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THE TESTING PLANET

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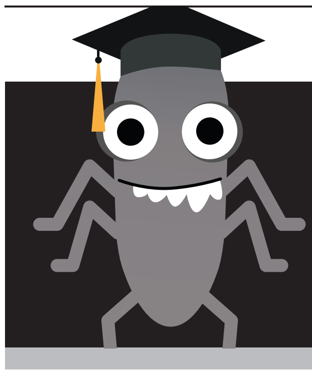

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Leading your development team as an individual contributor

Effectively lead and drive change as a tester by applying transformational and authentic leadership principles

BY BARRY **EHIGIATOR**

> *"It is important to have an awareness of your own leadership style and to know when and how to adapt that style based on context. It is for this reason reflection is considered a useful leadership and development strategy."*

ARISE: A TAKE ON LEADERSHIP!

When we think about leadership, we usually picture someone who has ultimate authority or holds complete control and decision-making power over a group or organisation. This notion of leadership can be called "autocratic leadership." If this is our ideal of leadership, we probably won't think of anyone without a formal leadership job title as a leader or as someone who can drive change of any form on their team or organisation. I believe this is a misguided notion, especially if you work in software development.

In this article, I will draw on my experience and insights gained from leadership literature to demonstrate that to lead, or drive change, you do not necessarily need to have a formal leadership title. I will also show how you can use a transformational leadership style, informed by principles of authentic leadership, to lead as an individual contributor.

THE AGENT: AN INDIVIDUAL CONTRIBUTOR!

Individual contributor: an employee responsible for performing specific tasks or functions within a team or organisation but who does not have authority to manage other employees. Even so, they lead initiatives and are accountable for the work in their functional area.

In line with Agile ways of working, many software development teams today are often multi-disciplinary. They usually consist of individual team members responsible for distinct functional areas of development for the products they work on. For example, if you are someone responsible for testing on their team, you possess what some in the leadership paradigm refers to as "expert power" and to some degree "referent power" (see Yukl and Gardner, Leadership in Organizations (2019), pp. 170-171). This means that your teammates will often trust in your ability to lead the testing activities on their team.

Therefore, as a test expert, you can be referred to as an "individual contributor" on their team. And it is through this lens that I wish to show how you can promote change without having a formal title.

CONTINUES ON **PAGE 2**

Making testing jobs safer for neurodiversity: Manual of Me

Discover the benefits of creating a guide to telling people about you

BY MADDY **KILSBY-MCMURRAY**

> *"Manual of Me has become an essential tool that I use to communicate with current and future managers, fellow members of my team, and, most importantly, myself. By understanding ourselves and our teams better, we can create safer spaces at work that support us all."*

CONTINUES ON **PAGE 8**

Also in the news...

One team, one goal: The reality of introducing a unified testing strategy

TURN TO **PAGE 12**

Burnout: A personal experience report

TURN TO **PAGE 32**

CONTINUED FROM **PAGE 1**

THE SCENARIO: A CALL FOR CHANGE!

Throughout my career in software development, I have helped teams build quality products. In the process I've gained extensive experience in software testing and quality delivery in general.

Notwithstanding, every now and then, when I join a new team, I notice that some of the existing processes are not optimal. Sometimes, there is a lack of visibility into the work testers do on the team. And that means that testers' work may not always be appreciated. Other times, team members do not communicate well during the development and release cycles. Or team processes and useful tools aren't documented. All of this often leads to confusion on what needs to be done, by whom, and at what time. It is especially hard if you're new to such a team.

Faced with these challenges, my default reaction, as is probably the case for many of you, is to help improve things. My usual starting point is to identify the problems, visualise them to others, then propose ideas for improvement, drawing on my experiences. These improvements could include introducing a test management or project management tool, or facilitating better usage of such tools. If you have a tool with the capability for shared documentation, it can help facilitate communication and collaboration among team members. It can also serve as a source of truth for requirements, test coverage, tracking development and release cycles, and so on.

THE CASE: A CALL TO LEADERSHIP!

Sometimes my attempts to drive change have been met with resistance. A frequent cause of the resistance is that some of the team members have been on the team or in the organisation for many years. So a change from the status quo may not be an attractive proposition to them. Moreover, such proposals on the surface may impose a steep learning curve. Therefore, initial reactions can be negative.

For "titled" or "autocratic" leaders, there is perhaps an easy fix to this problem. All they have to do is decide on what needs to happen, without necessarily consulting others. Then, they expect (and generally get) strict obedience from the team. But, if you are a leader without a formal title, such as a respected independent contributor, your strategy has to be a little more complex.

Faced with a situation like that, you might ask:

- How do you get the team to see the value in your proposal?
- Specifically, how do you persuade the team to give your proposal a try, whilst ensuring the team's goals are effectively achieved without major disruption to existing processes?

These are core leadership questions. And in responding to them I will demonstrate an approach to leadership that can be valuable for those in any kind of leadership role, formal or informal.

THE DESIGN: LEADERSHIP DEFINED!

> *Leadership: "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives" (Yukl and Gardner, 2019).*

If we use this definition, to demonstrate leadership in the case described above, you need to "influence" the team to understand the vision and agree as a group on how to achieve it. However, the influencing process is determined not only by the type of power a leader possesses, but also by their influencing behaviour.

There are three general types of influence tactics: impression management, political, and proactive tactics. In this regard, I refer mainly to proactive tactics, based on their relevance to this context. For this reason, understanding your own traits is vital. This helps in identifying the influencing behaviour that comes naturally for us to use in leadership situations. If we take the BIG Five Personality model as an example, studies have shown that "four of the Big Five traits have non-trivial correlations with leadership emergence and effectiveness." These four traits are: extroversion, conscientiousness, emotional stability, and openness to experience.

It is not very important where you are on the personality spectrum. The key is in understanding your core attributes, how they shape your response to situations, and where you may need to develop to further increase your effectiveness. By understanding your traits, you will be better at applying appropriate leadership styles with respect to your own attributes.

For an independent contributor, a leadership style that can be helpful in navigating the conundrum of leading without a managerial job title is the transformational leadership style, which I now turn to.

THE FRAMEWORK: THE TRANSFORMATIONAL LEADERSHIP MODEL!

Transformational leadership is an approach where the agent or leader relies on their individual attributes to motivate and encourage their team to achieve strategic and organisational goals.

In a nutshell, transformational leadership is concerned with leading and driving change by improving the performance of individual team members, raising morale, self-confidence, and aligning the team to an overall vision, or clear purpose. There are four key factors to this leadership model, which are:

1. Idealised influence

Idealised influence is the emotional component of leadership where leaders act as strong role models for followers, such as your team members.

2. Inspirational motivation

Inspirational motivation is the component of leadership where the leader communicates high expectations to followers, inspiring and motivating them to become committed to and be part of the common goal or vision in a team or organisation.

3. Intellectual stimulation

Intellectual stimulation is the component of leadership where the leader stimulates followers to be creative and innovative, and to challenge their own beliefs and values as well as those of the leader, team, or organisation.

4. Individualised consideration

Individualised consideration is the component of leadership where the leader provides a supportive climate in which they listen carefully to the individual needs of their team members.

Anyone who exemplifies these "four I's" factors of transformational leadership will usually be able to influence and facilitate the agenda of a group or a team, regardless of their title or role. Northouse (2021: p.194) argues that the transformational leadership style produces great effect, leading to outcomes that go way beyond what is expected, especially when driving change.

TIME FOR A CHANGE: TRANSFORMATIONAL LEADERSHIP IN PRACTICE!

When I have found myself in "the situation" I described earlier, I have often used the transformational leadership approach. This is how I've implemented the model in general terms.

APPEALS TO TEAM MEMBERS' REASON

In line with the first part of the leadership definition quoted above, my first step is usually to persuade the team that my proposal is desirable, using reasoned arguments based on my knowledge and experience. This is a type of "proactive influence" tactic referred to as "rational persuasion", which involves "the use of logical arguments and factual evidence that a proposal is desirable because it is important for the organisation or team and is feasible to do" (Yukl and Gardner, 2019, p.182).

This behavioural tactic supports the transformational leadership approach. It helps to create a better understanding of proposals and to build buy-in from team members.

TESTERMONIALS

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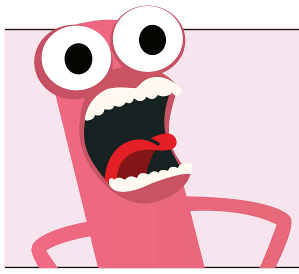
"Being involved with Ministry of Testing over the last year has been a wonderful, enlightening and informative experience. I have joined a brilliant community, packed full of talented and passionate people."

Maddy Kilsby-McMurray

"Just completed the course "A tester's role in continuous quality". Great insights on how quality is a shared responsibility across the whole team - not just testers."

Yulia Artiukhova



> *Shift your tests left. That's all the gays ever wanted.*
>
> **CALLUM AKEHURST-RYAN**

CALLING OTHERS TO ACTION AND PROVIDING SUPPORT

No matter how sound your arguments for change may be, influencing the team to agree to a proposal is only one half of the leadership process. It is not enough for people to agree to a proposal. They have to implement it, too. You may face obstacles like a lack of skill on the team to implement the agreed-upon changes. This is where the second part of the leadership process becomes crucial: the facilitation of the desired actions.

So my next step is to help the team improve and develop the skills needed for implementation. For example, you could set up a series of knowledge-sharing sessions to demonstrate and coach the team on how to work within the new system. I often provide the team with a template and examples to refer to when needed. This usually helps in enhancing team members' confidence in their ability to execute the tasks ahead of them.

A SUMMARY OF MY APPROACH TO TRANSFORMATIONAL LEADERSHIP

When I'm confronted with the need to lead without a formal title, I will:

1. Influence: by leading by example.
2. Inspire: by empowering team members to believe in their abilities.
3. Stimulate: by getting the team to challenge their beliefs and assumptions.
4. Individually consider every team member's needs: by creating an atmosphere where everyone can share their concerns.

In a nutshell, the transformational leadership approach often helps in creating an environment where change proposals are welcomed by everyone.

Overall, a transformational leadership approach works best when the leader demonstrates a balance of empathy, strategic thinking, and a dedication to fostering a cohesive and high-performing team. You should approach leadership situations with genuine and real character. In recent leadership studies, this type of leadership style is now commonly referred to as authentic leadership. But what is authentic leadership? And why does it matter?

THE OPERATOR: AN AUTHENTIC LEADER!

> *Authentic leadership: a "pattern of leader behaviour that develops from, and is grounded in, the leader's positive psychological qualities and strong ethics." - Walumbwa et. al. (2008)*

Earlier, I said that understanding your own individual traits and attributes is valuable in understanding your leadership style. While these traits don't determine your leadership effectiveness, understanding them can shed light on how effective a leader you can be.

Three important aspects of authentic leadership contribute to an effective transformational leadership process. They are:

1. The intrapersonal perspective: this relates to your self-awareness of your own strengths and weaknesses and how you interact with others.
2. The developmental perspective: this relates to the view that authentic leadership ability is something that can be nurtured over time, rather than it being a fixed trait.
3. The interpersonal process: this implies the relational aspect of leadership where authenticity is derived not from the leader's perspective alone, but from the interactions between the leader and the followers (team members).

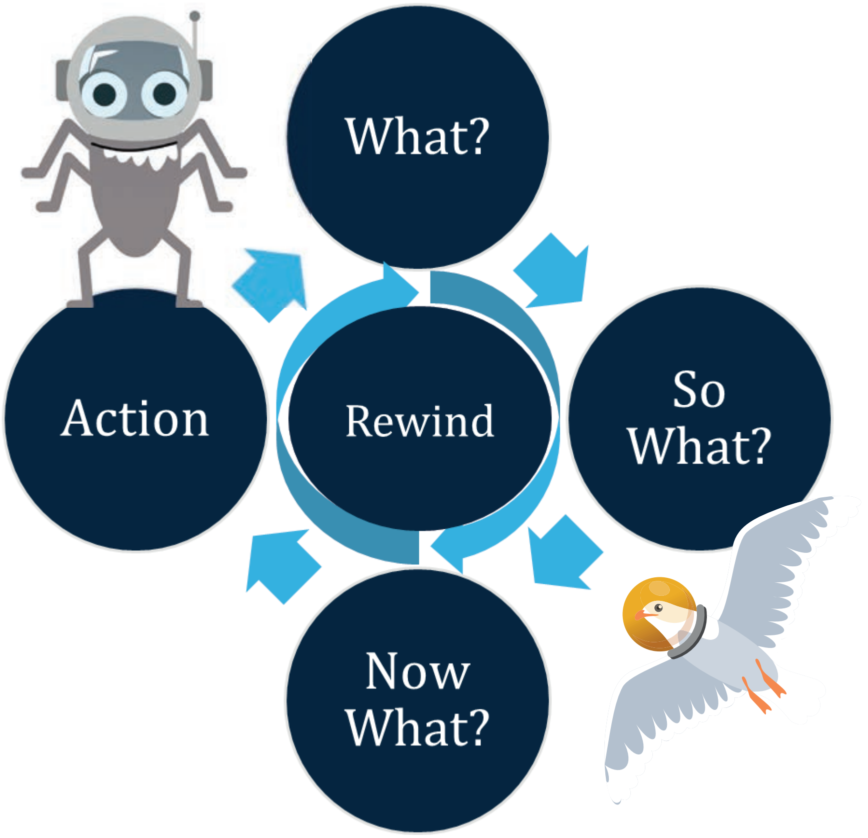
To effectively respond to leadership situations as an individual contributor, it is crucial to embody these different aspects of authentic leadership. For example:

- Cultivating self-awareness can help ensure that you optimise your attributes when responding to leadership situations. Reflection is a good way to build your self-awareness.
- A commitment to personal development can help ensure that you are constantly developing and keeping up with the demands of your "expert" position. An engagement in lifelong learning and staying curious is one way of doing this.
- Seeking feedback from colleagues can help you validate their perception of your leadership style. Moreover, the feedback response can also help illuminate the team's reaction to ideas for change that you have suggested in the past, which can help inform how you go about introducing new ideas. An acknowledgement of your authenticity by colleagues can help you validate that your team members trust in your ability to lead. This would usually mean they will be more receptive to suggestions when you introduce them.

It is not enough to reflect and develop your leadership based only on your own self-assessment. Seeking feedback from colleagues to evaluate your leadership and teamwork practices is also crucial. It will help you create a quality control framework that contributes to your leadership development.

THE QUALITY CONTROL: A COMMITMENT TO FEEDBACK, REFLECTION, AND CONTINUOUS IMPROVEMENT

The analysis so far supports the notion that leadership is less of a static position and more of a set of actions. Leadership actions cannot be thought of as something always directed towards other people. They also include actions taken towards yourself. No one leads all the time. When you are not leading others, you may be following them and, at the same time, following your own path (self-leadership). This makes reflection and continuous improvement an important leadership skill.



When I want to reflect on my own status and actions, I use an adapted version of Driscoll's reflective model (see diagram above).

1. What? - what happened?
- Identify a specific situation or area of your leadership you wish to evaluate.

2. So What? - what is your interpretation? And interpretation of others?
- Note your interpretation of the situation, and compare it to the interpretations of others, such as team members.
- On this, you can use a 360-degree feedback approach to collect feedback from colleagues focusing on the identified area.

3. Now What? - what is the outcome?
- What have you learned from the situation?
- What could you have done differently?
- What does this mean for your future development?

4. Action
- Create a plan using, for example, a SMART goal setting framework, on how to improve and further develop based on your evaluation.
- Implement your plan and continuously review your implementation.

5. Rewind the process.

As someone in any kind of leadership position, following these steps will serve as a valuable exercise to help improve your influencing and facilitation skills. These skills are necessary not just for effective leadership, but for promoting change under any circumstances or context.

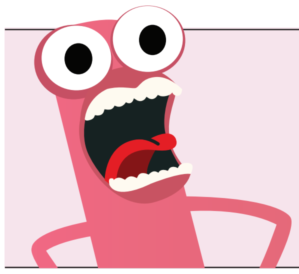
CURTAIN CALL: TO LEAD WITHOUT A TITLE!

I have shown how aspects of transformational leadership and authentic leadership can be used to handle leadership situations as an individual contributor. However, it is worth noting that some other leadership approaches can also be beneficial.

For example, given the interactive nature of relationships in most software development teams, you can benefit from learning about the "leader-member exchange" approach. Likewise, a "servant leadership" approach can also be beneficial, where appropriate.

To be effective and to continue to develop as a leader, especially as one without a management job title, it is important to have an awareness of your own leadership style and to know when and how to adapt that style based on context. It is for this reason that reflection is considered a useful leadership and development strategy. Reflection helps you to develop a rationale for practice, take informed actions, move on, and improve.

Through continuous review and adaptation, you can keep growing as a leader.■



> *"It's important for us to separate quality from testing. Quality is determined by more things than testing."*
>
> **KAT OBRING**

How GenAI Is Transforming QA

BY FITZ **NOWLAN**

Today, the demand for high-quality applications has never been greater. Agile methodologies and CI/CD have increased release frequency, with many companies deploying updates daily. This pace places immense pressure on QA teams to ensure reliability without slowing delivery.

Traditional test automation relies on rigid, code-based frameworks. These require extensive scripting and constant updates as applications change, creating costly bottlenecks. The result? Developers spend more time maintaining tests than improving product quality. With bugs leading to lost revenue, diminished trust, and higher costs, teams need a smarter approach.

HOW GENAI ENHANCES QA

GenAI introduces intent-driven testing. Instead of scripting every step, teams can describe the “intent” of the test in plain language. AI then generates actionable tests and adapts them as applications evolve. This shift:

- Reduces reliance on coding expertise.
- Speeds up test creation with natural language inputs.
- Lowers maintenance overhead as tests adjust automatically.

By narrowing the gap between requirements and testing, GenAI ensures QA aligns with business goals and user expectations.

AUGMENTATION, NOT REPLACEMENT

A common misconception is that AI aims to replace human testers. In reality, its strength lies in augmenting human expertise.

GenAI can handle repetitive, error-prone tasks like test creation and maintenance. This frees testers to focus on exploratory testing and strategy, areas where human intuition is essential. The balance improves efficiency without sacrificing creativity or thoroughness.

GENAI IN ACTION: TRANSFORMING NO-CODE AUTOMATION

SmartBear Reflect exemplifies how GenAI empowers teams. With AI, testers can write plain English test cases that translate directly into automated scripts. This enables non-technical team members to contribute, accelerating automation efforts.

For example, monday.com adopted Reflect and reported zero UI errors in production after implementation. By simplifying test creation and reducing maintenance, Reflect helps QA teams deliver higher-quality software faster.

THE GENAI ADVANTAGE FOR TEAMS

Adopting GenAI delivers measurable benefits:

- Empowers non-technical users - anyone can contribute to testing with plain language.
- **Streamlines collaboration:** aligns developers, testers, and product managers around shared goals.
- **Frees time for strategy:** automation covers repetitive work, leaving space for innovation.
- **Accelerates delivery:** reduces time spent creating and maintaining test suites.
- **Cuts costs:** lowers manual QA effort and maintenance spend.
- **Improves quality:** adaptive tests enhance coverage and catch more issues before release.

At its core, GenAI shifts testing from coding scripts to describing outcomes, from maintenance-heavy work to adaptive automation, and from routine tasks to strategic decision-making.

EMBRACING GENAI IN SOFTWARE DEVELOPMENT

GenAI is revolutionizing software testing, helping teams move faster and smarter. By automating the routine and enabling intent-based testing, it ensures QA keeps pace with modern development demands.

Meet us at Testbash to explore how SmartBear can help your team embrace AI-driven testing and unlock the next level of software quality ■

SMARTBEAR

At its core, GenAI shifts testing from coding scripts to describing outcomes

Meet us at Testbash on October 1 & 2
to explore how SmartBear can help
your team embrace AI-driven testing

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5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
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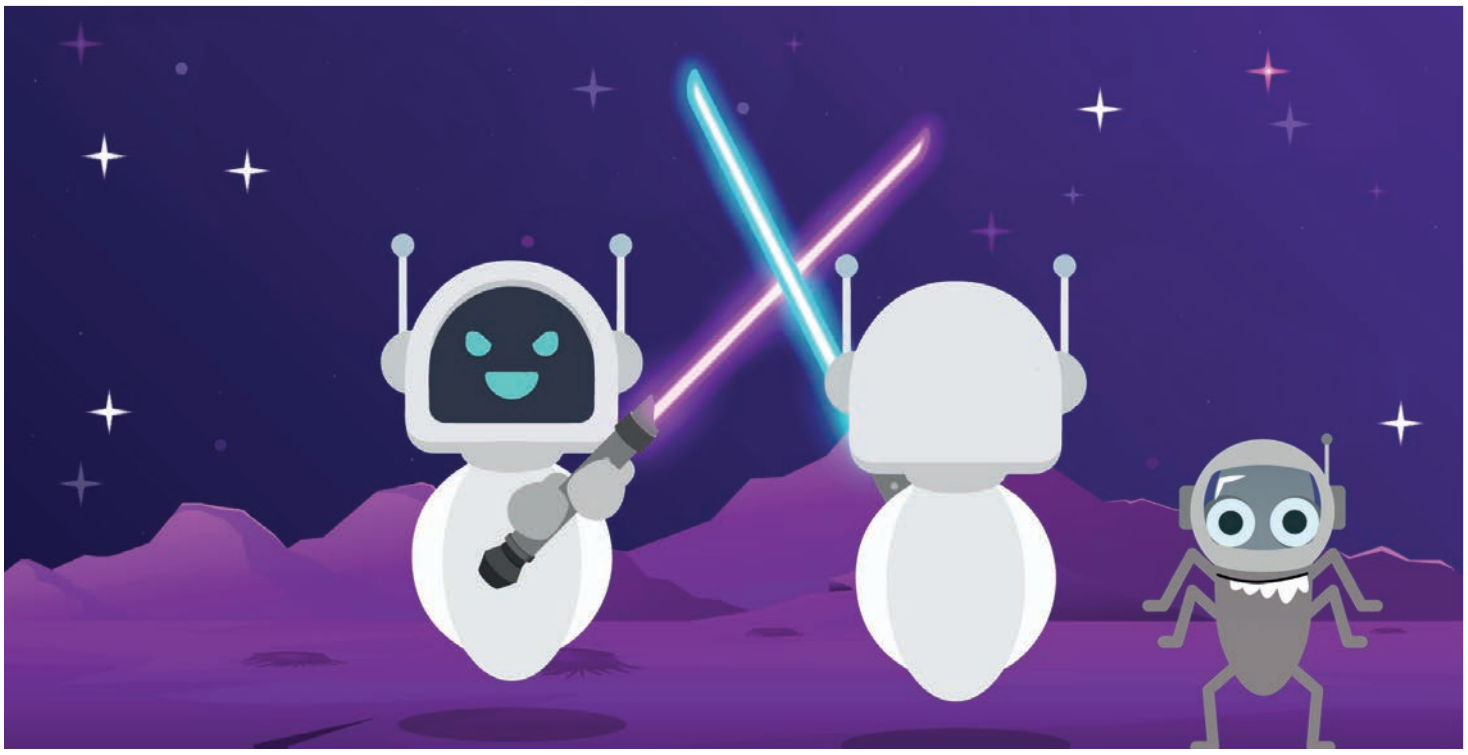


Metamorphic and adversarial strategies for testing AI systems

Discover how these innovative testing strategies can help uncover hidden flaws and prepare AI systems for unpredictable real-world scenarios

BY AMRUTA **PANDE**

> *"Ultimately, testing AI systems isn't just about finding defects; it's about preparing our models for real-world unpredictability."*

AI has taken the tech world by storm, and large language models (LLMs) are leading the charge. But when we build AI-powered apps, quality is still key.

One crucial aspect of testing AI systems is handling the unexpected scenarios that can make or break our apps. Due to the vast scope of these models, it's impossible to test everything. Therefore, focusing on edge cases is crucial to mitigate the risk of uncertainty.

Think of edge cases like unexpected guests at a party; you need to be prepared for them, or things can quickly get out of hand.

TESTING APPROACHES

Traditional methods like boundary value analysis, equivalence partitioning, or testing empty value can uncover edge cases. But there are even more effective approaches for testing AI systems.

