

CovidDB Technical Report

Motivation

It's no secret that we're still embroiled in the global COVID-19 pandemic. It is also no secret that every corner of the world is trying to gather and study data about infections both domestically and abroad. However, due to the large scale of both the crisis itself and the resulting influx of data, it can be hard to sort through what's been happening for the last year and a half. Thus, our website will aggregate covid information by **country** and **city** to make it clear which areas have been hit the hardest at which times throughout the pandemic.

User Stories

From our Customers:

- Phase 1
 - Hey Development team, I am a middle school student who is responsible for delivering morning announcements over the intercom. The start of my announcement involves reading daily statistics for cases in our area. It would be awesome if the data could be updated at minimum, everyday. This way I can provide the most recent, accurate information to my classmates.
 - Our Response: "Hello. Though we will be dynamically filling our statistics each day in a future phase of our project, it is unfortunate that we will not be able to implement your dynamic request in this phase." There was not much we could do for this story in this first phase due to requiring a dynamic addition of data to our database, so we could not complete it.
 - Their Response: As an assessment of user story 1 from phase 1, I agree with your team's decision that this user story is a solution you will come to a solution with in a later phase. As for time estimates, I believe that this solution will take about 1 hour to complete when ready to implement. I believe this to now be a phase 4 goal, and we can approach readjusting this milestone as your team continues to develop.
 - Most recent response: To provide an update to this request, this is something we're looking into. Our current implementation has our API read from our database which is statically populated. Implementing your request would require updating our database with new data daily, which of course is not impossible, but is not trivial either. We'll try to implement your request by phase 4.

- Hey Development team, I am a mother of three so I am usually pretty busy throughout the day. I try my hardest to keep up with recent news and updates on COVID in order to keep my family as safe as possible. Sometimes, however, it's hard to keep up with so much; so, I was wondering if this website could contain a feature that displays major news regarding covid for example, new outbreaks in the area, government announcements, etc. This would be awesome because it would be a centralized location that can keep me informed and my family safe.
 - Our Response: "Hello. We will retain this feature as an idea to implement in the next phases of our project. But for now, we just have information about key locations and their Covid statistics." This once again would require looking at data dynamically, which is not a part of this phase.
 - Their Response: As an assessment of user story 2 from phase 1, I agree with your team's decision that this user story is a solution you will come to a solution with in a later phase. As for time estimates, I believe that this solution will take about 2 hours to complete when ready to implement. I believe this to now be a phase 4 goal, and we can approach readjusting this milestone as your team continues to develop.
 - Final response: Fortunately, this is something we were able to implement in phase 2! By visiting our home page, you can see local COVID updates in your area or see local updates for whatever city or state you're viewing on our website!
- Hey Development team, I am a pediatric doctor who hears from a lot of patients that they have trouble finding testing locations. As a result, I would think it would be amazing if there was a feature that showed nearby testing locations for users based on the address they search. Available and reachable testing is very important in beating this virus because we can take proper precautions for infected individuals.
 - Our Response: "Hello. In the near future, we will be implementing searching to our databases, but for now we are trying to maintain only small amounts of information on our website. Please look forward to the convenience that will come when searching is implemented." This would require a search, which is a dynamic procedure that we do not have right now. On top of that, we only have six total locations
 - Their Response: As an assessment of user story 3 from phase 1, I agree with your team's decision that this user story is a solution you will come to a solution with in a later phase. As for time estimates, I

believe that this solution will take about 3 hours to complete when ready to implement. I believe this to now be a phase 4 goal, and we can approach readjusting this milestone as your team continues to develop.

- Final response: Fortunately, this was another request that we were able to implement in this phase! Our home page automatically contains information about finding COVID tests in your local area!
- Hey Development team, I am a math teacher at my local high school. After seeing numbers all day, I think my students and I can both agree we don't enjoy seeing a list of statistics. I request a feature that visualizes the data, and can provide a better visualization of the severity of these stats. Whether this be through charts, graphs, etc, I think this feature would better deliver the goal of this website in informing the population about COVID data.
 - Our Response: "Hello. I am afraid that all we can do right now is show the statistics directly in the form of numbers. However, in the future, we will be making our information more friendly to the eyes with things like charts and graphs." We thought that it would be better to wait until the next phase for this so that we could turn our data into graphics with code.
 - Their Response: As an assessment of user story 4 from phase 1, I agree with your team's decision that this user story is a solution you will come to a solution with in a later phase. As for time estimates, I believe that this solution will take about 2 hours to complete when ready to implement. I believe this to now be a phase 3 goal, and we can approach readjusting this milestone as your team continues to develop.
 - Final response: We implemented a graph in the covid timelines page of each country's trends. It definitely made sense to add such a feature, thank you for bringing it up.
- Hey Development team, I am an elderly man who is a high risk individual. I think this website will be great for me to identify the general threat of my surrounding neighborhood. But, because I am older I have trouble navigating complicated websites. I would love it if there was a feature that could make it easy to generate a search for my address. This would help because it would be friendly for me to take advantage of the data you provide and stay safe.
 - Our Response: "Hello. This is a feature we will keep in mind when making the search features of the website. For now, we are not in a phase to implement this feature." This request was another request

that we could not do in the first phase because it seemingly requires that we use their location.

