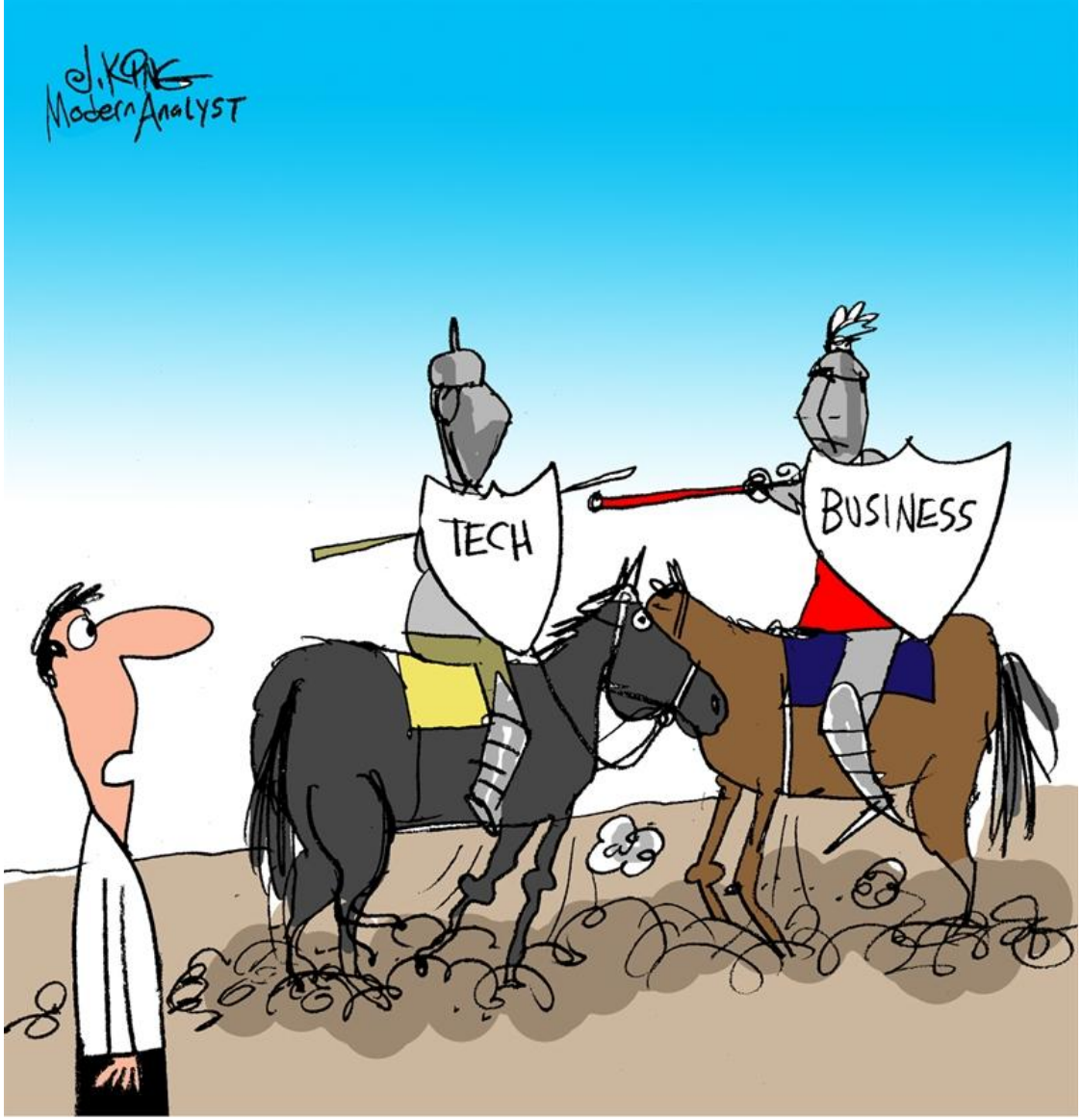
Business Requirement Analysis for Solution Architect



"I may have been called too late to bridge the gap between business and technology."

Agenda

1. Requirements Concepts & Knowledge Areas (BABOK & FSOFT's Practice)
   a. Get to know, quick Test & Expectation - 45 mins
   b. 6 Business Analysis Key Concepts - 30 mins
   c. Morning Break - 30 mins
   d. 6 Key Knowledge Areas & Tasks - 30 mins
   e. Discussion & Tips - 30 mins
   f. Quiz - 20 mins

2. Requirements-related Tasks for Solution Architect
   a. Elicitation and Collaboration - 45 mins
   b. Strategy Analysis - 30 mins
   c. Coffee Break - 30 mins
   d. Requirements Analysis and Design Definition - 30 mins
   e. Solution Evaluation - 15 mins

4. Final Assignment - 30 mins
5. Non-functional Requirements - 15 mins - optional

Start:	8:30
Break:	09:45 - 10:15
Lunch:	11:45 - 13:30
Break:	15:30 - 16:00
End:	16:45

Learning Goals

After this course, you should be able to:

Understand business analysis & requirements documents

Participate in business analysis related tasks as an architect

Produce solution & architecture that serves needs

- **Question: your expectation?**

Your Missions

To complete this topic and achieve goals, you need to:

- Study selective sections of BABOK v3
- Actively participate in class discussions
- Complete final exam at home

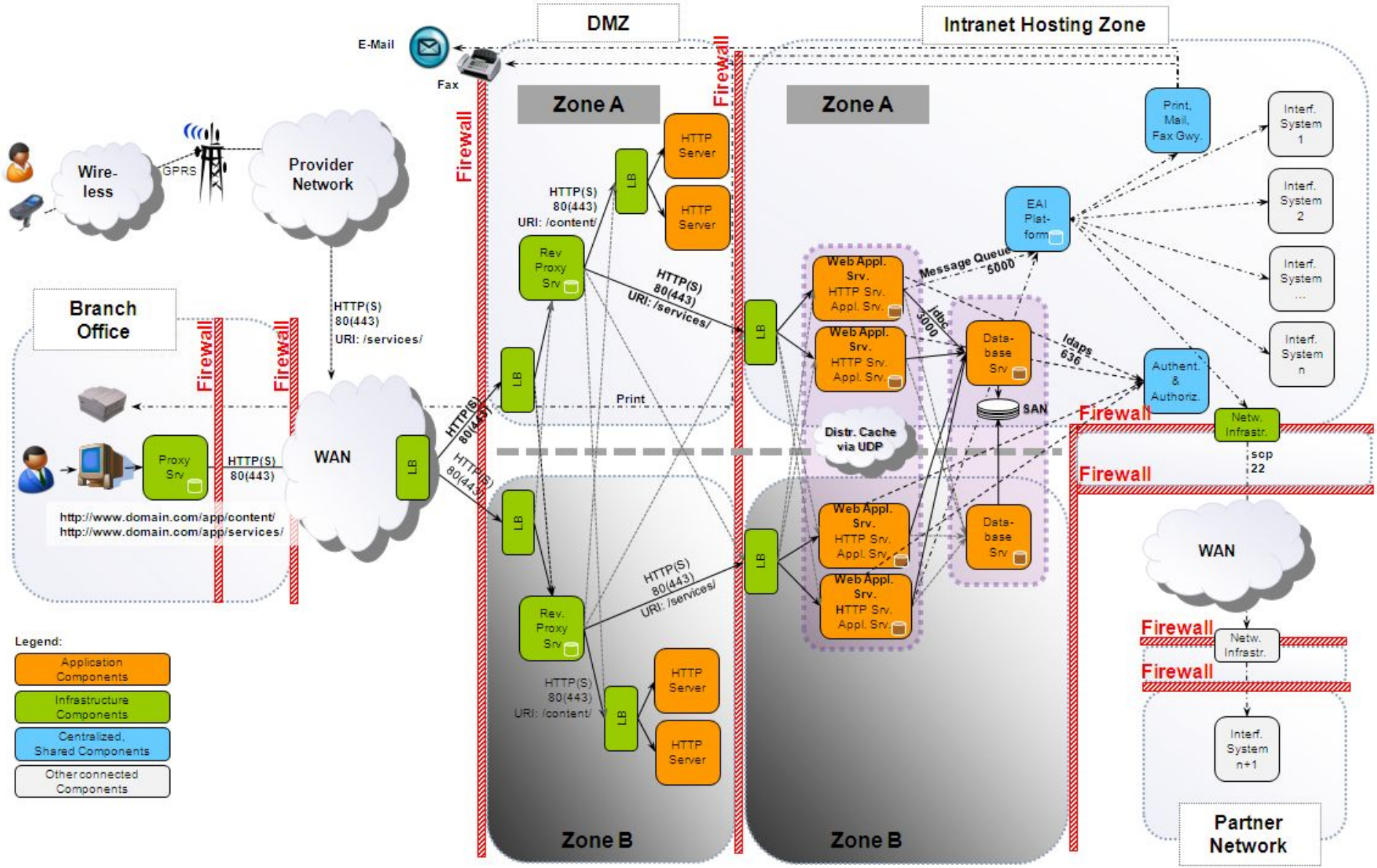
Solution architects design or modify systems architecture to meet certain business needs. They test, integrate, and program software systems to ensure that specific business issues are solved.

Solution Architect Responsibilities:

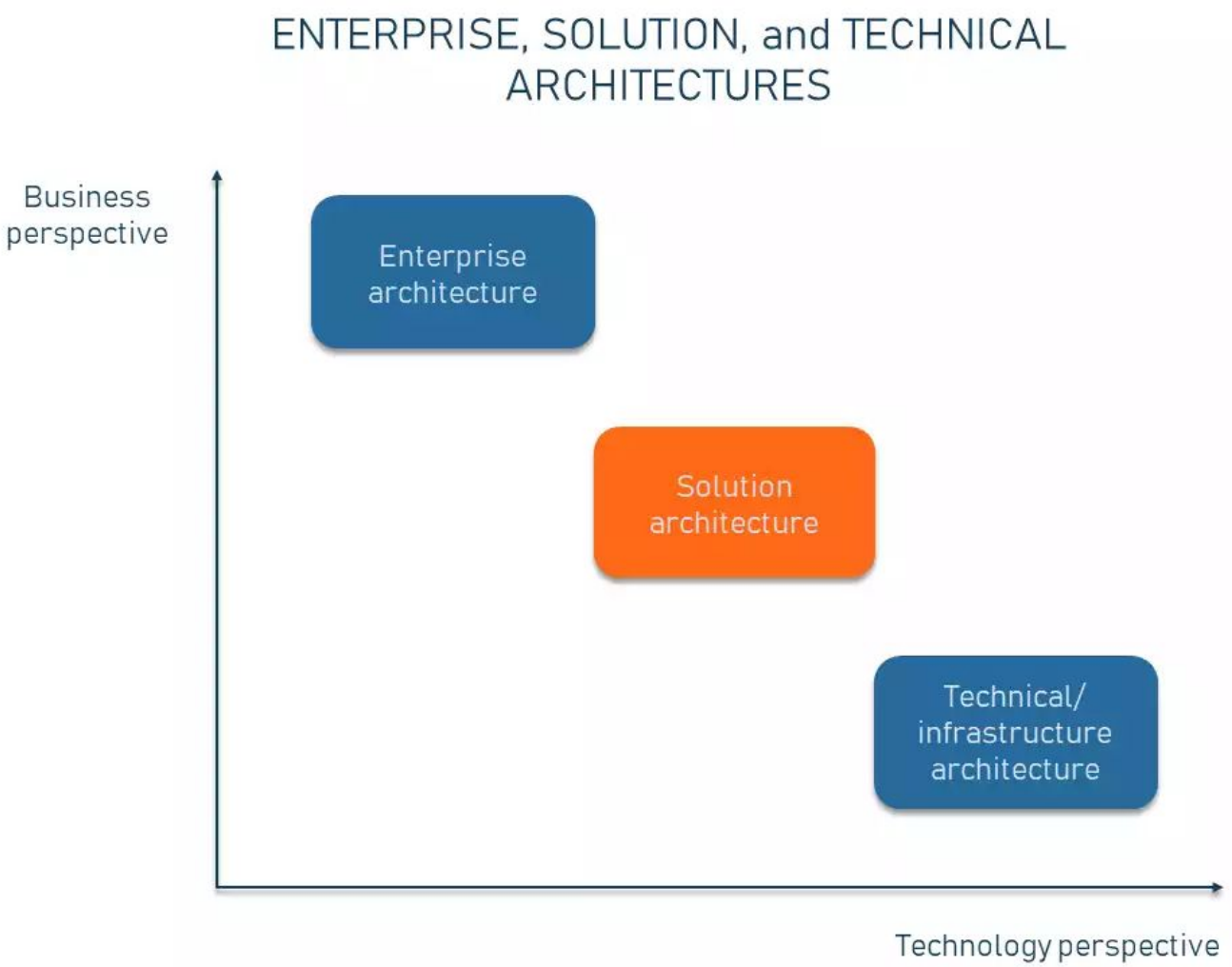
- Building and integrating information systems to meet the company's needs.
- Assessing the systems architecture currently in place and working with technical staff to recommend solutions to improve it.
- Resolving technical problems as they arise.
- Providing supervision and guidance to development teams.
- Continually researching current and emerging technologies and proposing changes where needed.
- Informing various stakeholders about any problems with the current technical solutions being implemented.
- Assessing the business impact that certain technical choices have.
- Providing updates to stakeholders on product development processes, costs, and budgets.

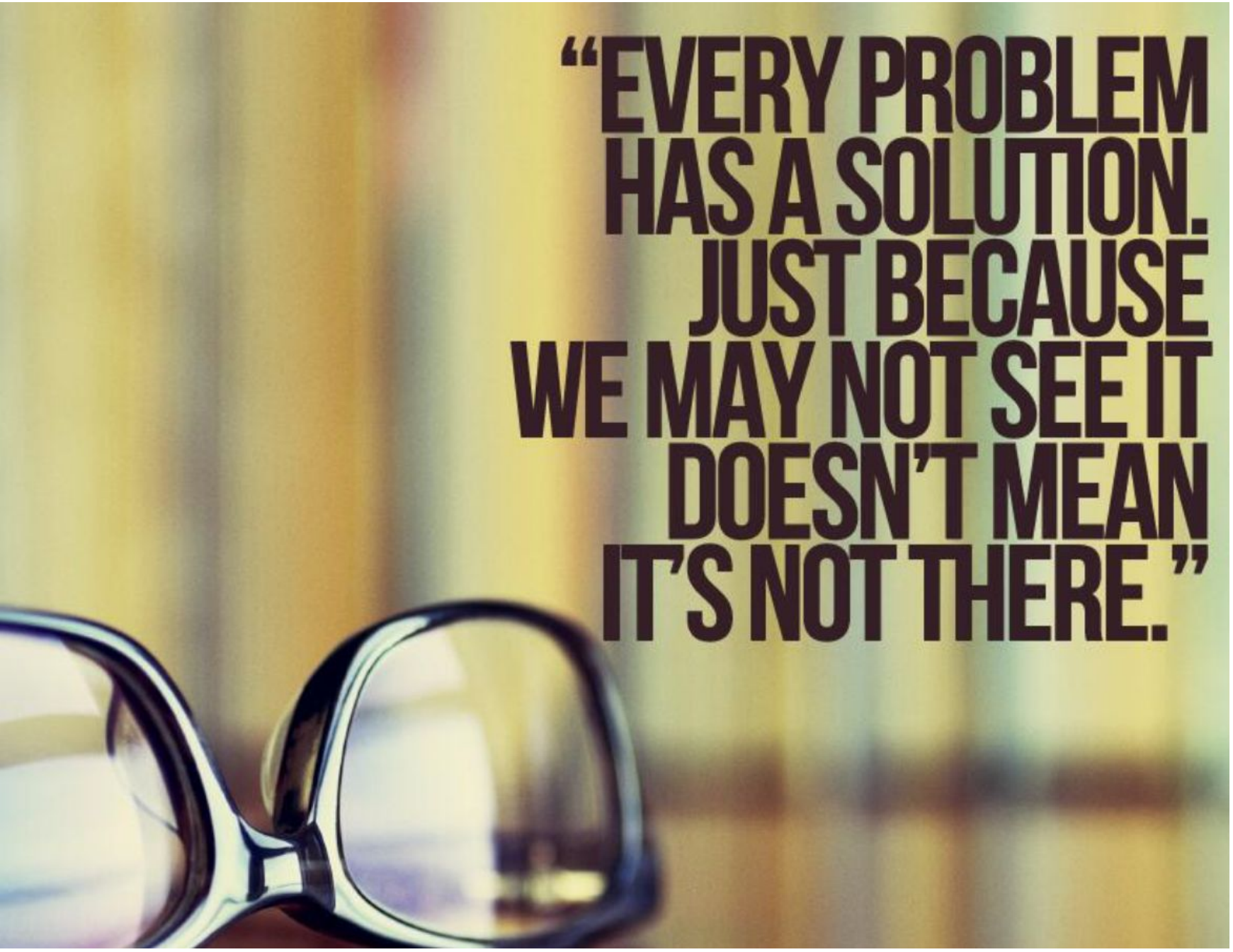
Solution Architect Requirements:

- Bachelor's degree in information technology, software engineering, computer science, or related field.
- Proven experience in engineering and software architecture design.
- Previous project management experience is advantageous.
- In-depth understanding of coding languages (Java, JavaScript).
- Sound knowledge of various operating systems and databases.
- Efficient communication skills.
- Strong organizational and leadership skills.

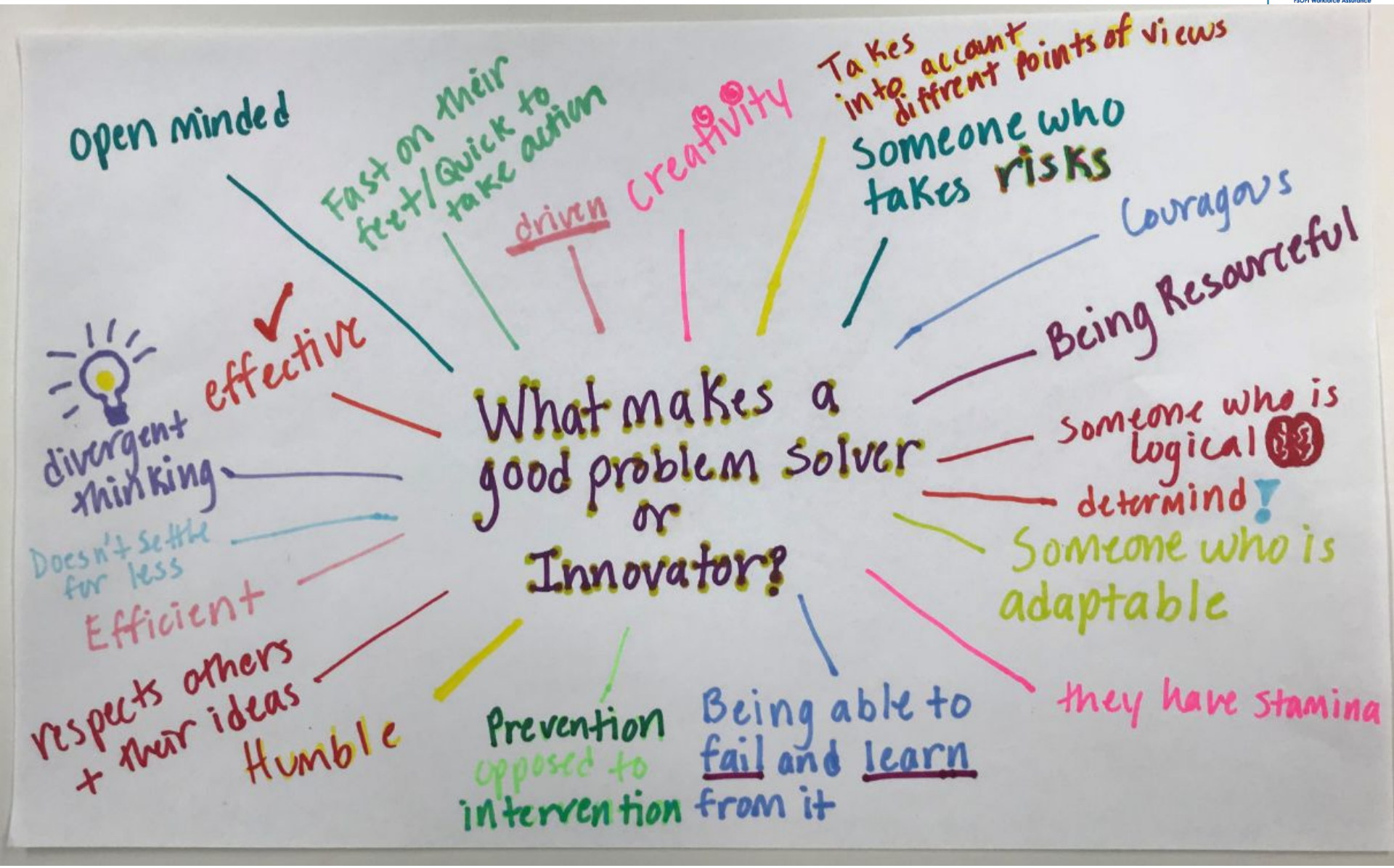

DMZ
Intranet Hosting Zone
E-Mail
Fax
Zone A
Zone A
Firewall
Firewall
Wire-less
GPRS
Provider Network
HTTP(S) 80(443) URI: /content/
HTTP Server
HTTP Server
LB
Rev Proxy Srv
HTTP(S) 80(443) URI: /services/
Branch Office
HTTP(S) 80(443) URI: /services/
Firewall
Firewall
Proxy Srv
HTTP(S) 80(443)
WAN
LB
Print
Web Appl. Srv. HTTP Srv. Appl. Srv.
Web Appl. Srv. HTTP Srv. Appl. Srv.
Message Queue 5000
jdbc 3000
Data-base Srv
EAI Plat-form
Print, Mail, Fax Gwy.
Interf. System 1
Interf. System 2
Interf. System ...
Interf. System n
ldaps 636
Authent. & Authoriz.
SAN
Distr. Cache via UDP
Netw. Infrastr.
scp 22
Firewall
Firewall
http://www.domain.com/app/content/
http://www.domain.com/app/services/
Rev. Proxy Srv
HTTP(S) 80(443) URI: /services/
HTTP(S) 80(443) URI: /content/
HTTP Server
HTTP Server
Web Appl. Srv. HTTP Srv. Appl. Srv.
Web Appl. Srv. HTTP Srv. Appl. Srv.
Data-base Srv
WAN
Firewall
Netw. Infrastr.
Firewall
Interf. System n+1
Partner Network
Zone B
Zone B
Legend:
Application Components
Infrastructure Components
Centralized, Shared Components
Other connected Components

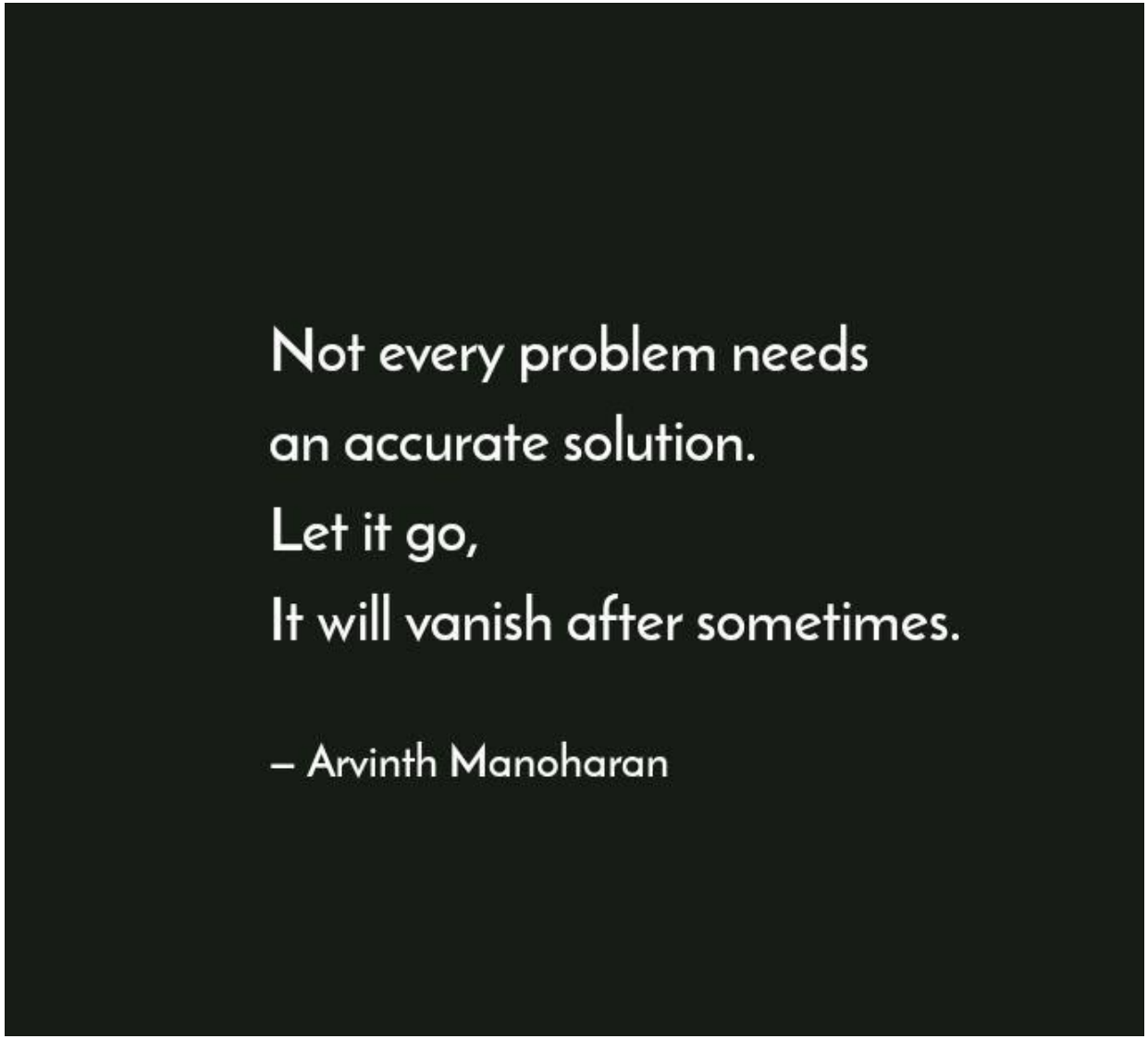
- need
- technology
- risks
- scope
- cost
- quality
- time
- resources




“EVERY PROBLEM
HAS A SOLUTION.
JUST BECAUSE
WE MAY NOT SEE IT
DOESN’T MEAN
IT’S NOT THERE.”

ARE YOU A PROBLEM SOLVER ?


What makes a good problem solver or Innovator?
Open minded
Fast on their feet/Quick to take action
driven
Creativity
Takes into account different points of views
Someone who takes risks
Courageous
Being Resourceful
Someone who is logical
determind!
Someone who is adaptable
they have stamina
Being able to fail and learn from it
Prevention opposed to intervention
Humble
respects others + their ideas
Efficient
Doesn't settle for less
divergent thinking
effective


Not every problem needs
an accurate solution.
Let it go,
It will vanish after sometimes.
– Arvinth Manoharan

We can’t fix everything

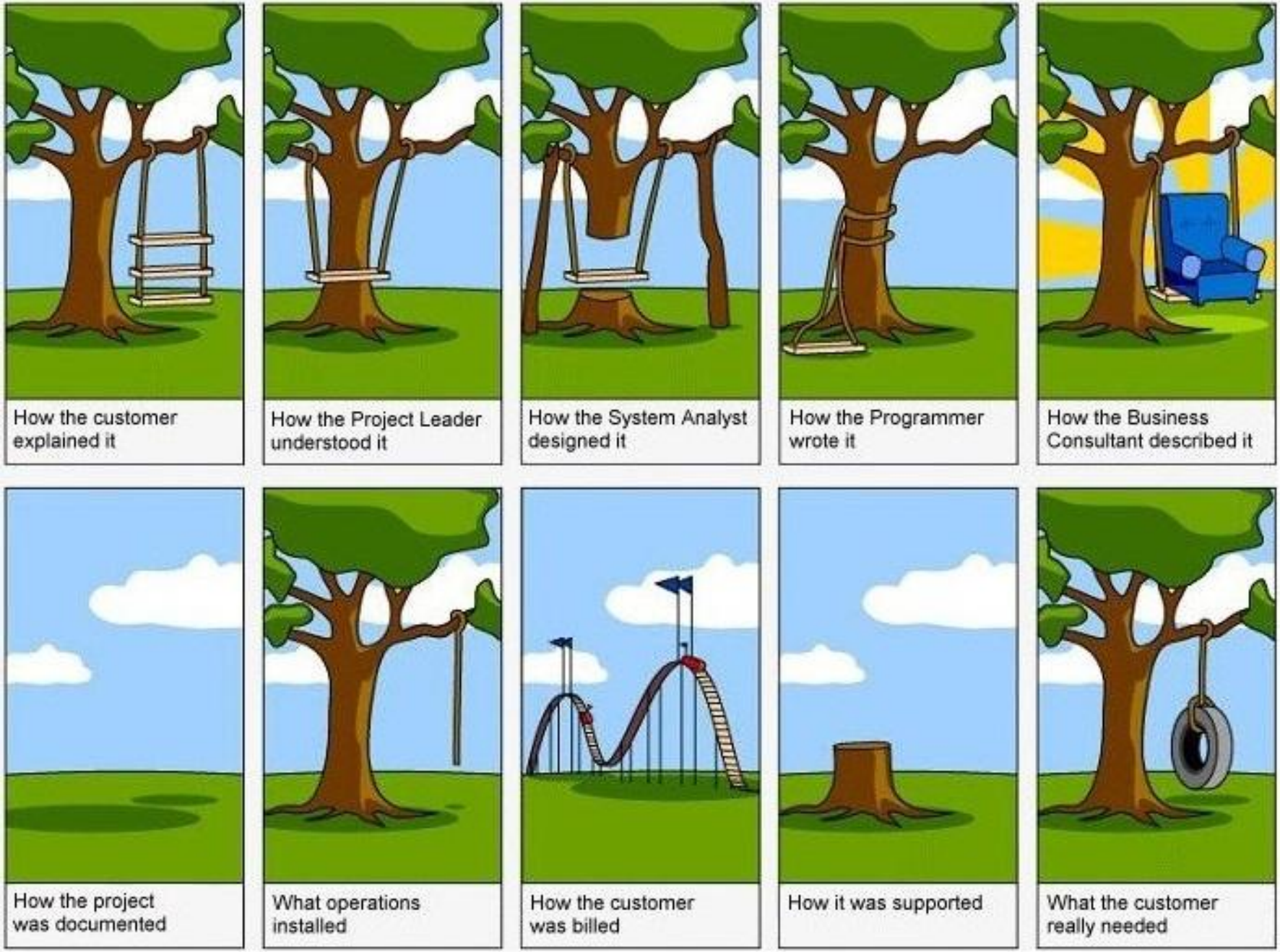
We need to learn to be okay with unresolved problems

None of this is to say that you should never try to fix your problems.

Let the answers come to you

Finding **a problem worth solving** is the hardest part for **every** startup, corporate or government innovation project.


