

Final Project: Database Backend for a WebGIS Application



ROOF OF THE WORLD FESTIVAL

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Introduction:

The Roof of the World Festival is an annual event that takes place in Khorog, Tajikistan. The festival is a celebration of the culture and traditions of the Pamir region, also known as the "Roof of the World", which is located in the eastern part of Tajikistan.

The festival brings together artists and performers from various parts of the Pamir region, as well as from other parts of Tajikistan and neighboring countries. The performances showcase traditional music, dance, and other art forms that are unique to the region. Within the Festival, professional artists will provide a series of masterclasses for interested students, musicians, art critics, and local and international music admirers.

In addition to the cultural performances, the festival also features exhibitions, workshops, and other events that highlight the history and traditions of the Pamir region. The festival aims to promote cultural exchange and understanding, as well as to preserve and promote the rich cultural heritage of the Pamir people.

The festival aims to reflect the beauty of cultural diversity (of Central Asia and the world generally) and enhance mutual understanding through the expression of various art forms and different cultural backgrounds. It also promotes universal human values and peaceful coexistence in the region.

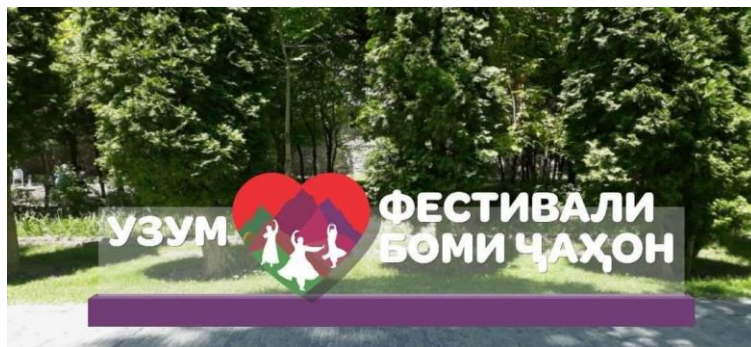


Photo Courtesy: AsiaPlusTJ

The festival is supported by the local government of the GBAO, the U.S. Embassy in Dushanbe, the Aga Khan Foundation, the Aga Khan Music Programme, and the French Embassy and “Bactria” Cultural Center.

Behind the entire organization of the festival is a team of dedicated specialists, and local volunteers, who have inexhaustible enthusiasm to celebrate and show annually on the Roof of the World the cultural identity and diversity of the traditions of the Central Asian peoples as well as other peoples of the world.

Read more: <https://asiaplustj.info/en/news/tajikistan/society/20220819/the-15th-roof-of-the-world-festival-returns-to-khorog>