- Their Response: As an assessment of user story 5 from phase 1, I agree with your team's decision that this user story is a solution you will come to a solution with in a later phase. As for time estimates, I believe that this solution will take about 1 hour to complete when ready to implement. I believe this to now be a phase 4 goal, and we can approach readjusting this milestone as your team continues to develop.
- Final response: This is also a request that we were able to implement in this phase! The requestor states that they have difficulty using technology and would like to search their address to find COVID data in their area, however, we took it one step further and on our home page automatically display COVID data in the user's area!

- Phase 2

- I am an elderly person trying to use your website. I have terrible eyesight as it is, and the blurriness of your pictures bothers my headaches even more. If you could find clear pictures to place in your cards by the end of phase 2, that would be awesome.
 - Our Response: I am very sorry to hear about your poor eyesight and constant headaches. We have taken action to alleviate your terrible terrible pain and replaced our images with ones that are of higher resolution. Hopefully, they meet your expectations.
- I am an elderly person trying to gain information from your website. My brain has admittedly slowed down over the years. It is hard to read the large numbers on the covid page for the number of cases and the number of deaths. If you could add commas so it's easier to read, that would be appreciated.
 - Our Response: Hey there! I think that most people (including myself) would appreciate this feature so I went ahead and changed our website so that all large numbers are comma-separated.
Thanks for bringing this up!
- I am a middle aged man using the website. I like the convenience it provides, but I do have a request that may improve convenience. Currently, I have to click on the date to see the data visualization for a covid entry. Because I like to check everyday, it would be nice if the most recent entry's data was on the entry page before having to click on the date. For the rest of the dates, clicking will suffice I am just concerned with the most recent entry.

- Our Response: We have changed the approach to how we display our data. We have separated the entries by countries so you will no longer have to click on the specific date to see the data you are after. The covid totals such as "cases", "Deaths", and "recoveries" will be listed along with the country. Selecting your country will take you to a timeline of daily information instead of totals from most recent to oldest dates. I think you will find this new design more convenient and thank you for bringing it up.
- I am a elderly woman who is very concerned about covid. As a result, I am always tracking where covid is growing and prevalent. It would be appreciated if you could add a message on the home page with the most impacted country and city from the most recent covid entry.
 - Our Response: Thank you for your suggestion! Unfortunately, we are unable to fulfill your request for phase II, but we will see what we can do to implement this suggestion during the next phase!
- Hi Development team, I am a geography teacher at a high school. I want my student's to learn about locations covid is impacting, and have recommended your website as a source. An addition to your Country page that I believe would be helpful to conceptualizing covid's impact is to have the total number of cases for each country added to the table on the country page.
 - Our Response: That's a great suggestion but we believe it would be best to keep general information and covid information separate. Do not worry though, we have added a very noticeable button that links you straight to that specific country's covid information for easy access when you want to know how that country is doing.

To our Developers:

- Phase 1:
 - Hello. I am the mother of 4 children, and I want to plan a trip to reward them for doing well so far in class. On this trip, I want to treat them to the cuisine of the world. If I could easily see the different foods around the world, that would be nice.
 - Their Response: We place a picture of the main dish or dishes of each country on the food and tourism page for that country and we hope that should help in this scenario! We will look into maybe adding pictures of more dishes for each country in Phase 2.
 - Our Response (assessment): Thank you! All these new foods look divine! I hope that I will be able to see more of them when you all get more information about more locations and more foods by the end of **this phase**. I think that this will take a while, maybe 3 hours?