JUICERO
Sweet Greens
apple
baby spinach
pineapple
kale
lemon
NET WEIGHT 10 OZ (283 g)

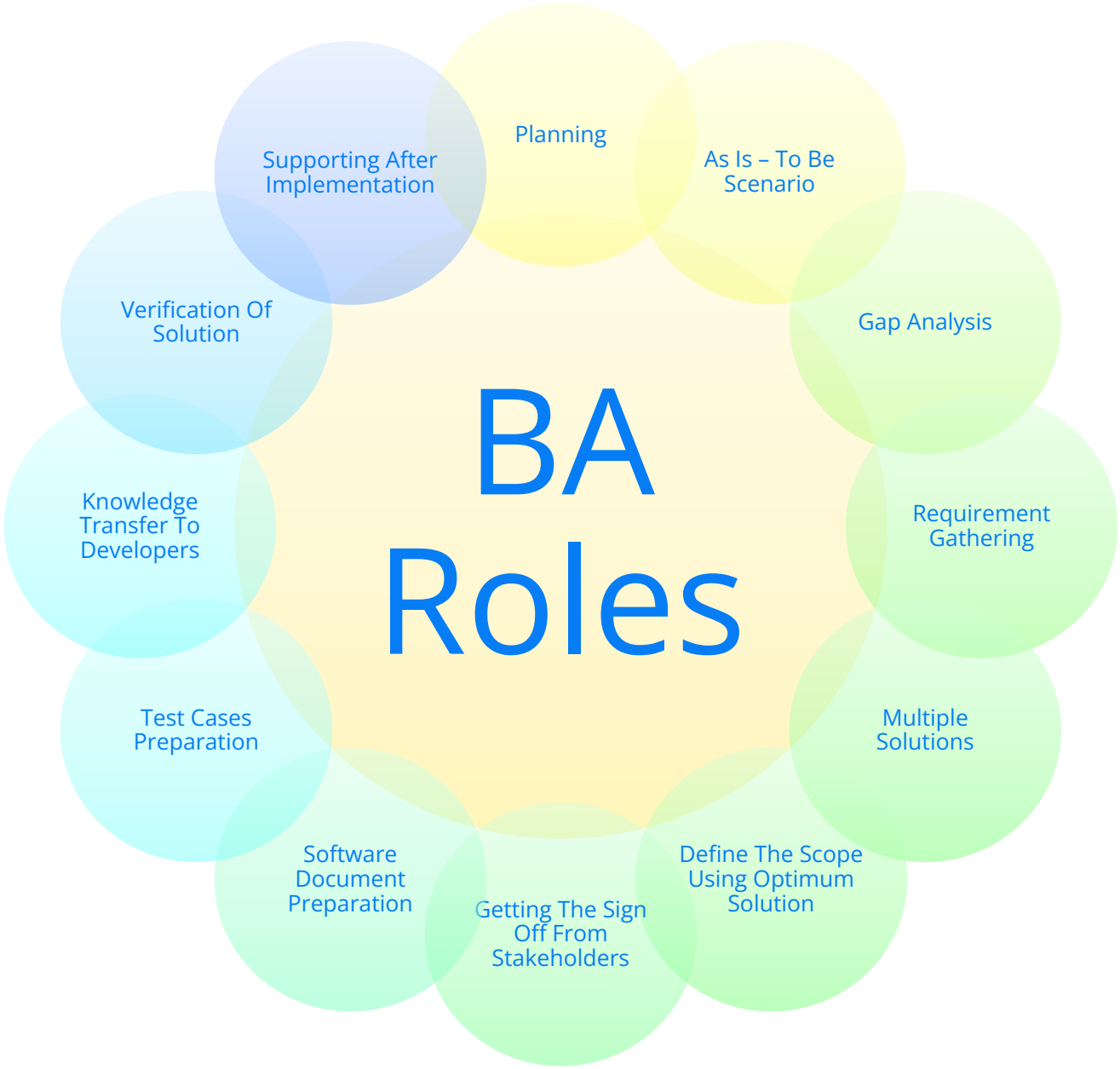

How the customer explained it
How the Project Leader understood it
How the System Analyst designed it
How the Programmer wrote it
How the Business Consultant described it
How the project was documented
What operations installed
How the customer was billed
How it was supported
What the customer really needed

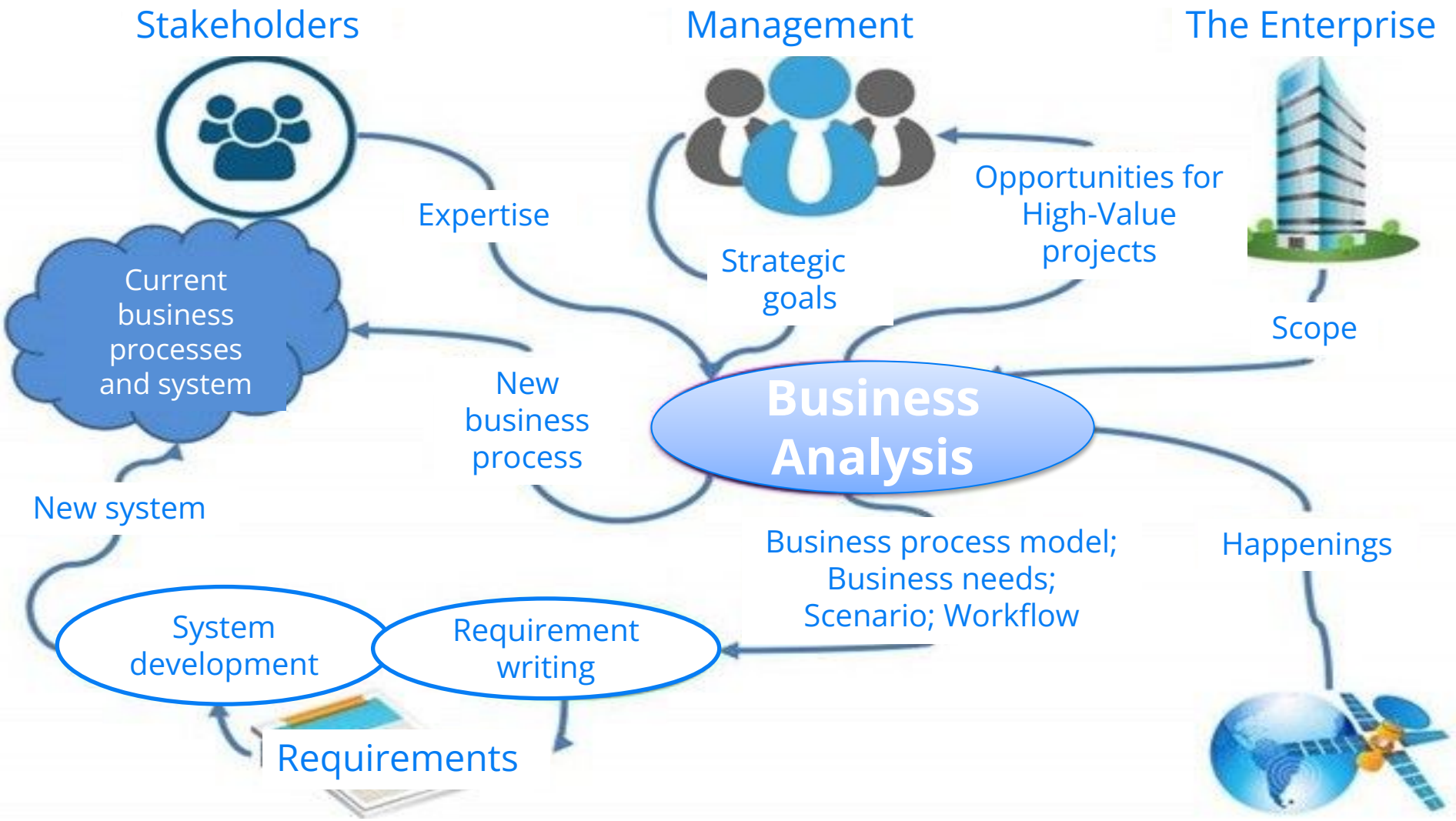
Babok v3.0 Sections

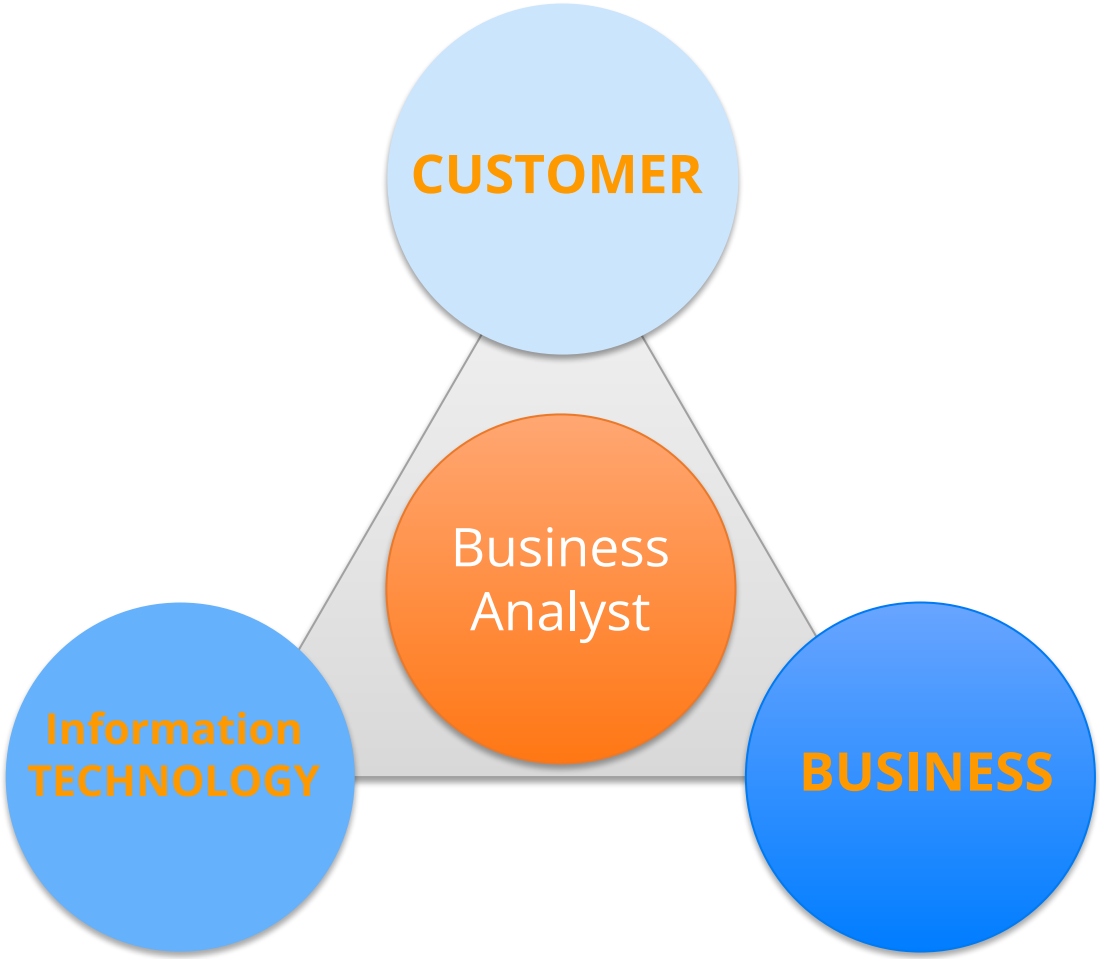
- **Chapter 1: Business Analysis**
  - 1.2 What is Business Analysis?
  - 1.3 Who is a Business Analyst?
- **Chapter 2: Business Analysis Key Concepts**
- **Chapter 4: Elicitation and Collaboration**
  - 5.3 Prioritize Requirements
  - 6.2 Define Future State (optional)
- **Chapter 7: Requirements Analysis and Design Definition** (7.4 is optional)
- **Chapter 8: Solution Evaluation** (8.4 & 8.5 are optional)
- **Techniques**
  - 10.19 Estimation
  - 10.24 Interface Analysis
  - 10.28 Metrics and Key Performance Indicators (KPIs)
  - 10.30 Non-Functional Requirements Analysis
  - 10.33 Prioritization

Business Analyst **is the Bridge** between the Stakeholder and the Project Team.

Business analysis is a research discipline of **identifying business needs** and **determining solutions** to business problems.


BA
Roles
Planning
As Is – To Be Scenario
Gap Analysis
Requirement Gathering
Multiple Solutions
Define The Scope Using Optimum Solution
Getting The Sign Off From Stakeholders
Software Document Preparation
Test Cases Preparation
Knowledge Transfer To Developers
Verification Of Solution
Supporting After Implementation


Stakeholders
Management
The Enterprise
Expertise
Strategic goals
Opportunities for High-Value projects
Scope
Current business processes and system
New business process
Business Analysis
New system
Business process model; Business needs; Scenario; Workflow
Happenings
System development
Requirement writing
Requirements



1. **Investigate business systems,** taking a **holistic (interconnected) / view** of the situation

2. Evaluate actions **to improve the operation** of a business system.

3. **Document** the business requirements, ensure the effective use of information systems in meeting the needs of the business.


BA
2009
2019
CNN
BUSINESSAIMS
IN JUST 10 YEARS BOTH THE CAMERA MAN AND THE PILOT LOST THEIR JOBS.
UPGRADE YOURSELF.


Omonbude Emmanuel
@BUDESCODE
To replace programmers with Robots, clients will have to accurately describe what they want.
We're safe.
7:25 PM · 20 Jul 20 · Twitter for Android

1. Requirements Concepts & Knowledge Areas

Quick Test

- **Exercise: complete paper test in 15 minutes.**

- **Pick one of your project, describe how business analysis related activities have been executed.**
- **Everything should be in bullets and in 1 A4 page**

Quick Test

- **Question: How such activities should be executed or which activities were missing?**

Quick Test

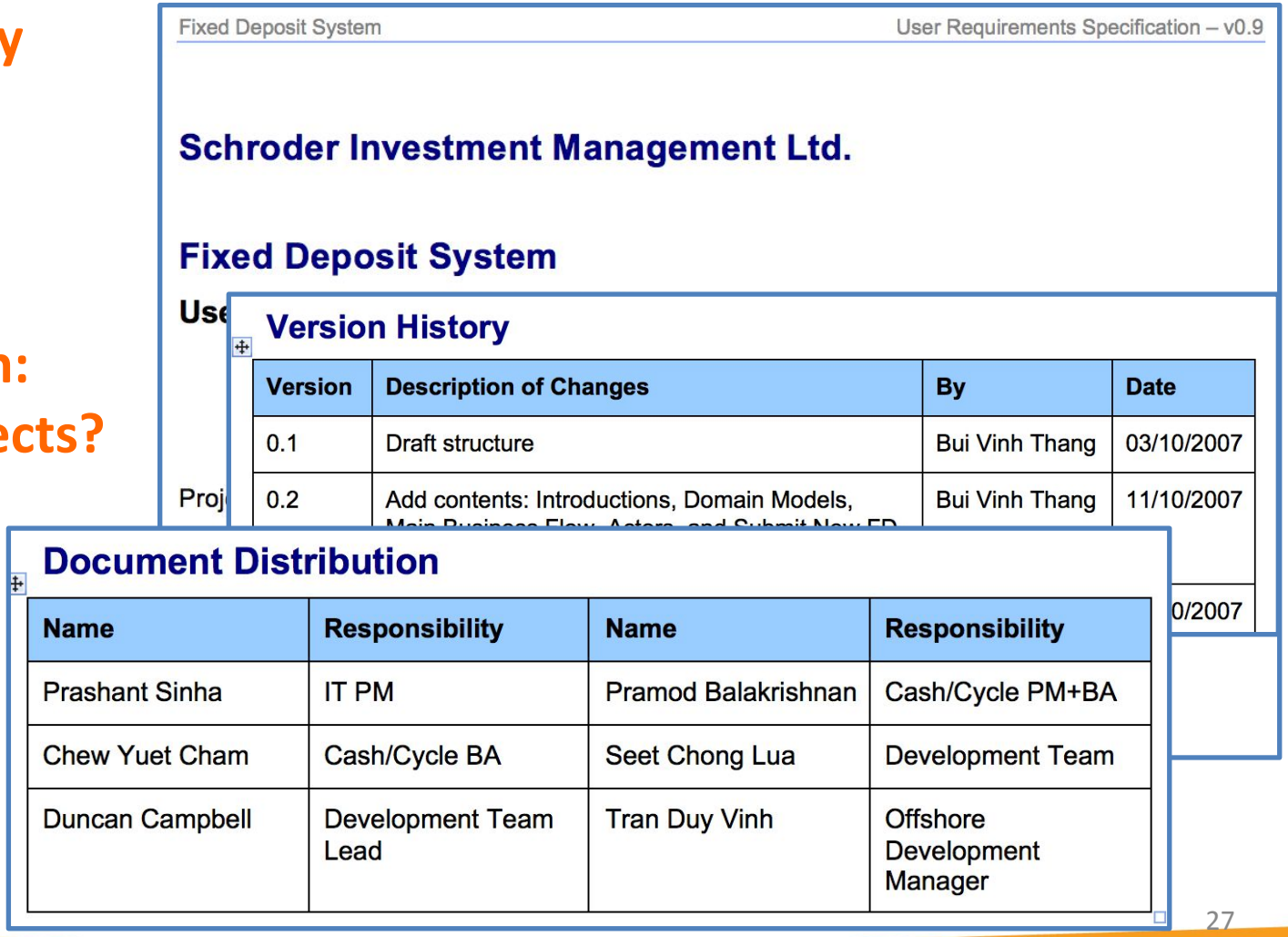
- **Question: What knowledge/activity in the test you are not aware of or would like to focus more on?**

Common Concerns

1. Requirement is not ready for Development
2. Lack of Interface Analysis
3. Lack of detail business Rules & Workflow ⇒ difficult in Screen Design & Database Design
4. Identify customer's need
5. Hiểu được vai trò của SA khi triển khai và xây dựng req
6. Phát hiện những requirement ngầm
7. Resolve conflicts between BA vs TL/SA
8. Describe for the development team to understand the customer's requirements
9. Should have Release Pipeline CICD
10. Follow Scrum Sprint but have to release sooner than planned. Development & Requirement grooming are done at the same time. ⇒ Negotiate
11. Non - functional Requirement: No clear Distinction

Key Concepts

- Business Analysis & Business Analyst
- **Case Study**
- **Discussion: your projects?**



Fixed Deposit System — User Requirements Specification – v0.9

Schroder Investment Management Ltd.

Fixed Deposit System

Use

Proj

Version History

Version	Description of Changes	By	Date
0.1	Draft structure	Bui Vinh Thang	03/10/2007
0.2	Add contents: Introductions, Domain Models, Main Business Flow, Actors, and Submit New FD	Bui Vinh Thang	11/10/2007

0/2007

Document Distribution

Name	Responsibility	Name	Responsibility
Prashant Sinha	IT PM	Pramod Balakrishnan	Cash/Cycle PM+BA
Chew Yuet Cham	Cash/Cycle BA	Seet Chong Lua	Development Team
Duncan Campbell	Development Team Lead	Tran Duy Vinh	Offshore Development Manager

Key Concepts

Business Analysis

- Within customer's organization (Schroders, London Scottish Bank, SMRT, Boeing, etc.):
  - Continuous improvement with business operation and project
  - Domain specific, deep knowledge about domain & organization
  - Dedicated or from business power users or process owners;
- In FSOFT:
  - Project & Product;
  - Software development process & engineering knowledge;
  - Dedicated, team lead, or test lead.

Key Concepts (cont.)

- Business Analysis Core Concept Model™ (BACCM™)

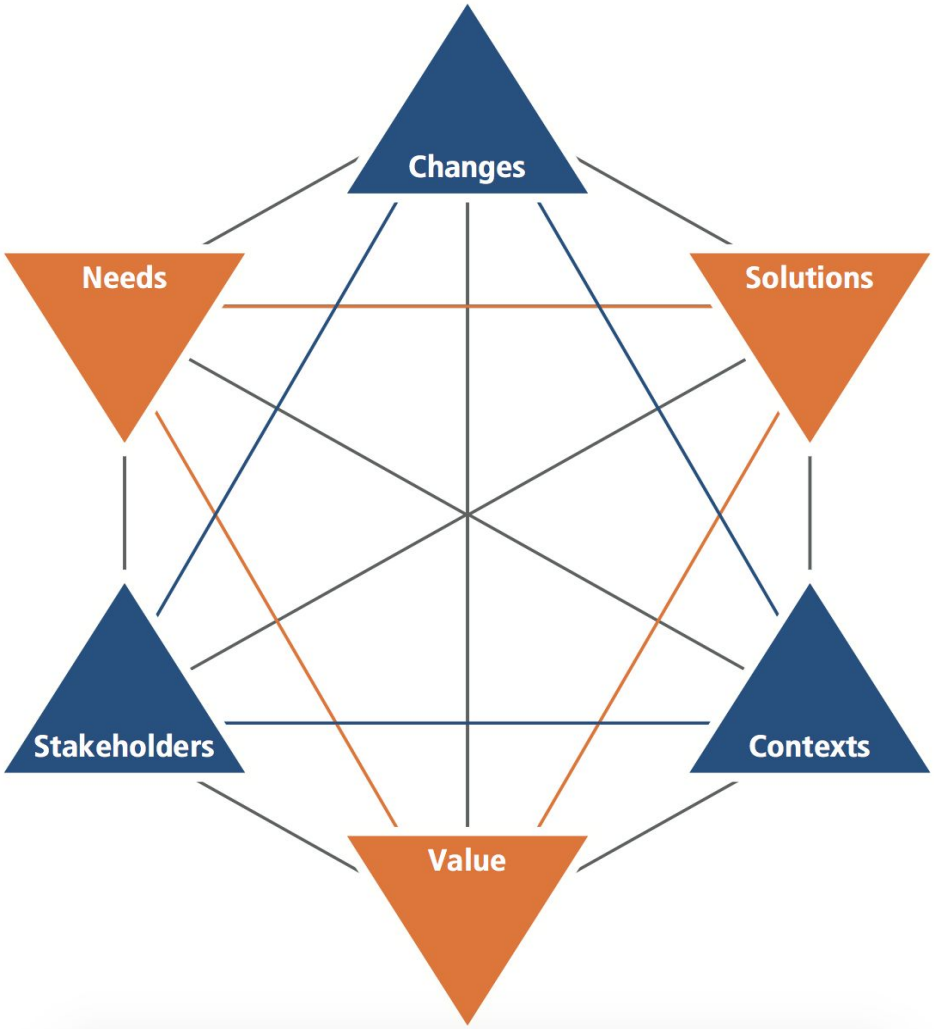
- **Question: what are the 6 core concepts under BACCM?**

Key Concepts (cont.)

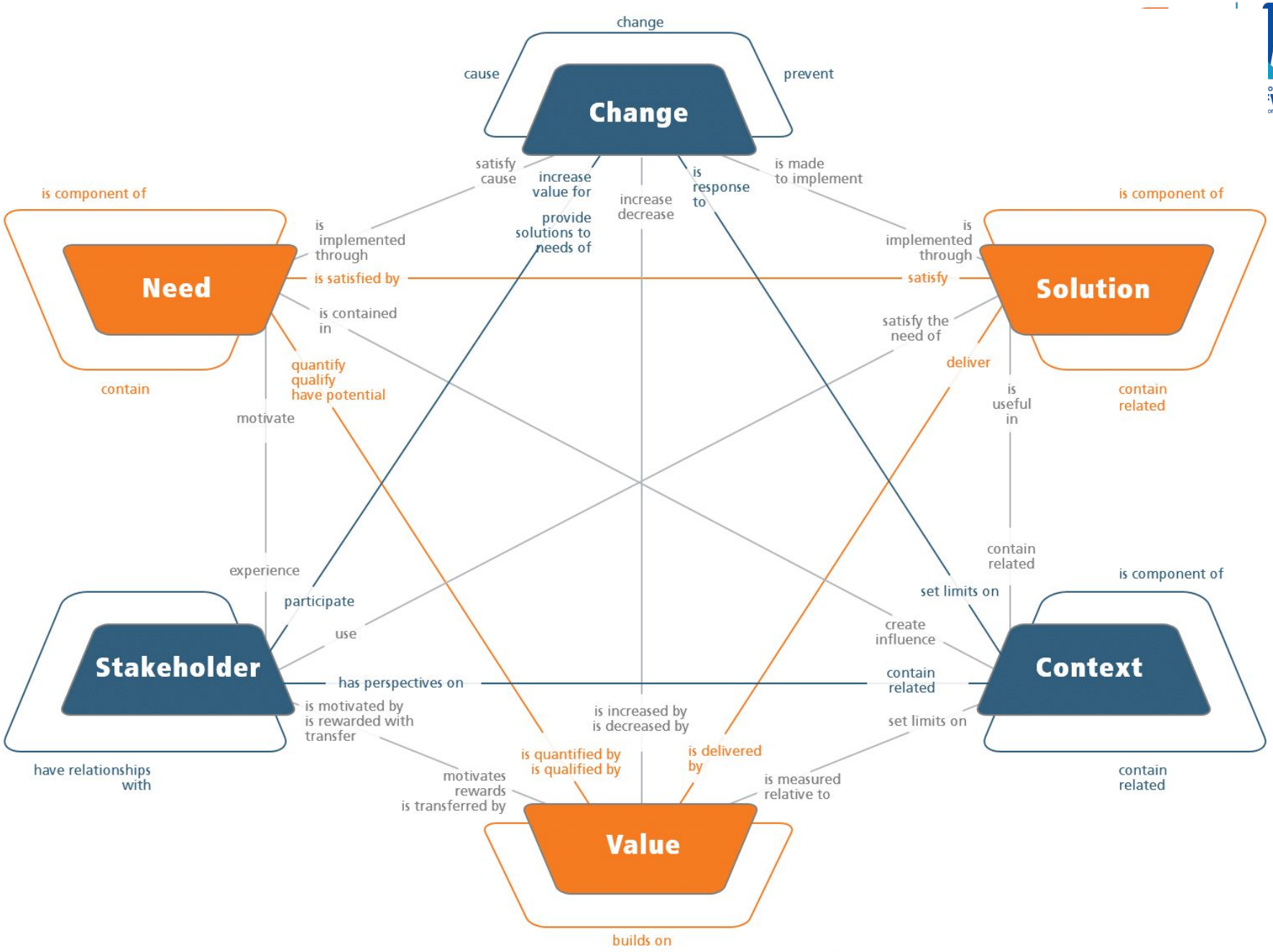
- Business Analysis Core Concept Model™ (BACCM™)

- **Exercise: select a project and identify contents for the 6 concepts.**

- **Hint: always consider how each core concept is addressed when performing requirements-related tasks.**




THE EXPERT
7 RED LINES


change
cause
prevent
Change
satisfy
cause
increase
value for
provide
solutions to
needs of
increase
decrease
is
response
to
is made
to implement
is component of
is
implemented
through
Need
is satisfied by
satisfy
Solution
is component of
is
implemented
through
is contained
in
satisfy the
need of
deliver
quantify
qualify
have potential
contain
motivate
is
useful
in
contain
related
contain
related
experience
participate
use
set limits on
is component of
create
influence
Stakeholder
has perspectives on
contain
related
Context
is motivated by
is rewarded with
transfer
is increased by
is decreased by
set limits on
is quantified by
is qualified by
is delivered
by
have relationships
with
motivates
rewards
is transferred by
is measured
relative to
contain
related
Value
builds on

Change: The act of transformation in response to a need.

Need: A problem or opportunity to be addressed.

Solution: A specific way of satisfying one or more needs in a context.

Stakeholder: A group or individual with a relationship to the change, the need, or the solution.

Value: The worth, importance, or usefulness of something to a stakeholder within a context.

Context: The circumstances that influence, are influenced by, and provide understanding of the change.

Key Concepts (cont.)

- Other Terms (*very briefly or can be ignored*)
  - Business Analysis Information
  - Design: presentation of a solution
  - Requirement: a usable representation of a need

- Requirements Classification Schema

- **Question: how do you see requirements classified in your projects?**

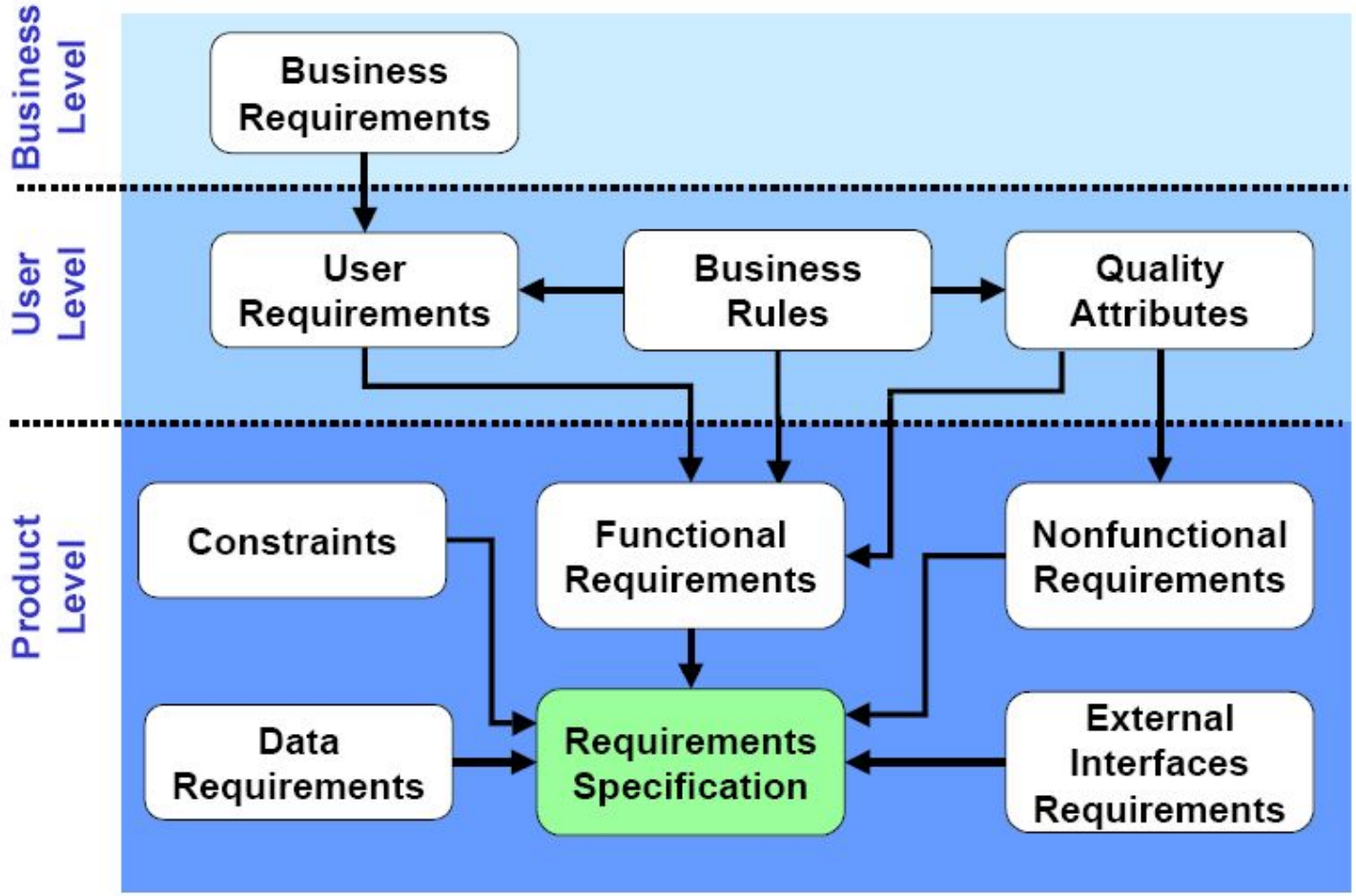
Key Concepts (cont.)

- Requirements Classification Schema
  - View from BABOK:
    - Business Requirements;
    - Stakeholder Requirements;
    - Solution Requirements: Functional, Non-Functional;
    - Transition Requirements.

- **Question: example about transition requirements?**

Key Concepts (cont.)

Requirements Classification Schema



Key Concepts (cont.)

- Requirements Classification Schema

- **Case: review some sample requirements documents.**

- **Validate: clear understanding between Functional vs. Non-Functional.**

Example Challenge

Non-functional requirements

Qualitative requirements

- Performance
- Security
- Reliability
- Useability
- Changeability/Maintainability
- Portability

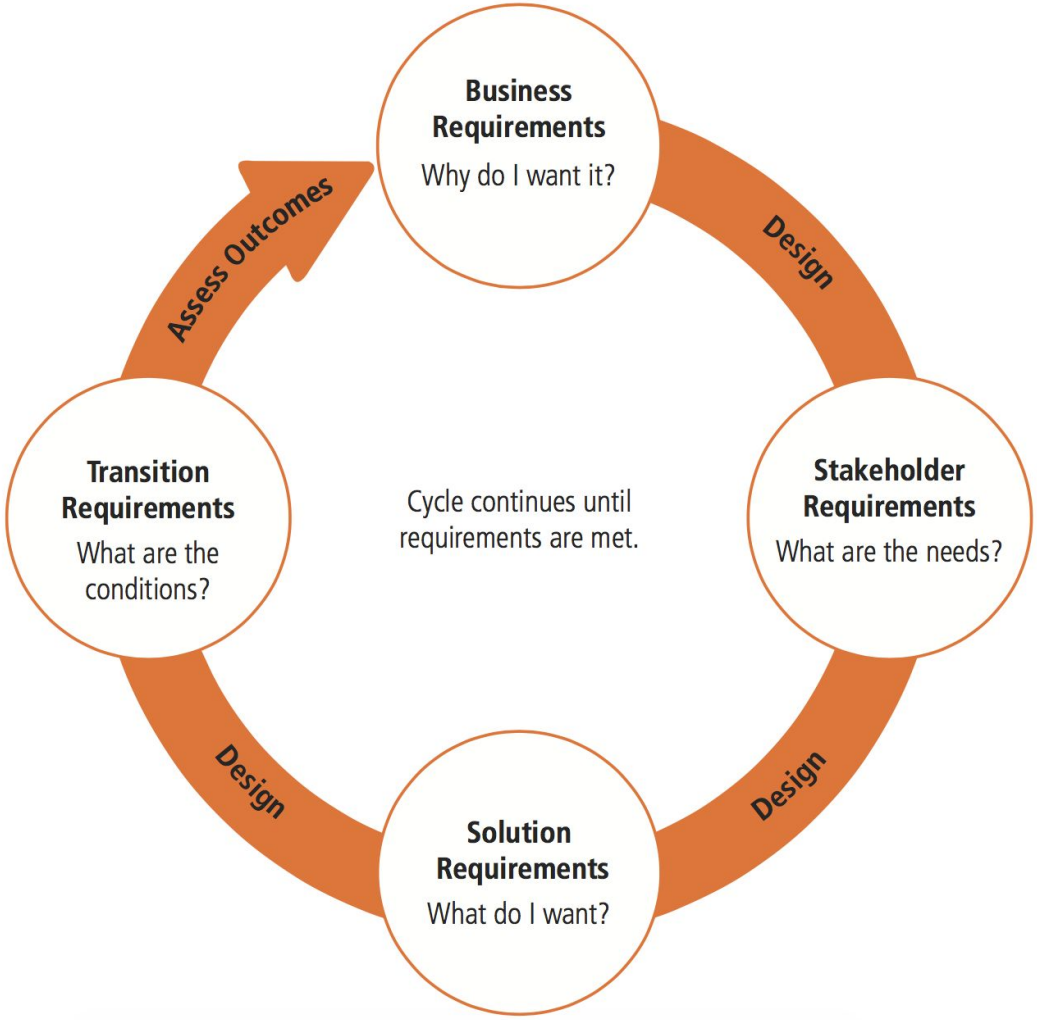
Boundary conditions

- Laws
- Standards
- Technology
- Process

	Functional requirements	Nonfunctional requirements
Objective	Describe what the product does	Describe how the product works
End result	Define product features	Define product properties
Focus	Focus on user requirements	Focus on user expectations
Documentation	Captured in use case	Captured as a quality attribute
Essentiality	They are mandatory	They are not mandatory, but desirable
Origin type	Usually defined by user	Usually defined by developers or other tech experts
Testing	Component, API, UI testing, etc. Tested before nonfunctional testing	Performance, usability, security testing, etc. Tested after functional testing
Types	External interface, authentication, authorization levels, business rules, etc.	Usability, reliability, scalability, performance, etc.

Key Concepts (cont.)

- Requirements and Designs



Key Concepts (cont.)

