



WHITE PAPER

Analyzing the Impact of Requirement Changes

Introduction

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.

Helix ALM's impact analysis capabilities take the guesswork out of understanding and approving requirement changes by helping you quickly understand the scope of changes within 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.

When changes occur with little notice, impact analysis can still help ensure changes to dependent items are not missed, and identify areas of rework.

Types of Impact Analysis

Helix ALM includes both forward and backward impact analysis. Forward impact analysis determines 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.

Backward impact analysis determines 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 with Helix ALM, open the requirement and click the Traceability tab. Click Impact Analysis and then select the box for Forward Impact, Backward Impact, or both.

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.

Impact	Item Type	Number	Summary	Relation	Suspect
▶ Backward	BR Business Requi...	9	Activity Planning	←← Parent	No

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

Impact	Item Type	Number	Summary	Relation	Suspect	Related By	Comment	Status	Assigned Users
▶ Forward	📄 Test Case	7	Requirement 25: D...	→ Child	🚩 Yes	🔗 Requirement T...	Happy path.	Ready	Tester, Sherry A
▶ Forward	📄 Test Case	8	Requirement 25: V...	→ Child	🚩 Yes	🔗 Requirement T...	Optional path.	Ready	Tester, Sherry A
▶ Backward	📄 Business Requ...	145	Participation Tracki...	←← Parent	No	🔗 BPS Requirem...		Approved	

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

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.

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.

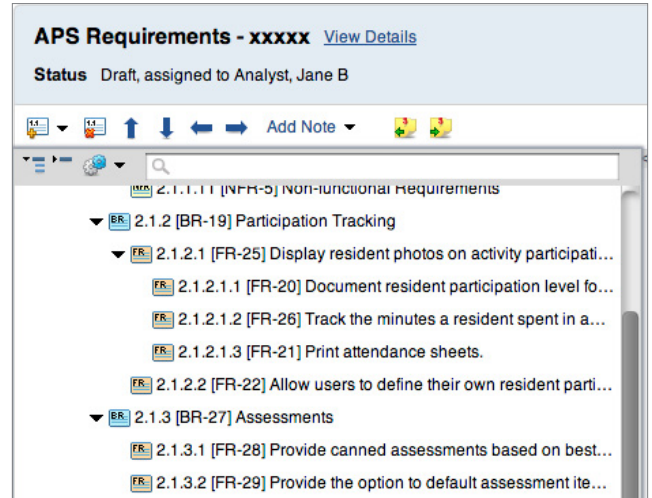


Figure 3: Requirement relationships are based on the requirement document hierarchy

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.

IMPACT ANALYSIS	IMPACT TYPE	DISPLAYS
Forward Impact	Direct	Child requirements one level down in the requirement document hierarchy Items with child or peer links to the requirement
	Indirect	Items with child or peer links to the directly impacted items
Backward Impact	Direct	Parent requirements one level up in the requirement document hierarchy Items with parent or peer links to the requirement
	Indirect	Items with peer or parent links to the directly impacted items

Impact	Item Type	Number	Summary	Relation	Suspect	Related By	Comment	Status	Assigned Users
Forward	Functional Req...	20	Document resident...	→ Child	No	APB Requirem...		Approved	
Forward	Functional Req...	21	Print attendance s...	→ Child	No	APB Requirem...		Approved	
Forward	Functional Req...	26	Track the minutes ...	→ Child	No	APB Requirem...		Approved	
Forward	Test Case	7	Requirement 25: D...	→ Child	Yes	Requirement T...	Happy path.	Ready	Tester, Sherry A
Forward	Test Case	8	Requirement 25: V...	→ Child	Yes	Requirement T...	Optional path.	Ready	Tester, Sherry A

Figure 4: Forward impact analysis displays downstream dependencies

Impact	Item Type	Number	Summary	Relation	Suspect	Related By	Comment	Status	Assigned Users
Indirect	Business Requ...	7	Activity Profession...	← Parent	No	APB Requirem...		Awaiting Re...	
Indirect	Business Requ...	8	Activity Application	← Parent	No	APB Requirem...		Draft	Analyst, Jane B

Figure 5: Backward impact analysis displays upstream dependencies

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.

Other Helix ALM Impact Analysis Features

If a change request has the potential to affect several requirements, you may want to use Helix ALM 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

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.

REQUIREMENT FORWARD TRACEABILITY REPORT

The Requirement Forward Traceability report displays a specific set of requirements and

Tag	Name	Risk	Difficulty	Status
RD-2	APS Requirements			Draft, assigned to Analyst, Jane B
BR-6	Overview			Awaiting Review, not assigned
BR-7	Activity Professional Suite			Awaiting Review, not assigned
BR-8	Activity Application			Draft, assigned to Analyst, Jane B
BR-9	Activity Planning			Draft, assigned to Analyst, Jane B
BR-19	Participation Tracking			Approved, not assigned
FR-25	Display resident photos on activity participation entry form.			Awaiting Review, not assigned
TC-7	Requirement 25: Display resident photos on activity participation entry form.			Ready, assigned to Tester, Sherry A
TR-134	Requirement 25: Display resident photos on activity participation entry form.			Failed
IS-18	Test Run 134: Requirement 25: Display resident photos on activity participation entry form. - Application crashes when I click the save button.			Open, assigned to Developer, Joe C
TC-8	Requirement 25: Validate that resident photo on the activity participation entry form is optional.			Ready, assigned to Tester, Sherry A
TR-135	Requirement 25: Validate that resident photo on the activity participation entry form is optional.			Passed
FR-20	Document resident participation level for scheduled and unscheduled activities.			Approved, not assigned
TC-9	Requirement 20: Document resident participation level for scheduled and unscheduled activities.			Draft, assigned to Tester, Sherry A
FR-22	Allow users to define their own resident participation levels.			Approved, not assigned
TC-11	Requirement 22: Allow users to define their own resident participation levels.			Draft, assigned to Analyst, Jane B
FR-26	Track the minutes a resident spent in an activity.			Approved, not assigned
TC-12	Requirement 26: Track the minutes a resident spent in an activity.			Ready, assigned to Tester, Sherry A
FR-21	Print attendance sheets.			Approved, not assigned
TC-10	Requirement 21: Print attendance sheets.			Ready, assigned to Tester, Sherry A
TR-136	Requirement 21: Print attendance sheets.			Failed
IS-19	Test Run 136: Requirement 21: Print attendance sheets. - Only the first column of information prints.			Open (Verify Failed), assigned to Administrator, System
TR-137	Requirement 21: Print attendance sheets.			Failed
IS-20	Test Run - 137: Requirement 21: Print attendance sheets. -			Open, not assigned
TR-138	Requirement 21: Print attendance sheets.			Not Started, assigned to Tester, Sherry A

