Analyzing the Impact of Requirement Changes
Abstract

When a requirement changes, dependent items may be impacted. Without a full understanding of a requirement’s dependencies, there is an increased risk of making uninformed decisions about implementing changes. An overlooked dependency can quickly cause a ripple effect of missed changes, ultimately resulting in schedule overruns and scope creep.

TestTrack’s impact analysis capabilities take the guesswork out of understanding and approving requirement changes by helping you quickly understand the scope of changes in the context of the entire project.
Why Perform Impact Analysis?

When a requirement change is requested, you must consider what is involved in making the change and estimate the impact it will have on the project scope and schedule. The impact may be minimal if the change is requested early in the development cycle, or it may be more far-reaching if it is requested later in development or testing. Impact analysis exposes requirement dependencies and the status of dependent items in the development cycle, which can help you make more accurate, informed decisions about change requests.

Impact analysis can also help you:

• Reduce the risk of missing changes to dependent items.
• Eliminate unexpected consequences, such as impacting another component that reuses a requirement, as a result of making a change.
• Identify new requirements or other items, such as additional test cases, that need to be created as a result of changes.

When to Perform Impact Analysis

Ideally, impact analysis happens when a change is proposed and before it is approved or implemented. This allows you to evaluate the potential impact of making the change and determine if additional discussion is required before approving the change.

Of course, in the fast-paced product development world, changes can occur with little-to-no advance notice. In this case, impact analysis can still help you make sure changes to dependent items are not missed and identify areas of rework.

Types of Impact Analysis

TestTrack includes both forward and backward impact analysis. Use forward impact analysis to determine the child requirements and other dependent items that may be affected by requirement changes. For example, a change to a high-level business requirement may affect all child functional requirements or a change to a requirement may affect all test cases linked to it.
Use backward impact analysis to determine the parent requirements and other dependent items that may be affected by requirement changes. For example, a suggested change to a child requirement may conflict with its parent requirement or a feature request may affect the requirement created to address it.

How to Perform Impact Analysis

To perform impact analysis, open the requirement and click the Traceability tab. Click Impact Analysis and then select the box for Forward Impact, Backward Impact, or both.

![Impact Analysis](image1)

**Figure 1:** Impact analysis is available on the requirement Traceability tab.

Requirements that are related in a requirement document or linked to each other are displayed, as well as linked test cases, test runs and defects.

Detailed information is displayed for each dependent item to help you determine the item's status and view more about its relationship with the requirement.

![Impact Analysis](image2)

**Figure 2:** Impact analysis displays detailed information about requirement relationships.

Forward and backward impact analysis both display directly and indirectly impacted items. The following table includes the items that are displayed for each type of impact analysis.
The following forward impact analysis example shows the table of contents for a requirement document. Notice the relationships that FR-25 has. It is the parent requirement of requirements FR-20, FR-26, and FR-21.

<table>
<thead>
<tr>
<th>IMPACT ANALYSIS</th>
<th>IMPACT TYPE</th>
<th>DISPLAYS</th>
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<tbody>
<tr>
<td>Forward Impact</td>
<td>Direct</td>
<td>Child requirements one level down in the requirement document hierarchy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Items with child or peer links to the requirement</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>Items with child or peer links to the directly impacted items</td>
</tr>
<tr>
<td>Backward Impact</td>
<td>Direct</td>
<td>Parent requirements one level up in the requirement document hierarchy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Items with parent or peer links to the requirement</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>Items with peer or parent links to the directly impacted items</td>
</tr>
</tbody>
</table>

Figure 3: Requirement relationships are based on the requirement document hierarchy

In this example, the child requirements of FR-25 are displayed in the Impact Analysis area. Test cases and test runs linked to the requirement FR-25 are also displayed. If the requirement changes, these dependent items should be investigated to determine if additional changes are needed.
In the following backward impact analysis example, parent requirements of requirement FR-25 are displayed. Requirement FR-25 may be affected if these requirements change.

Other TestTrack Impact Analysis Features

If a change request has the potential to affect several requirements, you may want to use TestTrack reports or the Analyze Traceability dialog to evaluate requirement relationships on a broader scale.

Requirement Document Impact Report

The Requirement Document Impact report displays all requirements and dependent items that are included in a requirement document. This report can help you gauge how far-reaching the effects of a requirement change are and trace relationships in the context of the entire project.

The impact report displays the hierarchical outline of requirements. Test cases are displayed under related requirements, test runs are displayed under related test cases, and defects are displayed under related test runs. You can easily spot and evaluate dependent items to determine if they may be impacted by changes.

Each item’s status is displayed to help you see where all items are within their lifecycle. Requirement risk and difficulty are also displayed to help you further assess the impact of making a change. Click the item links to view more information about an item.
The Requirement Forward Traceability report displays a specific set of requirements and dependent items in a table format. This report can help you quickly see which requirements have downstream dependencies that may be affected by requirement changes. You can also identify gaps, such as which requirements do not have related test cases.

You can filter this report to include a set of requirements, regardless of the requirement document they are included in. The report displays requirements and any test cases or defects linked to each requirement, which gives you a quick summary of the number and type of dependencies.

Matrix reports include information to help you analyze linked and related items in a configurable table format. These reports are yet another way to expose all items that may be impacted if you make a change.

Unlike the Requirement Forward Traceability report, you can define the columns to include in the report, items displayed in columns, how columns are related, details displayed about items, and other report content.
Analyze Traceability

TestTrack allows you to analyze traceability and generate a high-level matrix view of all the relationships in a project. You can quickly filter the information to dynamically explore relationships and see which items are related, as well as how they are related.

Learn more in this three-minute TestTrack matrix reports video.

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<table>
<thead>
<tr>
<th>BR-7</th>
<th>BR-8</th>
<th>BR-9</th>
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</tr>
</tbody>
</table>

Figure 8: Matrix reports help you analyze linked and related items easily

Figure 9: The Analyze Traceability feature provides a dynamic view of item relationships
Make Informed Decisions with Impact Analysis

TestTrack's impact analysis capabilities provide a clear picture of relationships between items so you can accurately determine the impact of changing requirements. A better understanding of these relationships will help you ensure that changes are not missed and do not negatively affect the project outcome.
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