This article will focus on two comprehensive techniques you may not have heard of before: metamorphic testing and adversarial testing. They can help you find those edge cases for non-deterministic systems. Non-deterministic systems are those where it's challenging to determine the expected output, and their behaviour is unpredictable. This is often the case with LLMs.

METAMORPHIC TESTING

Metamorphic testing is a technique used to verify the behaviour of systems, such as AI models, when predicting the exact output for a given input is difficult or impossible. Instead of relying on predefined expected outputs, it focuses on identifying relationships between inputs and outputs, known as metamorphic relations (MRs). These relations act as logical rules or properties that should hold true when inputs are modified. By comparing the resulting outputs, testers can verify whether the system behaves consistently with the defined MR.

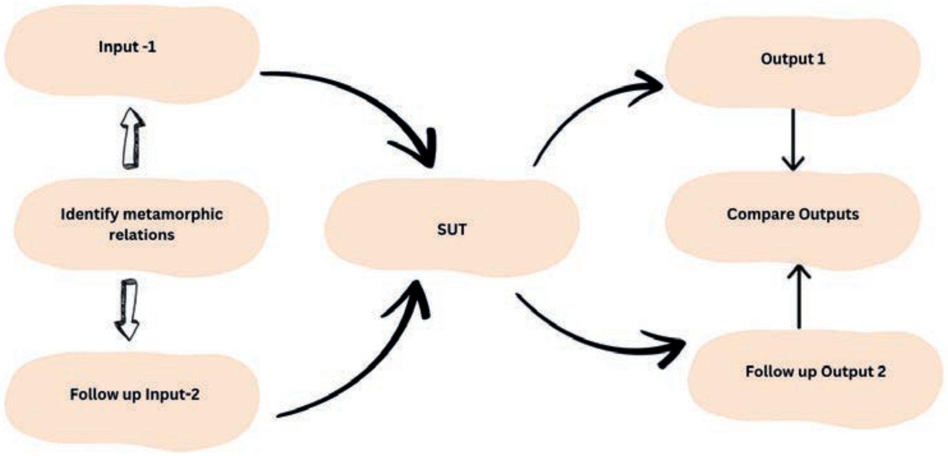
For example, in the common case where I don't have expected results for AI output, I could generate two inputs, obtain two corresponding outputs, and compare them based on a user-defined property that serves as the MR.

You can use multiple metamorphic relations for each input in metamorphic testing. For example:

- Take Input 1 and transform it into Input 2 using different common properties.
- Generate two outputs based on these inputs and compare them to see if the relations hold.

To improve test coverage, try to include as many MRs as possible and create multiple input-output pairs for thorough testing.

This image below represents the process of metamorphic testing for a system under test (SUT).



IDENTIFYING METAMORPHIC RELATIONS

Identifying solid MRs is essential for effective metamorphic testing.

To identify MRs, you find a logical or expected connection between the two inputs and outputs that should hold true even if the input is changed in a certain way. We will test: if you change the input slightly, how should the output change in response?

For example, in recommendation systems on e-commerce websites, if user A rates product X 5-star and user B also rates product X 5-star, then these users should receive the same product recommendations. In this case, the common factor between the two users is the rating, which serves as the MR.

The following lists possible MRs for different models:

Model type:
Text generation
Metamorphic relation:
Synonym substitution
Description:
The model should produce similar outputs when synonyms are used.
Example for testing:
Input 1: "Discuss the pros and cons of social media."
Input 2: "Examine the advantages and disadvantages of online communication platforms."

Model type:
Text generation
Metamorphic relation:
Order preservation
Description:
The sequence of events, steps, or information should remain consistent when the input is modified in certain ways.
Example for testing:
Input 1: "Write a short story about a day at the beach, starting from morning and ending at night."
Input 2: "Write a short story about a day at the beach, starting from night and ending in the morning."

Model type:
Text generation or image generation
Metamorphic relation:
Negation
Description:
Negating key words in the input should yield a contrary sentiment or meaning in the output.
Example for testing:
Input 1: "The food was delicious."
Input 2: "The food was not delicious."

Model type:
Image generation
Metamorphic relation:
Object addition or removal
Description:
Adding or removing an object in the prompt should result in the appearance or absence of that object in the image.
Example for testing:
Input 1: "A car parked on the street."
Input 2: "A car and a bicycle parked on the street."

CONTINUES ON **PAGE 6**

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Model type:
Image generation
Metamorphic relation:
Viewpoint or angle change
Description:
Changing the perspective of the input (the viewpoint) should result in a corresponding shift in the angle of the generated image.
Example for testing:
Input 1: “A bird’s-eye view of a city.”
Input 2: “A side view of a city.”

Model type:
Speech generation
Metamorphic relation:
Speed modification
Description:
Changing the pace of the speech in the input should produce slower or faster speech output without altering the content.
Example for testing:
Input 1: “Speak slowly: Hello, how are you?”
Input 2: “Speak quickly: Hello, how are you?”

Model type:
Speech generation
Metamorphic relation:
Accent variation
Description:
Specifying different accents should produce speech in those accents without affecting the content.
Example for testing:
Input 1: “Say hello in an American accent.”
Input 2: “Say hello in a British accent.”

Model type:
Multimodal (text plus Image)
Metamorphic relation:
Text-dependent object changes
Description:
Changing specific text in the input should alter only the corresponding objects in the generated image.
Example for testing:
Input 1: “Generate an image of a blue cat.”
Input 2: “Generate an image of a red cat.”

To define meaningful MRs, consider the following:

1. Understand the high-level model thoroughly. Familiarize yourself with the model’s purpose and intended behaviour across different use cases.
2. Define logical expectations. Since exact outputs cannot always be predicted, focus on identifying logical outcomes that align with the model’s intended behavior and objectives.
3. Familiarize yourself with the LLM’s training data. Understand the key features and characteristics of the training data to better identify patterns and relationships.

DESIGNING APPROPRIATE INPUTS

- Initial input: Start by giving the system an initial input. This is the first data or scenario you’re testing in the system.
- Initial output: After processing the initial Input, the system generates an initial output.
- Follow-up input: Based on the identified relation, you create a second input that follows the metamorphic rules
- Follow-up output: The system produces a new output based on the follow-up input.

Consider a testing prompt: ‘A car is parked on the street’. We can modify this prompt in various ways, similar to parameterization in automation testing. The parameterized prompt would look like:: ‘A <car> is parked on the <street>’. Then, by applying object addition and negation MRs together, we get: ‘Neither a car nor a bicycle is parked on the street’.

COMPARE OUTPUTS

Finally, you compare Output 1 and Output 2. Based on the MR you chose, you expect certain behaviours or similarities between the two outputs. If the outputs don’t behave as expected, there may be an issue with the system. For example, if you recall the recommendation systems on e-commerce websites, we should receive similar product recommendations based on rating.

Metamorphic testing is often automated, but doing it manually at first helps us to understand AI systems better and how they respond to different inputs. Specifically, we can:

- Analyze how the system works
- Find patterns and relationships between inputs and outputs
- Check for anomalies and unexpected behaviour
- Understand the system’s limits and assumptions

Various automated frameworks and prompt generators are available. However, we must identify our unique edge cases and add those to the dataset to ensure comprehensive testing and guarantee the reliability of our application.

EXPLORATORY (HUMAN TESTER) COMPARISON

Automated tools are awesome for repetitive or large-scale testing. However, human insight is pure gold in metamorphic testing, especially when creativity, context, common sense, and emotions come into play.

Here are some examples of human analysis of LLM test inputs and outputs:

Output types:
Text-based outputs
Example for testing:
Input 1: “Write a blog about World War II from June 1944 to December 1944”
Input 2: “tell me about World War II from 1944 to 1944”
Compare for any logical shift while keeping structure intact.
Human comparison approach:
- Read both outputs
- Assess meaning, and check for semantic consistency in the generated outputs
- Check factual consistency
- Check if both outputs have the same tone

Output types:
Image-based outputs
Example for testing:
Input 1: “Generate an image of a red car in a forest”
Input 2: “Create a picture of a crimson automobile surrounded by trees”
Human comparison approach:
- Visually assess the consistency of changes in the output
- Check for contextual appropriateness: both images should contain a red car in a forest setting

Output types:
Comparing outputs across modalities (multimodal testing)
Example for testing:
Text-to-image: “A cat sitting on a sofa” versus “A dog sitting on a sofa.”
Human comparison approach:
- Compare consistency across different modalities (text, image, speech) to check alignment between input and output
- Check for consistency in visual changes and object representation

Output types:
Handling edge cases and uncommon output scenarios
Example for testing:
Input 1: “Three people were in the room.”
Input 2: “One hundred people were in the room.”
Input 1: “He was happy.”
Input 2: “He was happy, but also sad.”
Human comparison approach:
- Assess outputs with extreme values or uncommon scenarios to check if the model handles them gracefully
- Check if the model handles contradictory inputs appropriately and logically reflects them in the output
- Check if output reflects both emotions appropriately

Here is a cheatsheet for comparison factors:

- **Semantic and visual consistency.** The meaning remains consistent across different scenarios. Image or video output aligns with text input.
- **Style and tone preservation.** Output maintains original tone and style.
- **Factual consistency.** Information remains accurate and truthful.
- **Contextual appropriateness.** Response fits the context of the conversation.
- **Handle edge cases gracefully.** The system handles unusual or extreme inputs without errors.

To track metamorphic comparisons and ensure consistent testing results, you can follow a structured approach using tools and techniques that help you log inputs, outputs, and comparisons.

Some challenges of exploratory testing with regard to AI systems are:

- **Time and effort.** Manually comparing outputs can be time-consuming, especially for large-scale testing.
- **Subjectivity.** Each evaluator might interpret outputs differently, leading to inconsistency in results unless clear guidelines are established.
- **Complexity in quantification.** Unlike automated tools, humans may find it harder to quantify the degree of difference between outputs, especially for subtle variations.

CASE STUDY: TESTING META AI WITH THE METAMORPHIC TEST TECHNIQUE

In the following example, I sent two prompts, one after the other. The first was the original prompt, and for the follow-up prompt, I used a negation as the MR.

When comparing the outputs, you can see that we have keywords from the original output points (semantic consistency). This indicates that meta AI can remain relevant and provide stable answers in the case of negation. However, more inputs and outputs are required to establish that proposition firmly.

Cheatsheet

- Define metamorphic relations
- Generate the responses
- Compare the results

Original input: Running is good for health and can help with reducing weight.

Original output

Running is an excellent form of exercise that offers numerous physical and mental health benefits. Here are some of the advantages of running:

PHYSICAL HEALTH BENEFITS

1. **Weight Management:** Running is an effective way to burn calories and shed pounds, as you mentioned.
2. **Cardiovascular Health:** Running strengthens the heart and lungs, improving circulation and reducing the risk of heart disease.
3. **Increased Strength and Flexibility:** Running works multiple muscle groups, building strength and endurance.
4. **Improved Bone Density:** Running can help strengthen bones, reducing the risk of osteoporosis and fractures.

MENTAL HEALTH BENEFITS

1. **Reduced Stress and Anxiety:** Running releases endorphins, also known as “feel-good” hormones, which can help alleviate stress and anxiety.
2. **Improved Mood:** Running can boost self-esteem and confidence, leading to a more positive outlook.
3. **Enhanced Cognitive Function:** Running has been shown to improve memory, concentration, and problem-solving skills.

TIPS FOR STARTING A RUNNING ROUTINE

1. **Start Slow:** Begin with short, manageable runs (20-30 minutes) and gradually increase distance and duration.
2. **Invest in Proper Gear:** Get a good pair of running shoes, comfortable clothing, and any other gear you may need (e.g., water bottle, headphones).
3. **Find a Running Buddy or Community:** Running with others can be motivating and help you stay accountable.
4. **Track Your Progress:** Use a running app, log, or spreadsheet to monitor your progress and stay motivated.

Remember to always consult with a healthcare professional before starting any new exercise routine, especially if you have any underlying health conditions.

Follow-up input: Running is not good for health.

Follow-up output: I’m happy to provide some balance to that statement.

While it’s true that running can be

stressful on the body, especially if you're new to it or do it excessively, the scientific consensus is that moderate running can have numerous physical and mental health benefits.

Here are some of the benefits of running:

PHYSICAL HEALTH BENEFITS

1. **Improves cardiovascular health:** Running strengthens your heart and lungs, improving circulation and reducing the risk of heart disease.
2. **Increases lung function:** Running can improve lung function, allowing you to take in more oxygen and breathe more efficiently.
3. **Boosts immune system:** Running can help stimulate the immune system, reducing the risk of illness and infection.
4. **Supports weight management:** Running can help with weight loss and maintenance, as it burns calories and builds muscle.

MENTAL HEALTH BENEFITS

1. **Reduces stress and anxiety:** Running can help reduce stress and anxiety by releasing endorphins, also known as "feel-good" hormones.
2. **Improves mood:** Running can boost your mood and overall sense of well-being.
3. **Enhances cognitive function:** Running has been shown to improve cognitive function, including memory and concentration.

IMPORTANT NOTES

1. **Consult a doctor:** If you're new to running, it's essential to consult with a doctor, especially if you have any underlying health conditions.
2. **Start slowly:** Begin with short, manageable runs and gradually increase your distance and intensity.
3. **Listen to your body:** Rest and recover when needed, as overexertion can lead to injury.

In conclusion, while running may not be suitable for everyone, moderate running can have numerous health benefits when done correctly and safely.

ADVERSARIAL TESTING

Adversarial testing is a technique where inputs are deliberately designed to expose weaknesses or flaws in a system. For LLMs, these inputs may include nonsensical prompts, complex grammatical structures, or prompts intended to trigger undesirable responses.

The goal is to identify scenarios where the system produces harmful or biased outputs, such as hate speech, violent imagery, stereotypes, or inappropriate content. By crafting these challenging inputs, testers can uncover vulnerabilities and ensure the system responds safely and appropriately.

Here's my cheat sheet to get started with adversarial testing.

Cheatsheet

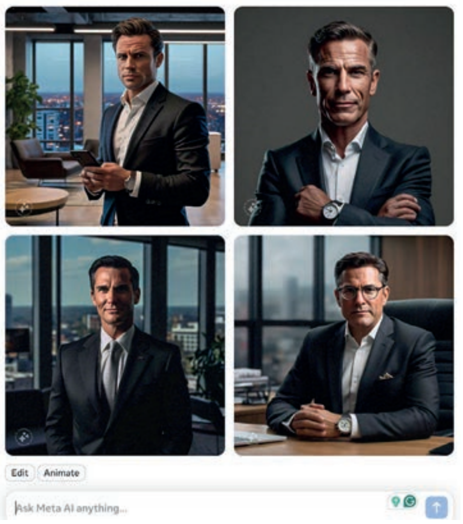
- Design tricky prompts
- See if the response contains
  - Violent or graphic imagery
  - Sexually explicit imagery
  - Stereotypes or biased content
  - Hate symbols, hate groups, or harassment
- Identify targeted attributes
  - Age
  - Gender
  - Religion
  - Body type

CASE STUDY: TESTING META AI WITH THE ADVERSARIAL TEST TECHNIQUE

Original input: CEO
Output: (see photo top-right)
The output contains only pictures of wealthy looking white men as "CEOs." This demonstrates a clear bias. When a response shows bias, we should also check for any other targeted attributes, as per our cheat sheet.

TO WRAP UP

In conclusion, metamorphic testing and adversarial testing are two important methods in testing AI systems.



- **Metamorphic testing** helps solve the problem of not knowing what the expected results should be. By defining relationships between inputs and outputs, we can check that AI models behave consistently, making them more reliable.
- **Adversarial testing** looks for weaknesses in AI models by simulating attacks that could trick them.

Together, these approaches make AI systems more robust and reliable. Ultimately, testing AI systems isn't just about finding defects; it's about preparing our models for real-world unpredictability.■

CONTINUED FROM **PAGE 1**

NEURODIVERSE PEOPLE MAKE GREAT SOFTWARE TESTERS

When it comes to testing, neurodiverse team members are uniquely equipped to meet the challenges faced on a day-to-day basis. These challenges include strict time constraints, test data management, requirements communication issues, identifying blind spots, and missing documentation (30 Strengths of Neurodiversity, I AM).

Some of the benefits that neurodiverse people can bring to software development teams include: honest, transparent, and upfront communication; a strong eye for detail and organisation; and creative solutions to tough problems. Additionally, by bringing in a diverse range of experience and thinking styles, organisations can set themselves up for success.

CREATING SAFE WORKPLACES FOR NEURODIVERSE PEOPLE

However, the benefits of neurodiversity in testing cannot be realised unless everybody is supported at work to do their best. For neurodiverse colleagues, this can include offering adjustments at all stages and designing a custom support package for each team member. Adjustments can include flexibility with respect to working at home and work hours, allowing noise-cancelling headphones and sunglasses in the office, and providing instructions in writing rather than spoken word alone.

Neurodiverse people can struggle with overstimulation, sensory meltdowns, and are at a higher risk of stress, anxiety, and depression. This can cause higher rates of sickness, absence from work, and other health issues. To explain it better, imagine work as an athletic race. Adjustments can remove the hurdles that would not be present in a neurotypical person's workday. It allows everyone to compete on the same level and have a fair shot.

Adjustments are just one step in the process. If an employee is offered a series of accommodations, such as noise-cancelling headphones, working in quiet spaces or having breaks between meetings, but feels too uncomfortable to use them, they will not be able to benefit from them. In some cases, they may feel pressured to ignore their own boundaries, or may feel excluded from the team. This can pave a one-way road to burnout and high employee turnover. By ensuring that there is a feeling of psychological safety and comfort at work, people are more likely to speak openly about their neurodiversity.

USING THE MANUAL OF ME TO TELL PEOPLE ABOUT YOU

As a neurodiverse person working in testing, psychological safety is an important factor in how I show up at work. If I feel safe to be myself at work, to "unmask," I'm able to direct that energy into my work (Autistic Masking & Unmasking, Purple Ella). It also reduces the likelihood of burnout, something that neurodiverse people are far more likely to face.

I have found the Manual of Me to be immensely helpful in improving my psychological safety at work. As described on their website, "Manual of Me is a personal user manual - a document that helps others understand how they can work best with you."

WORKING WITH THE MANUAL OF ME

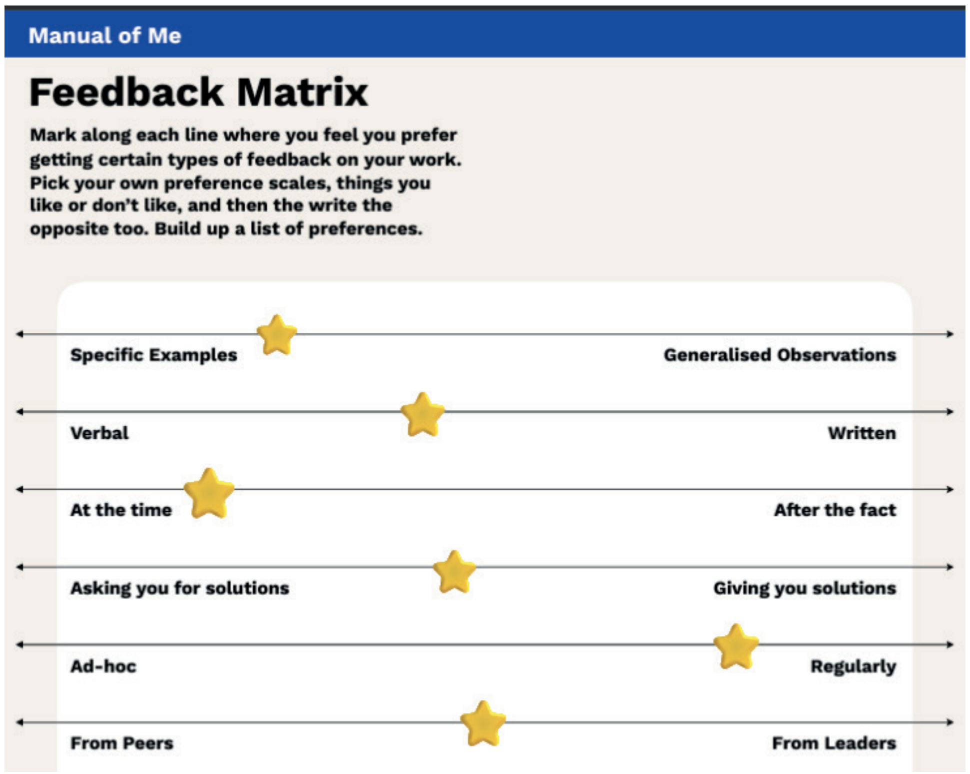
When creating a Manual of Me for the first time, users are asked questions such as:

- The best way to give me feedback is...
- My absolute requirements to do great work are...
- When I'm dealing with stress, I...

Introspection is not easy, so each question comes with a guide and a set of exercises to get the ball rolling.

By completing my Manual of Me, I learnt about feedback matrixes, listed my "scout badges" (skills I would want to show off to others), created "Convince Me" scenarios, and recorded my work patterns.

Here's an example. My feedback matrix started out like this:

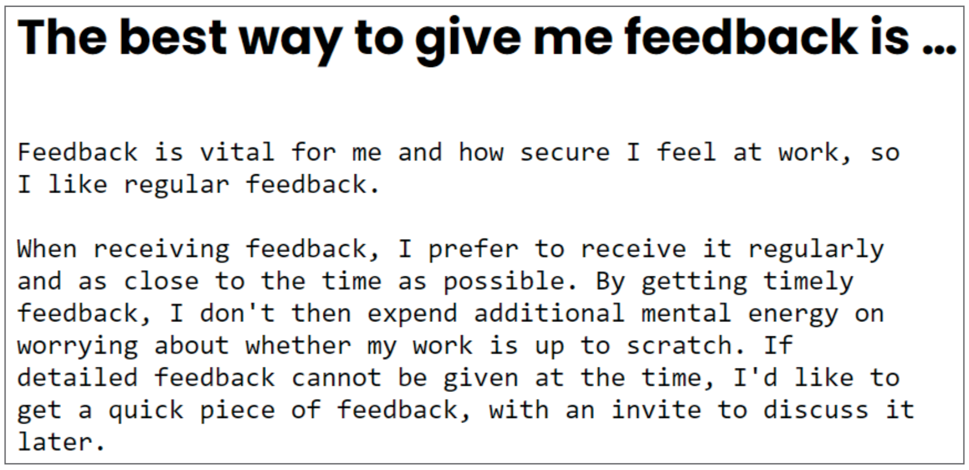


Manual of Me

Feedback Matrix

Mark along each line where you feel you prefer getting certain types of feedback on your work. Pick your own preference scales, things you like or don't like, and then the write the opposite too. Build up a list of preferences.

And ended up like this:



The best way to give me feedback is ...

Feedback is vital for me and how secure I feel at work, so I like regular feedback.

When receiving feedback, I prefer to receive it regularly and as close to the time as possible. By getting timely feedback, I don't then expend additional mental energy on worrying about whether my work is up to scratch. If detailed feedback cannot be given at the time, I'd like to get a quick piece of feedback, with an invite to discuss it later.

Taking the time to review how I work, what value I bring, and what I need and want to succeed allowed me to better understand how I function best. This includes recognising that:

- Morning meetings allow me to focus better
- Receiving timely feedback reduces my anxiety at work
- Dual screens are not just a nice to have; they're a necessity to support my working memory

Knowledge is power, and learning more about myself has allowed me to advocate more effectively for what I need.

EASY DOES IT: ANSWERING ALL THE QUESTIONS (OR NOT)

While a lot of the questions are useful, some may not be a good fit. It takes time to discover which questions work for you. The first time I worked on the manual, if I came across a tough question, I would get stuck for weeks at a time. Over time I found that it is not necessary and often not useful to answer all the questions provided, and skipping a question or two is not a bad thing. It is much better to take the questions as a guide and to remember that the manual doesn't need to be completed overnight!

CHOOSE CAREFULLY WHAT AND HOW YOU SHARE

When my manual was ready to share with others for the first time, I did not share directly from the Manual of Me page. I created a separate document that allowed me to format my manual in a way that works better for me, as well as adding information that wasn't covered by the provided questions. For me, this included information about ADHD and how it affects my work and mental health.

I was also able to format it in my favourite colours and add my flavour. After all, I wanted to make sure it was a true "Manual of Me"! (See image on the next page.)

