

# Acceptance Test Plan

for

**WAVED**

**Version 2.0**

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# Table of Contents

1. Document History .....	4
2. Introduction .....	5
2.1 Purpose .....	5
2.2 References .....	5
2.2.1 Software Requirements Specification.....	5
2.2.2 Issue Tracking.....	5
2.3 Definitions .....	5
3. Test Approach and Constraints.....	7
3.1 Test Objectives.....	7
3.2 Test Structures .....	7
3.3 Test Constraints .....	7
4. Test Assumptions and Exclusions.....	8
4.1 Test Assumptions .....	8
4.2 Test Exclusions .....	8
5. Entry and Exit Criteria .....	9
5.1 Entry Criteria .....	9
5.2 Exit Criteria.....	9
6. Testing Participants.....	10
6.1 Roles and Responsibilities.....	10
6.2 Training Requirements.....	10
6.3 Problem Reporting .....	10
6.4 Progress Reporting.....	10
7. Test Cases.....	11
7.1 Introduction .....	11
7.2 Test Cases.....	11
7.2.1 Creating a Project.....	11
7.2.2 Saving a Project.....	12
7.2.3 Loading a project.....	13
7.2.4 Deleting a Project.....	14
7.2.5 Modifying a Project.....	15

7.2.6 Exporting a Visualization .....	16
7.2.7 Project Revision History .....	17
7.2.8 Adding Widgets and Elements .....	18
7.2.9 Removing Widgets and Elements .....	20
7.2.10 U.S. Map Widget .....	22
7.2.11 Line Graph Widget .....	24
7.2.12 Button Widget.....	26
7.2.13 Text Block Widget .....	26
7.2.14 Glyphs.....	27
7.2.15 Tooltip .....	29
7.2.16 Data .....	30
7.2.17 Actions .....	34
7.2.18 Events.....	37
7.2.19 Google Analytics.....	39
8. Traceability Matrix .....	41

# 1. Document History

Name	Date	Reason	Version
Kristian Calhoun, Sean Bluestein, Hannah Pinkos, Steve Nguyen, Keith Horrocks	January 7, 2014	Initial Draft	1.0
Kristian Calhoun, Sean Bluestein, Hannah Pinkos, Steve Nguyen, Keith Horrocks	February 4, 2014	Update for changes made to SRS	2.0

## 2. Introduction

### 2.1 Purpose

This document provides the plan for completing the acceptance test of Web App for Visualizing Environmental Data (WAVED). The included test cases were derived from the *Software Requirement Specifications for WAVED* (2.2), which details the system's functionality.

### 2.2 References

#### 2.2.1 Software Requirements Specification

This document references the requirements in the [Software Requirements Specification for WAVED](#) document. Requirement numbers from this document are listed for every test to indicate the requirements the test is exercising.

#### 2.2.2 Issue Tracking

The issue tracking system used to track any test failures, bugs, concerns, and backlog items can be found at <https://github.com/KSHSK/WAVED/issues>.

### 2.3 Definitions

**Action** - The process of changing the properties of a widget, element or data set via an event

**Data Binding** - Making an explicit association between a data source or data subset and a widget, property, or event

**Data Set** - A data source or data subset

**Data Source** - A collection of data, such as that found in an uploaded CSV or JSON file

**Data Subset** - The resulting portion of a data source that meets some specified criteria.

**Element** - An accessory component of a widget. The creation of elements requires a parent widget to exist; elements cannot stand on their own. For example, glyphs are elements of a map widget.

**Event** - Something that occurs (click, hover, etc.) to trigger an action

**Glyph** - A marker indicated by some shape or icon

**Project** - The context in which a user works to create a single visualization using the WAVED application.

**Property** - Defines a value used for a widget attribute, such as width, height, color, name, etc

**Software Requirements Specification (SRS)** - A document containing the complete description of the behavior of a system

**Stakeholder** - The group investing in the development of the product (in this case, Climate Central)

**Subwidget** - A widget that is the child of another widget

**Target** - Part of a widget, element, or data set affected by an action

**Test Case** - A test case is an atomic test description including preconditions that must be satisfied before the test is performed, the actions a tester will take when performing the test, and the expected postconditions that will ensure the system has completed the expected behavior.

**Test Team Leader** - The individual responsible for overseeing the execution of all test cases.

**Trigger** - Part of a widget or element that causes an event to fire (e.g. a component that can be clicked, hovered, etc.)

**Unit Tests** - Unit tests are a collection of small code snippets that each test a single atomic module of the source code to ensure its proper functioning.

**Widget** - A top level component that has properties, subwidgets, elements, and bound data

**Workspace** - The interactive area of the WAVED user interface that displays the visualization as it is assembled from widgets.

## 3. Test Approach and Constraints

This section describes the objectives, structure and constraints for the software acceptance test plan for WAVED.

### 3.1 Test Objectives

Following the prescribed Acceptance Test Plan process will verify that WAVED fulfills all of the functional requirements specified in the Software Requirements Specification. WAVED will be ready for deployment if and only if it passes all of the test cases contained in the Acceptance Test Plan.

### 3.2 Test Structures

Atomic test cases were derived from the SRS. Each test case has a unique identifier, a name, a high-level description of the functionality it tests and references to its related requirements in the SRS.

Additionally, each test case contains preconditions, actions and postconditions. Preconditions describe the state the system is required to be in before the test is performed. The actions include an itemized list of steps the tester will take when performing the test. The postconditions describe the state the system is expected to be in after the actions have been performed. If the postcondition(s) are met, then the software has passed the test case.

### 3.3 Test Constraints

The Acceptance Test Plan will only test the functionality of WAVED as described in the SRS. The test cases described in the Acceptance Test Plan are not concerned with specific design and implementation details of the system. The test cases focus on ensuring that the correct system behavior is achieved for the complete set of functions available to users of the system.

## 4. Test Assumptions and Exclusions

This section provides greater details about which functions and features of WAVED are and are not covered by the Acceptance Test Plan process.

### 4.1 Test Assumptions

The test cases covered in the Acceptance Test Plan are written under the assumption that the related issues are also addressed by unit tests, integration tests and system tests for WAVED.

The Acceptance Test Plan covers:

- The functional requirements listed in the Software Requirements Specification.
- The consistency of the user-related system documentation.
- The usability of the system.

### 4.2 Test Exclusions

It is assumed that unit tests, integration tests, and system tests for WAVED exercise areas of the system not covered by the Acceptance Test Plan.

The Acceptance Test Plan does not cover:

- The non-functional requirements of the system listed in the Software Requirements Specification.
- Functionality beyond what is described in the Software Requirements Specification
- The structural integrity of the source code.



## 5. Entry and Exit Criteria

This section lists the criteria that must be satisfied in order for the Acceptance Test Plan to commence, as well as the criteria that must be satisfied in order to conclude the acceptance testing.

### 5.1 Entry Criteria

Acceptance testing can begin after the following preconditions are met:

- All Priority 1 requirements are considered to be implemented by the WAVED development team.
- WAVED has successfully completed unit, integration and system testing.
- A proper testing environment meeting the hardware and software constraints specified in 4.3 of the Software Requirements Specification is available.
- The most recent revision of the Software Requirements Specification has been received by the Test Team Leader and the Stakeholder.
- Consent has been obtained from the Test Team Leader.
- Consent has been obtained from the Stakeholder.

### 5.2 Exit Criteria

The Acceptance Test Plan can end after any of the following conditions have been met:

- All Priority 1 requirements were tested and resulted in expected behavior (Success).
- At least one Priority 1 requirement failed to meet the documented specification (Failure).
- All parties mutually agree to postpone testing until a later date (Failure).

## 6. Testing Participants

This section describes the roles and responsibilities of the parties involved in the Acceptance Test Plan, as well as the procedure for reporting the test results and any subsequent issues.