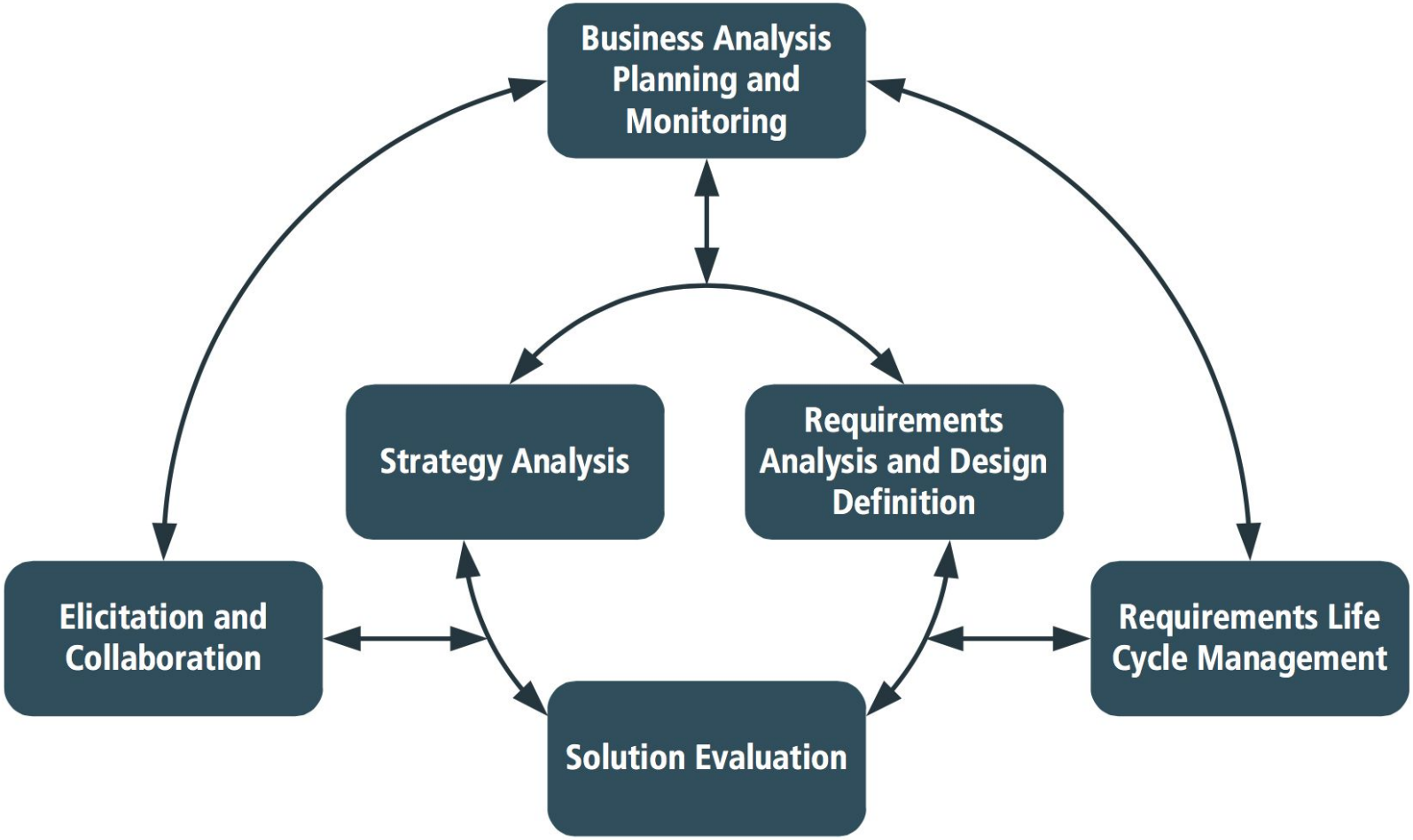
- Requirements and Designs

- **Case: requirements vs. designs. Show document.**

Requirement	Design
View six months sales data across multiple organizational units in a single view.	A sketch of a dashboard.
Reduce amount of time required to pick and pack a customer order.	Process model.
Record and access a medical patient's history.	Screen mock-up showing specific data fields.
Develop business strategy, goals, and objectives for a new business.	Business Capability Model.
Provide information in English and French.	Prototype with text displayed in English and French.

- **Exercise: work in group, provide your samples.**

Knowledge Areas & Tasks



Tools & Techniques for *BABOK® Guide v3*

ENTERPRISE ARCHITECT

BABOK® Guide v3 Models

BABOK® Guide v3 | IIBA®

3 Business Analysis Planning and Monitoring

- 3.1 Plan Business Analysis Approach
- 3.2 Plan Stakholder Engagement
- 3.3 Plan Business Analysis Governance
- 3.4 Plan Business Analysis Information Management
- 3.5 Identify Business Analysis Performance Improvements

4 Elicitation and Collaboration

- 4.1 Prepare for Elicitation
- 4.2 Conduct Elicitation
- 4.3 Confirm Elicitation Results
- 4.4 Communicate Business Analysis Information
- 4.5 Manage Stakeholder Collaboration

5 Requirements Life Cycle Management

- 5.1 Trace Requirements
- 5.2 Maintain Requirements
- 5.3 Prioritize Requirements
- 5.4 Assess Requirements Changes
- 5.5 Approve Requirements

6 Strategy Analysis

- 6.1 Analyze Current State
- 6.2 Define Future State
- 6.3 Assess Risks
- 6.4 Define Change Strategy

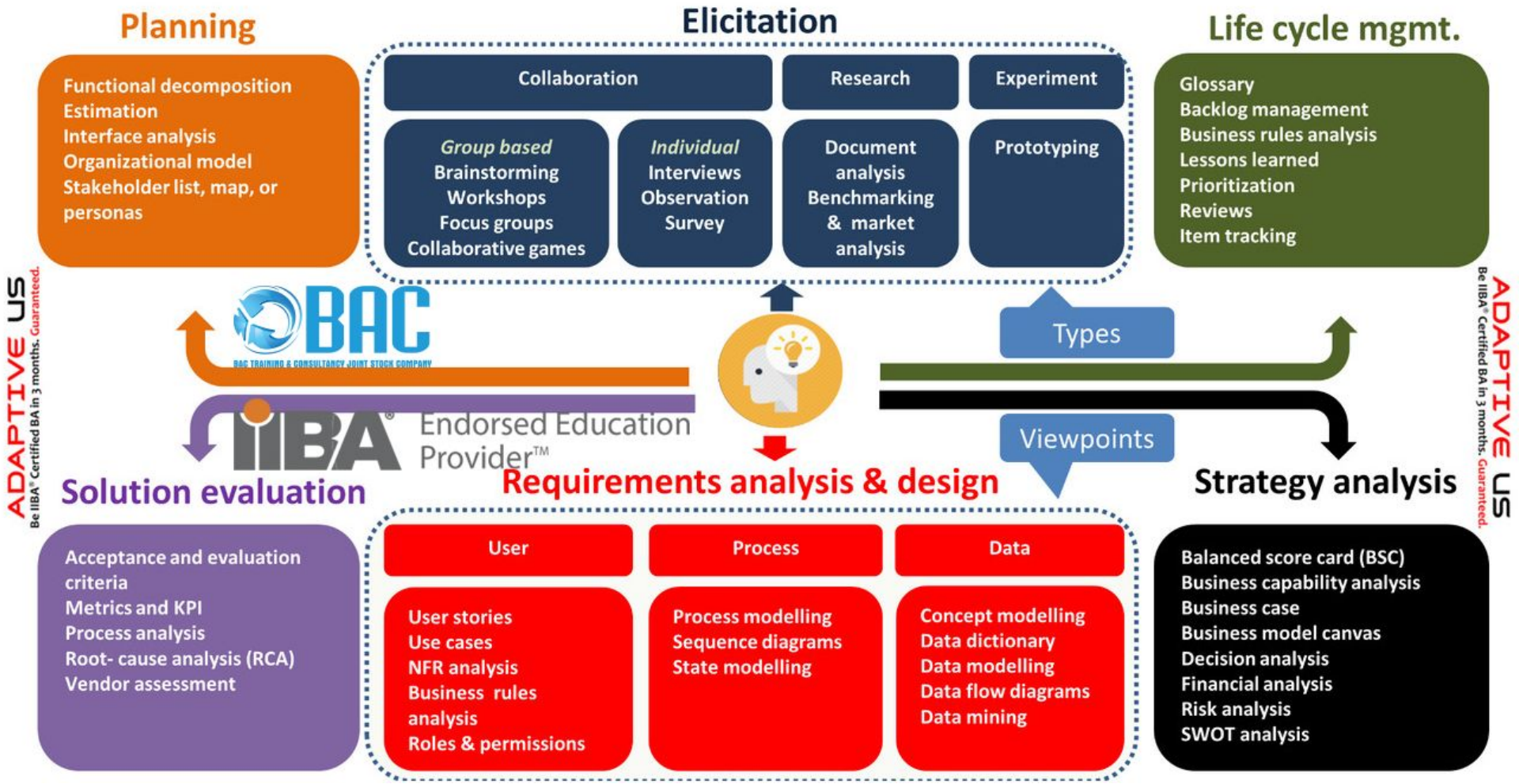
7 Requirements Analysis and Design Definition

- 7.1 Specify and Model Requirements
- 7.2 Verify Requirements
- 7.3 Validate Requirements
- 7.4 Define Requirements Architecture
- 7.5 Define Design Options
- 7.6 Analyze Potential Value and Recommend Solution

8 Solution Evaluation

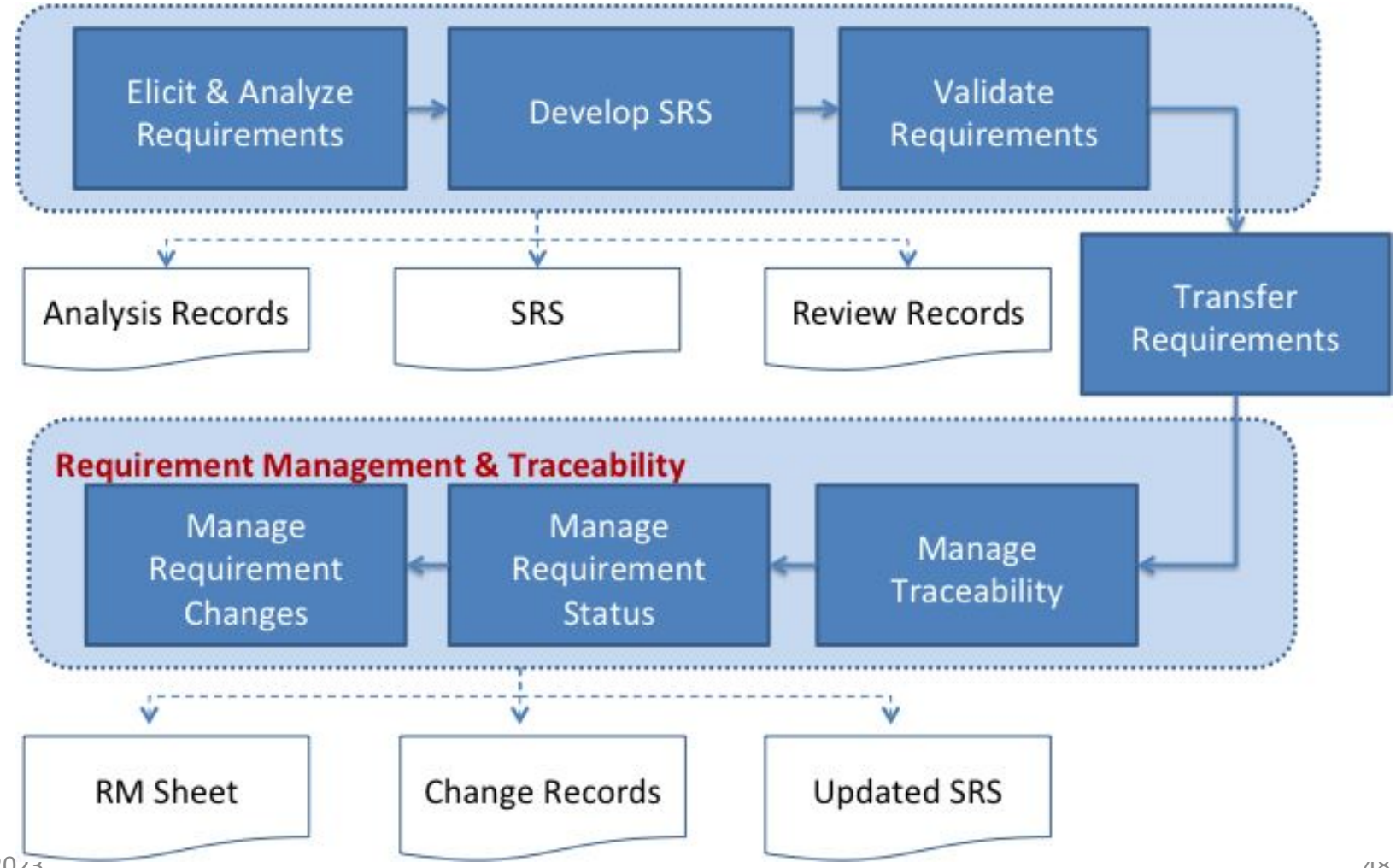
- 8.1 Measure Solution Performance
- 8.2 Analyze Performance Measures
- 8.3 Assess Solution Limitation
- 8.4 Assess Enterprise Limitations
- 8.5 Recommend Actions to Increase Solution Value

BABoK® V3 Techniques Mind Map



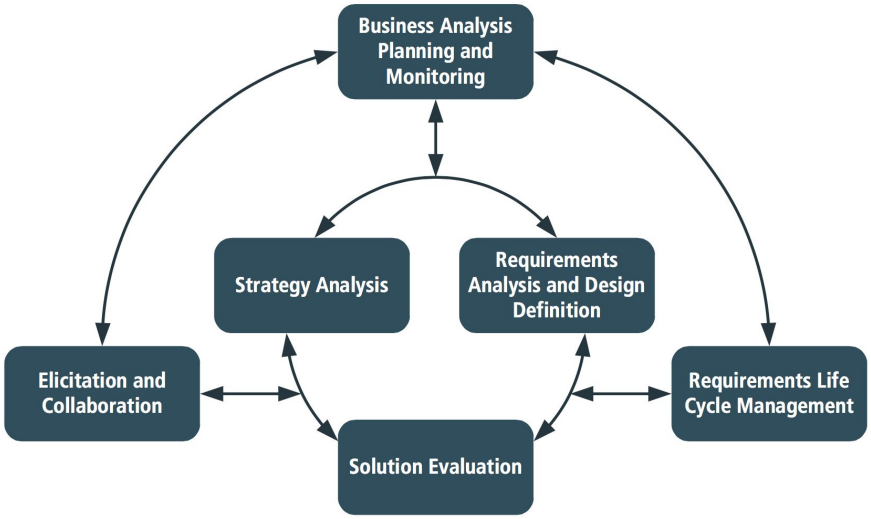
Knowledge Areas & Tasks

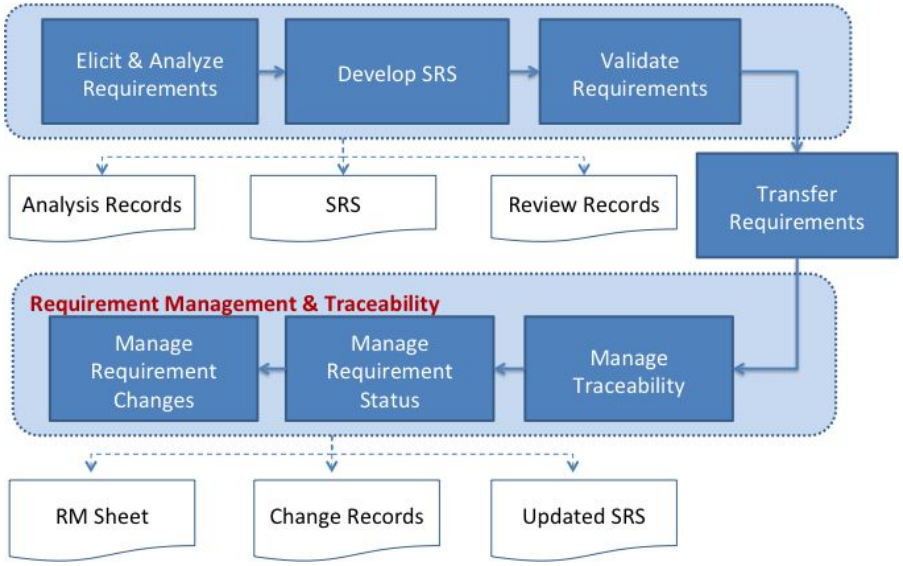
FSOFT Practice



Knowledge Areas & Tasks

- **Exercise: sample & brainstorm about areas & tasks between 2 models and your reality.**





- **Short break ±∞**

REQUIREMENT PREPARATION

DETAILS

REQUIREMENT ANALYSIS & DESIGN DEFINITION

DETAILS

DEVELOPMENT SUPPORT

DETAILS

REQUIREMENT ELICITATION

DETAILS

SOLUTION EVALUATION

DETAILS

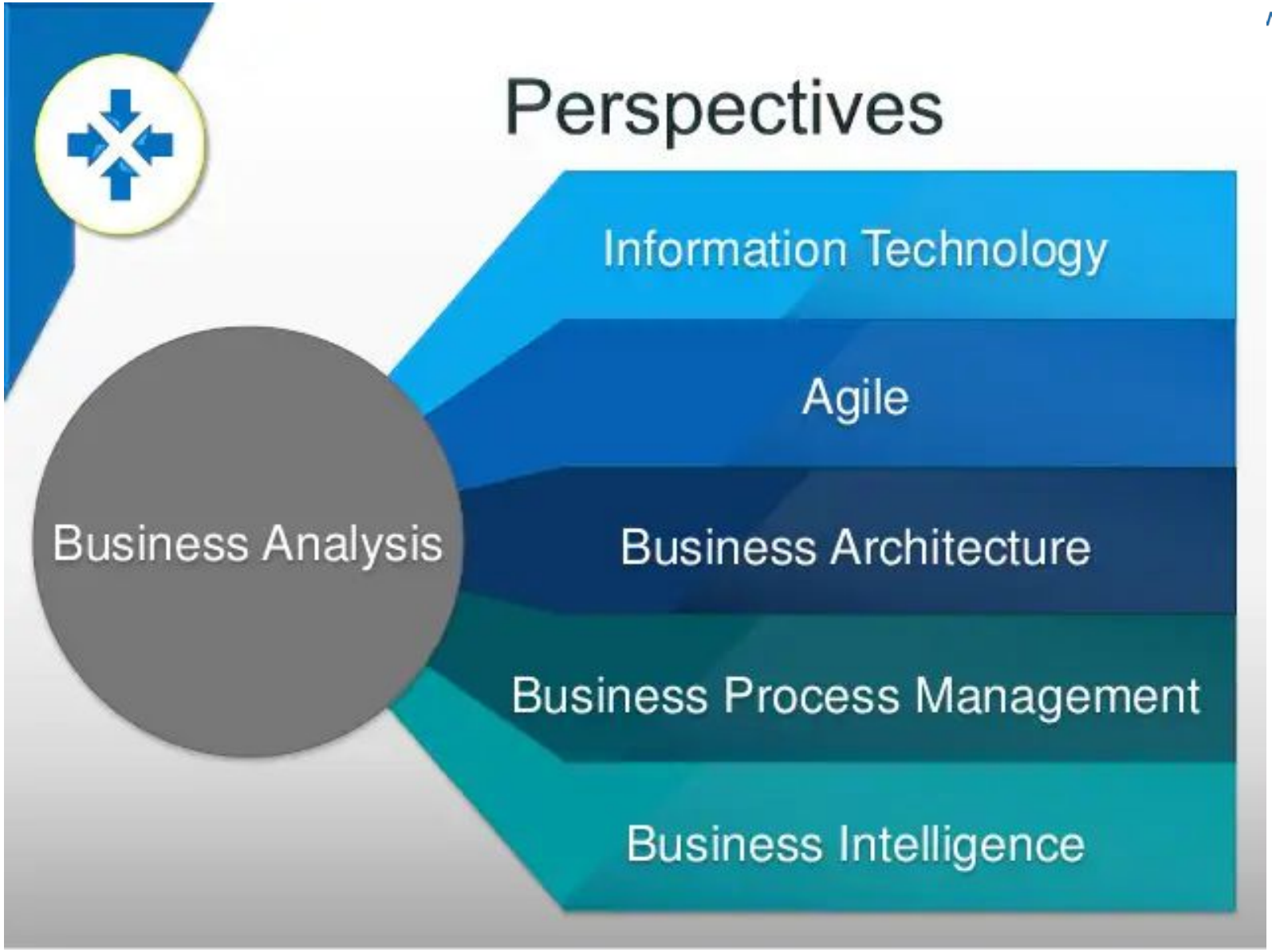
Tasks are grouped into knowledge areas

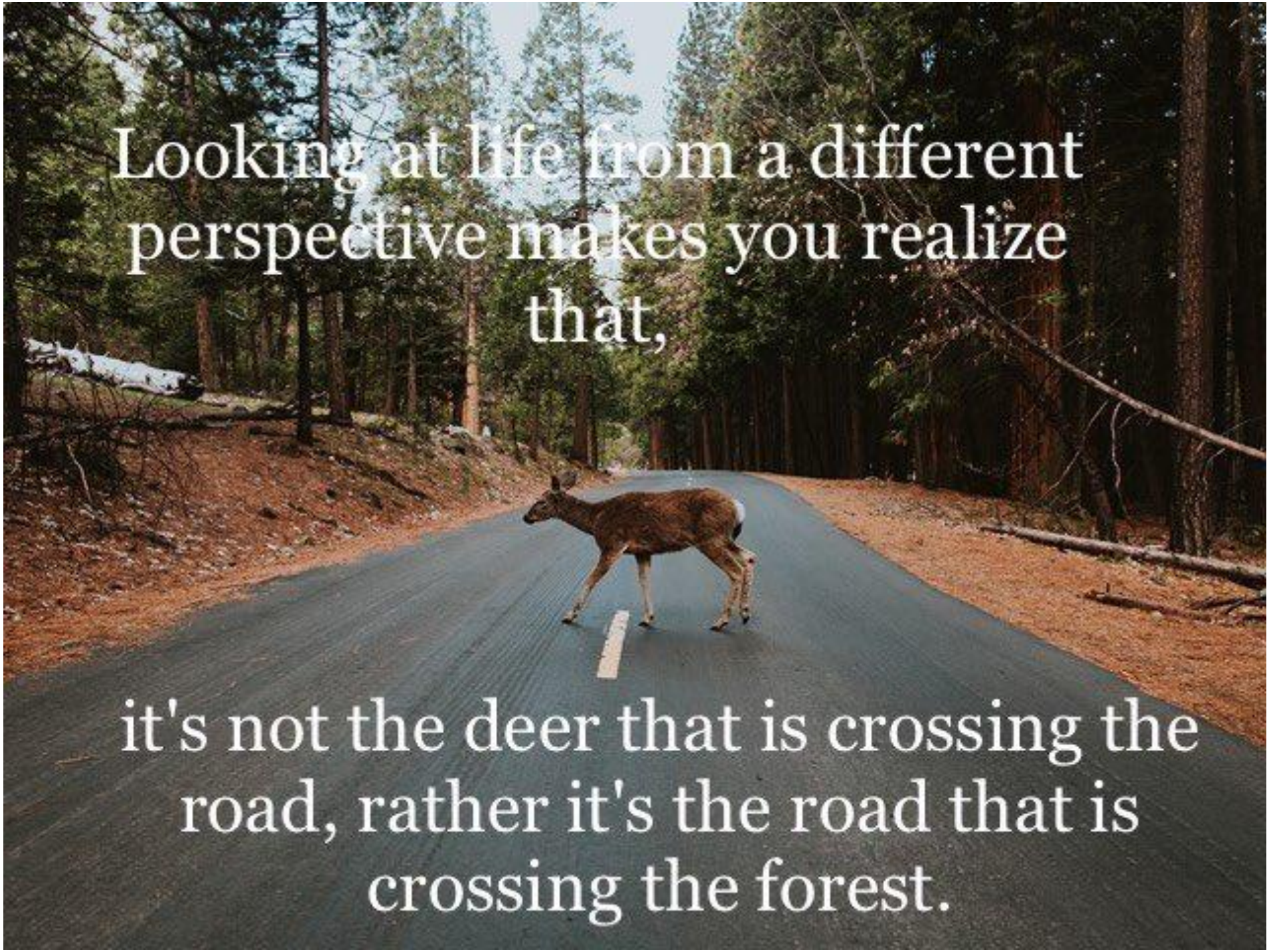
- Purpose
- Description
- Inputs
- Elements
- Guidelines/Tools
- Techniques
- Stakeholders
- Outputs

- Purpose
- Description
- Elements
- Usage

Considerations

Perspectives




Looking at life from a different perspective makes you realize that,
it's not the deer that is crossing the road, rather it's the road that is crossing the forest.

“a particular way of considering something or to think about a situation or problem in a wise and reasonable way”

- Set of commonly accepted practices

- Practice of enabling change

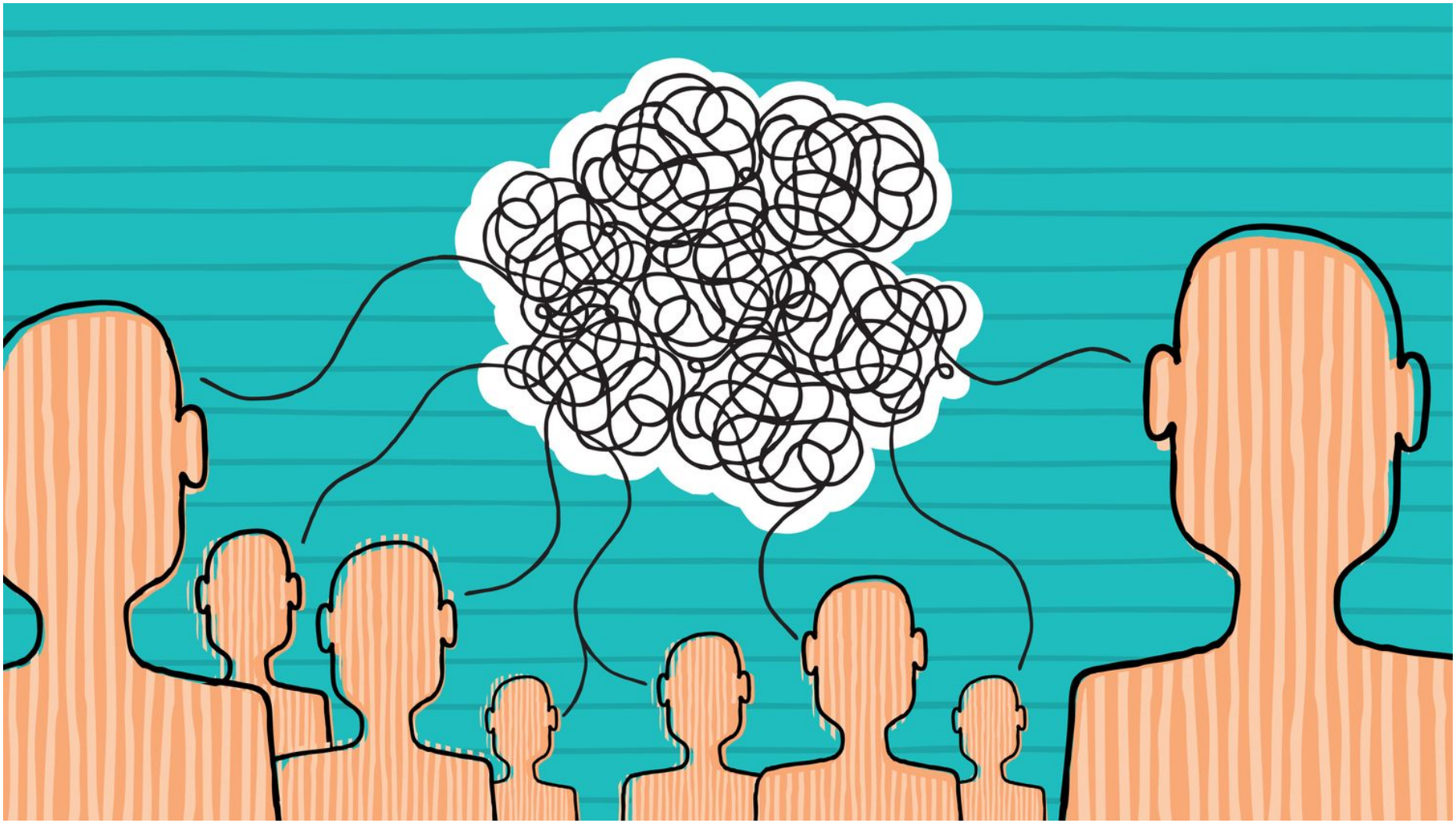
- Business Analysis is performed on a variety of initiatives within an enterprise.

- Initiatives may be strategic, tactical, or operational.

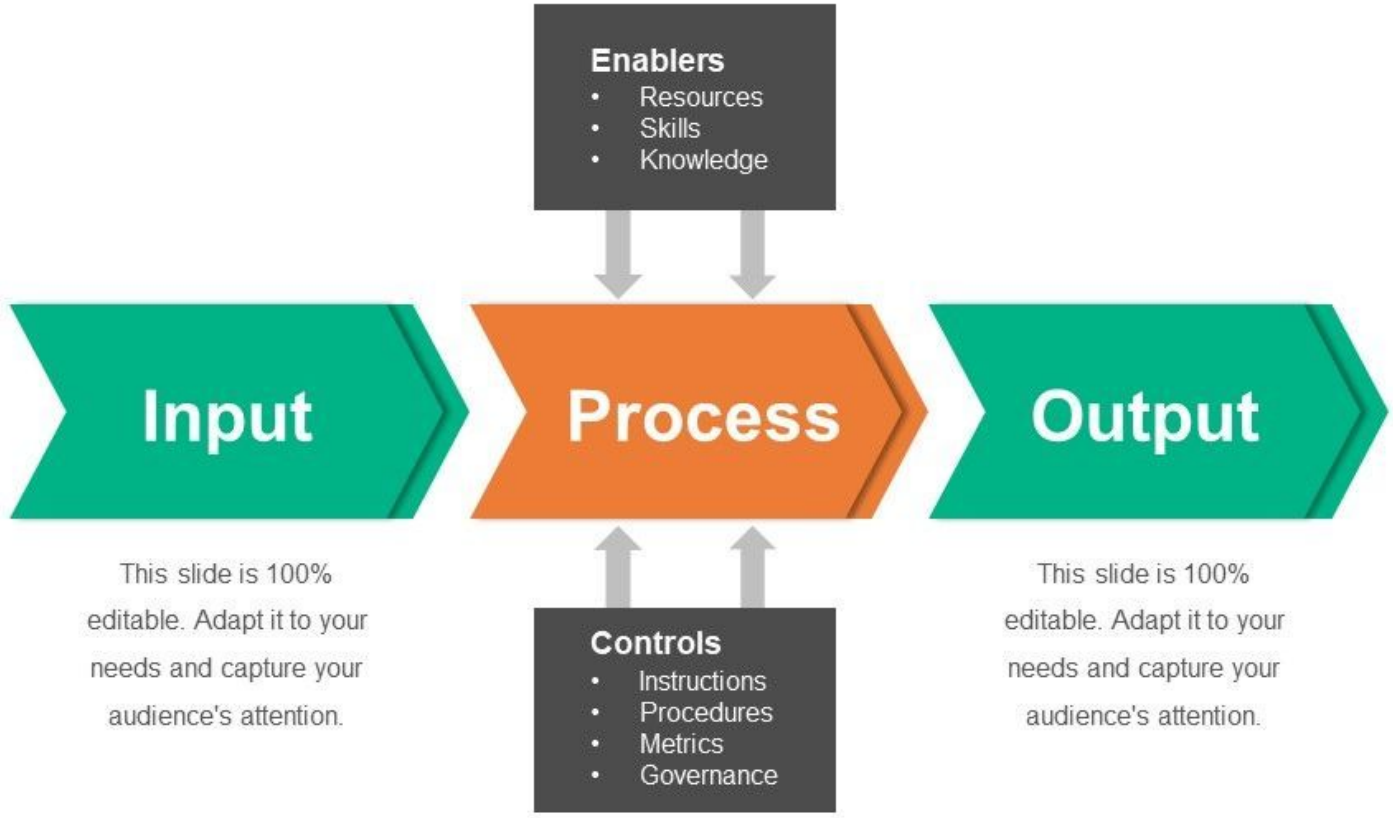
Business analysts play a role in **aligning (on the same page)** the designed and delivered solutions with the needs of stakeholders. The activities that business analysts perform include:

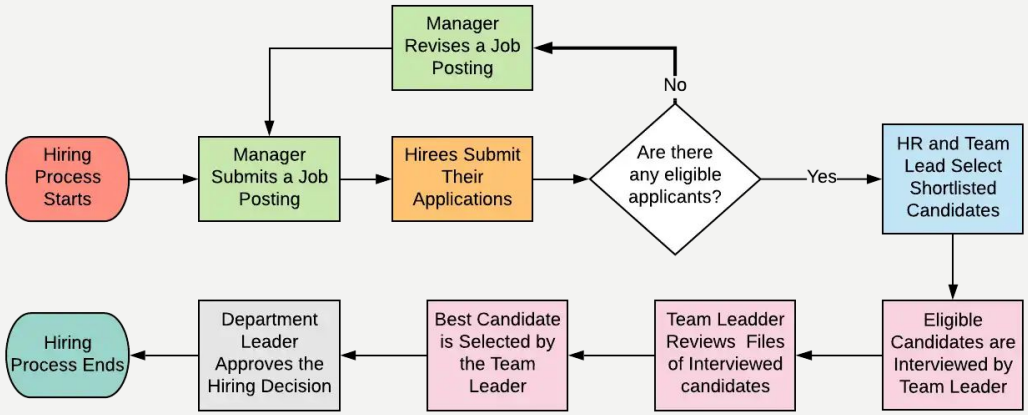
- understanding enterprise problems and goals,
- **analyzing** needs and solutions,
- devising strategies,
- **driving (Consult & Recommend)** change, and
- facilitating stakeholder collaboration.