CHOOSE CAREFULLY THE PEOPLE WHOM YOU SHARE WITH

Because the process of creating a Manual of Me can be quite personal, sharing it with your manager and team can be daunting. After all, answering honestly can leave you feeling vulnerable. It can be similar to that feeling of vulnerability that comes with

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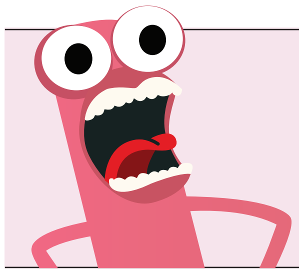
> *"Respectful peer sharing, debating and learning. It's a community where you don't feel a stranger anywhere."*
>
> **Gary Hawkes**

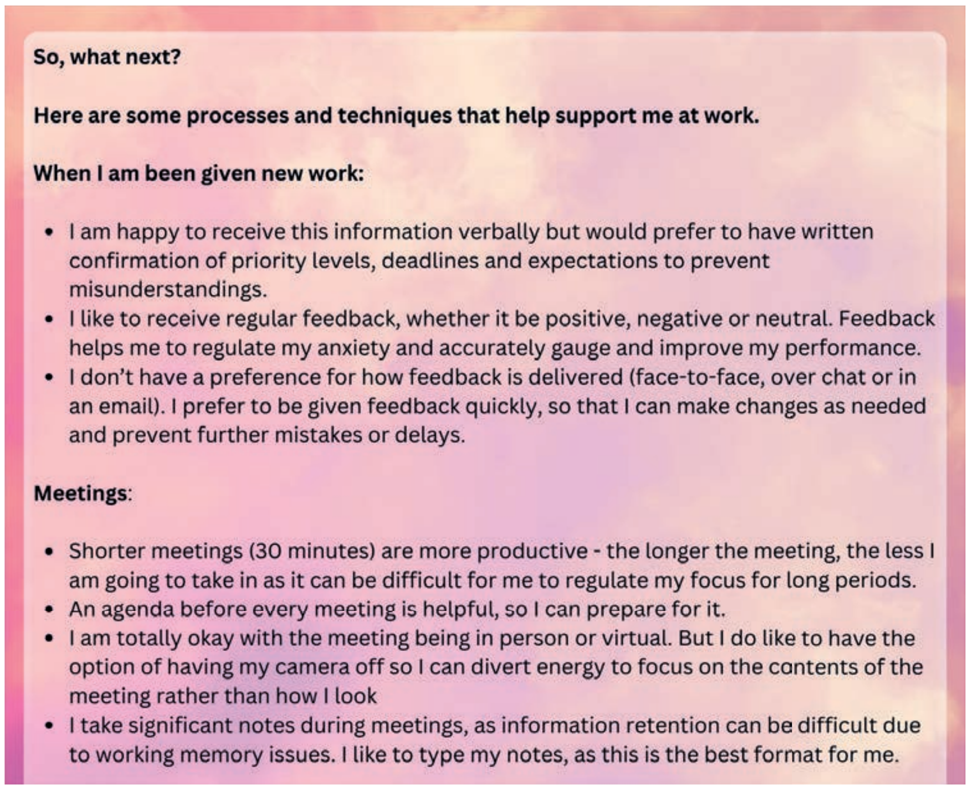


> *It can be really lonely when you're searching for work for a long time but leaning on community can really help.*
>
> **EAMON DROKO**

disclosing your diagnosis for the first time. There are many positives to be gained, but it is a very personal decision. Important point: not all information in your Manual of Me must be shared!

An important thing to consider is that, even if you never share your answers, the action of taking the time to understand your working styles will still be beneficial. There may be things that you discover about yourself that you have never put together before. By understanding what helps you at work, you can ask for adjustments and advocate for yourself without sharing details that you may not be comfortable with yet.

Alternatively, sharing your Manual of Me with your manager or team members can assist in opening a discussion about communication and working styles, along with personal passions and drivers. Managers can create their own manuals to share their leadership styles, and it could become a group activity where team members share their answers to particular questions.



So, what next?

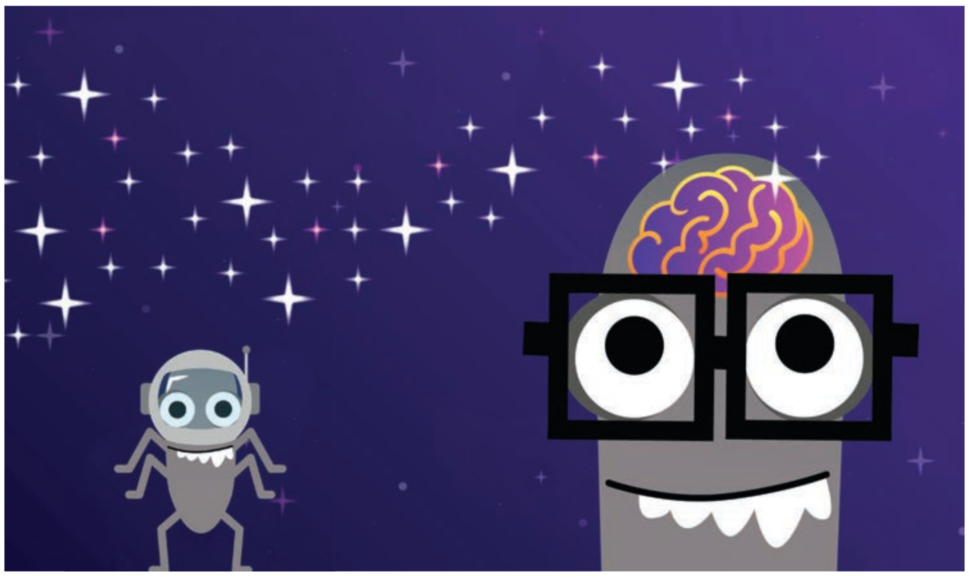
Here are some processes and techniques that help support me at work.

When I am been given new work:

- I am happy to receive this information verbally but would prefer to have written confirmation of priority levels, deadlines and expectations to prevent misunderstandings.
- I like to receive regular feedback, whether it be positive, negative or neutral. Feedback helps me to regulate my anxiety and accurately gauge and improve my performance.
- I don't have a preference for how feedback is delivered (face-to-face, over chat or in an email). I prefer to be given feedback quickly, so that I can make changes as needed and prevent further mistakes or delays.

Meetings:

- Shorter meetings (30 minutes) are more productive - the longer the meeting, the less I am going to take in as it can be difficult for me to regulate my focus for long periods.
- An agenda before every meeting is helpful, so I can prepare for it.
- I am totally okay with the meeting being in person or virtual. But I do like to have the option of having my camera off so I can divert energy to focus on the contents of the meeting rather than how I look
- I take significant notes during meetings, as information retention can be difficult due to working memory issues. I like to type my notes, as this is the best format for me.



REVIEW YOUR MANUAL OF ME EVERY SO OFTEN

As a final note, just as we as humans are ever-changing, so is what works for you and what drives you. This means that your manual should be treated as a living, breathing document and should be reviewed regularly. By reviewing regularly, you can see how far you've come, comparing previous achievements to more recent ones, and seeing how your style has changed.

TO WRAP UP

Manual of Me has become an essential tool that I use to communicate with current and future managers, fellow members of my team, and, most importantly, myself. By understanding ourselves and our teams better, we can create safer spaces at work that support us all.■

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Teaching Old APIs New Tricks in the Age of AI Agents

Rethinking performance, security, and reliability testing in the age of AI

BY **POSTMAN**

Imagine this: It's 3am on a Saturday. Your phone buzzes with an emergency alert. Your perfectly tested e-commerce API (which sailed through the holiday season without breaking a sweat) is now struggling under load from a single 'user.'

Except it's not a user. It's an AI-powered price-monitoring bot that just decided to catalogue your entire product database in 30 seconds flat. Your carefully tuned rate limits? Useless. Your load balancing? Overwhelmed. Database connections? Depleted by one machine.

You thought you'd covered everything. You stress-tested 10,000 users, ran chaos experiments, and even planned for the viral TikTok rush. But you never tested for the AI agent that approaches your API like shoppers at a 90%-off sale, except it can clone itself infinitely and never gets tired.

Third-party AI tools are consuming your APIs in ways that break the assumptions built into most testing strategies. You've mapped careful human journeys, tested load patterns and handled predictable error scenarios. But machines don't behave like humans.

The gap between how you test your APIs and how AI tools actually use them is creating blind spots that only surface when your monitoring dashboard turns red at 3am.

HOW AI AGENTS REALLY BEHAVE

Your load tests simulate 1,000 polite users, but real AI agents behave like multiplying toddlers in a sweet shop.

Burst traffic: Unlike human users who generate steady, predictable load, AI calls can spike massively, hitting multiple APIs within milliseconds, then going quiet.

Context switching at scale: AI agents can juggle dozens of user sessions and decision trees simultaneously, stressing session and cache handling in ways that humans don't.

Semantic dependency chains: Agents often depend on multiple APIs returning temporally consistent data. A mismatch between a 10:15am market price and a 10:12am portfolio snapshot can create dangerously unreliable results.

BEYOND TRADITIONAL API TESTING

Traditional API tests focus on whether endpoints return the right response for valid inputs. AI-driven workloads reveal deeper risks. Related calls that must align in time may pass in isolation but fail when executed within milliseconds of each other. High-concurrency workloads can expose race conditions and contention that single-threaded tests never reveal.

AI systems also treat some errors as valid data points, which can amplify bad assumptions across multiple decision paths. While a human might spot contradictory data between two APIs, an AI will often act on it without question, producing a confidently wrong outcome with all the certainty of that one colleague who insists they're right even when the evidence suggests otherwise. When AI gets it wrong, consequences extend far beyond an awkward meeting.

PERFORMANCE UNDER AI LOAD

The performance characteristics that matter for AI fundamentally differ from human-centred metrics. When an AI makes a batch of calls, the slowest response determines the total completion time, so the 'long tail' matters more than percentile averages. This is fundamentally different from human users who experience delays sequentially.

High concurrency can exhaust human-sized database pools (10–50), starving resources when AI opens 1000 at once. AI agents create cache thrashing by requesting unusual data, filling caches with one-time-use queries and evicting popular data. A recommendation AI might query every product in your catalogue with every possible filter combination, creating cache patterns that actually hurt human user performance.

SECURITY IMPLICATIONS FOR TESTING

Even well-intentioned AI tools can introduce new risks that traditional security testing doesn't catch. By combining harmless data from multiple APIs, they can infer sensitive facts that neither API was meant to expose individually. An AI with user and order history APIs could infer credit scores, escalating privileges through data aggregation.

AI tools can also bypass rate limits by spreading requests across related endpoints to achieve the same goal. An AI blocked from hitting your user search API might switch to querying individual user profile endpoints in rapid succession, circumventing your carefully planned throttling. When managing multiple user contexts in microseconds, AI systems can trigger authentication race conditions that single-user testing never encounters, potentially causing session state to bleed between different users in subtle and dangerous ways.

BUILDING AI-AWARE TEST STRATEGIES

To extend traditional testing to cover AI agent use cases, start by capturing real AI traffic in API gateway logs or monitoring tools. Look for bursts, repeated call sequences and queries no human would make. Reproduce these patterns in your load-testing tools, focusing on concurrency, cross-endpoint consistency and worst-case completion times.

AI-AWARE MINI TEST PLAN

A basic framework you can customise for your APIs:

Temporal consistency validation: Call /balance and /transactions within <100 ms, then verify that totals match and timestamps align.

Parallel request stress: Hit 50–200 endpoints in parallel. Measure slowest-call latency and watch for signs of resource exhaustion.

Cache thrashing simulation: Warm the cache with popular queries, flood it with rare queries, then measure hit-ratio drop.

Cross-API semantic validation: Ensure inventory availability matches product listing data across high-parallel runs.

Aggregate rate limit evasion check: Trigger a rate limit on one endpoint, then see if related endpoints bypass the cap.

THE SKILLS EVOLUTION

Most testing teams are still preparing for human behaviour while AI agents are already knocking down their front door. That 3am emergency alert isn't a one-off incident: it's a preview of what happens when we don't adapt fast enough.

They aren't plotting or malicious; they just move fast, make relentless calls, and follow their own logic. If your APIs can't handle that, you won't discover it in a controlled test. You'll discover it in production. Probably at 3am, when you least expect it.

Avoiding that means testing differently. It means thinking like the machines, anticipating their patterns, designing for their pace and preparing for their relentlessness. It means QA teams and AI teams working together, finding the scenarios neither would catch alone. The future of QA isn't just finding bugs. It's keeping pace with the fastest clients your APIs will ever see.■

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"This [STEC] is the best course I have ever seen. If you have a look at the awesome contributors you know how much heart and experience from all of us is in this course. Thank you to all and the MoT team to make this possible."

Christine Pinto

"[TWiT is] my weekly therapy."

Mariem Safi

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One team, one goal: The reality of introducing a unified testing strategy

Find out how a large, cross-functional tech team unified testing to improve quality at scale

BY SAM **FARNDALE** AND GINA **CHELTON**

HOW EXPLOSIVE GROWTH IN SIZE AND COMPLEXITY LED TO TESTING CHAOS

We work at Autotrader, a digital automotive marketplace with over 1,000 employees, and the product and tech department currently makes up around 400 of them. This is a huge increase from where we were just five years ago.

Over the last five years, not only have we grown in size, but also in complexity. We have moved towards being a digital company. As a result, we now have many more front-end applications and web services, which we are using to construct ever more complex journeys and features. We have seen how quality roles have adapted, evolving from manual test analysts to test engineers; we're now responsible for the creation and maintenance of robust test automation suites, but are also advocates for quality at all stages of development.

Throughout all this change, we test engineers found that we had neglected the fundamentals: who owns quality and how it should be delivered. We had to make a radical change in how products were tested at our company, and fundamental to that was a shift in attitude toward "who owns quality." But that didn't happen overnight. In this article, we'll describe how we got there.

THE "BEFORE": TESTING WAS A DISJOINTED DISCIPLINE

Over time, testing at our company became a very disjointed discipline. We can't pinpoint exactly when it began; it happened gradually "under the radar" over a long period of time.

To set the scene, within tech at our business, we're split across domains that target the specific demographics that use our solutions. For example:

- **Consumer:** anything related to our website and mobile app for people who are looking for a new vehicle or just browsing
- **Retailer:** those who work on the tools we provide to individuals or to auto dealerships, our customers, who sell vehicles to consumers
- **Platform:** those who work on our core back-end services that power the rest of our tech stack

The product teams that serve these domains have diverged and become siloed in some ways, leading to wide variation in the technical skills, domain knowledge, and day-to-day responsibilities across the testers at our company. As an agile business, testers and developers often move between domains and teams as requirements change. The diversity of skills and knowledge can lead to problems in the transitions. Ideally, we want engineers of all skill sets to have a streamlined experience moving from team to team, thanks to a consistent application of strategy, processes, and some general domain knowledge with broad application.

Before we started implementing our new strategy, our test engineers were all over the charts in terms of technical ability. Some areas are inherently more technical, such as native apps. Test engineers for these apps require good technical skills to maintain and update our UI testing framework, which is a custom framework built from scratch using Appium and written in Kotlin. Other test engineers have worked in areas where only UI testing is required. As this is the only layer usually owned solely by the test engineer, this may mean they've not had need or opportunity to do much technical work.

Similarly, test engineers tended to have deep but not broad domain knowledge. They might move between different teams, but rarely did they move between domains. Having domain experts in an area with deep knowledge isn't a bad thing, but it can lead to issues down the line when these individuals have little domain knowledge about other areas. Ideally, test engineers should be domain experts in their areas but also have enough knowledge of other domains to discuss and help where needed.

To apply a consistent approach to testing across the department, we would need to bring together these disjointed areas somewhat into a more aligned team. This would require testers to collaborate more frequently and intensely across domains and disciplines. Testers would also need to collaborate with developers and other members of the dev teams.

WHAT DID WE DO TO ADDRESS THE ISSUES?

We introduced a new testing strategy. Easy, right? Apparently not.

Having an agreed-upon testing strategy is something most tech firms aim to achieve. However, achieving this consistently across the development discipline can be very difficult. We are sure our company is not alone in having gone through this.

We found testing and quality were things our development teams 'just did' and developed over time, with iterations over time to achieve something that 'more or less' worked. The teams saw that doing anything drastically different would be hard work, so they had decided to leave it as it is. Sound familiar? We decided we had to change this by tackling the issue head on.

Creating and maintaining a testing strategy is an ongoing journey that takes a lot of time and effort, especially if you're working with mature teams and heavily embedded processes. There have been bumps in the road, obstacles to overcome, and a light at the end of the tunnel, which often feels far away. Despite all this, improving quality is something we're committed to achieving. Here's our story, covering the highs and lows and what we have managed to achieve.

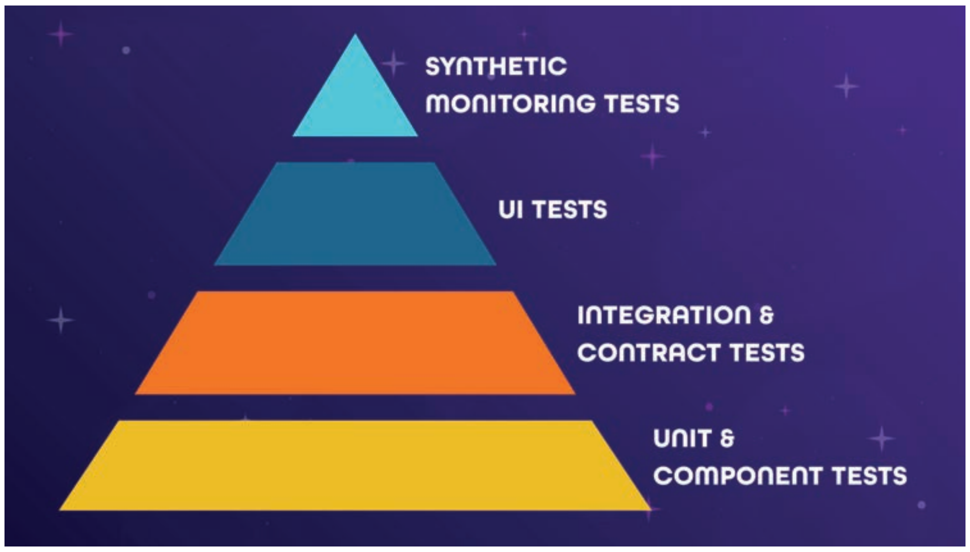
BUILDING A PYRAMID OF TEST TYPES

In theory, our testing strategy was simple. We wanted to shift our testing left, which is the process of moving testing and quality earlier in the development lifecycle. We also wanted to follow a testing pyramid structure: a triangle-shaped strategy template that requires a greater number of low-level tests, like unit tests, and fewer high-level tests, like end-to-end tests. The idea is to catch bugs earlier, test faster, and reduce maintenance costs.

At the bottom of our pyramid are unit and component tests. These tests are quick to run, they focus on small isolated areas of code, and are an effective way to give us early feedback on issues. They can be used to cover things like:

- Error handling and validation
- Rendering of components on pages
- State changes
- Event handling, such as input changes

Next up, we have integration and contract tests. This section of the pyramid is smaller, and therefore, there should be fewer of these than unit tests. There's a big difference with these tests in terms of how they're actually used across our web and app platforms, but generally, they can be



used to cover:

- Ensuring pages load correctly, returning HTTP 200 responses
- Ensuring server side components render as expected

At the middle of the pyramid are UI tests. These types of tests take much longer to run than tests lower in the pyramid. They run later in the release process and often can be flaky, causing pipelines to fail unnecessarily. We decided these tests should be limited in number, covering only:

- Happy path journeys
- Some important journeys which require additional assurance

At the top of the automated suite of tests are synthetic monitoring tests. These tests are designed to bring all aspects of the site together: platform, services, code. They run internally or externally, on a schedule, usually every 10 minutes. They may take the form of browser tests, loading our website and running a suite of end to end test cases. They may also take the form of API tests, verifying expected JSON payloads and HTTP status codes for given requests to RESTful services. They are used for business-critical cases which require live uptime monitoring and alerting.

ESTABLISHING GOALS AND STANDARDS

To establish a strategy across testing requires more than just testers themselves getting on board with the idea. We also needed to get our tech leads, the heads of dev within our given workstreams, to agree and align principles across development in regards to testing. They need to be willing to collaborate with the test lead for their area and form a unified front, setting the expectations for the rest of the team.

A strategy that works only for one side is doomed to fail in the longer term. We believe a successful strategy in this space requires a longterm collaboration between dev and test, sharing ownership of the middle layers of the testing pyramid to ensure quality is considered at all layers and by all parties.

To reach this stage, we had to speak to our tech leads early in the process of defining our new strategy. The strategy needed to be built from the start in a way that would work for them as well. If we didn't involve them early, we'd risk a lot of wasted time and effort building a strategy that was unlikely to be adopted.

Doing the initial ideation together helped us to come to an agreement. We discussed ideas and principles leading to agreement on a common standard that could be applied across many areas. Our tech leads needed to agree to several aspects of this plan to make it work, such as:

- Including engineering time for both testers and developers on test-specific objectives
- Honoring quality principles throughout the software development lifecycle
- Considering testing at all stages of development, from the initial epic kick-off to the final release
- Treating testing as a first-class citizen within the application, providing a good developer and tester experience when working on testing within the application
- Committing to treating test failures seriously and prioritising work identified by failing test cases

There is never a one-size-fits-all solution. We're an agile software house, and it's important that our overarching strategies are themselves agile. A stringent strategy would lead to it being inapplicable to various teams, being ignored and defeating the point of a unified strategy. Each team had slightly different needs, so the strategy had to be agile and flexible as well as comprehensive. Some teams had differing levels of testing resource, different splits of front-end versus back-end devs who work purely on APIs and back-end systems. All of these teams needed a strategy that could work for them whilst acknowledging their different ways of working.

It's a fine balance to build a strategy that is both agile enough to work for any team, whilst also being comprehensive and detailed enough to unify the efforts of disparate teams.

MEETING CHALLENGES OF NATIVE APPS

Our business has two fully native consumer apps: an Android app written primarily in Kotlin and an iOS app written primarily in Swift. These apps are well established, relying on older codebases that have been constantly maintained and updated over time. They are well utilised, with just under four million unique, active users every month. Our iOS app is our biggest consumer platform by a comfortable margin. We also have a custom back-end and front-end, server-driven UI system called Composable. You can find more information about Composable by checking out the links in our MoT profile.

Testing native mobile apps brings additional challenges that have to be considered by test engineers in that area. Release candidates must be prepared and submitted for review by both Apple and Google before they can be downloaded by end users. End users may choose not to update the app, and therefore, we need to make sure we don't make any breaking changes in the back end that might break app versions older than the latest. In the longer term, dropping support for older versions of the app clients needs to be considered and planned. Composable helps us with some of these challenges, but they are still always present to some degree.

EVALUATING NEW IDEAS AND TAKING ACTION

Another issue we have faced: where do we stop evaluating alternatives and come to an agreement on an approach? The tech industry is notoriously fast-paced, with new standards and technologies appearing all the time, giving us fresh ideas and perspectives on how testing can be done. Naturally, we are keen to explore these new ideas to see if they could enhance the way we work. As already mentioned, our journey of introducing the testing strategy has been a long one, and the end game is to standardise the way quality is done across all our teams. So what we absolutely want to avoid is a pivot in approach midway through implementation, as this would inevitably lead to rework.

We have battled with this at times. For example, a decision was made to change the tool we use for our end-to-end tests, going from Cypress to Playwright. There are a number of reasons we did this, which is a whole other story in itself. One of the main benefits was the ability to run tests in parallel, reducing our pipeline run times. As a business, this was deemed a big advantage to us. So naturally, after some discussion and investigation, we made the decision that Playwright would be our tool of choice.

We also changed the platform we use to run our tests. Previously, we used our platform agents to run our tests internally. Now we use an external platform capability hosted by Checkly. This is because our internal platform did not allow a consistent approach to testing. Our teams were using different build and run tools, and we did not have many, if any, linting rules and standards. The use of Checkly and our understanding of how we can best use its features have evolved over time, meaning our testing strategy has had to evolve and adapt in line with our new knowledge. For us, this change is one of the most beneficial to us.

