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I Don't Need Requirements – I Know What I'm Doing!

Usability as a Critical Human Factor in Requirements Management

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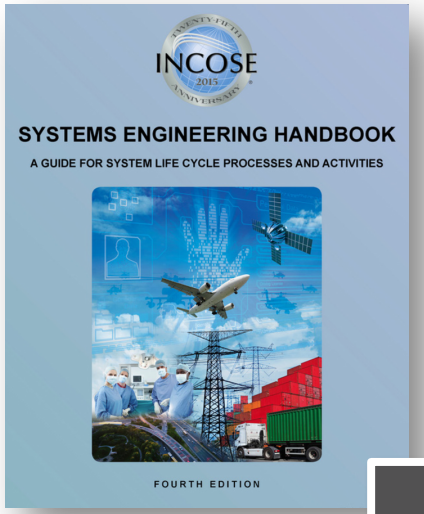
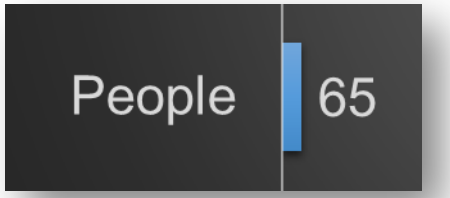
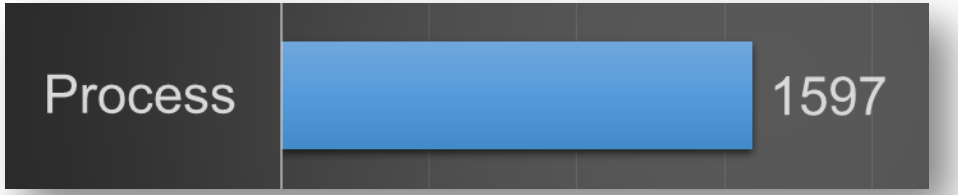
INTRODUCTION

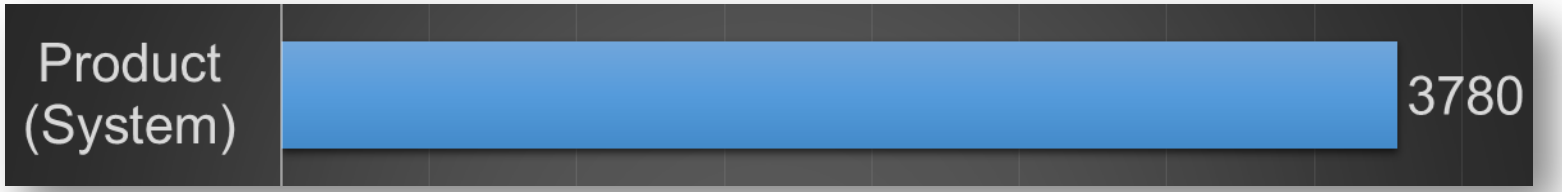
INCOSE ON HUMAN FACTORS



KEYWORD SEARCH HITS



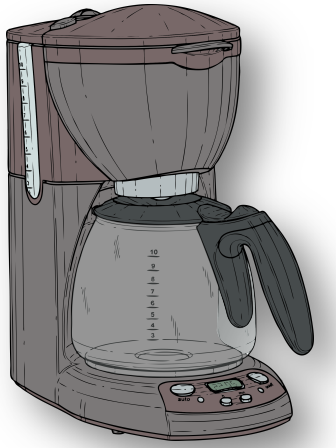




SYSTEMS ENGINEERS LOVE SYSTEMS & PROCESSES …

INTRODUCTION

DO YOU ALWAYS READ THE INSTRUCTIONS?



YOU HAVE DONE THIS BEFORE?
YOU KNOW WHAT YOU ARE DOING?
YOU DON'T NEED THE USER MANUAL?

INTRODUCTION

… THEN YOU ARE NOT ALONE

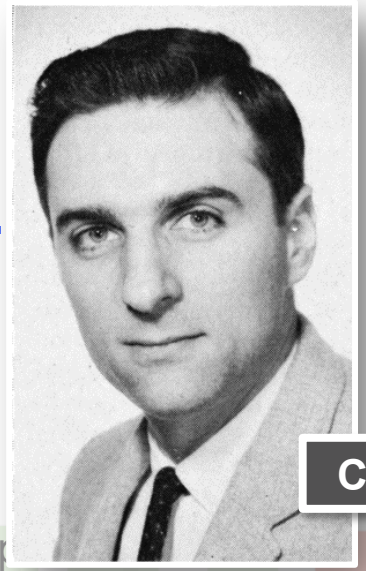
INTRODUCTION

WHY PEOPLE DON'T READ INSTRUCTIONS

- We Don't Have Time
- We Are Lazy
- We Already Know Everything
- We Aren't Too Bright
- We Think Common Sense is Enough
- We Would Rather Call a Help Line
- Instructions Are Poorly Written

CONVENIENCE

SOME PEOPLE WILL NEVER BECOME A SYSTEMS ENGINEER



CONWAY'S LAW

Source: http://www.abcsignup.com/blog/why-people-dont-read-instructions

Introduction

Consumer Behavior Theory

The consumer behavior theory suggests that …
if (requirements specifications) **consumption is made too difficult,**
then consumers will want to move on to things they actually find satisfying
(e.g. design, implementation, testing).

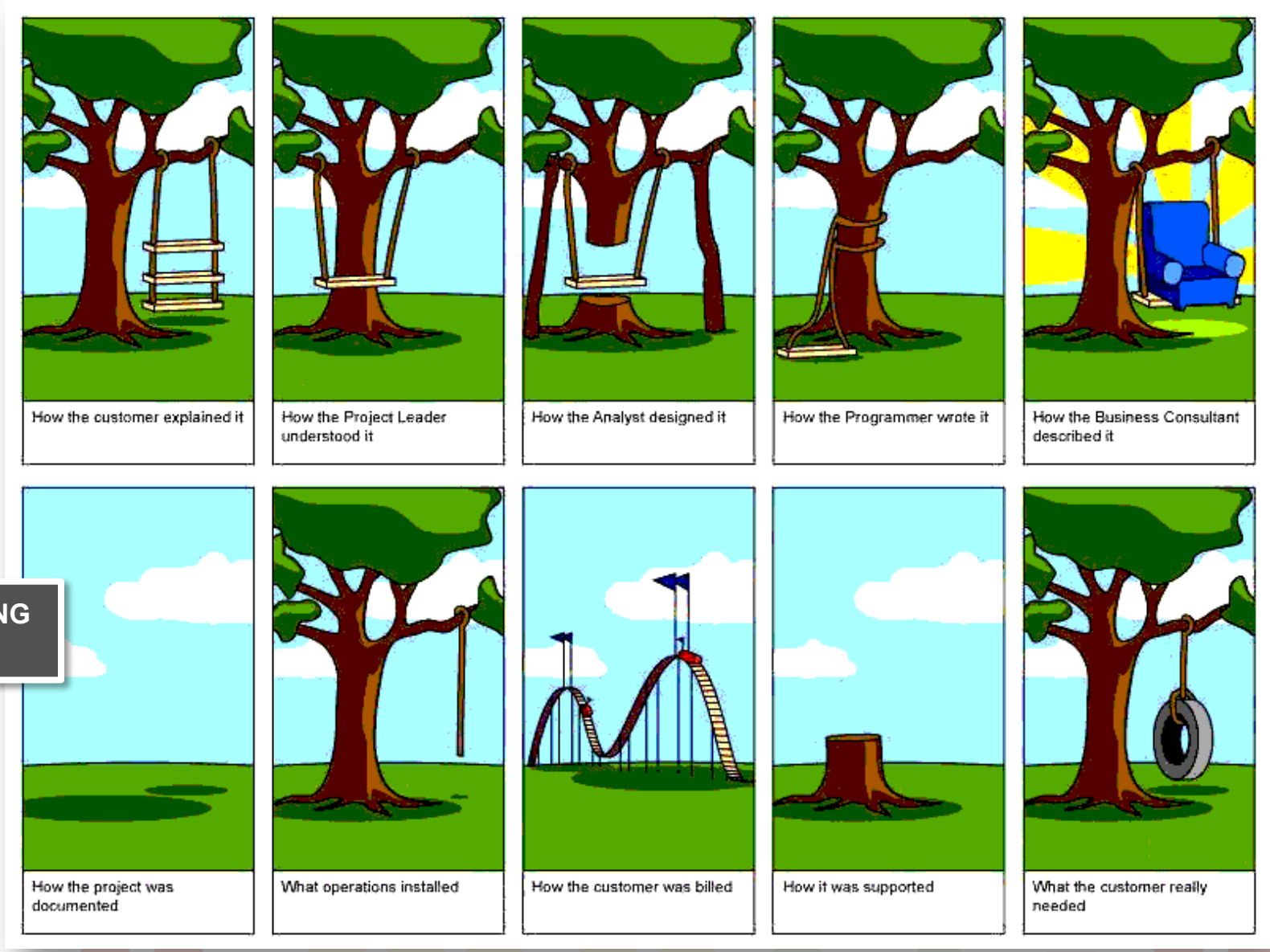
By providing requirements specifications that **are not readily usable**
to consumers, an **additional processing burden** is placed on them,
and consumers might succumb to the **temptation to**
cut the requirements analysis phase short.

Considering human factors, this may result in requirements consumers to move on,
stating: "**I have done this before. I don't need requirements. I know what I'm doing!**".

AGENDA

- **Problem Description**
- Objectives
- Offered Solution
- Practical Example
- Other Applications
- Summary