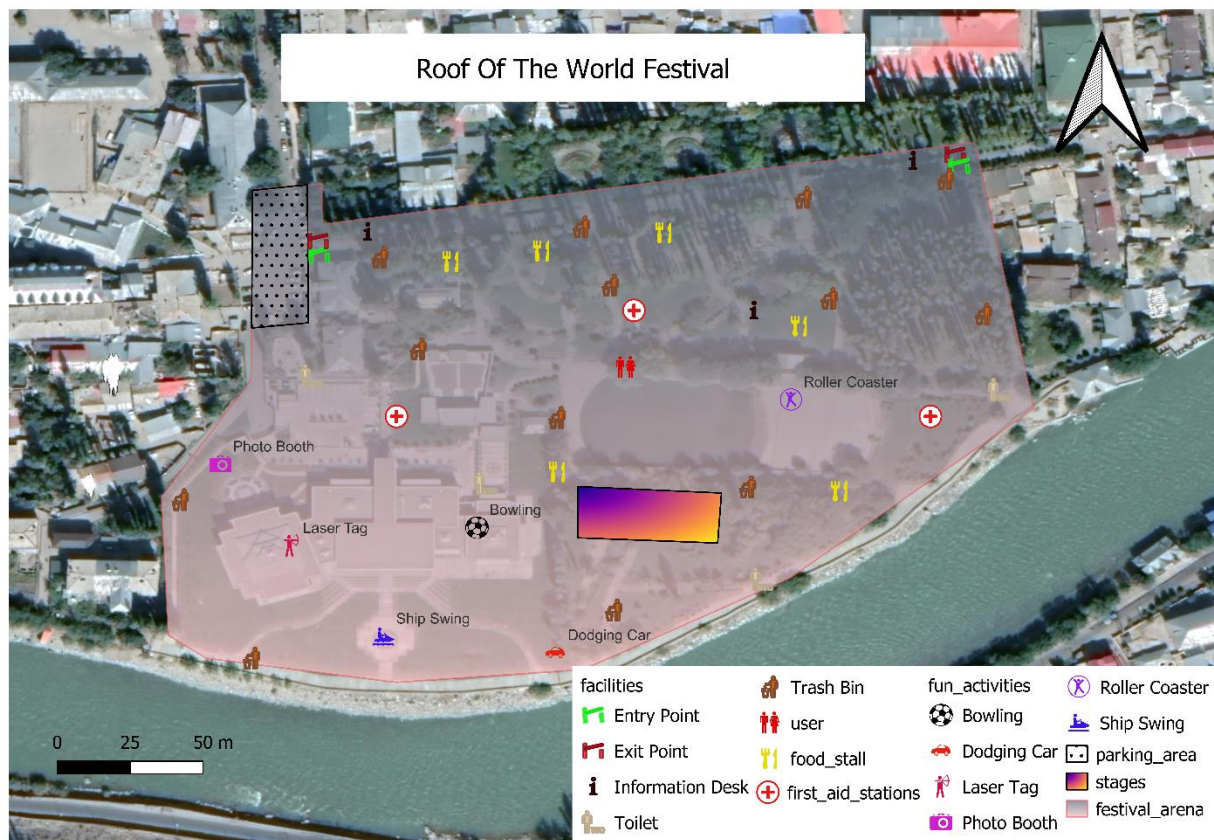


Figure 1. Map of the festival

Description of the Database:

This festival is really important for the people of the Pamir region. This cultural exhibition brings together so many different cultures and promotes diversity. Every year they try to improve the festival and they want the visitors to have a pleasant experience. This year the event company “Vudstork Entertainment Ltd” signed the agreement to design the backend database for the “Roof of the World” festival application. As the database specialist, the company chose me for this job and set the following requirements for the database as coordinated by the organizers:

- The database should serve as database backend to organize all the facilities, activities, opening times as well as other facilities, garbage bins, toilets and more.
- It should return user-specific, dynamic queries that return which events take place or facilities that are close to the current visitor’s position (hard coded values in this example).
- User-specific and dynamic queries about the festival (digital maps, lists of events and more).

This database has been designed to facilitate the festival application. All the data in this example is hypothetical but the name of the event and its location is real and original. PgAdmin and QGIS were the two primary tools that helped design this database. Creation of the tables and making all the entries were completed with the support PgAdmin, while the geometry (where necessary) was added to the entries with support of the postgis extension in the QGIS.

Universe of Discourse

The universe of discourse for this database includes the festival itself, including all the elements that make up the database of the event and the elements that are the most essential part of the whole database as listed below:

Festival Arena: The location of the festival is significant as it helps identify suitable locations to set up stalls, booths and other activities.

Events: The different events that are part of the festival, such as concerts, cultural performances, and exhibitions.

Stages: This element includes the information about the only stage available at the festival. The stage would be associated with the events and performances that will take place on it.

Performers: This table includes information about the different performers who participate in the festival, such as their names, genres, and other important information. Each performer would be associated with the events and stages they are scheduled to perform on.

Performances: This table include information about the different performances that take place at the festival, such as their names and schedules. Each performance would be associated with the stage and performer that are involved.

Food stalls: This table includes information about all the food stalls that offer food and drinks at the festival, including their locations, price range, and food type.

Food vendors: This table includes the information about the food vendors. It is essential for the entity = ‘food stalls’ but in general it is not the most relevant entity in the scope of this database.

Facilities: This element includes all the facilities available at the festival, such as restrooms, first aid stations, information desks, garbage bins, and parking lots. This entity encapsulates all the stations and facilities under the column = ‘facility’

Fun activities: This element provides the details on different fun activities that are part of the festival, such as games, rides, and other interactive experiences.

Spatial component: A unique spatial/geometry component is included in almost all the entities of the database. This adds the spatial feature while making a query.

The universe of discourse for this database would provide a complete view of the festival's performances, stages, and performers, allowing users to easily search and access information about the different events and schedules. This would include details such as the timing of the performances, and the order of the acts. Additionally, the database would enable users to easily browse and search for information about their favorite performers, or performances, and to quickly identify when they will be performing.

Each of these tables have their own set of fields, and they would be related to each other through common identifiers aka foreign keys. For example, each event and/or the fun activity could be associated with one or more food stalls and facilities. This would allow users of the app to easily access all the relevant information about the festival, such as the events they want to attend, the food stalls they want to try, and the facilities they need to use.

