DELIVERY 2

Task 1 – Identifying and finding inconsistencies in the vision document
Time spent during the inspection: 55 minutes
Defects Table

Defect #	Location	Defect type	Classification	Description	Status	Date corrected
1	Page-2, sec 2.1	Omission	Major	Missing stakeholders affected by the problem, like brokers and system admins in problem statement		
2	Page-2, sec 2.2	Omission	Major	Missing target customers- brokers and system admins in Product position statement		
3	Page-3, sec3.1	Omission	Major	Missing Stakeholder information in the stakeholder summary		
4	Page-4,sec3.3	Unintelligbility	Minor	The information presented in the “User environnent” section is in paragraph, instead of short and precise bullet points, which can lead to slight issue in understanding the content.		
5	Page 5, sec3.4	Omission	Minor	Missing some user needs like secure login, robustness of the application, feature of adding and removing broker etc.		
6	Page 5, sec4.1	Inadequacy	Major	The diagram lacks sufficient details and explanation. It doesn't adequately explain the relationships between the entities (broker, sys admin, and buyer) or the flow of the process.		
7	Page 5, sec4.2	Inadequacy	Minor	The assumption and dependencies given are more ‘general’ in nature. It should be specific to user requirements and does not adequatly explain the details.		
8	Page 6, sec5	Omission	Major	Some core features are missing, like password recovery, notifications, feedbacks etc.		
9	Page 7, sec 6	Omission	Minro	Some hardware and standard features are missing.		
8	Page 2, sec 2.1	Ambiguity	Major	The statement “It also allows the broker to efficiently list all their properties in the province” is ambiguous. The word		

				efficiently does not clearly state in what ways the listing would be made efficient.		
9	Page 4, sec 3.3	Noise	Minor	The word ‘scale’ in the context of scaling the application does not provide enough information about distributed server implementation in the problem world feature.		

Inconsistency Table
Time spent during the inspection: 90 minutes

No	Location	Inconsistency type	Classification	Description	Status	Date corrected
1	Stakeholder Summary (Section 3.1) S1:The **customers** will create their accounts with the REB+ web application, following which they can log into their accounts and search for homes/properties. S2: They will work closely with other **users** and especially customers while understanding system requirements.	Terminology clash	Weak	The term ‘customers’ are referred as ‘users’ in the responsibnilities of development team. S2 specifies users and the customers again, instead of just customer to be specific.		
2.	Key Stakeholder (Section 3.4) S3: **A user-friendly platform** with powerful search feature, supported by filters based on popular **user** criteria like price, number of rooms, area, year built etc.	Designation Clash	Weak	The term user here is not specific. One stakeholder can interpret this as customer friendly, while another stakeholder might interpret it as broker, or system admin		
3	Key Stakeholder (Section 3.4)	Terminology Clash	Weak	The same concept of users		

	S4: REB+ provides an online platform with worldwide reach to potential **clients**. It allows broker to post customized ads which they can modify anytime S5:U**sers** can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly			are given different names as 'users' and 'clients' in the respective two statements S4 and S5.		
	Other Product Requirement (Section 6) S6: Recovery from failure should mean that **user's** are able to resume from where they left off. There should be no loss of **consumer** data.	Terminology Clash	Weak	Again, the concept of potential user have been referred by two terms 'users' and 'consumers'.		
	User Summary (Section 3.2) S7: Once logged in, they can search for residential properties directly and schedule property viewings. Product Features (Section 5) S8:Homebuyers can fix an appointment with the broker.	Structural Clash	Weak	The concept of 'viewing a selected property' is described in different structure in statement S7 and S8. S7 refers it as 'scheduling property viewing' while S8 refers to it as 'fixing an appointment' with the broker.		

Other comments/recommendations:

1. The statement "The platform should be scalable, and should be able to handle increasing number of users without any performance degradation." in section 6 is indeed a desirable property, although, it exhibits Strong conflict. The platform should be scalable to accommodate a growing number of users, but ensuring no performance degradation in a distributed system presents a challenge.

