

Managing Requirements & Improving Quality

TraceCloud

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Synopsis

Failure to define, communicate, and validate business requirements is the root cause of many project delays, overruns, and failures. There is a growing realization of the importance of requirements management in organizations. The goal of this paper is to show how TraceCloud can be used to collaborate, define, approve, control, and track requirements to have a high-quality end product.

What are Requirements?

Requirement is the industry term used to describe end-user needs or the level of service expected from an application. Requirements tend to vary in granularity, meaning, and categorization.

Types of Requirements

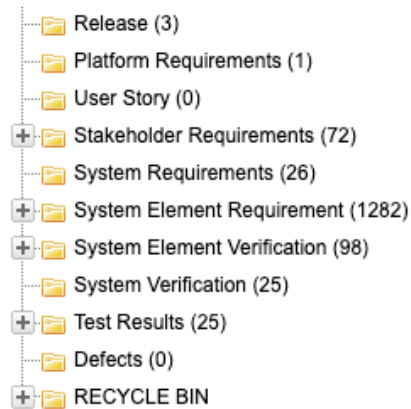
- **Business requirements** describe the overall objectives of a system.
- **User requirements** describe user needs and problems.
- **Functional requirements** describe specific behaviors of the system and internal workings of the software.
- **Quality of service requirements** describe localizability, accessibility, performance, and scalability needs.

In a typical project, different organizations own different types of requirements.

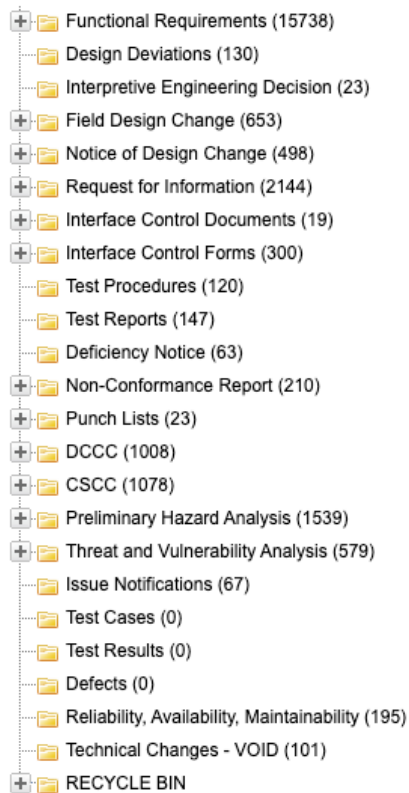
- Product Marketers, Business Analysts, and Program Managers define business requirements. Working with project managers and release managers, they group these requirements in a release.
- Development managers define functional requirements and associate them with business requirements.
- Test managers define test cases and assign them to functional requirements. Typically, they also own the execution of test cases and track test results to completion.

While the above example is typical in most software development companies, it may differ based on the organizational needs. Hence, at the beginning of a project, it's important to understand and define a Requirements Management Plan (RMP).

If you are working on a Systems Engineering project, your requirements may look like this...



If you are working on a large-scale infrastructure project with a large pool of vendors and requirement types, then your project structure may look like this...



In other words, when beginning a project, you want to define the Requirement Types that your project will need to support. This is part of your RMP (Requirements Management Plan) definition exercise.

Why Manage Requirements?

The root cause of failed projects is often a failure to define, track, and manage requirements, as well as constantly changing requirements. Digging deeper, you may recognize the following symptoms:

- Lack of clearly defined requirements
- Lack of a clear relationship between different types of requirements resulting in:
 - Changes to business requirements that were not communicated to downstream stakeholders
 - Changes to functional / field requirements that were not communicated upstream for approval
- Unapproved/unauthorized changes to requirements
- Lack of visibility into the overall release status
- Lack of ownership of requirements
- Inability to report on requirements

A requirements management tool and a requirements management plan can go a long way towards solving these basic problems. In the next section, we'll see how a requirements management plan (RMP) can get different stakeholders on the same page.

Your Current Challenges

If the following challenges sound familiar to you, then this whitepaper and the workshop will be of great help to you.

- **Consolidation:** Your requirements are distributed across multiple Excel and Word files. You would love to consolidate all these requirements into a common project.
- **Common Process:** Members working on the same project are not following the same practices or are even aware of a standard procedure. You feel that a common structure & process will reduce miscommunication and help with project delivery.
- **Traceability:** You do not have a way to connect requirements in one Excel file with requirements in a separate Excel file. Hence you can't form a daisy chain of work and see the impact of modifying one on the rest.
- **Big Picture:** You are not able to run complex reports that run across these files. You are limited to reporting on the status of one set of data at a time. You are worried that you are missing the big picture
- **Change Management:** You are not happy with your change management process. You would like to have a "Change Impact Analysis" report before the change, see the impact of the change after the event, and receive confirmation that all stakeholders have internalized the change.
- **Approval Workflow:** You would love to have an approval work flow for changes and have the approvals logged.

- **Versioning & Audit Trail:** You want to manage versioning of requirements and have an approved change log.
- **Reporting:** You want to be able to report on the status of the project or individual parts of the project.
- **Ease of Use:** You want the flexibility and ease of use that comes with Excel. You don't want to be burdened with a complex tool that takes time to learn.
- **Baselining:** You want to be able to baseline the progress of the project and have it ready for reference
- **Collaboration:** You want to have multiple organizations or vendors collaborate on the same project. But you also want to limit who can see what and who can modify which portions of the project.
- **Custom Reports & Dashboards:** You want to be able to generate custom word reports in a client-acceptable format. You also want to see dashboards so you can track progress and identify missteps early.