Figure 6: The Requirement Document Impact report displays relationships for all requirements in a document

HelixALM Requirement Forward Traceability		
Report generated by Demonstration, User 13 on 6/10/2014 at 3:26:26 PM		
Requirements	Test Cases	Issues
BR-1: Introduction		
FR-2: Functional Requirements		
FR-3: Functional Area 1		
FR-4: Functional Area 2		
NFR-5: Non-functional Requirements		
BR-6: Overview		
BR-7: Activity Professional Suite		
BR-8: Activity Application		
BR-9: Activity Planning		
FR-10: Define activities.		
FR-11: Schedule activities.		
FR-12: Display graphs of participation data.		
FR-13: Provide reports on individual resident participation.		
FR-14: Provide monthly, aggregated resident participation report.		
FR-15: Provide reports on activity program effectiveness		
FR-16: View results of resident interest summaries.		
FR-17: View report on common characteristics of low-participation residents.		
FR-18: Provide a resident activity suggestion box.		
BR-9: Participation Tracking		
FR-20: Document resident participation level for scheduled and unscheduled activities.	TC-9: Requirement 20: Document resident participation level for scheduled and unscheduled activities.	IS-20: Open, assigned to Demonstration, User 4; Demonstration, User 5; Demonstration, User 6; Demonstration, User 7; Demonstration, User 8; Demonstration, User 9
FR-21: Print attendance sheets.	TC-10: Requirement 21: Print attendance sheets.	IS-20: Open, assigned to Demonstration, User 4; Demonstration, User 5; Demonstration, User 6; Demonstration, User 7; Demonstration, User 8; Demonstration, User 9
FR-22: Allow users to define their own resident participation levels.	TC-11: Requirement 22: Allow users to define their own resident participation levels.	

Figure 7: The Requirement Forward Traceability report displays requirements and downstream dependencies

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.

HelixALM APS Functional Risk						
Report generated by Administrator, System on 6/4/2014 at 8:31:14 PM						
Business Requirements		Functional Requirements				
Summary	Summary	Importance	Difficulty	Uncertainty	Risk	
BR-6 - Overview Awaiting Review, not assigned						
BR-7 - Activity Professional Suite Awaiting Review, not assigned						
BR-8 - Activity Application Draft, assigned to Analyst, Jane B						
BR-9 - Activity Planning Draft, assigned to Analyst, Jane B	↔ FR-10 - Define activities. Draft, assigned to Analyst, Jane B ↔ FR-11 - Schedule activities. Draft, assigned to Analyst, Jane B ↔ FR-12 - Display graphs of participation data. Draft, assigned to Analyst, Jane B ↔ FR-13 - Provide reports on individual resident participation. Draft, assigned to Analyst, Jane B ↔ FR-14 - Provide monthly, aggregated resident participation report. Draft, assigned to Analyst, Jane B	Must	Medium	Medium	Medium	
		Must	High	Medium	High	
		Must	Low	Low	Low	
		Must	Medium	Medium	Medium	
		Must	High	High	High	

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

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.

Helix ALM 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.

MATRIX REPORTS

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.

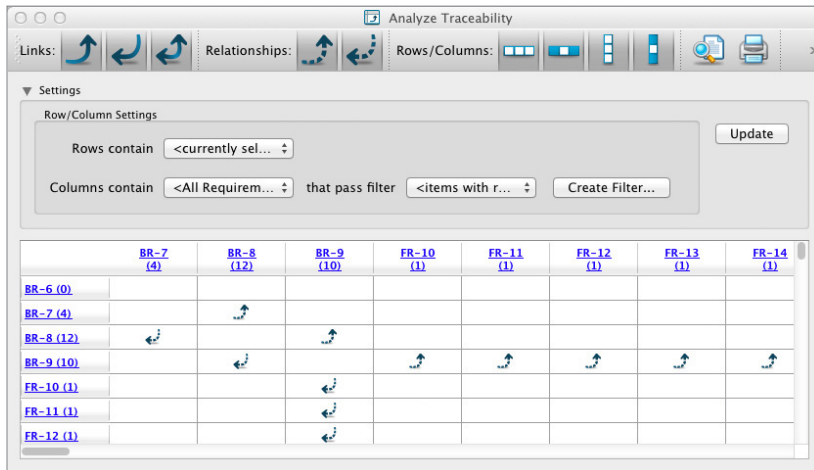


Figure 9: The Analyze Traceability feature provides a dynamic view of item relationships

ANALYZE TRACEABILITY

Helix ALM 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.

Make Informed Decisions with Impact Analysis

Helix ALM'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.

Learn about Helix ALM's benefits and features at [Perforce.com](https://www.perforce.com).

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