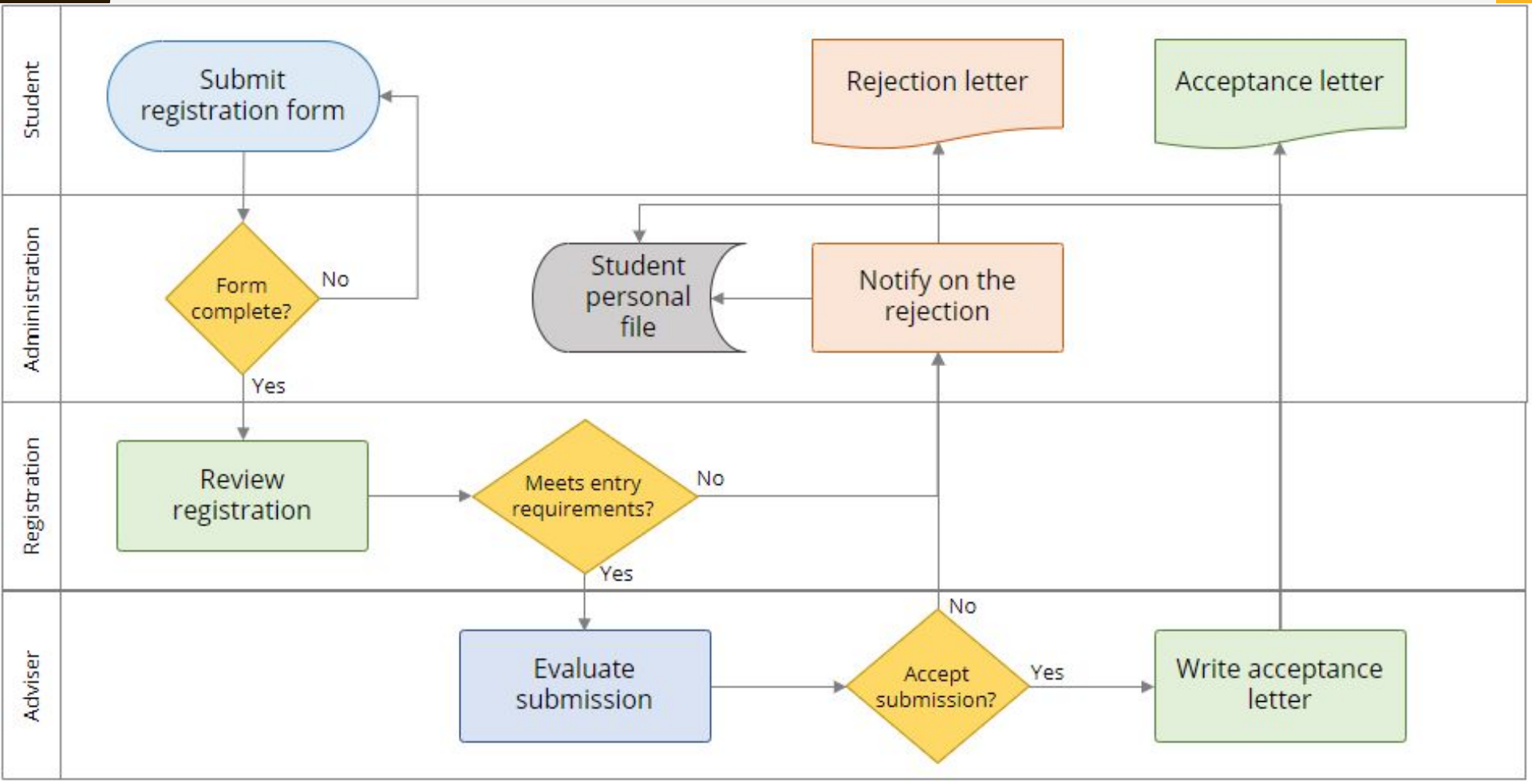
Business Connection ???



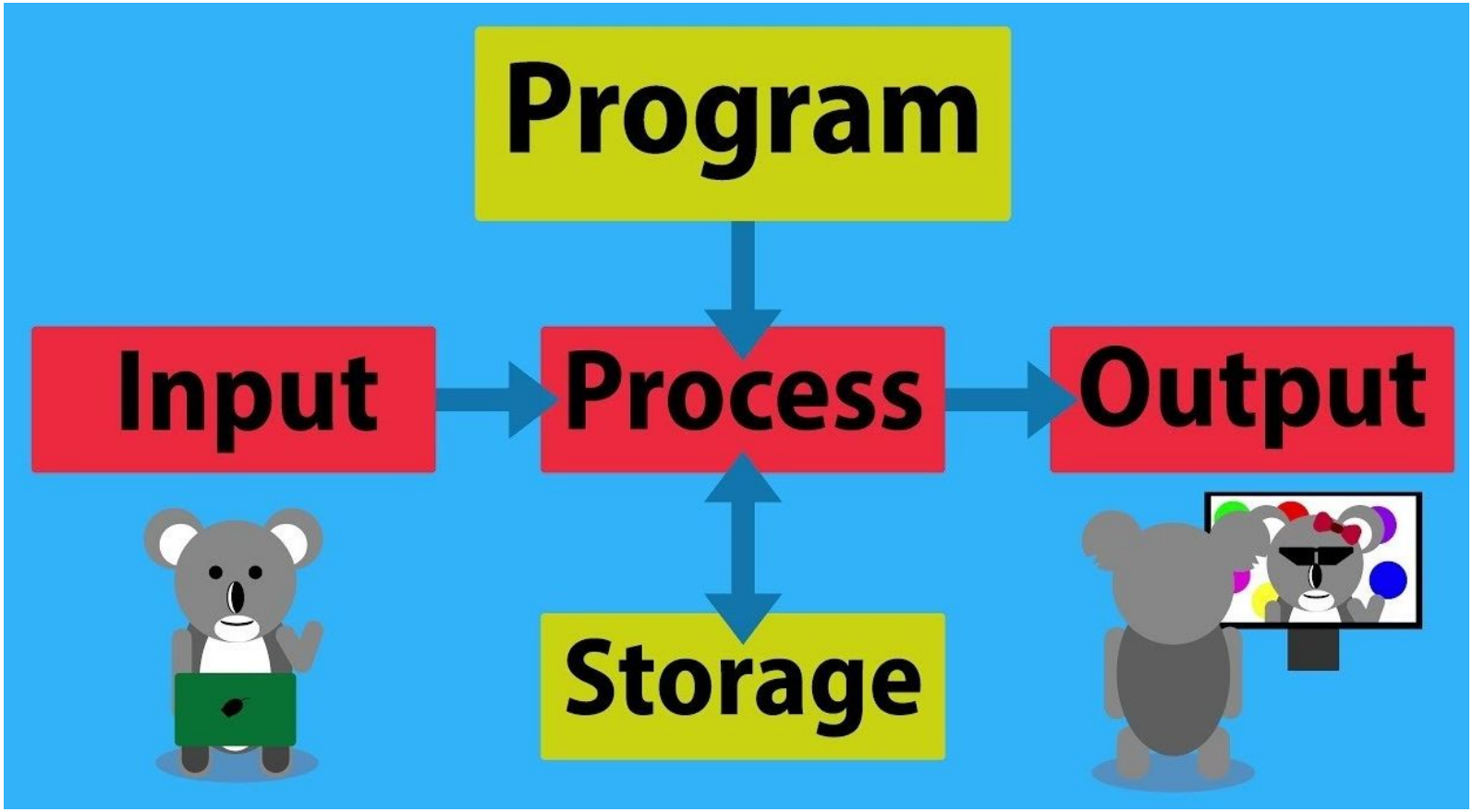
A business process is a series of **steps** performed by a group of **stakeholders** to achieve a concrete **goal.**

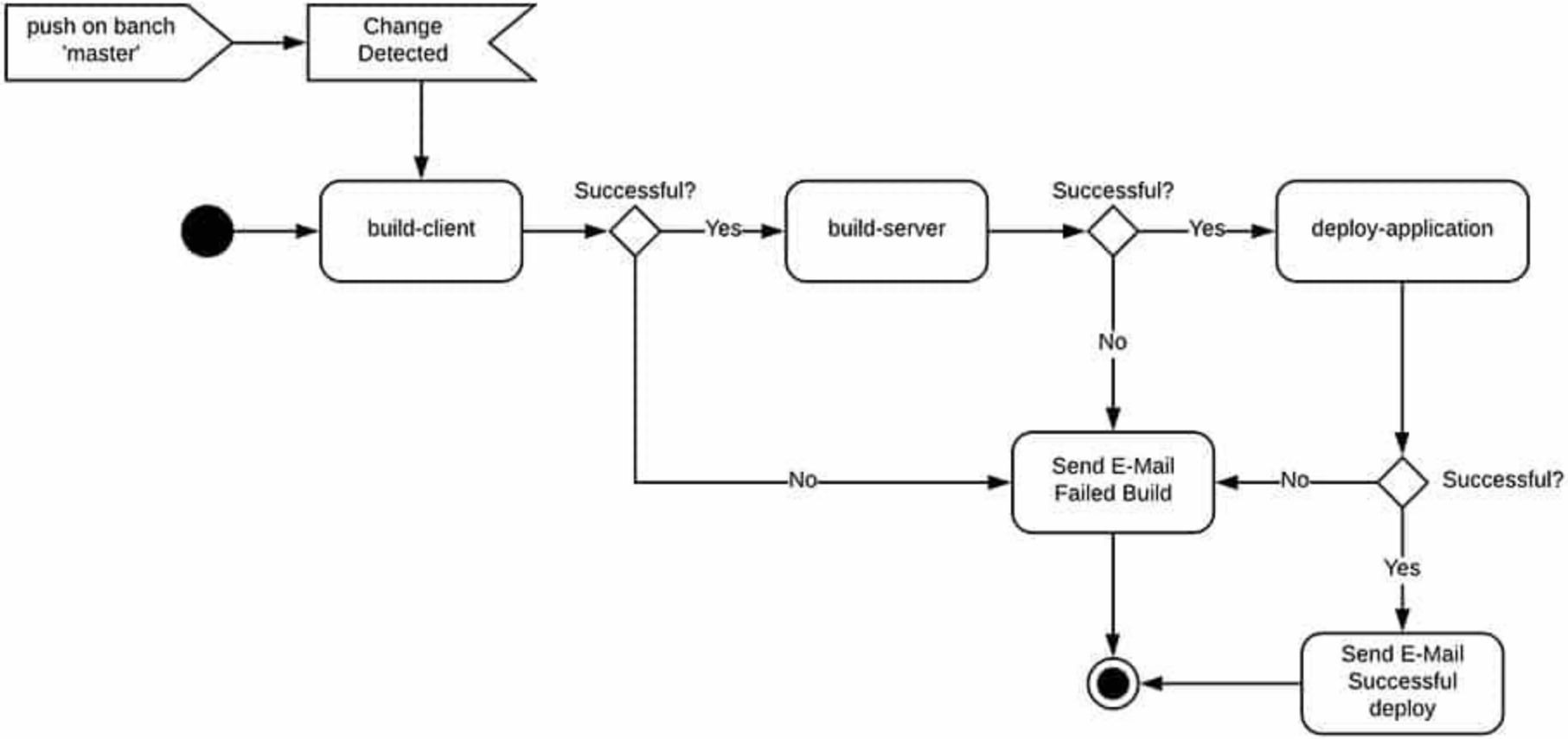



Manager Revises a Job Posting
No
Hiring Process Starts
Manager Submits a Job Posting
Hirees Submit Their Applications
Are there any eligible applicants?
Yes
HR and Team Lead Select Shortlisted Candidates
Eligible Candidates are Interviewed by Team Leader
Team Leadder Reviews Files of Interviewed candidates
Best Candidate is Selected by the Team Leader
Department Leader Approves the Hiring Decision
Hiring Process Ends


Student
Administration
Registration
Adviser
Submit registration form
Rejection letter
Acceptance letter
Form complete?
No
Yes
Student personal file
Notify on the rejection
Review registration
Meets entry requirements?
No
Yes
Evaluate submission
Accept submission?
No
Yes
Write acceptance letter

Software is a set of instructions, data or programs used to operate computers and execute specific tasks.





ACTIVITY DIAGRAM

Business Analysis Skill

Narrative book (Bio / Tiểu Thuyết / Comic)
Tree book (BABOK, Library, Systematic Knowledge) - Skim & Take Notes
Branch book (specific - Thinking Fast (Instinct) & Slow (Mental)) ⇒ Never make decision when you are in hurry or angry

- Mục tiêu việc đọc
- Đọc quanh chủ đề: **Way of thinking**
- Bản đồ kiến thức
- Ghi chú
- Tư duy khi đọc: **Matching** / Challenge / **Argument** / **Accept**
- Question to improve critical thinking
- Mental Model

Môn gì càng thắng càng thua?

2. Requirements-related Tasks for Architect

Elicitation and Collaboration

- **Question:**
  - **In what phase Elicitation & Collaboration is conducted?**
  - **Is it planned or unplanned?**

- **Cases about Elicitation & Collaboration (for Needs & Solutions):**
  - **In multi-apps migration project: PETRONAS, Gulliver, Deutsche Bank;**
  - **In large-scale business application: SMRT, Schroder FDS, LSB-IBIS, DTV Guide Studio.**

Elicitation and Collaboration (cont.)

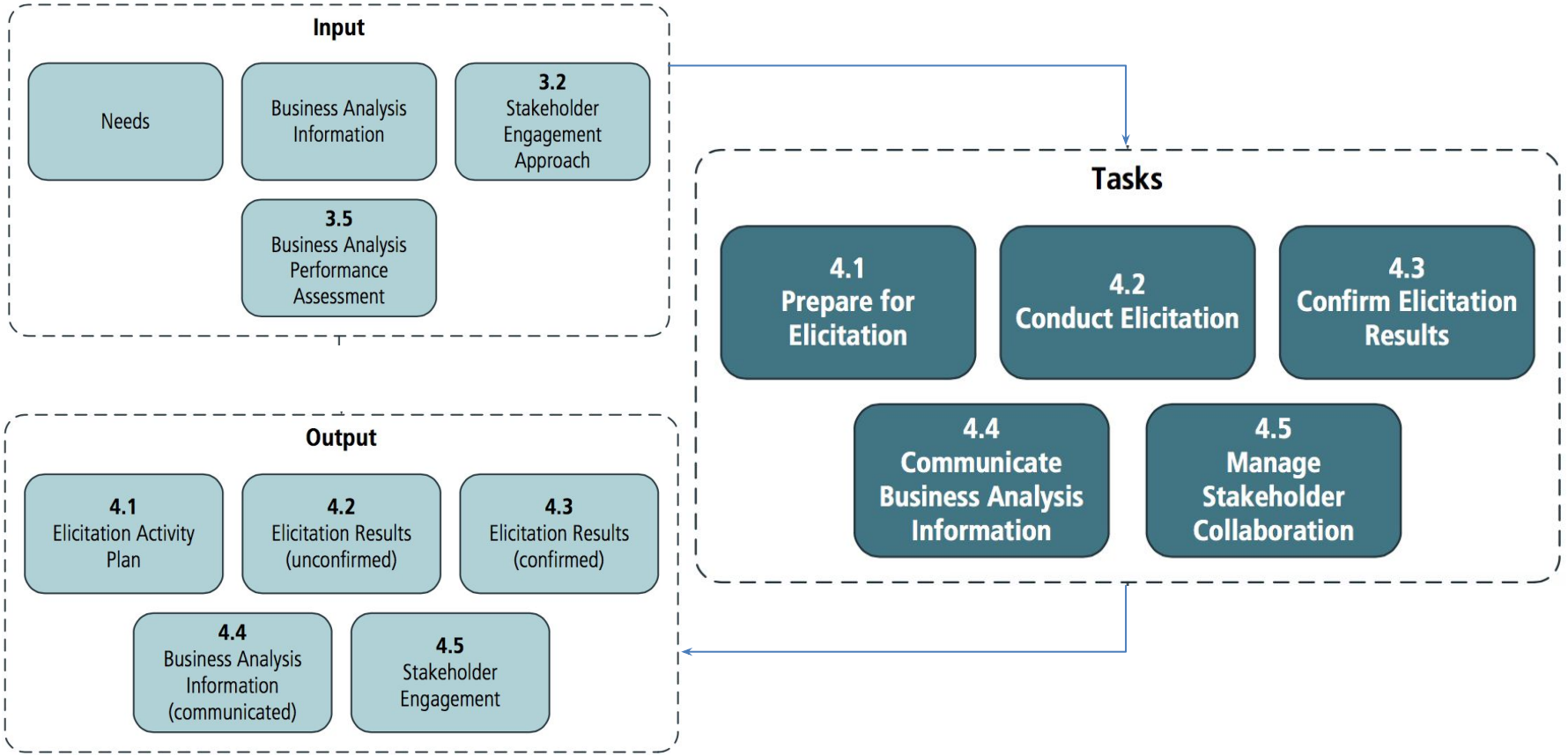
- The Core Concept Model in Elicitation and Collaboration

Core Concept	During Elicitation and Collaboration, business analysts...
Need: a problem or opportunity to be addressed.	elicit, confirm, and communicate needs and supporting business analysis information. As elicitation is iterative and incremental, the understanding of needs may evolve over time.
Solution: a specific way of satisfying one or more needs in a context.	elicit, confirm, and communicate necessary or desired characteristics of proposed solutions.

- **Homework: study BABOK v3 table 4.0.1**

Elicitation and Collaboration (cont.)

❖ Tasks – Overview



Elicitation and Collaboration (cont.)

- **Case: Elicitation & Collaboration tasks in Boeing DADM LE Assessment project.**

- Prepare for Elicitation
  - ✔ Understand the Scope of Elicitation
  - ✔ Select Elicitation Techniques
  - ✔ Set Up Logistics
  - ✔ Secure Supporting Material
  - ✔ Prepare Stakeholders

Requirement Elicitation & Collaboration Use Case Exploration

Application domain understanding

• Application domain knowledge is knowledge of the general area where the system is applied.

Problem understanding

• The details of the specific customer problem where the system will be applied must be understood.

Business understanding

• You must understand how systems interact and contribute to overall business goals.

Understanding the needs and constraints of system stakeholders

• You must understand, in detail, the specific needs of people who require system support in their work.

Elicitation and Collaboration (cont.)

❑ Question: 3 common types of Elicitation?

- ❖ Conduct Elicitation
  - ✔ Guide Elicitation Activity
  - ✔ Capture Elicitation Outcomes
- ❖ Confirm Elicitation Results
  - ✔ Compare Elicitation Results Against Source Information
  - ✔ Compare Elicitation Results Against Other Elicitation Results

Elicitation and Collaboration (cont.)

Collaborative: involves direct interaction with stakeholders, and relies on their experiences, expertise, and judgment.

Research: involves systematically discovering and studying information from materials or sources that are not directly known by stakeholders involved in the change. Stakeholders might still participate in the research. Research can include data analysis of historical data to identify trends or past results.

Experiments: involves identifying information that could not be known without some sort of controlled test. Some information cannot be drawn from people or documents—because it is unknown. Experiments can help discover this kind of information. Experiments include observational studies, proofs of concept, and prototypes.

Elicitation and Collaboration (cont.)

- **Question: common communication platform?**

- Communicate Business Analysis Information
  - ✔ Determine Objectives and Format of Communication
  - ✔ Communicate Business Analysis Package: utilize common communication platforms

- Manage Stakeholder Collaboration
  - ✔ Gain Agreement on Commitments
  - ✔ Monitor Stakeholder Engagement
  - ✔ Collaboration

- **Discussion: architect's involvement in Elicitation & Collaboration?**

Elicitation and Collaboration (cont.)

- **Group collaboration**: used to communicate the package to a group of relevant stakeholders at the same time. It allows immediate discussion about the information and related issues.

- **Individual collaboration**: used to communicate the package to a single stakeholder at a time. It can be used to gain individual understanding of the information when a group setting is not feasible, most productive, or going to yield the best results.

- **E-mail or other non-verbal methods**: used to communicate the package when there is a high maturity level of information that will need little or no verbal explanation to support it.

Requirement Elicitation & Collaboration / Use Case Exploration

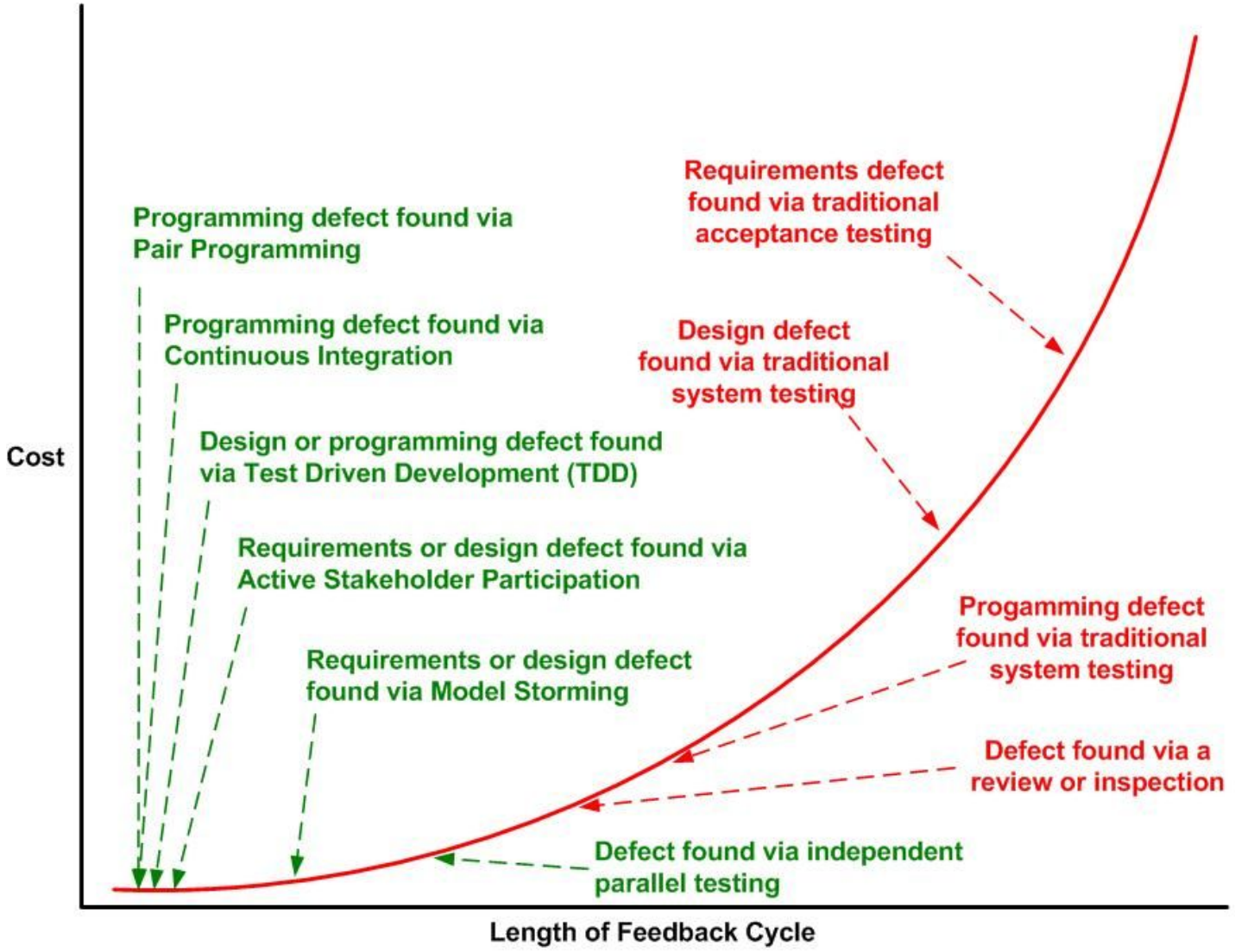
WHY does it matter?

It is the main path to discovering requirements and design information, and might involve talking with stakeholders directly, researching topics, experimenting, or simply being handed information.

Requirement Elicitation & Collaboration – Use Case Exploration

- Cost of Change Curve
- *“most significant risk factor a company faces is selecting the wrong CEO”*
- “incomplete requirements” as the leading cause of software project failure and reveals that poor requirements account for 50% of project failures.
- “*accurately capturing system requirements is the major factor in the failure of 90% of large software projects*”
- scope creep, budget overrun and inadequate process redesign
- many stakeholders are unable to accurately articulate the business problem

Requirement Elicitation & Collaboration - Use Case Exploration



Requirement Elicitation & Collaboration – Use Case Exploration

If you don't understand your customers' pain points, how are you going to solve their problems?

Financial, Convenience & Productivity, Shopping Journey

"75% of companies identified improving customer experience as their top objective".

Requirement Elicitation & Collaboration Use Case Exploration

- Delayed response
- Lack of product knowledge
- Not available on customers preferred channel

- Inconvenience in using the product
- Redundancy and friction in the buying process

- Subscription plans or membership fees
- A high cost of repeat purchases

- Connecting to the right department
- Application submission

- Brands need to ensure that they are able to meet customer queries faster by the right team and by persuading their prospects that your products/services are easier to use.

- Businesses need to convince their customers that their product is the key to save time and effort.

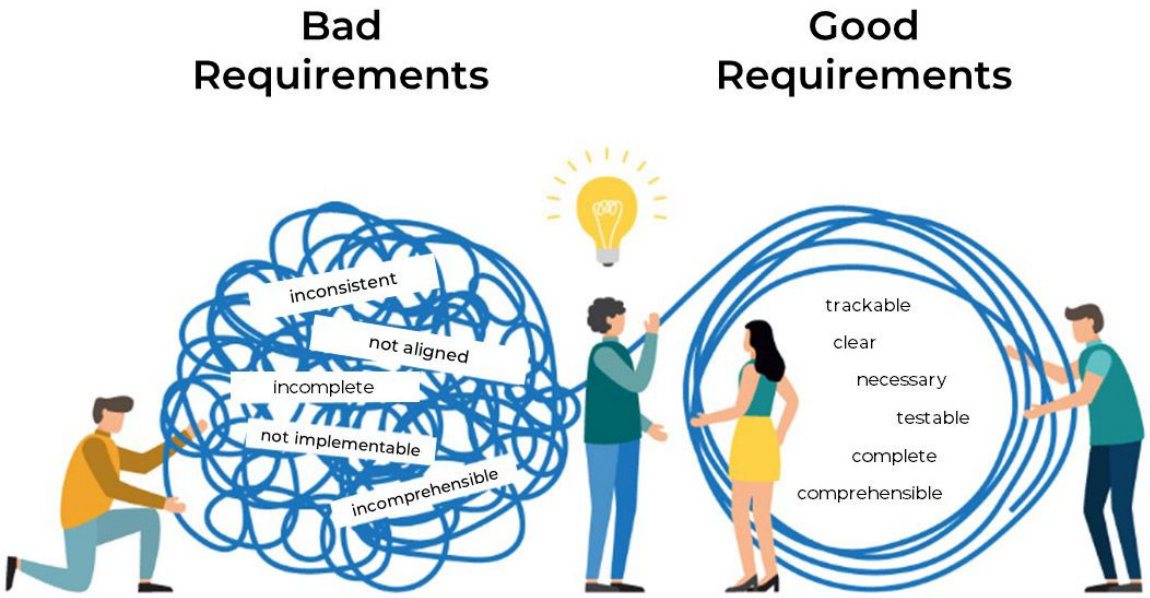
- One of the best ways to exceed your customer expectations is by helping them in real time, with digital engagement tools like live chat, co-browsing, and AI chatbots.

- The main goal for businesses should be to prove to the potential customers the right value they will perceive in choosing your products.

Requirement Elicitation & Collaboration - Use Case Exploration

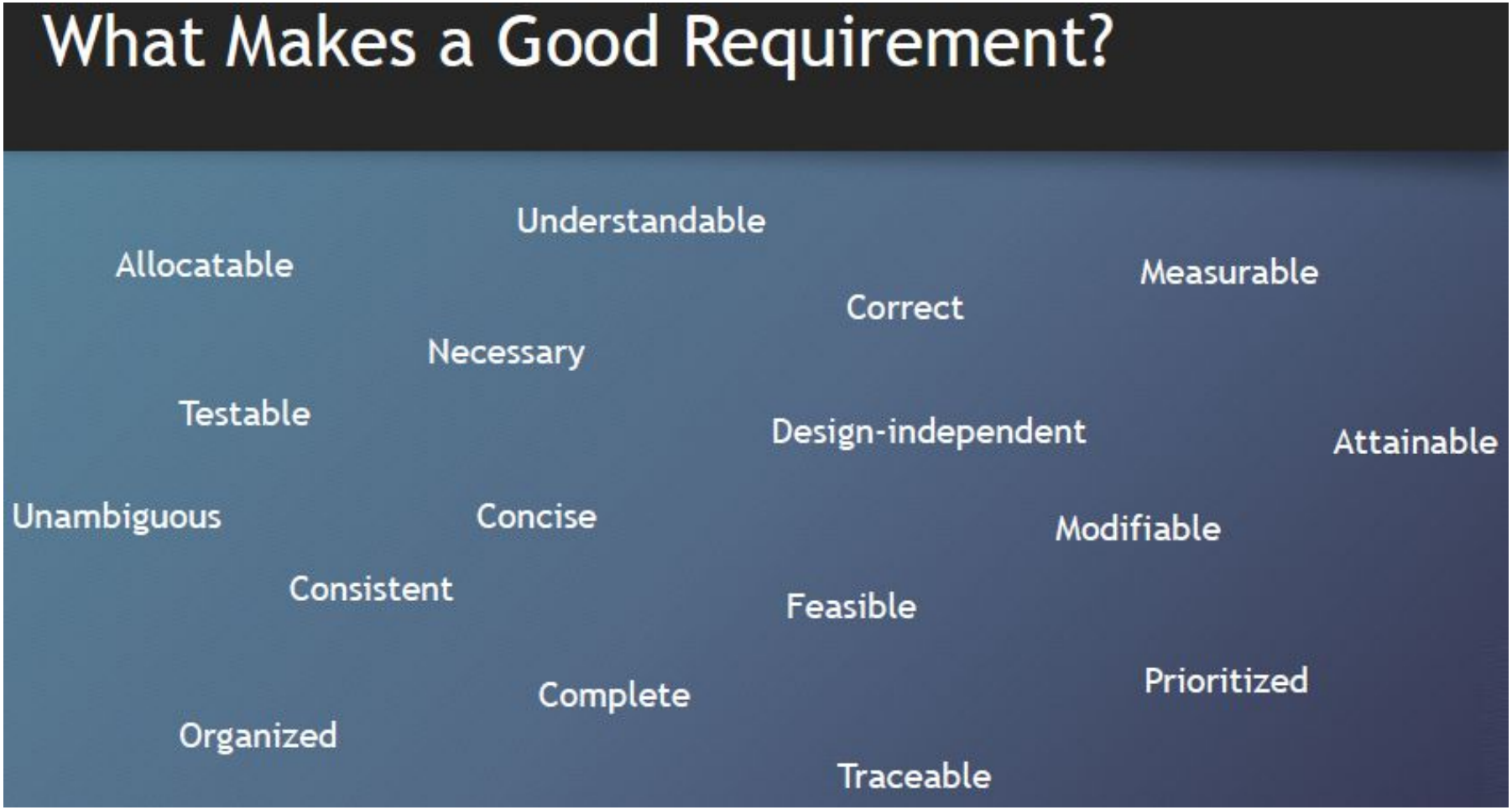
Analysts performing the elicitation need to ensure that the requirements produced are clearly **understandable**, **useful** and **relevant**.

Offer **Clarity** and **Transparency**



A well defined problem and clear requirements will go a long way to creating the **correct** solution that adds **value** to the business.