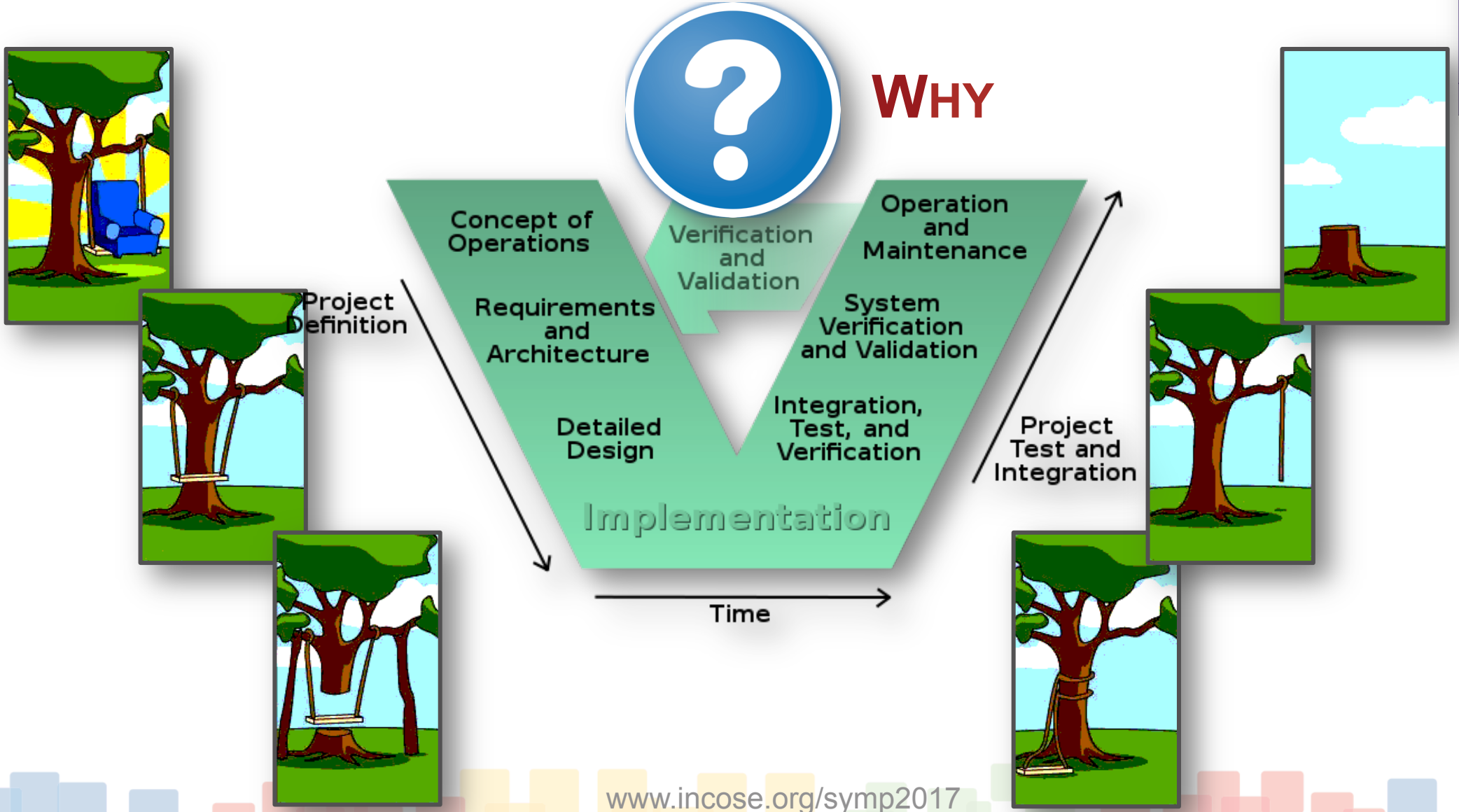
PROBLEM DESCRIPTION



ENGINEERING FAILURE

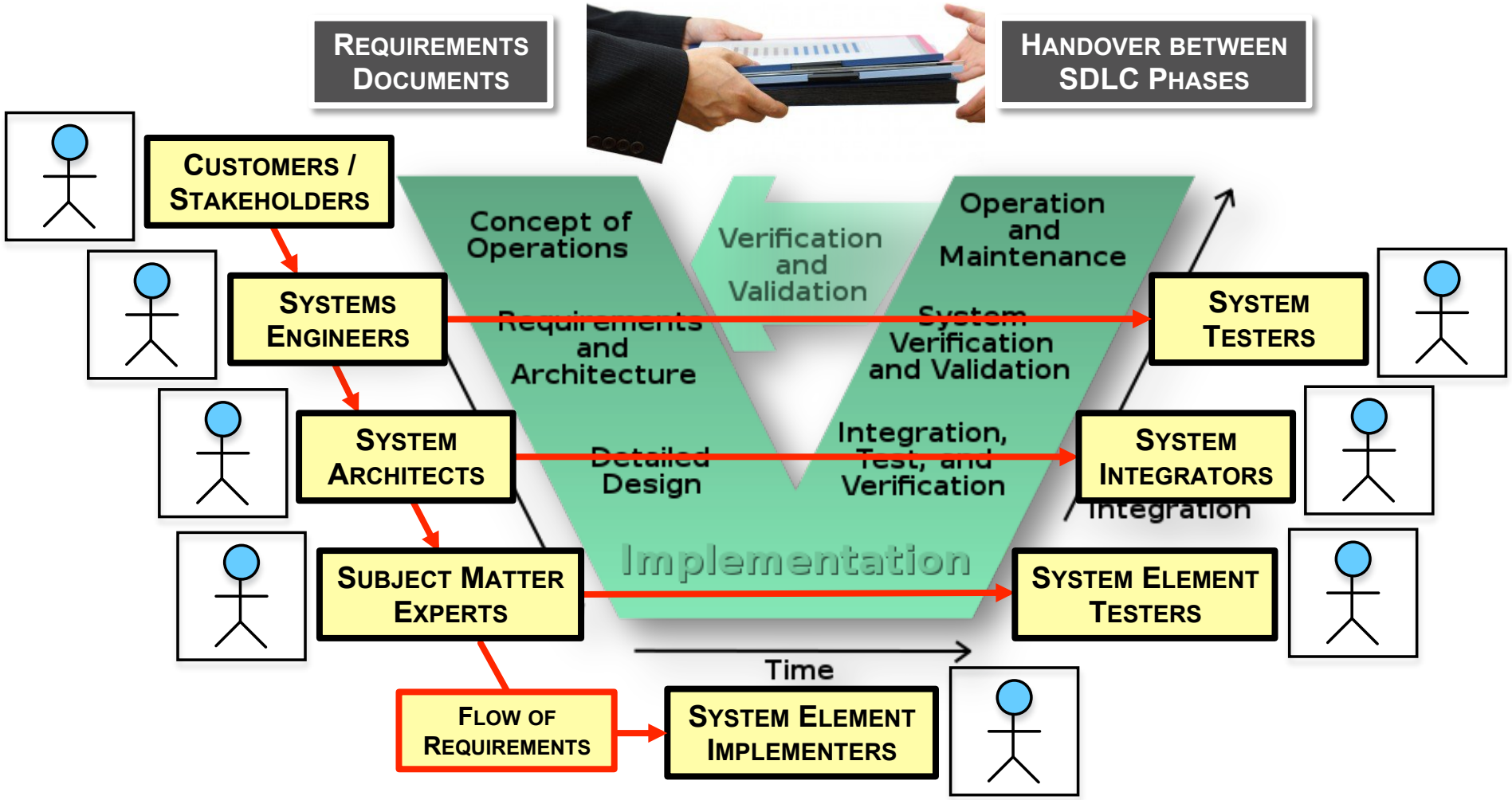
Problem Description

Application to Systems Development Life Cycle



Problem Description

Work Is Performed By Human Beings



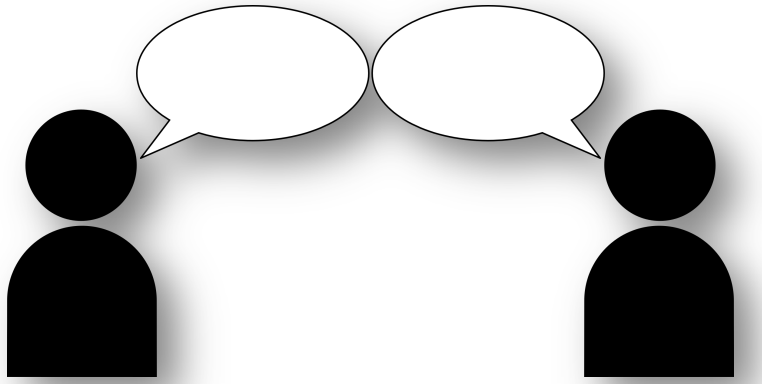
Challenge: Effective Communication

Requirements Documents Serve As a Form of Communication

Requirements Documents

Handover between SDLC Phases

Communication

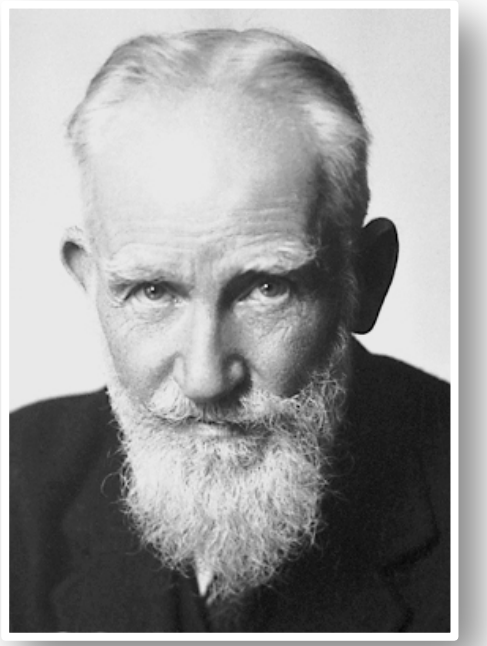


"I know that you believe you understand what you think I said,
but I'm not sure you realize that what you heard is not what I meant."
- Robert McCloskey

CHALLENGE: EFFECTIVE COMMUNICATION

EFFECTIVE COMMUNICATION IS THE MOST CRUCIAL SUCCESS FACTOR

"… THE MOST CRUCIAL SUCCESS FACTOR IN PROJECT MANAGEMENT IS EFFECTIVE COMMUNICATIONS TO ALL STAKEHOLDERS"



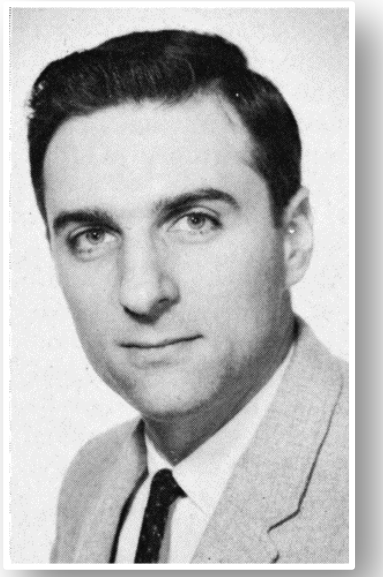
"THE SINGLE BIGGEST PROBLEM IN COMMUNICATION IS THE ILLUSION THAT IT HAS TAKEN PLACE"

- GEORGE BERNARD SHAW

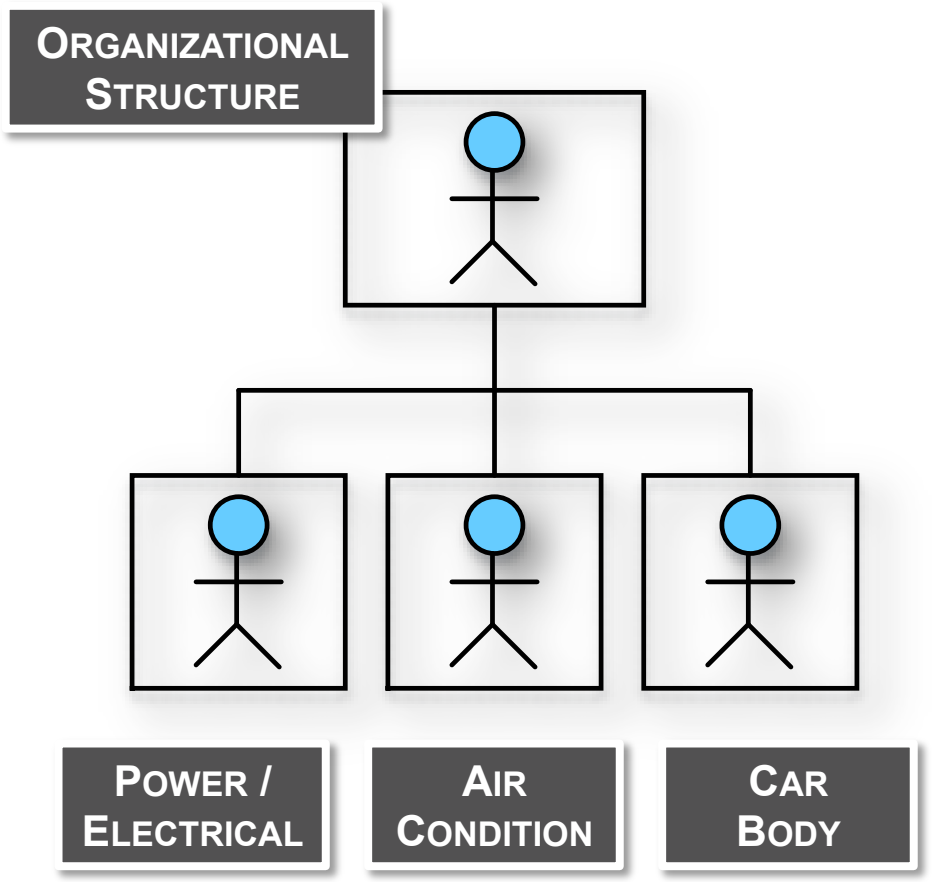
Source: https://en.wikiquote.org/wiki/George_Bernard_Shaw

Challenge: Communication Structures

Conway's Law



"Organizations which design systems ...
are constrained to produce designs
which are copies of the communication structures
of these organizations"
- M. Conway



CHALLENGE: COMMUNICATION STRUCTURES

CONWAY'S LAW (CONT'D)

Source: http://i81.photobucket.com/albums/j236/dimitri_the_pirate/RedneckCarAirConditioner.jpg

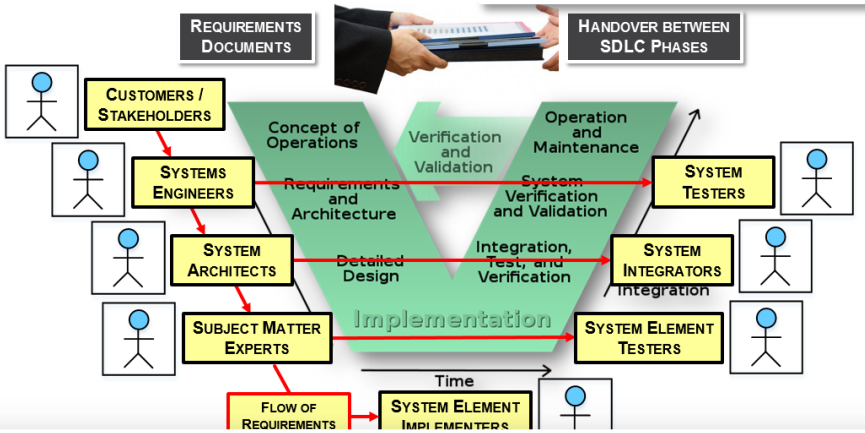
"ORGANIZATIONS WHICH DESIGN SYSTEMS ... ARE CONSTRAINED TO PRODUCE ~~*DESIGNS*~~ ***REQUIREMENTS DOCUMENTS*** WHICH ARE COPIES OF THE COMMUNICATION STRUCTURES OF THESE ORGANIZATIONS"