### 6.1 Roles and Responsibilities

For the Acceptance Test Plan, the following individuals fill the roles listed below:

- Test Team Leader: Steven Nguyen
- Testers: Sean Bluestein, Kristian Calhoun, Keith Horrocks, Hannah Pinkos
- Stakeholder: Scott Kulp (Climate Central)

### 6.2 Training Requirements

All parties involved in the Acceptance Test Plan should be comfortable with standard web application interfaces. Additionally, all parties should be familiar with the WAVED user interface, the type of visualizations WAVED is expected to produce, and the WAVED Software Requirements Specification.

### 6.3 Problem Reporting

Any problem found by either a Tester or the Stakeholder must be documented and reported to the Test Team Leader via the project's issue tracking system. Any reported problems will be reviewed by the Test Team Leader and development team during a mandatory post testing review meeting and subsequently assigned to at least one person on the development team to resolve.

### 6.4 Progress Reporting

The Acceptance Test Plan Report will be compiled by the Test Team Leader after the testing process has been concluded and has satisfied any one of the conditions listed in 5.2. The Acceptance Test Plan Report will be reviewed by the WAVED development team during the mandatory post testing review meeting.

# 7. Test Cases

## 7.1 Introduction

The test cases below cover all functionality required by the Software Requirements Specification document. Each of the test cases includes the following information:

- ID - An identification code for the test case
- Name - A descriptive name of the test
- Requirement(s) - The requirement number(s) from the Software Requirements Specification document
- Description - A brief overview of the test purpose
- Precondition(s) - The expected state of the software before the actions are executed
- Action(s) - The step(s) to be completed by the tester
- Postcondition(s) - The expected state of the software after the actions are executed

## 7.2 Test Cases

### 7.2.1 Creating a Project

<b>ID</b>	T7.2.1.1
<b>Name</b>	Creating a new project at launch
<b>Requirement(s)</b>	4.1.1.1, 4.2.1, 4.2.4.1, 4.2.4.2, 4.2.4.3
<b>Description</b>	The user opens the WAVED application and creates a new project.
<b>Precondition(s)</b>	None
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens a web browser and navigates to the hosted location of the WAVED application.</li> <li>2. The user clicks the new project button on the dialog</li> <li>3. The user enters a valid name for the project</li> <li>4. The user clicks the okay button to create the project</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The user is presented with a blank project</li> <li>• The project name the user entered appears on the menu</li> </ul>

<b>ID</b>	T7.2.1.2
<b>Name</b>	Creating a new project after making changes to the current project
<b>Requirement(s)</b>	4.2.2, 4.2.3, 4.2.4
<b>Description</b>	The user abandons changes to the current project, and overwrites the current project

	with a new project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has made at least 1 change to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks the new button in the main menu</li> <li>The user clicks the okay button on a prompt asking to confirm the decision to lose any unsaved changes</li> <li>The user enters the same name for the new project as the existing project</li> <li>The user clicks the okay button to create the project</li> <li>The user clicks the okay button to overwrite the existing project</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The workspace area is empty</li> <li>There are no widgets or elements seen in the project tree</li> <li>The user cannot use the undo button to recover changes from the abandoned project</li> </ul>

### 7.2.2 Saving a Project

<b>ID</b>	T7.2.2.1
<b>Name</b>	Saving a project
<b>Requirement(s)</b>	4.3.1, 4.3.3
<b>Description</b>	The user saves the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Widgets Panel</li> <li>The user adds a U.S. map widget to the project</li> <li>The user clicks the save button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The user is not prompted to save</li> <li>The U.S. map has been added to the saved state of the project</li> <li>If the user reloads the created project, the U.S. map widget is visible.</li> </ul>

<b>ID</b>	T7.2.2.2
<b>Name</b>	Saving a copy of the project
<b>Requirement(s)</b>	4.3.2
<b>Description</b>	The user saves a copy of a previously saved project under a new name.

<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created and saved a project</li> <li>The user has made at least one change to the project after saving</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks the Save As button</li> <li>The user enters a new name for the project</li> <li>The user clicks the save button on the popup dialog</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>An entry for the project has been created in the database under the new name</li> <li>The new project name is displayed on the menu bar</li> <li>An entry for the old project name still exists in the database</li> <li>Changes saved to the copy were not saved to the original project</li> </ul>

<b>ID</b>	T7.2.2.2
<b>Name</b>	Overwriting a saved project
<b>Requirement(s)</b>	4.3.2
<b>Description</b>	The user overwrites a previously saved project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created and saved a project</li> <li>The user has made at least one change to the project after saving</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks the Save As button</li> <li>The user enters the name of the current project.</li> <li>The user clicks the save button on the popup dialog</li> <li>The user clicks the confirm button when prompted to overwrite the existing project</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The database entry for the saved project name has been updated with the saved changes</li> </ul>

### 7.2.3 Loading a project

<b>ID</b>	T7.2.3.1
<b>Name</b>	Loading a project
<b>Requirement(s)</b>	4.4
<b>Description</b>	The user opens a project that has previously been saved.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has saved a project</li> <li>The user is at the WAVED welcome screen</li> </ul>

<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the load button from the welcome dialog</li> <li>2. The user selects the name of the previously saved project from the list on the popup dialog</li> <li>3. The user clicks the load button on the popup dialog</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The name of the loaded project appears on the screen</li> <li>• The workspace area has populated with the widgets and elements that are part of the saved project</li> <li>• The project tree lists all widgets and elements that are part of the saved project</li> <li>• The properties for each widget have been populated</li> <li>• Events on the workspace area can be triggered</li> <li>• Any actions applied by default in the original project have taken effect.</li> </ul>

### 7.2.4 Deleting a Project

<b>ID</b>	T7.2.4.1
<b>Name</b>	Deleting a saved project
<b>Requirement(s)</b>	4.5.1, 4.5.3, 4.5.4, 4.5.5
<b>Description</b>	The user deletes a project from the list of saved project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created and saved a project</li> <li>• The user is at the WAVED welcome screen.</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the load button on the welcome dialog</li> <li>2. The user selects the saved project from the list of saved projects</li> <li>3. The user clicks the delete button</li> <li>4. The user clicks okay when prompted to delete the project</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The deleted project no longer appears in the list of projects to load</li> <li>• The entry for the deleted project no longer appears in the database</li> <li>• Files associated with the deleted project were removed from the server</li> </ul>

<b>ID</b>	T7.2.4.2
<b>Name</b>	Deleting the currently opened project
<b>Requirement(s)</b>	4.5.2, 4.5.3, 4.5.4, 4.5.5
<b>Description</b>	The user deletes the currently opened project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created and opened a project.</li> </ul>

<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Project Tree Panel</li> <li>2. The user selects the top level project folder from the project tree hierarchy</li> <li>3. The user clicks the delete button</li> <li>4. The user clicks okay when prompted to confirm deletion of the project</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The deleted project is no longer open</li> <li>• The user is presented with the WAVED welcome screen.</li> <li>• The entry for the deleted project no longer appears in the database</li> <li>• Files associated with the deleted project were removed from the server</li> </ul>

### 7.2.5 Modifying a Project

<b>ID</b>	T7.2.5.1
<b>Name</b>	Changing the workspace size
<b>Requirement(s)</b>	4.6.1, 4.6.4, 4.6.5, 4.6.6, 4.6.7
<b>Description</b>	The user resizes the workspace
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Project Tree Panel</li> <li>2. The user selects the workspace on the project tree</li> <li>3. The user opens the Properties Panel</li> <li>4. The user changes the height from 600 to 400 pixels</li> <li>5. The user changes the width from 750 to 600 pixels</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The workspace has updated to the size the user entered</li> <li>• The workspace has the same relative appearance</li> </ul>

<b>ID</b>	T7.2.5.2
<b>Name</b>	Resetting the workspace
<b>Requirement(s)</b>	4.6.2, 4.6.3
<b>Description</b>	The user triggers an action in the workspace and then resets the workspace to its initial state.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has created an action targeting the widget with the apply by default option left unchecked.</li> </ul>

	<ul style="list-style-type: none"> <li>The user has created a click event using the created action with the widget as the trigger.</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks on the widget to trigger the action</li> <li>The user clicks the refresh button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The workspace has reverted to the state it was in before the user triggered the click event</li> </ul>