Requirement Elicitation & Collaboration & Use Case Exploration



Requirement Elicitation & Collaboration - Use Case Exploration

Requirement Elicitation & Collaboration - Use Case Exploration

Business Rules vs Business Requirements

Requirement Elicitation & Collaboration - Use Case Exploration

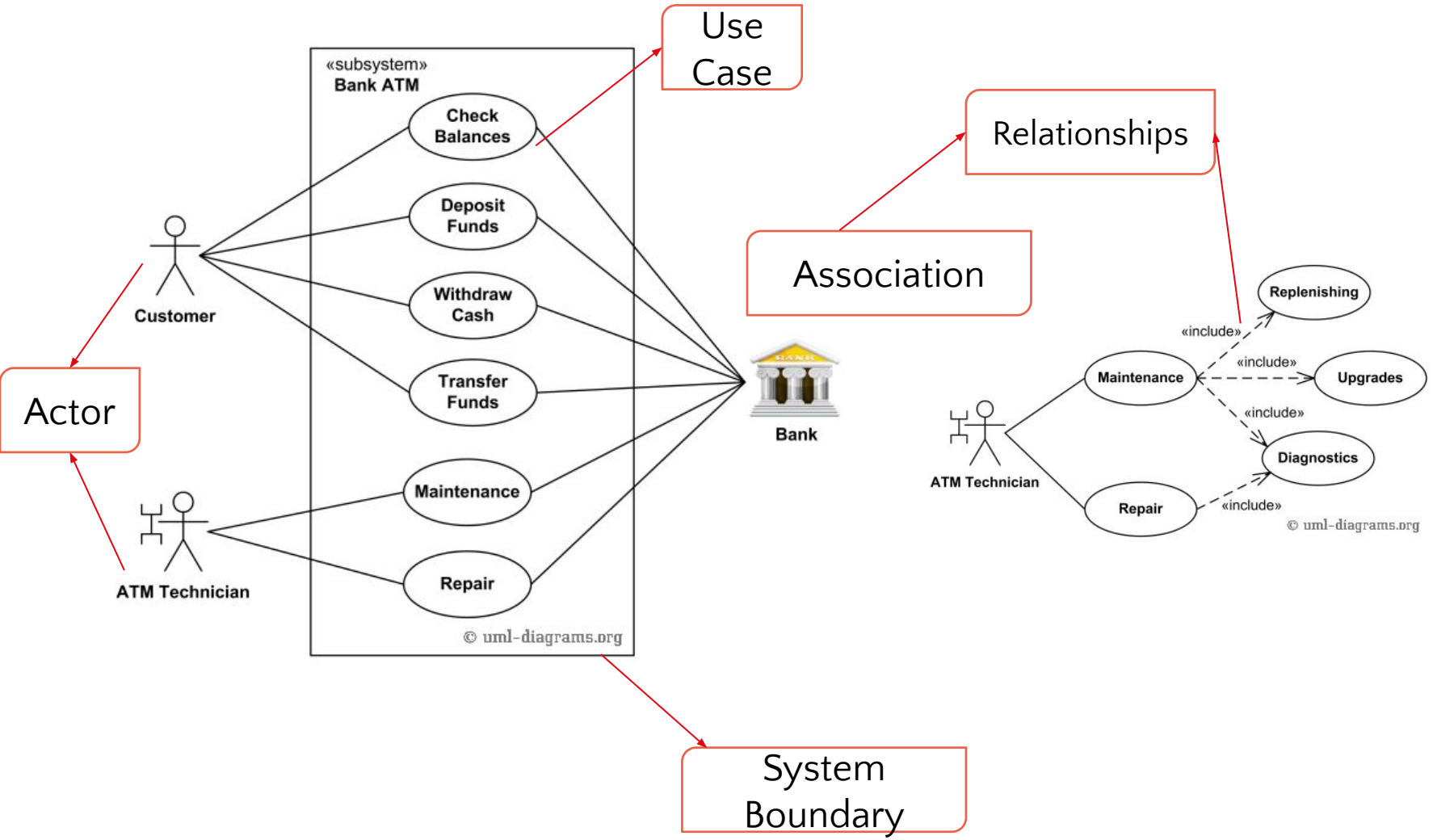
Rule:

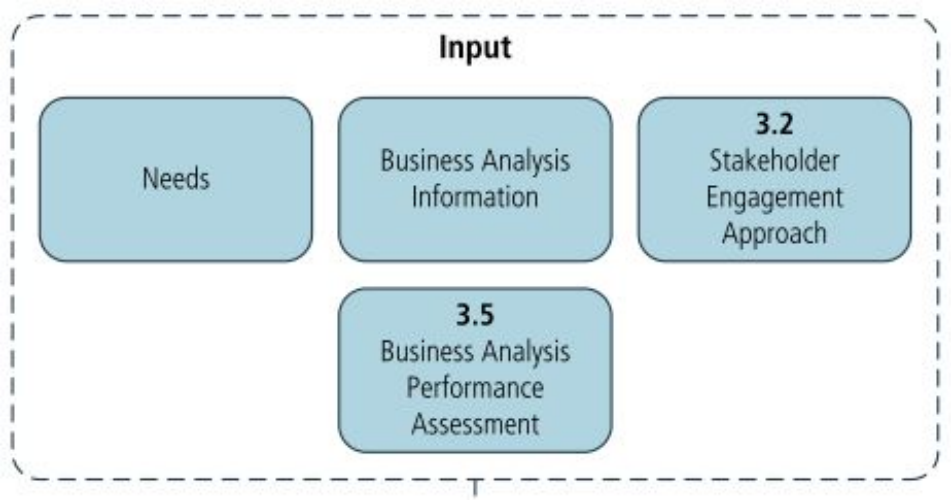
- Entered email addresses must appear valid (contain @, then later .)

Possible Requirements:

- Capability to enter email address
- Alert agent when the email doesn't appear to be valid
- Allow for correction of email if invalid email format is entered

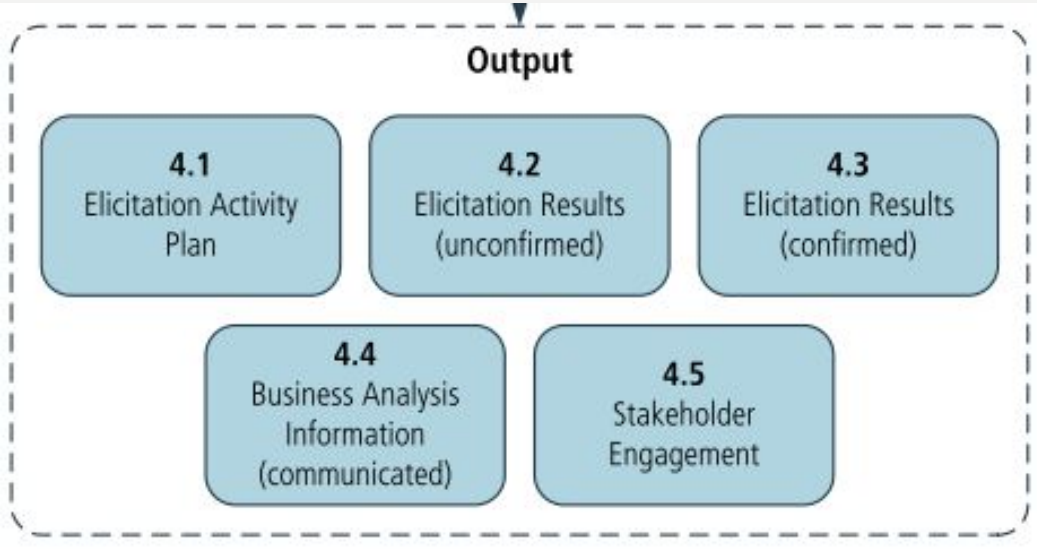
USE CASE DIAGRAM





- Conduct
- Confirm
- Communicate

- Elicitation
- Collaboration



Requirement Elicitation & Collaboration / Use Case Exploration

Requirement Elicitation & Collaboration / Use Case Exploration

Strategy Analysis

- **Exercise: describe some project you think Strategy Analysis has been conducted.**
- **Cases: RQ1 – greater values for customer, RQ, and OP2.**

Strategy Analysis (cont.)

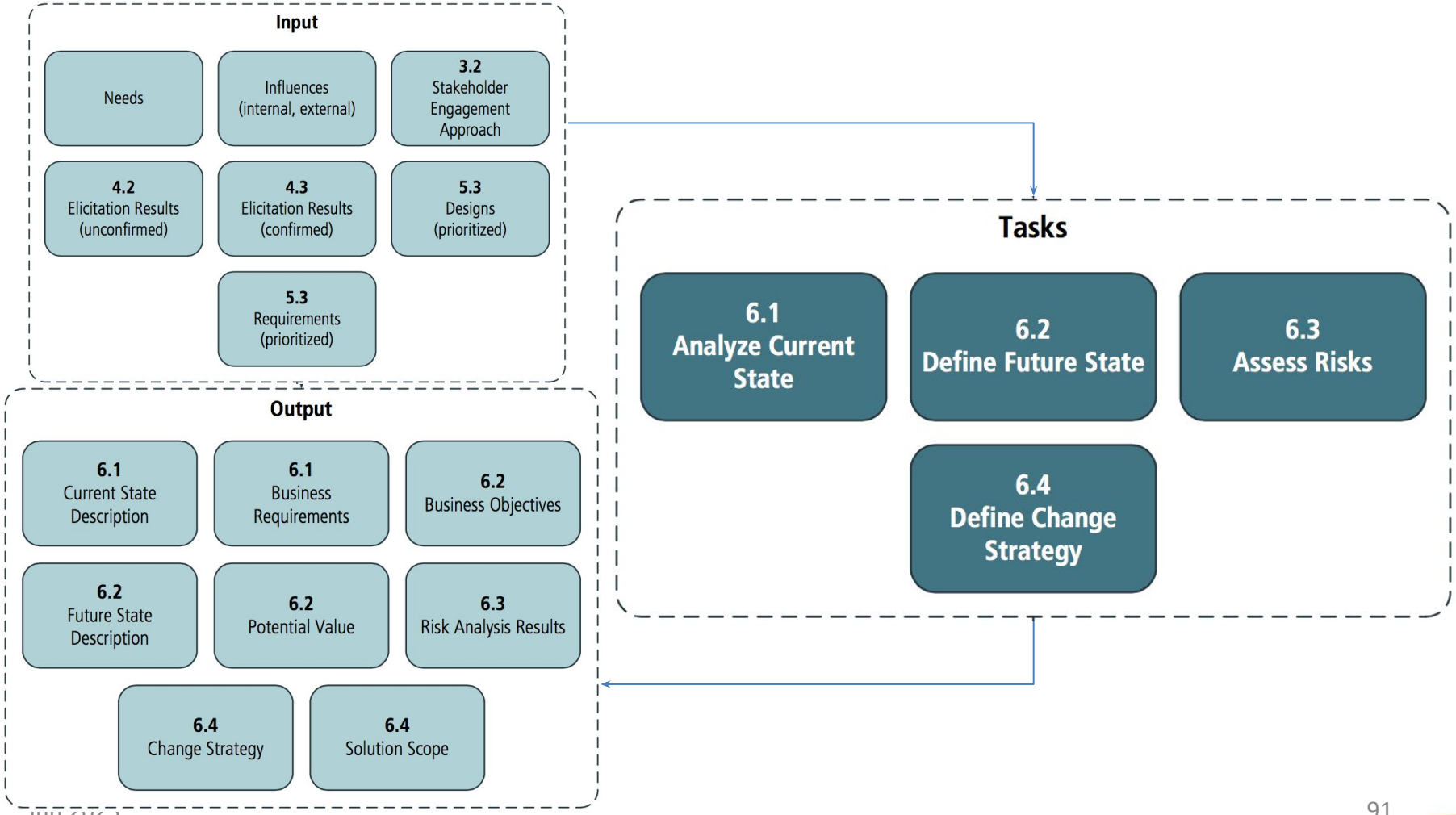
❖ The Core Concept Model in Strategy Analysis

Core Concept	During Elicitation and Collaboration, business analysts...
Change: the act of transformation in response to a need.	define the future state and develop a change strategy to achieve the future state.
Need: a problem or opportunity to be addressed.	identify needs within the current state and prioritize needs to determine the desired future state.
Solution: a specific way of satisfying one or more needs in a context.	define the scope of a solution as part of developing a change strategy.

❖ Homework: study BABOK v3 table 6.0.1

Strategy Analysis (cont.)

❖ Tasks – Overview



Strategy Analysis (cont.)

- **Case: WebBOLD proposal or DADM LE Assessment.**

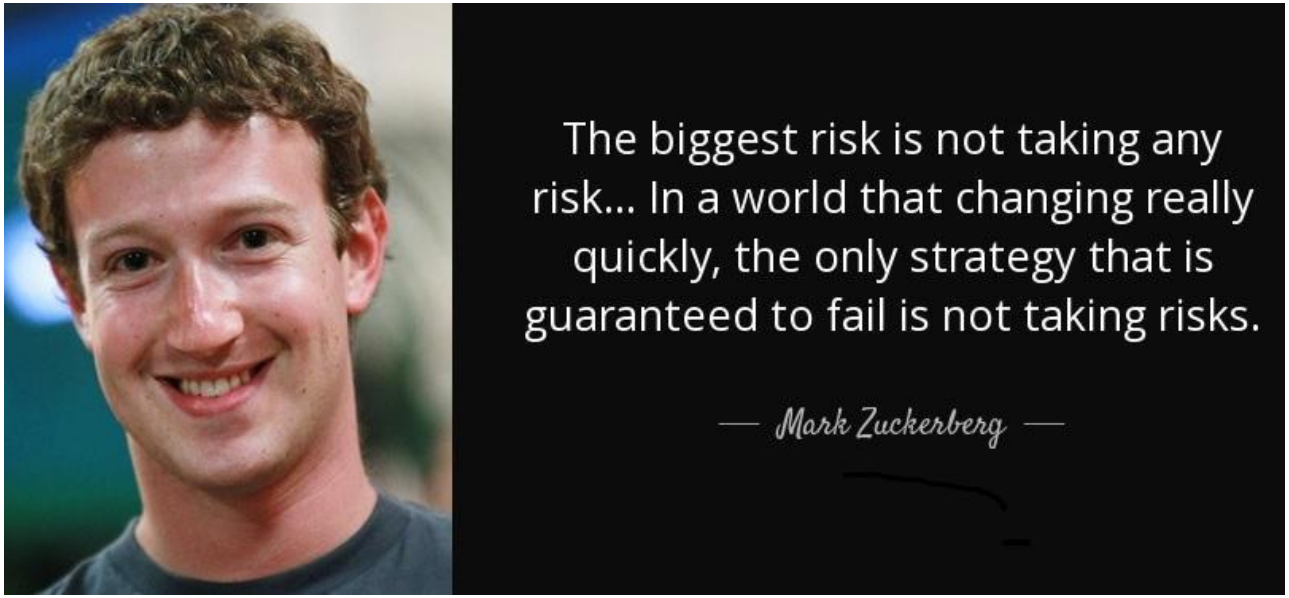
- Analyze Current State
  - ✔ Business Needs
  - ✔ Organizational Structure and Culture
  - ✔ Capabilities and Processes
  - ✔ Technology and Infrastructure
  - ✔ Policies
  - ✔ Business Architecture
  - ✔ Internal Assets
  - ✔ External Influencers

Strategy Analysis (cont.)

- Define Future State
  - ✔ Business Goals and Objectives
  - ✔ Scope of Solution Space
  - ✔ Constraints
  - ✔ Organizational Structure and Culture
  - ✔ Capabilities and Processes
  - ✔ Technology and Infrastructure
  - ✔ Policies
  - ✔ Business Architecture
  - ✔ Internal Assets
  - ✔ Identify Assumptions
  - ✔ Potential Value

- Assess Risks
  - ✔ Unknowns
  - ✔ Constraints, Assumptions, and Dependencies
  - ✔ Negative Impact to Value
  - ✔ Risk Tolerance
  - ✔ Recommendation

Strategy Analysis (cont.)



1. Nokia refused Android
2. Yahoo refused Google
3. Kodak refused digital cameras

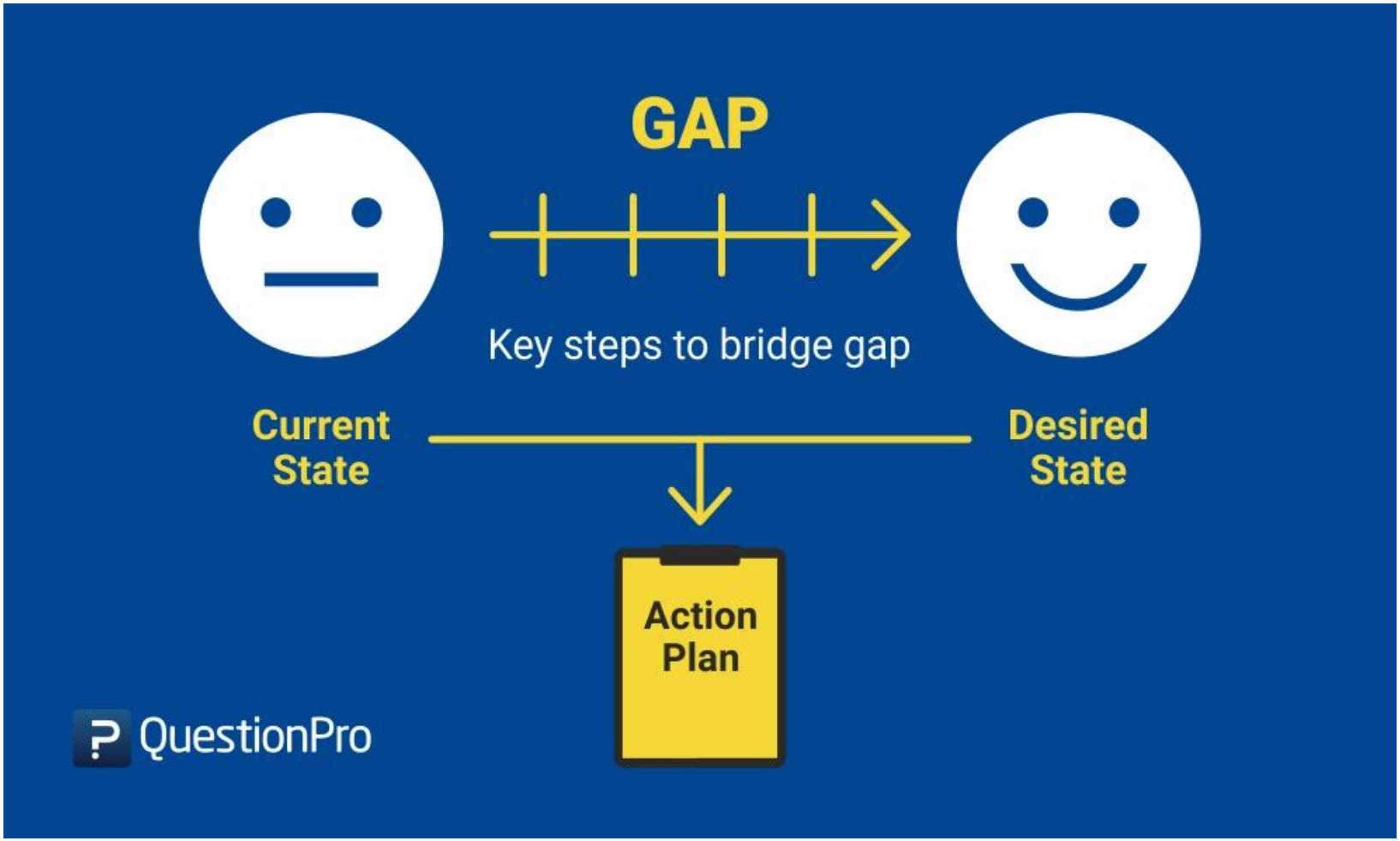
The downfall of Nokia!

Strategy Analysis (cont.)

- Define Change Strategy
  - ✔ Solution Scope
  - ✔ Gap Analysis
  - ✔ Enterprise Readiness Assessment
  - ✔ Change Strategy
  - ✔ Transition States and Release Planning

- **Case: Citus SaaS Blocks product vision & strategy; BMC for Technology Renovation.**
- **Discussion: architect's involvement in Strategy Analysis?**

Strategy Analysis (cont.)



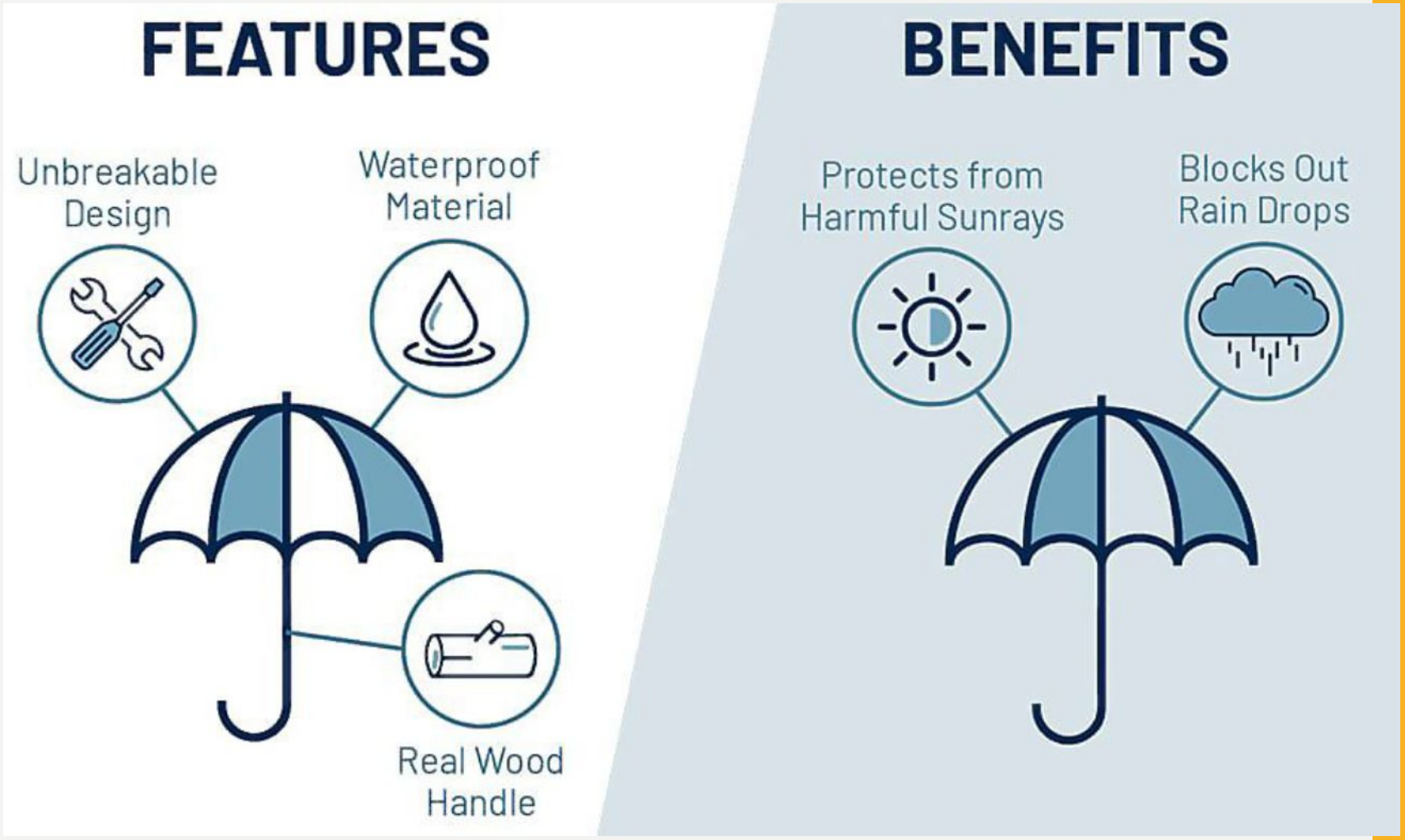
Strategy Analysis (cont.)

Gap Analysis 5 States

Table with Objective, Current State, Future State, Gap Description and Actions to Close Gap

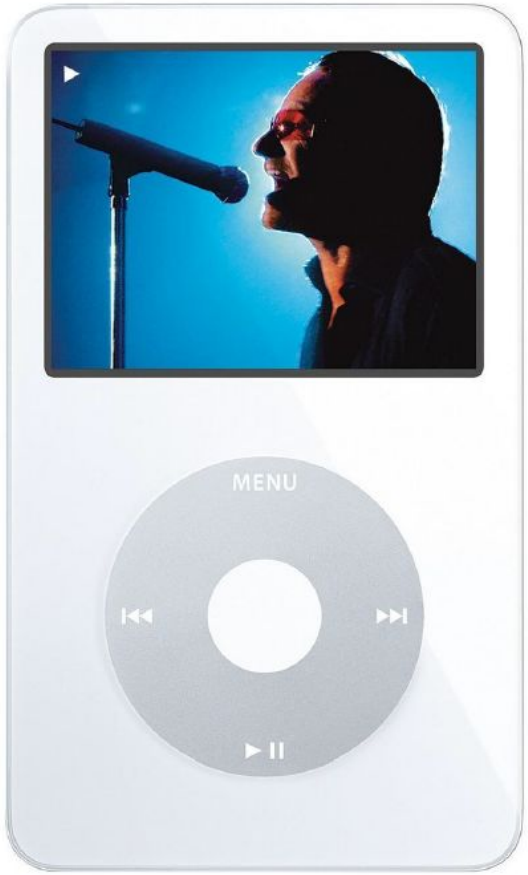
Objective	Current State	Future State	Gap Description	Remedy
Improve business profitability	**PBT = 2,4%**	**PBT = 10%**	**Too high production costs impact gross margin level**	**Automation and digitization of processes**
This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.
This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.
This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.	This is a place for your text. Write your text here.

Presentation, Interaction & Collaboration



Communication

- *Processor Speed:* 1.0 GHz.
- *Processor Type:* Apple A5.
- *Processor Core:* 2.
- *Onboard RAM:* 512 MB.
- *Storage capacity:* 64 GB.
- *Display:* 4" retina display (1136 x 640, 326 ppi).
- *Connectivity:* USB, wi-fi, Bluetooth.
- *Wireless standard:* 802.11n 2.4 GHz and 5 GHz.
- *Bluetooth:* 4.0.
- *OS installed:* iOS 6.0.
- *Mac support:* MacOS X 10.6.8.
- *Dimensions:* 4.86 x 2.31 x 0.24.
- *Average weight:* 3.10 oz.
- *Navigation:* Multitouch screen.

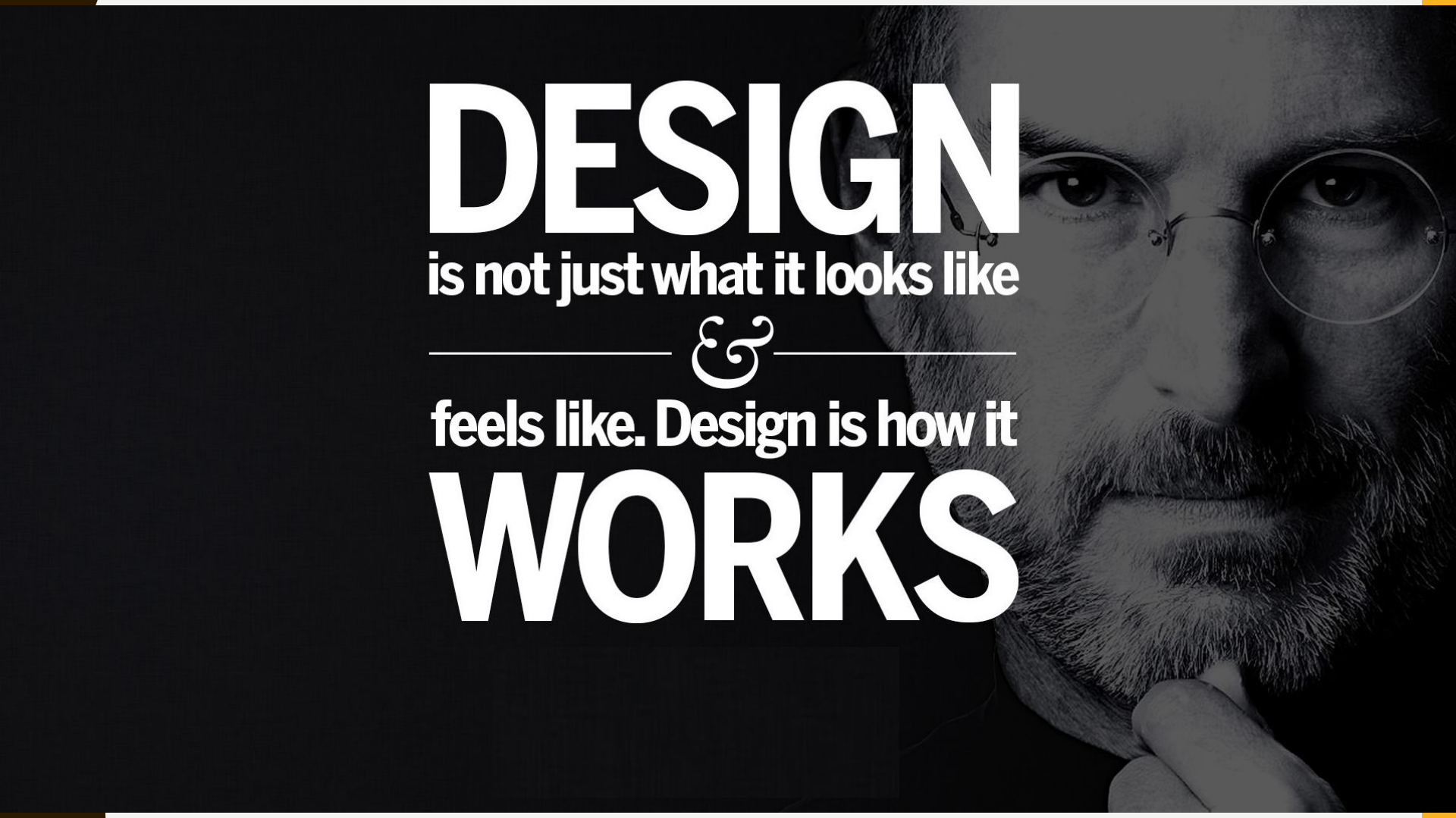


10,000 songs

40 hours of listening

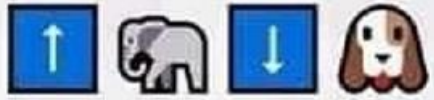
Sharing with friends

Design Science & Principle



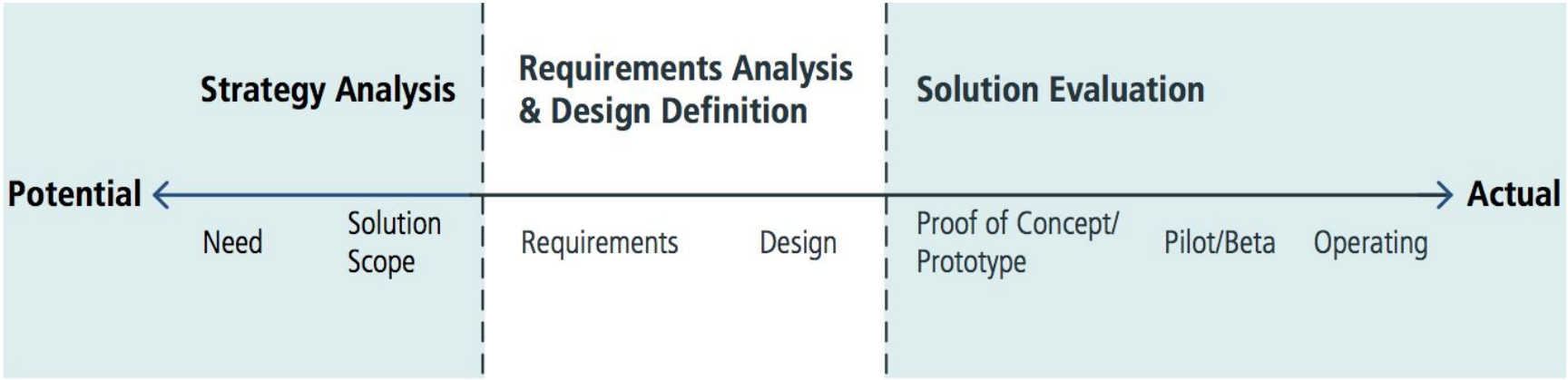
ĐUỔI "EMOJI"
BẮT "CÂU CA DAO"

moji

1. 
2. 
3. 
4. 
5. 
6. 
12. 
13. 
14. 
15. 
16. 
17. 

Requirements Analysis and Design Definition

- **Exercise: describe from some of your projects – WHAT & WHO.**
- **Cases: DTV Guide Studio.**



Requirements Analysis and Design Definition (cont.)

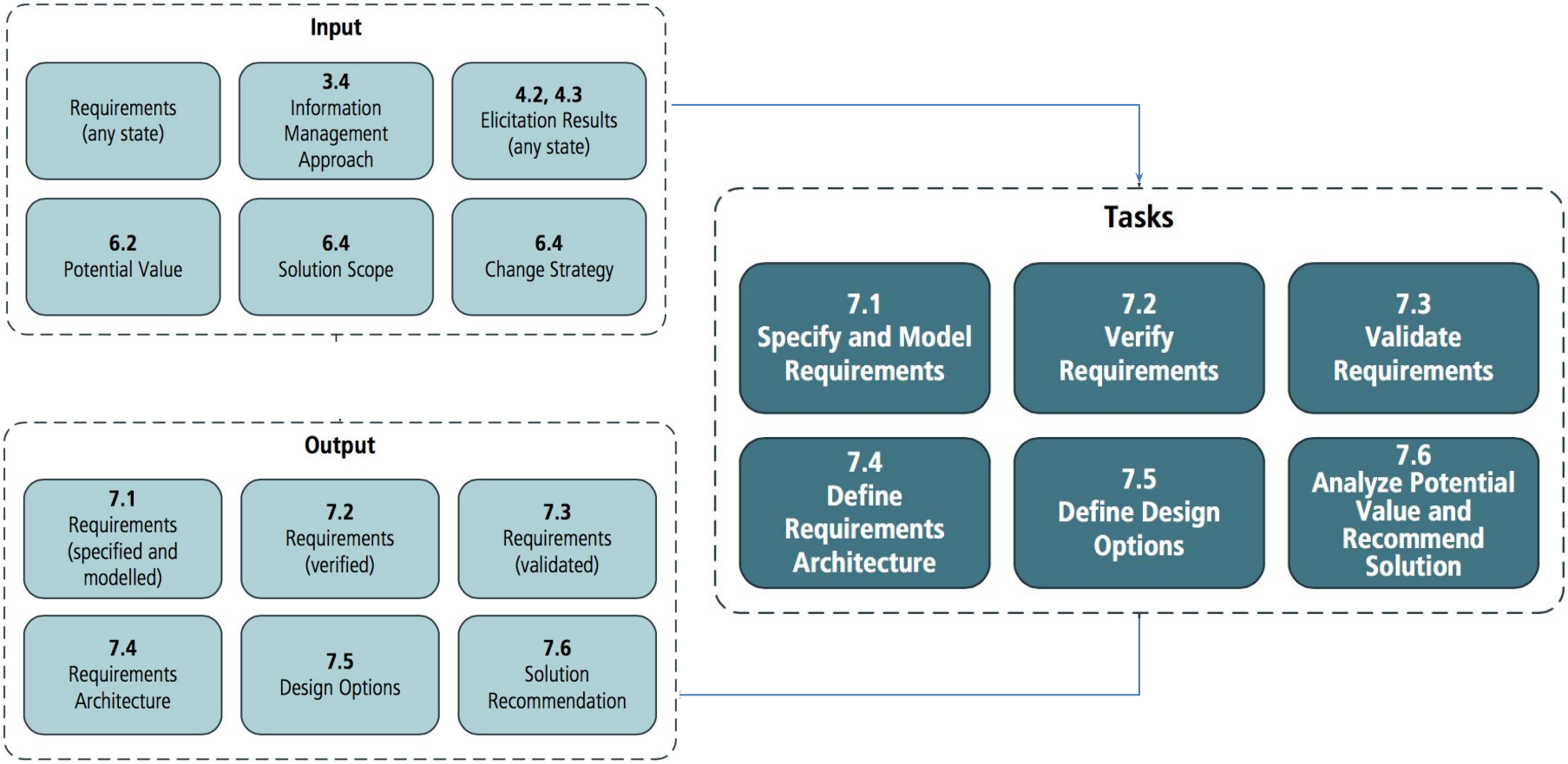
❖ The Core Concept Model in Strategy Analysis

Core Concept	During Elicitation and Collaboration, business analysts...
Change: the act of transformation in response to a need.	transform elicitation results into requirements and designs in order to define the change.
Need: a problem or opportunity to be addressed.	analyze the needs in order to recommend a solution that meets the needs.
Solution: a specific way of satisfying one or more needs in a context.	define solution options and recommend the one that is most likely to address the need and has the most value.