Graphical Representation:

A graphical representation has always been the key component in the design of the database model. It provides a clear overview to the specialists and the general audience about the model. For this particular exercise, the ERD tool in the PgAdmin has been utilized to construct the conceptual and the logical model for the database. It outlines all the major entities of the database along with their elements, and their respective datatypes. In the following ERD diagrams, you may notice that the user location has not been connected to any of the other entities. It serves the purpose that the entries for this element must be integrated in real time for a better experience, also, somethings must stay unresolved for the application developers to work on. In addition, the diagram also avoids the connection entanglement, hence, it only connects the 'festival arena' entity with a couple of the tables, which in fact must be associated with all the other tables.



Figure 2. An image from the festival venue. Source: AsiaPlusTJ

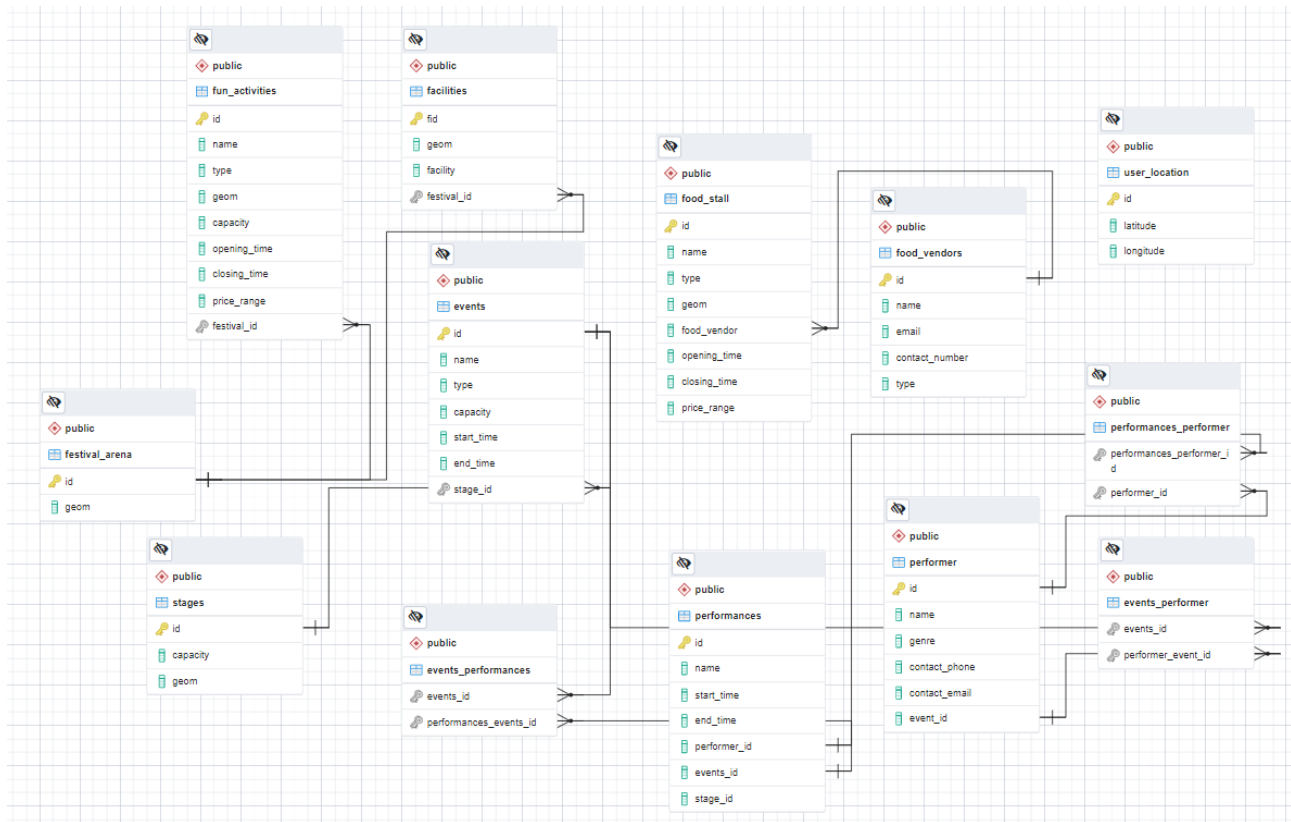


Figure 3. Conceptual Model Diagram of the database

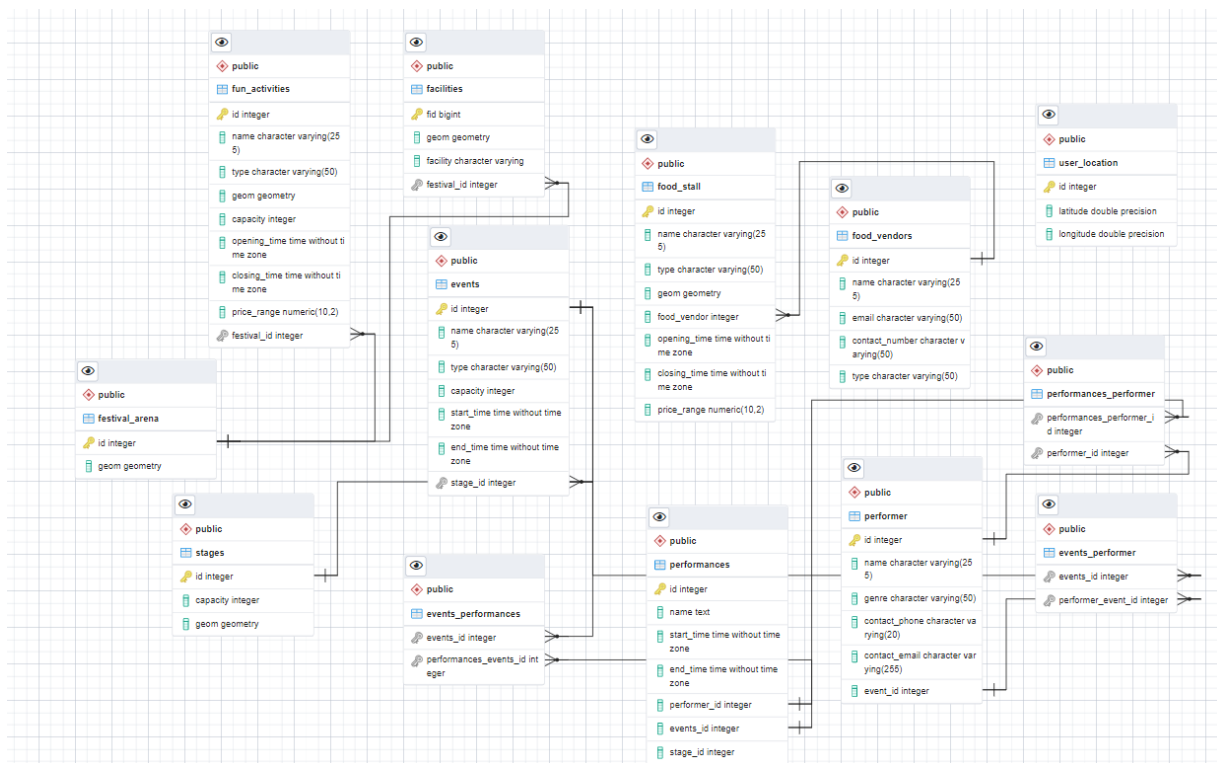


Figure 4. Logical Model Diagram of the database

User Specific Queries:

This section documents all the user specific queries the visitor aka the user makes based on their location and likings. This element of the database makes it dynamic and allows the interactivity in the application. The examples below only work with the hard coded locations for the instant; however, this could be one of the additional steps the developers might need to consider while developing the application.

```

26
27 select name,type, capacity
28 from events
29 where start_time >= '10:30:00' and end_time < '17:30:00';
30
31
32

```

	name	type	capacity
	character varying (255)	character varying (50)	integer
1	Lunch break	Break	[null]
2	Singing performance	Performance	500
3	Dance performances	Performance	500

Figure 5. User specific query to know all the events happening at the specified time