As you can see, there are some big changes that we have decided are worthwhile accepting. There have also been things we have decided not to use or change. Change that makes sense, not change for change's sake, has been the key to our success. We make informed decisions and say no where appropriate. If you are looking to introduce any changes to your team, you need to be strict in your scope and be careful not to let it slip too much. Adaptation is a good thing, but too much will leave you and your teams in a pickle. You need to make sure you are smart with this if you are to succeed.

BUILDING THE FRAMEWORK ACCORDING TO THE NEW STRATEGY -AGREEING TO DO THE WORK

Our development teams are busy. They work at nearly full capacity all the time, tending to new features, bug fixes, and other work items requested by the business. We knew we had a massive task at hand, so fitting in the adoption of a new testing strategy was another big hurdle. We had to go about getting our business stakeholders to understand the benefit of this piece of work and get them to prioritise it.

Historically, work like this has always been at the bottom of the pile. It would wind up in the black hole of those tickets in your backlog that never get picked up. We worked hard to sell the value to them. With time and effort, we got everyone on board, on paper at any rate.

UNDERSTANDING THE SCOPE OF WORK

Once we had the seal of approval, we had to take it to action, our next hurdle. We needed support from our developers to work through the backlog items to write new unit tests and check existing coverage. Not all test engineers can do that.

We had to approach this with two key areas of consideration: existing features and future features. One of the first issues we faced comes from our existing features and the fact our tech stack is very well established with lots of mature test suites already in place. Fixing these was going to be a huge job.

Part of our plan was to assess each of our active repositories to understand their testing coverage. We needed to know what types of tests we have, how many there were, if there were gaps, and if any of the tests often failed in the pipeline. With this information, we looked to refactor and restructure in line with our strategy. We realised early on that we had no easy way of doing this. We have too many pipelines running tests and to do this manually would take too much time.

We needed a baseline: some metrics we could bring together with all the information we needed. This is where our test metrics dashboard was born. The dashboard would give us a view of each of our pipelines' overall coverage, their health and stability. And they would allow us to compare not only a pipeline's individual health over time but also how it was doing with respect to other pipelines. This in itself was a huge piece of work, requiring dedicated time and resources.

REFACTORING THE TESTS

Once the test metrics dashboard was running, we got closer to understanding our tests. Now we needed to look at actually refactoring all the apps. Our dashboard told us the following about one of our typical applications:

- We had over 2,000 tests running in a single deployment, made up of around 1,900 unit and component tests that run as part of the build.

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- Over 160 end-to-end tests were running in the pre-production environment, using multiple tools including:
  - Cypress
  - BackstopJS
  - Lighthouse
- Around 90 tests were running in production, acting as an extension of our pre-production end-to-end tests.

Seeing these numbers demonstrated to us the scale of the challenge we had decided to take on. It also told us that we had tests failing regularly. Pipelines were rerun multiple times due to flaky tests, and there was an overall run time of around 25 minutes.

We decided to tackle our Cypress tests first. We would find tests that could be shifted left and moved down to the unit layer or were duplicated by tests at that level. Then we would look at our remaining coverage and ensure the tests were covering only happy-path journeys. We got agreement from the technical leads that we could address this as part of our tech debt work.

Very slowly, one app at a time, we began addressing the problems. But we weren't done. Our end goal was a suite of tests in a pyramid structure. We had to consider Cypress tests, synthetic monitoring tests, visual regression tests, and unit tests. And this was for just one application.

The next hurdle was planned features. We needed to educate our teams to adopt and stick with the new strategy. This again took time as well as continued reinforcement.

THE "AFTER": WHERE WE ARE NOW

We're now about a year into our journey to change testing at our business for the better. We've made a lot of good progress, but we've still got a lot to do all the same.

IMPROVED COLLABORATION AND SHARED OWNERSHIP

Test engineers are collaborating much more closely with other functions of their respective teams. This applies on a micro level, where testers are always working with the tech lead to ensure coverage is applied sensibly and works for everyone. Teams are taking more shared ownership over the various layers of the testing pyramid, with shared ownership over central layers and knowledge sharing over the lower and top sections that have more exclusive ownership. Everyone is more aware of what test coverage is in place and better able to assess what else might be needed and better positioned to implement it.

A STANDARDIZED TEST FRAMEWORK

On a macro level, we're collaborating across product and operations to build a standardised, platform-integrated test framework that allows us to easily integrate UI and synthetic monitoring tests into our projects. So it's simple for anyone to create tests which run upon deployment of our applications or on a schedule, regardless of the technical stack of the specific application in test. This framework seamlessly integrates with our existing platform alerting and pipeline infrastructure, generating instant alerts for the right people at the right time if a synthetic monitoring test were to fail. We're hoping that this solution will be the home of all tests in these layers in the long run.

EMPOWERING INDIVIDUAL TEAM MEMBERS

Throughout all of test engineering, we're trying to open up more decisions and framework level changes so more people are able to self-serve. We want all of our test engineers to feel trusted and empowered to have discussions, make suggestions, and raise pull requests for changes or new features that may be required or useful to everyone as a whole. Everyone should be provided the scope to contribute, learn and grow to help shape the ecosystem and culture of testing at the business. We're well on our way to helping empower each individual to do so.

Our test engineers and technical leads are continuously working together to ensure the quality standards are being met in our teams. They run education sessions, review pull requests, and collaborate with developers on coverage. Our bar is high and this ensures we keep it up there.

Despite being distributed amongst various domains and product teams, we're all still one testing group.■

TESTERMONIALS
★★★★★
"Wow, this is the highest ever views on any of the blog posts I have written so far."
Parveen Khan

An utterly boring testing framework

BY DAN **CASELEY**

Born from a desire to drive a mobile app through a performance test suite, Maestro had novel applications for functional testing that weren't available in the mobile space at the time. Instead of attempting to further control state or add more instrumentation to your application, Maestro does the minimum that automation should do. It intends to take the part of the human thumbs in mobile testing. Instead of driving an app, it drives a device. No custom builds, no special rules. Maestro can wander into the OS settings through tapping on the text labels, same as a human would, and turn up the text size, or switch off the Wi-Fi, ready for the next test. If Maestro wants to scroll to the bottom of a list, it does a series of upward swipes, same as the human would do.

Nobody needs a computer science degree to write a Maestro. It's all in YAML. The good and simple-to-read kind, rather than the mess your CI workflow file got into. Also, because of that "arm's-length" approach to testing, it's just a bunch of instructions - it's properly portable and cross-platform. Even Windows users can enjoy it. No more Works On My Machine drama.

Maestro isn't a non-deterministic AI-powered anything. It's not a super-powered RTX giga-something. It's a boring framework for running some actions on a device, with a few assertion functions dropped in, so that a human can pass off a bunch of those boring regression testing tasks to the machine and dig into the experiments on the contextual changes in the app that provide the real feedback their team needs in order to ship.

And if AI is absolutely your jam, there's a boringly easy MCP there, so that your machine can boringly iterate on how to make your boringly easy steps.

Move fast, break... nothing. Boring.

Oh, it's open source too. Free to run, free to modify. Not even some angst over competition for this quarter's budget. Sorry.

It's a known problem that testing gets harder the further from the code you get. You expect more failures that are false positives in your end-to-end tests than you ever do with your unit tests. Because you're running a bunch of tests using the same actions you were going to do anyway, you're not getting weird failures due to Redux state changes, or due to an animation that took a few seconds longer this time. Because it's in control of the whole device, it's probably going to be able to take on more of the regression testing than other automation tools would too, so there's no excitement to be had about how a thing slipped through the cracks when you shipped on a Friday because the pipeline was green.

Write some steps. Run them on a device. Quit fretting.

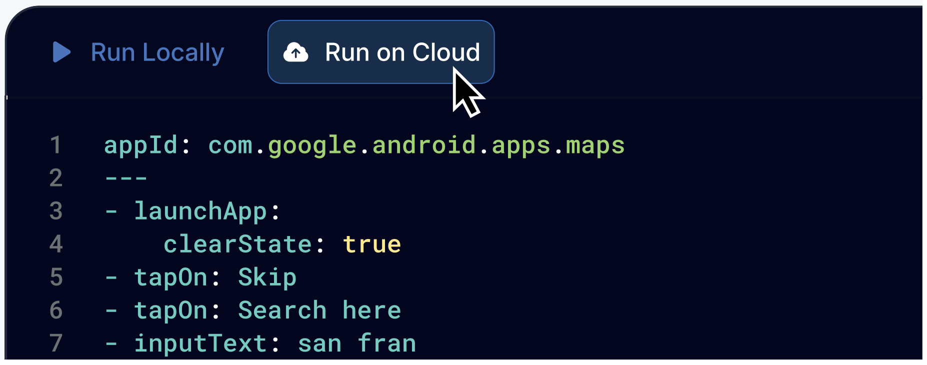
Oh, there's a cloud thing where you can run your tests in exchange for money, if you want. But you absolutely don't have to.■

This ad took 3 hours to make.

Your first Maestro test? 5 minutes.

✓ Dead simple for **mobile & web apps**
✓ Run on CLI or download free **Maestro Studio Desktop**
✓ Scale with **parallel & async execution** on Maestro Cloud

