Database System Development and Implementation Plan

Version 1.0: [ENTER DATE]
Presented by: [STUDENT NAME]

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1. Database System Overview

The following assignment is meant to detail the development and implementation of a purposeful database management system at an example company of our choice. The understand if that the criteria of the weekly assignments to follow for our example company need to meet similar rationale to the problem-based learning scenario in each submission. For the purposes of this I will be working with a theoretical small business retail operation. The company is a niche tabletop gaming and comix shop that is looking to expand operations in their 2 locations to involve more interactive opportunities, tournaments and move some of the supportive materials for these events and clientele to the online marketplace for the company. This involves improving their current database management system and development of an online marketplace with core products available for the MVP (minimum viable product) release. The goal being to expand benefits of these improvements substantially in the future.

1.1. General Business Environment

RPGE+ (Role Playing Games Emporium PLUS) has become an adventurous financial venture for the local community. The company started from a group of tabletop gamers that kept in touch as they pursued careers in a variety of fields. This group came back together in 2017 to start the organization and opened their first retail store that January. Starting with sales of tabletop role playing games, various classic and modern board games as well as collectable card games, RPGE+ has increased their clientele significantly and have financially achieved the ability to expand in their community to another densely populated metro area approximately 50 miles away. Both locations each have an operating team of 10 staff, 4 assistant managers, 1 store manager and a shared general manager. Overseeing these

retail operations are a core team of 5 stakeholder senior managers handling: Finance, Human Resources, Executive, Operations and Technology.

The company operates on relatively newer Point of Sale (POS) technology, a state of the art Chronos time management system and have a relatively decent HR system all integrated into their main servers. But as the operation has expanded, they realized they are struggling with the following areas:

- Customer Management

- Inventory Control

- System Documentation

- Lack of Online Capabilities

- Lack of Events Management

We understand that the improved Customer Management system will allow opportunities to start offering membership which improves marketing opportunities and opens the company up to start hosting membership only events at their facilities and gaming conventions. Improving the Inventory control system will ensure optimal stock of all products as well as automate the reordering process. Providing system documentation will help baseline what the system capabilities are and what the expected thresholds are should we need to improve capabilities in the future.

Where we lack but have heard great desire from our customers is the ability to bring live events to our storefronts daily and larger events for bigger conventions. We believe implementing an events management and registration system will give us greater opportunities to bring in existing and new customers with specific targeted marketing campaigns for theme nights and gaming experiences. In support of this, we also want to

expand our operations to the online marketplace. Many customers have expressed a desire to order materials online in advance of attending any events at our retail locations and major conventions.

1.2. Database System Goals and Objectives

"Database management system (DBMS) consists of a collection of interrelated data and a set of programs to access that data. The collection data is usually referred to as data base which contains information about one particular enterprise. The primary goal of a DBMS is to provide an environment that is both convenient and efficient to use in retrieving and storing data base information. The DBMS is the interface between the user of application programs on one hand and the data base on the other." (Your Article Library, n.d.) For our specific delivery we are looking to improve out database management system to support the following:

- Enhanced customer management system

- Implementing a membership options program

- Protecting customer data in line with privacy regulations for retail operations

- Build out the system to improve opportunities for scalability and growth

- Incorporate interfaces and applications to support online shopping cart software

- Improve the accuracy of the inventory management system

- Improve and automate the replenishment and ordering processes

- Expand capabilities to support events management and registration for members

- Improve system integrity making our data authentic, consistent and accurate

1.3. Identified Problem Statement and How Solution Aims to Resolve

RPGE+ has expanded their operations and customer base to the point they are seeing

many returning customers and a desire to expand operations even further to support local

events. Simultaneously, it has been identified that the existing database management system

is not necessarily supportive of moving operations to an online market in addition to the

retail operations. The solution is meant to solve for multiple issues that will ultimately build a

better operating system to support increased opportunities, better inventory management,

events planning and delivery as well as an improved customer system that can support

building and implementing a membership perks program.

1.4. Mission Statement Strategic Goals & How the Solution Aligns with Them

RPGE+ is a customer-centric organization that relies heavily on good word of mouth and

continuous engaged clientele bringing in the right consumers for the products offered. The

organization has realized what it needs to achieve to reach the next level in their evolution.

The solution will help frame the necessary components of the database management system

to support the effective improvements the company needs.

1.4.1. Mission of The Company

The high-level Mission of RPGE+ is to continuously engage the customer in new

and innovative ways that keep them returning for new and unique experiences. As a

company that has found great success in their particular market, now they want to be

industry leaders showing a well-organized and efficient approach to managing events,

retail functions and day-to-day operations. RPGE+ aims to continue to grow within their

communities and build opportunities to expand further to new exciting markets.