A Requirements Management Plan (RMP)

A properly defined requirements management plan is a good way to document the process and secure the acceptance of all the participants. An RMP includes the following:

- Type of requirements you plan to track
- Attributes relevant to each requirement type
- Folder structure of requirements
- Roles of users who will work on the requirements
- Ownership and read/write privileges

Requirement Types & Attributes

If you look at your current requirements, you can probably group them into different types, based on:

- The attributes you want to track for a group of requirements
- The roles or responsibilities of individuals who work on these requirements
- The scope of the project and the sequence of work these requirements drive

For example, in a typical Software Development project, you may have:

- Business Requirements
- Product Requirements
- Functional Requirements
- Non-Functional Requirements
- Test Cases
- Test Results

A Systems (Hardware + Software) project may have the following:

- User Stories
- Platform Requirements
- Stakeholder Requirements
- System Requirements
- System Element Requirements
- System Verification
- System Element Verification
- Test Results
- Defects

Similarly, for a large-scale civil engineering or rail transportation project, you may have additional Requirement Types, such as:

- Request for Information
- Field Design Changes
- Design Deviations

Each of these types of requirements are currently represented by an Excel file in your current model. i.e each of them may be tracking different columns of information. Also, these files are owned by different teams and have their own change control & change approval process.

A good requirements management system will let you bring in all these types of requirements into a single project, so you can connect these requirements to one another.

The takeaway here is talk to your project stake holders, see how they currently track their requirements, and once you analyze the purpose of these requirements, the stake holders, and the attributes they are supposed to track, you can easily figure out the types.

You can fill [use template](#) below to keep track of your Requirement Types.

Requirement Type 1	
Name	Hardware Requirements
Prefix	HR-1, HR-2
Requires Approval	Yes
Attribute 1	
Name	Sample Name

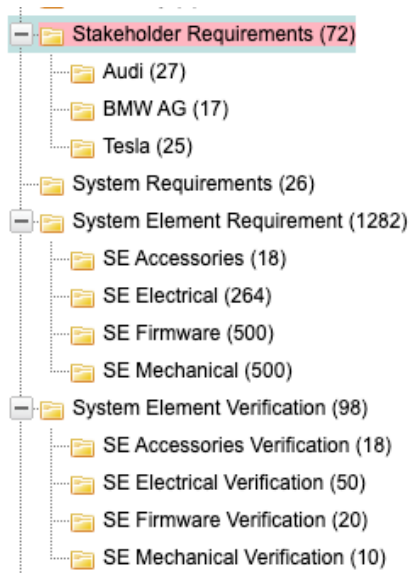
Type	textbox, date, url, dropdown single, dropdown multiple
Default Value	Sample default value
Change to this attribute will change requirement Version number	Yes/ No
Change to this attribute will make all up / downstream connections suspect	Yes/ No
Change to this attribute will require that the requirement needs to be re-approved	Yes/ No
Attribute 2	
Name	Sample Name
Type	textbox, date, url, dropdown single, dropdown multiple
Default Value	Sample default value
Change to this attribute will change requirement Version number	Yes/ No
Change to this attribute will make all up / downstream connections suspect	Yes/ No
Change to this attribute will require that the requirement needs to be re-approved	Yes/ No
Attribute 3	
Name	Sample Name
Type	textbox, date, url, dropdown single, dropdown multiple
Default Value	Sample default value
Change to this attribute will change requirement Version number	Yes/ No
Change to this attribute will make all up / downstream connections suspect	Yes/ No
Change to this attribute will require that the requirement needs to be re-approved	Yes/ No

Folders

Since you can potentially have 100s or 1000s of requirements of a single type, you will want to organize these into Folders and Sub Folders. This is conceptually similar to how you might break up your Excel file into different tabs or how you might organize your files on your PC’s file system.

In TraceCloud each Requirement Type is represented by a top level folder and you have the flexibility to create a sub folder structure below that and move requirements around.

In the picture below, for example, the Stakeholder Requirements are organized into Audi, BMW, and Tesla folders. Similarly, the System Electrical Requirements are organized into SE Accessories, SE Electrical, SE Firmware, and SE Mechanical folders.



TraceCloud gives you the ability to easily move requirements around folders and generate reports across sub folders, so there is no penalty for organizing into multi-level sub-folders. You can also generate folder level statistics using dashboards. If you organize your folders to have functional meaning, you can get a good functional perspective on the problem

Stakeholder Requirements/Audi Actions Create ST

Folder Contents
Folder Metrics
Recent Comments in Folder
Recent Changes in Folder
Folder Info

Total	Approval				Traceability			
	Draft	Pending	Rejected	Approved	Dangling	Orphan	Suspect Upstream	Suspect Downstream
27	26	1	0	0	21	23	0	1

Another advantage of having sub-folders is that you can implement an access control (Permissions) system, so only users with a certain role can access certain folders. For example, one might want to restrict Write Permissions on my Stakeholder Requirements/Audi folder to only Audi Product Managers.



