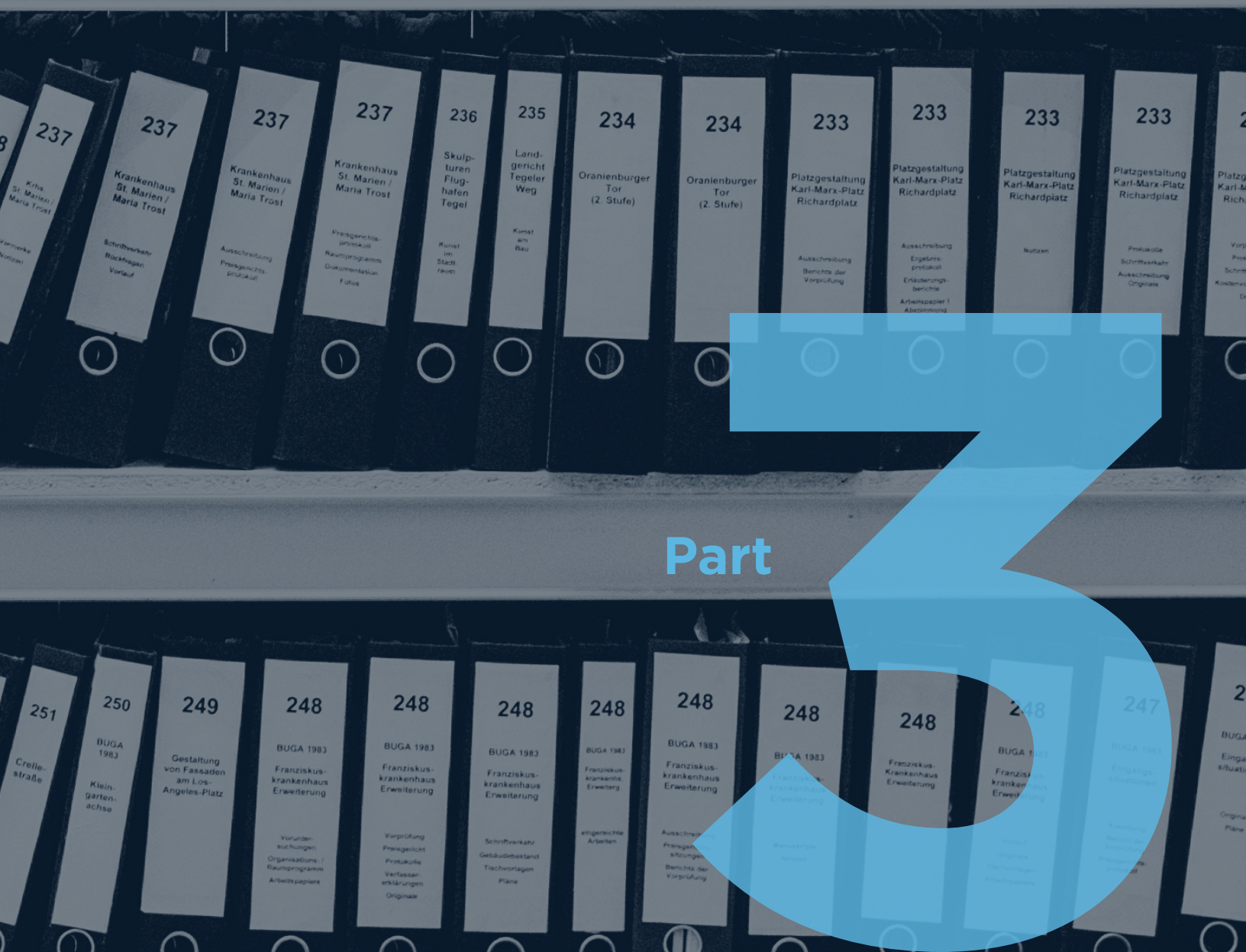




QVscribe



Easy Approach to Requirement Syntax



Part

Introduction

Unconstrained natural language requirements can be vague, ambiguous, verbose, and confusing. In many cases, these requirements can lead to unexpected interpretations, erroneous implementations, costly scrap and rework, and - in the worst cases - disaster. The Easy Approach to Requirements Syntax - EARS, helps solve that problem by bringing just enough rigor to writing requirements in natural language. Simplifying the requirements writing process and supporting authors in writing clear and consistent requirements.