1.4.2.   Goals of the Company

RPGE+ wants to start offering an online registration management system that can be used by the customer and store staff to schedule and manage local events at both retail locations. To take advantage of this system and register, we also need to implement a customer registration system where we can now offer a membership perks program and tiered offerings for VIP clientele. We have a goal to show we have high return rate for our consumers and want to prove (through a variety of marketing efforts and events) that we aim to have 25% of our customers return more than twice every 60 days. We want to improve our sale add-on rates by 15% each quarter by offering items that are more appropriately related and available both in store and online. Finally, we want to fully automate our inventory management system so we can have low/no touch required on reordering and ensuring all stock remains available to our consumers.

1.5. Analysis: Fulfillment of the Mission and Goals of the Organization

In the Problem Based Learning scenario, the company is aiming to; improve their back office systems, improve automation opportunities of back office operations and systems management, increase focus on customer satisfaction and reduce employee turnover by making it easier and more efficient for the team to do their jobs. I fully believe the criteria I've established above also accomplishes the same or similar goals and objectives for my example company; RPGE+. As future IP submissions address additional components of this, it is my aim the each of the goals will be addressed and shown as possible to accomplish through the database systems development and implementation plan.

2. Entity Relationship Model

2.1. Business Rules Enforced by Proposed DBMS

- A Customer will be uniquely linked to a single Membership ID

- One or more customers can have the same location/address

- Memberships can be enabled for one or more Promotions simultaneously

- Memberships will be required to be able to attend Events

- Events will track attendees by Membership ID.

- Events can offer one or more Promotions

- Events will Occur at a single Location

- Events will be sponsored by a Single Store

- Stores will be recognized as a single unique location

- An Employee is associated with a single store as their primary location

- One or more employees can have the same location/address

- An Employee Type can be either: Associate, Assistant Manager, Manager or Store Manager

- Products can have more than one promotion active simultaneously

- Products will be required to have: Product Name, Product Category, Reorder Quantity and Reorder Threshold set when entering into the system.

- A Product can only exist in a single category.

- Orders can have zero or more Memberships (purchases by non-members allowed).

- Orders must be associated to a single Store

- Orders will be entered by a single Employee

- Orders must contain one or more products.

2.2. Entitles, Attributes, Relationships & Cardinality Constraints

Entities (Tables)	Attributes (Rows)	Relationships	Cardinality Constraints
Customers	CustomerID (PK) (Char10)	Has Membership	1:1
	Customer Name (Varchar50)		
	LocationID (Char10)	Has a Location	1:Many
	MembershipID (Char10)	Directly associated to Unique Customer	1:1
	Contact eMail (VarChar200)		
	Contact Phone (Int)		
Store	StoreID (Char10)	Can Sponsor Events Can Create Orders Has a Location Has Employees	1:Many 1:Many 1:1 1:Many
	Store Name (Varchar50)		
	LocationID (Char10)	Has a Location	1:1
	OpenTimes (Varchar500)		
Employee	EmployeeID (Char10)	Associated to a Store Can Create Orders	1:1 1:Many
	Employee Type (Varchar25)		
	Employee Name (Varchar50)		
	LocationID (Char10)	Has a Location	One Location may have multiple Employees
	StoreID (Char10)	Is associated to a Store	1:1
	PayRate (Decimal 8,2)		
	Pay Frequency (Varchar20)		
Membership	MembershipID (Char10)	Requires a Customer Registers at Events Can receive Promotions	1:1 1:Many 1:Many
	Membership Type (Varchar50)		
	Membership Tier (Char2)		
	CustomerID (Char10)	Has Membership	1:1
	EventID (Char10)	Membership Required to Register	1:Many
	Total Spent (Decimal 10,2)		

Entities (Tables)	Attributes (Rows)	Relationships	Cardinality Constraints
	PromotionID (Char10)	Can have multiple Promotions	1:Many
Orders	OrderID (Char10)	Associated to a Store	1:1
		Initiated by Employee	1:1
		Can have Promotions	1:Many
		Can have Memberships	1:1
		Must have Products	1:Many
	Transaction Date (Date)		
	MembershipID (Char10)	Can have Membership	1:1
	StoreID (Char10)	Associated to Store	1:1
	EmployeeID (Char10)	Employee initiates Sale	1:1
	Total Sale (Decimal 10,2)		
	Sales Tax (Decimal 5,2)		
	PrmotionID (Char10)	Can have Promotions	1:Many
	ProductID (Char10)	Must have Products	1:Many
Promotions	PromotionID (Char10)	Can be associated to Memberships	1:Many
		Can be Associated to Events	1:Many
		Can be Associated to Products Directly	1:Many
	Promotion Name (Varchar200)		
	Promotion Type (Varchar50)		
	Discount (Decimal 5,2)		
	Date Start (Date)		
	Date End (Date)		
Products	ProductID (Char10)	May have Promotions	1:Many
	Product Name (Varchar200)		
	Product Brand (Varchar100)		
	Product Category (Varchar 50)		
	Description (Varchar2500)		
	Count Available (Int)		
	Reorder Threshold (Int)		
	Reorder Quantity (Int)		
	PromotionID (Char10)	Can have more than 1 simultaneously	1:Many
Events	EventID (Char10)	Is associated with a Store	1:1