Your Roles 'Administrator'

Folder Details

Folder Name Audi
 Folder Path Stakeholder Requirements/Audi
 Folder Description Audi

Requirement Type

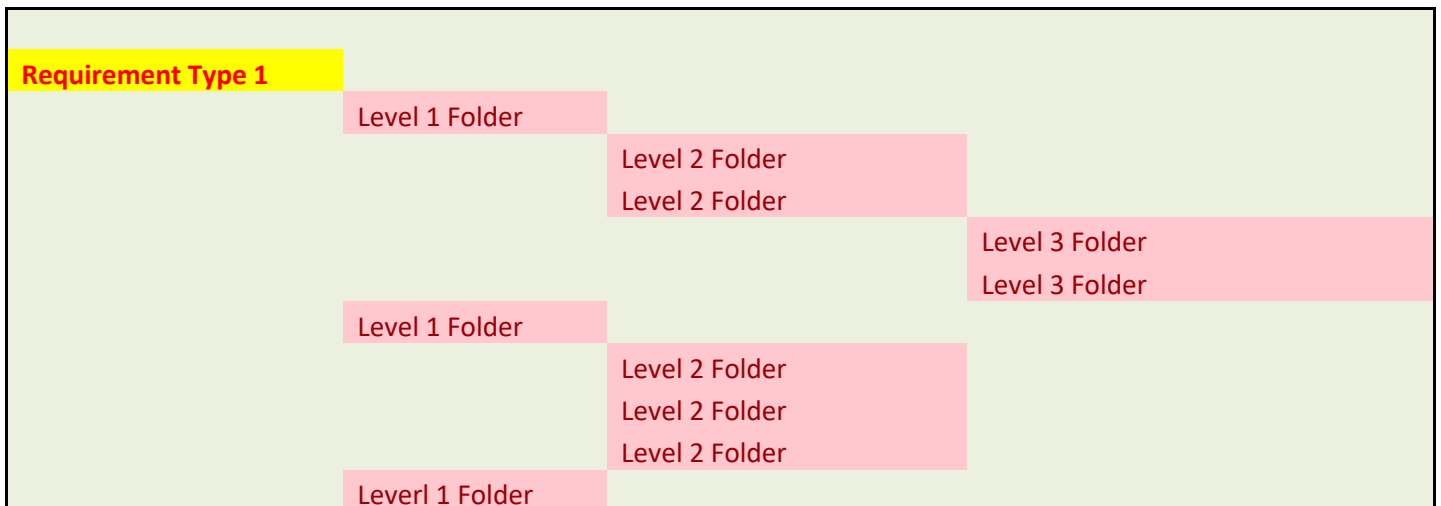
This folder can store Requirements of type 'Stakeholder Requirements'.
 All these Requirements will have tags that start with 'ST'

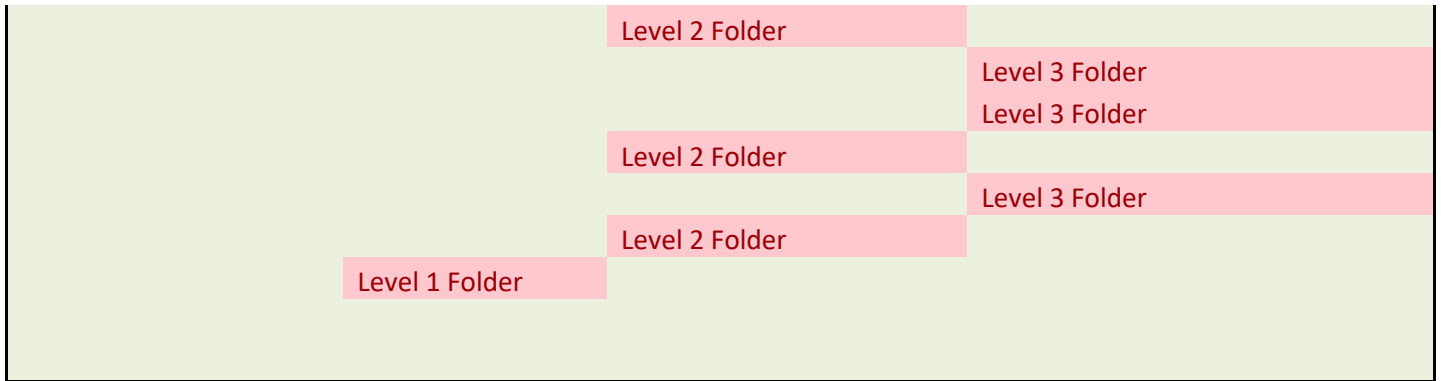
Permissions

Roles with this Permission

Create	Administrator Stakeholder
Read	Administrator Electrical Engineer Firmware Engine Engineer User
Update	Administrator Stakeholder
Delete	Administrator Stakeholder
Trace To / From	Administrator Stakeholder
Approve	Stakeholder (All Members MUST Respond)

As part of your defining your Requirements Management Plan, you should define your folder hierarchy. Here is a template you can use to do that:





Roles

A Role is a collection of users who have a set of permissions to act on a group of folders. For example, you may have a Role called ‘Administrators’ who have Read / Write / Delete / Create / Trace permissions on ALL folders of a project.

You can also have a group of users called Guest Users, who have read permissions on ALL folders but cannot modify anything.

Defining Roles and what members of these roles can do is a big part of defining your RMP.

Here is a template you can use to define your roles for your RMP:

Role 1	
Name	Sales Engineer
Description	sales/solutions engineer touching the customer
Members	Jim Hayden's team
Requirement Type 1 Permissions for this Role	
Create Requirements	Yes
Read Requirements	Yes
Update Requirements	Yes
Delete Requirements	No
Trace to / from Requirements	Yes/ No
Approve Requirements	No
Update Attributes	Yes/ No

Requirement Type 2 Permissions for this Role	
Create Requirements	No
Read Requirements	No
Update Requirements	No
Delete Requirements	No
Trace to / from Requirements	No
Approve Requirements	No
Update Attributes	No
Requirement Type 3 Permissions for this Role	
Create Requirements	No
Read Requirements	No
Update Requirements	No
Delete Requirements	No
Trace to / from Requirements	No
Approve Requirements	No
Update Attributes	No

If you plan to use organize your requirements by sub-folders, then you may need to think about which sub folders these roles have permission to act on.