- Hello. I am a Journalist, and I am writing a piece about countries with the best views. My company is giving me an amount of money to visit these places to report about them first hand. I would like to be able to see the locations where they have places that I can sightsee, such as parks and famous spots in the area.
 - Their Response: We have attached a tourism video for each country on the food and tourism page, and we have also listed some of the more popular tourist attractions for that country. We would look into trying to provide the location of the tourist attraction in phase 3!
 - Our Response (assessment): Thank you for getting to most of the issues that I listed. There is a lot that needs to be done in this phase, so I am grateful for what I can see on your website. Hopefully by **Phase 3** I will be able to see locations on your website. This should not take more than an hour I would hope.
- Hello. A friend and I wanted to go to a particular country to see if we could better learn the people there. We want to learn the language, learn about the people, and know about the locations where a guide could take us around the area. Being able to see these things together would be nice!
 - Their Response: We have listed basic facts about the country on the demographics page for that country, including the main languages spoken there. Furthermore, we have some popular tourist locations listed on the food and tourism page, which we hope should help with this!
 - Our Response (assessment): Thank you for implementing this for me. I should have seen that this would have been impossible to implement in **Phase 1** since you were all trying to learn the ropes for programming a webpage and did not have much of an information base yet.
- Hello. I am looking to work in a foreign country as a writer. I want to work somewhere where the government is not oppressive, since I want to express myself freely, but I also like to use the ocean as an inspiration. Being able to see if a country is an island nation would be nice to fit my needs.
 - Their Response: We have some information regarding the water area of the country on the geography page for that country. However, we will look into trying to specifically categorize a country as an island nation in Phase 3! Unfortunately, we don't have information on the type of government, but we will try finding it!

- Our Response (assessment): I see that trying to ensure that no other options show up when I am trying to find my new home would be out of the scope of what you all are currently trying to accomplish. I hope I am able to see this implemented by **Phase 3** of your project! I think it would take two hours to implement.
- Hello. I am a rich oil baron billionaire hoping to start a tourism business in a wealthy country. I need some way to launder this money. Anyways, I would like to be able to sort the various locations by their GDP so that I may be capable of milking the most amount of money out of the people. On top of this, I will also be purchasing and constructing local restaurants in the area, so weeding out the areas devoid of restaurants or people would be nice.
 - Their Response: We will enable sorting countries by their GDP within the table on the demographics page during Phase 3. Additionally, we will be enabling sorting by population, so you can find areas devoid of people.
 - Our Response (assessment): I agree that my need is a problem for another time. Hopefully, by the end of the **3rd phase** of the project, I will be capable of finding my new prospects. I think that sorting items will take an hour to have placed into your website.
- Phase 2:
 - As an avid tourist, I am always interested in learning about a country's culture. Can your website provide information about a country's culture or local traditions/customs? If possible, it'd be nice if your sources come from within the country so they're likely to be more accurate.
 - Their Response: On our Food and Tourism pages, we have included some of the traditional food items and dishes of each country, and each of their pictures. We also have a video explaining the culture and tourism of the country, which we hope will give an insight into the local traditions and customs in most cases!
 - Whenever I go on a vacation with my family, I am constantly worried about some no-good criminal robbing us and spoiling the vacationing mood. Is it possible for your website to provide any information regarding the crime rate of a country? I think this could help users make sure they pick a safe country to visit.
 - Their Response: We looked into displaying crime rates but this is a little tough to implement, given the variation of safety across a country. However, we will look into finding more data or some sort of safety index to display in Phase 3!

- My asthma can get pretty bad when I am exposed to heavily polluted air. Is it possible for your website to provide information about the air quality of a country? It would be a lot more convenient for me if your website could provide this kind of information all in one spot.
 - Their Response: We will be sure to include some information on air quality for a country in the Food and Tourism instance pages for the safety of those wanting to visit a country, most likely by the end of the next phase!
- I'm heading over to Japan in a couple of months, but I'm not sure how much money I have in Japanese Yen. Can your website provide information about the currency exchange rate between US dollars and the currency of the country in question? Maybe also some information about how to exchange currency?
 - Their Response: While we don't have information on exchange rates just yet, we will look into this right now and have some information on it in the Food and Tourism instance pages by the end of Phase 3!
- My worst fear is to visit a country and end up swimming in rain throughout my vacation. Is it possible for your website to provide information about the country's weeklong weather forecast? It may be particularly helpful to have weather information for popular airports.
 - Their Response: We have included data about average temperatures for the coldest and warmest months for that country, and we hope that will give you a decent idea as to what type of weather to expect!

RESTful API

We designed our RESTful API using Postman:

<https://documenter.getpostman.com/view/17756516/UUy4cRD>

Endpoints:

Country:

-All:

<https://crown19db.me/api/v1/models/country/all>

Fetch data about all the countries in the database

-All Reduced:

<https://api.crown19db.me/v1/models/country/all/reduced>

Fetch data about all the countries in the database with fewer attributes

-By Name:

<https://api.crown19db.me/v1/models/country/name=<countryname>>

Fetch data about one particular country by Name

-By ID:

<https://crown19db.me/api/v1/models/country/id=<countryId>>

Fetch data about one particular country by ID

City:

-All:

<https://crown19db.me/api/v1/models/city/all>

Fetch data about all the cities in the database

-By Name:

<https://api.crown19db.me/v1/models/city/name=<cityname>>

Fetch data about one particular city by Name

-By ID:

<https://crown19db.me/api/v1/models/city/id=<cityId>>

Fetch data about one particular city by ID

Covid:

-All: <https://crown19db.me/api/v1/models/covid/all>

Fetch data about every Country's Covid data

-by Country ID:

https://api.crown19db.me/v1/models/covid/country_id=<countryId>

Fetch data about one Country's Covid data by Country ID

-CovidInstance by Country ID:

https://api.crown19db.me/v1/models/covidInstance/country_id=<countryId>

Fetch data for timeline of a Country's Covid Data by Country ID

-By ID:

<https://crown19db.me/api/v1/models/covid/id=<countryId>>

Fetch data about one Country's Covid data by ID

Misc:

-Documentation:

<https://api.crown19db.me/>

Links to Postman Documentation

Models

- Countries
 - Gdp

- Population
- Population density
- Flag
- Land area
- Map
- Capital
- Covid info
- Cities (counties or states)
 - Name
 - Latitude
 - Longitude
 - Population
 - Map
 - Time zone
 - Country
 - Country covid info
- Country Covid cases timeline
 - Country instances
 - Name
 - Capital city
 - Total cases
 - Total deaths
 - Total recovered
 - Timeline of the country stats per day
 - New cases that day
 - Deaths that day
 - Cases daily
 - Deaths daily
 - Recovered that day

Tools

- Tools
 - HTML for frontend work
 - A mark-up language that tells your browser how to display our website.
 - React for frontend work
 - Used to create the frontend in a component-based way with convenient packages to easily implement things like page routing. Mainly serves as an easier way to write HTML and interweave it with TypeScript.

- Typescript for frontend work
 - Used to implement any dynamic part of the website (such as dynamic git statistics). Used as an alternative to JavaScript so type mismatching can be caught at compile time rather than runtime.
- Postman for API design and testing the API
 - A tool to conveniently and concisely document the API for our website.
- Discord for team communication
- React Bootstrap for CSS
 - A framework for CSS that makes it easier to write CSS for our website so our website is appealing to the human eye.
- Amazon Web Services for hosting our website
 - A cloud-based platform that is used to host our website.
- Git and Gitlab for collaboration, version control, continuous integration, issue tracking, and many other tools
 - Git - Used for version control of source code; helps developers work on the same codebase while working on their own systems by automatically merging their work into a single codebase.
 - GitLab - A remote repository that serves as a third party hosting our codebase in a centralized spot.
- Python's unittest library for testing
 - Python's built in unit testing framework helped us test the backend functions for our website.
 - <https://docs.python.org/3/library/unittest.html>
- Jest for Frontend testing
 - Jest is a unit testing framework for Javascript. The main feature used from the framework was the snapshot testing tools for our objects.
 - <https://jestjs.io/>
- Selenium for testing
 - Selenium is an open-source automated testing framework used to validate web applications across different browsers and platforms. It was used to test our website's GUI.
 - <https://www.selenium.dev/>
- COVID-19 Dashboard (<https://trekhleb.dev/covid-19/>)
 - Interactive graph embedded in our covid timeline instances. The graph displays the specific countries trends in "confirmed", "deaths", and "recovered".
- Data Sources
 - For the Covid-19 Cases Data, we used this site as a source.
<https://data.humdata.org/dataset/novel-coronavirus-2019-ncov-cases>

- For the general data of a city, we used this site as a source.
<https://simplemaps.com/data/world-cities>
- APIs
 - For the general data of a country, we used this API as a source.
<https://restcountries.com/v3.1/all>

Hosting

After some initial troubles securing a domain name because of restriction of the phrase “covid”, we registered our domain “crown19db.me” through NameCheap and hooked it up to our React App using AWS Amplify. Once NameCheap and AWS were communicating we enabled SSL and now our app is just waiting for a back end and more data.

Phase 2 Features

- Database:
 - Our database was constructed using AWS’s RDS tool to create a database instance using PostgreSQL. Then, by using PGAdmin4 and our own backend code, we populated our database. In making this database, the tutorial from Caitlin was followed.
- Pagination:
 - Our models utilize the react-paginate module to implement pagination in our three models. Each of our models has a certain amount of instances on each page based on the type of model. For the countries model page, we have the number of total countries divided by twelve. The cities model page has the number of total cities divided by ten. Lastly, the covid country data model page uses the same semantic as the cities model.
- Additional Features implemented during this Phase:
 - We implemented something that one of our customers asked for which was a search feature for covid cases and testing in their area. We embedded Bing into the Splash page for that feature.
 - Our third model was refactored in this phase to more easily be able to get data and connect the different models. A piece of media that we employed for this model was a graph, which was implemented in this phase.