<b>ID</b>	T7.2.5.3
<b>Name</b>	Changing widget properties
<b>Requirement(s)</b>	4.9.3
<b>Description</b>	The user changes the properties of a widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a widget to the project</li> <li>The widget is selected</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Properties Panel</li> <li>The user changes the value of one of the properties of the widget</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The widget visualization in the workspace has been updated to reflect the changed property value</li> </ul>

## 7.2.6 Exporting a Visualization

<b>ID</b>	T7.2.6.1
<b>Name</b>	Exporting a visualization
<b>Requirement(s)</b>	4.7.1, 4.7.3
<b>Description</b>	The user exports a project to his or her local machine.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project and made at least one change to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks the export button</li> <li>The user browses to a directory on the local machine</li> <li>The user enters a name for the exported file</li> <li>The user clicks the export button on the popup dialog</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>A zip file has been created in the specified directory with the specified name</li> </ul>



	<ul style="list-style-type: none"> <li>• The zip file contains the files specified in 4.7.1.2</li> <li>• Every file (excluding the data files) complies with the readability requirements specified in 4.7.3</li> </ul>
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<b>ID</b>	T7.2.6.2
<b>Name</b>	Embedding a visualization
<b>Requirement(s)</b>	4.7.2, 4.6.3
<b>Description</b>	The user embeds the exported application in another web page.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has exported the visualization</li> <li>• The user has extracted the contents of the exported zip folder</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user creates a new HTML file and adds the exported HTML file in an iframe tag</li> <li>2. The user opens the newly created HTML file in a web browser</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The visualization appears on the web page</li> <li>• The visualization in the web page has the same functionality as the visualization seen on the workspace area of WAVED</li> </ul>

### 7.2.7 Project Revision History

<b>ID</b>	T7.2.7.1
<b>Name</b>	Undoing changes to a project
<b>Requirement(s)</b>	4.8.1
<b>Description</b>	The user reverts 10 changes made to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user makes 11 changes to the project</li> <li>2. The user clicks the undo button 10 times</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The undo button is now disabled</li> <li>• The 10 most recent changes have been reverted</li> </ul>

<b>ID</b>	T7.2.7.2
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<b>Name</b>	Redoing changes to a project
<b>Requirement(s)</b>	4.8.2.1, 4.8.2.3
<b>Description</b>	The user restores 10 changes that were previously undone to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has made 10 changes</li> <li>• The user has undone the 10 changes</li> </ul>
<b>Action(s)</b>	1. The user clicks the redo button 10 times
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The redo button is disabled</li> <li>• The undo button is enabled</li> <li>• The reverted changes have been restored</li> </ul>

<b>ID</b>	T7.2.7.3
<b>Name</b>	Overwriting undone changes
<b>Requirement(s)</b>	4.8.2.2
<b>Description</b>	The user undoes a change, then makes a new change to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has made two changes to the project</li> <li>• The user has reverted one change</li> </ul>
<b>Action(s)</b>	1. The user makes a change to the project
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The redo button is disabled</li> </ul>

## 7.2.8 Adding Widgets and Elements

<b>ID</b>	T7.2.8.1
<b>Name</b>	Adding a widget
<b>Requirement(s)</b>	4.9.1.1, 4.14
<b>Description</b>	The user adds a widget to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Widgets Panel</li> <li>2. The user clicks to add a widget to the project</li> </ol>

<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The widget is visible in the workspace</li> <li>• The widget is selected</li> <li>• The widget has been added to the project tree</li> <li>• The widget's properties are seen in the Properties Panel</li> </ul>
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<b>ID</b>	T7.2.8.2
<b>Name</b>	Adding a subwidget
<b>Requirement(s)</b>	4.9.1.2
<b>Description</b>	The user adds a subwidget to a widget that has already been added to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The widget is selected</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Properties Panel</li> <li>2. The user clicks the add subwidget button</li> <li>3. The user selects which type of widget to add on the popup dialog</li> <li>4. The user clicks the okay button on the popup dialog</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The new widget can be seen in the workspace area</li> <li>• The new widget is selected</li> <li>• The new widget's properties are seen on the Properties Panel</li> <li>• The new widget has been added to the project tree under the existing widget</li> </ul>

<b>ID</b>	T7.2.8.3
<b>Name</b>	Adding an element
<b>Requirement(s)</b>	4.9.2
<b>Description</b>	The user adds an element to a widget that has been added to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget that supports elements to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the add element button</li> <li>2. The user selects the type of element to add</li> <li>3. The user clicks the okay button on the popup dialog</li> <li>4. The user opens the Properties Panel</li> <li>5. The user sets required properties for the element</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The new element can be seen in the workspace area</li> </ul>

	<ul style="list-style-type: none"> <li>• The new element is selected</li> <li>• The new element's properties are visible on the Properties Panel</li> <li>• The new element has been added to the project tree under the existing widget</li> </ul>
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## 7.2.9 Removing Widgets and Elements

<b>ID</b>	T7.2.9.1
<b>Name</b>	Removing a widget
<b>Requirement(s)</b>	4.9.4.1, 4.9.4.2
<b>Description</b>	The user selects a widget with no children and deletes it from the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Project Tree Panel</li> <li>2. The user selects the widget to remove</li> <li>3. The user clicks the delete button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The widget is no longer seen in the workspace area</li> <li>• The widget is no longer listed in the project tree</li> <li>• The widget is no longer selectable from the select combobox in the main menu</li> </ul>

<b>ID</b>	T7.2.9.2
<b>Name</b>	Removing an element
<b>Requirement(s)</b>	4.9.4.1, 4.9.4.2
<b>Description</b>	The user selects an element and deletes it from the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added an element to the widget</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Project Tree Panel</li> <li>2. The user selects the element to remove</li> <li>3. The user clicks the delete button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The element is no longer seen in the workspace area</li> <li>• The element is no longer listed in the project tree</li> </ul>

	<ul style="list-style-type: none"> <li>The element is no longer selectable from the select combobox in the main menu</li> </ul>
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<b>ID</b>	T7.2.9.3
<b>Name</b>	Removing a widget with children
<b>Requirement(s)</b>	4.9.4.1, 4.9.4.2, 4.9.4.5, 4.9.4.6
<b>Description</b>	The user deletes a widget with subwidgets and elements.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a widget</li> <li>The user has added a subwidget to the widget</li> <li>The user has added an element to the widget</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Project Tree Panel</li> <li>The user selects the widget to remove from the project tree</li> <li>The user clicks the delete button</li> <li>The user clicks the okay button on the dialog alerting him or her that any children of the selected widget will also be deleted</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The widget and its children are no longer seen in the workspace area</li> <li>The widget and its children are no longer listed in the project tree</li> <li>The widget and its children are no longer selectable from the select combobox</li> </ul>

<b>ID</b>	T7.2.9.4
<b>Name</b>	Removing a widget with events and actions
<b>Requirement(s)</b>	4.9.4.3, 4.9.4.4
<b>Description</b>	The user deletes a widget with events and actions referring to it.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a widget</li> <li>The user has created a default action that targets the widget</li> <li>The user has created an event that is triggered by the widget</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Project Tree Panel</li> <li>The user selects the widget to remove from the project tree</li> <li>The user clicks the delete button</li> <li>The user clicks the okay button on the dialog alerting him or her that the widget cannot be deleted until actions and events are changed</li> </ol>

	<ol style="list-style-type: none"> <li>5. The user deletes the event that is triggered by the widget</li> <li>6. The user modifies the action so it does not target the widget</li> <li>7. The user opens the Project Tree Panel</li> <li>8. The user selects the widget</li> <li>9. The user clicks the delete button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The widget is no longer seen in the workspace area</li> <li>• The widget is no longer listed in the project tree</li> <li>• The widget is no longer selectable from the select combobox in the main menu</li> </ul>

