

Non-Relational Data Bases 2023/2024
Group 4

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COUCHBASE

HISTORY

- Emerged from the merger of NorthScale and CouchOne in February 2011
- NorthScale rebranded as Membase, Incorporated in 2010
- CouchOne Inc., previously Relaxed, focused on Apache CouchDB open-source project
- Couchbase focused on scalable, high-performance **document-oriented** database system post-merger

LICENSING

- **Community Edition** (Apache License, Version 2.0)
 - For developers and small projects
 - Free use, modification, and distribution
- **Enterprise Edition:**
 - For large use cases and enterprise environments
 - Subscription-based model with additional features and support
- **Cloud Editions:**
 - Optimized for cloud-based deployments.

PRICING

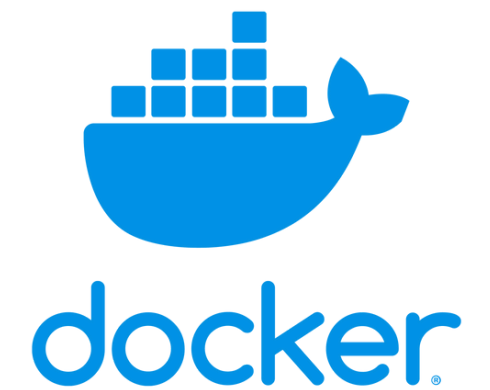
- **Capella Product:**
 - Basic capabilities starting at \$0.28 per node per hour.
 - Additional plans offer enhanced features starting at \$0.35 and \$0.56 per node.
- **Couchbase Server and Couchbase Mobile:**
 - Pricing available upon request, tailored to specific requirements

COMMUNITY & DOCUMENTATION

- Couchbase's **community**:
 - Couchbase Hub: Central hub for product updates, sharing projects, and event information
 - Let's Talk Couchbase Discord server: Real-time discussions and idea exchange
 - Couchbase forums: Technical assistance and insights from experts
- Couchbase's **documentation** covers various aspects:
 - Detailed instructions
 - Tutorials code samples
 - References to help users understand and use the database

INSTALLATION OVERVIEW

- For our project, Couchbase was deployed with Docker.
- Starting by downloading an image and then setting up the container with all the configurations needed.
- To setup the cluster, import the collections and create indexes, we used shell scripts to run the commands needed.
- The Web Console of Couchbase Server is available at **localhost:8091**.
- For the backend and frontend dependencies, running the corresponding scripts should work fine.
- Finally, for the prototype itself, the user should access **localhost:8080**.



ADMINISTRATION OVERVIEW

- An admin can interact with the Couchbase database through either accessing a CLI interface or its Web Console.
- The Web Console provides an easy-to-use interface with a multitude of Couchbase's features.
- The admin can configure various aspects such as FullText and other kinds of indexes, create buckets, documents, and scopes, etc all through the Web Console.



DATA MODEL

- **Document** data model based on JSON (attribute-value pairs)
- Allows storage of documents with **dynamic schema**
- Supports complex types like **embedded** documents and **arrays**
- **Self-contained** documents reduce need for complex queries and joins.

DATA OPERATIONS

- **Basic CRUD operations**
- **Query Service using SQL++:** query language based on SQL for extraction and manipulation of JSON data.
- **Indexing:**
 - Reduces response time for query and search operations
 - Four types: Primary, Secondary, Full-Text, and Analytics

DATA OPERATIONS

- **Searching:**

- Full-Text Search supported by appropriate indexes
- Features include Language-Aware Searching, Geospatial Queries, and Scoring Results

- **Eventing:**

- Near-real-time data mutation management technique.
- Define operations for specific data modifications (events) like inserts, updates, deletes, and expiration.
- Applications include propagating data changes, enriching documents instantly, and cascade delete prevention.



KEY FEATURES



SQL++

Access NoSQL JSON data with a full implementation of the familiar and popular SQL syntax.



Full-Text Search

Add a real-time search engine-like index to your data without copying or moving it into another tool.



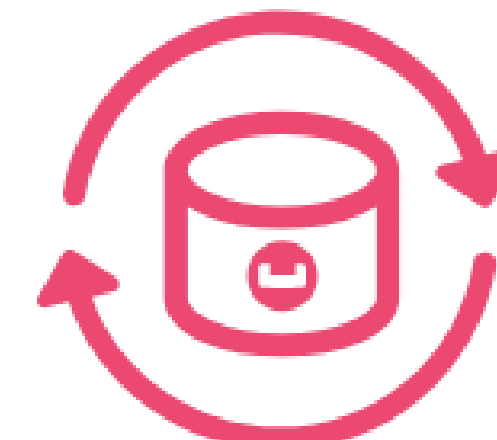
Key-Value Store

Look up data as efficiently as possible with a direct key lookup.