Problem Description: Brief Recap

Problem Description

Work Is Performed By Human Beings

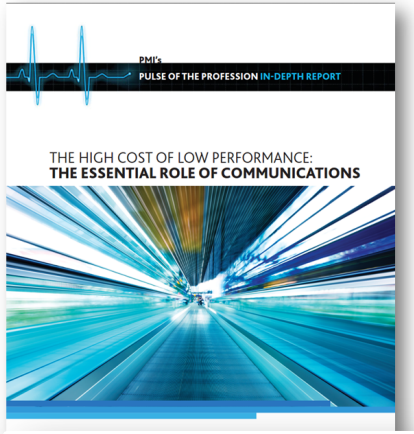
Project Work Is Performed by Human Beings Communicating with Each Other



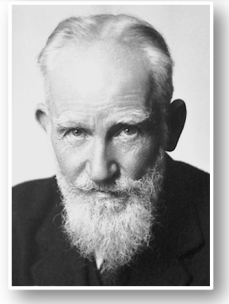
Challenge: Effective Co

Effective Communication Is The Most C

Effective Communication Is The Most Crucial Project Success Factor



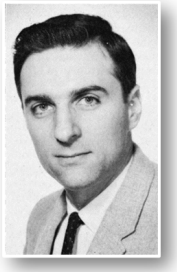
"… the most crucial success factor in project management is effective communications to all stakeholders"



"The single biggest problem in communication is the illusion that it has taken place"

Challenge: Communication Structures

Conway's Law



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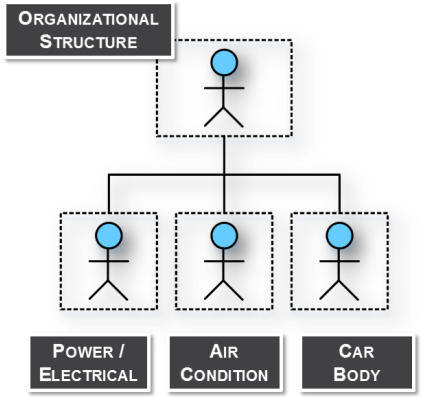

Effective Communication is Constrained by Organizational Structures

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Considering human factors, this may result in requirements consumers to move on
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Human Factors: If Tasks Are Made too Difficult for People, They Will Try To Avoid Them

PROGRESS

- Problem Description
- **Objectives**
- Offered Solution
- Practical Example
- Other Applications
- Summary

OBJECTIVES

CONSIDER THE HUMAN ASPECT

"EASY" TO USE

INTRODUCTION

WHY PEOPLE DON'T READ INSTRUCTIONS

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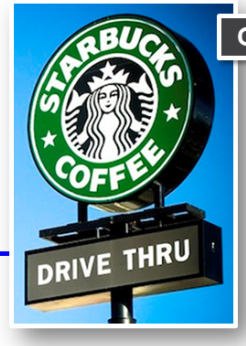
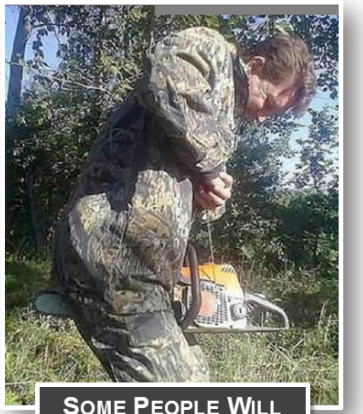
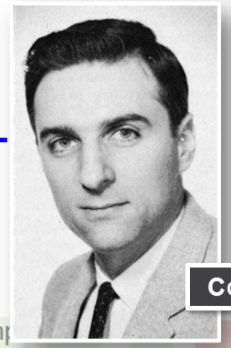


CONVENIENCE



SOME PEOPLE WILL NEVER BECOME A SYSTEMS ENGINEER



CONWAY'S LAW

Source: http://www.abcsignup.com/blog/why-people-dont-read-instructions

www.incose.org/symp 5

CONVENIENCE:

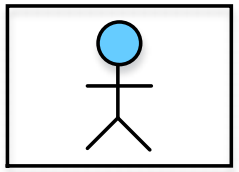
"THE STATE OF BEING ABLE TO PROCEED WITH SOMETHING WITH LITTLE EFFORT OF DIFFICULTY"

USABILITY (ISO 9241-11):

"THE EXTEND TO WHICH A PRODUCT CAN BE USED BY SPECIFIED USERS TO ACHIEVE SPECIFIED GOALS WITH EFFECTIVENESS, EFFICIENCY AND SATISFACTION IN A SPECIFIED CONTEXT OF USE"

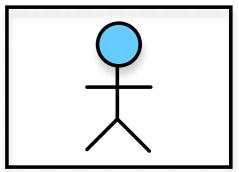
OBJECTIVES

CONSIDER CONWAY'S LAW

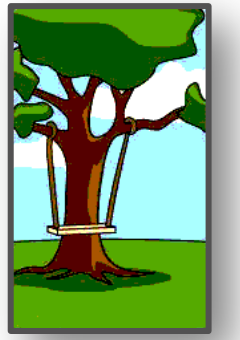


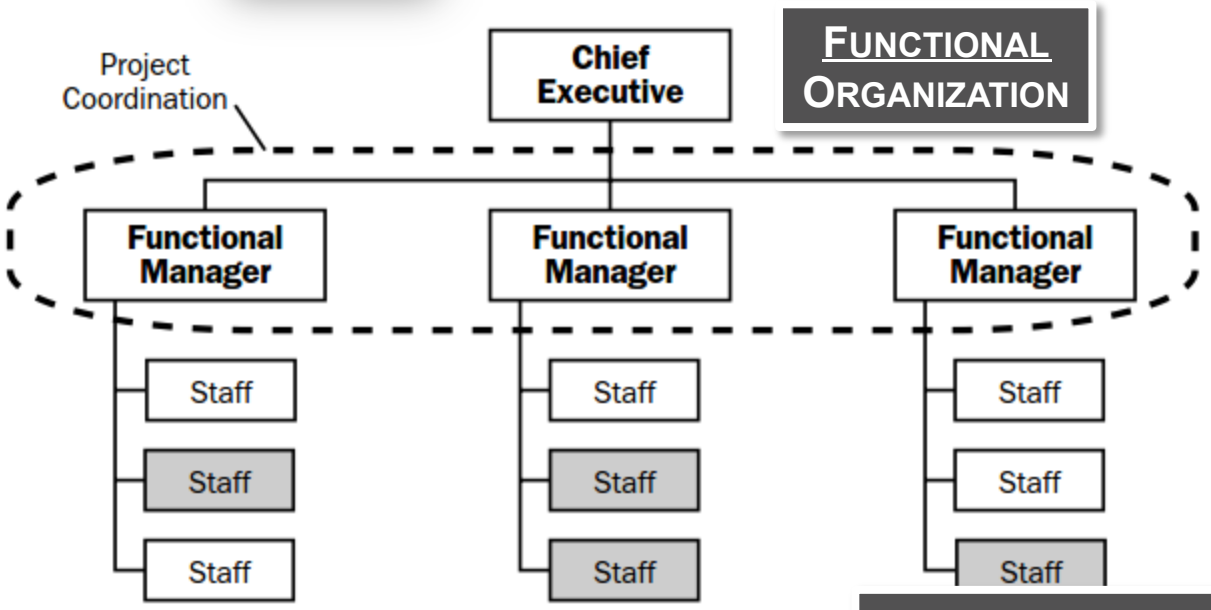
ACQUIRER

RFP



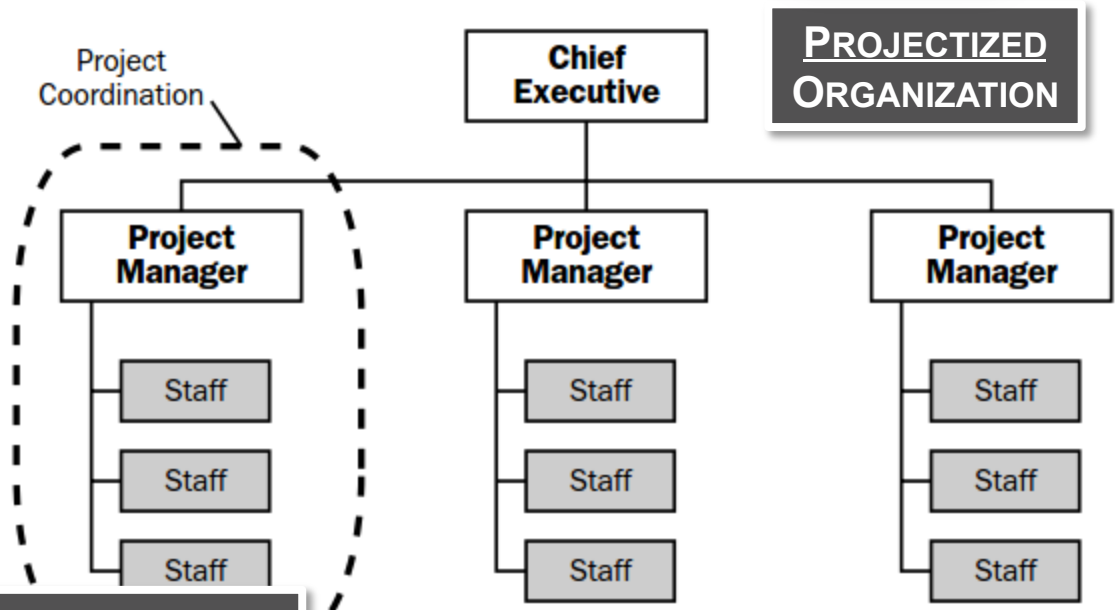
SUPPLIER





FUNCTIONAL ORGANIZATION

(Gray boxes represent staff engaged in project activi



PROJECTIZED ORGANIZATION

y boxes represent staff engaged in project activities)

OBJECTIVE: EFFECTIVE COMMUNICATION BETWEEN DIFFERENT ORGANIZATIONAL STRUCTURES

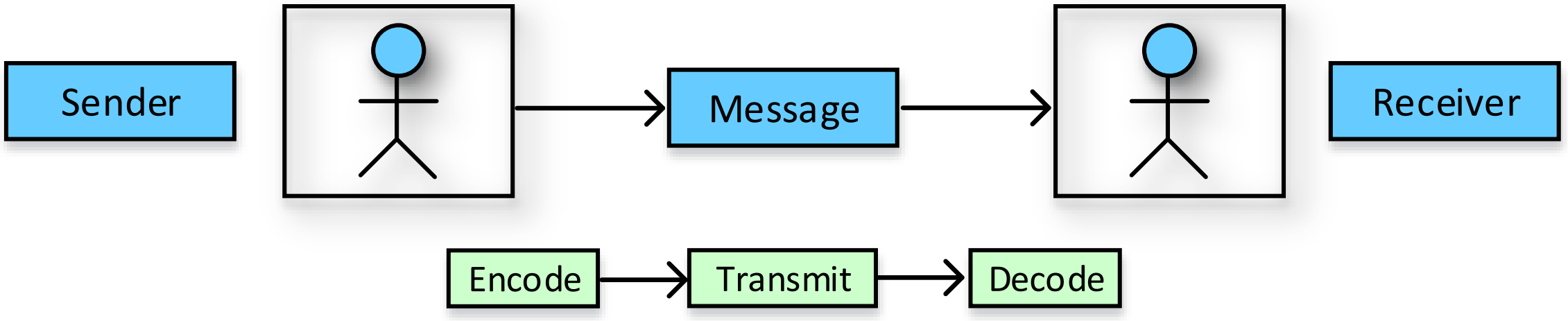
Source: Project Management Institute. 2013. *A Guide to the Project Mana*
Body of Knowledge (PMBOK® Guide). Fifth Edition. Figures 2-1 and 2-5

PROGRESS

- Problem Description
- Objectives
- **Offered Solution**
- Practical Example
- Other Applications
- Summary