Traceability between Requirement Types

Traceability starts with the act of connecting one requirement to another. With this act you get the following benefits:





- You can form a daisy chain of relationships (TraceTree)
- You can see the impact of change and how it propagates up and down the chain (Change Impact Analysis)
- You can identify DANGLING and ORPHAN tasks in your project.
 - Dangling: Work that is not being implemented by a downstream team. E.g: User Requirements that are not being implemented
 - Orphan: Work that is not being performed to satisfy an upstream team. E.g: Functional Requirements that don't go towards satisfying a user need
- You can ensure that any change in one part of the project has been acknowledged and adapted by those impacted by this change (Suspect Up and Suspect Down Traces)

- You can see relationships between different parts of the project (Trace Matrix: Show me how my User Requirements are related to my Functional Requirements)
- You can form a logical entity comprising all the work that is related to a higher level task and track its progress (Release Dashboard)

Trace Tree:

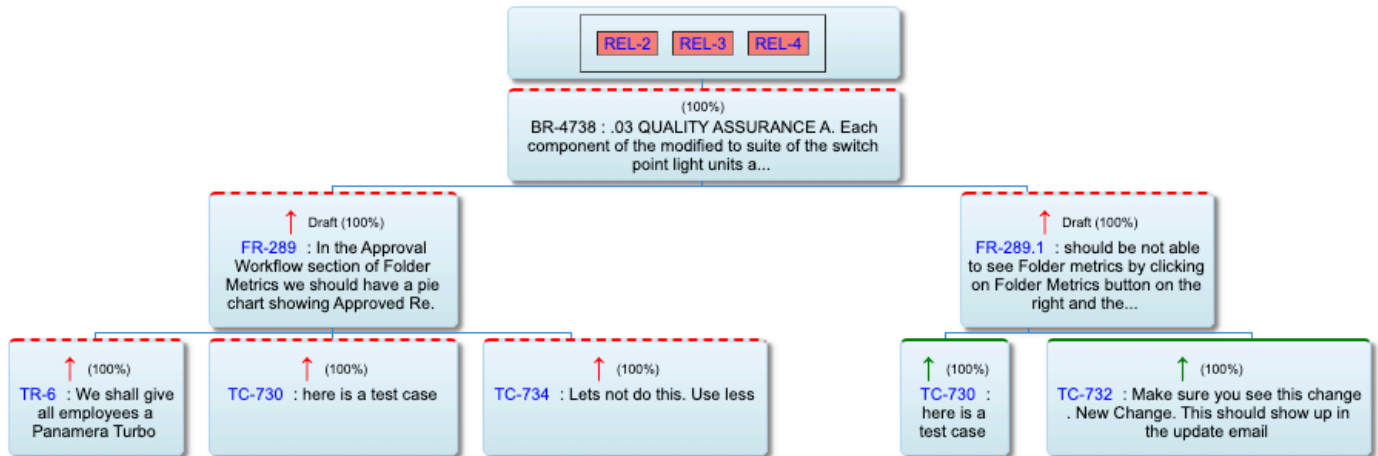
This is a visualization that shows how one requirement is connected to other requirements in the project. You can usually define a depth for how deep down the relationship chain you want to traverse to. TraceCloud provides you the ability to mashup columns from all the different requirements that form this tree and form a dynamic spreadsheet like view.

In the screenshot below, “Customer” and “Deliverability” are attribute of Business Requirements and “Customer Type” is an attribute of Functional Requirement. The trace tree can bring all these values into one report.

	Requirement (Tag : Version : Name)	Customer	Customer Type	Deliverability
BR-4738	BR-4738 : Ver-12 : 1.03 QUALITY ASSURANCE A. Each component of the modified to suite of the switch point light units and controllers will be inspected prior to shipment.	test		Mandatory
 FR-289	FR-289 : Ver-33 : In the Approval Workflow section of Folder Metrics, we should have a pie chart showing Approved Re.		Demo	
 TR-6	TR-6 : Ver-3 : We shall give all employees a Panamera Turbo			
 TC-730	TC-730 : Ver-1 : here is a test case			
 TC-734	TC-734 : Ver-4 : Lets not do this. Use less			

Trace Org Chart

This is a **simple org**-chart style visualization that show how a requirement is connected to other up or downstream requirements in the project.



Dangling / Orphan / Suspect Up / Suspect Down

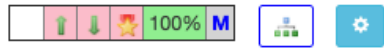
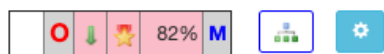
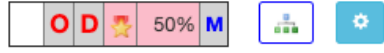
Dangling (D) - No downstream traces exist. i.e. no downstream team is working on these items

Orphan (O) - No upstream traces exist. i.e. this work is not relevant to any upstream team

Suspect Up (U) - Our requirement is not in sync with a previously understood upstream requirement definition

Suspect Down (D) - Our requirement is not in sync with a previously understood downstream requirement definition

TraceCloud uses a standard and consistent visualization to represent the traceability status. In the status bar below, you can associate O with Orphan, D with Dangling, and U D with Suspect Up and Suspect Down relationships. We use this framework across many reports.