Entities (Tables)	Attributes (Rows)	Relationships	Cardinality Constraints
		Requires Membership to Attend	1:Many
		Performed at Location	1:1
	Event Name (Varchar200)		
	Event Description (Varchar2500)		
	Event Date (Date)		
	Attendee Cap (Int)		
	MembershipID (Char10)	Defines Allowed Attendees	1:Many
	Count of Attendees (Int)		
	PromotionID (Char10)	Can have Promotions	1:Zero or More
	LocationID (Char10)	Performed at Location	1:1
	StoreID (Char10)	Owned by Store	1:1
Location	LocationID (Char10)	Is associated to Customers	1:Many
		Is Associated to Employees	1:Many
		Is Associated to Stores	1:1
		Is Associated to Events	1:Many
	Address Line 1 (Varchar150)		
	Address Line 2 (Varchar150)		
	City (Varchar50)		
	State (Char2)		
	Zip Code (Char5)		
	County (Varchar50)		
	Country (Varchar50)		

2.3. Entity Relationship Diagram
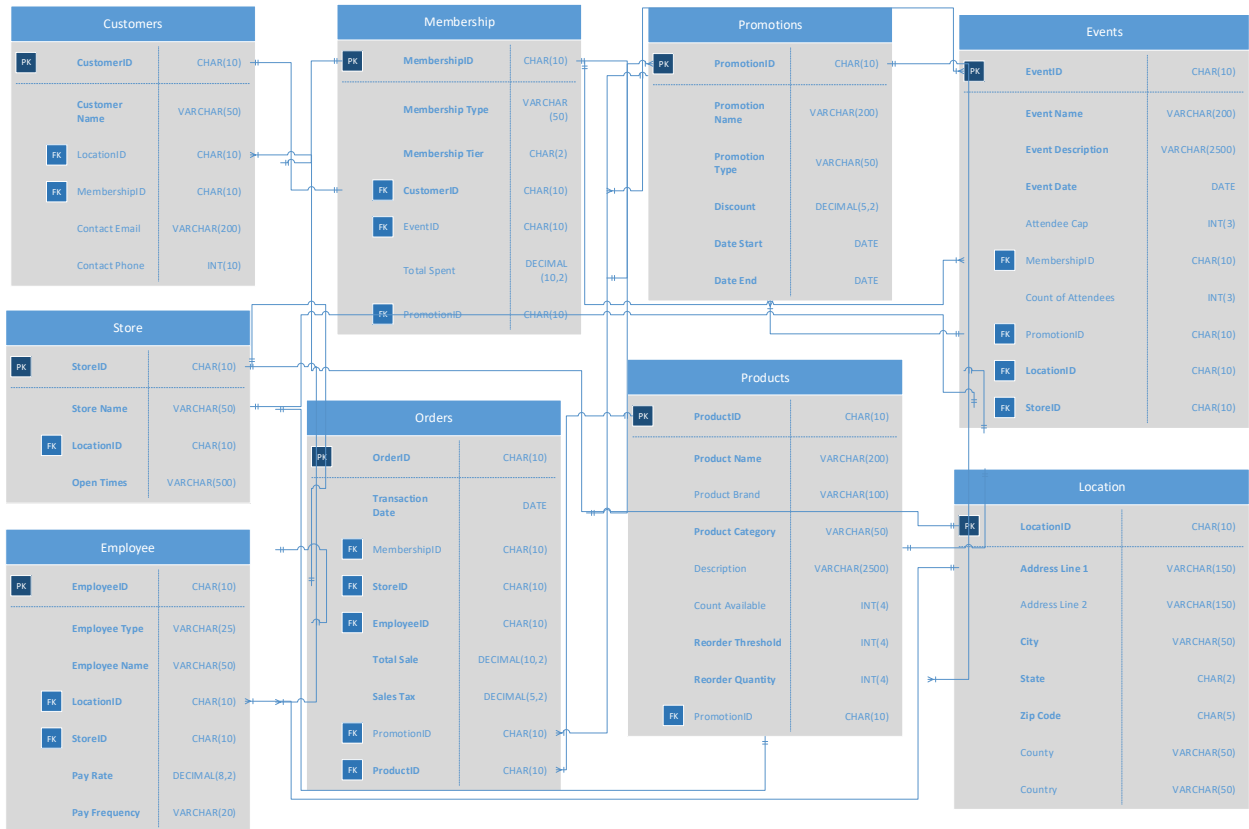
Attached for easier Reading

IP2_ER_Diagram.vsd
x

2.4. Analysis on Fulfillment of Mission and Goals of Case Study Organization

The specific goal of this week's update to the project was to effectively document the

relational database for the proposed solution. This required diving in to an Entity

