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Stop Gathering Requirements and Start Building Them

Stop Gathering Requirements and Start Building Them

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Abstract

Atoms make up the observable universe. Similarly, everything in our business solutions is, in a sense, made up of requirements, which, like atoms, serve as building blocks for all that "matters" to an organization. What if we could see our requirements as atoms—what would they look like? If we could split one open, what would be inside? Einstein taught us—though the Special Theory of Relativity—that time and space are two parts of the same whole. We examine requirements in this way. We observe basic elements of a requirement, which upon closer examination, link to each other to the point where they are inseparable.

Introduction

The International Institute of Business Analysis (IIBA®) writes, "Business analysis is the practice of enabling change in an enterprise by defining needs and recommending solutions that deliver value to stakeholders." (International Institute of Business Analysis, 2015, p. 10) This requires a sophisticated means of eliciting and specifying requirements.

> "A requirement is a usable representation of a need. Requirements focus on understanding what kind of value could be delivered if a requirement is fulfilled. The nature of the representation may be a document (or set of documents), but can vary widely depending on the circumstances." (International Institute of Business Analysis, 2015, p. 48)

> "[A requirement is] A condition or capability that must be met or possessed by a system, product, service, result, or component to satisfy a contract, standard, specification, or other formally imposed documents. Requirements include the quantified and documented needs, wants, and expectations of the sponsor, customer, and other stakeholders." (Project Management Institute, 2004, p. 371)

The IIBA and Project Management Institute (PMI) alike have done a very good job at helping us understand the extrinsic value of requirements, which is the idea that we use them to solve problems, satisfy needs, and build solutions. Requirements have extrinsic value because they begin a causal chain of events that eventually brings us to realized value for the organization and its stakeholders. However, neither the IIBA nor PMI explains the intrinsic value of a requirement. The fundamental elements of a requirement give rise to its intrinsic value. Understanding the very nature of those elements is essential to eliciting, planning, analyzing, communicating, and managing them.

Because of this basic lack of understanding, we get sporadic arrangements of text, tables, and diagrams, which may or may not reside within a single document. Often conceived with minimal traceability, requirements exist as seeds spread across many packages or across many pages of the same document. What if there was a way solve this problem? It would mean we would have to abandon decades of thinking—redefining the very nature of the word "requirement." When we only understand requirements extrinsically, we are doing so in a classical sense. When we add an intrinsic aspect, we are understanding requirements at a quantum level.

Classical Requirements

There are two ways to think of requirements: Classical and Quantum. Requirements, conveyed to stakeholders as textual specifications or graphic images, are classical when they are elicited and recorded as a single declarative statement or image, across a single document or a collection of artifacts packaged together in separate smaller documents. In a classically defined environment, the business analyst would typically ask, "What are your requirements stakeholders?" Appendix-A details examples of classically specified requirements found within a generic Business Requirements Document. Some of these requirements may be poorly stated and disorganized. This is by design and representative of many of the requirements we come across. We also notice that many of these requirements relate to each other in some way. Figure 1 illustrates an example of requirements, which, separated within the document—perhaps by many pages—cause a potential for design, development, and testing errors. Again, this is common amongst requirements packages and documents.

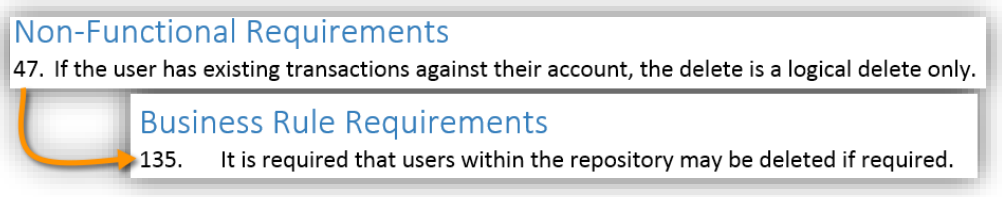


Figure 1 Disjointed Requirements Example

Quantum Requirements

In a classical sense, a Quantum Requirement is a deliberate grouping of all the elements that make up a requirement. Requirements necessitate the joining of components such as its value, the characteristics that make it what it is, and the affects it will have on its environment, once it has been realized. Figure 2 demonstrates the internal structure of a Quantum Requirement.