❖ Homework: study BABOK v3 table 7.0.1

Requirements Analysis and Design Definition (cont.)

❖ Tasks – Overview



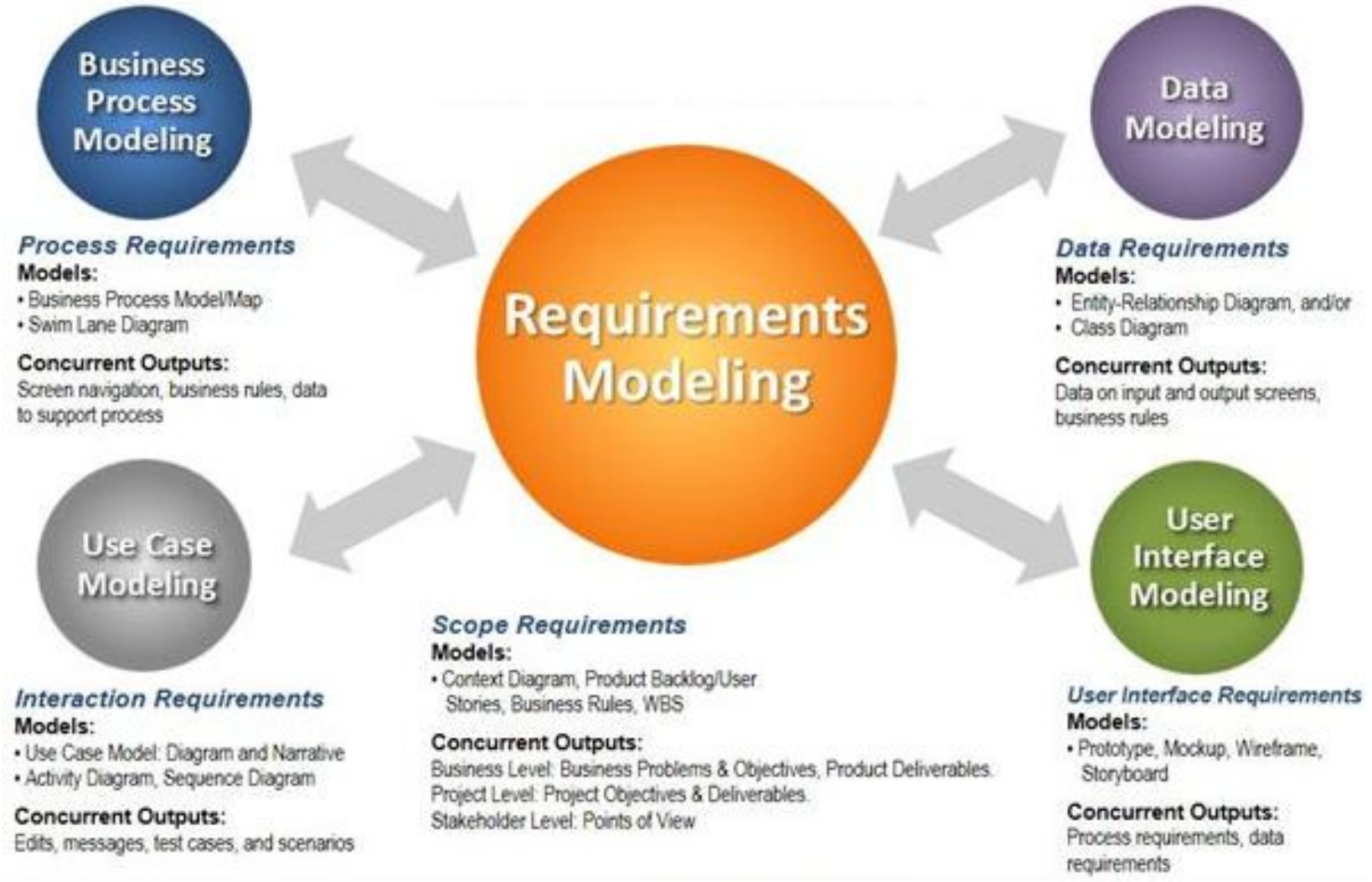
Requirements Analysis and Design Definition (cont.)

- **Case:**
  - **DTV Guide Studio.**
  - **Schroder FDS (Use Case)**
  - **Citus SaaS Blocks (User Story)**

- Specify and Model Requirements
  - ✔ Model Requirements
  - ✔ Analyze Requirements
  - ✔ Represent Requirements and Attributes
  - ✔ Implement the Appropriate Levels of Abstraction

- ✔ **Discussion: how non-functional requirements are specified and modeled from your projects (through 4 tasks above)?**

Specify and Model Requirements



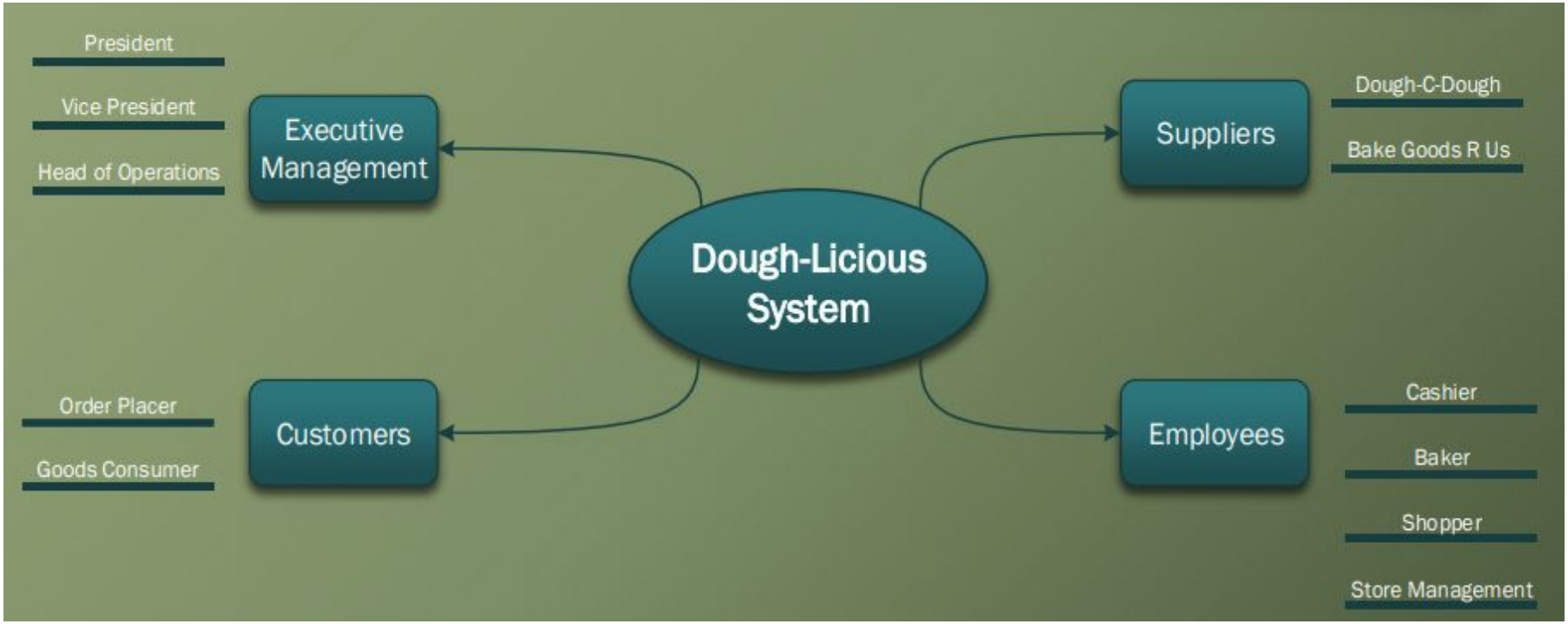
Specify and Model Requirements

Competitive Comparison Matrix

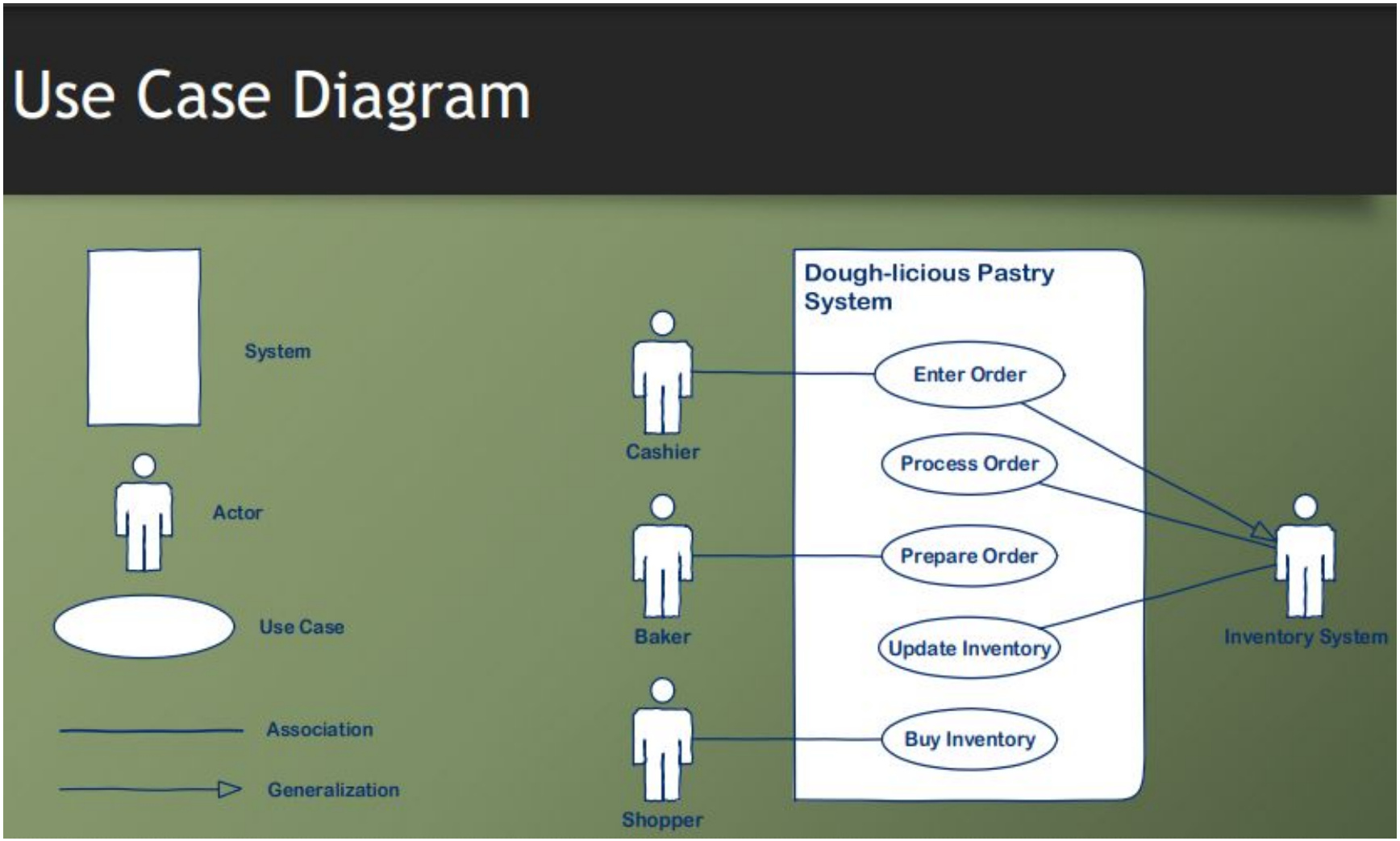
	fakebook!	FakePress	SaleCo	
Price	$19.95/mo	$24.95/mo	$25.50/mo	$29.99/mo
Administrative Controls	✓	✗	✓	✓
Quick Install	✓	✓	✓	✓
Training Included	✗	✓	✓	✓
Unique Features	✗	✓	✗	✓

	fakebook!	FakePress	SaleCo
Price	$19.95/mo	$24.95/mo	$25.50/mo
Ease of Use	3	1	4
Time to Install	4	5	4
Quality of Training	0	4	3
Additional Features	0	3	1

Specify and Model Requirements

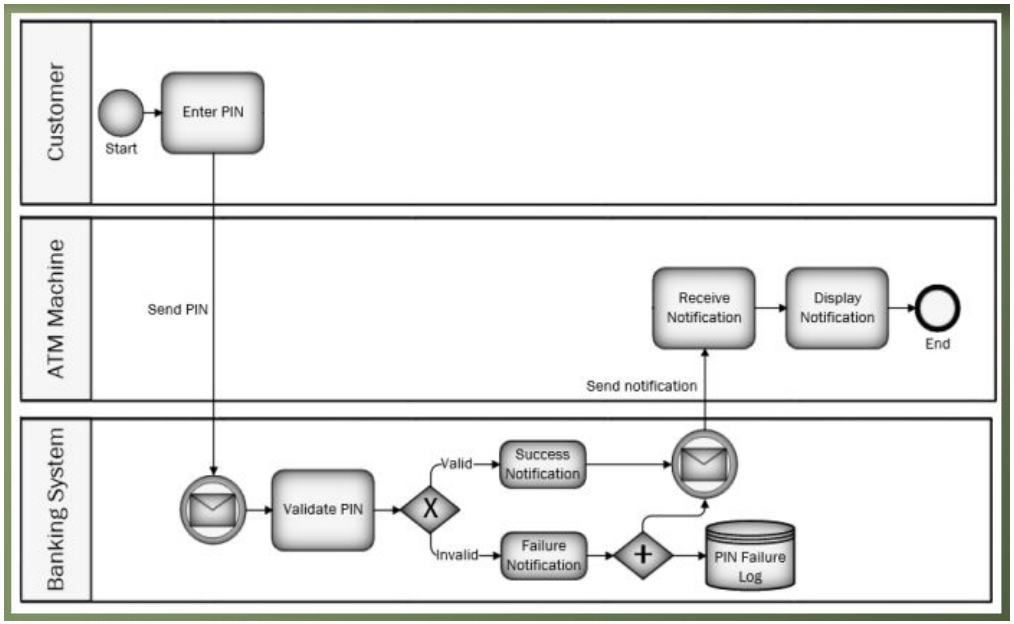


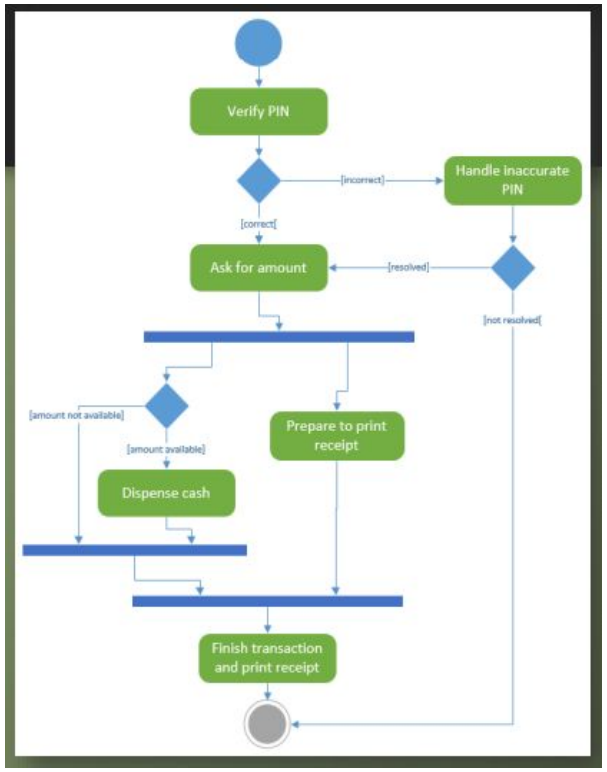
Specify and Model Requirements



Specify and Model Requirements

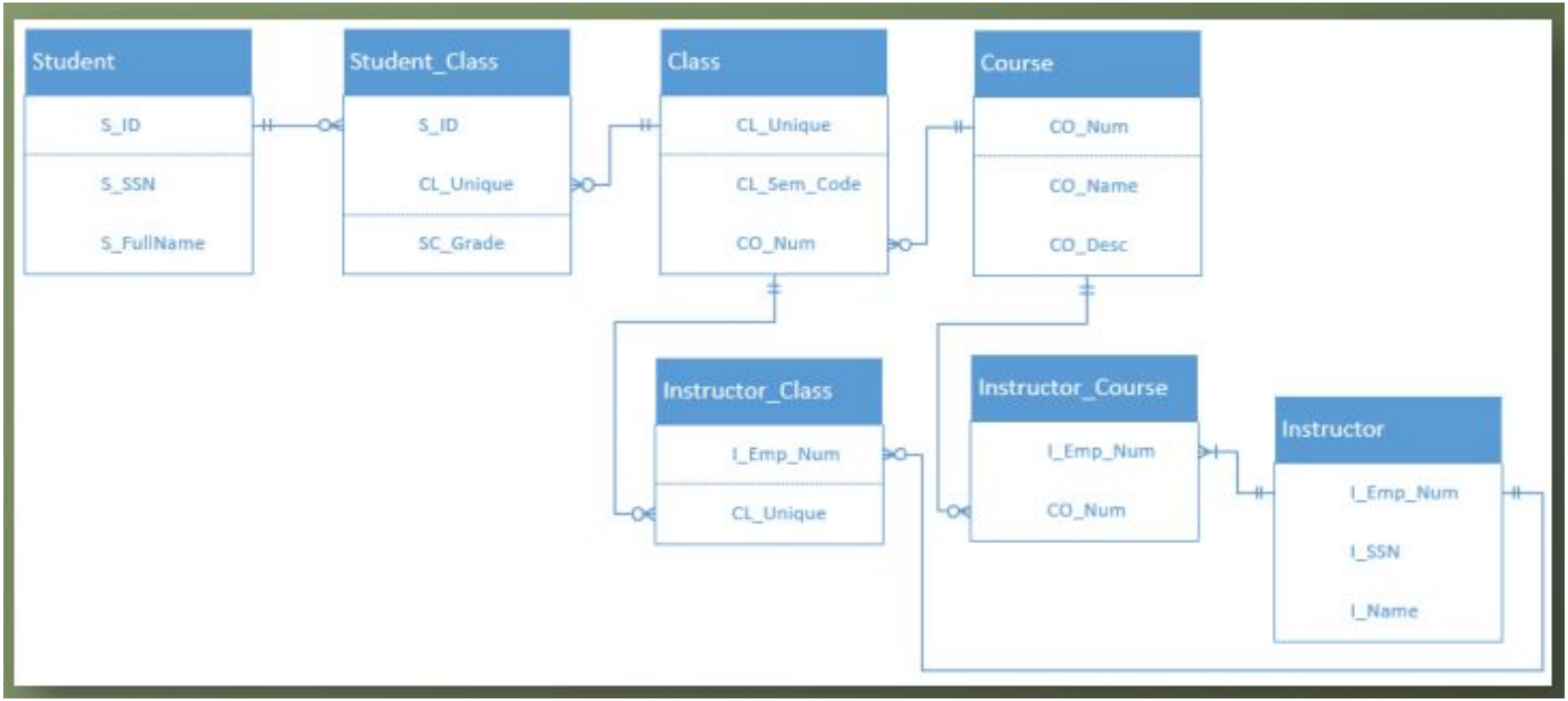
Process Flow Diagram	Business Process Modeling (BPMN)	UML Activity Diagram





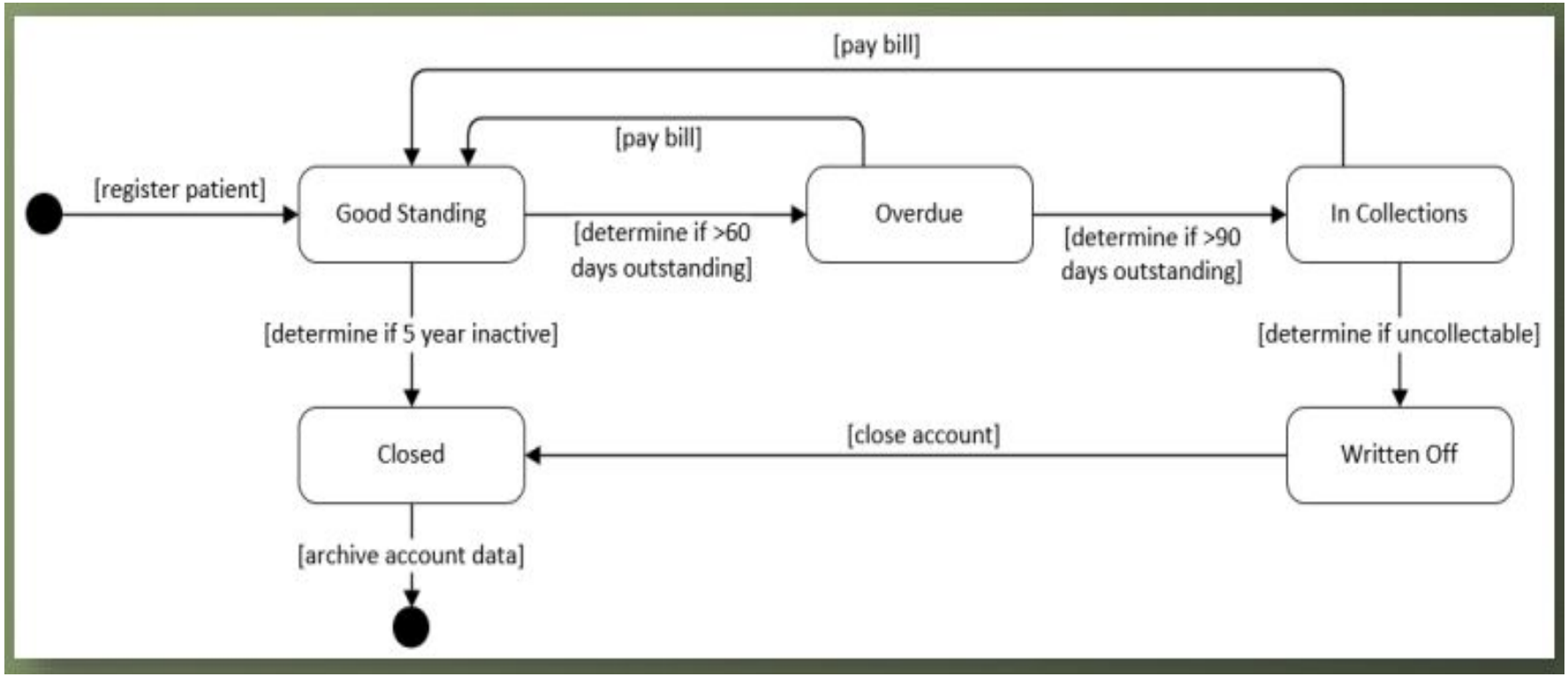
Specify and Model Requirements

Entity Relationship Diagram (ERD)

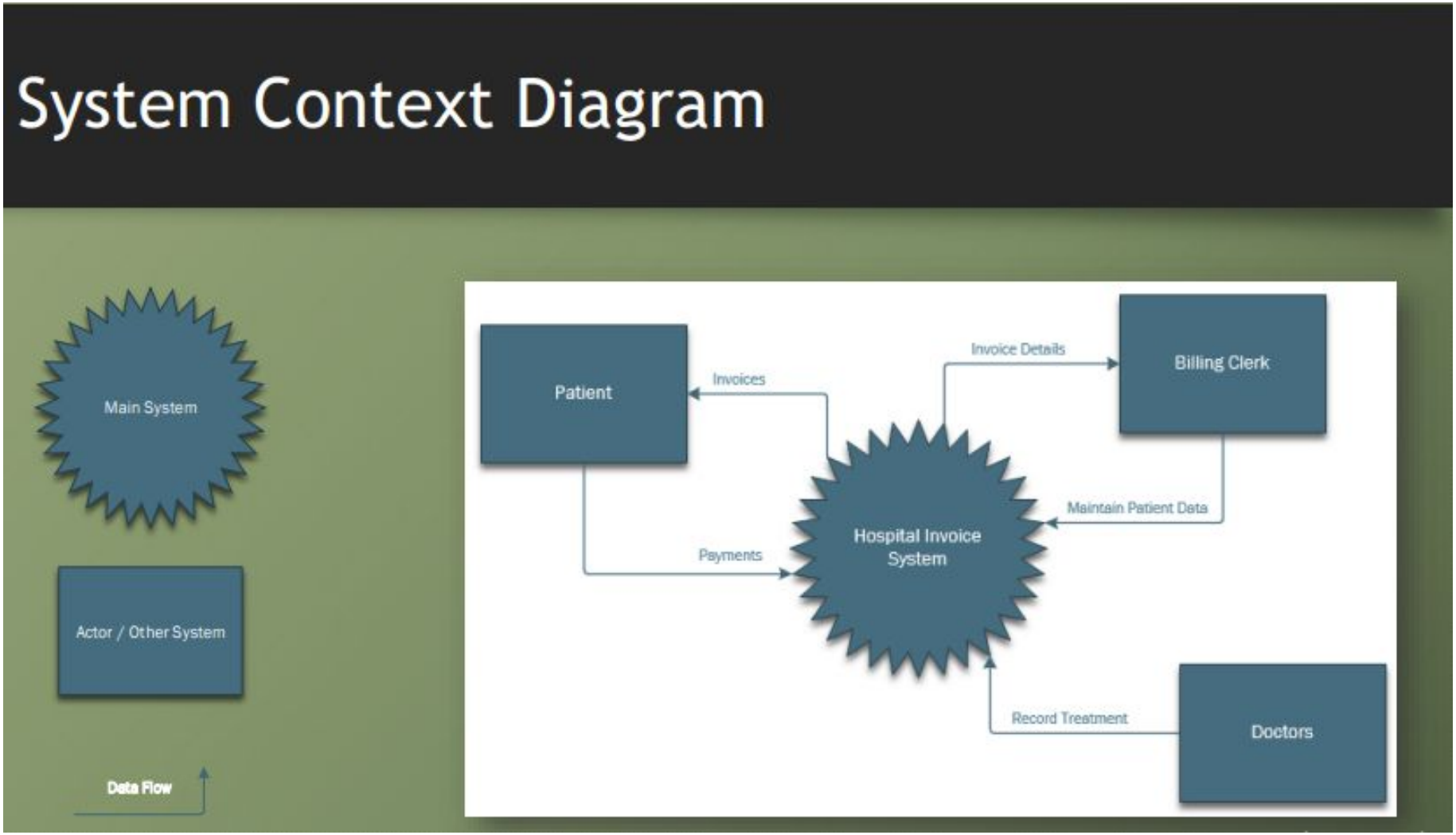


Specify and Model Requirements

State Diagram

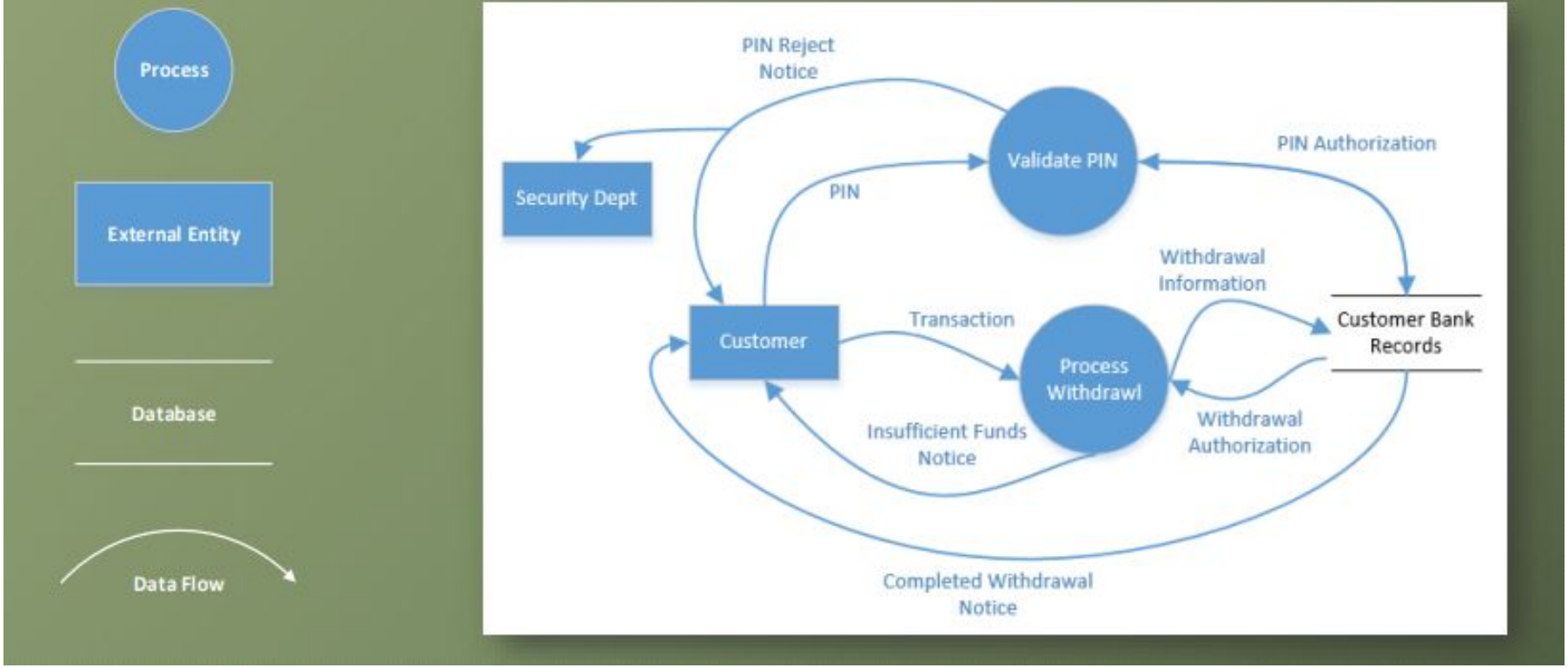


Specify and Model Requirements



Specify and Model Requirements

Data Flow Diagram



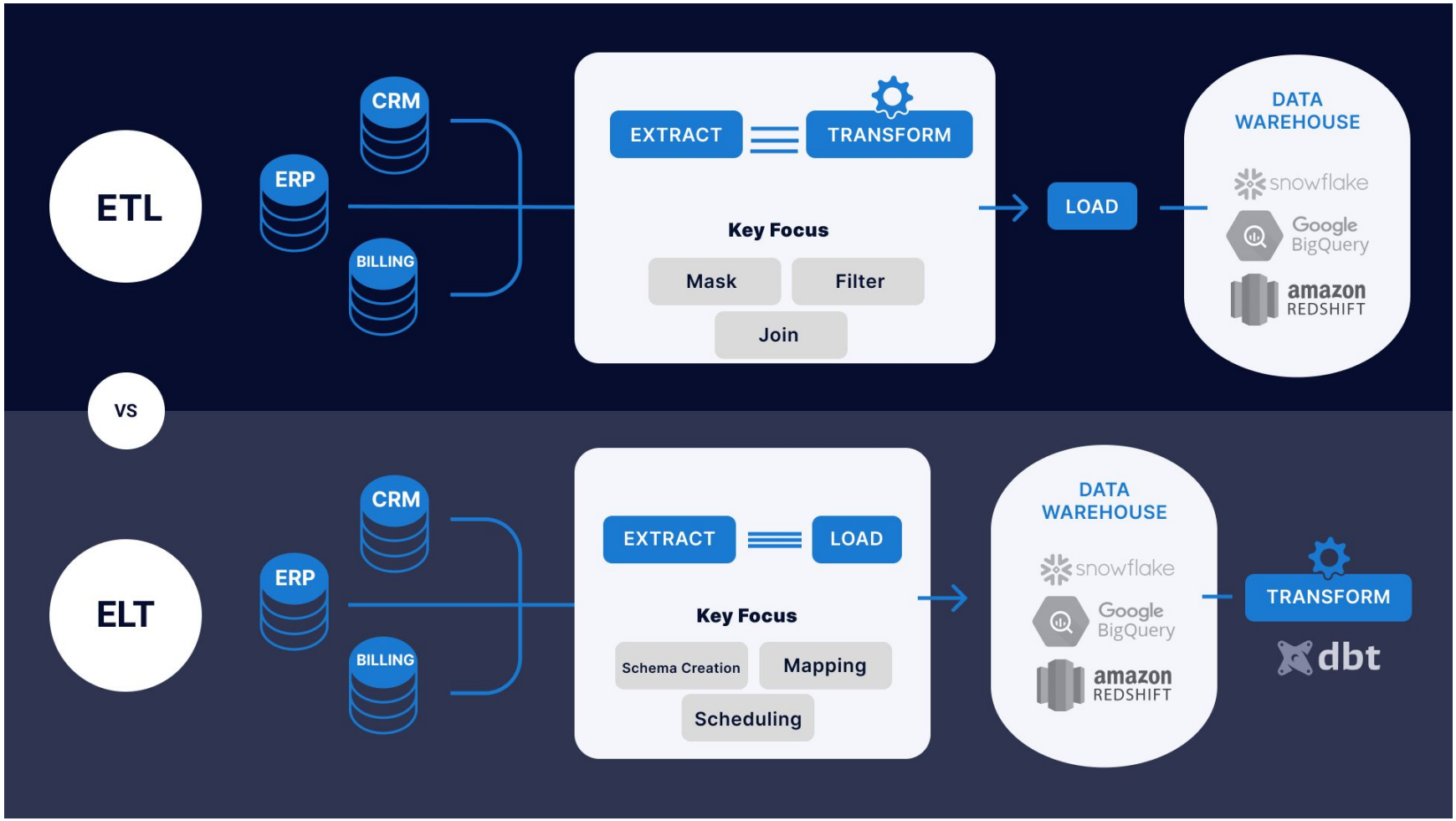
Specify and Model Requirements

CRUD Matrix

Information	Role			
	Doctor	Nurse	Billing Clerk	Billing Manager
Access to Medical Data				
Patient History	CRU	RU	R	R
Test Results	R	R		
Treatment Results	R	R		
Treatment Authorization	CRUD	R		
Access to Administrative Data				
Patient demographics	R	RU	RU	RU
Patient Registration		CRUD	R	R
Billing				
Patient Bill			CRU	CRUD

Create
Read
Update
Delete

Specify and Model Requirements



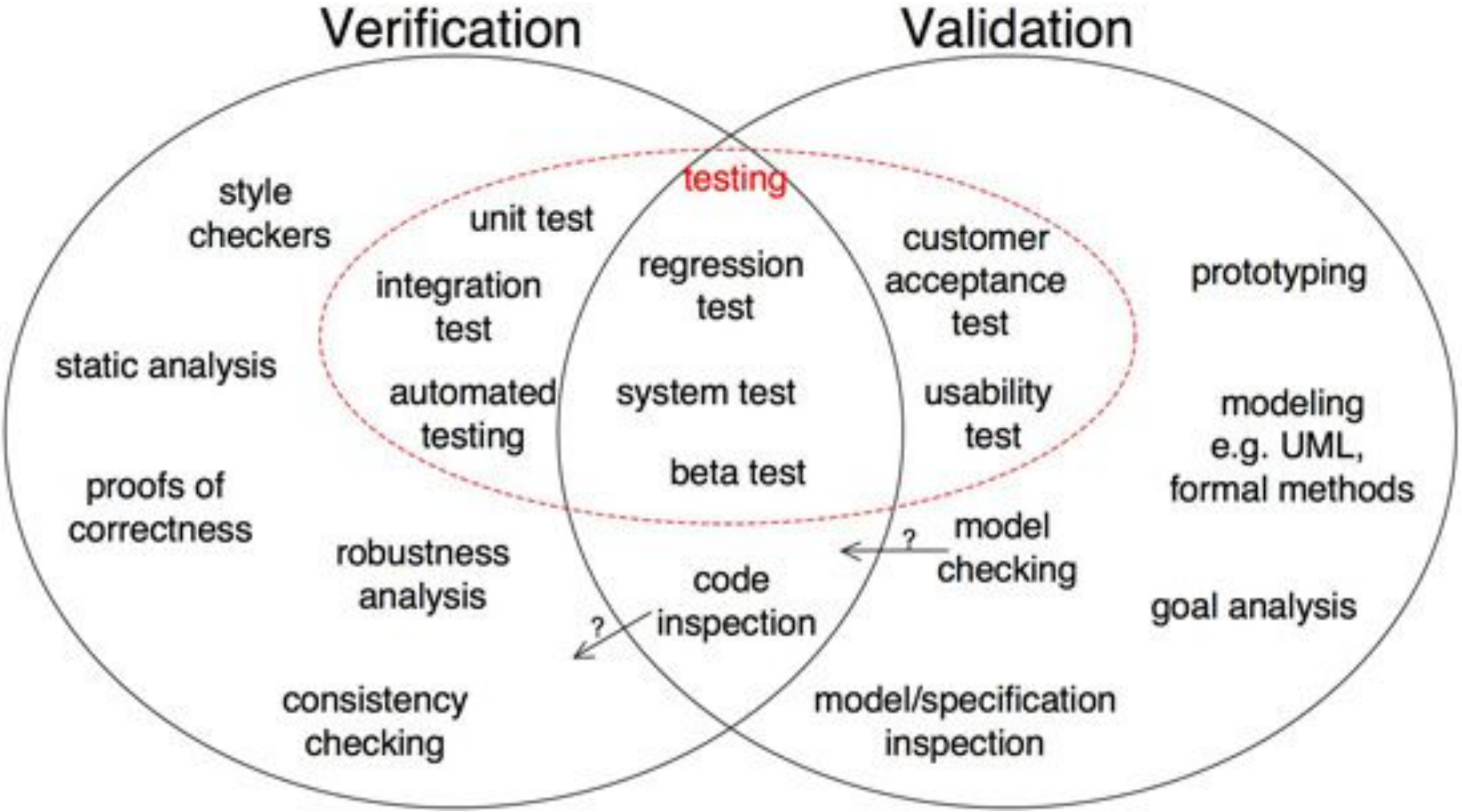
Requirements Analysis and Design Definition (cont.)