### 7.2.10 U.S. Map Widget

<b>ID</b>	T7.2.10.1
<b>Name</b>	Adding a U.S. map widget
<b>Requirement(s)</b>	4.9.5, 4.9.6, 4.9.7.1.1, 4.9.7.1.2
<b>Description</b>	The user adds a U.S. map widget to the project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Widgets Panel</li> <li>2. The user adds a U.S. Map widget</li> <li>3. The user opens the Properties Panel</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The map with all 50 states is visible in the workspace</li> <li>• All properties and elements listed in requirements 4.9.5, 4.9.6 and 4.9.7.1.2 are accessible from the Properties Panel</li> </ul>

<b>ID</b>	T7.2.10.2
<b>Name</b>	Adding elements to the U.S. map
<b>Requirement(s)</b>	4.9.7.1.3
<b>Description</b>	The user adds a glyph and a tooltip to the U.S. Map widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a U.S. Map widget</li> <li>• The U.S. map widget is selected</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Properties Panel</li> <li>2. The user clicks the add element button</li> </ol>

	<ol style="list-style-type: none"> <li>3. The user selects to add a glyph and clicks okay</li> <li>4. The user sets required glyph properties</li> <li>5. The user selects the U.S. Map widget</li> <li>6. The user opens the Properties Panel</li> <li>7. The user clicks the add element button</li> <li>8. The user selects to add a tooltip and clicks okay</li> <li>9. The user sets required tooltip properties</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The glyphs and tooltip have been added to the project tree</li> <li>• The glyphs and tooltip appear on the map</li> </ul>

<b>ID</b>	T7.2.10.3
<b>Name</b>	Using a U.S. map widget to fire an action
<b>Requirement(s)</b>	4.9.7.1.4.1
<b>Description</b>	The user clicks on the map to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a U.S. map widget to the project.</li> <li>• The user has created a click event that uses the U.S. map widget as a trigger</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the map</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The event is fired</li> </ul>

<b>ID</b>	T7.2.10.4
<b>Name</b>	Using the states to fire an action
<b>Requirement(s)</b>	4.9.7.1.4.2
<b>Description</b>	The user clicks on a state to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a U.S. map widget to the project</li> <li>• The user has created a click event that uses the states as a trigger</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks a state</li> <li>2. The user clicks another state</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• Two actions are fired</li> </ul>

### 7.2.11 Line Graph Widget

<b>ID</b>	T7.2.11.1
<b>Name</b>	Adding a Line Graph widget
<b>Requirement(s)</b>	4.9.5, 4.9.6, 4.9.7.2.1, 4.9.7.2.2
<b>Description</b>	The user adds a line graph to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a data source to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Widgets Panel</li> <li>2. The user clicks to add a Line Graph widget</li> <li>3. The user opens the Properties Panel</li> <li>4. The user binds the data source to the project</li> <li>5. The user sets the x-axis and y-axis data properties</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The Line Graph widget appears on the workspace area</li> <li>• The graph has circles for each data point</li> <li>• The graph displays lines connecting the data point circles</li> <li>• All properties and elements listed in requirements 4.9.5, 4.9.6 and 4.9.7.2.2 are accessible from the Properties Panel</li> </ul>

<b>ID</b>	T7.2.11.2
<b>Name</b>	Adding elements to the Line Graph
<b>Requirement(s)</b>	4.9.7.2.3
<b>Description</b>	The user adds a tooltip to a Line Graph widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a Line Graph widget</li> <li>• The Line Graph widget is selected</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the add element button</li> <li>2. The user selects to add a tooltip</li> <li>3. The user clicks okay to close the dialog</li> <li>4. The user sets required tooltip properties</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The tooltip has been added to the Project Tree</li> <li>• The tooltip appears on the graph</li> </ul>



<b>ID</b>	T7.2.11.3
<b>Name</b>	Using the graph to fire an action
<b>Requirement(s)</b>	4.9.7.2.4.1
<b>Description</b>	The user clicks the line graph to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a line graph widget to the project.</li> <li>• The user has set the data properties of the graph</li> <li>• The user has created a click event that uses the graph as a trigger</li> </ul>
<b>Action(s)</b>	1. The user clicks the graph
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The action is fired</li> </ul>

<b>ID</b>	T7.2.11.4
<b>Name</b>	Using data points to fire an action
<b>Requirement(s)</b>	4.9.7.2.4.2
<b>Description</b>	The user clicks on data points to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a line graph widget to the project.</li> <li>• The user has set the data properties of the graph</li> <li>• The user has created a click event that uses the graph data points as a trigger</li> </ul>
<b>Action(s)</b>	1. The user clicks on a data point
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The action is fired</li> </ul>

<b>ID</b>	T7.2.11.5
<b>Name</b>	Using the grid lines to fire an action
<b>Requirement(s)</b>	4.9.7.2.4.3
<b>Description</b>	The user hovers within the graph to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a line graph widget to the project.</li> <li>• The user has set the data properties of the graph</li> <li>• The user has created a hover event that uses the vertical grid lines as a target</li> </ul>

<b>Action(s)</b>	1. The user hovers above and below data points
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The action associated with the event is fired</li> </ul>

### 7.2.12 Button Widget

<b>ID</b>	T7.2.12.1
<b>Name</b>	Adding a button
<b>Requirement(s)</b>	4.9.5, 4.9.6, 4.9.7.3.1, 4.9.7.3.2
<b>Description</b>	The user adds a button widget to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Widgets Panel</li> <li>The user clicks to add a Button widget to the project</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>A Button widget is visible in the workspace area.</li> <li>All properties listed in 4.9.5, 4.9.6 and 4.9.7.3.2 are accessible from the Properties Panel</li> </ul>

<b>ID</b>	T7.2.12.2
<b>Name</b>	Using a button to fire an action
<b>Requirement(s)</b>	4.9.7.3.3.1
<b>Description</b>	The user clicks a Button widget to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a Button widget to the project</li> <li>The user has created an event that uses the button as a trigger</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks the button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The action is fired</li> </ul>

### 7.2.13 Text Block Widget

<b>ID</b>	T7.2.13.1
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<b>Name</b>	Adding a text block
<b>Requirement(s)</b>	4.9.5, 4.9.6, 4.9.7.5.1, 4.9.7.5.2
<b>Description</b>	The user adds a text block widget to the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Widget Panel</li> <li>The user adds the Text Block widget</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>A rectangular text block is visible in the workspace area</li> <li>All properties listed in 4.9.5, 4.9.6 and 4.9.7.5.2 are accessible from the Properties Panel</li> </ul>

<b>ID</b>	T7.2.13.2
<b>Name</b>	Using a text block to fire an action
<b>Requirement(s)</b>	4.9.7.5.3.1
<b>Description</b>	The user clicks a text block to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a Text Block widget to the project</li> <li>The user created a click event using the text block as a trigger</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks the text block</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The action is fired</li> </ul>

### 7.2.14 Glyphs

<b>ID</b>	T7.2.14.1
<b>Name</b>	Adding constant size glyphs
<b>Requirement(s)</b>	4.9.5, 4.9.8.1.1
<b>Description</b>	The user adds constant sized glyphs to a U.S. map widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has created a U.S. map widget</li> <li>The user has selected the U.S. map widget</li> <li>The user has opened the Properties Panel</li> </ul>

<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the add element button in the Properties Panel</li> <li>2. The user selects glyphs from the resulting popup and clicks the okay button</li> <li>3. The user sets a data set</li> <li>4. The user supplies a number for the size of the glyphs</li> <li>5. The user selects a field from the selected data set for the latitude</li> <li>6. The user selects a field from the selected data set for the longitude</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• Glyphs are visible on the U.S. map.</li> <li>• All properties listed in 4.9.5 and 4.9.8.1.1 are accessible from the Properties Panel</li> </ul>