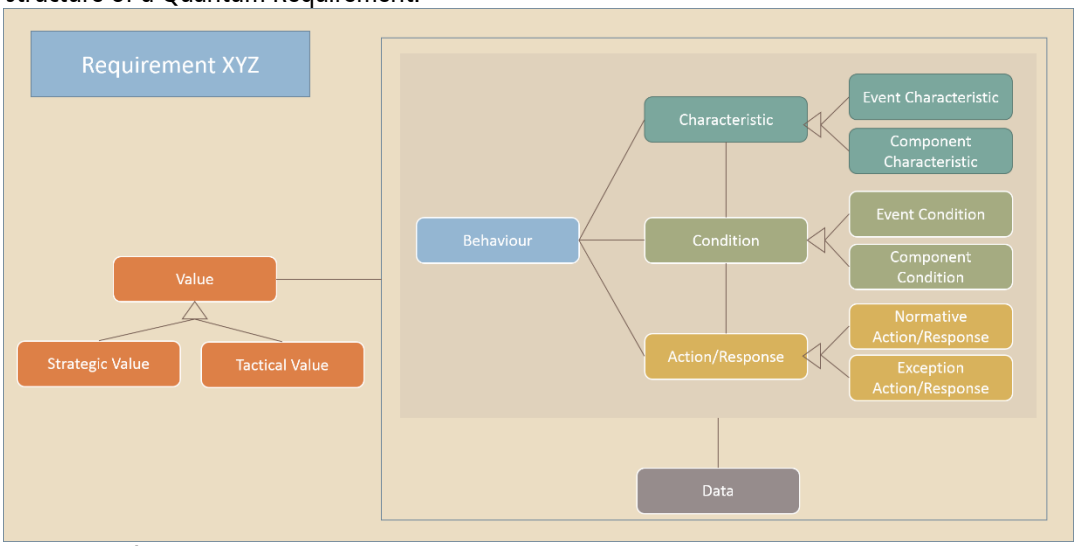


Figure 2 Quantum Requirement Structure

Elements of a Quantum Requirement

Value

The requirement must deliver value to the stakeholder who needs it and the organization that will support and sustain it. We measure value in two ways.

- Extrinsic value, the benefits of a thing associated through external agency
- Intrinsic value, as belonging to a thing by its very nature

Extrinsic Value	• A means to an end • A chain of derivation • The extrinsic value of A can be traced to the extrinsic value of D through B, and C • Money has extrinsic value because you can buy garments to cover your body; those garments, in turn, have extrinsic value because they protect you from the elements—while protecting you, the garments extrinsically offer social acceptance through attributes such as colour and design . . . and so on
Intrinsic Value	• As a philosophic property, the belief that a thing can have value in of itself • Intangible: As a belief system, the underlying perception of true value based on the sum of all other value-add considerations • Tangible: As an economic principle, the intrinsic theory of value or objective value is an axiomatic approach, suggesting that the cost of producing a thing, and the costs involved in the process of producing that thing are intrinsically imbedded – and cannot be removed – within the thing, once it has been produced

Value drives and constrains the requirement, as a whole.

Strategic Value

Strategic value provides a future-oriented, larger overall plan for the organization, as a whole. The plans, created to realize strategic value, typically contain several smaller tactical plans. Strategic plans achieve results over long periods.

Tactical Value

Tactical value represents the plans and projects that carry out because of the strategic value. The perspective of tactical value is far narrower than strategic.

From Strategic to Tactical to Project

Strategic Goal	This year will be very customer focused, creating a better experience for them regardless of how they connect.
Tactical Goal	We will increase the results of the customer satisfaction survey from 76% to 95% by the end of the third quarter of this year.