EARS is available in QVscribe as templates, and in the following three-part series, we will outline how you can optimize the EARS format to enhance and simplify your requirement writing personally, in a team, and company-wide.

Please note that in certain circumstances using EARS templates is not ideal. Please refer to the following blog on [when not to use EARS](#).

Why Standardize Your Requirement Writing Process?

In parts 1 and 2 of the EARS series, we went into detail about the benefits and fundamentals of EARS template, plus we demonstrated how to use EARS templates to write and rewrite high-risk requirements.

Let's take a step back and discuss why implementing resources such as EARS and standardizing your requirement writing process is a successful practice that many teams and organizations have implemented.

Writing clear and consistent requirements can be a grueling task, even for the most advanced requirement writing teams. Projects across the same team can be completely different in scope, scale, and complexity. So, how can a team optimize its process to avoid common pitfalls such as misalignment, communication issues, and errors and re-work due to ambiguous requirements?

Here at QRA, we believe standardizing your requirement process is crucial for consistency across projects and developments. By standardizing your process, you build a requirement writing workflow that is repeatable and predictable. With clear steps and baselines, your team will be empowered to make quicker and smarter decisions and to collaborate and communicate more effectively.

Some key benefits of standardizing your requirement writing process include the following:

- 1. Increased efficiency:** A standardized requirement writing process will help streamline capturing, authoring, analyzing, and communicating requirements. Cutting down on the time and effort required to author requirements and improving the quality of requirements and the project as a whole.
- 2. Improved collaboration:** Having a standardized requirement writing process can facilitate better collaboration between all stakeholders and parties involved. By using consistent language and a clear format or template for authoring requirements, everyone can easily contribute to the process and ensure that all relevant information is captured.
- 3. Clarity and consistency:** When everything is communicated clearly for all stakeholders and everyone follows the same process for writing requirements, everyone knows their roles and responsibilities. It becomes easier to understand and interpret requirements which reduces confusion and ensures everyone is on the same page.

- 4. Reduced errors and rework:** When there is effective communication and alignment across stakeholders, there is less chance of errors and misunderstandings. This will reduce the amount of rework later in the project, which will save time and money.
- 5. Better traceability:** A standardized requirement writing process can help ensure that requirements are properly linked to other project artifacts, such as design documents, standards, test cases, and user stories. This will improve traceability across the project and ensure that all requirements are properly documented, allocated, tested, and validated.
- 6. Improving machine readability:** A standardized requirement writing process can improve your ability to process and utilize the information found in natural language requirements to scope projects, generate models and parse data digitally.

Standardizing your requirement writing process will help your team ensure that all requirements are clear, consistent, and complete, which will improve the quality of your projects.

Now that we understand the benefits of standardizing your requirement writing process. Let's take a look at how you can learn about requirement writing structure, and how you can share your knowledge with your team. By taking these steps, you can work with your team to build your requirement writing process.

How to Learn Requirement Structure and Share Your Knowledge Across Teams.

Building out a requirement writing process may seem like a daunting task, but there are many resources available, best practices to follow, and requirements formats you can effectively deliver to your team. Here are six steps we recommend taking to learn more about requirement structure and process:

Step 1: Read up on requirements engineering and best practices

Many books, articles, and online resources cover the basics of requirements engineering and writing requirements. We recommend the 'INCOSE Guide for Writing Requirements, May 2022.' We have some great resources at QRA for Requirement Authoring, which you can find here: <https://qracorp.com/resources/requirements-authoring/>.

Step 2: Attend training courses, watch webinars, or take a workshop

We provide QVscribe and requirement training here at QRA, available to all QVscribe customers. If you aren't a customer yet, we have many webinars and resources that are available for your reference on our website. For more information, you can contact us here: <https://qracorp.com/support/contact-us/>.

Step 3: Review real-world examples

Look for examples of systematic requirements documents or successful projects and analyze the structure of the requirements. Pay close attention to how the requirements are organized, written, and linked to other project artifacts.

Step 4: Write requirements using EARS format

EARS templates provide an easy way to learn requirements structure. Start by writing requirements using common EARS templates (Ubiquitous, Event-Driven, State-Driven, Optional-Feature, and Unwanted Behavior) and gradually work your way up to the more complex requirements templates. All EARS templates are available within QVscribe.