Analytics

Perform complex BI and analytics queries on your data without impacting performance. Includes a full SQL implementation.



Eventing

Use the Eventing service to execute custom code whenever data is modified.

<https://developer.couchbase.com/what-is-couchbase/>



KEY FEATURES - COMMUNITY EDITION



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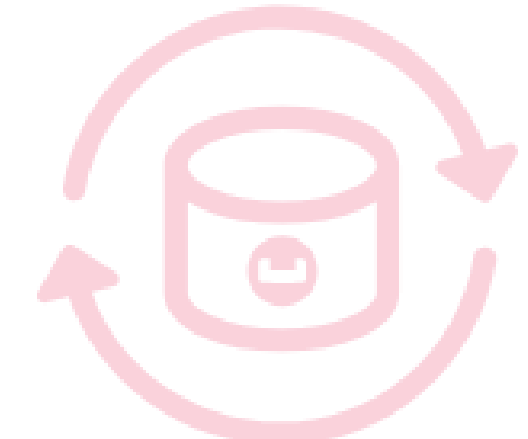
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FEATURES HIGHLIGHT

- Consistency and Replication
- Map-Reduce
- ACID transactions

CONSISTENCY AND REPLICATION

Cross Data Center Replication (XDCR) enables replication of data accross clusters located in different data-centers. Sequence-based and timestamp-based mechanism maintain data coherence during concurrent updates.

ACID TRANSACTIONS

Perform multiple operations as a single unit of work, so that either all operations commit or roll back

MAP-REDUCE

This feature, although it exists, has too many limitations nowadays, mainly because of the now unsupported Views property, which only work on the `_default` collection.



API'S AND CLIENT LIBRARIES

Server SDKs

The Couchbase SDKs allow applications to access a Couchbase cluster.

SDKs: C, Java, .NET, Node.js, Python, Go, etc...

RESTful APIs

Exposes HTTP endpoints for managing Couchbase Server resources such as buckets, documents, views, and users.

Querying APIs

N1QL, a query language, enables developers to perform SQL-like queries on JSON documents, supporting features like joins, filtering, and aggregations.

Full-Text Search API

Provides a RESTful API for performing full-text search operations on Couchbase Server, enabling developers to create and execute search queries against indexed data.

