase involves creation, verification and rework of test cases & test scripts. Test data , is identified/created and is reviewed and then reworked as well.

  - Activities
    - · Create test cases, automation scripts (if applicable)
    - · Review and baseline test cases and scripts
    - · Create test data (If Test Environment is available)

  - Deliverables
    - · Test cases/scripts
    - · Test data

- **Test Environment Setup**

  Test environment decides the software and hardware conditions under which a work product is tested. Test environment set-up is one of the critical aspects of testing process and can be done in parallel with Test Case Development Stage. Test team may not be involved in this activity if the customer/development team provides the test environment in which case the test team is required to do a readiness check (smoke testing) of the given environment.

  - Activities
    - · Understand the required architecture, environment set-up and prepare hardware and

software requirement list for the Test Environment.
- · Setup test Environment and test data
- · Perform smoke test on the build

- Deliverables
  - · Environment ready with test data set up
  - · Smoke Test Results.

- **Test Execution**
  During this phase test team will carry out the testing based on the test plans and the test cases prepared. Bugs will be reported back to the development team for correction and retesting will be performed.

  - Activities
    - · Execute tests as per plan
    - · Document test results, and log defects for failed cases
    - · Map defects to test cases in RTM
    - · Retest the defect fixes
    - · Track the defects to closure

  - Deliverables
    - · Completed RTM with execution status
    - · Test cases updated with results
    - · Defect reports

- **Test Cycle Closure**
  Testing team will meet, discuss and analyze testing artifacts to identify strategies that have to be implemented in future, taking lessons from the current test cycle. The idea is to remove the process bottlenecks for future test cycles and share best practices for any similar projects in future.

  - Activities
    - · Evaluate cycle completion criteria based on time, test coverage, cost, software, critical business objectives, quality
    - · Prepare test metrics based on the above parameters.
    - · Document the learning out of the project
    - · Prepare Test closure report
    - · Qualitative and quantitative reporting of quality of the work product to the customer.
    - · Test result analysis to find out the defect distribution by type and severity.

  - Deliverables
    - · Test Closure report
    - · Test metrics

C. PRODUCT TRANSITION

This section covers product transition, which begins during Phase 4 – Staging. This is where we begin to evaluate and validate the product for readiness against the requirements validation criteria. This phase includes providing a pre-production prototype for the customer to validate and a reassessment of the market prior to making a decision to transition into Phase 5 - Production. Transition activities within the production phase are categorized under growth and optimization. Production and production support are paramount needs for ensuring that the application meets customer and user needs. We would also jump start our sales and marketing activities to ensure product transition and growth within the current market. Optimization activities occur when the customers and users provide feedback which would be incorporated into additional versions and restart our development process.

III. TECHNICAL MANAGEMENT

This encompasses the management of technical activities during the life-cycle of the project. This includes technical planning, requirements management, interface management, technical risk management, configuration management, technical data management technical assessment, and decision analysis.

A. TECHNICAL PLANNING

Technical planning is needed to develop a viable solution that meets stakeholder requirements and our business goals. To develop an iDeal marketplace, the key categories of coding, interfacing, hosting, security, and maintenance of the web application and mobile app must be carefully planned to ensure a smooth product lifecycle. Much of this is covered in the previous sections, but this section will elaborate on a few technical planning artifacts to highlight the importance of meticulous planning.

One of the first major decisions for iDeal will be planning for the platform(s) to deploy on. The options are to a) deploy on a single native platform of our choice, or b) deploy across multiple platforms simultaneously. To make that decision, we used the beta distribution method to determine estimated costs for each option.