TASK 2 - Task 2 – Documenting conflicts

Statements

1. S1: The **customers** will create their accounts with the REB+ web application, following which they can log into their accounts and search for homes/properties.
2. S2: They(developer team) will work closely with other **users** and especially customers while understanding system requirements.
3. S3: **A user-friendly platform** with powerful search feature, supported by filters based on popular **user** criteria like price, number of rooms, area, year built etc.
4. S4: REB+ provides an online platform with worldwide reach to potential **clients**. It allows broker to post customized ads which they can modify anytime.
5. S5: **Users** can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly.
6. S6: Recovery from failure should mean that **user's** are able to resume from where they left off. There should be no loss of **consumer** data.
7. S7: Once logged in, they can search for residential properties directly and **schedule property viewings.**
8. S8: Homebuyers can **fix an appointment** with the broker.

Statements	S1	S2	S3	S4	S5	S6	S7	S8	Total
S1	0	0	1000	1	0	0	1000	0	2001
S2	0	0	1000	1	1000	1000	0	0	3001
S3	1000	1000	0	1	1000	0	1000	1	4002
S4	1	1	1	0	1	1	1000	1000	2005
S5	0	1000	1000	1	0	0	0	1	2002
S6	0	1000	0	1	0	0	0	0	1001
S7	1000	0	1000	1000	0	0	0	1000	4000
S8	0	0	1	1000	1	0	1000	0	2002
Total	2001	3001	4002	2005	2002	1001	4000	2002	20,014

Conflicting pairs of statements

S1-S4, S2-S4, S3-S4, S3-S8, S5-S4, S5-S8,S6-S4,

Task 3 – Conflict resolution

The following are the conflicting statements found from Task 2

Statement S1	The customers will create their accounts with the REB+ web application, following which they can log into their accounts and search for homes/properties
Statement S4	REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime
Conflict and Resoultion tactic	The conflict arises between the terms "customers" in S1 and "potential clients" in S4. These terms actually refer to the same user group, which is the audience for the REB+ web application.. We can make term ‘customers’ to be synonymous with the term ‘client’ by using Specializing the Conflict tactic.
Specializing the Conflict	S1: The customers will create their accounts with the REB+ web application, following which they can log into their accounts and search for homes/properties --- S4: REB+ provides an online platform with worldwide reach to potential customers (clients). It allows broker to post customized ads which they can modify anytime

Statement S2	They(developer team) will work closely with other users and especially customers while understanding system requirements.
Statement S4	REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime
Conflict and Resoultion tactic on both sentences	The conflict arises between the terms “users” in S2 and and potential clients in S4. The developers will work with every user group to ensure requirements are complete and consistent. REB+ is a platform that not only helps potential clients/customers, but also the broker and admins of the organization. **We can weaken S2 by broadening the group of users developer will work with.**
Weaken Conflicting statements on S2 and S4	S2: The developer team will work closely with users like potential customers (clients),brokers and admins while understanding system requirements. --- S4:: REB+ provides an online platform with worldwide reach to potential customers (clients). It allows broker to post customized ads which they can modify anytime and allow admins to manage user

Statement S3	A user-friendly platform with powerful search feature, supported by filters based on popular user criteria like price, number of rooms, area, year built etc.
Statement S4	REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime
Conflict and Resoultion	We have to use **restore conflicting statemen**t. S3 specify how the platform is easy for the customers with search features. However, the phrase ‘worldwide

tactic on both sentences	reach' doesn't imply explicitly if it will be user-friendly for the brokers too. (Again, terms user and clients conflict but they are considered to be resolved in the aformentioned conflict resolution).
Restore Conflicting statements on S3 and S4	S3:A user-friendly platform with powerful search features for customers, supported by filters based on popular customer criteria like price, number of rooms, area, year built etc, along with worldwide reach capability for brokers to attract suitable customers. --- S2: REB+ provides a user-friendly online platform with worldwide reach to potential customers (clients). It allows broker to post customized ads which they can modify anytime

Statement S3	A user-friendly platform with powerful search feature, supported by filters based on popular user criteria like price, number of rooms, area, year built etc.
Statement S8	Homebuyers can fix an appointment with the broker.
Conflict and Resoultion tactic on both sentences	We have to use **restore conflicting statemen**t and reframe S8 in way that it is consistent with the terminology used for user group "customers". We will also apply the same tactic on S3 like mentioned in the previous table.
Restore Conflicting statements on S3 and S8	S3:A user-friendly platform with powerful search features for customers, supported by filters based on popular customer criteria like price, number of rooms, area, year built etc, along with worldwide reach capability for brokers to attract suitable customers. --- S8: Customers can fix an appointment with the broker