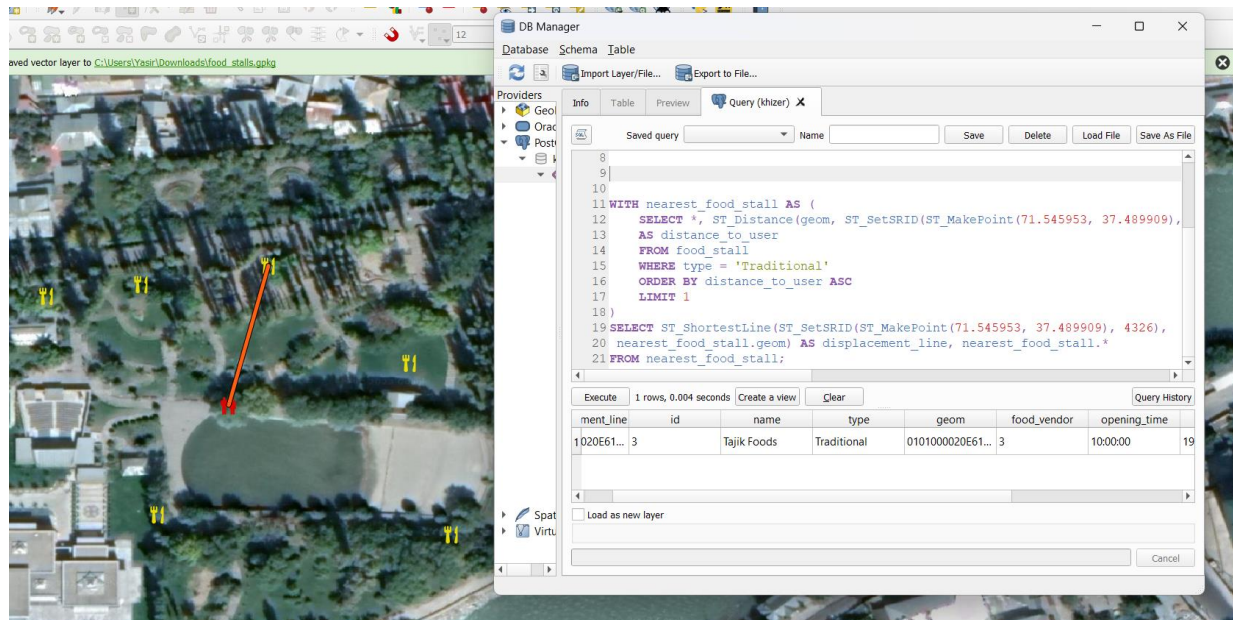


Figure 6. User specific dynamic query with hard coded points - to find the traditional food stalls

```

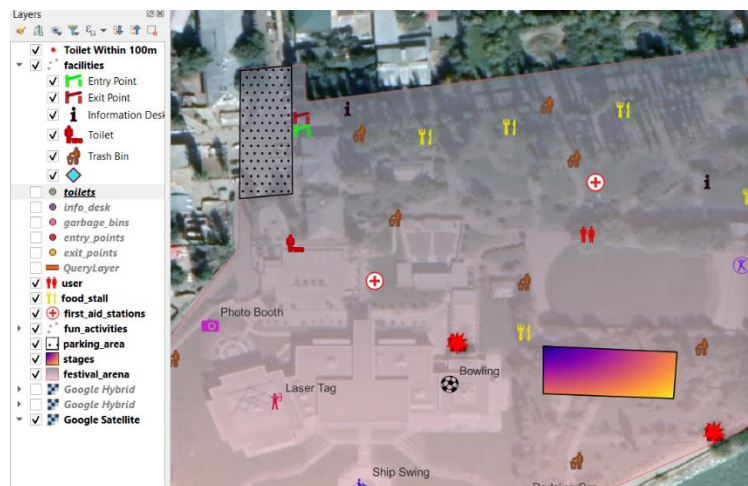
20
21 SELECT name, start_time,end_time
22 FROM performances
23 where performer_id = 5;
24

```

Data Output Explain Messages Notifications

	name text	start_time time without time zone	end_time time without time zone
1	Traditional Music	16:30:00	18:00:00

Figure 7. User-specific query to find the performance of a specific performer



QGIS Query Builder

Schema Table

Import Layer/File... Export to File...

Info Table Preview Query (khizer) X

Saved query Name Save Delete

```

1 SELECT facilities.*
2 FROM facilities, stages
3 WHERE ST_DWithin(facilities.geom, stages.geom, 100)
4 AND facilities.facility = 'Toilet';
5
6
7
8

```

Execute 2 rows, 0.005 seconds Create a view Clear

	fid	geom	facility
1	23	0101000020837...	Toilet
2	24	0101000020837...	Toilet

Figure 8. User specific query to find toilets within 100 m from the stage (Flash sign)