- Verify Requirements
  - ✔ Characteristics of Requirements and Designs Quality
  - ✔ Verification Activities
  - ✔ Checklists

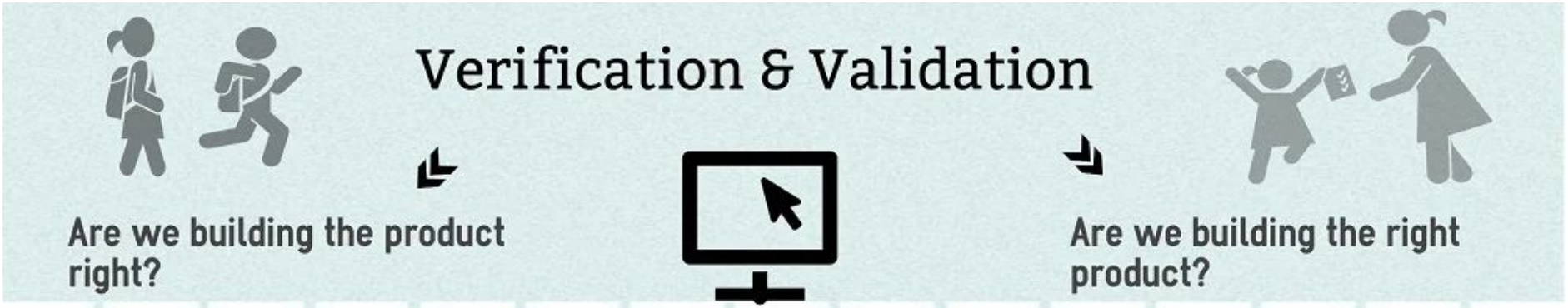
- Validate Requirements
  - ✔ Identify Assumptions
  - ✔ Define Measurable Evaluation Criteria
  - ✔ Evaluate Alignment with Solution Scope

- **Question:**
  - **Verify vs. Validate?**
  - **Example about assumptions?**

Verify & Validate Requirements



Verify & Validate Requirements



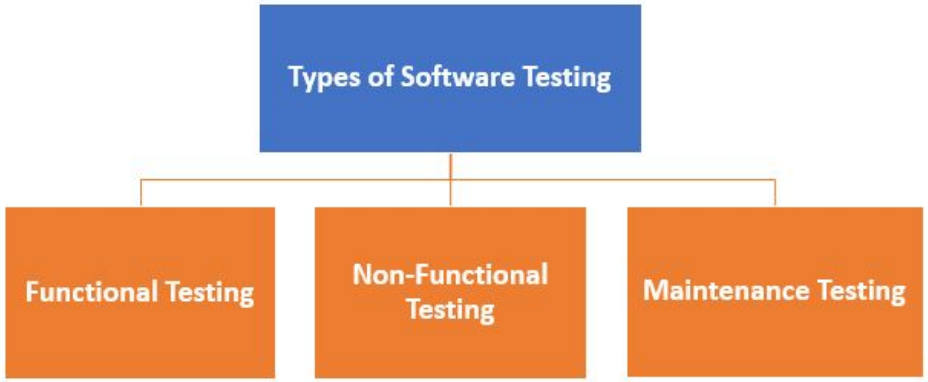
Verification

- Verify the intermediary products like requirement documents, design documents, ER diagrams, test plan and traceability matrix
- Developer point of view
- Verified without executing the software code
- Techniques used: Informal Review, Inspection, Walkthrough, Technical and Peer review

Validation

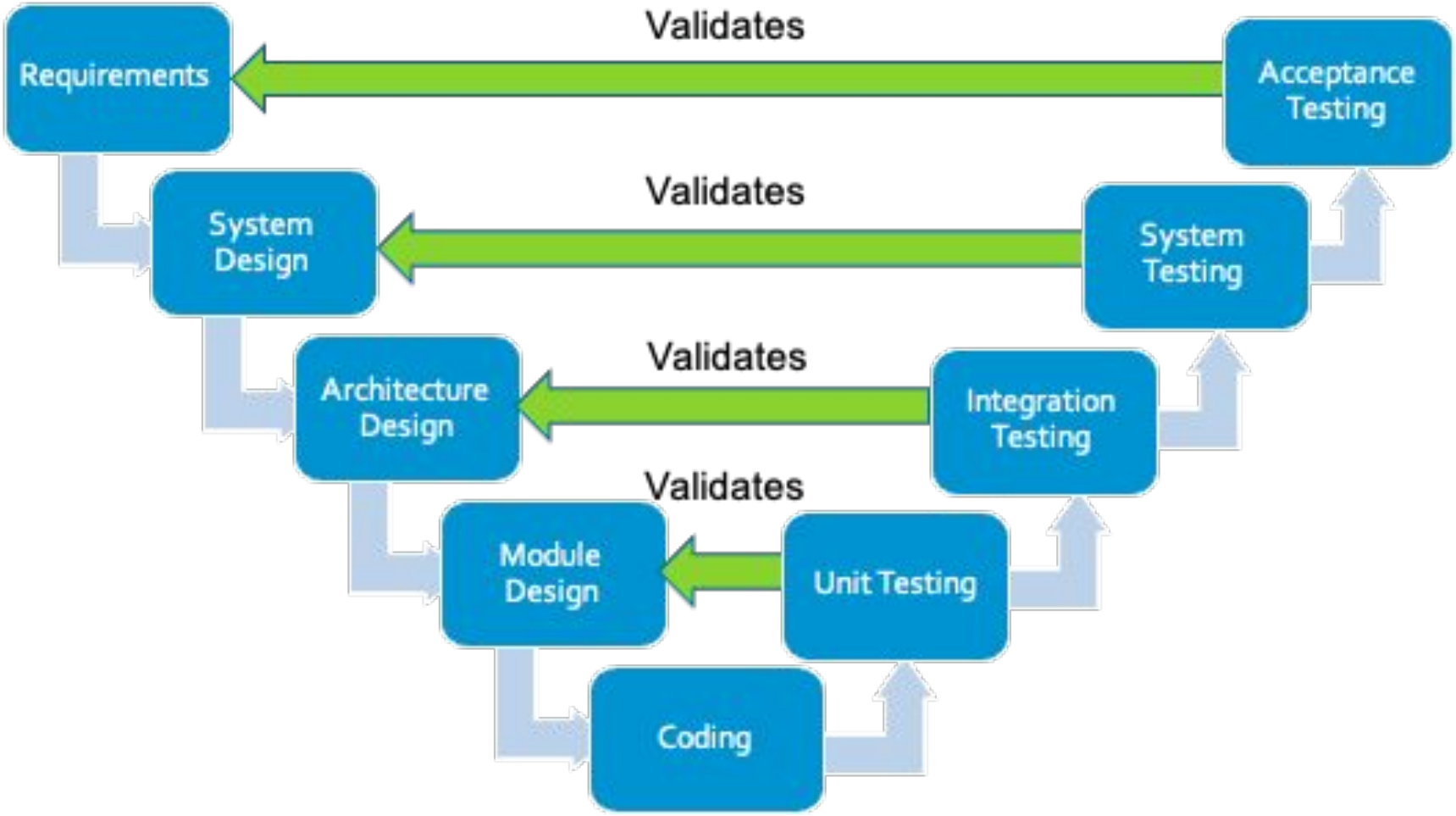
- Validate the final end product like developed software or service or system
- Customer point of view
- Validated by executing the software code
- Techniques used: Functional testing, System testing, Smoke testing, Regression testing and Many more

Verify & Validate Requirements

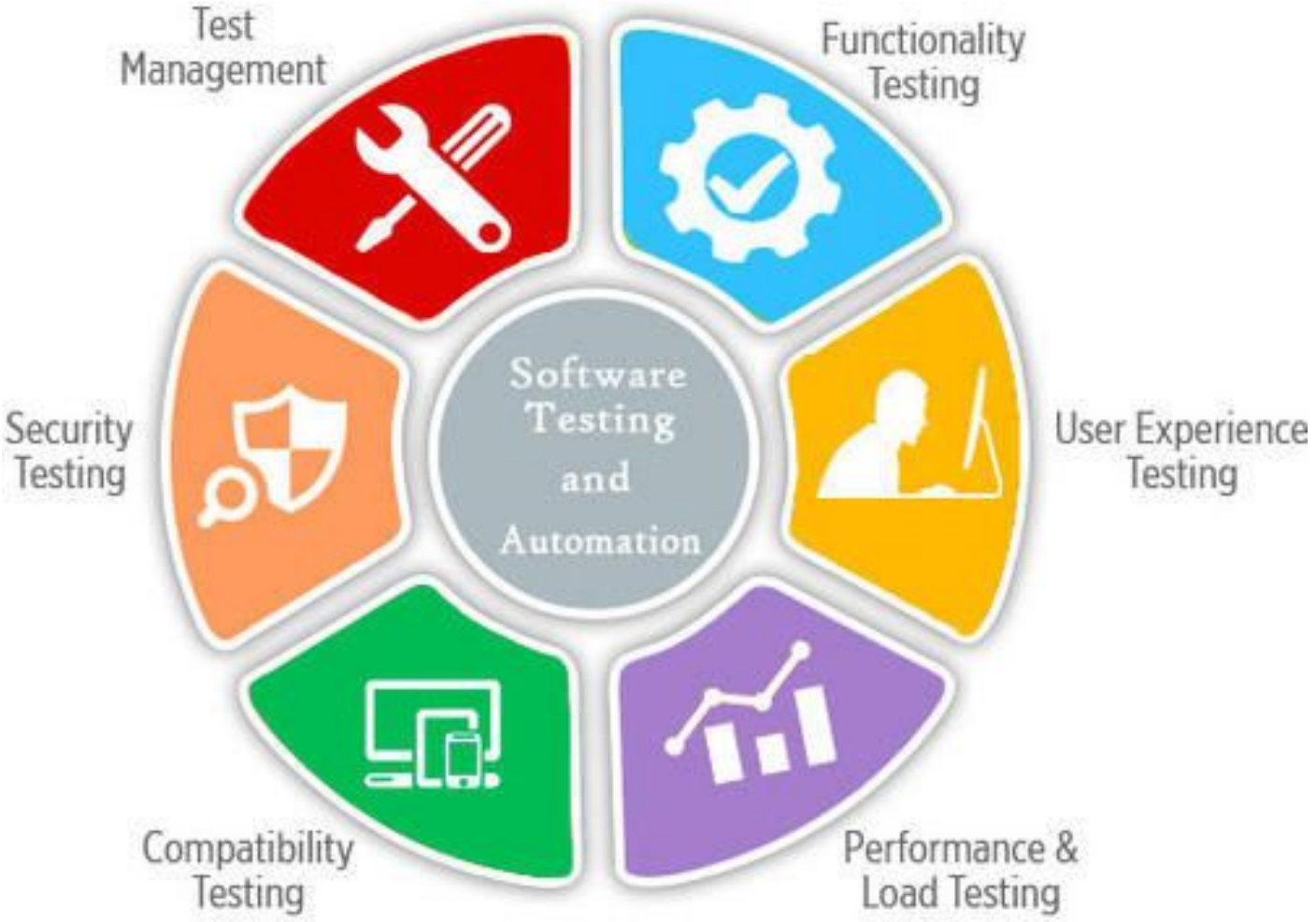


Testing Category	Types of Testing
Functional Testing	• Unit Testing • Integration Testing • Smoke • UAT (User Acceptance Testing) • Localization • Globalization • Interoperability • So on
Non-Functional Testing	• Performance • Endurance • Load • Volume • Scalability • Usability • So on
Maintenance	• Regression • Maintenance

Verify & Validate Requirements



Verify & Validate Requirements



Requirements Analysis and Design Definition (cont.)

- Define Requirements Architecture

- Define Design Options
  - ✔ Define Solution Approaches
  - ✔ Identify Improvement Opportunities
  - ✔ Requirements Allocation
  - ✔ Describe Design Options

- Analyze Potential Value and Recommend Solution
  - ✔ Expected Benefits
  - ✔ Expected Costs
  - ✔ Determine Value
  - ✔ Assess Design Options and Recommend Solution

- **Question:**
  - **Requirements Architecture: is it Traceability?**
  - **When to allocate requirements?**
- **Discussion: how new/advanced technology can cause improvement opportunities? How architect involves in this important task?**
- **Sample: DTV Guide Studio Platform Evaluation report.**

Requirements Analysis and Design Definition (cont.)

Business Architect

Assessment & Improvement

Customer End-to-End

Mobile Requirement

Package / System Integration

BPM Requirement

BI / DW Requirement

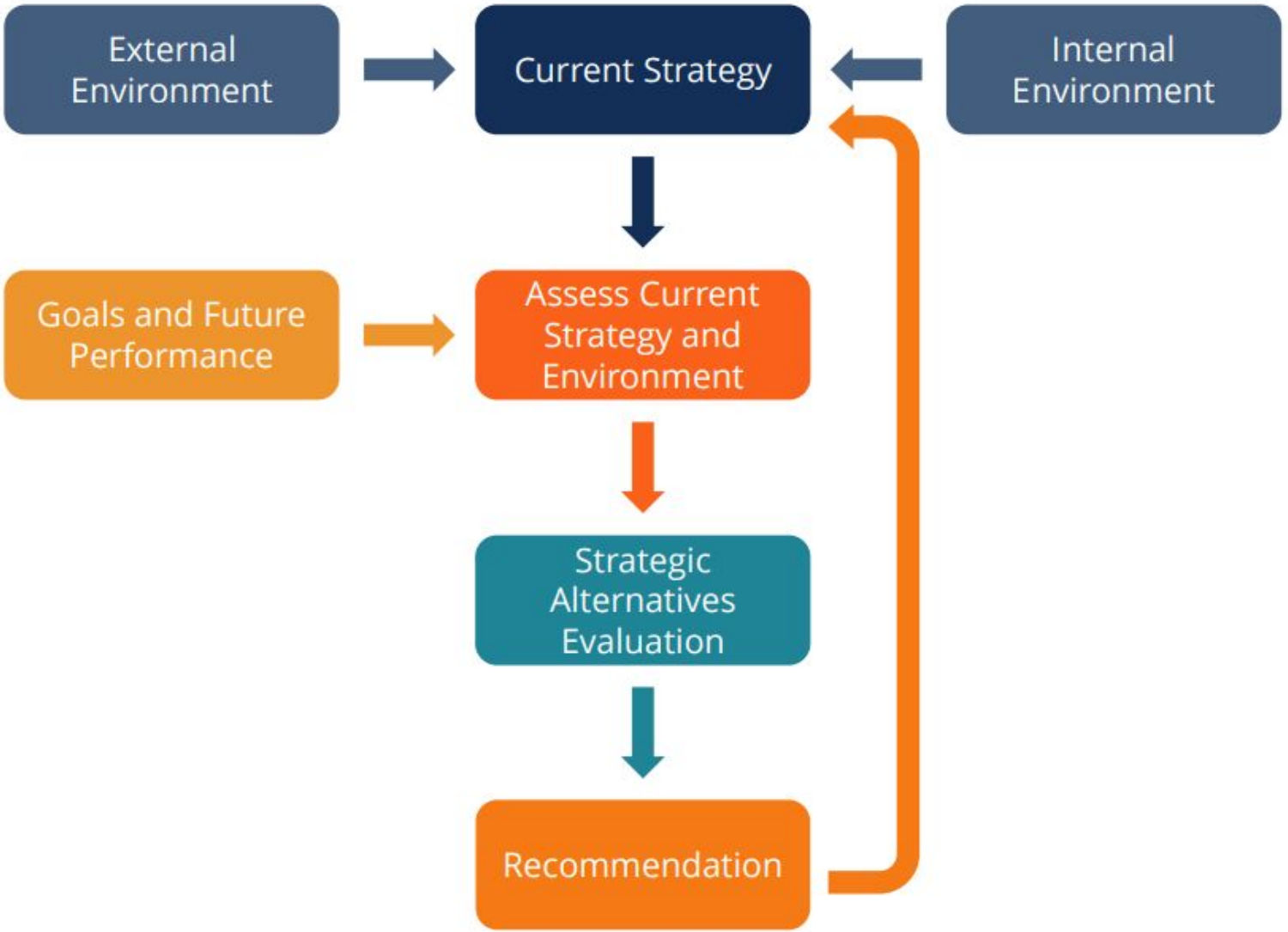
Facilitation

Requirements Analysis and Design Definition (cont.)

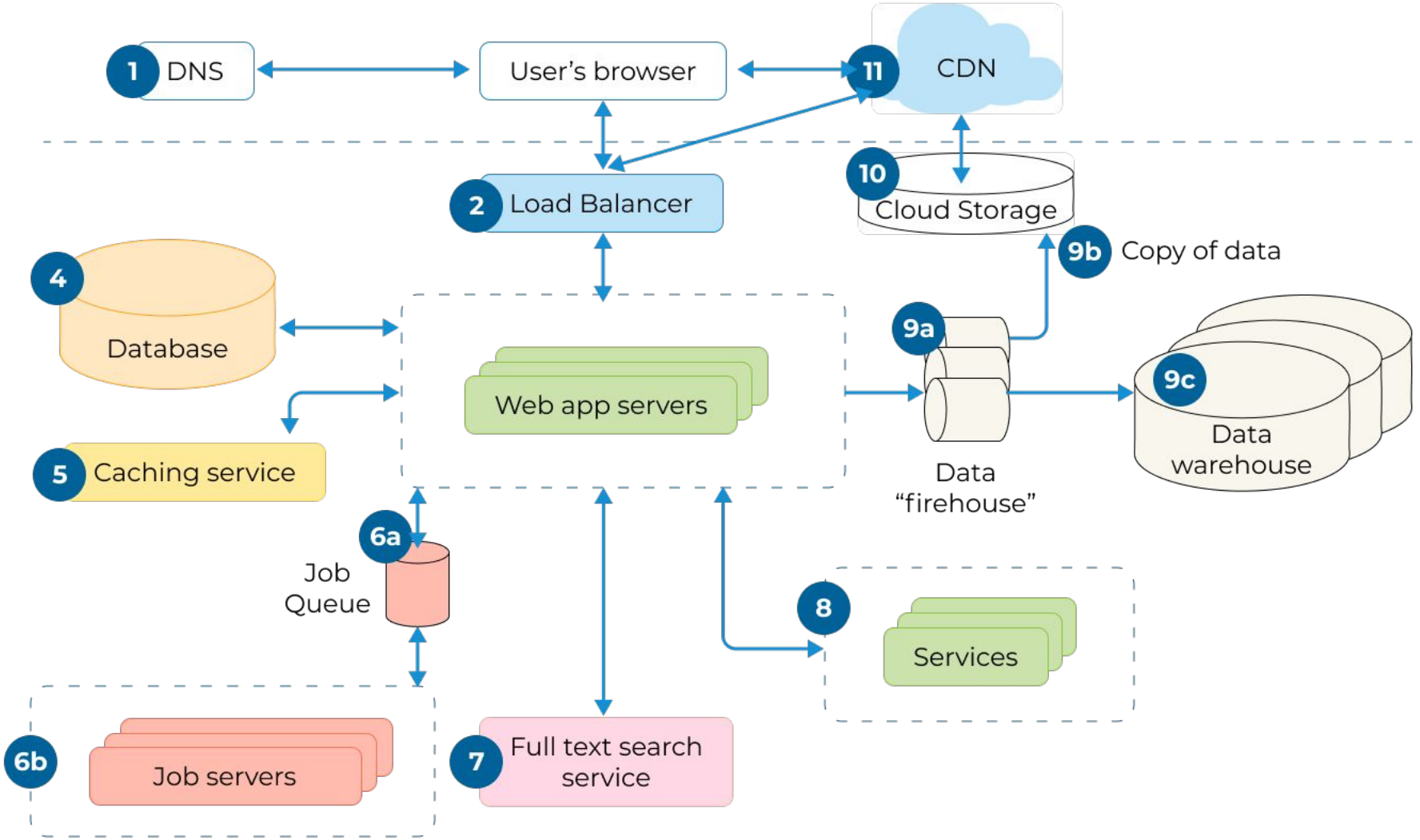
Relate and Verify Requirements Relationships

- **Defined**: there is a relationship and the type of the relationship is described.
- **Necessary**: the relationship is necessary for understanding the requirements holistically.
- **Correct**: the elements do have the relationship described.
- **Unambiguous**: there are no relationships that link elements in two different and conflicting ways.
- **Consistent**: relationships are described in the same way, using the same set of standard descriptions as defined in the viewpoints.

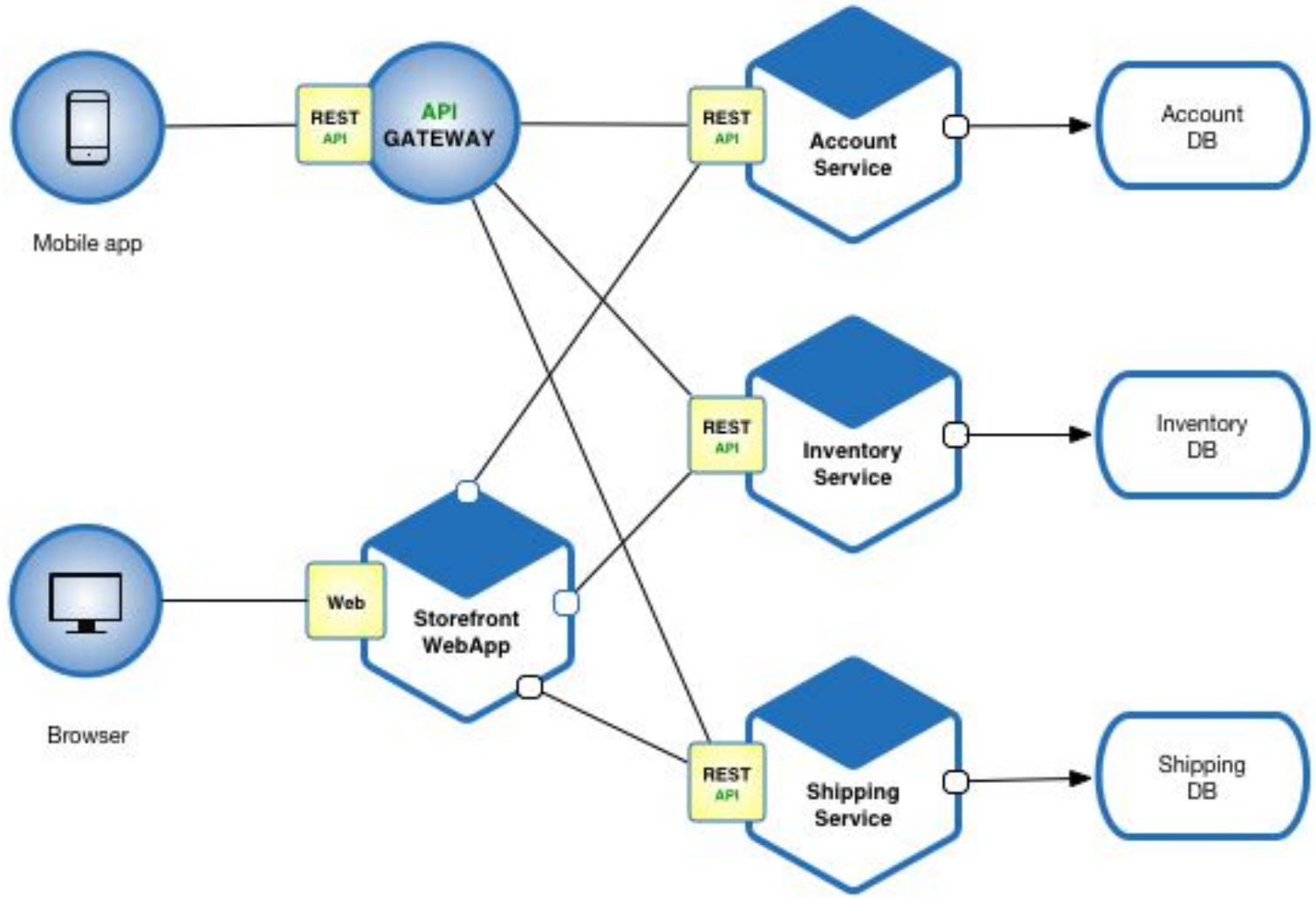
Requirements Analysis and Design Definition (cont.)



Requirements Analysis and Design Definition (cont.)



Requirements Analysis and Design Definition (cont.)



Requirements Analysis and Design Definition (cont.)

The term software construction refers to the detailed **creation** of working software through a combination of coding, verification, unit testing, integration testing, and debugging.

API	Application Programming Interface
COTS (OOTB)	Commercial Off-the-Shelf <> MOTS
GUI	Graphical User Interface
IDE	Integrated Development Environment
OMG	Object Management Group
POSIX	Portable Operating System
TDD	Test-Driven Development
UML	Unified Modeling Language

Requirements Analysis and Design Definition (cont.)

COTS

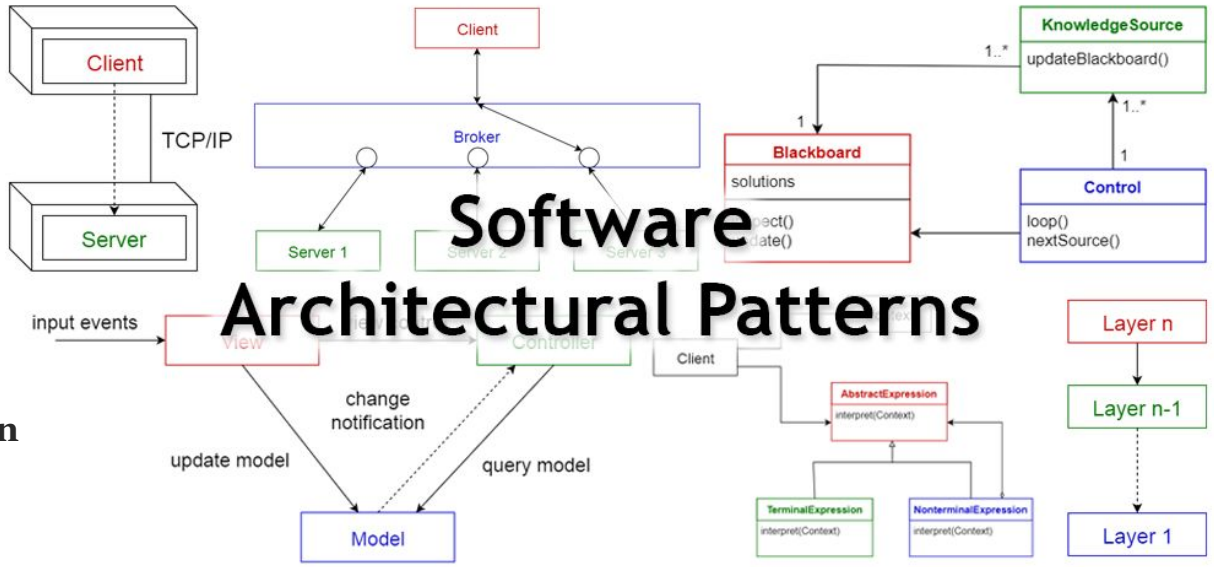
Custom Developed

Pros	Cons
Organization can develop any desired feature	Takes a long time to develop
No unnecessary additional features	Expensive
Scaling up and customization is easy	No free trials or demos before making the choice
No licensing costs	Lack of user community for support
Complete ownership over the product	Takes more effort to determine the requirements for the system

Requirements Analysis and Design Definition (cont.)

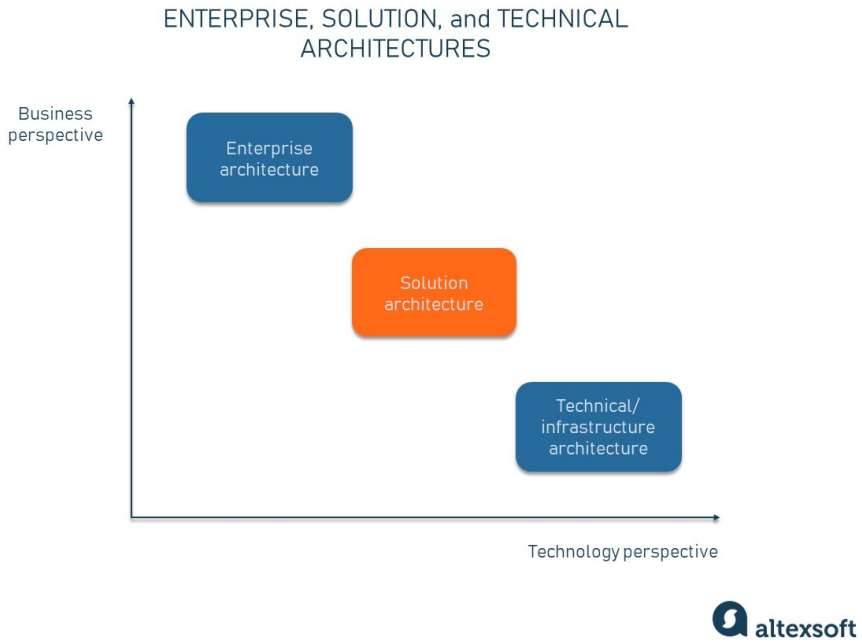
Requirements Analysis and Design Definition (cont.)

1. **Layered pattern**
2. **Client-server pattern**
3. **Master-slave pattern**
4. **Pipe-filter pattern**
5. **Broker pattern**
6. **Peer-to-peer pattern**
7. **Event-bus pattern**
8. **Model-view-controller pattern**
9. **Blackboard pattern**
0. **Interpreter pattern**



Requirements Analysis and Design Definition (cont.)

- Find the best tech **solution** to solve existing business problems.
- Describe the **structure, characteristics**, behavior, and other aspects of the software to project stakeholders.
- Define **features**, development phases, and solution requirements.
- Provide **specifications** according to which the solution is defined, managed, and delivered.



- Analyzing the technology environment
- Analyzing enterprise specifics
- Analyzing and documenting requirements
- Setting the collaboration framework
- Creating a solution prototype
- Participating in technology selection
- Controlling solution development
- Supporting project management

Requirements Analysis and Design Definition (cont.)