From Strategic to Tactical to Project *(continued)*

Tactical Goal	A business case will be commissioned to explore the solution options to meet the goal of increasing the customer satisfaction survey. We will increase the results of the customer satisfaction survey from 76% to 95% by the end of the third quarter of this year.
Tactical Analysis	In response to the business case, which explored solution options for increasing the results of the customer satisfaction survey from 76% to 95% by the end of the third quarter of this year, we will charter a short-term project to understand the current state of the Client Care Centre Customer Complaint Ticketing Process and make recommendations for improvement.
Tactical Project	Having reviewed the tactical analysis project, chartered to understand the current state of the Client Care Centre Customer Complaint Ticketing Process, and make recommendations for improvement, we will charter an implementation project to design, build, and implement the chosen option. This option, strategically aligned to improve our customer's experience and tactically aligned with increasing our customer satisfaction survey, will improve the customer's overall experience from 76% to 95% by the end of the third quarter of this year.

Behaviour Element

All requirements must do something, regardless of their classification or categorization. A behaviour defines a range of actions in combination with itself and its environment. It is the response of the system or organism to various stimuli or inputs, whether internal or external, voluntary or involuntary. The behaviour will drive and constrain all elements within the requirement. All elements within the requirement must support and sustain the behaviour.

Characteristic Element

Distinctive qualities and states possessed by the behaviour and other elements within the system. Characteristics will drive and constrain conditions, actions, and responses. These elements, in turn, support and sustain characteristic elements identified within the requirement. Either event based or component based, characteristics affect the requirement in different ways.

Event Characteristic	Event characteristics are qualities, which, attached to the relevant elements, provide occurrence based needs for the realization of the requirement.
Component Characteristics	Similar to event characteristics, component characteristics provide structural needs for the realization of the requirement.

Condition Element

Conditions are distinctive imperatives the elements within the requirement must follow, as a matter of structure or process. As expected, we see event conditions and component conditions.

Event Condition	Event conditions are rules specific to process.
Component Condition	Component conditions are rules specific to structure.

Conditions will drive and constrain behaviors, characteristics, and action/responses. In turn, these elements support and sustain behaviors, characteristics, and action/responses. Figure 3 illustrates the effects conditions have on policies and endorsements

Action/Response Element

All requirements do something. Therefore, all requirements have discrete actions. Known as an Action and Reaction Force Pair, this element pair tracks transactions between an actor and another actor or an actor and some other behavior. In Newtonian physics, every action comes with a reaction. This also applies to requirements, in terms of behavior goals, people actions, and usually system responses. For every behavior, there is at least one or more actions or steps for that behavior. For every action, there is at least one or more responses to an action.

Normative Action/Response	Thinking in terms of a use case, the normative or normal actions and responses are those that we intend and deliberately design.
Exception Action/Response	Again, using the use case as a reference, exception actions and responses are behavioral steps, which must be accounted for when the requirement encounters something outside the boundaries of normal operations.

Data

The data element is associated to the central elements to support and record anything required by regulation, law, research, or any other purpose require. It is important to understand that data is just that – data. It is raw and without context. It is with context that information arises