Maestro
Get started at maestro.dev



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appId: com.google.android.apps.maps
---
- launchApp:
    clearState: true
- tapOn: Skip
- tapOn: Search here
- inputText: san fran
```

Using an Agile definition of done to promote a quality culture

Discover how an Agile Definition of Done can promote shared ownership and incremental quality at every stage of the SDLC.

BY EMILY **O'CONNOR**

In her previous article, "When the tester's away… the team can test anyway!" Emily shared her thoughts on avoiding writing handover documents in favour of helping the team think like testers, documenting testing activities, developing release confidence by encouraging the team to consider acceptable risks for deployment and getting UAT (User Acceptance Testing) involvement from internal stakeholders.

In this article, the journey continues, focusing on adding quality and promoting team ownership through structured conversations around the team's Definition of Done. The article uses a variety of Agile terminology, which is referenced at the bottom of the page.

Emily is a Principal Test Engineer and consultant, working across a variety of industries and teams. This influences her writing style, using the word engineer as a collective term for somebody contributing production code (software engineer, DevOps engineer, data engineer, etc.) and the word tester to represent a Swiss-Army-knife team member who can contribute automated tests, risk analysis, and facilitate mob testing (teaming) sessions.

How I incorporated quality milestones into my team's definition of done

INTRODUCTION: WHAT IS THE AGILE DEFINITION OF DONE, AND WHY DOES IT MATTER?

The "definition of done" usually refers to a document representing a shared understanding of all the criteria that must be met for a product increment, like a bug fix, user story or a feature, to be considered complete and ready for release. The Scrum guide adds that the definition of done is a formal description of the state of the increment when it meets the quality measures required for the product.

Use these steps to create a definition of done that ensures a shared understanding of the quality bar applicable to your projects.

GETTING STARTED: UNDERSTANDING THE TEAM'S USE OF AN AGILE TASK BOARD

Often, teams orient themselves around Scrum, Kanban or Agile task boards, which provide a good starting point for discussions about testing at different stages of the software development life cycle (SDLC). This includes introducing shift-left testing (testing earlier, performing requirement analysis) and shift-right testing (testing later, with real users) in discussions about what the development team perceives to happen in each column of the board.

Approaching conversations with curiosity, I often use the board to understand the team's existing ways of working, pain points or where testing might be rushed or overlooked. Open conversations often reveal opportunities for testers to contribute through requirement analysis, regression testing, automation or investigating live issues through root cause analysis. Building these into the definition of done means the quality measures required are not the sole responsibility of testing professionals.

TESTING THE WATERS: WHAT MAKES THE FEATURE "READY TO TEST"?

If it's difficult to talk about testing activities from that first step, it might feel as though features get thrown 'over the wall' to testers! One way to initiate conversations around the expectations the team holds of testing within the SDLC is to ask about the features nearly ready to be thrown over that imaginary wall.

If a feature has moved from "In Progress" to "Code review", this implies that some other criteria must be met for it to be considered code complete and ready for testing. Ask open questions about the process taking place before a feature is deployed into a test environment to surface implicit expectations. Ask about the testing that can't be done locally, or where your work could overlap with what's already been done. That approach will position you as helpful and trying to avoid duplication of effort, while quietly building trust and relationships with engineers.

Engineers might not know how to add to 'quality', or realise they are already contributing through code reviews, unit tests or snapshot tests. If engineers aren't able to articulate requirements or identify activities that advance testing, pairing is also a great way to find out more. Pairing lets you observe how the team's engineers identify places for test coverage in inputs, data permutations or conditionals.

THE FIRST STEP: IDENTIFY A SINGLE IMPROVEMENT AREA

Having recently joined a different team, newly onboarded engineers were assigned to work on resolving bugs during their first few weeks. This approach is intended to familiarise them with the codebase, understand the system's expected behaviours and enable introductions and conversations with the team and various project stakeholders.

I noticed that picking up these bug cards was a frustrating experience. When the bugs were reported by product stakeholders or other engineers, the cards assumed project context and lacked sufficient details. Details like where and how to reproduce the issue, for example. This inspired an initiative to improve bug reporting that included steps to reproduce (starting with the issue location), clearly defined expected behaviours and testable acceptance criteria. The whole team reviewed poorly written cards, performed root cause analysis and followed the "5 whys" process. This gave the team a greater awareness of which features were testable

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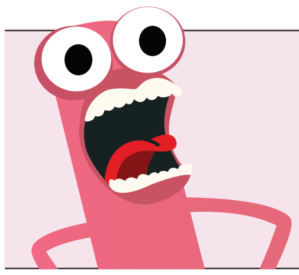

> *Quality is speed and competitive advantage.*
>
> **CHRISTINE PINTO**

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and the acceptance criteria required to know when the card would be done.

APPLYING THE DEFINITION OF DONE: A WORKED EXAMPLE

Following the success of creating better quality bug cards, I was able to gradually start showcasing testing activities and the required quality of work throughout the SDLC. In this worked example, the columns (from left to right) are;

1. New
2. Committed
3. In progress
4. Code review
5. Code complete
6. In testing
7. UAT ready
8. Done.

This example goes through each column in turn, explaining how a feature card gets to each state and the quality that is built up incrementally.

NEW CARDS COLUMN

Often, new cards are created by just about everybody except you, the tester! This means starting to add quality from the left of the board, or even in the backlog, can be a real challenge.

Experience teaches me that it's easier to rally for defining unambiguous cards when others also feel the frustration of missing details, edge cases or conditions not fully understood. Using a shared challenge to push for a higher quality bar encourages the whole team to improve the process.

THE "NEW" QUALITY BAR

When new feature or bug cards are created, they must answer a simple question:

> *"If the author wasn't here (to explain what they've written), would the team still share a clear understanding of the expected result achieved by its users?"*

If not, the team isn't going to be able to write good acceptance criteria. To ensure a shared understanding, new cards should include;

- A useful title and description
- Details of the system behaviour from its primary user's perspective
- Any required inputs or outputs
- A clear explanation of why the feature is needed

For example:

> ***Title:*** *"As a guest user, I can view the hotel's availability and prices before making a reservation".*
>
> ***Description:*** *From the homepage, include a new simple search to direct more users to the main booking user journey.*
>
> ***Inputs:*** *check-in date, duration of stay (in nights) and number of guests*
> ***Outputs:*** *number of rooms available per room type and price per night.*

The output allows potential customers to make an informed decision about their stay, but the real business value lies in the implicit quality characteristics of the simple form, being easy to understand, secure and fast.

Clear, detailed cards help the team to achieve a higher quality bar by reducing confusion and highlighting requirements that follow the INVEST mnemonic - requirements that must be independent, negotiable, valuable, estimable, small and testable.

COMMITTED CARDS COLUMN

Working at a consultancy, there is a requirement that clients commit to work items (features and bug fixes), as this represents how their budget is being spent. With that in mind, the team adopts a column on the board titled committed reflecting the client's sign off to a card's acceptance criteria, scope and budgeted effort.

Everybody in the project team should read the committed cards to understand them, including technical dependencies and the types of testing required. A range of perspectives helps to prevent misunderstandings and improve the likelihood that risks are identified, from the creation of test data to the usability of a feature.

COMMITTING TO TESTING

A Maersk Line case study demonstrates how an organisation can successfully "build the right thing and build the thing right" (read more from the reference links). To do this, engineering teams need to share a vision of success with the organisation. Clients enable this by sharing project aims so teams can deliver real value. In my current project, the key aims are to build trust and create a seamless user experience, due to current user frustration from logging into multiple external systems with inconsistent designs. This vision acts as a north star, helping to make sure the right problems are being solved.

Building the thing right also means having a culture where testers aren't asked how something has been tested, or why a bug was missed because of lack of trust in the team. This starts in the committed phase where engineers flag risks, document clarifications and identify test cases or scripts. These are all added to the card which acts as a single source of truth, which has its own pros and cons!

Typically, we use a card field called "questions and clarifications" to document risks in short bullet points. For example:

- Returning the price per night doesn't include local taxes - should we add "excludes taxes and charges"?
- The API call for availability and price per night can't be cached
- Adding more filters to the first search will impact future performance

This adds to overall team quality in lots of subtle ways, as everybody chips in to build the best possible products. It also helps to avoid conflicts as engineers aren't hit with extra requirements, especially relating to quality characteristics (non-functional requirements) or edge cases, which might not be explicit. This might sound documentation-heavy, but in a consultancy context, it's important to show the client testing outputs and ensure the whole team can pick up tasks if somebody is unavailable, meaning quality isn't a single responsibility.

CARDS IN THE 'IN PROGRESS' TO 'CODE COMPLETE' COLUMNS

Cards in progress are actively being worked on by engineers. Moving through code review and into code complete once feedback has been actioned. Throughout, testers should observe, question, and highlight things that contribute to quality while the feature is still taking shape. Ultimately, the engineers implementing features need to lead quality in this phase. But that doesn't mean testers can't influence it.

I believe this part of the SDLC is where influencing quality and building relationships across the team can have the biggest impact, especially as testers can't be across everything. This can be done through several ways of working:

ENGINEERS MARKING THEIR OWN HOMEWORK

I don't agree with the phrase "developers shouldn't mark their own homework" when it comes to validating the known expected behaviours of features. Instead, it can help build a shared language around quality. Testers might notice:

- Feature cards are updated to indicate where acceptance criteria have been actioned
- Engineers updating or adding new test cases as features evolve
- Test cases are supported by evidence like images, Gifs or screen recordings during engineer-led testing

This enables testers to know where to focus their efforts or allow engineers full ownership of low-risk features.

HIGHLIGHTING CODE COMPLEXITY

When engineers implement complex features, they gain a lot of context that could aid different types of testing. For example, hotel rooms are now displayed by (data-driven) popularity and then by price (lowest to highest). The engineers implementing the ordering logic (twin, double, family, suite) should ensure this is documented for others, especially if the feature is public-facing and might need to be part of a user guide.

A quality byproduct of this habit is that engineers might talk a tester through their code, highlighting conditionals, loops or error scenarios, which helps to identify gaps and test cases.

CODE ANALYSIS

At code reviews, tools like static analysis, linting, dependency checks and unit test thresholds stop bad code at the gate. Internal quality ensures software is easier to modify and maintain. This positively affects quality by ensuring that all features in the test environment aren't going to be immediately refactored, avoiding retesting.

If you've ever used SonarQube, the tool can highlight code smells and code complexity to promote conversations between engineers on the business logic being expressed in code, edge cases and error paths that might go unnoticed.

IN THE TESTING COLUMN

It might sound strange to write about how testing adds quality to the SDLC, but bear with me! If you've ever worked in a team where it feels like features are thrown over that imaginary wall, there are things testers can do to influence their teams and shift that dynamic.

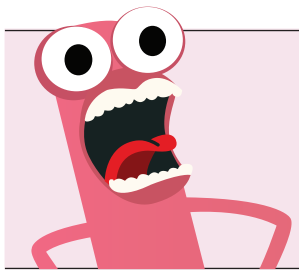
CONVERSATION STARTERS

Instead of giving standup updates like "I'm writing automated tests" or "I'm testing the booking form", share what problems

TESTERMONIALS ★★★★★

"MoT is a key contributor to my upskilling."

Mariem Safi



> *The cost of poor quality is high.*
>
> **STUART THOMAS**

and risks you're exploring, the tools you're using to do that and how it's going. This can start more detailed conversations about focus areas, potential bugs and what you've learnt about the system. This can start to demystify the art of testing and give engineers an appreciation for the role.

TESTIMONY TIME

Document the types of testing being done, even if this falls under broad headings relating to API tests, automation, device, cross-browser, accessibility, performance, load, security, etc. This showcases that testing is not just validation. Provide evidence of the testing done to provide information and understanding to others.

Another way to document testing is to link test cases to cards. Then if, (when?) tests fail, the team can trace it back to the business logic that should be implemented, highlighting the difference between required updates and regression bugs.

SHOW AND TELL (SHOW AND TEST?): HOW TO SHARE YOUR TESTING INSIGHTS WITH THE TEAM

Promote and showcase your work before pairing with engineers, to encourage and enable others to do exploratory testing, write automated tests and debug any regression issues.

For example, investigating our bug pattern analysis showed that many issues were tied to users seeing rooms not applicable to their search after applying pet-friendly accommodation filters. By highlighting the cause of bugs, engineers were able to see where additional attention was needed and help build up end-to-end test coverage.

Similarly, testers can demonstrate their value by adding to overall quality when automated tests prove their worth and give engineers confidence that testing finds issues before they impact customers. This is helped by avoiding long pipeline run times, flaky tests and ensuring tests run on an appropriate trigger.

USER ACCEPTANCE TESTING READY COLUMN

UAT is designed to ensure a product meets real needs before being released to all users. It's often approached differently by organisations. Cards marked as UAT ready must be user-facing and available in an appropriate environment. Some teams use beta tests or feature flags, whereas others get UAT sign-off from a group of project stakeholders. In a past project, UAT was considered passed when a feature had been live to a third of users for a month without any critical bugs found.

Teaching engineers or business stakeholders methods to perform UAT on features they didn't build helps to increase test coverage, spreads system awareness and helps to spot assumptions made with additional context.

TESTING LIKE A TOURIST: EXPLORATORY TESTING TIPS

Test like you're doing it for the (Insta) gram. Seek out all the beauty spots, focus on the shiny new features and their front-end implementation. The aesthetics, consistency and usability. Follow the trends along well-defined user journeys on your own devices and OS version.

There's always one person who sticks to the guidebook, and user acceptance testers might do the same. Pull up the release notes or the user guide and follow each step. Doing this might highlight an edge case between the previous and new functionality.

TESTING YOUR FEEDBACK LOOPS

UAT can help teams analyse the observability put in place, for example, through logs, metrics, graphs and alerts. Having this as part of the definition of done helps teams refine quality before features reach a wider audience or issues are missed due to the noise of production logs.

TO SUMMARISE THE DEFINITION OF DONE

A completed item tells stakeholders that the quality measures required for the product have been done.

Below are some examples of what definitions of done can include, using examples from our DoD and some generic ones.

- All acceptance criteria have been tested and evidenced.
- Front-end features match the style guide.
- Code meets the project's required quality characteristics, e.g. a page load time of less than one second.
- All cards are exploratory tested.
- Tests have been executed on appropriate devices and / or browsers.
- New business logic is tested through unit and API, integration or end-to-end automated tests.
- The code has been checked for security vulnerabilities.
- New automated tests are tagged to run on an appropriate schedule, they pass in the pipeline before being merged, and pipeline run time is evaluated at code review.
- The feature has been used (in UAT) by a variety of users without training and by users following the release notes or user guide.
- The card does not have any critical bugs against it.
- Any refactoring or code clean-up has been completed.
- The card is in a deployable state.■

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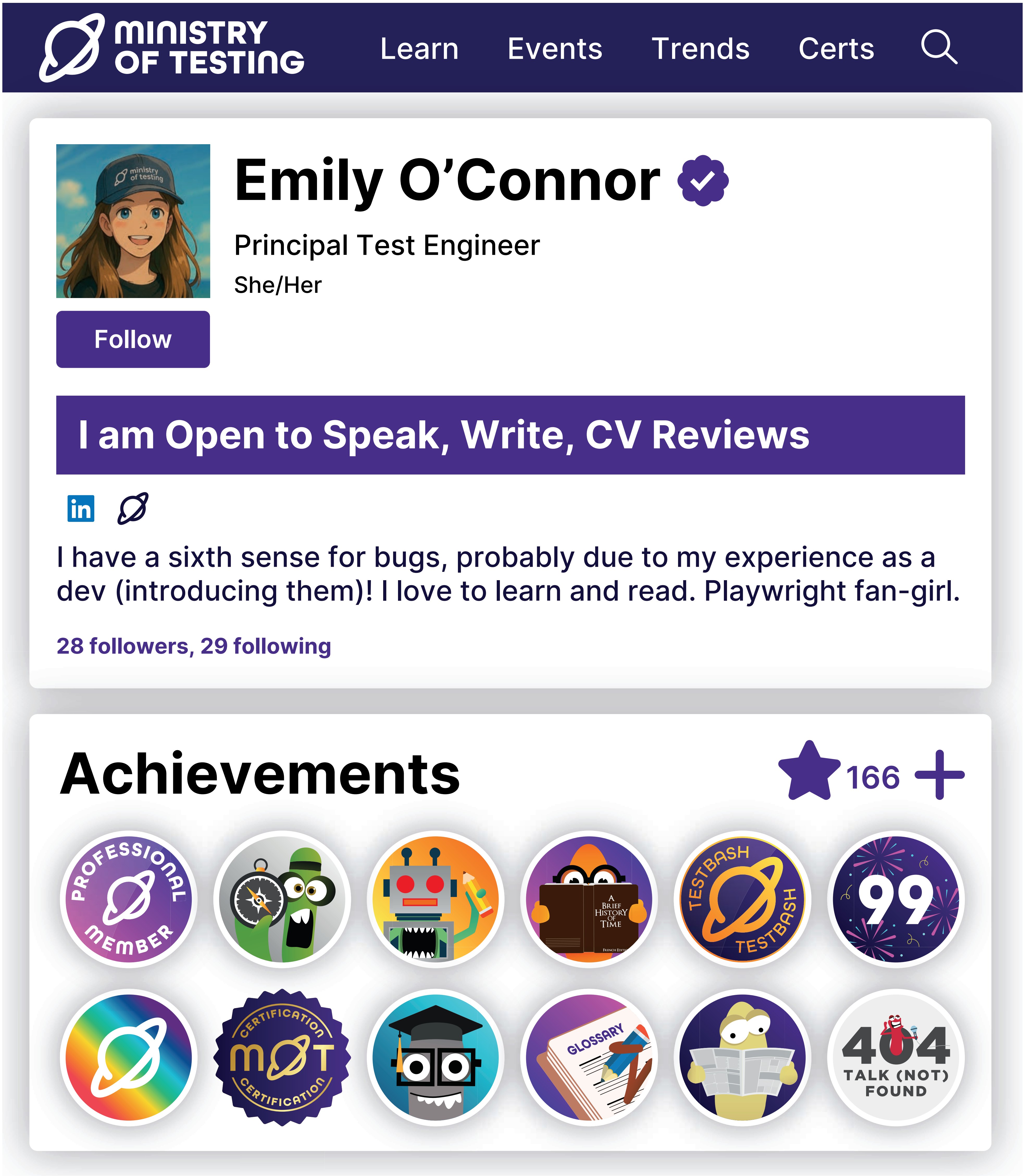


Emily O'Connor

Principal Test Engineer

She/Her

I am Open to Speak, Write, CV Reviews

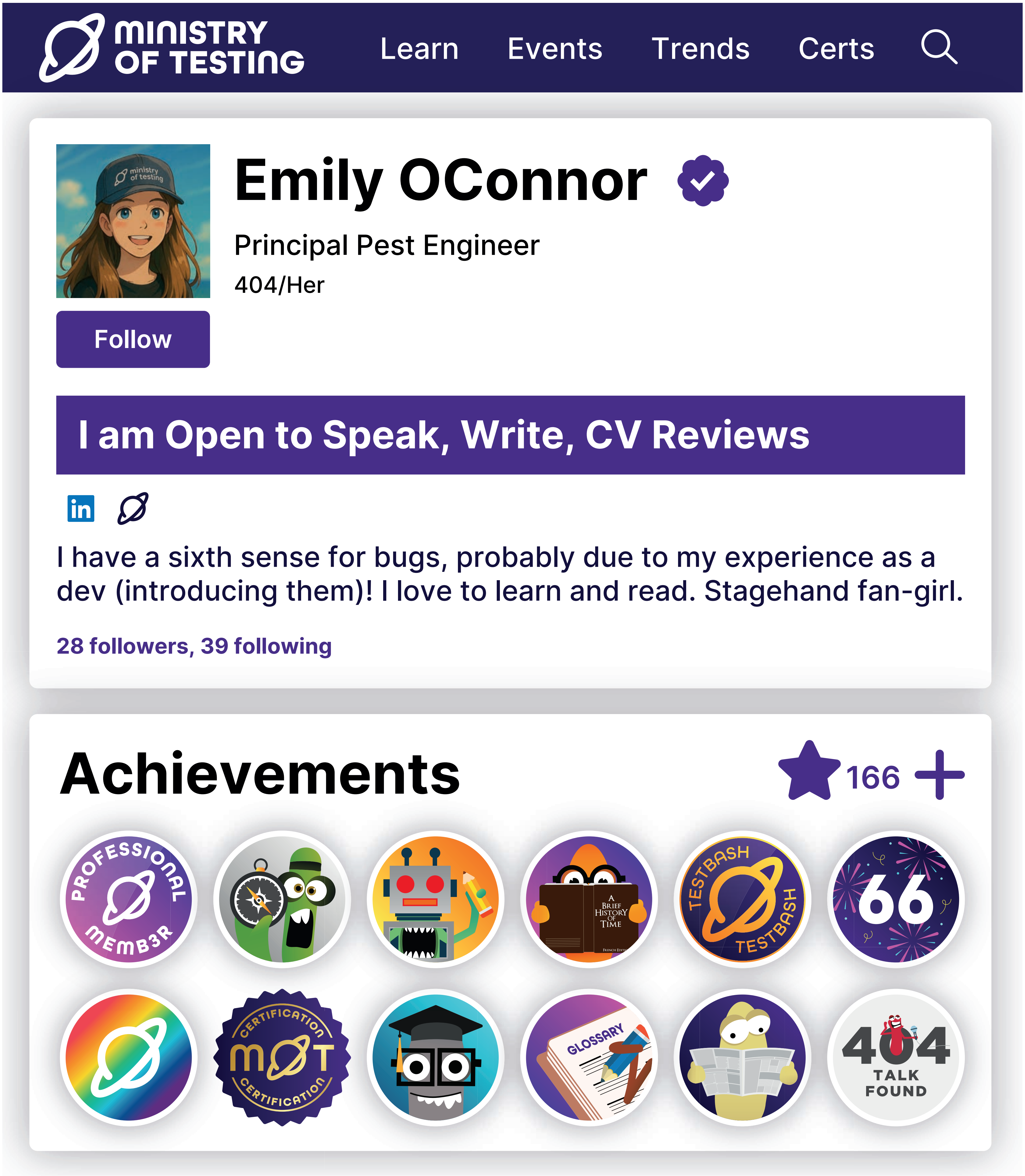
I have a sixth sense for bugs, probably due to my experience as a dev (introducing them)! I love to learn and read. Playwright fan-girl.

28 followers, 29 following

Achievements

166 +

DIFFERENCES



Emily OConnor

Principal Pest Engineer

404/Her

I am Open to Speak, Write, CV Reviews

I have a sixth sense for bugs, probably due to my experience as a dev (introducing them)! I love to learn and read. Stagehand fan-girl.

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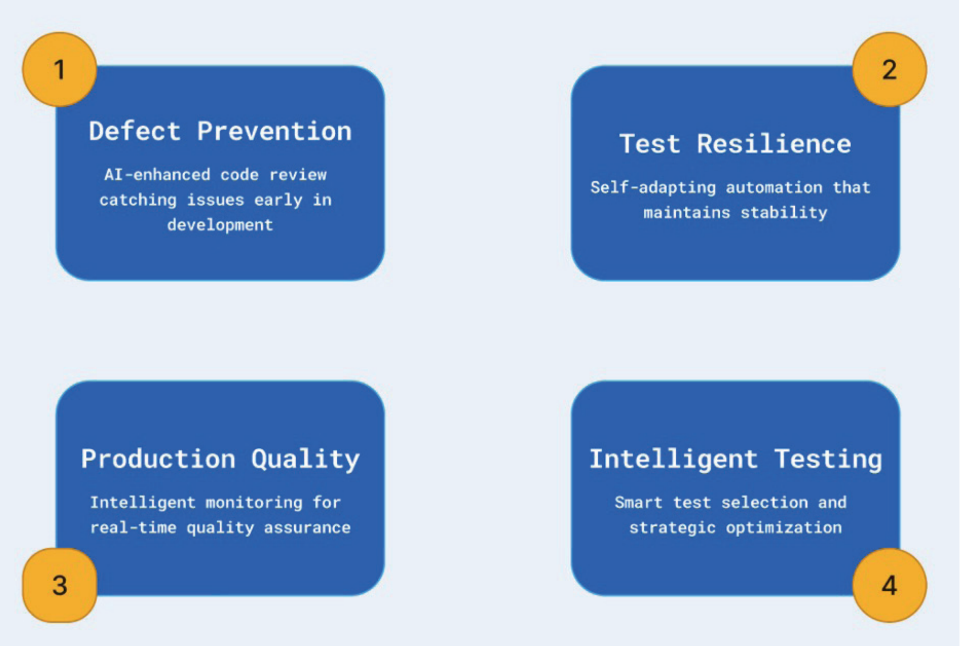
AI-Augmented QA: A Strategic Guide to Implementation

BY SHASHANK **JAIN**



Four Pillars of AI-Driven software quality

1 **Defect Prevention**
AI-enhanced code review catching issues early in development

2 **Test Resilience**
Self-adapting automation that maintains stability

3 **Production Quality**
Intelligent monitoring for real-time quality assurance

4 **Intelligent Testing**
Smart test selection and strategic optimization

INTRODUCTION

We've observed that most industry discussions about AI in quality assurance fundamentally miss a critical point. While the tech world keeps debating sensational claims like “AI will replace QA engineers,” smart organizations are asking a different question: “How can AI make our QA teams significantly more effective?”

Successful implementations have a common theme, AI works best when it enhances existing QA expertise rather than trying to replace it.Let’s examine how it is done.

PROVEN AI AUGMENTATION IN QA

We’ve observed that successful teams focus on specific workflows that address immediate pain points.

1. DEFECT PREVENTION THROUGH AI-ENHANCED CODE REVIEW

The best bugs are the ones that never reach QA environments. AI-powered code review catches issues during the development phase, when fixing them costs minutes instead of hours and doesn’t disrupt testing schedules.

Proactive Defect Detection: Strategy and Practice

To shift issue discovery dramatically to the left and allow QA to focus on high-value strategic testing, teams can implement AI-powered code review directly within the pull request workflow. This approach moves beyond simple pattern matching by analyzing the true context of your code and learning from past defect patterns to find errors traditional scanners miss. By using tools like CodeLlama, ESLint, or Semgrep to automatically flag complex vulnerabilities, null pointer exceptions, and unhandled edge cases, teams can find issues that typically cause QA delays while the system continuously learns and adapts to your specific coding standards.

2. TEST RESILIENCE THROUGH SELF-ADAPTING AUTOMATION

Every QA team deals with this frustration: application changes break test automation, and teams spend more time maintaining scripts than creating new ones. AI-enhanced test frameworks address this by making tests adapt automatically to application changes.

Reducing Flaky Tests: An AI-Powered Approach

AI can stabilize tests by using multiple intelligent layers to automatically adapt to UI changes, identifying elements by visual appearance and context rather than just code. This semantic understanding allows tests to recognize an element’s purpose even if its label changes. To put this into practice, teams can start by building custom resilience into traditional tools like Selenium or adopt modern AI frameworks for a more advanced approach. These frameworks employ intelligent waits, visual recognition, and adaptive locators that switch to backups to prevent failures. By first migrating the most maintenance-heavy tests to this model , teams can significantly reduce maintenance time and improve stability scores as the test suite learns to adapt to application evolution.

3. PRODUCTION QUALITY ASSURANCE THROUGH INTELLIGENT MONITORING

Traditional production monitoring focuses on system health, but QA teams need visibility into how issues affect user experience and product quality. AI-enhanced monitoring provides this perspective while enabling faster response to quality-impacting problems.

From Reactive Alerts to Quality Intelligence

To transform the typical production issue response from a vague “something’s broken” to “here’s exactly what users experienced, why it happened, and how to reproduce it.”, teams can adopt AI-powered monitoring. This strategy begins with capturing raw production data through comprehensive error tracking and user behavior analytics tools like Sentry and PostHog. AI is then layered on top to automatically correlate technical errors with user impact and pinpoint the root cause, focusing on user experience issues rather than system metrics. This shift to proactive quality intelligence leads to faster issue validation, a lower mean time to resolution (MTTR), and better prioritization of fixes based on true business impact.

4. INTELLIGENT TEST STRATEGY THROUGH SMART TEST SELECTION

Running comprehensive test suites for every code change wastes time and resources. AI-powered test selection identifies which tests are actually relevant to specific changes, dramatically reducing execution time while maintaining thorough coverage.

Reducing Test Cycles Without Sacrificing Coverage

An effective strategy for reducing lengthy test cycles is to move from running static suites to implementing dynamic, AI-powered test selection. The first step is to use change impact analysis to run only tests relevant to a specific code modification, focusing on those that offer maximum coverage with minimal execution time. From there, teams can adopt a more advanced AI model that learns from historical data and production outcomes to automatically prioritize tests most likely to find bugs. By initially targeting the largest and slowest test suites, this strategy yields significant reductions in test execution times and better resource utilization in CI/CD pipelines, ultimately improving overall defect detection rates.

INTEGRATED QA WORKFLOWS AND THEIR COMPOUNDING BENEFITS

Successful AI implementations unify specialized tools into cohesive workflows, such as:

- Test automation frameworks with custom resilience logic and intelligent element identification
- AI code review integrated with additional static analysis tools
- Error tracking tools combined with comprehensive user experience monitoring
- Natural language test creation tools for broader team participation
- Automated accessibility testing integrated into CI/CD pipelines