Step 5: Get QVscribe feedback

Analyze your requirements using QVscribe's Quality, Consistency, and Similarity analyses to identify potential issues and avoid common requirement errors including:

- Unclear – Risk of being misunderstood by a reader.
- Not Testable – Too vague to be proven.
- Uncontrolled Terms - Multiple names for the same object.
- Improper Units - Different systems of units used.
- Duplication - The same information is repeated.
- Contradiction – Conflicting information in the same document.

QVscribe can help you identify areas for improvement and help refine your skills over time.

Step 6: Practice, practice, practice

The best way to learn about requirement structure is to practice writing requirements yourself. Practice makes perfect.

Given this article is part of our EARS templates series, let's discuss **Step 4: Write requirements using EARS format**, in more detail. We believe that including EARS templates in your requirement writing methods can simplify your process, the sharing of requirement knowledge, and training of new authors.

EARS greatly improves the requirement quality with very little overhead. Often just a short training session or walkthrough of EARS is enough for even brand-new requirements authors to start using EARS and writing clear, consistent, and complete requirements. Teams are usually surprised by how easy EARS is to learn and how little effort it takes to standardize their requirements writing process using EARS.

Some other note-worthy benefits of EARS include:

- Eliminates or greatly reduces most common types of requirements errors
- Helps assure requirements coverage of both normal and unwanted behavior
- Assists with system decomposition
- Makes requirements easy to understand
- Reduces word count of requirements and specifications
- Ensures requirements are written in active voice

To better understand how EARS can support requirement writing, let's take a look at some before and after examples.

Here are some examples of requirements that do not use EARS templates. These requirements received an overall score of 2 out of 5 in QVscribe, which makes these requirements high-risk.

Without EARS

The following distance will be computed in seconds behind the forward vehicle (i.e. 260 feet of following distance at 60 mph (88 feet per second) is about 3 seconds).

The system will have indicator lights for when the system is activated, engaged, as well as the status of the cruise control.

If the car in front of the subject car slows down then the system will adjust to a lower speed.

Pre-collision system overrides the FSRACC.

If any component of the system fails (i.e. controller, radar, etc.) then the system will notify the driver and disengage immediately.

When the driver taps the accelerator, the system is temporarily disengaged while the driver accelerates the car, the system will re-engage at the previously set speed once the accelerator is no longer pressed.

Some issues that QVscribe flagged include no Imperatives, use of Vague Words, use of Excessive Continuances, use of Passive Voice, use of Optional Open-ended Clauses, and use of Non-specific Temporal Words. You will have to work to resolve these flagged issues before your requirements are ready for review or can be approved.

Now, here are the same requirements using EARS templates. These requirements received an overall score of 5 out of 5 in QVscribe, which makes these requirements very low risk.

With EARS

Ubiquitous: The <system> <imperative> <system response>.

The Cruise Control System shall compute the Following Distance in Seconds.

State-Driven: While <pre-condition(s)>, the <system> <imperative> <system response>.

While in Standby Mode, the Cruise Control System shall display the Standby Status on the dashboard.

Event-Driven: When <trigger>, the <system> <imperative> <system response>.

When the Driver Dressed the Set Cruise Button, the Cruise Control System shall enter Cruise mode.

Optional Feature: Where <feature is included>, the system <imperative> <system response>.

Where the Pre-Collision System is present, the Cruise Control System shall yield to inputs from the Pre-Collision System.

Unwanted Behavior: If <trigger>, then the <system> <imperative> <system response>.

If the Radar fails, then the Cruise Control System shall enter Standby Mode.

Complex: While <pre-conditions>, when <trigger>, the <system> <imperative> <system response>.

While in Cruise Mode, when the Driver presses the Accelerator, The Cruise Control System shall yield to inputs from the Accelerator.

Overall, these requirements are well-written, complete, and concise, but even visually they are more appealing. They flow nicely and have a consistent structure that will make it much easier to understand and dissect by reviewers or readers.

It is important to note that using a template does not necessarily mean you will have a requirement with no potential issues. However, it will likely drastically cut down on the chances of potential issues. Using a template will help avoid many common mistakes made when writing requirements because the template provides a clear structure and leaves little room for added ambiguity. Having an agreed template makes it clear to the author and reader, where the details are located and helps take out a lot of the guesswork for the author and reader.

When using EARS templates you are training your brain to think differently about requirements. With a set structure and syntax pattern, you save yourself time because you no longer have to think about how to structure your requirements. Given that the flow of the requirements is always consistent, it saves the reader time trying to understand what the author was trying to convey.