<b>ID</b>	T7.2.14.2
<b>Name</b>	Adding scaled size glyphs
<b>Requirement(s)</b>	4.9.8.1.1.4.1.2
<b>Description</b>	The user adds glyphs scaled in size to a U.S. map widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a U.S. map widget</li> <li>• The user has selected the U.S. map widget</li> <li>• The user has opened the Properties Panel</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user clicks the add element button in the Properties Panel</li> <li>2. The user selects the glyphs option from the resulting popup and clicks the okay button</li> <li>3. The user sets a data set</li> <li>4. The user selects a data field for the size of the glyphs</li> <li>5. The user selects a field from the selected data set for the latitude</li> <li>6. The user selects a field from the selected data set for the longitude</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• Glyphs are visible on the U.S. map.</li> <li>• The glyphs are scaled by the values in the specified data field</li> </ul>

<b>ID</b>	T7.2.14.3
<b>Name</b>	Using an individual glyph to fire an action
<b>Requirement(s)</b>	4.9.8.1.2.1
<b>Description</b>	The user clicks on a glyph to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a U.S. map widget to the project</li> </ul>

	<ul style="list-style-type: none"> <li>The user has added a glyph to the map</li> <li>The user has created a click event targeting individual glyphs</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks one of the glyphs</li> <li>The user clicks a second glyph</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>Different actions are fired for each glyph</li> </ul>

<b>ID</b>	T7.2.14.4
<b>Name</b>	Using glyphs to fire an action
<b>Requirement(s)</b>	4.9.8.1.2.2
<b>Description</b>	The user clicks on any glyph in the set of glyphs to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a U.S. map widget to the project</li> <li>The user has added glyphs to the map</li> <li>The user has created a click event that uses the set of glyphs as a trigger</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user clicks one of the glyphs</li> <li>The user clicks another glyph</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The same action is fired twice</li> </ul>

## 7.2.15 Tooltip

<b>ID</b>	T7.2.15.1
<b>Name</b>	Adding tooltips
<b>Requirement(s)</b>	4.9.5, 4.9.8.2.1
<b>Description</b>	The user adds a tooltip to a widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has created a widget that supports tooltips</li> <li>The user has selected the widget to be customized</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Properties Panel</li> <li>The user clicks the button to add an element</li> <li>The user selects the tooltip option from the dialog</li> <li>The user clicks okay to close the dialog</li> <li>The user sets a text value for the tooltip</li> </ol>

<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• A tooltip is visible on the selected widget.</li> <li>• All properties listed in 4.9.5 and 4.9.8.2.1 are accessible from the Properties Panel</li> </ul>
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<b>ID</b>	T7.2.15.2
<b>Name</b>	Using a tooltip to fire an action
<b>Requirement(s)</b>	4.9.8.2.3.1
<b>Description</b>	The user clicks on a tooltip to fire an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added a tooltip to the widget</li> <li>• The user created a click event that is triggered by the tooltip</li> </ul>
<b>Action(s)</b>	1. The user clicks the tooltip
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The action is fired</li> </ul>

## 7.2.16 Data

<b>ID</b>	T7.2.16.1
<b>Name</b>	Adding data sources to the project
<b>Requirement(s)</b>	4.10.1, 4.10.2
<b>Description</b>	The user uploads data sources from his or her local machine to the project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Data Panel</li> <li>2. The user clicks the add data source button</li> <li>3. The user selects a CSV file from his local machine</li> <li>4. The user clicks the load button</li> <li>5. The user clicks the add data source button</li> <li>6. The user selects a JSON file from his local machine</li> <li>7. The user clicks the load button</li> <li>8. The user clicks the add data source button</li> <li>9. The user selects a XML file from his local machine</li> <li>10. The user clicks the load button</li> <li>11. The user clicks the add data source button</li> <li>12. The user selects a text file from his local machine</li> </ol>

	13. The user clicks the load button 14. The user clicks okay when prompted the file is not a valid format 15. The user clicks cancel to close the dialog
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The filenames of the added data sources are visible in the Data Source list of the Data Panel</li> <li>The data sources are available as an option when binding data to widgets</li> </ul>

<b>ID</b>	T7.2.16.2
<b>Name</b>	Viewing added data
<b>Requirement(s)</b>	4.10.3
<b>Description</b>	The user views the data fields for an added data source.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a data set to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Data Panel</li> <li>The user selects a data set from the list</li> <li>The user clicks the view button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>A dialog containing a table is displayed</li> <li>The table contains the data field names</li> <li>The table contains the data values</li> </ul>

<b>ID</b>	T7.2.16.3
<b>Name</b>	Removing a data source
<b>Requirement(s)</b>	4.10.5.1, 4.10.5.3, 4.10.5.4
<b>Description</b>	The user removes a data source from the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a data source to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Data Panel</li> <li>The user selects a data source from the list</li> <li>The user clicks the delete button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The data source is removed from the list of available data in the Data Panel</li> <li>The deleted data source is no longer available as an option when binding data to a widget</li> </ul>

	<ul style="list-style-type: none"> <li>The corresponding data file is deleted from the server</li> </ul>
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<b>ID</b>	T7.2.16.4
<b>Name</b>	Removing bound data
<b>Requirement(s)</b>	4.10.5.5, 4.10.5.6
<b>Description</b>	The user removes a bound data source from the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a data source to the project</li> <li>The user has added a widget to the project</li> <li>The widget is selected</li> <li>The user has bound the data source to the widget</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Data Panel</li> <li>The user selects the data source to delete</li> <li>The user clicks the delete button</li> <li>The user clicks the okay button on the dialog instructing him or her to unbind the data</li> <li>The user opens the Properties Panel</li> <li>The user removes the data source from the bound data section</li> <li>Repeat steps 2-3</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The data source is no longer visible in the list of data sources in the Data Panel</li> <li>The data source can no longer be bound to the widget</li> <li>The data source is no longer available to the project</li> </ul>

<b>ID</b>	T7.2.16.5
<b>Name</b>	Removing a data source with a data subset
<b>Requirement(s)</b>	4.10.5.1, 4.10.5.2, 4.10.5.3
<b>Description</b>	The user deletes a data source after a data subset has been created from that data source.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a data source</li> <li>The user has created a data subset from a data source</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Data Panel</li> <li>The user selects a data source from which a data subset was created</li> </ol>



	3. The user clicks the okay button on the dialog asking to confirm deletion of the data source
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The deleted data source is no longer listed in the list of data sources in the Data Panel</li> <li>Any data subsets created from the deleted data source are no longer listed in the Data Panel</li> <li>Neither the deleted data set nor any of its data subsets are available as options when binding data to widgets</li> </ul>

<b>ID</b>	T7.2.16.6
<b>Name</b>	Adding a data subset
<b>Requirement(s)</b>	4.10.4
<b>Description</b>	The user creates a data subset from a loaded data source.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>The user has created a project</li> <li>The user has added a data source to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>The user opens the Data Panel</li> <li>The user selects the option to add a data subset</li> <li>The user selects a data set</li> <li>The user supplies a name for the data subset</li> <li>The user selects a data field of the selected data set</li> <li>The user selects a comparison operator</li> <li>The user specifies a comparison value</li> <li>The user selects the AND operator</li> <li>The user repeats steps 5-7</li> <li>The user selects the OR operator</li> <li>The user repeats steps 5-7</li> <li>The user clicks the okay button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>The provided name for the data subset appears in the list of data subsets in the Data Panel</li> <li>The data subset is available as an option when binding data to widgets</li> </ul>

<b>ID</b>	T7.2.16.7
<b>Name</b>	Binding data to a widget
<b>Requirement(s)</b>	4.10.6
<b>Description</b>	The user binds a loaded data source to a widget with an element.