Statement S5	Users can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly..
Statement S4	REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime.
Conflict and Resoultion tactic on both sentences	There is a conflict between S4 and S5 since both statements use different terms to refer to the same user group. S4 uses the term "potential clients," while S5 uses the term "users". S5 specifically means customers or potential clients, and not any users.
Specialize conflict source or target on S5	S5:Potential customers (clients) can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly --- S4: REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime.

Statement S5	Users can directly view broker's updated availability, and book online meetings

	directly and get it confirmed quickly.
Statement S8	Homebuyers can fix an appointment with the broker.
Conflict and Resoultion tactic on both sentences	There could be a potential conflict if the process of fixing appointments is not consistent between the two statements. S5 suggest online appointment, and S8 doesn't clarify if fixing appointment is through call, online or any other method. We need to use specialize conflict source or target on them.
Specialize conflict source or target. on S5 and S8	Customers (clients/homebuyers) can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly. --- Homebuyers can fix an appointment online or through call with the broker.

Statement S6	Recovery from failure should mean that user's are able to resume from where they left off. There should be no loss of consumer data.
Statement S4	REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime.
Conflict and Resoultion tactic on both sentences	The recovery process can affect the condition of 'modifying customized ads **anytime**' as data cannot be manipulated when the system is down. We have to use Avoid boundary condition to resolve them. We can avoid the boundary condition by making it explicit that modifying data involves being logged in. Users will be logged out in case of server crash.
Avoid boundary condition. On S4	Recovery from failure should mean that users are able to resume from where they left off. There should be no loss of consumer data. --- REB+ provides an online platform with worldwide read to potential clients. It allows broker to post customized ads which they can modify anytime when they are logged in.

Task 4 – Conflict evaluation

We will be using weighted matrix to consider alternative options for identified conflicts

$$totalScore(opt) = \sum_{crit} (Scores(opt, crit) \times Weight(crit))$$

Alternative Option 1: The customers will create their accounts with the REB+ web application, following which they can log into their accounts and search for homes/properties

Alternative Option 2: REB+ provides an online platform with worldwide reach to potential customers (clients). It allows broker to post customized ads which they can modify anytime

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternative Option 1**	**Alternative Option 2**
User-friendly interface	0.3	0.8	0.8
Global reach	0.3	0.3	0.9
Reliability	0.4	0.7	0.7
Total	1.0	0.61	**0.79**

Hence Alternative option 2 will be selected to solve the conflict

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Alternative Option 1: The developer team will work closely with users like potential customers (clients),brokers and admins while understanding system requirements.

Alternative Option 2: REB+ provides an online platform with worldwide reach to potential customers (clients). It allows broker to post customized ads which they can modify anytime and allow admins to manage users

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternative Option 1**	**Alternative Option 2**
User engagment and collaboration	0.4	1.0	0.7
Global reach	0.3	0.2	0.9
Customization	0.2	0.7	0.9
Data security	0.1	0.4	0.7
Total	1.0	0.64	**0.8**

Hence alternative option 2 will be selected to solve the conflict.

Alternative Option 1:A user-friendly platform with powerful search features for customers, supported by filters based on popular customer criteria like price, number of rooms, area, year built etc, along with worldwide reach capability for brokers to attract suitable customers.

Alternative Option 2: REB+ provides a user-friendly online platform with worldwide reach to potential customers (clients). It allows broker to post customized ads which they can modify anytime

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternative Option 1**	**Alternative Option 2**
User-friendly interface for all users	0.3	0.7	0.7
Extensive search filter for customers	0.2	1.0	0.3
Global customer reach for brokers	0.2	0.1	0.8
Searching efficiency	0.3	0.9	0.7
Total	1.0	**0.7**	0.64

Hence selecting Alternative Option 1 for resolving the conflict

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Alternative Option 1:A user-friendly platform with powerful search features for customers, supported by filters based on popular customer criteria like price, number of rooms, area, year built etc, along with worldwide reach capability for brokers to attract suitable customers.