Status	Business Requirement Name ↑↓
	<p>BR-4738 : 1.03 QUALITY ASSURANCE</p> <p>A. Each component of the modified to suite of the switch point light units and controllers will be inspected prior to shipment.</p>
	<p>BR-4739 : 1.04 DELIVERY, STORAGE, AND HANDLING</p> <p>A. Switch point lights, controllers, and related equipment will be properly crated at the manufacturer's point of shipment.</p> <p>B. Switch point lights, controllers, and related equipment will be protected from damage throughout delivery, storage and handling.</p> <p>C. Equipment damaged in transit or by mishandling or improper storage will be replaced by the Contractor at no additional cost to CTA.</p>
	<p>BR-4740 : 1.04 DELIVERY, STORAGE, AND HANDLING</p> <p>A. Switch point lights, controllers, and related equipment will be properly crated at the manufacturer's point of shipment.</p> <p>B. Switch point lights, controllers, and related equipment will be protected from damage throughout delivery, storage and handling.</p>

Trace Matrix

A Trace Matrix is a visual representation that shows the trace relationships between objects in 2 different folders. For example, if you want to see the relationship and status between work being done by Vendor A and Vendor B (Both of them are working in the same project, but different folders), this tool come in very handy

In the screenshot below, you can see how the Functional Requirement is connected to the Business Requirements. TraceCloud lets you use the Trace Matrix to perform bulk operations and export to Excel.

Next pages (From) : 1 | 2 | 3

<p>Business Requirement → To Reqs (Up Stream)</p> <p>From Reqs (Down Stream) ↓</p> <p>Functional Requirements</p>	<p>BR-4738</p> <p>1.03 QUALITY ASSURANCE</p> <p>A. Each component of the modified to suite of the switch point light unit...</p>	<p>BR-4739</p> <p>1.04 DELIVERY, STORAGE, AND HANDLING</p> <p>A. Switch point lights, controllers, and related equipment w...</p>	<p>BR-4740</p> <p>1.04 DELIVERY, STORAGE, AND HANDLING</p> <p>A. Switch point lights, controllers, and related equipment w...</p> <p>Action ▾</p>	<p>BR-4751</p> <p>testing baselines</p>	<p>BR-4752</p> <p>testing timezone</p>
<p>FR-289</p> <p>In the Approval Workflow section of Folder Metrics, we should have a pie chart showing Approved Re.</p>					
<p>FR-289.1</p> <p>A should be not able to see Folder metrics by clicking on Folder Metrics button on the right and the...</p>					
<p>FR-289.2</p> <p>HI-1</p>					
<p>FR-292</p> <p>In the Approval Workflow section of Folder Metrics, we should have a pie chart showing Rejected Redo...</p>					
<p>FR-295</p> <p>In the Approval Workflow section of Folder Metrics, we should have a pie chart showing Total Requi</p>					

As part of your RMP definition exercise, you want to set your Traceability process rules. For each Requirement Type, you can determine:

- What should it trace Up to and what should it trace Down to
- Who owns the clearing of traces, once they become suspect due to change up / downstream
- What are the common reports (Trace Tree, Trace Matrix) that will be used
- What are the checkpoints when the team ensure a clean traceability report

Approval Workflow

For any project, it is very common to have changes in requirements. However, it is absolutely critical to manage this change. One advantage of having all the stakeholders working on the same project is that it now becomes possible to see the impact of change, to request approval for any change, and to have an audit trail.

You should be able to set the typical CRUD (Create, Read, Update, Delete) permissions for any folder so that the right set of people are authorized to make changes.

In TraceCloud, you can go beyond the typical CRUD to set permissions for Traceability (which roles can make traces between requirements) and Approval (which roles need to approve changes).

This is managed with a combination of Roles, Folders and Permissions.

Role & Permissions:

A project can have many roles.

Role Administrator

[Edit Role](#) | [Edit Privileges](#) | [Add Users](#) | [Edit Users](#)

Edit Role

Name

Description

Approval Type [More Info](#)

Approval Rank [More Info](#)

[Update Role](#)

Each role is a collection of users. A user can be a member of more than one role.

Role Administrator

[Edit Role](#) | [Edit Privileges](#) | [Add Users](#) | [Edit Users](#)

Edit Users in this Role.

<input type="checkbox"/>	User Name	Email
<input type="checkbox"/>	Nathan Reddy	nathan@tracecloud.com
<input type="checkbox"/>	Neel Reddy	neel@tracecloud.com
<input type="checkbox"/>	saichandreddy kamana	sai.chand@tracecloud.com
<input type="checkbox"/>	Shambhavi Roy	sami@tracecloud.com

[Delete Users](#)

Each role also has a set of Create, Read, Update, Delete, Trace, and Approve permissions on folders and sub folder of requirements. TraceCloud gives you granular control, where you can set some roles to be able to modify certain attributes and not others.

With this model (organizing your requirements into types and sub folders and then controlling permissions at each folder level for each role), you can build an easy to use and understandable set of permissions.

Role Administrator

[Edit Role](#) | [Edit Privileges](#) | [Add Users](#) | [Edit Users](#)

Edit Permissions for Users in Role

Folder Path **Voting Rights** **Updatable Attributes** (Collapse)

Create **Read** **Update** **Delete** **Trace** **Approve**

<input type="checkbox"/> Business Requirement	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="200"/>	Attributes Total Votes Cast collateral Keep Me Informed Customer Deliverability
<input type="checkbox"/> Business Requirement/Admin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	Attributes Total Votes Cast collateral Keep Me Informed Customer Deliverability
<input type="checkbox"/> Business Requirement/Admin/Executive	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	Attributes Total Votes Cast collateral Keep Me Informed Customer Deliverability

In TraceCloud, you can look at each folder and get a read out of the different roles and what they can do on this folder.