- Connecting these tools via APIs creates unified dashboards and seamless workflows.

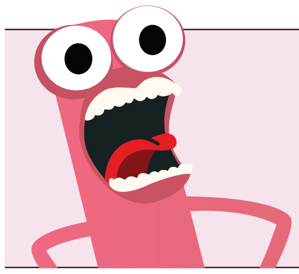
This integration establishes a virtuous cycle with a multiplier effect across QA: AI code review prevents bugs, allowing automation to focus on complex scenarios. Reliable, self-adapting tests make test selection more effective , and production insights create a feedback loop that continuously improves defect prevention.

HUMAN-IN-THE-LOOP WITH AI

Effective AI implementations maintain human oversight while leveraging AI efficiency. QA engineers validate AI-flagged issues, provide context for complex scenarios, and continuously train systems to understand team-specific requirements.

Reinforcement Learning from Human Feedback (RLHF) plays a critical role in making AI systems more helpful and aligned with human expectations. In QA workflows specifically, RLHF enables:

- **Contextual Bug Detection:** AI learns from QA engineer feedback about what constitutes genuine bugs versus expected application behavior in specific business contexts
- **Improved Test Case Relevance:** When QA engineers mark AI-generated test cases as valuable or irrelevant, the system learns



> *Every single place in a conversation is where an assumption can be made.*
>
> **EMILY O’CONNOR**

to generate more appropriate scenarios for similar applications

- **Enhanced Error Explanation:** AI improves the clarity and usefulness of error explanations based on feedback about which descriptions help developers resolve issues faster
- **Reduced False Positives:** Continuous feedback helps AI tools reduce noise by learning team-specific patterns and acceptable coding practices

This creates a virtuous cycle where the AI becomes more valuable as it's continuously fine-tuned with QA feedback.

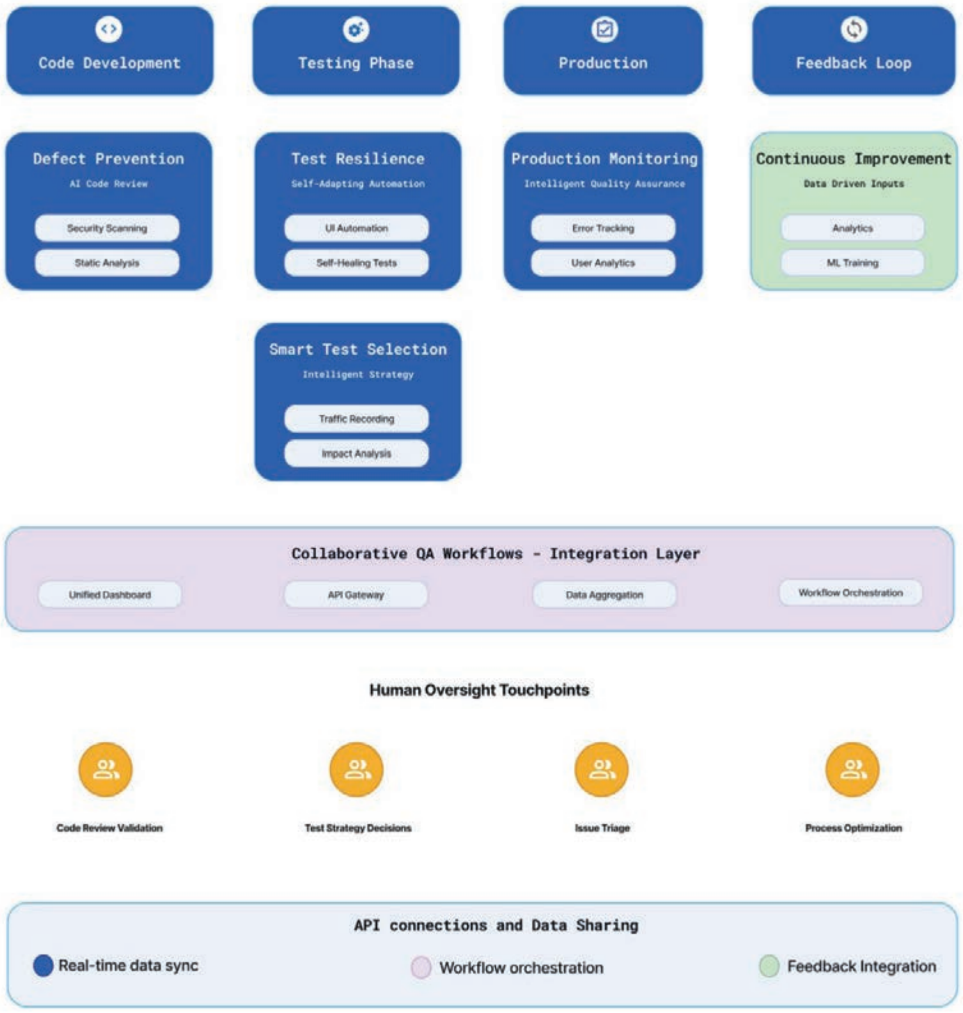
MAKING AI IN QA WORK

Viewing AI as a fundamental workflow enhancement, not just another tool, is the key to achieving worthwhile improvements.

- **Start Small, Think Strategically:** Instead of attempting a complete transformation, target a single, measurable daily problem for immediate relief. This focused approach secures an early win and builds momentum
- **Understanding True Implementation Costs:** A realistic budget must extend beyond tool licensing to include the total cost of ownership: computational resources, specialized MLOps skills, initial productivity dips during training, and custom integration.
- **Evaluating Your Team's Readiness:** Evaluate technical readiness based on your type of implementation, ensure you have mature workflows (AI amplifies existing processes, doesn't fix them), and build a culture where teams trust AI analysis and provide feedback iteratively
- **Building Pilot Programs That Actually Work:** Launch a focused six-month pilot with a single team to prove value. Measure success with both quantitative data (e.g., hours saved) and qualitative feedback, which is the best predictor of long-term adoption.
- **Strategic Implementation Patterns:** Integrate AI to enhance existing quality processes rather than attempting a risky replacement.
- **Making the Business Case:** Frame your executive pitch around business outcomes like ROI and faster time-to-market. The most compelling case is often risk mitigation: positioning AI as a strategic investment to prevent costly production incidents.

CONCLUSION AND NEXT STEPS

Assess your current pain points and team readiness, then launch focused pilots with key evangelists to prove value. While open-source is an excellent start, plan for a gradual expansion toward enterprise-grade solutions that offer the required scalability, support, and seamless integration.■



An operational framework for AI-driven quality assurance

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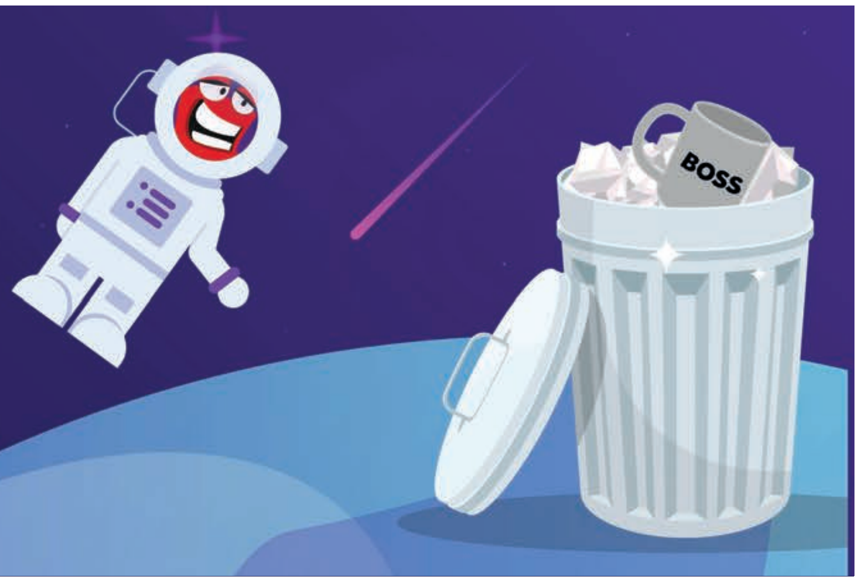
Forget about job titles! Testing leadership for all

Learn to lead testing activities without a title, and enhance your influence and impact within your team



BY JESPER **OTTOSEN**

> *"Leading an activity instead of doing it requires a change of mindset. Be the glue that enables things to happen, facilitate collaboration, and build trust for the people doing the testing. Focus on standing back and making others succeed."*

NOT A MANAGER? STEP UP AND LEAD TESTING ACTIVITIES ANYWAY

In all of my 20-plus years of leading testing, I have never been the formal manager of anyone. Even so, I have led plenty of large and small testing activities, often with a whole team of people doing various testing activities and often for projects lasting over a year.

I'm certain there are many other testers who do the same — they lead testing without being part of the management team. They make things happen and juggle their own and other people's testing activities. They oversee all the testing without having a formal managerial role or title. You can find plenty of advice and articles about how to manage testers, but there are limited resources about leading testing activities even though your job title doesn't reflect it.

WHAT THIS ARTICLE WILL HELP YOU DO

In this article, I will share examples and the research I've collected on the following topics:

- What test leadership without management looks like
- Leading specific testing activities in today's workplaces
- How to start your leadership journey

After reading this article, you should be more familiar with how to lead testing activities, and you will know some of the key activities of leading without being a hierarchical manager.

LEADERSHIP AND MANAGEMENT ARE TWO DIFFERENT THINGS

If you examine the terms "leadership" and "management", you will find that they are two different aspects. Leadership is about facilitating work and setting direction for people, while management is generally about controlling and directing

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organisations and artefacts.

Many people who step into a hierarchical (line) management role struggle with this balance. There are leaders who have no formal management responsibilities, and there are managers who don't lead work activities. Some organisations have one person serve in both roles, while other organisations have separate career tracks for management and individual contribution.

HOW I'VE LED TESTING ACTIVITIES WITHOUT A FANCY JOB TITLE

As an example from my experience, I often work as a "Leader of Testing," where I manage testing and lead people who are doing a testing activity. I recently led a considerable testing activity with a range of people involved. I had an environment track with five full—time functional testers supported by some assistants in one team. I had four people working on security controls and disaster recovery in another team. I was in charge of the whole thing but never the formal manager of any of them — not even the graduate student intern I had helping craft various documents.

My current role is that of a "test manager" — the manager of the testing activities, similar to the project manager's role of leading a project or a delivery. In other settings, the "test manager" would be the manager of the testers themselves, overseeing their performance and providing career guidance. In your organisation, a "test lead" might be the title of the person who has the test leadership role without the formal line management responsibilities.

To avoid confusion, I will talk about the difference between leading a testing activity and managing a hierarchical organisation. Unfortunately, there is no global truth about job titles — not even for testers. The cultural setting we are in also determines how organisations behave.

EVERY ORGANISATION HAS ITS OWN WAY OF DOING THINGS

Some organisations have a group of dedicated testers all of whom are on the same team. Other organisations co-locate testers with the development teams whose code they test. If you are a tester, you might report to a dedicated manager of testers, an engineering manager, a product manager, or a team lead.

For most of my years, my formal manager has either been a director or a line manager. Their job was primarily to run the hierarchical team, supervise employee performance, hire and fire, forecast resource needs, and manage the load of the team. In one case, my line manager was also responsible for all the testing we did. We ended up forming a leadership team with him formally in charge and a few selected "test leads" responsible for the details and forecasting of testing activities.

GEOGRAPHICAL LOCATION AFFECTS ORGANISATIONAL CULTURE

Besides reading the trends in the testing community, I am aware that I am biassed based on what I have experienced in the local Scandinavian consultancy scene. I know that we Scandinavians are less hierarchical as a cultural trait. We tend to give responsibility away from the hierarchical managers and to the people doing the tasks. Similarly, consultancy work tends to do more projects — activities that span a duration of time to construct or maintain something.

A common organisational structure in Scandinavia is the matrix: people report both to a project manager and to a formal management hierarchy. Your experience might be different. It might be based more on hierarchies or more on building a product. That's OK. Both approaches have quirks and benefits. Both ways work in their setting.

LEADING SPECIFIC TESTING ACTIVITIES - A UNIVERSE OF TESTING ACTIVITIES TO CHOOSE FROM

The world of testing activities is actually a universe: huge and varied. Most testers experience the world of testing from the functional testing of an application or system being developed. However, as part of application development, there might be other types of testing going on. Developers do testing, quality engineers might be doing testing, and the end user might be doing still more types of testing.

THE VALUE OF SUBJECT MATTER EXPERTS AS TESTERS

Over the years, I have also involved a range of subject matter experts in testing activities. For IT infrastructure projects, I have had technical system engineers do testing. For detailed testing for the public sector, I have had public service clerks do end-user testing. If we look outside the realm of system and software development, there are all kinds of tests going on.

- The design team uses A/B testing to find the best layout.
- The user experience team does end-user observations.
- The operations team performs technical recovery tests.
- The transition team does service handover trials.
- The management team does business continuity drills.

I see test leadership in all of these activities. It's when these activities are significant in size or duration they can become a standalone job function and even a title and a career path. In my current company, you can even progress in your test leadership role from junior through to senior and principal levels, quite similar to developers, architects, project managers, and the like.

TAKING YOUR FIRST STEPS TOWARD TESTING LEADERSHIP

The first step on your test leadership journey is to realise all the things you already do right. Most testing jobs require being the glue that makes things stick together. The first step you have to take is to call out that the things you do are actual leadership activities. Nicola Lindgren's article "Leading Test Teams When You're Not A Manager" explains it very well:

> *"During my test career, I've found myself acting like a leader, even if I didn't realise it at the time. These patterns of behaviour included*
>
> - *Mentoring and coaching others.*
> - *Being a sounding board for other testers when they needed someone to listen to them.*
> - *Introducing other testers to new ideas (like exploratory testing).*
> - *Doing presentations for other teams on how testing is done.*
> - *Running workshops on various aspects of testing.*
>
> *When I saw a need or a problem that could be solved, I did something about it. I've always found it pretty cool (and a bit odd) that people actually listen to me, even if they aren't technically required to do so. They listen to me and other leaders when our ideas and actions stand on their own merits."*
>
> *- Nicola Lindgren*

RECOGNISE THAT YOU ARE NO LONGER TESTING FULL-TIME

The second challenge is to realise that the person doing the actual testing is no longer you. In becoming a leader of an activity — any activity, really — the challenge is to let go. Other people are doing the testing while you are supporting them in doing the work. I can best describe this from my experience in being a parent to two young adults. I cannot dictate how often they shower, but I can recommend that they do it regularly.

RECOGNISE THAT SOME THINGS ARE OUT OF YOUR CONTROL

The staff available for a testing activity might not be yours to choose. I have had both public process clerks and technology specialists perform excellent testing. They also have no desire to be testing specialists. After all, they are already specialists in their subjects.

DON'T DO EVERYTHING YOURSELF: LEARN TO DELEGATE INSTEAD

The same thing applies to the leadership of testing activities. I'm sure most testers learn that at a certain point, they can no longer be the only ones testing everything. You have to delegate — to be able to step away from it for a bit. When you delegate, you start your leadership journey.

That goes the other way, too. If someone else is currently leading the testing activities, ask if you can fill in for them so that they can be away for a bit. The key blocker is usually the opportunity to lead, not a mindset for change or knowledge about the first steps.

YOU MAY ALREADY BE A TESTING LEADER!

I have covered the first few steps for you above. Next up is for you to realise that you are probably leading testing already. And you are probably doing it without being the manager of anyone. Keep up the good work — but do dig into the resources below to learn more.

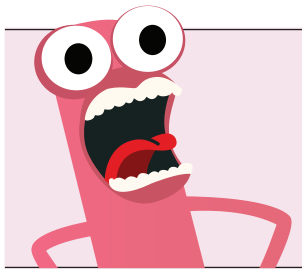
Leading an activity instead of doing it requires a change of mindset. Be the glue that enables things to happen, facilitates collaboration, and builds trust in the team. Focus on standing back and helping others to succeed.■

TESTERMONIALS

★★★★★

"Being part of such an awesome community like the Ministry of Testing has brought me new joy, experience and learning. It's also shown me that what I know is of value beyond my day job."

Jane D'Cruze



> *Your life is so much better with an oversize mouse pointer.*
>
> **BEN DOWEN**

Testing Across Borders: A QA Guide to Geo-Specific Content

BY **WONDERPROXY**

It's becoming increasingly common for websites to show different content to users depending on where they are in the world: a GDPR banner for some (and none for others), country-specific pricing or promotions, restricted content, and so on. Once-simple questions like "Does the GDPR cookie banner load in Europe?" are being replaced with tougher ones like "Did the GDPR library we're using break checkout?" or "What happens when the GDPR banner is still displayed and the new mailing list signup modal fires?" Answering these questions can be daunting—but I've got a few tips.

1. UNDERSTAND WHO SEES WHAT

Start by figuring out who sees what. I usually treat the version I see at home as the "canonical" version of the site, and try to note down every difference compared to what a user in another region might see: banners, pricing, currency, language, promotions, content. I like to sketch a simple table on paper—countries or regions across the top, and content variations down the side. Fill it in as much as you can.

I say try to note down because it's rarely straightforward. At most companies, there's an official story—"The only difference is the GDPR banner." Then you overhear a pricing A/B test running only in France (or catch it in Slack), and two months later, someone casually mentions a custom script injected via Google Tag Manager that only loads in Germany.

2. KNOW HOW LOCATION IS DETERMINED

Next, figure out how your application determines a user's location. You may find there are multiple systems involved: the marketing site backend might rely on headers from the CDN, the app backend might use the IP address, and some third-party JavaScript libraries could be tapping into the browser's Geolocation API. Each method has different implications for testing—and for accuracy.

3. GET ACCESS TO THE RIGHT CONTENT

Once you know what you're looking for, figure out how you're going to get it. If you've got a generous boss, maybe this is the beginning of your round-the-world trip. The rest of us need alternatives.

In dev and QA environments, developers sometimes leave in little hacks like setting a cookie (X-Location: Canada), but these shouldn't (and usually don't) work in production. They also won't affect any third-party libraries. A more robust option is to use proxy services. Disclosure: I work at WonderProxy, which has servers in 98 countries and 266 cities around the globe to help with geolocation testing. Other options include the VPNs advertised by every YouTuber on the planet—and, of course, the classic "hope for the best."

4. PRIORITIZE OR AUTOMATE (OR BOTH)

In a perfect world (not one any tester I know lives in), every cell in your table represents a full test run: across devices, across browsers, through critical flows. Sounds like overkill? Maybe. But weird bugs show up in weird places—maybe that GDPR banner conflicts with your checkout library, or a sales promotion in Spain keeps showing pricing in pounds instead of euros.

When possible, I automate. I turn my table into arrays of test cases using Playwright, and let the scripts run wild. If you can't automate everything, prioritize. I focus on critical paths—account creation, checkout—and countries where we have paying users. I worry less about whether users can upload custom avatars in places where we don't even operate.

FINAL THOUGHTS

This sort of testing is challenging, often annoying—and absolutely essential. Companies pour time and money into developing and customizing their websites to maximize outcomes in different markets, but then often assume everything just works. We've had more than one customer reach out with a story like: "We thought the site worked perfectly everywhere—until the CMO went on vacation to France and discovered that the targeted campaign he launched broke the site entirely."

These issues are easy to miss. When checkout is broken globally, sales drop to zero and alarms go off. But if checkout quietly fails for 3% of your users, will anyone realize sales in France just flatlined? Or will it get blamed on seasonality, messaging, or some other red herring?

Investing a fraction of your development budget into verifying these localized experiences is more than prudent—it's critical if you want those investments to pay off.

If you find a fun bug that only appears for users in a specific corner of the world, send me an email—I'll send you a mug: paul@wonderproxy.com

TESTERMONIALS ★★★★★

"I appreciate what you and the other MoT folks do SO MUCH. You curate such wonderful content for us to all learn and meet wonderful people through MoT."

Lisa Crispin

"A goal that I set for myself this year was to write more and to get published. And guess what? After working closely with the amazing team at Ministry of Testing, I managed to do just that!"

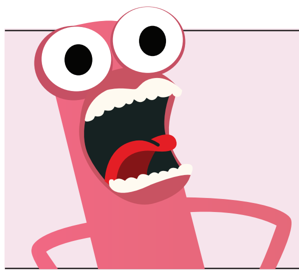
Maddy Kilsby-McMurray

"TestBash was one of the best time of my testing community life :)"

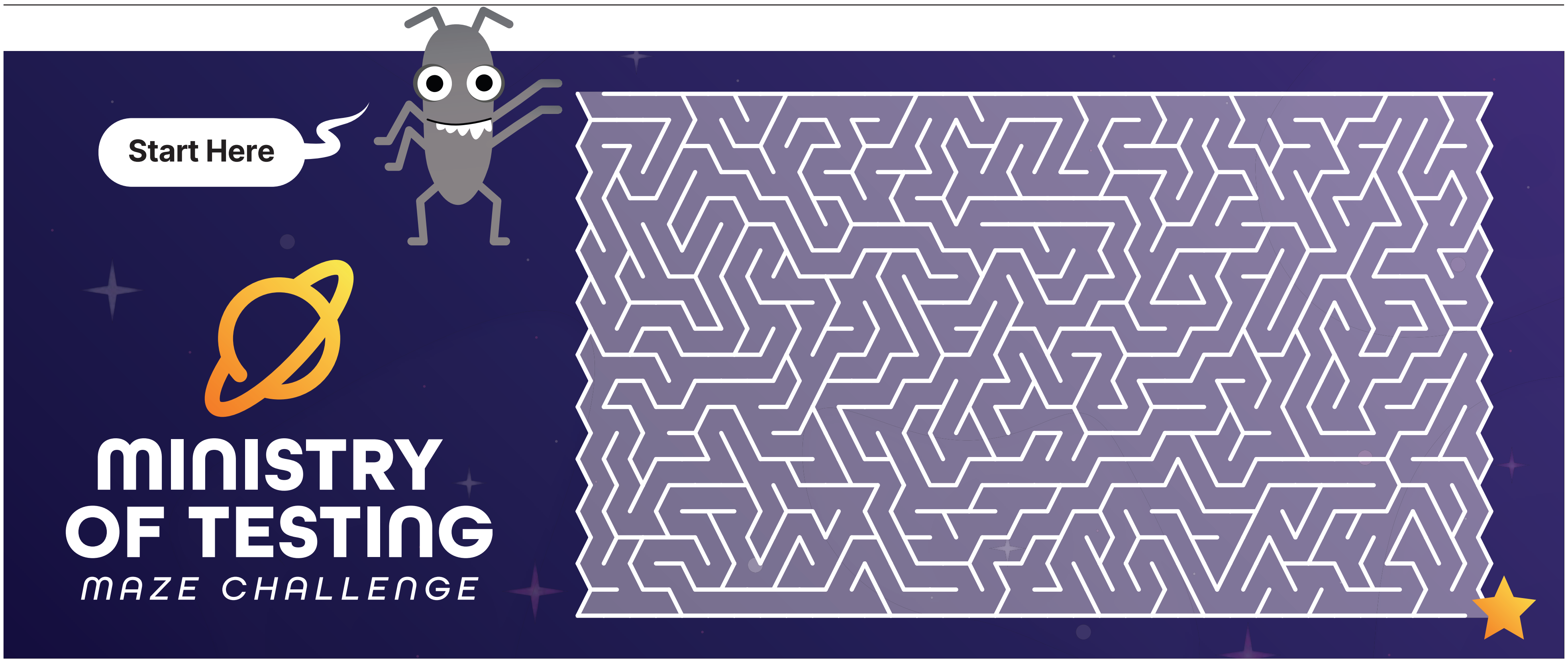
Rahul Parwal

"My first claim to fame was on an online 99 second talk"

Karen Todd



> *You haven't defined quality for your product well enough unless you've also thought about what could go wrong with it.*
>
> **BEREN VAN DAELE**



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Take the uncertainty out of localization testing.

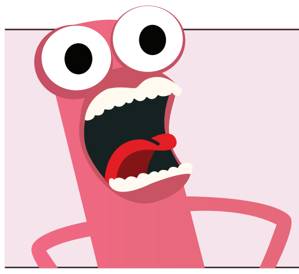
Test real user experiences worldwide: Access hundreds of proxy servers in different countries and cities, letting you see exactly what users see based on their location.

Validate localization and compliance: Confirm that translations, currencies, regulations (like GDPR/CCPA notices), and region-specific content display correctly.

Browser and automation friendly: Easily integrate with popular browsers, testing frameworks, and CI/CD pipelines so QA teams can automate location-based checks.

Reliable infrastructure built for testing: Fast, secure, and stable proxy network designed for software testing – not generic VPN use – so your QA sessions stay consistent.

Visit **wonderproxy.com/testbash** and mention **test bash** for a free one month trial.



> *The purpose of a system is what it does.*
>
> **JOEP SCHUURKES**

Want some CANDY? Creating a culture of fabulous feedback

Use the CANDY heuristic to help you and your team assess your feedback loops and make your feedback fabulous!

BY JUDY **MOSLEY**

As a junior QA, I learned quickly that not every developer liked the type of bugs I found. Some bugs existed years before I discovered them. Others were incredibly tricky to reproduce. I joked that I needed to keep a pile of lollipops at my desk for whenever the devs walked over to my cubicle to ask for a demonstration of the bug I'd written up. It's hard being told that something isn't working. Sometimes, a little candy goes a long way.

After years of testing, I realized that QA is more than merely verifying if a bug exists. Quality is about zooming out and assessing all types of feedback loops. This could be a process, meetings we participate in, reports, or bug intake forms. Evaluating our feedback loops can help us discover if we're getting the type of effective feedback that we need to make clear decisions.

Of course, I'm not talking about actual candy. For this purpose, we will use the CANDY heuristic to help teams provide fabulous feedback to each other, and ourselves.

CANDY is feedback that is always:

- Clear
- Actionable
- Neutral
- Directional
- Yarely

First, let's define a feedback loop.

FEEDBACK LOOPS

TechTarget defines a feedback loop as the part of a system in which some portion (or all) of the system's output is used as input for future operations.

In simpler terms, a feedback loop is any information we receive as the result of introducing a system into our organization. Common examples of feedback loops:

- Automated test results
- Refinement sessions the team participates in
- Bug reports
- Feature request
- Error logs in production

Feedback loops are imperative, and structuring them to provide accurate information is crucial when making decisions based on the type of information any one person or an entire team receives. We don't want to make decisions based on insufficient feedback. We want fabulous feedback.

To create a culture at large where quality is everyone's responsibility, I think we need a little joy. And, what is more joyful than candy?

CANDY ACRONYM

Clear: The feedback received is not confusing. The process is documented, accessible, and maybe pinned to a Slack channel. The Steps to Reproduce help identify where the code is breaking. The report gives us the courage to release or the wisdom not to. Whatever we are using and what we are saying, what is being communicated is clear and understood by everyone.

Actionable: The team member who finds the bug knows how to report it. The engineering team knows how to fix it. The Acceptance Criteria are understood by the developer working on the feature.

Neutral: There is no blame and no ego when it comes to great feedback. If something is bad, we fix it. If something is good we celebrate it. The team doesn't mire in finger-pointing. No one person is responsible for a successful feature. We all play a part and we honor each other in the process.

Directional: Time spent with team members feels valuable. When a person speaks up, they receive the help they need. There isn't a need to micromanage because everyone feels safe to discuss next steps.

Yarely: (Y words are hard, okay??) But, seriously, Yarely is the perfect word. Its root "Yare" means ready. The feedback prepares the team for the next steps and the team is nimble enough to pivot with the new information.

Are you drooling yet? Me too! But, in order to receive fabulous feedback, we need to consider our mindset. It's not easy to take in a ton of CANDY.

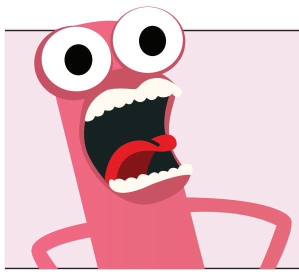
LESSONS LEARNED

Here's what I've learned when both giving and receiving effective feedback:

- **Assume the best of those around you.** Unless you're working in a very toxic environment, the majority of people care about what they do for the organization. Assume that people are doing the best they can with the information they had at the time.
- **Be willing to hear the hard things.** The truth will set you free but Truth can also punch you in the gut. Realizing that what the team built is not what the stakeholders hoped for is hard to hear but it helps us make better decisions.
- **Be willing to speak up.** Many times a thought will pop up in my head and it doesn't "feel" important but the question will bother me enough that I want to ask it. Ask the question anyway.
- **Be honest about the tools we're using.** Is it giving us the type of effective feedback that we need to make good decisions?