Relationship Diagram model and providing context to the tables and columns down to third

normal form (3NF). Before we can get there, we need to get past first and second normal

form. Above first normal form would have required database tables without repeating columns or sub-columns. Start here by creating unique fields and keys. Next, Second Normal form is where "all the non-key columns are dependent on the table's primary key". (EssentialSQL, n.d.). Basically, on the customer table, fields that are not related foreign keys to other tables should be fields directly related to the unique CustomerID. In each of our tables, fields not identified by Primary or Foreign key should be directly related to that table defined. A great example of this is in the location table. All fields in the location table are geolocation fields and are not listed in other tables. They specifically apply to the LocationID.

Third Normal Form (3NF) happens when your tables are all at least in Second Normal Form state and contains columns that are not directly dependent on other columns in the table aside from or through the primary key. This means when the first column after the primary key relies on the value of the primary key and another column in the table also relies on the primary key, that is expected. But you should not be able to say that the first column is reliant on the primary key through the second column. To be non-transitively dependent that means that all columns only depend on the primary key and nothing else in the table.

As for the mission of the company, this helps them establish their database structure to facilitate and document events and the registration of events now also tied to membership. They can now better promote their membership system and keep better track of promotions and apply these uniquely across both retail locations. While this doesn't answer the entire solution for online sales just yet, it helps establish a working foundation for the retail side of the house that can be easily adapted for online sales.

3. Structured Query Language (SQL) Scripts

3.1. DDL SQL – Create & Insert Statements

Create DDL

CS660_IP3_DDL_Cre
ate.sql

Insert DML

CS660_IP3_DML_Ins
ert.sql

3.2. DML SQL – Delete & Update Statements

Update & Delete DML

CS660_IP3_DML_Del
ete_Update.sql

3.3. REPORT SQL – Select, Crosstab & Aggregate Function Statements

CS660_IP3_Reportin
g_Queries.sql

3.4. Analysis: How This Fulfills the Case Study Organization Mission & Goals

This week we have been tasked with exploring the functions of SQL and the ability to build our example organization's database to support the mission and goals of the company. Because of the investment in the quantity of tables and the type of data, this was an extremely large task to complete in a week. What I found myself doing was overanalyzing and refactoring my database after I came up with more queries that I would consider providing better data integrity in reporting. One of the things that caught my attention, having experience in viewing sales databases is the face that each table I created I could have expanded the columns exponentially to provide a more substantive amount of data.

Two major mission objectives the company wanted to improve on was Customer Management and inventory control. There needed to be an improved automated process to identify when inventory was falling close to or below the reorder threshold. As the company works to expand further, they will be working to find additional ways they can automate reporting of their new database to better support their customers and ensure they have all the high demand products available as often as possible.

Of all the tables, there was one that I created that didn't require 20 records. That was the store table. There are only 2 locations in my organization and adding in 18 unnecessary placeholder records would not work out well. On the other hand, due to the ability to track locations of offices, customers and employees in a single table, the locations table doubled in count compared to the rest. All in all, this database is a good start and I have a feeling it will be improved slightly before the final submission to incorporate a wide variety of reporting factored into the data collected.

4. Database Administration

Customer data is and the ability to convey a sense of safety, security and integrity is critical to the success of your business in the eyes of the customer whose data you are in possession of. For this section, the organization wants to address concepts and processes that will yield an optimal level of structure to the new proposed database solution. We are operating on a series of assumptions;

- The highest volume of orders typically occurs during midday (both online in the future and store)

- We are going to hire a single database administrator/owner to address these functions.

- We need to implement a standard backup procedure to save data and reduce data loss.

- Data Recovery needs to be as of last transaction.

- Uptime is expected to be continuous (no downtime) and support to staff this needs to be established.

- The database needs to be created to support future online transactions.

Over the course of this next few pages I will be expressing the plan for addressing; Database Administration, Transaction Management, Database Security and the Backup and Recovery model we intend to implement. Handling all of these will bring our data base management operations up to code and operationally efficient. "Before a newly installed DBMS can be used effectively, standards and procedures must be developed for database usage. Studies have shown that companies with high levels of standardization reduce the cost of supporting end users by as much as 35 percent or more as compared to companies with low levels of standardization." (InformIT, November 7, 2012).