Functional Requirements [Actions](#)

Your Roles 'Administrator' 'Product Marketing ' 'Engineering' 'Accessibility Approvers' 'CAN tire BR Approvers' 'can tire FR subset approver' 'Zettics Super Users' 'Testing approval role'

Folder Details

Folder Name Functional Requirements
 Folder Path Functional Requirements
 Folder Description Default folder used to storeFunctional Requirements

Requirement Type

This folder can store Requirements of type 'Functional Requirements'.
 All these Requirements will have tags that start with 'FR'

Permissions

Roles with this Permission

Create	Administrator Engineering Trial
Read	Administrator Product Marketing Engineering Idea Approvers Accessibility Req Generators Accessibility Approvers CAN tire BR Approvers can tire FR subset approver Trial engineering users Zettics Super Users Clients Approvers Testing approval role test
Update	Administrator Engineering Trial
Delete	Administrator Engineering
Trace To / From	Administrator Engineering Trial
Approve	Testing approval role (All Members MUST Respond) Accessibility Approvers (All Members MUST Respond)

Approval Sequence:

Your requirements must follow a versioning sequence. Any meaningful change must not only be logged, but also you must keep track of different versions of each requirement. Typically, approval workflow is required when the version of a requirement changes. For example, if V3 of BR-1 was approved and some change was made to this requirement so that its version number increases (You are now at V4 of BR-1), then you will need to get this version approved by the stakeholders.

In TraceCloud, approval sequence follows a simple, but effective model. All new versions start out at “Approval Status = Draft”. They can then be submitted for approval, where their Approval Status changes to “In Approval WorkFlow”. It stays in this state, until either ALL required approvers approve the requirement, in which case it moves to “Approved” state. If any one of them rejects the requirement, it goes to “Rejected” state.

If you are the owner of a requirement and it has been approved by a stakeholder, then you can reach out to them to address their concerns, so they can lift the rejection (and the approval process continues) or you can modify the requirement (and a new version is created with your approval status set to “Draft”) and restart the approval process.

During the approval cycle, you can stagger the roles that need to approve the requirement, so that some roles get to approve first, before subsequent roles are asked for their approval. You also have the ability to set some roles as “ALL members of the role MUST approve” or “Any one member of the role can approve”. The system is dynamically able to interpret the set of approvers who need to approve and when they need to approve and carries the requirement through the cycle.

Approval WorkFlow Action for role : **Design Reviewers** by **Nathan Reddy** Bypass

Role	Acceptance Rank	Role Type	Acceptor	Acceptance Status	Date
Design Reviewers	1	Acceptance By All	Nathan Reddy	Pending	null
Product Marketing	1	Acceptance By All	Shambhavi Roy	Pending	null
Product Marketing	1	Acceptance By All	Nathan Reddy	Pending	null
Engineering	3	Acceptance By All	Jayati Reddy	Waitng for Others	null
Engineering	3	Acceptance By All	Shambhavi Roy	Pending	null
Engineering	3	Acceptance By All	Nathan Reddy	Pending	null

Notes

Accept Now
Reject Now
Cancel

Milestones and Tracking Progress

While defining your RMP, it helps to define your Project Milestones (what will get done by when) and have a framework for tracking progress.

Project Milestones

Each project has its milestones. It helps to define your project milestones and deliverables in your RMP. For example:

Milestone	Stakeholders	Deliverables
Concept Commit	Product Managers Vendor 1 Vendor 2 Engineering Managers Validation Team	Approved Business Requirements No Dangling BusinessRequirements No Orphan Business Requiremets No suspect traces to or from Business Requirements All comments on Business Requirements addressed Vendors must submit standard reports

Construction Start	Vendor 1	Approved Engineering Requirements
	Vendor 2	No Dangling Engineering Requirements
	Engineering Managers	No Orphan Engineering Requirements
	Validation Team	No suspect traces to or from Engineering Requirements
		All comments on Engineering Requirements addressed
		Vendors must submit standard reports
		City certified construction permits

Hand over for signaling	Vendor 3	Approved Signal and Telecom Requirements
	Vendor 4	No Dangling Signal and Telecom Requirements
	Engineering Managers	No Orphan Signal and Telecom Requirements
	Validation Team	No suspect traces to or from Signal and Telecom Requirements
		All comments on Signal and Telecom Requirements addressed
		Vendors must submit standard reports
		Approved Signal and Telecom designs

Tracking Progress

As part of your RMP, you can also define how each deliverable will be tracked and what reports are acceptable in the system.

Day in the Life Of

As part of your RMP, you should also define what the expectations are for each role. They could be daily (operational tasks) or milestone based (strategic tasks). You can also specify the reports and dashboards that are commonly used. As new members join the project and old members leave, having a well-defined “Day in the Life Of” plan will keep the project moving along smoothly.