Offered Solution

Principles of Communication

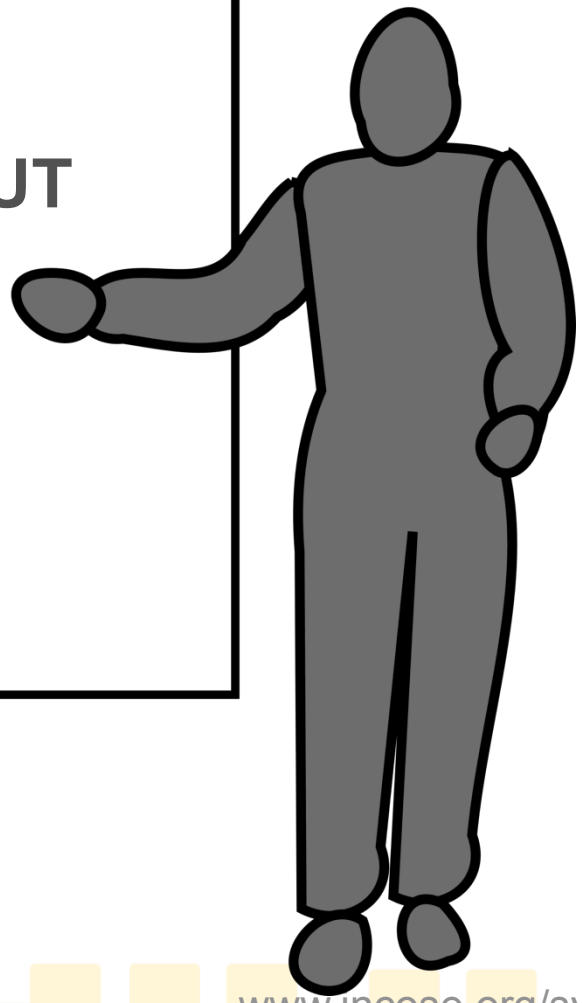


The Sender is responsible to ensure that the Receiver understands the Message

Offered Solution

Good Communication (Presentation) Skills

It is all about
YOUR
Audience

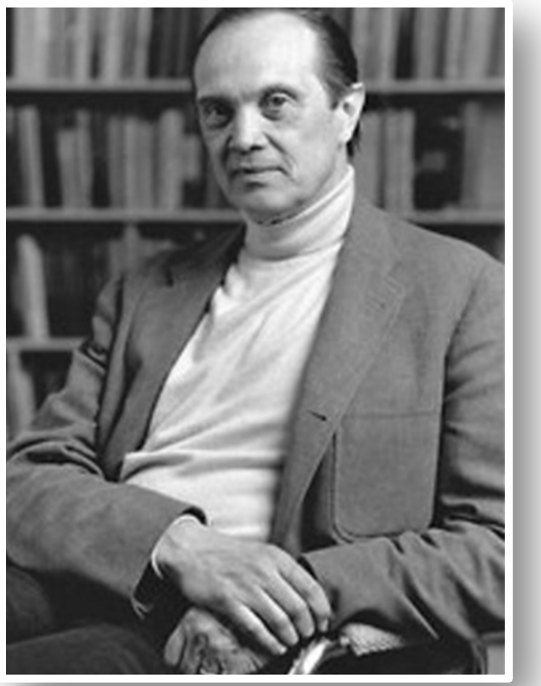


As the Sender, Tailor Your Message to Your Audience (Receiver)

Offered Solution

Basic Principles of Effective Communication

- **Define What**
  - Expected Outcome / Deliverables
- **Define Who**
  - Allocate Responsibility / Accountability
- **Define When**
  - Specify the Due Date / Milestone
- **Define How (if desired)**
  - Define Activities, Constraints, etc.
- **Structure It**
  - Groups Requirements by Receiver
  - Consider the Magical Number 7 ± 2



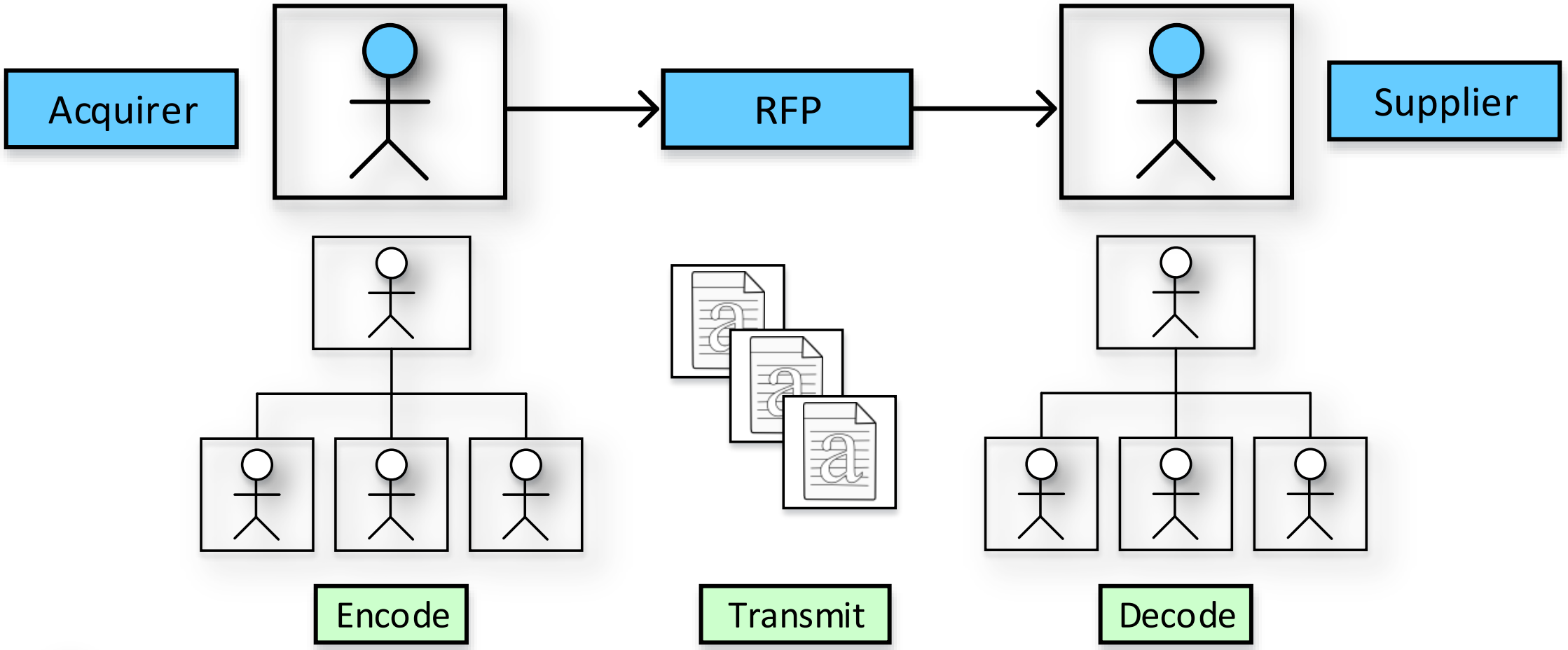
"The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information"

- George A. Miller

Source:
https://en.wikipedia.org/wiki/The_Magical_Number_Seven,_Plus_or_Minus_Two

Offered Solution

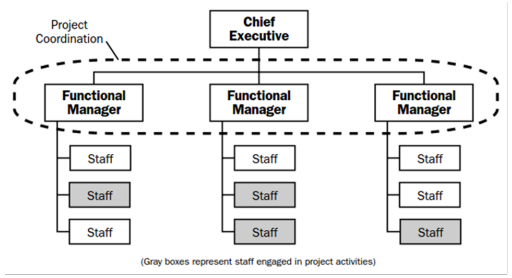
Example: Request For Proposal (RFP)

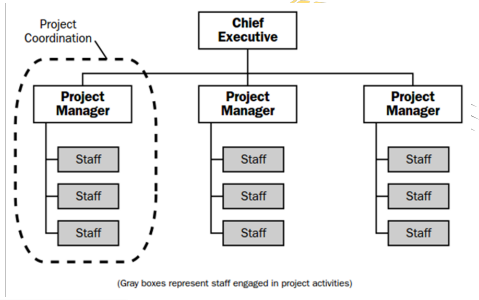


The Acquirer is responsible to ensure that the Supplier understands the RFP

OFFERED SOLUTION

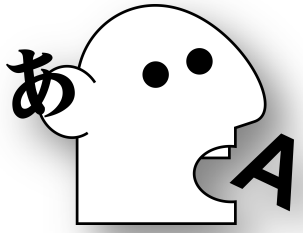
EXAMPLE: REQUEST FOR PROPOSAL (CONT'D)





FUNCTIONAL ORGANIZATION

PROJECTIZED ORGANIZATION



"TRANSLATE"

Requirement #1

Requirement #2

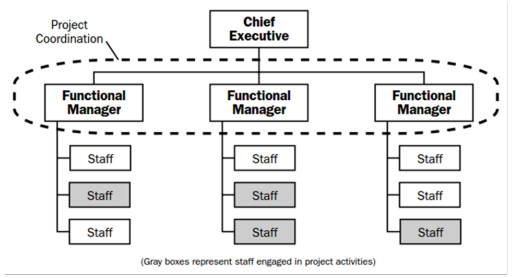
Requirement #n

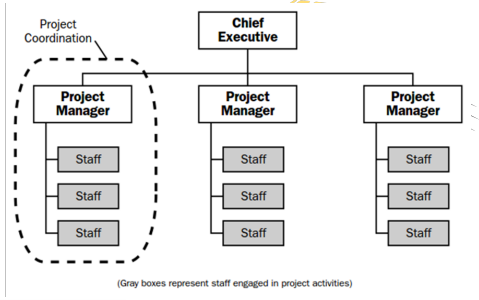
WHAT DOES IT MEAN TO ME?

WHAT DOES IT MEAN TO YOU?

OFFERED SOLUTION

EXAMPLE: REQUEST FOR PROPOSAL (CONT'D)



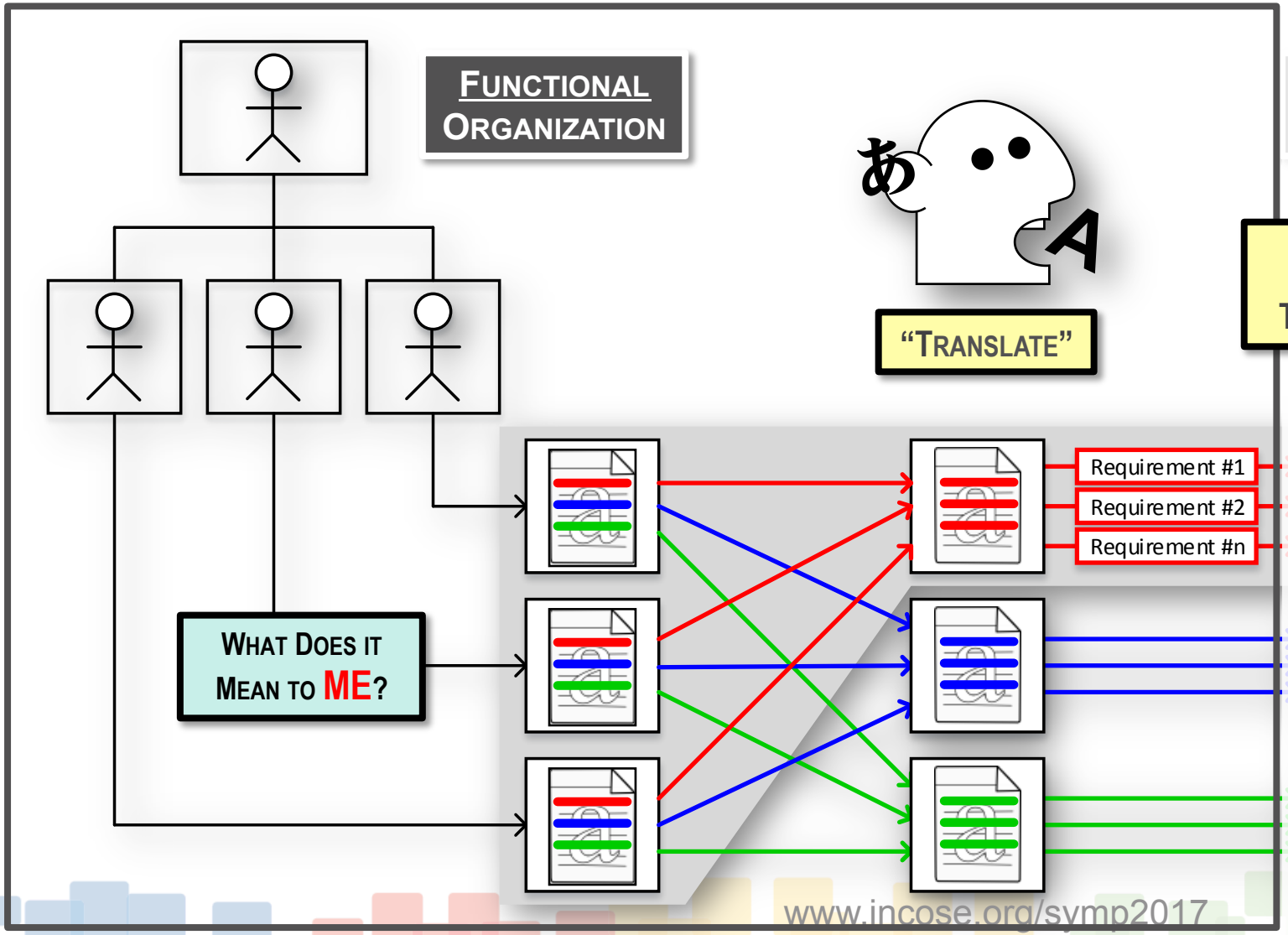


FUNCTIONAL ORGANIZATION

"TRANSLATE"

PROJECTIZED ORGANIZATION

THE ACQUIRER IS RESPONSIBLE TO ENSURE THAT THE SUPPLIER UNDERSTANDS THE RFP



WHAT DOES IT MEAN TO YOU?