<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a data set to the project</li> <li>• The user has added a widget to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user selects the widget to which data should be bound</li> <li>2. The user opens the Properties Panel</li> <li>3. The user clicks the button to bind data to the widget</li> <li>4. The user checks the boxes on the dialog next to the data sets that should be bound to the widget</li> <li>5. The user clicks the okay button to close the dialog</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The name of the data set appears in the list of data sources in Properties Panel when the the widget to which it was bound is selected</li> <li>• The name of the bound data set is available as an option when creating an action or adding elements to the widget</li> </ul>

<b>ID</b>	T7.2.16.8
<b>Name</b>	Unbinding data from a widget
<b>Requirement(s)</b>	4.10.7
<b>Description</b>	The user removes bound data from a widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has added a data set to the project</li> <li>• The user has added a widget to the project</li> <li>• The user has bound a data set to a widget</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user selects the widget from which bound data should be removed</li> <li>2. The user selects the name of the data set to be removed from the list of data sets bound to the widget</li> <li>3. The user clicks the button to remove the data</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The name of the unbound data set no longer appears in the list of data sources bound to the widget in the Properties Panel</li> <li>• The unbound data set is no longer available as an option when creating an action or adding an element to the widget</li> </ul>

## 7.2.17 Actions

<b>ID</b>	T7.2.17.1
<b>Name</b>	Adding a change property action
<b>Requirement(s)</b>	4.11.1, 4.11.2.1.1

<b>Description</b>	The user adds a default action to change a property of a widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Actions Panel</li> <li>2. The user clicks the add button</li> <li>3. The user selects property as the action type</li> <li>4. The user selects the widget to target</li> <li>5. The user selects a widget property from the displayed list</li> <li>6. The user enters a new value for the property in the options section of the dialog</li> <li>7. The user clicks the okay button to close the dialog and apply the action</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The affected target property of the widget is updated in the workspace view</li> </ul>

<b>ID</b>	T7.2.17.2
<b>Name</b>	Adding a change property action
<b>Requirement(s)</b>	4.11.1, 4.11.2.1.2
<b>Description</b>	The user adds a default action to change a property of a widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added a data source to the project</li> <li>• The user has created a data subset</li> <li>• The user has created a default action that uses the data subset</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Actions Panel</li> <li>2. The user clicks the add button</li> <li>3. The user selects data subset as the action type</li> <li>4. The user selects the data subset to target</li> <li>5. The user alters the data subset definition</li> <li>6. The user clicks the okay button to close the dialog and apply the action</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The property affected by the default action has been updated for the changes to the data subset</li> </ul>

<b>ID</b>	T7.2.17.3
<b>Name</b>	Modifying an action
<b>Requirement(s)</b>	4.11.3

<b>Description</b>	The user modifies an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added a default action that changes a property of a widget</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Actions Panel</li> <li>2. The user selects the action</li> <li>3. The user clicks the modify action button</li> <li>4. The user changes the value of the changed property</li> <li>5. The user clicks the okay button to close the dialog</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The workspace has updated to reflect the new property value defined in the action</li> </ul>

<b>ID</b>	T7.2.17.4
<b>Name</b>	Removing an action
<b>Requirement(s)</b>	4.11.4.1
<b>Description</b>	The user removes an action.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added an action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Actions Panel</li> <li>2. The user selects the action to be removed</li> <li>3. The user clicks the remove action button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The removed action no longer appears in the list of actions</li> <li>• The removed action is no longer available as an option when creating an event</li> </ul>

<b>ID</b>	T7.2.17.5
<b>Name</b>	Removing an action used by an event
<b>Requirement(s)</b>	4.11.4.2
<b>Description</b>	The user removes an action that is currently being used by an event in the project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> </ul>

	<ul style="list-style-type: none"> <li>• The user has added an action</li> <li>• The user has added an event using the action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Actions Panel</li> <li>2. The user selects the action to be removed</li> <li>3. The user clicks the remove button</li> <li>4. The user clicks okay on the dialog that appears informing the user that the action is in use by an event and cannot be deleted.</li> <li>5. The user removes the event using the action</li> <li>6. The user repeats steps 1-3.</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The removed action no longer appears in the list of available widget actions in the Properties Panel</li> <li>• The removed action is no longer available as an option when adding an event to the widget</li> </ul>

## 7.2.18 Events

<b>ID</b>	T7.2.18.1
<b>Name</b>	Adding a click event to a widget
<b>Requirement(s)</b>	4.12.1.1.1, 4.12.2
<b>Description</b>	The user adds a click event to a widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added a change property action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Events Panel</li> <li>2. The user clicks the add button</li> <li>3. The user selects click as the event type</li> <li>4. The user selects the widget as a trigger</li> <li>5. The user selects the action</li> <li>6. The user clicks the okay button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The added click event is displayed in the event list</li> <li>• The action added to the event is fired when the click event is triggered on the designated target</li> </ul>

<b>ID</b>	T7.2.18.2
<b>Name</b>	Adding a hover event

<b>Requirement(s)</b>	4.12.1.1.2, 4.12.2
<b>Description</b>	The user adds a hover event.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added a change property action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Events Panel</li> <li>2. The user clicks the add button</li> <li>3. The user selects hover as the event type</li> <li>4. The user selects a widget to target</li> <li>5. The user selects the action</li> <li>6. The user clicks the save button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The added hover event is displayed in the event list</li> <li>• The action added to the event is fired when the hover event is triggered on the designated target</li> </ul>

<b>ID</b>	T7.2.18.3
<b>Name</b>	Adding a move event
<b>Requirement(s)</b>	4.12.1.1.3, 4.12.2
<b>Description</b>	The user adds a move event.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has added a change property action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Events Panel</li> <li>2. The user clicks the add button</li> <li>3. The user selects move as the event type</li> <li>4. The user selects a widget to target</li> <li>5. The user selects the action</li> <li>6. The user clicks the save button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The added move event is displayed in the event list</li> <li>• The action added to the event is fired when the move event is triggered on the designated target</li> </ul>

<b>ID</b>	T7.2.18.4
<b>Name</b>	Modifying an event

<b>Requirement(s)</b>	4.12.3
<b>Description</b>	The user modifies an event.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the current project</li> <li>• The user has added an action</li> <li>• The user has added an event triggering an action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Events Panel</li> <li>2. The user selects the event</li> <li>3. The user clicks the edit button</li> <li>4. The user changes the selected action</li> <li>5. The user clicks the okay button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The new action is triggered when the event is fired</li> </ul>

<b>ID</b>	T7.2.18.5
<b>Name</b>	Removing an event
<b>Requirement(s)</b>	4.12.4
<b>Description</b>	The user removes an event from a widget in the current project.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the current project</li> <li>• The user has added an action</li> <li>• The user has added an event triggering an action</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Events Panel</li> <li>2. The user selects the event</li> <li>3. The user clicks the delete button</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The event is no longer in the list of events</li> </ul> <p>Interacting with the workspace no longer triggers the action used in the deleted event</p>

## 7.2.19 Google Analytics

<b>ID</b>	T7.2.19.1
<b>Name</b>	Adding Google Analytics
<b>Requirement(s)</b>	4.13

<b>Description</b>	The user adds a Google Universal Analytics tracking code to the current project and enables it for the selected widget.
<b>Precondition(s)</b>	<ul style="list-style-type: none"> <li>• The user has created a project</li> <li>• The user has added a widget to the project</li> <li>• The user has selected a widget</li> <li>• The user has registered a valid Google Analytics account outside of the WAVED application</li> <li>• The user has registered a website with Google Analytics and received a Universal Analytics tracking code</li> </ul>
<b>Action(s)</b>	<ol style="list-style-type: none"> <li>1. The user opens the Google Analytics Panel</li> <li>2. The user enters the UA tracking code they received in the designated field</li> <li>3. The user enters a valid title in the designated field</li> <li>4. The user opens the Properties Panel</li> <li>5. The user checks to log google analytics</li> </ol>
<b>Postcondition(s)</b>	<ul style="list-style-type: none"> <li>• The entered UA tracking code and title persist in the Google Analytics Panel as the user navigates the WAVED application.</li> <li>• When the project is exported and embedded in a webpage that matches the domain registered with the supplied Google Analytics UA code, clicking on the widget within the webpage logs Google analytics.</li> </ul>