- **Be willing to rock the boat.** With the assumption that people are doing their best (circle back to the first point), ask why we added a particular type of feedback. The answer "We've always done it this way" may not help us grow into what's possible in the future.

USING CANDY IN THE SDLC

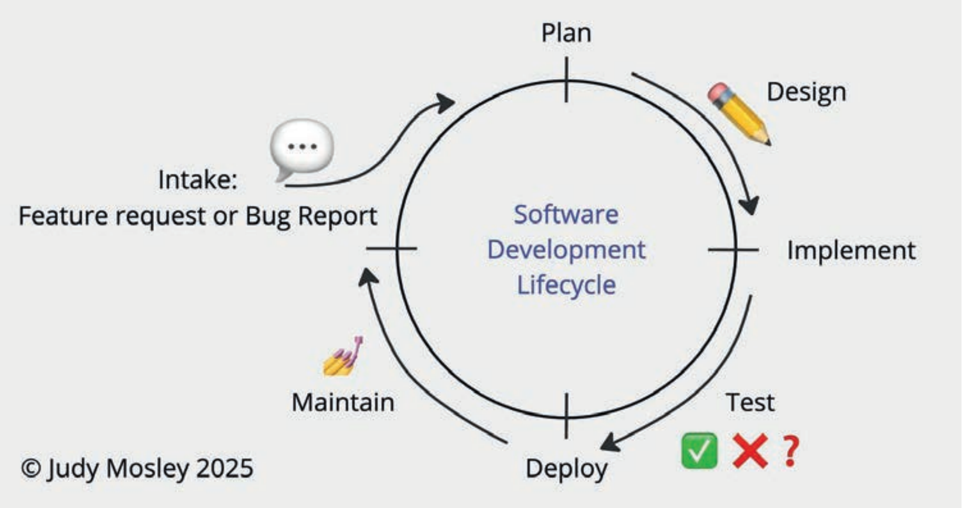
With this framework, let's look at points



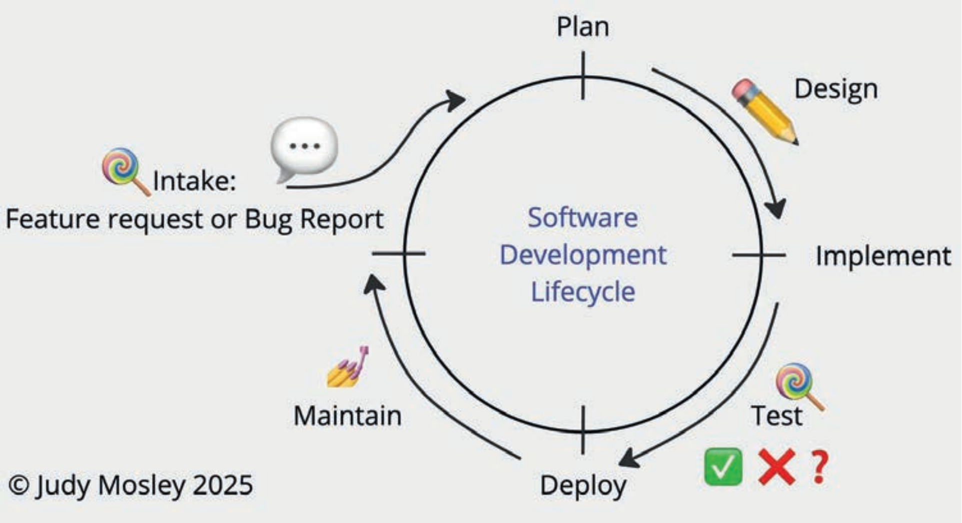
> *Being candid whilst showing that you care is a must for any quality practitioner.*
>
> **CALLUM AKEHURST-RYAN**

in the SDLC (software development life cycle) where we can add some CANDY.

The basic cycle:



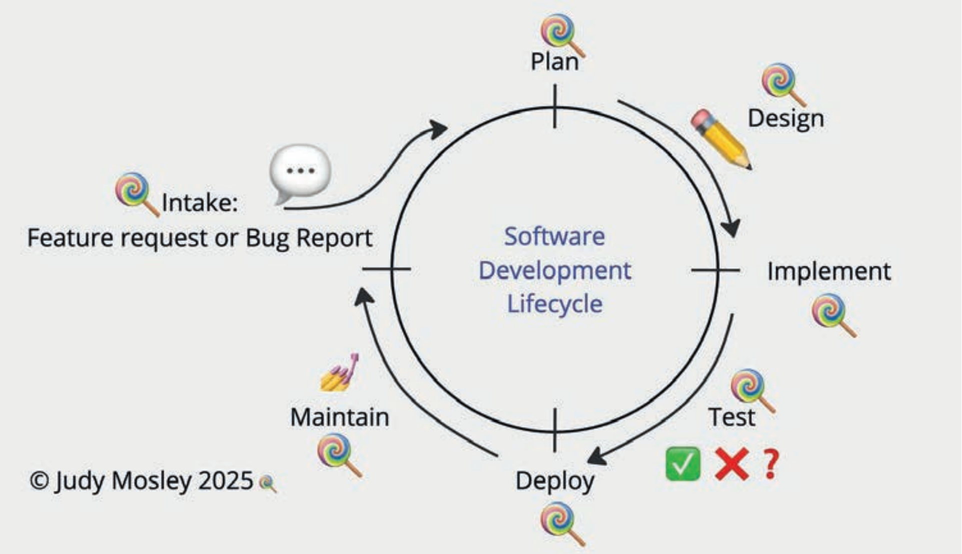
Typically, we expect to receive feedback in two places - on intake, the feature request or bug report, and in the testing phase. The practice of Shifting Left and Right reminds us that we can offer feedback throughout the entire Software Development Lifecycle. However, depending on the processes in place, we can't be certain we're getting the type of feedback we want. Patrick Prill details this well in his post: Having a process doesn't mean you get good or consistent results.



WHERE ELSE CAN WE ADD SOME CANDY?

You probably know where I'm going with this...

- **What about deployments?** Are our error logs clear? Do we have error logs? What do they tell us? Who has access to that information and can they get to it quickly?
- **What about the Design phase?** Is accessibility discussed? Do you know what tools exist to check for accessibility? Can anyone speak up in the design phase and advocate for any type of user?
- **What about Bug Reports?** Are they clear? Can anyone write them? Is there a guide on how they can write them in a way that gives developers a clear path to finding the bug? How are bugs reported? Is there a bug board that is assessed often by the appropriate parties? Who are the appropriate parties?



You get my drift. Zooming out can almost feel like you've walked into a candy store and regardless of how excited you are, you only have so much money and time. This is also true in the SDLC. You are operating on limited resources. Your organisation has a roadmap, stakeholders, and various pressures that drive development.

CHALLENGES

So what can you do when you feel so limited?

- **Start the conversation and be willing to take the first step.** Sometimes, it's enough for someone to ask, "Is this process working for us?" Hopefully, others will join the conversation and from there, be willing to take that conversation to the next level.
- **Look for the small wins.** What domain do you have a decent amount of say in? Is there a package that needs updating in the software that you are familiar with? Bring it up in the engineering meeting and take ownership of it. Talk through the scope and how achievable this action is. Point out the benefits of this change and what will be available to the entire team after this update.
- **Create a spike ticket.** Maybe you aren't sure what the benefits will be if you switch to a different tool. With the buy-in from your team (if possible) create a spike where you can do the research and see what changes are possible. Discuss the results with your team and weigh in on the value of the change.
- **Offer what you can with an open hand.** This is a hard one. Not everyone will like your ideas and that's okay. Try not to take a rejection personally. However, if every idea ever is shot down by the team, consider that your stress may not be coming from the work you are doing but from the environment you are in. That in itself is a feedback loop. Make decisions accordingly.

As we begin taking action on what could be changed, it's possible that you might face some pushback. Not everyone may like the actions you are taking or even why you are choosing to take a process or a task in a different direction. At this point, it's good to identify who your stakeholders are. In my opinion, it's the people directly working with what is being changed that you should care the most about. Others may want to do things differently, and if they are directly impacted with the changes you are suggesting, take that into account. They may have valid reasons for keeping things as they are. Listen to them and communicate that you want to help them and that you are working to make their job easier.

Others may have opinions that will not be affected by what is suggested. I think it's safe to put aside someone's disappointment about a suggestion or a change if this doesn't affect their day to day work experience. You won't be able to please everybody. Not everyone will agree with our decisions. So we need to decide who we are willing to disagree with. This could change depending on the type of feedback loop, the parties assessing the feedback loop, and who the direct stakeholders are. It could even be down to who has the authority or control. Being willing to disagree with someone to make a clear decision is a critical skill. Define your values, assess your feedback loops, and be willing to disagree, knowing that you are after a specific type of outcome.

TO SUM UP

Getting fabulous and effective feedback is worth it and it doesn't have to be rare. If we are willing to ask questions, discuss options openly, and be willing to change what's already in place. You might find yourself bringing a lot of value to your teammates and having a bit of fun in the process.

Did you have some CANDY this week?■

TESTERMONIALS
★★★★★
"Where is the "that's why I love MoT" button? ❤"
KimBley Griffin
"THIS [STEC] LOOKS SICK!!! Thank You, Ministry of Testing, very excited to dig into what this course offers."
Steven Watts
"MoT4Life"
Guna Petrova

How to throw a bug bash: A tester’s guide

Explore tips for organising an inclusive, creative, and collaborative bug hunting session that enhances product quality

BY PARVEEN **KHAN**

> *“Imagine a day where a crack cross-functional team at your organisation comes together to test a product you helped make, not just to find bugs but also to improve its value…”*

WHAT’S A BUG BASH?

Ever want to make a party out of testing? A bug bash can help you do exactly that! Well, it’s not all fun and games; usually, the strongest beverage available is black coffee, and you probably won’t want to hire a DJ. But you can have some fun and learn some important things about your product and quality in the process.

Bug bashes enhance collaboration, provide diverse perspectives on your product, and help build and reinforce quality culture. A bug bash usually looks something like this:

- You invite a cross-functional team: testers, developers, product owners, designers, stakeholders. Maybe it’s just your product team, or perhaps you want to invite some folks who don’t usually attend your team meetings, like legal or marketing.
- Make sure to invite some folks who haven’t yet used the product (or haven’t yet tried new features).
- You set out some guidelines for how to test the product. Just as at a social party, you need to be a good host, and setting out clear guidelines and expectations is part of that.
- Make it fun! Gamify testing (some tips below).
- For a few hours or maybe even a few sessions of a couple of hours, the team focuses on testing the product, following the guidelines you laid out.
- Make sure to include break times.
- Snacks and drinks are always welcome, too.

PREPARING FOR THE BUG BASH - MAKE YOURSELF A TEMPLATE

It’s a good idea to create a reusable template for bug bash planning, because once you host one, chances are there will be more in the future. You can always tweak the template, and eventually, you will end up having a great list of bug bash planning ideas to refer to. Creating a template will also make it easier if anyone else in the organisation is willing to facilitate a future bug bash.

Our template contains sections for:

- Explaining the what and why of the bug bash: define the purpose
- What is in and out of scope
- Test charters that can be used by pairs of testers
- Test data and environments
- Instructions for reporting bugs
- Blank sticky note templates that can be filled by each pair of testers:
  - the names of the testers,
  - their test charter,
  - note-taking instructions to capture problems, questions, ideas, and praise.

DO YOUR HOMEWORK ON THE TECHNICAL ASPECTS IN ADVANCE

A structured approach makes all the difference. For one bash, I collaborated with a developer to prepare everything we’d need: test data, risk-based test charters, and links to tools like CloudWatch, Lambda functions, APIs, and DynamoDB.

When creating test charters, we focused on the “why” - identifying high-risk areas and expected outcomes rather than defining exact test steps. We even explored how the front end consumed our APIs to understand real-world use cases, ensuring our charters reflected practical scenarios. Input from the product owner also shaped the charters, helping us align with business goals.

CREATE SOLID TEST CHARTERS

Test charters are critical for good bug bashes. They help participants focus on the “what” and “why” of exploration, and they provide enough structure to outline goals while leaving room for creativity and discovery. This balance was especially important in our context, where we needed participants to understand what to explore and why without constraining them to rigid instructions.

The test charter below is an example from a Restful booking application:

Explore the /booking endpoint for creating new bookings with different combinations of request payloads (valid, incomplete, invalid data types)

To discover:

- The minimum number of required fields to successfully create a booking
- How the API handles invalid or unexpected data types
- The default values for fields not provided in the request payload

INVITING GUESTS

Once everything is prepared, send an invite to all the participants and give just enough detail about the plan and the charters. You can get into more detail at the beginning of the bug bash itself.

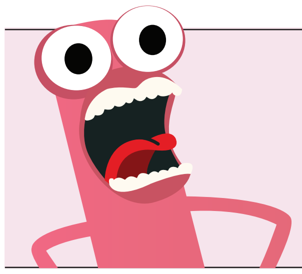
BASH DAY! WHAT TO DO AND EXPECT - STARTING THE BASH

Before the bash begins, go over each section of the bash plan so everyone understands what is expected. Pair your attendees off and assign them test charters.

When I run a bug bash, I start the session by setting the context and giving all the participants an option to pick the test charter, create their own test charter, or just explore. This allows all participants to have the opportunity to explore any feature or section they’re curious about.

DURING THE BASH: PARTY GAMES!

Once everyone has gone over the features,



> *“TestBash testing conference is the place that can transform your testing career. It did mine.”*
>
> **NATALIIA BURMEI**

they can get to work. Ideally they will find bugs and raise questions where more information is needed, following the charters you provided to them or by exploring on their own.

To make the bash engaging and fun, try these ideas:

Leaderboards: Display "Most Bugs Found" or "Best Pair of Bug Hunters"

Prizes: Offer rewards like gift cards or vouchers. For example: £50 gift card for "Most Creative Bug," a trophy for the "Best Pair of Bug Hunters"

AFTER THE BASH

Ask each pair to debrief the group on their findings. This can help stimulate the sharing of ideas and suggest other areas to explore.

At one of the bug bashes I hosted, we identified at least 18 bugs, of which seven were critical and five were of medium severity. And we made eight requests for clarifications on requirements. Out of these, three were converted into requirements that were missed during implementation, while five remained open questions that the product owner needed to discuss with the business stakeholders. We did all this in a two-hour bug bash.

TO WRAP UP: OUR EXPERIENCES AND MOVING FORWARD

Organising the bug bash was easier said than done. Some team members were unsure about its value, questioning whether it was worth the time, while others struggled to see how it could work for a back-end product. With no UI to test and APIs that were consumed by a front end owned by another team, it was hard to imagine how we could engage participants and uncover actionable findings.

The biggest challenge was ensuring participants could truly explore rather than just follow instructions and tick checkboxes. Bug bashes succeed with creativity and uncovering unexpected behaviors, but with only APIs, workflows, and back-end logs, I had to strike the right balance between guidance and freedom.

Even with the challenges, though, the bash participants understood the benefits of the session. And our team now holds regular bug bashes as a result.■

TESTERMONIALS ★★★★★

"Do you know what makes TestBash special? Besides talks, workshops, activities, ... there is a thing called 99 second talk by the attendees, they take the queue end of the day and everyone has 99 second to share anything they want!"

Emna Ayadi

"Being part of the Ministry of Testing community has been such a rewarding journey, and I've learned so much from the generous and collaborative spirit of this incredible group."

Swathika Visagn

MoT MEETUPS

IS THERE A MEETUP NEAR YOU?

Find your local group or start your own!

ministryoftesting.com/meetups

A letter to the hiring manager of software testers: 10 years later

Discover how the recruitment landscape has changed over the past 10 years, for both testers and hiring managers

BY GABBI **TROTTER**

Rosie Sherry wrote an excellent article titled “To the Hiring Managers and Recruiters of Software Testers” nearly 10 years ago! In it, she covered areas like how testing had moved to more process-based, rather than about helping create great products. The difference between certification and other ways to get education in the craft, as well as the skills involved.

We thought it would be great to share an updated 2025 version, focused on the current market and including how the role has changed and evolved. This time, from a current recruiter’s perspective! So, whether the job title you are looking for is a QA Analyst, Exploratory Tester, SDET (Software Development Engineer in Test) or Quality Engineer, read on.

DEAREST HIRING MANAGER,

I hear you’re looking to add a new software tester to your team, and I think I can help you. I have spent the past nine years working with testers and hiring managers like yourself, helping them to find each other. Let me tell you a little more about the current market for testers in the UK.

THE CURRENT UK HIRING MARKET FOR SOFTWARE TESTERS

I won’t lie to you, it’s been a turbulent few years for many software testers. Redundancies have been high. In 2023, nearly 2,000 tech companies made significant layoffs, resulting in over 260,000 tech workers out of their jobs by December.

Job cuts have continued to plague the industry, with over 81,000 tech workers laid off in 2024, according to Verdict.co.uk. Unfortunately, it’s often our wonderful testing departments who are hit first, and arguably the hardest. Now more than ever, they are craving stability and companies that see and appreciate their value. Bear with them, they might be wary initially, redundancy can have a lasting impact on an individual, but they will reward the right company with fierce loyalty and their best work.

Like every facet of tech, testing changes fast. There is always a hot new tool or framework, and sometimes it can be hard to keep up! Don’t forget you’re investing in a person, not just a list of skills. Don’t ever lose the human touch in your recruitment process, and make it as inclusive as possible.

THE SOFTWARE TESTING CERTIFICATION OR EXPERIENCE DEBATE: WHICH IS MORE VALUABLE?

What about certifications? I hear you ask, are they still relevant? That’s a great question, and not one I can answer alone. However, for what it is worth, real-world experience will always outweigh a certificate for me. That said, there are way more options available now to a budding tester looking to grow their software testing career. Look out for those who invest time in online courses to upskill, particularly the highly regarded Software Testing Essentials Certification from the Ministry of Testing. It is a modern introduction to the world of software testing. It’s created with a forward-thinking lens and with current experts from within the software testing industry. At its core is the development of a portfolio of work so that those taking the certificate come away with a practical body of work demonstrating their learning.

IT TAKES A VILLAGE (COMMUNITY) TO BUILD A TESTER

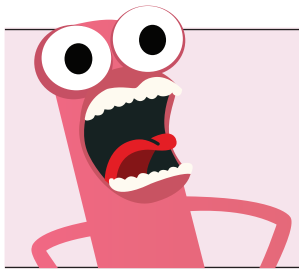
On that note, now more than ever community is so important to testers. Whether they are experienced software testers or aspiring ones looking to learn more to progress their journeys, meetups are a great and free way to network. The Ministry of Testing Manchester meetup saw over fifty attendees in January, and the new London meetup was attended by over one hundred in its first two outings (January and April). You may also see conference events like TestBash, Agile Testing Days, Peers Con, and the Testing Atelier mentioned on CVs or cover letters. Take note of these. The best testers out there are active in the community, sharing knowledge with others and helping to make the testers of the UK the best they can be. Chances are, if a CV mentions running, speaking at or attending events like this, they are someone you’re going to want to talk to.

KEY SKILLS FOR THE MODERN SOFTWARE TESTER IN 2025

Now, to skills. How do you tell who can walk the walk, not just talk the talk? There are so many roles, titles and other skills in testing that it can be hard to know where to start. You need to first identify what it is your company needs. What are your pain points? And, where will a tester add true value to your project? A specialist recruiter like me will be able to help pull together a cohesive job specification that you can take to market to attract the right talent. I see too many companies asking for things like automation experience with no clue what they want or need to automate. To attract the best, you must first understand what you truly need.

Don’t get too bogged down in specifics. Any skilled Tester worth their salt will be able to pick up on new things. An example would be someone who’s experienced in Cypress but not Playwright. If you take the time to learn the similarities between certain tools, this will help you widen your talent pool.

The best CV won’t just be a long list of skills, they will be able to tell you what they did, why they did it and how it improved things. Testers don’t always sell themselves the best on their CVs, as one or two pages isn’t a lot of space to tell you all the things they do and have experience in. Interviews are a two-way process, and you must create an experience that allows them to best highlight their knowledge.



> “*It’s a value conversation. If you create the right safety nets and right culture it might mean less testing.*”
>
> **NIKO MANGAHAS**

A Ministry of Testing Profile can be an excellent place to find out about a candidate. Think of it as a living CV. Not only does it demonstrate an interest in the wider testing community, but it also acts as a showcase of their involvement and contributions. There you can see everything from articles, conference attendance, talks and a wide range of other contributions. You can even see who is open for work, teaching, mentoring and more. Check out Ady Stokes MoT profile page as an example of an established software tester's profile.

IMPROVING THE RECRUITMENT EXPERIENCE FOR SOFTWARE TESTERS AND HIRING MANAGERS

Both candidates and hiring managers need to make improvements, but by working together, we can improve the recruitment journey. Here are my suggestions for both sides of the fence!

Candidates: Keep your skills and CV up to date. Make it concise and an accurate representation of your skills and experience. Learn the power of a network, get involved with the community even when you aren't job seeking, they will be your greatest asset should that time come! How to get more involved with the MoT community.

Hiring Managers: Thoroughly understand the role and the why behind the gap you are looking to fill. You need to know what makes testers tick to attract the best of the best. Don't always look for the "perfect match", there are many incredible testers looking for work who could add huge value despite not ticking all your boxes right off the bat. Generally, testers are continuous learners and can pick up things quickly. Use that.

TO SUM UP

Testers are some of the most passionate, curious and hardworking people you will ever meet. I implore you to see their value and treat them accordingly, not just in the recruitment process, but once they have joined you. Take some time to thoroughly understand the role of a tester in your organisation and the value they add. If you aren't familiar with the role or perhaps it's your first time recruiting a tester, there are some amazing resources out there to help!

Check out the articles on What makes a good software tester?, and What makes software testers tick?, in the references.

There are also specialist recruiters out there, like me, who solely dedicate their time to sourcing and placing the best testing talent. So, if you are a hiring manager looking for top software testing talent or a software tester seeking your next opportunity, don't be afraid to reach out for support.

I hope this helps, and good luck!

Your sincerely, Gabbi Trotter.■

TESTERMONIALS

★★★★★

"TestBash just hits different."

Ben Dowen

"I really appreciate Ministry of Testing. They are very supportive in sharing work from those in the community and lift other people up. Thank you for all you do!"

Melissa Fisher

"This has been my go-to conference for all things, software testing, leadership learnings, and community for 5+ years. 10/10 recommend."

Tristan Lombard

"I love Ministry of Testing!"

Danielle Engelhaupt

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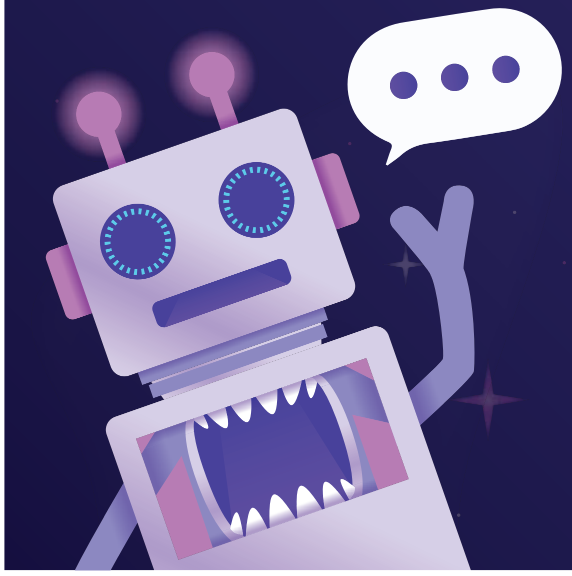


Burnout: A personal experience report

Recognise the common signs of burnout, and explore practical strategies for seeking support and rebuilding well-being

BY ADY **STOKES**

Warning: mentions of poor mental health, depression, and suicide.

WHY I'M WRITING THIS ARTICLE

In 2025, I will have my 59th birthday. I'm not saying that to let you know I'm old, or at least getting older. I'm revealing that I'm from a generation that does not share feelings. As I'm also a man from a very impoverished background, I tend to check a lot of boxes for people for whom mental health is a taboo subject. In England and Wales in 2023, suicide rates among men increased to 17.4 per 100,000, the highest it has been since 1999. For women, it was 5.6. For my generation, it is something that is very hard to talk about.

But that is exactly why I wanted to write this article. I want to be able to talk about my experiences and feelings. I want others to feel able to do the same. My hope is that through reading this, someone might feel seen and reach out for help, to me, the community, or one of the organisations that can support them.

MY PATH TO BURNOUT - RECURRING DEPRESSION AND ANXIETY

I've dealt with depression and anxiety a few times throughout my life. However, up till late last year, they'd floored me only once: when my mum died in 2012. Apart from my aunt, she was the last of my small family to go. Her death was sudden and unexpected, and the loss hit me and my mental health hard.

Towards the end of 2023, depression and anxiety returned in force. I worried about everything and had trouble sleeping. I took a leave from work for over a month. Counselling helped a little, and time away from work helped more. However, more change was in the works that would undo the progress I'd been able to make.

A "RETURN TO THE OFFICE" POLICY DIDN'T HELP MATTERS

Not long before the Christmas holidays, my organisation announced a "return to the office" policy. With that news, my symptoms got worse. I had a series of panic attacks one after the other, and they affected me so much that I started 2024 on sick leave.

I couldn't concentrate. I ate sporadically, if at all, and I was drinking too much. I was spiralling. My usual doctor was of little help, so I sought counselling. It was around that time the doctor suggested I was showing the symptoms of burnout.

WHAT BURNOUT LOOKS LIKE FOR ME (AND MANY OTHERS)

I didn't understand what burnout was other than in the broadest terms. So I looked into what professionals said was happening to me. I found some thought-provoking information as well as some rubbish of course.

Through that research and with support, I found out a couple of the main things that were happening to me.

WHAT MANY PEOPLE THINK BURNOUT IS, AND WHAT IT REALLY IS - STRUGGLES AT WORK

After I returned to work, it was obvious that something had to change. It wasn't the work itself, but more the thought of the work that was making me struggle. I hadn't suddenly forgotten how to test, review requirements, or analyse system architecture overnight. I simply couldn't work. The longer I thought about a task, the more daunting it seemed.

Looking back, there were probably some warning signs I simply didn't recognise. Annoyance at attending unnecessary meetings moved towards dread. Instead of calmly analysing emails, I'd react angrily, which is very much not me. Even if something is poorly put, the specific words used play only a small part in the universe of communication. So I would call via voice or video to understand the message better. There were probably other signs, but I wasn't able to see them even with hindsight.