Offered Solution

Translating (Encoding) the Requirements Specification Message

Acquirer

Supplier

1.0 SENDER 1

1.1 TOPIC 1
- Requirement 1
- Requirement 2
- Requirement n

1.2 TOPIC 2
- Requirement 1
- Requirement 2
- Requirement n

1.3 TOPIC N
- Requirement 1
- Requirement 2
- Requirement n

WHO

1.0 RECEIVER 1

1.1 SENDER 1 REQUIREMENTS

1.1.1 Deliverables

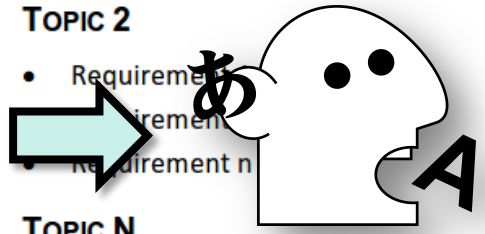
WHAT

HOW
- Requirement 1
- Requirement 2
- Requirement n

1.1.2 Due Dates

WHEN
- Deliverable 1
- Deliverable 2
- Deliverable n

WHAT DOES IT MEAN TO ME?



"TRANSLATE"

WHAT DOES IT MEAN TO YOU?

1.2 SENDER 2 REQUIREMENTS

1.3 SENDER 3 REQUIREMENTS

2.0 SENDER 2

2.1 TOPIC 1

2.2 TOPIC 2

2.3 TOPIC N

2.0 RECEIVER 2

2.1 SENDER 1 REQUIREMENTS

2.2 SENDER 2 REQUIREMENTS

2.3 SENDER 3 REQUIREMENTS

Structure

3.0 SENDER N

3.1 TOPIC 1

3.2 TOPIC 2

3.3 TOPIC N

3.0 RECEIVER N

3.1 SENDER 1 REQUIREMENTS

3.2 SENDER 2 REQUIREMENTS

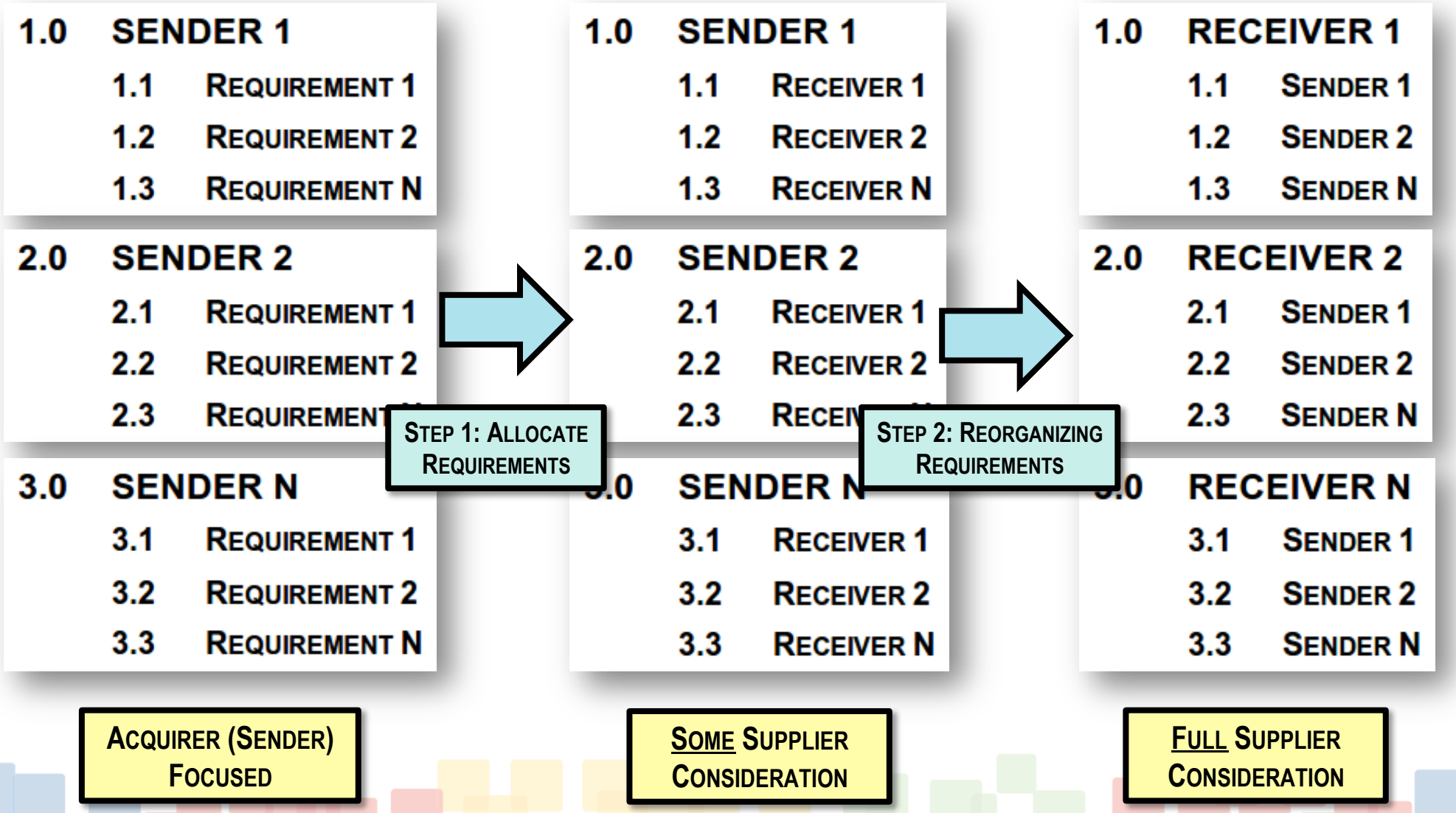
3.3 SENDER 3 REQUIREMENTS

SENDER FOCUSED REQUIREMENTS

RECEIVER FOCUSED REQUIREMENTS

Offered Solution

Two Step Process



PROGRESS

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- **Practical Example**
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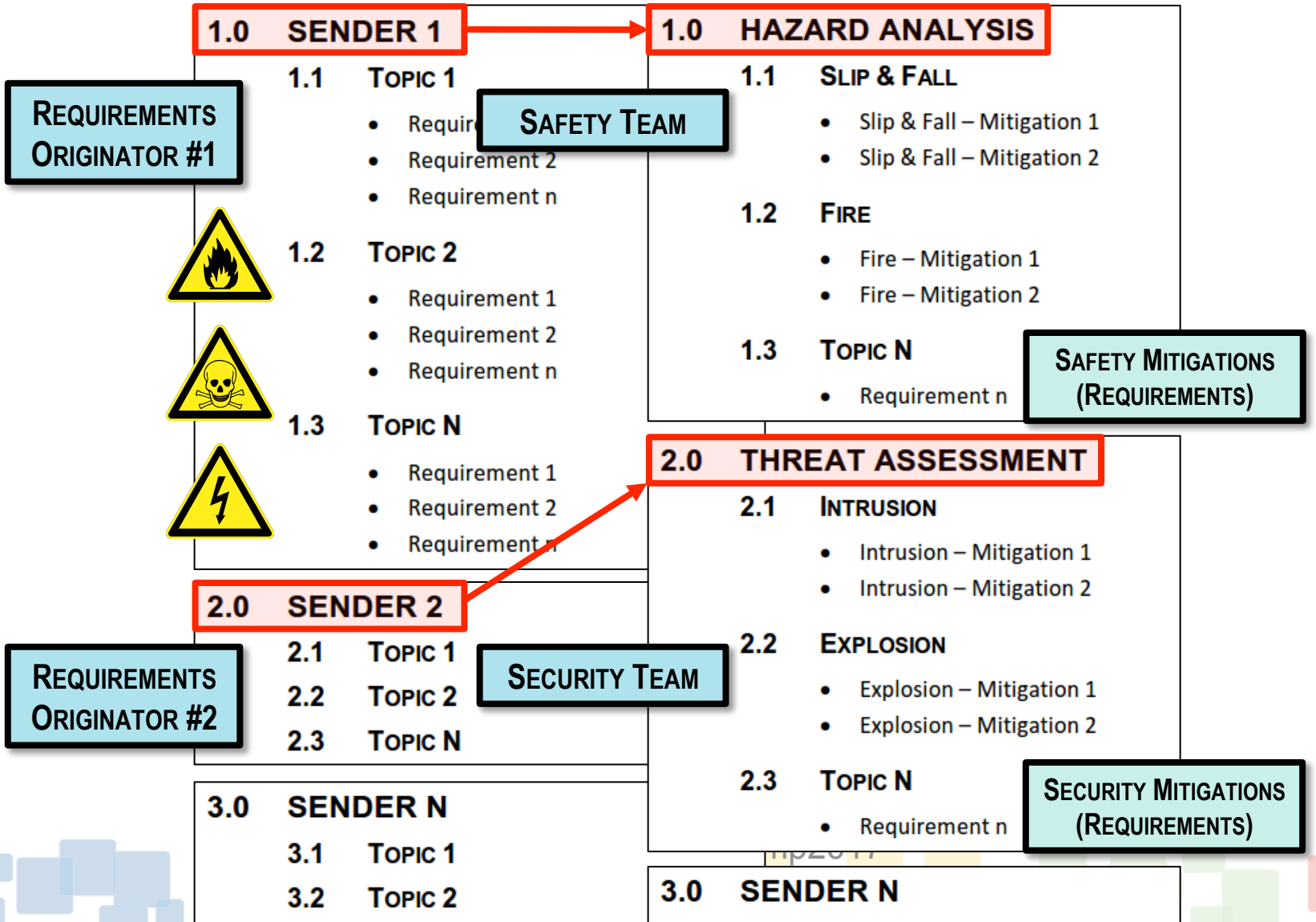
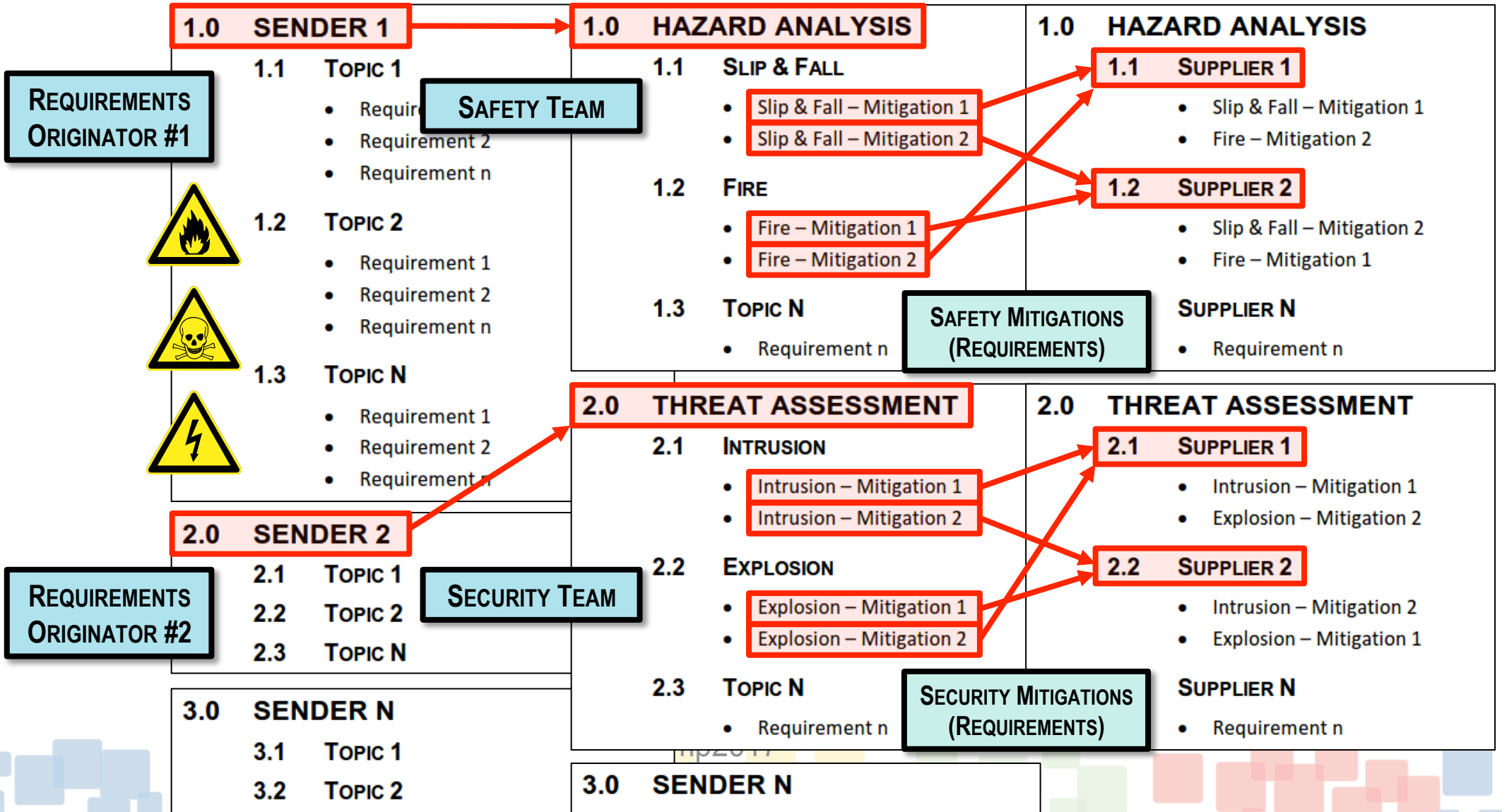
PRACTICAL EXAMPLE