Table 21: Beta Cost Estimation forDifferent Platforms

Platform	Optimistic	Most Likely	Pessimistic	Beta
Apple iOS	$150,000.00	$250,000.00	$400,000.00	$258,333.33
Android	$100,000.00	$200,000.00	$350,000.00	$208,333.33
Windows	$100,000.00	$180,000.00	$350,000.00	$195,000.00
Cross-platform	$300,000.00	$500,000.00	$600,000.00	$483,333.33

The decision tree below uses those numbers and representative data to determine the best course of action. Based on the decision analysis, the estimated monetary value (EMV) for a cross-platform deployment is $3.9 Million, compared to only $1.8 Million for the best native platform. Even with higher risks and initial costs, cross-platform appears to be the best option. If we were limited to a single platform, apple's iOS offers the best return on investment.
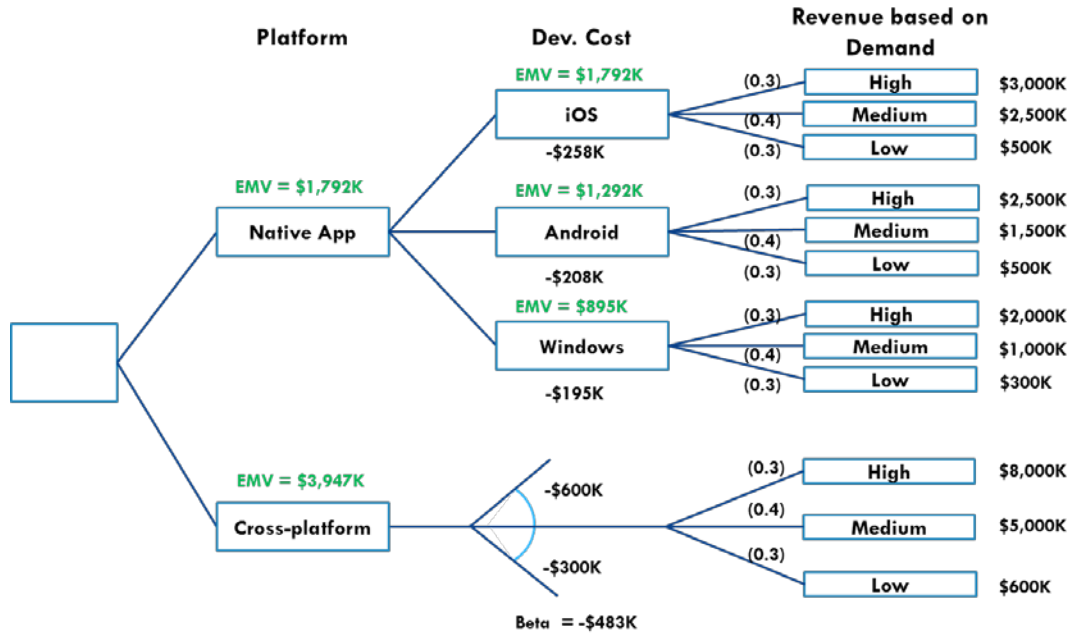
Figure U: Platform Selection Decision Tree

B. TECHNOLOGY TRANSFER AND COMMERCIALIZATION

The technology readiness level assessment below (**Table 22**) outlines different technologies. Associated with the technologies are the consequences in the event that they fail and the preventative steps that may be taken in order to mitigate those failures.

Table 22: Technology Readiness Assessment

Technology	Description	Risk Level	Readiness Assessment	Consequence	Mitigation
(1) Servers	Servers are responsible for running the mobile application in production	H	9	Under the event that the servers are down, the application will not	Have multiple and secondary servers in the event that main servers are down
(2) Database Security	Securing a database in order to prevent unauthorized access to possibly sensitive information	H	8	Under the event that database security is compromised, sensitive information may be	Abide by application security protocols and have alerts that alarm if unauthorized users hack the application
(3) Platform	The platform of the mobile application will determine how the speed and targeted market	H	7	A poor or unoptimized platform may cause the application to run slow; selection of the wrong platform may target an undesirable market	Conduct adequate technical research to determine which platform will optimize application security and speed; Conduct adequate market research to determine which users are most likely to use the application
(4) Application Design	The design of the application will determine how appealing the app will be to users	M	5	A poor application design will deter potential users from using and interacting with the	Conduct iterations of different designs, aligned with market research
(5) Application Program Interface	The interface of the application will determine how the user interacts with the app	M	8	Under the event that the API is not functioning correctly, the application will not be able to link to other entities such as	Conduct thorough testing using the API with all other potential entities
User Experience	When building the application, user experience must be a consideration so that users are able to easily interact with the app	M	4	A poor user experience will make the application difficult to use, deterring potential users	Conduct thorough testing to ensure usability; Run demos to the public to optimize usability
(6) Application Speed/Connectivity	Application speed will allow for more interaction as users will be able to use the application faster	M	6	A poor application speed will deter users that are impatient for the application to render information	Conduct thorough testing and have an adequate number of servers sustain the application; Test most optimal number of users the application and servers can handle