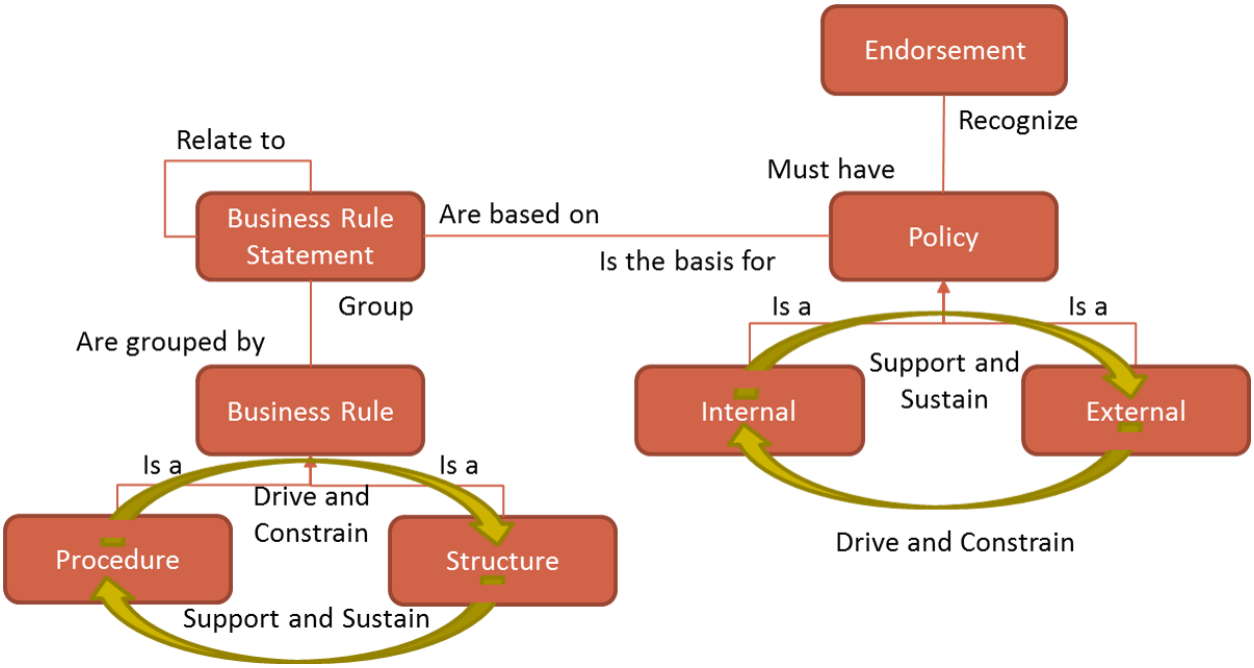


Figure 3 Conditions Sub Structure

Understanding the Depth of Our Analysis

We are used to hearing expressions like "high-level analysis" or "detailed analysis," but how high and how detailed? These words are subjective and ambiguous, leaving a lot of room for errors when specifying or modeling requirements, either classically or by collecting and grouping the quanta of a requirement. With a few simple rules and a basic understanding of analysis terms, we can build our quantum requirement with precision and clarity. Figure 5 illustrates how we use the concept of depth to analyze our requirements.

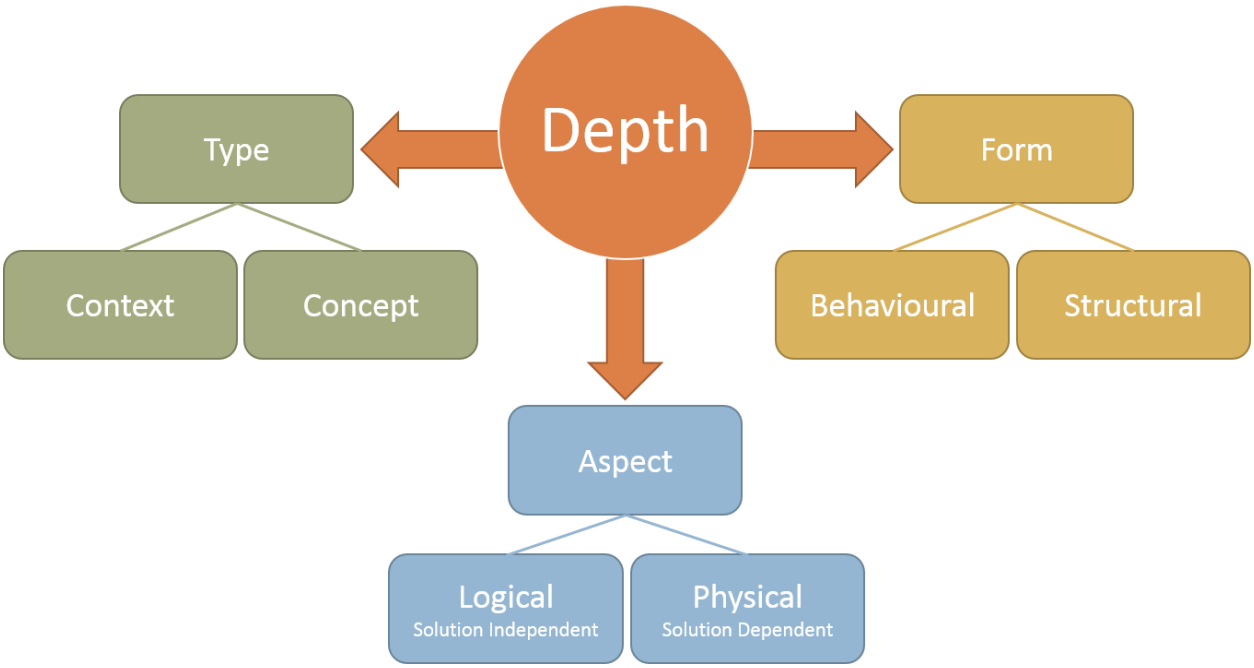


Figure 4 Depth of Analysis

Type

Context

The term context refers to a higher order of thinking. The following are some examples of words, which help to describe contextual thinking: fixed, archetype, established, or immutable. Contextual analysis illustrates pattern-based thinking and helps to identify elements, which we use to inform scope.