STAKEHOLDER REQUIREMENTS: SAFETY & SECURITY TEAMS



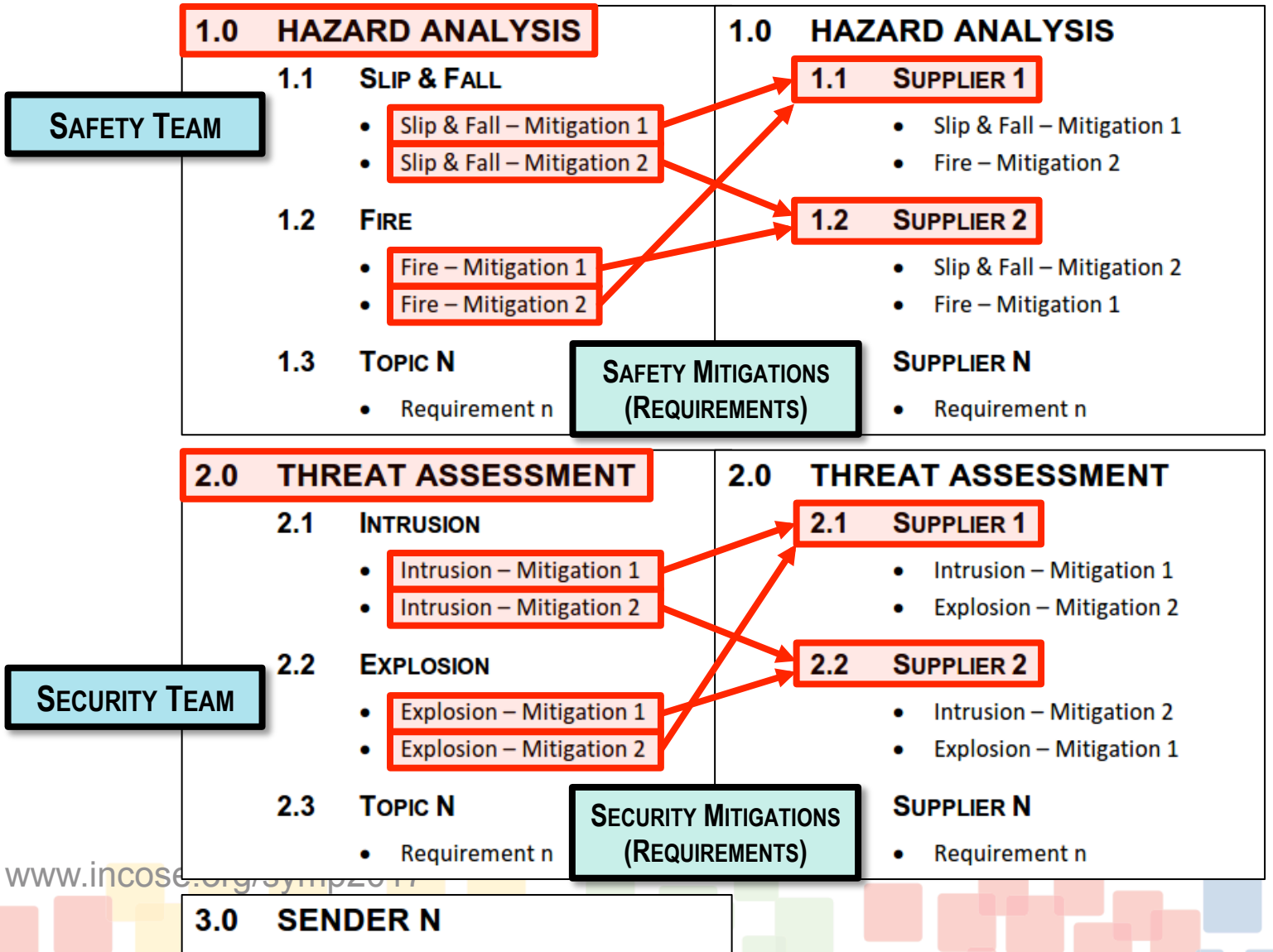
Practical Example

Step 1: [Analysis &] Allocation of Requirements



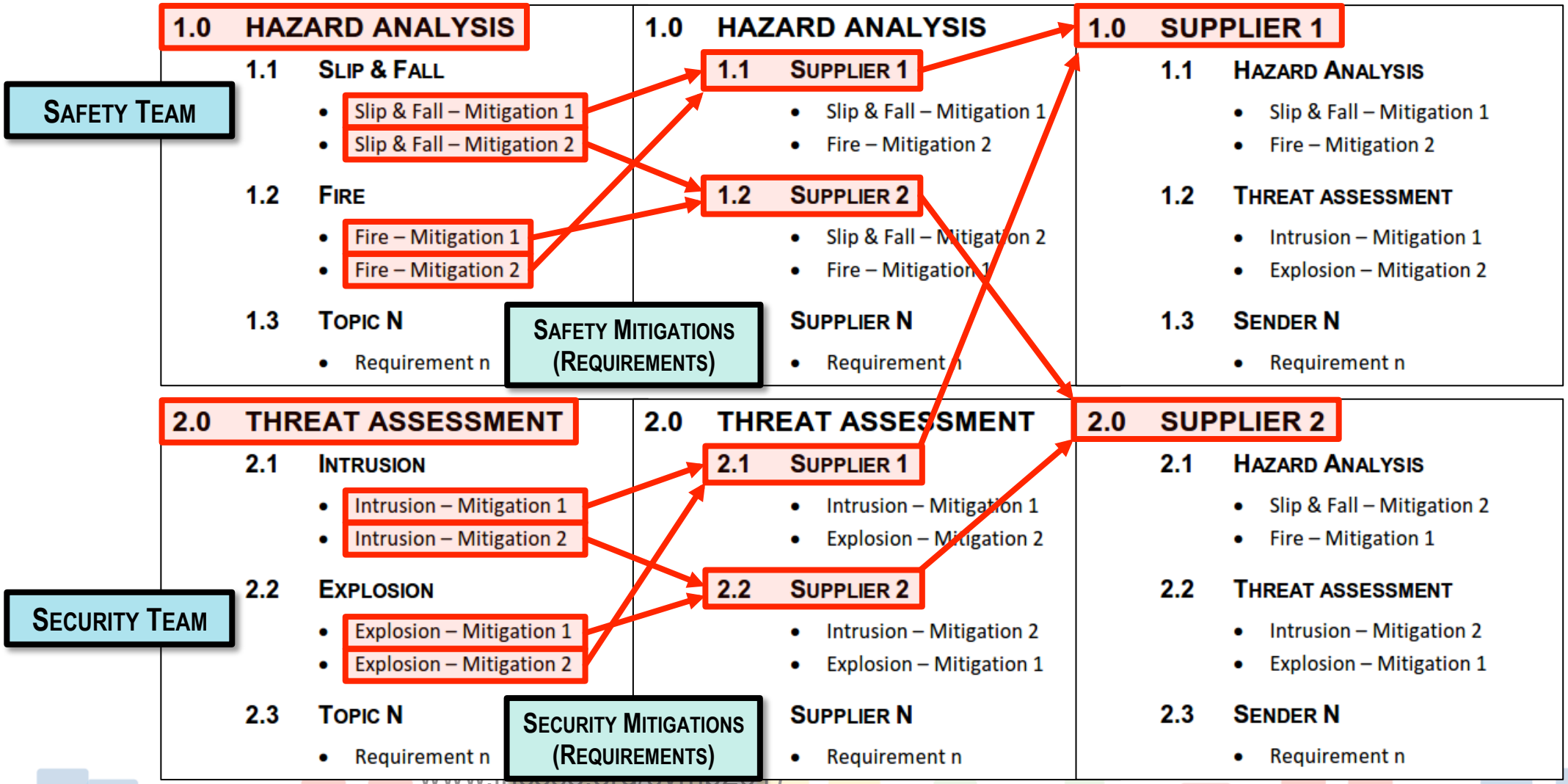
PRACTICAL EXAMPLE

STEP 2: REORGANIZING OF REQUIREMENTS



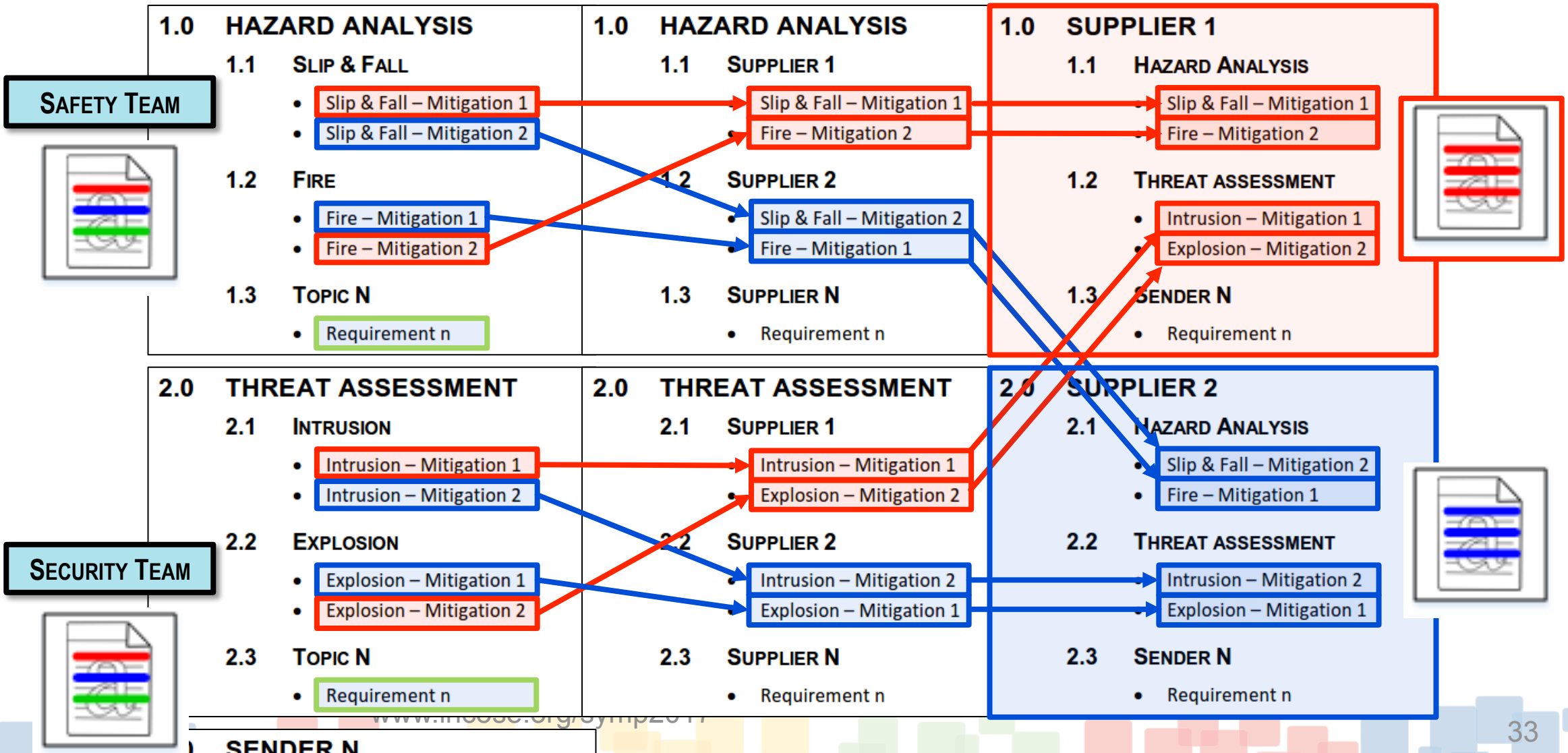
Practical Example

Step 2: Reorganizing of Requirements



Practical Example

Flow of Requirements



Safety Team

1.0 HAZARD ANALYSIS

1.1 SLIP & FALL
- Slip & Fall – Mitigation 1
- Slip & Fall – Mitigation 2

1.2 FIRE
- Fire – Mitigation 1
- Fire – Mitigation 2

1.3 TOPIC N
- Requirement n

.0 HAZARD ANALYSIS

1.1 SUPPLIER 1
- Slip & Fall – Mitigation 1
- Fire – Mitigation 2

1.2 SUPPLIER 2
- Slip & Fall – Mitigation 2
- Fire – Mitigation 1

1.3 SUPPLIER N
- Requirement n

1.0 SUPPLIER 1

1.1 HAZARD ANALYSIS
- Slip & Fall – Mitigation 1
- Fire – Mitigation 2

1.2 THREAT ASSESSMENT
- Intrusion – Mitigation 1
- Explosion – Mitigation 2

1.3 OPERATIONAL REQUIREMENTS
- Operational Requirement 1
- Operational Requirement 3

1.4 SENDER N
- Requirement n

Security Team

2.0 THREAT ASSESSMENT

2.1 INTRUSION
- Intrusion – Mitigation 1
- Intrusion – Mitigation 2

2.2 EXPLOSION
- Explosion – Mitigation 1
- Explosion – Mitigation 2

2.3 TOPIC N
- Requirement n