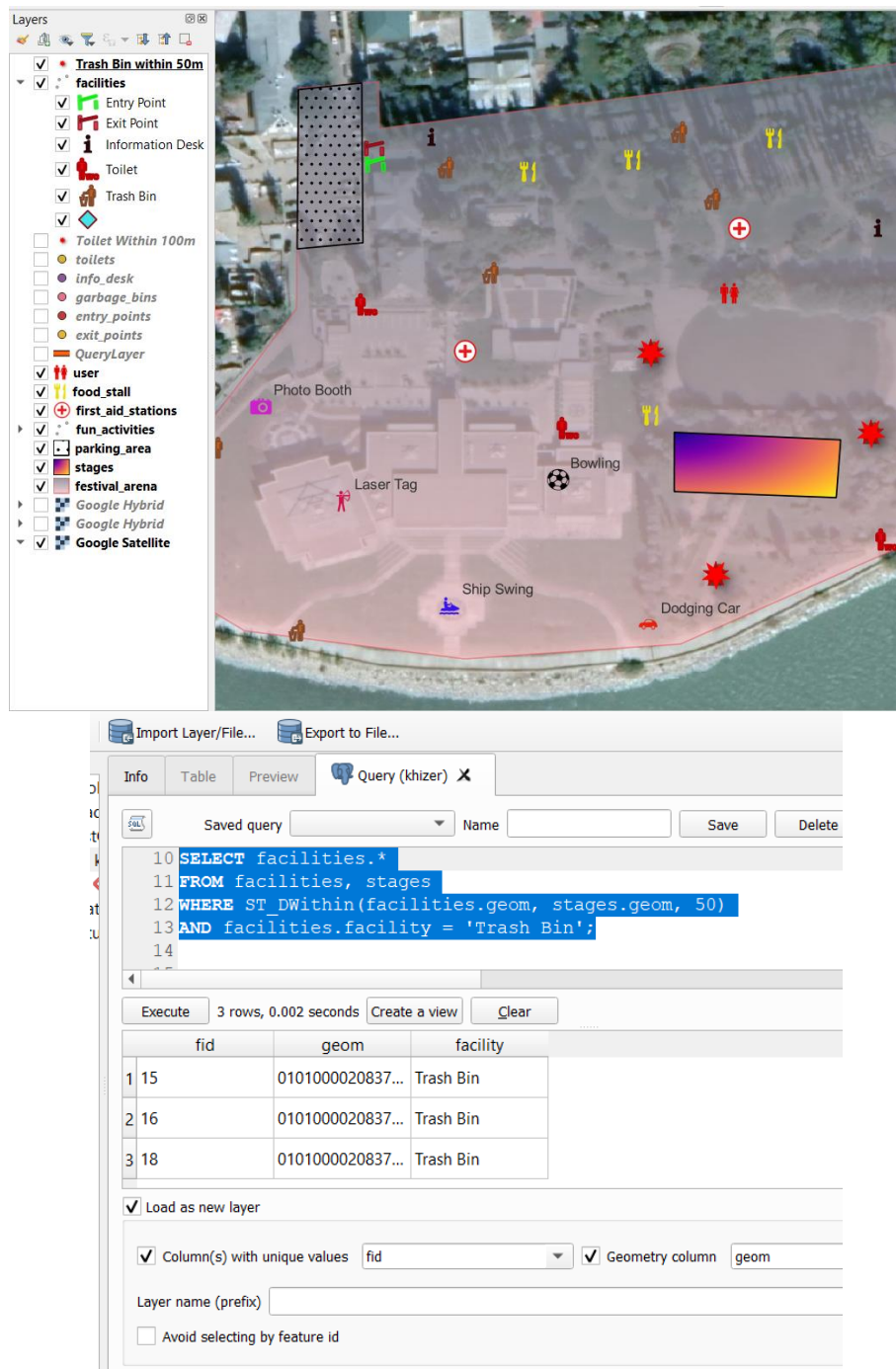


Figure 9. User specific query to find garbage bins within 50 m from the stage (Flash sign)