4.1. Database Administration Plan

The first step of the Database Administration plan is understanding all the components we need to have managed. We will then be hiring a Database Administrator that will also act as the Database Owner in implementing and managing all the identified components. In our research we have identified the following qualities as needs for this role to own/manage:

- Installing Software

- Configuring Database Servers

- Managing and Monitoring System Operability, Health and Security

- Designing Efficient Backup Processes for The Servers and Associated Data

- Creation and Management of Accounts for Users at Various System Security Levels

- Document and Implementation of Disaster Recovery Protcols

- Establishment of End to End Tech Support and Resolutions

- Scheduling and Handling Routine Server Maintenance

- Creation of Data and Database Management Procedures and Standards

- Continuous Evaluation of Data Analysis and Procedures for Efficiency, Practicality, Integrity and Security.

- Develop Cross-Training Guides to Ensure Standard Practices Can be Adhered to By Everyone Involved with the Database both current and potentially new hires.

Once we have identified the needs of the role, and hired for the position, we need to start practices to build the database to the needs and requirements of the organization then normalizing the data to make it fit for use/purpose. Before we begin implementing new hardware and software, we want this new database administrator role to participate in development of the plan and communication standards for this process. One major issue we

need to address is a standard communications management plan. Having the organization on the same page will drive efficiency practices and support the highest possible up-time of this new system.

We expect this new role to be able to identify and define the following standards and procedures within the first 45 days of the engagement. The days following that 45 days will be the practical implementation of the following standards and guidelines:

- Statement of Intent Regarding Organizations Policies around Data, Data Management and Importance to the company

- Data Ownership/Stewardship Guidelines

- Rules for Data Creation, Updating, Deleting and overall Management.

- Logical & Physical Data Models and Guidelines Around Maintenance of the Models.

- A Goals Statement Regarding Establishment, Development and Maintenance of an Enterprise Data Model.

- Data Sharing Policies Across the Organization

- Documentation for Data Analysis, Thresholds, Expectations, Standard Operating Procedures for Handling Data falling out of expectations.

- Communication Guidelines between Database Administration and Operations to Ensure Effective Database Management Procedures and Operations.

4.2. Transaction Management Plan

"A transaction is one or more SQL statements that make up a unit of work performed against the database, and either all the statements in a transaction are committed as a unit or

all the statements are rolled back as a unit. This unit of work typically satisfies a user request

and ensures data integrity." (TechTarget, July 27, 2009)
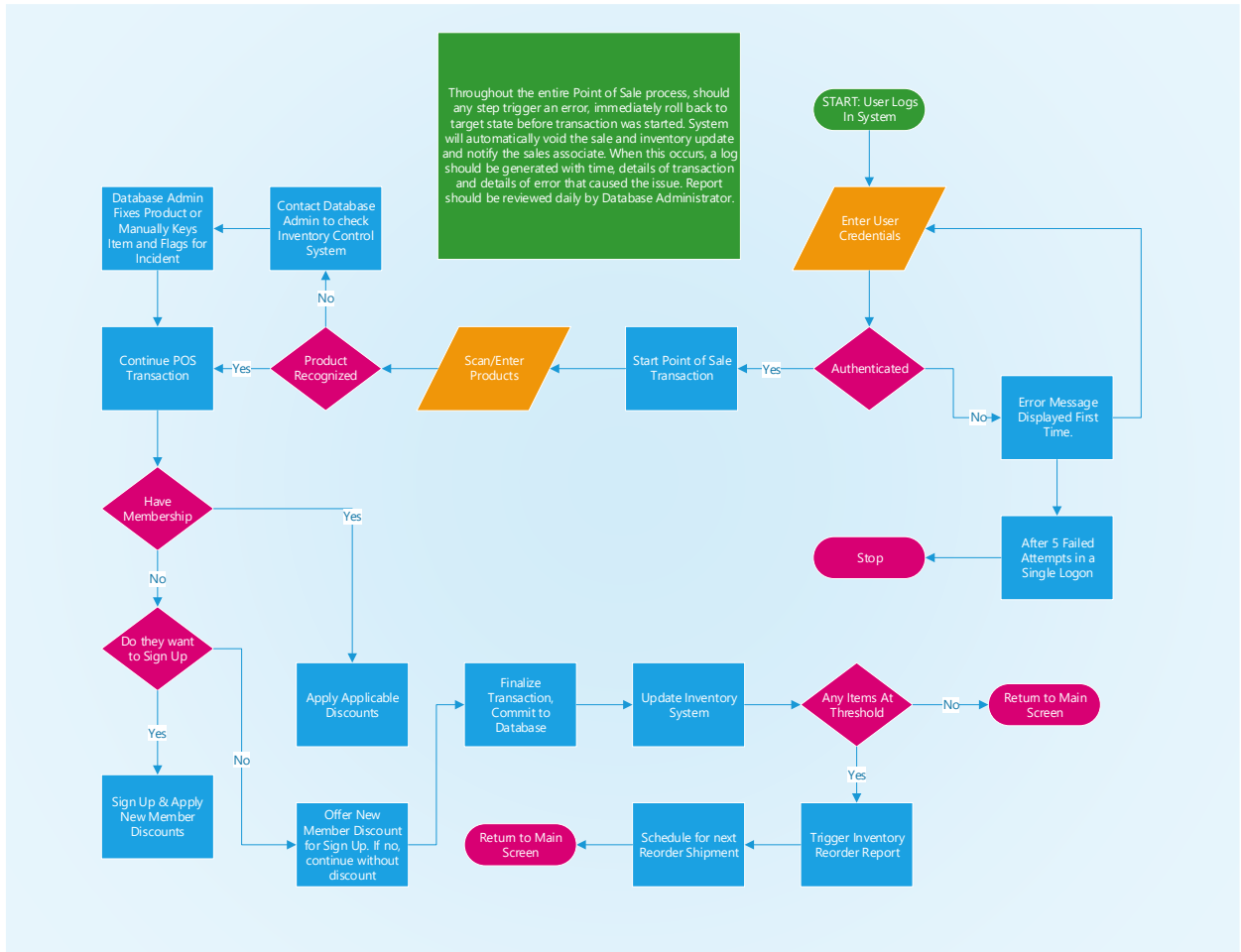
To ensure this Transaction Flow Diagram can be read, The following is the attachment of the