Role 1	
Name	Sales Engineer
Description	sales/solutions engineer touching the customer
Members	Jim Hayden's team

Daily Tasks	
Create Requirements	Yes
Read Requirements	Yes
Update Requirements	Yes
Delete Requirements	No
Trace to / from Requirements	Yes/ No
Approve Requirements	No
Update Attributes	Yes/ No
Milestone tasks	
Generate compliance reports	Yes
Present clean release dashboard	Yes
Ensure all requirements are marked complete	Yes
Reports and Dashboards used	
All Incomplete Business Requirements	Link
Release Dashboard	Link
All un approved requirements	Link
All Dangling Business Requirements	Link

Reports

Since a project can have 1000s of requirements and 100s of users spread out over a global team, you need to have a good set of reporting tools (i.e. you are working on a large scale infrastructure project and you have vendors / sub vendors / approvers / engineers in the field).

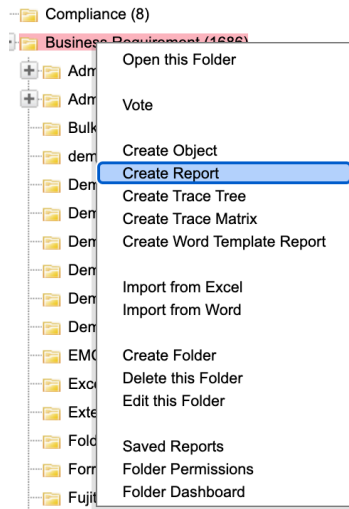
Here are some reports that TraceCloud provides **out of the box**:

Standard (List) Reports: These are similar to excel files. You pick a folder and run reports of the contents of the folder. You can choose to include contents of the folder and which columns you want to display.

You can also apply additional filters, such as:

- Filters on attribute values
- Filters on the traceability state of the requirements like Dangling, Orphan, and Suspect Up / Down
- Filters on the approval state of the requirements
- Filters on the testing and completion state of the requirements

TraceCloud list report also gives you the ability to bulk update requirements.



Report and Bulk Edit Requirements

Close Filter | Run | Save | Delete | Clear All Filters

Step 1 (Optional) : Apply Filters

Dangling (No Downstream) Requirements

Step 2 (Optional) : In Release

Step 3 (Optional) : Fields to Display

Standard Attributes	Custom Attributes
Description	Total Votes Cast
Comments	collateral
Owner	Keep Me Informed
	Customer
Trace To	Deliverability
Trace From	Impact to customer
	Severity
Approval Status	Type
Approved By	test
Rejected By	Agile Sprint
Pending By	Agile Task Weight
Dynamic Approval Role	Agile Task Status
	Agile Total Effort (hrs)
Percent Complete	Agile Effort Remaining (hrs)
Testing Status	Amdocs_Work_Estimate
Folder Path	
Locked By	
External URL	
Priority	
Baselines	
Created By	

Use **Ctrl + Mouse Click** to select / deselect values

Sort By

Rows Per Page

Step 4 :

Report and Bulk Edit Requirements

| | |

No Of Reqs : 1 Page : 1

Select



Requirement (Tag : Version : Name)

BR-4740 : Ver-1 : 1.04 DELIVERY, STORAGE, AND HANDLING

A. Switch point lights, controllers, and related equipment will be properly crated at the manufacturer's point of shipment.

B. Switch point lights, controllers, and related equipment will be protected from damage throughout delivery, storage and handling.

C. Equipment damaged in transit or by mishandling or improper storage will be replaced by the Contractor at no additional cost to CTA.

Customer

Deliverability

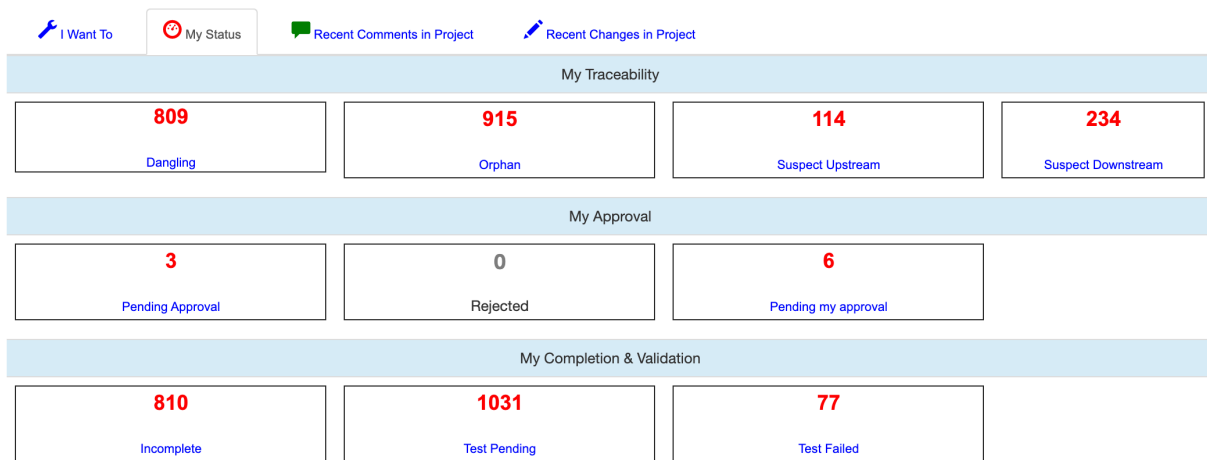
Desirable

Trace Tree, Trace Matrix, Trace Org Chart

These are visual reports that display the relationships between different requirements and the current state of those relationships. These reports are explained [in other parts of this document](#). You can use these tools to not only report on state, but also to create new relationships.

User (Owner) Dashboard

TraceCloud has a concept of “Owner” for a requirement. There can be only one owner per requirement. The benefit of this system is that we can generate dashboards for each stakeholder. Each of the metrics in the dashboard cover Traceability, Approval, and Completion & Validation state of all the requirements this owner is responsible for.