Alternative Option 2: Customers can fix an appointment with the broker

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternative Option 1**	**Alternative Option 2**
User-friendly interface	0.3	0.9	0.6
Availability and response time for appointment booking	0.5	0.7	0.9
Search capabilities	0.2	0.9	0.5
Total	1.0	**0.8**	0.73

Therefore, Alternative Option 1 will be selected to resolve the conflict.

Alternative Option 1:Potential customers (clients) can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly

Altenrative Option 2: REB+ provides an online platform with worldwide reach to potential clients. It allows broker to post customized ads which they can modify anytime.

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternate Option 1**	**Alternate Option 2**
Global reach to customers	0.3	0.1	0.8
Online booking convenience	0.4	0.8	0.7
Response time for bookings	0.3	0.8	0.4
Total	1.0	0.59	**0.64**

Hence, Alternative Option 2 will be selected to resolve the conflict.

Alternate Option 1: Customers (clients/homebuyers) can directly view broker's updated availability, and book online meetings directly and get it confirmed quickly.

Alternate Option 2: Homebuyers can fix an appointment online or through call with the broker.

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternate Option 1**	**Alternate Option 2**
Online meeting booking convenience	0.4	0.8	0.8
Booking meeting through call	0.1	0.1	0.8
Confirmation Speed	0.2	0.9	0.3
Real-time broker's availability updates	0.3	0.9	0.3
Total	1.0	**0.78**	0.55

Hence Atlernate Option 1 will be selected to resolve the conflict

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Alternate option 1: Recovery from failure should mean that users are able to resume from where they left off. There should be no loss of consumer data.

Alternate Option 2: REB+ provides an online platform with worldwide read to potential clients. It allows broker to post customized ads which they can modify anytime when they are logged in.

		Options Score	
Evaluation Criteria NFR	**Significance Weighting**	**Alternate Option 1**	**Alternate Option 2**
Data recovery and resumable interaction	0.5	0.9	0.1
Platform Reliability	0.3	0.7	0.6
Data integrity(modifying data)	0.2	0.9	0.8
Total	1.0	**0.84**	0.39