above diagram:

IP4_Transaction_Ma
nagement.vsdx

4.3. Database Security Procedure

When working with Customer data, database security is of the upmost importance. As

part of the initial phase of this new Database Management System, we are focusing heavily

on our internal system users to make sure the right people have the proper level of access to be able to perform their job well and not unnecessarily influence other components or back end procedures they should not be impacting. In order to handle this correctly, we need to implement access control methods to our system (both Point of Sale and Back End). We will be implementing a Role Base Access Control system. The Database Administrator will oversee this implementation. What this will do is give everyone in the company the ability to log on to their own station or log into a station with their own credentials and have their work session managed completely within their own session and authenticated on the machine they are operating. Based on your role, on login you will be presented with the applicable level of options you can perform. These will be managed in the Active Directory for the system.

Authentication will be Username and Password. We are not using multifactor authentication in the early stages, but this will be pursued in the future as we expand to web sales and more retail operations. Password will require strict rules and be something that the Database Administrator will define requirements around. "Strong passwords in the database are enforced when technically possible, and database passwords are encrypted when stored in the database or transmitted over the network." (UC Berkley, n.d.). System up-time should be minimally operating hours of the store and optimally 24/7. For that to be possible we want to operate on more than 1 node and server. When one server is going through maintenance procedures, the other remains active. Should the active server start to show warning signs of degradation, the Database Admin has the right to invoke procedures for cutting over to the optimized inactive node. The procedure should appear seamless to the front end and allow for triage of the former active system. Both systems should maintain realtime transaction

processing and backup to one another to ensure last transaction is the most current should a rollback be required.

4.4. Backup Plan & Recovery Model

"One of the key responsibilities of a database administrator (DBA) is to prepare for the possibility of media, hardware and software failure as well as to recover databases during a disaster. Should any of these failures occur, the major objective is to ensure that the database is available to users within an acceptable time period, while ensuring that there is no loss of data." (ISACA, 2012)

The Database Administrator will need to provide a plan that identifies:

- Which data is required to be backed up?

- What is the appropriate backup type to use?

- What is the strategy for handling the backup?

- What is the appropriate schedule and window backups will occur within?

- Where are backups and their logs stored?

- What is the retention policy for backups?

There is an explicit goal to automate as much of the backup process as possible. Backups need to be continually tested throughout the process and monitored for any disconnect to the process. Validation points should be established throughout to ensure data integrity. Backups should provide a comprehensive log indicating any variance from expected values that are determined by the DBA. "The DBA team must draft a backup and recovery SLA, covering details of backup procedures and including a timeline for recovery, and have management sign off on it. The SLA does not assist in the recovery process itself but sets the user

community's (and management's) expectations for the recovery process, which may provide the team more time to complete the restore process." (IASCA, 2012).

4.5. Analysis: How this section fulfills Mission and Goals of the Organization.

For this fourth week of the assignment the focus was on management of the database from the role of the database Administrator. Before you can define what the role needs to be able to do, you need to evaluate the goals and objectives of the company as it relates to the system operations. In the past 3 weeks we have identified quite a few business goals, this week now ties that to supportive system-based goals that support the system demands from the business side. One critical mission component the company has with this implementation is the management of data around customers and their memberships. By working towards tuning the database to support heightened security around customer data and locking down access controls around this, you are providing a level of integrity to the customer that their data is more secure. Invoking the DBA role to manage controls around system standards and operating procedures to guarantee the system up-time also starts to build a better case for starting to support online sales as well. Having a well-functioning database and operational procedures allows the company to grow significantly. This very effectively aligns with the goals established the first three weeks.

