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Precipi-Tracker

"Insert best tagline here"

The Problem: With rising water bills, global warming, and natural disasters, there needs to be a way to collect water for storage. The best way to store drinkable water long-term is through collecting rain. If a blizzard takes out our power and leaves us stranded, mains pipes and sewage systems will burst, and water will become unsafe to use. When the economy inflates too high – a future where water is $10 / gallon – there needs to be a better way to collect it than going to the store or food shelter. In case of one of these situations, most people will not be deeply knowledgeable about the best areas to collect rainwater relative to their location; For those off the grid, they would use the local river or lake for their water. However, in the long term it would be ideal for them to collect and store rainwater. The problem is that most people would not know what places are best for in their area.

The Solution: Develop a cross-platform, web-based app or website that uses a dynamically updated heat-map of areas that have reported precipitation levels. Users will be able to interact with a map of a chosen region and have a granular view compared to the scale of the map.

Key Concepts:

- Use a Google maps (or similar) API to overlay Precipi-Tracker data onto an interactive platform.
- Aggregation and citation of data from available databases.

Features:

- Users will be able to view an interactive map on a web browser or mobile browser
- Users can view real-time precipitation data or historical data
- The availability of data visible on Precipi-Tracker is relative to the map's scale - I.E., at the national level, state level, and county level if data is available.

Use Cases:

Go from regional view to state view to county view:

- Goal:
  - Navigate from a national/regional viewpoint of the United States to the county view of a single state.
- Resources Needed:
  - The product website
  - A device with an internet connection
  - An internet connection
- Participants:
  - The individual user
- User Actions:
  - Once the user loads onto the precipi-tracker website, the user will be faced with the default view of the United States called the region view. The region view will show the regions of the United States. The user will be able to click upon one of those regions and then the map API will be updated to show the region-state view which intuitively will show the states within the region the user has clicked on. The user will then be able to click on a state and like how the region view goes to region-state view, the website map will update to show the county view which displays the counties for the clicked upon map. Goal accomplished.

Change the date range for a specified view:

- Goal:
  - To alter the date range setting
- Resources Needed:
  - The product website
  - A device with an internet connection
  - An internet connection
- Participants:
  - The individual user
- User Actions:
  - Once the user loads the website, the date range setting will be shown in the header of the map API of the website. It will always be on the top of the map. The user can alter the date range setting to say a week through it. Once changed, the map will update to show the data for the new date range.

Competitive Analysis:

The main competition for Precipi-Tracker would be other mainstream websites that provide interactive weather maps (CoCoRaHS, Weather.gov, etc.). Since our product is unique to displaying rainfall and snow accumulation data, it is unlikely that one of the other companies would implement something similar, or that our app would be copying other works.

Functional Requirements:

- Web Browser (Firefox, Chrome, Safari, etc.)
    - The Precipi-tracker site should have little to no compatibility issues with major web browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge, Opera, and Apple's Safari.
- Accessibility
    - The Website should be easily accessible to those with handicaps, such as the blind, deaf, hard of hearing, or those who have dexterity or hand-eye coordination issues. Such accessibility features may include color choice, layout, and ease of use.

Nonfunctional Requirements:

- Operating System (Windows, Mac, Linux)
    - The Precipi-tracker website and webserver should be able to run on any platform while the database will be run on Linux through Lemuria or another similar server environment.
- Process Architecture (x86/64, ARM)
    - Precipi-tracker will be able to run on multiple architectures that support the implementation of a web server that supports a database i.e. Apache/MySQL. This applies to most Linux distros, as well as Apple MacOS and Microsoft Windows.

- Performance
    - It is important to have a high degree of performance, Precipi-Tracker needs to be able to handle situations where high latencies might occur - either by an ISP or slow website hosting precipitation data.
- Reliability
    - Like security, it is important to make sure that the users are receiving accurate information. The Precipi-Tracker will be as reliable as large-scale websites to ensure users will see accurate rain/snow data.

