

## Initial Ideation for a Peer-to-Peer Retail Application Database System

### Introduction:

My plan for the semester project is to construct a centralized peer-to-peer (P2P) retail database, such as one might find working behind the webpages of Ebay, Etsy, or Amazon. The final implementation of this database schema should facilitate a complete set of durable, secure, and efficient transactions and be capable of servicing a fully functional P2P marketplace retail model website. The database will support transactions between buyers and sellers (with a strong focus on sales, of course), while storing and manipulating user data to fulfill support the roles of each user. An interesting extension to this project idea may include research on NoSQL databases and P2P distributed network data management systems. A rather fascinating area of research which addresses the fundamental scalability problem posed by conventional relational database systems.

### Motivation for the Database Design:

The rapid expansion of online P2P marketplaces appears to have given rise to a fascinating area of research involving P2P distributed networks. A subject that appears to have the potential to solve the fundamental data scalability problem once and for all. For more information on this topic, please visit the following URL: [<https://www.cs.utexas.edu/users/browne/CS395Tf2002/Papers/peerdb.pdf>]

**P2P Mobile Networks** appear to offer a promising model for servicing the seemingly endless demand for more efficient, more durable, more scalable, and more robust data storage systems. Computer Science departments of major universities, including Texas A&M, the University of Illinois Chicago, and several others have made active contributions to this area of research within the past year, making this a fascinating area of research that I would like to somehow incorporate into the design of my project.

### Relations and Data Sources for the Database Project:

A wide variety of functional database schemas have been developed to support the P2P online marketplace model, any of which may serve as a foundation for the development of a more customized database solution. Database schemas utilizing both conventional SQL and NoSQL database services (with an apparent preference for the later) have been published with palpable fervor in the last five years or so. Large amounts of test data can be found online, provided by resources made available in the form of web server APIs, academic research articles, and GitHub public repositories.

The relation attributes of the P2P marketplace model appear to involve large quantities of volatile user data (many sellers modify their product listings all day!). These databases are also likely to experience high levels of traffic volume, in addition to abrupt changes in demand throughout a 24-hour period.

Achieving a database model with the necessary functionality and the desired ACID properties is likely to be a daunting task, given all the details that need to be maintained by such a system. As a result, I will most likely base the design of my project on the more effective NoSQL P2P models that I discover during

my next round of research. As a starting point for the development of my relational database schema and E/R diagram, please see figure 1 (below).

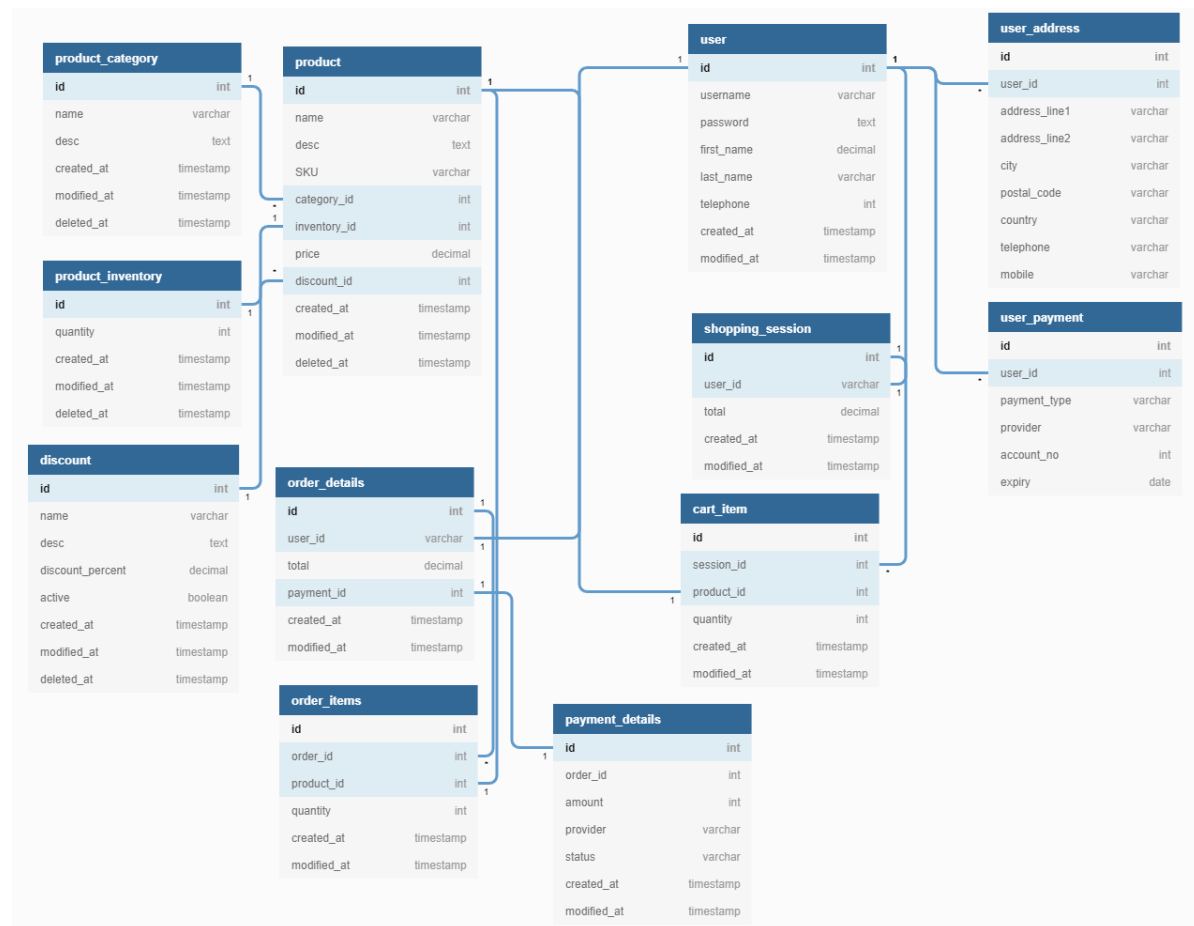


Figure 1.) An example of a relational database schema for the P2P marketplace business model. Subtype categories “buyer” and “seller” will belong to the “user” super-type (shown above). Users will also need to complete transactions within the service interface itself to maintain their respective user contracts with the service itself. Source: <https://fabric.inc/blog/ecommerce-database-design-example/>

### Description and Justification of Platforms for the Creation, Querying, and Presentation of Data

NoSQL databases appear to have taken the lead over more traditional SQL relational database models in most ecommerce platforms. This appears to be happening for one simple reason: **SCALABILITY**. Although we have not yet covered the topic of NoSQL in this course, a single look at a developer job board will demonstrate the demand for professionals with experience using NoSQL database services. This, in addition to the concern of scalability, form my primary justifications for choosing a NoSQL service for my database design.

### Desired Learning Outcomes for the Database Project

A primary learning outcome of this project for me will include developing an understanding of at least one NoSQL database product. The benefits and tradeoffs (not to mention learning curve) associated

with NoSQL database vendors is a subject that deserves careful consideration. As such, I have not decided on a particular vendor at the moment (but I am working on it!). In the early stages of the project, my primary focus will be refining the necessary relations and transactions implicit in the P2P marketplace model and finding data to load and test my database with.

#### Meeting the Learning Objectives for the Database Project

I will need to perform a great deal of research on the prevailing database models of P2P marketplaces, including the primary concerns among leading industry professionals. This research will involve reading and learning about various takes on the current market trends. I will also need to research NoSQL vendors to learn more about the pros and cons of each of the publicly available NoSQL services.