Root Cause Analysis (RCA) for IT

In the world of software development and technology, you’re always trying something out only to test it again. Engineers learn from their mistakes and use them to grow their skillsets. While this is beneficial at times, the idea of a major failure when it comes to networks or entire company infrastructures is not so forgiving. The result of unintended problems or events is a thing of nightmares.

Fortunately, there is a systematic approach available if a problem should ever arise (which it will) that helps engineers and developers find the basic beginning of a problem and discover what went wrong: Root Cause Analysis.

What is root cause analysis?

Root cause analysis (RCA) is a systematic process for finding and identifying the root cause of a problem or event. Based on
the basic idea that having a truly effective system means more than just putting out fires all day, RCA aims to not only figure out where the issue came about but it also strives to respond to it and then find a way to prevent it from happening again in the future.

Originally started in aeronautical engineering, this method is now applied in virtually every field imaginable, but with particular focus and benefits in software development. Finding the root cause of a software or infrastructure problem is a highly effective quality engineering technique that is already mandated across a variety of industries.

Why is root cause analysis necessary?

RCA has a wide range of advantages, but it is dramatically beneficial in the continuous atmosphere of software development and information technology. Not only does RCA help to pinpoint factors that contribute to the problem or event, it also helps companies avoid the temptation to single-out one issue in order to resolve the problem as fast as possible. It also helps to find the actual cause of the problem as opposed to just fixing resulting symptoms.

Another major reason why root cause analysis is so important is that it can significantly reduce development time and business expenses by catching problems early on. By being able to identify the root of the problem in the beginning or early stages, developers are able to further enhance the agile environment and drive process improvement. Even though the analysis may seem like a time-consuming process, especially in the fast-paced world of technology, the opportunity to eliminate or mitigate risks and root causes is undeniably worth the time.
RCA principles

Some of the basic principles of RCA can help organizations ensure they are following the correct methodology:

- Focusing on corrective measures of root causes is more effective than simply treating the symptoms of a problem or event
- RCA is performed most effectively when accomplished through a systematic process with conclusions backed up by evidence
- There is usually more than one root cause for a problem or event
- The focus of investigation and analysis through problem identification is WHY the event occurred, and not who made the error

How to perform root cause analysis

While the specific map of root cause analysis may look slightly different in each organization and industry, the most basic outline to use is:

- Define the problem
- Gather all information and data
- Identify any issues that contributed to the problem
- Determine root causes
- Identify recommendations for the recurrence of problems in the future
- Implement the necessary solutions
When a problem or event arises, the first thing that needs to take place is for all suspected parts to be isolated to ensure that the issue is contained. Once the problem is found, the next step would be to compile all data and evidence related to the specific issue in order to begin understanding what it might be.

Once all of the information is gathered and other symptoms of the problem are identified, the Root Cause Analysis can begin by using one of a variety of different techniques. Each tool is used to search for small clues that may reveal the root cause, allowing the person or team to correctly identify what went wrong.

Once this is completed, it is vital to implement a solution to guarantee the problem does not happen again. After the entire process is finished, the root cause analysis engineer will document the problem as well as the overall resolution so that future engineers can use it as a resource.

### RCA Method: The 5-Whys

While there are a wide variety of other methods, one of the most simple and commonly utilized tools in conducting an RCA is the 5-Whys method. Mimicking the approach of curious children, the 5-Whys method literally suggests one asks “Why?” five times in a row in order to identify the root cause of the issue.
basically any process or problem. Even though the method seems explicit enough, this approach is still meant to be flexible depending on the scenario; sometimes five whys will be enough while others will require the investigator asks a few more times.

To begin this method, follow a similar outline:

- Write down the specific problem that needs to be fixed, describing it completely
- Ask “Why?” the problem happened and write the answer below
- If your first question didn’t find the root cause, ask “Why?” again and write that answer down
- Continue this process until the team is in agreement that the root cause of the problem is identified

Remember, in order to have an effective RCA it is important that the team recognizes that processes cause the problems not people. Pointing fingers and placing blame on specific workers will not solve anything.

Benefits of analyzing root cause

Other than the obvious main benefit of RCA of being able to identify and solve problems, there a numerous other examples that help to solidify its usefulness and importance in the tech environment.

Solve real-world problems

When the specific employees obtain the proper RCA training as well as resolution training, the correct processes are executed and common business problems are solved.

Lower costs

When minor or major problems are caught right away, the
likelihood of them causing a lot of issues is much lower, especially when part of the agile work environment. This not only saves valuable employee time, but it also ensures organizations don’t face other fines or compromises.

**Safer workplace**

Employee safety is one of the most important things on the brain of employers, and root cause analysis provides an added peace-of-mind. By being able to quickly and effectively investigate any safety incidents, solutions can be put into place to prevent anything similar from happening again down the line.

**Effective and long-lasting solutions**

When resolutions are combined to the end stage of the RCA process, long-term prevention is focused upon and made a priority versus just the fastest fix. With this forward-thinking piece in place, companies can spend their time being proactive and productive instead of just reactive.

**Effective RCA saves you more than money**

Taking the time to create a robust root cause analysis process may take some time and effort in the initial stages, but it is an investment that will extend far beyond the expenses. The skills learned during the RCA process can be carried over to almost every other problem or field and initiate an attitude of continuous improvement. This culture will surely permeate the entire organizational system, making companies the most efficient and effective as possible.