- **Maintainability**: Đáp ứng với việc thay đổi một cách nhanh chóng, tốn ít công sức và mức độ ảnh hưởng thấp.
- **Scalability**: Có khả năng mở rộng, xây dựng thêm các tính năng mới mà ít ảnh hưởng đến các tính năng sẵn có. Tốn ít thời gian và công sức
- **Performance / Speed / Stress**: …
- **Reusability**: Phải thiết kế làm sao để các module có thể được sử dụng lại ở các hệ thống khác mà không cần phải chỉnh sửa hoặc chỉnh sửa rất ít.
- **Reliability**: Hệ thống xây dựng theo solution đó phải có độ tin cậy cao, chạy ổn định, đảm bảo toàn vẹn dữ liệu.
- **Testability**: Có thể dễ dàng test được hệ thống sử dụng các test framework sẵn có
- **Security**: Hệ thống xây dựng theo solution đó phải đảm bảo an toàn thông tin (chống tấn công mạng, chống revert source code,…). Thường thì các hệ thống chạy trên nền tảng web, mobile sẽ đòi hỏi về security cao hơn các hệ thống khác.
- **Feasibility**: Đây là một tiêu chí quan trọng nhất nhưng được nói đến cuối cùng vì nó ảnh hưởng đến tất cả các tiêu chí kể trên. Một Solution đưa ra thì ngoài việc phải khả thi về phương diện kỹ thuật thì còn phải khả thi về phương diện nguồn lực con người, phải khả thi về mặt thời gian. Chính vì vậy đôi lúc, để đảm bảo Feasibility thì chúng ta phải hy sinh một số các tiêu chí đã đề cập ở trên.

Solution Evaluation

- **Discuss: describe some pilot projects.**

- **Cases:**
  - **SMRT TFTDS: data transfer engine**
  - **DTV Guide Studio: pilot phase**
  - **E.ON: pilot the migration of on-premises app to cloud**
  - **Pilot in Notes migration projects: PETRONAS, LNAR**

Solution Evaluation (cont.)

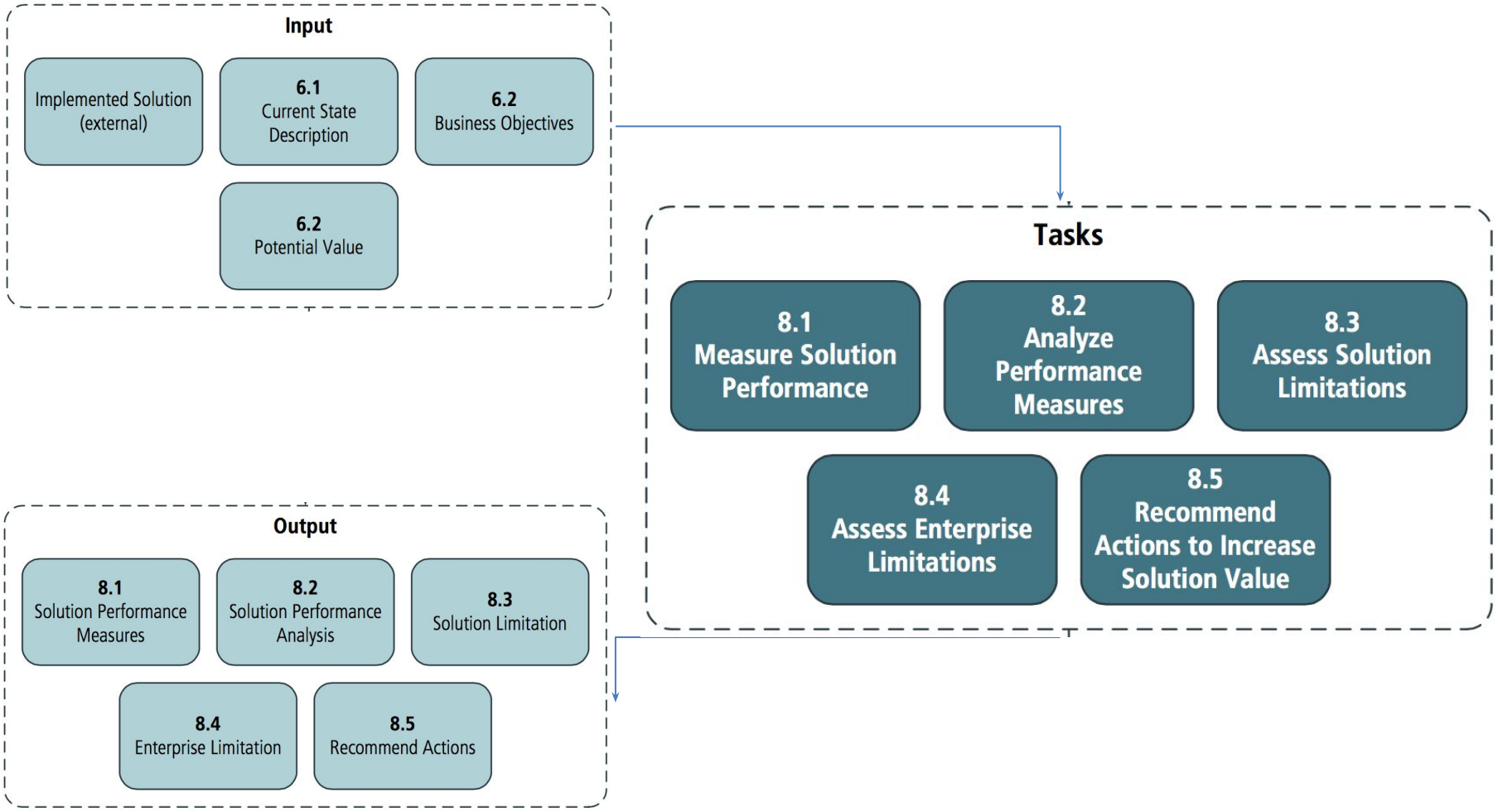
The Core Concept Model in Strategy Analysis

Core Concept	During Elicitation and Collaboration, business analysts...
Change: the act of transformation in response to a need.	recommend a change to either a solution or the enterprise in order to realize the potential value of a solution.
Need: a problem or opportunity to be addressed.	evaluate how a solution or solution component is fulfilling the need.
Solution: a specific way of satisfying one or more needs in a context.	assess the performance of the solution, examine if it is delivering the potential value, and analyze why value may not be realized by the solution or solution component.

Homework: study BABOK v3 table 8.0.2

Solution Evaluation (cont.)

❖ Tasks – Overview



Solution Evaluation (cont.)

- Measure Solution Performance
  - ✔ Define Solution Performance Measures: quantitative vs. qualitative
  - ✔ Validate Performance Measures
  - ✔ Collect Performance Measures: volume/sample size, frequency & timing, currency
- Analyze Performance Measures
  - ✔ Solution Performance versus Desired Value
  - ✔ Risks
  - ✔ Trends
  - ✔ Accuracy
  - ✔ Performance Variances
- Assess Solution Limitations
  - ✔ Identify Internal Solution Component Dependencies
  - ✔ Investigate Solution Problems
  - ✔ Impact Assessment
- Assess Enterprise Limitations
- Recommend Actions to Increase Solution Value

❑ **Exercise: provide sample quantitative & qualitative measures for an ATM software.**

Solution Evaluation (cont.)

- Potential **Value**: can be used as a **benchmark** against which the value delivered by a design can be evaluated.

- Design **Options**: need to be evaluated and **compared** to one another to recommend one option for the solution.

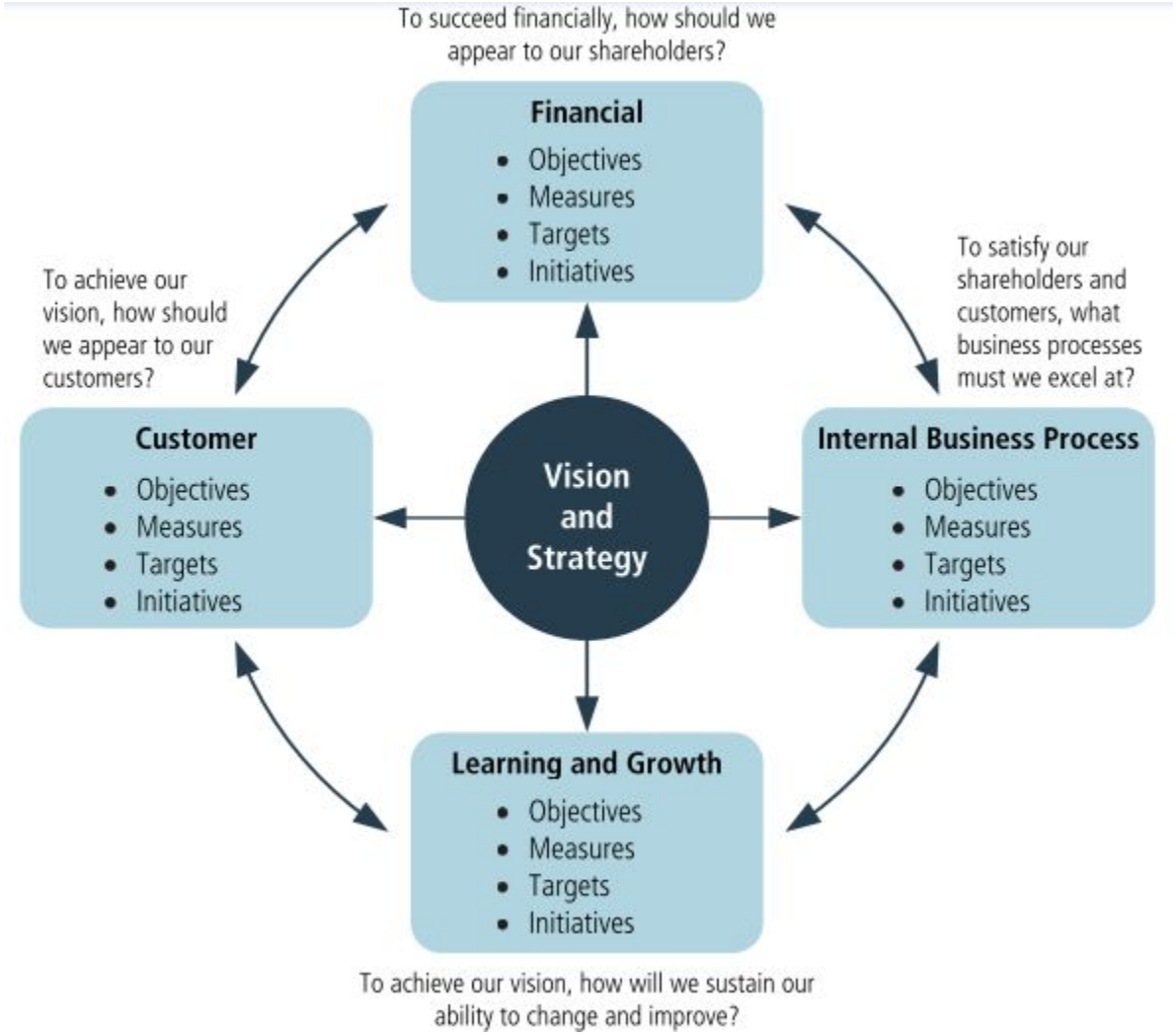
Solution Evaluation (cont.)

Solution Evaluation (cont.)

- How do customers see us? (customer perspective)
- What must we excel at? (internal perspective)
- Can we continue to improve and create value? (innovation and learning perspective)
- How do we look to shareholders? (financial perspective)

- **Learning and growth**
- **Business processes**
- **Customers**
- **Finance**

Solution Evaluation (cont.)



Solution Evaluation (cont.)

Financial Perspective	
GOALS	MEASURES
Survive	Cash flow
Succeed	Quarterly sales growth and operating income by division
Prosper	Increased market share and ROE

Customer Perspective	
GOALS	MEASURES
New products	Percent of sales from new products
	Percent of sales from proprietary products
Responsive supply	On-time delivery (defined by customer)
Preferred supplier	Share of key accounts' purchases
	Ranking by key accounts
Customer partnership	Number of cooperative engineering efforts

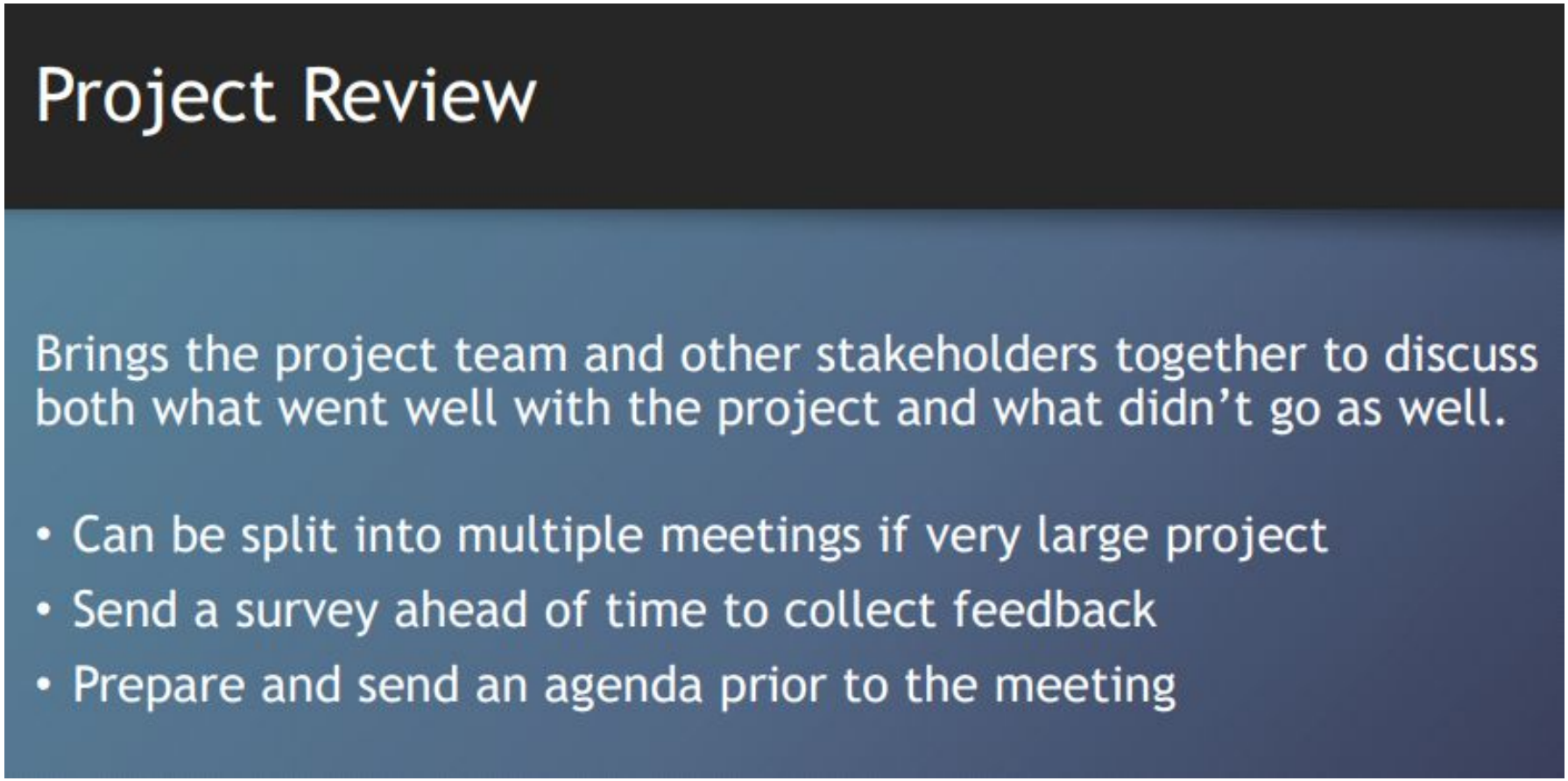
Internal Business Perspective	
GOALS	MEASURES
Technology capability	Manufacturing geometry vs. competition
Manufacturing excellence	Cycle time Unit cost Yield
Design productivity	Silicon efficiency Engineering efficiency
New product introduction	Actual introduction schedule vs. plan

Innovation and Learning Perspective	
GOALS	MEASURES
Technology leadership	Time to develop next generation
Manufacturing learning	Process time to maturity
Product focus	Percent of products that equal 80% sales
Time to market	New product introduction vs. competition

Solution Evaluation (cont.)

- **Strategic:** These big-picture key performance indicators monitor organizational goals. Executives typically look to one or two strategic KPIs to find out how the organization is doing at any given time. Examples include return on investment, revenue and market share.
- **Operational:** These KPIs typically measure performance in a shorter time frame, and are focused on organizational processes and efficiencies. Some examples include sales by region, average monthly transportation costs and cost per acquisition (CPA).
- **Functional Unit:** Many key performance indicators are tied to specific functions, such finance or IT. While IT might track time to resolution or average uptime, finance KPIs track gross profit margin or return on assets. These functional KPIs can also be classified as strategic or operational.
- **Leading vs Lagging:** Regardless of the type of key performance indicator you define, you should know the difference between leading indicators and lagging indicators. While leading KPIs can help predict outcomes, lagging KPIs track what has already happened. Organizations use a mix of both to ensure they're tracking what's most important.

Project Completion Best Practices



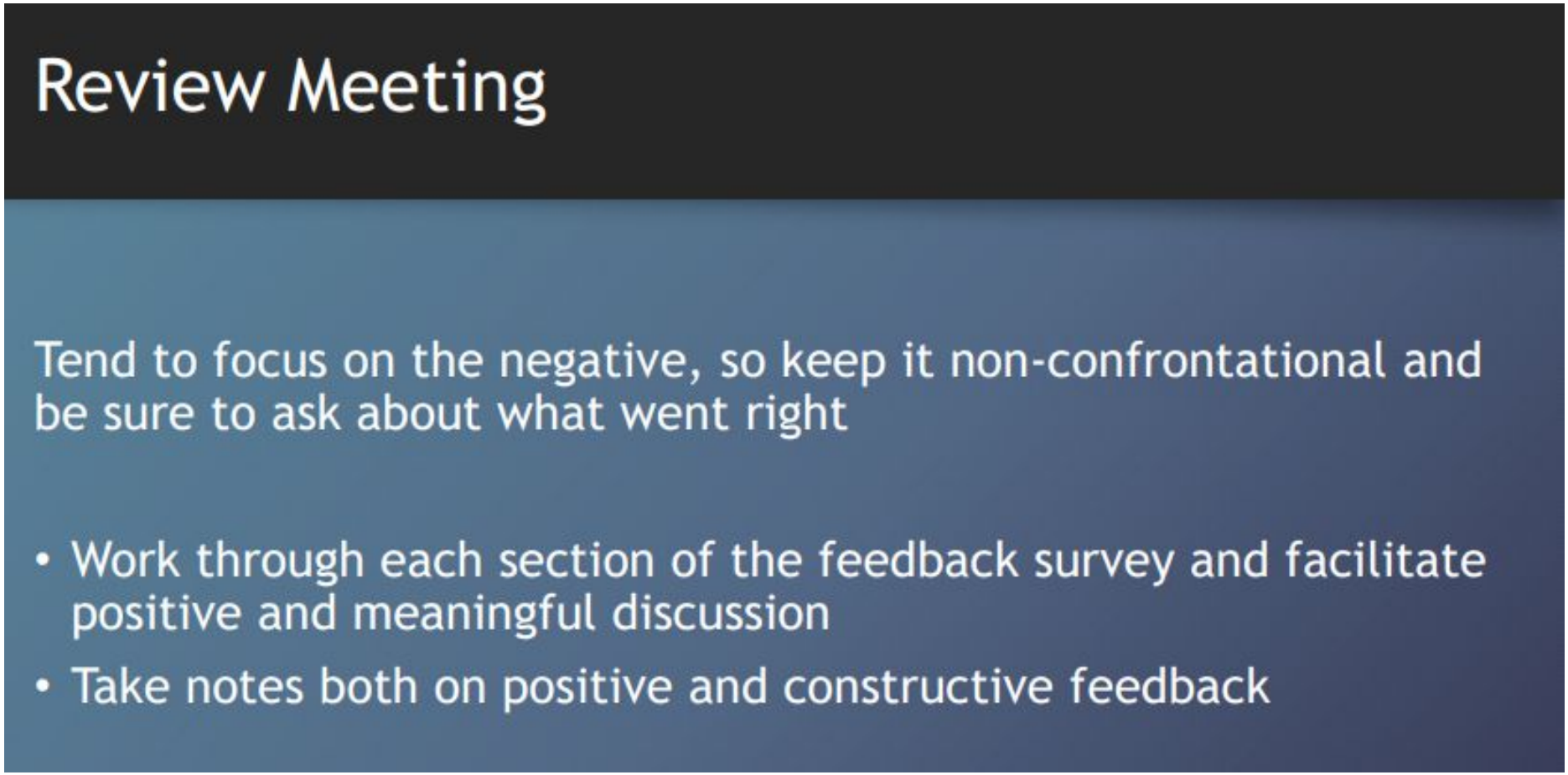
Project Completion Best Practices

Feedback Survey

A feedback survey should be sent at least one week before the meeting asking about thoughts on various aspects of the project.

1. Overall, how successful do you think this project was? What went right (list up to 3 things)?
2. What obstacles did you face (list up to 3 things)?
3. What needs improvement/should have been done differently (list up to 3 things)?
4. Do you have any other comments?

Project Completion Best Practices



Project Completion Best Practices

Post Review Meeting

Analyze the results from the review meeting and recommend process or procedural changes that should be made for future projects.

"Those who do not learn from history are doomed to repeat it"

- George Santavana

Final Test - Group

- Pick one of your project, describe below information:
  - Project Overview, Pain Point & Functional Requirement
  - How Elicitation Activities has been carried out & documented
    - *Use Case Diagram / Activity Diagram / System As Is & To be*
  - Difficulties & how project overcome it
  - Based on this course' Content/Best Practices, suggest how should team improve in Planning/Requirement/Design phase

- Everything should be in bullet point with at least 2 follow up explanations - Structured Text
- 2 sided A4
- Duration: 30 mins - 1 hour
- Submit Time: 16:40

***Deadline**: <u>in-class submission</u>*

Final Test – Result

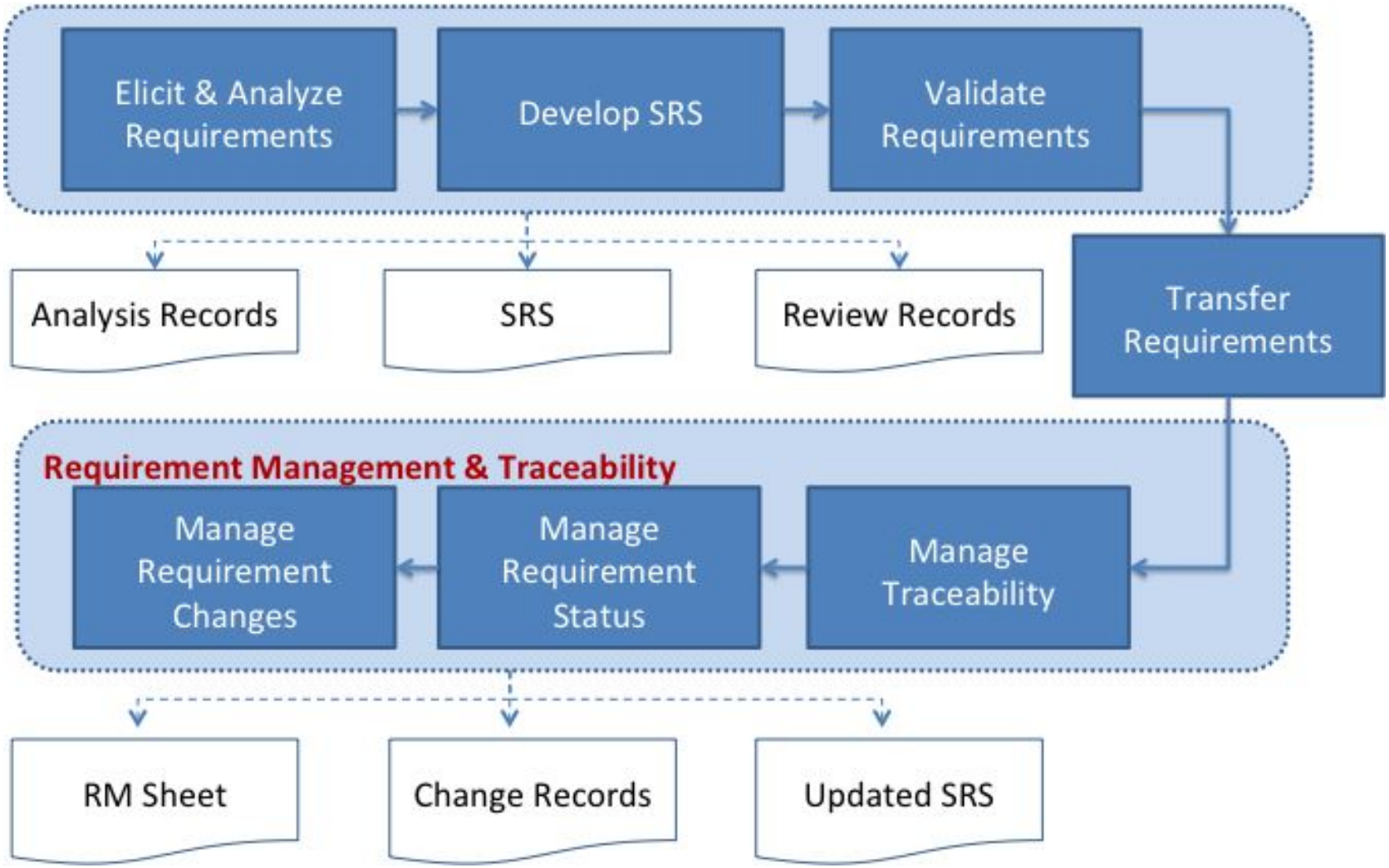
Criteria & Principle

- Overall = (Timeliness + Detail + 3*Knowledge Coverage)/5
- Knowledge Coverage: matching practices & improvements with lecture knowledge

Result

1. A
2. B
3. C
4. D
5. E

Knowledge Coverage



Knowledge Coverage

Elicitation and Collaboration

- Prepare for Elicitation
  - ✔ Understand the Scope of Elicitation
  - ✔ Select Elicitation Techniques
  - ✔ Set Up Logistics
  - ✔ Secure Supporting Material
  - ✔ Prepare Stakeholders
- Conduct Elicitation
  - ✔ Guide Elicitation Activity
  - ✔ Capture Elicitation Outcomes
- Confirm Elicitation Results
  - ✔ Compare Elicitation Results Against Source Information
  - ✔ Compare Elicitation Results Against Other Elicitation Results
- Communicate Business Analysis Information
  - ✔ Determine Objectives and Format of Communication
  - ✔ Communicate Business Analysis Package
- Manage Stakeholder Collaboration
  - ✔ Gain Agreement on Commitments
  - ✔ Monitor Stakeholder Engagement
  - ✔ Collaboration

Strategy Analysis

- Analyze Current State
  - ✔ **Business Needs**
  - ✔ Organizational Structure and Culture
  - ✔ Capabilities and Processes
  - ✔ **Technology and Infrastructure**
  - ✔ **Policies**
  - ✔ **Business Architecture**
  - ✔ Internal Assets
  - ✔ External Influencers
- Define Future State
  - ✔ Business Goals and Objectives
  - ✔ Scope of Solution Space
  - ✔ **Constraints**
  - ✔ Organizational Structure and Culture
  - ✔ Capabilities and Processes
  - ✔ **Technology and Infrastructure**
  - ✔ **Policies**
  - ✔ **Business Architecture**
  - ✔ Internal Assets
  - ✔ **Identify Assumptions**
  - ✔ Potential Value
- Assess Risks
  - ✔ **Unknowns**
  - ✔ **Constraints, Assumptions, and Dependencies**
  - ✔ Negative Impact to Value
  - ✔ Risk Tolerance
  - ✔ **Recommendation**
- **Define Change Strategy**
  - ✔ Solution Scope
  - ✔ Gap Analysis
  - ✔ Enterprise Readiness Assessment
  - ✔ Change Strategy
  - ✔ Transition States and Release Planning

Knowledge Coverage (cont.)

Requirements Analysis and Design Definition

- Specify and Model Requirements
  - ✔ Model Requirements
  - ✔ **Analyze Requirements**
  - ✔ Represent Requirements and Attributes
  - ✔ Implement the Appropriate Levels of Abstraction
- Verify Requirements
  - ✔ Characteristics of Requirements and Designs Quality
  - ✔ Verification Activities
  - ✔ Checklists
- Validate Requirements
  - ✔ Identify Assumptions
  - ✔ Define Measurable Evaluation Criteria
  - ✔ Evaluate Alignment with Solution Scope
- Define Requirements Architecture
- **Define Design Options**
  - ✔ Define Solution Approaches
  - ✔ Identify Improvement Opportunities
  - ✔ Requirements Allocation
  - ✔ Describe Design Options
- Analyze Potential Value and Recommend Solution
  - ✔ Expected Benefits
  - ✔ Expected Costs
  - ✔ Determine Value
  - ✔ **Assess Design Options and Recommend Solution**

Solution Evaluation

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- Assess Solution Limitations
  - ✔ Identify Internal Solution Component Dependencies
  - ✔ Investigate Solution Problems
  - ✔ Impact Assessment
- Assess Enterprise Limitations
- Recommend Actions to Increase Solution Value

4. Non-functional requirements

Characteristics

- No clear distinction between functional and non-functional requirements.
- Depends on:
  - Level of details described
  - Comprehension of the domain or the system
  - Experiences of the people involved (BA, SA, Designer, Dev, etc.)

⇒ Elicit and Analyze together with functional requirements.

Characteristics

- Example:
  - The system must be protected from unauthorized access.
  - There is a need for a secured authentication and authorization to control the user access. User must be identified using username and password in order to access the system.

Types

The ‘IEEE-Std 830 - 1993’ lists 13 non-functional requirements to be included in a Software Requirements Document.

- Performance requirements
- Interface requirements
- Operational requirements
- Resource requirements
- Verification requirements
- Acceptance requirements
- Documentation requirements
- Security requirements
- Portability requirements
- Quality requirements
- Reliability requirements
- Maintainability requirements
- Safety requirements

Gather and document non-functional requirements

- Functional and non-functional requirements can be gathered at the same time, in the same meetings.
- SA should involve in:
  - Elicit & Analyze Requirements
  - Write SRS (non-functional requirements).

Elicit & Analyze Requirements - Issues

- Issues of scope
  - The boundary of the system is ill-defined
  - The customers/users specify unnecessary technical detail that may confuse overall system objectives
- Issues of understanding
  - Issues of customer
  - Issues of development team

Elicit & Analyze Requirements - Issues

- Issues of understanding (cont)
  - Omit information that is believed to be “obvious”
  - Specify requirements that conflict with the needs of other customers/users
  - Specify requirements that are ambiguous or un-testable.
- Issues of volatility
  - The requirements change over time

Issues with Natural Language

- Language barrier
  - Foreign language
  - Writing skills
  - The language's own ambiguity. Because it is natural language.
- Weak words
- Unbounded lists
  - The management roles such as Administrator, Account Manager, etc. can access all data in the system.
- Implicit Collections
  - The system must support Android devices.
- Ambiguity
  - The screen must be loaded very fast.
  - The list must be displayed consistently to users.

Techniques

- Goal-based derivation: 3 step approach.
  - Identify the enterprise goal
  - Decompose of the goal into sub-goals
  - Identify non-functional requirements.

Techniques

- Elicitation Techniques
  - Researching application domain
  - Interviewing and questionnaires
  - Workshop and brainstorming
  - Storyboarding and role playing
  - Observation
  - Use cases
- Analyzing Techniques
  - System modeling
  - Rapid Prototyping

Techniques

- Testable NFRs: use measurable metrics

Property	Metric
Performance	1. Processed transactions per second 2. Response time to user input
Reliability	1. Rate of occurrence of failure 2. Mean time to failure
Availability	Probability of failure on demand
Size	Kbytes, Mbytes
Usability	1. Time taken to learn the software 2. Number of errors made by user
Robustness	Time to restart the system after failure
Portability	Number of target systems

Techniques

Questions

- User interface and human factors
  - What type of user will be using the system?
  - Is it particularly important that users be protected from making errors?
  - What sort of input/output devices for the human interface are available, and what are their characteristics?

- Error handling and extreme conditions
  - How should the system respond to input errors?
  - How should the system respond to extreme conditions?

Techniques

Questions

- Resources and Management Issues
  - How often will the system be backed up?
  - Who will be responsible for the back up?
  - Who is responsible for system installation?
  - Who will be responsible for system maintenance?

Develop SRS

- Benefit of good document
  - Basis for agreement between the customers and the team on what the software product is to do.
  - Reduce the development effort.
  - Provide a basis for estimating costs, schedules.
  - Provide a baseline for validation and verification.
  - Facilitate transfer.
  - Serve as a basis for enhancement

Develop SRS – Techniques

- Specify requirements using **structured natural language** (forms, tables, etc.)
- **Functional requirements** can be specified using modeling - a combination of graphical notations and structured natural language
  - Use cases
  - Use case diagrams
  - Use case specifications
- **Non-functional requirements** can't be modeled => specified using structured natural language only

Requirement Elicitation & Collaboration / Use Case Exploration

1. Finding your customer's pain point.
2. Earning their trust.
3. Solving the pain point for them.
4. Prepare & Conduct
    a. Techniques
    b. Collaboration
5. Confirm & Communicate
6. Stakeholder
7. Commitment


Q&A


Thank
you


Teamwork
Trust
Inspiration
Share
COLLABORATION
Exchange
Success
Support
Assist


GROWTH
TEAMWORK
SUCCESS
HELP!
PARTNER

Practice – Write NFRs

Write Natural Language NFRs

- Divide the class into small groups
- Each group selects a product (car, house, etc.)
- Each group write 2 to 3 non-functional requirements about producing the product.
- For example: produce a new car.

→ The car must be reliable.

- Share with class and discuss whether each requirement is testable.