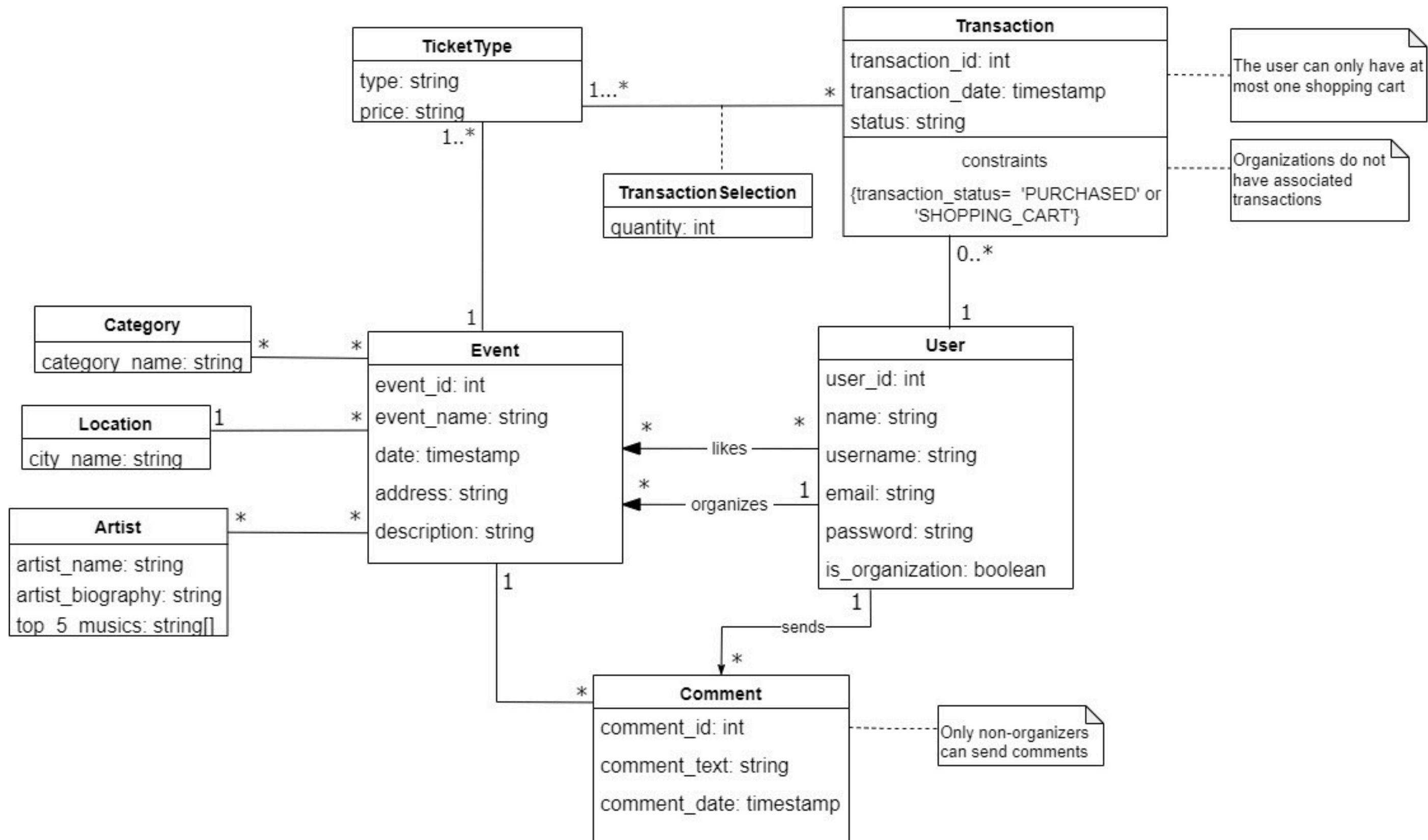


PROTOTYPE

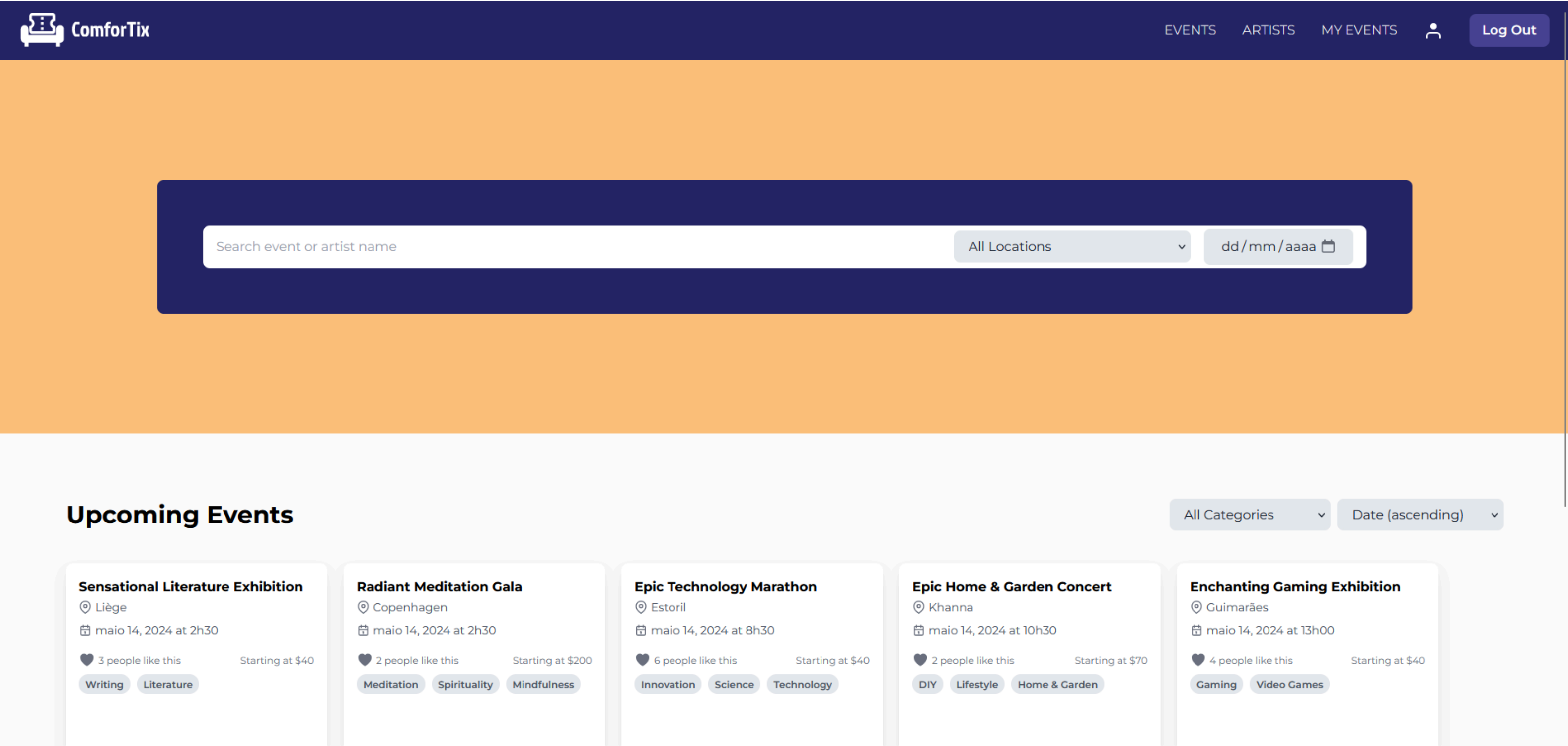
OVERVIEW OF THE PROTOTYPE

- Event ticketing system where consumers can **purchase** tickets for multiple events, from art exhibitions to music concerts
- Users can **search** for artists and events, **filter** and **sort** according to their preferences
- Organizations have access to a detailed event **analytics**:
 - Total income per ticket type
 - Total tickets sold per ticket type
 - Best selling event, total events hosted, total revenue