5. Future Database System Implementation Plan

5.1. Difference Between Object-Oriented/Relational and Web Based Database Systems

Measure	Relational DBMS	Object Oriented DBMS
Data Storage	Entities defined as Tables	Objects
Complexity of Data	Handles More Simple Data	Handles More Complex Data
Data Handling	Only Stores Data	Stores Data and How to Use It
Primary Objective	Data Remains Independent from Applications	Data is Encapsulated
Key	Primary Key is the unique identifier for an item in a table	"Object Identifier (OID) is an unambiguous, long-term name for any type of object or entity." (GeeksForGeeks, n.d.)

There are many identifiable differences that distinctively explain Object Oriented Database Management Systems and Relational Database Management Systems. The fundamental differential measures are explained above. Relational databases are more akin to using coding languages that many are familiar with such as SQL. If you've worked in an Information Technology Role, you have likely crossed paths with one or more RDBMS's.

Object Oriented DBMS's are meant for much more complex data organization and storage. An ODBMS is meant to facilitate concepts such as:

- classes of objects – Class in ODBMS refers to a collective grouping of elements that share a common definition. The values are the different instances that fall within the common definition.

- object identity – "Identity is a property of an object that distinguishes the object from all other objects in the application." (Khoshafian S, Abnous R, 1990)

- polymorphism – Greek for "having multiple forms" this refers to the ability for the data element to be able to exist under multiple formats as long as the application sourcing the information can derive the appropriate usage and format of the data.

- Encapsulation – This refers to processing and functional behavior being grouped with the object. This means the data and the code to process the data are packaged together.

- Inheritance – This term applies to an object hierarchy where a lower object can access (or inherit) the data class behaviors that exist above it within the hierarchy.

When you also take into account Web Based DBMS's, you have another set of options that may work for your business. "Web-based Database management system is used to handle those databases that are having data regarding E-commerce, E-business, Blog, e-mail and other online applications." (W3 Schools, n.d.). Web Based DBMS's are more open and flexible with a wide variety of object structures. Whereas RDBMS and OODBMS are typically (though not always) defined and hardware driven on premise are various locations for an organization, Web Based DBMS offers more flexibility and opportunities to leverage more on demand cloud infrastructure where you pay for what you use. Most Web DBMS's are platform independent, easy to use and have unique graphical user interfaces (GUI's) allowing for quicker training and logical utilization for building and managing the database.

5.2. Changes Needed if Converting to Data Mart / Data Warehouse

Data Warehouses are an enterprise wide construct that is meant to help by separating the data from the operational components of a system. Data Marts are sub-systems of data within the Data Warehouse. Each Data Mart has some level of common differentiator that identifies where the data belongs and within which data mart among the data warehouse. Multiple independent database systems can be integrated through the concept of ETL (Extract, Transform, Load) to a Data Warehouse. There the operations are handled in the individual databases and through some level of processing are then integrated into the data warehouse and into appropriate data marts.

As the company continues to grow and expand into different retail locations and expand their web sales to larger markets and even expand globally in the distant future, it would make more sense to make sure system operations are more secure and maintained and backed up to a data warehouse for improved analytics and better management of integrated systems. Changes required would be to establish the formal data warehouse structure and how the data should be leveraged from the warehouse and marts themselves. Once that has been identified then the ETL process can be created to normalize and standardize the data. Finally, the independent source systems can be integrated into the Data Warehouse and Allocated to appropriate Data Marts. Regardless of which DBMS we select for our organization, it is possible for each to backup and integrate into a data warehouse with the right handling through ETL.

5.3. Considerations for Making Database Distributed

As ironic as this may sound, since we manage our operations and sales at the individual store level, we have always been operating in a distributed model. If we wish to continue this

model, more accountability and management of data will need to be standardized and
maintained at the individual store level while the processing and integration into the
Datawarehouse will need to be adhered to across the board at all sites. One major benefit to
having a distributed database system is that if one store fails, they all do not fail. This could
allow us to quarantine an issue, address and resolve it locally then bring the system back
online to the network.

5.4. Business Intelligence and How it Can Improve Decisions

Knowledge is power and businesses need to be aware of certain metrics to maintain any
level of consistency. When you work in an industry that is progressively evolving, data is
your greatest asset. The data you maintain in your company and how you use it to provide
informational reporting could drive future business direction or potentially stop a major issue
before it becomes too large. Business Intelligence can better align the highest up stakeholders
with the worker-bees that see what the company does on the day-to-day level. A great
example is; seeing how a product is selling for a particular demographic. Should a new
product come out that works well with or comparatively better than, you can structure your
plan for sales appropriately. Data of this magnitude can also be used to forecast future
business decisions based on previous patterns of customer behavior. In the retail sector, this
can be a most successful component to have in your company.