Hence, Alternate Option 1 is selected

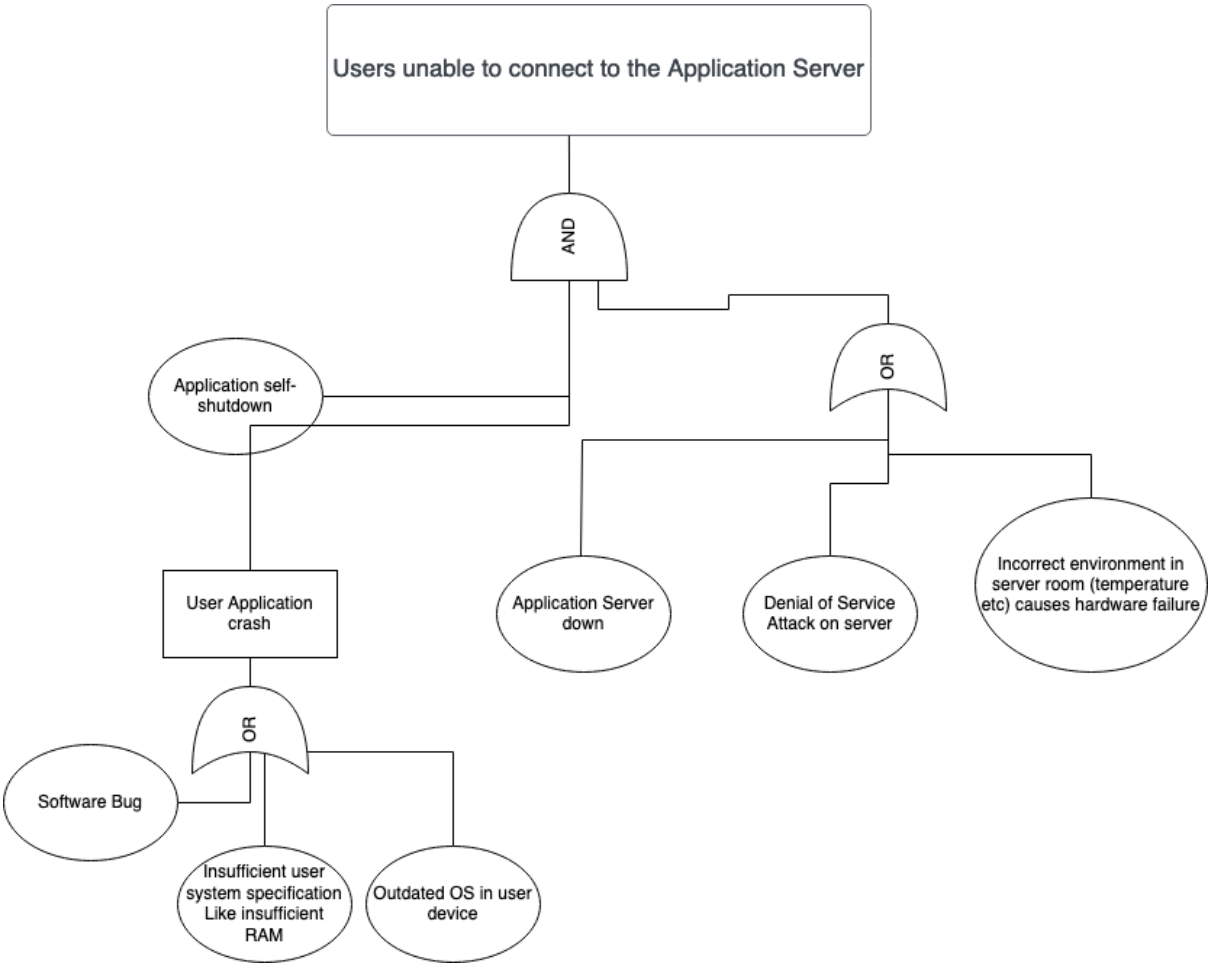
TASK 5: Risk Management

(A) Risk Identification

1. Component Inspection
    - **Application server**: The current implementation of the REB+ platform proposes the use of a single, adequately powered, capable server to handle requests from multiple regions. This is the single point of failure. Shutting down this server can seriously impact the users and stakeholder business.
    - **Hardware System**: The end user's devices might fail to render and run the REB+ web application properly, due to various reasons like not enough system specification in the user's device, outdated software or OS in the user's device.
    - **Network:** REB+ platform being a web application, depends on good internet infrastructure. If there is low-speed internet or no internet, the quality of service might be heavily reduced for the users.
    - **Payment Gateway:** Initial implementation (also a popular practice in the industry) is to use a third-party payment gateway to facilitate financial transactions in our REB+ platform. Integration with third-party payment gateways introduces the risk of technical glitches, downtime, or payment processing errors. These issues could impact transactions and lead to dissatisfied users.
2. Risk Checklist
    - **Usability**: REB+ focuses on providing powerful search features, which can inadvertently affect or drastically reduce the usability of the user interface.

- **Cost**: The risk of the development or maintenance of the platform exceeding the allocated budget, leading to financial strain or compromises in other aspects of the application.
- **Confidentiality**: The risk of unauthorized access to user data, financial information, property information and personal details.
- **Integrity**: The risk of data being altered or manipulated by unauthorized, malicious entities, leading to inaccurate property information or transactions.

3. Risk Tree



(B) Risk Quantitaive Assessment

1. **Application Server**: the risk of a single application server failing is considerably high.
   Estimated cost = $500,000 million (approx estimate of restoring the server to back to its normal working condition, making sure of resumability etc)
   Probability of risk = 0.3 (a single server has considerable high probability of single point failure)
   Risk exposure = impact x probability of risk = $50,000 x 0.3 = $150,000

2. **Hardware**:
   Estimated cost = $50, 000 (approx financial loss of userbase of users with low-end devices leaving the platform)
   Probability of risk = 0.07 (usually, large proportion of users have decent devices with good specifications)
   Risk exposure = $50,000 x 0.07 = $3,500

3. **Network**:
   Estimated cost = $10,000 (financial loss due to people with less internet accessability is very less with the advent and growth of high speed internet around the world)
   Probability of risk = 0.05 (loss of internet can occur any time to any user, even userbase with high speed internet can experience few minutes of downtime or less speed)
   Risk exposure = $10,000 x 0.05 = $500