## 8. Traceability Matrix

Requirement	Description	Test Cases
<b>4.1</b>	<b>Application</b>	
4.1.1	On launch	
4.1.1.1	Create a new project	T7.2.1.1
4.1.1.2	Load an existing project	T7.2.1.1
<b>4.2</b>	<b>Creating a Project</b>	
4.2.1	Launching an application	T7.2.1.1
4.2.2	Creating a new project	T7.2.1.2
4.2.3	Abandoning changes	T7.2.1.2
4.2.4	Project name	T7.2.1.2
4.2.4.1	Project name uniqueness	T7.2.1.1, T7.2.1.2
4.2.4.2	Project name length	T7.2.1.1, T7.2.1.2
4.2.4.3	Project name character restriction	T7.2.1.1, T7.2.1.2
4.2.4.4	Overwriting a project with the same name	T7.2.1.2
<b>4.3</b>	<b>Saving a Project</b>	
4.3.1	Saving the current state	T7.2.2.1
4.3.2	Saving a new project.	T7.2.2.2
4.3.3	Saving a copy of the project	T7.2.2.1
<b>4.4</b>	<b>Loading a Project</b>	
4.4.1	Loading a saved project	T7.2.3.1
4.4.2	Selecting a saved project from a list	T7.2.3.1
4.4.3	Validating the project loaded correctly	T7.2.3.1
<b>4.5</b>	<b>Deleting a Project</b>	
4.5.1	Deleting a saved project	T7.2.4.1
4.5.2	Delete an open project	T7.2.4.2
4.5.3	Prompt before deletion	T7.2.4.1, T7.2.4.2
4.5.4	Project is not in list of saved projects	T7.2.4.1, T7.2.4.2
4.5.5	Deleted project removed from server	T7.2.4.1, T7.2.4.2
<b>4.6</b>	<b>Workspace</b>	
4.6.1	Updating the workspace	T7.2.5.1
4.6.2	Refreshing the workspace	T7.2.5.2
4.6.3	Functionality of the workspace	T7.2.6.2
4.6.4	Workspace height	T7.2.5.1
4.6.5	Workspace height default value	T7.2.5.1
4.6.6	Workspace width	T7.2.5.1
4.6.7	Workspace width default value	T7.2.5.1
<b>4.7</b>	<b>Export Visualization</b>	

4.7.1	Exported File	
4.7.1.1	Creating a zip file	T7.2.6.1
4.7.1.2	Zip file contents	
4.7.1.2.1	An HTML file	T7.2.6.1
4.7.1.2.2	A JavaScript file	T7.2.6.1
4.7.1.2.3	A CSS file	T7.2.6.1
4.7.1.2.4	A data folder	T7.2.6.1
4.7.2	Visualization Functionality	
4.7.2.1	Expected functionality of export	T7.2.6.2
4.7.2.2	Embedding the visualization	T7.2.6.2
4.7.3	Readability of Exported Code	
4.7.3.1	Exported code conventions	
4.7.3.1.1	White space	T7.2.6.1
4.7.3.1.2	One statement per line	T7.2.6.1
4.7.3.1.3	Appropriate variable names	T7.2.6.1
4.7.3.1.4	Code comments	T7.2.6.1
<b>4.8</b>	<b>Project Revision History</b>	
4.8.1	Undo	
4.8.1.1	Number of changes that can be reverted	T7.2.7.1
4.8.1.2	When undo is disabled	T7.2.7.1
4.8.2	Redo	
4.8.2.1	Reverted changes can be restored	T7.2.7.2
4.8.2.2	When reverted changes cannot be restored	T7.2.7.3
4.8.2.3	When redo is disabled	T7.2.7.2
<b>4.9</b>	<b>Widgets and Elements</b>	
4.9.1	Adding a Widget	
4.9.1.1	Adding widgets to a project	T7.2.8.1
4.9.1.2	Adding subwidgets	T7.2.8.2
4.9.2	Adding an Element	
4.9.2.1	Adding elements to a project	T7.2.8.3
4.9.3	Modifying a Widget or Element	
4.9.3.1	Modifying defined properties	T7.2.5.3
4.9.3.2	Selecting to change properties	T7.2.5.3
4.9.4	Deleting a Widget or Element	
4.9.4.1	Deleting a widget or element	T7.2.9.1, T7.2.9.2, T7.2.9.3
4.9.4.2	Selecting a widget to delete	T7.2.9.1, T7.2.9.2, T7.2.9.3
4.9.4.3	Remove elements	T7.2.9.4
4.9.4.4	Remove actions	T7.2.9.4
4.9.4.5	Prompting to delete of children	T7.2.9.3

4.9.4.6	Deleting children recursively	T7.2.9.3
4.9.5	Common Widget and Element Properties	
4.9.5.1	List of shared properties	
4.9.5.1.1	Name	
4.9.5.1.1.1	Name length	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1, T7.2.14.1, T7.2.15.1
4.9.5.1.1.2	Name uniqueness	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1, T7.2.14.1, T7.2.15.1
4.9.5.1.1.3	Name character restriction	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1, T7.2.14.1, T7.2.15.1
4.9.5.1.2	Visibility	
4.9.5.1.2.1	Visibility values	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1, T7.2.14.1, T7.2.15.1
4.9.5.1.2.2	Visibility default value	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1, T7.2.14.1, T7.2.15.1
4.9.5.1.3	Log Google Analytics	
4.9.5.1.3.1	Google Analytics	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1, T7.2.14.1, T7.2.15.1
4.9.6	Common Widget Properties	
4.9.6.1	List of shared properties	
4.9.6.1.1	Horizontal Offset	
4.9.6.1.1.1	Valid horizontal offset values	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1,
4.9.6.1.1.2	Measuring the offset	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.1.3	Default value	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.2	Vertical Offset	
4.9.6.1.2.1	Valid vertical offset values	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.2.2	Measuring the offset	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.2.3	Default value	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.3	Height	
4.9.6.1.3.1	Height value restriction	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.3.2	Height default value	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.4	Width	
4.9.6.1.4.1	Width value restriction	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.6.1.4.2	Width default value	T7.2.10.1, T7.2.11.1, T7.2.12.1, T7.2.13.1
4.9.7	Available Widgets	
4.9.7.1	U.S. Map	
4.9.7.1.1	U.S. Map	
4.9.7.1.1.1	Displays 50 states	T7.2.10.1
4.9.7.1.2	U.S Map Properties	
4.9.7.1.2.1	Coloring	
4.9.7.1.2.1.1	Coloring Schemes	

4.9.7.1.2.1.1.1	All states same color	T7.2.10.1
4.9.7.1.2.1.1.2	Four color scheme	T7.2.10.1
4.9.7.1.2.1.2	Default coloring	T7.2.10.1
4.9.7.1.3	U.S. Map Elements	
4.9.7.1.3.1	Glyph	T7.2.10.2
4.9.7.1.3.2	Tooltip	T7.2.10.2
4.9.7.1.4	U.S. Map Triggers	
4.9.7.1.4.1	Any location on the map	T7.2.10.3
4.9.7.1.4.2	Individual states	T7.2.10.4
4.9.7.2	Line Graph	
4.9.7.2.1	Line Graph	
4.9.7.2.1.1	Displays data points	T7.2.11.1
4.9.7.2.1.2	Displays connecting lines	T7.2.11.1
4.9.7.2.2	Line Graph Properties	
4.9.7.2.2.1	Title	
4.9.7.2.2.1.1	Character restriction	T7.2.11.1
4.9.7.2.2.2	X-Axis Label	
4.9.7.2.2.2.1	Character restriction	T7.2.11.1
4.9.7.2.2.3	Y-Axis Label	
4.9.7.2.2.3.1	Character restriction	T7.2.11.1
4.9.7.2.2.4	Graph Data	
4.9.7.2.2.4.1	Graph data requirement	T7.2.11.1
4.9.7.2.2.5	X-Axis Data	
4.9.7.2.2.5.1	Valid x-axis value	T7.2.11.1
4.9.7.2.2.6	Y-Axis Data	
4.9.7.2.2.6.1	Valid y-axis value	T7.2.11.1
4.9.7.2.3	Line Graph Elements	
4.9.7.2.3.1	Tooltip	T7.2.11.2
4.9.7.2.4	Line Graph Triggers	
4.9.7.2.4.1	Any location on the line graph	T7.2.11.3
4.9.7.2.4.2	Data points	T7.2.11.4
4.9.7.2.4.3	Vertical grid lines	T7.2.11.5
4.9.7.3	Button	
4.9.7.3.1	Button	
4.9.7.3.1.1	A clickable area with text	T7.2.12.1
4.9.7.3.2	Button Properties	
4.9.7.3.2.1	Label	
4.9.7.3.2.1.1	Label length	T7.2.12.1
4.9.7.3.3	Button Triggers	
4.9.7.3.3.1	The button	T7.2.12.2