.0 THREAT ASSESSMENT

2.1 SUPPLIER 1
- Intrusion – Mitigation 1
- Explosion – Mitigation 2

2.2 SUPPLIER 2
- Intrusion – Mitigation 2
- Explosion – Mitigation 1

2.3 SUPPLIER N
- Requirement n

2.0 SUPPLIER 2

2.1 HAZARD ANALYSIS
- Slip & Fall – Mitigation 2
- Fire – Mitigation 1

2.2 THREAT ASSESSMENT
- Intrusion – Mitigation 2
- Explosion – Mitigation 1

2.3 OPERATIONAL REQUIREMENTS
- Operational Requirement 2
- Operational Requirement 4

2.4 SENDER N
- Requirement n

Operations

3.0 OPERATIONAL REQ.

3.1 STAKEHOLDER 1
- Operational Requirement 1
- Operational Requirement 2

3.2 STAKEHOLDER 2
- Operational Requirement 3
- Operational Requirement 4

.0 OPERATIONAL REQ.

3.1 SUPPLIER 1
- Operational Requirement 1
- Operational Requirement 3

3.2 SUPPLIER 2
- Operational Requirement 2
- Operational Requirement 4

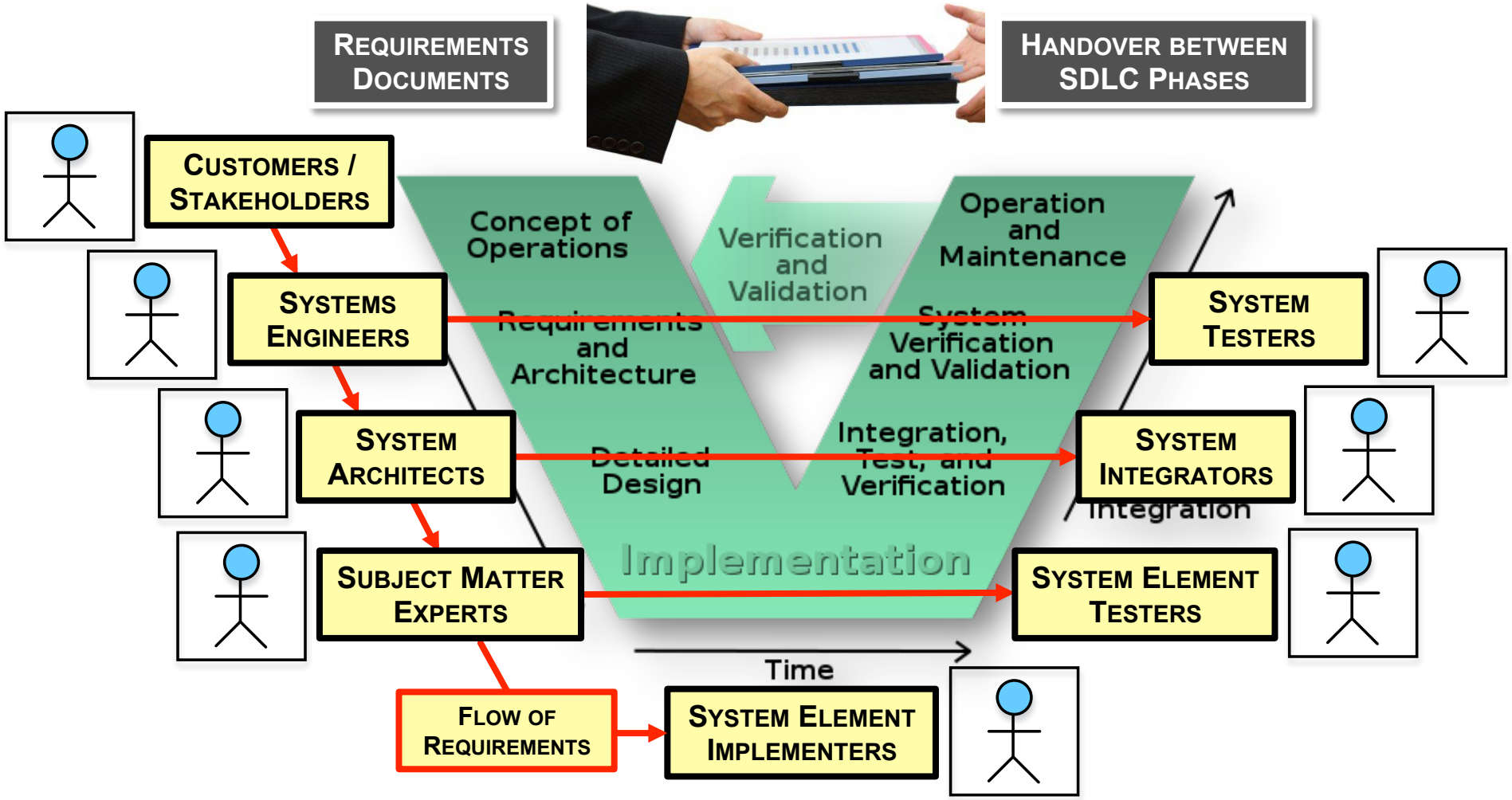
PRACTICAL EXAMPLE
ADDITIONAL REQUIREMENTS

PROGRESS

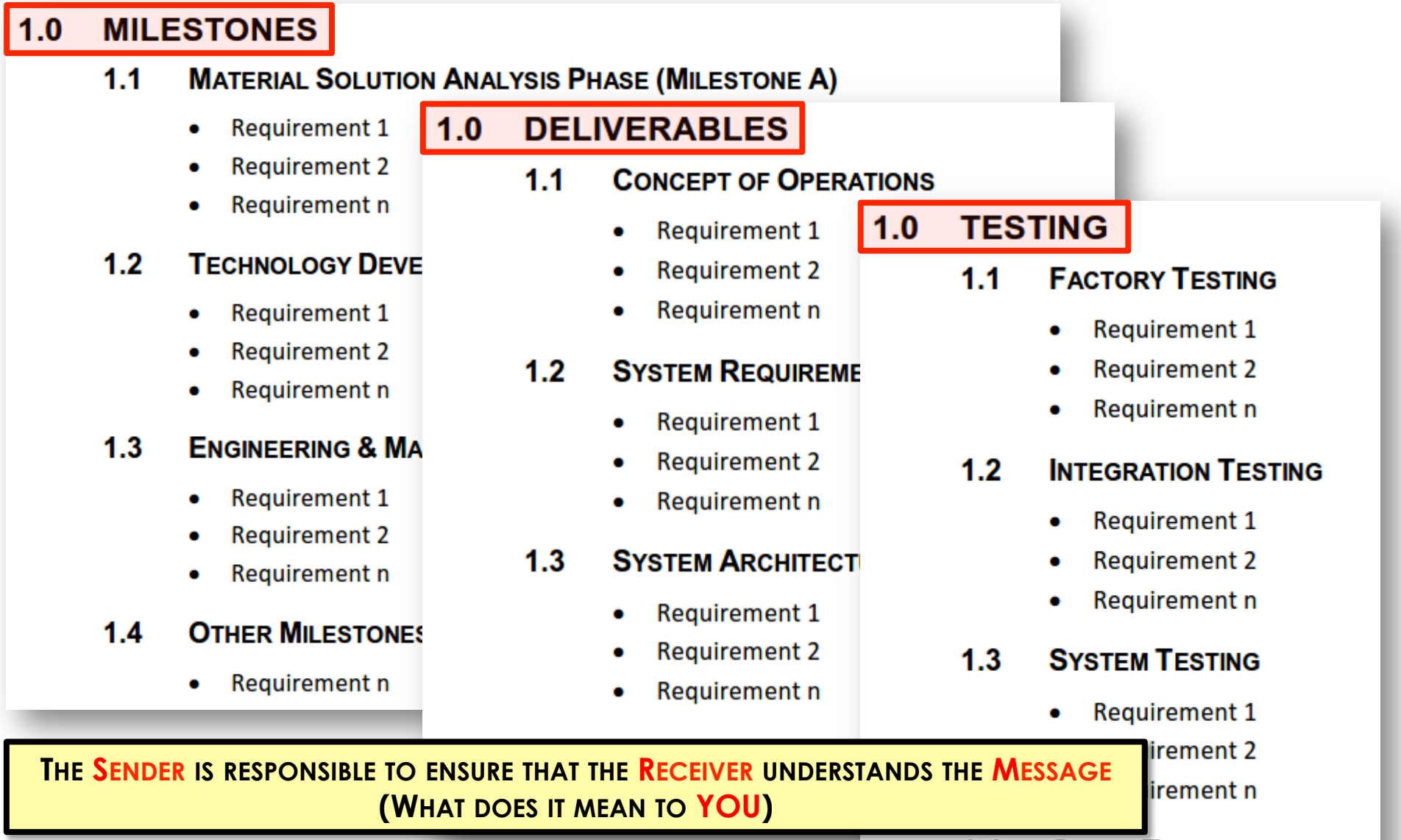
- Problem Description
- Objectives
- Offered Solution
- Practical Example
- **Other Applications**
- Summary

Other Applications

Abstraction To Any Communication



APPLICATION TO TECHNICAL MANAGEMENT



THE SENDER IS RESPONSIBLE TO ENSURE THAT THE RECEIVER UNDERSTANDS THE MESSAGE
(WHAT DOES IT MEAN TO YOU)