Now that we have a better picture of how to learn requirement structure, share your knowledge across teams, and how EARS templates can support all of these activities, let's discuss how you can standardize your requirement writing process across your team or organization.

How To Standardize The Requirement Writing Processes.

Many organizations and industries are working towards modernizing their requirement writing processes based on requirement engineering best practices, standards, and recommendations.

Now that we understand the benefits of standardization and how we can learn more about requirement structure, we must determine how to integrate these processes.

First, it's crucial to examine every step involved before putting it into practice. You'll need to establish specific procedures for writing, documenting, and managing requirements to ensure the success of the process. Here are some suggestions on fundamental steps to consider incorporating into your requirement writing process:

Step 1: Define team roles and responsibilities

Step one is to identify the stakeholders involved and establish the roles and responsibilities of each stakeholder. We recommend using a RACI matrix (responsible, accountable, consulted, and informed) to ensure everyone is clear on their roles and responsibilities within the process.

Step 2: Establish a standard template and guidelines for writing requirements

A standard template, such as EARS templates, should be mandated or encouraged for writing natural language requirements.

There are numerous recommended guidelines for writing requirements. Choose the guidelines that best fit your company, project, and industry; some common ones include:

1. Having a unique alpha numeric requirement ID for each requirement
2. Defining acceptance criteria
3. Ensuring requirements are atomic. Requirements should be singular. For more information on the importance of atomic requirements, please refer to our blog post: <https://qracorp.com/atomic-requirements-101-a-comprehensive-guide-with-examples/>
4. Imposing clear rules across groups such as agreed imperatives and clearly defined terms
5. Avoid technical jargon
6. Defining what other information should be associated or linked to the requirement such as notes, diagrams, or user needs
7. Recommending that each requirement have at least a 4 out of 5 score in QVscribe

Step 3: Develop a review process

Next, develop a review process to ensure that authors have adopted the established standard template and guidelines for writing requirements. This process can include peer reviews, stakeholder reviews, or formal reviews by a designated requirements team. You can also use the QVscribe report to help facilitate these reviews.

When conducting a review process, it's essential to establish a set of steps for reviewing, revising, and approving requirements.

Review: Requirements are reviewed by stakeholders to verify that they are complete, accurate, and meet the required needs.

Revise: After the requirements are reviewed they may need to be revised based on feedback. It is critical to document any changes to the requirements and confirm that all stakeholders are informed of any changes.

Approve: Once the requirements have been reviewed and revised, they are approved by all stakeholders.

Step 4: Use a Requirements Management Tool

Consider using a Requirements Management Tool such as Polarion, DOORS Next, or Jama to improve your requirements management. They help unify, automate, and streamline your development process. Such tools provide features to capture, trace, manage, and automate reviews and requirements changes.

Step 5: Train your team

Provide training to your team on your standardized requirements writing process. This could involve 1:1 sessions, workshops, or online resources. Ensure that everyone understands the process and has the skills they need to apply it effectively.

Here at QRA, we have many resources and training materials on requirements that can aid in adopting your requirements process. Please feel free to reach out to us for more information, <https://qracorp.com/support/contact-us/>.

Step 6: Continuous Feedback Loop

For a successful requirement writing process, this last step is pivotal. Continuously evaluating and improving your process is essential for achieving ongoing desired results. Gather feedback from stakeholders and analyze effectiveness over time. Be open to adjusting and improving to ensure the process remains relevant and effective.

Follow the steps in Part 3 of our EARS use cases to help you build your requirement writing process.

Conclusion

Implementing a standardized requirement writing process using resources like EARS templates offers multiple benefits. It streamlines requirement authoring and communication process while ultimately leading to more successful projects. As you implement your standardized process, the speed, consistency, and predictability of your team's work and your projects will likely improve and be of higher quality.

You can trust in the quality of your requirements and have the time to tackle potential problems one at a time when the error occurs rather than when it accumulates and at the end of the project. This ability will save you, your team, and your organization time and money.

This ends Part 3 of our 3-part series on EARS templates.

For everything you need to know about EARS, you can refer to our EARS Resource Hub: <https://qracorp.com/ears-resources/>

EARS Use Case Series:

Part 1: Write natural language requirements that are clear, concise, unambiguous and testable

Part 2: Rewriting high-risk requirements and using complex EARS templates

Part 3: Learning requirement structure and standardizing requirement writing processes for speed and consistency



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