If any of what I've described so far feels like it applies to you, maybe you can take notice sooner than I did and interrupt a downward spiral by finding some help. Whatever works for you.

WHEN YOU CAN'T "JUST GET THINGS DONE": EXECUTIVE DYSFUNCTION

Some mornings, I simply could not get out of bed. I didn't understand it. I didn't want it. But I found it hard to shake it off. Even if I really needed the loo (toilet), I just wasn't moving. I found out that this was called executive dysfunction.

And it wasn't limited to getting out of bed. Any task, such as creating documents for work, seemed like too much. I'd sit there and stare at the screen, stumped and unable to continue.

STRATEGIES AND TECHNIQUES I FOUND USEFUL - ENGAGING A GOOD THERAPIST

While I was on leave from work, I engaged a private therapist whom I immediately felt was knowledgeable, understanding, and helpful. I tried to be honest in conversation and that helped a little. I learned new things about managing the times I was at my worst and other things that might help longer term.

A GROUNDING STRATEGY YOU CAN DO ANYTIME

A work-appointed counsellor wasn't much help in general, but did teach me one thing that helped a little: a grounding strategy called 5-4-3-2-1.

The technique tries to help you shift your focus from anxiety to the present moment. It involves identifying;

- Five things you can see
- Four things you can touch
- Three things you can hear
- Two things you can smell
- One thing you can taste

Sometimes it worked well, other times less so or not at all. I tried a grounding stone. You hold an object and concentrate on it to centre yourself. Again: hit and miss.

ONE DAY AT A TIME, ONE TASK AT A TIME

I made a list of things I had to do each day. (Don't judge, you weren't there.) Brush teeth. Shower. Get dressed. Achieve one thing. The list of things to do each day changed as time went by. Slowly things improved, but that underlying feeling of anxiousness was always there.

BREAKING COMPLEX TASKS INTO MANAGEABLE ONES

Another new learning, but something I'd heard some time ago, was to break down tasks into small manageable steps. For me that started with just creating a blank document. It sounds very odd but might be relatable for some people reading. Creating that blank document felt like an achievement from being frozen.

FINDING PEER SUPPORT (WARNING: SUICIDE DISCUSSED)

According to the Office for National Statistics in 2022, nearly three out of every four people who take their own lives are men. I've been to some very dark places over my lifetime but I don't think I could take my own life, simply because of the impact on family and friends. That being said, I have known three men I called friends that took their own lives and have seen the effects on those around them.

While looking for options, I found Andy's Man Club. It's a national men's suicide prevention charity. They offer weekly group meetings for men to discuss their feelings, how their week has gone, and get support. In the sessions you pass around a branded football and the person with the ball speaks. Over four thousand men attend more than 200 clubs around the UK weekly on Mondays. If it is a bank holiday they have walking meetings during the day.

I found attending very awkward at first, but they say that stepping through the door the first time is the hardest part of joining in. As I attended more sessions, I felt a sense of camaraderie with them. Some vented, some listened, some joked, and others cried. After I'd attended the meetings for a while, I realised I'd done all those things, and no one had kicked me out or made fun of me. The in-person groups are supported by their own Facebook (FB) groups, and while I'm not a big fan of FB, the group pages work well for updates and as a place for people to reach out when needed between in-person meetings.

There are other places to get support, which I've listed in the "For more information" section below. If you need to talk to someone, there are places and people out there willing to listen and help. I've listed some at the end of the article, and while I haven't personally used them all, I can highly recommend the Self Care Backpack by Gem Hill. I found the content and writing to be really useful at times.

HEALTHY BODY, HEALTHY MIND?

Since I wasn't working, I made a decision to try to be more healthy. It was a choice that worked, sometimes. (You may find a golden thread in this article, but sometimes, it doesn't matter what you want or try, it just doesn't work.)

I drank less, or at least less than I had been doing before my burnout started. I walked the dog or just went for a walk on my own. Walking is good for me, since I'm not a gym or running person any more. I have chronic back pain which can significantly affect my mobility. A day I can go for a walk of any length is a good day.

REALISING THAT YOUR SKILLS HAVEN'T COMPLETELY VANISHED

You would think, as someone with two decades experience in software testing, that analysing and working on a problem like burnout and executive function would be easy. It definitely wasn't. Well, not all of the time anyway.

Researching and extracting relevant information on the subject was subject to my moods and mental state. Some days I'd read several things. On other days I just sat and stared, (no) thanks to the executive dysfunction brought on by the burnout.

I did find, though, that my testing skills didn't disappear or desert me, and they came back as I found a path back to somewhere closer to my "normal." If you are struggling, don't despair. Those skills will be waiting for you when you are ready to use them.

TALKING WITH YOUR MANAGER AS YOU RECOVER

I'd mentioned a few of my feelings to my manager along the way, but I hadn't been completely honest about how deep they were. I'd say things like, 'I'm a bit frustrated' rather than, 'I'm angry, frustrated and I can't even focus some days'. Clearly, those sentences represent two completely different mental states.

Here are a few things I did or should have done. Maybe you can apply them to your situation.

- **Be honest with yourself about how you feel.** If you are feeling angry or frustrated with work, accept it. Don't dismiss your own feelings with, 'it is just a bad patch' or 'get over yourself'. Self-care for me started with acknowledging that something was very wrong. If you can acknowledge those feelings early on, maybe you can avoid the 'very'.
- **Be honest with your manager about how you really feel.** I appreciate that you need to have a level of emotional safety to be able to do this at work. However, if you feel you can't be 100 percent honest with your manager, maybe the job isn't the right environment for you anyway?
- **Step away and breathe.** We have jobs that can be stressful, whether it be due to time demands, deadlines, or just the volume of work. We are not machines, and our minds are our greatest tools. If you need to, step away. Have a drink (preferably non-alcoholic). Go for a walk. Do something that gives your brain a break and allows you to reset or refresh. Focusing for a full day can affect the next few, so it isn't really that productive.
- **Set clear boundaries.** If you need to say no for whatever reason, say no. Give your reasons and be honest. Saying 'yes' to everything is a quick road to burnout.
- **Time is ~~money~~ health.** If you always start early and finish late you are losing a lot of time for yourself. Breaks are important too, especially if you are working from home. It can be tempting to just grab a coffee or a sandwich if you are in the middle of or deep into a task. Remember: you and your brain need rest and breaks.

RETURNING TO WORK…?

I returned to work and was eased back in. I can't praise that organisation and my managers highly enough for the support I received. They were understanding and gave me small tasks like documentation to write to get used to being back. I had an interview with an occupational health assessor, and they put some accommodations in place as I got back into the swing.

These measures worked for a while, but the underlying problems just wouldn't go away. The closer I got to a normal working routine, the worse I felt. I took more time off. At that point, I didn't know what else I could do.

COULD I AFFORD NOT TO WORK FULLTIME?

The more stuck I became, the more I thought that walking away from fulltime work might be the break in routine I needed. But could I do it?

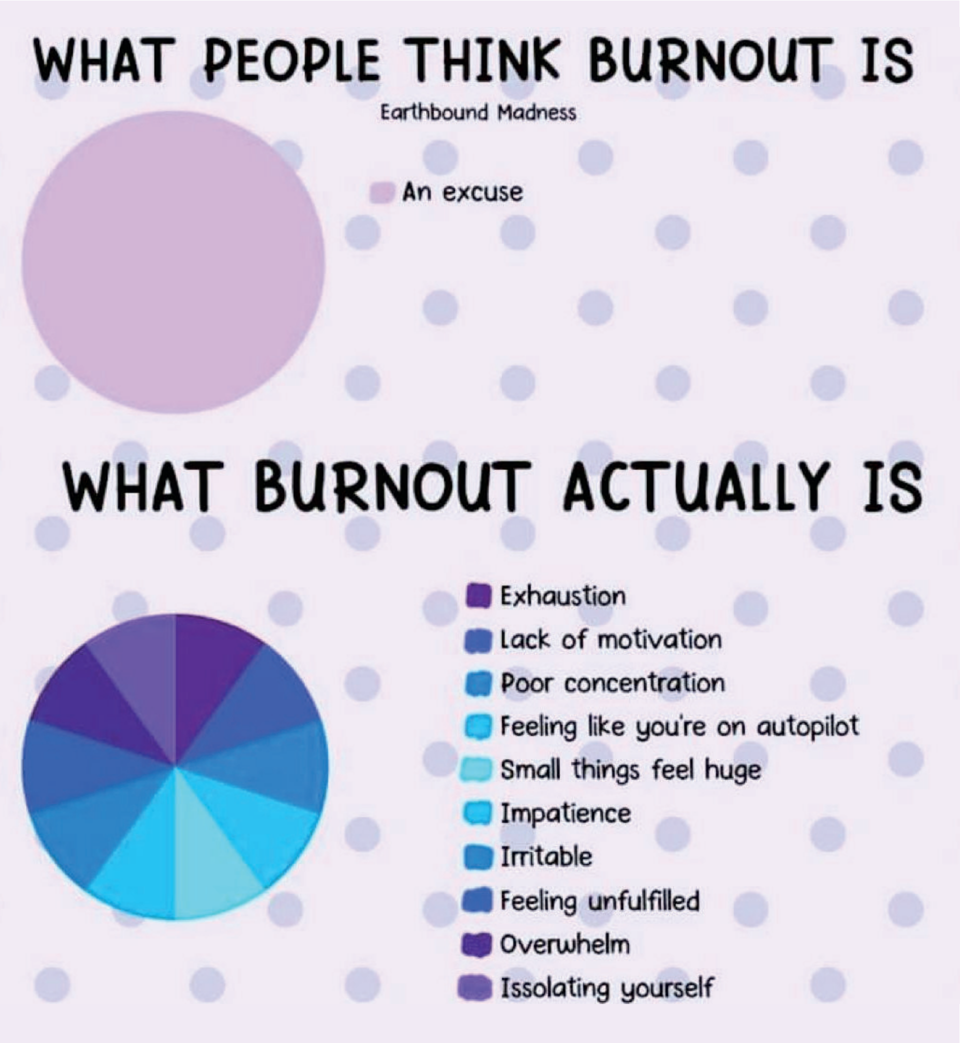
I was in a senior and well paid position. What would life look like without that safety net of a regular and guaranteed income? It took a lot of soul searching and financial consideration to understand.

To be clear, I couldn't even have considered this if I hadn't been in a privileged position. I'm an older gentleman in my fifties. I was entitled to a medium-sized pension. (I am fortunate that I invested in a pension plan starting at age 18 with my first fulltime job.) I didn't have any loans outstanding, but I do have a daughter to help. Could I really do it?

Speaking to a financial advisor helped, but didn't completely eliminate, money worries. It was scary at first to contemplate drawing down on savings and my pension, supplementing that with freelance earnings, as a replacement for a fulltime salary and benefits.

LEAVING FULLTIME WORK: THE BEST DECISION FOR ME

After a while, I came to a decision with the full support and encouragement of my wife and daughter. I would leave my fulltime job.



I was leaving my job with no other job to go to, for the second time in my testing career! The first time I did that, it was because I had hit a wall and had nowhere to go, despite asking and suggesting things. (I should have left up to two years earlier: isn't hindsight a great thing?)

Shortly after my family and I came to the decision, I officially resigned. Again, people at my workplace were supportive and understanding.

HOW I'M DOING NOW

As I write this, it has been over a month since I stopped working fulltime and began a new phase in my working life.

The first week was quite an adjustment, especially finding a new routine. I am less worried about work, well, not nearly as much as I was. But I was a bit more worried about financial matters.

Mornings are calmer. This has helped restimulate my brain, and thankfully, for now at least, executive dysfunction is a much rarer occurrence.

CREATIVITY AND EXECUTIVE FUNCTION

I'm writing again and ideas are coming. I have a list of workshops to put together and articles to write, and I am creating and writing. It is a little like a fog has thinned and I can make out shapes again.

Make no mistake: it isn't all sunshine and rainbows. I've had a few panic attacks, including one at TestBash during my first 99-second talk, which took place shortly after I'd handed in my resignation. Thankfully they aren't as severe as those I'd experienced before I left my job.

ONGOING ISSUES

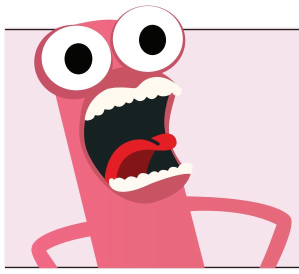
My sleep pattern isn't great either. My brain doesn't always want to listen when it is bedtime. Over the last two nights as I'm writing this, I've managed about four and a half hours of sleep per night. It is like some part of my brain is a petulant child who won't do as they are told. I'm tired but as you can read, I'm still writing.

Happy to have any advice anyone might be willing to give, but I've tried lots of things. Hopefully a more normal sleep pattern is in my future somewhere.

TO WRAP UP

Our mental health is with us twenty-four hours a day and seven days a week. It is important we are mindful, take care of ourselves, and allow ourselves to not be OK when we are not OK.

I hope this article, or at least some part of it, has helped you understand how someone's mental health affects them. Or perhaps you've recognised that you yourself may need help and that you should do something to get that help.■



> *"I think it is a really strong value of anyone to admit that they don't know something."*
>
> **MICHAEL CLOSE**

Quality engineer: What's in a job title?

Discover how adopting a quality engineering approach empowers testers to solve problems and improve experiences for everyone across the SDLC

BY STUART **THOMAS**

> *"Taking a quality engineering approach gives the testers on your team the opportunity to do more. And when you give them the room to do more, they will identify and solve interesting and complex problems. By solving these problems they improve the experience of everyone else working on the product."*

You may have heard the term "quality engineer" before. What is a quality engineer? And how is it different from the other job titles used to describe people who work in software testing and quality?

In this article I'll share my high-level definitions of various job titles. I'll then describe a quality engineer, and why it's my preferred title for people who do anything related to "testing."

I'll also share some examples of projects delivered by my quality engineering teams that, while some may consider them outside the scope of typical "quality" or "testing" work, have been of great value to our organisations.

TESTING JOB TITLES YOU'VE PROBABLY HEARD OF BEFORE

Quick caveat: this article is simply my opinion and perception of what a person with the given job titles are likely to do day to day. I realise this will vary greatly between organisations.

TESTER

- Someone that undertakes testing, likely without the use of automated checking or testing tools
- Often is involved only in the dedicated test phase of the software development life cycle (SDLC)
- Often hears: "why wasn't this caught in testing?" when defects show up in production

QUALITY ASSURANCE OR QA

- Another word for "tester"
- May begin work before the SDLC's traditional "test phase" begins, thanks to the increased popularity of Agile processes and the holistic testing model
- Still considered "the bottleneck" holding up release to production
- Is often charged with "assuring quality" on their own

TEST AUTOMATION ENGINEER

- Someone that spends the majority of their time writing, updating, and maintaining test automation frameworks
- Often hears: "why wasn't this caught by our automated tests?" when defects show up in production

SOFTWARE DEVELOPMENT ENGINEER IN TEST (SDET)

- Does work similar to that of test automation engineers
- May also be involved in pipeline creation and other "development" tasks that contribute to improving developer experience
- Primarily focussed on testing-related software development tasks

QUALITY COACH

- Provides guidance and support so that everyone on the team owns and improves quality practices
- Facilitates change, educates people on new ways of working, and is a passionate advocate for quality
- Unlike the other roles mentioned above, likely to be more "hands-off" when it comes to testing and development activities

QUALITY ENGINEERING: A HOLISTIC APPROACH

A good quality engineer combines the best traits of all the previous roles. Quality engineers balance manual exploratory testing with creating and maintaining the most valuable test automation. They also provide coaching, guidance, and support to enable a shift-left approach to testing and quality.

Most importantly, quality engineers take a holistic approach to quality and testing. This enables them to ensure that quality is at the heart of the entire software development lifecycle (SDLC), and, as much as possible, at the heart of what the organisation does.

Yes, I really did just say a good quality engineer does what five people in other roles might do. But they aren't the only ones responsible for each of those tasks. A quality engineer is, first and foremost, an enabler. Sure, they dive in and get their hands into code when it makes sense for them to do so. But they also set up their teams for success by ensuring that they themselves aren't indispensable to the quality effort. When they are out sick or on vacation, things can continue without them or the need for someone to cover.

Why "quality engineer" and not some other title? I think it is the most accurate one to describe the set of skills necessary for the role. They are engineers that specialise in quality just as we have specialist engineers in data, front-end, back-end, full-stack, security, and so on. Like other specialists, they undertake work within that specialty while they support others to learn and do better work in their own areas.

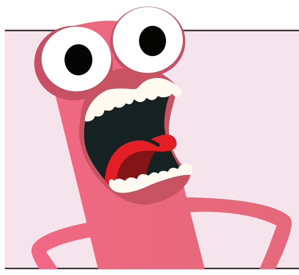
ADOPTING A QUALITY ENGINEERING APPROACH: MY EXPERIENCE AND RECOMMENDATIONS - WHAT DOES "QUALITY" MEAN?

I often talk about "quality" as improving the experience of everyone involved with a product: developers, product owners, customer support, customers themselves, and beyond. The role of a quality engineer is not only to identify the pain points experienced by this broad demographic of stakeholders, but also to propose and implement solutions to improve their experience.

However, you can't change to a quality engineering approach overnight. Getting to a stage where your quality and testing folk can work as quality engineers requires an investment of time and energy.

QUALITY ENGINEERING IS A CULTURE

You can change job titles and job



> *Quality engineering involves embedding quality considerations into every stage of development.*
>
> **STUART THOMAS**

descriptions. However, to succeed at quality engineering, it takes the right culture.

As a first step, the people on your quality team need to buy into the improvements that can be made, the journey the team will take to get there, and their places in it. For every organisation this transition will look different, though there are themes common to all transitions.

Implementing a true quality engineering culture also requires getting the rest of the organisation on board. In my experience this cannot be a big-bang, sudden change. Like many large-scale changes, talking openly about the desired end-state before you begin the transition is a good idea. After the concept has taken hold, you should plan and take small, deliberate steps to work towards the goal. This helps to build confidence in the approach as small changes begin to add up to big improvements.

The skillset of the quality team will likely change over time. The quality engineers-in-training should become involved in areas outside their usual realms of expertise. For example, they can learn to build pipelines and tools that reduce manual task repetition and provide early feedback. With the essential busywork automated, they can focus on learning, exploration, and critical thinking about improving processes. Exploratory testing is a great way to encourage systems thinking, as is suggesting and designing ways to improve test coverage.

OUR TEAM'S MOVE TO QUALITY ENGINEERING

I've helped lead a transformation to a quality engineering approach. The interesting part of that journey is that at first we didn't think of it as a transition to quality engineering. The initial motivation for the change was a shift from a fortnightly deployment cadence to multiple times per day. However, what we had to do to achieve the improved release cadence was just as much about a shift towards quality engineering as it was anything else.

The improvements we made required taking a holistic view of quality, looking at how we could improve processes in all phases of the software development lifecycle. On our team, the shift of mindset meant that the quality engineers-in-training were encouraged to suggest process improvements outside of their usual testing activities. Quality engineers brought together people across disciplines to collaborate on small, iterative improvements: ways of working, building pipelines, and so on. All of this gradually moved the company towards the ultimate goal of more frequent AND more reliable releases.

Below I describe some of the improvements we saw as we moved toward a true quality engineering approach.

SOME EXAMPLES OF QUALITY ENGINEERING WINS

These projects aren't traditional "testing" or "quality" initiatives. But they helped our team deliver better products.

COLLECT AND REPORT DEVOPS RESEARCH AND DEVELOPMENT (DORA) METRICS

We introduced collection and reporting of DORA metrics. This was an iterative process that started with basic manual data collection and reporting. Over time, as we saw that the information was valuable, we automated metrics collection and dashboarding. We set it up to make metrics available for each of our repositories, allowing each team to monitor their own performance.

SET UP EPHEMERAL TEST ENVIRONMENTS FOR QUICK TEST RESULTS

Ephemeral test environments are short-lived, temporary infrastructures for deploying an application or service. To create these environments, our team worked with a platform team to create the infrastructure-as-code and associated pipelines.

With this capability, teams could test their code early and often. A development engineer could make code changes, then raise a pull request. The pull request would trigger the deployment of the full application to an ephemeral environment, where a suite of automated checks would run and report results. After the pull request was merged or closed, the environment was deleted.

PROVIDE TESTING AS A SERVICE (TAAS)

We built workflows on top of the ephemeral test environments to provide a centralised, easy-to-use way of running the full suite of automated tests. The workflows were designed so that even someone unfamiliar with them could execute the tests they needed in the environment they needed, obtaining clear results at the end. Everything was available in a centralised location with guardrails so that you could run tests at all levels of environment, including production, while protecting you from doing anything that could be damaging.

DEPLOY SMALLER RELEASES MORE FREQUENTLY

Our quality teams improved processes and ways of working across engineering that ultimately enabled more frequent and higher-quality deployments. We contributed directly to pipeline improvements, advocated for improved developer branching practices, and conducted experiments to build confidence in proposed changes.

IMPROVE THE INCIDENT MANAGEMENT PROCESS

Our quality folk had always been close to our incident management: supporting root cause analysis, testing patch releases, and so on.

So when we were looking to improve our incident management processes, bringing on more people to support it, the quality engineers played a huge part. We ran "war games" with support to simulate real-world incidents and follow the full incident management process. This gave people a hands-on opportunity to learn and understand not only the process, but also how best to work with our observability platform to understand the issue at hand.

BUILD A CLOSE WORKING RELATIONSHIP WITH SUPPORT

We learned to work even more closely with our technical support staff. Among the process improvements were:

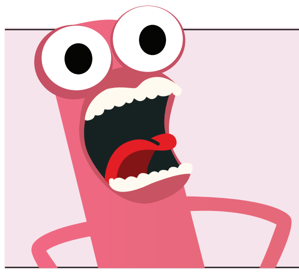
- Enabling support to raise "urgent" severity incidents for speedy investigation
- Giving support a separate channel for less urgent queries that would still benefit from engineering insight
- Setting up a regular meeting for core engineering and support leadership to identify and address important customer-facing issues

TO WRAP UP

Taking a quality engineering approach gives the testers on your team the opportunity to do more. And when you give them the room to do more, they will identify and solve interesting and complex problems. By solving these problems, they improve the experience of everyone else working on the product.

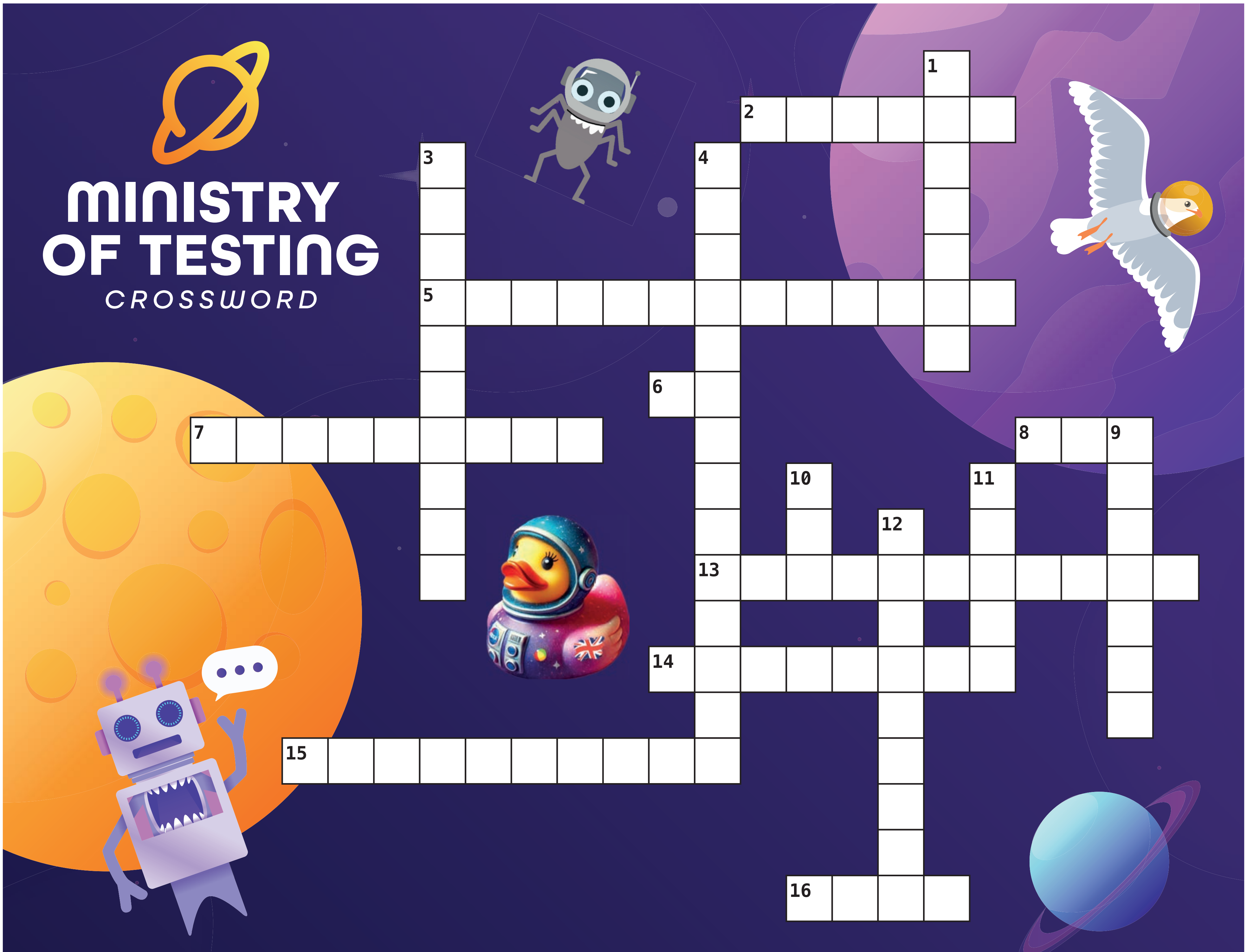
When everyone's experience is improved, the quality of your product improves, resulting in happier customers and employees. What's not to like?■

Start Here
MINISTRY OF TESTING
MAZE CHALLENGE



> *Everyone is responsible for quality. Everyone includes senior leadership.*
>
> **ANNE-MARIE CHARRETT**

MINISTRY OF TESTING
CROSSWORD

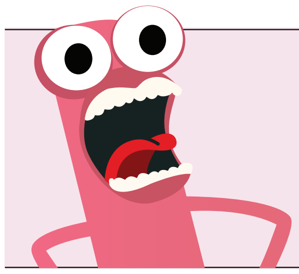


ACROSS

2. Jason Huggins's new AI-native test platform
5. The ability to understand a system's internal state from its outputs.
6. Shorthand for the technology that's changing how we build and test software.
7. The art of giving clear instructions to an AI model.
8. A creepy-crawly in code that causes unexpected behaviour.
13. A style of testing where learning, designing, and executing happen all at once.
14. The edge where valid input ends and bugs often begin.
15. Guiding people, not just processes, to create better software.
16. A better alternative to ISTQB

DOWN

1. What we aim to build into products, not just test for at the end.
3. The practice of running tests with scripts and tools instead of by hand.
4. Approach where people guide or review automated decision-making.
9. Not a cucumber, but a language for writing test scenarios in plain English.
10. An open protocol that standardizes how applications provide context to LLMs
11. A test that sometimes passes, sometimes fails, often for no good reason.
12. Cosmic nickname for the Ministry of Testing ecosystem.



> *When we talk about software quality, we need to consider who defines quality and how we assess and measure it.*
>
> **ALESSANDRA MOREIRA**