5.5. Data Warehousing Benefits

Data Warehousing itself has many beneficial components in larger organizations. One of
the first identifiable ones as mentioned previously is the ability to separate out the data from
the operations aspects of your organization. That allows for more comprehensive analytics

without impacting operations. This also helps facilitate a better backup and recovery plan should any portion of the operational model fail and require reload of data backed up to a point in time.

5.5.1.ROI on Business Intelligence Based Initiatives (3 Year Estimate)

Given that our retail operation is heavily watching their data to see what products sell better and to which demographic while also trying to promote an event based system that encourages more targeted shopping frequently, it is very clear what the goals we are aiming for could be in the next 1-3 years. We expect to see an increase in revenue 15-25% year over year. We also want to see memberships increase by 10% each month. That means for every sale, we want to have a membership associated with it ultimately. The goal at the 3-year mark would be to have 70% of sales be associated to a membership ID. This will also drive opportunities for events and potentially more retail locations to support the larger interactive membership base. By watching and evaluating our data and sales trends, we can continually model this and identify what we need to improve in to meet that goal.

5.5.2.Competitive Advantages

Another major goal we intend to leverage with our data warehousing and business intelligence is leveraging competitor based public information to better inform our own statistics as to what products and brands cater to which demographic better. Gaming is making an interesting comeback and there are many businesses catering to different styles and flavors of gaming. Our industry needs to know what are the trending companies working within our demographic ranges and we need to capitalize on new and innovative means for bringing in consumers to enjoy and purchase those products. While

we don't intent to knock out our competitors, we want to position ourselves as the primary option consumers choose if possible.

5.5.3. Increased Productivity of Decision Makers

Our stakeholders have been very informed and have always hit the ground running trying to understand what drives good business for this industry. By providing them improved metrics around our data they can make better calculated decisions that will drive the company to a better state for the future. By centralizing the data and building out better business intelligence with a specific target of getting that right level of statistics to our stakeholders, we can ensure that the company will continue to not only thrive but be on the forefront of the future of gaming and consumer needs.

5.6. Addressing Potential Future Data Warehousing Concerns

No matter how much you try you will always find something better or a missed opportunity you would like to integrate. The future of the company can only get better as the data improves as well. To better plan for that, I highly recommend incorporating budget into the whole process for continual reevaluation of the systems and data to see if we can leverage improvements. As we embark on improving our database management system, we need our new Database Admin role to really look at the most efficient ways to leverage continuous improvement.

5.6.1. Change in Requirements around Data Capture

Effective Requirements Elicitation is a very important skill in the early stages of this development effort. Post-production, if requirements change, there should be a process to handle these changes. A Submission process with the very specific changes,

acceptance criteria, details and identification of impacted systems is mandatory. Once received, the DBA should process this and assess length of time to develop the change in a lower environment. Once documented, share that with the stakeholder team to prioritize and see if/when/where this makes the most sense to build. Start build in a lower environment that has a mirror of production and test. Ensure the right data is there to facilitate testing. Move to a middle-tier platform and request the business review the improvements. The process should be aligned with typical release schedules and maintained as such. Instances of emergency fixes or security breaches should be prioritized and addressed accordingly.

5.6.2.Increased Demand for Disk Space & Resources

As the company expands and data capture is retained it will continually grow. As with requirements changes, this too should be anticipated. The process to increase/improve any facet of the data base operations and hardware should be clearly defined. Risks and environmental assessments should be reviewed iteratively for continuity. Effective monitoring and reporting should yield insights into this much earlier on. The DBA should know what effective thresholds are recommended to begin identifying when we need to have discussions around improving space and resources. The plan for addressing these changes should be called our very clearly in a communications strategy and database management document. Plans for increasing or managing disk space and resources will be evaluated every 3-6 months by the DBA and any process to review will be addressed by them.

5.6.3.Discovering Hidden Problems with Source Systems

If a problem is discovered, it's not technically hidden. It could be unanticipated and revealed over time but when that occurs, if the DBA has done their job effectively pre-production, there will be a process and detailed documentation that addresses how and what to do when hidden problems come to light. There should be a process documented for handling high priority issues in an efficient and effective manner. This too should also be called out in the communications management plan. The issue should be well documented including what occurred, what the anticipated results should have been and what the actual results were. As with the demand for resources and disk space, there should be an evaluation process with the applicable stakeholders that will evaluate the priority of the issue and how soon it should be resolved.

5.7. Analysis on How This Please Fulfills Mission and Goals of Case Study Organization

This final phase of the document takes all we have built and evaluates how best to implement and anticipate what could happen. After you go into production it's all about monitoring and control. Ensuring you have your data working effectively for you and you can utilize it to make beneficial decisions is a critical success factor. I believe for the case study organization I have evaluated all the necessary components and can move on to the presentation to propose improving their database management system.

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