Concept

Conceptual thinking is an instance of the context. Words related to conceptual thinking: relative, informed, appropriate, tangible, or specific. Conceptual thinking illustrates thinking specific to scope. The elements identified here inform solution options.

Form

Behavioral

A behavior is something that defines a range of actions in combination with itself and its environment. It is the response of a system or organism to various stimuli or inputs, whether internal or external, conscious or subconscious, overt or covert, and voluntary or involuntary (Source: Wikipedia).

Structural

The concept of structure is fundamental. All things, from the atom to the tallest building, have structure. Structure pertains to intangible things too such as culture, and even working relationships. A structure is an assemblage of physical entities or concepts in space-time intended to form a system capable of supporting the intrinsic or extrinsic value of the structure itself. Structures may be permanent or temporary. Regardless, anything that has structure is made of patterns and relationships between its constituent elements.

Aspect

Logical

The term logic has many meanings, depending on its usage. Philosophy teaches us that logic is a formal discipline where one reasons a solution using the rules of logical thinking. Logic may be formal, informal, symbolic, or even mathematic. Despite the approach, logic is always looking for ideas that will solve a problem and proof that those ideas have a reasonable chance of passing logical tests. In project management, business/systems analysis, design, and development we are still using the basic rules of formal logical discourse except our ideas and tests must be independent of the actual physical solution. We must be able to imperially say, "Regardless of how we decide to proceed, regardless of what choices we make, this logical analysis must hold true for the physical solution." The logical analysis is an instance of the contextual patterns that have already been identified.

Physical

A physical analysis is as it seems. A physical analysis provides insight into exactly where things will go, what solutions we intend to use, and how it all will fit together on our machines, with our process and people in this moment in time. Like a logical analysis, a physical one will help you to understand the actual solutions you have chosen, in an intuitive manner.

As you can see, this model provides some insight into how we can join these concepts to create unique ways of looking at the problem space and build quantum requirements with great clarity. Even the most precise model, however, will be of little value if it when polluted with object, entities, joins, forks, lines, of flow—and all the other things we like to add to our models. When diagraming, keeping our requirements clear and understandable is an important step in the analysis process. The rule of seven helps us to keep our diagrams brief and to the point.

The Miller Rule of Seven

George A. Miller (1956) of Harvard University first published this idea in his paper The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information. Since then, it has become one of the most highly cited papers in psychology. In his article, Miller discussed a coincidence between the limits of judgment and short-term memory as well as the limits of judgment and memory span. Without getting into all the science and maths, our brains, hard wired to view and make judgments on a very limited amount of information, attempt to make sense of what they sees and often make assumptions. If there are too many images or words on a page we are unable to comprehend it or perhaps even remember it.