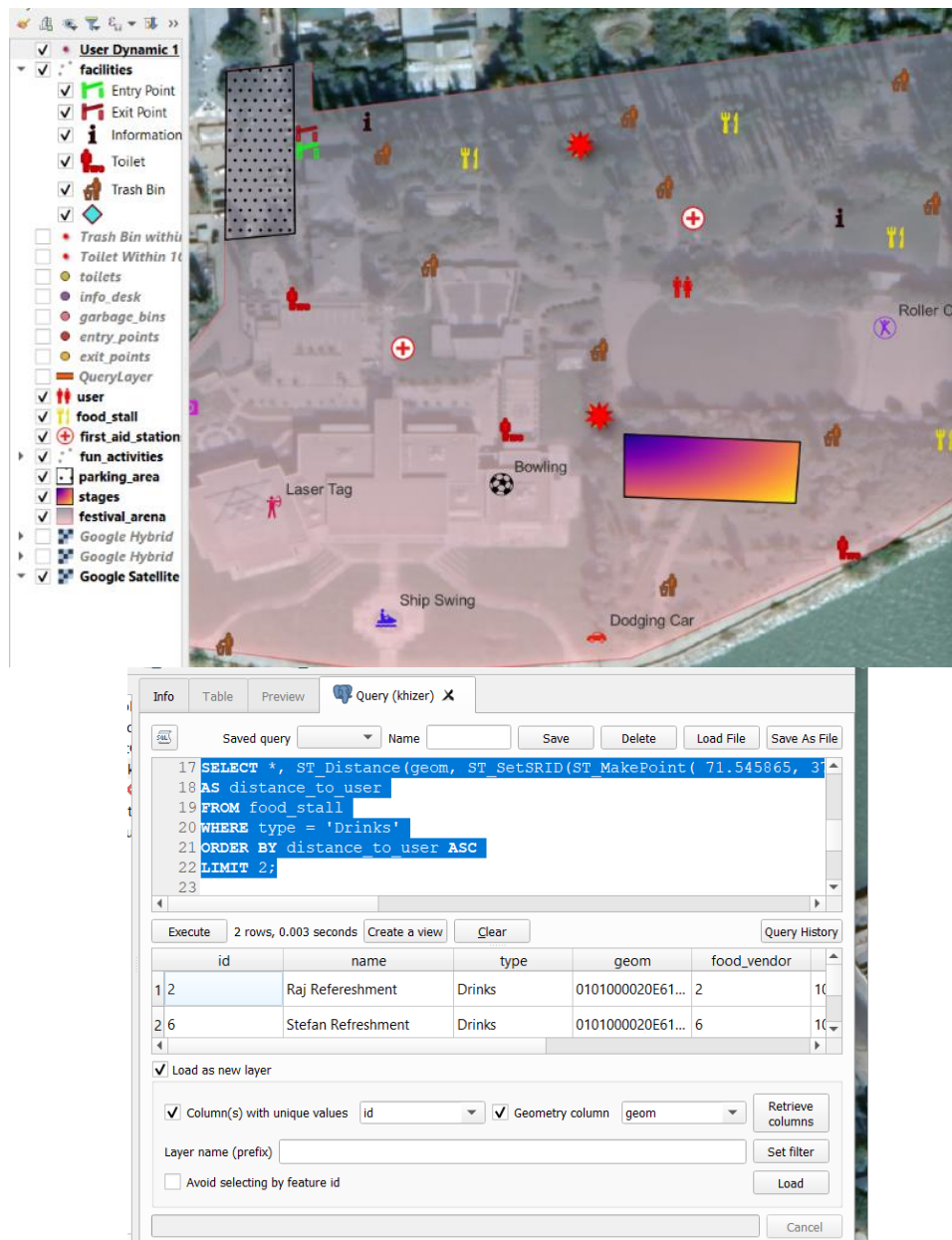


Figure 10. User specific query to find food stalls for drinks from the user's location (Flash sign)