C. INTERFACE MANAGEMENT

This section addresses formal interface management to maintain the interface definition, details, and compliance among the end products and enabling products. This includes preparing interface management procedures, identification of interfaces, maintaining interface documentation, disseminating interface information, and conducting interface control.

The interface diagram at **Figure V** is an N2 diagram. It depicts the inputs and outputs from each of the functions of the iDeal app. Changes to the interface should be supported with market research and demo testing. It should also be noted that interface changes should not conflict with, but support a stronger user experience.
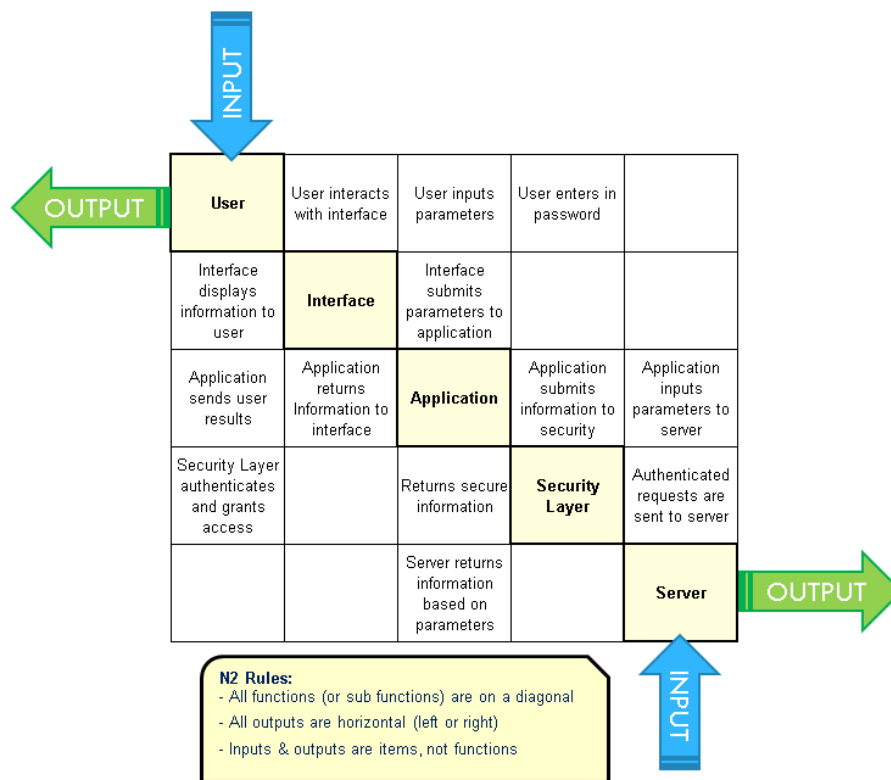

Figure V: Interface Diagram (N2)

D. TECHNICAL RISK MANAGEMENT

The technical risk assessment below contains numbers that correlate with the technical risks that were previously exhibited. The numbers, which indicate a specific technology concern, have been placed onto the chart below in accordance to the consequence of the risk and the likelihood of its occurrence. Risks that are placed in red zones indicate a relatively severe consequence and likelihood. Those that are in the yellow indicate a mid-level consequence and likelihood and those that are in the green indicate a low consequence and likelihood.