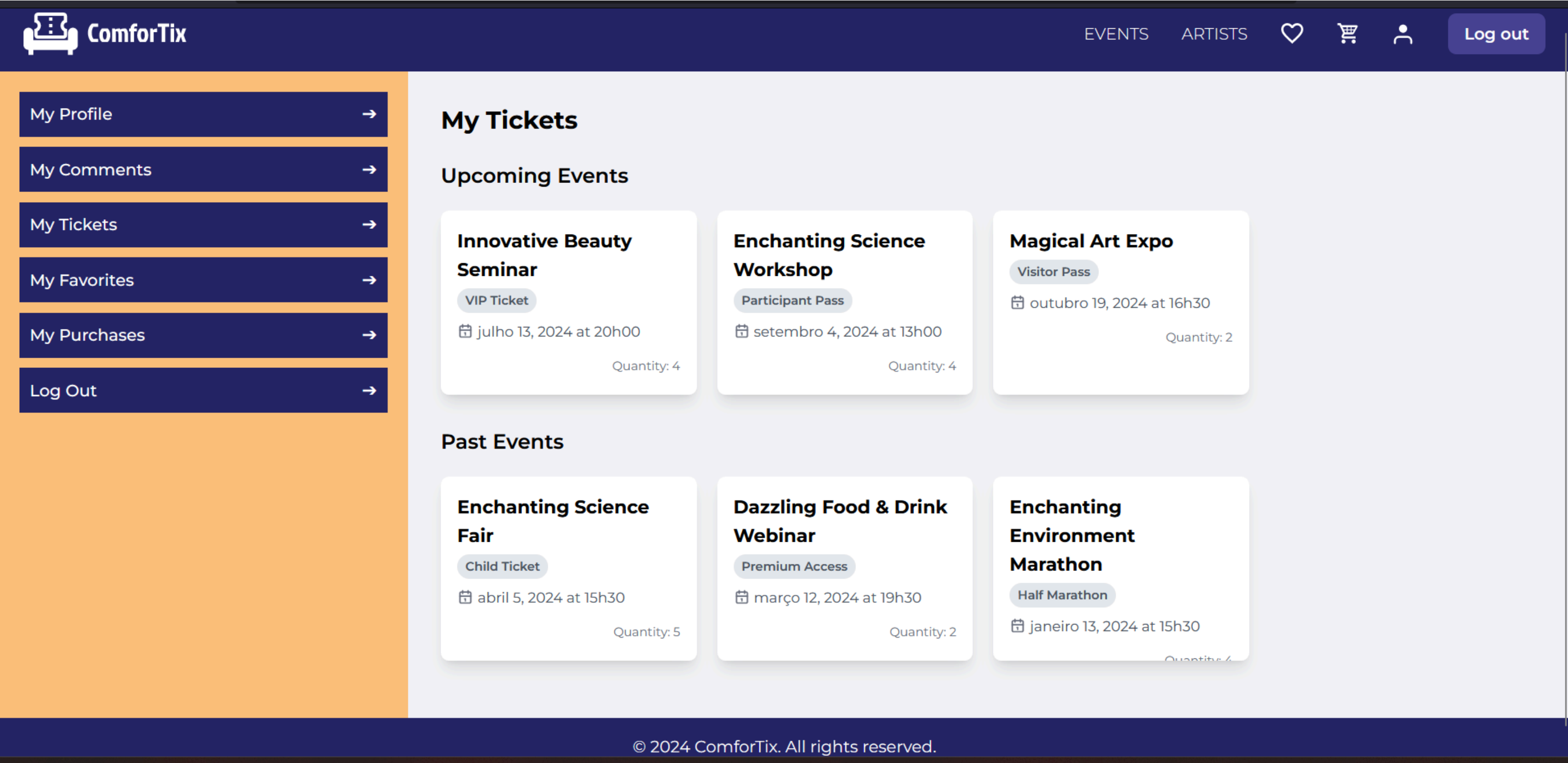
CONCEPTUAL DATA MODEL



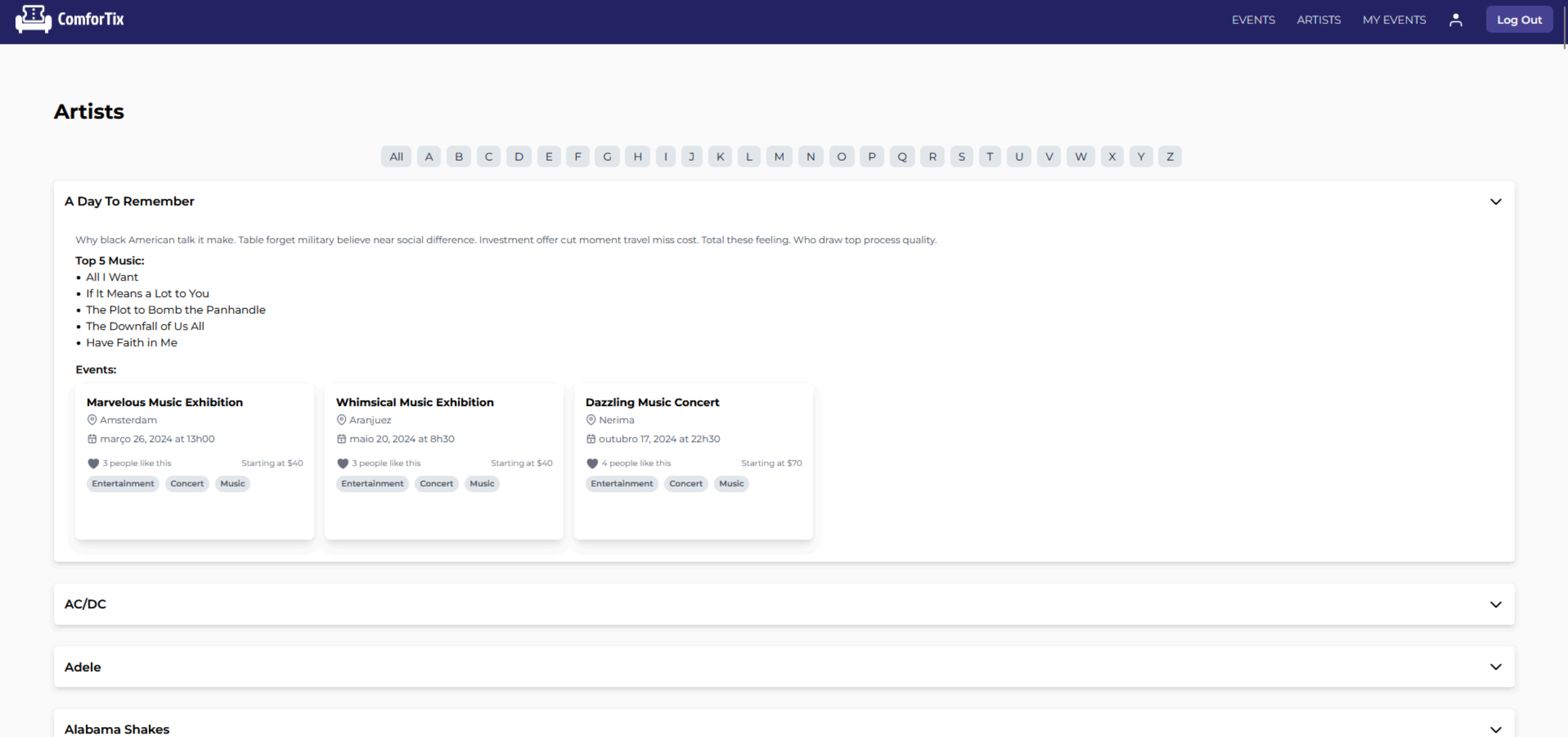
OVERVIEW OF THE PROTOTYPE - HOMEPAGE



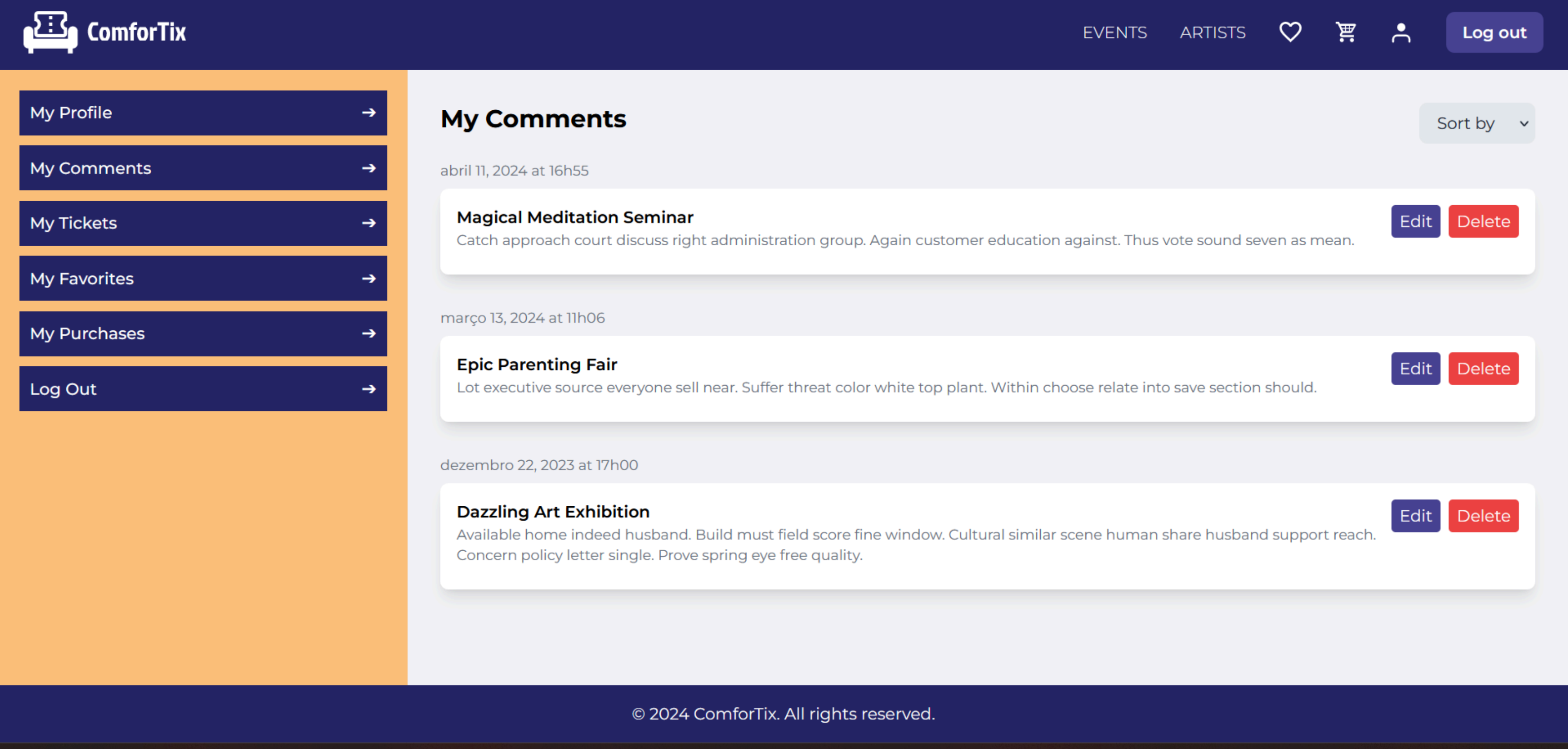
OVERVIEW OF THE PROTOTYPE - MY TICKETS




OVERVIEW OF THE PROTOTYPE - ARTISTS PAGE




OVERVIEW OF THE PROTOTYPE - MY COMMENTS



OVERVIEW OF THE PROTOTYPE - MY EVENT

ComforTix

EVENTSARTISTSMY EVENTSLog Out

Total Event Revenue

\$200

Revenue by Ticket Type

VIP Experience\$200

Standard Entry\$0

Total Number of Tickets Sold

2


Number of Tickets Sold by Ticket Type

VIP Experience2

Standard Entry0

Whimsical Gaming Exhibition

GamingVideo Games

 6 likes

Location: Dortmund | 464 Brown Springs South John, PW 29389

Date: julho 4, 2024 at 22h30

Step into a realm of artistic brilliance at our exhibition. Discover a diverse collection of works that will inspire, provoke thought, and ignite your imagination.

Ticket Types:

Standard Entry

\$40

VIP Experience

\$100

Comments:

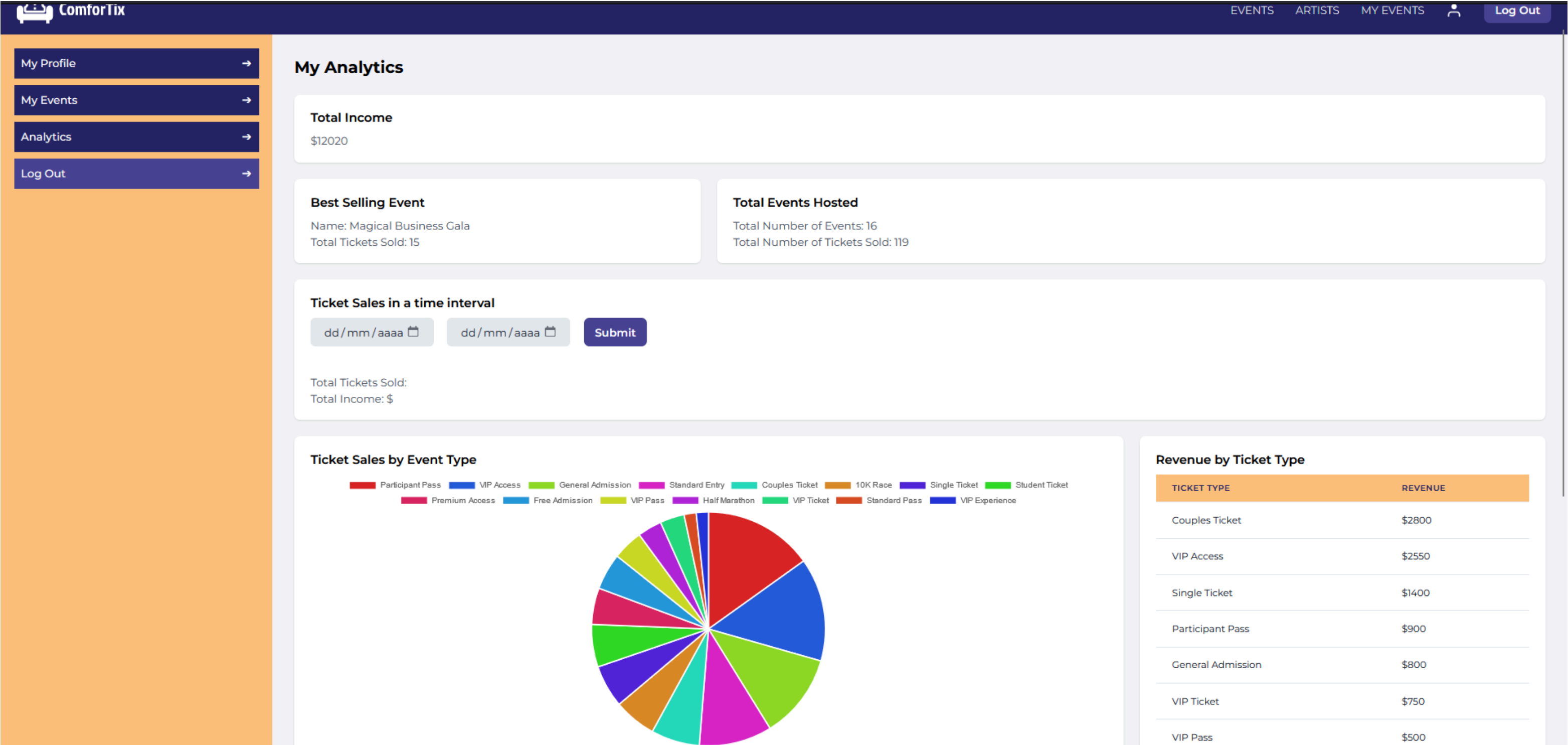
Carly Chung

dezembro 17, 2023 at 8h34

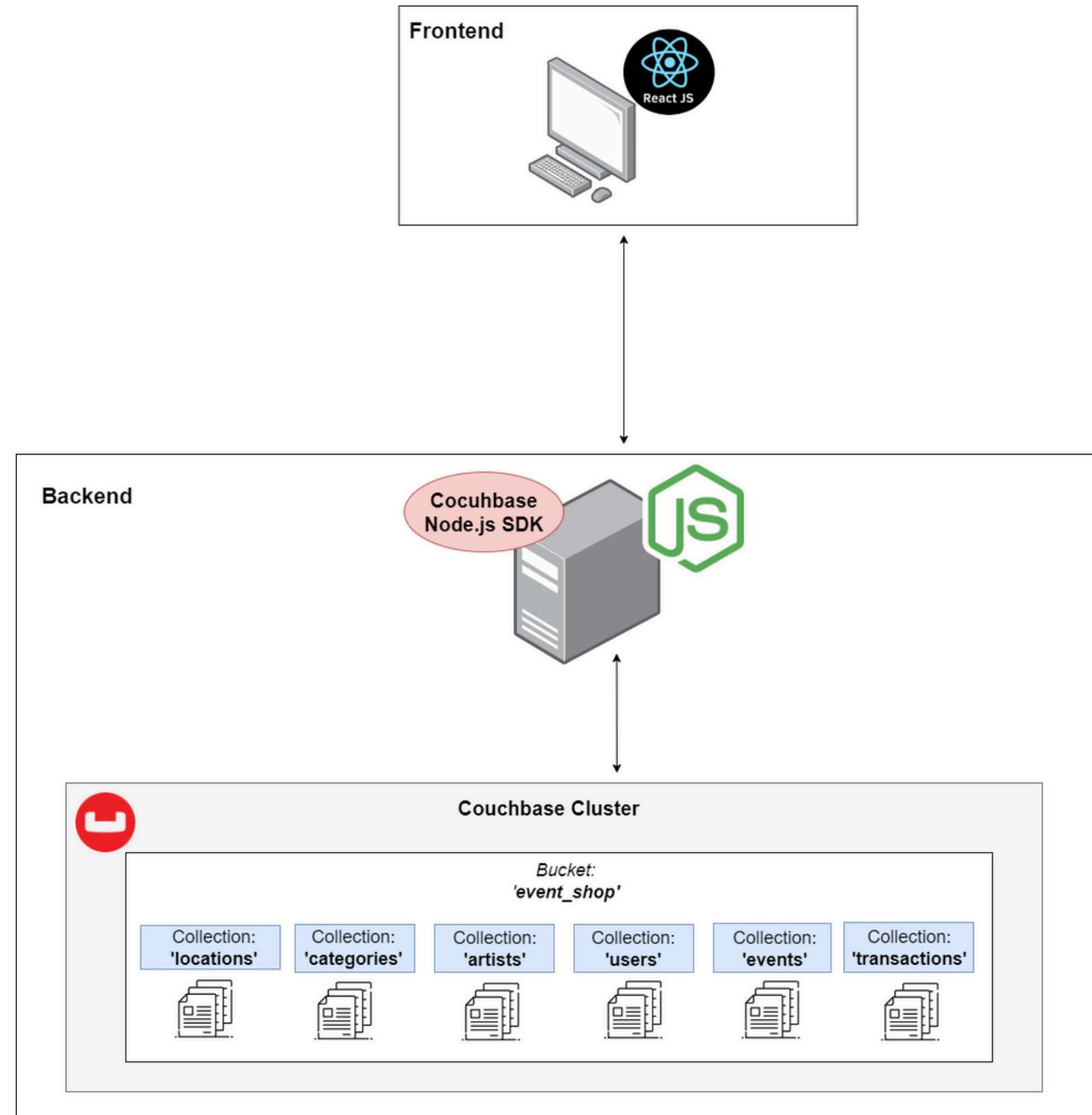
Visit arrive off. Play decide able spend seven. Our staff none light property environmental rate. Beyond court production item save.

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OVERVIEW OF THE PROTOTYPE - MY ANALYTICS



PHYSICAL DATA MODEL





DEMO



THANK YOU

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