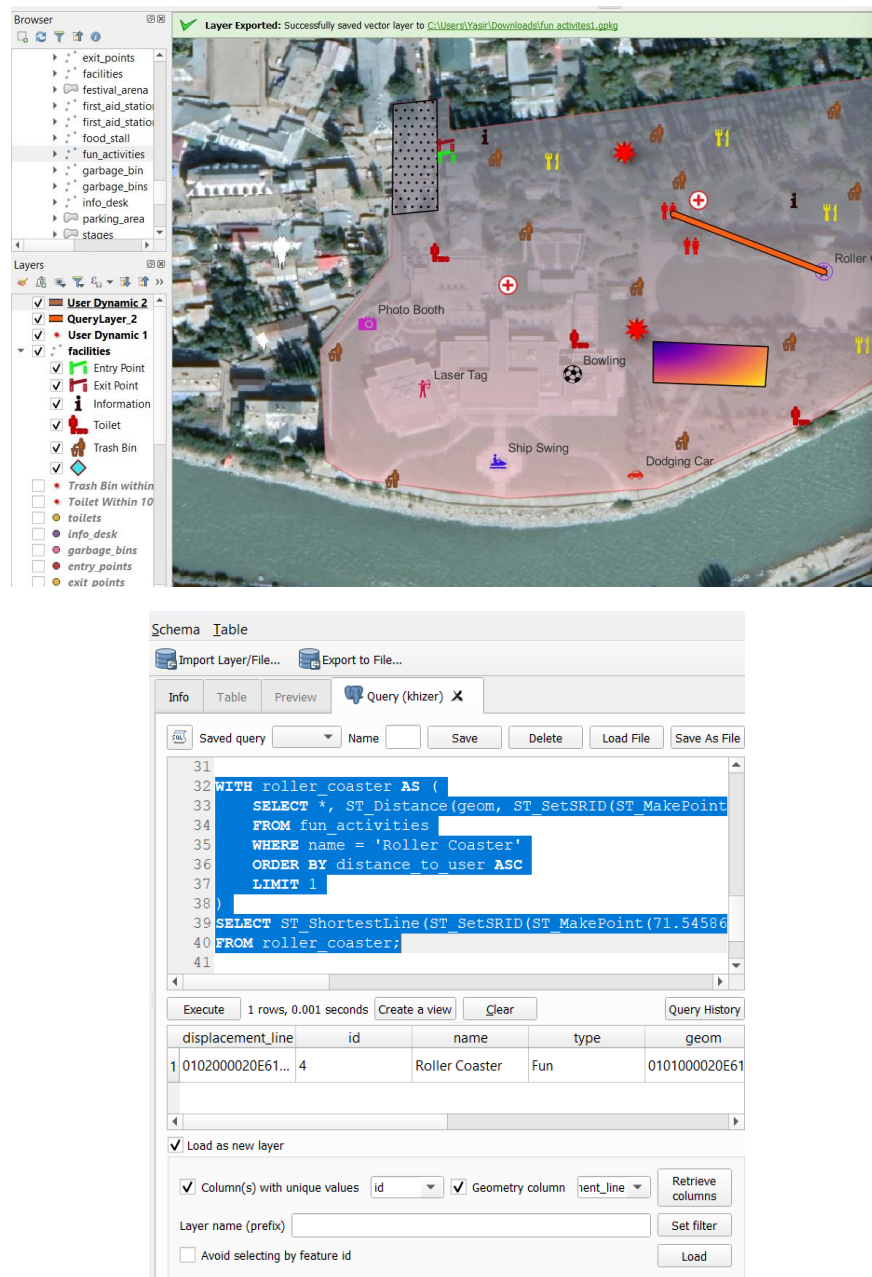


Figure 11. Dynamic query to find roller coaster from user's location (path)

Views:

This section presents some stored views in the database that can be utilized by the developers while developing the app as a shortcut to some of the dynamic queries. More views can be stored to optimize querying.

id	geom	point_id
1	0101000020837F0000D2E850B0FDBE0741A960CFC2DCB24F41	[null]
2	0101000020837F000088830DA296C10741D844EE0FF2B24F41	[null]
3	0101000020837F00007E17F8E9B6C40741D96DA465D9B24F41	[null]

Figure 12. View with specific information for first aid stations

id	name	start_time	end_time	performer_id	events_id	stage_id
1	6 Music	17:00:00	18:30:00	1	5	1
2	7 Music	19:00:00	23:00:00	2	3	1

Figure 13. View with specific information for music performances

id	name	type	geom	food_vendor	opening_time	closing_time
1	3 Tajik Foods	Traditional	0101000020E6100000B2910851F3E25140561D5256C6BE4240	3	10:00:00	19:00:00
2	4 Pakistani Food	Traditional	0101000020E610000012B40EF0FB251404F7C1081BABE4240	4	10:00:00	19:00:00

Figure 14. View with specific information for food stalls

Conclusion:

The development of the database for the “Roof of the World” festival served as the perfect opportunity to translate the skills into the practical world. Although I have visited the discussed festival, I would have never realized the organization complications. The design, the decision-making, and the implementation of the database all are equally important components.

Throughout the process, I revised many of the skills and techniques that I learned through the course; however, I developed some new essential skills to work with databases, especially while developing an application. All in all, the development of the database was interesting considering that the hypothetical data was of no influence rather the design and development of the database matter the most. There were few small challenges while making the spatial queries, while the CRS transformation stand out as a challenge when computing different measures. The CRS alters all the measurements if it is not handled effectively.



HAPPY FESTIVAL!!! PAMIR – ROOF OF THE WORLD