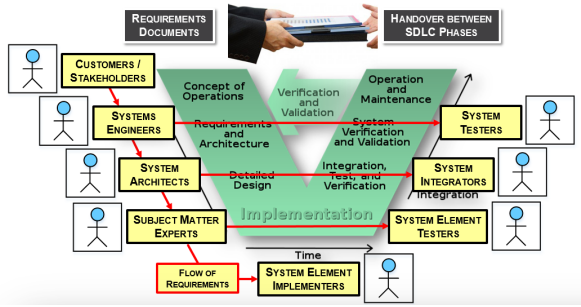
PROGRESS

- Problem Description
- Objectives
- Offered Solution
- Practical Example
- Other Applications
- **Summary**

SUMMARY

PROBLEM DESCRIPTION

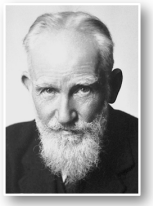
WORK IS PERFORMED BY HUMAN BEINGS



CHALLENGE: EFFECTIVE COMMUNICATION

EFFECTIVE COMMUNICATION IS THE MOST CRUCIAL SUCCESS FACTOR

"… THE MOST CRUCIAL SUCCESS FACTOR IN PROJECT MANAGEMENT IS EFFECTIVE COMMUNICATIONS TO ALL STAKEHOLDERS"



"THE SINGLE BIGGEST PROBLEM IN COMMUNICATION IS THE ILLUSION THAT IT HAS TAKEN PLACE"

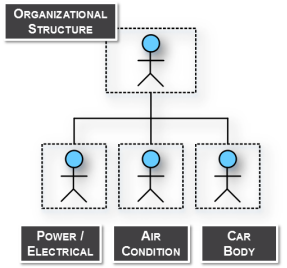
- GEORGE BERNARD SHAW

CHALLENGE: COMMUNICATION STRUCTURES

CONWAY'S LAW

"ORGANIZATIONS WHICH DESIGN SYSTEMS … ARE CONSTRAINED TO PRODUCE DESIGNS WHICH ARE COPIES OF THE COMMUNICATION STRUCTURES OF THESE ORGANIZATIONS"

- M. CONWAY



INTRODUCTION

CONSUMER BEHAVIOR THEORY

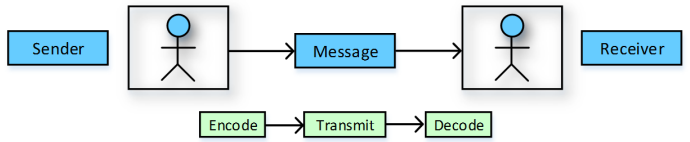
THE CONSUMER BEHAVIOR THEORY SUGGESTS THAT …
IF (REQUIREMENTS SPECIFICATIONS) CONSUMPTION IS MADE TOO DIFFICULT,
THEN CONSUMERS WILL WANT TO MOVE ON TO THINGS THEY ACTUALLY FIND SATISFYING
(E.G. DESIGN, IMPLEMENTATION, TESTING).

BY PROVIDING REQUIREMENTS SPECIFICATIONS THAT ARE NOT READILY USABLE
TO CONSUMERS, AN ADDITIONAL PROCESSING BURDEN IS PLACED ON THEM,
AND CONSUMERS MIGHT SUCCUMB TO THE TEMPTATION TO
CUT THE REQUIREMENTS ANALYSIS PHASE SHORT.

CONSIDERING HUMAN FACTORS, THIS MAY RESULT IN REQUIREMENTS CONSUMERS TO MOVE ON, STATING: "I HAVE DONE THIS BEFORE. I DON'T NEED REQUIREMENTS. I KNOW WHAT I'M DOING!".

OFFERED SOLUTION

PRINCIPLES OF COMMUNICATION



THE SENDER IS RESPONSIBLE TO ENSURE THAT THE RECEIVER UNDERSTANDS THE MESSAGE

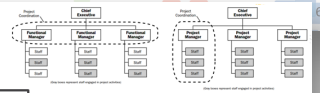
OFFERED SOLUTION

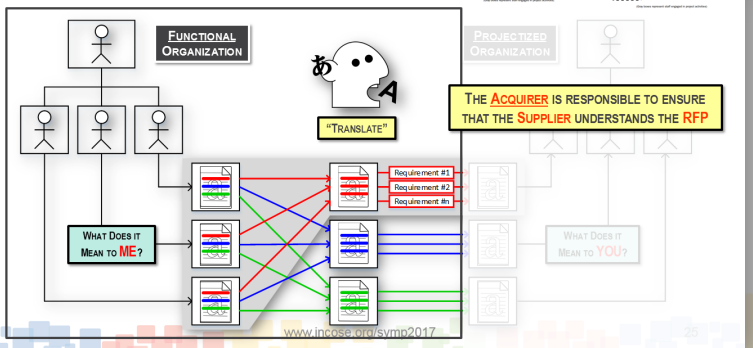
GOOD COMMUNICATION (PRESENTATION) SKILLS

AS THE SENDER, TAILOR YOUR MESSAGE TO YOUR AUDIENCE (RECEIVER)

OFFERED SOLUTION

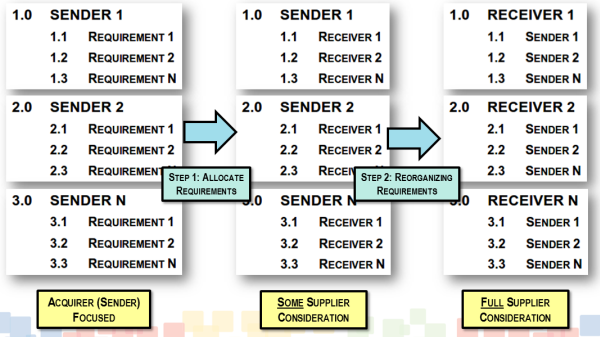
EXAMPLE: REQUEST FOR PROPOSAL (CONT'D)





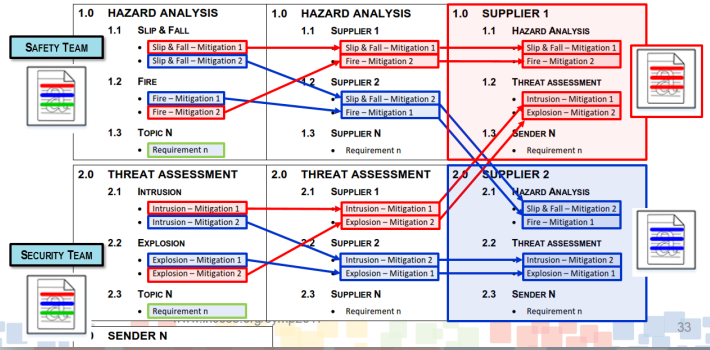
OFFERED SOLUTION

TWO STEP PROCESS

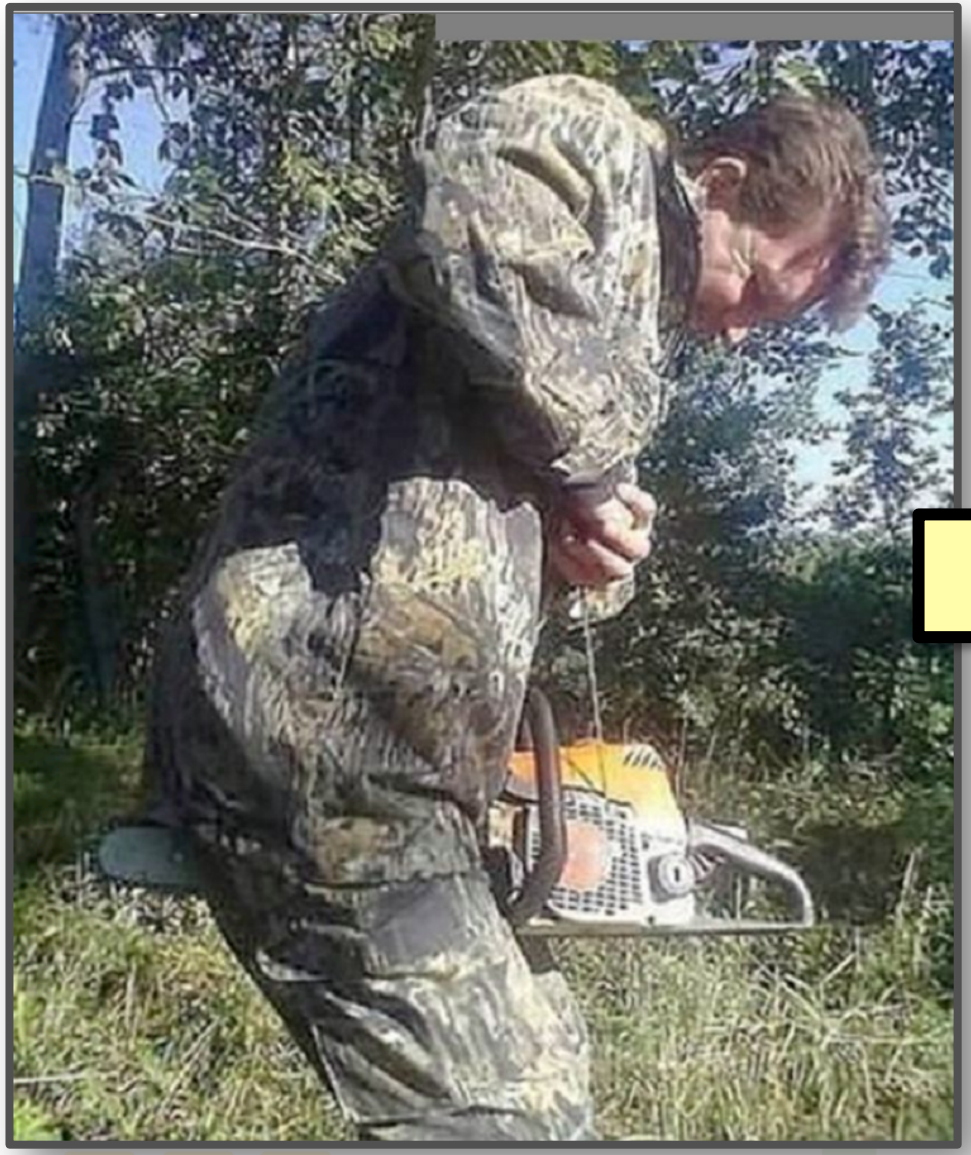


PRACTICAL EXAMPLE

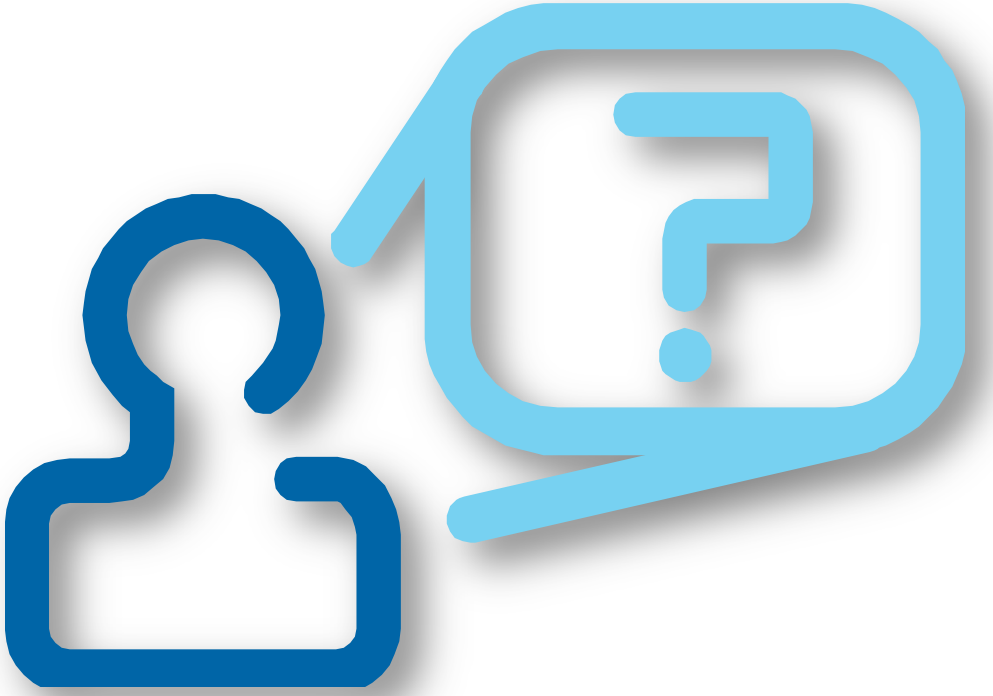
FLOW OF REQUIREMENTS



Final Words



Questions & Answers



Thank You for Your Attention!

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