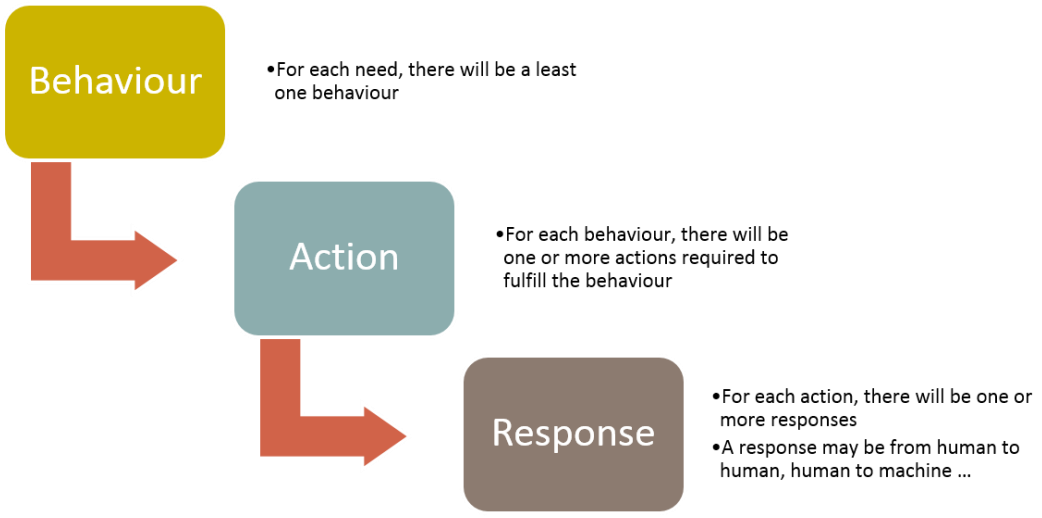
When diagraming requirements using process maps, activity diagrams, use cases, or whatever tool you have chosen, it is important to use the following as a general guideline:

- Limit each diagram to no more than seven items (actors, use cases, activities, entities, elements . . .) plus or minus two;
- Limit your diagram-set (model) using the same rule, no more than seven diagrams (plus or minus two) deep;
- Therefore, you should be able to describe your entire problem space using about seven items per diagram and about seven diagrams, in total—that's a minimum of forty-nine elements to understand the problem with a maximum of eighty-one.

Conclusion

We build requirements at a quantum level to connect the vital elements, which are needed to realize that requirement. The entire package is the requirement. The elements are merely that, elements of the requirement, and do not separate from the whole. Figure 6 describes the relationships between behaviors, actions, and responses.

- Each need drives and constrains one or more behaviors.
- Each behavior supports and sustains one or more needs.
- Each behavior drives and constrains one or more actions.
- Each action supports and sustains one or more behaviors.
- Each action drives and constrains a response.
- Each response supports and sustains one or more actions.



As we consider the relationships between the behaviors, actions, and responses, we begin to identify and associate the characteristics and conditions, which will drive and constrain the behaviors. Be they events, components, normative, or exceptions, behaviors, characteristics, conditions, actions, and responses are all inexorability linked together. Realizing a requirement means joining these elements together and noting them as elements of the requirement and not individual requirements in of themselves.

Appendix-A:
Sample Business Requirements—Classical Approach

Functional Requirements

1. The system must provide for secure access and validation via pin and password.
   A. The system provides PIN.
   B. The Health Professional may change their password according to a set of defined rules.
2. A facility will exist to list current stock levels
3. The system will allow Health Practitioner to make changes to Patient Personal Identity data
4. It must be possible to add new Patients to the Patient repository.

Reporting Requirements

1. A report is required covering all details of a Patient's account
   – Including current open transactions, transaction history, and activity

Data Requirements

1. The system will not allow Patient personal health information to be stored within the same physical location as Patient personal identity information.
2. All Patient records will use the following date format: mm/dd/yy.

Non-Functional Requirements

1. If the user has existing transactions against their account, the delete is a logical delete only.
2. All user access is to be secure and encrypted.
3. The system MUST include a complete inventory management facility to store and track stock of books for the on-line bookstore.
4. Approval time for all CC payments shall be less than 2 minutes
5. Except where fraud checks fail
6. The system will 'mask' the first three and last four digits of the Patient Health Number.
7. Patient status will appear on the Patient's main screen.
8. Patient personal identity will appear on the Patient's main screen.

Business Rule Requirements

1. It is required that users within the repository may be deleted if required.
2. Health Care Professional will manually update stock quantities if physical checking reveals inconsistencies.

Process Requirements

1. All payments will be by credit card.
2. The system will accept all credit card types.

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About the Author

Perry McLeod is a management consultant, facilitator and instructor with over 14 years of experience in business analysis, process reengineering, project management, business modeling and strategic alignment. Perry delivers industry recognized best practices for some of North America's most successful companies across a number of industries such as: banking and finance, agriculture, supply chain, consumer products, software design, insurance and payment processing. In addition to his many professional accomplishments Perry was one of the contributors to the IIBA's BABOK® v 2.0.