4. **Payment Gateway:**
   Estimated cost = $35,000 (loss of business due to user's failed attempt to complete transaction)
   Probability of risk = 0.1
   Risk Exposure = $35,000 x 0.1 = $3,500

5. **Usability:**
   Estimated Cost = $8000 (approx financial loss for the loss of userbase who find it difficult to use the application)
   Probability of risk = 0.2
   Risk Exposure = $8,000 x 0.2 = $1,600

6. **Cost:**
   Estimated Cost = $60,000 (approx loss for projects going overbudget)
   Probability of risk = 0.4 (research shows that considerably high number of software projects go overbudget and suffer financial loss)
   Risk Exposure = $60,000 x 0.4 = $24,000

7. **Confidentiality**
   Estimated Cost = $40,000 (assuming REB+ is a small-medium size organization, breach of data confidentiality can be in the range of $20,000 to $100,000)
   Probability of risk = 0.45 (Organizations around the world records huge number of cyber-attacks each year)
   Risk Exposure = $40,000 x 0.45 = $18,000

8. **Integrity:**
   Estimated Cost = $120,000 (failing to maintain integrity of data not only has direct financial loss, but also lot of legal implications)
   Probability of risk = 0.10
   Risk Exposure = $120,000 x 0.10 = $12,000

(C) Risk Control

1. **Application Server:**

Countermeasure option 1:Using Reduce Risk likelihood. Distributed application servers implementing a distributed REB+ web-application to combat single point of failure and to ensure high availability and run-time of the application. This will reduce the risk to 0.05 with estimated cost of $10,000

Risk Exposure 1 = $500,000 x 0.05 = $25,000

Calculating RRL1 (alternative option 1) =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 150,000 - 25,000 / 100,000 = 1.25

Countermeasure Option 2: Using Reduce Risk consequence. Implementing another backup server and redundant system to reduce the financial and other consequences. This will reduce the risk to 0.1 and estimated cost is $120,000

Risk Exposure 2 = $500,000 x 0.1 = $50,000

Calculate RRL2 (alternative option 2) =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 150,000 - 50,000 / 120,000 = 0.83

Comparing both RRL1 and RRL2, we will choose RRL 1 as it has value > 1

2. **Hardware**:

Countermeasure option 1:Using Reduce consequences likelihood. Provide device compatibility guidelines to make sure that new users can invest in right set of devices. This will reduce the risk to 0.05 with the cost of $1000 for issuing documentations

Risk Exposure 1 = $50,000 x 0.05 = $2,500

Calculating RRL1 =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 3,500 - 2,500 / 1000 = 1

Countermeasure option 2: Using Reduce risk likelihood. Invest in compatibility enhancement to make sure that REB+ works with legacy devices and low-end systems. This will reduce the risk to 0.01 with the cost of $4,000

Risk Exposure 2 = $50,000 x 0.01 = $500

Calculating RRL2 =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 3500 - 500 / 4000 = 0.75

Comparing both RRL1 and RRL2, we will choose RRL 1 as it has value > =1

3. **Network.**

Countermeasure option 1: Using Reduce risk likelihood. Collaborating with internet service providers to ensure high availability of internet for users across regions with highly active users. This will reduce risk probability to 0.04 at the cost of $20,000 (collaboration with multiple ISP is expensive)

Risk Exposure 1 = $10,000 x 0.04 = $400

Calculating RRL1 =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 500 - 400 / 20000 = 0.005

Countermeasure option 2: Avoid risk. Introduce content caching for the user so that they can navigate the app on cached data, and make user's broker's details offline to ensure communication between them. This will reduce the risk to 0.02 at the cost of 200$ (content caching is not expensive)

Risk Exposure 2 = $10,000 x 0.02 = $200

Calculating RRL2 =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 500 - 200 / 4000 = 1.5

Since RRL2> 1 , we will select countermeasure 2 for risk control

4. **Payment gateway**

Coutermeasure option 1 : Using Mititage risk consequences. Develop in-house Organization's own payment gateway. This will reduce the risk to 0.02 at the cost of $2,500