Based on the relationship between consequence and likelihood, we are able to prioritize time and resources determining which risks to mitigate. Those that are deemed most severe and of high likelihood are mitigated with priority, whereas those that are of negligible consequence and unlikely to happen are prioritized much lower. Based on the technical risk assessment, we also able to create contingency plans in the event that these risks occur, focusing heavily on those with significant impact on the successful

operation of our app. From the assessment below we can visually observe which risks are prioritized over others.
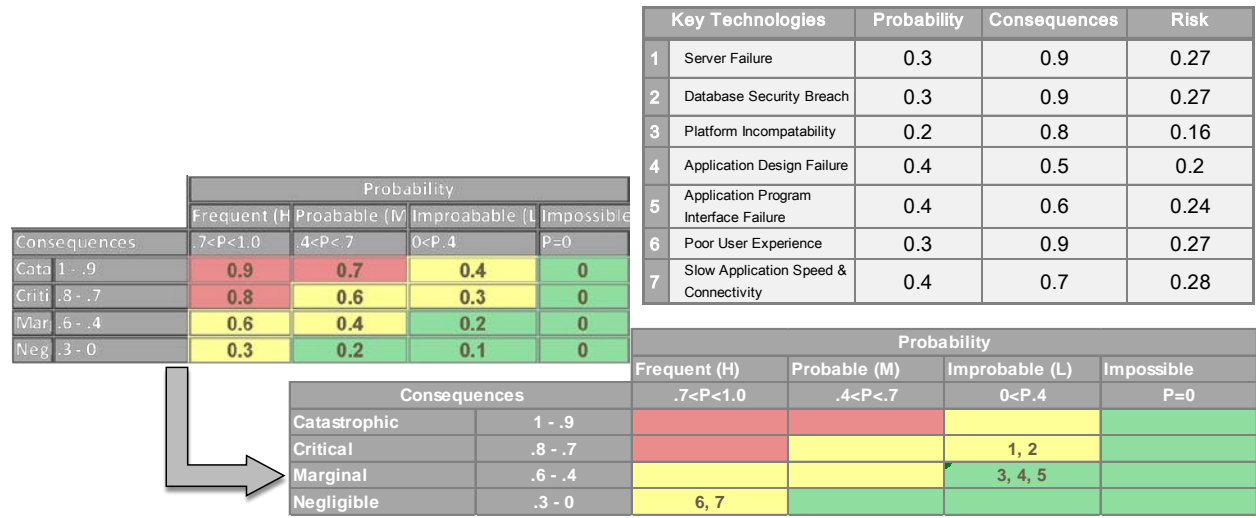
Key Technologies		Probability	Consequences	Risk
1	Server Failure	0.3	0.9	0.27
2	Database Security Breach	0.3	0.9	0.27
3	Platform Incompatability	0.2	0.8	0.16
4	Application Design Failure	0.4	0.5	0.2
5	Application Program Interface Failure	0.4	0.6	0.24
6	Poor User Experience	0.3	0.9	0.27
7	Slow Application Speed & Connectivity	0.4	0.7	0.28

	Probability			
	Frequent (H)	Probable (M)	Improbable (L)	Impossible
Consequences	.7<P<1.0	.4<P<.7	0<P.4	P=0
Catastrophic	1 - .9				
Critical	.8 - .7			1, 2	
Marginal	.6 - .4			3, 4, 5	
Negligible	.3 - 0	6, 7			

Figure W: iDeal Technical Risk Assessment

E. TECHNICAL DATA MANAGEMENT

This section addresses the management of technical data. This includes identifying and controlling data requirements, acquiring, accessing, and distributing data needed to develop, manage, operate, and support system products. They must manage and dispose data as records, analyze data use, obtain technical data feedback for managing the contracted technical efforts, and assess the collection of appropriate technical data and information. Establishing technical data management strategies and policies, maintaining stored technical data, providing technical data to authorized parties, and collection and storage of required technical data are also included in achieving proficiency in this area.

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