4.9.7.5	Text Block	
4.9.7.5.1	Text Block	
4.9.7.5.1.1	A rectangular area with text	T7.2.13.1
4.9.7.5.2	Text Block Properties	
4.9.7.5.2.1	Text Content	
4.9.7.5.2.1.1	Text content length	T7.2.13.1
4.9.7.5.3	Text Block Triggers	
4.9.7.5.3.1	Inside the text block	T7.2.13.2
4.9.8	Available Elements	
4.9.8.1	Glyphs	
4.9.8.1.1	Glyph Properties	
4.9.8.1.1.1	Data	
4.9.8.1.1.1.1	Selecting data	T7.2.14.1
4.9.8.1.1.2	Color	
4.9.8.1.2.2.1	Valid color value	T7.2.14.1
4.9.8.1.2.2.2	Default color	T7.2.14.1
4.9.8.1.1.3	Shape	
4.9.8.1.1.3.1	Available glyph shapes	
4.9.8.1.1.3.1.1	Circle	T7.2.14.1
4.9.8.1.1.3.1.2	Default shape	T7.2.14.1
4.9.8.1.1.4.	Size	
4.9.8.1.1.4.1	Specifying dimensions	
4.9.8.1.1.4.1.1	Constant size	T7.2.14.1
4.9.8.1.1.4.1.2	Data dependent size	T7.2.14.2
4.9.8.1.1.5	Latitude	
4.9.8.1.1.5.1	Latitude source	T7.2.14.1
4.9.8.1.1.5.2	Valid latitude	T7.2.14.1
4.9.8.1.1.6	Longitude	
4.9.8.1.1.6.1	Longitude source	T7.2.14.1
4.9.8.1.1.6.2	Valid longitude	T7.2.14.1
4.9.8.1.2	Glyph Triggers	
4.9.8.1.2.1	An individual glyph	T7.2.14.3
4.9.8.1.2.2	Any glyph in the set	T7.2.14.4
4.9.8.2	Tooltip	
4.9.8.2.1	Tooltip Properties	
4.9.8.2.1.1	Text	
4.9.8.2.1.1.1	Text length	T7.2.15.1
4.9.8.2.2	Tooltip Triggers	
4.9.8.2.3.1	The tooltip	T7.2.15.2
<b>4.10</b>	<b>Data</b>	

4.10.1	Valid Data File Formats	
4.10.1.1	Acceptable Formats	
4.10.1.1.1	CSV	T7.2.16.1
4.10.1.1.2	JSON	T7.2.16.1
4.10.1.1.3	XML	T7.2.16.1
4.10.2	Adding A Data Source	
4.10.2.1	Loading data	T7.2.16.1
4.10.2.2	File type restrictions	T7.2.16.1
4.10.2.3	Name uniqueness	T7.2.16.1
4.10.3	Viewing a Data Set	
4.10.3.1	Viewing data	T7.2.16.2
4.10.4	Creating a Data Subset	
4.10.4.1	Data subset name	T7.2.16.6
4.10.4.1.1	Name uniqueness	T7.2.16.6
4.10.4.1.2	Name length	T7.2.16.6
4.10.4.1.3	Character restriction	T7.2.16.6
4.10.4.2	Data source to derive from	T7.2.16.6
4.10.4.3	Creating the conditional	
4.10.4.3.1	A data field	T7.2.16.6
4.10.4.3.2	Comparison Operators	
4.10.4.3.2.1	Less than	T7.2.16.6
4.10.4.3.2.2	Less than or equal to	T7.2.16.6
4.10.4.3.2.3	Equal to	T7.2.16.6
4.10.4.3.2.4	Not equal to	T7.2.16.6
4.10.4.3.2.5	Greater than	T7.2.16.6
4.10.4.3.2.6	Greater than or equal to	T7.2.16.6
4.10.4.3.3	A user-supplied value	T7.2.16.6
4.10.4.4	Logical Operators	
4.10.4.4.1	AND	T7.2.16.6
4.10.4.4.2	OR	T7.2.16.6
4.10.4.5	Logical Operator Precedence	T7.2.16.6
4.10.5	Removing A Data Set	
4.10.5.1	Removing data	T7.2.16.3, T7.2.16.5
4.10.5.2	Prompt if children exist	T7.2.16.5
4.10.5.3	Recursively delete	T7.2.16.3, T7.2.16.5
4.10.5.4	Remove data from server	T7.2.16.3
4.10.5.5	Restrictions on removing data	T7.2.16.4
4.10.5.6	Prompt if removing is restricted	T7.2.16.4
4.10.6	Binding Data To Widgets	
4.10.6.1	Data must be bound to access the data	T7.2.16.7

4.10.6.2	Elements access parent data	T7.2.16.7
4.10.7	Unbinding Data from Widgets	
4.10.7.1	Removing bound data	T7.2.16.8
4.10.7.2	Only remove unused data	T7.2.16.8
<b>4.11</b>	<b>Actions</b>	
4.11.1	Creating an Action	
4.11.1.1	Required information	
4.11.1.1.1	Action type	T7.2.17.1, T7.2.17.2
4.11.1.1.2	Affected widget or element	T7.2.17.1, T7.2.17.2
4.11.1.1.3	Data set	T7.2.17.1, T7.2.17.2
4.11.1.1.4	Thing to change	T7.2.17.1, T7.2.17.2
4.11.1.1.5	New value	T7.2.17.1, T7.2.17.2
4.11.1.1.6	Apply immediately	T7.2.17.1, T7.2.17.2
4.11.2	Action Types	
4.11.2.1	Valid action types	
4.11.2.1.1	Change a property value	T7.2.17.1
4.11.2.1.2	Change a data subset query	T7.2.17.2
4.11.3	Modifying an Action	
4.11.3.1	Actions can be modified	T7.2.17.3
4.11.4	Removing an Action	
4.11.4.1	Removing an action	T7.2.17.4
4.11.4.2	Restrictions on removing an action	T7.2.17.5
<b>4.12</b>	<b>Events</b>	
4.12.1	Event Types	
4.12.1.1	Valid event types	
4.12.1.1.1	A click event	T7.2.18.1
4.12.1.1.2	A hover event	T7.2.18.2
4.12.1.1.3	A move event	T7.2.18.3
4.12.2	Creating an Event	
4.12.2.1	Required information	
4.12.2.1.1	Event type	T7.2.18.1, T7.2.18.2, T7.2.18.3
4.12.2.1.2	Name of widget	T7.2.18.1, T7.2.18.2, T7.2.18.3
4.12.2.1.3	Target	T7.2.18.1, T7.2.18.2, T7.2.18.3
4.12.2.1.4	Action	T7.2.18.1, T7.2.18.2, T7.2.18.3
4.12.3	Modifying an Event	
4.12.3.1	Events can be modified	T7.2.18.4
4.12.4	Removing An Event	
4.12.4.1	Events can be removed	T7.2.18.5
<b>4.13</b>	<b>Google Analytics</b>	
4.13.1	Google Analytics tracking	T7.2.19.1

4.13.2	Google Analytics requirements	T7.2.19.1
4.13.3	Google Analytics tracking code restriction	T7.2.19.1
4.13.4	Google Analytics title character restriction	T7.2.19.1
4.14	<b>Project Tree</b>	
4.14.1	Hierarchical format	T7.2.8.1
4.14.2	Widgets and elements in the tree	T7.2.8.1