Risk Exposure 1 = $35000 x 0.02 = $700

Calculating RRL1 =

(RE_{before} - RE_{after}) / (cost of risk reduction) = 3500 - 700 / 2500 = 1.12

Countermeasure option 2: Using reduce risk likelihood. Regular monitoring and maintenance of the third party system. This will reduce the probability to 0.7 at the cost of $1,200

Risk Exposure 2 = $35,000 x 0.07 = $2450

Calculating RRL2 =

(REbefore - REafter) / (cost of risk reduction) = 3500 - 2450 / 1200 = 0.87

Since RRL1 > 1, we will be selecting countermeasure 1 for risk control

5. **Cost**

Countermeasure 1: Using Avoid risk. Establish contractual obligation of not exceeding pre-agreed budget for the project, failing which the development will be handed over to another development team/organization. This will reduce the risk to 0.2 with risk reduction cost of $20,000.

Risk Exposure 1 = 60,000 x 0.2 = 12000

Calculating RRL1 =

(REbefore - REafter) / (cost of risk reduction) = 24000-12000/20000 = 0.6

Countermeasure 2: Using Reduce risk likelihood. Implementing an Agile development approach that allows for more flexibility and adaptability during the development process, reducing the likelihood of going overbudget to 0.06 at the cost of $12,000.

Risk Exposure 2 = 60000 x 0.06 = $3600

Calculating RRL2 =

(REbefore - REafter) / (cost of risk reduction) = 24000-3600/12000 = 1.7

Since RRL2 > 1, we will select countermeasure 2.

6. **Data Confidentiality.**

Countermeasure 1: Using Avoid risk likelihood. Robust Access-control system implementation to restrict user access to specific data based on their roles and privileges. This will reduce the risk 0.10 at the cost of $10,000

Risk Exposure 1 = 40000 x 0.10 = 4000

Calculating RRL1 =

(REbefore - REafter) / (cost of risk reduction) = 180000-4000/10000 = 1.4

Countermeasure 2: Using Avoid risk. Handover security management to a third party company who will take full responsibility for company's data confidentiality. This will reduce the risk to 0.09 at the cost of $20,000.

Risk Exposure 2 = 40,000 x 0.09 = 3600

Calculating RRL2 =

(REbefore - REafter) / (cost of risk reduction) = 18000-3600/20000 = 0.72

Since RRL1 value is greater than 1, countermeasure 1 will be used to control risk.

7. **Usability**

Countermeasure 1: Using Reduce risk likelihood. User-centric design approach by prioritizing user needs and preference while developing REB+ platform. This will reduce the risk probability to 0.1 at the cost of $750

Risk Exposure 1 = 8000 x 0.1 = 800

Calculating RRL1 =

(REbefore - REafter) / (cost of risk reduction) = 1600-800/750 = 1.06

Countermeasure 2: Using Reduce consequences likelihood. Establish regular user feedback and roll out beta versions of REB+ exclusively for this user feedback activity. This will reduce the risk to 0.18 at the cost of $600

Risk Exposure 2 = 8000 x 0.18 = 1440

Calculating RRL2 =

(REbefore - REafter) / (cost of risk reduction) = 1600-1440/6000 = 0.26

Since RRL1 value is greater than 1, countermeasure 1 will be used to control the risk

8. **Integrity**

Countermeasure 1: Using Reduce risk likelihood. Implement Data encryption and hashing to protect the integrity of data stored in the REB+ platform. Encryption ensures that data remains confidential and cannot be accessed by unauthorized entities, while hashing adds an additional layer of security by verifying the integrity of data. This reduces the probability to 0.02 with cost of $9500

Risk Exposure 1 = 120,000 x 0.02 = 2400

Calculating RRL1 =

(REbefore - REafter) / (cost of risk reduction) = 12000-2400/9500 = 1.01

Countermeasure 2: Using Mitigate risk consequences. Enforce regular whitebox and black box network and system penetration testing to make sure there is no known vulnerabilities through which malicious actors can get into the system. This will reduce the risk to 0.05 at the cost of $15000

Risk Exposure =2 = 120,000 x 0.05 = 6000

Calculating RRL1 =

(REbefore - REafter) / (cost of risk reduction) = 12000-6000/15000 = 0.4

Comparing RRL1 and RRL2, its clear that RRL1 value is greater than 1, which means risk control is cost effective.