Folder Dashboard

Folder Dashboard takes the same concept (i.e show Traceability, Approval, and Completion & Validation state), but applies it to all contents of the folder.

Business Requirement/Administration Requirements/pradyumna Actions Create BR

Folder Contents
Folder Metrics
Recent Comments in Folder
Recent Changes in Folder
Folder Info

Total	Approval				Traceability			
	Draft	Pending	Rejected	Approved	Dangling	Orphan	Suspect Upstream	Suspect Downstream
167	167	0	0	0	163	165	0	0

Project Dashboard

If you want to get the status of the entire project, you can go to Project Dashboard. This gives you the same metrics but across all folders of the project.

Project Metrics as of '30 December 2020 12:00:06 AM' Re Calculate Project Metrics

Set Level of Detail to Project and Focus On Approval Traceability Testing Completion Refresh

Requirement Type	All	Approval				Traceability				Testing			Completion	
		Draft	Pending	Rejected	Approved	Dangling	Orphan	Suspect Upstream	Suspect Downstream	Pending	Pass	Fail	Completed	Incomplete
REL	4					0	0	0	4	0	0	4	0	4
UC	5					3	4	0	2	4	1	0	1	4
CL	8					8	8	0	0	8	0	0	0	8
BR	1686	1683	3	0	0	1185	1449	156	389	1448	113	125	459	1227
FR	743	441	3	1	298	680	153	385	8	598	105	40	457	286

Release Dashboard

TraceCloud supports a logical entity called a “Release”. Conceptually, you can consider your project as being implemented in phases. Each phase may implement some customer or business requirements, and each of these requirements has more downstream work associated to them. So, it makes sense to track the progress of the project, not just at the whole project level, but at different phase levels.

In TraceCloud a phase is known as a “Release”.

The system generates Release Dashboards, which is a status report on all the work comprising all the requirements in this phase.

Dashboard for Releases in Project : Trace Cloud Development

Step 1 : Select A Release Admin Requirements 2

Step 2 : Select on of these reports

- [Release Metrics](#)
- [Release Trends](#)
- [Reqs in Release Changed After](#)
- [Defects in](#) Defect Status

Release Metrics as of '15 February 2020 03:28:37 AM ' for 'REL-2:Admin Requirements 2'

Level of Detail Requirement Type Focus On Approval Traceability Testing Completion Refresh

Requirement Type	Approval					Traceability			
	All	Draft	Pending	Rejected	Approved	Dangling	Orphan	Suspect Upstream	Suspect Downstream
FR	2	2	0	0	0	0	0	2	2
TR	4					0	0	1	0
TC	3					0	0	3	1
BR	2	2	0	0	0	0	0	1	2

You could have the same Business Requirement being implemented in multiple phases (i.e. is tracing up to multiple Release objects), but in Release 1, only a part of this requirement is implemented. Over time, the entire requirement gets implemented.

Baseline Dashboard

There are times you want to take a snapshot of a collection of requirements and be able to store this snapshot. Overtime, as these requirements evolve, you can always refer back to the snapshot and see what has changed and how. TraceCloud supports a full-fledged baselining tool set. You will see more of this in the workshop section of this document.

Custom Word Reports

There are times when you want to generate output collateral in a customized format (as directed by the customer). TraceCloud supports embedding requirements into Word templates and dynamically generating documents with a consistent look and feel, while reflecting the latest status in the database.

Shared & Global Requirements (Requirements Reuse)

If your organization is working on multiple projects, but you want to be able to share requirements across projects and prove that you are consistently compliant with global practices, a good Requirements Management tool can help with this.

For example:

- You are building 10 medical devices and you have 10 projects. You want all these projects to follow FDA approved testing and verification requirements, while following local requirements specific to the project.
- You are building 10 different phones, and you don't want to redefine the same set of requirements for every phone. So, you define common product families and common sets of requirements for each family. Now any time a new product is built, it pulls requirements from the product family and adds some more specific requirements as needed.

TraceCloud supports a robust Shared & Global Requirements model. You can define a well vetted & approved set of requirements, baseline the current version, and then publish this baseline. Once published, client projects can consume these libraries of requirements. Traceability is maintained from the source (published requirements) to the destination (consumed requirements). As the common pool gets updated with new versions or as newer requirements are added to the global pool, you can publish newer baselines and the consuming projects can choose to update their import set.

Summary:

We hope this gives you a good overview on best Requirements Management practices and if you are interested in a deeper dive, please contact us at support@tracecloud.com. We would love to brainstorm with you and set up a demo project that showcases these features. You can also try the exercises in the workshop to get hands on experience.

About Us

TraceCloud is a start up based in Silicon Valley (San Jose, California) . Our founders graduated from IIT, and UC Berkeley before working at Valley stalwarts like Cisco and Apple. At Cisco and Apple, they were involved with developing applications and managing systems for Engineering, Manufacturing and IT organization. They took away a lot of lessons from the way Requirements were managed in these organizations and decided to build a better mouse trap for Requirements Management.

The market leaders in this space (Requisite Pro , Rally and Doors) are based on a dated architecture. When they were initially designed, the concept of Web 2.0 , AJAX and Collaboration, did not exist. So, we decided to approach the problem with a clean slate and TraceCloud is the end result of this effort.

We are designed for both a SAAS (Software As A Service) implementation and for an On Premises implementation.

If this white paper has piqued your interest and you would like us to come over and discuss your Requirements Management implementation, please reach out to us at support@tracecloud.com