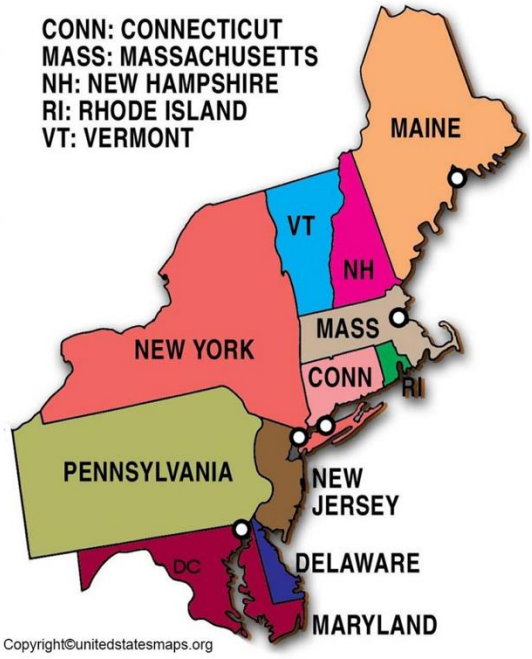
- Security
    - Precipi-Tracker will be able to resist any form of attack that disrupts the use of the website, web server, or database. The security will fall in line with many other professionally made websites.
    - The risk of data loss is low, as the type of data being used is only weather-related.
- Users
    - Intended for individuals who wish to get an understanding of the places with the highest chance of precipitation. The product is not exclusively for those intended individuals.
- Scale
    - The Precipi-tracker should be able to handle thousands of users and their respective interactions within the website which will gather and display data. This is implemented to handle a small amount of the large population browsing the internet. It is **not** set up for large scale traffic from the internet.
- Data usage
    - Precipi-Tracker will use datasets in a precipitation database from CoCoRaHS Data Explorer. The dataset will fluctuate based on the dynamic selection of the user such as selected date ranges and geographical areas.
- Post-launch support (Layers of Water data/Additional Features)
    - After the product's initial launch, there will be multiple updates including new features. Features that will be implemented after launch include water monitoring systems such as snowfall and humidity and adding a heat map to better relay which areas have a higher chance of precipitation.
- Release Date
    - This document’s creation marks the start of the product. It is ideal to release the product once the core functionality and features are working as intended. Our planned release date is May 2025.
- Environmental Use-case
    - The website should be accessible anywhere with cell service or internet access. This only applies to the Precipi-tracker website.
- Database/Webserver (Ubuntu)
    - The Database and the Web Server will be managed by the Precipi-tracker team, but only the software; The website will be hosted on a webserver and pull data from the Database, but we will not be managing the hardware for either.

Process Model:

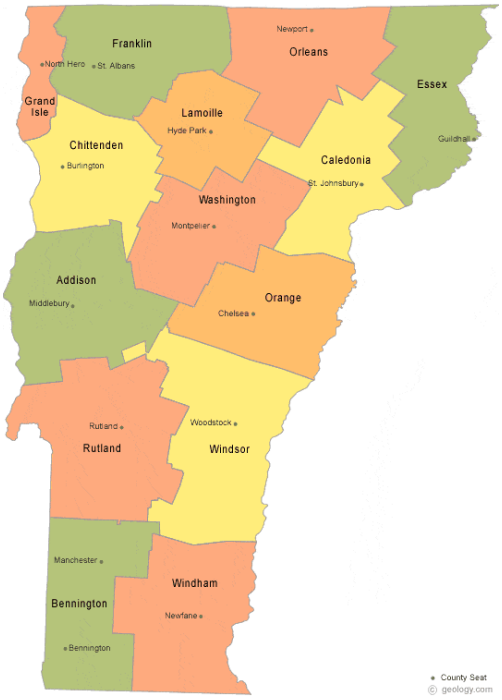
Region-View:

https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf

State-View:



County-View:



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